YAW M

YAW M is an active brake in a yaw design serving for generating a brake force on a brake disk in order to decelerate its rotation or stop it, respectively, or keep it at standstill.
The KTR-STOP® YAW M brake has been designed to operate as a stop brake. Please consult with KTR Kupplungstechnik for any other applications.

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1 Technical Data

Table 1: Technical Data

<table>
<thead>
<tr>
<th>Property</th>
<th>YAW M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight [kg]</td>
<td>Approx. 63 ²)</td>
</tr>
<tr>
<td>Width of brake pad [mm]</td>
<td>108</td>
</tr>
<tr>
<td>Surface area of each brake pad [mm²]</td>
<td>Approx. 20,300</td>
</tr>
<tr>
<td>Max. wear of each brake pad (material: organic) [mm]</td>
<td>7</td>
</tr>
<tr>
<td>Nominal coefficient of friction [μ]</td>
<td>0,4</td>
</tr>
<tr>
<td>Total brake piston area – complete brake [cm²]</td>
<td>254</td>
</tr>
<tr>
<td>Volume for each brake piston with 1 mm stroke [cm³]</td>
<td>25,4</td>
</tr>
<tr>
<td>Pressure port</td>
<td>1/4&quot; BSP</td>
</tr>
<tr>
<td>Drain port</td>
<td>1/4&quot; BSP</td>
</tr>
<tr>
<td>Max. clamping force [kN]</td>
<td>203</td>
</tr>
<tr>
<td>Max. operating pressure [bar]</td>
<td>160</td>
</tr>
<tr>
<td>Thickness of brake disk [mm]</td>
<td>20 - 70</td>
</tr>
<tr>
<td>Assembly of external brake</td>
<td></td>
</tr>
<tr>
<td>min. diameter of brake disk ØDa [mm]</td>
<td>400</td>
</tr>
<tr>
<td>Assembly of internal brake</td>
<td></td>
</tr>
<tr>
<td>min. diameter of brake disk ØDi [mm]</td>
<td>900</td>
</tr>
<tr>
<td>Operating temperature [°C]</td>
<td>-30 to 40</td>
</tr>
</tbody>
</table>

²) The friction coefficient each depends on the application or material of the friction pad; please consult with KTR.

\[ F_b = F_c \cdot 2 \cdot \mu \quad \text{Braking force [kN]} \]
\[ F_c = \text{Clamping force [kN]} \]
\[ M_b = \frac{z \cdot F_b \cdot D_{av}}{Z} \quad \text{Braking torque [kNm]} \]
\[ z = \text{Number of brakes each brake disk} \]
\[ D_{av} = \text{Effective diameter of brake [m]} \]
1 Technical Data

Brake disk dimensions

Illustration 3: assembly of internal brake

Illustration 4: assembly of external brake

Table 2: Calculation of brake disk

<table>
<thead>
<tr>
<th></th>
<th>Assembly of internal brake</th>
<th>Assembly of external brake</th>
</tr>
</thead>
<tbody>
<tr>
<td>( D_{i\min} )</td>
<td>( \sqrt{D_{av}^2 - 200 \cdot D_{av} + 46000} )</td>
<td></td>
</tr>
<tr>
<td>( D_{av} )</td>
<td>( \sqrt{D_{i}^2 - 36000 + 100} )</td>
<td>( D_{av} = D_A - 102 )</td>
</tr>
<tr>
<td>( D_{A\min} )</td>
<td>( D_i + 250 )</td>
<td>( D_{max} = D_A - 240 )</td>
</tr>
</tbody>
</table>

Brake assembly dimensions

Illustration 5: connection dimensions
2 Hints

2.1 General Hints

Please read through these operating-/mounting instructions carefully before you set the brake into operation. Please pay special attention to the safety instructions!

The operating-/mounting instructions are part of your product. Please keep them carefully.

The copyright for these operating-/mounting instructions remains with KTR Kupplungstechnik GmbH.

2.2 Safety and Advice Hints

STOP

DANGER! Danger of injury to persons.

CAUTION! Damages on the machine possible.

ATTENTION! Pointing to important items.

2.3 General Hints of Danger

STOP

DANGER!

With assembly, operation and maintenance of the brake it has to be made sure that the entire drive train is protected against unintentional engagement. You can be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety instructions.

• All operations on and with the brake have to be performed taking into account "safety first".
• Please make sure to disengage the power pack before you perform your work.
• Protect the power pack against unintentional engagement, e. g. by providing hints at the place of engagement or removing the fuse for current supply.
• Do not touch the operation area of the brake as long as it is in operation.
• Please protect the brake against unintentional touch. Please provide for the necessary protection devices.
• Please make sure that the overall brake/hydraulic system is depressurized during maintenance operations.

2.4 Proper Use

You may only assemble, operate and maintain the brake if you

• have carefully read through the operating-/mounting instructions and understood them
• had technical training
• are authorized to do so by your company

The brake may only be used in accordance with the technical data (see chapter 1). Unauthorized modifications on the brake design are not admissible. We do not take any warranty for resulting damages. To further develop the product we reserve the right for technical modifications.

The Brake - Type YAW M described in here corresponds to the technical status at the time of printing of these operating-/mounting instructions.
3 Storage

The brake is delivered in a preserved condition and can be stored in a closed, dry place during 12 months. With favourable storage conditions its properties remain unchanged up to 12 months. If the brake is stored over a longer period exceeding 12 months as well as after each transport the corrosion protection needs to be renewed and the brake has to be activated over the full braking distance in order to avoid conglutination of the gaskets.

CAUTION!
The storage rooms may not include any ozone-generating devices, like e. g. fluorescent light sources, mercury-vapour lamps or electrical high-voltage appliances. Humid storage rooms are not suitable. Please make sure that there is no condensation. The best relative air humidity is less than 65%.

4 Assembly

The brake is supplied pre-assembled. Before assembly the brake has to be inspected for completeness.

4.1 Components of the Brakes

Components/group of components of brake – Type YAW M

<table>
<thead>
<tr>
<th>Component/group of components</th>
<th>Quantity</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>Housing with single parts</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Brake pad</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Distance plate</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Seal ring</td>
</tr>
</tbody>
</table>

1) Number depends on the thickness of brake disk.

Group of components 1 – Housing with single parts

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>1</td>
<td>Housing</td>
</tr>
<tr>
<td>1.2</td>
<td>2</td>
<td>Brake piston</td>
</tr>
<tr>
<td>1.3</td>
<td>2</td>
<td>Scraper</td>
</tr>
<tr>
<td>1.4</td>
<td>2</td>
<td>U-Cap</td>
</tr>
<tr>
<td>1.5</td>
<td>4</td>
<td>Screw plug VSTI (acc. to DIN 908)</td>
</tr>
<tr>
<td>1.6</td>
<td>1</td>
<td>Ring bolt DIN 580</td>
</tr>
<tr>
<td>1.7</td>
<td>1</td>
<td>Sealing plug</td>
</tr>
</tbody>
</table>

Illustration 6: components of the brake
Illustration 7: housing with single parts
4 Assembly

4.2 Preparation of Assembly

ATTENTION!
To ensure the full braking power, the preparation of assembly needs to be performed carefully.

- The connection plate for the brake as well as the brake disk have to be inspected for dimensional accuracy. For that purpose please investigate the connection dimensions, connection surfaces and tolerances as mentioned in the drawing (see illustrations 1 to 5 and table 2).
- Please clean and degrease the brake disk and mounting surfaces. The corrosion protection can easily be removed by means of solvents.

ATTENTION!
The connection between connection plate and brake is defined to be frictionally engaged. Any residues of oil, dirt and corrosion protection reduce the coefficient of friction. As a result the operation of the brake and the full braking power are no longer ensured.

CAUTION!
Please pay attention to the manufacturer’s instructions with regard to solvents.

4.3 Brake Pads

ATTENTION!
KTR supplies brake pads free from asbestos and lead only. If requested, we will provide you with the corresponding certificates.

The brake pads are each adapted to the application and delivered accordingly. They can be distinguished as follows:
- organic material
- powder metal

CAUTION!
Brake pads made of organic material are highly sensitive to grease and oil which means that they cannot be cleaned. Brake pads having such kind of dirt need to be replaced and disposed of.

In contrast to organic brake pads, brake pads made from powder metal can be cleaned from grease and oil as long as they have not fully soaked with grease and oil.

ATTENTION!
We would recommend to keep the brake pads in their package as long as possible to protect them against any kind of dirt.

CAUTION!
Brake pads which have worn off to the wear limit have to be replaced immediately. Please make sure to replace by original parts only.

4.4 Assembly of the Brakes

DANGER!
In order to avoid injuries please always make use of proper lifting equipment.

The back of the brakes includes cup points serving to use lifting equipment. After assembly of the brake the cup points are to be disassembled and stored in a safe place.
4 Assembly

4.4 Assembly of the Brakes

⚠️ CAUTION!
In order to avoid any kind of damage on the brake, never twist a rope or any other lifting tool around damageable components.

- Before you start with the assembly, each one dust protection plug (component 1) has to be removed from both housings.
- Please insert the brake pads in the housing as deep as possible. Compress the brake pads and the brake pistons manually.
- Please make sure that the connection surface is in parallel with the brake and the tolerances as per illustration 5 are observed.
- Push one housing into the correct position of the connection plate and fasten the housing by 2-off cap screws M10.
- Put the sealing ring (component 4) into the recess.
- **Depending on the thickness of brake disk:** Put the distance plate (component 3) onto the housing and insert the second sealing ring (component 4) in the counterbore of the distance plate.
- Put the second housing onto the first housing or distance plate, respectively, in the correct position.
- Screw the brake to the connection plate by means of 8 screws and tighten them hydraulically evenly stepwise at 1/3 and afterwards 2/3 of the tightening torque $T_A$ (see table 3). Afterwards tighten the screws hydraulically at the full tightening torque mentioned in table 3. Other tightening processes after consultation with KTR.

⚠️ ATTENTION!
We would recommend to use the order mentioned in illustration 9.

<table>
<thead>
<tr>
<th>Screw size</th>
<th>Untreated and oiled</th>
<th>Greased with MoS₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>M27</td>
<td>1496</td>
<td>1100</td>
</tr>
</tbody>
</table>

- Align the brake in centre to the brake disk.
- Please make sure that the brake disk can rotate freely while not touching the housing.

⚠️ ATTENTION!
In order to avoid contact between the brake disk and the brake resulting from heat expansion, the distance of the brake according to table 2 needs to be adhered to.

⚠️ CAUTION!
Please make sure that the tolerances of the brake disk do not exceed the figures mentioned in illustration 5.
4 Assembly

4.5 Pressure Connection of a Brake

- Connect the pressure oil pipe to the pressure connections of the brake (see illustration 10 and 11). For that purpose remove the locking screw beforehand.

- Mount a miniature measuring coupling with a miniature measuring hose to the venting hole on the highest point (see illustration 10 and 11), for that purpose please remove the locking screw beforehand. Dissipate the end of the miniature measuring hose in a suitable collection container.

**ATTENTION!**
The pressure connections on top serve for venting the brake. For a wash-up system please make use of one of the upper pressure connections.

**ATTENTION!**
Always connect the brake consisting of two halves to a pressure pipe (see illustration 11), since otherwise the brake disk is loaded with the full braking force on one side in case of a failure.

**CAUTION!**
It is not recommended to use steel plugs for venting.

- Connect the oil leakage pipe to the brake (see illustration 10 and 11). For that purpose remove the sealing plug beforehand.

**ATTENTION!**
In order to locate a leakage immediately, it is recommended to use a transparent hose and collection container. Since higher pressures (5 bar at the maximum) are not produced, a pneumatic hose may be used, too. Please inspect the brake regularly for leakages.

**CAUTION!**
Extreme leakages have to be removed immediately. Oil which has escaped has to be removed completely, since oil remains may vaporize on hot components and ignite.

Illustration 10: connections of the oil leakage pipes/pressure oil pipes

Illustration 11: pressure connection of a brake

**ATTENTION!**
Please make sure that the connections and valves are adapted to the brakes with regard to pressure, flow rate, temperature and liquidity. Moreover, we would recommend to use flexible hydraulic valves in order to not restrain potential movements of the brake. Any hoses which are situated close to mobile components should be secured or coated accordingly.
4 Assembly

4.6 Pressure Connections of Several Brakes

ATTENTION!
If several brakes are assembled we would recommend to connect the pressure connection for each brake individually (in parallel) (see illustration 12). Please note, if several brakes are connected in a series (see illustration 13), the braking effect of all following brakes may become effective slightly delayed.

- Connect the pressure oil pipe to the pressure connections of the brake (see illustration 10, 12 and 13). For that purpose remove the locking screw beforehand.
- Mount a miniature measuring coupling with a miniature measuring hose to the venting hole on the highest point (see illustration 10, 12 and 13), for that purpose please remove the locking screw beforehand. Dissipate the end of the miniature measuring hose in a suitable collection container.

ATTENTION!
The upper pressure connections serve for venting the brake. For a wash-up system please make use of one of the upper pressure connections.

ATTENTION!
Always connect the brake consisting of two halves to a pressure pipe (see illustration 12 and 13), since otherwise the brake disk is loaded with the full braking force on one side in case of a failure.

CAUTION!
With the parallel connection of brakes (see illustration 12) each brake needs to be vented individually.

CAUTION!
It is not recommended to use steel plugs for venting.

- Connect the oil leakage pipe to the brake (see illustration 10, 12 and 13). For that purpose remove the sealing plug beforehand.

ATTENTION!
In order to locate a leakage immediately, it is recommended to use a transparent hose and collection container. Since higher pressures (5 bar at the maximum) are not produced, a pneumatic hose may be used, too. Please inspect the brake regularly for leakages.

CAUTION!
Extreme leakages have to be removed immediately. Oil which has escaped has to be removed completely, since oil remains may vaporize on hot components and ignite.

Illustration 12: pressure connection of several brakes (in parallel)  Illustration 13: pressure connection of several brakes (in a series)
4 Assembly

4.6 Pressure Connections of Several Brakes

ATTENTION!
Please make sure that the connections and valves are adapted to the brakes with regard to pressure, flow rate, temperature and liquidity. Moreover, we would recommend to use flexible hydraulic valves in order to not restrain potential movements of the brake. Any hoses which are situated close to mobile components should be secured or coated accordingly.

4.7 Start-up of the Brakes

ATTENTION!
Before start-up and after any operation on the brake the hydraulic system needs to be basically vented. Repeat the venting of the brake several times a year, since any air in the hydraulic system may affect the operation of the brake and the plant.

CAUTION!
Please make sure that there is sufficient liquid in the hydraulic system during and after the venting process (recommendation of liquid, see chapter 4.8).

- Switch on the hydraulic system for a short term to make sure that the brake is flushed with hydraulic oil. Repeat this process until a stream of clean oil dissipates from the miniature measuring hose.
- Remove the miniature measuring hose.

ATTENTION!
If the miniature measuring coupling is removed as well, the locking screw (component 1.5) needs to be screwed in the venting hole (see illustrations 9 to 12).

- Dispose of the hydraulic oil of the collection container as per chapter 4.11.
- The active brake described in here does not require any gap to release the brake or brake pads, respectively.
- Put pressure on the hydraulic system. This allows the brake pads to place onto the brake disk.

CAUTION!
The hydraulic system must never be operated at a higher pressure than the figures mentioned in the type plate of the brake or table 1. In case that any figures or types/sizes are modified, please contact KTR Kupplungstechnik.

CAUTION!
Never keep your fingers between brake disk and brake when locking the brake in order to prevent serious injuries of your hands. Before every maintenance operation please make sure that the brake is fully secured against activating.

- The brake pads have to be looped-in on the surface of the brake disk to achieve the rated coefficient of friction.

ATTENTION!
Please observe the instructions for grinding-in according to KTR-N.
4 Assembly

4.8 Recommendation of Fluids to be Used

ATTENTION!
Only those hydraulic fluids corresponding to the following criteria may be used (other manufacturers may be chosen).

KTR Kupplungstechnik recommends the following fluids:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Standard</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral oil</td>
<td>-20 °C to +40 °C (-4 °F to +104 °F)</td>
<td>+30 °C to +70 °C (+86 °F to +158 °F)</td>
</tr>
<tr>
<td>Shell</td>
<td>Tellus TX32</td>
<td>Tellus TX46</td>
</tr>
<tr>
<td>Mobil</td>
<td>DTE 13M</td>
<td>DTE 15M</td>
</tr>
<tr>
<td>Hydro Texaco</td>
<td>Rando HDZ32</td>
<td>Rando HDZ46</td>
</tr>
<tr>
<td>Valvoline</td>
<td>Ultramax HVLP32</td>
<td>Ultramax HVLP46</td>
</tr>
<tr>
<td>Synthetic oil</td>
<td>-20 °C to +40 °C (-4 °F to +104 °F)</td>
<td>+30 °C to +70 °C (+86 °F to +158 °F)</td>
</tr>
<tr>
<td>Mobil</td>
<td>SHC 524</td>
<td>SHC 525</td>
</tr>
<tr>
<td>Bio oil ¹)</td>
<td>-20 °C to +30 °C (-4 °F to +86 °F)</td>
<td>+30 °C to +70 °C (+86 °F to +158 °F)</td>
</tr>
<tr>
<td>Shell</td>
<td>Naturelle HF-E15</td>
<td>Naturelle HF-E32</td>
</tr>
</tbody>
</table>

¹) Purity: <200PPM water components in oil.
In general: Mineral hydraulic fluid as per DIN 51524 part 3.

ATTENTION!
The permissible operating temperatures from -20 °C to +60 °C (-4 °F to +140 °F) of the brake components have to be adhered to. For deviating operating temperatures please consult with KTR Kupplungstechnik.

Viscosity
We would recommend a viscosity range from 20 to 200 cSt of the hydraulic fluid with operating temperature.

Filtration
The oil in the system and the oil to be refilled always have to be filtered, please observe the instructions of the hydraulic system manufacturer.
To refill the oil we would recommend to use an offline filter.

ATTENTION!
The service life of the brake system is extended depending on the amount of purity of the oil.

The KTR hydraulic systems are provided with a 10-µm inline filter as a standard.
In order to ensure the reliability of the system, only oils originating from the following purity classes are permitted:
- NAS 1638, class 8
- ISO 4406, class 19/1 7/1 4.

ATTENTION!
We would recommend to replace the filters every 6 months, depending on the degree of dirt. After initial assembly activate the pressure connections of the brakes reciprocally several times (approx. 20 times) and replace the filter.
4 Assembly

4.8 Recommendation of Fluids to be Used

Replacement of hydraulic fluid
Mineral oil: after 8.000 hours or once a year
Other fluids: after 2.000 hours or two times a year

The system has to be scavenged after each draining of the brake system.

⚠️ CAUTION!
Unwelcome reactions may be produced by mixing different fluids or fluids of various manufacturers.

👉 ATTENTION!
Please contact the manufacturer of mineral oils if you intend to switch to another hydraulic fluid.

4.9 Disassembly of the Brakes

- Discharge the pressure fully from the hydraulic system.

⚠️ CAUTION!
Please make sure that the entire brake system is depressurized.

🚨 STOP
DANGER!
Parts falling down may cause injury of persons or damage to the machine. Secure the driving parts during assembly or disassembly.

- Remove the locking screw situated on the highest point (component 1.5) from the venting hole (see illustrations 10 to 13).
- Discharge the hydraulic oil fully from the brake.
- Dispose of the hydraulic oil as per chapter 4.11.
- Disconnect the leakage oil and oil pressure pipe from the brake.
- Screw the locking screws (component 1.5) in all pressure connections or venting holes (see illustrations 10 to 13).
- Remove the 8-off screws (M27) serving for fixing the brake to the connection plate.
- Remove the fully untightened half of the brake (component 1).

- Depending on the thickness of brake disk
  Remove the distance plate after having taken out the first half of the brake.
- Remove the 2-off cap screws (M10) serving for fastening the second half of the brake to the connection plate.
- Remove the second half of the brake (component 1).

👉 ATTENTION!
Between the two halves of the brake there is one or there are two sealing rings, respectively. Please make sure not to lose them.
4 Assembly

4.10 Spares Inventory, Customer Service Addresses

A basic requirement to guarantee the operational readiness of the brake is a stock of the most important spare parts on site.

Contact addresses of the KTR partners for spare parts and orders can be obtained from the KTR homepage under www.ktr.com.

**ATTENTION!**
KTR does not assume any liabilities or guarantees regarding the use of spare parts and accessories which are not provided by KTR and for the damages resulting herefrom.

4.11 Disposal

In respect of environmental protection we would ask you to dispose of the products on termination of their service life in accordance with the effective legal regulations and standards, respectively.

- **Metal or brake pads, respectively**
  Brake pads and any other metal parts have to be cleaned and disposed of by scrap metal.

- **Gaskets**
  Gaskets can be disposed of by residual waste.

- **Hydraulic oil**
  Hydraulic oils have to be collected in suitable tanks and disposed of by a waste disposal company.

5 Maintenance

5.1 Replacement of Brake Pads

**ATTENTION!**
Brake pads having a balance of pad height of 2 mm have to be replaced by return.

- Discharge the pressure fully from the hydraulic system.

**CAUTION!**
Please make sure that the overall brake system is depressurized.

**DANGER!**
Parts falling down may cause injury of persons or damage to the machine.
Secure the driving parts during assembly or disassembly.

- Unscrew the 8-off screws (M27) serving for fastening the brake to the connection plate. Afterwards remove 7 out of the 8 screws.
- Turn the top half of the brake away from the brake disk using the remaining screw as a hinge.
- Replace the brake pad which has worn off. Insert the brake pad in the housing as deep as possible. Compress the brake pad and brake piston manually.
- Turn the top half of the brake back to its original position.
5 Maintenance

5.1 Replacement of Brake Pads

ATTENTION!
Before you displace the brake halves to their original position, please observe chapter 4.2 Preparation of assembly.

- Please repeat this chapter with the lower half of the brake.
- Screw the brake to the connection plate by means of 8 screws and tighten them hydraulically evenly stepwise at 1/3 and afterwards 2/3 of the tightening torque $T_a$ (see table 3). Afterwards tighten the screws hydraulically at the full tightening torque mentioned in table 3. Other tightening processes after consultation with KTR.

ATTENTION!
Please note chapter 4.4 Mounting of brake.

- Before you reactivate the brake, see chapter 4.7 start-up of brake.

5.2 Maintenance of the Brakes / Replacement of Single Parts

ATTENTION!
To ensure the full braking power, both disassembly and assembly have to be performed at the highest level of cleanness.

- Disassemble the brake, see chapter 4.9 disassembly of brake.
- Take off the brake pads (component 2).
- Press the brake pistons (component 1.2) with the hydraulic pressure at the pressure connection out of the housing (component 1.1).
- Remove the U-caps (component 1.4) and scrapers (component 1.3).

ATTENTION!
When removing the U-caps and scrapers please make sure that the keyways in the housing are not damaged.

- The components have to be cleaned from dirt, grease and corrosion protection. The components can easily by cleaned by means of solvents. Afterwards dry the components.

CAUTION!
Please pay attention to the manufacturer’s instructions with regard to solvents.

- Insert the new U-caps (component 1.4) and scrapers (component 1.3) in the housing (component 1.1). For that purpose the components may be heart shaped (see illustration 14).

CAUTION!
The U-caps and scrapers have to be installed in the right direction (see illustration 15).

ATTENTION!
With a re-assembly of the brake piston basically new U-caps and scrapers have to be used, since their function is no longer ensured subject to wear and damages.
5 Maintenance

5.2 Maintenance of the Brakes / Replacement of Single Parts

- Grease the U-caps and scrapers with hydraulic oil (see illustration 15).

**CAUTION!**

Oils and greases with additives of molybdenum disulphide or zinc sulphide must not be used.

Illustration 14: assembly of U-cap and scraper

Illustration 15

**CAUTION!**

Inspect the surfaces of the brake pistons and the holes of the housing to make sure that they are neither scratched nor damaged, since the surfaces are either ground or polished. Such kind of damages may cause an earlier wear on the U-caps and scrapers and produce leakages.

- Insert the brake pistons (component 1.2) in the housing (component 1.1) and compress them against a stop.
- Repeat chapters 4.2 to 4.7.

5.3 Maintenance and Service

**KTR-STOP® YAW M** is a low-maintenance brake. We recommend to perform a visual inspection and an operational testing on the brake at least once a year. Here you should put special emphasis on leakages, corrosion, wear of brake lining and the condition of the screw connections.

**ATTENTION!**

If you realize any irregularities, please perform repairs accordingly.