OPERATING MANUAL

Model/Series:	9000
Number:	040-573GB
Version:	2010-04

DEUBLIN®

Rotating Unions

Series

9000

for steam / thermal oil.

Content

1 For your Safety

This chapter provides information on the safe handling of *DEUBLIN* rotating unions.

- ❑ For your own safety and the safety of other people read this operating manual carefully and completely prior to working on or with *DEUBLIN* rotating unions.
- ❑ This operating manual exclusively describes the rotating unions of the manufacturer *DEUBLIN*. In the further description/explanation the name "*DEUBLIN*" is left out for a better readability.
- ❑ This operating manual is a material part of the specified rotating unions. The operator is responsible for the personnel to take note of this manual.
- ❑ Always use the latest version of the operating manual, available under www.deublin.com.
- ❑ The operator of the rotating unions shall not make any modifications or attachments to and retrofitting of the rotating union without the manufacturer's consent.
- ❑ Please follow the additional instruction "Installation" for a secure and correct installation of the rotating union. The installation instruction is included with the delivered union.
- ❑ Request the model specific installation drawing for your rotating union from *DEUBLIN* to guarantee safe installation and operation.

1.1 Intended Use

The rotating unions of the series 9000 supply the following flow media: steam or thermal oil

Series	Model	Max. Temperature (°C) *	Max. Pressure (bar)	Max. Speed (RPM)	Flow medium	
					Steam	Thermal oil
9000	9075-9200	185°	10	400	•	
9000	9075-9150	230°	7	400		•
9000	9200	200°	7	400		•

* For applications with higher temperatures please ask *DEUBLIN*.

The rotating unions referred to are designed for non-potentially explosive environments and non-combustible flow media.
Details on the operating range of the rotating unions are provided in the catalogue and/or the model-specific installation drawing.

The rotating unions of the series 9000 can be used as one-way or two-way version depending on the type of connection.

1.1.1 Application single passage version (Mono)

For the single passage version, models are available which can be fitted to the end of the machine shaft.

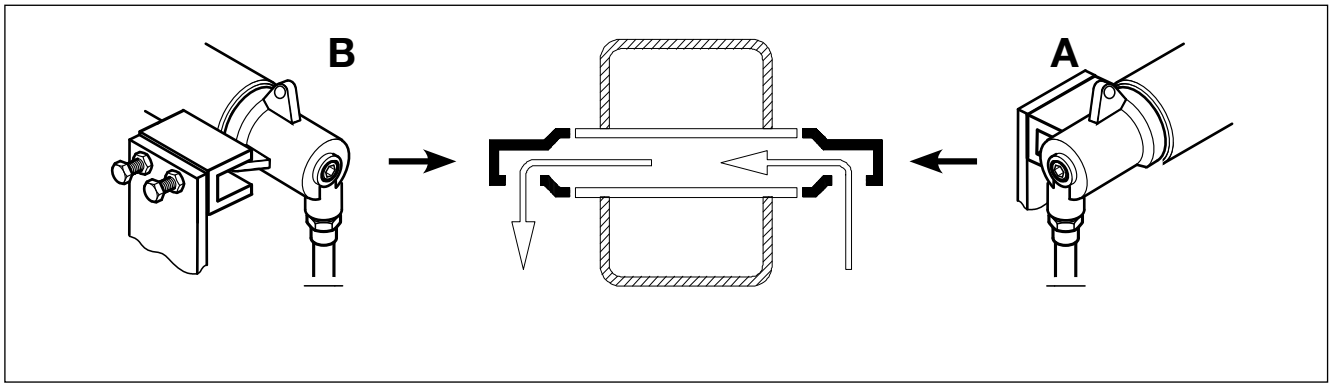


Fig. 1: Schematic diagram single passage version (Mono – externally mounted)

One single passage version of the rotating union is mounted at each of the two ends of the machine shaft. The rotating union **(A)** conveys the media flow into the machine shaft. The rotating union **(B)** conveys the media flow into the piping system of the machine.

1.1.2 Application two-way version (Duo) Steam

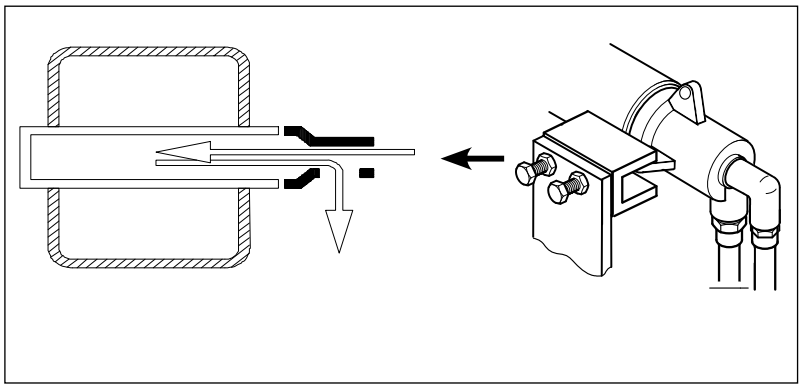


Fig. 3: Schematic diagram two-way version (Duo) Thermal Oil

The rotating unions of the 9000 series are also available as two-way model (Duo).

The steam is fed into the machine shaft through the module housing and the outer annular channel. The condensate is taken **out** by the same rotating union through the siphon pipe and elbow and hose and fed into the machine's piping system.

The two-way rotating union is fitted with an axial connection and elbow. Thermal oil passes through the elbow and into the machine shaft through a supply tube.
The thermal oil also returns via the same rotating union, elbow and hose fed into the machine's piping system.

The flow direction can be reversed depending on the system's requirements.

1.2 Misuse

This chapter provides information on known misuse of rotating unions of the 9000 series.
The rotating unions are not suitable for the areas and applications described herein. Use in such areas or for such applications constitutes a misuse endangering people and machines and is therefore prohibited.

Prohibition for the following areas:

- **Potentially explosive areas**
  The rotating unions of the 9000 series shall not be used in potentially explosive areas, as they are not approved for the requirements in potentially explosive areas. Operation in such areas may cause explosions.
- **Food**
  Food, cleaning and disinfectant residues cannot be removed from the rotating unions. People may suffer poisoning.

Prohibition for the following applications:

- **Conveying of combustible flow media or hydrocarbons**
  Combustible flow media or hydrocarbons may ignite or cause explosions.
  Exception: Thermal oil within the admissible temperature range. Please observe the safety data sheet of the used thermal oil.
- **Connection to a piping system with excessive pressure**
  If excessive pressure is applied to the rotating unions, supply pipes can come off and cause personal injury or property damage.
- **Operation without lubrication**
  Dry operation (without flow medium) of the rotating union causes damage to the spherical seals.
- **Connection to fixed pipes**
  In case of connection to fixed pipes, the rotating unions may leak and the bearing may be damaged.

- ❑ **Flow media temperatures**
  Flow media temperature must not exceed that stated in the current *DEUBLIN* Catalogue. If temperature is exceeded this could result in leaky rotating unions and personal injury or property damage.
- ❑ **Application in ambient temperatures/with flow media temperatures below 3 °C**
  Rotating unions may be damaged if they are operated at temperatures (ambient or flow media) below 3 °C.
- ❑ **Use of hydraulic oils**
  If you are using the rotating union for hydraulic oils, then the rotating union will be damaged and hydraulic oil could spurt out. People could be injured.
- ❑ **Operation at the highest speed and with maximum pressure**
  Speed and pressure must be adjusted to each other so that the rotating unions are not damaged (see model-specific installation drawing).

This list is not comprehensive and will be updated with results from product observation.

1.3 Safety Instructions

This chapter provides information on the hazards from rotating unions.

1.3.1 Hazards due to hot surfaces

The rotating unions are heated by the temperature of the flow medium. Skin contact with heated rotating unions can cause injuries.

- ❑ Use safety gloves and PPE (Personal Protective Equipment) protecting against heat when handling the rotating union.
- ❑ Attach a clearly visible danger sign visibly on/next to the rotating union in order to warn of danger.

1.3.2 Hazards due to incorrect hoses

For the connection of the rotating union to the machine, you have to choose appropriate hoses for the respective flow media the specification of which meets the application.
If you use incorrect hoses, it may become porous or burst. This can cause personal injury and/or property damage to components of the machine.

- ❑ In case of the flow media, steam or thermal oil, use hoses, which are suitable for the maximum system pressure of the machine and the maximum temperature of the flow media.

1.3.3 Hazards due to the flow medium

When working on the rotating union, injuries can be caused by skin or eye contact with the flow medium.

- ❑ Observe the COSHH Safety Data Sheet for the flow medium.

1.3.4 Hazards due to faulty installation

If the rotating unions are installed incorrectly, hoses and connections may become leaky. The flow medium can escape. Depending on the flow medium, personal injury or property damage to the components of the machine may occur.

- ❑ Before installing the rotating union ensure that no feed pressure and no residual pressure is applied to the pipeline system of the machine.
  - Please follow the additional instruction “Installation” for a secure and correct installation of the rotating union. The installation instruction is included with the delivered union.
- ❑ Install the rotating union on the machine using hoses only, in order to avoid stress on the rotating union.
- ❑ Install the hoses free from stress.

- ❑ Install the hoses to the rotating union prior to mounting it at the machine shaft.
- ❑ Install the anti-rotation element on the rotating union, tension free.

1.4 Structure of Pictograms

This chapter provides information on the meaning of the pictograms used in the manual.


Warning

Warning
Potentially dangerous situation which may result in death or serious bodily injuries.


Note

Note
Potentially harmful situation in which the product or an object in its surroundings can be damaged.


Info

Application notes
and other useful information.

2 Information as to this Manual

The copyright as to this manual remains with *DEUBLIN*. Subject to changes!

- ❑ You can download the latest version of this manual under www.deublin.com.
- ❑ Always use the latest version of the operating manual.

3 Information on the Name Plate

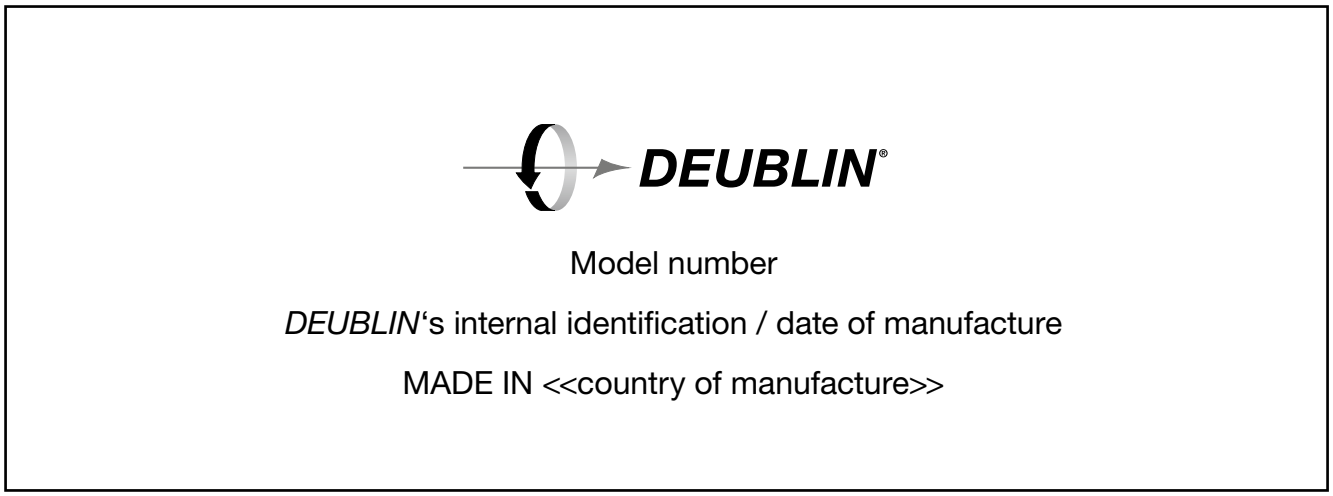


Fig. 4: Name plate

The coding of the model number is described in the catalogue. The model number corresponds to the order number.

4 Information on the Design

This chapter provides information as to which items have to be observed in the design in order to have a positive effect on the service life of the rotating union.


Info

You can obtain the drawings of the rotating unions from *DEUBLIN* in order to integrate the rotating union in your drawing.
You will need the model-specific installation drawing of your rotating unions for a secure set-up and operation of the rotating unions.

The model-specific installation drawing of the respective rotating union contains e.g.:

- ❑ torque moments of the union
- ❑ technical data
- ❑ tolerances
- ❑ approved flow media

4.1 Filtering of the Flow Medium

Unfiltered flow media with a particle size of more than 60 µm result in increased wear of the rotating union.


Info

The larger the particles in the flow medium, the higher the wear of the rotating union is. The higher the total of all particles (polluting load), the higher the wear is.

- ❑ Insert a filter in front of the rotating union which filters particles with a size of 60 µm and larger from the flow medium.

4.2 Floor space with wear

The series 9000 rotating unions are equipped with carbon graphite seals. The length of the rotating union increases due to seal wear. With this the rotor is pushed out of the housing by spring force. This must be allowed for in the design and construction of the machine. The rotating unions must always be without stress. Stress can lead to the rotating unions leaking.


Warning

Risk of injury due to incorrect installation
If the rotating unions are under stress then the wearing of seals due to linear expansion cannot be counterbalanced. The rotating unions will leak once they have reached a degree of wear. Leaking steam or thermal oil could seriously injure people.

- ❑ Make sure that the rotating unions are always installed without stress.
- ❑ Please note the details on linear growth in the model specific installation drawing.

4.3 Connecting Options of the Rotating Union at the Machine Shaft

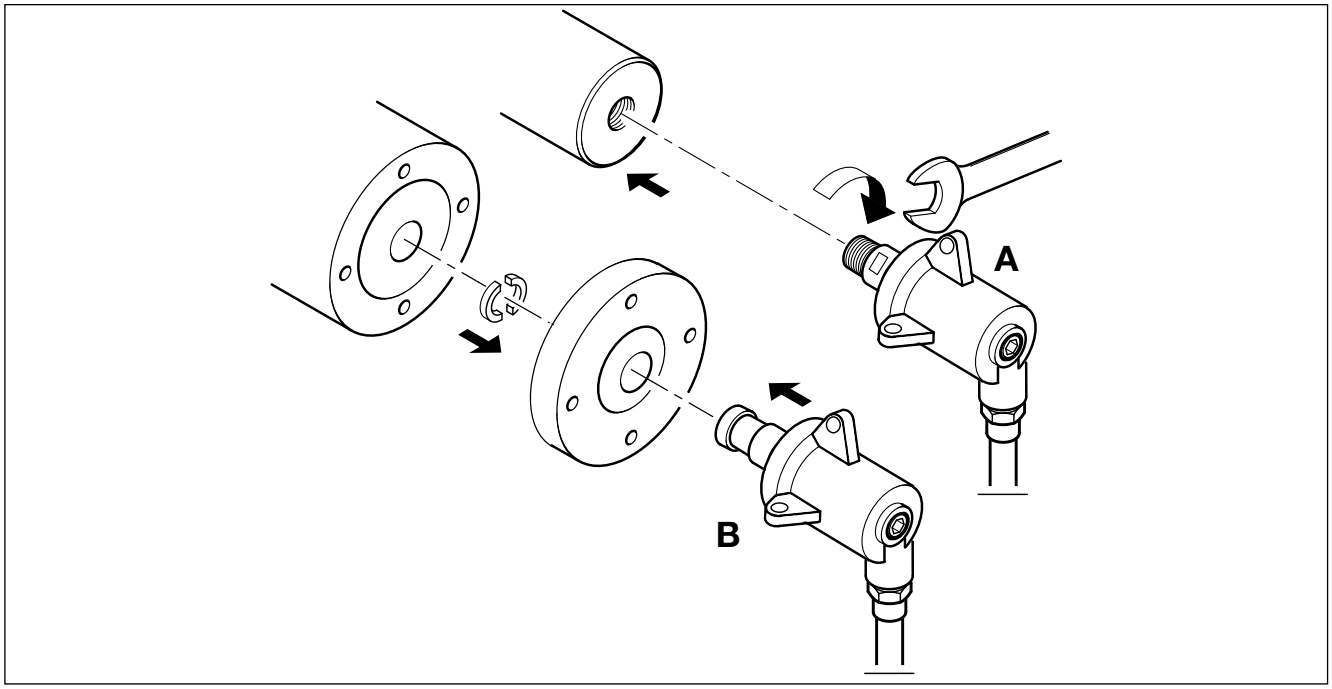


Fig. 5: Options for the installation on the machine shaft

The rotating unions are fixed to the machine shaft by the rotor. The following rotor versions are available:

- ❑ **Version (A):**
  The rotor is fitted via a thread on the end.
- ❑ **Version (B):**
  The rotor is fitted via a groove. The customer applies fixing components (e.g. flange and a split ring) to this groove.

The rotor forms the connection between the rotating union and shaft. For this reason it is important to design the shaft with great care and observe the specifications of the rotating unions model specific installation drawing. Deviations can lead to leaks and eccentric rotation of the rotating unions.
The rotating unions can be horizontally installed onto the shaft.


Warning

Component damage due to incorrect installation
If the rotating unions are installed vertically with the rotor pointing upwards or downwards, this can lead to leakage.

- ❑ Only install the rotating unions horizontally.
- ❑ Please contact *DEUBLIN*, if you would like to install the rotating unions vertically.

4.4 Options of Hose Installation

The following examples show how to install the hoses to the rotating unions.
These connecting options ensure that the hoses do not transfer stress to the rotating unions when the machine shaft moves.

- ❑ Please pay attention to the chapter “1.3 Safety Instructions” regarding the design.

4.4.1 Connection of hose to the rotating union

The hoses must be installed without stress and bends so that they do not apply any forces to the rotating union. The following figures show examples of installation.

Fig. 6: Connect hoses horizontally

If you want to connect the rotating unions to a machine then you must make the connection with flexible hoses. Flexible hoses prevent any side loads occurring on the rotating union's bearing during operation.

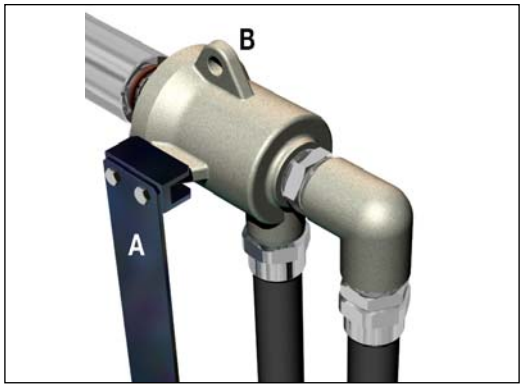
Fig. 7: Hoses bent by 90°

If the hoses are to be guided away from the rotating unions vertically and bent by 90°, connect the hoses as shown.

Fig. 8: Horizontal connection

If the hoses are to be guided away from the rotating unions horizontally and bent by 90°, connect the hoses as shown.

4.5 Using a locking element



The rotating union housing must be secured against rotation during operation using an anti-rotation element **(A)**.
For this the rotating unions are fitted with torque supports **(B)** on the housing.
The anti-rotation devices can be attached to these torque supports but must not prevent axial movement.

Fig. 9: Example of a possible locking element

Warning

Risk of injury due to incorrect installation
If the rotating unions are under stress then the wearing of seals due to linear expansion cannot be counterbalanced. The rotating unions will leak once they have reached a degree of wear. Leaking steam or thermal oil could seriously injure people.

- ❑ Make sure that the rotating unions are always installed without stress.
- ❑ Please note the details on linear growth in the union's specific installation drawing.

5 Installation

The union installation is described in an additional leaflet which is supplied with each rotating union. Enclosed you will also find the manual "Installation".

- ❑ Ensure that the person installing the rotating union receives the following information:
  - Position and location of the rotating union in the machine
  - Plan for connection of hoses
  - Position of leakage line
  - Information on the flow medium

6 Information on the Operation

Note

Damage to components through operation without a flow medium (Dry run)
The axial face seals of the rotating unions are lubricated by the flow medium. If the rotating unions are operated without medium present they are not lubricated and will thus be damaged.

- ❑ Ensure that the rotating unions are operated with a flow medium.
- ❑ Switch off the plant/machine, if the rotating unions are operated without flow medium.

7 Storage


Note

Damage of component due to incorrect storage
If you store the rotating unions incorrectly, they become leaky or are damaged.

- ❑ Store the rotating unions in a dry space between 3 °C and 40 °C.
- ❑ Store rotating unions for two years at the most.

8 Maintenance

This chapter provides information on how to extend the service life of the rotating unions by means of maintenance.

8.1 Maintenance Intervals

The series 9000 rotating unions are maintenance free.


Warning

Risk of injury due to hot or cold surfaces
The rotating unions are heated or cooled by the temperature of the flow medium.
Skin contact with these heated or cooled rotating unions can cause severe injuries.

- ❑ Before starting to work on the rotating union, allow the machine and media to cool down.
- ❑ Use safety gloves and PPE (Personal Protective Equipment) protecting against heat or cold depending on the application of the rotating unions.


Info

The rotating unions are lubricated with flow mediums.

8.2 Daily Inspection

Check the rotating unions for tightness.


Warning

Risk of injuries due to applied line pressure
If you have to work on the rotating union and feed pressure of the flow medium is applied or there is residual pressure in the piping system of the machine, the flow medium can escape under pressure when releasing the connections. You and other people may suffer severe injuries.

- ❑ Ensure that no feed pressure is applied.
- ❑ Ensure that there is no residual pressure in the piping system.


Warning

Risk of injury due to hot surfaces
If you are carrying out work on the rotating union and the flow medium's pump pressure is on the machine or there is residual pressure in the machine's piping system, when loosening connections the flow medium can leak out under pressure. You and other people could be seriously injured.

- ❑ Ensure that no feed pressure is applied.
- ❑ Ensure that there is no residual pressure in the piping system.
- ❑ Ensure media and machine is cool enough to work on.

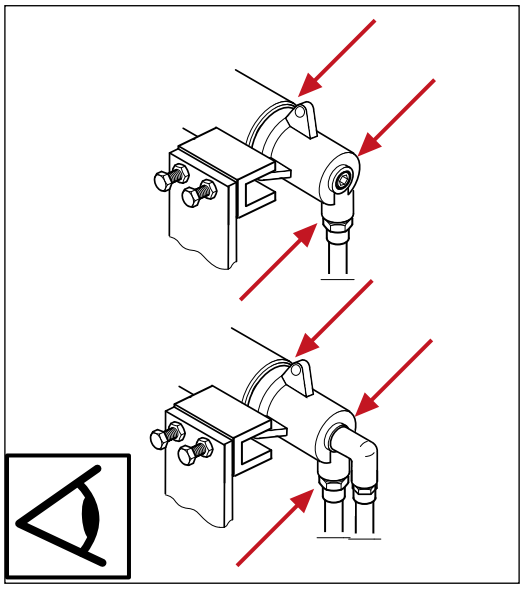


Fig. 10: Inspect visually

During operation of the machine, leakages may occur at the connections and hoses depending on the requirements to the rotating unions.

1. Carry out daily visual inspections in order to check whether leakages occurred at the connections (see arrows).

If you detect leakage:
1. Stop the machine.
2. Replace the defective hoses with new ones.
3. Seal leaking connections.
4. If the rotating union is worn and leaks and the wear indicator on the rotor is visible and flush with the end of the end cap (Fig. 10), replace the seal with a new one. Repair kits are also available for these models from *DEUBLIN*.

8.2.1 Monitoring wear

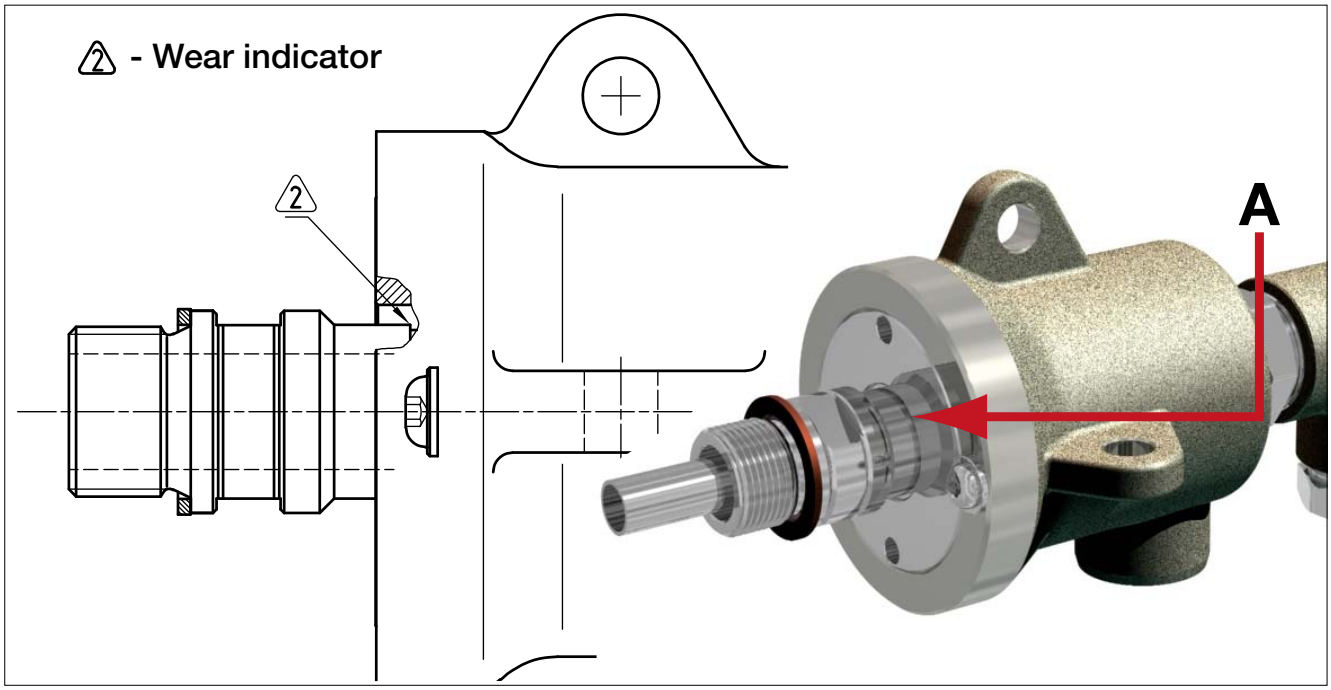


Fig. 11: Wear indicator on the rotor

The rotating unions are fitted with carbon graphite seals. The more the seals are worn, the further the rotor protrudes out of the housing. To establish the degree of wear, there is a wear indicator **(A)** on the rotor. If the wear indicator can be seen then you must immediately replace the seals.

- ❑ Check the rotor to see if the wear indicator is visible.
- ❑ Have the union repaired by *DEUBLIN* or have the seals and rotor replaced by a competent person (see “Replacement Parts” section on page 16).

Warning

Risk of injury due to worn rotating unions
If the rotating union seals are worn then flow medium can leak and seriously injure people.

- ❑ Check the rotating union for wear every day.
- ❑ Immediately replace worn rotating unions.

8.3 Maintenance

This rotating union does not require any special care or additional lubrication. This rotating union is maintenance free.

9 Trouble Shooting

This chapter provides the following information:

1. Which problem may occur?
2. What can be the cause of the problem?
3. How can you eliminate this problem?


Info

Do not disassemble ~~open~~ the rotating unions for repair. This invalidates the warranty claim.

9.1 Potential Causes for Errors and their Elimination


Warning

Risk of injuries due to applied line pressure

If you have to work on the rotating union and feed pressure of the flow medium is applied or there is residual pressure in the piping system of the machine, the flow medium can escape under pressure when releasing the connections. You and other people may suffer serious injuries.

- ❑ Ensure that no feed pressure is applied.
- ❑ Ensure that there is no residual pressure in the piping system.


Warning

Risk of injury due to worn rotating unions

If the rotating union seals are worn then flow medium can leak and seriously injure people.

- ❑ Check the rotating union for wear every day.
- ❑ Immediately replace worn rotating unions.

Error	Potential causes	Elimination
Rotating union is leaky after installation	Incorrect installation	1. Stop the machine. 2. Ensure that the connections are sealed according to the manual “Installation”. 3. Ensure that all hoses are installed without stress. 4. Ensure that all seal faces are clean. 5. Ensure that the anti-twist device is installed without stress.
	Seal faces of the rotating union are damaged	1. Pack rotating union (see Pack rotating union for transport, page 15). 2. Send rotating union to *DEUBLIN* for overhaul/service.
Drying cylinder is flooded	With elbow type C: gasket is damaged.	1. Stop the machine. 2. Dismantle the rotating union. 3. Ensure that the gasket in the elbow is not damaged, replace defective gasket. 4. Ensure that the gasket is in the correct position (see model specific installation drawing), if necessary adjust position.
	With elbow type C: gasket is not correctly adjusted	1. Stop the machine. 2. Dismantle the rotating union. 3. Ensure that the gland is sufficiently pressed into the elbow.
	Siphon hose is broken off	1. Stop the machine. 2. Dismantle the rotating union 3. Replace the siphon hose.
Rotating union leaks before the end of the expected service life	Flow medium is contaminated	1. Stop the machine. 2. Drain flow medium. 3. Send rotating union to *DEUBLIN* for overhaul/service, if required. 4. Mount new filter. 5. Flush the piping system of the machine. 6. Fill in new flow medium.
	Rotating union is not designed for the respective application	1. Ensure that the correct *DEUBLIN* Rotating Union is used. 2. Contact *DEUBLIN* if required.
Rotating union runs untrue or wobbles	Thread and/or concentricity outside the admissible tolerance.	1. Stop the machine. 2. Remove rotating union. 3. Manufacture new thread or flange.
	Rotating union is mounted incorrectly.	1. Stop the machine. 2. Remove rotating union. 3. Mount the rotating union according to installation instructions.

9.2 Pack Rotating Union for Transport

The rotating union has to be protected against mechanical impact and humidity during transport to ensure that the rotating union will arrive at *DEUBLIN* without being damaged.

1. Dismount the rotating union in reverse order of the installation (see Installation).
2. Ensure that the rotating union is free from the respective flow medium.

3. Use a cardboard box which is suitable for the weight of the rotating union.
4. Cushion the base of the cardboard box with a soft material, e.g. air bubble film.
5. Wrap the rotating union with a soft material, e.g. air bubble film.
6. Ensure that no packing material or dirt can penetrate the opening of the rotating union.
7. Position the rotating union in the middle of the cardboard box.
8. Fill the free space around the rotating union with newspaper or another suitable material.
9. Close the cardboard box by means of tape.

10 Disposal

10.1 Dispose of Packaging

❑ Dispose of the packaging (cardboard box and plastics) according to the national standards, regulations and directives.

10.2 Dispose of Rotating Union

Basically, the rotating unions consist of metals (aluminium, steel, brass, bronze, copper, cast) which can be reused within the reclamation of scrap. Dispose of materials in a way that the disposal is compatible regarding humans, nature and environment. In doing so, ensure that rotating unions to be disposed of are free from the respective flow media.

❑ Dismount the rotating union in reverse order of the installation (see Installation).
❑ Flush the rotating union.
❑ Collect the dirty flushing media.
❑ Dispose of the collected flushing media according to the national standards, regulations and directives.
❑ If you use thermal oil, please observe the instructions of the thermal oil manufacturer.
❑ Dispose of the rotating union according to the national standards, regulations and directives.

In case of repair, *DEUBLIN* disposes of all used parts.

11 Spare Parts

The rotating unions have a limited service life and include wearing parts. Wearing parts are excluded from the warranty. All static and dynamic sealing elements of a component are considered wearing parts.
Repair kits are available for 9000 series of the rotating unions and can be obtained from *DEUBLIN*. Please ask your *DEUBLIN* Service.
You need special tools and repair instructions for repair of the rotating unions which can be obtained from *DEUBLIN* as well.


Info

Note
If you do not want to repair your rotating union on your own, *DEUBLIN* will be pleased to help you. If requested, *DEUBLIN* will exchange all wearing parts and clean all components of the rotating union. Before repaired rotating unions leave the premises, they will be subjected to an operational check. You will receive a rotating union with warranty.

Reliability

Many years' experience, ongoing liaison with customers, innovations sourced inhouse and from suppliers place *DEUBLIN* in a position providing reliable Rotating Unions at the highest level.

When it comes to concrete applications, maximum service life is guaranteed by matching the sealing to the respective medium.

The service life is also equally maximized by maintaining cleanliness when storing and handling the Rotating Union and by adhering to the guidelines issued by *DEUBLIN* in respect of the conditions on the customer's premises.