

IWAKI

Self-priming Magnetic Drive Pump

SMX Series

Instruction Manual

 Read this manual before use of product

Thank you for selecting Iwaki's Self-priming Magnetic Drive Pump SMX Series. This instruction manual deals with "Important instructions", "Outline", "Installation", "Operation", and "Maintenance" for the SMX series pumps. Please read through this manual carefully to ensure the optimum performance, safety and service of your pump.

This instruction manual should be kept by each end user for a quick reference.

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

Important instructions

For the Safe and Correct Handling of the pump

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

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

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.

Safety Section

WARNING

- **Pay attention to the magnet field**

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, etc.



- Be sure to turn off all the related power supplies prior to any inspection/ maintenance and installation works. Working on the pump with power ON, any rotating part may catch the hand, finger, hair, or clothes, and it may result in serious injury.



- **Wear protective clothing**

When arranging piping or dismantling the pump, wear protective clothing such as eye protection, protective gloves etc.



- **Do not remodel pump**

Do not remodel the pump. We are not responsible for a personal injury or damage to the pump due to any modifications.



- **When handling dangerous liquid**

For the transfer of the dangerous liquids mentioned as below, be sure to conduct daily inspection and maintenance for the prevention of liquid/gas leakage or other related failure.

1. Explosive or flammable liquid
2. Corrosive or stimulus toxic liquid
3. Harmful liquid to human health

Pay extra attention. The front casing of the SMX has space where gas can stay.



Safety Section

CAUTION

- **Attention to magnetic force**

A pair of strong magnets is mounted in the pump and its magnet force may affect a magnetic disk or card. Do not bring these magnetic storage mediums close to the pump.



- **Restriction on pump operator**

The pump must be handled or operated by a qualified person with a full understanding of the pump.



- **For specified application only**

Use of the pump in any application other than those clearly specified may result in failure or damage to the pump.



- **Specified power only**

Do not apply the voltage which is not specified on the nameplate to the product. Otherwise damage or fire may result. Only the specified power source must be used.



- **Ventilation**

Poisoning may result when handling a toxic or odorous liquid. Ventilate the operating site sufficiently.



- **Countermeasure against efflux**

Take a protective measurement against the accidental efflux caused by pump or piping breakage. Also, take an appropriate measurement to prevent liquid flowed out from directly soaking into the ground.



- **Do not run pump dry**

Do not run pump dry (Operation without liquid). Rubbing generates heat in the dry running and causes the pump damage. If the pump is operated with a suction side valve closed, the pump runs dry.



- **Do not bring the pump close to any inflammables**

Keep the pump away from any inflammables for the prevention of fire.



- **Unpacking**

Before unpacking, check the package is not put upside down. Take care not to be scratched by a nail or a piece of wood at unpackage.



Safety Section

CAUTION

- **Do not lift the pump by gripping any plastic parts (such as the case, flange, or base).**

Do not lift the pump by gripping a plastic part. The pump can drop unintentionally as the parts break and it may result in serious injury.



- **Do not stand on the pump**

Do not stand on the pump as a step.



- **Do not touch the pump.**

Do not touch the pump or piping with bare hands right after the pump is transferring a hot liquid. Surface temperature is hot.



- **Earthing**

Risk of electrical shock. Do not run the product without earthing. Secure earthing to reduce the risk of electric shock.



- **Install an earth leakage breaker**

Risk of electrical shock. Do not run the product without a leakage breaker. Secure a leakage breaker to reduce the risk of electrical shock.



- **Limited operating site and storage**

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

1. Ambient temperature is beyond 0-40 dig.C.
2. Ambient humidity is beyond 35-85%RH.
3. Under a flammable/explosive atmosphere or in a dusty place.
4. The pump is exposed to the direct sunlight (Except Outdoor-use type).
5. The pump is subject to vibration.
6. Under a corrosive atmosphere such as chlorine gas.



- **Foreign matter**

When foreign matters enter the pump, turn off power at once and remove them. Using the pump with foreign matters may cause damage or a malfunction to the pump.



- **Pump disposal**

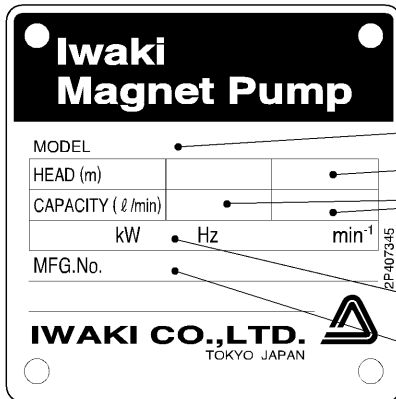
Any used or damaged pump must be disposed of in accordance with local laws and regulations. (Consult a licensed industrial waste products disposing company.)



Outline

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1. Unpacking

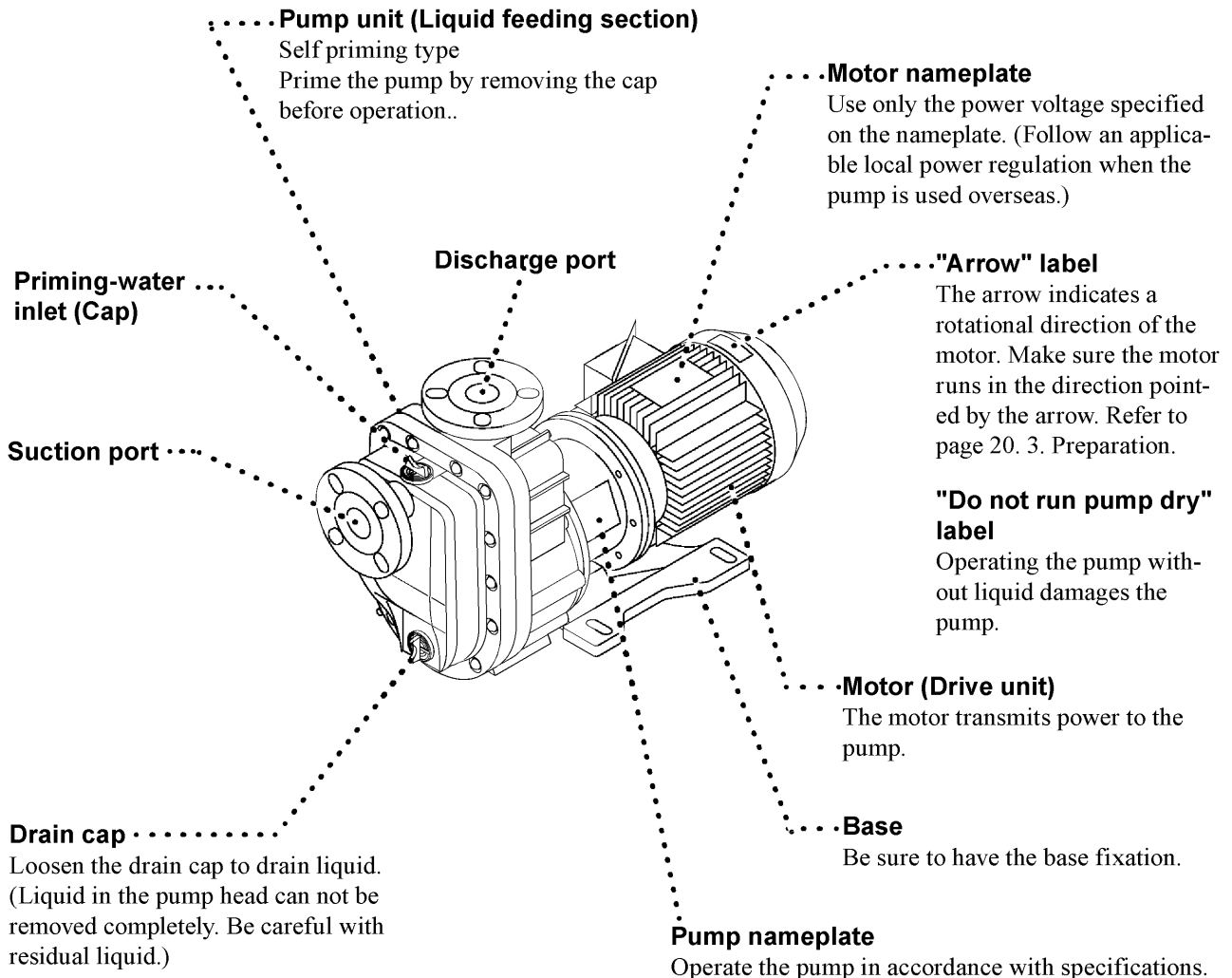


Model
Head
Discharge capacity
Frequency
Manufacturing number

Check the following points before use.

- [1] If the model code, discharge capacity, head, and voltage on the nameplate correspond to your order.
- [2] If the pump unit or any related parts are not damaged or bolts/nuts are not loosened in transit.

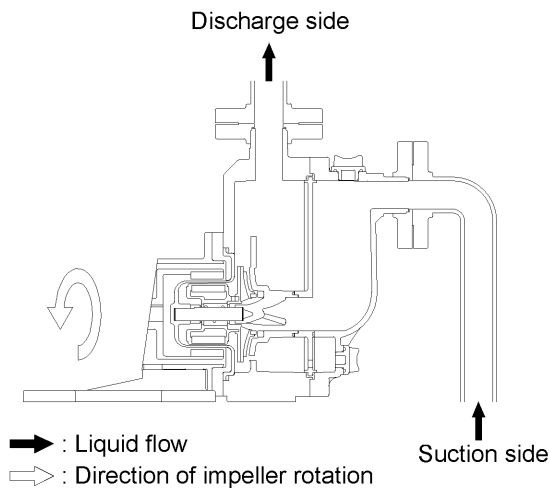
If you have any defect, contact us or your nearest dealer..



⚠ CAUTION

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

2.Principle of Operation



The SMX series pump is a self-priming centrifugal pump and is driven by magnetic force. Magnetic force rotates a impeller in the rear case in order to transfer liquid.

3.Model Code

SMX - 22 0 CA V V C

① ② ③ ④ ⑤ ⑥ ⑦

① Series code

SMX: Pump head material: GFRPP

② Pump bore

22: Suction bore 25A × Discharge bore 25A

44: Suction bore 40A × Discharge bore 40A

③ Motor output

0: 0.4kW (0.37kW)

1: 0.75kW

2: 1.5kW

3: 2.2kW

④ Bearing/ Spindle/ Liner ring

CA: Carbon/ High purity alumina ceramic/
Alumina ceramic

RA: PTFE(with Filler)/ High purity alumina ceramic/
Alumina ceramic

KA: SiC/ SiC/ alumina ceramic

⑤ O ring and Gasket material

V: FKM

E: EPDM

⑥ Impeller code

T, V: 50Hz

X, Y: 60Hz

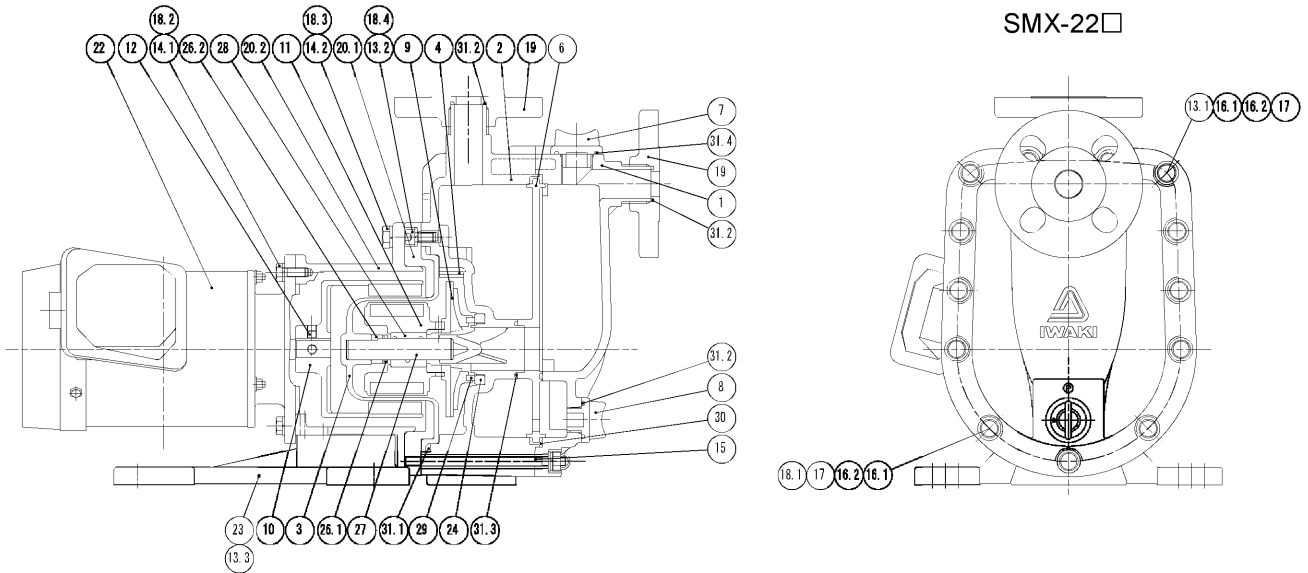
⑦ Motor type

No code: Totally-enclosed-fan-cooled motor for
indoor use

C: Totally-enclosed-fan-cooled motor for outdoor
use

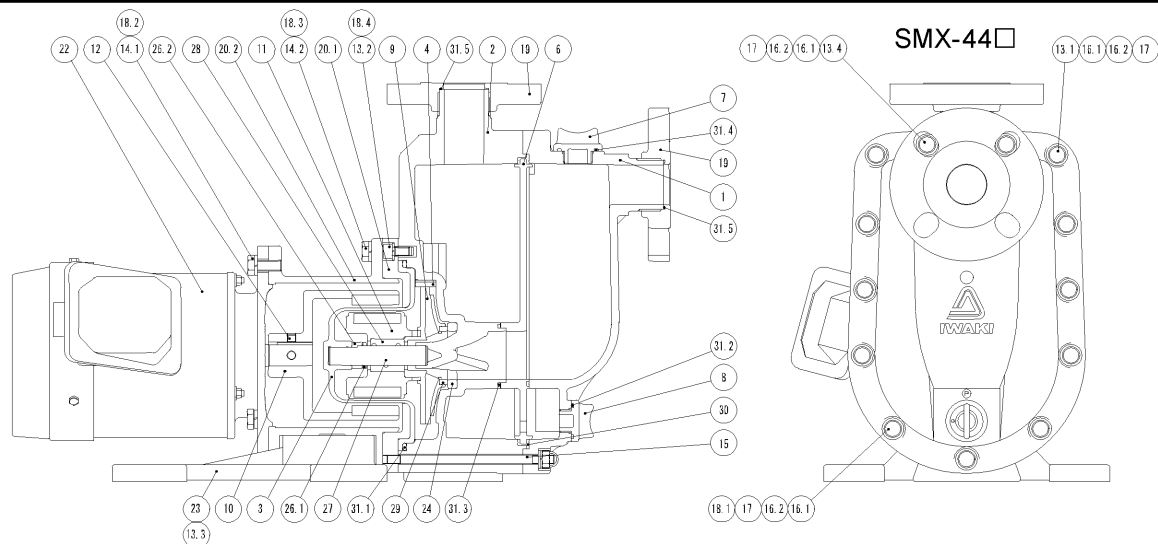
A: Increased safety for outdoor use

4. Parts Name



NO	PARTS NAME	MATERIAL			Q'TY	REMARKS
		CA	RA	KA		
1	FRONT CASE		GFRPP		1	
2	REAR CASE		GFRPP		1	
3	REAR CASING		GFRPP		1	
4	VOLUTE SPACER		GFRPP		1	
6	PLATE		GFRPP		1	
7	CAP		GFRPP		1	
8	DRAIN CAP		GFRPP		1	
9	IMPELLER		GFRPP		1	
10	DRIVE MAGNET UNIT		SMX-220: FERRITE MAGNET + ALUMINIUM ALLOY SMX-221: FERRITE MAGNET + DUCTILE IRON SMX-222: REAR EARTH MAGNET + DUCTILE IRON		1	
11	MAGNET CAPSULE		SMX-220, 221: FERRITE MAGNET + PP SMX-222: REAR EARTH MAGNET + PP		1	
12	HEX SOCKET SET SCREW		STEEL		2	
13.1	HEX SOCH HEAD BOLT		STNLS STL		8	M8×40 PW,SW
13.2	HEX SOCH HEAD BOLT		STNLS STL		3	M8×15
13.3	HEX SOCH HEAD BOLT		STEEL		4	M8×20 PW,SW
14.1	HEX HEAD BOLT		STNLS STL		4	220 type: M8×20 221, 220 type: M10×25
14.2	HEX HEAD BOLT		STNLS STL		4	M10×25
15	STUD BOLT		STNLS STL		5	
16.1	NUT		STNLS STL		13	M8
16.2	COVER CAP		PE		13	
17	PLAIN WASHER		STNLS STL		13	M8
18.1	SPRING WASHER		STNLS STL		5	M8
18.2	SPRING WASHER		STNLS STL		4	220 type:M8 221, 222type:M10
18.3	SPRING WASHER		STNLS STL		4	M10
18.4	SPRING WASHER		STNLS STL		3	M8
19	FLANGE		GFRPP		2	
20.1	REAR CASING SUPPORT		DUCTILE IRON		1	
20.2	BRACKET		DUCTILE IRON		1	
22	MOTOR				1	
23	BASE		GFRPP		1	
24	LINER RING		ALUMINA CERAMIC 99%		1	
26.1	REAR THRUST RING		ALUMINA CERAMIC 99.5%		1	ONLY RA TYPE
26.2	REAR THRUST		CFRPSS		1	
27	SPINDLE		ALUMINA CERAMIC 99.5%	SiC	1	
28	BEARING	CARBON	PTFE(with Filler)	SiC	1	
29	MOUTH RING		PTFE(with Filler)		1	
30	GASKET				1	
31.1	O RING (REAR CASING)		V:FKM E:EPDM		1	G-160
31.2	O RING (DRAIN CAP/FLANGE)				3	G-25
31.3	O RING (REAR CASE)				1	G-40
31.4	O RING (CAP)				1	G-30

The diagram is of the SMX-220



NO	PARTS NAME	MATERIAL			Q'TY	REMARKS
		CA	RA	KA		
1	FRONT CASE		GFRPP		1	
2	REAR CASE		GFRPP		1	
3	REAR CASING		GFRPP		1	
4	VOLUTE SPACER		GFRPP		1	
6	PLATE		GFRPP		1	
7	CAP		GFRPP		1	
8	DRAIN CAP		GFRPP		1	
9	IMPELLER		GFRPP		1	
10	DRIVE MAGNET UNIT	SMX-441: FERRITE MAGNET + DUCTILE IRON SMX-442, 443: REAR EARTH MAGNET + DUCTILE IRON			1	
11	MAGNET CAPSULE	SMX-441: FERRITE MAGNET + PP SMX-442, 443: REAR EARTH MAGNET + PP			1	
12	HEX SOCKET SET SCREW		STEEL		2	
13.1	HEX SOCH HEAD BOLT		STNLS STL		6	M8×45
13.2	HEX SOCH HEAD BOLT		STNLS STL		3	M8×15
13.3	HEX SOCH HEAD BOLT		STEEL		4	M8×20 PW,SW
13.4	HEX SOCH HEAD BOLT		STNLS STL		2	M8×85
14.1	HEX HEAD BOLT		STNLS STL		4	M10×25
14.2	HEX HEAD BOLT		STNLS STL		4	M10×25
15	STUD BOLT		STNLS STL		5	
16.1	NUT		STNLS STL		13	M8
16.2	COVER CAP		PE		13	
17	PLAIN WASHER		STNLS STL		21	M8
18.1	SPRING WASHER		STNLS STL		13	M8
18.2	SPRING WASHER		STNLS STL		4	M10
18.3	SPRING WASHER		STNLS STL		4	M10
18.4	SPRING WASHER		STNLS STL		3	M8
19	FLANGE		GFRPP		2	
20.1	REAR CASING SUPPORT		DUCTILE IRON		1	
20.2	BRACKET		DUCTILE IRON		1	
22	MOTOR		—		1	
23	BASE		GFRPP		1	
24	LINER RING		ALUMINA CERAMIC 99%		1	
26.1	REAR THRUST RING		ALUMINA CERAMIC 99.5%		1	ONLY RA TYPE
26.2	REAR THRUST		CFRPPS		1	
27	SPINDLE		ALUMINA CERAMIC 99.5%	SiC	1	
28	BEARING	CARBON	PTFE(with Filler)	SiC	1	
29	MOUTH RING		PTFE(with Filler)		1	
30	GASKET				1	
31.1	O RING (REAR CASING)				1	G-160
31.2	O RING (DRAIN CAP)		V:FKM E:EPDM		1	G-25
31.3	O RING (REAR CASE)				1	G-50
31.4	O RING (CAP)				1	G-30
31.5	O RING (FLANGE)				2	AS568-129

The diagram is of the SMX-441

Installation

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 **CAUTION**

● **Do not run pump dry**

Be sure to prime the pump chamber with liquid before running the pump for the first time or right after assembly. Running the pump without liquid, rubbing parts are seized. The rubbing parts of the SMX pump are lubricated/cooled by the pumped liquid. Never close any suction side valve during operation.



* If the pump runs dry by mistake, turn off power and leave it for more than one hour to cool it down gradually. Quick cooling can give rise to cracks on parts.

* The IWAKI dry run protector, the DR model, is recommended for the prevention of dry running.

● **Keep the pump away from fire**

To prevent a fire or an explosion, do not place any dangerous or inflammable substance close to the pump.



● **No remodeling**

Risk of electrical shock. Do not remodel the pump.



1. Before Use

Precautions when starting/stopping the pump (In case the pump is in flooded suction system)

Follow the next steps when starting/stopping the pump for the prevention of water hammer.

Take extra care when the discharge piping is long.

a. When starting the pump

First, prime the pump. Then turn on power to start operation with a discharge valve closed.

After starting the pump, gradually open the discharge valve to adjust flow rate to a specified point.

b. When stopping the pump

Gradually close a discharge valve. Turn off power and stop the pump after the valve is fully closed.

* Never close the discharge line suddenly with a solenoid valve. Shutting the discharge line rapidly causes water hammer and the pump may be damaged by excessive pressure.

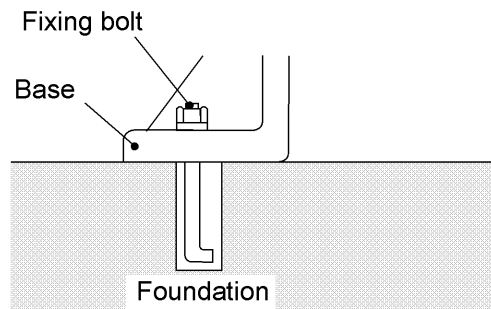
2. Installation Location

Select a installation location under the following conditions.

1. The pump should be installed on a flat foundation.
2. The location should be free from vibration.
3. Ambient temperature should be between 0 - 40 deg.C.
4. Humidity should be between 35 - 85%RH.
5. The location should be free from water spill (Except outdoor use type).
6. The pump should be installed in a clean atmosphere.
7. The location should be free from water influx even if any accident or disaster happen.

3. Installation

1. Install the pump as close to the suction tank and its liquid level as possible. Allowable height for self-priming is up to 4m, however, try to arrange short self-priming height.
* The height of self-priming varies with liquid characteristics, temperature, and suction line length. Contact us for detail information.
2. Secure maintenance space around the pump.
3. The figure below shows a foundation.
 - 3-1. The foundation should be larger than the plastic pump base.
 - 3-2. If piping vibrates sympathetically with the pump in operation, provide an expansion joint between the pump and the piping to reduce vibration.

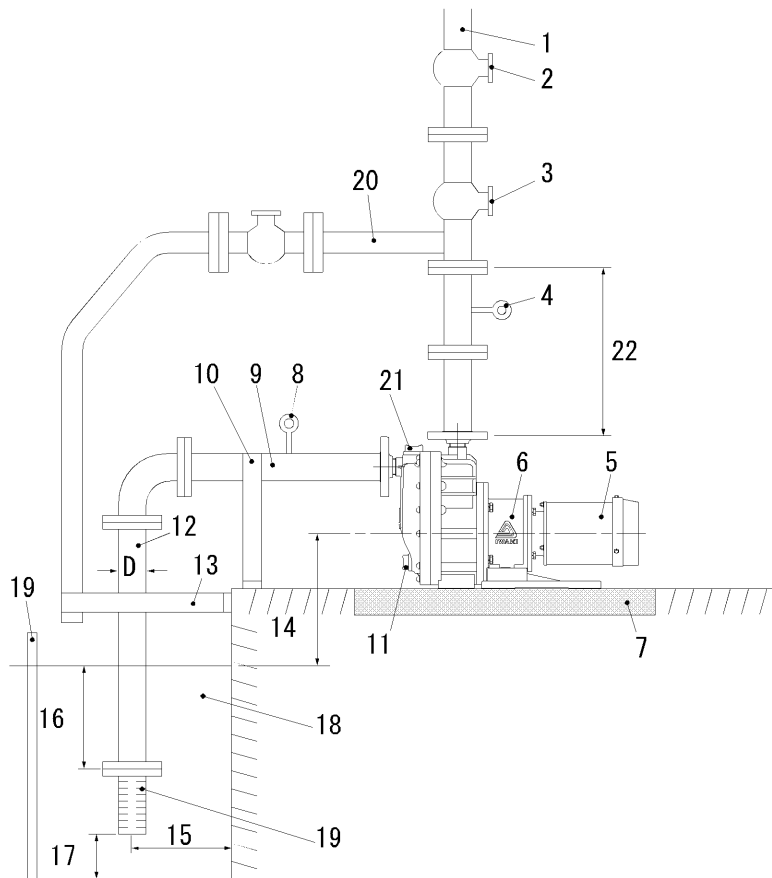


4. Any outdoor type SMX can be used indoors. (If the motor is designed for indoor use, do not use it out of doors.)
When installing the outdoor type pump out of doors, take a preventative measure to protect a motor and electrical circuit against disaster such as a flood.

⚠ CAUTION

Support the pump and piping with a proper measure.

4. Piping



- (1) Discharge pipe (Support the pipe to keep the pump free of piping load.)
- (2) Valve
- (3) Check valve
- (4) Pressure gauge
- (5) Motor
- (6) Pump
- (7) Drain ditch
- (8) Vacuum gauge
- (9) 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)
- (10) Pipe support
- (11) Drain cap
- (12) Suction pipe (Pipe diameter : D)
- (13) Pipe support
- (14) Self-priming height (Within 4m)
- (15) 1.5 times larger than D
- (16) 2 times longer than D / 500 mm or more
- (17) 1 or 1.5 times larger than D or more
(The distance must be more than 500 mm if sand or mud accumulates easily.)
- (18) Suction tank
- (19) Filtering screen
- (20) Air bleeding pipe
- (21) Priming water inlet (cap)
- (22) Straight pipe of 500mm or more

■ Suction piping

1. Suction pipe bore should be equal to the suction port of the pump (25A or 40A).

If the suction pipe bore is larger than the suction port of the pump, air volume in the suction pipe becomes too large for the pump to self prime.

2. Suction pipe length should be within 4.7m in total

The suction pipe length is actual length from the suction port of the pump to the lowest liquid level (If a liquid tank is too small, the liquid level in the tank can fluctuate significantly.). If the suction pipe length is longer than 4.7m, air volume in the suction pipe becomes large. This prevents the pump from sucking liquid even if the suction height is 4m or less (Allowable height for self-priming is 4m).

3. The end of suction pipe

1. The end of suction pipe should be below at least 50cm from liquid level for the prevention of air sucking.
2. There should be at least 1 or 1.5D between the suction pipe end and the bottom of tank.
3. Provide a screen at the suction pipe end in the tank for the prevention of foreign matter interfusion (Clean the screen periodically.).

4. Installation of a gate valve

In flooded suction, a gate valve should be installed on the suction pipe for easier overhaul & inspection.

5. Make sure joints on the suction piping are installed securely and air doesn't come in. Try to reduce the number of joints. If the air enters the suction pipe, the liquid may not be pumped or the pump may break at its worst.

6. Do not allow any projection on the suction pipe to prevent air from being trapped. The suction pipe should have an ascending gradient of 1/100 toward the pump.

7. Pipe support

If piping weight loads the pump, any plastic part is deformed. Be sure to install a pipe support.

■ Discharge piping

1. Discharge pipe bore should be determined on pipe resistance.

The discharge pipe should be straight with a bore of 50 cm or more. If discharge pipe bore is too narrow, pipe resistance increases so that an intended flow can not be obtained. It also affects self-priming performance.

2. A gate valve should be installed on the discharge piping

A gate valve should be installed on the discharge pipe not only for adjusting a discharge flow rate but also smooth operation and inspection/maintenance. Make sure that discharge piping or air vent piping is open.

3. A check valve should be installed in the following conditions.

When selecting the check valve, consider the check valve pressure limit (including the influence of water hammer or back flow onto the pump).

- ① The discharge piping is very long
- ② The discharge head exceeds 15 m
- ③ The end of the discharge pipe is higher than 9m or more from a liquid level.
- ④ Several pumps are running in parallel on piping

4. Install an air vent piping in the following cases.

- ① Horizontal layout of discharge piping is 10m or more.
- ② When a check valve is installed. Air vent piping is required for self-priming.
- ③ Discharge piping is not open. Air vent piping is required for self-priming.

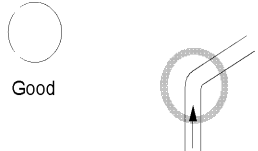
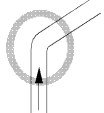
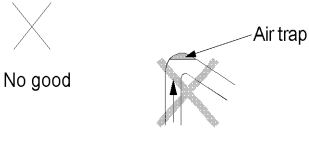
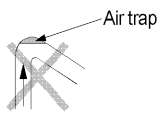
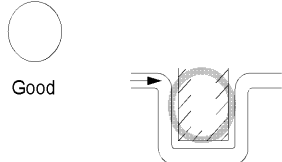

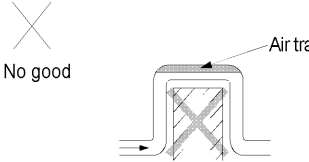
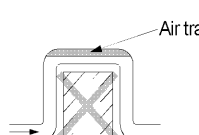
5. Pressure gauge mounting

A pressure gauge should be installed on discharge piping for monitoring operation condition.

6. Install a drain valve if it is possible for liquid in the discharge pipe to freeze.

7. Pipe support

If piping weight loads the pump, any plastic part is deformed. Be sure to install a pipe support.

Good conditions		Unacceptable conditions	
 <p>Good</p>		 <p>No good</p>	 <p>Air trap</p>
 <p>Good</p>		 <p>No good</p>	 <p>Air trap</p>

■ **Tightening torque between discharge/suction ports and pipes**

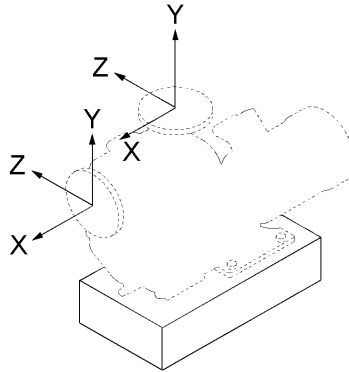
Connect pipe flanges with discharge and suction ports on the table below.

(The table is based on use of metal pipe flanges and rubber gaskets.)

Bolt size	Tightening torque (N·m)
M16	20

■ **Load of piping and momentum of piping**

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



Permissible stress and moment

Forces of discharge piping

Load direction	Pipe dia. (mm)	
	25	40
	Load	
	kN	
Fx	0.10	0.15
Fy: compression	0.15	0.20
Fy: tension	0.10	0.10
Fz	0.10	0.15

Forces of suction piping

Load direction	Pipe dia. (mm)	
	25	40
	Load	
	kN	
Fx	0.10	0.10
Fy	0.10	0.15
Fz	0.10	0.15

Moments of discharge piping

Load direction	Pipe dia. (mm)	
	25	40
	Moment	
	kN·m	
Mx	0.02	0.05
My	0.05	0.10
Mz	0.05	0.10

Moments of suction piping

Load direction	Pipe dia. (mm)	
	25	40
	Moment	
	kN·m	
Mx	0.05	0.10
My	0.02	0.05
Mz	0.05	0.10

5. Wiring

Electrical wiring and any work on power source must be permitted to qualified persons only. We are not responsible for any injury and damage due to noncompliance with the above notice. Contact us as necessary.

- [1] Use an electromagnetic switch that conforms with the specifications (voltage, capacity, etc.) of the pump motor.
- [2] If the pump is used out of doors, waterproof the wiring in order to protect the switches from rainwater.
- [3] Electromagnetic switches and push buttons should be installed away from the pump.

Operation

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1. Operational Precautions

CAUTION

- Never run the pump dry or run it with a suction side valve (Gate valve) close. This may damage the pump.
- Stop the pump within one minute when it is running under cavitation. Do not run the pump when it is sucking the air through the suction port.
- Stop the pump within one minute when the magnet coupling is disconnected. The magnet force reduces if the pump keeps on running in this condition.
- Keep liquid temperature change within 80 deg.C through stopping and operation.
- (In flooded suction piping system,) Start the pump with a discharge valve fully close in order to avoid water hammer.
- If the pump is operated with a discharge valve closed for a long time, the liquid temperature inside the pump rises and damages the pump.
- If power is interrupted while the pump is running, switch off the pump immediately and close the discharge valves.
- Take extra care so that the discharge pressure dose not exceed the pump allowable pressure. Refer to page 20, "7. Allowable pressure limit".
- When high temperature liquid is transferred, the pump surface becomes very hot. Take a protective measure against burn. See the table below for the surface temperature when transferring a liquid of 80 deg.C.

Liquid temperature(deg.C)	Max. pump surface temperature (Ambient temp. is 40 deg.C.)
80	80

- The noise level is shown on the table below.
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.

Noise level
80 dB



Prohibit



Caution



Caution



2. Before Use

Confirm the specified pump performance and other specifications prior to operation.

1. H-Q performance

The performance curve on catalogue is based on pumping clean water at 20 deg.C in flooded suction system.

2. Certain liquid level is required for self priming

The SMX is a self-priming pump, however, the pump needs to be primed to certain liquid level before operation.

On and after the first operation, the pump doesn't need to be primed because the needed level for self-priming remains in the pump head. But then prime the pump after a long period of storage (For more than a day) or when the pump stops in self priming (When the pump is running but liquid is not discharged.).

CAUTION

Do not pour liquid rapidly. Liquid may overflow the pump head.

The needed liquid volume

SMX-22□	3.0L
SMX-44□	4.2L

3. ON-OFF operation

Starting and stopping the pump frequently will damage the pump. Starting/stopping the pump in self-priming damage the pump earlier. Do not ON-OFF the pump more than 7 times per hour.

4. Handled liquid - Contact us for detail

1. Slurry Slurry can not be handled
2. Liquid viscosity Allowable up to 30mPa*s. Ask us for detail
3. Liquid temperature 0-80deg.C (Clean water). Self-priming performance reduces as liquid temperature increases. Some liquid with a high vapour pressure or bubbly liquid may not be sucked up in the self-priming mode or not even pumped.

5. Disconnection of the magnet coupling

Stop the pump within one minute when the magnet coupling is disconnected. The magnet force reduces if the pump keep on running in this condition.

6. Operating temperature

Allowable liquid temperature: Between 0 and 80 deg.C with clean water.

Self-priming performance reduces as liquid temperature increases.

Allowable liquid temperature varies with chemicals.

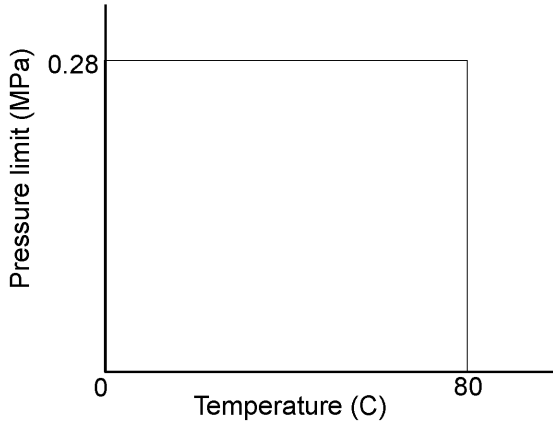
Ambient temperature range: Between 0 and 40 deg.C

Ambient humidity range: 35 - 85%RH

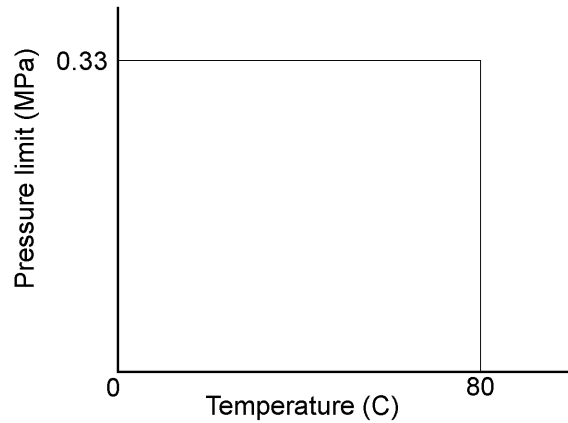
7. Allowable pressure limit

See the table below for allowable pressure limits at each model.

Be careful. Pumping a liquid with high specific gravity may exceed the allowable pressure limit.



SMX-22□



SMX-44□

3. Preparation

Take the next steps to start the pump at the first operation or after a long period of storage.

1. Clean the inside of piping and tank

Do not leave any waste of bond, sealing material, and screws/nuts.

2. Retighten the bolts on piping connections.

Make sure the air does not enter the piping. Take extra care to the suction piping because the inside of the suction piping is vacuum.

3. Check the bolts on the pump and retighten it as necessary.

4. Detach the cap for priming. Fill the pump with liquid.

⚠ CAUTION

Do not pour liquid rapidly. Liquid may overflow the pump head.

5. Tighten the cap securely. Make sure the air can not enter.

6. Check the direction of motor rotation

Run the motor for a moment in order to check if the motor rotates to the direction the arrow label points (Clockwise, seen from the motor fan). If the motor rotates reverse, interchange 2 of 3-phase power.

4. Operation

■ Operation step

Operate the pump by following the steps below.

No	Operation Procedure	Remarks
1	<ul style="list-style-type: none"> • Close or open the valve. 	<ul style="list-style-type: none"> • Open the suction valve fully • Close the discharge valve fully (in flooded suction), Open the discharge valve fully (in a suction lift)
2	<ul style="list-style-type: none"> • Prime the pump 	<ul style="list-style-type: none"> • Check that the pump is filled with liquid. If not, fill the pump with liquid. • After priming, close the discharge valve fully (in flooded suction). • After priming, open the discharge valve fully (in suction lift).
3	<ul style="list-style-type: none"> • Check the motor for correct rotating direction. Turn on power and then immediately switch off the power. 	<ul style="list-style-type: none"> • Supply power immediately to run the pump only for checking the rotating direction of the pump. (Correct rotation direction seen from the motor fan is indicated with an arrow on the pump.) • Observe carefully whether the motor fan smoothly stops after the power switch is turned off. <p>⚠ Caution</p> <ul style="list-style-type: none"> • The pump can be damaged by continuous operation in reverse rotation • If the motor fan does not stop smoothly, it is possible there is trouble in the pump. Check the inside of the pump. • In a suction lift, a long time operation for checking rotation direction may cause a back flow. In this case fill the pump with liquid again.

No	Operation Procedure	Remarks
4	<ul style="list-style-type: none"> • Turn on power and start the pump and adjust the discharge pressure and capacity. See below for the minimum discharge capacity <p>Do not operate the pump at discharge capacity less than the allowable minimum discharge capacity below.</p> <ul style="list-style-type: none"> ▶ The allowable minimum discharge capacity: 10ℓ/min. • Follow the same procedures even if the pump system is operated automatically. <p>⚠ Caution Do not run the pump longer than 1 minute with discharge valve fully closed.</p>	<ul style="list-style-type: none"> • In flooded suction When the pressure gauge indicates the shut-off pressure while the pump operates normally, open the discharge valve gradually to obtain the specified discharge pressure level. • In a suction lift Start the pump with the discharge valve fully open. When the pump starts normal operation after the air is discharged, close the discharge valve gradually to obtain the specified discharge pressure level. In a suction lift, it takes a while to completely discharge the air out of the pump and the suction pipe. <p>* Within 1 minute after the pump starts normal operation, open/close the discharge side valve gradually to adjust discharge pressure, checking a pressure gauge on discharge side (or adjust discharge capacity by checking a flow meter).</p> <p>⚠ Caution If the valve is excessively opened, the motor may be over-loaded. Open the valve watching the amperage.</p>
5	<p>Points to be observed during operation</p> <p>When the pump runs in continuous operation, check a flow meter and confirm that pump operation is as per specifications.</p>	<ul style="list-style-type: none"> • If flow any meters are not available, check each value of discharge pressure, suction pressure, and electric current with reference to piping resistance.

⚠ CAUTION

If any trouble happens, turn off power immediately and solve problems referring to page 25, "1. Causes of Trouble and Troubleshooting".

■ Stoppage

No	Operation Procedure	Remarks
1	<ul style="list-style-type: none"> • Close a discharge valve gradually. 	<ul style="list-style-type: none"> • Do not close the valve (e.g. solenoid valve) instantly. Otherwise the pump may be destroyed by water hammer action which is possible when discharge piping is long.
2	<ul style="list-style-type: none"> • Turn off power and stop pump operation. 	<ul style="list-style-type: none"> • Check that the motor stops slowly and smoothly. If it does not stop smoothly, inspect the inside of the pump. • The pump is designed to hold enough liquid for the next operation with a siphon-cut function. The pump only requires supply of liquid once at the initial operation stage, however, check liquid in the pump after a long period of stoppage. • If the pump stops before self-priming is completed (Before liquid is discharged.), the pump needs to be primed again to carry out next self-priming.
3	<p>Before/After leaving the pump stop</p> <ul style="list-style-type: none"> • Liquid in the pump may decrease if the pump is left stopped for a long period (a day or more). In such a case, prime the pump before operation. • Liquid in the pump may freeze and damage the pump in winter season. Drain liquid before storage. Be careful when draining dangerous liquid. • Use a heater to prevent liquid from freezing when the pump is temporally stopped in extremely cold region. • In the event of power failure, turn off power and close discharge valve. 	

Maintenance

1. <i>Causes of Trouble and Troubleshooting</i>	25
2. <i>Maintenance and Inspection</i>	26
3. <i>Spare & Consumable Parts</i>	30
4. <i>Disassembly & Assembly</i>	32






1. Causes of Trouble and Troubleshooting

If you can not find out the root cause of failure, stop the pump and contact us.

Trouble	Cause	Troubleshooting
Self-priming is impossible or slow. The pump does not self-prime repeatedly.	<ul style="list-style-type: none"> ● The amount of priming liquid is insufficient. ● The pump is running dry. 	<ul style="list-style-type: none"> ○ Stop the pump and feed a sufficient amount of priming liquid. Then restart the pump.
	<ul style="list-style-type: none"> ● A discharge valve is closed. ● An air bleeding pipe is closed. 	<ul style="list-style-type: none"> ○ Open the valve fully and restart the pump.
	<ul style="list-style-type: none"> ● Air enters the inside of the pump from the suction pipe or the gasket. 	<ul style="list-style-type: none"> ○ Re-check the sealing condition of the coupling flange surfaces on the suction pipe. ○ Check that the water suction level is not too low.
	<ul style="list-style-type: none"> ● The magnet coupling has disconnected. 	<ul style="list-style-type: none"> ○ Measure current to check that the pump is not overloaded. ○ Check any foreign matters are not stuck between the impeller and the magnet capsule. ○ Check that the voltage level is normal.
	<ul style="list-style-type: none"> ● The stroke speed is insufficient. 	<ul style="list-style-type: none"> ○ Check the wiring & the motor and take necessary measures.
	<ul style="list-style-type: none"> ● The pump rotates in the wrong direction. 	<ul style="list-style-type: none"> ○ Exchange the connected wires.
	<ul style="list-style-type: none"> ● The pump is positioned too high. 	<ul style="list-style-type: none"> ○ Install the pump within the self-priming height. ○ Check that the liquid level is not too low.
	<ul style="list-style-type: none"> ● Specific gravity or viscosity of liquid is not suitable. ● Liquid temperature is too high. 	<ul style="list-style-type: none"> ○ Check the temperature, specific gravity, and viscosity of the liquid and take necessary measures.
	<ul style="list-style-type: none"> ● The suction pipe is too long. 	<ul style="list-style-type: none"> ○ Shorten suction piping.
	<ul style="list-style-type: none"> ● Frequency is not suitable for the pump. 	<ul style="list-style-type: none"> ○ Adjust frequency to the pump.
	<ul style="list-style-type: none"> ● Suction piping is blocked with foreign matters. ● Discharge piping is blocked with foreign matter. 	<ul style="list-style-type: none"> ○ Remove foreign matters. ○ Take measures against foreign matter interfusion.
	<ul style="list-style-type: none"> ● A suction hose is deformed. 	<ul style="list-style-type: none"> ○ Change the hose to new one with higher rigidity.
Discharge rate is too low.	<ul style="list-style-type: none"> ● The ends of the discharge pipe and the air bleeding pipe are positioned below the water surface. 	<ul style="list-style-type: none"> ○ Raise the ends of the pipes above the water surface.
	<ul style="list-style-type: none"> ● The suction flange or the cap is loosened. 	<ul style="list-style-type: none"> ○ Check the O ring and tighten it if necessary.
	<ul style="list-style-type: none"> ● The suction port is blocked with foreign matters and smooth discharge of the liquid is not possible. 	<ul style="list-style-type: none"> ○ Remove the foreign matters from the suction port.
	<ul style="list-style-type: none"> ● An air pocket is in a suction pipe. 	<ul style="list-style-type: none"> ○ Check piping condition and adjust pipes as necessary.
	<ul style="list-style-type: none"> ● The inlet of the impeller is blocked with foreign matters. 	<ul style="list-style-type: none"> ○ Disassemble the impeller section partially and remove the foreign matters.
	<ul style="list-style-type: none"> ● Air enters the pump from suction piping or the gasket. 	<ul style="list-style-type: none"> ○ Check suction pipe joints and retighten it as necessary.
	<ul style="list-style-type: none"> ● Discharge piping or the pump head is blocked with foreign matters. 	<ul style="list-style-type: none"> ○ Remove foreign matters from the pump. ○ Remove foreign matters and/or scales from the pipe.
	<ul style="list-style-type: none"> ● Piping resistance is increased due to an air pocket in the piping. 	<ul style="list-style-type: none"> ○ Check suction piping for any projection and take necessary measures.
<ul style="list-style-type: none"> ● Discharge piping has a resistant section or the actual head and loss of head are too high. 	<ul style="list-style-type: none"> ○ Measure the actual head and the loss of head in discharge piping and take necessary measures. 	
<ul style="list-style-type: none"> ● The motor rotates in the opposite direction. 	<ul style="list-style-type: none"> ○ Exchange the connected wires. 	

Trouble	Causes	Troubleshooting
The motor is overheated.	<ul style="list-style-type: none"> ● Voltage has dropped greatly. ● The motor is overheated. ● Ambient temperature is too high. 	<ul style="list-style-type: none"> ○ Check voltage and frequency. ○ Check that specific gravity and viscosity of the liquid are suitable. ○ Ventilate around the motor.
The discharge rate has dropped suddenly.	<ul style="list-style-type: none"> ● The suction port is blocked with foreign matters. 	<ul style="list-style-type: none"> ○ Remove the foreign matters.
Pump vibrates excessively.	<ul style="list-style-type: none"> ● The base is not anchored firmly. ● Installation bolts are loosened. ● Suction piping is blocked and it is causing cavitation. ● The pump bearing is worn or melted. ● The magnet capsule or spindle is damaged. ● Dynamic balance of the driving magnet has changed. ● The impeller is in contact with the magnet capsule anchoring part. ● The motor bearing is worn. 	<ul style="list-style-type: none"> ○ Reinstall the base. ○ Retighten the bolts. ○ Clean the pump and get rid of blockage. ○ Replacement ○ Replacement ○ Remove the cause or replace the part. ○ Replacement ○ Replace the bearing or motor.

2. Maintenance and inspection

 WARNING	
<ul style="list-style-type: none"> ● Do not have the medical electronics close to magnet. Any person who is equipped with medical electronics such as a pacemaker should not be close by the magnet of pump. 	 Prohibited
<ul style="list-style-type: none"> ● Pay attention to magnet force The magnet force of the pump is powerful. Take care not to catch a finger in the bracket. 	 Caution
<ul style="list-style-type: none"> ● Wear protective clothing Coming in contact with or getting wet with the harmful liquid such as chemical may cause eye or skin trouble. Wear protective clothing such as a protective mask, goggles, gloves during the work. 	 Wear protective gear
<ul style="list-style-type: none"> ● Turn off power during the maintenance work Risk of electrical shock during the work with power on. Make sure the power source is turned off and the pump and devices are stopped prior to the work. 	 Turning off power

 **CAUTION**

- ▶ Mark at each wire so that the wires can be connected correctly when disconnecting the wiring of the motor.
- ▶ Do not disassemble the pump beyond the extent shown on this manual.
- ▶ Make sure to close suction and discharge sides valves before dismantling/assembling the pump. Clean the inside of the pump as well.
- ▶ The magnet force which is used in the pump are strong. Be careful not to catch the finger. Do not allow iron pieces or powder to be attracted by the magnets.
- ▶ Do not put the electronic devices close to the magnets.

■ **Daily inspection**

[1] Make sure there is no liquid leakage before starting the pump. Never operate the pump when leakage is detected.

 **CAUTION**

Tightening torque of the pump installation bolts/nuts may reduce in the initial phase of use or under operating conditions where the temperature fluctuates greatly. Check the torque periodically and retighten the bolts and nuts as necessary. Tightening torque for the pump installation bolts/nuts is shown on page 36. Fasten the bolts by applying an equal torque to each bolt.

[2] Check whether the pump operates smoothly without abnormal noise or vibration.

[3] Check a liquid level in the suction tank and a suction pressure.

[4] Check that discharge capacity and electric current of the motor in operation is as per specifications on the motor nameplate.

* Readings of the pressure gauge are in proportion to specific gravity of liquid. Cock of the pressure gauge or vacuum gauge should be opened only when measurement is carried out and close it after measurement. If the cock remains open during pump operation, the meter mechanism may be affected by abnormal pressure caused by water hammer action.

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

[6] Check that discharge pressure, discharge capacity, and motor power supply voltage do not fluctuate during pump operation. If considerable fluctuation at respective values occurs, refer to "1. Causes of Trouble and Troubleshooting".

■ Periodic inspection

To ensure efficient and smooth operation, carry out periodic inspections on the procedures described below. When dismantling the pump, check if the rubbing parts and plastic parts are not damaged. The magnetic force of the drive magnet and magnet capsule is strong. **Be careful not to catch the finger. Do not put the electrical devices close to the magnets.**

Interval	Parts name	Inspection items	Measures
Once a 6 months (Maintain an Inspection record)	Drive magnet	<ul style="list-style-type: none"> ● If there is a rubbed trace ● If the drive magnet housing is correctly mounted or if the hex. socket set screws are not loose ● Decentering of magnet and motor shaft.(Max.1/10mm) 	<ul style="list-style-type: none"> ○ If abnormality is found, consult dealer ○ Reset the drive magnet to the motor shaft and retighten the screws ○ Retighten the hex. socket set screws or replace the drive magnet. (Consult dealer if replacement is needed.)
	Rear casing	<ul style="list-style-type: none"> ● Rubbed trace on an inner surface ● If there is no crack on wet-end material ● If the rear thrust is worn. ● Dirt in the rear casing 	<ul style="list-style-type: none"> ○ Consult dealer ○ If crack is found, replace rear casing ○ Consult dealer ○ Clean the rear casing
	Magnet capsule	<ul style="list-style-type: none"> ● If there is rubbed trace on a rear end or side face ● If there is crack on a rear end or side face ● Measure the bearing inner diameter and check wear ● If the impeller is securely fixed to magnet capsule 	<ul style="list-style-type: none"> ○ If abnormality is found, consult dealer ○ If abnormality is found, consult dealer ○ Replace if excessively worn. ○ If it is loose, replace or consult dealer
	Impeller	<ul style="list-style-type: none"> ● Measure the mouth ring thickness ● If there is no crack ● The inside of impeller is clogged. ● Change of dimension. 	<ul style="list-style-type: none"> ○ Replace the impeller if excessively worn ○ Replace the impeller if cracked ○ Clean the impeller ○ Replace if abnormality is found
	Front casing	<ul style="list-style-type: none"> ● Dirty wet-end ● If there is a crack ● If there is no abnormal wear, cracks, rubbed traces on liner ring. ● If there is swelling or a crack on O ring. ● If there is a rubbed trace. 	<ul style="list-style-type: none"> ○ Clean the impeller ○ Replace if abnormality is found ○ Consult dealer if abnormality is found. ○ Replace if abnormality is found. ○ Consult if abnormality is found.
	Spindle	<ul style="list-style-type: none"> ● If there is no crack. ● Wear against bearing 	<ul style="list-style-type: none"> ○ Replace if abnormality is found ○ Replace if the spindle is excessively worn

■ Wear limits of bearing and spindle

Parts name	Dia. at shipment	Wear limit	Wear depth
Inner diameter of bearing	Ø 18.0mm	Ø 19.0mm	1.0mm
Outer diameter of spindle	Ø 18.0mm	Ø 17.0mm	1.0mm

1. The values on the table shows respective wear limit at each part.
2. If the clearance between the inner diameter of the bearing and the outer diameter of the spindle exceeds 1 mm, either the bearing or spindle, whichever has greater wear, should be replaced regardless of the values in the above table.

Example

Inner diameter of bearing is Ø18.7

Wear depth is 0.7mm (Within wear limit)

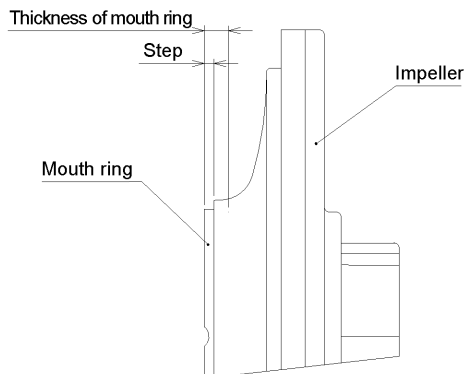
Outer diameter of spindle is Ø17.5

Wear depth is 0.5mm (Within wear limit)

Clearance is 1.2mm. In this case replace the bearing cause its wear is deeper than the spindle.

3. Initial wear may appear in the sliding parts in an initial operation stage but this is not abnormal. Initial wear stops within approximately 100 hours.

■ Wear limit of mouth ring



Dia. at shipment	Wear limit
7.5 mm	5.5 mm

* The step between the surfaces of the mouth ring and the impeller is 2 mm when shipped. When the step becomes 0 mm, replace the impeller unit.

3. Spare & consumable parts

Appropriate spare parts are necessary for a long continuous operation. It is recommended that expendable parts be always in stock. Place an order for consumables with the following information.

- ① Name of part and parts code (Refer to the diagram in this manual.)
- ② Pump model identification code and manufacturing number (as indicated on the pump nameplate)
- ③ Drawing number if you have IWAKI-approved drawing

■ Parts number of the SMX

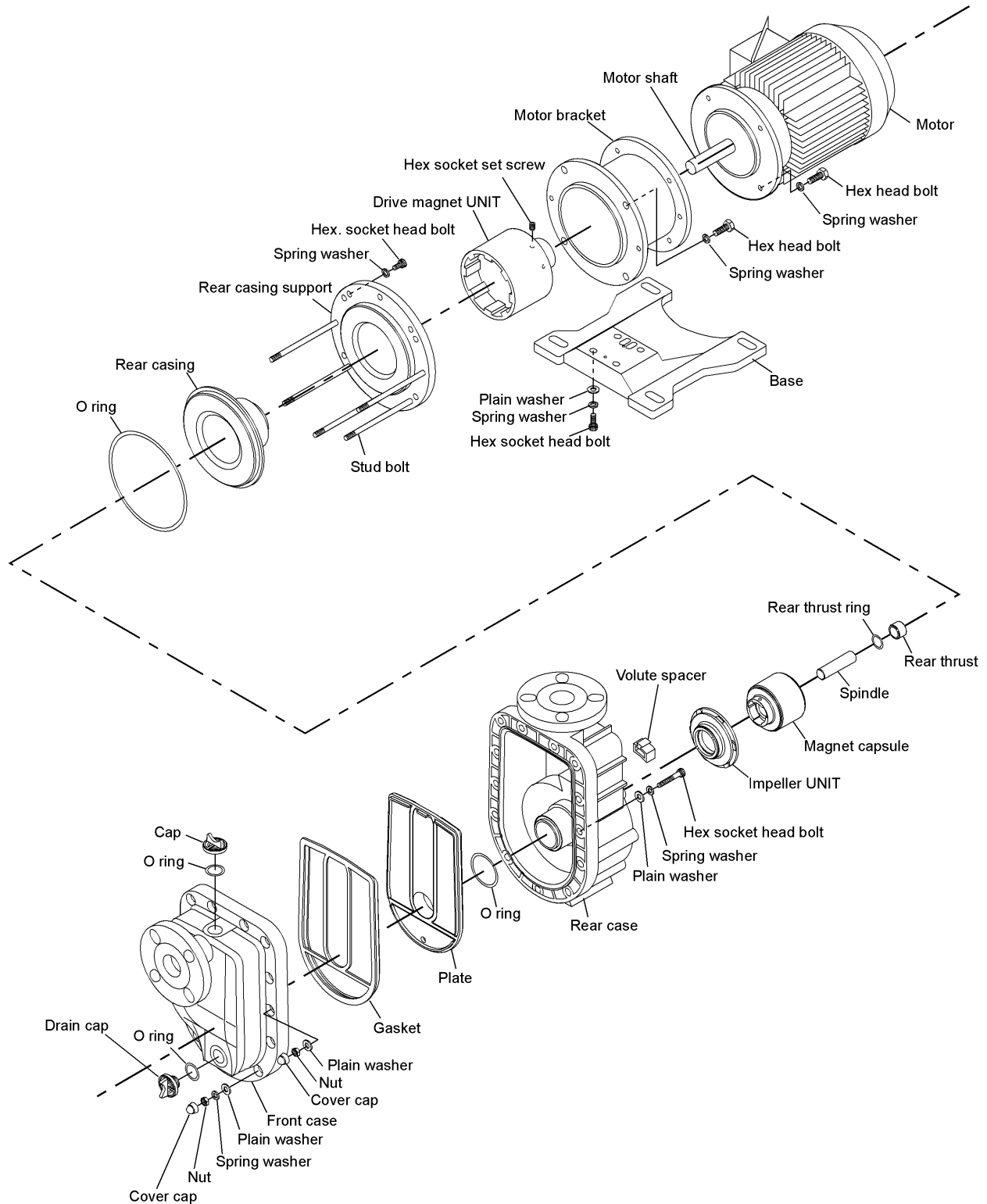
Spare parts and consumable parts list of the SMX-22

No	Parts Name			Material	Parts code			
					SMX-220	SMX-221	SMX-222	
1	Front case			GFRPP	SMX0001			
2	Rear case	Impeller code	V	GFRPP	SMX0002		——	
			Y	GFRPP	SMX0003		——	
			T	GFRPP	——	SMX0033		
			X	GFRPP	——	SMX0002		
3	Rear casing			GFRPP	SMX0004			
4	Volute spacer	Impeller code	V	GFRPP	SMX0005		——	
			Y	GFRPP	SMX0006		——	
			X	GFRPP	——	SMX0005		
6	Plate			GFRPP	SMX0007			
7	Cap			GFRPP	SMX0008			
8	Drain cap			GFRPP	SMX0009			
9 + 29	Impeller UNIT	Impeller code	V	GFRPP	SMX0010		——	
			Y	GFRPP	SMX0011		——	
			T	GFRPP	——	SMX0034		
			X	GFRPP	——	SMX0010		
11	Magnet capsule UNIT			CA	——	SMX0012	SMX0035	SMX0038
				RA	——	SMX0013	SMX0036	SMX0039
				KA	——	SMX0014	SMX0037	SMX0040
19	Flange			GFRPP	SMX0015			
26.1	Rear thrust ring (for RA)			Alumina ceramic	SMX0016			
26.2	Rear thrust	For CA, KA		CFRPPS	SMX0017			
		For RA		CFRPPS	SMX0018			
27	Spindle	For CA, RA		Alumina ceramic	SMX0019			
		For KA		SiC	SMX0020			
30	Gasket			V	FKM	SMX0021		
				E	EPDM	SMX0022		
31.1	O ring (For Rear casing)			V	FKM	SMX0023		
				E	EPDM	SMX0024		
31.2	O ring (For Drain cap/Flange)			V	FKM	SMX0025		
				E	EPDM	SMX0026		
31.3	O ring (For Rear case)			V	FKM	SMX0027		
				E	EPDM	SMX0028		
31.4	O ring (For Cap)			V	FKM	SMX0029		
				E	EPDM	SMX0030		

Spare parts and consumable parts list of the SMX-44

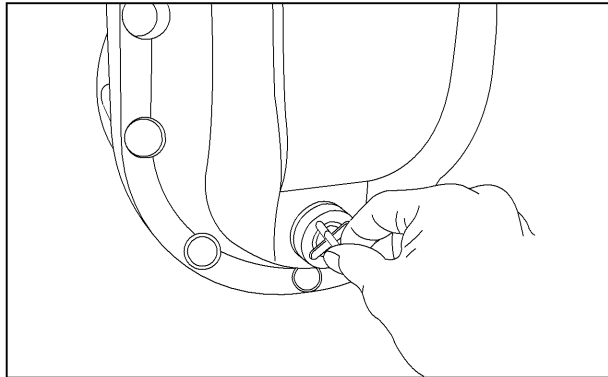
No	Parts Name			Material	Parts code		
					SMX-441	SMX-442	SMX-443
1	Front case			GFRPP	SMX0041		
2	Rear case	Impeller code	T	GFRPP	SMX0043		———
			Y	GFRPP	SMX0042		———
			X	GFRPP	———	SMX0043	
3	Rear casing			GFRPP	SMX0004		
4	Volute spacer	Impeller code	T	GFRPP	SMX0045		———
			Y	GFRPP	SMX0044		———
			X	GFRPP	———	SMX0055	
6	Plate			GFRPP	SMX0046		
7	Cap			GFRPP	SMX0008		
8	Drain cap			GFRPP	SMX0009		
9 + 29	Impeller UNIT	Impeller code	T	GFRPP	SMX0048		———
			Y	GFRPP	SMX0047		———
			X	GFRPP	———	SMX0056	
11	Magnet capsule UNIT		CA	———	SMX0035	SMX0038	
			RA	———	SMX0036	SMX0039	
			KA	———	SMX0037	SMX0040	
19	Flange			GFRPP	SMX0049		
26.1	Rear thrust ring (for RA)			Alumina ceramic	SMX0016		
26.2	Rear thrust	For CA, KA		CFRPPS	SMX0017		
		For RA		CFRPPS	SMX0018		
27	Spindle	For CA, RA		Alumina ceramic	SMX0019		
		For KA		SiC	SMX0020		
30	Gasket		V	FKM	SMX0051		
			E	EPDM	SMX0052		
31.1	O ring (For Rear casing)		V	FKM	SMX0023		
			E	EPDM	SMX0024		
31.2	O ring (For Drain cap)		V	FKM	SMX0025		
			E	EPDM	SMX0026		
31.3	O ring (For Rear case)		V	FKM	SMX0053		
			E	EPDM	SMX0054		
31.4	O ring (For Cap)		V	FKM	SMX0029		
			E	EPDM	SMX0030		
31.5	O ring (For Flange)		V	FKM	SMX0031		
			E	EPDM	SMX0032		

4. Disassembly and Assembly



Dismantlement

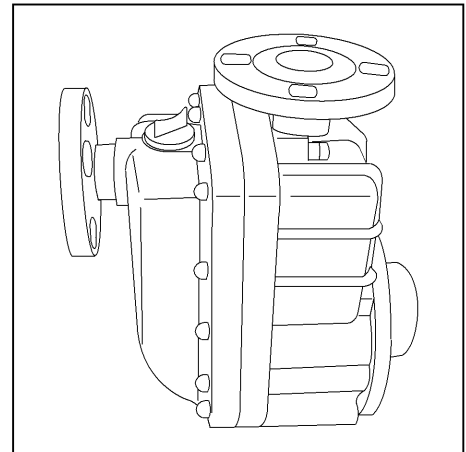
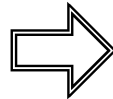
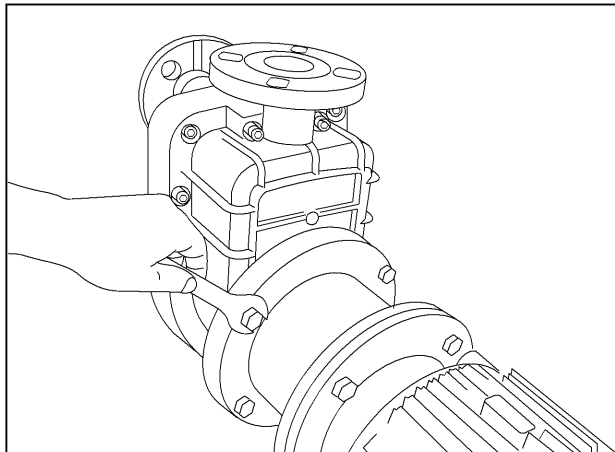
1. Remove the drain cap and drain liquid from the pump head. (Liquid can not be drained completely.)



CAUTION

Wear chemical proof gloves for the prevention of getting wet with chemicals.

2. Loosen the 4 hex. head bolts on the motor bracket to detach the pump head from the motor

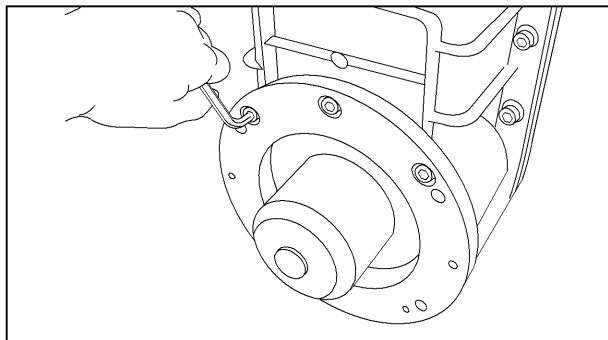


CAUTION

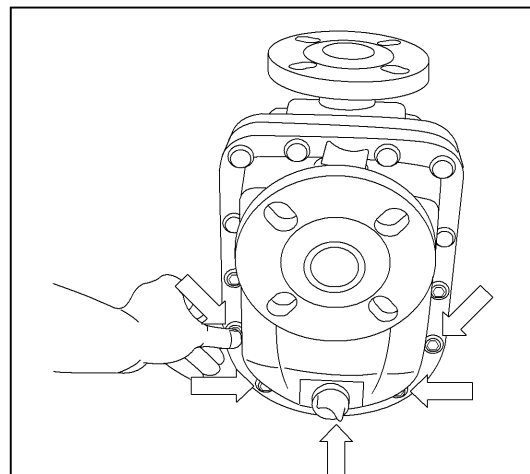
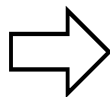
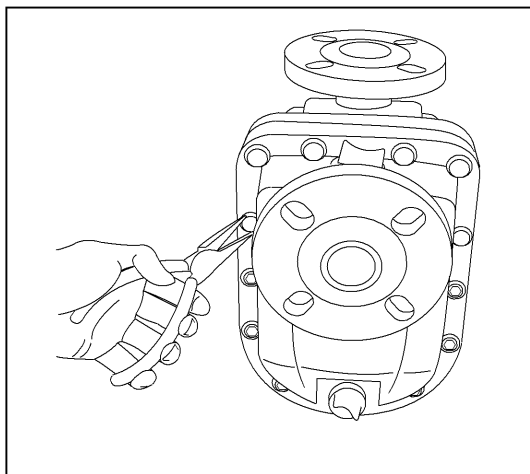
There is strong magnetic force between the pump head and motor. Be careful not to catch the finger.

The motor is attracted by the magnetic force. Fix the motor when removing the pump head.

3. Remove the 3 hex. socket head bolts which are fixing the rear casing support to rear case.



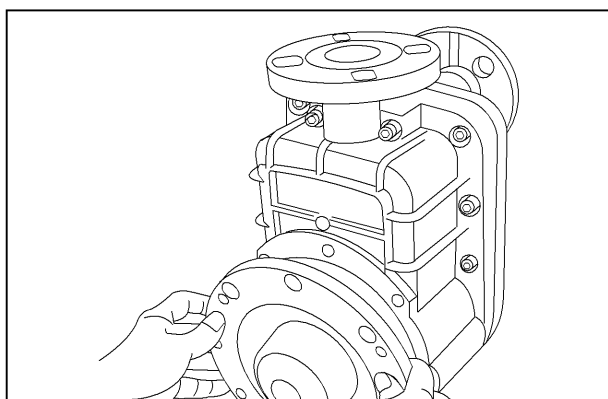
4. Remove all cover caps by using a nippers and loose the 5 nuts which are fixing the front case.



⚠ CAUTION

Be careful. Residual liquid can start to leak at this point.

5. Pull out the rear casing support, rear casing and impeller + magnet capsule UNIT together from the rear case. (RA type has the rear thrust ring. Do not loose it.)



-
-
6. Loose the hex. socket head bolts which are fixing the front case with rear case.
 7. Remove the plate and gasket. Remove the volute spacer if it is installed.

Assembly

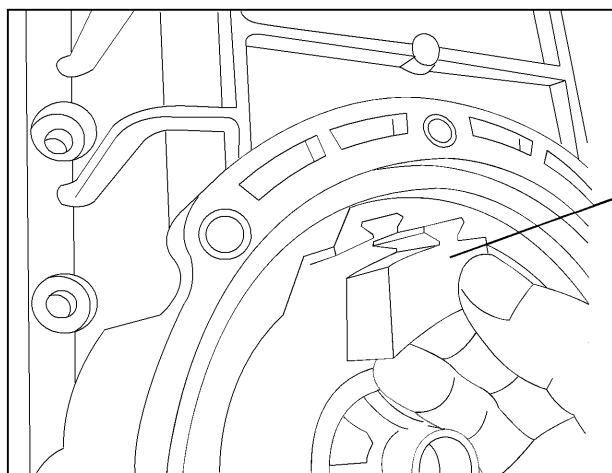
! INSPECTION

If foreign matters such as iron powder stay on the magnet capsule by magnetic force, remove them.

! CAUTION

Check that the fitting spaces for O ring and gasket are free from dust and scratches. Use new parts as necessary.

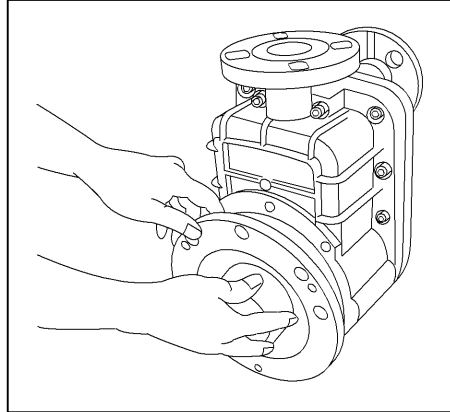
1. Fit the O ring and drain cap to the drain port on the front case.
2. Fit the gasket to the plate. (Make sure the gasket is fitted in the groove on plate in place.)
3. Mount the O ring and plate (and volute spacer if it is provided) to the rear case.
(The volute spacer has a mounting direction)



Volute spacer

4. Lay the rear case on its rear side and mount the front case. Temporarily tighten the hex. socket head bolts for fixing the front and rear cases for preventing the O ring and plate from moving.
5. Insert the spindle to the rear casing through rear thrust.
6. After inserting the impeller to the spindle in the rear casing (For RA type, insert the rear thrust ring between the magnet capsule and rear thrust), first insert an O ring and then place the impeller + rear casing in the rear case.

7. Place the rear casing support in place while holding the rear casing in the rear case. Temporarily tighten the 3 hex. socket head bolts for fixing the rear casing support and the 5 stud bolts for fixing the front case.



8. Tighten the bolts on tightening torque below.

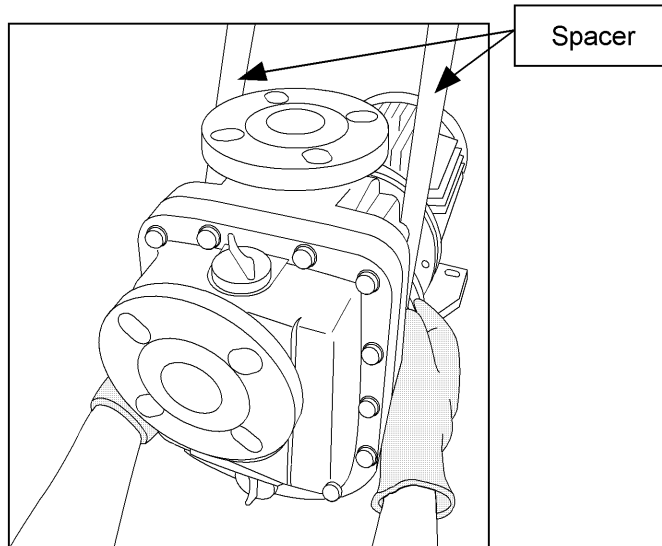
⚠ CAUTION

Stainless bolts/nuts are easy to be stuck.

Tightening torque

Bolt size	Tightening torque
M8	11.8 N•m
M10	14.7 N•m

9. Use spacers to secure a space between the rear casing support and motor bracket not to catch the finger. Carefully place the pump head in the motor bracket while holding the pump head securely.



⚠ CAUTION

Be careful not to catch the finger. The pump head is attracted to the motor by magnet force. Fix the motor for preventing it from attracted to the pump head.

10. Tighten the 4 hex. head bolts for fixing the motor bracket to the rear casing support.

Impeller removal

Tap the back side of the impeller by a plastic hammer while holding the magnet capsule.

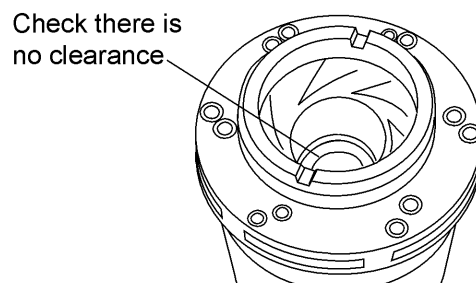
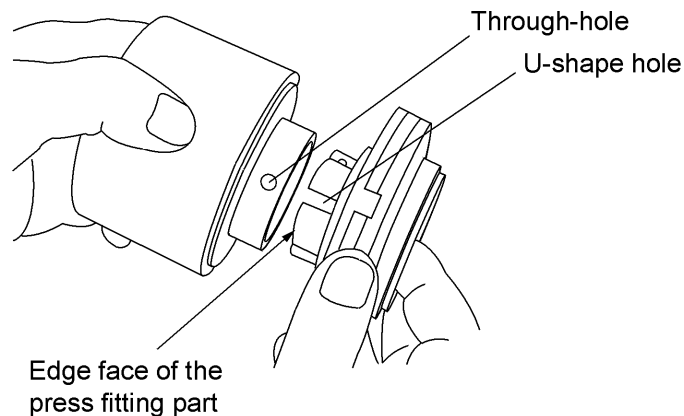
If the impeller can not be removed from the magnet capsule in the above method, immerse the impeller in hot water of 90°C for 5 minutes. And then tap the back side of the impeller by a plastic hammer, again.

CAUTION

Be careful not to get scalded with hot water.

Impeller mounting

Press the impeller into the magnet capsule with concavo-convex in place. Make sure that the through-hole on the magnet capsule comes under the U-shape hole on the impeller and there is no clearance between the edge face of press-fitting part and bearing. If the fitting is too tight to pressfit the impeller into the magnet capsule, immerse the magnet capsule into hot water of 90°C for 5 minutes.





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