

Instruction Manual

Pearl Rotary Joint

KC Series

This instruction manual applies to products with type designations that begin with KC, or SKCL.



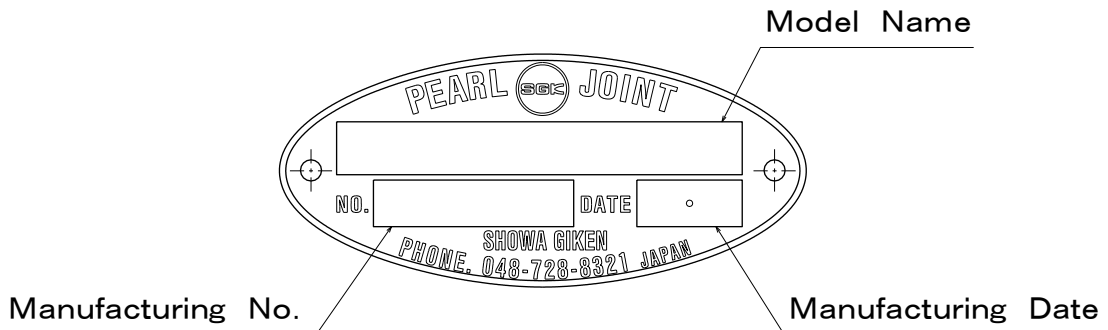
This instruction manual describes important precautions for preventing accidents and how to handle the product. To ensure safe use, be sure to read this manual and fully understand its contents before using this product. Store this manual carefully so that it can be referred to at any time.

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

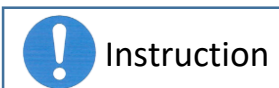
The symbols used in this instruction manual are described below.



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

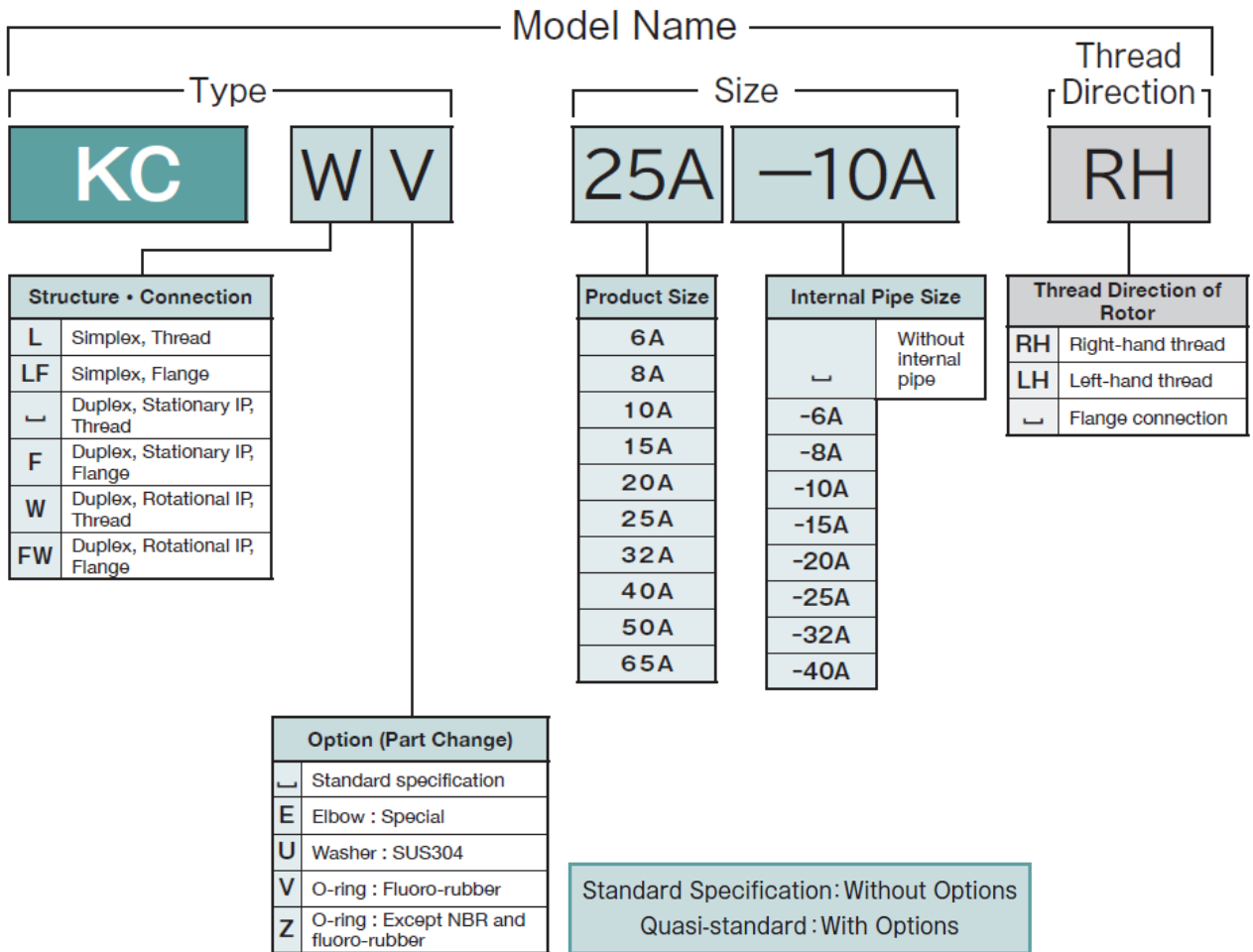
3-1) Application

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 KC series model names is described below.
The product list is shown in our catalog or on our website.

● For installation with a taper thread or a flange



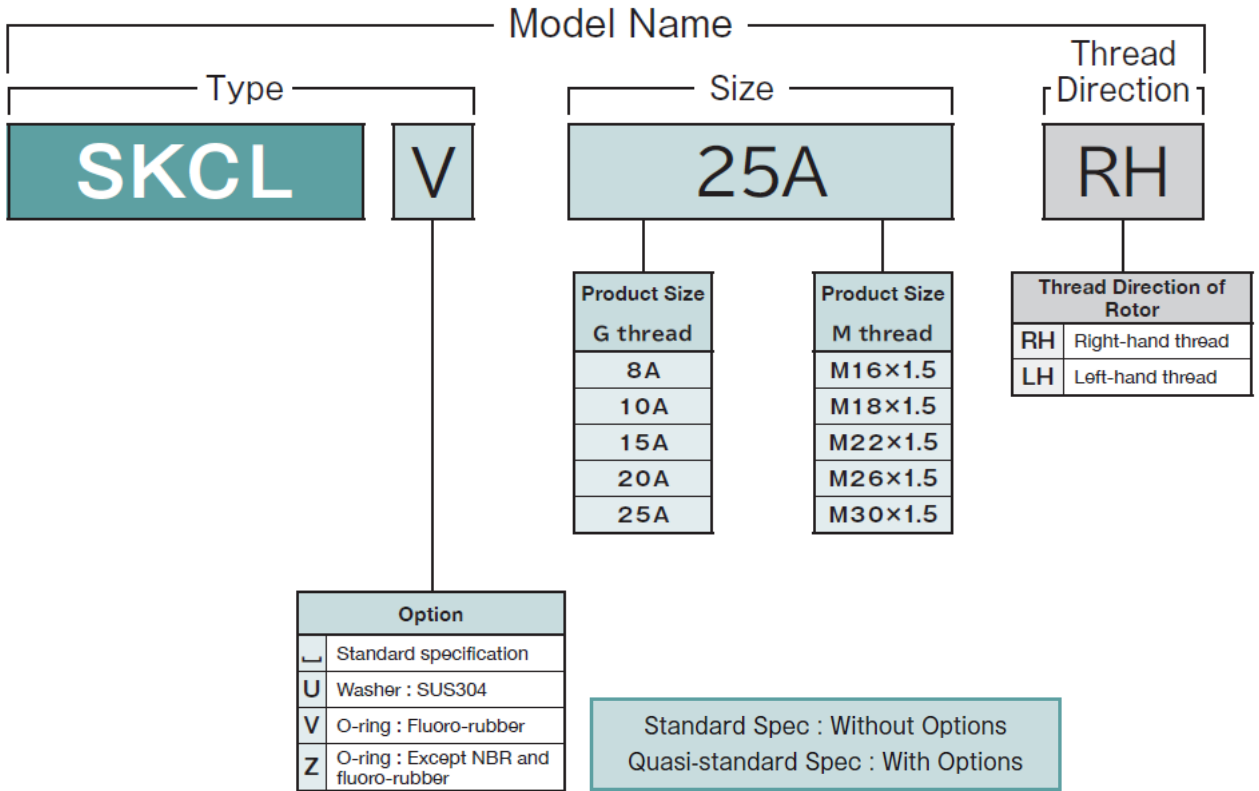
Note 1) “┌” indicates a space. A model name is indicated without spaces.

2) If two or more option (part change) codes are selected, they are indicated in alphabetical order.

3) The selection of two or more options resulting in a long model name is indicated as type “OKC****” to denote a customized product for administrative reasons.
(The asterisks (****) indicate a four-digit number allocated to each model.)

If you have any questions, contact our sales representative.

● For installation with a parallel thread (simplex only)



- Note 1) “ ” indicates a space. A model name is indicated without spaces.
 2) If two or more option (part change) codes are selected, they are indicated in alphabetical order.
 3) The selection of two or more options resulting in a long model name is indicated as type “OKC****” to denote a customized product for administrative reasons. (The asterisks (****) indicate a four-digit number allocated to each model.)

If you have any questions, contact our sales representative.

3-3) Service conditions



Service Conditions of KC Series






Series	Fluid	Size	Max.		
			Pressure (MPa)	Rotation speed (min ⁻¹)	Temperature (°C)
KC	Air / Gas / Water / Oil	6A~25A	0.98	1,500	100
		32A~65A		1,000	

Note) The lowest pressure when used under a pressure lower than atmospheric pressure is 1.3 kPa abs (10 Torr).

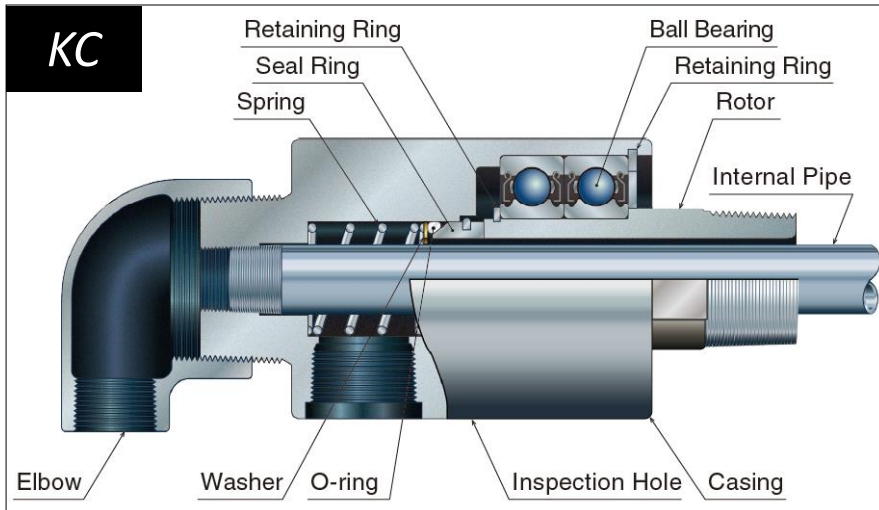
3-4) Precautions for use

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

 WARNING	<ol style="list-style-type: none"> 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.  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"> Perform operation within the service conditions.  Do not operate under conditions where both pressure and rotation speed are close to the max. values. Doing so significantly reduces product lifetime.  This product cannot be used in temperature conditions where the product ambient temperature exceeds the upper limit of the service conditions.  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.  <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



Materials of Main Components
(Standard Specification)

Part Name	Material
Rotor	Stainless Steel Carbon Steel
Casing	Aluminum Alloy
Seal Ring	Carbon
O-ring	NBR

The casing is finished with alumite treatment (anodizing).

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 KC Series

(kg)

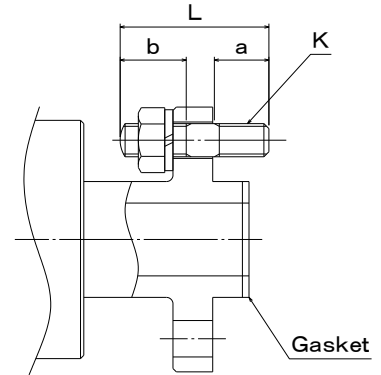
Type	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A
KCL	0.15	0.25	0.37	0.60	0.85	1.2	2.3	2.6	5.3	9.6
KCLF	-	-	0.90	0.90	1.25	1.7	3.0	3.3	6.6	10.9
KC/KCW	-	-	-	0.75	1.05	1.5	2.6	2.9	6.5	10.6
KCF/KCFW	-	-	-	1.05	1.45	2.0	3.3	3.6	7.8	11.9
SKCL	-	0.25	0.37	0.60	0.85	1.2	-	-	-	-

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		
KCLF	10A	24	16	3.2	M8	36	11	18	M8 type1	M8 No.2
	15A	24	16	3.2						
KCLF KCF KCFW	20A	29	20	3.2	M10	45	15	20	M10 type1	M10 No.2
	25A	34	26	3.2						
	32A	49	37	3.2	M10	48	15	20	M10 type1	M10 No.2
	40A									
	50A	64	50	3.2	M12	58	18	27	M12 type1	M12 No.2
65A	79	62	3.2							

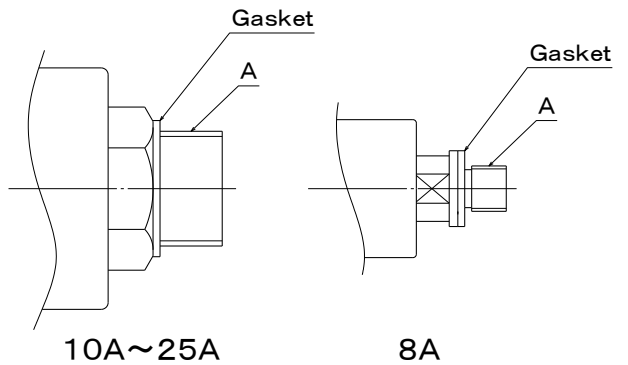


2. A duplex, stationary IP, flange connection product (KCF) is supplied with a lock nut (right-hand thread, SS400) used for securing the internal pipe.

3. A product installed with a parallel thread (SKCL) is supplied with a gasket (copper plate).

Accessories
(Installation with parallel thread) (mm)


Type	Size	A	Gasket		
			Outer Dia.	Inner Dia.	Thick-ness
SKCL	8A	G1/4	22	13.5	2
		M16 × 1.5	23	16.3	2
	10A	G3/8	26	17	2
		M18 × 1.5	24	18.5	2
	15A	G1/2	30	21.3	2
		M22 × 1.5	27.5	22.2	2
	20A	G3/4	35	26.8	2
		M26 × 1.5			
25A	G1	39.5	33.5	2	
	M30 × 1.5	39	30.5	2	



4. Transport and Storage

4-1) Transport


Transport this product by following the instructions described below.

 Instruction	<ol style="list-style-type: none">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.
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4-2) Storage

An improper storage method causes product damage or early leakage.

Store this product by following the instructions described below.


 Instruction	<ol style="list-style-type: none">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.
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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	<ol style="list-style-type: none">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.
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● Duplex, stationary IP, thread connection (KC)

Screw the internal pipe taper thread into the head. For standard specification products, the thread directions of the rotor and internal pipe are the same. Depending on the customer's request, the thread directions of the rotor and internal pipe may be different from each other. Check the thread directions on the product drawings, etc. before installation.

● Duplex, stationary IP, flange connection (KCF)

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

5-2) Installing to a roll

Install the product by following the 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. Moreover, leaked fluid may accumulate in a casing and ball bearings may be damaged, causing serious bodily accidents due to resulting rotation failure.




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.

● 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: parallel thread

1. Install the supplied gasket to 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 the supplied spring washers on the stud bolts, and then secure the product with the supplied nuts.

5-3) Pipe laying

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





WARNING

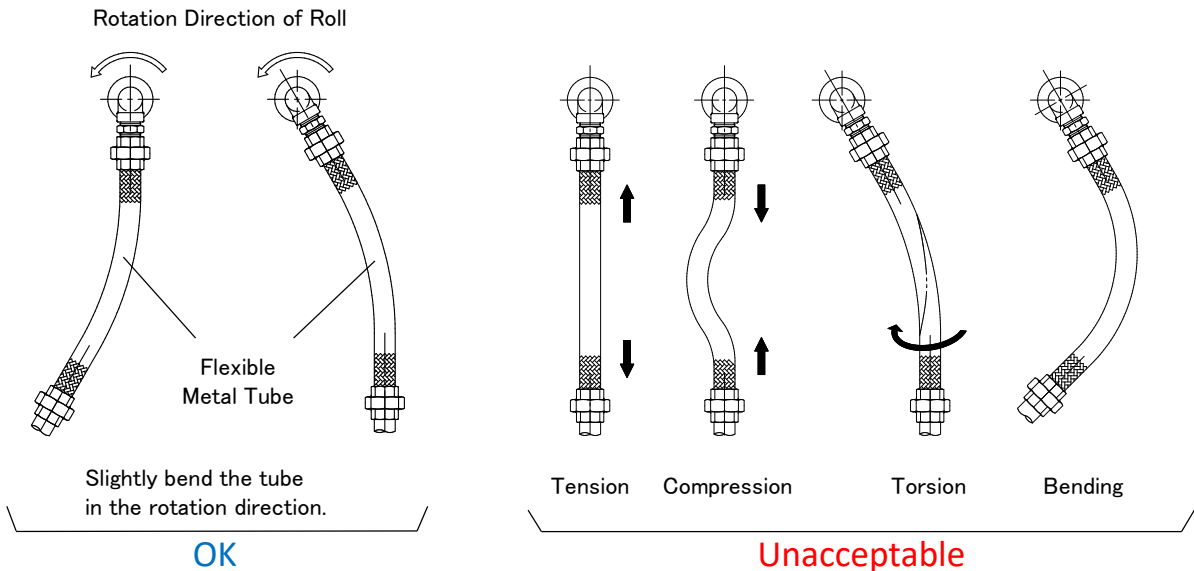
Use a hose for product connection suitable for characteristics of fluid used and operating conditions (pressure, temperature). If an unsuitable hose is used, it may be damaged, causing injury to workers or damage to peripheral equipment.



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 or rubber hose with adequate flexibility.**
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)

サイズ	6A~20A	25A	32A/40A	50A	65A
長さ	300~400	400~500	600~800	900~1000	1200~1300

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.

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.
5. If the fluid is air, add oil mist to the air.

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. **If water is used as the fluid, take a measure to prevent water from freezing in the product.** Freezing may cause product damage, resulting in fluid leakage after operation restart.
3.  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

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.

8-2) Greasing

As grease-sealed ball bearings are used, greasing is not required.

8-3) Repair and replacement of consumables

The ball bearings and the seal face of the seal ring become worn over the course of operation time. O-rings also deteriorate. Moreover, if the internal pipe rotates in the product, bearings that support the pipe also become worn. Then 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 inspection hole.	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 is damaged.	Contact us for repair.
	The fluid contains foreign objects.	Clean the inside of the product, pipes, and roll. Install a strainer.
	The O-ring adheres to the casing.	Contact us for repair.
	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>	<Flange connection type> Repair the spigot /socket. <Thread connection type>
	The shaft end screw hole of a roll is offset from the roll rotation axis.	Repair the screw hole.
	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>	<Flange connection type> Repair the installation face on the roll side to which the product is installed. Evenly tighten the 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.	Repair the screw hole. Reinstall the product.
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.
	Ball bearings are damaged.	Contact us for repair.
	A sliding sound is heard from the seal face.	No fault is indicated.
The rotor does not rotate.	A ball bearing does not rotate.	Contact us for repair.
Oil is leaking from a ball bearing.	Oil released from the grease seeps.	No fault is indicated.

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

URL <https://www.sgk-p.co.jp>

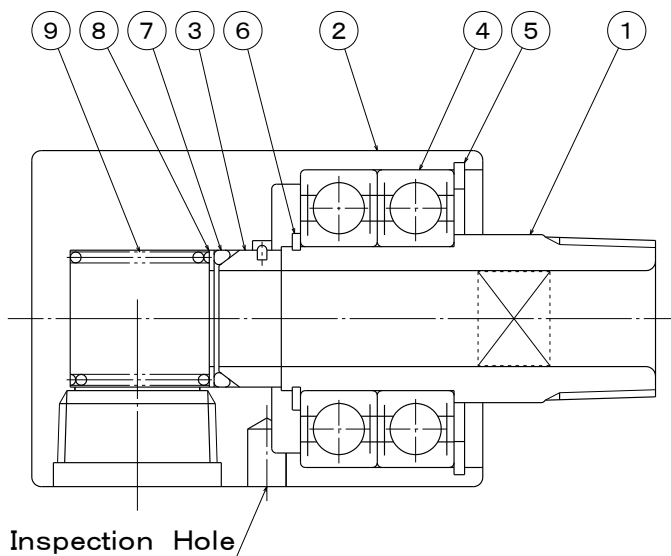


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A. Appendix – How to Repair or Replace Consumables

A-1) For simplex (KCL, KCLF, SKCL)

An explanation is given below with reference to KCL (figure shown below).
The same workflow is applied to KCLF and SKCL.



- ①Rotor ②Casing ③Seal Ring ④Ball Bearing ⑤Retaining Ring
⑥Retaining Ring ⑦O-ring ⑧Washer ⑨Spring

< 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 and seal ring ③.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 3) Remove retaining ring ⑤.
- 4) Pull out the assembly consisting of rotor ①, ball bearings ④, retaining ring ⑥ (hereinafter called the rotor assembly) from casing ②.
- 5) Remove seal ring ③, O-ring ⑦, washer ⑧, and spring ⑨ from casing ②.
- 6) Remove retaining ring ⑥ from rotor ①, and then pull out ball bearings ④.

< Inspection >

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

< Repair and parts replacement >

- 1) Rotor ① and seal ring ③ may be reused by lapping their seal faces in case of minor damage.
- 2) Replace O-ring ⑦ 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.

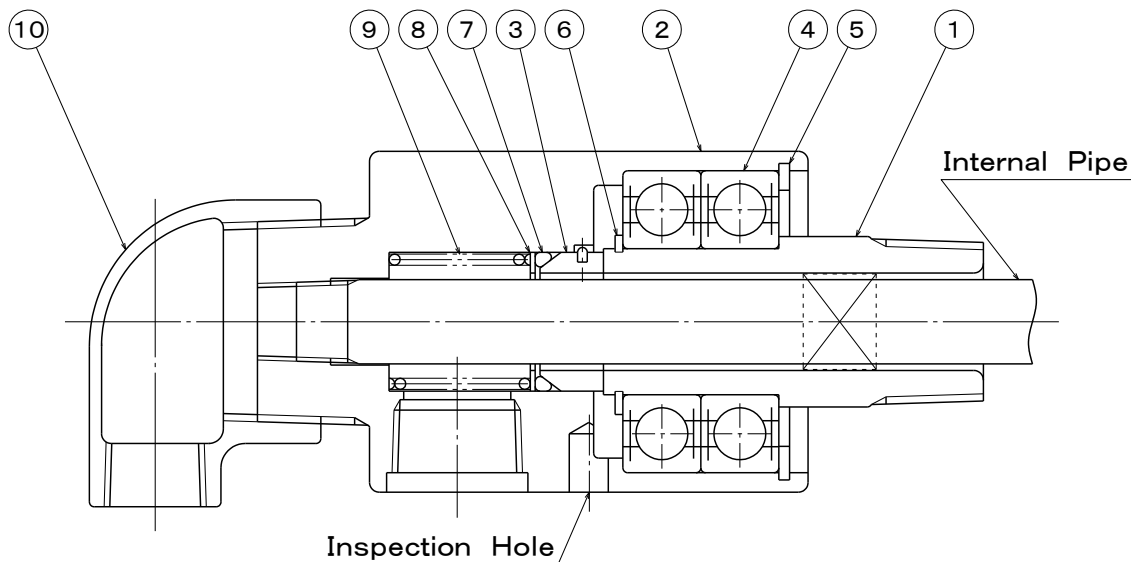
< Assembly >

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) Apply grease to O-ring ⑦ and the inner perimeter of casing ② with which the O-ring comes in contact.
- 2) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 3) Install spring ⑨, washer ⑧, O-ring ⑦, and seal ring ③ to casing ② in order. At this point, install so that the pin of seal ring ③ fits into the groove of casing ②.
- 4) Insert ball bearings ④ into rotor ①, and then install retaining ring ⑥.
- 5) Install the rotor assembly assembled in step 4) to casing ②.
- 6) Install retaining ring ⑤ to casing ②.
- 7) Check that rotor ① smoothly rotates.

A-2) For duplex, stationary IP, thread connection (KC)



- ①Rotor ②Casing ③Seal Ring ④Ball Bearing ⑤Retaining Ring
⑥Retaining Ring ⑦O-ring ⑧Washer ⑨Spring ⑩Elbow

< 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 and seal ring ③.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Remove elbow ⑩ from casing ②.
- 3) Remove the internal pipe from casing ②.
- 4) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 5) Remove retaining ring ⑤.
- 6) Pull out the assembly consisting of rotor ①, ball bearings ④, retaining ring ⑥ (hereinafter called the rotor assembly) from casing ②.
- 7) Remove seal ring ③, O-ring ⑦, washer ⑧, and spring ⑨ from casing ②.
- 8) Remove retaining ring ⑥ from rotor ①, and then pull out ball bearings ④.

< Inspection >

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

< Repair and parts replacement >

- 1) Rotor ① and seal ring ③ may be reused by lapping their seal faces in case of minor damage.
- 2) Replace O-ring ⑦ 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.

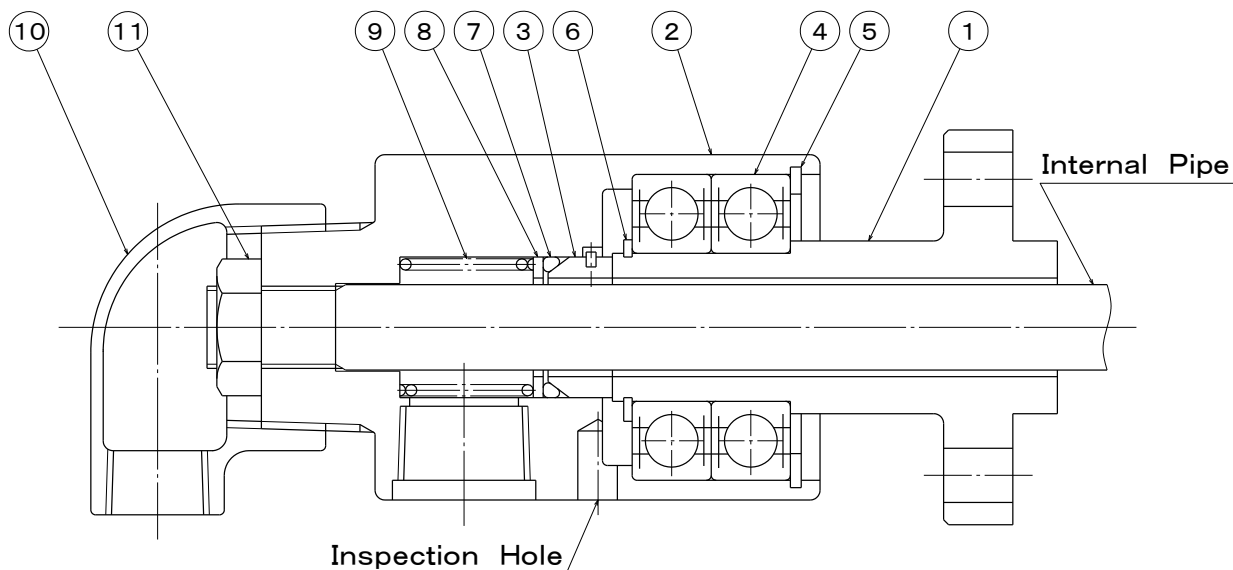
< Assembly >

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) Apply grease to O-ring ⑦ and the inner perimeter of casing ② with which the O-ring comes in contact.
- 2) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 3) Install spring ⑨, washer ⑧, O-ring ⑦, and seal ring ③ to casing ② in order. At this point, install so that the pin of seal ring ③ fits into the groove of casing ②.
- 4) Insert ball bearings ④ into rotor ①, and then install retaining ring ⑥.
- 5) Install the rotor assembly assembled in step 4) to casing ②.
- 6) Install retaining ring ⑤ to casing ②.
- 7) Check that rotor ① smoothly rotates.
- 8) Screw the internal pipe into the product.
- 9) Wrap seal tape around the taper thread of casing ②, and then install elbow ⑩.

A-3) For duplex, stationary IP, flange connection (KCF)



- ①Rotor ②Casing ③Seal Ring ④Ball Bearing ⑤Retaining Ring
⑥Retaining Ring ⑦O-ring ⑧Washer ⑨Spring ⑩Elbow
⑪Lock Nut

< 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 and seal ring ③.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Remove elbow ⑩ from casing ②.
- 3) Remove lock nut ⑪ and the internal pipe.
- 4) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 5) Remove retaining ring ⑤.
- 6) Pull out the assembly consisting of rotor ①, ball bearings ④, retaining ring ⑥ (hereinafter called the rotor assembly) from casing ②.
- 7) Remove seal ring ③, O-ring ⑦, washer ⑧, and spring ⑨ from casing ②.
- 8) Remove retaining ring ⑥ from rotor ①, and then pull out ball bearings ④.

< Inspection >

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

< Repair and parts replacement >

- 1) Rotor ① and seal ring ③ may be reused by lapping their seal faces in case of minor damage.
- 2) Replace O-ring ⑦ 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 >

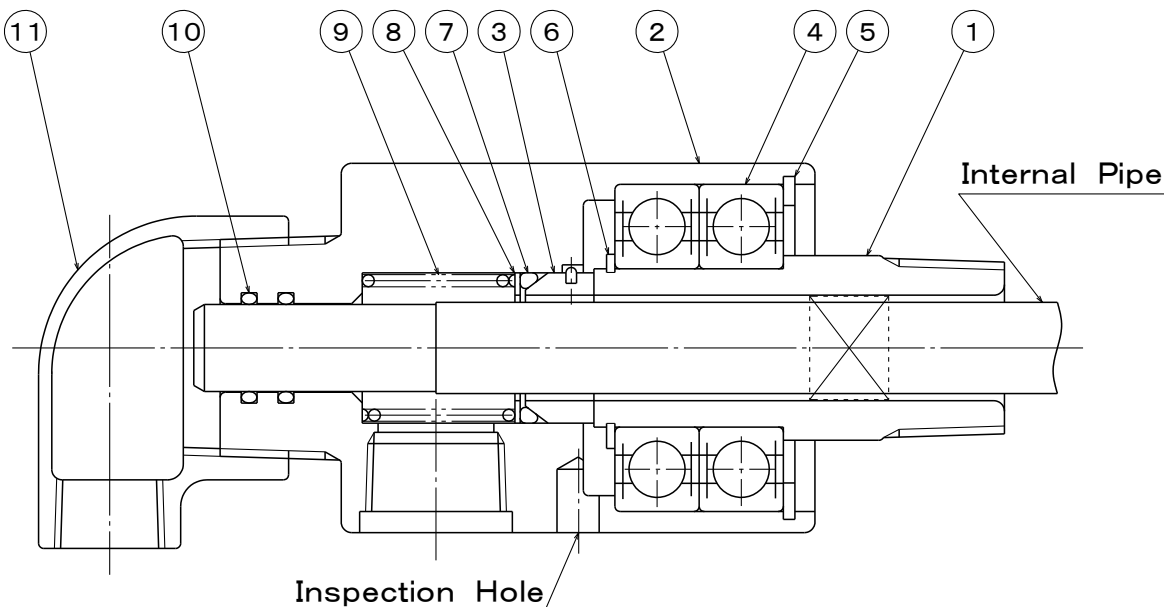
Assemble the product in the reverse order of disassembly.

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) Apply grease to O-ring ⑦ and the inner perimeter of casing ② with which the O-ring comes in contact.
- 2) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 3) Install spring ⑨, washer ⑧, O-ring ⑦, and seal ring ③ to casing ② in order. At this point, install so that the pin of seal ring ③ fits into the groove of casing ②.
- 4) Insert ball bearings ④ into rotor ①, and then install retaining ring ⑥.
- 5) Install the rotor assembly assembled in step 4) to casing ②.
- 6) Install retaining ring ⑤ to casing ②.
- 7) Check that rotor ① smoothly rotates.
- 8) Screw the internal pipe into the product and secure it with lock nut ⑪.
- 9) Wrap seal tape around the taper thread of casing ②, and then install elbow ⑩.

A-4) For duplex, rotational IP (KCW, KCFW)

An explanation is given below with reference to KCW (figure shown below).
The same workflow is applied to KCFW.



- ①Rotor ②Casing ③Seal Ring ④Ball Bearing ⑤Retaining Ring
⑥Retaining Ring ⑦O-ring ⑧Washer ⑨Spring ⑩O-ring
⑪Elbow

< 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 and seal ring ③.

- 1) Disconnect all pipes, etc. connected to the product.
- 2) Remove elbow ⑪ from casing ②.
- 3) Remove the internal pipe from casing ②.
- 4) Remove O-rings ⑩ from casing ②.
- 5) Clamp casing ② with a vice, etc. so that rotor ① faces upward.
- 6) Remove retaining ring ⑤.
- 7) Pull out the assembly consisting of rotor ①, ball bearings ④, retaining ring ⑥ (hereinafter called the rotor assembly) from casing ②.
- 8) Remove seal ring ③, O-ring ⑦, washer ⑧, and spring ⑨ from casing ②.
- 9) Remove retaining ring ⑥ from rotor ①, and then pull out ball bearings ④.

(*) 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 and seal ring ③.

< Repair and parts replacement >

- 1) Rotor ① and seal ring ③ may be reused by lapping their seal faces in case of minor damage.
- 2) Replace O-rings ⑦ and ⑩ with new ones regardless of their conditions.
- 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) Apply grease to O-ring ⑦ and the inner perimeter of casing ② with which the O-ring comes in contact.
- 2) Apply grease to O-rings ⑩ and the O-ring grooves of casing ②, and then install O-ring ⑩.
- 3) Clamp casing ② with a vice, etc. so that the rotor side faces upward.
- 4) Install spring ⑨, washer ⑧, O-ring ⑦, and seal ring ③ to casing ② in order. At this point, install so that the pin of seal ring ③ fits into the groove of casing ②.
- 5) Insert ball bearings ④ into rotor ①, and then install retaining ring ⑥.
- 6) Install the rotor assembly assembled in step 4) to casing ②.
- 7) Install retaining ring ⑤ to casing ②.
- 8) Check that rotor ① smoothly rotates.
- 9) Insert the internal pipe into the product.
- 10) Wrap seal tape around the taper thread of casing ②, and then install elbow ⑪.

(*) 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 9) and 10).