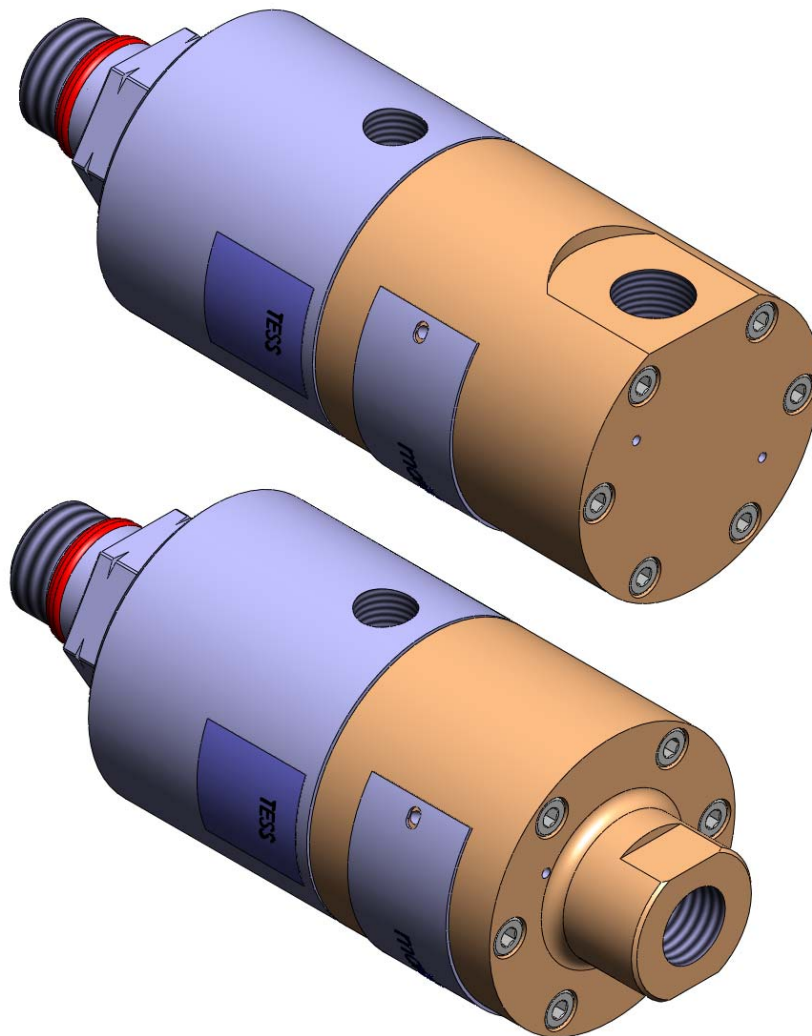


Operating Instructions for Maier Rotary Unions

Series KL / KLT





Preface



Keep this manual for future reference.

Editor

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Section	Contents	Designation
1	General part of the operating instructions	
2	Specifications and spare parts	



B General part of the operating instructions for Maier Rotary Unions KL/KLT

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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 the 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 the designation S)
This section provides product-specific data

The operators must read and fully understand this manual and observe all instructions it contains. Exclusion of liability: We shall not be responsible in any way for damages and interruptions or any type of consequences whatsoever resulting from the failure to read and/or observe the instructions contained in this manual.

Read chapter 3 and the specific safety instructions in the individual chapters with particular care.

We reserve the right to technical modifications, i.e. the components may actually differ from the information given in this manual to the extent to which such modifications are required to improve the rotary union or its accessories.

1.2 Explanation of symbols

Symbol	Used for	Explanation
•	List	List of facts or instructions. No specific sequence required.
1.	Instructions consisting of several individual steps	Instructions consisting of several steps 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 unions are high-precision devices which may only be used to connect pressurized pipes to rotating pressurized systems. Typical examples of such rotating pressurized systems are motor spindles or tool systems through the inside of which flow liquids or air in order to cool them, lubricate them or actuate or control them hydraulically or pneumatically. Series KL rotary unions are designed for fluids such as cutting fluids or multi-purpose oils, series KLT rotary unions for cutting fluids, multi-purpose oils, aerosols or compressed air. Other fluids are possible; please contact the manufacturer. Please refer to the section "Specifications and Spare Parts" for approved fluids and their qualities and limits; this information must be observed in the application.

Never modify the rotary union as this may cause hazards. Install, operate and maintain the rotary union only as described in these operating instructions. Christian Maier GmbH & Co. KG shall not be liable for any damage and interruption whatsoever caused by failure to adhere to the operating instructions.

Always comply with all national and local regulations applicable at the installation site as well as all regulations concerning the prevention of accidents.

Use only genuine spare parts or standard norm parts explicitly approved by Christian Maier GmbH & Co. KG for repairs. If you use other parts, this may have adverse effects on the safety of the unit.

2.2 Reasonably foreseeable misuse

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

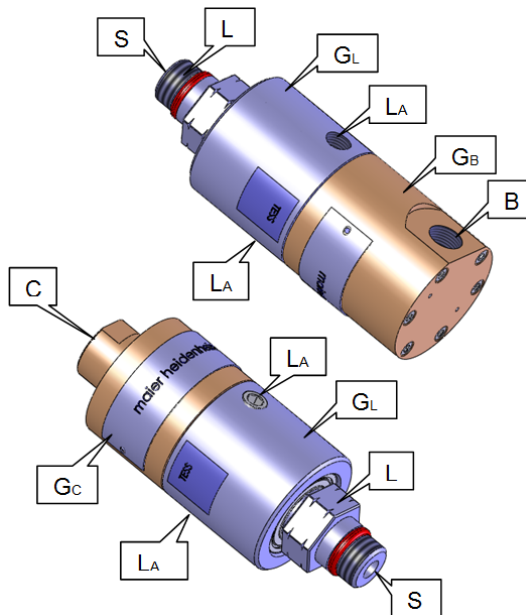
Reasonably foreseeable misuse includes, but is not limited to:

- failure to adhere to application data
- failure to adhere to fluid specifications
- failure to adhere to maintenance intervals
- failure to replace wearing parts
- failure to perform maintenance work
- maintenance work performed with errors
- additional components mounted and conversions without written approval
- use of spare parts other than genuine spare parts

B Operating Instructions for Rotary Unions KL / KLT

2. Product description

2.3 Components



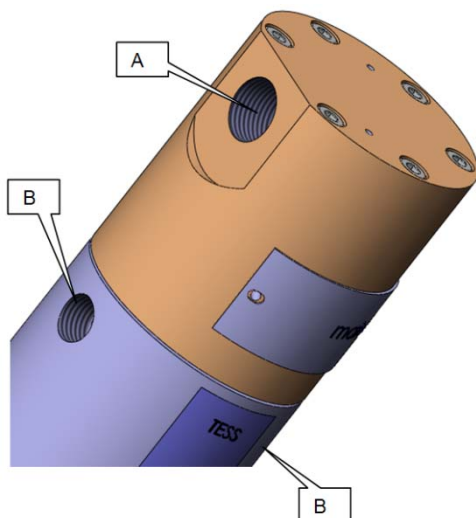
B-1

- [B] Housing connections for the fluid radial
- [C] Housing connections for the fluid axial
- [GB] Housing with connection radial (usually stationary)
- [Gc] Housing with connection axial (usually stationary)
- [GL] Bearing housing (usually stationary)
- [L] Rotor (usually rotating)
- [S] Outlet fluid
- [LA] Leakage connection

2.4 Function

Maier rotary unions are high-precision devices which may only be used to connect pressurized pipes to rotating pressurized systems. Typical examples of such rotating pressurized systems are motor spindles or tool systems through the inside of which flow liquids or air in order to cool them, lubricate them or actuate or control them hydraulically or pneumatically.

The connection to the stationary pressure system (housing connection) is obtained via the stationary part of the rotary union – the housing. Depending on the version, the following types can be distinguished:

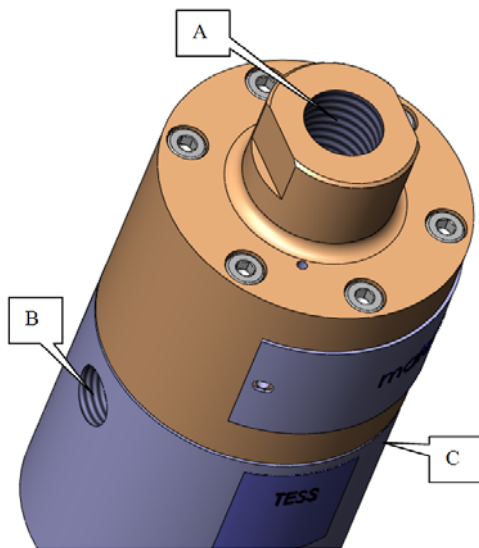


B-2

- **Version B / radial connection:** housing with a radial connection for supplying or removing the fluid to or from the rotating pressure system. The radial version features a fluid connection [A] and two leakage connections [B] offset by 180°. One of these leakage connections is factory-closed with a screw plug.
- The two possible leakage connections ensure that the leakage connection used always points down in the case of horizontal installation. This is a prerequisite for trouble-free operation. For this reason, you must always use the bottom leakage connection if the unit is installed horizontally. Always use both connections in the case of tilting spindles and if you are unsure as to hose routing.

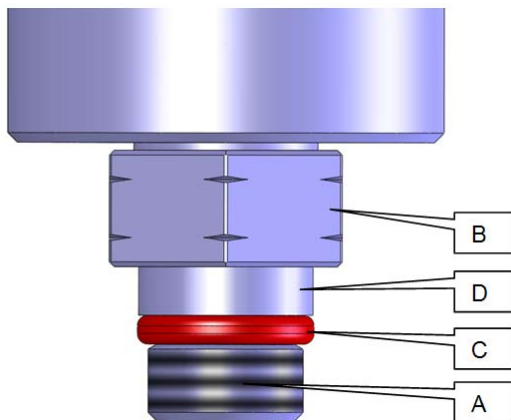
B Operating Instructions for Rotary Unions KL / KLT

2. Product description



B-3

- **Version C / axial connection:** housing with an axial connection for supplying or removing the fluid to or from the rotating pressure system.
- The fluid connection [A] is axial. There are no deflections of the flow of the fluid. Undercuts and changing diameters are avoided. Due to the above measures, the rotary union is perfectly suited for minimum quantity lubrication, externally mixed.
- [B] shows the leakage connection; as in the case of the radial version, there is a second leakage connection [C] which is closed with a screw plug.



B-4

- **Rotor connection:** The connection to the rotating pressurized system is made by the rotating part of the rotary union – the rotor.
- Fig. 4 shows the part of the rotor protruding over the bearing housing.
- It is equipped with a thread [A] by means of which the rotor is screwed to the spindle. After the thread has been tightened, the rotor has a hex bolt [B].
- To seal the connection, an O ring [C] is mounted right behind the thread.
- To obtain a defined seat of the rotary union on the spindle, the rotor also has a fitting surface [D] for centering.
- In order to keep the rotor from coming loose from the spindle, always ensure correct direction of rotation / correct thread. Only rotors with left-hand thread have notches at the hex bolt as shown in [B].
- The hole through which the fluid flows is located in the inside of the rotor.

INFORMATION



Please refer to our catalog and the corresponding outline drawing in the section "Specifications and Spare Parts" for further information.



3. Safety

3.1 Introduction

The rotary union was designed and built according to the latest technology and complies with the pertinent safety regulations. However, the rotary union may still cause hazards if it is not used as intended or if it used by untrained staff or in an incorrect way.

Never tamper with the rotary union or modify it in any way as this may adversely affect the safety and the performance of the rotary joint. We shall not be liable for any damages resulting from unauthorized modification of the rotary joint.

The owner/operator of the rotary joint must 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.

3.2 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 all the pertinent regulations and guidelines concerning workplace safety and prevention of accidents.
- Use only flexible elements for housing connections. Do not apply forces to the housing via the connections.
- The hose connection also serves as a torque support. When the bearings block, the hose connection can burst. Caution: Fluid can escape under high pressure and at high temperatures! Provide a protection unit or a cover to protect against this hazard.
- Only perform work on the rotary union when the machine/system is at a standstill and the pressure released.
- Only operate the rotary union if it is in perfect technical condition. Only use the rotary joint according to the instructions and specifications; never operate the unit outside of the framework of the specifications and performance data indicated. Be aware of all pertinent safety and danger aspects when operating the rotary joint. Immediately repair any malfunctions or problems or have such malfunctions or problems repaired as they may interfere with the safety of the rotary joint!
- The service life of counter-rotating parts is limited. Therefore, perform preventive repair of all seals and bearings as per section 8.2!
- If you need to dismantle safety devices for repair or maintenance of the rotary union, you must refit such devices immediately upon completion of the work and check the proper function of the devices!
- Retighten all screw connections that you may have loosened for maintenance or repair work! Refer to the section "Specifications and Spare Parts" for information on the tightening torques.

INFORMATION



Refer to the section "Specifications and Spare Parts" for additional information.

B Operating Instructions for Rotary Unions KL / KLT

3. Safety

3.3 Structure of the safety messages

3.3.1 Signal words

 **DANGER**



Immediately imminent danger. Failure to observe the information will result in death or severe injuries.

 **WARNING**



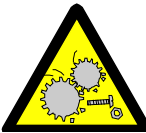
Possibly imminent danger! Failure to observe the information can result in death or severe injuries.

 **CAUTION!**



Possibly imminent danger! Failure to observe the information may result in minor injuries.

NOTE



Possibly imminent danger! Failure to observe the information may result in damage to property.

INFORMATION



Provides additional information

B Operating Instructions for Rotary Unions KL / KLT

3. Safety

3.3.2 Pictograms

**Warning: general hazards**

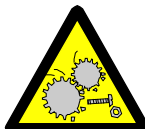
This warning pictogram highlights activities that involve several hazards.

**Warning: hot surfaces**

This warning pictogram highlights activities that involve hazards caused by hot surfaces.

**Warning: crushing hazard**

This warning pictogram highlights activities that involve hazards caused by rotating machine parts.

**Warning: equipment damage**

This warning pictogram highlights activities that involve damage to the rotary unions caused by incorrect operation.

3.4 Authorized staff

Only staff that has read and fully understood these operating instructions and that is fully aware of the dangers resulting from the unit 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.

Each person having to do with the installation, mounting, dismantling, commissioning, maintenance and repair of the rotary union or any other activities concerning the rotary union must have read and fully understood the operating instructions (and, in particular, all the safety messages) before taking up such activities. It is recommended that the owner of the rotary joint have each person confirm this in writing.

3.5 Risk assessment and residual risks

Rotary unions are machine components that can be used in a large variety of machines and system. These products are not subject to the Machinery Directive 2006/42/EC – hazards caused by this product are treated by compliance with the pertinent directive 97/23/EC (Pressure Equipment Directive). Directive 94/9/EC (Explosion Protection Directive) additionally applies to "ATEX" certified rotary unions.

After installation of our rotary unions 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 should be avoided by design measures, if possible.

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 in the system / machine:

- If hot parts are touched or if hot or hazardous fluids escape under high pressure or if rotating parts draw in persons, this may result in severe burns, cuts or crushing.
 - Possible measures: Mount a protective cover to the rotary union that prevents direct contact with hot parts, safely retains escaping fluid and avoids contact with rotating parts.
 - If a hood cannot be mounted, other suitable protective measures must be taken. Always use the housing connections provided for the safe discharge of leaking fluid.
- If the rotary union blocks and rotates along with the spindle, hoses can be torn off and hot or hazardous fluids may escape under high pressure.
 - Always observe the design and mounting and operation information in chapter 5.
 - Ensure that the unit is regularly maintained as per chapter 8.

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

Dangers



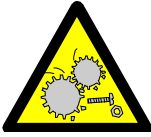
- Warning!
If you touch hot parts or come into contact with liquids escaping under high pressure, this may result in severe injuries and dangerous burns.
- ⇒ Mount a protective cover to the rotary union that prevents direct contact and safely retains escaping fluid.



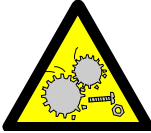
- Warning!
If the rotary joint union and rotates along with the rotating tool, the hoses may be torn off so that liquids can escape under high pressure.
- ⇒ Always observe the design and mounting information in chapter 5.
Monitor the bearings of the rotary union by means of a vibration pickup.
Ensure that the unit is regularly maintained as per chapter 8

B Operating Instructions for Rotary Unions KL / KLT

3. Safety



- Caution!
Damage to components caused by vibration and heat expansion.
⇒ Use only flexible hoses to connect the unit!



- Caution!
Danger of damage if the rotary joint is not used as intended.
⇒ The specifications listed in this document are binding.
⇒ Never operate the unit beyond the application data specified!
⇒ Use only approved fluids and lubricants!
⇒ Christian Maier GmbH & Co. KG shall not be liable for any damage whatsoever caused by failure to adhere to limit values or use of unsuitable fluids and lubricants!



4. Storage

Storage

- It is recommended to store the rotary union in the protective package in which it was shipped.
- In the original packages, Maier rotary joints are not suited for a storage time of more than 6 months.
- In the case of extended shutdown or storage periods of rotary unions, it is recommended to use suitable corrosion protection film 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 (59°F) und 30°C (86°F)).
- After a storage time of more than approx. 3 years or when the package has been damaged or the unit has been subjected to shocks, the rotary union must be checked in the factory or the nearest service center!
- If you want to preserve complete system components including the rotary union, make sure the corrosion protection measures are compatible with the materials and sealing elements used! Risk of chemical reactions and accumulations at sealing and bearing elements.
- After longer storage periods, verify that the rotary union can be easily rotated. Due to the closed rotating mechanical seal, there is slight friction and there may be friction noise which is harmless.

5. Information on design and mounting and operation

The following must be noted for fast and reliable mounting and commissioning, for safe operation of the rotary union and for ensuring that the warranty will not be void:

- Never operate the rotary union outside of the application and performance limits specified.
- For smooth operation of rotary union ensure concentricity and minimum run-out tolerance at the point where it is connected! See section 6.1 for more detailed information.
- The information on the admissible mounting position of the rotary union provided in the section "Specifications and Spare Parts" must be adhered to.
- Use hydraulic hoses between the supply system and the rotary union housing. This compensates for heat expansion and vibrations.
- Never apply torsional, tensile or pressure loads to the lines. Observe the minimum bend radius as specified by the manufacturer – if in doubt, contact your hose vendor. Section 6.2 provides examples of possible hose installation.
- In order to reliably seal the pressure line, use screw-in connections with Eolastic seal ED!
- Connect the leakage connection with a push-in fitting - sealed in the thread - for an 8 mm hoses. Plug in a hose for the leakage with an inside diameter of at least 5.5 mm and make sure that all escaping leakage can be completely removed. A gradient must be available to ensure unobstructed removal of the leakage. Backpressure in the leakage hose will cause premature failure.



B Operating Instructions for Rotary Unions KL / KLT

5. Information on design and mounting and operation

- Christian Maier GmbH & Co. KG recommends: Festo push-in fitting with G1/8 (ordering no.: QS-G1/8-8 #186098) or with 1/8" NPT (ordering no.: QB-1/8-5/16-U #533274) corresponding to the leakage connections
- It is recommended to use the leakage monitoring unit, product number 1193000. It is equipped with two switching outputs, one as a pre-alarm and one as an alarm if the limit amount of approx. 4 l/h of leaking liquid is exceeded. This allows to protect the spindle from being flooded.
- Optional safety equipment:
Install a vibration pickup with connection to the machine controller in order to avoid bearing damages and consequential damages and enable preventive maintenance!
- In order to ensure the reliability and service life of the seal in the rotary union, the quality of the fluid must comply with the specifications (see "Specifications and Spare Parts page", section 1 and section 4)!

INFORMATION



Refer to section 3.4 for additional information.

6. Mounting

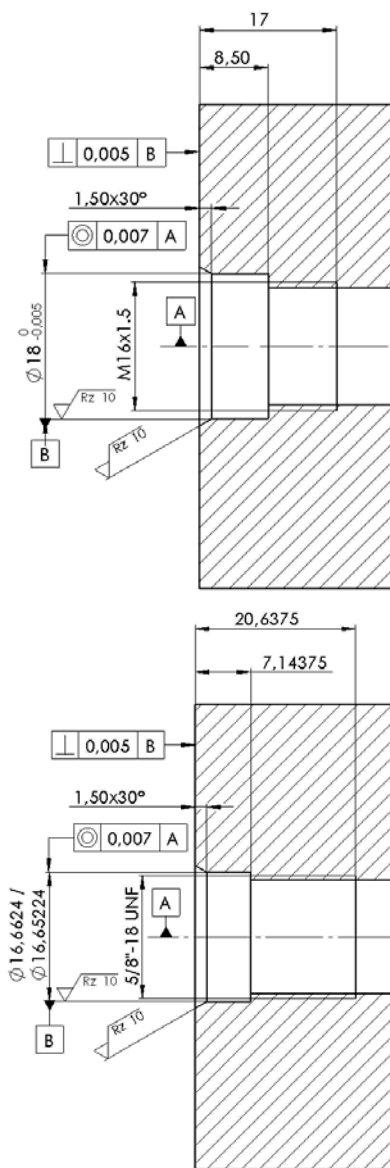
6.1 Mounting the rotary union to the spindle

INFORMATION



Use connection pieces with cutting edges. The rotor connection is sealed by means of the O ring at the rotor.

Mounting preparations

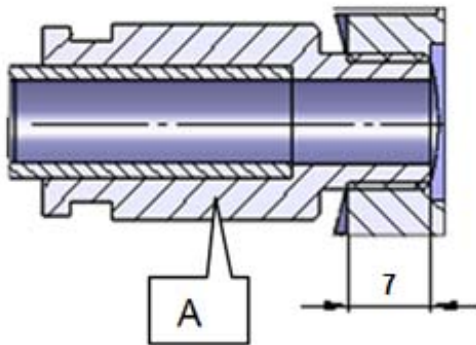


B-5

- Check the connection prerequisites as per figure 5 prior to mounting the rotary union to the spindle. In particular, pay attention to left-hand thread and right-hand thread.
- The specified clearances, form and position tolerances must be adhered to in order to avoid wobbling of the rotary union which will cause premature bearing failure.
- Prior to mounting, apply suitable mounting paste (e.g. Molykote TP 42) to the mating surface $\varnothing 18-0.005$ (or $\varnothing 16.6624 / \varnothing 16.65224$) to protect against seizing of the rotor mating surface of the rotary union (see figure 4 item D on page 5)!

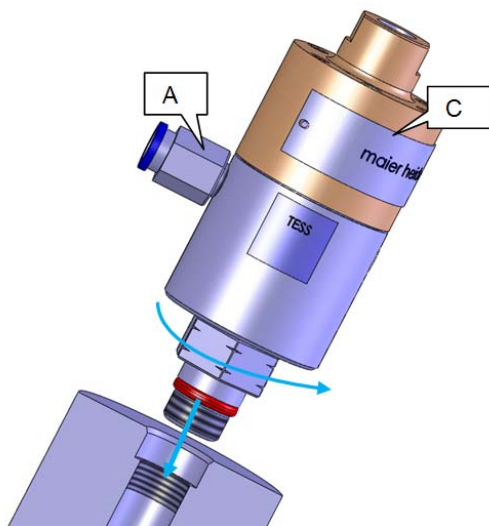
B Operating Instructions for Rotary Unions KL / KLT

6. Mounting



B-6

- Push-in fitting at the leakage connection (figure 6 and figure 7 [A]); screw in thread with Teflon coating for an 8 mm hose. **In the case of a leakage connection with cylindrical thread, make sure to note the maximum screw-in depth of 7 mm!**

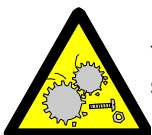


B-7

Mounting with thread to rotor

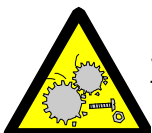
1. Clean the centering surface and apply a sufficient amount of mounting paste to avoid seizing.
2. Carefully push the rotary union [C] into the receptacle of the spindle.
3. Screw the thread of the rotor into the spindle.
4. Screw the rotary union into the spindle all the way until it contacts the front surface using a torque wrench. Observe the tightening torque specified in the table in section 2 in "Specifications and Spare Parts".
5. The standard rotor version uses an O ring for sealing.

NOTE



You must perform the grease distribution run as per "Specifications and Spare Parts", section 3.

NOTE



Smooth and trouble-free operation of the rotary joint requires the connection conditions, figure 5, to be met!

INFORMATION

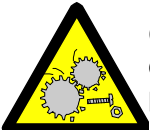


Observe the information in section 5!

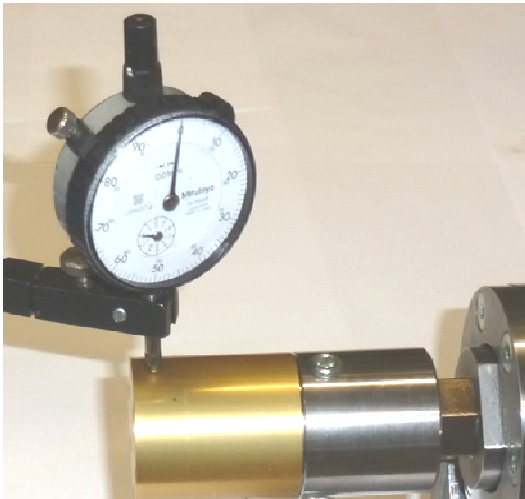
B Operating Instructions for Rotary Unions KL / KLT

6. Mounting

NOTE



Carefully avoid any type of damage to the rotary union during mounting. Due to the extremely small production tolerances, even minimum bends may damage the high-precision component and considerably reduce the service life.



B-8

Checking concentricity

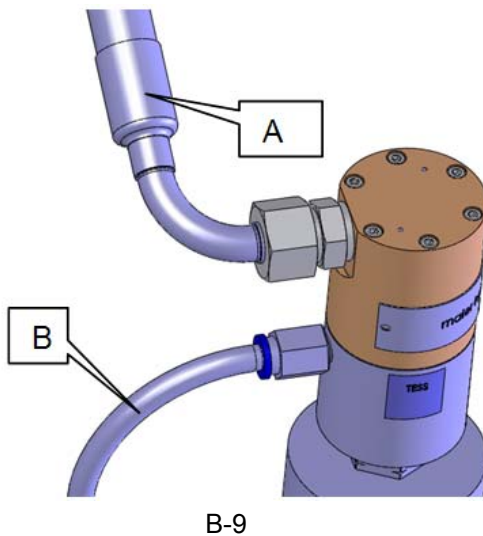
- The concentricity of the rotary union must be checked because wobbling may have an adverse effect on the service life of the bearings.
- The easiest way is to use a dial gauge as per figure 8.
- The dial gauge should be used at the rear end of the housing in order to get the maximum deflection.
- The concentricity tolerance must not exceed a value of 0.01 mm.
- If this value is not met, you must check whether the required tolerances as per figure 5 are met.
- If the tolerances are met and the required concentricity is not obtained, please contact Christian Maier GmbH & Co. KG.

Connecting the rotary union

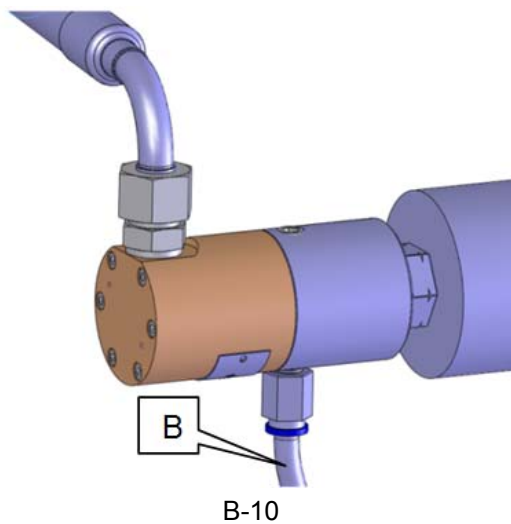
INFORMATION



Also refer to chapter 5. for important information on this section.



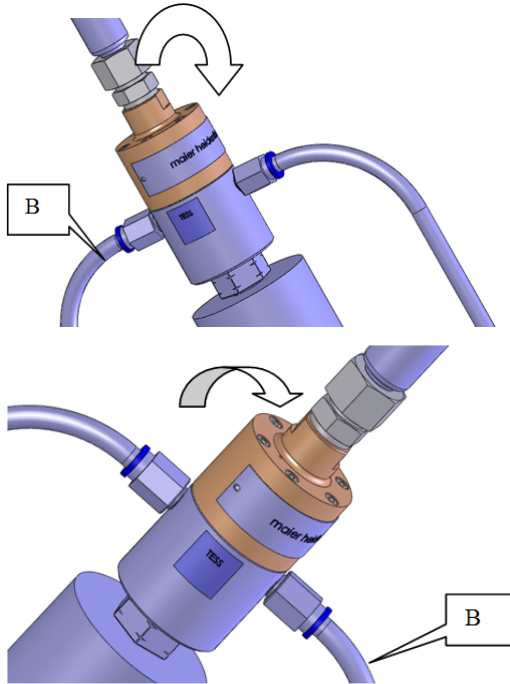
- The figure shows a connection example with vertical arrangement.
- The pressure connections [A] at the rotary union must be able to move freely; they must not apply additional loads or tension to the rotary joint!
- Ensure sufficient gradient for the leakage connection [B] and avoid bending or insufficient radii! It must be ensured that leakage can be removed without obstacles in any mounting position! Figure 9



- Figure 10 shows a connection example with horizontal arrangement.
- In such an arrangement, the leakage connection should always be at the bottom so that the leakage can be removed unobstructed.

B Operating Instructions for Rotary Unions KL / KLT

6. Mounting



B-11

- Use both connections in the case of tilting spindles or spindles with critical or uncertain leakage removal and connect the hoses accordingly. This way, any leakage can be fully discharged from the rotary union, irrespective of the spindle position.
- The figure shows two connected leakage connections for safe removal of leakage of a tilting spindle.

- Due to the gravitation, the leakage connections must always point down to ensure reliable leakage drain. The additional connection is factory-closed with a screw plug; the connection can be used as required.
- Connect the optional leak monitoring unit! Please inquire for further details!
- Connect the vibration pickup for bearing monitoring (option)! Please inquire for further details!

General information on connection lines

The following sections show examples of the design of the flexible connection elements:

- ↔ permissible movement (go for)
- ↔ impermissible movement (avoid)

B Operating Instructions for Rotary Unions KL / KLT

6. Mounting

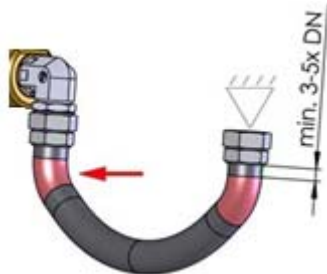


B-12



B-13

Do not compress or extend the lines.



B-14

To increase the service life, add a length of 3-5x DN per connection to the length calculated on the basis of the permissible bend radius.



B-15

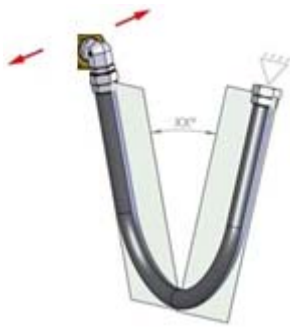
Avoid connection offset. Take length changes into account in the case of bending.

B Operating Instructions for Rotary Unions KL / KLT
6. Mounting



B-16

Take into account limited degrees of freedom and the minimum permissible bend radius.



B-17



B-18

If possible, use fixed elbows, dual-line version, for bends.

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

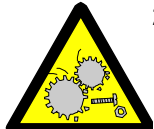


B-19



7. Operation

NOTE



1. Damage to the KL rotary union in the case of dry run.
The KL rotary union must not run dry!
Exception: test run for a maximum of 30 minutes and at very low speed.
Rotary unions series KLT may run dry.
2. Exceeding the permissible application data as per "Specifications and Spare Parts" causes damage to the rotary union. Make sure to meet the maximum application data as per "Specifications and Spare Parts", section 1.
Also observe 2.1 and section 2.2 in this section.
3. Destruction of reduced service life if the grease distribution run is not performed as per "Specifications and Spare Parts", section 3. The warranty shall be void in this case. Damage caused by failure to perform the grease distribution run are easy to locate.

7.1 Commissioning

- During initial commissioning of the rotary union, minor amounts of drops of leaking fluid may occur during the breaking in period of the dynamic seal. The duration of the breaking in period depends on the speed and the pressure; usually, it is terminated after a few days.
- The fluid must be filtrated as per "Specifications and Spare Parts", section 1.
- At the beginning, the rotary union may generate slight whistling noise during dry run. However, this is uncritical since the sliding surface must break in. Once you operate the rotary union with cooling lubricant, the noise will disappear.
- You must perform the grease distribution run described in "Specifications and Spare Parts", section 3, prior to initial commissioning!

7.2 During operation

Check the following:

- Quality of the fluid in the system
Document the checked data. Refer to the section "Specifications and Spare Parts" for the required values.
- Visible leakage at the leakage connection of the rotary union
Usually, the operating behavior of the rotating mechanical seal does not change suddenly. Slowly increasing leakage indicates seal failure. This allows you to acquire values concerning the operating behavior of the rotary joint installed in the system.
- It is recommended to use a leakage monitoring unit. Replace the rotary union if the leakage exceeds a rate of approx. 4 liters per hour.
- The fluid should only be applied to the rotary union if it can also be removed via the tool; otherwise, the pressure may cause great forces which can damage the bearings. This means, for example, that you should use fluid only for tools with internal cooling and switch off the supply of fluid for tools without internal cooling.

B Operating Instructions for Rotary Unions KL / KLT

7. Operation

Troubleshooting

Problem	Reason	Remedy
Excessive amounts of leakage (approx. > 4 l/h) escape via the leakage opening on an ongoing basis	<ul style="list-style-type: none"> Rotating mechanical seal damaged or worn 	<ul style="list-style-type: none"> Replace the rotary joint! Send the component to Christian Maier GmbH & Co. KG for diagnosis and, if applicable, repair. Check the quality of the fluid.
Noise and out-of-center run	<ul style="list-style-type: none"> Bearing worn Bearing damage 	<ul style="list-style-type: none"> Replace the rotary union
Whistling noise and slight friction of the rotary union	<ul style="list-style-type: none"> Rotary union not yet broken in KLT rotary union has been operated without cooling lubricant for a long time so there is no lubricant film on the sealing surface 	<ul style="list-style-type: none"> Allow the rotary union to break in Apply cooling lubricant to the rotary union for a short time.
Excessive heating up of the bearing housing (bearing housing temperature permanently higher than 80°C)	<ul style="list-style-type: none"> Bearing defective Relief defective (KLT only) Heating up caused by other components in the vicinity, e.g. spindle or electrical motor 	<ul style="list-style-type: none"> Find and remove the heat source! If the rotary union itself is the reason, replace it!
Leakage at sealing points	<ul style="list-style-type: none"> Sealing element damaged. Screw torque of connection insufficient 	<ul style="list-style-type: none"> Retighten the rotor with the correct torque as per "Specifications and Spare Parts, section 2. Do not overload the rotor thread as this will destroy it. Tighten the connection screws as per manufacturer specifications.

8. Maintenance

INFORMATION



Christian Maier GmbH & Co. KG offers on site service by our experts and training of your service staff.

- Observe the safety messages in section 3.
- Maintenance may only be performed by authorized staff as per chapter 3.4.
- Only perform work on the rotary union when the machine/system is at a standstill and after the rotary union has cooled down.
- Always use personal protective equipment such as gloves, safety glasses, etc. when performing work on the rotary union to protect against escaping fluid.
- Allow the rotary union to cool down and make sure it is not under pressure before you take up work.
- Use only genuine spare parts.
- If you have removed protective equipment, refit such equipment after having finished your work and verify proper operation of such equipment.
- All screws must be tightened with the specified tightening torque (refer to section "Specifications and Spare Parts").

8.1 Maintenance plan

The rotary union is maintenance-free within 12 months in the case of normal operation (see "Specifications and Spare Parts"! **This requires compliance** with the specified mounting and operating conditions as well as the specifications for the fluids. The bearings feature lifetime grease lubrication and should be replaced after no more than three years (even if the unit is only stored or rarely operated).

Rotary unions KL can be used for up to 70 bar pressure of the fluid. The bearings used feature lifetime grease lubrication so they are maintenance free.

Interval	Activity	Explanation
Every 12 months	<ul style="list-style-type: none"> • Check rotary union. 	By customer service of Christian Maier GmbH & Co. KG.
Every 6 months	<ul style="list-style-type: none"> • Check tightness 	Replace the rotary union if the leakage exceeds a rate of approx. 4 liters per hour.

B Operating Instructions for Rotary Unions KL / KLT

8. Maintenance

8.2 Repair

8.2.1 Tools

- A torque wrench must be used for tightening screws with a specified tightening torque.

8.2.2 Repair work

8.2.2.1 Dismounting the rotary union from the spindle

Prerequisites:

- Unpressurize the rotary union
- Drain the fluid contained in the rotary union
- Remove the protective hood

Procedure:

WARNING



Risk of injury caused by escaping fluid under pressure.

No tool may be in the spindle!

The system must not be under pressure!

Make sure that shut-off fittings cannot be opened inadvertently or intentionally during repair work!

Always wear personal protective equipment, in particular protective glasses and gloves!

INFORMATION



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

1. Dismount the housing connections.
2. Loosen the connection to the spindle.
 - In the case of thread at rotor by unscrewing with wrench at wrench surfaces.

8.2.2.2 Having the rotary union repaired

Prerequisite

- The rotary union must have been dismantled from the spindle

INFORMATION



Series KL and series KLT rotary unions are high-precision, complex and delicate components which may only be dismantled and repaired by Christian Maier GmbH & Co. KG and its authorized partners. Reliable operation can only be ensured in this way.

8.3 Decommissioning and disposal



B Operating Instructions for Rotary Unions KL / KLT

8. Maintenance

At the end of the life cycle, rotary unions must be disposed or recycled by trained staff. See section 8.2.2.1 of this chapter for information on dismantling. Prior to disposing of the rotary union, you must remove the fluid, including all residues.

The rotary union to be scrapped must be dismantled in such a way that it can no longer be used for the purposes for which it was designed. It is not permitted to use parts of the rotary union for other purposes; the rotary union must be scrapped in its entirety. Christian Maier GmbH & Co. KG shall not be responsible for any damage whatsoever resulting from failure to observe this information.

Recycling of materials is essential. Each component must be delivered to controlled waste management companies. Rotary unions must not be disposed of with household waste! Observe all applicable disposal regulations.

The packaging material in which the rotary union is delivered by Christian Maier GmbH & Co. KG must be separated and disposed of in compliance with the applicable regulations.

Please note that it is recommended to return the unit in the original packaging for maintenance, i.e. it should be kept.

INFORMATION



See section 8.2 "Maintenance" for information on dismantling. Additional information may be found in the operating instructions for the complete system.

S Specifications and spare parts

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S Specifications and Spare Parts Series KL / KLT

1. Application data

1. Application data

	KL	KLT	KLT-405 & KLT-406
Version	Closed seal Without Tess	Closed seal With Tess	Closed seal With Tess
Nominal diameter DN [mm]	7	7	7
Fluid	Cooling lubricant, multi-purpose oils	Cooling lubricant, multi-purpose oils, Minimum quantity lubrication, air	Cooling lubricant, multi-purpose oils, Minimum quantity lubrication, air
Mounting position	Any; however, the position of the relief connection at the housing must allow for safe draining of leaking fluid		
Temperature max. °C	50	50	50
Pressure PN, max. bar Cooling lubricant	70	70	70
Pressure PN, max. bar minimum quantity lubrication	-	10	10
Pressure PN, max. bar Dry air	-	10	10
Speed max. min ⁻¹	16 000 (at max. 15 bar)	16 000 (at max. 15 bar)	10 000 (at max. 15 bar)
Channels	1	1	1
Filtration Micron	50	50	50
Cleanliness of fluid according to ISO 4406	-/16/13	-/16/13	-/16/13



The diagrams below show the approved combinations of pressure and speed of rotation:

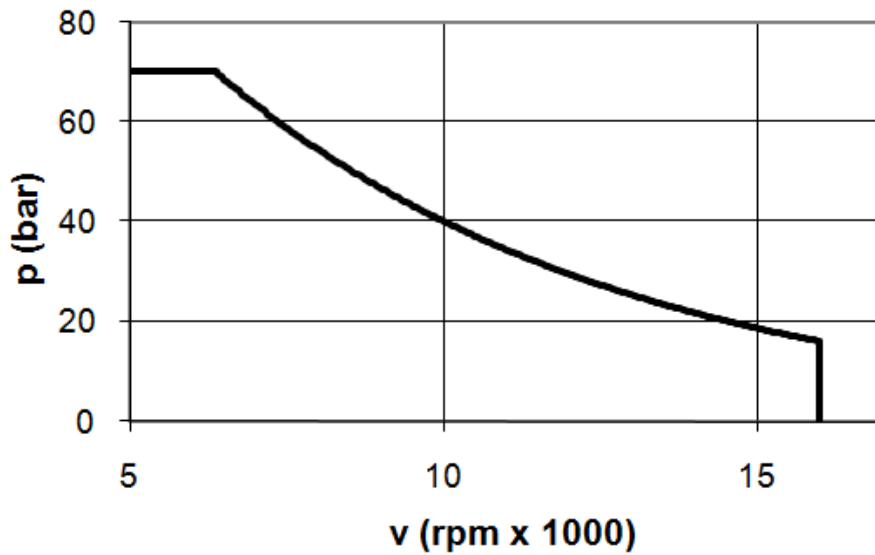


Diagram for KL and KLT

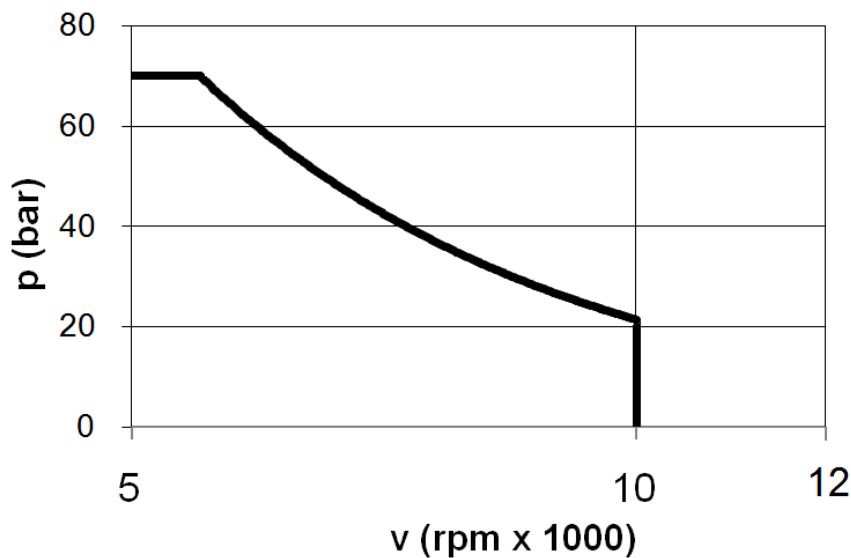


Diagram for KLT-405 and KLT-406

During normal operation, the rotary union is not permanently operated at maximum values, but only on a short-term basis; the maximum values are shown above in the diagram.

S Specifications and Spare Parts Series KL / KLT

2. Tightening torque in Nm for rotor

2. Tightening torque in Nm for rotor

Size	at friction in thread and head seat $\mu = 0.14$ at 20°C screw temperature
M16	50
5/8"-18-UNF	50

Please observe the thread properties of the counter material.

3. Initial lubrication and relubrication

Our rotary unions are factory-greased. The factory-applied grease is a lifetime lubrication. This "Longlife" lubrication of the bearings requires a grease distribution run which must be performed by the customer according to the procedure described below.

Grease distribution run

Speed [1/min]	Duration [min]	Pressure [bar]
4 000	10	Pressure as low as possible ≤ 5 bar*
0	10	0
6 000	10	Pressure as low as possible ≤ 5 bar*
0	10	0
10 000	10	Pressure as low as possible ≤ 5 bar*
0	10	0
13 000	10	Pressure as low as possible ≤ 5 bar*
0	10	0
16 000	30	Pressure as low as possible ≤ 5 bar*
If the desired maximum speed of rotation is not 16 000 1/min, this maximum speed of rotation must be held for 30 minutes at a low pressure of ≤ 5 bar, if possible.*		

* It is essential to comply with the pv diagram as per section 1 of this chapter!

Measure the temperature of the bearings at the housing at the desired maximum speed of rotation. The housing temperature should not exceed 50°C / should not be above the ambient temperature by more than 25°K. If your value is higher, allow the rotary union to cool down completely and then perform the complete grease distribution run again. If the problem persists, contact Maier.

Due to ageing of the grease, Maier rotary unions cannot be stored for more than three years. There is no relubrication.



S Specifications and Spare Parts Series KL / KLT

4. Fluids specifications

4. Fluids specifications

Series KL rotary unions are designed for fluids such as cutting fluids or multi-purpose oils, series KLT rotary unions for cutting fluids, multi-purpose oils, aerosols and compressed air. Other fluids including additives must be checked for compatibility with the materials used in the manufacturer's plant.

General

The quality of the fluid used plays a decisive role in the service life and reliability of a rotary joint.

In the case of cutting fluids, the composition is particularly important. Insufficient quality of the fluid will result in heavy wear of the sealing and premature failure of the rotary union. Use only distilled water for mixing because tap water contains, for example, calcium and magnesium salts which are abrasive and have a negative impact on the service life of the seal. In addition, cutting liquids require sufficient filtration (see chapter 1, "Application data") so that abrasive substances such as metal particles from metal working cannot get into the rotary union. In such a case, there is a risk of abrasive particles reaching the seal chamber. This would considerably reduce the service life of the seal and require shorter maintenance intervals for your machine. In times of high demands on productivity, this may cause greater damage than in the past.

It is therefore essential to meet the specifications detailed in chapter 1 and observe the information provided in the "General part of the operating instruction"!

Approved temperatures

Series KL rotary unions are suitable for cutting fluids and multi-purpose oils.

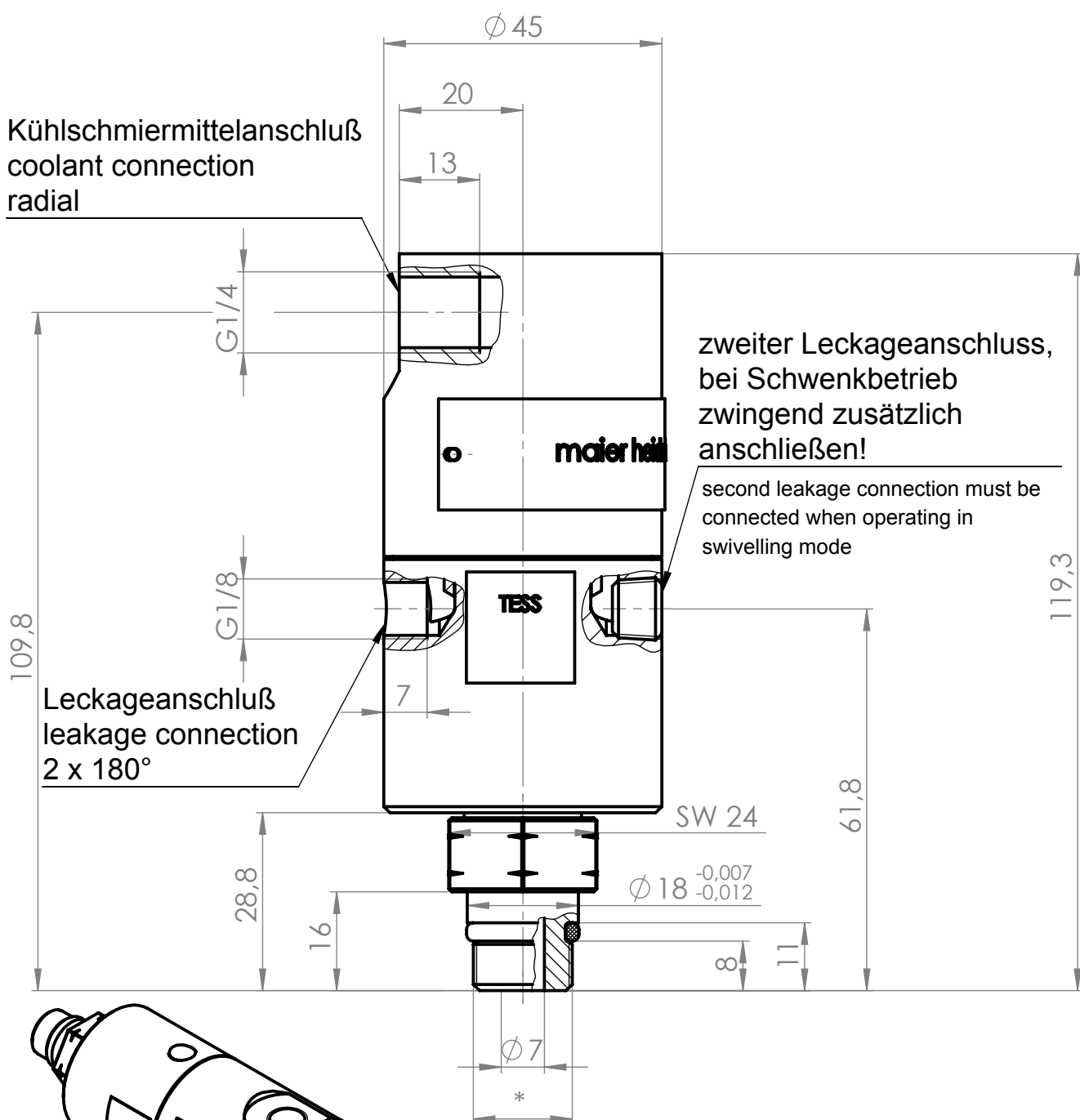
Series KL rotary joints are suitable for cooling lubricants, dry air and aerosols for minimum quantity lubrication.

The elastomers of the seals can be used at dry air up to a max. temperature of 80 °C (176 °F) and, in the case of cutting liquids, up to 80 °C (176 °F) max. However, for technical reasons, the temperature of the fluid must not exceed 50 °C (122 °F)!

Please inquire for other fluids or application conditions not listed!

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Kühlschmiermittelanschluß
coolant connection
radial



zweiter Leckageanschluß,
bei Schwenkbetrieb
zwingend zusätzlich
anschießen!
second leakage connection must be
connected when operating in
swivelling mode

Leckageanschluß
leakage connection
2 x 180°

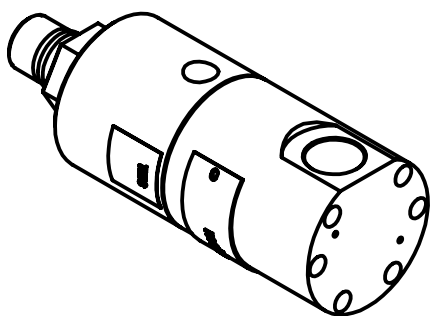
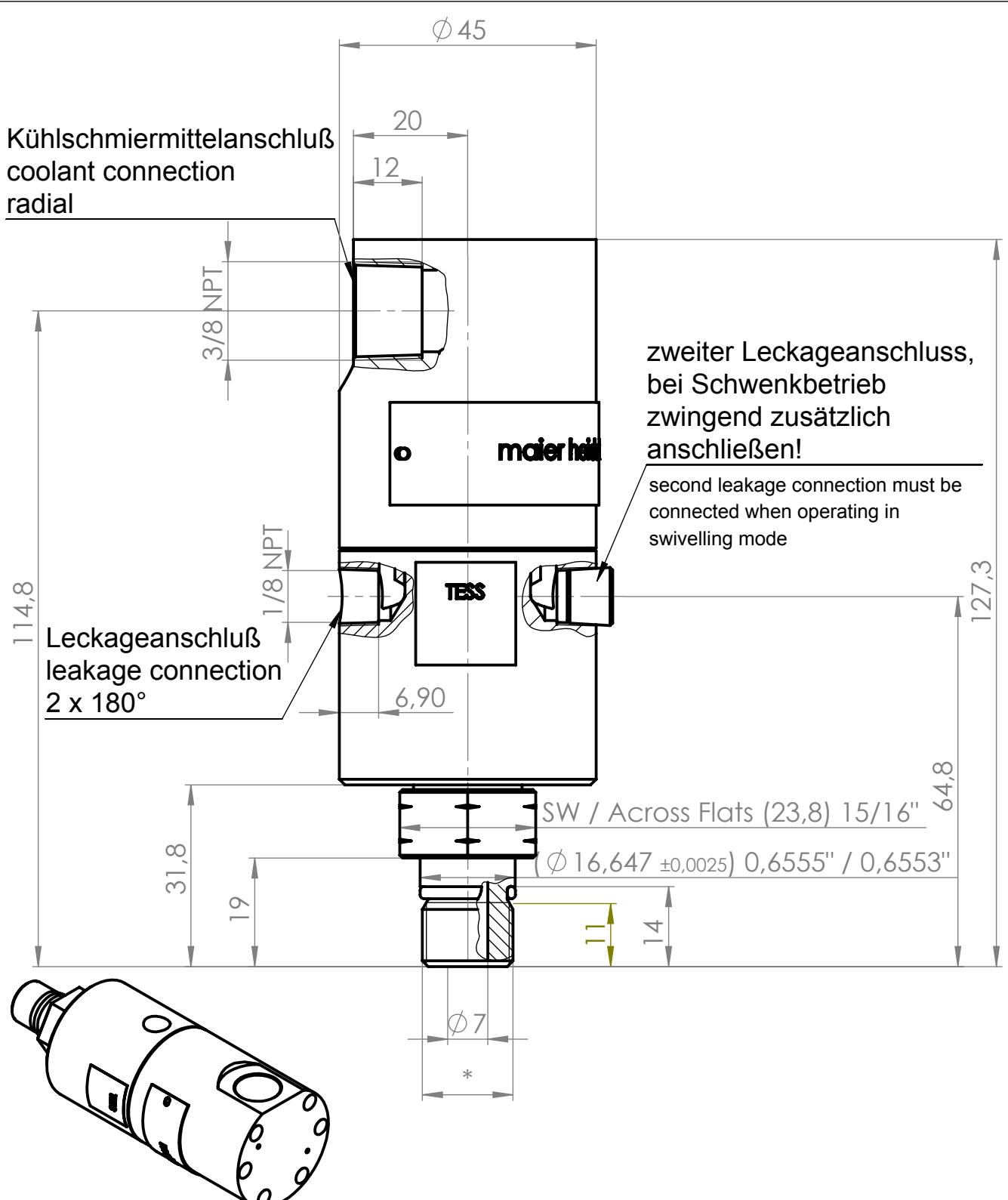
* Gewinde M16x1,5 rechts: KLT 11 B 07 R-401 Art.Nr. 1121201-401
Gewinde M16x1,5 links: KLT 11 B 07 L-401 Art.Nr. 1121202-401

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					MB 10884	1
A	s. Mittlg. v.	08.07.11	wei	maier heidenheim	Art.-Nr.	Entst.aus MB 10751
Zust.	Änderung	Datum	Name		Ers.für	Ers.durch



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* thread 5/8"-18 UNF RH: KLT 11 B 07 R-402 Art.Nr. 1121201-402
 thread 5/8"-18 UNF LH: KLT 11 B 07 L-402 Art.Nr. 1121202-402

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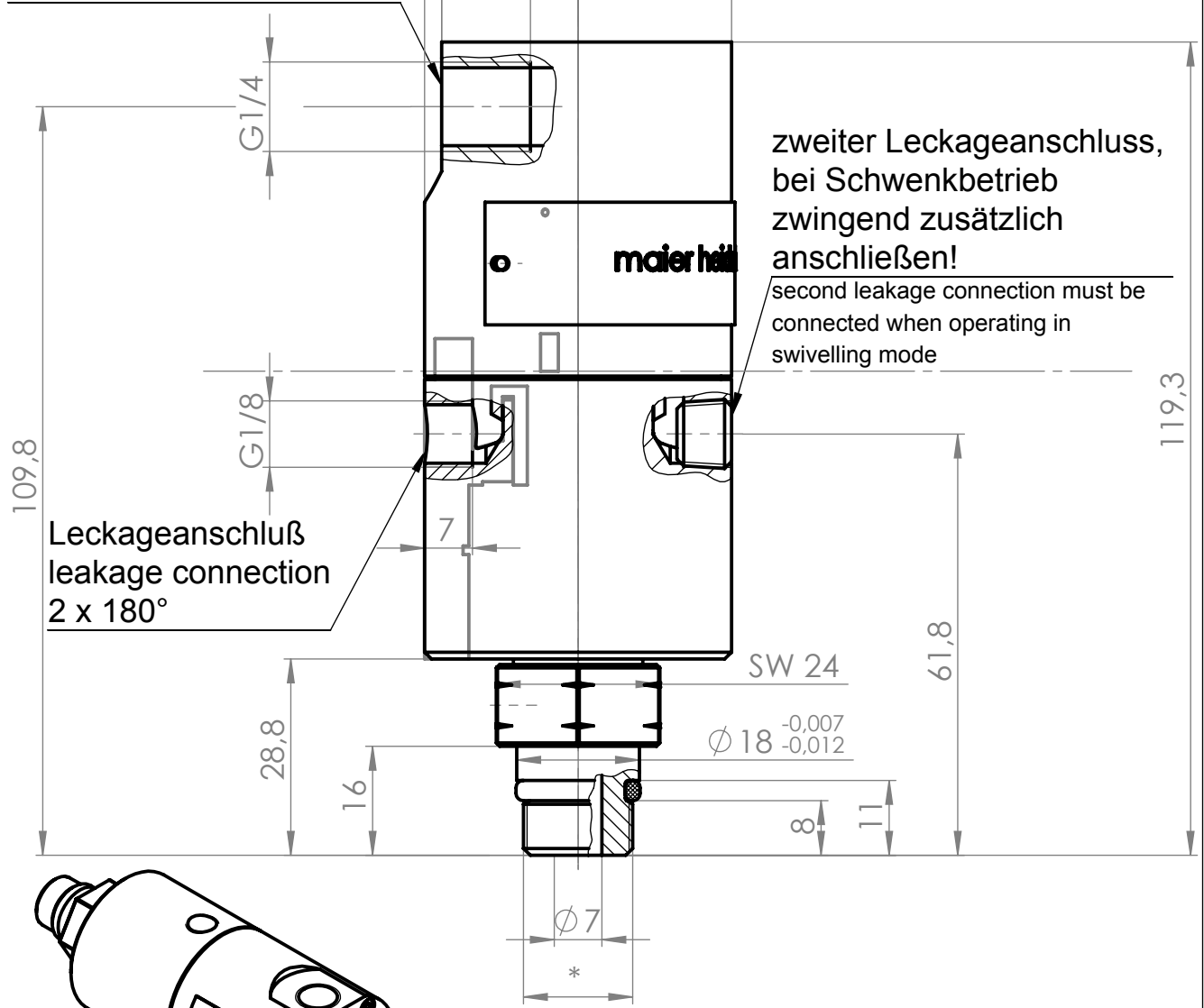
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					Art.-Nr.	Entst.aus MB 10884
					Ers.für	Ers.durch
A	s. Mittlg. v. 09.01.12	16.01.12	mil			
Zust.	Änderung	Datum	Name			

maier heidenheim



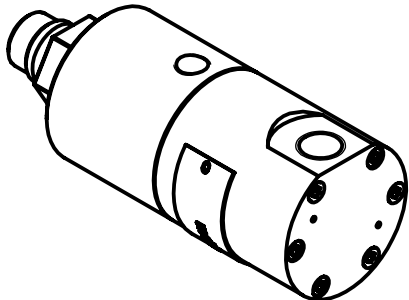
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Kühlschmiermittelanschluß
coolant connection
radial



Leckageanschluß
leakage connection
2 x 180°

zweiter Leckageanschluß,
bei Schwenkbetrieb
zwingend zusätzlich
anschließen!
second leakage connection must be
connected when operating in
swivelling mode



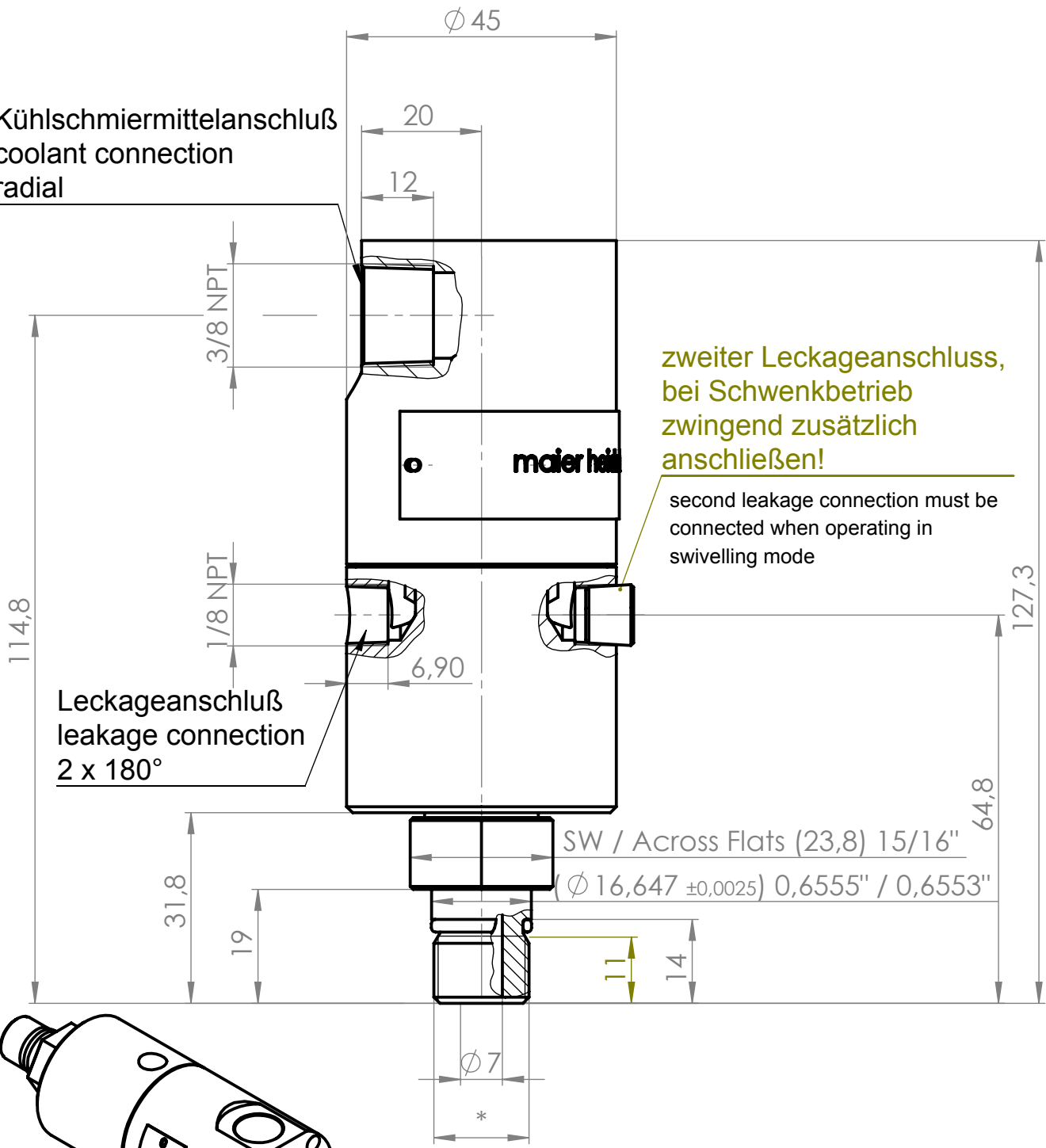
* Gewinde M16x1,5 rechts: KL 11 B 07 R-1 Art.Nr. 1121201-001
Gewinde M16x1,5 links: KL 11 B 07 L-1 Art.Nr. 1121202-001

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				Norm. 12.07.11	wei	
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A	s. Mittlg. v.	12.07.11	wei	maier heidenheim	Art.-Nr.	Entst.aus MB 10884
Zust.	Änderung	Datum	Name		Ers.für	Ers.durch

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coolant connection
radial

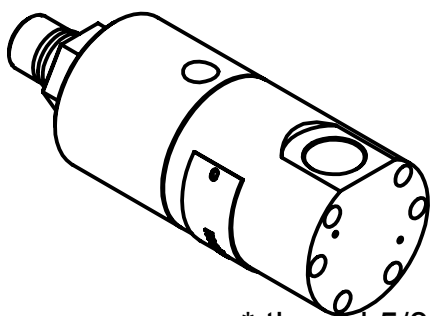


zweiter Leckageanschluß,
bei Schwenkbetrieb
zwingend zusätzlich
anschließen!

second leakage connection must be
connected when operating in
swivelling mode

Leckageanschluß
leakage connection
2 x 180°

SW / Across Flats (23,8) 15/16"
(Ø 16,647 ±0,0025) 0,6555" / 0,6553"



* thread 5/8"-18 UNF RH: KL 11 B 07 R-2 Art.Nr. 1121201-002
thread 5/8"-18 UNF LH: KL 11 B 07 L-2 Art.Nr. 1121202-002

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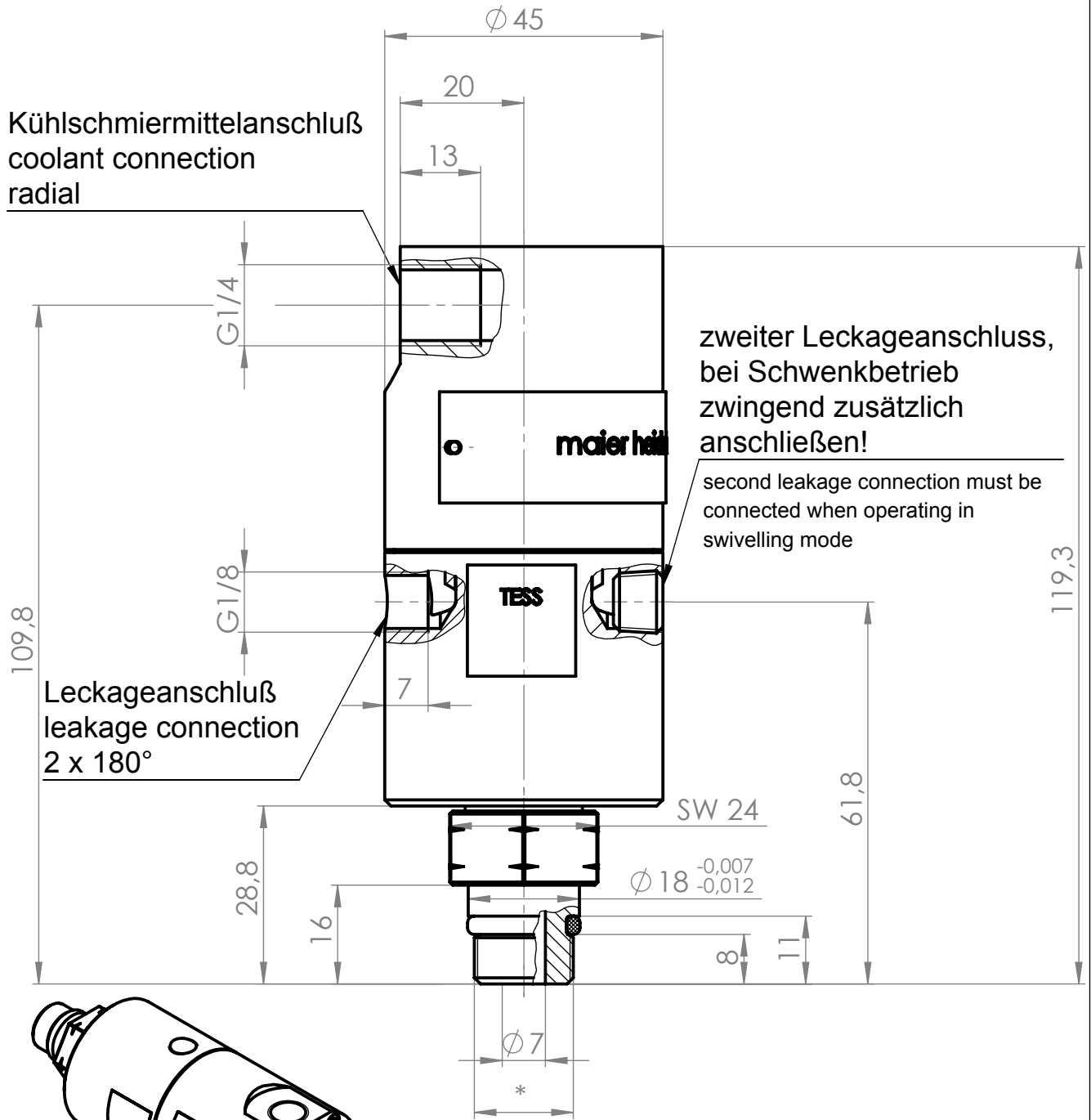
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					Ers.durch	
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A	s. Mittlg. v. 09.01.12	13.01.12	mil			

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2 x 180°

zweiter Leckageanschluß,
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anschießen!
second leakage connection must be
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swivelling mode



* Gewinde M16x1,5 rechts: KLT 11 B 07 R-405 Art.Nr. 1121201-405
Gewinde M16x1,5 links: KLT 11 B 07 L-405 Art.Nr. 1121202-405

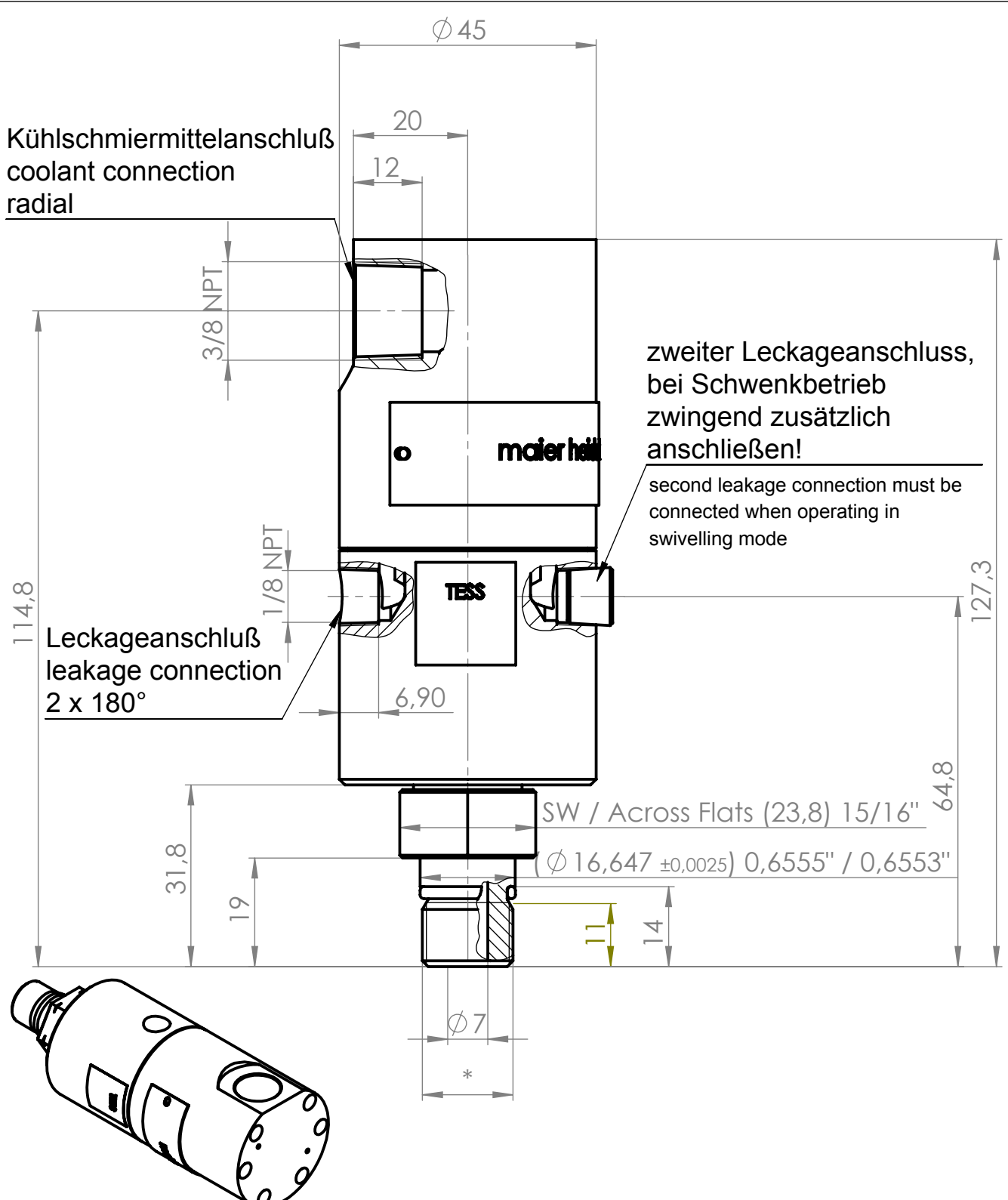
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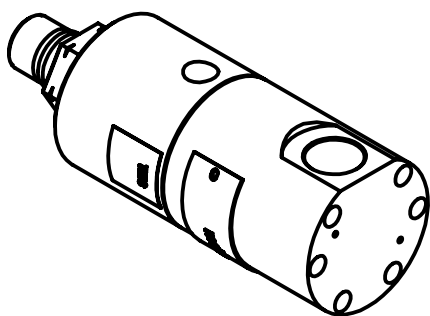
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zweiter Leckageanschluss, bei Schwenkbetrieb zwingend zusätzlich anschließen!
 second leakage connection must be connected when operating in swivelling mode



* thread 5/8"-18 UNF RH: KLT 11 B 07 R-406 Art.Nr. 1121201-406
 thread 5/8"-18 UNF LH: KLT 11 B 07 L-406 Art.Nr. 1121202-406

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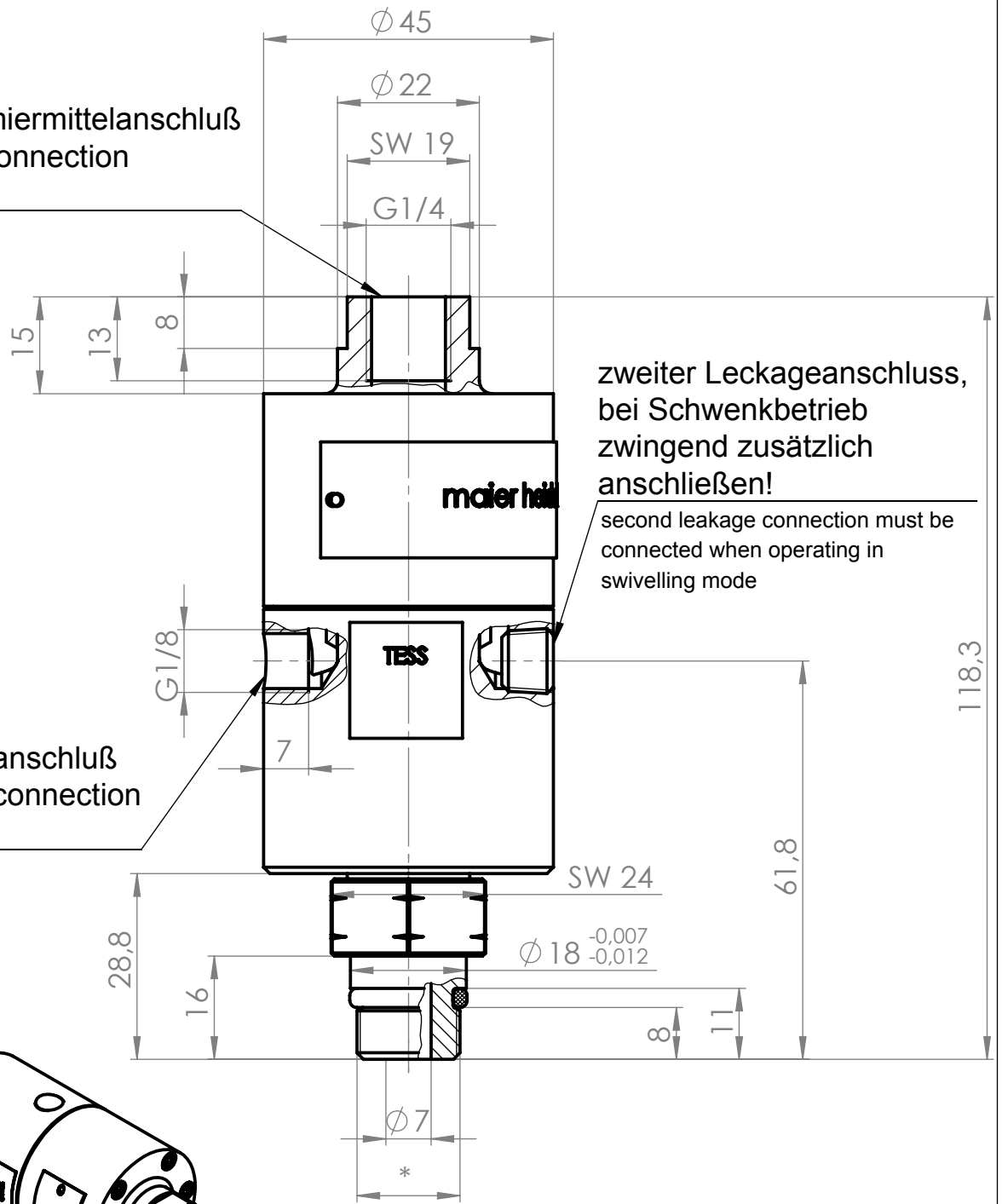
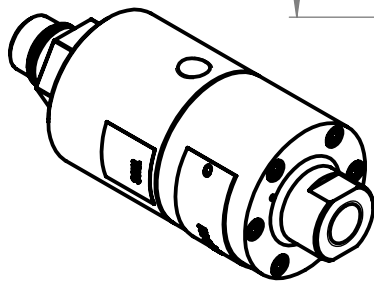
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Kühlschmiermittelanschluß
coolant connection
axial

Leckageanschluß
leakage connection
2 x 180°

zweiter Leckageanschluss,
bei Schwenkbetrieb
zwingend zusätzlich
anschießen!

second leakage connection must be
connected when operating in
swivelling mode



* Gewinde M16x1,5 rechts: KLT 11 C 07 R-401 Art.Nr. 1121207-401
Gewinde M16x1,5 links: KLT 11 C 07 L-401 Art.Nr. 1121208-401

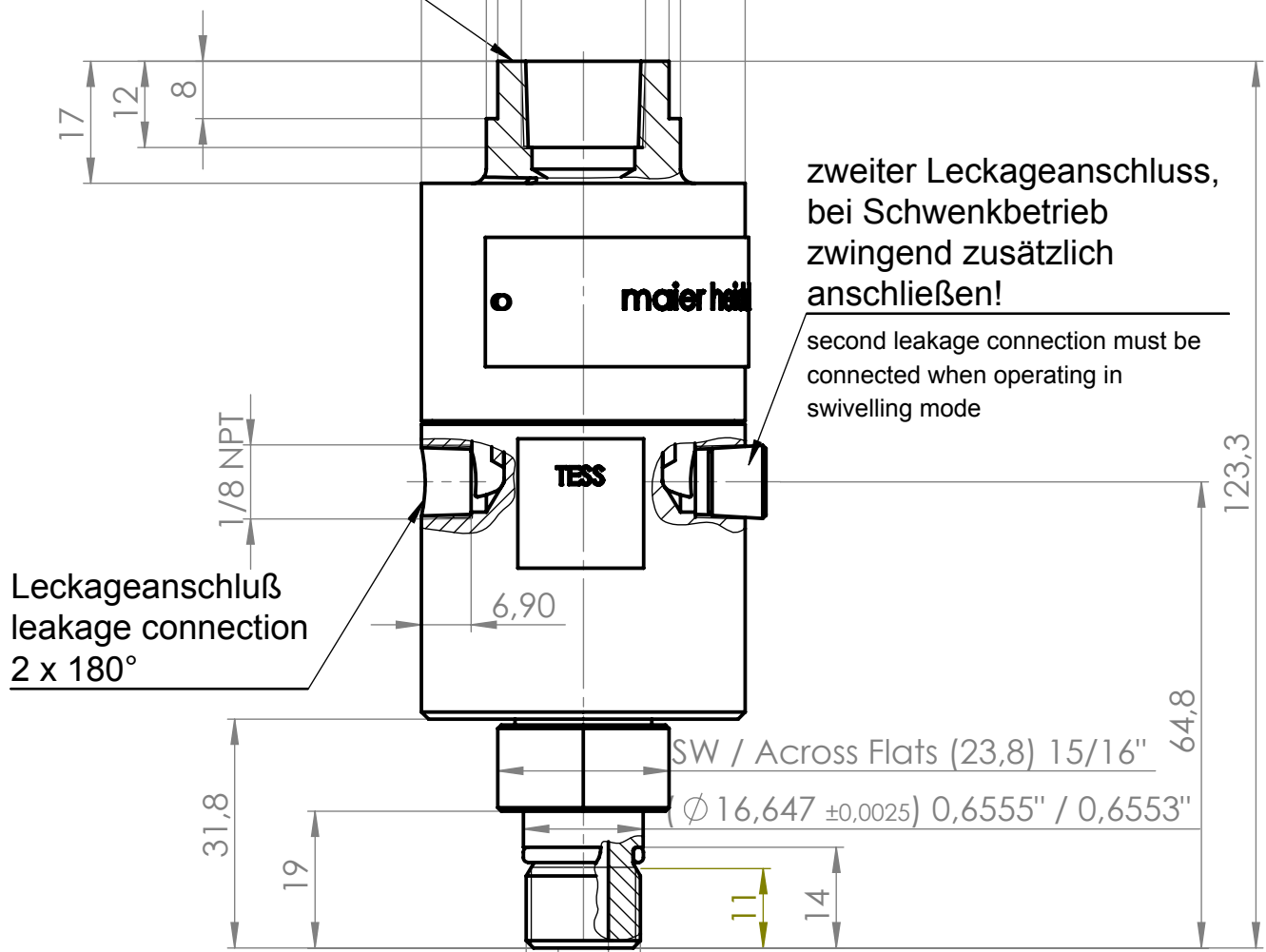
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Str.-Pos	Sachnummer	Str.-Menge	ME	Benennung 1	Benennung 2	Bemerk.
				Freimaßtoleranz mittel nach DIN 7168		
				zul. arithm. Mittenrauhwert Ra in μm DIN ISO 1302 Reihe 2	Prüfplan-Nr.	Maßstab
				12,5 / 3,2 / 0,8 / 0,1	Freigabestatus	1:1
				Datum	Name	Benennung
				Bearb. 08.06.11	mil	Dichtkopf / rotary joint
				Gepr. 12.07.11	wei	KLT 11C07 L-401
				Norm. 12.07.11	wei	
					Zeichn.-Nr.	Bl.
					MB 10885	1
A	s. Mittlg. v.	12.07.11	wei	maier heidenheim	Art.-Nr.	Entst.aus MB 10884
Zust.	Änderung	Datum	Name		Ers.durch	Ers.durch

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Kühlschmiermittelanschluß
coolant connection
axial

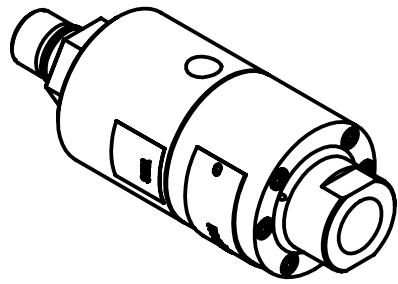
SW / Across Flats (23,81) 15/16"



zweiter Leckageanschluss,
bei Schwenkbetrieb
zwingend zusätzlich
anschießen!

second leakage connection must be
connected when operating in
swivelling mode

Leckageanschluß
leakage connection
2 x 180°



* thread 5/8"-18 UNF RH: KLT 11 C 07 R-402 Art.Nr. 1121207-402
thread 5/8"-18 UNF LH: KLT 11 C 07 L-402 Art.Nr. 1121208-402

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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	1:1
				Datum	Name	Benennung
				Bearb. 29.11.11	mil	Dichtkopf rotary joint KLT 11 C07 R/L-402
				Gepr. 30.08.12	mil	
				Norm. 30.08.12	mil	
B	s. Mittlg. v.	30.08.12	mil	maier heidenheim	Zeichn.-Nr.	Bl.
A	s. Mittlg. v. 01.09.12	16.01.12	mil		MB 11090	1
Zust.	Änderung	Datum	Name	Art.-Nr.	Entst.aus	MB 11089
				Ers.für	Ers.durch	

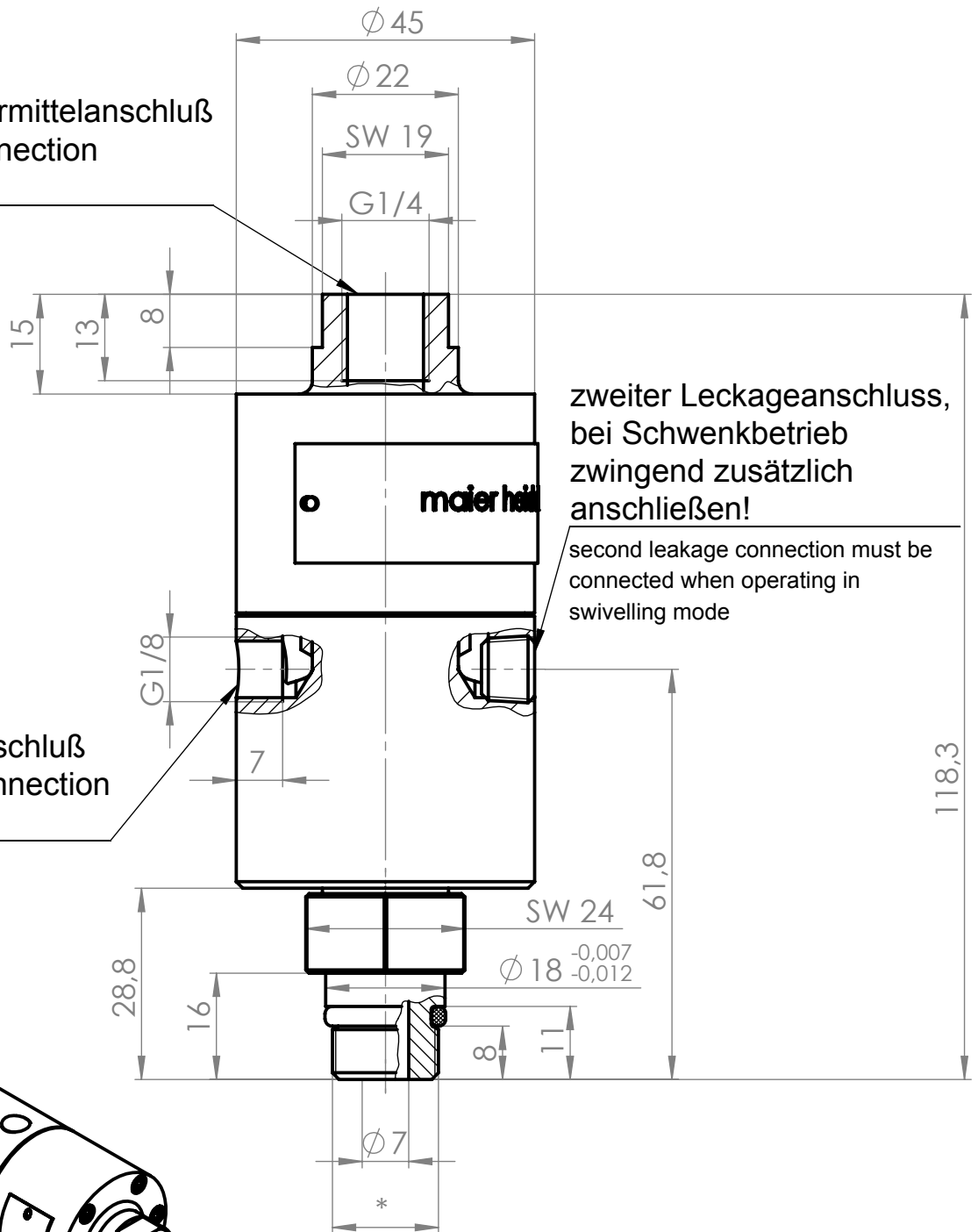
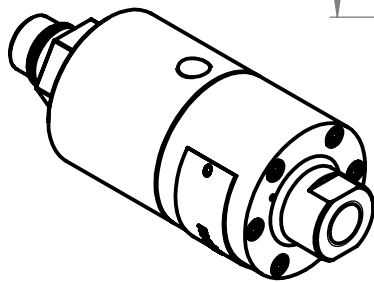
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Kühlschmiermittelanschluß
coolant connection
axial

Leckageanschluß
leakage connection
2 x 180°

zweiter Leckageanschluss,
bei Schwenkbetrieb
zwingend zusätzlich
anschießen!

second leakage connection must be
connected when operating in
swivelling mode



* Gewinde M16x1,5 rechts: KL 11 C 07 R-1 Art.Nr. 1121207-001
Gewinde M16x1,5 links: KL 11 C 07 L-1 Art.Nr. 1121208-001

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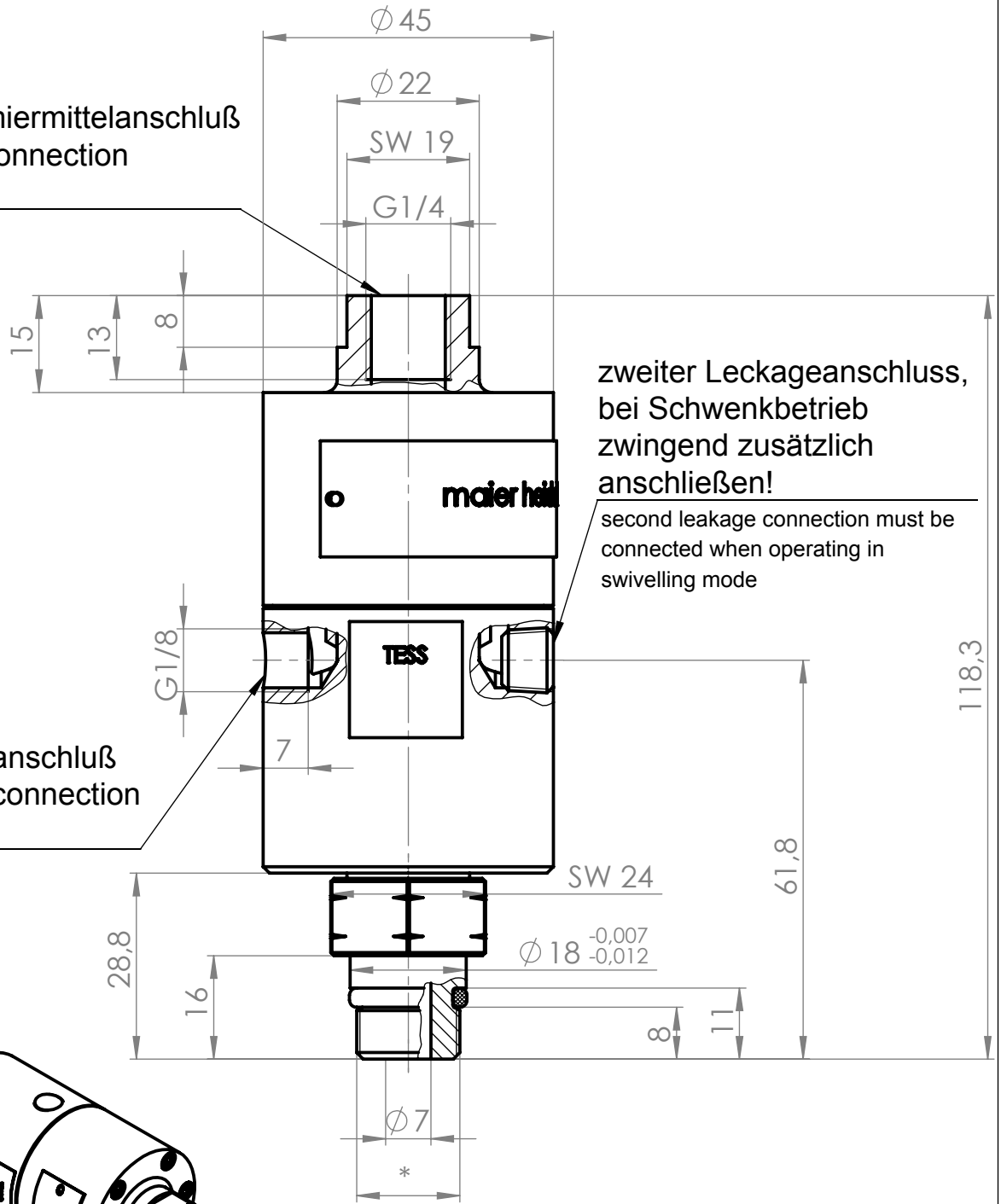
Str.-Pos	Sachnummer	Str.-Menge	ME	Benennung 1	Benennung 2	Bemerk.
				Freimaßtoleranz mittel nach DIN 7168		
				zul. arithm. Mittenrauhwert Ra in μm DIN ISO 1302 Reihe 2	Prüfplan-Nr.	Maßstab
				12,5/ 3,2/ 0,8/ 0,1/	Freigabestatus	1:1
				Datum	Name	Benennung
				Bearb. 15.06.11	mil	Dichtkopf / rotary joint KL 11 C07 R-1
				Gepr. 12.07.11	wei	
				Norm. 12.07.11	wei	
					Zeichn.-Nr.	Bl.
					MB 10896	1
					Art.-Nr.	Entst.aus
						MB 10885
					Ers.für	Ers.durch
A	s. Mittlg. v.	12.07.11	wei			
Zust.	Änderung	Datum	Name			

maier
heidenheim

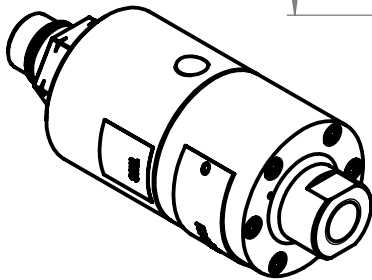


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Kühlschmiermittelanschluß
coolant connection
axial



Leckageanschluß
leakage connection
2 x 180°



* Gewinde M16x1,5 rechts: KLT 11 C 07 R-405 Art.Nr. 1121207-405
Gewinde M16x1,5 links: KLT 11 C 07 L-405 Art.Nr. 1121208-405

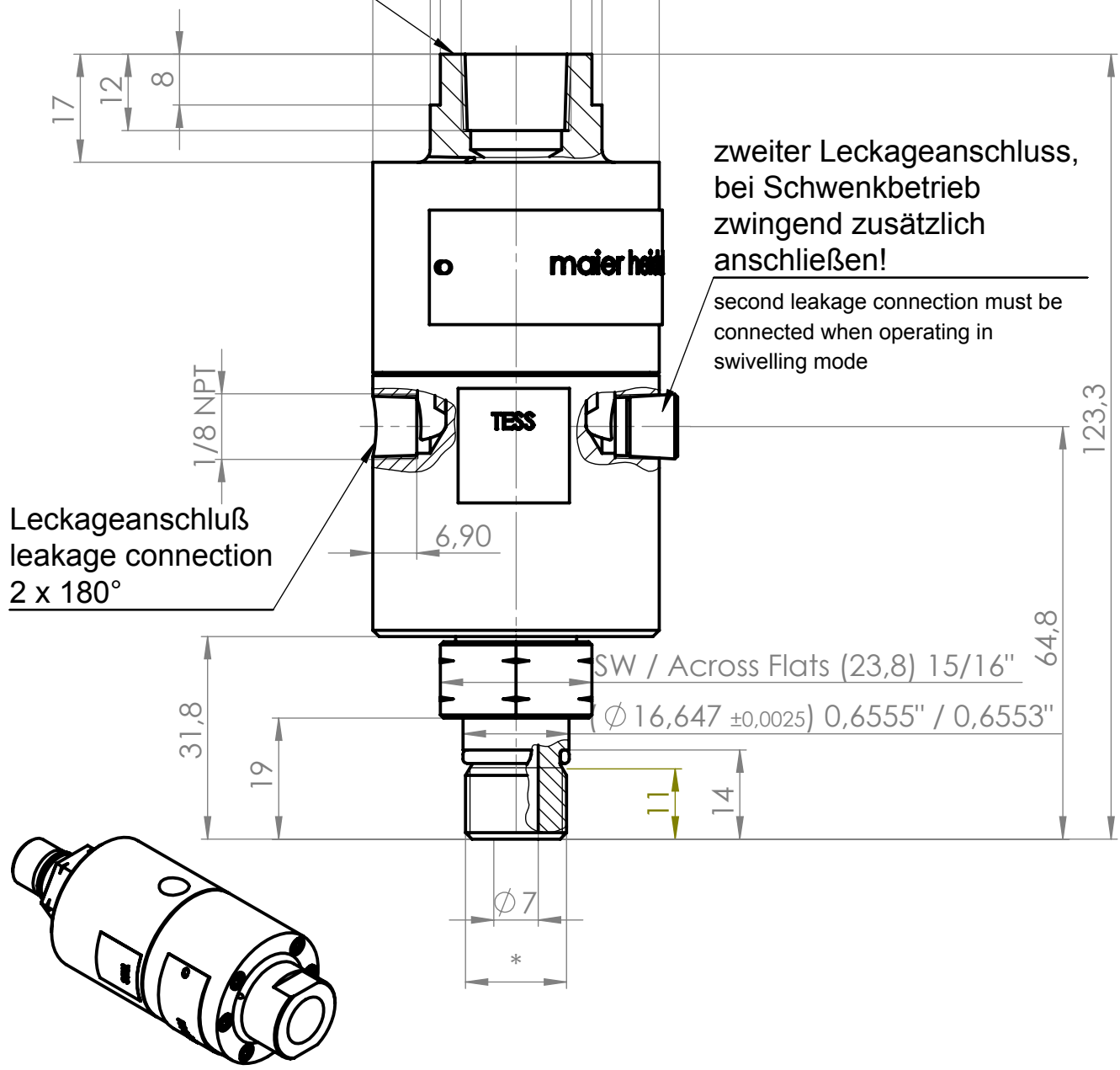
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Str.-Pos	Sachnummer	Str.-Menge	ME	Benennung 1	Benennung 2	Bemerk.
				Freimaßtoleranz mittel nach DIN 7168		
				zul. arithm. Mittenrauhwert Ra in µm DIN ISO 1302 Reihe 2	Prüfplan-Nr.	Maßstab
				12,5/ 3,2/ 0,8/ 0,1/	Freigabestatus	1:1
				Datum	Name	Benennung
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				Gepr. 04.07.12	mil	
				Norm. 04.07.12	mil	
					Zeichn.-Nr. MB 11218	Bl. 1
Zust.	Änderung	Datum	Name	maier heidenheim	Art.-Nr.	Entst.aus MB 10885
					Ers.für	Ers.durch

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Kühlschmiermittelanschluß
coolant connection
axial

SW / Across Flats (23,81) 15/16"

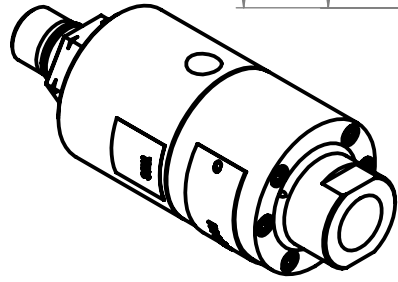


zweiter Leckageanschluss,
bei Schwenkbetrieb
zwingend zusätzlich
anschießen!

second leakage connection must be
connected when operating in
swivelling mode

Leckageanschluß
leakage connection
2 x 180°

SW / Across Flats (23,8) 15/16"
(Ø 16,647 ±0,0025) 0,6555" / 0,6553"



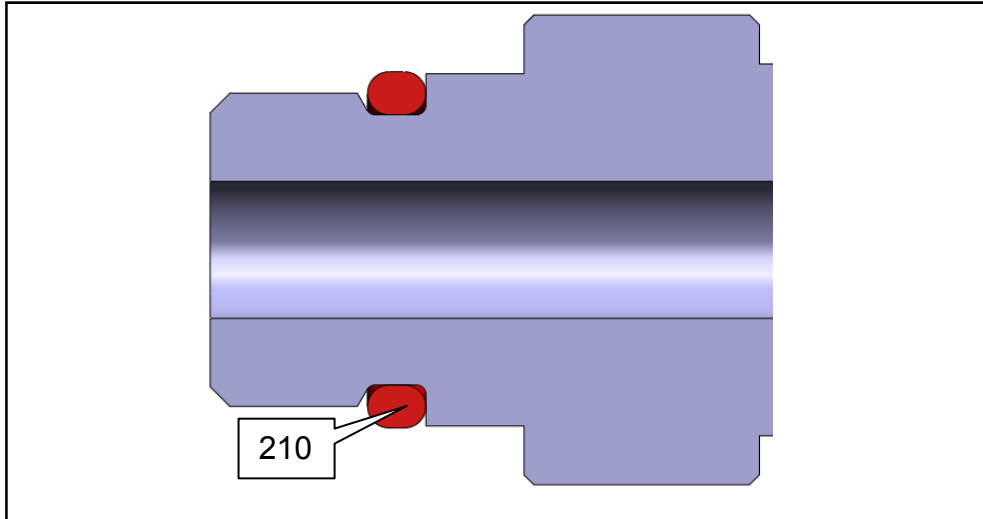
* thread 5/8"-18 UNF RH: KLT 11 C 07 R-406 Art.Nr. 1121207-406
thread 5/8"-18 UNF LH: KLT 11 C 07 L-406 Art.Nr. 1121208-406

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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	1:1
				Datum	Name	Benennung
				Bearb. 04.04.12	mil	Dichtkopf / rotary joint
				Gepr. 07.01.13	mil	KLT 11C07 R/L-406
				Norm. 07.01.13	mil	
B	s. Mittlg. v.	07.01.13	mil	maier heidenheim	Zeichn.-Nr.	Bl.
A	s. Mittlg. v.	30.08.12	mil		MB 11220	1
Zust.	Änderung	Datum	Name	Art.-Nr.	Entst.aus	MB 11090
				Ers.für	Ers.durch	

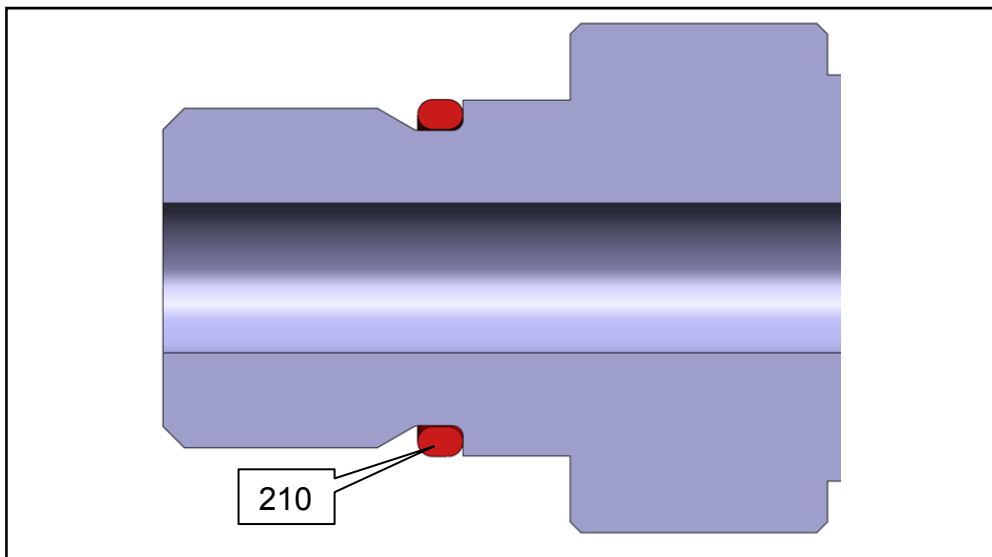
6. Spare parts

Seals at rotor M16x1.5 between rotor and spindle connection:



ITEM	PROD. #	Designation
210	3512618-001	O ring

Seals at rotor 5/8"-18 UNF between rotor and spindle connection:



ITEM	PROD. #	Designation
210	3512632-001	O ring