

## YAW M

YAW M B-xx is a disk brake in an active design serving for transmitting a brake force onto a brake disk in order to decelerate or stop its rotation, respectively, or keep it at standstill.

	<b>KTR-STOP®</b>	KTR-N 445120 EN
	<b>YAW M B-xx</b>	Sheet: 2 of 16
	<b>Operating/Assembly instructions</b>	Edition: 1

The KTR-STOP® YAW M B-xx brake was designed for use as a stop brake. For any other applications please consult with KTR.

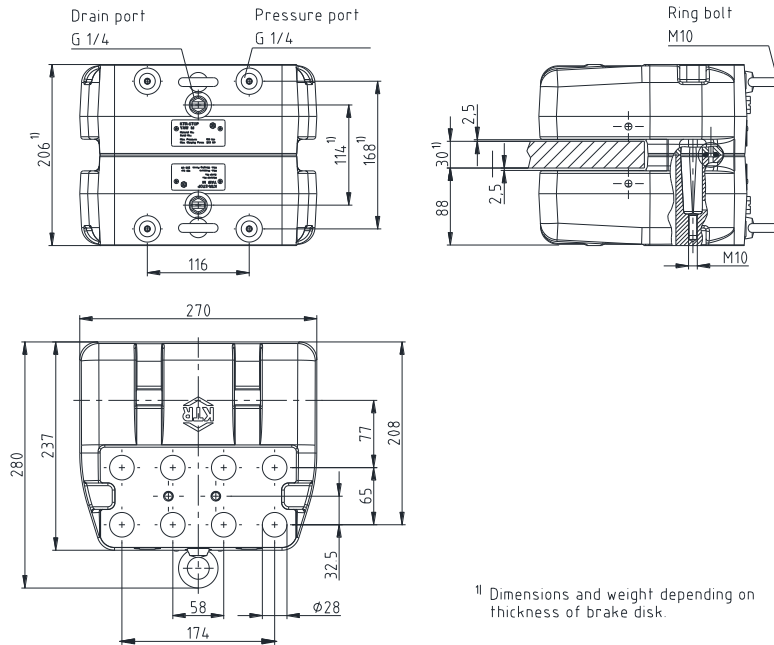
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**1 Technical data**



<sup>1)</sup> Dimensions and weight depending on thickness of brake disk.

Illustration 1: Dimensional drawing

**Table 1: Technical data**

		<b>YAW M B-xx</b>
Weight	[kg]	Approx. 63 <sup>1)</sup>
Width of brake pad	[mm]	108
Surface of each brake pad	[mm <sup>2</sup> ]	20,300
Max. wear of each brake pad (material: organic)	[mm]	7
Rated coefficient of friction <sup>2)</sup>	[μ =]	0.4
Total brake piston surface - complete brake	[cm <sup>2</sup> ]	254
Volume for each brake caliper with 1 mm stroke	[cm <sup>3</sup> ]	25.4
Pressure port		G 1/4
Oil bleed		G 1/4
Max. clamping force	[kN]	203
Max. operating pressure	[bar]	160
Thickness of brake disk	[mm]	30 - 50
<i>External assembly of brake</i>		
Min. diameter of brake disk ØD <sub>A</sub>	[mm]	500
<i>Internal assembly of brake</i>		
Min. diameter of brake disk ØD <sub>i</sub>	[mm]	900
Operating temperature	[°C]	-20 to +50

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

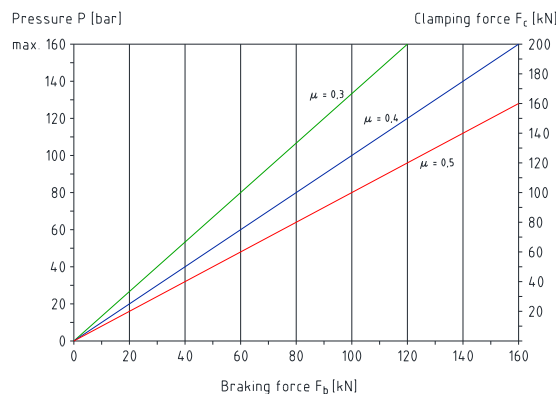


Illustration 2: Diagramme

$$F_b = F_c \cdot 2 \cdot \mu$$

$$M_b = z \cdot F_b \cdot \frac{D_{av}}{2}$$

- F<sub>b</sub> = Brake power [kN]
- F<sub>c</sub> = Clamping force [kN]
- M<sub>b</sub> = Braking torque [kNm]
- z = Number of brakes with each brake pad
- D<sub>av</sub> = Effective diameter of brake [m]

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**1 Technical data**

**Dimensions of brake disk**

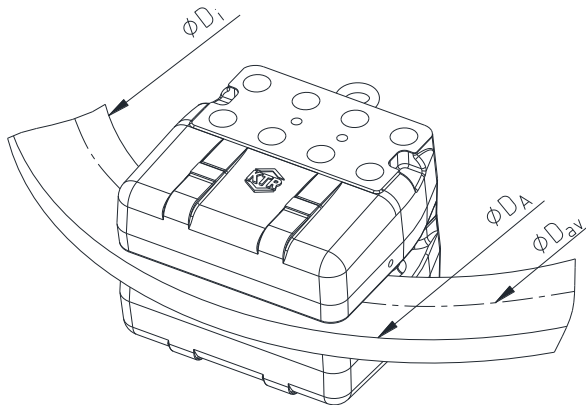


Illustration 3: Internal assembly of brake

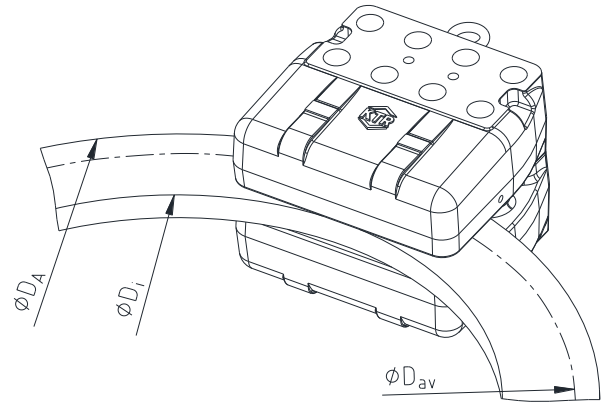


Illustration 4: External assembly of brake

**Table 2: Calculation of brake disk**

Internal assembly of brake	External assembly of brake
$D_{i \min.} = \sqrt{D_{av}^2 - 200 \cdot D_{av} + 46000}$	
$D_{av} = \sqrt{D_i^2 - 36000} + 100$	$D_{av} = D_A - 102$
$D_{A \min.} = D_i + 250$	$D_{i \max.} = D_A - 240$

**Connection dimensions of brake**

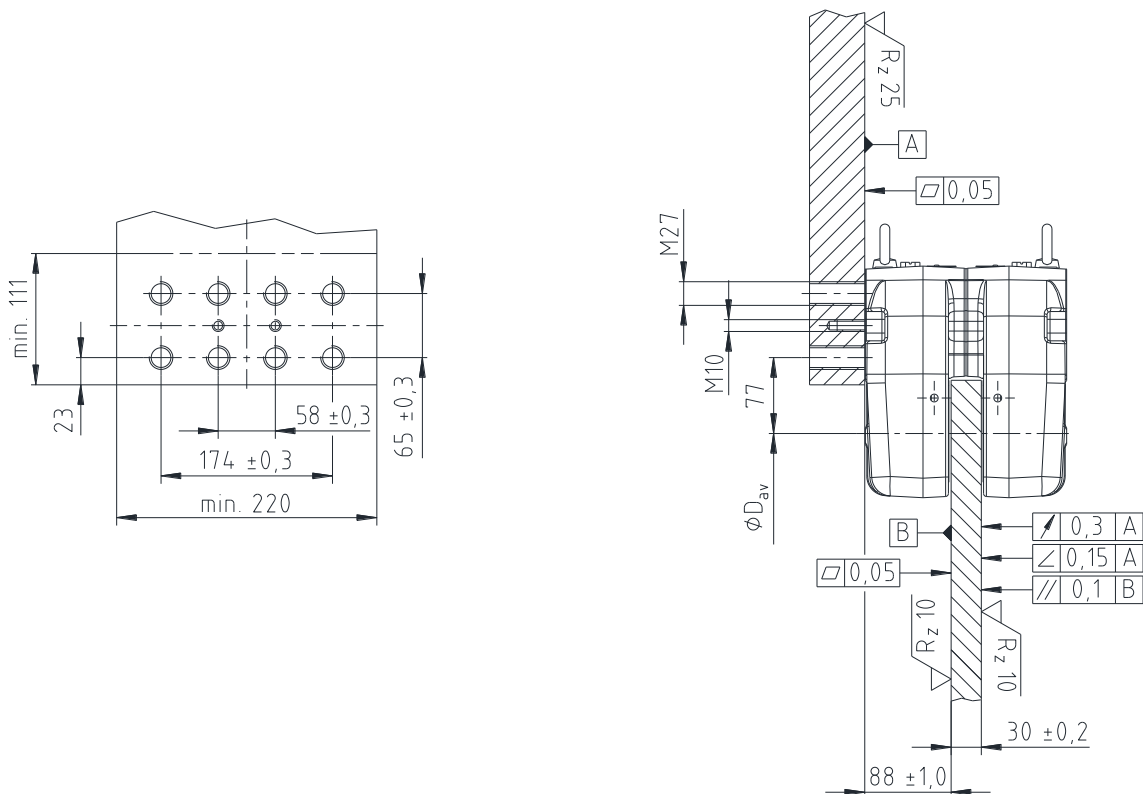


Illustration 5: Connection dimensions

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## 2 Advice

### 2.1 General advice

Please read carefully through these operating/assembly instructions before you start up the brake.  
 Please pay special attention to the safety instructions!  
 The operating/assembly instructions are part of your product. Please store them carefully.  
 The copyright for these operating/assembly instructions remains with KTR.

### 2.2 Safety and advice symbols



**Warning of personal injury**

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death.



**Warning of product damages**

This symbol indicates notes which may contribute to preventing material or machine damage.



**General advice**

This symbol indicates notes which may contribute to preventing adverse results or conditions.

### 2.3 General hazard warnings



**With assembly, operation and maintenance of the brake it has to be made sure that the entire drive train is secured against accidental switch-on. You may be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety indications.**

- All operations on and with the brake have to be performed taking into account "safety first".
- Make sure to switch off the power pack before you perform your work on the brake.
- Secure the power pack against accidental switch-on, e. g. by providing warning signs at the place of switch-on or removing the fuse for current supply.
- Do not reach into the operating area of the brake as long as it is in operation.
- Please secure the brake against accidental contact. Please provide for the necessary protection devices.
- Please make sure that the overall brake/hydraulic system is depressurized during maintenance operations.

### 2.4 Intended use

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

- have carefully read through the operating/assembly instructions and understood them
- had technical training
- are authorized 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 will not assume liability for any damage that may arise. In the interest of further development we reserve the right for technical modifications.

The brake type YAW M B-xx described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

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### 3 Storage, transport and packaging

#### 3.1 Storage

The brake is delivered in 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 sticking together of the gaskets.



**The storage rooms must 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 condensation is not generated. The best relative air humidity is less than 65 %.**

#### 3.2 Transport and packaging



**In order to avoid any injuries and any kind of damage always make use of proper transport and lifting equipment.**

The brake is packed differently each depending on number and kind of transport. Unless otherwise contractually agreed, packaging will follow the in-house packaging specifications of KTR.

### 4 Assembly

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

#### 4.1 Components of the brake

##### Components/component assemblies of brake – Type YAW M B-xx

Component/subassembly	Quantity	Description
1	2	Housing with components
2	2	Brake pad
3	1)	Distance plate
4	1)	Gasket

1) Number depends on thickness of brake disk.

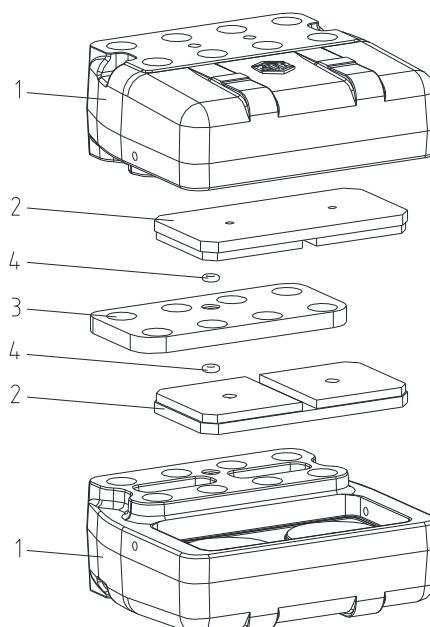


Illustration 6: Components of the brake

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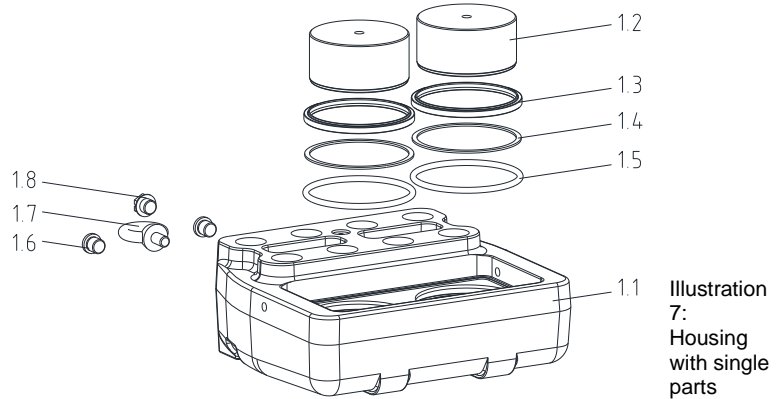


**4 Assembly**

**4.1 Components of the brake**

**Subassembly 1 - Housing with components**

Component	Quantity	Description
1.1	1	Housing
1.2	2	Brake piston
1.3	2	Scraper
1.4	2	Back-up ring
1.5	2	O-ring
1.6	2	Screw plug VSTI (acc. to DIN 908)
1.7	1	Eye bolt DIN 580
1.8	1	Screw plug



**4.2 Preparation of assembly**



To ensure the full braking power, the preparation for 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 investigate the connection dimensions, connection surfaces and tolerances as specified in the drawing (see illustrations 1 to 5 and table 2).
- Clean and degrease the brake disk and mounting surfaces. Dirt can easily be removed by means of solvents.



The connection between connection plate and brake is defined as 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.



Observe the manufacturer's instructions regarding the use of solvents.

**4.3 Brake pads**



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

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

- organic material
- powder metal



Brake pads are highly sensitive to grease and oil which means that they cannot be cleaned. Brake pads with such dirt need to be replaced and disposed of.



We recommend to store the brake pads in their package as long as possible to protect them from any kind of dirt.



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

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4 Assembly

4.4 Assembly of the brake



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

On the reverse side of the brakes there are threads for eye bolts serving for using lifting devices. The eye bolts should be disassembled after assembly of the brake and stored in a safe place.



In order to avoid any damages on the brake, never twist a rope or another lifting tool around damageable components.

- Before you start with the assembly each one dust protection plug needs to be removed from both housings (component 1).
- Insert the brake pads into the housing as deep as possible. Compress the brake pads and 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.

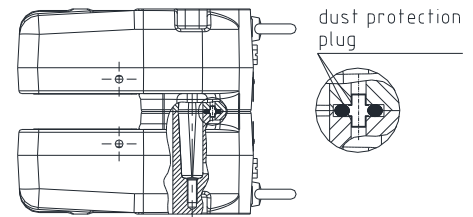


Illustration 8: Dust protection plug

- Push a housing in the correct position of the connection plate and fasten the housing via 2 cap screw M10.
- Insert the O-ring (component 4) in the counterbore.
- **Depending on the thickness of brake disk:**  
Put the distance plate (component 3) onto the housing and insert the second gasket (component 4) into the indentation of the distance plate.
- Fit the second housing in the correct position onto the first housing resp. distance plate.
- Screw the brake to the connection plate by means of 8-off screws and tighten them hydraulically evenly gradually at 1/3 and afterwards 2/3 of the tightening torque  $T_A$  (see table 3). Afterwards tighten the screws at the full tightening torques specified in table 3 hydraulically. For any other tightening procedures please consult with KTR.

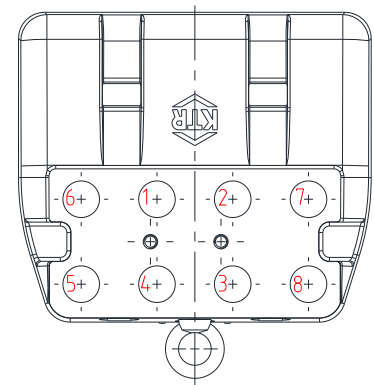


Illustration 9: Tightening of connection screws



Preferably use the order specified in illustration 9.

Table 3: Tightening torques

Screw size	Tightening torque $T_A$ [Nm] – 10.9	
	Untreated and oiled	Greased with MoS <sub>2</sub>
M27	1496	1100

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



In order to avoid any contact between the brake disk and the brake resulting from thermal expansion, the distance of the brake as per table 2 needs to be observed.



Make sure that the tolerances of the brake disk do not exceed the figures specified in illustration 5.

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4 Assembly

4.5 Pressure port of a brake

- Connect the pressure oil line to the pressure ports of the brake (see illustration 10 and 11). For that purpose remove the screw plug beforehand.



**The hydraulic lines have to be rinsed before connecting to the brake to prevent any particles from getting into the brake. If the lines are not rinsed sufficiently, the gaskets may be damaged and the operation of the brake is no longer ensured.**

- Mount a miniature measuring coupling with a miniature measuring hose to the venting hole (see illustration 10 and 11), for that purpose the screw plug needs to be removed beforehand. Discharge the end of the miniature measuring hose in a suitable collection container.



**The pressure ports on top serve for venting the brake. For a wash-up system make use of one of the pressure ports on top.**



**Always connect the brake consisting of two halves to a pressure line (see illustration 11), since the brake disk is loaded with the full braking power on one side in case if one half of the brake fails.**



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

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



**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 generated, a pneumatic hose may be used, too. Inspect the brake for leakages regularly.**



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

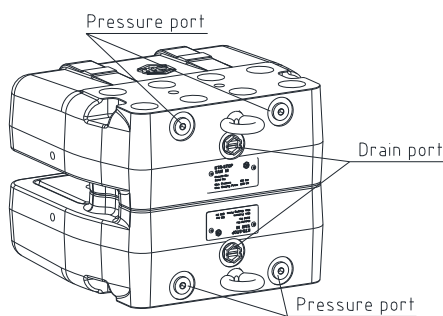


Illustration 10: Connections of the drain lines/pressure lines

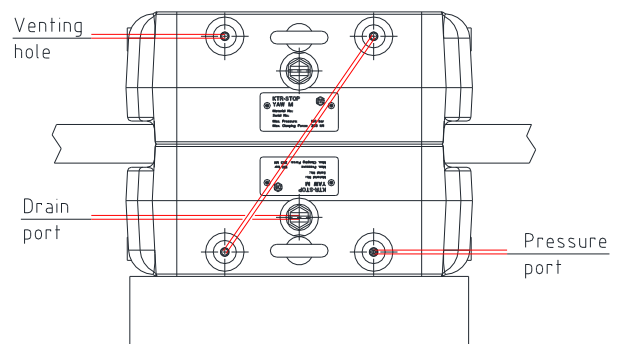


Illustration 11: Pressure port of a brake



**Please make sure that the connections and hoses are adapted to the brakes with regard to pressure, flow rate, temperature and liquid. Moreover, you have to use flexible hydraulic hoses in order to not limit the motions of the brake. Any hoses which are located close to mobile components should be secured or coated accordingly.**

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4 Assembly

4.6 Pressure port of several brakes



If several brakes are assembled we recommend to connect the pressure port 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 line to the pressure ports of the brake (see illustration 10, 12 and 13). For that purpose remove the screw plug beforehand.



The hydraulic lines have to be rinsed before connecting to the brake to prevent any particles from getting into the brake. If the lines are not rinsed sufficiently, the gaskets may be damaged and the operation of the brake is no longer ensured.

- Mount a miniature measuring coupling with a miniature measuring hose to the venting hole (see illustration 10, 12 and 13), for that purpose the screw plug needs to be removed beforehand. Discharge the end of the miniature measuring hose in a suitable collection container.



The pressure ports on top serve for venting the brake. For a wash-up system make use of one of the pressure ports on top.



Always connect the brake consisting of two halves to a pressure line (see illustration 12 and 13), since the brake disk is loaded with the full braking power on one side in case if one half of the brake fails.



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



It is not recommended to use steel plugs for venting.

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



In order to locate a leakage immediately, it is recommended to use a transparent hose and collection container on every single brake. Since higher pressures (5 bar at the maximum) are not generated, a pneumatic hose may be used, too. Inspect the brake for leakages regularly.



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

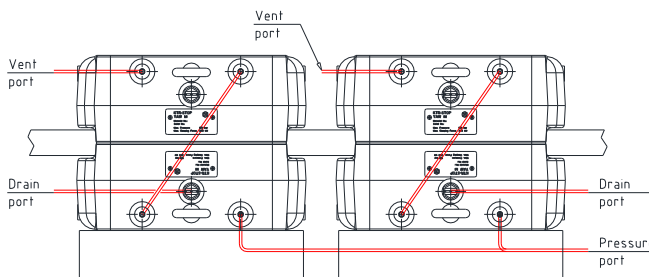


Illustration 12: Pressure port of several brakes (in parallel)

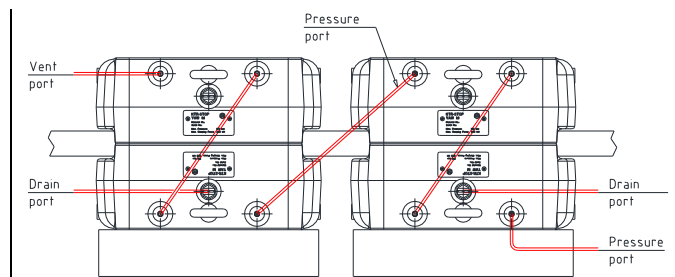


Illustration 13: Pressure ports of several brakes (in a series)

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## 4 Assembly

### 4.6 Pressure port of several brakes



Please make sure that the connections and hoses are adapted to the brakes with regard to pressure, flow rate, temperature and liquid. Moreover, you have to use flexible hydraulic hoses in order to not limit the motions of the brake. Any hoses which are located close to mobile components should be secured or coated accordingly.

### 4.7 Start-up of the brake



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



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 while to make sure that the brake is rinsed with hydraulic oil. Repeat this process until a stream of clean oil dissipates from the miniature measuring hose.
- Remove the miniature measuring hose.



If the miniature measuring coupling is removed as well, the screw plug (component 1.6) 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 5.
- The active brake described in here does not require any gap to release the brake or brake pads, respectively.
- Put some pressure on the hydraulic system. This will allow the brake pads to fit onto the brake disk.



The hydraulic system must never be operated at a higher pressure than the figures specified in the type plate of the brake or table 1. If any figures or types/sizes are changed, please consult with KTR.



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

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

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## 4 Assembly

### 4.8 Recommendation of liquids to be used



You may only use mineral hydraulic liquids meeting the demands of DIN 51524. KTR recommends those liquids corresponding to DIN 51524-3.

KTR recommends the following liquids (other manufacturers may be selected):

Manufacturer	Standard		Special	
<i>Mineral oil</i>	-20 °C to +40 °C (- 4 °F to 104 °F)	+10 °C to +60 °C (+ 50 °F to + 140 °F)	-30 °C to +20 °C (- 22 °F to 68 °F)	+30 °C to 70 °C (+ 86 °F to + 158 °F)
Castrol	Hyspin HVI 32	Hyspin HVI 46	-	Hyspin HVI 68
Shell	Tellus S2 VX32	Tellus S2 VX46	Tellus S4 VX32	Tellus S2 VX68
Mobil	DTE 10 Excel 32	DTE 10 Excel 46	-	DTE 10 Excel 68



The permissible operating temperatures from -20 °C to +50 °C (-4 °F to +122 °F) of the brake components have to be adhered to. For deviating operating temperatures please consult with KTR.

#### Viscosity

We would recommend a viscosity range from 20 to 220 mm<sup>2</sup>/s (cSt) of the hydraulic liquid with operating temperature.

The viscosity during starting should not exceed 500 mm<sup>2</sup>/s and the viscosity during operation should not fall below 12 mm<sup>2</sup>/s.

#### Filtration

When filling and re-filling the hydraulic system and replacing the hydraulic liquid, the oil needs to be filtered. For that purpose use an offline filter or a respective fill unit. In addition we would recommend to use an inline filter.



The service life of the brake system is extended depending on the degree 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:

- ISO 4406, class 18/16/13

#### Maintenance operations on the hydraulic system

In order to ensure smooth operation of the overall system, the maintenance operations on the hydraulic system (inspection of level and degree of dirt, replacing the hydraulic liquid or filter elements, etc.) have to be performed as per the manufacturer's operating instructions.

The system has to be rinsed or vented after each replacement of the hydraulic liquid.



Adverse reactions may be generated by mixing different liquids or liquids of various manufacturers.



Please contact the manufacturer of mineral oils if you intend to replace the hydraulic liquid.

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## 4 Assembly

### 4.9 Disassembly of the brake

- Release the pressure fully from the hydraulic system.



**Make sure that the entire brake system is depressurized.**



**Parts released or falling down may cause injury to persons or damage on the machine. Secure the components before disassembly.**

- Remove the highest located screw plug (component 1.6) from the venting hole (see illustrations 10 to 13).
- Drain the hydraulic oil completely from the brake.
- Dispose of the hydraulic oil as per chapter 5.
- Disconnect the drain and pressure oil line from the brake.
- Screw the screw plugs (component 1.6) in all pressure ports or venting holes (see illustration 10 to 13).
- Remove the 8-off screws (M27) serving for fixing the brake to the connection plate.
- Take out the brake.
- **Depending on the thickness of brake disk**  
Remove the distance plate after having taking out the first half of the brake.
- Remove the 2-off cap screws (M10) serving for fixing the second half of brake to the connection plate.
- Take out the second half of brake (component 1).



**There are one resp. two gaskets between the two brake halves. Make sure not to lose them.**

## 5 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 legal regulations and standards that apply, 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.

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## 6 Maintenance

### 6.1 Replacement of brake pads



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

- Release the pressure fully from the hydraulic system.



**Make sure that the entire brake system is depressurized.**



**Parts released or falling down may cause injury to persons or damage on the machine. Secure the components before disassembly.**

- Remove the 7-off or 8-off screws serving for fixing the brake to the connection plate.
- Swing the upper half of the brake from the brake disk by using the remaining screw as a joint.
- Replace the brake pad that has worn off. Insert the brake pad into the housing as deep as possible. Compress the brake pad and brake piston manually.



**Before you swing the brake half back to its original position, please note chapter 4.2 *Preparation of assembly*.**

- Repeat this chapter with the half of brake at the bottom.
- Screw the brake to the connection plate by means of 8-off screws and tighten them hydraulically evenly gradually at 1/3 and afterwards 2/3 of the tightening torque  $T_A$  (see table 3). Afterwards tighten the screws at the full tightening torques specified in table 3 hydraulically. For any other tightening procedures please consult with KTR.



**Please note chapter 4.4 *Assembly of the brake*.**

- Before you reactivate the brake, please observe chapter 4.7 *Start-up of the brakes*.

### 6.2 Maintenance of the brake / replacement of single parts



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

- Disassemble the brake, please observe chapter 4.9 *Disassembly of brakes*.



**One O-ring is located between the two halves of the brake. Make sure not to lose it.**

- Take out the brake pads (component 2).
- Press the brake pistons (component 1.2) out of the housing (component 1.1) by means of some hydraulic pressure on the pressure port.
- Remove the gaskets (component 1.4 and 1.5) and the scraper (component 1.3).



6 Maintenance

6.2 Maintenance of the brake / replacement of single parts



When removing the gaskets and scrapers 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 be cleaned by means of solvents. Afterwards dry the components.



Observe the manufacturer's instructions regarding the use of solvents.

- Insert gaskets (component 1.4 and 1.5) and scrapers (component 1.3) into the housing (component 1.1). For that purpose the components may be heart-shaped (see illustration 14).



The gaskets and scrapers have to be installed in the right direction (see illustration 15).



With a reassembly of the brake piston basically new gaskets and scrapers have to be used, since their operativeness is no longer ensured due to wear and damages.

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



Oils and greases containing molybdenum disulphite or zinc sulphite additives must not be used.

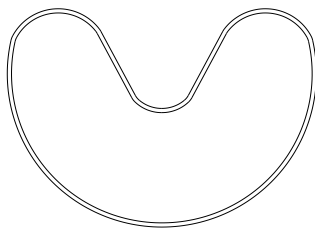


Illustration 14: Assembly of O-ring, support ring and scraper

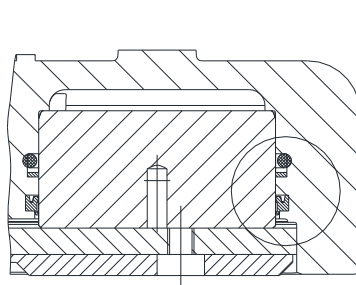
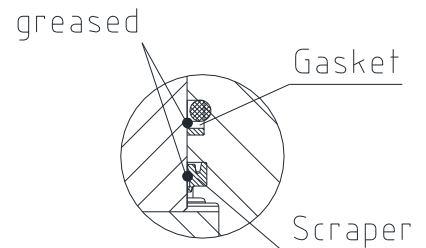


Illustration 15



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 earlier wear on the gaskets and scrapers and generate leakages.

- Insert the brake pistons (component 1.2) in the housing (component 1.1) and press them against a stop.
- Mount the (new) brake pad. Insert the brake pad into the housing as deep as possible. Compress the brake pad and brake piston manually.
- Repeat chapters 4.2 to 4.7.

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## 6 Maintenance

### 6.3 Maintenance and service

**KTR-STOP® YAW M B-xx** 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 pads and the condition of the screw connections.



**If you realize any irregularities, perform repairs accordingly.**

## 7 Spares inventory, customer service addresses

A basic requirement to ensure the readiness for use 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 at [www.ktr.com](http://www.ktr.com).



**KTR does not assume any liability or warranty for the use of spare parts and accessories which are not provided by KTR and for the damages which may incur as a result.**

Please observe protection note ISO 16016.	Drawn: 2019-11-18 Shg/Wie Verified: 2019-11-22 Shg	Replacing: --- Replaced by:
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