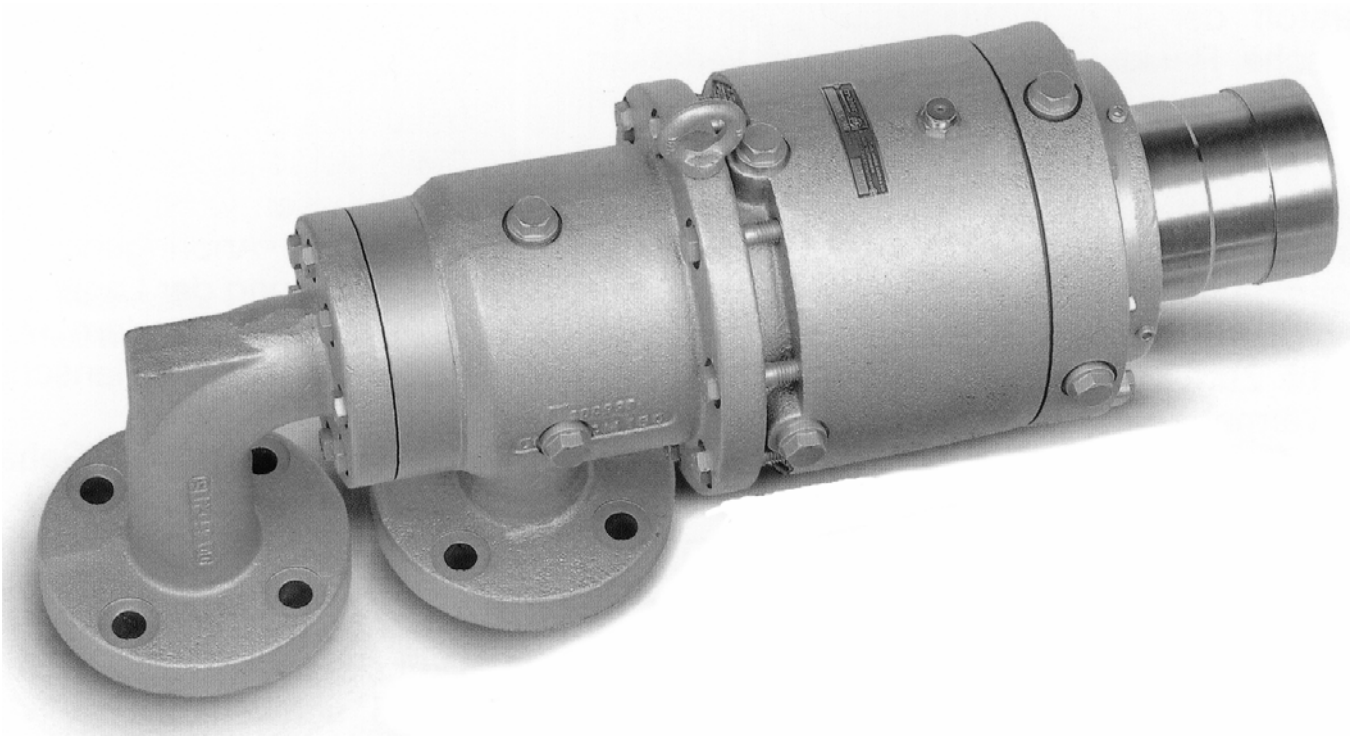


## Operating Manual for Maier Rotary Joints

### DQB 2150 K-10

B-DQB2150K-10\_en -Version 0 – 30.06.05



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# Operating Instructions Maier Rotary Joints

## Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

### Contents

1	Safety .....	2
2	Design and functions .....	3
3	Information on design and mounting.....	4
4	Transportation and storage.....	6
5	Mounting.....	6
6	Operation .....	10
7	Maintenance .....	11

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# Operating Instructions Maier Rotary Joints

## Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

### 1 Safety

#### 1.1 Application

Maier rotary joints may only be used to connect pressurized flow pipes to rotating pressure systems. Such rotating pressure systems are, for example, rollers through which flow liquids for cooling or heating purposes. Series DQ rotary joints may only be used for thermal oil. The rotary joint may only be operated within the application limit values specified on the enclosed sheet "Data and Dimensions".

Never modify the rotary joint or tamper with it in any way as this may cause dangers. Install, operate and maintain the rotary joint only as described in these operating instructions. We shall not be liable for any damages or plant interruptions whatsoever resulting from failure to observe these operating instructions.

These operating instructions do not contain all information important for the safe operation of the rotary joint. Also observe all pertinent local and national regulations and legislation concerning workplace safety and prevention of accidents.

Use only genuine or Maier-approved spare parts (standard norm parts). If you use other parts, this may have adverse effects on the safety of the rotary joint. We shall not be liable for any damages whatsoever resulting from the use of such non-approved or non-genuine parts.

#### 1.2 Requirements concerning installation and maintenance staff as well as operators

Only staff that has read and fully understood these operating instructions and that is fully aware of the dangers resulting from the rotary joint as well as the appropriate safety measures may work with Maier rotary joints. Such staff must have at least the knowledge of a trained locksmith or industrial mechanic who has experience with pressurized components.

#### 1.3 Dangers



**Warning!**

**If you touch hot parts or come into contact with hot liquids escaping under high pressure, this may result in dangerous burns.**

⇒ **Mount a protective hood to the rotary joint in order to prevent persons from directly coming into contact with hot parts and to safely retain escaping medium.**



**Warning!**

**If the rotary joint blocks and rotates along with the roller, the hoses may be torn off so that hot liquids can escape under high pressure.**

⇒ **Always observe the design and mounting information in chapter 3. Monitor the rotary joint by means of a torque sensor and a vibration pickup. Ensure that the rotary joint is regularly maintained as per chapter 7.**

#### 1.4 Safety precautions

Always observe the following safety precautions for the operation of the rotary joint:

- DQ, DQT and DQTX rotary joints may only be operated with a properly operating cooling unit.
- DQL rotary joints do not require a cooling unit, but they need to be lubricated (see 7.2 on page 11).

# Operating Instructions Maier Rotary Joints

## Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

### 2 Design and functions

#### 2.1 Components

- B, C Housing connections for the medium.  
Only one connection in case of mono versions.
- D Sealing element (flat packing or O ring)
- F Flange (K flange with inner ring, screwed flange or fixed flange) for mounting to roller
- G Housing
- I Optional inner pipe for duo versions, rotates e.g. with the roller
- L Rotor, rotates with roller
- R Locking fork
- S Sensor plug for position monitoring
- QE Inlet for quench medium (DQ, DQT, DQTX)
- QA Outlet for locking medium (DQ, DQT, DQTX)
- W Roller

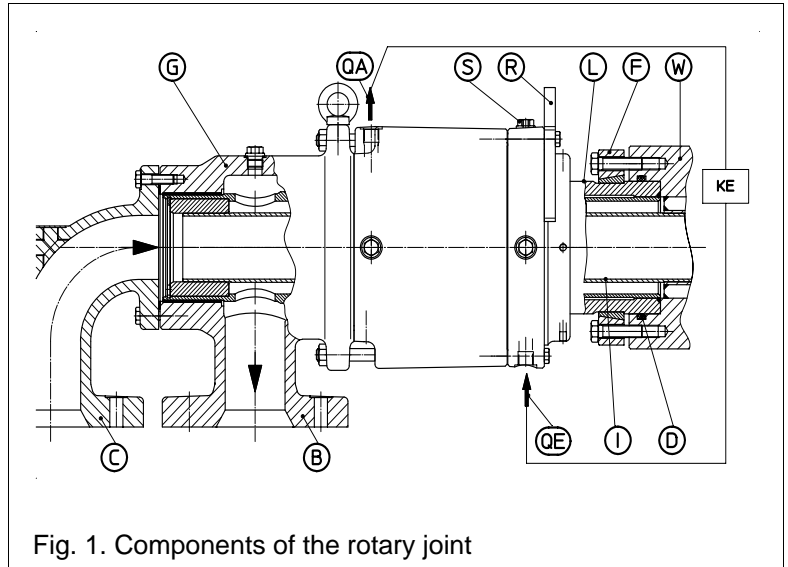


Fig. 1. Components of the rotary joint

#### 2.2 Functions

The rotary joint is mounted to the rotating roller "W" by means of flange "F". Sealing element "D" is used for sealing. The medium enters the system through the stationary housing and flows into the roller. In the case of duo versions, the medium is supplied and removed via the same rotary joint. In such a case, a second flow channel is created by means of an inner pipe "I", arranged centrally with reference to the rotating rotor "L". The stationary housing is supported by means of locking fork "R". Sensor plug "S" is provided for the installation of a vibration pickup to enable monitoring of the bearings in the rotary joint.

Series DQ rotary joints are suitable for thermal oils with a supply temperature of up to 400°C and speeds of up to 2000 min<sup>-1</sup>. Typical application areas comprise coating and laminating systems, paper, non-woven and textile calendars, dryers, rotary reactors.

If hot thermal oil comes into contact with the oxygen in the air, this causes chemical reactions such as coking or cracking. The seals are damaged and oil or oil vapor may escape. DQ systems separate the air oxygen and the oil by means of a quench medium (quench oil) - same oil as in the main circuit. The quench medium also cools and lubricates the seals and bearings in the rotary joint.

If more than a single rotary joint is connected to a cooling unit, you must install an oil distributor which assures that all rotary joints are supplied with sufficient quench oil volumes.

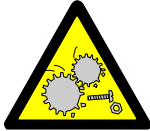
To cool down the quench oil, DQ, DQT and DQTX rotary joints require an additional cooling unit "KE". DQL rotary joints do not require a cooling unit, the application limit is 250°C, and the application limit for nominal diameter 50 is 200°C.

# Operating Instructions Maier Rotary Joints

## Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

### 3 Information on design and mounting



**Attention!**  
**Damage to components due to vibration and heat expansion.**  
 ⇒ Use only flexible hoses to connect the rotary joint!

- Use flexible metal hoses for the hot oil and cooling oil flowing between the supply pipe system and the rotary joint housing. This compensates for heat expansion and vibrations.
- Never apply torsional, tensile or pressure forces to metal hoses. Observe the minimum bending radii quoted by the hose manufacturers.
- Use pure graphite flat packings to securely seal flange connections.
- Only operate the rotary joint with a sufficiently dimensioned torque support to prevent rotation of the housing. The support element must allow for axial and radial movements of the housing.
- Also install a torque monitoring system with connection to the emergency shutdown facility in order to avoid damages resulting from bearing damages. If the torque monitoring system is activated, the rotation of the roller should be stopped immediately and the supply of the medium should be interrupted upstream of the metal hoses.
- If the bearings in the housing are to be monitored, connect a vibration pickup at sensor plug "S" (female thread M6x1; see fig. 1 on page 3).
- Center the inner pipe and the roller as well as the rotary joint. Run-out and axial tension will lead to malfunctions of the rotary joint.
- For smooth operation of rotary joint ensure concentricity and minimum run-out tolerance at roller or intermediate flange.

#### 3.1 Overview - preparing mounting

- 1 Series DQ rotary joint
- 2 Flange, e.g. KF...
- 3 Inner ring IR...with KF if flange is used
- 4 <sup>1)</sup> Sealing element (e.g. flat packing)
- 5a/ <sup>2)</sup> Screw connection for supply / alternative: hose for supply
- 5b <sup>2)</sup> alternative: hose for return
- 6a/ <sup>2)</sup> Screw connection for return / alternative: hose for return
- 6b <sup>2)</sup> alternative: hose for return
- 7 Metal hose E...CC
- 8 Flat packing
- 9 <sup>2)</sup> Cooling unit KE...
- 10 <sup>2) 3)</sup> Quench oil distributor

- <sup>1)</sup> Depending on the roller design, other sealing elements may be used.
- <sup>2)</sup> Not required for DQL!
- <sup>3)</sup> Only if several rotary joints are connected to a single cooling unit.

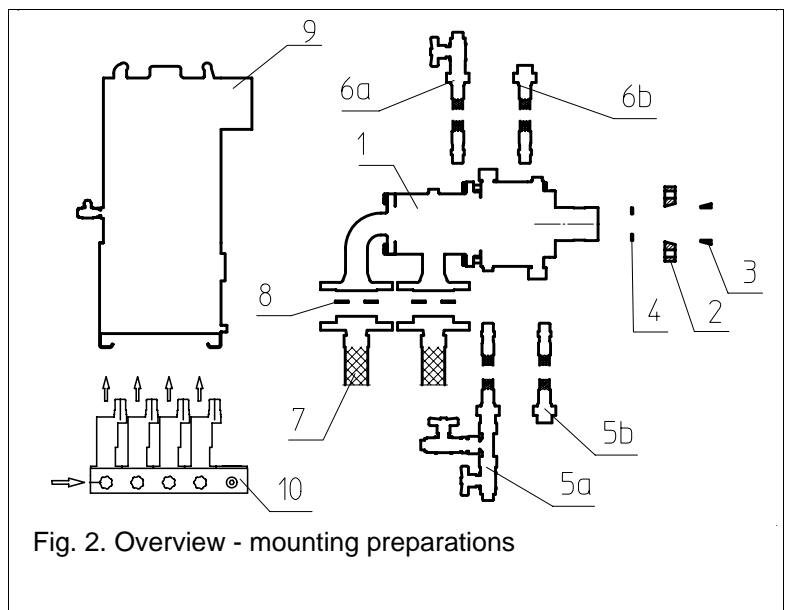


Fig. 2. Overview - mounting preparations

# Operating Instructions Maier Rotary Joints

## Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

### 3.2 Cooling oil circuit

If you use a Maier cooling unit, observe the information provided in the corresponding operating instructions. In all other cases, observe the information provided in the operating instructions of the corresponding manufacturer. The cooling oil circuit must meet the following requirements:

- Place the cooling unit in such a way as to assure that
  - the cooling oil pipes have a maximum total length of 25 m (please contact the manufacturer if this is impossible)
  - the operating side is easily accessible
  - contact with hot surfaces that are not insulated is impossible
  - escaping oil is collected (e.g. by means of a collecting vat)
- If several rotary joints are connected to a single cooling unit, you must connect all rotary joints in parallel and install an oil distributor. Refer to the sheet "Data and Dimensions" for information on the required oil flow.
- The following operation parameters should be monitored and not be exceeded to assure proper operation of the rotary joint:
  - Min. cooling oil flow V1 according to the sheet "Data and Dimensions" (remedy problems within 10 minutes! If this is impossible, immediately shut down the cooling unit and the rotary joint in order to prevent damage to the rotary joint and prevent blocking). Integrate the limit value transducer into the oil distributor, if possible, and monitor each rotary joint separately.
  - Max. cooling oil temperature (remedy problems within 30 minutes! If this is impossible, immediately shut down the cooling unit and the rotary joint in order to prevent damage to the rotary joint and prevent blocking). Monitor the temperature at a central point in the cooling unit.
  - Filtering of the cooling oil (remedy problems within 3 days! If this is impossible, immediately shut down the cooling unit and the rotary joint in order to prevent damage to the rotary joint and prevent blocking).
  - Min. and max. cooling oil level. This enables conclusions concerning the status of the rotary joint:
    - Min. level = Primary seal with internal leak or secondary seal with external leak
    - Max. level = Primary seal with internal leak.

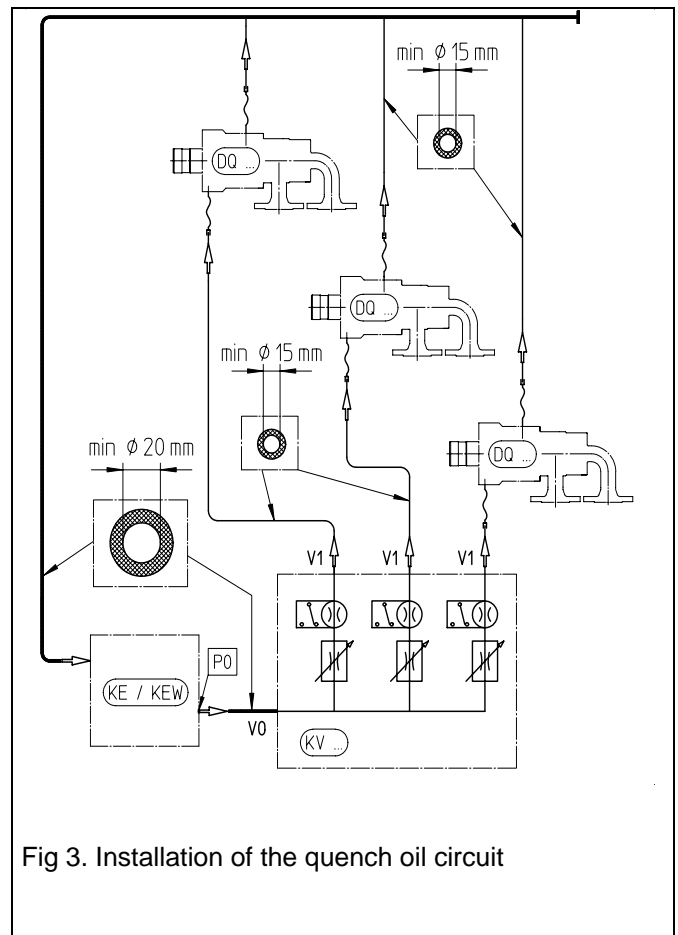


Fig 3. Installation of the quench oil circuit

# Operating Instructions Maier Rotary Joints

## Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

### 4 Transportation and storage

- Use suitable lifting gear to transport rotary joints weighing more than 25 kg. Use a suitable ring screw (see sheet "Data and Dimensions").
- The rotary joints may only be stored in the original package.
- Make sure the storage conditions specified in the sheet "Data and Spare Parts" are met.
- If the rotary joint is shut down for a longer period of time or stored, protect it against corrosion. We recommend filling the complete bearing chamber with clean oil (e.g. thermal oil or corrosion protection oil) via the cooling oil connections.
- If the rotary joint itself or the facility in which the rotary joint is installed is to be preserved, make sure the preservation agent and the seals of the rotary joint are compatible.

### 5 Mounting

#### 5.1 Adapting the hot oil connections

Connections B / C can be rotated in 45° increments. To do so:

- Loosen the fastening screws.
- Turn the housing parts to the desired position.
- Make sure not to damage flat packings 360 and 370!

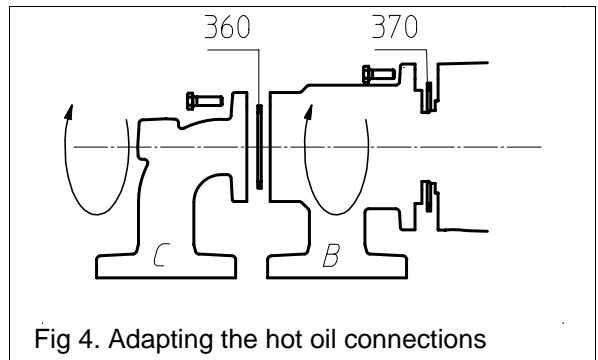


Fig 4. Adapting the hot oil connections

#### 5.2 Adapting the cooling oil connections - DQ, DQT, DQTX only

The cooling oil inlet "IN" may be in any position in the A-A plane.

In the B-B plane, the cooling outlet must always be at the highest point. If not, you must bleed the system every time you start it. Changing the oil outlet "OUT":

- Change the position of plug 265 in increments of 4 x 90°. This assures sufficient safety for bleeding, even if the rotary joint is in an intermediate position.  
In case of bearing monitoring with vibration pickup: Interchange sensor plug "S" with M6x1 blind hole with any other plug 265 at planes A-A or B-B.

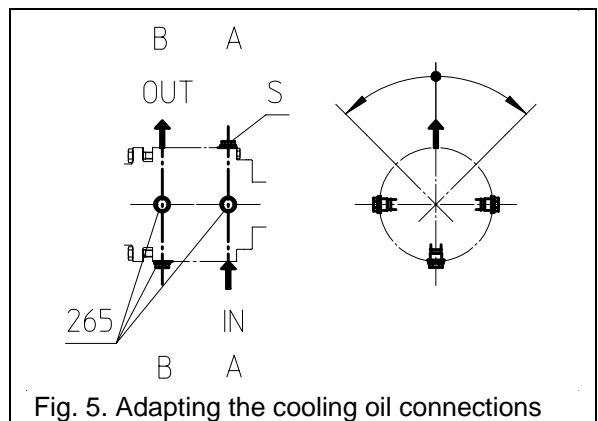


Fig 5. Adapting the cooling oil connections

#### 5.3 Adapting the leakage connection - DQL only

Series DQL rotary joints feature a relief connection (4 connections with G thread) for leakage at the seal in plane B-B. Leakage should be discharged from the rotary joint to a safe point:

- If the rotary joint is mounted *horizontally*, use the bottom housing connection to discharge leakage. Ensure a continuous hydraulic slope so that the leakage may be discharged without backdraft. It may be necessary to interchange the closing plugs.
- If the rotary joint is mounted *vertically*, you may use any housing connection.

#### 5.4 Adapting the anti-rotation fork

- Support the rotary joint with anti-rotation fork 180. Adapt the position in increments of  $8 \times 45^\circ$ .
- Dismount clamping screws 410 and 420 and reposition them.
- Always make sure that the housing parts are tightly held by at least two screws – danger of tension and damage to the seal!

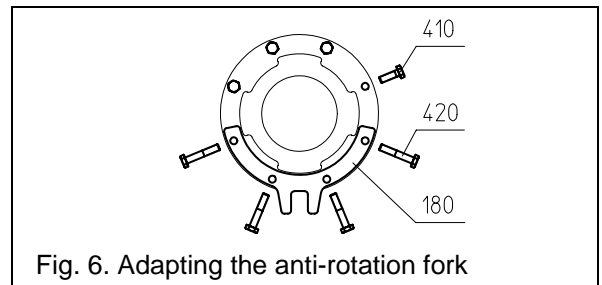


Fig. 6. Adapting the anti-rotation fork



## Operating Instructions Maier Rotary Joints

### Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

#### 5.5 Mounting the rotary joint to the roller

- Mount rotary joint 1 to roller W:  
as per drawing A with K flange and inner ring 3  
as per drawing B with screwed flange 4 or  
as per drawing C with fixed flange 5
- Seal with O ring 6, flat packing 7 or another suitable  
sealing element.
- Fasten the rotary joint with screw 8 or stud bolt 9 and  
nut 10.
- Clean sealing surfaces DF, apply mounting paste and  
place the sealing element into roller W.  
Recommended material for flat packing:  
pure graphite with metal insert.
- Rotary joint with inner pipe: screw or plug the inner pipe  
into the rotary joint, depending on the version. For easier  
mounting, it is recommended to loosen the elbow at  
connection C. Do not damage the flat packing!
- Mount K flange 2 with screws over rotor 80 and place  
inner ring 3 into rotor groove or screw flange 4 to rotor  
90. Mount stud bolts 9.
- Lift the rotary joint at the suspension point with a ring  
screw and insert it into the centering unit of the roller.  
Versions with inner pipe: the inner pipe must be centered  
with reference to the rotary joint and the roller. If  
you encounter resistance, check for correct position.  
Run-out and axial tension cause malfunctions of the ro-  
tary joint.
- Mount screws 8 and nuts 10. Maximum admissible  
torque as per "Specifications and Spare parts".

#### **Attention:**

- When sealing with flat packing, do not fully tighten  
the screws until you have aligned the rotary joint  
as per section 5.2!
- Assure the minimum distance MA - otherwise  
leakage will occur at the sealing element and the  
rotary joint and the inner pipe will be damaged:  
drawings A and B:  $MA \geq 1 \text{ mm}$   
drawing C :  $MA = 0 \text{ mm}$

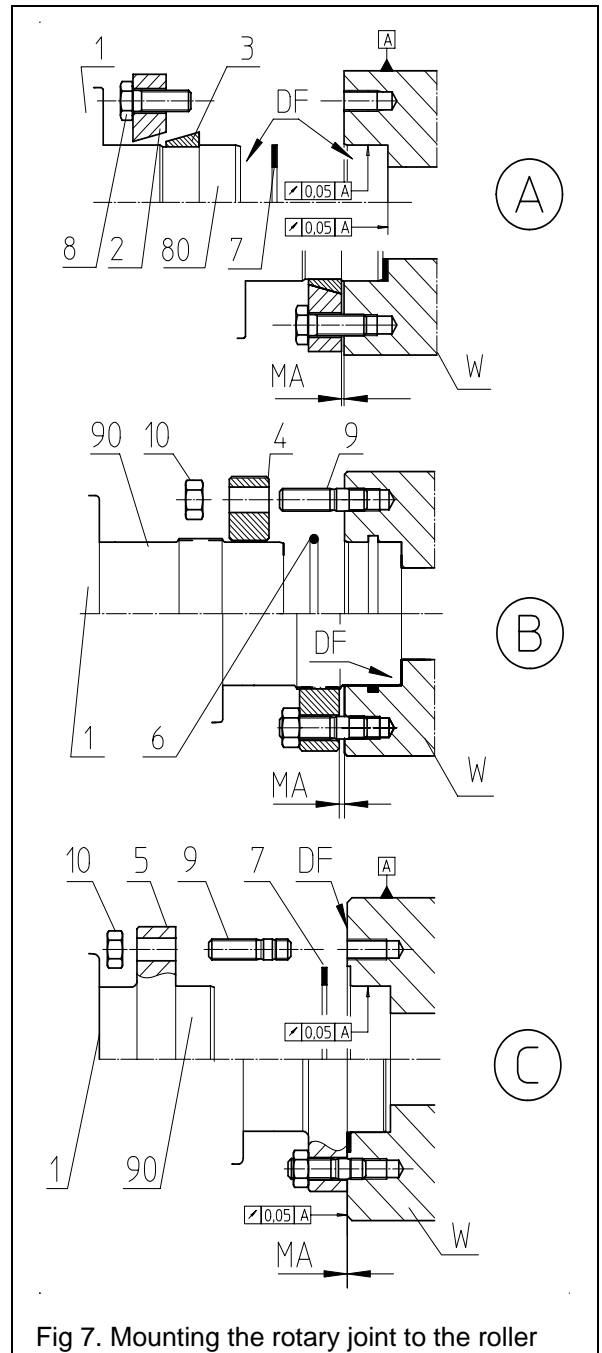


Fig 7. Mounting the rotary joint to the roller



**Note!**  
For smooth operation of rotary joint ensure concentricity and minimum run-out tolerance of roller.

# Operating Instructions Maier Rotary Joints

## Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

### 5.6 Aligning the rotary joint

- Place dial gauge "M" from the idle machine frame "MG" onto the rotary joint.
- Rotate roller "W" until the dial gauge is at the bottom dead center "UT". Mark the pointer position.
- Rotate roller until you reach the upper dead center "OT".
- Tighten the bottom screws "Su" until the dial gauge is in the center position.
- Repeat this alignment process until you reach the concentricity tolerance specified in the table.
- Tighten the screws with the admissible torque as per "Specifications and Spare"!

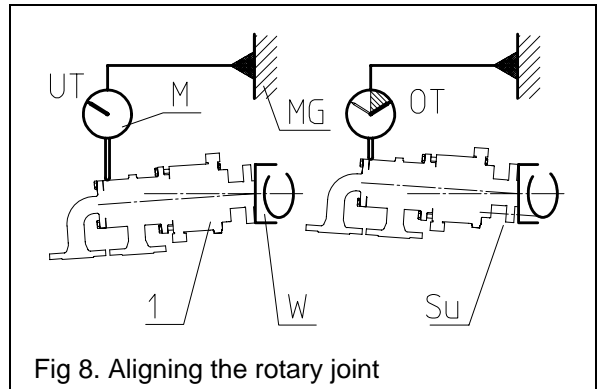
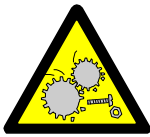


Fig 8. Aligning the rotary joint

Admissible concentricity tolerance

DN	n (min <sup>-1</sup> / rpm)		
	≤ 100	≤ 400	> 400
25-50	±0.25 mm		
65-150	±0.1 mm		

### 5.7 Connecting the rotary joint



#### Attention!

**Overheating causes damage.**

- ⇒ **Never operate DQ, DQT, DQTX rotary joints without cooling!**
- ⇒ **Never operate the unit beyond the application data specified in the sheet "Data and Dimensions"!**
- ⇒ **The rotary joints must never run dry!**

- Mount anti-rotation device 30 of the rotary joint housing. Mount torque monitor or vibration pickup for bearing monitoring at sensor connection "S".
- Connect housing flanges "B" and "C" for thermal oil.
- **DQ, DQT, DQTX:**
  - Connect the cooling oil circuit as per section 3.2 and according to the mounting instructions for the cooling unit.
  - Connect the cooling oil supply to connection "QA" and the cooling oil return to connection "QE"
- **DQL:** connect the leakage boring.
  - Filter the thermal oil since the service life of the seal depends to a large degree on the concentration of solid matter in the oil.

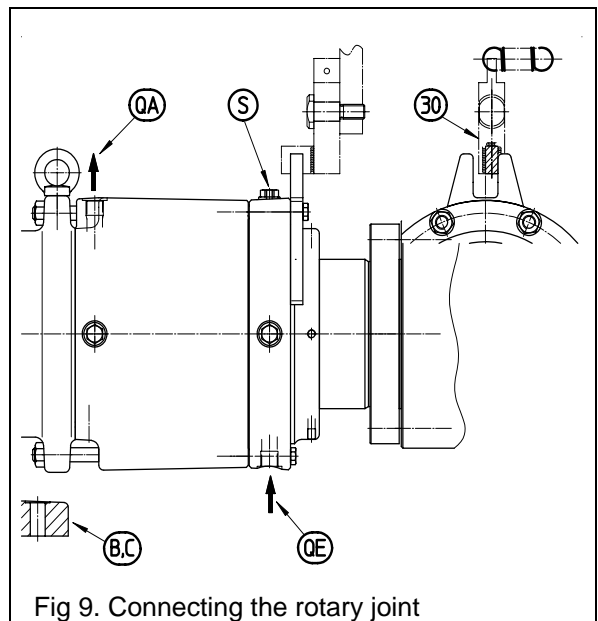


Fig 9. Connecting the rotary joint



Note!

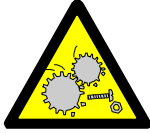
Refer to the sheet "Data and Dimensions" for information on the lubricants to be used. Observe the notes in section 3!

# Operating Instructions Maier Rotary Joints

## Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

### 6 Operation



**Attention!**

**Danger of damage if the rotary joint is not operated as per instructions.**

- ⇒ **Never operate the rotary joint beyond the application data specified in the sheet "Data and Spare Parts"!**
- ⇒ **Observe the limitations specified in section 1.1 on page 2!**

#### 6.1 Observe and check during operation

Check the following during operation:

- Check for centric arrangement of the rotor with reference to the roller cog. The radial deflection at the housing in the area of the elbow must not exceed 0.1 mm. Place a dial gauge from the idle machine frame onto the rotary joint housing to check.
- Check the quench oil circuit for leaks and effectiveness. Also check the volume flow monitoring system for the circuit (cooling unit or oil distributor).
- Check the cooling unit for effectiveness according to the separate instructions.
- Check the quality of the thermal oil and the quench oil.

#### 6.2 Trouble shooting

Problem	Reason	Repair
Cooling circuit does not operate properly	Cooling medium low, leakage, failure of the pump or the quench oil cooling.	Check the level and flow. The problem must be fixed within 30 minutes in order to prevent damage to the rotary joint! Refer to the information in the instructions for the KE/KEW cooling unit.



# Operating Instructions Maier Rotary Joints

## Series DQ

B-DQ\_E-Version 0 – Oct. 14, 2004

### 7 Maintenance

#### 7.1 Safety during maintenance

Only staff that has read and fully understood these operating instructions and that is fully aware of the dangers resulting from the rotary joint as well as the appropriate safety precautions may work with Maier rotary joints. Such staff must have at least the knowledge of a trained locksmith or industrial mechanic who has experience with pressurized components.

Perform work on the rotary joint only when the machine/system is idle.

Allow the rotary joint to cool down before you take up work or wear safety equipment to protect against the heat.

Always wear safety glasses when performing work on the rotary joint to protect against escaping medium.

Use only genuine or Maier-approved spare parts (standard norm parts). If you use other parts, this may have adverse effects on the safety of the rotary joint. We shall not be liable for any damage whatsoever resulting from the use of such non-approved or non-genuine parts.

Maier offers on site specialist service. We can also train your service staff - just get in touch with us!

If you have to remove protective equipment to perform the work, refit such equipment when you are done and check it for proper operation.

Make sure to properly tighten all screws (see sheet "Data and Dimensions").

Always observe the safety information in chapter 1 on page 2.

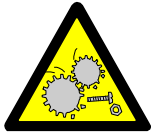
#### 7.2 Maintenance plan

Interval	To be done	Explanations
According to sheet "Data and Dimensions"	Lubricate DQL rotary joints, depending on the operating temperature.	Only use the lubricants listed in the sheet "Data and Dimensions"! Lubricant volumes depend on the nominal diameters of the rotary joints (see sheet "Data and Dimensions").
8 weeks	Check the quench oil and thermal oil circuits as well as the connections for leaks.	
	Check the relief connections of the rotary joint for leaks.	Slowly increasing leakage indicates seal failure.
	Check the quality of the quench oil and the thermal oil and record the values.	
	Check the lubrication oil unit.	See separate instructions KE/KEW.
	Check the quench oil level.	Increasing levels indicate leaks in the quench supply system, increasing levels indicate leaks at the mechanical seal.
Every 24 months	Check and replace all bearings.	By Maier customer service

## Data and dimension sheet, spare parts

### DQB 2150 K-10

S-DQB2150K-10\_en -Version 0 – 30.06.05



#### Caution!

Improper use might damage the rotary joint!

- ⇒ The technical specifications in the data and dimension sheet are binding.
- ⇒ Never exceed the specified limit values!
- ⇒ Use only approved media and lubricants!
- ⇒ Christian Maier GmbH & Co. KG shall not be held liable for damages caused by non-compliance with the specified limits or the use of unsuitable medial or lubricants!

#### Operating data

Design		B2
Nominal diameter DN [mm]		150
Accessory equipment cooling and lubrication		KE / KEW
Medium		Thermal oil (mineral or synthetic), filtered through 0,25 mm mesh size
Temperature	max. °C max. °F	300 572
Nom. pressure PN	max. bar max. psi	10 145
Speed	max. rpm	660

Avoid combination of maximum values.

#### Transport and storage

Storage temp.	15 °C to 30 °C
Air humidity	65 %
Preservation	none; if necessary, test compatibility with sealants
<b>Lifting tackle</b>	
Nominal diameter	Thread diameter for eyebolt
25 - 40	n/a
50 - 65	M 10
80 - 200	M 12

#### Torque for securing screws

Size	Torque (Nm) at friction in thread and bearing face with $\mu = 0.14$ and strength class ...	
	5.6	8.8
M 6	3.8	8.6
M 8	9.1	21
M 10	18	42
M 12	31	72
M 16	76	174
M 20	148	340
M 24	255	580
M 30	510	1160

For strength class see identification of the fixture.  
Specifications for other materials available on request.



## Data and dimension sheet, spare parts

### DQB 2150 K-10

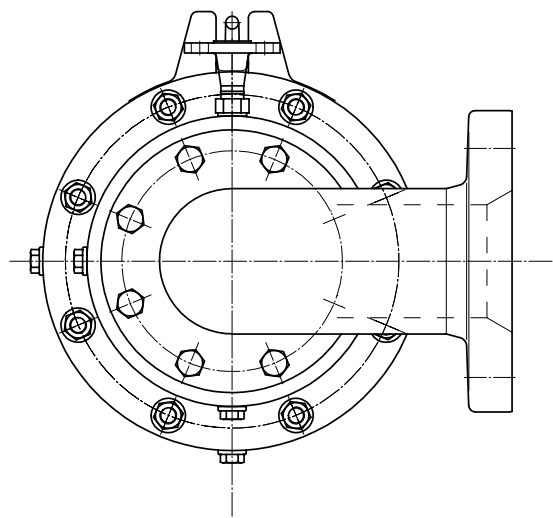
S-DQB2150K-10\_en -Version 0 – 30.06.05

#### Bearing lubrication and cooling

<b>Lubricant</b>	Preferably same oil as used in thermal oil circuit. Quality requirements: - Clean, free of solids - Min. viscosity 15 mm <sup>2</sup> /s at 40 °C - Min. thermal stability 150 °C	
<b>Volume</b>	Q oil (V1) [l/min]	≥ 8
	*1 The oil flow per rotary joint must be distributed evenly by means of the oil distributors. The specified minimum value must be adhered to. For more information, see operating manual of the cooling unit.	
<b>Relubrication interval</b>	Rotary joints of the above design are lubricated by the circulating cooling oil and are maintenance-free, unless a fault occurs in the cooling unit.	
<b>Max. permissible lubricant inlet temperature T<sub>max</sub></b>	T <sub>max</sub> (°C)	80

Ansicht X ; M 1:5

Einbaulage



um 8x45° schwenkbar  
adjustment possible by 8x45°

Lage der Bohrungen kann nicht bestimmt werden!  
the position of the bores can not determined!

um 8x45° schwenkbar  
adjustment possible by 8x45°

Kühlöl-Rücklauf  
cooling oil return flow  
(stets oben / always on the top)

Entlüftung / air release  
Flansch / flange  
C 15x21,3 DIN2633 - PN16

X →

← Z

M6x10 Anschluß für Schwingungssensor  
M6x10 connection for vibration sensor

260

40

∅ 105

∅ 132

∅ 210, z=8

∅ 280

315

90

192

∅ 105 G7  
e8

∅ 352

G1/2; z=4x90°

G1/2; z=4x90°

720

200

600

152

45

50

← Z

160

20

Entlastungsanschluß G1/8  
drain port G1/8

∅ 200 H8  
h8

∅ 14,6

∅ 204 G7  
h8

Kühlöl-Vorlauf in dieser Ebene.  
Empfohlener Anschluß unten!  
Entsprechende Verschlussschr. entfernen.  
cooling oil inlet at this level,  
recommended connection on the bottom!  
remove corresponding locking screw

Flansch nach  
flange according to  
DN 125-DIN2633-PN 16  
um 90° gedreht gezeichnet  
drawn turned by 90°

Ansicht Z

um 8x45° schwenkbar  
adjustment possible by 8x45°

232

30

55

Str.-Pos	Sachnummer	Str.-Menge	ME	Benennung 1	Benennung 2	Bemerk.
				Freimaßtoleranz mittel nach DIN 7168		
				zul. arithm. Mittenrauhwert Ra in µm DIN ISO 1302 Reihe 2	Prüfplan-Nr.	Maßstab
				12,5 / 3,2 / 0,8 / 0,1	Freigabestatus freigegeben	1:2,5
				Datum Name	Benennung	
				Bearb. 28.01.02 mue	Dichtkopf	
				Gepr. 29.01.02 ewe	DQB 2150 K-10	
				Norm 29.01.02 ewe		
					Zeichn.-Nr. MB 8053	Bl.
					Art.-Nr. 1110681-010	Entstaus MB 7156
Zust.	Änderung	Datum	Name		Ersfür	Ersdurch

maier  
industrietechnik









## Data and dimension sheet, spare parts

### DQB 2150 K-10

S-DQB2150K-10\_en -Version 0 – 30.06.05

TEILELISTE / PARTS LIST

VERSION : 30.06.2005

DICHTKOPF / ROTARY JOINT	DQB 2150 K-10
ART.NR. / ORDER NO.	1110681-010
ZEICHNG.NR. / DRAWING NO.	MB 8058

E = ERSATZTEIL / SPARE PART

V = VERSCHLEIßTEIL / WEARING PART

POS. / ITEM	ART. NR. / ORDER NO.	MENGE / QTY	BENENNUNG / DESIGNATION	E / V
30	1110702	1 St / unit	HOUSING NO.3 DQ150	
40	1110709	1 St / unit	BEARING HOUSING NO. 4 DQ150	
50	1110624-116	1 St / unit	VENT PORT COMPLETE	
60	1110719	1 St / unit	ROTOR BUSH NO. 6 DQ150	
80	1110715	1 St / unit	ROTOR NO. 8 DQ150	
100	3511196-011	1 St / unit	METAL BELLOWS FIXT. DQ150	V
102	1110727-126	1 St / unit	STATIONARY SEAL DQ150-126	V
110	1110726	1 St / unit	STATIONARY SEAL PACK COMPLETE DQ 150	
110-10	3511411-041	1 St / unit	STATIONARY SEAL Q150-41	V
110-20	1110728-153	1 St / unit	FACE SEAL RING DQ150-153	V
110-30	1110726-154	1 St / unit	SUPPORT RING DQ150-154	
110-40	3511551	8 St / unit	COMPRESSION SPRING 2 DQ150	E
110-50	3511727-004	1 St / unit	O-RING 221.62X5.33	V
110-60	3511726-004	1 St / unit	O-RING 208.92X5.33	V
120	1110735	1 St / unit	COVER NO. 12 DQ150	
140	1110731-054	1 St / unit	SUPPORT DISK NO. 14 DQ150	
150	1110739	1 St / unit	ELBOW NO. 15 DQ150	
160	1110723	1 St / unit	DEFLECTOR SLEEVE NO. 16 DQ150	
180	1110737	1 St / unit	ANTI-ROTATION FORK NO. 18 DQ150	
190	3510491	1 St / unit	SLIDE BUSH MB16080DU	V
200	3510024-250	1 St / unit	GROOVED BALL BEARING 190/290/64	E
202	3510023-250	1 St / unit	GROOVED BALL BEARING190/260/45	E
204	1110733	1 St / unit	DISTANCE RING NO. 20.4 DQ150	
206	1110736	1 St / unit	SPACER NO. 20.6 DQ150	
220	1110732-056	1 St / unit	SEAL PROTECTOR DISK NO. 22 DQ150	
240	1110699-138	1 St / unit	GROOVED NUT NO. 24 DQ150	
260	3501237	1 St / unit	CIRCLIP 150X4 DIN472-ST	
270	3511557	20 St / unit	COMPRESSION SPRING D-234B-01 - FDST	E
280	3500871	1 St / unit	RETAINING RING SB 230-FDST	
290	3500896	1 St / unit	LOCKING PIN 8X32 DIN1473-ST	
300	3500922	1 St / unit	LOCKING PIN 5X25 DIN1474-ST	
320	3500664	4 St / unit	SCREW PLUG G 1/8 DIN906-ST	
330	3500655	8 St / unit	SCREW PLUG G1/2 DIN910-5.8	
332	3500655-158	1 St / unit	SENSOR PLUG DQ65-158	
350	3511759-001	1 St / unit	O-RING 278.77X5.33	V



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POS. / ITEM	ART. NR. / ORDER NO.	MENGE / QTY		BENENNUNG / DESIGNATION	E / V
360	1110743-116	1	St / unit	GASKET 1 DQ150-116	V
370	3512255	1	St / unit	GASKET NO. 22 DA80	V
380	3502115-001	10	St / unit	SEAL RING 21X26X1.5 DIN7603-CU	V
390	3500875	1	St / unit	CIRCLIP SB 260-FDST	
400	3500173-007	4	St / unit	HEXAGON SCREW M12X80 DIN931-5.6	
410	3500164-007	4	St / unit	HEXAGON SCREW M12X60 DIN931-5.6	
420	3500271-007	8	St / unit	STUD BOLT M16X80 DIN939-5.6	
430	3500204-007	8	St / unit	HEXAGON SCREW M16X60 DIN933-5.6	
450	3500287-007	8	St / unit	HEXAGON NUT M16 DIN934-5	
470	3500668	1	St / unit	EYEBOLT M12 DIN580-C15	

For queries and orders, please indicate the exact rotary joint type code!