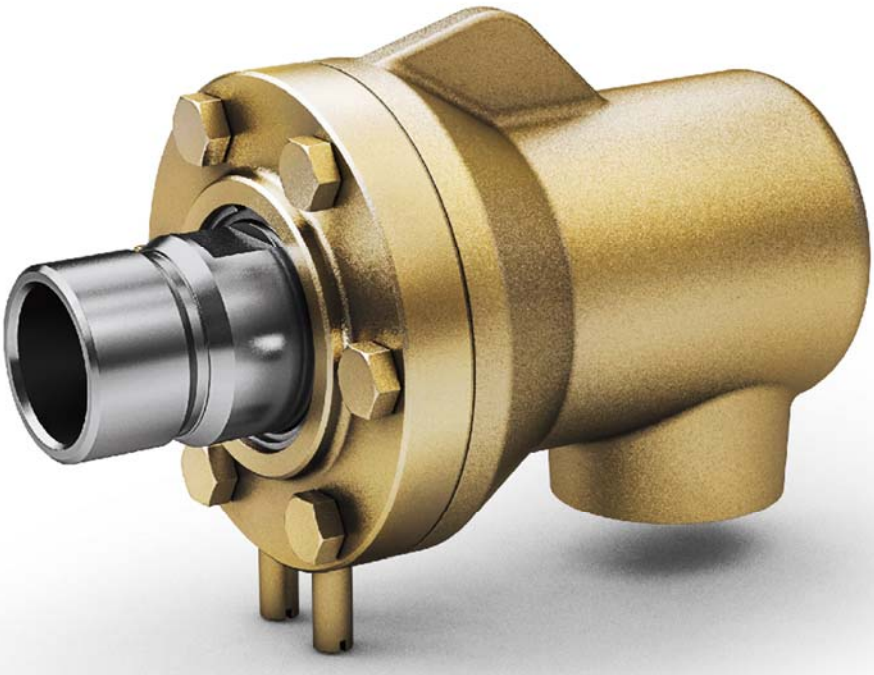
Operating Instructions for Maier Rotary Joints

Series H / HW



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Section	Contents	Designation
1	General part of the operating instructions	B
2	Specifications and spare parts	S
3	For ATEX-certified products (directive 2014/34/EC): Additional information for use in hazardous areas (EX areas)	A

Document identification

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List of modifications

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B General Part of the Operating Instructions for Maier Rotary Joints H / HW

1 Contents

1 General

1.1 Information on this Manual

This manual is intended for use by the operators, the maintenance and the inspection staff. It is divided into the following sections:

- Section 1 "General Part of the Operating Instructions":
  (pages with designation B)
  This section provides general information on the manual, on safety and on handling the product.
- Section 2 "Specifications and Spare Parts":
  (pages with designation S)
  This section provides product-specific data.
- Section 3 "Additional Information for Use in Hazardous Areas (EX areas)":
  (pages with designation A)
  (only available for products certified as per directive 2014/34/EU)

Staff and operators must have read and fully understood the operating instructions and must observe all instructions it contains. Please note that we will not be liable in any way for any damages and operational disruptions resulting from the failure to read and/or observe the operating instructions.

Read chapter 7 and the specific safety instructions in the individual chapters with particular care.

We reserve the right to technical modifications if such modifications are required to improve the rotary joint or its accessories, i.e. details and descriptions may differ from the information given in this manual.

1.2 Explanations and Symbols

Symbol	Used for	Explanation
•	List	List of facts and instructions. No specific sequence required.
1.	Instructions consisting of several individual steps	Instructions consisting of several steps which must be followed exactly in the sequence listed. Failure to observe the instructions in the correct sequence may result in damages or accidents.
[1]	Item number	Item number of the component mentioned in the corresponding illustration.

2 Product Description

2.1 Intended Use

Maier Rotary Joints are only permitted to be used as fittings to connect pressurized pipes to rotating pressurized systems. Typical examples of such rotating pressurized systems are rollers which are heated or cooled by means of liquid, gas, or steam flowing through them. **Please refer to the section "Specifications and Spare Parts" for details on approved media, their grades and specifications.** These specifications must be observed in the application. Other media may be possible; please consult the manufacturer.

Never modify the rotary joint as this can cause hazards. Install, operate and maintain the rotary joint only as described in these operating instructions. Company Maier will not be liable for any damages and operational disruptions resulting from failure to read and/or observe the operating instructions.

These operating instructions do not contain all the information which is crucial for safe operation. In addition, you are required to observe all national and local laws and regulations concerning the prevention of accidents, applicable at the place of installation.

For repairs, use only genuine Maier spare parts or standardized components explicitly approved by Maier. Using any other components can have adverse effects on the safety of the unit.

2.2 Reasonably Foreseeable Misuse

In case of reasonably foreseeable misuse of the product, the manufacturer's warranty will be void and the operator will be fully responsible for the consequences.

Reasonably foreseeable misuse includes:

- failure to observe the application data
- failure to observe the medium specifications
- failure to observe the maintenance intervals
- failure to replace wearing parts
- failure to perform maintenance work
- faulty maintenance work
- additional components mounted and conversions carried out without written approval
- use of non-genuine spare parts

3 Components

3.1 H1 / HW1 / R/L/K DN 15 ... 100; HW1 Serie-450 /K DN15 ... 25

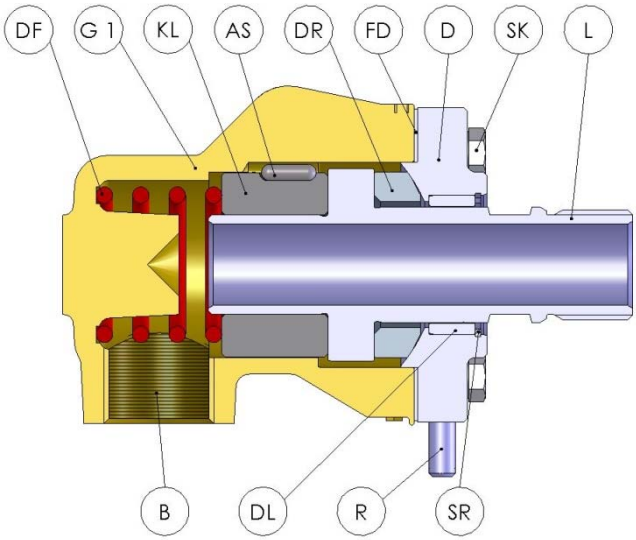


Figure 1

G 1	Housing 1
B	Housing connection for the medium
L	Rotor
DR	Sealing ring
DL	Cover bushing
FD	Flat packing
D	Cover
KL	Carbon bushing
DF	Compression spring
SK	Hexagon screw
AS	Locking pin
SR	Circlip
R	Anti-rotation device

3.2 H2 / HW2 /R/L/K DN 15 ... 100; HW2 Serie-450 /K DN 20 ... 25

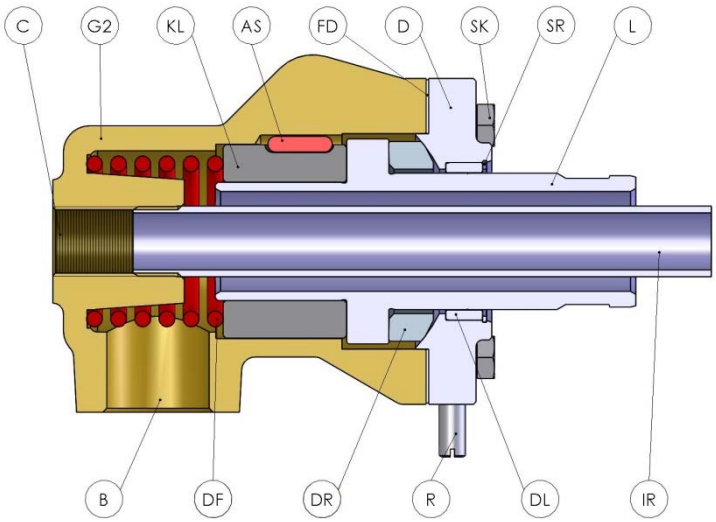


Figure 2

G 2	Housing 2
B,C	Housing connection for the medium.
L	Rotor
DR	Sealing ring
DL	Cover bushing
FD	Flat packing
D	Cover
KL	Carbon bushing
DF	Compression spring
SK	Hexagon screw
AS	Locking pin
SR	Circlip
R	Anti-rotation device
IR	Inner pipe (not included in the scope of supply)

3.3 HR2 / HWR2 /R/L/K DN DN 15 ... 100; HWR2 Serie-450 /K DN 20 ... 25

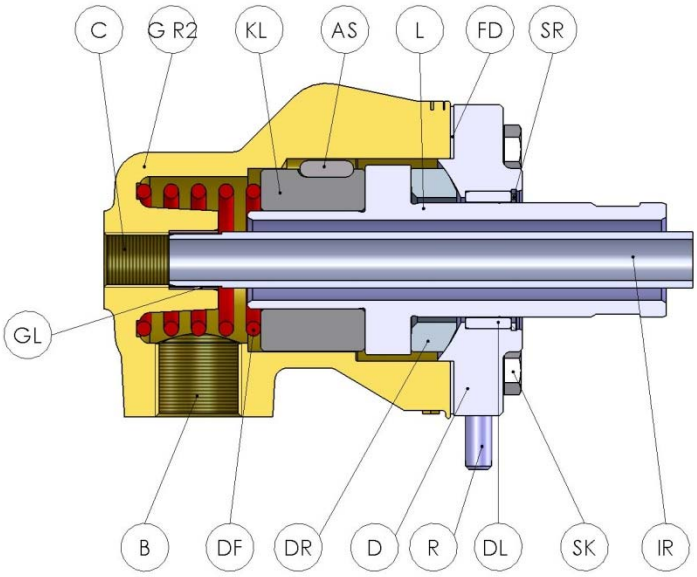


Figure 3

G R2	Housing R 2
B,C	Housing connection for the medium
L	Rotor
GL	Slide bushing
DR	Sealing ring
DL	Cover bushing
FD	Flat packing
D	Cover
KL	Carbon bushing
DF	Compression spring
SK	Hexagon screw
AS	Locking pin
SR	Circlip
R	Anti-rotation device
IR	Inner pipe (not included in the scope of supply)

3.4 H3 / R/L/K DN 25 ... 40

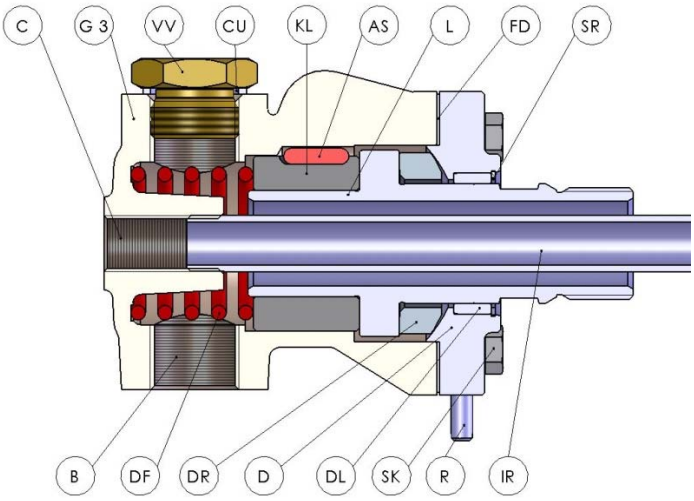


Figure 4

G 3	Housing 3
B,C	Housing connection for the medium
L	Rotor
VV	Vacuum valve
CU	CU seal
DR	Sealing ring
DL	Cover bushing
FD	Flat packing
D	Cover
KL	Carbon bushing
DF	Compression spring
SK	Hexagon screw
AS	Locking pin
SR	Circlip
R	Anti-rotation device
IR	Inner pipe (not included in the scope of supply)

3.5 HWX2 / K - DN 32-50

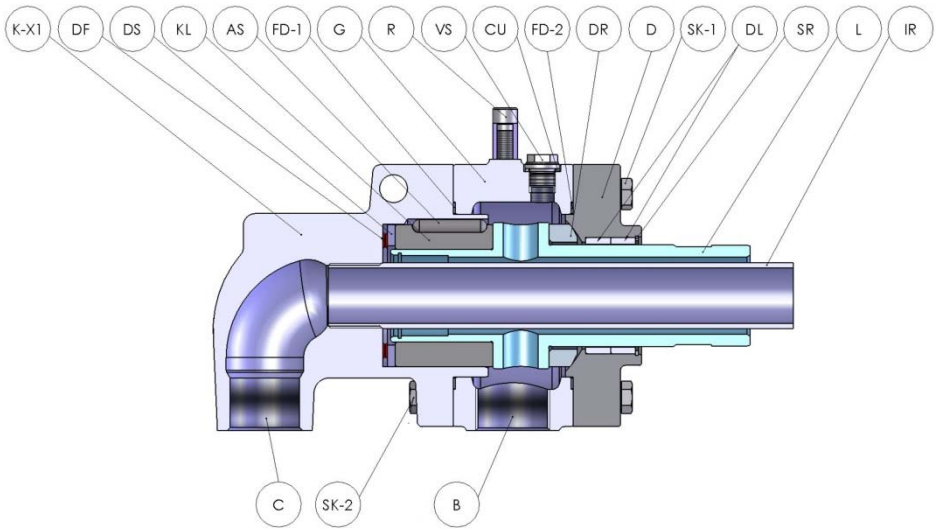


Figure 5

G	Housing	KL	Carbon bushing
B,C	Housing connection for the medium	DF	Compression spring
L	Rotor	SK-1	Hexagon screw 1
K-X1	Elbow 1 (HWX2 DN 32-50)	SK-2	Hexagon screw 2
DS	Thrust washer	AS	Locking pin
DR	Sealing ring	SR	Circlip
DL	Cover bushing	VS	Screw plug
FD-1	Flat packing 1	CU	CU seal
FD-2	Flat packing 2	R	Anti-rotation device
D	Cover	IR	Inner pipe (not included in the scope of supply)

3.6 HWX2 / K - DN 65-100

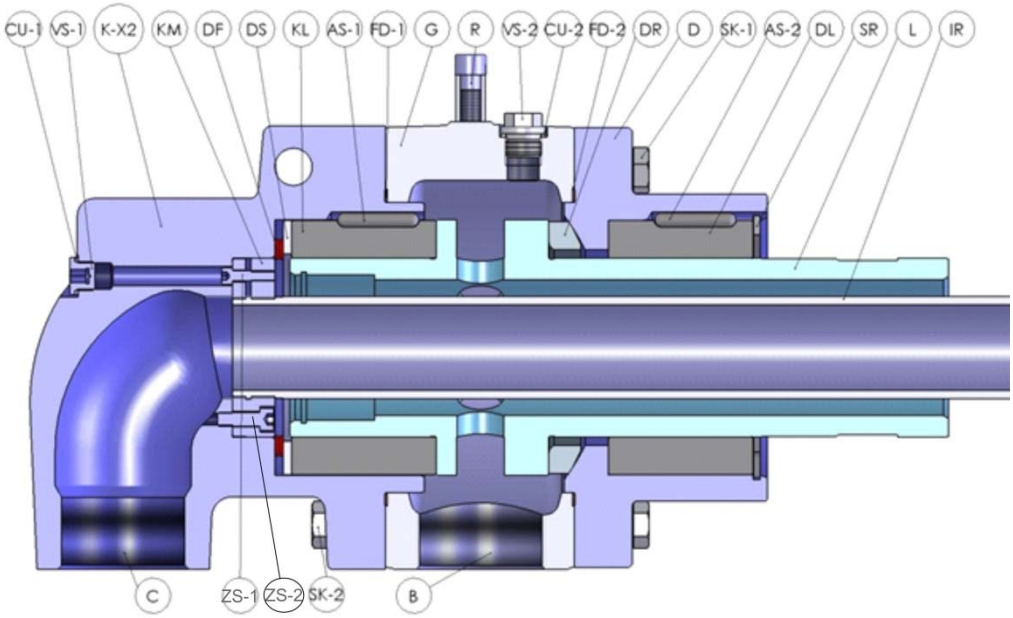


Figure 6 Cover Bushing [DL] and Locking Pin [AS-2] DN 75-100

G	Housing	ZS-1	Socket head screw 1
B,C	Housing connection for the medium	ZS-2	Socket head screw 2
L	Rotor	VS-2	Screw plug 2
K-X2	Elbow 2 (HWX2 DN 65-100)	CU-2	CU-seal 2
DS	Thrust washer	R	Anti-rotation device
DR	Sealing ring	IR	Inner pipe (not included in the scope of supply)
DL	Cover bushing		
FD-1	Flat packing 1		
FD-2	Flat packing 2		
D	Cover		
KL	Carbon bushing		
DF	Compression spring		
SK-1	Hexagon screw 1		
SK-2	Hexagon screw 2		
AS-1	Locking pin 1		
AS-2	Locking pin 2		
SR	Circlip		
VS-1	Screw plug 1		
CU-1	Sealing ring 1		
KM	Clamp nut		

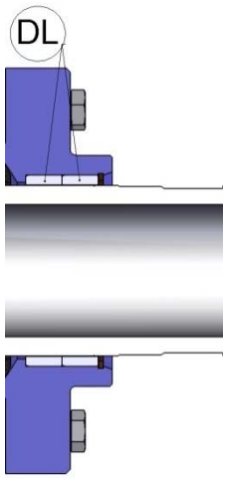


Abbildung 6-1

Figure 6.1

3.7 HWB2 / K DN 32 – 100

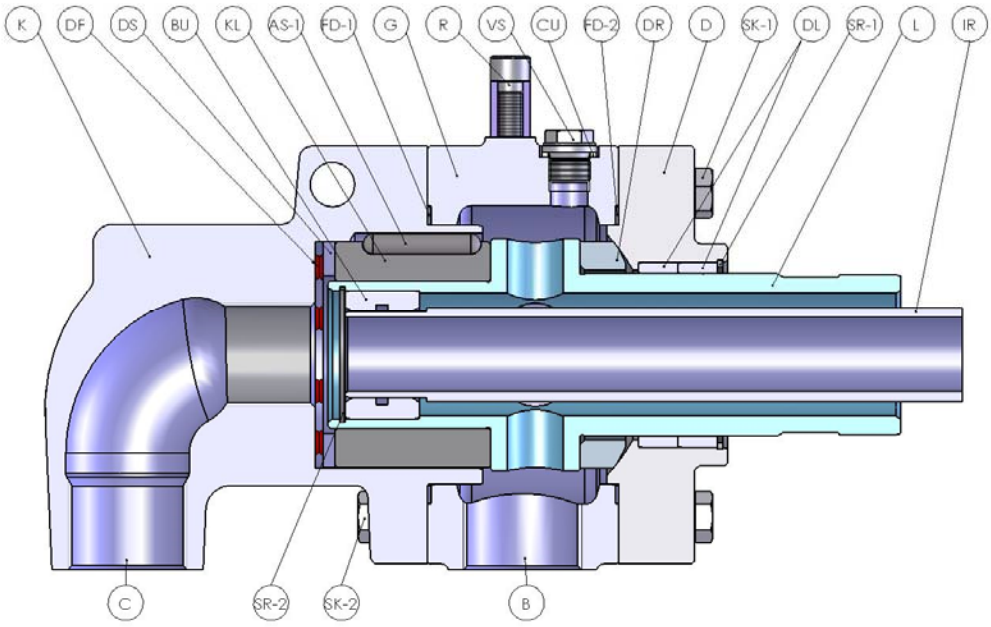


Figure 7 Cover Bushing [DL] DN 32-65

G	Housing
B,C	Housing connection for the medium
L	Rotor
BU	Bushing
K	Elbow
DS	Thrust washer
DR	Sealing ring
DL	Cover bushing
FD-1	Flat packing 1
FD-2	Flat packing 2
D	Cover
KL	Carbon bushing
DF	Compression spring
SK-1	Hexagon screw 1
SK-2	Hexagon screw 2
AS-1	Locking pin 1
AS-2	Locking pin 2
SR-1	Circlip 1
SR-2	Circlip 2
VS	Screw plug
CU	CU seal
R	Anti-rotation device
IR	Inner pipe (not included in the scope of supply)

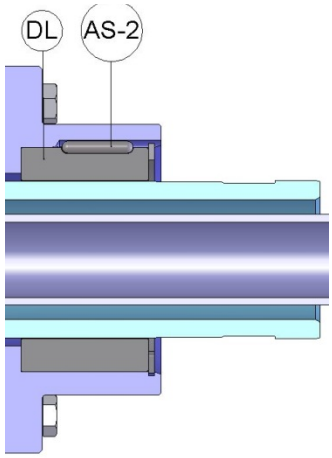


Figure 7-1

Cover Bushing [DL] and
Locking Pin [AS-2]
DN 75-100

3.8 HWA2 / K DN 32 – 2099

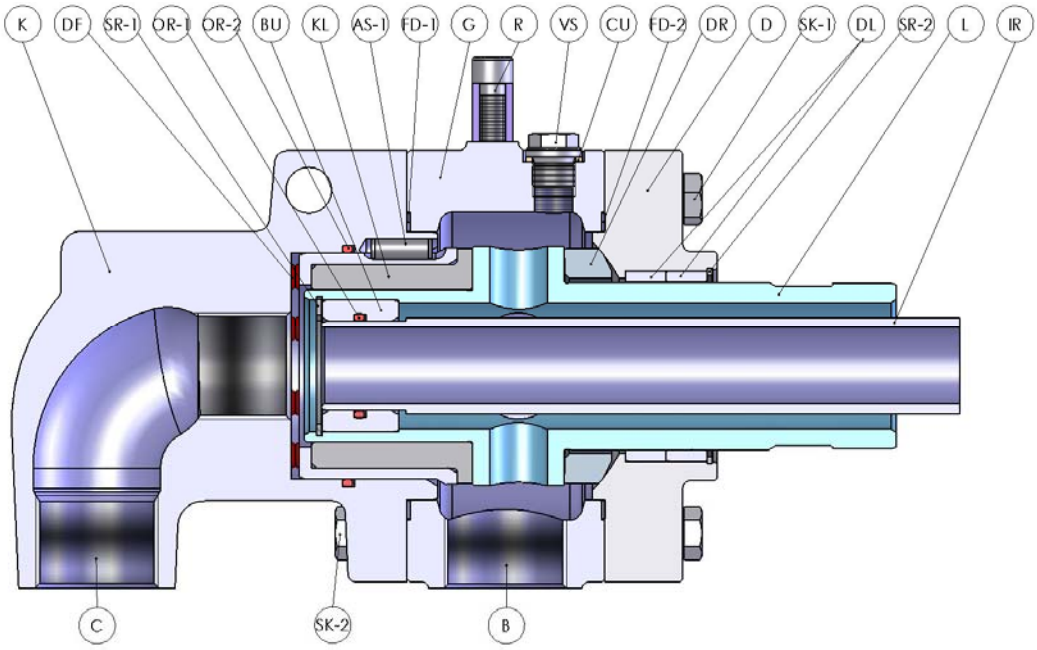


Figure 8 Cover Bushing [DL] DN 32-65

G	Housing	CU	CU seal
B,C	Housing connection for the medium	R	Anti-rotation device
L	Rotor	IR	Inner pipe (not included in the scope of supply)
BU	Bushing		
K	Elbow		
DR	Sealing ring		
OR-1	O-ring 1		
OR-2	O-ring 2		
DL	Cover bushing		
FD-1	Flat packing 1		
FD-2	Flat packing 2		
D	Cover		
KL	Carbon bushing		
DF	Compression spring		
SK-1	Hexagon screw 1		
SK-2	Hexagon screw 2		
AS-1	Locking pin 1		
AS-2	Locking pin 2		
SR-1	Circlip 1		
SR-2	Circlip 2		
VS	Screw plug		

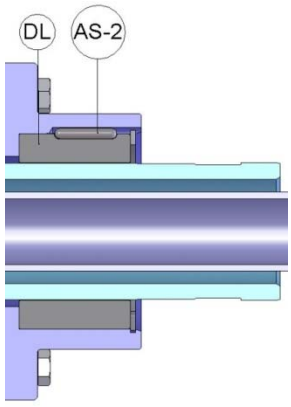


Figure 8-1
Cover Bushing [DL] and Locking Pin [AS-2]
DN 75-2099

3.9 HW1 Series-500 / K DN 32 – 100

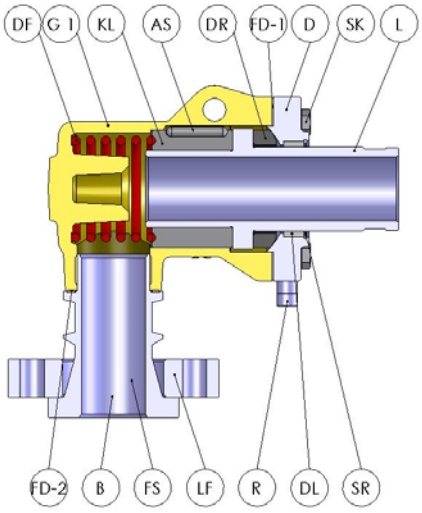


Figure 9

G 1	Housing 1
B	Housing connection for the medium
L	Rotor
FS	Flange with neck
LF	Slip flange
DR	Sealing ring
DL	Cover bushing
FD-1	Flat packing 1
FD-2	Flat packing 2
D	Cover
KL	Carbon bushing
DF	Compression spring
SK	Hexagon screw
AS	Locking pin
SR	Circlip
R	Anti-rotation device

3.10 HWX2 Series -500 / K DN 32 – 50

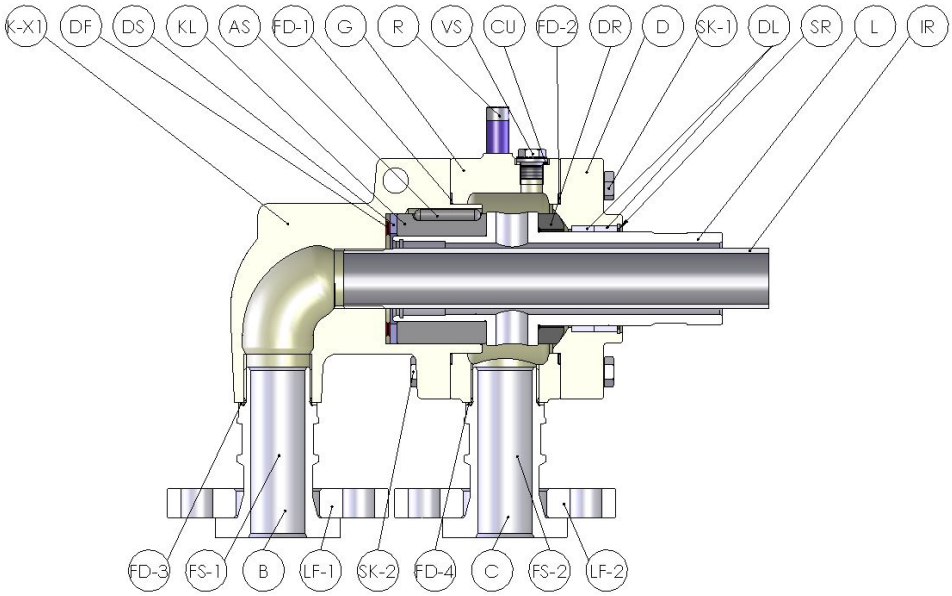


Figure 10

G	Housing	CU	CU seal
B,C	Housing connection for the medium	R	Anti-rotation device
L	Rotor	IR	Inner pipe (not included in the scope of supply)
FS-1	Flange with neck 1		
LF-1	Slip flange 1		
FS-2	Flange with neck 2		
LS-2	Slip flange 2		
K-X1	Elbow X1 (HWX DN 32-50)		
DS	Thrust washer		
DR	Sealing ring		
DL	Cover bushing		
FD-1	Flat packing 1		
FD-2	Flat packing 2		
FD-3	Flat packing 3		
FD-4	Flat packing 4		
D	Cover		
KL	Carbon bushing		
DF	Compression spring		
SK-1	Hexagon screw 1		
SK-2	Hexagon screw 2		
AS	Locking pin		
SR	Circlip		
VS	Screw plug		

3.11 HWX2 Series-500 / K DN 65-100

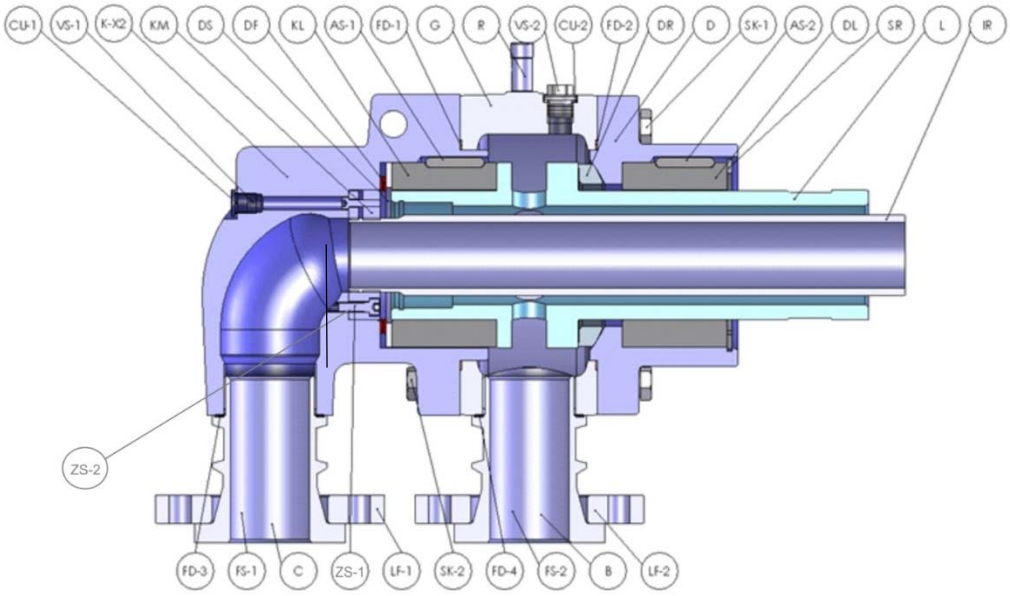


Figure 11 Cover Bushing [DL] and Locking Pin [AS-2] DN 75-100

G	Housing
B,C	Housing connection for the medium
L	Rotor
FS-1	Flange with neck 1
LF-1	Slip flange 1
FS-2	Flange with neck 2
LF-2	Slip flange 2
K-X2	Elbow X2 (HWX DN 65-100)
DS	Thrust washer
DR	Sealing ring
DL	Cover bushing
FD-1	Flat packing 1
FD-2	Flat packing 2
FD-3	Flat packing 3
FD-4	Flat packing 4
D	Cover
KL	Carbon bushing
DF	Compression spring
SK-1	Hexagon screw 1
SK-2	Hexagon screw 2
AS-1	Locking pin 1
AS-2	Locking pin 2
SR	**Circlip**

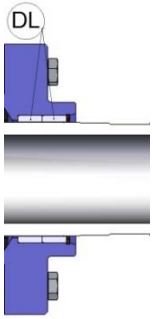


Figure11-1 Cover Bearing [DL] DN 65

VS-1	Screw plug 1
CU-1	CU-seal 1
KM	Clamp nut
ZS-1	Socket head screw 1
ZS-2	Socket head screw 2
VS-2	Screw plug 2
CU-2	CU-seal 2
R	Anti-rotation device
IR	Inner pipe (not included in the scope of supply)

3.12 HWB2 Series -500 / K DN 32 – 100

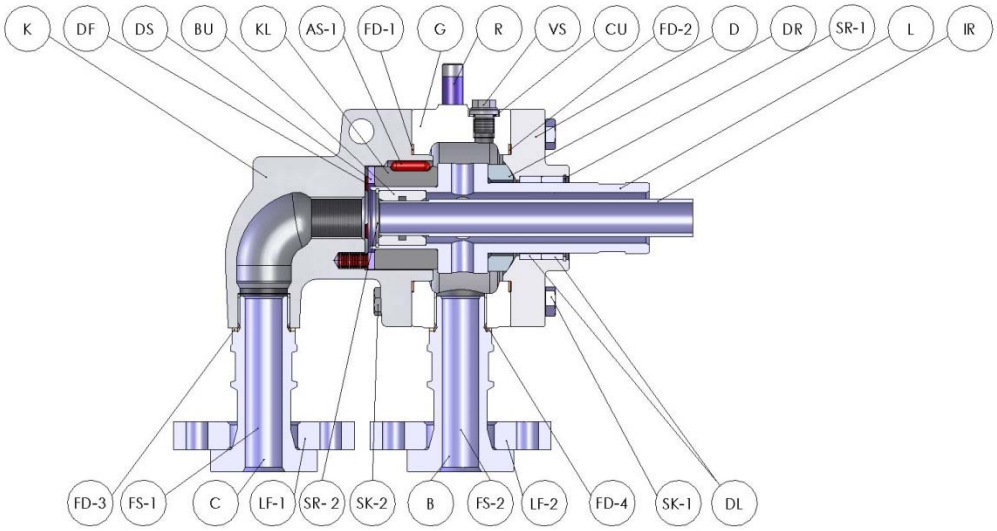


Figure 12 Cover Bearing [DL] DN 32-65

G	Housing		
B,C	Housing connection for the medium		
L	Rotor		
BU	Bushing		
FS-1	Flange with neck 1		
LF-1	Slip flange 1		
FS-2	Flange with neck 2		
LF-2	Slip flange 2		
K	Elbow		
DS	Thrust washer		
DR	Sealing ring		
DL	Cover bushing		
FD-1	Flat packing 1	AS-1	Locking pin 1
FD-2	Flat packing 2	AS-2	Locking pin 2
FD-3	Flat packing 3	SR-1	Circlip 1
FD-4	Flat packing 4	SR-2	Circlip 2
D	Cover	VS	Screw plug
KL	Carbon bushing	CU	CU seal
DF	Compression spring	R	Anti-rotation device
SK-1	Hexagon screw 1	IR	Inner pipe (not included in the scope of supply)
SK-2	Hexagon screw 2		

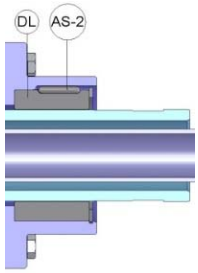


Figure 12-1
Cover Bushing [DL] and Locking Pin [AS-2] DN 75-100

3.13 HWA2 Serie -500 / K DN 32-2099

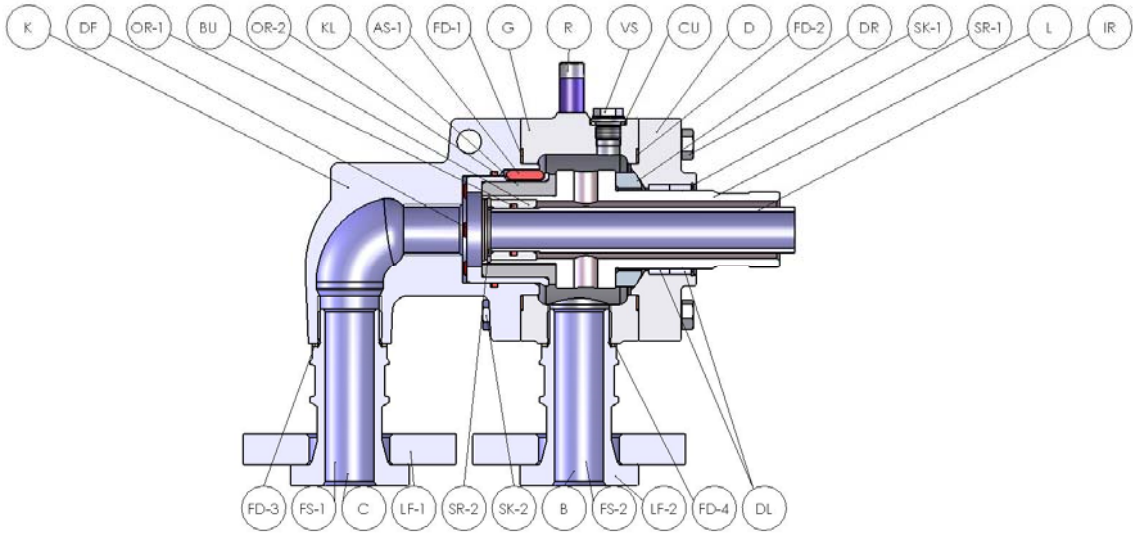


Figure 13 Cover Bushing [DL] DN 32–65

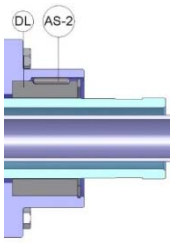


Figure 13-1
Cover Bushing [DL] and
Locking Pin [AS-2] DN 75-2099

G	Housing		
B,C	Housing connection for the medium		
L	Rotor		
BU	Bushing		
FS-1	Flange with neck 1	**D**	Cover
LF-1	Slip flange 1	**KL**	Carbon bushing
FS-2	Flange with neck 2	**DF**	Compression spring
LF-2	Slip flange 2	**SK-1**	Hexagon screw 1
K	Elbow	**SK-2**	Hexagon screw 2
DR	Sealing ring	**AS-1**	Locking pin 1
OR-1	O-ring 1	**AS-2**	Locking pin 2
OR-2	O-ring 2	**SR-1**	Circlip 1
DL	Cover bushing	**SR-2**	Circlip 2
FD-1	Flat packing 1	**VS**	Screw plug
FD-2	Flat packing 2	**CU**	CU-Seal
FD-3	Flat packing 3	**R**	Anti-rotation device
FD-4	Flat packing 4	**IR**	Inner pipe (not included in the scope of supply)

4 Function

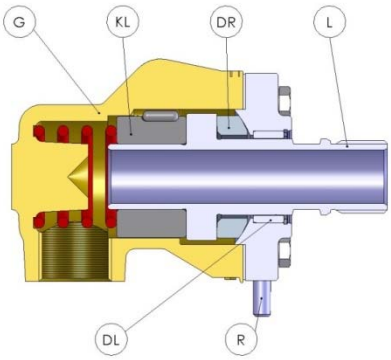


Figure 14

Maier Rotary Joints are fittings to connect pressurized pipes to rotating pressurized systems. Typical examples of such rotating pressurized systems are rollers which are heated or cooled by means of liquid, gas or steam flowing through them.

The rotor „L" is the part rotating with the roller while the housing „G" is the stationary part of the rotary joint. Inside the housing, two slide bushings "KL" and "DL" made of artificial carbon provide support for the rotor. A special sealing ring "DR" made of artificial carbon is situated at the junction between the stationary and the rotating parts sealing the medium against the atmosphere. Wear of the sealing ring causes an axial displacement of the housing (away from the roller). In order to prevent malfunctions, this movement must not be impeded. Rotation of the housing is prevented by means of an anti-rotation fork "R".

NOTICE

Rotary Joints of Series H/HW are available with several different housing and rotor designs

5 Housing Connections

There are following design variations depending on the rotary joint type:

5.1 One-Way Flow Design (single passage)

5.1.1 Design 1

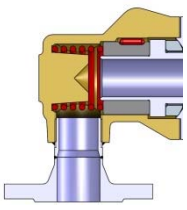


Figure 15

One-Way Flow Design (single passage)
Housing with one connection for supplying or discharging a medium to or from the rotating pressure system.

5.2 Two-Way Flow Design (dual passage)

Housing with two connections for supplying and discharging a medium to and from the rotating pressure system. The second flow channel is created by an inner pipe which is centered on the central axis of the rotating part. The structural variations of the inner pipe are distinguished by following the design types:

5.2.1 Design 2 (Fig. 16) or X2 (Fig. 17)

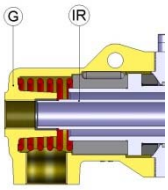


Figure 16

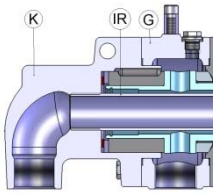


Figure 17

Stationary inner pipe:
The inner pipe [IR] is screwed either into the housing [G] or the elbow [K] (standard version always with right-hand thread).

5.3 Design R 2

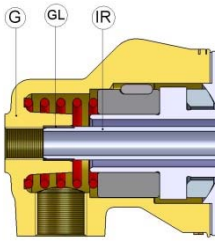


Figure 18

Rotating inner pipe supported in the housing:
The inner pipe [IR] runs inside a self-lubricating slide bushing [GL] and is supported by the stationary housing [G]. The points of support are subject to wear.

5.4 Design A 2

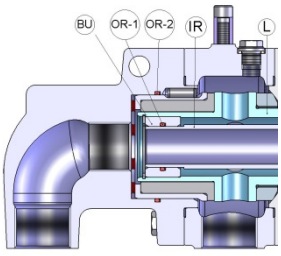


Figure 19

Rotating inner pipe with static support in the rotating part of the rotary joint:
The inner pipe [IR] runs inside a bushing [BU] in the rotor [L].
For an accurate separation of supply and return flow:
Additional sealing: [OR-1] and [OR-2]
The points of support are not subject to wear.

5.5 Design B 2

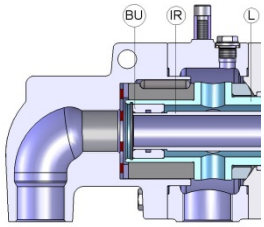


Figure 20

Rotating inner pipe with static support in the rotating part of the rotary joint:
The inner pipe [IR] runs inside a bushing [BU] in the rotor [L]. For an accurate separation of supply and return flow: gap seal.
The points of support are not subject to wear.

5.6 Three-Way Flow Design

5.6.1 Design 3

Housing with three connections for supplying steam and discharging condensate, with integrated vacuum valve as safeguard against vacuum in thin-walled dryer cylinders.

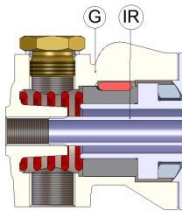


Figure 21

Stationary inner pipe:
The inner pipe [IR] is screwed either into the housing [G] or the elbow [K] (standard version always with right-hand thread).

6 Rotor Connections

The connection to the rotating pressure system (rotor connection) is made by means of the rotating part of the rotary joint – the rotor. There are following design variations:

6.1 Threaded Connection

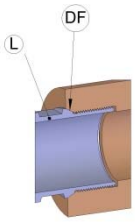


Figure 22

The rotor [L] is connected to the roller by means of either a right-hand or a left-hand thread (R/L).

Sealing is done by means of a sealing cone [DF].

or

6.2 Flange Connection

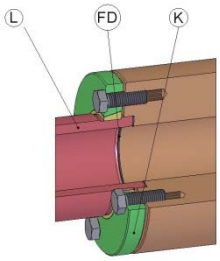


Figure 23

The rotor is connected to the roller by means of a K- flange (K).

Sealing is done by means of a flat packing [FD] on the front side between the rotor [L] and the pressure system..

INFORMATION

For additional information, please refer to our catalog and the corresponding dimensional drawing in the section "Specifications and Spare Parts".

7 Safety

7.1 Introduction

The rotary joint was designed and built according to the latest state of the art and complies with the pertinent safety regulations. However, the rotary joint may still cause dangers if it is not used as intended and according to the instructions or if it is used by untrained staff or if it is used improperly.It is not allowed to tamper with the rotary joint or to modify it in any way which may adversely affect the safety and the performance of the rotary joint.We strongly advise the operator of the rotary joint to check his safety concept in terms of the effects a failure of the rotary joint may have on the environment. Make sure to take all additional safety measures required to protect persons and the environment.

7.2 General Safety Information

- Always keep the operating instructions at the installation site for quick and easy access.
- In addition to the instructions provided in this manual, you must also observe the pertinent regulations and guidelines concerning workplace safety and prevention of accidents.
- Equip the rotary joint with a sufficiently dimensioned anti-rotation device.
- Use only flexible elements for the housing connections! Do not apply forces to the housing via the connections.
- Prior to carrying out any works on the rotary joint, switch off the machine / system and secure it against unintentional restart. Pressure must be removed from the rotary joint, and the rotary joint must have cooled down (max. 50°C).
- Only operate the rotary joint when it is in perfect technical condition and only for the intended use and in accordance with the instructions and specifications of the operating instructions. Observe all safety regulations to prevent hazards. Immediately repair (or have repaired) any malfunctions or problems which may interfere with the safety of the rotary joint!
- The service life of counter-rotating parts is limited. Therefore, perform preventive maintenance of seals and bearings after no more than 12 months!
- If it is necessary to dismantle safety devices for repair or maintenance of the rotary joint, all such devices must be refitted immediately upon completion of the work. Check the devices for proper function!
- When replacing the rotary joint, carefully fasten it to appropriate lifting gear and secure it in such a way that it cannot cause any hazards. Use only suitable lifting gear which is in perfect technical condition and which has a sufficient rating for the load to be lifted! Do not step or work below suspended loads!
- Re-tighten all screw connections which may have been loosened for maintenance or repair work! Refer to the section "Specifications and Spare Parts" for information on tightening torques.
- Use only genuine spare parts for repairs.

INFORMATION

For additional information refer to the section "Specifications and Spare Parts"

7.3 Structure of the Safety Instructions

7.3.1 Signal Words

⚠ DANGER

DANGER

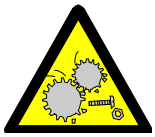
Refers to acute danger. Failure to avoid the danger will result in death or severe injuries.

⚠ WARNING

Refers to a possibly imminent danger! Failure to avoid the danger may result in death or severe injuries.

⚠ CAUTION

Refers to a possibly imminent danger! Failure to avoid the danger may result in slight or minor injuries.



NOTICE

Refers to a possibly imminent danger! Failure to avoid the situation can result in damage to property.

INFORMATION

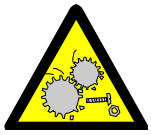
Provides additional information

7.4 Pictograms Used

Warning: general hazards
This warning pictogram marks activities that involve several hazards.

Warning: hot surfaces
This warning pictogram marks activities that involve hazards caused by hot surfaces.

Warning: crushing hazard
This warning pictogram marks activities that involve hazards caused by rotating machine parts.



Warning: equipment damages
This warning pictogram marks activities that may cause damage to the rotary joints due to incorrect operation.

7.4 Authorized Staff

Only staff who is fully aware of the dangers resulting from the rotary joint as well as of the appropriate safety precautions is allowed to operate and work on Maier Rotary Joints. Such staff must have at least the knowledge of industrial mechanics or machine fitters and must be experienced in working with pressurized components and hot surfaces.
Every person having to do with the installation, mounting, dismantling, commissioning, maintenance and repair of the rotary joint must have read and fully understood the operating instructions and, in particular, the safety information before taking up any such activities. It is recommended that the owner of the rotary joint has each person confirm this in writing.

7.5 Risk Assessment and Residual Risks

Rotary joints are machine components that can be used in a large variety of machines and systems. These products are not subject to the Machinery Directive 2006/42/EC - hazards caused by this product are treated in compliance with the pertinent directive 2014/68/EC (Pressure Equipment Directive). Directive 2014/34/EC (Explosion Protection Directive) additionally applies to "ATEX" certified rotary joints.

After installation of our rotary joints into systems/machines, these are subject to the Machinery Directive and may be subject to additional directives and legislation. The user of our products is responsible for complying with all pertinent directives and legislation as well as for performing a risk assessment in accordance with these directives. Depending on the actual installation situation and the actual use of our product, risks may arise that have to be eliminated as far as possible by structural design measures.

An analysis carried out by Christian Maier GmbH & Co. KG Maschinenfabrik resulted in the aspects listed below which necessitate an additional risk assessment by the user after installation of our products into the system/machine:

- Severe injuries, like burns, scalds, cuts or crushing, can be the result if hot parts are touched or if hot or hazardous media escape under high pressure or if rotating parts draw in persons.
  - Possible precautionary measures: Mount a protective cover around the rotary joint which prevents direct contact with hot parts, safely retains escaping medium and prevents contact with rotating parts.
  - If it is not possible to mount a cover, other suitable protective measures must be taken. In any case, always use the housing connections provided for the safe discharge of leaking medium.
- If the rotary joint blocks and rotates along with the roller, hoses can be torn off and hot or hazardous media can escape under high pressure.
  - Always observe the information on Mounting and Operation for the Design Department in chapter 5.
  - In particular when combining large nominal diameters with high speeds and high temperatures, we recommend to monitor the rotary joint by means of a torque monitoring system - alternatively by means of a vibration sensor.
  - Make sure that maintenance of the unit as per chapter 13 is carried out as scheduled.

The user of our products must verify the applicability and effectiveness of the listed possible measures in the actual situation.

8 Transportation an Storage

Transportation

- Use sufficiently dimensioned lifting gear to transport rotary joints weighing more than 25 kg.

Storage

- Maier rotary joints are not suited for storage in the original package for more than 6 months.
- For periods of extended shutdown or long-term storage of the rotary joints, we recommend to use a suitable corrosion protection sheet as provided, for example, by Cortec Corp. (www.CortecVCI.com).
- The storage room must be free from dust, sufficiently ventilated and not subject to major temperature changes (relative humidity below 65%, temperature between 15°C and 30°C).
- After a storage time of more than 2 years or when the package has been damaged or the unit has been subjected to shocks, the rotary joint must be checked in the factory or the nearest service center!
- If you want to preserve complete system components with the rotary joint attached, make sure the corrosion protection measures are compatible with the materials and sealing elements used. Otherwise there is the risk of chemical reactions and deposits on sealing and bearing elements.
-

9 Information on Mounting and Operation

- The following has to be observed to ensure fast and reliable mounting, commissioning, and safe operation of the rotary joint otherwise any warranty claims will be void:
- Never operate the rotary joint outside of the specified application and performance limits.
- Smooth operation of the rotary joint is only possible if roller and intermediate flange are concentric and do not wobble!
- The information on the admissible mounting position of the rotary joint provided in the section "Specifications and Spare Parts" must be observed.
- Use flexible metal hoses to connect the pipe network with the rotary joint housing. This compensates for heat expansion and vibrations.
- Never apply torsional, tensile or pressure loads to metal hoses. Observe the minimum bending radii specified by the manufacturer - if in doubt, contact your hose vendor. Chapter 11 provides examples of possible hose routings and installations.Never use axial compensators.
- Use flat packings made of pure graphite to securely seal flange connections.
- Only operate the rotary joint with a sufficiently dimensioned anti-rotation device attached to the housing. Use a locking pin or an anti-rotation fork for this purpose. The anti-rotation device must allow for axial and radial movements of the housing.
- Install an additional safety device:
- In order to avoid bearing damage and consequential damage, install a device for monitoring either the torque or the bearing by means of a vibration sensor (e.g. by companies FAG or SKF) connected to the emergency shutdown chain.Refer to the section "Specifications and Spare Parts" for limit values concerning the admissible friction torques. Chapter 10.13 provides an example of the anti-rotation stop on the

housing.when the monitoring system is activated, the rotation of the roller has to be stopped immediately and the supply of the medium must be interrupted upstream of the metal hoses.

- Center the inner pipe with the roller and the rotary joint. Wobbling and axial tension of the inner pipe will lead to operational disruptions of the rotary joint.
- Rotary joints with rotating inner pipe - design HR / HWR/ HWB/ HWA - have to be equipped with an inner pipe made of stainless steel or at least with a hard-chromium plated bearing seat.
- Rotary joints of series H / HW are used mostly with water, steam, and thermal oil. In order to ensure operational safety and reliability as well as a long service life of the seals installed in the rotary joint, we recommend to observe the media specifications as indicated in the section "Specifications and Spare Parts". Please contact the manufacturer for application with other media.
- Please refer to the instruction section "Specifications and Spare Parts" for additional instructions on correct and safe operation as required.

9.1 For ATEX-certified Products (regulations 2014/34/EC)

- Check the electrical resistance between the rotary joint and the system. If necessary, connect them with equipotential bonding strips to create the same potential on both sides.
- Determine the maximum temperature of the system. If necessary, install a safety temperature limiter.
-
-

INFORMATION

Refer to chapter 7.5 for additional information.

10 Installation

Mounting the rotary joint to the roller

INFORMATION

Use only flat packings made of pure graphite with metal insert.

Preparation for mounting and separation of the inner pipe for two-way flow design (dual-passage)

10.1 H2 / HW2

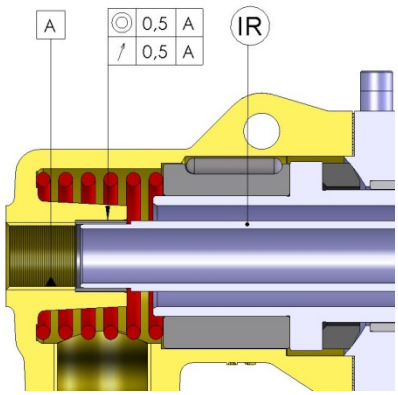


Figure 24

With stationary, screwed-in inner pipe:
Make sure that the inner pipe [IR] is centered on the axis of rotation.

10.2 HR2 / HWR2

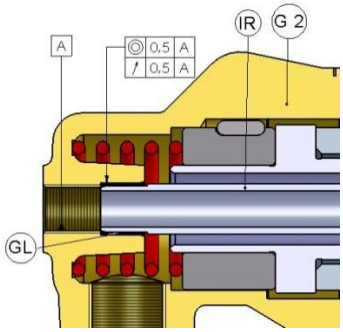


Figure 25

With rotating inner pipe:

Install the inner pipe [IR] in the rotating roller.

Slide the rotary joint over the inner pipe [IR] inserting the inner pipe [IR] into the slide bushing [GL] of the housing [G 2]. Make sure that the bearing surface of the inner pipe [IR] is centered in the rotary joint and that there is no tension.

10.3 H3

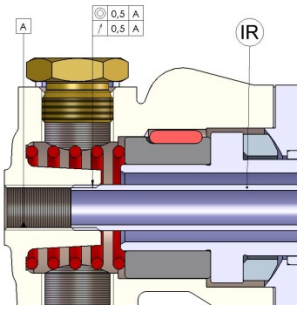


Figure 26

With stationary, screwed-in inner pipe:
Make sure that the inner pipe [IR] is centered on the axis of rotation.

10.4 HWX2 DN 32-50

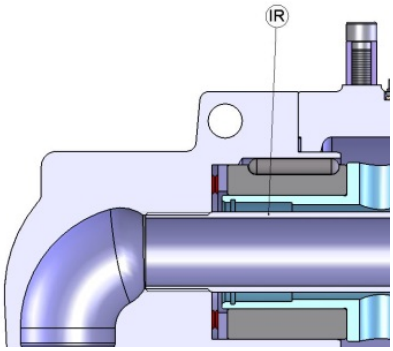


Figure 27

With stationary, screwed-in inner pipe:
Make sure that the inner pipe [IR] is centered on the axis of rotation.

10.5 HWX2 DN 65-100

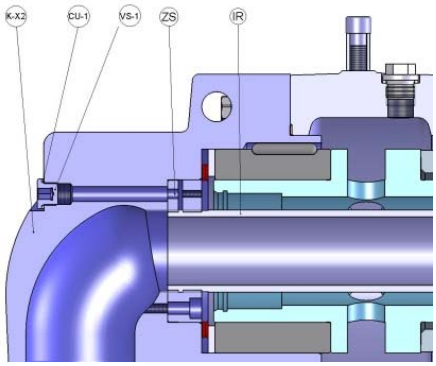


Figure 28

With stationary, screwed-in inner pipe.
Inner pipe clamping as standard design:
(this is a special design for other nominal sizes)
In order to prevent the inner pipe [IR] from being unscrewed from the elbow [K-X2] when the sense of rotation is anti-clockwise, the inner pipe [IR] will be secured from the outside.
Manner of functioning:

- screw in the inner pipe [IR] (min. 25 mm)
- remove the screw plug [VS-1] with sealing ring [CU-1]
- tighten socket head cap screw M6 [ZS] with a hexagon key exerting 15 Nm
- screw in screw plug [VS-1] with sealing ring [CU-1] and tighten it

The clamping action is achieved by the groove in the clamp nut.
Make sure that the inner pipe [IR] is centered on the axis of rotation.

10.6 HWB2

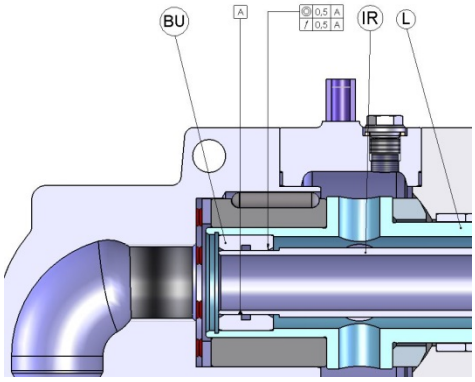


Figure 29

With rotating inner pipe:
Install the inner pipe [IR] in the rotating roller.
Slide the rotary joint over the inner pipe [IR] inserting the inner pipe [IR] into the bushing [BU] in the rotor [L]. Make sure that the bearing surface of the inner pipe [IR] is centered in the rotary joint and that there is no tension.

10.7 HWA2

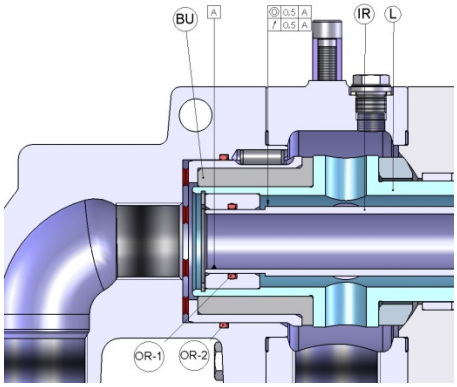


Figure 30

With rotating inner pipe:
I Install the inner pipe [IR] in the rotating roller.
Slide the rotary joint over the inner pipe [IR] inserting the inner pipe [IR] into the bushing [BU] in the rotor [L].
Make sure that the bearing surface of the inner pipe [IR] is centered in the rotary joint and that there is no tension.
Additional sealing by means of O-rings [OR-1, OR-2].

10.8 Mounting with Threaded Rotor

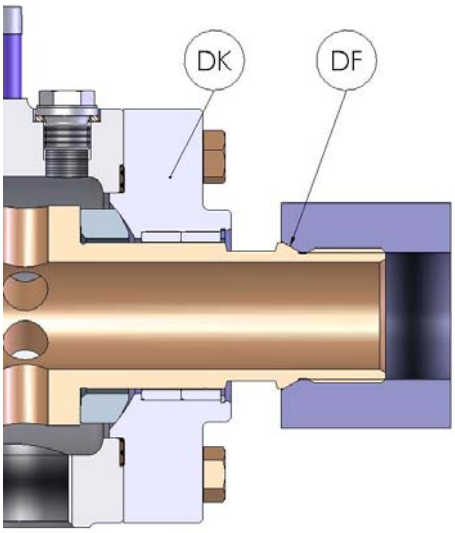
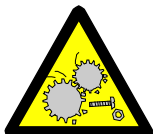


Figure 31

The rotor is connected by means of either a right-hand or a left-hand thread (R/L).

- Clean all faces of the sealing cone [DF] and apply assembly paste.
- Screw rotary joint [DK] into the roller.
  Sealing is done by means of sealing cone [DF].

10.9 Monting with K Flange [2] and Inner ring [3]



NOTICE

Mounting with K flange requires a minimum distance of [MA] ≥ 1 mm between K flange and roller. Otherwise leakage will occur at the sealing element, and the rotary joint, the inner pipe and the roller will be damaged:

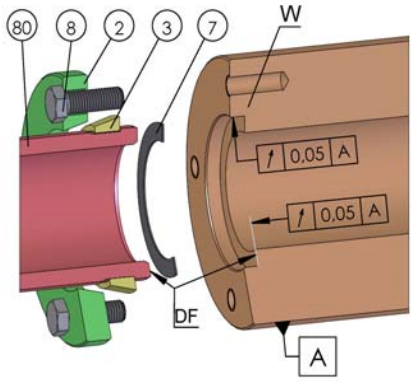


Figure 32

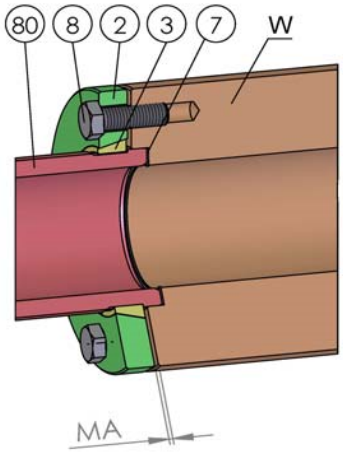


Figure 33

1. Clean sealing surfaces [DF], apply fitting grease and insert the sealing element [7] into the roller [W].
2. The flat packing as standard sealing element can also be replaced by a different element, e.g. an O-ring. Refer to the section "Specifications and Spare Parts" for additional information.
3. Insert bolts [8] into the holes of the K flange [2] and slide the flange onto the rotor [80]. Place the inner ring [3] into the rotor groove.
4. Lift the rotary joint and insert it into the centering element of the roller [W]. Design with inner pipe: the inner pipe must be centered with the rotary joint and the roller [W]. If it is hard to turn the inner pipe, make sure it sits in the correct position. Wobbling and axial tension will cause malfunctions of the rotary joint. Aligning the Rotary Joint when Sealing is done by means of Flat Packing.
5. Observe the minimum distance [MA] - otherwise leakage will occur at the sealing element and the rotary joint and the inner pipe will be damaged: MA ? 1 mm
6. Insert and tighten screws [8]. Maximum permissible tightening torque as per section "Specifications and Spare Parts".

10.10 Aligning the Rotary Joint When Sealing is done by means of Flat Packing

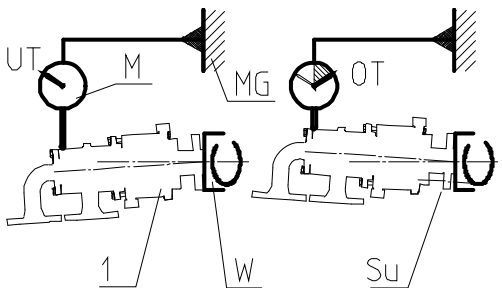


Figure 34

1. Place the dial gauge [M] from the static machine frame [MG] onto the rotary joint.
2. Rotate the roller [W] until the dial gauge is at the bottom dead center [UT]. Mark the pointer position.
3. Rotate the roller [W] until you reach the top dead center [OT].
4. Tighten the bottom screws [Su] until the dial gauge is in the central position.
5. Repeat this alignment process until concentricity complies with the tolerances specified in the table below.
6. Tighten the screws with the permissible torque as per section "Specifications and Spare Parts"!

10.11 Permissible Concentricity Tolerances

n[min^{-1}] / DN [mm]	≤ 40	> 40 ≤ 100	> 100
15-50	± 1	± 0,5	± 0,2
65-100	± 1	± 0,5	± 0,2
125-300	± 1	± 0,5	± 0,2

10.12 Connecting the Rotary Joint

⚠ WARNING

For safety reasons, always provide an anti-rotation device.

INFORMATION

Refer to chapter 7. for important additional information on this section.

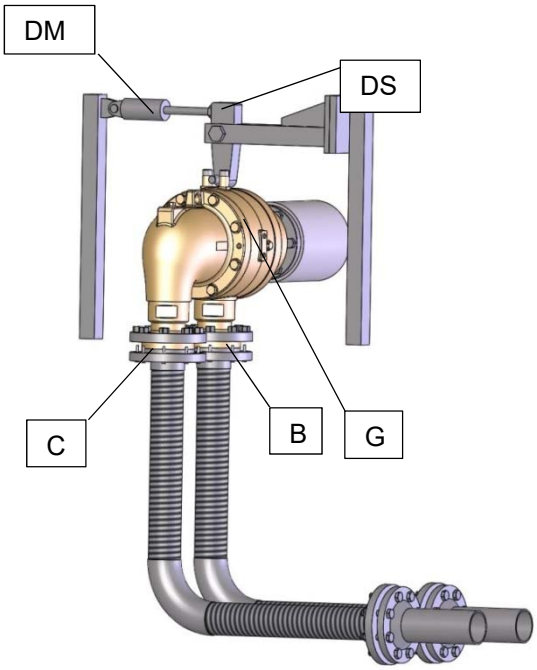


Figure 35 Schematic Representation

- Mount the anti-rotation device [DS].
  The information on the admissible mounting position of the rotary joint provided in the section "Specifications and Spare Parts" must be observed.
- Install the torque monitoring system [DM] or alternatively a vibration sensor on the anti-rotation device.(Optional)
- Connect the hoses [B,C].
- Please refer to the following information for additional details about the correct installation of the connection lines.

11 General Information on Connection Lines

The following section shows some examples of how to execute the flexible connection elements:

↔ permissible movement (to be aimed for)

↔ impermissible movement (to be avoided)

Figure 36

Figure 37

Do not compress or stretch the lines.

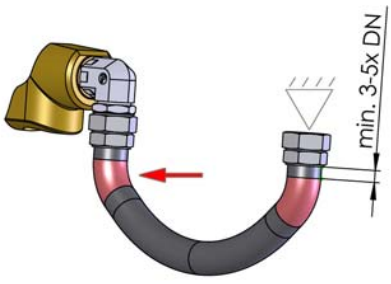


Figure 38

To prolong the service life, add a length of 3-5 times the DN per connection to the length calculated on the basis of the permissible bending radius provided by the manufacturer.

Figure 39

Avoid connection offset. Bear in mind that bending causes linear deformation.

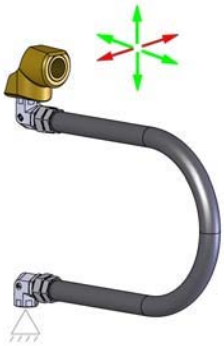


Figure 40

Allow for restricted degrees of freedom. Bear the smallest permissible bending radius in mind.

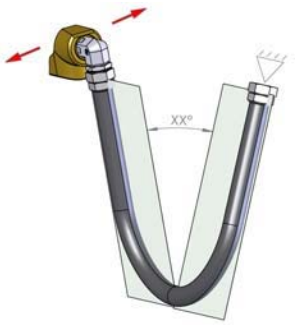


Figure 41

Figure 42

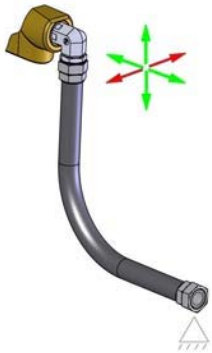
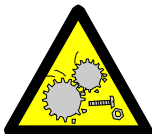


Figure 43

Preferably use pipe bends with fixed elbows which allow for two-way flow.

All degrees of freedom are possible without tension if the length is sufficient.

12 Operation



NOTICE

- Dry-run damages the rotary joint.As a general rule, dry-run of the rotary joint is not permissible.Exception: test run for a maximum of 30 minutes and at very low speed.
- Sudden temperature and pressure loads will damage the rotary joint.Maximum temperature change during startup: ΔT ≤ 2 K/min!
- Exceeding the permissible application data as determined in section "Specifications and Spare Parts" will damage the rotary joint. Avoid a combination of maximum values.

12.1 Commissioning

- During initial commissioning of the rotary joint, minor dripping leakage of the medium may occur during the run-in period of the dynamic seal. The duration of the run-in period depends on operating speed and pressure; usually, it ends after a few days.
- To avoid premature damage to seals in the rotary joint, we recommend to frequently check the filters installed for the medium when a new system is put into operation for the first time. During this period, expect more contamination by particles such as chips, rust or scales in the piping system. This is particularly true if the system has not been flushed prior to commissioning.
-

12.2 During operation

Check the following:

- Concentricity of the rotor with the roller journal.
  The radial deflection in the rear area of the housing must not exceed the values listed in the section "Permissible Concentricity Tolerances" (chapter 10.11) (Aligning the Rotary Joint when Sealing is done by means of Flat Packing)
- Specification of the medium in the system
  Record the data you have checked. Refer to the section "Specifications and Spare Parts" for the default values.
- Visible leakage of the rotary joint at the pressure relief connection
  As a rule, the operating behavior of the installed sealing ring does not change suddenly. An impending failure of the seal is indicated by slowly increasing leakage. This allows you to collect empirical data about the operating behavior of the rotary joint running on the system.

12.3 Troubleshooting

Problem	Cause	Remedy
leaking medium	– seal damaged or worn – axial "readjustment movement" (up to 15 mm) was obstructed at thermal expansion or wear of the sealing ring. – medium dirty	– overhaul the rotary joint completely! – check the hose routing and the anti-rotation device! (obstruction not permissible)
friction torque too high	– application data (pressure, temperature, speed) are too high	– avoid the combination of maximum values.

13 Maintenance

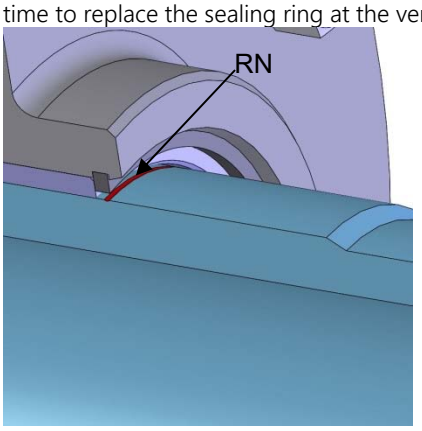
INFORMATION

Maier offers both onsite service by our experts and training of your service staff.

o Observe the Safety Instructions in chapter 7.

- Maintenance must only be performed by authorized staff as per chapter 7.4.
- Work on the rotary joint may only be performed when the machine/system is at a standstill and after the pressure has been removed and the rotary joint has cooled down. Secure the machine/system against restart.
- When performing work on the rotary joint, always wear safety glasses to protect your eyes against escaping media.
- Use only genuine spare parts.
- If protective equipment is removed, it must be refitted after you have finished your work. Make sure that it works properly again after reinstallation.
- All screws must be tightened with the specified tightening torque (refer to section "Specifications and Spare Parts").

13.1 Maintenance Plan

Interval	Activity	Explanations
Every 12 months	**Check for wear on the sealing ring.** The axial displacement of the housing caused by wear makes the wear indicator [RN] on the rotor visible. When this happens, it is time to replace the sealing ring at the very latest.  Figure 44	Recommended by Maier customer service.

14 Repair

Tools

- Suitable lifting gear must be used to mount the rotary joint to the roller.
- A torque wrench must be used for tightening screws with a specified tightening torque.

14.1 Repair Work

14.1.1 Dismounting the Rotary Joint from the Roller

- **Preparatory Requirements:**
- Remove pressure from the rotary joint.
- Drain the medium from the roller.
- Rotary joint must have cooled down. T ≤ 40°C
- Remove the protective cover and the anti-rotation devices.

Procedure:

⚠ WARNING

Risk of injury if media under pressure escape.
Make sure that shut-off valves cannot be opened inadvertently or intentionally during repair work.

INFORMATION

Refer to the operating instructions of the complete system for any further information on properly performing preparatory work.

- Disconnect the hoses.
- Secure the rotary joint by means of a crane, if necessary due to its weight.
- Loosen the connection between rotor and roller.
  - **Rotor with threaded end: unscrew the rotor by using a wrench on the wrench flats.**
  - **Rotor with flange connection: remove the flange screws. Slowly pull the rotary joint out of the roller. If the rotary joint cannot be pulled out easily, loosen it from its centering by slightly moving it up and down with the crane.**

15 Dismantling the Rotary Joint

Preparatory Requirement

- The rotary joint must have been dismounted from the roller.
-

INFORMATION

The structural design of the rotary joints is shown in the section "Specifications and Spare Parts".

15.1 H1 / HW 1 / R/L/K DN 15 ... 100; HW1 Series-450 / K DN 15 ... 25

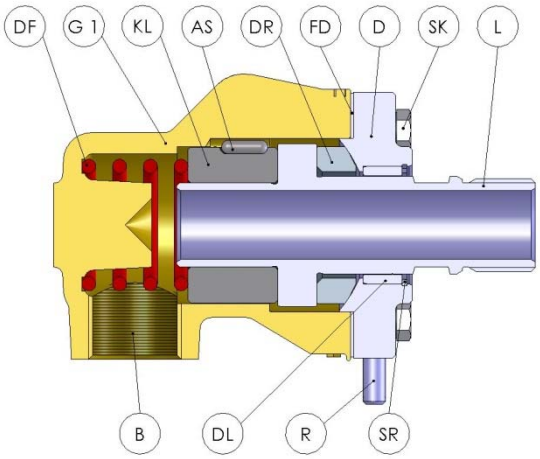


Figure 45

1.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK] with threaded rods and screw on nuts to secure the cover [D].
2.	Unscrew the remaining hexagon screws [SK].
3.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover [D] slightly with a hammer to loosen it from the housing [G 1].
4.	Take off cover [D].
5.	Remove circlip [SR] from cover.
6.	Remove cover bushing [DL] from cover [D].
7.	Remove rotor [L] together with sealing ring [DR] from housing [G 1].
8.	Lift off sealing ring [DR] from rotor [L].
9.	Remove carbon bushing [KL] from housing [G 1].
10.	Remove locking pin [AS] from carbon bushing [KL].
11.	Remove compression spring [DF] from housing [G 1].
12.	Carefully remove flat packing [FD] from housing [G 1] or cover [D] by using a spatula.
13.	If the anti-rotation device [R] is damaged, replace it.

15.2 H2 / HW2 / R/LK DN 15 ... 100; HW2 Series-450 / K DN 20 ... 25

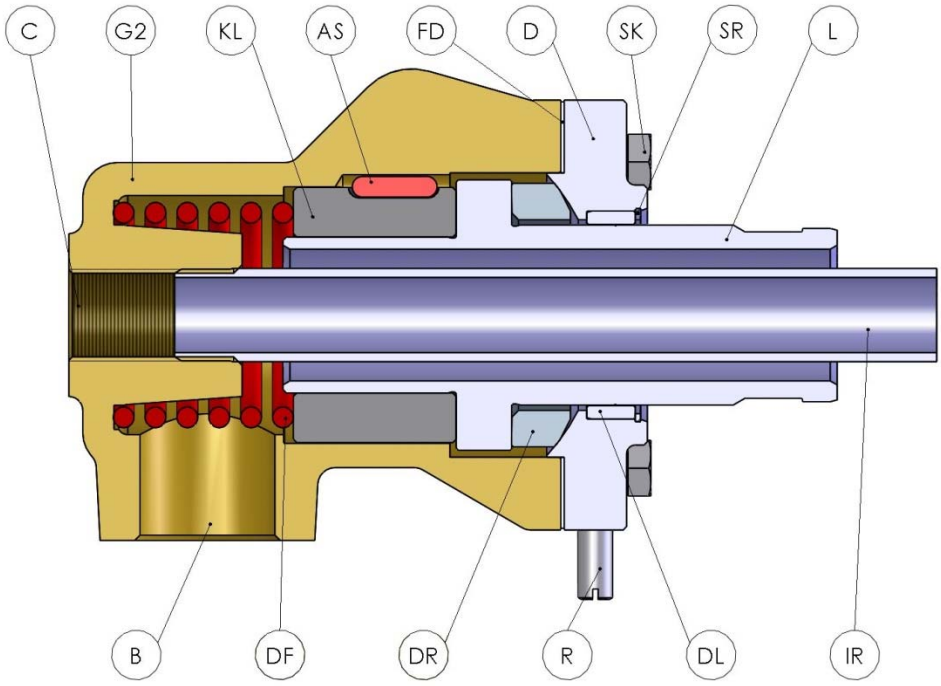


Figure 46

1.	Unscrew inner pipe [IR] from housing [G 2].
2.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK] with threaded rods and screw on nuts to secure the cover [D].
3.	Unscrew the remaining hexagon screws [SK].
4.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover slightly with a hammer to loosen it from the housing [G 2].
5.	Take off cover [D].
6.	Remove circlip [SR] from cover.
7.	Remove cover bushing [DL] from cover [D].
8.	Remove rotor [L] together with sealing ring [DR] from housing [G 2].
9.	Lift off sealing ring [DR] from rotor [L].
10.	Remove carbon bushing [KL] from housing [G 2].
11.	Remove locking pin [AS] from carbon bushing [KL].
12.	Remove compression spring [DF] from housing [G 2].
13.	Carefully remove flat packing [FD] from housing [G 2] or cover [D] by using a spatula.
14.	If the anti-rotation device [R] is damaged, replace it.

15.3 HR2 / HWR2 /R/L/K DN 15 ... 100; HWR2 Series-450 /K DN 20 ... 25

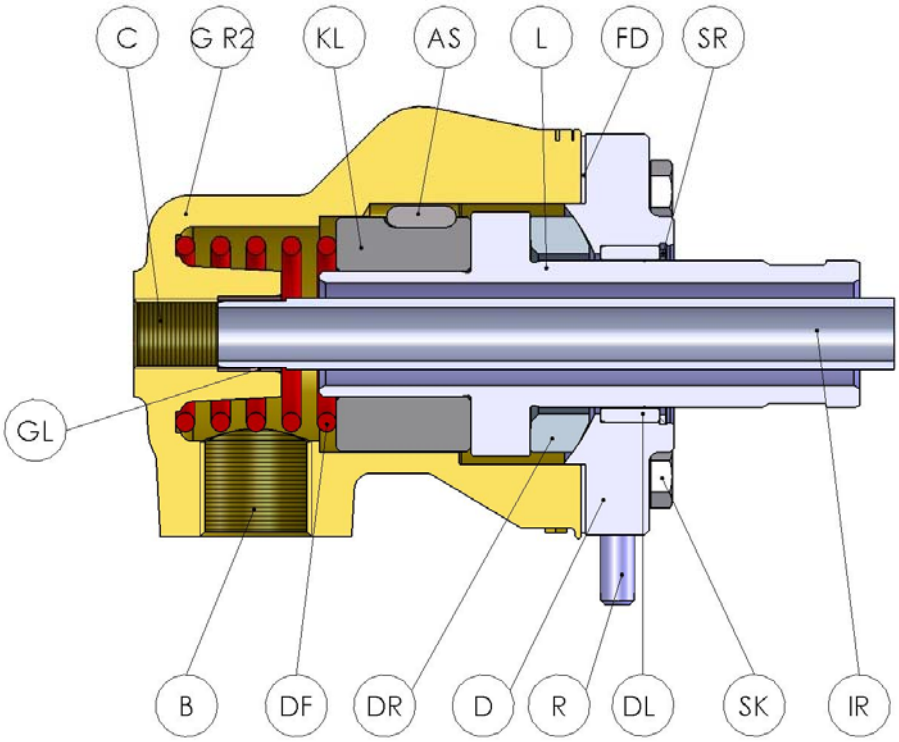


Figure 47

1.	After the rotary joint has been dismounted from the machine, the inner pipe [IR] remains in the roller.
2.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK] with threaded rods and screw on nuts to secure the cover [D].
3.	Unscrew the remaining hexagon screws [SK].
4.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover slightly with a hammer to loosen it from the housing [G R2].
5.	Take off cover [D].
6.	Remove circlip [SR] from cover.
7.	Remove cover bushing [DL] from cover [D].
8.	Remove rotor [L] together with sealing ring [DR] from housing [G R2].
9.	Lift off sealing ring [DR] from rotor [L].
10.	Remove carbon bushing [KL] from housing [G R2].
11.	Remove locking pin [AS] from carbon bushing [KL].
12.	Remove compression spring [DF] from housing [G R2].
13.	Remove slide bushing [GL] from housing [G R2].
14.	Carefully remove flat packing [FD] from housing [G R2] or cover [D] by using a spatula.
15.	If the anti-rotation device [R] is damaged, replace it.

15.4 H3 /R/L/K DN 25 ... 40

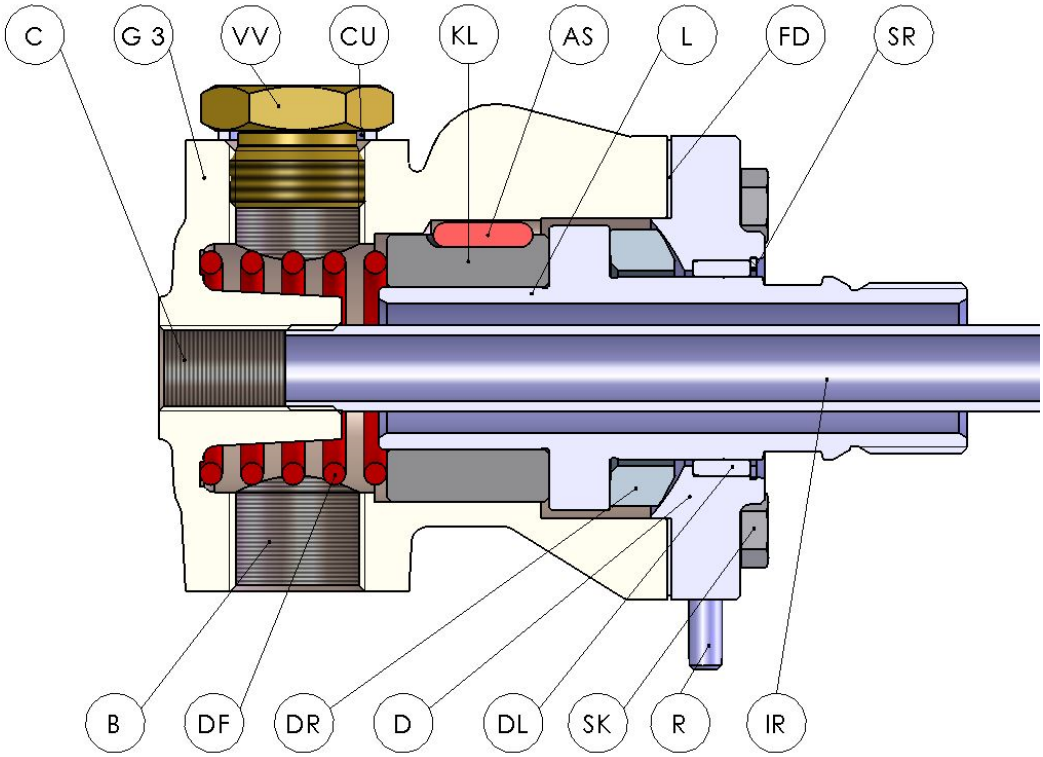


Figure 48

1.	Unscrew the inner pipe [IR] from housing [G 3].
2.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK] with threaded rods and screw on nuts to secure the cover [D].
3.	Unscrew the remaining hexagon screws [SK].
4.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover slightly with a hammer to loosen it from the housing [G 3].
5.	Take off cover [D].
6.	Remove circlip [SR] from cover [D].
7.	Remove cover bushing [DL] from cover [D].
8.	Remove rotor [L] together with sealing ring [DR] from housing [G 3].
9.	Lift off sealing ring [DR] from rotor [L].
10.	Remove carbon bushing [KL] from housing [G 3].
11.	Remove locking pin [AS] from carbon bushing [KL].
12.	Remove compression spring [DF] from housing [G 3].
13.	Remove vacuum valve [VV].
14.	Take out CU seal [CU].
15.	Carefully remove flat packing [FD] from housing [G 3] or cover [D] by using a spatula.
16.	If the anti-rotation device [R] is damaged, replace it.

15.5 HWX2 / K DN 32-50

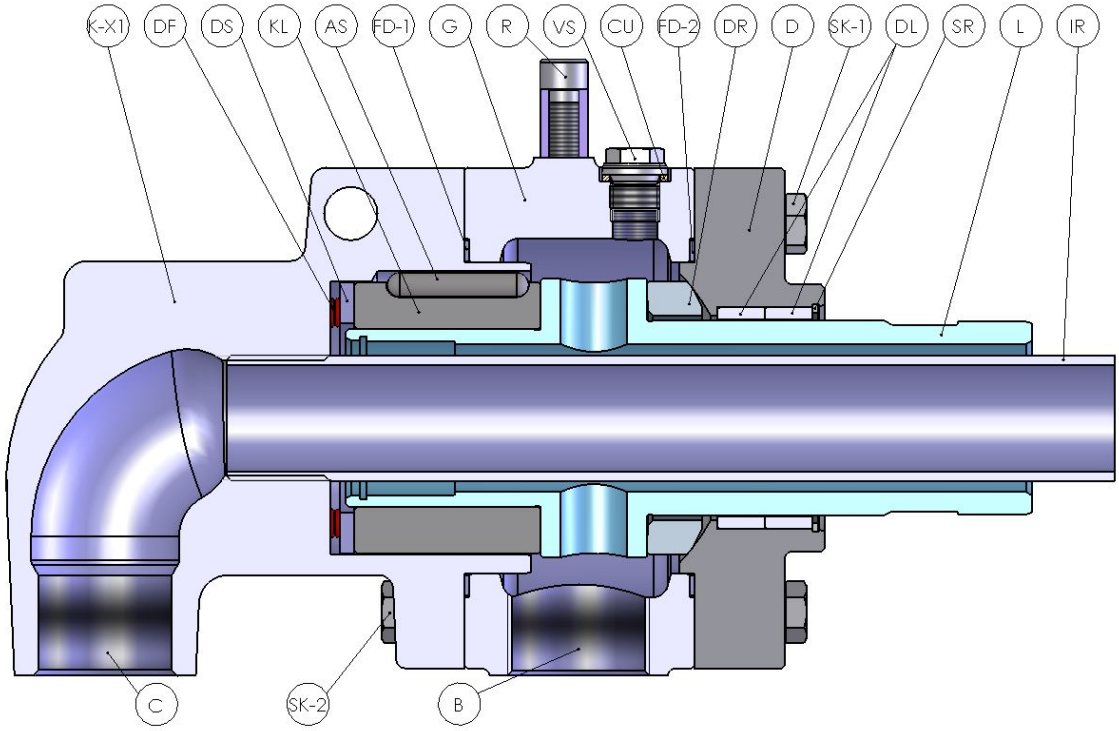


Figure 49

1.	Unscrew the inner pipe [IR] from elbow [K-X1].
2.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK-1] with threaded rods and screw on nuts to secure the cover [D].
3.	Unscrew the remaining hexagon screws [SK-1].
4.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover softly with a hammer to loosen it from the housing [G].
5.	Take off cover [D].
6.	Remove circlip [SR] from cover [D].
7.	Remove cover bushing [DL] from cover [D].
8.	Remove rotor [L] together with sealing ring [DR] from housing [G].
9.	Lift off sealing ring [DR] from rotor [L].
10.	Carefully remove flat packing [FD-2] from housing [G] or cover [D] by using a spatula.
11.	Unscrew the hexagon screws 2 [SK-2].
12.	Lift off elbow [K-X1].
13.	Remove carbon bushing [KL] from elbow [K-X1].
14.	Remove locking pin [AS] from carbon bushing [KL].
15.	Carefully remove flat packing [FD-1] from housing [G] or elbow [K-X1] by using a spatula.
16.	Remove thrust washer [DS] and compression springs [DF] from elbow [K-X1].
17.	Unscrew the screw plug [VS] from housing [G] and remove CU seal [CU].
18.	If the anti-rotation device [R] is damaged, replace it.

15.6 HWX2 DN 65-100

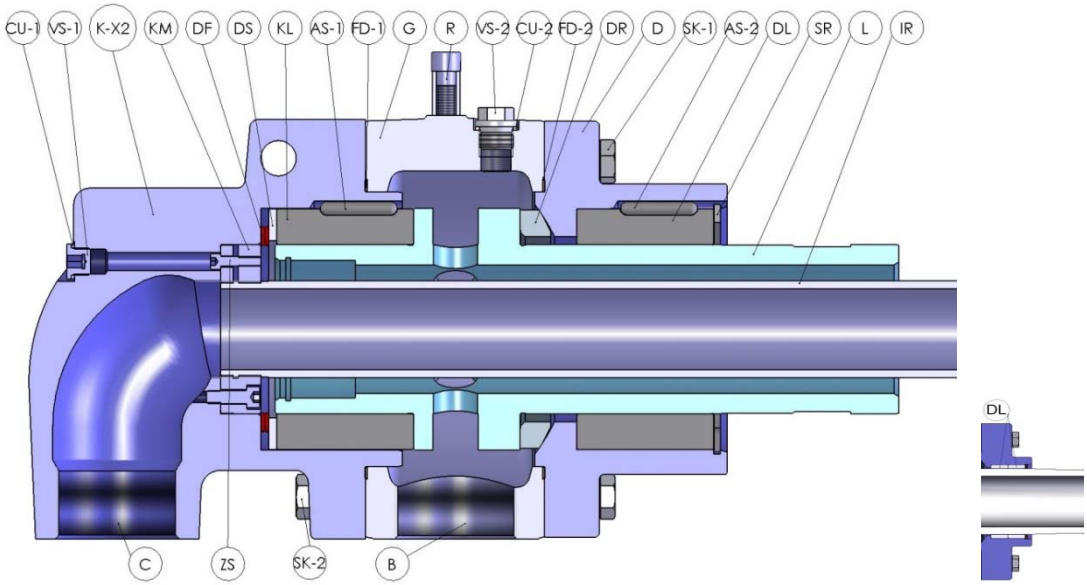


Figure 50 **Cover Bushing [DL] and Locking Pin [AS-2] DN 75-100**

gure 50-1
Cover Bushing [DL] DN 65

1.	Unscrew the screw plug 1 [VS1] from elbow [K-X2] and remove CU seal 1 [CU-1].
2.	Loosen socket head cap screw [ZS].
3.	Unscrew inner pipe [IR] from elbow [K-X2].
4.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK-1] with threaded rods and screw on nuts to secure the cover [D].
5.	Unscrew the remaining hexagon screws [SK-1].
6.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover slightly with a hammer to loosen it from the housing [G].
7.	Take off cover [D].
8.	Remove circlip [SR] from cover.
9.	Remove cover bushing [DL] from cover [D].
10.	Remove locking pin 2 [AS-2] from cover bushing [DL]. (DN 75-100)
11.	Remove rotor [L] together with sealing ring [DR] from elbow [K-X2].
12.	Lift off sealing ring [DR] from rotor [L].
13.	Carefully remove flat packing 2 [FD-2] from housing [G] or cover [D] by using a spatula.
14.	Unscrew the hexagon screws 2 [SK-2].
15.	Lift off elbow [K-X2].
16.	Remove carbon bushing [KL] from elbow [K-X2].
17.	Remove locking pin [AS] from carbon bushing [KL].
18.	Carefully remove flat packing 1 [FD-1] from housing [G] or elbow [K-X2] by using a spatula.
19.	Remove thrust washer [DS] and compression springs [DF] from elbow [K-X2].
20.	Unscrew the screw plug 2 [VS-2] from housing [G] and remove CU seal 2 [CU-2].
21.	If the anti-rotation device [R] is damaged, replace it.

15.7 HWB2 / K DN 32-100

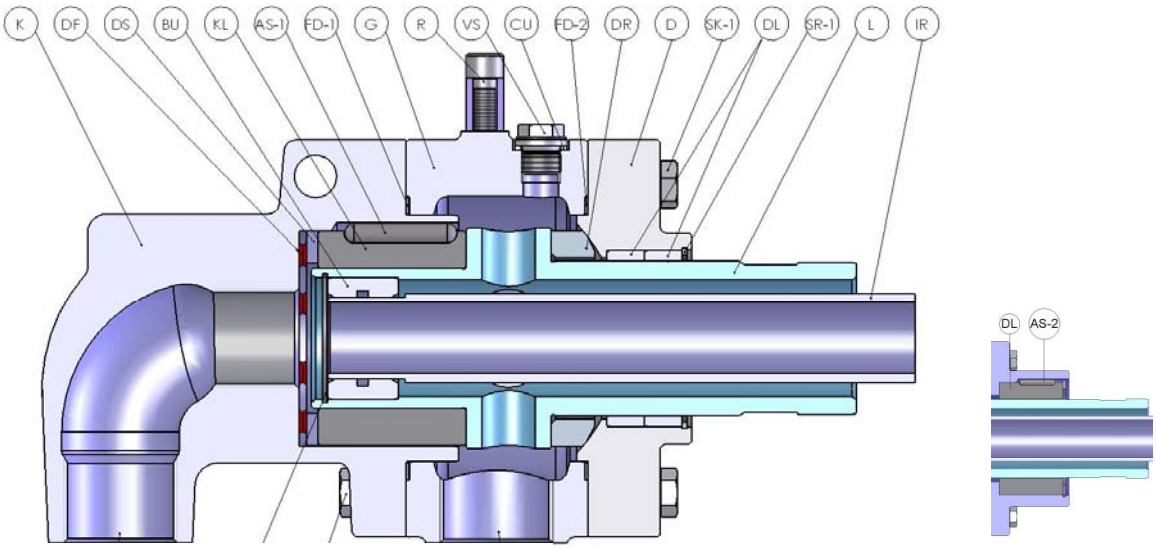
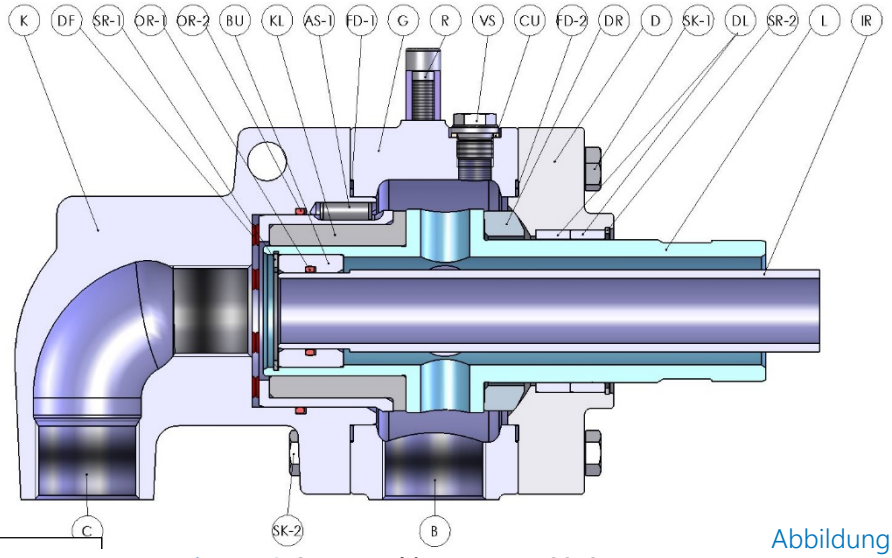


Figure 51-1
Cover Bushing [DL] and
Figure 51 Cover Bushing [DL] DN 32-65

1.	After the rotary joint has been dismounted from the machine, the inner pipe [IR] remains in the roller.
2.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK-1] with threaded rods and screw on nuts to secure the cover [D].
3.	Unscrew the remaining hexagon screws [SK-1].
4.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover slightly with a hammer to loosen it from the housing [G].
5.	Take off cover [D].
6.	Remove circlip [SR-1] from cover.
7.	Remove cover bushing 2 [DL] from cover [D].
8.	Remove locking pin 2 [AS-2] from cover bushing [DL]. (DN 75-100)
9.	Remove rotor [L] together with sealing ring [DR] from housing [G] and elbow [K].
10.	Lift off sealing ring [DR] from rotor [L].
11.	Carefully remove flat packing 2 [FD-2] from housing [G] or cover [D] by using a spatula.
12.	Unscrew the hexagon screws 2 [SK-2].
13.	Lift off elbow [K].
14.	Remove carbon bushing [KL] from elbow [K].
15.	Remove locking pin [AS-1] from carbon bushing [KL].
16.	Carefully remove flat packing 1 [FD-1] from housing [G] or elbow [K] by using a spatula.
17.	Remove circlip [SR-2] from rotor [L]
18.	Remove bushing [BU] from rotor [L] , thrust washer [DS] and compression springs [DF] from elbow [K]
19.	Unscrew the screw plug [VS] from housing [G] and remove CU seal [CU].
20.	If the anti-rotation device [R] is damaged, replace it.

15.8 HWA2 / K DN 32-2099



er Bushing [DL]
2] DN 75-2099

Figure 52 Cover Bushing [DL] DN 32-65

Abbildung 51-1 Deckellager [DL] und Arretierstift [AS-2] DN 75-100

1.	After the rotary joint has been dismounted from the machine, the inner pipe [IR] remains in the roller.
2.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK-1] with threaded rods and screw on nuts to secure the cover [D].
3.	Unscrew the remaining hexagon screws [SK-1].
4.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover slightly with a hammer to loosen it from the housing [G].
5.	Take off cover [D].
6.	Remove circlip 2 [SR-2] from cover.
7.	Remove cover bushing [DL] from cover [D].
8.	Remove locking pin 2 [AS-2] from cover bushing [DL]. (DN 75-2099)
9.	Remove rotor [L] together with sealing ring [DR] from housing [G] and elbow [K].
10.	Lift off sealing ring [DR] from rotor [L].
11.	Carefully remove flat packing 2 [FD-2] from housing [G] or cover [D] by using a spatula.
12.	Unscrew the hexagon screws 2 [SK-2].
13.	Lift off elbow [K].
14.	Remove carbon bushing [KL] from elbow [K].
15.	Remove locking pin [AS-1] from carbon bushing [KL].
16.	Carefully remove flat packing 1 [FD-1] from housing [G] or elbow [K] by using a spatula.
17.	Remove O-ring 2 [OR-2] from elbow [K].
18.	Remove circlip 2 [SR-1] from rotor [L]
19.	Remove bushing [BU] from elbow [K].
20.	Remove O-ring 1 [OR-1] from bushing [BU].
21.	Remove compression springs [DF] from elbow [K].
22.	Unscrew the screw plug [VS] from housing [G] and remove CU seal [CU].
23.	If the anti-rotation device [R] is damaged, replace it.

15.9 HW1 Series -500 / K DN 32-100

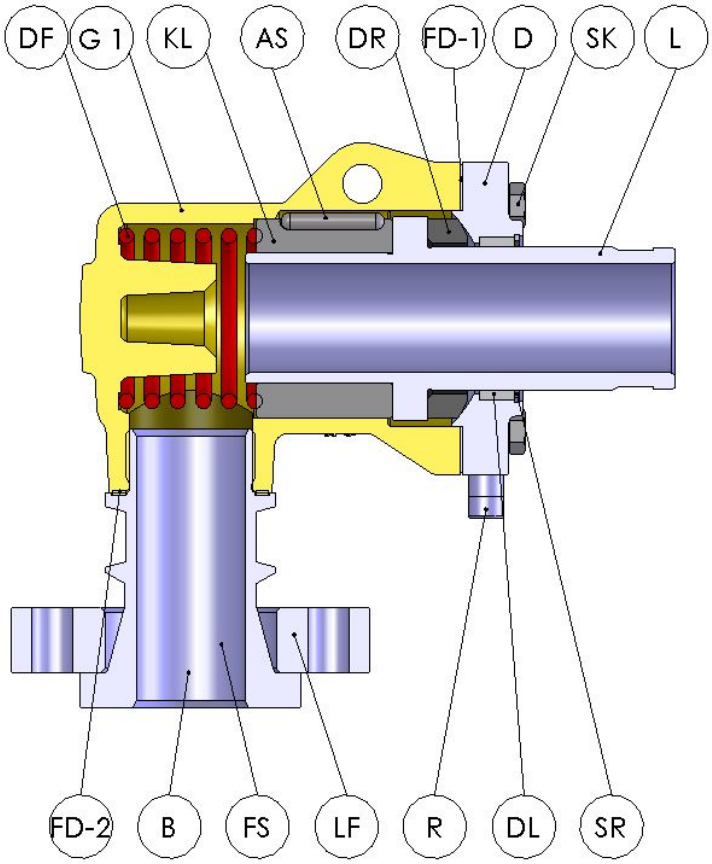


Figure 53

1.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK] with threaded rods and screw on nuts to secure the cover [D].
2.	Unscrew the remaining hexagon screws [SK].
3.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover slightly with a hammer to loosen it from the housing [G 1].
4.	Remove circlip [SR] from cover.
5.	Remove cover bushing [DL] from cover [D].
6.	Remove rotor [L] together with sealing ring [DR] from housing [G-1].
7.	Lift off sealing ring [DR] from rotor [L].
8.	Remove carbon bushing [KL] from housing [G-1].
9.	Remove locking pin [AS] from carbon bushing [KL].
10.	Remove compression spring [DF] from housing [G-1].
11.	Carefully remove flat packing [FD-1] from housing [G-1] or cover [D] by using a spatula.
12.	Unscrew flange with neck [FS] from housing [G-1].
13.	Remove flat packing 2 [FL-2] from housing [G-1].
14.	If the anti-rotation device [R] is damaged, replace it.

15.10 HWX2 Series -500 / K DN 32-50

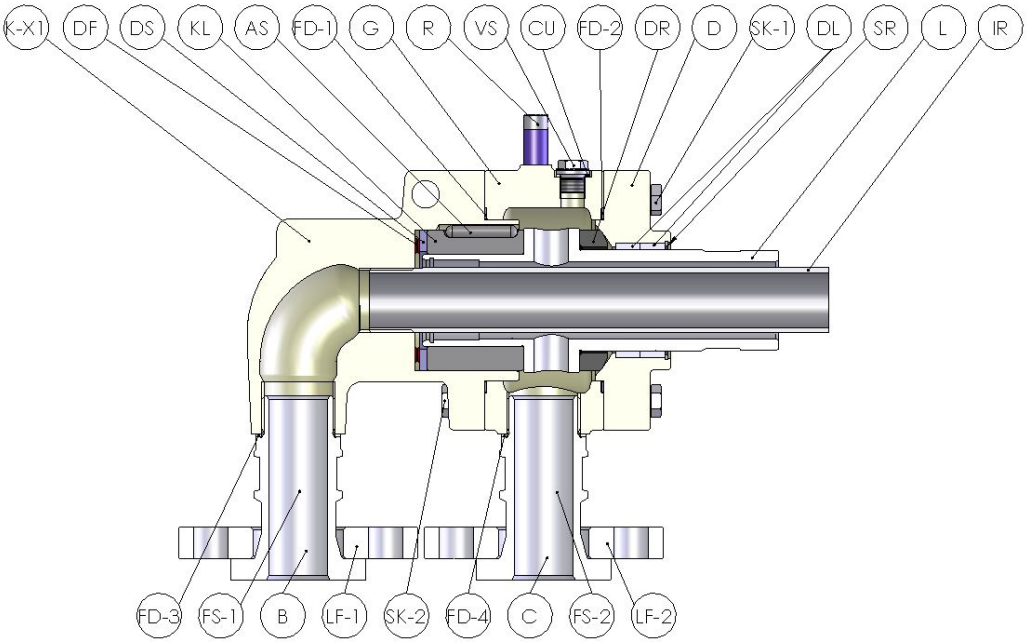


Figure 54

1.	Unscrew inner pipe [IR] from housing [G].
2.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK-1] with threaded rods and screw on nuts to secure the cover [D].
3.	Unscrew the remaining hexagon screws [SK-1].
4.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover [D] slightly with a hammer to loosen it from the housing [G].
5.	Take off cover [D].
6.	Remove circlip [SR] from cover.
7.	Remove cover bushing [DL] from cover [D].
8.	Remove rotor [L] together with sealing ring [DR] from housing [G] and elbow [K-X1].
9.	Lift off sealing ring [DR] from rotor [L].
10.	Carefully remove flat packing 2 [FD-2] from housing [G] or cover [D] by using a spatula.
11.	Unscrew the hexagon screws 2 [SK-2].
12.	Lift off elbow [K-X1].
13.	Remove carbon bushing [KL] from elbow [K-X1].
14.	Remove locking pin [AS] from carbon bushing [KL].
15.	Carefully remove flat packing 1 [FD-1] from housing [G] or elbow [K-X1] by using a spatula.
16.	Remove thrust washer [DS] and compression springs [DF] from elbow [K-X1].
17.	Unscrew the screw plug [VS] from housing [G] and remove CU seal [CU].
18.	Unscrew threaded flange [FS-1] from elbow [K-X1] and remove flat packing [FD-3].
19.	Unscrew threaded flange [FS-2] from housing [G] and remove flat packing [FD-4].
20.	If the anti-rotation device [R] is damaged, replace it.

15.11 HWX2 Series -500 / K DN 65-100

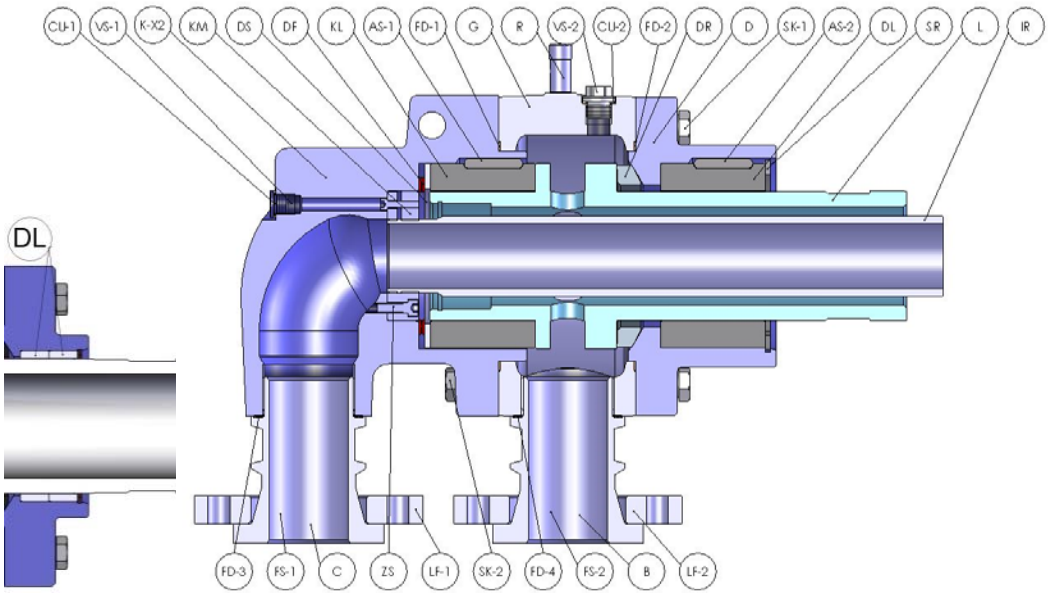


Figure 55 **Cover Bushing [DL] and Locking Pin [AS-2] DN 75-100** Abbildung 55-1 **Deckellager [DL]**

1.	Unscrew the screw plug 1 [VS1] from elbow [K-X2] and remove CU seal 1 [CU-1].
2.	Loosen socket head cap screw [ZS].
3.	Unscrew inner pipe [IR] from housing [G].
4.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK-1] with threaded rods and screw on nuts to secure the cover [D].
5.	Unscrew the remaining hexagon screws [SK-1].
6.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover [D] slightly with a hammer to loosen it from the housing [G].
7.	Take off cover [D].
8.	Remove circlip [SR] from cover.
9.	Remove cover bushing [DL] from cover [D].
10.	Remove locking pin 2 [AS-2] from cover bushing [DL]. (DN 75-100)
11.	Remove rotor [L] together with sealing ring [DR] from housing [G] and elbow [K-X2].
12.	Lift off sealing ring [DR] from rotor [L].
13.	Carefully remove flat packing 2 [FD-2] from housing [G] or cover [D] by using a spatula.
14.	Unscrew the hexagon screws 2 [SK-2].
15.	Lift off elbow [K-X2].
16.	Remove carbon bushing [KL] from elbow [K-X2].
17.	Remove locking pin [AS-1] from carbon bushing [KL].
18.	Carefully remove flat packing 1 [FD-1] from housing [G] or elbow [K-X2] by using a spatula.
19.	Remove thrust washer [DS] and compression springs [DF] from elbow [K-X2].
20.	Unscrew the screw plug 2 [VS-2] from housing [G] and remove CU seal 2 [CU-2].
21.	Unscrew flange with neck [FS-1] from elbow [K-X2] and remove flat packing [FD-3].
22.	Unscrew flange with neck [FS-2] from housing [G] and remove flat packing [FD-4].
23.	If the anti-rotation device [R] is damaged, replace it.

15.12 HWB2 Seies -500 / K DN 32-100

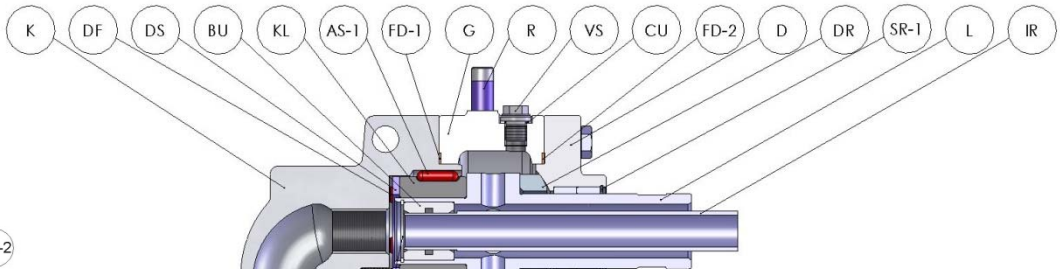


Figure 56 **Cover Bushing [DL] DN 32-65**

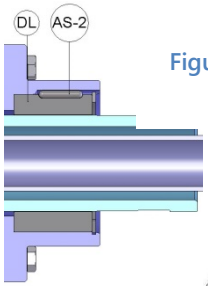
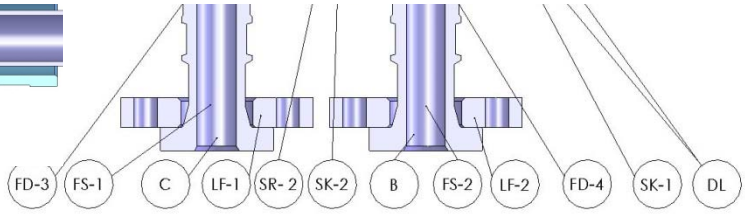


Figure 56-1 **Cover Bushing [DL] and Locking Pin [AS-2] DN 75-100**



1.	After the rotary joint has been dismounted from the machine, the inner pipe [IR] remains in the roller.
2.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK-1] with threaded rods and screw on nuts to secure the cover [D].
3.	Unscrew the remaining hexagon screws [SK-1].
4.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover slightly with a hammer to loosen it from the housing [G].
5.	Take off cover [D].
6.	Remove circlip [SR-1] from cover.
7.	Remove cover bushing [DL] from cover [D].
8.	Remove locking pin 2 [AS-2] from cover bushing [DL]. (DN 75 - 100)
9.	Remove rotor [L] together with sealing ring [DR] from the housing [G].
10.	Lift off sealing ring [DR] from rotor [L].
11.	Carefully remove flat packing 2 [FD-2] from housing [G] or cover [D] by using a spatula.
12.	Unscrew the hexagon screws 2 [SK-2].
13.	Lift off elbow [K].
14.	Remove carbon bushing [KL] from elbow [K].
15.	Remove locking pin [AS-1] from carbon bushing [KL].
16.	Carefully remove flat packing 1 [FD-1] from housing [G] or elbow [K] by using a spatula.
17.	Remove circlip [SR-2] and bushing [BU] from rotor [L].
18.	Remove thrust washer [DS] and compression springs [DF] from elbow [K].
19.	Unscrew the screw plug [VS] from housing [G] and remove CU seal [CU].
20.	Unscrew flange with neck [FS-1] from elbow [K] and remove flat packing [FD-3].
21.	Unscrew flange with neck [FS-2] from housing [G] and remove flat packing [FD-4].
22.	If the anti-rotation device [R] is damaged, replace it.

15.13 HWA2 Series -500 / DN 32-2099

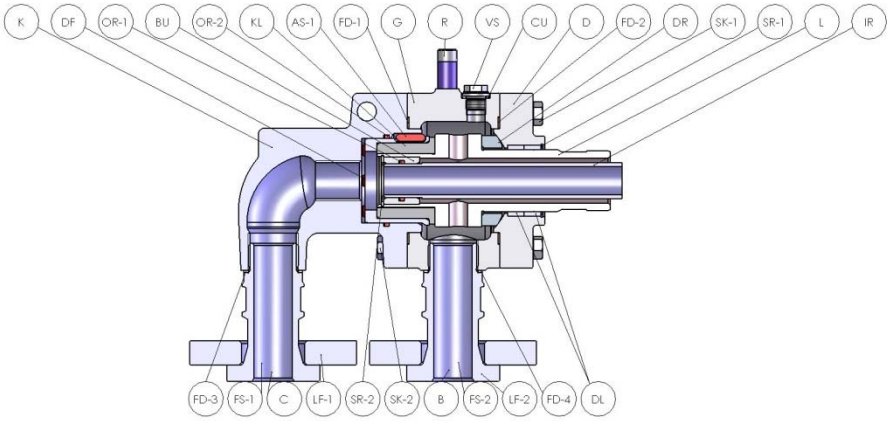


Figure 57 Cover Bushing [DL] DN 32-65

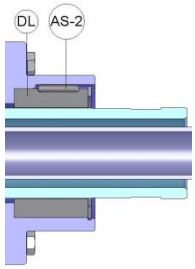
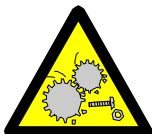


Figure 57-1 Cover Bushing [DL] and LockingPin [AS-2] DN 75-2099

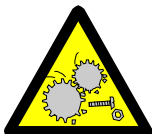
1.	After the rotary joint has been dismounted from the machine, the inner pipe [IR] remains in the roller.
2.	Preload rotor [L] with a press or replace two opposing hexagon screws [SK-1] with threaded rods and screw on nuts to secure the cover [D].
3.	Unscrew the remaining hexagon screws [SK-1].
4.	Relieve the press or carefully, slowly and steadily unscrew the two nuts on the threaded rods. At the same time, strike the cover [D] slightly with a hammer to loosen it from the housing [G].
5.	Take off cover [D].
6.	Remove circlip 1 [SR-1] from cover.
7.	Remove cover bushing [DL] from cover [D].
8.	Remove locking pin 2 [AS] from cover bushing [DL]. (DN 75-100)
9.	Remove rotor [L] together with sealing ring [DR] from housing [G].
10.	Lift off sealing ring [DR] from rotor [L].
11.	Carefully remove flat packing 2 [FD-2] from housing [G] or cover [D] by using a spatula.
12.	Unscrew the hexagon screws 2 [SK-2].
13.	Lift off elbow [K].
14.	Remove carbon bushing [KL] from elbow [K].
15.	Remove locking pin [AS-1] from carbon bushing [KL].
16.	Carefully remove flat packing 1 [FD-1] from housing [G] or elbow [K] by using a spatula.
17.	Remove O-ring 2 [OR-2] from elbow [K].
18.	Remove bushing [BU] from elbow [K].
19.	Remove O-ring 1 [OR-1] from bushing [BU].
20.	Remove circlip [SR-2] and bushing [BU] from rotor [L].
21.	Unscrew the screw plug [VS] from housing [G] and remove CU seal [CU].
22.	Unscrew flange with neck [FS-1] from elbow [K] and remove flat packing [FD-3].
23.	Unscrew flange with neck [FS-2] from housing [G] and remove flat packing [FD-4].
24.	If the anti-rotation device [R] is damaged, replace it.

16 Assembly of the Rotary Joint



NOTICE

All wearing parts V listed in the spare and wearing parts list in section “Specifications and Spare Parts” have to be replaced in every 12 months, spare parts E only if necessary.



NOTICE

Never grease or lubricate any sealing faces!
Apply a very thin film of a suitable lubricant to sealing rings (O-rings) made of elastomer. Do not bring them into contact with mineral oil-based lubricants (failure of the seals due to swelling or decomposition)! Use "Parker Super-O-Lube", a lubricant for assembly by company Parker.
Do not use force to assemble the components!

16.1 Requierment

Use only new original spare and wearing parts.

16.2 Assembly

Assembly of the components is done analogously for disassembly but in reversed order.

An assembly video on our website www.maier-heidenheim.de. provides you with valuable tips on assembly and mounting.

Refer to the tab “Operating Instructions” Assembly of Rotary Joint type HW.

The video is available in German and English.

Contents

1 Application data

Type		H	H / HW	HW		HW		HW	
Version Nom.diameter	[mm]	1, 2, R2, 3 15 ...100	3 15 ... 100	1, 2, R2, 3 15 ... 100		X2, A2 X2 DN 32 ... 100 A2 DN 32 ... 2099		B2 32 ... 100	
Medium		Water, steam	Steam	Water, steam	Thermal-oil	Water, steam	Thermal-oil	Water	Thermal-oil
Temperature	min ...max.°C	-10 ...220	-10 ... 160	-10 ... 220	-10 ... 300	-10 ... 230	-10 ... 300	14 ... 446	-10 ... 300
Pressure PN	max. bar	20	10	20	10	28	10	28	10
Speed	max. min^{-1}	50000 / DN x PN	H 50000 / DN x PN HW 100000 / DN x PN	100000 / DN x PN		150000 / DN x PN		150000 / DN x PN	

Type		HW -450		HW -500		HW -500		HW -500	
Version Nom. diameter	[mm]	1 15 ... 25		1 32 ... 100		X2, A2 X2 DN 32 ... 100		B2 32 ... 100	
Version Nom diameter	[mm]	2, R2 ¾ +1		---		---		---	
Medium		Water, steam	Thermal-oil	Water, steam	Thermal-oil	Water, steam	Thermal-oil	Water	Thermal-oil
Temperature	min ...max. °C	-10 ...250	-10 ... 300	-10 ... 250	-10 ... 300	-10 ... 230	-10 ... 300	-10 ... 230	-10 ... 300
Pressure PN	max. psi								
Speed	max. min^{-1}	100000 / DN x PN		100000 / DN x PN		150000 / DN x PN		1500000 / DN x PN	

Avoid operating the unit under conditions involving several maximum values attained at the same time! Inquire for greater values and other media.

2 Speed limitation of formula values

DN [mm]		15	20	25	32	40	50	65	75	80	100
Max. speed [1]	min^{-1} rpm	470	400	340	420	370	350	300	250	250	200

3 Transportation and storage

Storage temperature	15°C to 30°C
Humidity	65 %
Preservation	none; check compatibility with seal materials, if necessary

4 Tightening Torques for Fastening Screws in Nm at Screw Temperature 20°F

Size	Properity class 5.6	Properity class 8.8
M6	4	10
M8	10	24
M10	18	48
M12	37	82
M16	90	206
M20	175	400

INFORMATION

The property class is indicated by the designation of the fastening element.
Please inquire for data on other materials.

5 Approved media for the pressure pipe

Approved media for the pressure pipe

Series H / HW may be used for water, steam and thermal oil having the quality described below. Other media including additives (e.g. anticorrosion or antifreeze agents) must be checked for compatibility with the sealing materials in the manufacturer's plant.

Specifications - standard media

General

The quality of the medium used plays a decisive role in the service life and reliability of Maier rotary joints. It is strongly recommended to observe the specifications listed below. Insufficient quality of the medium will result in heavy wear of the sealing and premature failure of the rotary joint.

Section 1: Water at temperatures -10°C to 70°C

- Raw water: drinking water quality
- General: clear, no sediments
- Filtration: particle size 20 µm, max. 50µm
- Water hardness: < 3,2 mmol/l
- If required, add a suitable antifreeze agent and a **silicate-free** anticorrosion agent (ensure compatibility with the materials used in the unit, check back with manufacturer, if necessary).

Section 2: Water at temperatures of ≥ 70°C and boiler water for steam ≤ 220°C

- Raw water: drinking water quality
- General: clear, no sediments
- Filtration: particle size 20 µm, max. 50µm
- Water hardness: < 3,2 mmol/l
- Low salt concentration according to VdTÜV- Guideline TCh 1466 "Guideline for Circulation Water in Hot Water and Warm Water Heating Systems" ("Richtlinie für das Kreislaufwasser in Heißwasser – und Warmwasserheizungsanlagen), sheet 1
- If required, add a suitable antifreeze agent and a **silicate-free** anticorrosion agent (ensure compatibility with the materials used in the unit, check back with manufacturer, if necessary).

Section 3: Thermal oil

- Material groups:
  1. Thermal oil consisting of hydrocarbons (mineral base, group 1)
  2. Thermal oil made of isomer mixture (synthetic base – group 2)
     Only upon request
     Thermal oil consisting of uniform material (synthetic base – group 3)
- General: clear, no sediments
- Filtration: particle size 50 µm, max. 100µm
- Steam pressure*: The steam pressure must not exceed 0.5 bar abs at maximum operating temperature.

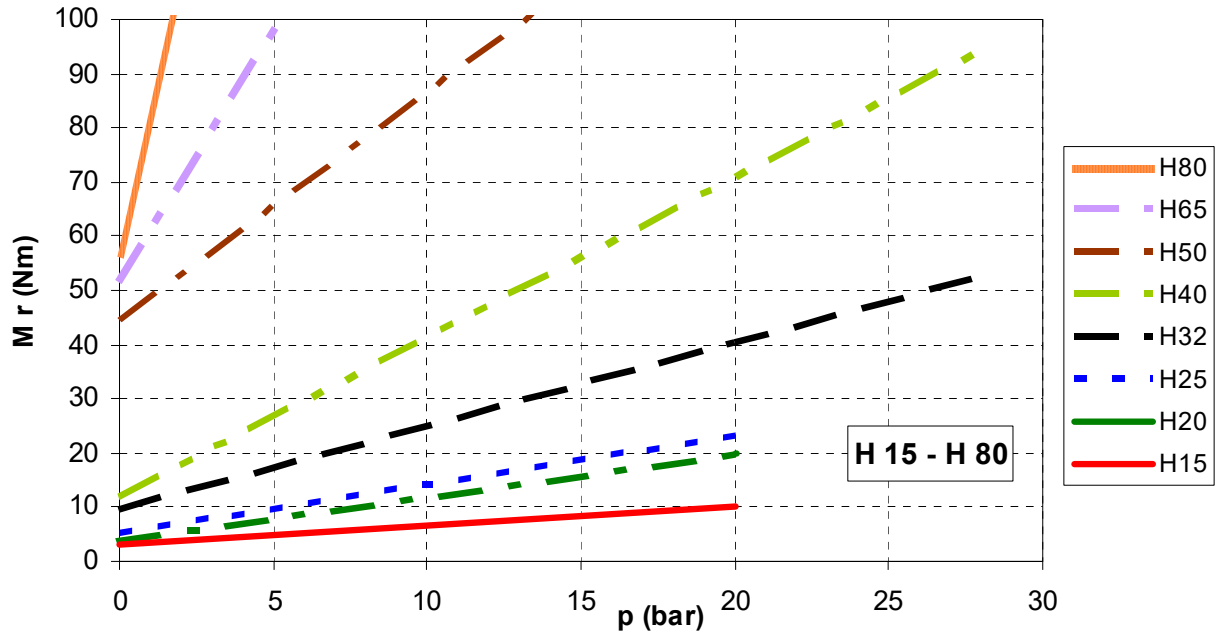
*: Steam pressure is the pressure at which a liquid becomes gaseous. The steam pressure depends on the temperature of the liquid.

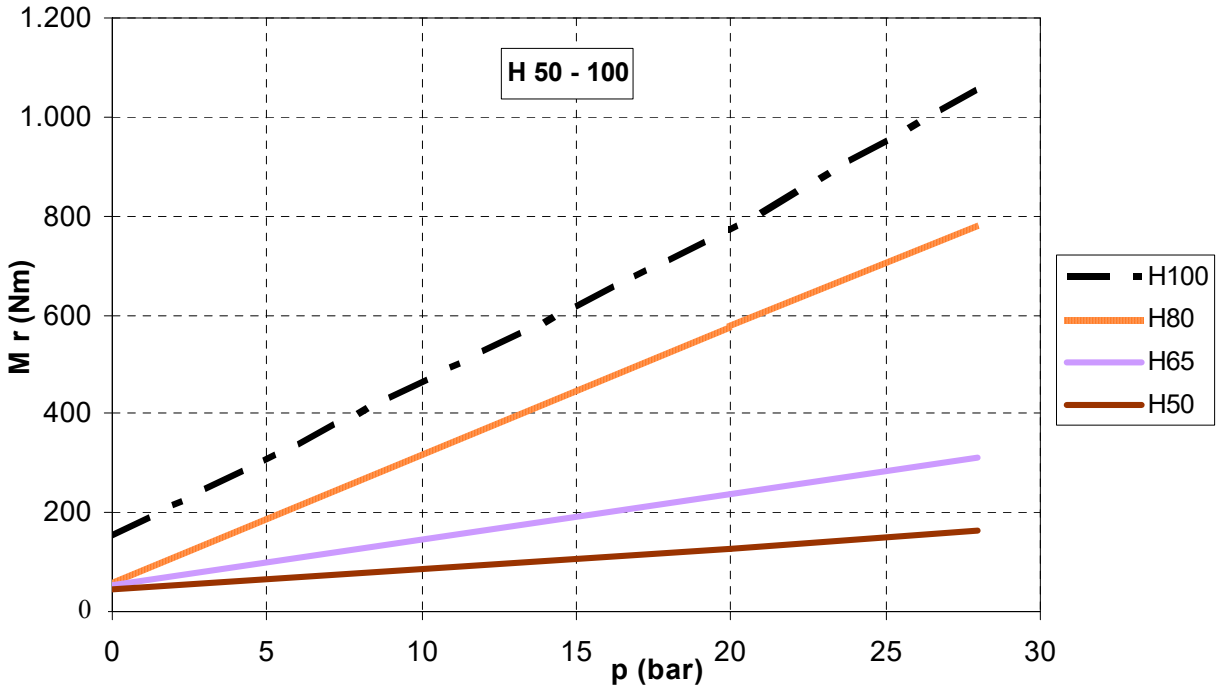
- Specific heat conductivity: For maximum heat dissipation in the sealing gap, the value should be as good as possible.
- Kinematic viscosity: For excellent flow in the system and lubrication effect in the rotary joint, the following values should be attained:
  - as low as possible at minimum application temperature
  - as high as possible at maximum application temperature.

Please inquire for media not listed.

6 Friction torque

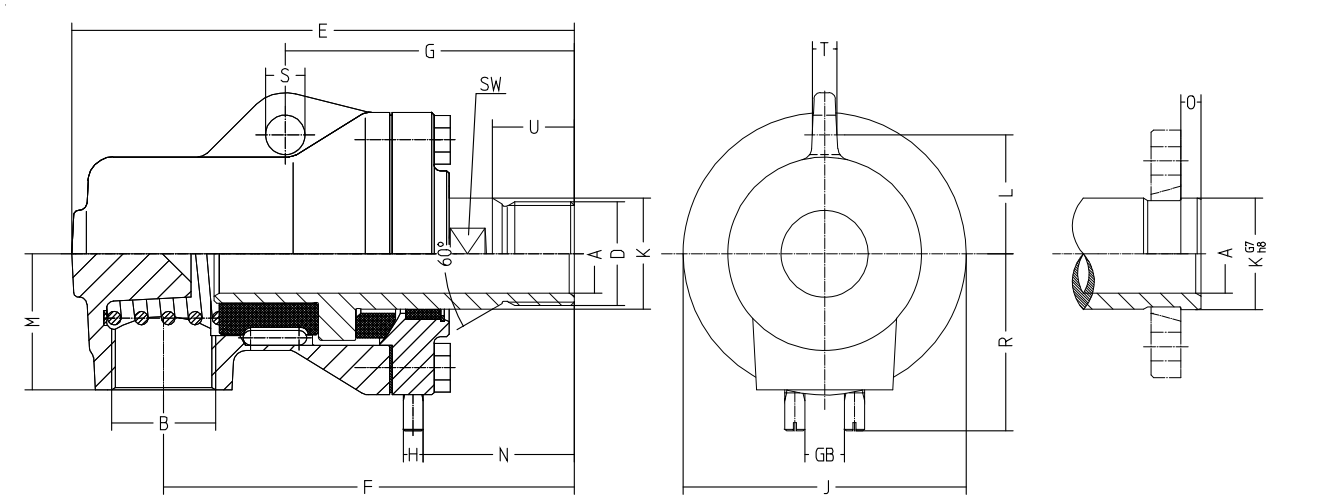
Friction torque is essential in designing drives and the safety device for torque monitoring. The values listed relate to measurements with water at 20°C . The operating pressure is the main factor of influence on the friction torque – in addition, speed, operating pressure and the medium play a role, but to a lesser degree. Therefore, variations of up to ± 20% are possible. The initial breakaway torque during commissioning and after longer idle periods may be twice as high as the values listed.





7 Dimensional Drawings

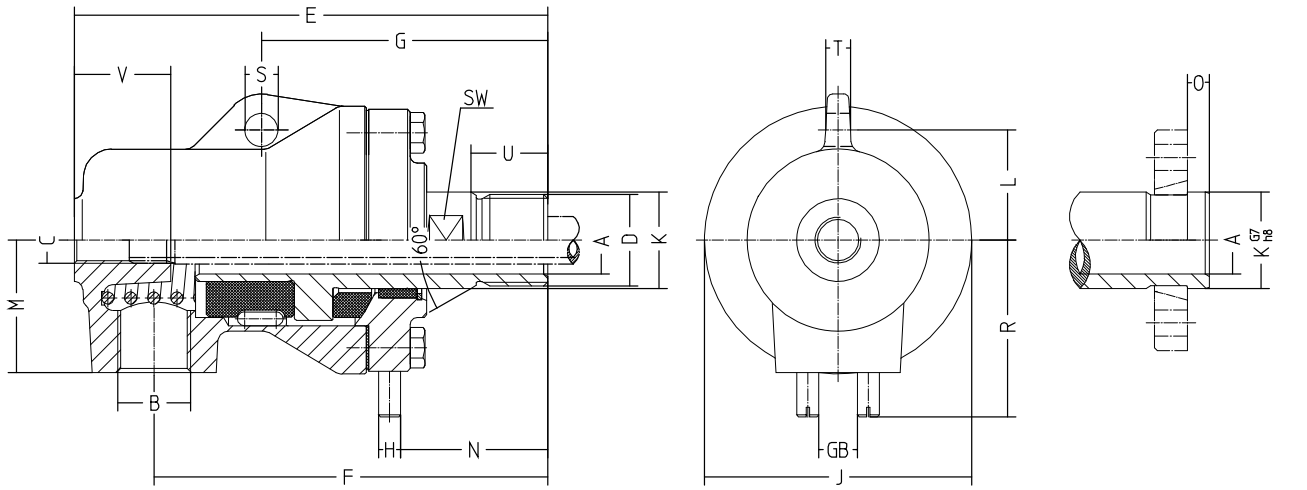
7.1 H 1 + HW 1, monoflow, DN 15 ... 100



DN inch	15	20	25	32	40	50	65	80	100
Type	H 115 R	H 120 R	H 125 R	H 132 R	H 140 R	H 150 R	H 165 R	H 180 R	H 1100 R
Ordering no.	1108050	1108130	1108210	1108350	1108450	1108550	1108650	1108750	1108850
Type	H 115 L	H 120 L	H 125 L	H 132 L	H 140 L	H 150 L	H 165 L	H 180 L	H 1100 L
Ordering no.	1108051	1108131	1108211	1108351	1108451	1108551	1108651	1108751	1108851
Type	H 115 K	H 120 K	H 125 K	H 132 K	H 140 K	H 150 K	H 165 K	H 180 K	H 1100 K
Ordering no.	1108052	1108132	1108212	1108352	1108452	1108552	1108652	1108752	1108852
Type	HW 115 R	HW 120 R	HW 125 R	HW 132 R	HW 140 R	HW 150 R	HW 165 R	HW 180 R	HW 1100 R
Ordering no.	1108065	1108145	1108165	1108366	1108465	1108565	1108665	1108765	1108865
Type	HW 115 L	HW 120 L	HW 125 L	HW 132 L	HW 140 L	HW 150 L	HW 165 L	HW 180 L	HW 1100 L
Ordering no.	1108066	1108146	1108166	1108367	1108466	1108566	1108666	1108766	1108866
Type	HW 115 K	HW 120 K	HW 125 K	HW 132 K	HW 140 K	HW 150 K	HW 165 K	HW 180 K	HW 1100 K
Ordering no.	1108067	1108147	1108169	1108368	1108467	1108567	1108667	1108767	1108867

Ø A	13	20	24,5	32	38	50	66	81	98
B	G ½	G ¾	G 1	G 1¼	G 1½	G 2	G 2½	G 3	G 4
D	G ½ A	G ¾ A	G 1 A	G 1¼ A	G 1½ A	G 2 A	G 2½ A	G 3½ A	G 4 A
E	130	146	174	203	226	275	327	398	480
F	107	120	143	167	183	225	264	320	383
G	85	91	104	118	124	146	165	203	243
H	6	6	8	8	10	16	18	18	25
Ø J	80	88	97	114	124	144	182	220	260
Ø K	25	30	35	45	52	66	85	107	118
Ø K G7/h8	24	30	35	45	50	65	85	105	114
L	31	36	40	48	53	62	80	100	115
M	34	42	48	55	65	80	90	115	135
N	44	49	53	63	66	81	93	121	143
O	6	8	8	8	10	10	10	12	12
R	52	56	64	74	82	92	115	135	168
S	12	12	12	16	16	18	20	22	26
T	7	8	9	10	12	13	15	20	22
U	23	23	28	33	36	43	48	54	66
GB	12	12	14	16	16	18	20	22	26
SW	22	27	30	41	46	60	75	95	110
Weight kg	1,7	2,4	3,4	5,5	7,1	11,3	21,4	37,9	62

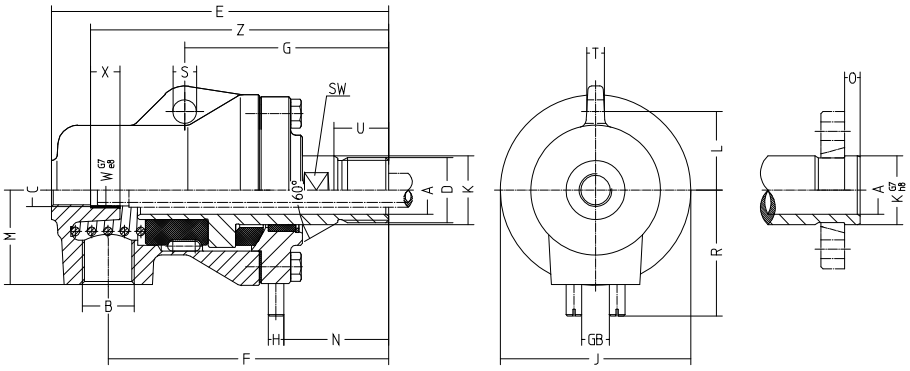
7.2 H 2 + HW 2, duoflow with stationary inner pipe, DN 15 ... 100



DN inch	15	20	25	32	40	50	65	80	100
Type	H 215 R	H 220 R	H 225 R	H 232 R	H 240 R	H 250 R	H 265 R	H 280 R	H 2100 R
Ordering no.	1108053	1108133	1108213	1108353	1108453	1108553	1108654	1108753	1108853
Type	H 215 L	H 220 L	H 225 L	H 232 L	H 240 L	H 250 L	H 265 L	H 280 L	H 2100 L
Ordering no.	1108054	1108134	1108214	1108354	1108454	1108554	1108655	1108754	1108854
Type	H 215 K	H 220 K	H 225 K	H 232 K	H 240 K	H 250 K	H 265 K	H 280 K	H 2100 K
Ordering no.	1108055	11008135	1108215	1108355	1108455	1108555	1108656	1108755	1108855
Type	HW 215 R	HW 220 R	HW 225 R	HW 232 R	HW 240 R	HW 250 R	HW 265 R	HW 280 R	HW 2100 R
Ordering no.	1108068	1108148	1108167	1108363	1108468	1108568	1108668	1108768	1108868
Type	HW 215 L	HW 220 L	HW 225 L	HW 232 L	HW 240 L	HW 250 L	HW 265 L	HW 280 L	HW 2100 L
Ordering no.	1108069	1108149	1108168	1108364	1108469	1108569	1108669	1108769	1108869
Type	HW 215 K	HW 220 K	HW 225 K	HW 232 K	HW 240 K	HW 250 K	HW 265 K	HW 280 K	HW 2100 K
Ordering no.	1108070	1108150	1108170	1108365	1108470	1108570	1108670	1108770	1108870

Ø A	13	20	24,5	32	38	50	66	81	98
B	G 3/8	G ½	G ¾	G 1	G 1¼	G 1½	G 2	G 2½	G 3
C	G 1/8	G ¼	G 3/8	G ½	G ¾	G 1	G 1½	G 1½	G 2
D	G ½ A	G ¾ A	G 1 A	G 1¼ A	G 1½ A	G 2 A	G 2½ A	G 3½ A	G 4 A
E	128	144	172	200	223	272	324	393	475
F	107	120	143	167	183	225	264	320	383
G	85	91	104	118	124	146	165	203	243
H	6	6	8	8	10	16	18	18	25
Ø J	80	88	97	114	124	144	182	220	260
Ø K	25	30	35	45	52	66	85	107	118
Ø K G7/h8	24	30	35	45	50	65	85	105	114
L	31	36	40	48	53	62	80	100	115
M	34	42	48	55	65	80	90	115	135
N	44	49	53	63	66	81	93	121	143
O	6	8	8	8	10	10	10	12	12
R	52	56	64	74	82	92	115	135	168
S	12	12	12	16	16	18	20	22	26
T	7	8	9	10	12	13	15	20	22
U	23	23	28	33	36	43	48	54	66
V	28	32	35	45	50	60	70	80	90
GB	12	12	14	16	16	18	20	22	26
SW	22	27	30	41	46	60	75	95	110
Weight lbs	1,6	2,3	3,2	5,3	6,9	11,1	21,3	37,1	61

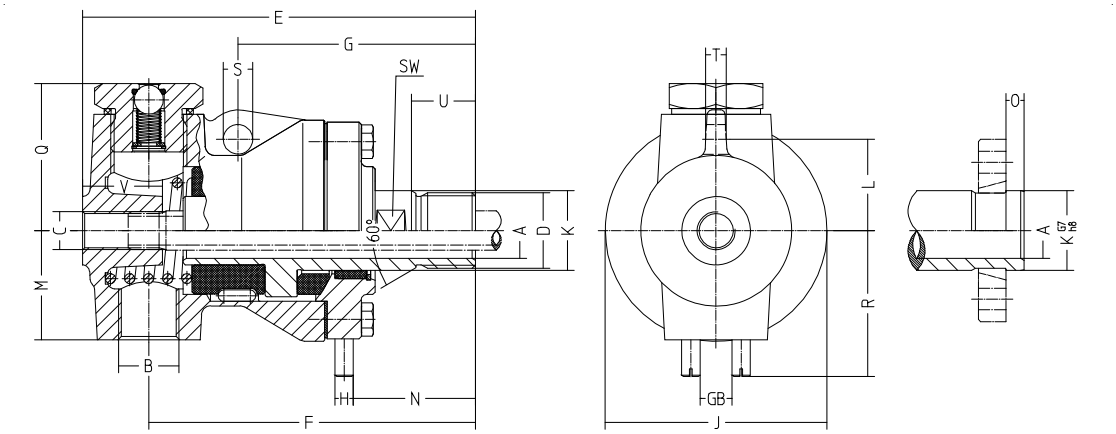
7.3 HR 2 + HWR 2, duoflow with rotating inner pipe, DN 15 ... 100



DN inch	15	20	25	32	40	50	65	80	100
Type	HR 215 R	HR 220 R	HR 225 R	HR 232 R	HR 240 R	HR 250 R	HR 265 R	HR 280 R	HR 2100 R
Best.-Nr	1108056	1108136	1108219	1108359	1108459	1108556	1108657	1108756	1108856
Type	HR 215 L	HR 220 L	HR 225 L	HR 232 L	HR 240 L	HR 250 L	HR 265 L	HR 280 L	HR 2100 L
Best.-Nr	1108057	1108137	1108220	1108360	1108460	1108557	1108658	1108757	1108857
Type	HR 215 K	HR 220 K	HR 225 K	HR 232 K	HR 240 K	HR 250 K	HR 265 K	HR 280 K	HR 2100 K
Best.-Nr	1108058	1108138	1108224	1108375	1108463	1108560	1108659	1108761	1108861
Type	HWR 215 R	HWR 220 R	HWR 225 R	HWR 232 R	HWR 240 R	HWR 250 R	HWR 265 R	HWR 280 R	HWR 2100 R
Best.-Nr	1108071	1108151	1108171	1108369	1108471	1108571	1108671	1108771	1108871
Type	HWR 215 L	HWR 220 L	HWR 225 L	HWR 232 L	HWR 240 L	HWR 250 L	HWR 265 L	HWR 280 L	HWR 2100 L
Best.-Nr	1108072	1108152	1108172	1108370	1108472	1108572	1108672	1108772	1108872
Type	HWR 215 K	HWR 220 K	HWR 225 K	HWR 232 K	HWR 240 K	HWR 250 K	HWR 265 K	HWR 280 K	HWR 2100 K
Best.-Nr	1108073	1108153	1108176	1108376	1108476	1108573	1108673	1108773	1108873

Ø A	13	20	24,5	32	38	50	66	81	98
B	G 3/8	G ½	G ¾	G 1	G 1¼	G 1½	G 2	G 2½	G 3
C	G 1/8	G ¼	G 3/8	G ½	G ¾	G 1	G 1½	G 1½	G 2
D	G ½ A	G ¾ A	G 1 A	G 1¼ A	G 1½ A	G 2 A	G 2½ A	G 3½ A	G 4 A
E	128	144	172	200	223	272	324	393	475
F	107	120	143	167	183	225	264	320	383
G	85	91	104	118	124	146	165	203	243
H	6	6	8	8	10	16	18	18	25
Ø J	80	88	97	114	124	144	182	220	260
Ø K	25	30	35	45	52	66	85	107	118
Ø K G7/h8	24	30	35	45	50	65	85	105	114
L	31	36	40	48	53	62	80	100	115
M	34	42	48	55	65	80	90	115	135
N	44	49	53	63	66	81	93	121	143
O	6	8	8	8	10	10	10	12	12
R	52	56	64	74	82	92	115	135	168
S	12	12	12	16	16	18	20	22	26
T	7	8	9	10	12	13	15	20	22
U	23	23	28	33	36	43	48	54	66
Ø W G7/e8	10	12	16	20	25	31,8	45	45	60
X	15	15	15	15	25	25	30	30	40
Z	115	127	152	170	198	237	284	343	425
GB	12	12	14	16	16	18	20	22	26
SW	22	27	30	41	46	60	75	95	110
Weight kg	1,6	2,3	3,2	5,3	6,9	11,1	21,3	37,1	61

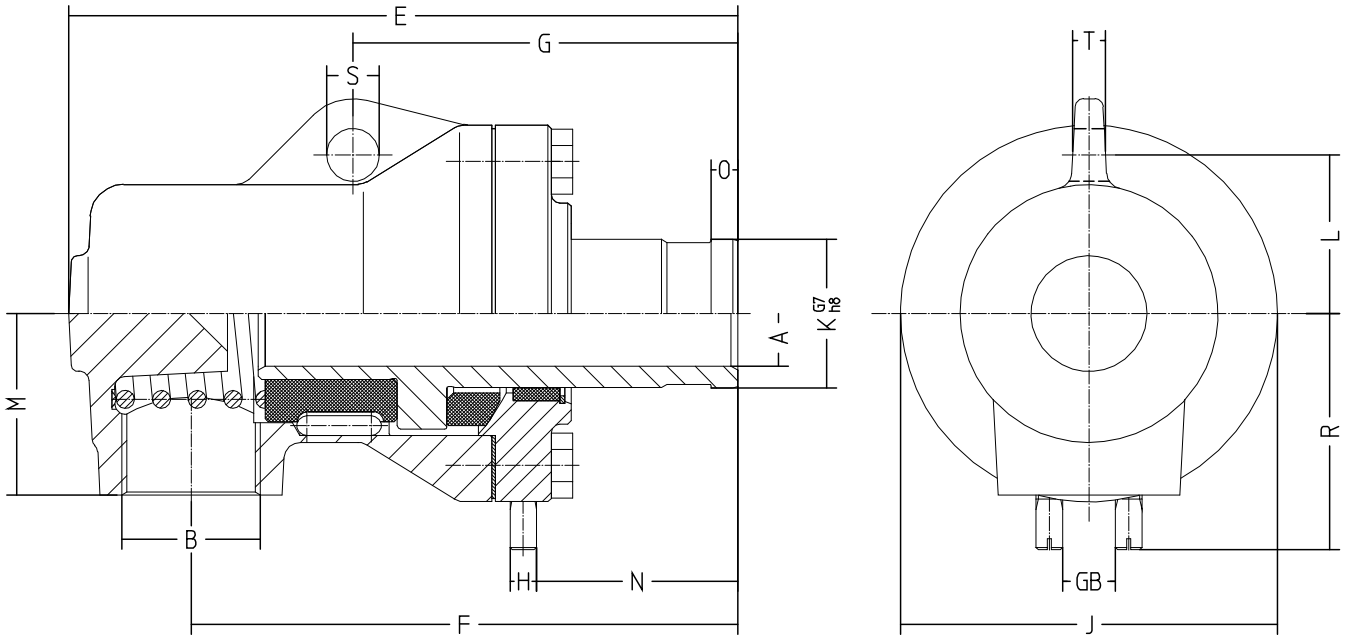
7.4 H 3 + HW 3, duoflow with rotating inner pipe and vacuum valve, DN 25-40



DN mm	25	32	40
Type Ordering no.	H 325 R 1108216	H 332 R 1108356	H 340 R 1108456
Type Ordering no.	H 325 L 1108217	H 332 L 1108357	H 340 L 1108457
Type Ordering no.	H 325 K 1108218	H 332 K 1108358	H 340 K 1108458
Type Ordering no.	HW 325 R 1108173	HW 332 R 1108371	HW 340 R 1108473
Type Ordering no.	HW 325 L 1108174	HW 332 L 1108372	HW 340 L 1108474
Type Ordering no.	HW 325 K 1108175	HW 332 K 1108373	HW 340 K 1108475

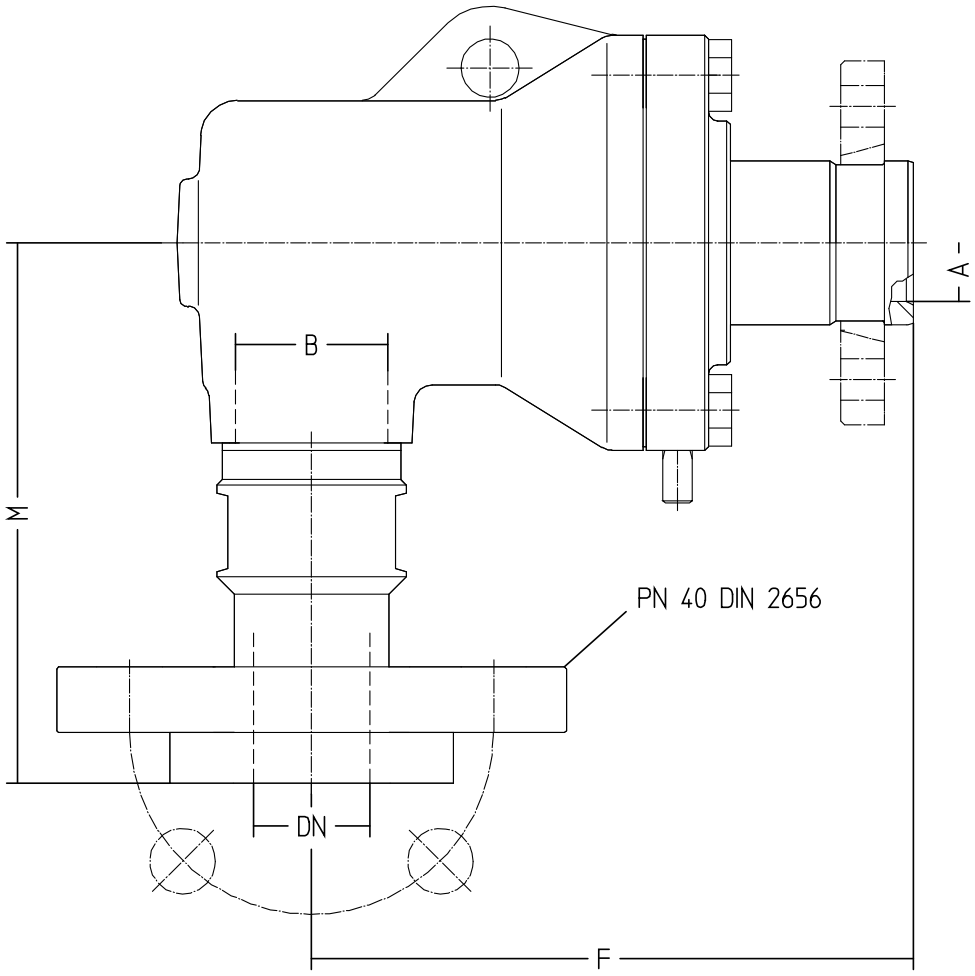
Ø A	24,5	32	38
B	G ¾	G 1	G 1¼
C	G 3/8	G ½	G ¾
D	G 1 A	G 1¼ A	G 1½ A
E	172	200	223
F	143	167	183
G	104	118	124
H	8	8	10
Ø J	97	114	124
Ø K	35	45	52
Ø K G7/h8	35	45	50
L	40	48	53
M	48	55	65
N	53	63	66
O	8	8	10
Q	64,5	69	74
R	64	74	82
S	13	16	16
T	9	10	12
U	28	33	36
V	35	45	50
GB	14	16	16
SW	30	41	46
Weight kg	3,6	5,7	7,3

7.5 HW 1 Series -450, monoflow, rotor material 1.4571 (SS 316 Ti), DN 15-25



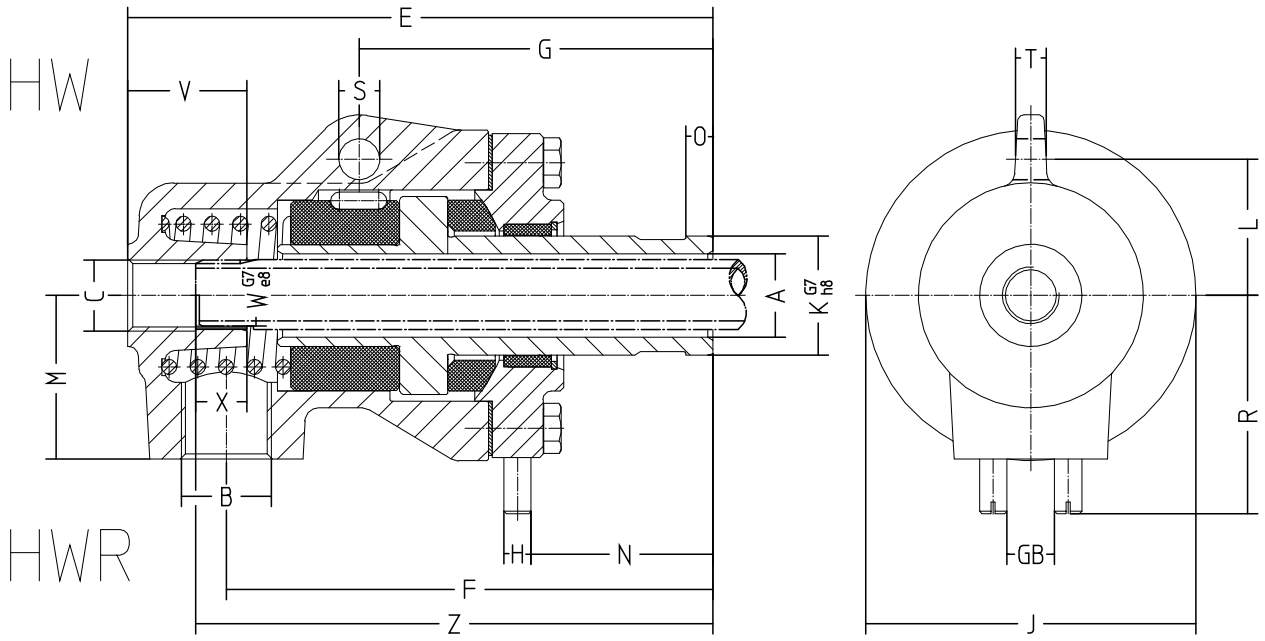
DN mm	15	20	25
Type	HW 115 K-450	HW 120 K-450	HW 125 K-450
Ordering no.	1108067-450	1108147-450	1108169-450
Ø A	13	20	24,5
B	G ½	G ¾	G 1
E	130	146	174
F	107	120	143
G	85	91	104
H	6	6	8
Ø J	80	88	97
Ø K G7 / h8	24	30	35
L	31	36	40
M	34	42	48
N	44	49	53
O	6	8	8
R	52	56	64
Ø S	12	12	12
T	7	8	9
GB	12	12	14
Weight kg	1,7	2,4	3,4

7.6 HW 1 Series -500, monoflow, rotor material 1.4571 (SS 316 Ti), DN 32-100



DN mm	32	40	50	65	80	100
Type	HW 132 K-500	HW 140 K-500	HW 150 K-500	HW 165 K-500	HW 180 K-500	HW 1100 K-500
Ordering no.	1108368-500	1108467-500	1108567-500	1108667-500	1108767-500	1108867-500
Ø A	32	38	50	66	81	98
B	G 1 ¼	G 1 1/2	G 2	G 2 1/2	G 3	G 4
F	167	183	225	264	320	383
M	148,5	160,5	179	193	239,5	277
DN	32	40	50	65	80	100
Weight kg	8,5	10,5	16	27	46	74

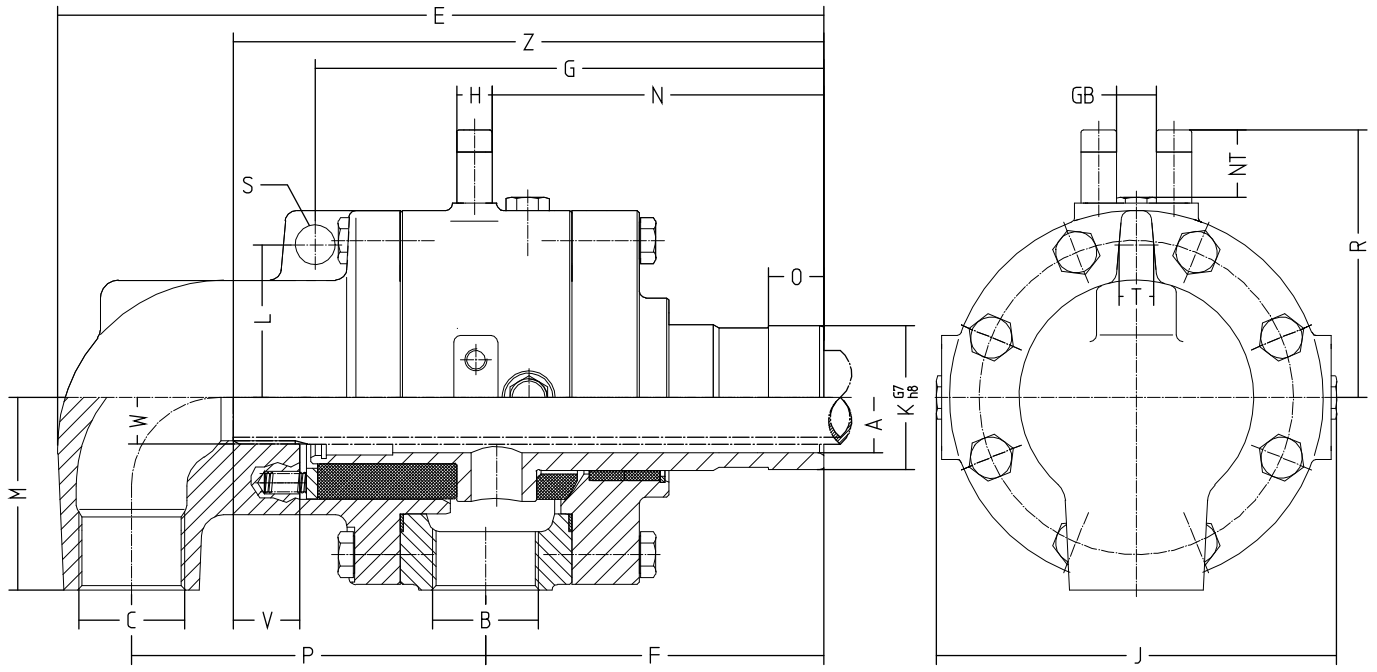
7.7 HW 2 + HWR 2 Series -450, duo flow, rotor material 1.4571 (SS 316 Ti), DN 20+25



DN mm	20	25
Type Ordering no.	HW 220 K-450 1108150-450	HW 225 K-450 1108170-450
Type Ordering no.	HWR 220 K-450 1108153-450	HWR 225 K-450 1108176-450

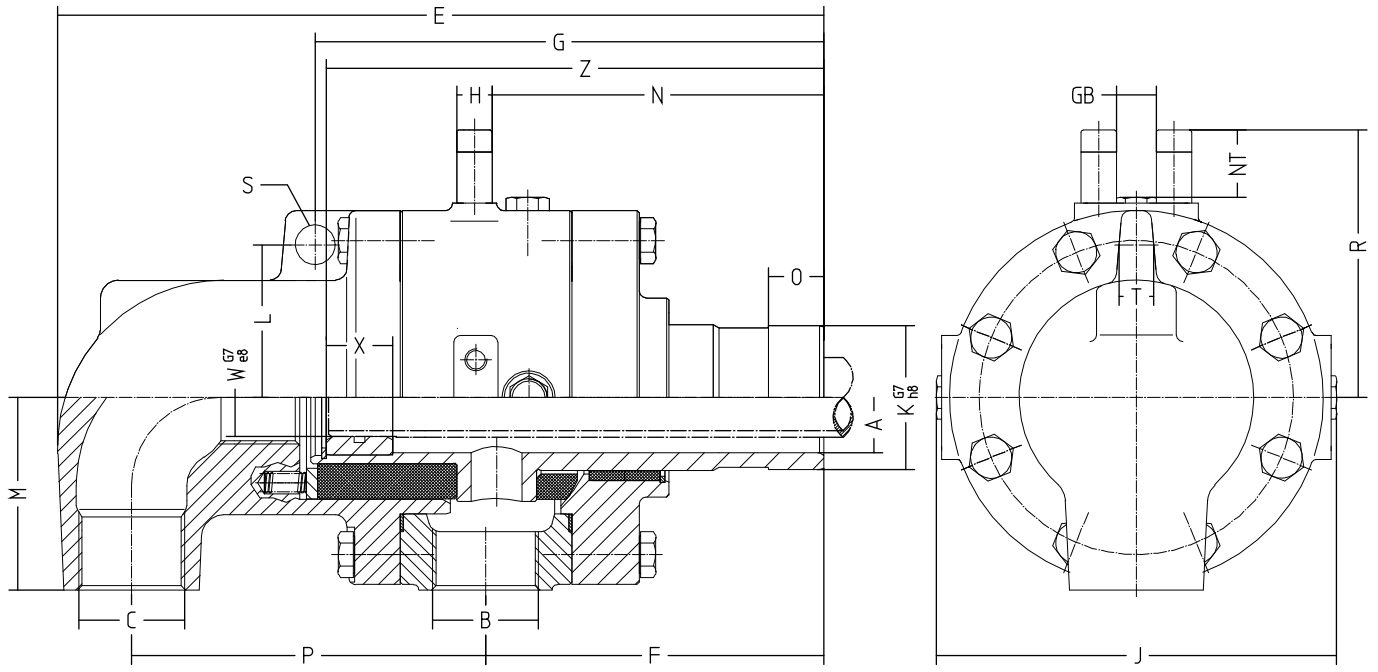
Ø A	20	24,5
B	G ½	G ¾
C	G 3/8	G ½
E	144	172
F	120	143
G	91	104
H	6	8
Ø J	88	97
Ø K G7 / h8	30	35
L	36	40
M	42	48
N	49	53
O	8	8
R	56	64
Ø S	12	12
T	8	9
V	32	35
Ø W G7/e8	16	18
X	15	15
Z	127	152
GB	12	14
Weight kg	2,3	3,2

7.8 HWX 2, duoflow, stationary inner pipe, DN 32-100



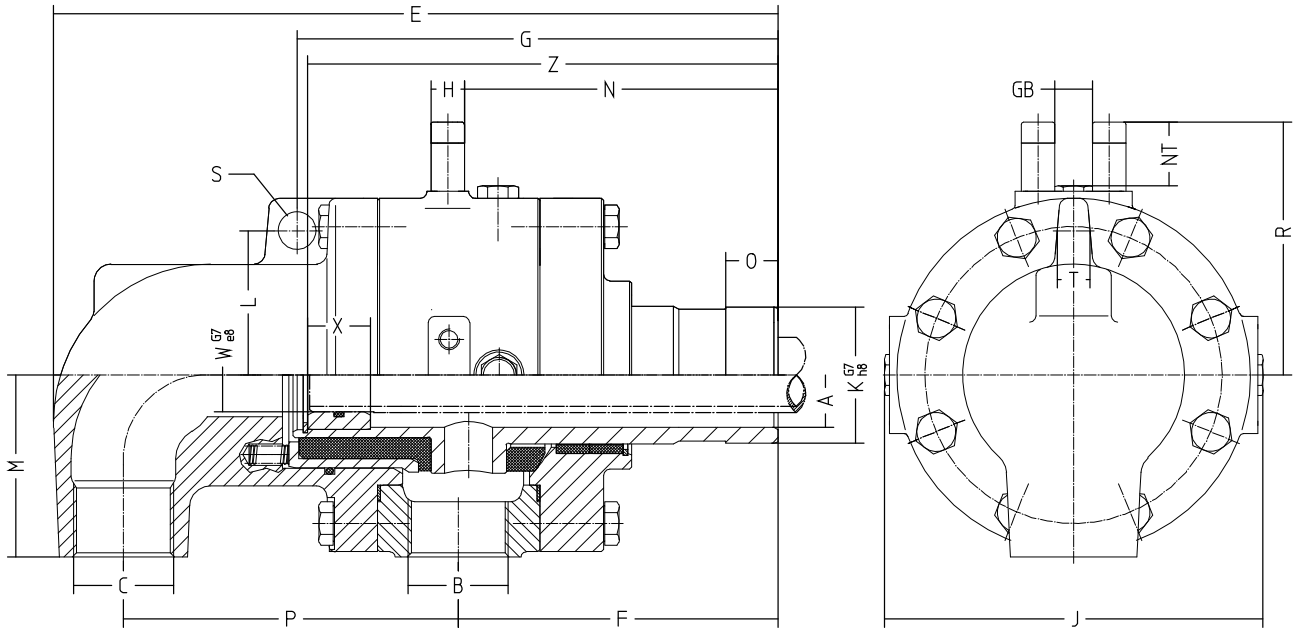
DN mm	32	40	50	65	75	80	100
Type	HWX 232 K	HWX 240 K	HWX 250 K	HWX 265 K	HWX 275 K	HWX 280 K	HWX 2100 K
Ordering no.	1108385	1108485	1108585	1108685	1108705	1108785	1108885
Ø A	32	38	50	66	67	80	98
B	G 1	G 1 ¼	G 1 ½	G 2	G 2 ½	G 2 ½	G 3
C	G 1	G 1 ¼	G 1 ½	G 2	G 2 ½	G 2 ½	G 3
E	271	313	347	402	535	540	609
F	120	132	153	178	270	275	305
G	183	204,5	230	272	380	385	424
H	13,5	16	16	18	18	18	25
J	150	159	181	218	274	274	302
Ø K G7 / h8	45	50	65	85	87,29	105	114
L	55	58	69	85	106	106	120
M	70	75	87	103	130	130	145
N	118	129	150	179	267	272	299
O	15	20	25	25	22,2	30	30
P	125	151	160	180	210	210	240
R	98	110	121	144	172	172	194
Ø S	16	16	18	20	22	22	26
T	13	15	16	18	25	25	26
V	25	30	30	30	25	30	30
W	G ¾	G 1	G 1 ¼	G 1 ½	G 1 ½	G 2	G 2 ½
Z	206	230	267	307	416	426	472
GB	16	16	18	20	22	22	26
NT	23	30,5	30,5	35	35	35	43
Weight kg	12	16,5	22	37	73	73	92

7.9 HWB 2, duoflow, rotating inner pipe, DN 32-100



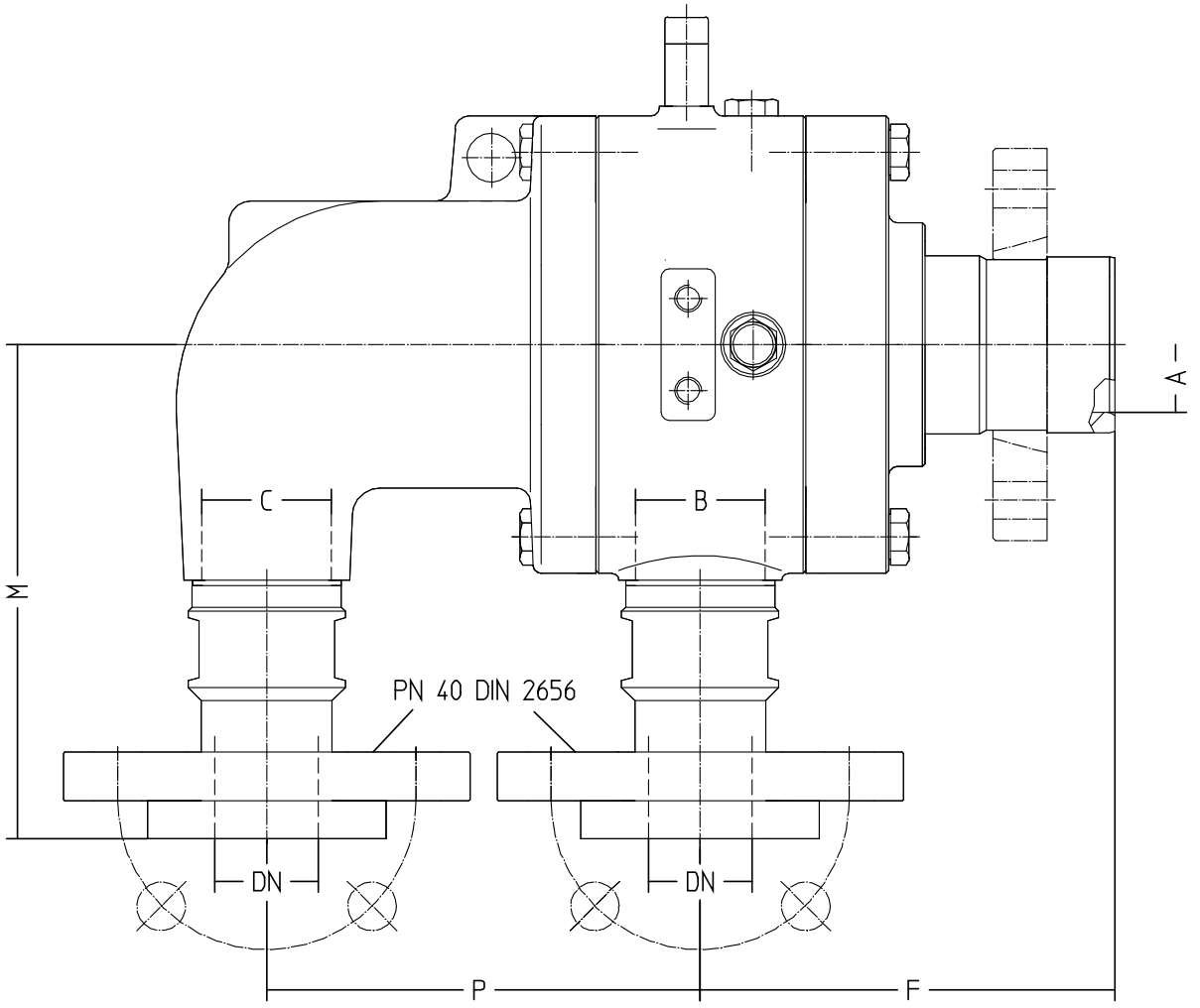
DN mm	32	40	50	65	75	80	100
Type	HWB 232 K	HWB 240 K	HWB 250 K	HWB 265 K	HWB 275 K	HWB 280 K	HWB 2100 K
Ordering no.	1108402	1108482	1108577	1108677	1108702	1108778	1108902
Ø A	32	38	50	66	67	80	98
B	G 1	G 1 ¼	G 1 ½	G 2	G 2 ½	G 2 ½	G 3
C	G 1	G 1 ¼	G 1 ½	G 2	G 2 ½	G 2 ½	G 3
E	271	313	347	402	535	540	609
F	120	132	153	178	270	275	305
G	183	204,5	230	272	380	385	424
H	13,5	16	16	18	18	18	25
J	150	159	181	218	274	274	302
Ø K G7 / h8	45	50	65	85	87,29	105	114
L	55	58	69	85	106	106	120
M	70	75	87	103	130	130	145
N	118	129	150	179	267	272	299
O	15	20	25	25	22,2	30	30
P	125	151	160	180	210	210	240
R	98	110	121	144	172	172	194
Ø S	16	16	18	20	22	22	26
T	13	15	16	18	25	25	26
Ø W G7/e8	22	28	35	45	45	60	75
X	30	30	30	40	40	40	50
Z	172	190	225	260	372	377	419
GB	16	16	18	20	22	22	26
NT	23	30,5	30,5	35	35	35	43
Weight kg	12	16,5	22	37	73	73	92

7.10 HWA 2, duoflow, rotating inner pipe, DN 32-2099



DN mm	3	40	50	65	75	80	100
Type Ordering no.	HWA 232 K 1108390	HWA 240 K 1108490	HWA 250 K 1108590	HWA 265 K 1108690	HWA 275 K 1108710	HWA 280 K 1108790	HWA 2099 K 1108880
Ø A	32	38	50	66	67	80	98
B	G 1	G 1 ¼	G 1 ½	G 2	G 2 ½	G 2 ½	G 3
C	G 1	G 1 ¼	G 1 ½	G 2	G 2 ½	G 2 ½	G 3
E	271	313	347	402	535	540	609
F	120	132	153	178	270	275	305
G	183	204,5	230	272	380	385	424
H	13,5	16	16	18	18	18	25
J	150	159	181	218	274	274	302
Ø K G7 / h8	45	50	65	85	87,29	105	114
L	55	58	69	85	106	106	120
M	70	75	87	103	130	130	145
N	118	129	150	179	267	272	299
O	15	20	25	25	22,2	30	30
P	125	151	160	180	210	210	240
R	98	110	121	144	172	172	194
Ø S	16	16	18	20	22	22	26
T	13	15	16	18	25	25	26
Ø W G7/e8	22	28	35	45	45	60	75
X	30	30	30	40	40	40	50
Z	172	190	225	260	372	377	419
GB	16	16	18	20	22	22	26
NT	23	30,5	30,5	35	35	35	43
Weight kg	12	16,5	22	37	73	73	92

7.11 HWX 2 + HWB 2 + HWA 2 Serie -500, duoflow, DN 32-100 (HWA DN 32 ... 2099)

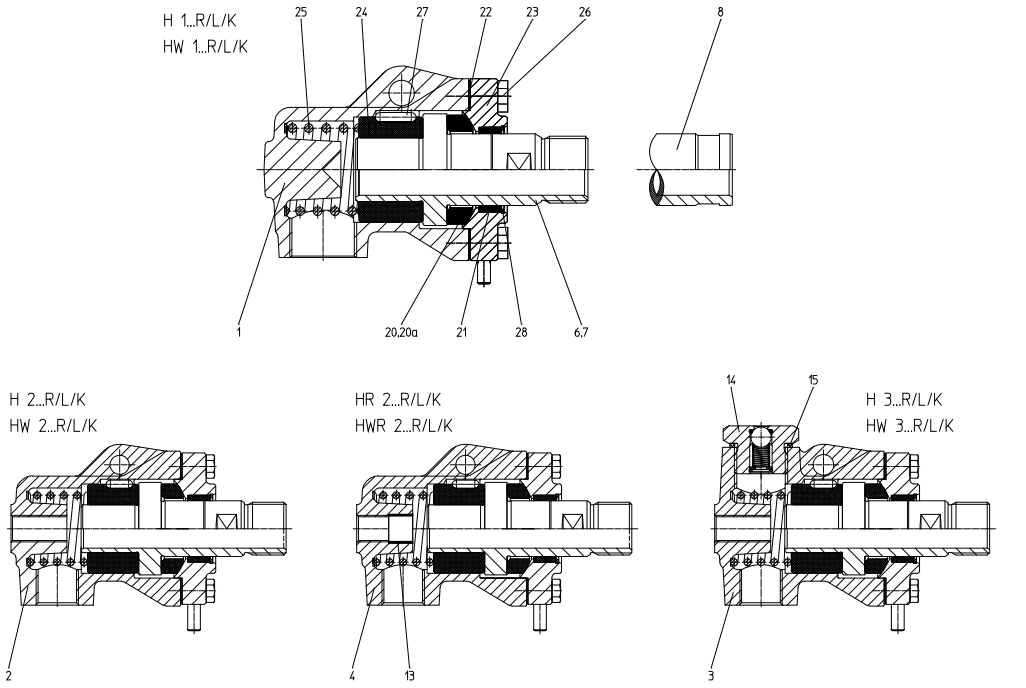


DN mm	32	40	50	65	75	80	100
Type Ordering no.	HWX 232 K-500 1108385-500	HWX 240 K-500 1108485-500	HWX 250 K-500 1108585-500	HWX 265 K-500 1108685-500	HWX 275 K-500 1108705-500	HWX 280 K-500 1108785-500	HWX 2100 K-500 1108885-500
Type Ordering no.	HWB 232 K-500 1108402-500	HWB 240 K-500 1108482-500	HWB 250 K-500 1108577-500	HWB 265 K-500 1108677-500	HWB 275 K-500 1108702-500	HWB 280 K-500 1108778-500	HWB 2100 K-500 1108902-500
Type Ordering no.	HWA 232 K-500 1108390-500	HWA 240 K-500 1108490-500	HWA 250 K-500 1108590-500	HWA 265 K-500 1108690-500	HWA 275 K-500 1108710-500	HWA 280 K-500 1108790-500	HWA 2099 K-500 1108880-500

Ø A	32	38	50	66	67	80	98
B	G 1	G 1 ¼	G 1 ½	G 2	G 2 ½	G 2 ½	G 3
C	G 1	G 1 ¼	G 1 ½	G 2	G 2 ½	G 2 ½	G 3
F	120	132	153	178	270	275	305
M	161,5	168,5	182,5	202	233	233	269,5
P	125	151	160	180	210	210	240
DN	25	32	40	50	65	65	80
Weight kg	16	22	29	46,5	84,5	84,5	107

8 Spare parts

8.1 Spare parts H 1 + HW 1, H 2 + HW 2, HR 2 + HWR 2, DN 15-100 H 3 + HW 3, DN 25-40

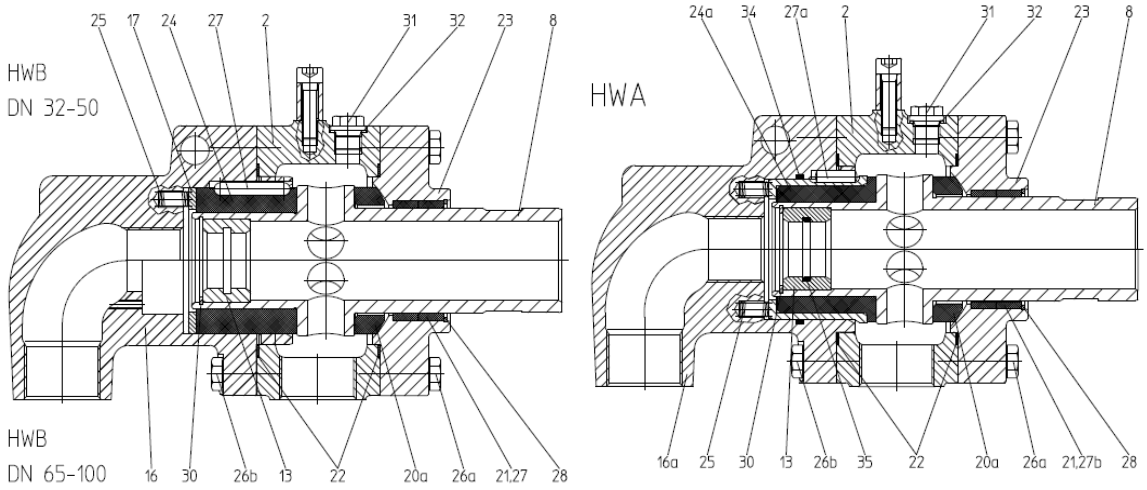


	DN mm	E V	15	20	25	32	40	50	65	80	100
1	Housing 1		15	1103139	1103222	1103362	1103462	1103559	1103633	1103762	1103862
2	Housing 2		1103059	1103140	1103223	1103363	1103463	1103560	1103634	1103763	1103863
3	Housing 3		1103060	-	1103224	1103364	1103464	-	-	-	-
4	Housing R 2		-	1103141	1103225	1103365	1103465	1103561	1103649	1103765	1103865
6	Rotor R	E	1103061	1103143	1103227	1103367	1103467	1103563	1103643	1103767	1103867
7	Rotor L	E	1103063	1103144	1103228	1103368	1103468	1103564	1103644	1103768	1103868
8	Rotor K	E	1103064	1103145	1103229	1103369	1103469	1103565	1103637	1103769	1103869
13	Slide bearing	V	1103065	3510504	3510506	3510501	3510509	3510512	3510514	3510514	3510523
14	Vacuum valve		3510502	-	1190020	1190020	1190020	-	-	-	-
15	CU seal		-	-	3511962	3511962	3511962	-	-	-	-
20	Sealing ring	V	-	3511302	3511303	3511304	3511305	3511306	3511307	3511308	3511309
20a	Sealing ring W	V	3511301	3510642	3510643	3510644	3510645	3510646	3510647	3510648	3510649
21	Cover bearing	V	3510641	3510602	3510603	3510604	3510605	3510606	3510607	3510608	3510609
22	Flat packing	V	3510601	3512002	3512003	3512004	3512005	3512006	3512007	3512016	3512017
23	Cover complete	E	3512001	1108139	1108221	1108361	1108461	1108559	1108653	1108759	1108858
24	Carbon bearing	V	1108059	3511342	3511343	3511344	3511345	3511346	3511347	3511348	3511349
25	Compress. spring		3511341	3511617	3511618	3511619	3511620	3511621	3511622	3511626	3511627
26	Hex screw		3511616	3500087	3500087	3500125	3500125	3500165	3500163	3500163	3500197
27	Locking pin		3500087	3500932	3500932	3500933	3500933	3500934	3500934	3500934	3500934
28	Circlip		3500932	3500697	3500702	3500703	3500704	3500705	3500706	3500707	3500708

E=Spare parts V= Wearing parts

Please specify rotary joint type designation when inquiring and placing orders!

8.2 Spare parts HWB 2 DN 32-100 / HWA 2 DN 32-2099

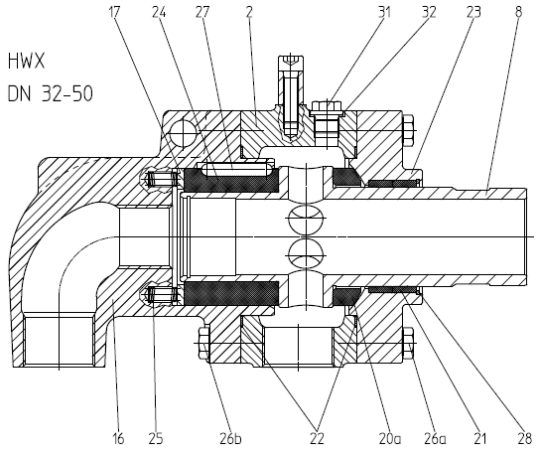


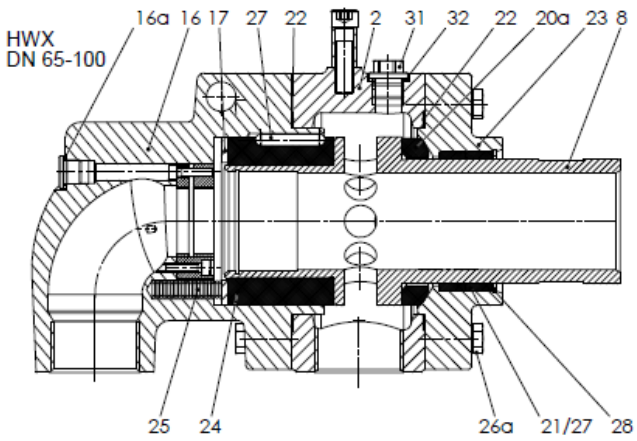
	DN mm	E V	32	40	50	65	75	80	100
2	Housing		1103400	1103500	1103582	1103700	1103810	1103810	1103930
8	Rotor	V	1103404	1103504	1103587	1103704	1103752	1103814	1103934
13	Bushing		1103387-417	1103481-365	1103581-428	1103651-397	1103755-054	1103787-446	1103888-552
16	Elbow B2		1103409	1103509	1103594	1103709	1103757	1103819	1103939
16a	Elbow A2		1103410	1103510	1103595	1103710	1103758	1103820	1103940
17	Trust washer		1103392-432	1103492-377	1103613-441	1103746-419	1103792-463	1103792-463	1103921-570
20a	Sealing ring W	V	3510644	3510645	3510646	3510647	3510648	3510648	3510649
21	Cover bearing	V	2x 3510604	2x 3510605	2x 3510606	2x 3510607	3511348	3511348	3511349
22	Flat packing	V	1114193-059	1103799-419	3512013	3512018	1110669-063	1110669-063	3512355-071
23	Cover complete	E	1103407	1103507	1103592	1103707	1103817	1103817	1103937
24	Carbon bearing B2	V	3511344	3511345	3511346	3511347	3511348	3511348	3511349
24a	Carbon bearing A2	V	3511344-421	3511345-362	3511346-426	3511347-398	3511348-449	3511348-449	3511349-549
25	Compression spring	E	5x3511668-001	6x3511668-001	8x3511668-001	4x 3511564	8x 3511564	8x 3511564	12x 3511564
26a	Hex screw 1		8x3500123-008	8x3500124-008	8x3500166-008	8x 3500163	8x 3500197	8x 3500197	8x 3500197
26b	Hex screw 2		8x 3500125	8x3500123-008	8x 3500165	8x 3500163	8x 3500197	8x 3500197	8x 3500197
27	Locking pin B2		1x 3500933	1x 3500933	1x 3500934	1x 3500934	2x 3500934	2x 3500934	2x 3500934
27a	Locking pin 1 A2		3500951-001	3500933	3500889-001	3500961-001	3500961-001	3500961-001	3500934
27b	Locking pin 2 A2		---	---	---	---	3500934	3500934	3500934
28	Locking ring (circlip)		3500703	3500704	3500705	3500706	3501237-001	3501237-001	3501043
30	Locking ring (circlip)		3501234	3501225	3501232	3501236	3501205	3501205	3501251
31	Vent screw		3x 3500657	3x3500658-007	3x3500658-007	3x3500655-007	3x3500655-007	3x3500655-007	3x3500655-007
32	Sealing ring	V	3x3502114-001	3x3502116-001	3x3502116-001	3x3502115-001	3x3502115-001	3x3502115-001	3x3502115-001
34	O-ring	V	3511701	3511708	3511694	3511692	3511702	3511702	3512515
35	O-ring	V	3511955	3511824	3511733	3511931	3511734	3511816	3511825

E=Spare parts V= Wearing parts

Please specify rotary joint type designation when inquiring and placing orders!

8.3 Spare parts HWX 2 DN 32-100





	DN mm	E* V*	32	40	50	65	75	80	100
2	Housing		1103400	1103500	1103582	1103700	1103810	1103810	1103930
8	Rotor	E	1103404	1103504	1103587	1103704	1103752	1103814	1103934
13	Bushing		1103387-417	1103481-365	1103581-428	1103651-397	1103755-054	1103787-446	1103888-552
16	Elbow		1103409	1103509	1103594	1103711	1103759	1103821	1103941
16a	Sealing ring	V	-	-	-	3502116-001	3502116-001	3502116-001	3502116-001
17	Trust washer		1103392-432	1103492-377	1103613-441	1103746-419	1103792-463	1103792-463	1103921-570
20a	Sealing ring W	V	3510644	3510645	3510646	3510647	3510648	3510648	3510649
21	Cover bearing	V	2x 3510604	2x 3510605	2x 3510606	2x 3510607	3511348	3511348	3511349
22	Flat packing	V	1114193-059	1103799-419	3512013	3512018	1110669-063	1110669-063	3512355-071
23	Cover complete	E	1103407	1103507	1103592	1103707	1103817	1103817	1103937
24	Carbon bearing	V	3511344	3511345	3511346	3511347	3511348	3511348	3511349
25	Compression spring	E	5x3511668-001	6x3511668-001	8x3511668-001	4x 3511564	8x 3511564	8x 3511564	12x 3511564
26a	Hex screw 1		8x3500123-008	8x3500124-008	8x3500166-008	8x 3500163	8x 3500197	8x 3500197	8x 3500197
26b	Hex screw 2		8x 3500125	8x3500123-008	8x 3500165	8x 3500163	8x 3500197	8x 3500197	8x 3500197
27	Locking pin		1x 3500933	1x 3500933	1x 3500934	1x 3500934	2x 3500934	2x 3500934	2x 3500934
28	Circlip		3500703	3500704	3500705	3500706	3501237-001	3501237-001	3501043
30	Circlip		3501234	3501225	3501232	3501236	3501205	3501205	3501251
31	Vent screw		3x 3500657	3x3500658-007	3x3500658-007	3x3500655-007	3x3500655-007	3x3500655-007	3x3500655-007
32	Sealing ring	V	3x3502114-001	3x3502116-001	3x3502116-001	3x3502115-001	3x3502115-001	3x3502115-001	3x3502115-001

*E= Ersatzteile *V= Verschleißteile

Bei Anfrage und Bestellung bitte genaue Typenbezeichnung angeben!