

Instruction Manual

Pearl Rotary Joint

NX Series

This instruction manual applies to products with type designations that begin with NXE, NXH.



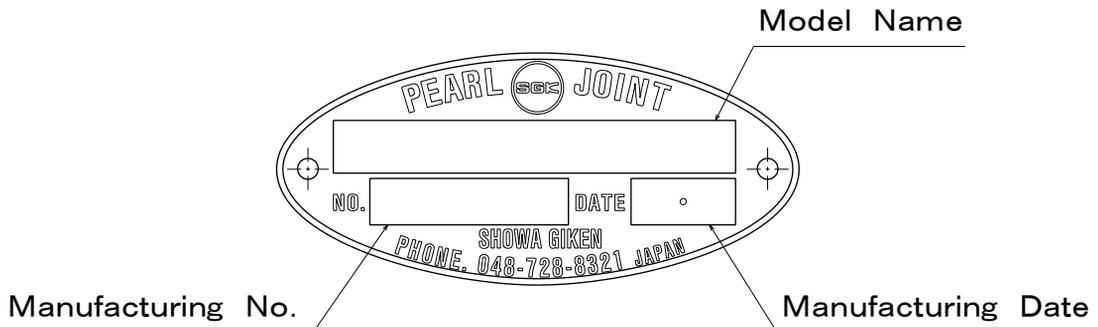
This instruction manual describes important precautions for preventing accidents and how to handle the product. To ensure safe use, be sure to read this manual and fully understand its contents before using this product. Store this manual carefully so that it can be referred to at any time.

Pearl is a trade name of Showa Giken Industrial Co., Ltd.

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1. How to Read Nameplate (Nameplate Information)



The nameplate attached to the product indicates the model name, manufacturing number, and manufacturing date.

2. For Safety

2-1) Symbols

The symbols used in this instruction manual are described below.



Indicates that failure to follow the warning message may cause bodily accidents that may result in serious or even fatal injury.



Indicates that failure to follow the caution message may cause personal injury or damage to peripheral equipment.



Indicates that failure to follow the instruction message may cause reduced product lifetime, product damage, or early leakage.



Indicates “prohibited actions”.

2-2) For safe use

1. Transport, storage, installation, piping, operation, or maintenance of this product should be carried out by an experienced expert.
2. Be sure to observe all warnings, cautions, and instructions described in each section.
3.  Never disassemble or modify this product because doing so is dangerous. We shall assume no responsibility for any malfunctions, accidents, or the results thereof involving a reassembled product after disassembly or a modified product. Also, a reassembled product after disassembly or a modified product shall not be covered by the product warranty even if the warranty period is still valid. This also applies to repairs done by yourself.
4. Confirm specifications (dimensions, materials, masses) indicated on individual product drawings before starting work. Contact our sales representative for requests for product drawings.
5. Always use the latest instruction manual. You can download the latest version from our website.

3. Product Overview

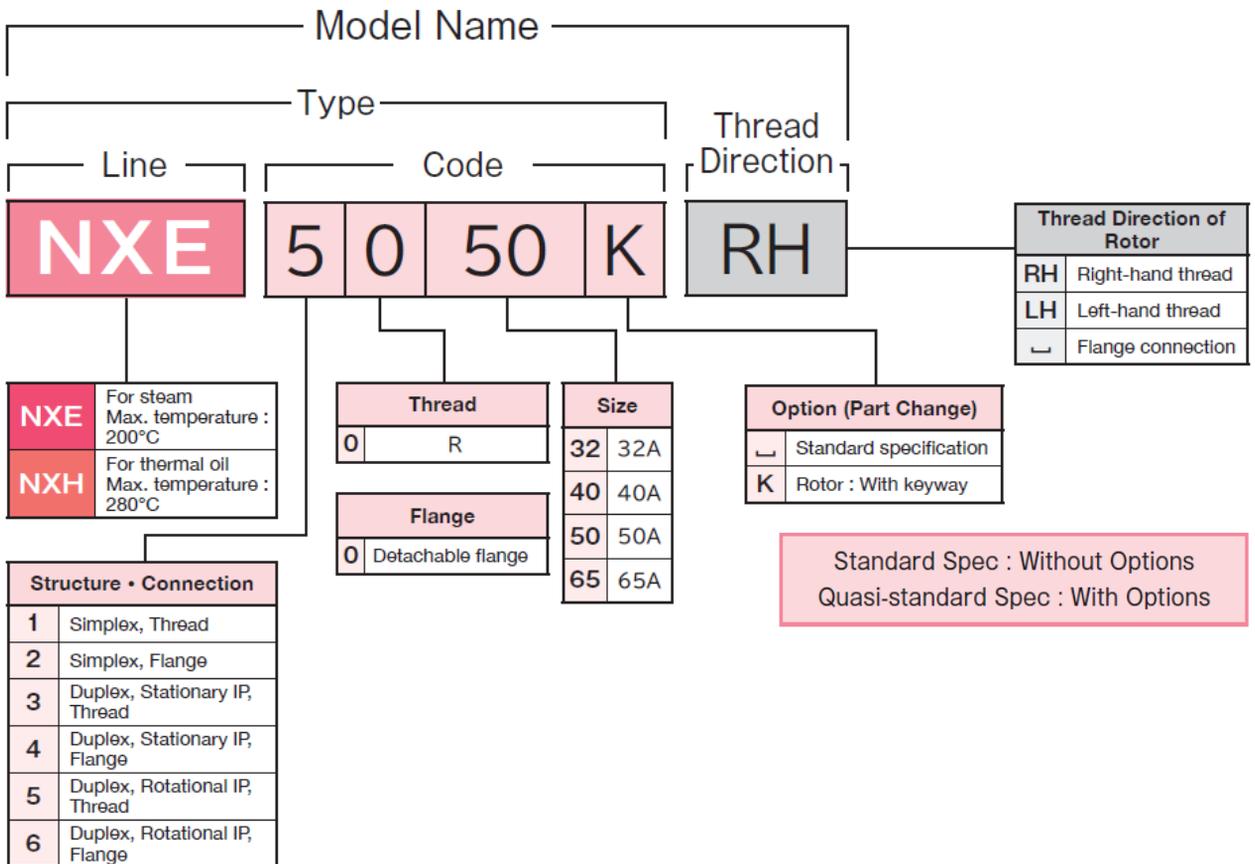
3-1) Application

A rotary joint is used for supplying fluid to or draining it from a machine rotating part called a roll, drum or cylinder, via fixed pipes.

3-2) Information indicated by model names

Information indicated by NX series model names is described below.

The product list is shown in our catalog or on our website.



Note 1) For 32A, only thread connection is available.

2) "┌" indicates a space. A model name is indicated without spaces.

If you have any questions, contact our sales representative.

3-3) Service conditions

Service Conditions of NX Series

Series	Line	Fluid	Size	Max.		
				Pressure (MPa)	Rotation speed (min ⁻¹)	Temperature (°C)
NX	NXE	Saturated Steam	32A~65A	1.5	150	200
	NXH	Thermal Oil	32A~65A	1.0	150	280

3-4) Precautions for use

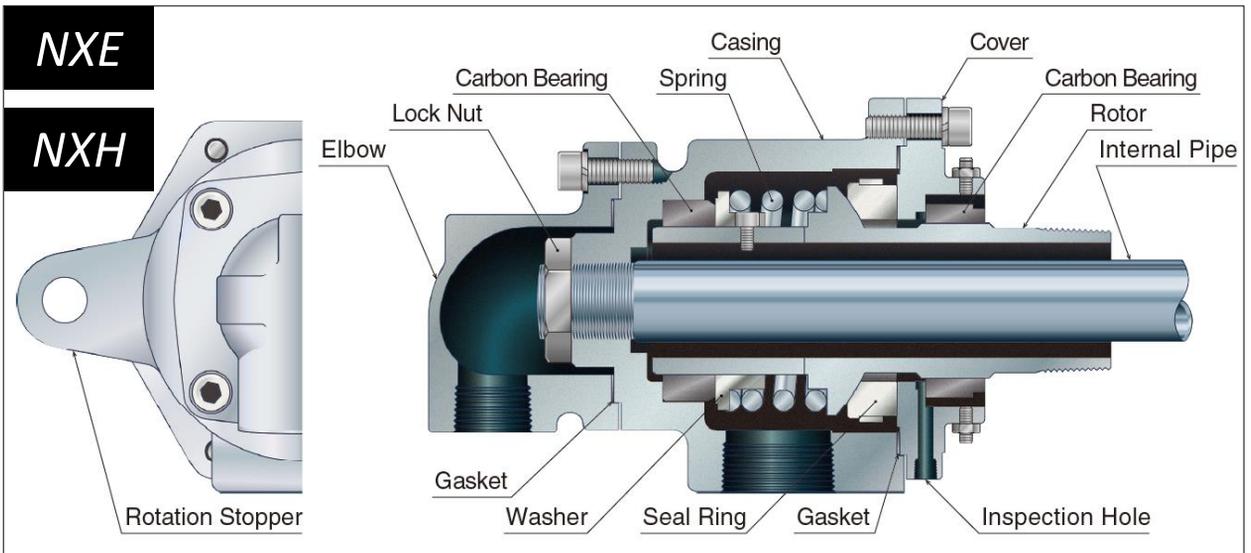
Use this product by following the warnings and instructions described below.

 WARNING	<ol style="list-style-type: none"> 1. If flammable fluids leak and ignite, bodily accidents including serious or even fatal injury, or accidents that damage peripheral equipment may occur due to explosion or fire. Depending on the type of fluid, this product may subject to restrictions due to national laws or local regulations. 2.  This product cannot be used for food-processing machinery. Doing so may lead to adverse health effects.
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 Instruction	<ol style="list-style-type: none"> 1. Perform operation within the service conditions. 2.  Do not operate under conditions where both pressure and rotation speed are close to the max. values. Doing so significantly reduces product lifetime. 3.  This product cannot be used in temperature conditions where the product ambient temperature exceeds the upper limit of the service conditions. 4.  The product cannot be used for liquid containing solid particles (slurry) or pulverulent body. The product cannot be used for fluid that causes corrosion on it. 5.  <u>This product cannot be used for operation with no rotation, intermittent rotation, or low-rotation speed (a few rotations per minute).</u> Otherwise, fluid leakage may occur.
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3-5) Product structures and materials

NXE and NXH are different in terms of seal ring shape and materials of the spring and gasket.



Materials of Main Components

Part Name	Material
Rotor	Carbon Steel
Casing	Cast Iron
Cover	Cast Iron
Elbow	Cast Iron
Seal Ring	Carbon

Heat-resistant paint is applied to external parts.

Note) Component materials are indicated on product drawings.

Contact our sales representative for requests for product drawings.

3-6) Product dimensions

Product dimensions are shown on product drawings, in our catalog, or on our website.

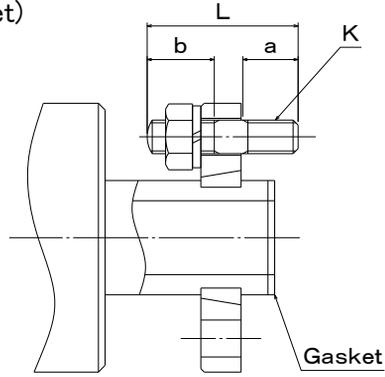
3-7) Product masses

Masses of NX Series (kg)

Line	Code	32A	40A	50A	65A
NXE NXH	10**	8.1	7.9	11.8	15.7
	20**	-	8.6	13.4	17.6
	30**	9.2	9.0	13.6	16.5
	40**	-	9.8	15.2	18.4
	50**	9.2	9.0	15.0	16.3
	60**	-	9.9	15.7	18.2

3-8) Accessories

1. A product installed with a flange is supplied with a gasket (copper jacket) and four sets of a stud bolt (SS400), a hex. nut (SS400), and a spring washer (SWRH).



Accessories(Flange Connection) (mm)

Type	Size	Gasket			Stud Bolt				Hex. Nut	Spring Washer
		Outer Dia.	Inner Dia.	Thick-ness	K	L	a	b		
NXE	40A	49	37	3.2	M10	48	15	20	M10 type1	M10 No.2
	50A	64	50	3.2	M12	58	18	27	M12 type1	M12 No.2
NXH	65A	79	62	3.2						

2. A duplex, stationary IP, flange connection product is supplied with a lock nut (right-hand thread) used for securing the internal pipe to the product. The material of the lock nut is SS400.
3. A duplex, rotational IP product is supplied with a gland (C3604), a lock nut (C3604), and four packings for 32A – 40A or three packings for 50A – 65A. Each part is temporarily installed in the product.

4. Transport and Storage

4-1) Transport

Transport this product by following the cautions and instructions described below.



CAUTION

To transport a product that weighs over 25 kg, use appropriate lifting equipment to prevent injuries.

Note) Even if the product weight is less than 25 kg, it increases to 25 kg or more when an internal pipe or a journal flange is installed to the product.



Instruction

1. **Do not subject the product to undue impact** while it is being transported. Falling down or impact causes product damage (seal ring, etc.) or early leakage. If the product fell down or was damaged, contact us for maintenance.
2. When transporting a product with an internal pipe, **do not secure the product so that the load is directly applied to the internal pipe**. Doing so may bend the internal pipe, hindering installation to a roll. Moreover, abnormal noise or early leakage may result after installation.

4-2) Storage

An improper storage method causes product damage or early leakage.

Store this product by following the instructions described below.



Instruction

1. Wrap the product before storing it to prevent the entry of foreign objects.
2. Store this product in a dry environment at 10°C to 40°C.
3. The storage period should be within two years. If the storage period exceeds two years, contact us for maintenance.
4. If the product is stored after use, clean and then store it under the above conditions.

5. Installation to Machinery

Product adjustment is not required before installation.

5-1) Internal pipe (for duplex only)

Install an internal pipe to the product according to the following instructions.

 Instruction

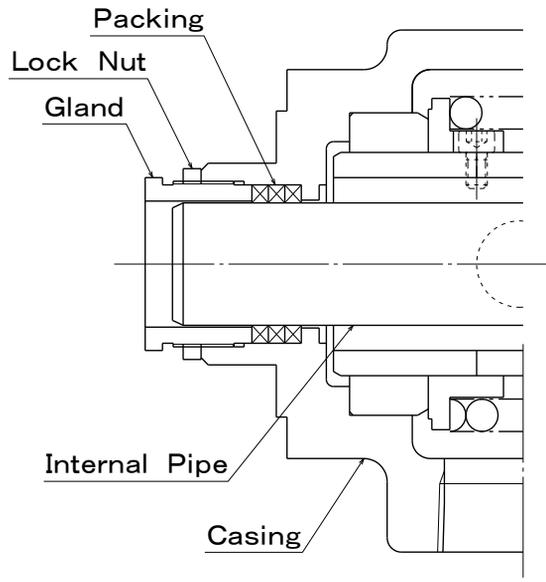
1. When inserting an internal pipe into the product rotor, **be careful so that the pipe does not hit inner parts**. Failure to do so could cause inner part damage, resulting in fluid leakage.
2. When installing an internal pipe to the product, **be careful not to bend the pipe**. If it is bent, product installation to a roll may be hindered. Also, vibration or abnormal noise after installation, or early leakage may result.

● Duplex, stationary IP (NXE30**, NXE40**, NXH30**, NXH40**)

Screw the G thread (right-hand thread) of an internal pipe into the casing, and then secure it with a supplied lock nut.

● Duplex, rotational IP (NXE50**, NXE60**, NXH50**, NXH60**)

1. Unscrew the lock nut, remove the gland, and then remove the packings.
2. Insert the internal pipe.
3. Install the packings.
4. Install the gland and secure it with the lock nut.



Note) The number of packings varies depending on the product size. Three packings are used for 32A and 40A, and four packings for 50A and 65A.

5-2) Installing to a roll

Install the product by following the warnings, cautions, and instructions described below.



WARNING

Be sure to install the product so that an inspection hole faces downward.

Also, **do not block the hole.** This hole is used for detecting leakage at an early stage. If this hole is directed toward other directions or is blocked, leakage cannot be detected at an early stage.



CAUTION

In order to prevent injuries, take the product weight into consideration before installing the product. Use equipment such as a crane as necessary. This work should be performed by two or more persons.



Instruction

1. **Remove any foreign objects in such flow passages as a pipe or a roll** before product installation. If the fluid contains foreign objects, install a strainer at the flow passages. Foreign objects cause early leakage.
2. If the product is installed with its center misaligned or tilted, vibration or abnormal noise may result. Moreover, the product or machine equipment may be damaged due to vibration.
3. When tightening screws or nuts, properly torque-tighten them according to the screw type or size.
4. To prevent uneven tightening, evenly tighten flange screws in a cross pattern.
5. Perform retightening after the start of use.
6.  To prevent internal pipe damage, do not hook a webbing sling to an internal pipe. Hook a webbing sling to a casing.
A rotation stopper hole can be used for suspension.

● Installation: taper thread

1. Wrap seal tape around the taper thread of the rotor.
2. Use the shank on the rotor to screw the product into a roll.

● Installation: flange

1. Install the supplied stud bolts to a roll.
2. Install the supplied gasket to a roll socket.
3. Insert the rotor spigot into the roll socket while checking that the stud bolts go through the rotor flange holes.
4. Set spring washers on the stud bolts, and then secure the product with the supplied nuts.

The flange is detachable. Install it to the rotor together with a split ring in advance.

5-3) Pipe laying

Perform pipe laying work by following the warnings and instructions described below.



WARNING

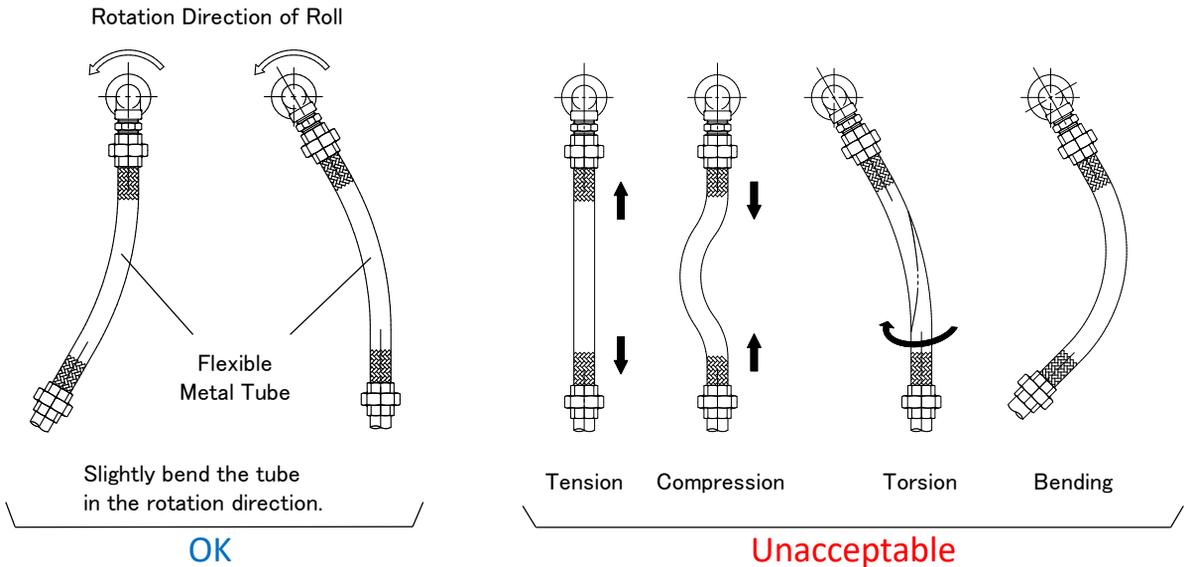
Use a flexible metal tube suitable for characteristics of the fluid used and operating conditions (pressure, temperature). If an unsuitable flexible metal tube is used, it may be damaged, causing injury to workers or damage to peripheral equipment.



Instruction

Observe the following instructions to prevent the generation of force applied to the sides of the product, possibly causing product damage or early leakage.

1. **Use a flexible metal tube for connection to the product.**
2.  **Steel pipes should not be used for pipe laying.**
3.  **Avoid such pipe laying where heavy items such as valves are suspended from the product.**
4. **When installing a flexible metal tube, slightly bend it in the rotation direction of roll.** (See the bottom left figure.)
5. **Carry out pipe laying work so that excessive “tension”, “compression”, “torsion”, or “bending” is not applied to a flexible metal tube.** In particular, “torsion” may significantly reduce the lifetime of the flexible metal tube. (See the bottom right figure.)
6. Use the following table as a guideline for the flexible metal tube length.



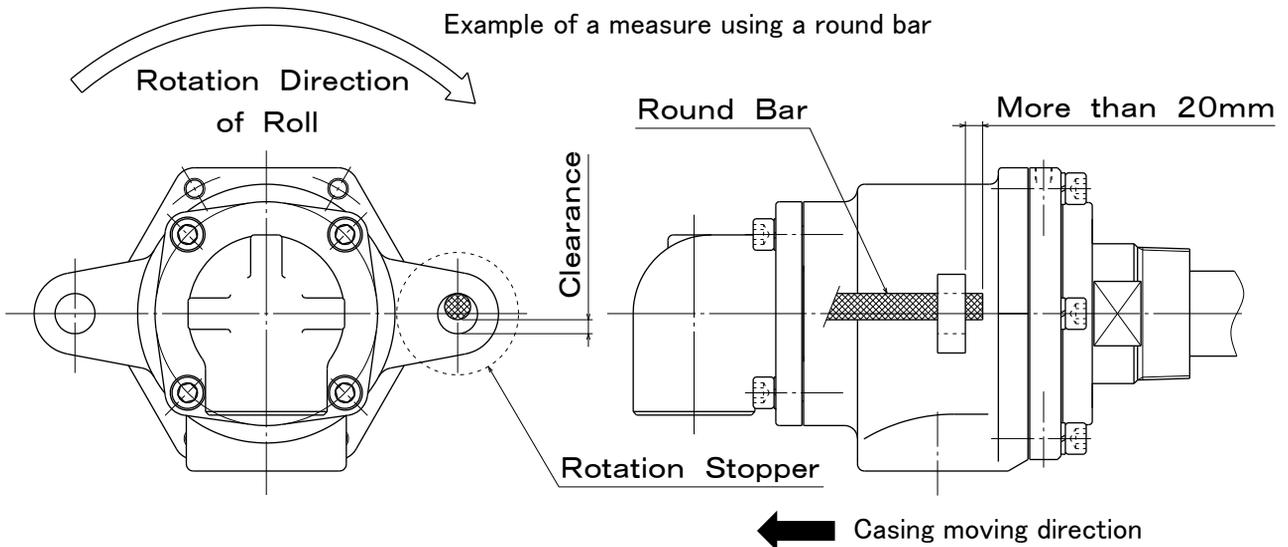
Flexible Metal Tube Length (Guideline) (mm)

Size	20A	25A	32A/40A	50A	65A
Length	300~400	400~500	600~800	900~1000	1200~1300

5-5) Measures for preventing rotation

A measure for preventing casing rotation is required. In order to prevent product damage or early leakage, take a measure according to the following instructions.

 Instruction	<ol style="list-style-type: none">1. Use an anti-rotation plate or a round bar in considering the change in casing position after a certain period of operation time has elapsed.2.  Do not secure the rotation stopper to an anti-rotation plate or a round bar.3. Use an anti-rotation plate or a round bar whose contact part with the rotation stopper is smooth. Moreover, provide space on the opposite side of the contact part.
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Note) The seal face of the seal ring becomes worn over the course of operation time, and the casing moves in the arrow direction.

6. Removal from Machinery

Remove the product by following the warnings, cautions, and instructions described below in reverse order of the installation.

 WARNING	In order to prevent bodily accidents due to residual fluid in the product or pipes, remove the product after fluid has been completely drained from the product or pipes and temperature has dropped to room temperature.
 CAUTION	In order to prevent injuries, take the product weight into consideration before removing the product. Use equipment such as a crane as necessary. This work should be performed by two or more persons.
 Instruction	 To prevent internal pipe damage, do not hook a webbing sling to an internal pipe. Hook a webbing sling to a casing. A rotation stopper hole can be used for suspension.

7. Operation

7-1) Operation

Perform operation by following the warnings, cautions, and instructions described below.



WARNING

Immediately stop operation if fluid leakage is detected during operation. If operation is continued with fluid leakage not being repaired, serious accidents including bodily accidents may result.



CAUTION



During rotation or high-temperature/pressure fluid flow, keep well away from the product to prevent injuries or burns. Do not directly touch rotating or hot parts during operation.



Instruction

1. When starting operation, check for abnormal rotation (center runout, abnormal noise, etc.) or fluid leakage from the product while gradually increasing fluid pressure and roll rotational velocity.
2. If operation is continued under a center runout condition, product damage or fluid leakage may result.
3. The occurrence of surging or water hammer can cause product damage or fluid leakage. Avoid such occurrence.
4.  **Do not perform dry operation (operation without fluid flow) for a long time.**
The product lifetime becomes shortened.

7-2) Operation shutdown

Follow the following instructions during operation shutdown.



Instruction

1. **If the product is left as is for a long time during operation shutdown, rust may occur, causing fluid leakage after operation restart.** Clean flow passages for the product, pipes, and roll before restarting operation.
2.  Do not put your hand on or ride on the product during equipment maintenance. Doing so may cause product damage or fluid leakage after operation restart.

8. Inspection and Maintenance

8-1) Daily inspection

Perform inspection according to the following instructions.

 Instruction	<ol style="list-style-type: none">1. Visually check pipe connections, product connections, and the product for fluid leakage. If leakage is detected, repair the product or replace it with a new one.2. When replacing, use the same type of product with the same size.
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8-2) Greasing

As carbon bearings are used, greasing is not required.

8-3) Repair and replacement of consumables

The carbon bearings and the seal faces of the seal ring become worn over the course of operation time, and such malfunctions as fluid leakage may occur. However, the product can be reused by repairing or replacing worn or deteriorated parts.

Contact us for repair or parts replacement. We carry it out according to our repair program. Depending on the products, expenses for purchasing new products may be lower than repair expenses. Consult with us when requesting repair or replacement.

< When carrying out repair or replacement of consumables by yourself >

- Repair or replacement should be carried out by an experienced expert.
- Perform work according to “A. Appendix – How to Repair or Replace Consumables”.
- Use our genuine parts as replacement parts.
Contact our sales representative to request genuine parts.
- Properly dispose of waste resulting from work according to national laws or local government regulations or ordinances.

(Attention)

If you carry out repair or replacement, we shall assume no responsibility for any product malfunctions, equipment malfunctions or accidents resulting from such product or the results thereof. Also, the product shall not be covered by the product warranty even if the warranty period is still valid.

9. Troubleshooting

This section describes the possible causes of and countermeasures against malfunctions.
If a problem persists, contact our sales representative for assistance.

Malfunctions	Causes	Countermeasures
Fluid is leaking from the product.	A load is applied to the product due to an improper method of pipe laying.	Review the pipe laying method.
	The seal ring is damaged. The seal ring lifetime has been reached. The rotor seal face (sphere) is damaged. The cover seal face (plane) is damaged.	Contact us for repair.
	The fluid contains foreign objects.	Clean the inside of the product, pipes, and roll. Install a strainer.
	A load is applied to the product due to improper countermeasures for preventing rotation.	Review the countermeasure for preventing rotation.
	Improper prevention of rotation hinders casing movement caused by seal ring wear.	Review the countermeasure for preventing rotation.
	Operation is performed without rotation, or operation occasionally ceases during the operation cycle.	Consult with us.
	Operation is performed at low-rotation speed (a few rotations per minute).	Consult with us.
	Improper product selection.	Consult with us.
The product has center runout. (It is vibrating.)	The rotation axes of a roll and the product are misaligned with each other. <Flange connection type>	-
	The shaft end socket of a roll is offset from the roll rotation axis. <Thread connection type>	-
	The shaft end screw hole of a roll is offset from the roll rotation axis.	-
	The rotation axes of a roll and the product are inclined from each other. <Flange connection type>	-
	The shaft end socket of a roll is offset from the roll rotation axis. Uneven tightening of fixing screws. <Thread connection type>	-
	The center lines of screw holes for fixing the product are inclined from the roll rotation axis. The product is screwed in diagonally.	-
Noise occurs.	The internal pipe bends and comes in contact with the inner perimeter of the product rotor or that of the roll shaft.	Straighten the bent internal pipe.
	The internal pipe bent by its weight comes in contact with the inner perimeter of the product rotor or that of the roll shaft.	Consult with us.
	A load is applied to the product due to an improper method of pipe laying.	Review the pipe laying method.

10. Disposal

When disposing of packaging materials or products, properly dispose of them according to national laws or local government regulations or ordinances.

11. Product Warranty

If a malfunction occurs during the warranty period, contact us or the distributor and send the product to us. Be sure to carefully pack the product for protection before sending it. After receiving the product, we will confirm the malfunction. If the malfunction was clearly caused by the materials of product components or the manufacturing method, we will repair the product in question or replace it with a new one free of charge.

Product Warranty Provision

1. Warranty period

<New products>

One (1) year and six (6) months after shipment (from the manufacturing date) or one (1) year after installation, whichever comes first.

<Repaired products>

Six (6) months after shipment (from the manufacturing date).

2. We charge a fee for repairs in any of the following cases.

- ① Failure after the warranty period has expired
- ② Failure caused by use of the product deviating from the service conditions
- ③ Failure caused by misuse
(improper storage, installation, pipe laying, operation or maintenance, etc.)
- ④ Failure caused by fluid contaminants or foreign objects in the fluid
- ⑤ Failure caused by relocation, transport, or falling of the product after delivery
- ⑥ Failure caused by disassembly, repair, or modification done by personnel other than our service personnel
- ⑦ Failure of the product attributed to using materials or according to standards specified by the customer
- ⑧ Failure of the product attributed to using materials provided by the customer
- ⑨ Failure caused due to unavoidable acts of nature such as fires or other natural disasters

3. Scope of responsibility

Our responsibility shall be limited to repairs, replacements, or transport expenses covered by this product warranty provision. Expenses or damages caused by said failures above shall not be covered.

4. Applicable regions

This product warranty provision shall be applicable to products installed in Japan.

Contact our sales representative if you install and use our products outside Japan.

5. Another agreement

If another product warranty agreement is made separately with us and clearly states that said agreement shall have priority over this product warranty provision, this provision shall not be applicable.

6. This product warranty provision shall not restrict the customer's legal rights.

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株式会社 昭和技研工業
SHOWA GIKEN INDUSTRIAL CO., LTD.

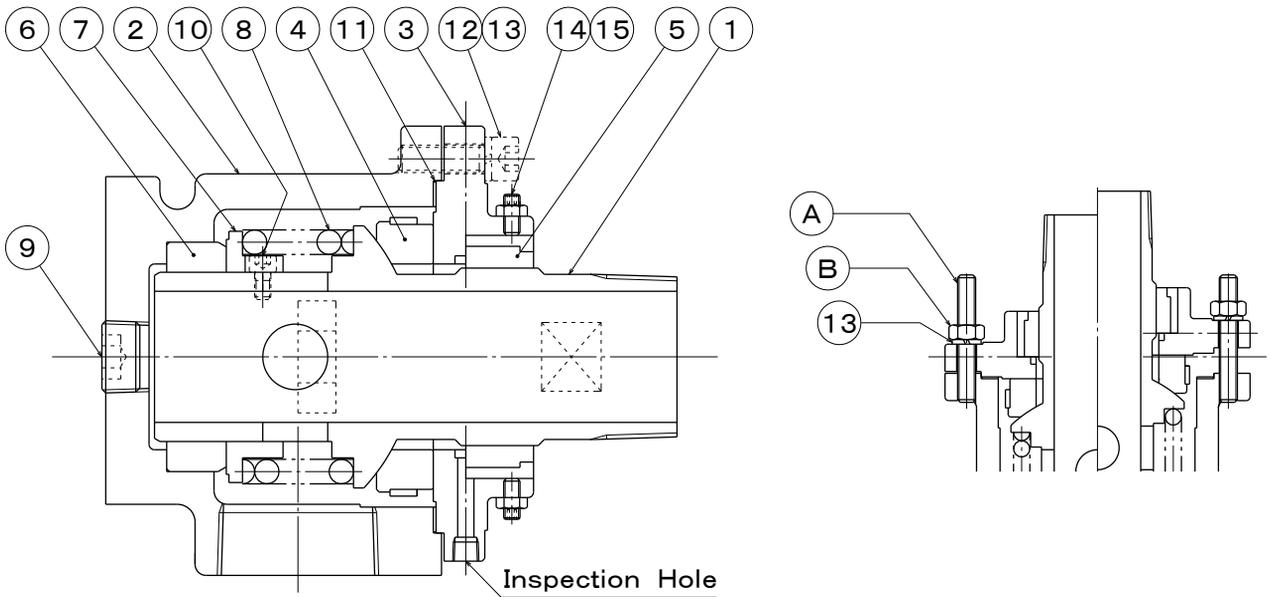
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A. Appendix – How to Repair or Replace Consumables

A-1) For simplex, thread connection (NXE10**, NXH10** / 32A~65A)



- ①Rotor ②Casing ③Cover ④Seal Ring ⑤Carbon Bearing ⑥Carbon Bearing
 ⑦Washer ⑧Spring ⑨Plug ⑩Cap Screw ⑪Gasket ⑫Cap Screw
 ⑬Spring Washer ⑭Set Screw ⑮Hex. Nut
 ⒶFully-threaded Bolt (32A~50A:M10×70, 65A:M12×80)
 ⒷHex. Nut (32A~50A:M10, 65A:M12)
 ※ Ⓐ and Ⓑ are not included in the product. You must procure them.

< Disassembly >

Carefully disassemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces of rotor ①, cover ③, and seal ring ④.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Remove plug ⑨ from casing ②.
- 3) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 4) Remove cover ③ according to the following procedure. (See the right figure.)
 - a) Remove two opposing cap screws ⑫ on each side together with spring washers ⑬.
 - b) Install fully-threaded bolts Ⓐ, and then tighten hex. nuts Ⓑ together with spring washers ⑬.
 - c) Remove the remaining cap screws ⑫ together with spring washers ⑬.
 - d) Alternately unscrew hex. nuts Ⓑ until the reaction force of spring ⑧ disappears.
 - e) Remove fully-threaded bolts Ⓐ and cover ③.
- 5) Remove gasket ⑪, seal ring ④, rotor ①, spring ⑧, washer ⑦, and carbon bearing ⑥ from casing ②.
- 6) Unscrew hex. nuts ⑮ and set screws ⑭, and then remove carbon bearing ⑤ from cover ③.
- 7) Remove cap screws ⑩ from rotor ①.

< Inspection >

Clean each part and check for damage. In particular, check the degree of wear and damage on the seal faces of rotor ①, cover ③, and seal ring ④.

< Repair and parts replacement >

- 1) Rotor ①, cover ③, and seal ring ④ may be reused by repairing their seal faces in case of minor damage.
- 2) Replace gasket ⑪ with a new one regardless of its condition.
- 3) If repair or reuse of parts is impossible, replace them with our new genuine parts.
Contact our sales representative to request genuine parts.

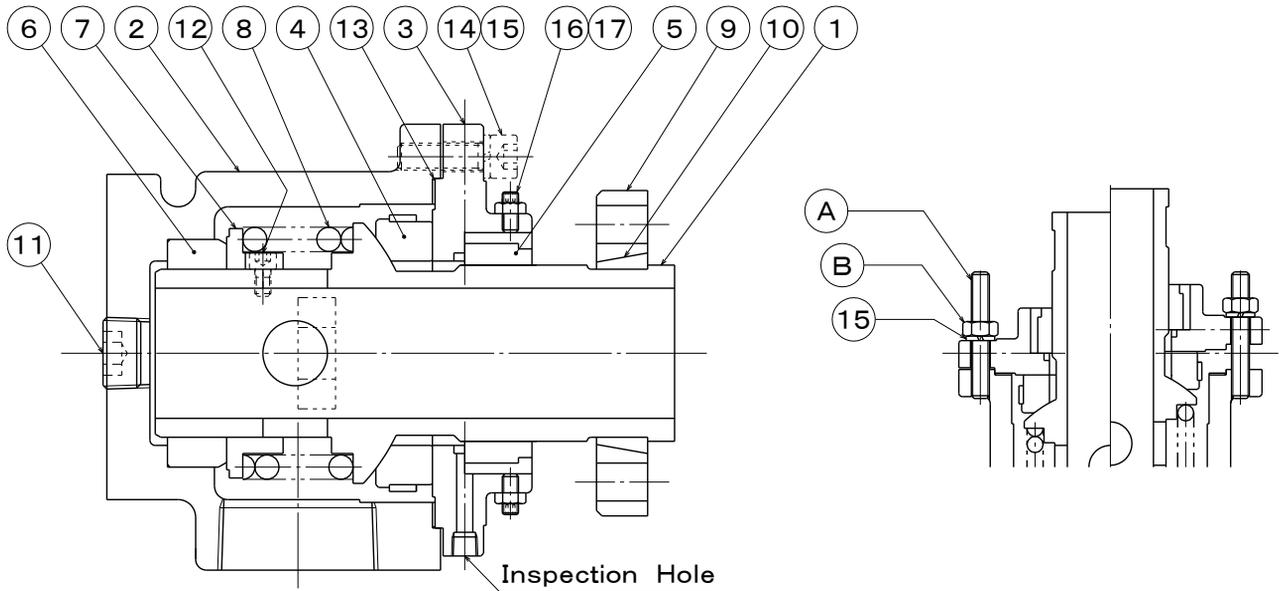
< Assembly >

Assemble the product in the reverse order of disassembly.

Carefully assemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces. If dust adheres to the seal face, wipe it off with thinner.

- 1) Install cap screws ⑩ to rotor ①.
- 2) Install carbon bearing ⑤ to cover ③, and then secure it with set screws ⑭ and hex. nuts ⑮.
- 3) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 4) Apply a thin coat of machine oil to the seal faces (sphere and plane) of seal ring ④.
- 5) Install carbon bearing ⑥, washer ⑦, spring ⑧, rotor ①, and seal ring ④ to casing ② in order.
Install rotor ① so that cap screws ⑩ and the notches of washer ⑦ are aligned with each other.
- 6) Install gasket ⑪ to casing ② and mount cover ③.
- 7) Secure cover ③ according to the following procedure.
 - a) Install two opposing fully-threaded bolts ① on each side. Alternately tighten hex. nuts ② together with spring washers ③.
 - b) Evenly tighten cap screws ④ together with spring washers ⑤ in a cross pattern.
 - c) Remove fully-threaded bolts ① and spring washers ③.
 - d) Alternately tighten the remaining cap screws ④ together with spring washers ⑤.
- 8) Place the product horizontally, wrap seal tape around plug ⑨, and then install to casing ②.
- 9) Check that rotor ① smoothly rotates.

A-2) For simplex, flange connection (NXE20**, NXH20** / 40A~65A)



- ①Rotor ②Casing ③Cover ④Seal Ring ⑤Carbon Bearing ⑥Carbon Bearing
 ⑦Washer ⑧Spring ⑨Rotor Flange ⑩Split Ring ⑪Plug ⑫Cap Screw
 ⑬Gasket ⑭Cap Screw ⑮Spring Washer ⑯Set Screw ⑰Hex. Nut
 A Fully-threaded Bolt (40A~50A: M10 × 70, 65A: M12 × 80)
 B Hex. Nut (40A~50A: M10, 65A: M12)

※ A and B are not included in the product. You must procure them.

< Disassembly >

Carefully disassemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces of rotor ①, cover ③, and seal ring ④.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Remove plug ⑪ from casing ②.
- 3) Move rotor flange ⑨ to the casing ② side and remove split ring ⑩.
Then pull out rotor flange ⑨ from rotor ①.
- 4) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 5) Remove cover ③ according to the following procedure. (See the right figure.)
 - a) Remove two opposing cap screws ⑭ on each side together with spring washers ⑮.
 - b) Install fully-threaded bolts A, and then tighten hex. nuts B together with spring washers ⑮.
 - c) Remove the remaining cap screws ⑭ together with spring washers ⑮.
 - d) Alternately unscrew hex. nuts B until the reaction force of spring ⑧ disappears.
 - e) Remove fully-threaded bolts A and cover ③.
- 6) Remove gasket ⑬, seal ring ④, rotor ①, spring ⑧, washer ⑦, and carbon bearing ⑥ from casing ②.
- 7) Unscrew hex. nuts ⑰ and set screws ⑯, and then remove carbon bearing ⑤ from cover ③.
- 8) Remove cap screws ⑫ from rotor ①.

< Inspection >

Clean each part and check for damage. In particular, check the degree of wear and damage on the seal faces of rotor ①, cover ③, and seal ring ④.

< Repair and parts replacement >

- 1) Rotor ①, cover ③, and seal ring ④ may be reused by repairing their seal faces in case of minor damage.
- 2) Replace gasket ⑬ with a new one regardless of its condition.
- 3) If repair or reuse of parts is impossible, replace them with our new genuine parts.
Contact our sales representative to request genuine parts.

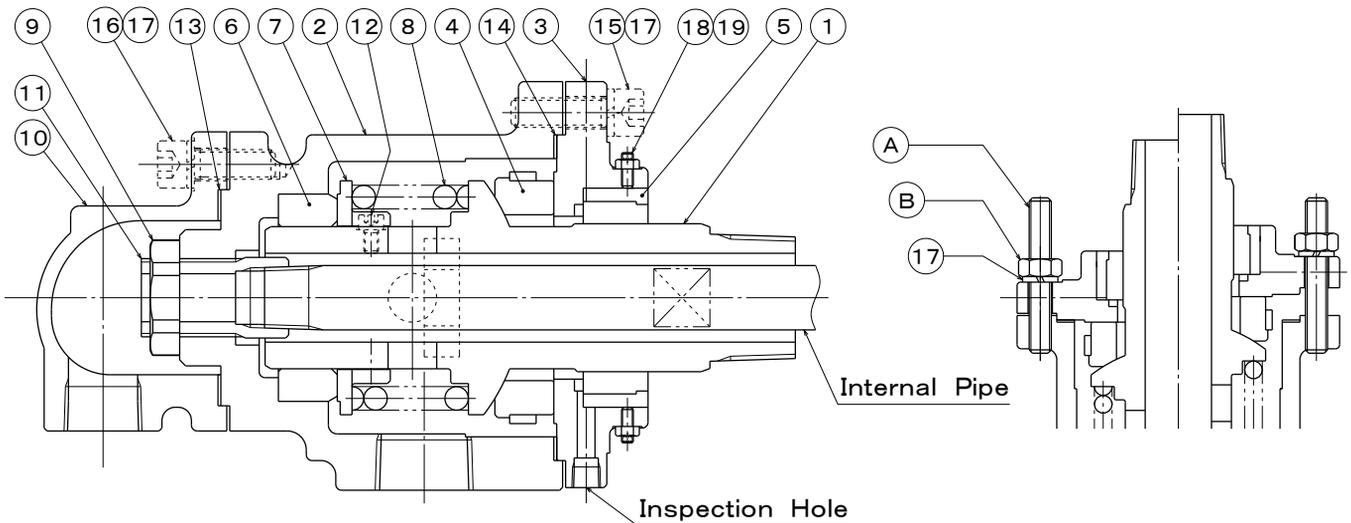
< Assembly >

Assemble the product in the reverse order of disassembly.

Carefully assemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces. If dust adheres to the seal face, wipe it off with thinner.

- 1) Install cap screws ⑫ to rotor ①.
- 2) Install carbon bearing ⑤ to cover ③, and then secure it with set screws ⑯ and hex. nuts ⑰.
- 3) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 4) Apply a thin coat of machine oil to the seal faces (sphere and plane) of seal ring ④.
- 5) Install carbon bearing ⑥, washer ⑦, spring ⑧, rotor ①, and seal ring ④ to casing ② in order.
Install rotor ① so that cap screws ⑫ and the notches of washer ⑦ are aligned with each other.
- 6) Install gasket ⑬ to casing ② and mount cover ③.
- 7) Secure cover ③ according to the following procedure.
 - a) Install two opposing fully-threaded bolts ① on each side. Alternately tighten hex. nuts ② together with spring washers ③.
 - b) Evenly tighten cap screws ④ together with spring washers ③ in a cross pattern.
 - c) Remove fully-threaded bolts ① and spring washers ③.
 - d) Alternately tighten the remaining cap screws ④ together with spring washers ③.
- 8) Place the product horizontally, wrap seal tape around plug ⑪, and then install to casing ②.
- 9) Check that rotor ① smoothly rotates.
- 10) Insert rotor flange ⑨ into rotor ① and install split ring ⑩.
Then move rotor flange ⑨ to the split ring ⑩ side.

A-3) For duplex, stationary IP, thread connection (NXE3032 , NXH3032 / 32A)



- ①Rotor ②Casing ③Cover ④Seal Ring ⑤Carbon Bearing ⑥Carbon Bearing
 ⑦Washer ⑧Spring ⑨Lock Nut ⑩Elbow ⑪Socket ⑫Cap Screw ⑬Gasket
 ⑭Gasket ⑮Cap Screw ⑯Cap Screw ⑰Spring Washer ⑱Set Screw ⑲Hex. Nut
 (A) Fully-threaded Bolt (M10 × 70) (B) Hex. Nut (M10)

※ (A) and (B) are not included in the product. You must procure them.

< Disassembly >

Carefully disassemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces of rotor ①, cover ③, and seal ring ④.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Remove cap screws ⑯ together with spring washers ⑰, and then remove elbow ⑩ and gasket ⑬ from casing ②.
- 3) Remove lock nut ⑨, and then remove socket ⑪ and the internal pipe.
- 4) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 5) Remove cover ③ according to the following procedure. (See the right figure.)
 - a) Remove two opposing cap screws ⑮ on each side together with spring washers ⑰.
 - b) Install fully-threaded bolts (A), and then tighten hex. nuts (B) together with spring washers ⑰.
 - c) Remove the remaining cap screws ⑮ together with spring washers ⑰.
 - d) Alternately unscrew hex. nuts (B) until the reaction force of spring ⑧ disappears.
 - e) Remove fully-threaded bolts (A) and cover ③.
- 6) Remove gasket ⑭, seal ring ④, rotor ①, spring ⑧, washer ⑦, and carbon bearing ⑥ from casing ②.
- 7) Unscrew hex. nuts ⑲ and set screws ⑱, and then remove carbon bearing ⑤ from cover ③.
- 8) Remove cap screws ⑫ from rotor ①.

< Inspection >

Clean each part and check for damage. In particular, check the degree of wear and damage on the seal faces of rotor ①, cover ③, and seal ring ④.

< Repair and parts replacement >

- 1) Rotor ①, cover ③, and seal ring ④ may be reused by repairing their seal faces in case of minor damage.
- 2) Replace gaskets ⑬ and ⑭ with a new one regardless of its condition.
- 3) If repair or reuse of parts is impossible, replace them with our new genuine parts.
Contact our sales representative to request genuine parts.

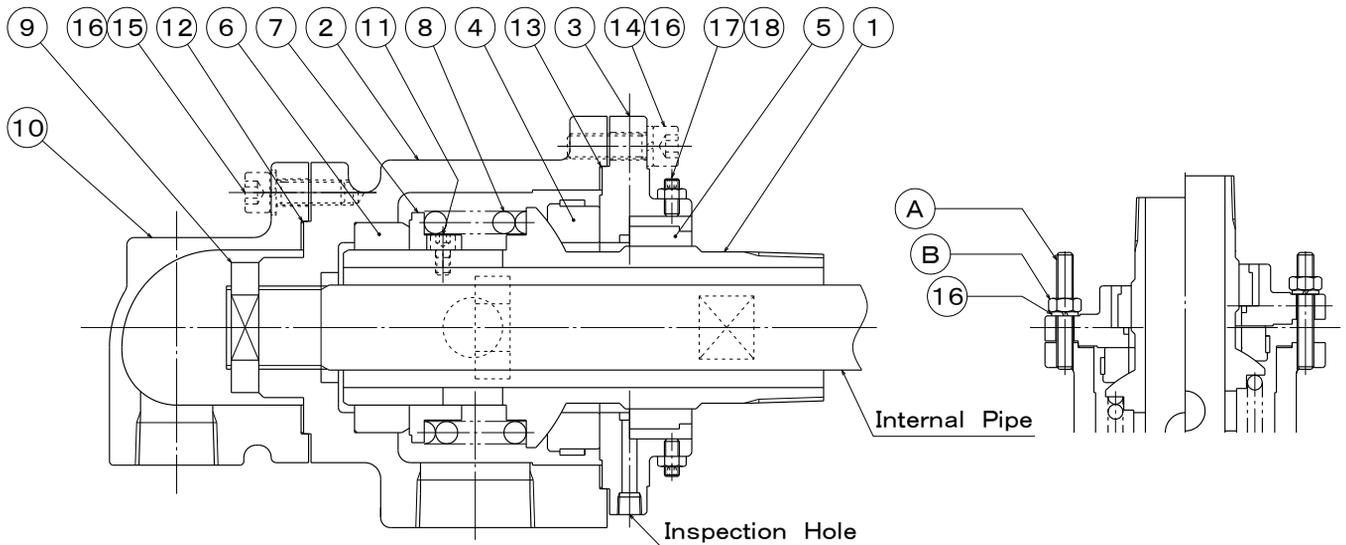
< Assembly >

Assemble the product in the reverse order of disassembly.

Carefully assemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces. If dust adheres to the seal face, wipe it off with thinner.

- 1) Install cap screws ⑫ to rotor ①.
- 2) Install carbon bearing ⑤ to cover ③, and then secure it with set screws ⑱ and hex. nuts ⑲.
- 3) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 4) Apply a thin coat of machine oil to the seal faces (sphere and plane) of seal ring ④.
- 5) Install carbon bearing ⑥, washer ⑦, spring ⑧, rotor ①, and seal ring ④ to casing ② in order.
Install rotor ① so that cap screws ⑫ and the notches of washer ⑦ are aligned with each other.
- 6) Install gasket ⑭ to casing ② and mount cover ③.
- 7) Secure cover ③ according to the following procedure.
 - a) Install two opposing fully-threaded bolts ① on each side. Alternately tighten hex. nuts ② together with spring washers ③.
 - b) Evenly tighten cap screws ④ together with spring washers ③ in a cross pattern.
 - c) Remove fully-threaded bolts ① and spring washers ③.
 - d) Alternately tighten the remaining cap screws ④ together with spring washers ③.
- 8) Check that rotor ① smoothly rotates.
- 9) Place the product horizontally, install socket ⑪ and the internal pipe, and then secure both with lock nut ⑨.
- 10) Install gasket ⑬ to casing ②, and then evenly tighten cap screws ⑯ together with spring washers ⑰ in a cross pattern to secure elbow ⑩.

A-4) For duplex, stationary IP, thread connection (NXE30**, NXH30** / 40A~65A)



- ①Rotor ②Casing ③Cover ④Seal Ring ⑤Carbon Bearing ⑥Carbon Bearing
 ⑦Washer ⑧Spring ⑨Lock Nut ⑩Elbow ⑪Cap Screw ⑫Gasket ⑬Gasket
 ⑭Cap Screw ⑮Cap Screw ⑯Spring Washer ⑰Set Screw ⑱Hex. Nut
 (A) Fully-threaded Bolt (40A~50A: M10 × 70, 65A: M12 × 80)
 (B) Hex. Nut (40A~50A: M10, 65A: M12)

※ (A) and (B) are not included in the product. You must procure them.

< Disassembly >

Carefully disassemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces of rotor ①, cover ③, and seal ring ④.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Remove cap screws ⑮ together with spring washers ⑯, and then remove elbow ⑩ and gasket ⑫ from casing ②.
- 3) Remove lock nut ⑨ and the internal pipe.
- 4) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 5) Remove cover ③ according to the following procedure. (See the right figure.)
 - a) Remove two opposing cap screws ⑭ on each side together with spring washers ⑯.
 - b) Install fully-threaded bolts (A), and then tighten hex. nuts (B) together with spring washers ⑯.
 - c) Remove the remaining cap screws ⑭ together with spring washers ⑯.
 - d) Alternately unscrew hex. nuts (B) until the reaction force of spring ⑧ disappears.
 - e) Remove fully-threaded bolts (A) and cover ③.
- 6) Remove gasket ⑬, seal ring ④, rotor ①, spring ⑧, washer ⑦, and carbon bearing ⑥ from casing ②.
- 7) Unscrew hex. nuts ⑱ and set screws ⑰, and then remove carbon bearing ⑤ from cover ③.
- 8) Remove cap screws ⑪ from rotor ①.

< Inspection >

Clean each part and check for damage. In particular, check the degree of wear and damage on the seal faces of rotor ①, cover ③, and seal ring ④.

< Repair and parts replacement >

- 1) Rotor ①, cover ③, and seal ring ④ may be reused by repairing their seal faces in case of minor damage.
- 2) Replace gaskets ⑫ and ⑬ with a new one regardless of its condition.
- 3) If repair or reuse of parts is impossible, replace them with our new genuine parts.
Contact our sales representative to request genuine parts.

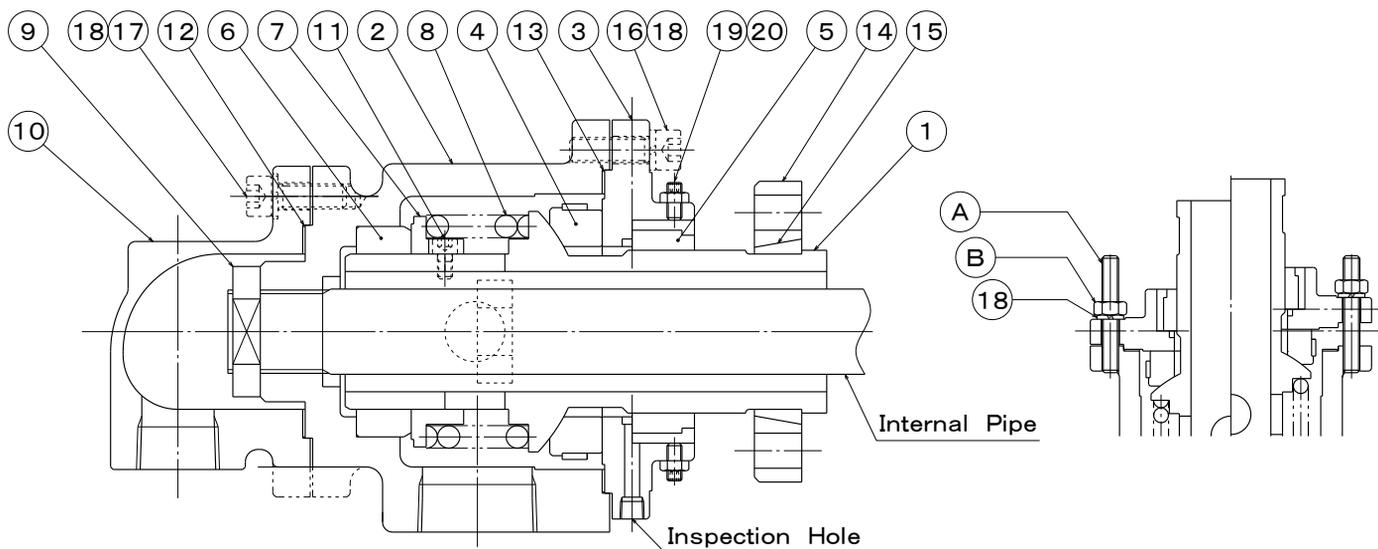
< Assembly >

Assemble the product in the reverse order of disassembly.

Carefully assemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces. If dust adheres to the seal face, wipe it off with thinner.

- 1) Install cap screws ⑪ to rotor ①.
- 2) Install carbon bearing ⑤ to cover ③, and then secure it with set screws ⑰ and hex. nuts ⑱.
- 3) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 4) Apply a thin coat of machine oil to the seal faces (sphere and plane) of seal ring ④.
- 5) Install carbon bearing ⑥, washer ⑦, spring ⑧, rotor ①, and seal ring ④ to casing ② in order.
Install rotor ① so that cap screws ⑪ and the notches of washer ⑦ are aligned with each other.
- 6) Install gasket ⑬ to casing ② and mount cover ③.
- 7) Secure cover ③ according to the following procedure.
 - a) Install two opposing fully-threaded bolts ① on each side. Alternately tighten hex. nuts ② together with spring washers ③.
 - b) Evenly tighten cap screws ④ together with spring washers ③ in a cross pattern.
 - c) Remove fully-threaded bolts ① and spring washers ③.
 - d) Alternately tighten the remaining cap screws ④ together with spring washers ③.
- 8) Check that rotor ① smoothly rotates.
- 9) Place the product horizontally, install the internal pipe, and then secure it with lock nut ⑨.
- 10) Install gasket ⑫ to casing ②, and then evenly tighten cap screws ⑮ together with spring washers ⑯ in a cross pattern to secure elbow ⑩.

A-5) For duplex, stationary IP, flange connection (NXE40**, NXH40** / 40A~65A)



- ①Rotor ②Casing ③Cover ④Seal Ring ⑤Carbon Bearing ⑥Carbon Bearing
 ⑦Washer ⑧Spring ⑨Lock Nut ⑩Elbow ⑪Cap Screw ⑫Gasket ⑬Gasket
 ⑭Rotor Flange ⑮Split Ring ⑯Cap Screw ⑰Cap Screw ⑱Spring Washer
 ⑲Set Screw ⑳Hex. Nut

Ⓐ Fully-threaded Bolt (40A~50A: M10 × 70, 65A: M12 × 80)

Ⓑ Hex. Nut (40A~50A: M10, 65A: M12)

※ Ⓐ and Ⓑ are not included in the product. You must procure them.

< Disassembly >

Carefully disassemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces of rotor ①, cover ③, and seal ring ④.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Move rotor flange ⑭ to the casing ② side and remove split ring ⑮.
Then pull out rotor flange ⑭ from rotor ①.
- 3) Remove cap screws ⑰ together with spring washers ⑱, and then remove elbow ⑩ and gasket ⑫ from casing ②.
- 4) Remove lock nut ⑨ and the internal pipe.
- 5) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 6) Remove cover ③ according to the following procedure. (See the right figure.)
 - a) Remove two opposing cap screws ⑯ on each side together with spring washers ⑱.
 - b) Install fully-threaded bolts Ⓐ, and then tighten hex. nuts Ⓑ together with spring washers ⑱.
 - c) Remove the remaining cap screws ⑯ together with spring washers ⑱.
 - d) Alternately unscrew hex. nuts Ⓑ until the reaction force of spring ⑧ disappears.
 - e) Remove fully-threaded bolts Ⓐ and cover ③.
- 7) Remove gasket ⑬, seal ring ④, rotor ①, spring ⑧, washer ⑦, and carbon bearing ⑥ from casing ②.
- 8) Unscrew hex. nuts ⑳ and set screws ⑲, and then remove carbon bearing ⑤ from cover ③.
- 9) Remove cap screws ⑪ from rotor ①.

< Inspection >

Clean each part and check for damage. In particular, check the degree of wear and damage on the seal faces of rotor ①, cover ③, and seal ring ④.

< Repair and parts replacement >

- 1) Rotor ①, cover ③, and seal ring ④ may be reused by repairing their seal faces in case of minor damage.
- 2) Replace gaskets ⑫ and ⑬ with a new one regardless of its condition.
- 3) If repair or reuse of parts is impossible, replace them with our new genuine parts.
Contact our sales representative to request genuine parts.

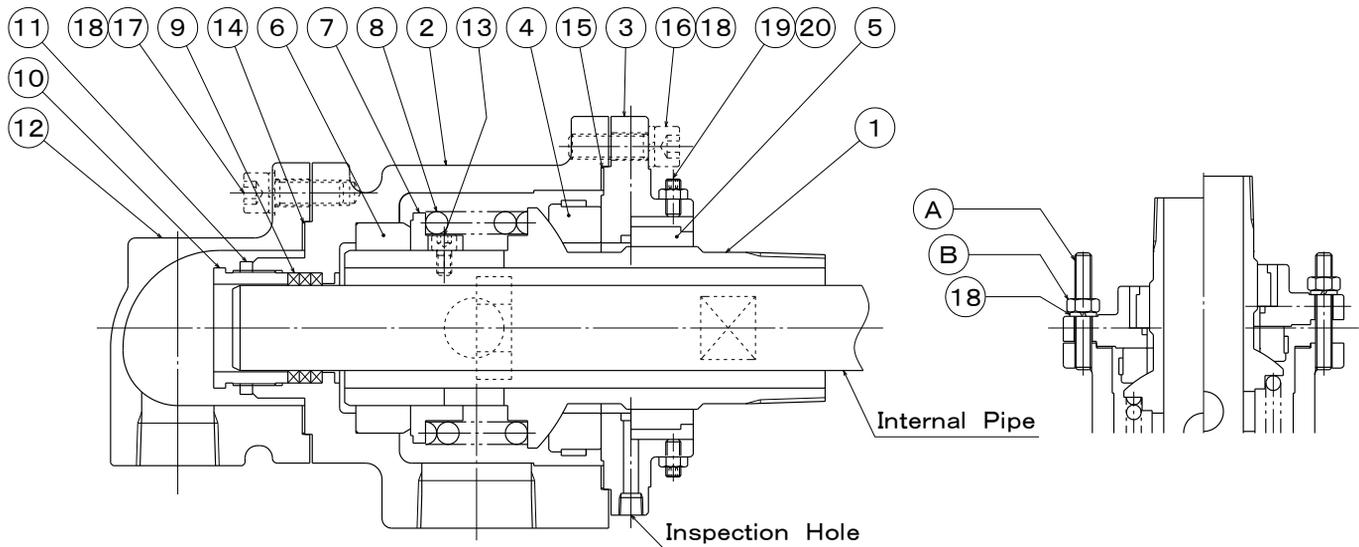
< Assembly >

Assemble the product in the reverse order of disassembly.

Carefully assemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces. If dust adheres to the seal face, wipe it off with thinner.

- 1) Install cap screws ⑪ to rotor ①.
- 2) Install carbon bearing ⑤ to cover ③, and then secure it with set screws ⑲ and hex. nuts ⑳.
- 3) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 4) Apply a thin coat of machine oil to the seal faces (sphere and plane) of seal ring ④.
- 5) Install carbon bearing ⑥, washer ⑦, spring ⑧, rotor ①, and seal ring ④ to casing ② in order.
Install rotor ① so that cap screws ⑪ and the notches of washer ⑦ are aligned with each other.
- 6) Install gasket ⑬ to casing ② and mount cover ③.
- 7) Secure cover ③ according to the following procedure.
 - a) Install two opposing fully-threaded bolts ① on each side. Alternately tighten hex. nuts ② together with spring washers ③.
 - b) Evenly tighten cap screws ④ together with spring washers ③ in a cross pattern.
 - c) Remove fully-threaded bolts ① and spring washers ③.
 - d) Alternately tighten the remaining cap screws ④ together with spring washers ③.
- 8) Check that rotor ① smoothly rotates.
- 9) Place the product horizontally, insert rotor flange ⑬ into rotor ①, and then install split ring ⑭.
Then move rotor flange ⑭ to the split ring ⑮ side.
- 10) Install the internal pipe and secure it with lock nut ⑨.
- 11) Install gasket ⑭ to casing ②, and then evenly tighten cap screws ⑰ together with spring washers ⑱ in a cross pattern to secure elbow ⑩.

A-6) For duplex, rotational IP, thread connection (NXE50**, NXH50** / 32A~65A)



- ①Rotor ②Casing ③Cover ④Seal Ring ⑤Carbon Bearing ⑥Carbon Bearing ⑦Washer
 ⑧Spring ⑨Packing ⑩Gland ⑪Lock Nut ⑫Elbow ⑬Cap Screw ⑭Gasket ⑮Gasket
 ⑯Cap Screw ⑰Cap Screw ⑱Spring Washer ⑲Set Screw ⑳Hex. Nut
 A Fully-threaded Bolt (40A~50A: M10 × 70, 65A: M12 × 80)
 B Hex. Nut (40A~50A: M10, 65A: M12)

※ A and B are not included in the product. You must procure them.

< Disassembly >

Carefully disassemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces of rotor ①, cover ③, and seal ring ④.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Remove cap screws ⑰ together with spring washers ⑱, and then remove elbow ⑫ and gasket ⑭ from casing ②.
- 3) Unscrew lock nut ⑪, remove the gland ⑩ from casing ②, and then pull out the internal pipe.
- 4) Remove packings ⑨.
- 5) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 6) Remove cover ③ according to the following procedure. (See the right figure.)
 - a) Remove two opposing cap screws ⑯ on each side together with spring washers ⑱.
 - b) Install fully-threaded bolts A, and then tighten hex. nuts B together with spring washers ⑱.
 - c) Remove the remaining cap screws ⑯ together with spring washers ⑱.
 - d) Alternately unscrew hex. nuts B until the reaction force of spring ⑧ disappears.
 - e) Remove fully-threaded bolts A and cover ③.
- 7) Remove gasket ⑮, seal ring ④, rotor ①, spring ⑧, washer ⑦, and carbon bearing ⑥ from casing ②.
- 8) Unscrew hex. nuts ⑳ and set screws ⑲, and then remove carbon bearing ⑤ from cover ③.
- 9) Remove cap screws ⑬ from rotor ①.

(*) For a product type whose internal pipe is secured to a roll, the internal pipe comes off from the product when the product is removed from the roll. Therefore, steps 2) and 3) are not required.

< Inspection >

Clean each part and check for damage. In particular, check the degree of wear and damage on the seal faces of rotor ①, cover ③, and seal ring ④.

< Repair and parts replacement >

- 1) Rotor ①, cover ③, and seal ring ④ may be reused by repairing their seal faces in case of minor damage.
- 2) Replace gaskets ⑭ and ⑮ with a new one regardless of its condition.
- 3) If repair or reuse of parts is impossible, replace them with our new genuine parts.
Contact our sales representative to request genuine parts.

< Assembly >

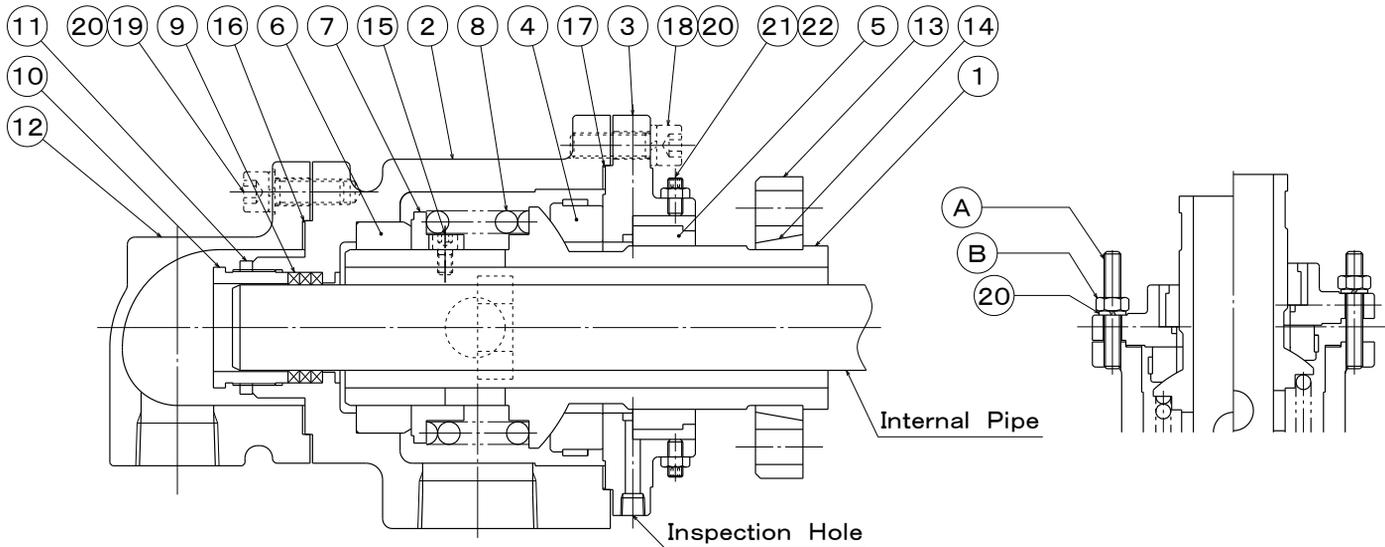
Assemble the product in the reverse order of disassembly.

Carefully assemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces. If dust adheres to the seal face, wipe it off with thinner.

- 1) Install cap screws ⑬ to rotor ①.
- 2) Install carbon bearing ⑤ to cover ③, and then secure it with set screws ⑲ and hex. nuts ⑳.
- 3) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 4) Apply a thin coat of machine oil to the seal faces (sphere and plane) of seal ring ④.
- 5) Install carbon bearing ⑥, washer ⑦, spring ⑧, rotor ①, and seal ring ④ to casing ② in order.
Install rotor ① so that cap screws ⑬ and the notches of washer ⑦ are aligned with each other.
- 6) Install gasket ⑮ to casing ② and mount cover ③.
- 7) Secure cover ③ according to the following procedure.
 - a) Install two opposing fully-threaded bolts ① on each side. Alternately tighten hex. nuts ② together with spring washers ③.
 - b) Evenly tighten cap screws ④ together with spring washers ③ in a cross pattern.
 - c) Remove fully-threaded bolts ① and spring washers ③.
 - d) Alternately tighten the remaining cap screws ④ together with spring washers ③.
- 8) Check that rotor ① smoothly rotates.
- 9) Place the product horizontally and insert the internal pipe.
- 10) Install packings ⑨. Install gland ⑩ and secure it with lock nut ⑪.
- 11) Install gasket ⑭ to casing ②, and then evenly tighten cap screws ⑰ together with spring washers ⑱ in a cross pattern to secure elbow ⑫.

(*For a product type whose internal pipe is secured to a roll, install the internal pipe to a roll and then install the product to the roll. After installing the product to the roll, perform steps 10) and 11).

A-7) For duplex, rotational IP, flange connection (NXE60**, NXH60** / 40A~65A)



- ①Rotor ②Casing ③Cover ④Seal Ring ⑤Carbon Bearing ⑥Carbon Bearing ⑦Washer
 ⑧Spring ⑨Packing ⑩Gland ⑪Lock Nut ⑫Elbow ⑬Rotor Flange ⑭Split Ring ⑮Cap Screw
 ⑯Gasket ⑰Gasket ⑱Cap Screw ⑲Cap Screw ⑳Spring Washer ㉑Set Screw ㉒Hex. Nut
 A Fully-threaded Bolt (40A~50A: M10 × 70, 65A: M12 × 80)
 B Hex. Nut (40A~50A: M10, 65A: M12)

※ A and B are not included in the product. You must procure them.

< Disassembly >

Carefully disassemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces of rotor ①, cover ③, and seal ring ④.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Move rotor flange ⑬ to the casing ② side and remove split ring ⑭.
Then pull out rotor flange ⑬ from rotor ①.
- 3) Remove cap screws ⑲ together with spring washers ⑳, and then remove elbow ⑫ and gasket ⑯ from casing ②.
- 4) Unscrew lock nut ⑪, remove the gland ⑩ from casing ②, and then pull out the internal pipe.
- 5) Remove packings ⑨.
- 6) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 7) Remove cover ③ according to the following procedure. (See the right figure.)
 - a) Remove two opposing cap screws ⑱ on each side together with spring washers ⑳.
 - b) Install fully-threaded bolts A, and then tighten hex. nuts B together with spring washers ⑳.
 - c) Remove the remaining cap screws ⑱ together with spring washers ⑳.
 - d) Alternately unscrew hex. nuts B until the reaction force of spring ⑧ disappears.
 - e) Remove fully-threaded bolts A and cover ③.
- 8) Remove gasket ⑰, seal ring ④, rotor ①, spring ⑧, washer ⑦, and carbon bearing ⑥ from casing ②.
- 9) Unscrew hex. nuts ㉒ and set screws ㉑, and then remove carbon bearing ⑤ from cover ③.
- 10) Remove cap screws ⑮ from rotor ①.

(*) For a product type whose internal pipe is secured to a roll, the internal pipe comes off from the product when the product is removed from the roll. Therefore, steps 3) and 4) are not required.

< Inspection >

Clean each part and check for damage. In particular, check the degree of wear and damage on the seal faces of rotor ①, cover ③, and seal ring ④.

< Repair and parts replacement >

- 1) Rotor ①, cover ③, and seal ring ④ may be reused by repairing their seal faces in case of minor damage.
- 2) Replace gaskets ⑩ and ⑪ with a new one regardless of its condition.
- 3) If repair or reuse of parts is impossible, replace them with our new genuine parts.
Contact our sales representative to request genuine parts.

< Assembly >

Assemble the product in the reverse order of disassembly.

Carefully assemble the product so that each part is not damaged. In particular, be careful not to damage the seal faces. If dust adheres to the seal face, wipe it off with thinner.

- 1) Install cap screws ⑮ to rotor ①.
- 2) Install carbon bearing ⑤ to cover ③, and then secure it with set screws ⑳ and hex. nuts ㉑.
- 3) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 4) Apply a thin coat of machine oil to the seal faces (sphere and plane) of seal ring ④.
- 5) Install carbon bearing ⑥, washer ⑦, spring ⑧, rotor ①, and seal ring ④ to casing ② in order.
Install rotor ① so that cap screws ⑮ and the notches of washer ⑦ are aligned with each other.
- 6) Install gasket ⑰ to casing ② and mount cover ③.
- 7) Secure cover ③ according to the following procedure.
 - a) Install two opposing fully-threaded bolts ㉒ on each side. Alternately tighten hex. nuts ㉓ together with spring washers ㉔.
 - b) Evenly tighten cap screws ⑮ together with spring washers ㉔ in a cross pattern.
 - c) Remove fully-threaded bolts ㉒ and spring washers ㉔.
 - d) Alternately tighten the remaining cap screws ⑮ together with spring washers ㉔.
- 8) Check that rotor ① smoothly rotates.
- 9) Place the product horizontally, insert rotor flange ⑬ into rotor ①, and then install split ring ⑭.
Then move rotor flange ⑬ to the split ring ⑭ side.
- 10) Insert the internal pipe.
- 11) Install packings ⑨. Install gland ⑩ and secure it with lock nut ⑪.
- 12) Install gasket ⑰ to casing ②, and then evenly tighten cap screws ⑮ together with spring washers ㉔ in a cross pattern to secure elbow ⑫.

(*) For a product type whose internal pipe is secured to a roll, install the internal pipe to a roll and then install the product to the roll. After installing the product to the roll, perform steps 11) and 12).