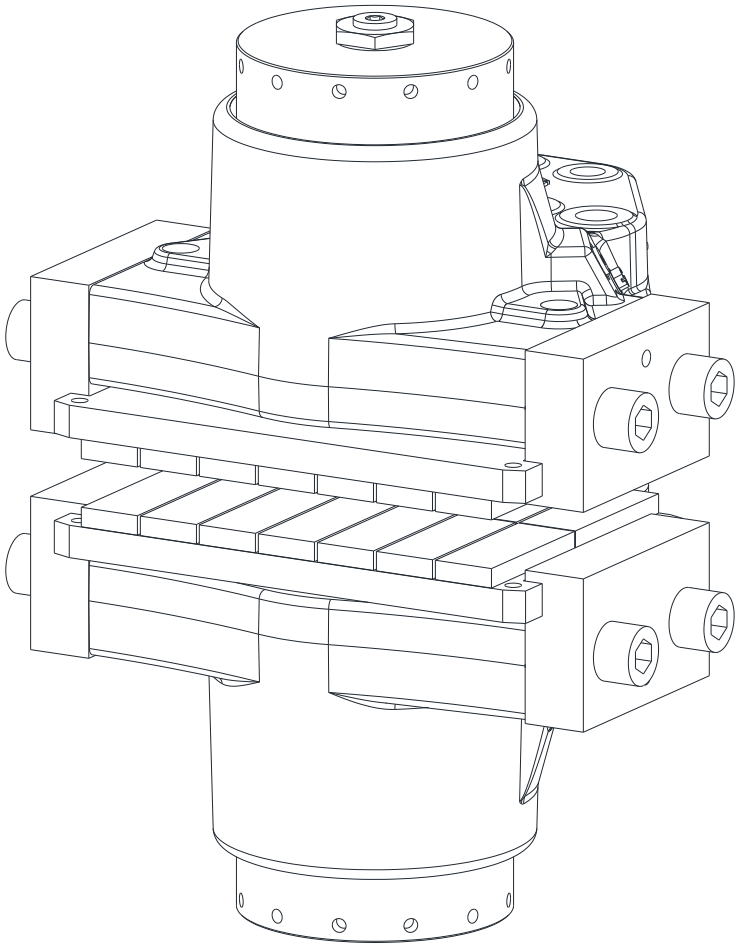

KTR-STOP® M-xxx B-xx-xx

M-xxx B-xx-xx is a spring-actuated brake in a fixed calliper design serving to generate a brake force onto a brake disk in order to decelerate a plant's movement or stop it, respectively, or keep it at standstill.

The KTR brake system was designed to operate as a service brake/emergency stop brake on rotating brake disks. For any other applications please consult with KTR.

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1 Technical data

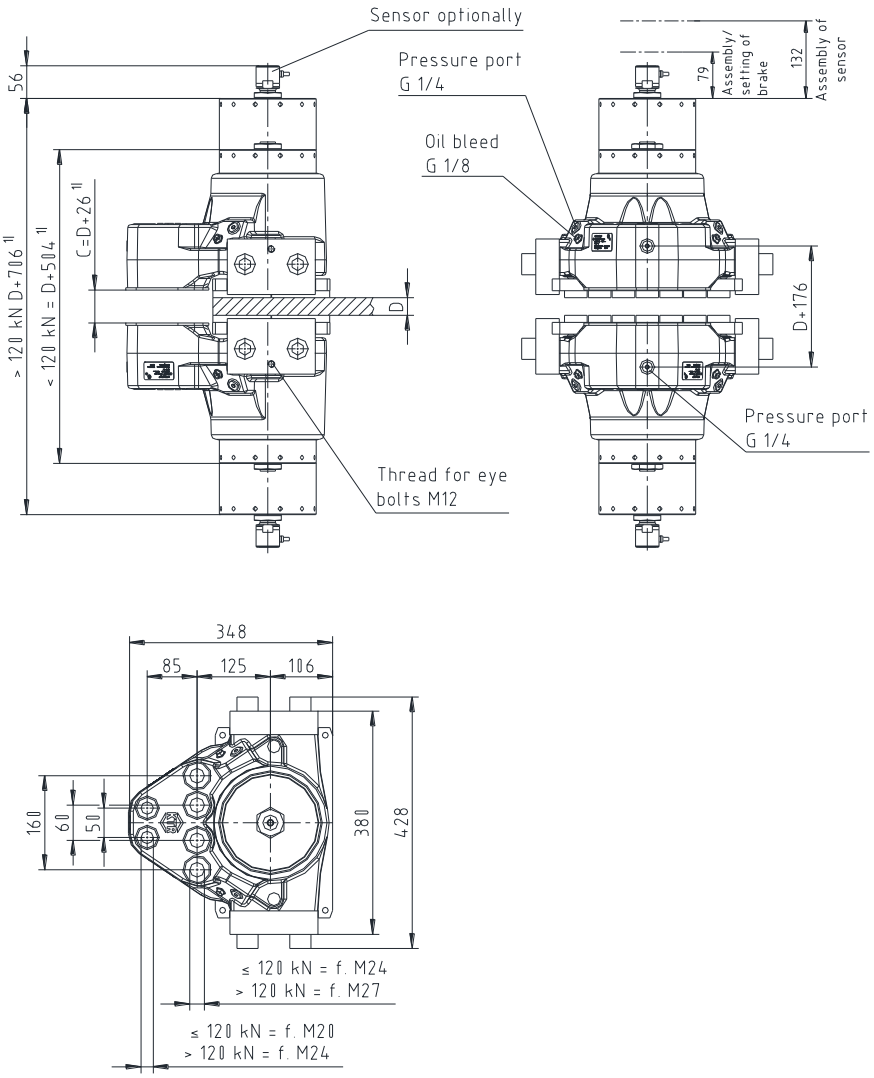

Illustration 1: Dimensional drawing

Table 1: Technical data

			M-xxx B-xx-xx
Weight		[kg]	Approx. 185 - 215 [1]
Width of brake pad		[mm]	200
Surface of each brake pad	organic	[mm²]	57,900
	powder metal	[mm²]	53,500
Max. wear of each brake pad		[mm]	10
Rated coefficient of friction [2]		[μ =]	0.4
Total brake piston surface - complete brake		[cm²]	137.4
Volume for each brake caliper with 1 mm stroke		[cm³]	13.74
Max. operating pressure		[bar]	200
Pressure port			G 1/4
Oil bleed			G 1/8
Min. diameter of brake disk ØD$_A$		[mm]	800
Operating temperature		[°C]	-20 to +50

1) Weight depending on clamping force

1 Technical data

Table 2: Clamping force, loss of preload force andopening pressure

Brake type [3]	Clamping force F_c [kN]	Loss of power [4] [%]	Opening pressure [bar]	Braking torque [Nm] with brake disk Ø [mm]		
				800	1500	2000
KTR-STOP® M-100 B-xx-xx	100	7.0	110	24000	52000	72000
KTR-STOP® M-110 B-xx-xx	110	6.5	120	26400	57200	79200
KTR-STOP® M-120 B-xx-xx	120	8.5	130	28800	62400	86400
KTR-STOP® M-130 B-xx-xx	130	5.0	140	31200	67600	93600
KTR-STOP® M-140 B-xx-xx	140	4.5	150	33600	72800	100800
KTR-STOP® M-150 B-xx-xx	150	7.5	165	36000	78000	108000
KTR-STOP® M-160 B-xx-xx	160	7.0	180	38400	83200	115200
KTR-STOP® M-170 B-xx-xx	170	6.5	190	40800	88400	122400
KTR-STOP® M-180 B-xx-xx	180	6.0	190	43200	93600	129600

2) The friction coefficient each depends on the application or material of the brake pad; please consult with KTR.
3) Other brake types on request
4) With a stroke of 1 mm

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

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

F_b = Brake power [kN]
F_c = Clamping force [kN]
M_b = Braking torque [kNm]
z = Number of brakes
D_{av} = Effective diameter of brake [m]

Table 3: Calculation of brake disk

$D_{C\,max.} = D_A - 420$
$D_{av} = D_A - 200$

Connection dimensions of brake

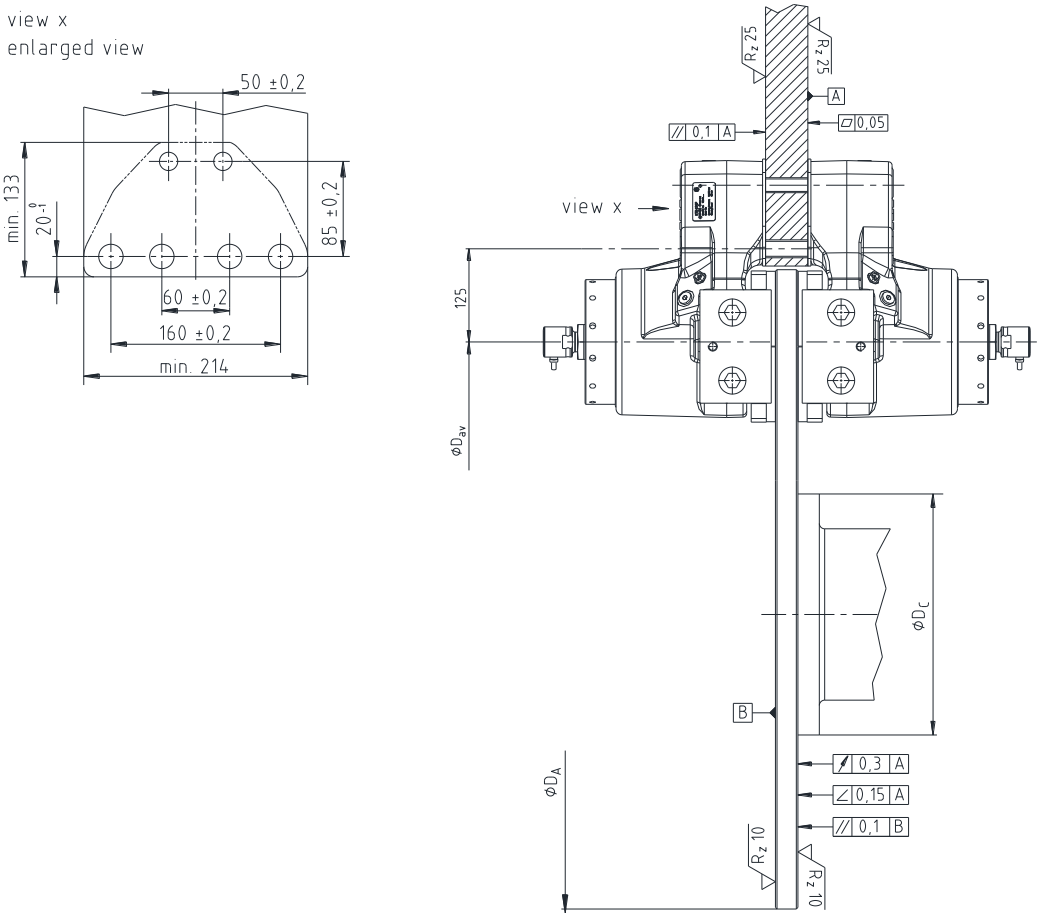

Illustration 2: Connection dimensions

2 Advice

2.1 General advice

Please read through these operating/assembly instructions carefully 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 M-xxx B-xx-xx** described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

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 for 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 applied over the full braking distance in order to prevent the gaskets from sticking together.

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 please 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.

The brake is generally supplied with the transport lock mounted.
The screw plug (component 1.20) is attached to the brake in bulk.

4.1 Components of the brake

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

Component/subassembly	Quantity	Description
1	2	Housing with components
2	4	Pad retraction set on fixed side
3	2	Brake pad
4	2 [1)]	Sensor

1) Optionally available

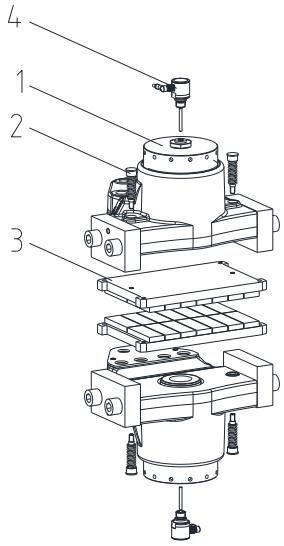

Illustration 3: Components/subassemblies of brake

4 Assembly

4.1 Components of the brake

Component assembly 1: Housing with components

Compo-nent	Quantity	Description
1.1	1	Housing
1.2	1	Brake piston
1.3	1	Scraper
1.4	1	Gasket
1.5	1	Gasket
1.6	1	Set of disk springs
1.7	1	Setting nut
1.8	1	Centering pin
1.9	1	O-ring
1.10	1	Scraper
1.11	1	Gasket
1.12	1	Gasket
1.13	3	Screw plug VSTI (acc. to DIN 908)
1.14	2	Pad retainer
1.15	2	Cap screw DIN EN ISO 4762 - 10.9
1.16	1	Drain plug (nylon)
1.17	1	Distance plate
1.18	2	Countersunk screw
1.19	1	Connection adapter
1.20	1	Screw plug VSTI (acc. to DIN 908)

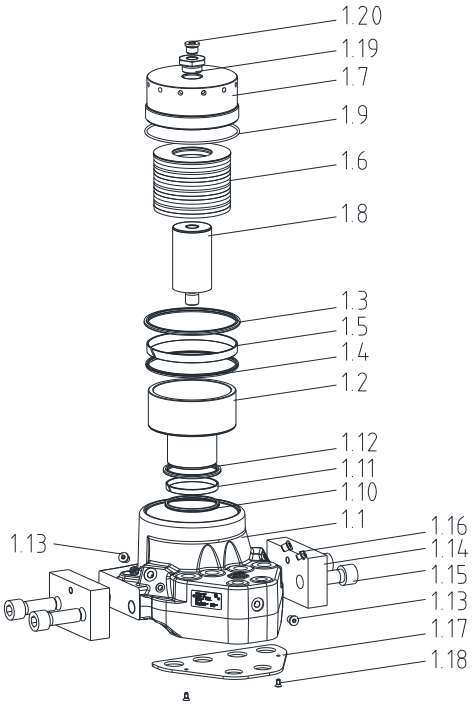

Illustration 4: Housing with single parts

Component assembly 2: Pad retraction sets

Compo-nent	Quantity	Description
2.1	1	Cap screw DIN EN ISO 4762 - 10.9
2.2	1	Pressure spring
2.3	1	Sealing plug

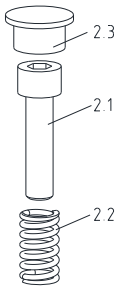

Illustration 5: Pad retraction set

4.2 Preparation of assembly

To ensure the full braking power, the preparation for assembly needs to be carefully performed.

- The connection plate or the stand 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 and 2 and table 3).
- Clean and degrease the brake disk and mounting surfaces. Dirt can easily be removed by means of solvents.

4 Assembly

4.2 Preparation of assembly

The connection between connection surface and brake is defined as frictional contact. 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.

Please 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 corresponding 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 having such kind of dirt need to be replaced and disposed of.

We would 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.

4.4 Assembly of the brake

If one half of the brake has to be mounted under pressure (without transport lock) for reasons of space, please consult with KTR.

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

M12 threads are positioned in the pad retainer to fasten an eye bolt serving to use lifting tools. The eye bolt is to be dismounted 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 please check if a sensor has been mounted.
Please remove it before assembly in order to avoid any damages.

- Inspect the position of the setting nut (component 1.7). If necessary, set it to the right dimension (see illustration 12).
- Insert the brake pads (component 3) fully into the housing.

4 Assembly

4.4 Assembly of the brake

☞ **If you want to use brake pads after having assembled the brake, it is necessary to disassemble the pad holder (component 1.14 and 1.15) for that purpose (chapter 5.1).**

- Mount the pad retraction sets (component assembly 2) by screwing the screw (component 2.1) with the pressure spring (component 2.2) into the brake pad.
- Hand-tighten the screw.
- Insert the protective plug (component 2.3).

☞ **Secure the screw connection (component 2.1) on the brake pad additionally against working loose, e. g. conglutinating with Loctite (average strength).**

- Insert the first half of the brake (component 1) in the correct position towards the connection plate or stand, respectively (see illustration 6).
- Insert one of the six connection screws into the brake until the face of the connection screw is flush with the rear connection plate respectively stand.

☞ **You should preferably insert the connection screw marked with 1 in illustration 6.**

- Insert the second half of the brake in the correct position towards the connection plate or stand, respectively.
- Push the connection screw screwed in before through the second half of the brake and align it symmetrically.
- Fasten the connection screw at the tightening torques specified in table 4.
- Repeat this process until the total of 6 connection screws have been mounted.

☞ **To facilitate the assembly it is possible to fix the position of the brake by one connection screw only first. Swing in the brake until the balance of the screws can be assembled, too (see illustration 6).**

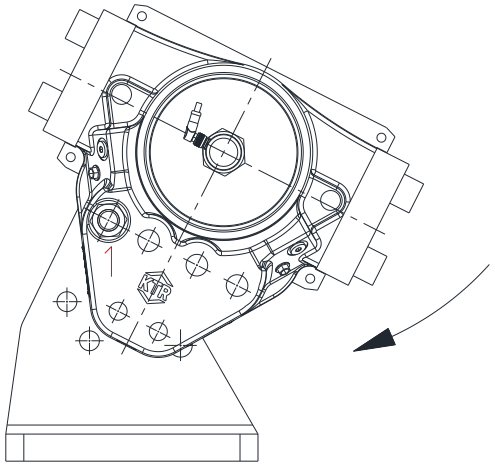

Illustration 6

Table 4: Tightening torques of the connection screws

Screw size	Tightening torque T_A [Nm] – 10.9 untreated and oiled	Tightening torque T_A [Nm] – 10.9 greased with MoS_2
M20	592	438
M24	1017	754
M27	1496	1100

☞ **In order to avoid any contact between the brake disk and the brake resulting from thermal expansion, the distance of the brake according to table 3 needs to be observed.**

⚠ **Please make sure that the tolerances of the brake disk do not exceed the figures specified in illustration 2.**

4 Assembly

4.5 Pressure port of a brake

- Connect the pressure oil line to one of the pressure ports of the brake (see illustration 7 and 8). 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 7 and 8), 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 please make use of one of the pressure ports on top.

Always connect the brake consisting of two halves to a pressure line (see illustration 8), since the brake disk is loaded with the full braking power on one side in case that 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 7 and 8). For that purpose remove the sealing plugs beforehand.

If no drain line is connected, a vacuum may be generated inside the brake which will damage the gaskets.

Never give any pressure on the drain line. Gaskets and scrapers are destroyed in this way.

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. Please regularly inspect the brake for leakages.

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.

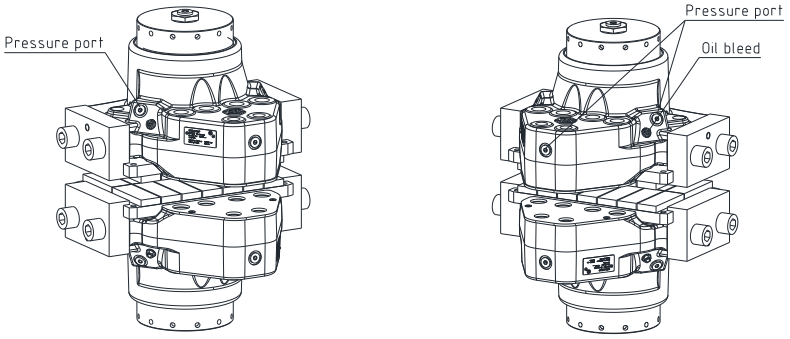

Illustration 7: Connections of the drain lines/pressure lines

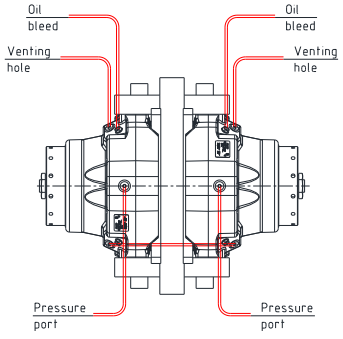

Illustration 8: Pressure port of a brake

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.

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 9).
Please note, if several brakes are connected in a series (see illustration 10), 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 8, 9 and 10). For that purpose remove the screw plugs 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 8, 9 and 10), for that purpose the screw plug needs to be removed beforehand. Discharge the end of the miniature measuring hose in a suitable collection container.

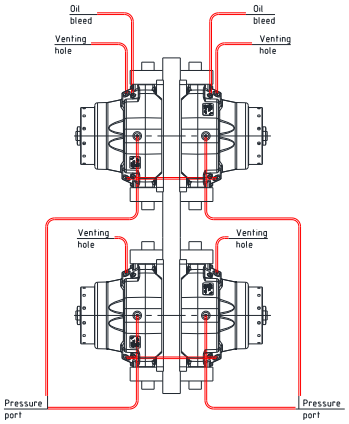

Illustration 9: Pressure port of several brakes (in parallel)

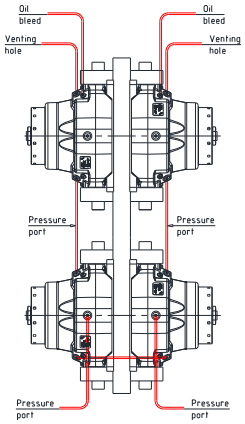

Illustration 10: Pressure port of several brakes (in a series)

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

Always connect the brake consisting of two halves to a pressure line (see illustration 9 and 10), since the brake disk is located with the full braking power on one side in case that one half of the brake fails.

With the parallel connection of brakes (see illustration 9) each brake needs to be vented individually.

It is not recommended to use steel plugs for venting.

- Connect the drain pipe to the brake (see illustration 8, 9 and 10). For that purpose remove the sealing plugs beforehand.

If no drain line is connected, a vacuum may be generated inside the brake which will damage the gaskets.

Never give any pressure on the drain line. Gaskets and scrapers will be destroyed in this way.

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. Please regularly inspect the brake for leakages.

4 Assembly

4.6 Pressure port of several brakes

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.

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 4.9).

- 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 1.13) needs to be screwed in the venting hole (see illustrations 9 and 10).

- Dispose of the hydraulic oil of the collection container as per chapter 4.12.
- Put the opening pressure (see table 2) on the hydraulic system to relieve the assembly lock.

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 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.

4 Assembly

4.7 Start-up of the brake

- Remove the screw with the disk (assembly lock, see illustration 11) on both sides from the centering pin (component 1.8).

☞ **Afterwards store the assembly lock (screw with disk) in a safe place since it will be required again later.**

- Screw the screw plug (component 1.20) on both sides into the setting nut (component 1.7).
- **<u>Applying with the use of a sensor only:</u>**
  Mount the sensor (component 4) according to chapter 6.2 instead of the screw plug (component 1.20).
- The brake pads have to be ground in on the surface of the brake disk to achieve the nominal coefficient of friction.

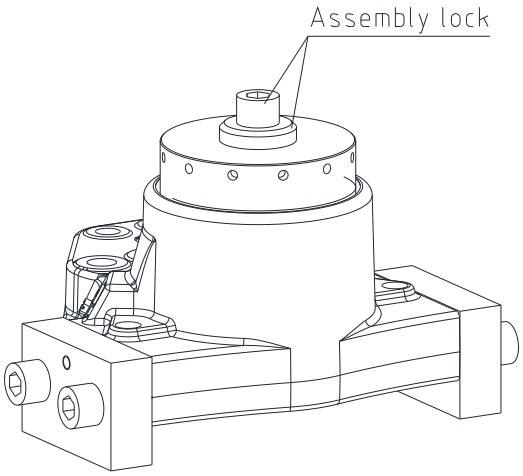

Bild 11: Assembly lock

☞ **Please observe the instructions for grinding-in according to KTR-N.**

4.8 Setting/Re-setting of the brake

☞ **The brake needs to be set with the initial assembly or after having replaced the brake pads or single parts, respectively. Only in this way it is ensured that the brake has the clamping force specified.**

☞ **In case of wear of the brake pads the brake needs to be regularly reset. Before you reset the brake, the centering system needs to be set first.**
For that purpose repeat the complete chapters *Setting/resetting of the centering system* and afterwards *Setting/resetting of the brake*.

- Remove the O-ring (component 1.9) and the screw plug on both sides (component 1.20).
- **<u>Applying with the use of a sensor only:</u>**
  Remove the sensor (component 4).
- Put the opening pressure (see table 2) on the hydraulic system to make sure that the brake pads lift off the brake disk.

☞ **Please note chapter 4.7 *Start-up of brake*.**

4 Assembly

4.8 Setting/Re-setting of the brake

- Screw the screw with the disk (assembly lock, see illustration 11) on both sides into the centering pin (component 1.8).
- Release the pressure from the hydraulic system.
- Measure the gap between the brake disk and the brake pad on both sides via a feeler gauge.
- Set the gap to 1 mm on both sides by screwing the setting nut either upwards or downwards.
- **Applying for resetting of the brake only (wear of brake pad):**
  With a wear of the brake pad (1 mm wear for each brake pad) of 2 mm the setting nut needs to be screwed in by one revolution.
- Insert the O-ring (component 1.9) on both sides between the housing and the setting nut.

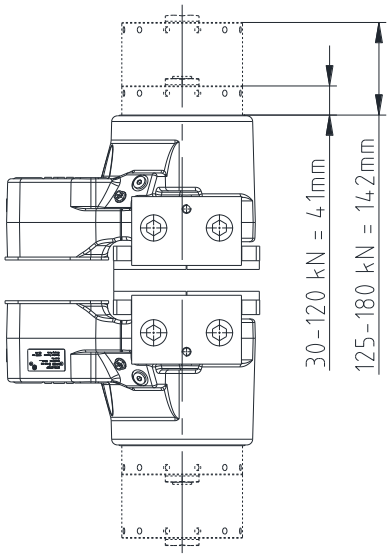

Illustration 12: Setting of adjusting nut

☞ **The gap between brake disk and brake pad needs to be 1 mm on both sides to ensure the brake power.**

- **Applying with the use of a sensor only:**
  Mount the sensor (component 4) according to chapter 6.2 instead of the screw plug (component 1.20).

4 Assembly

4.9 Recommendation of liquids to be used

You may only use mineral hydraulic liquids meeting the specifications 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	
Mineral oil	- 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 of brake components from - 20 °C to + 60 °C (- 4 °F to + 140 °F) have to be observed. For deviating operating temperatures please consult with KTR.

Viscosity

We would recommend a viscosity range from 20 to 220 mm^2/s (cSt) of the hydraulic liquid with operating temperature. The viscosity during starting should not exceed 500 mm^2/s and the viscosity during operation should not fall below 12 mm^2/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.

As a standard the KTR basic power packs are equipped with a 10 µm inline filter.
In order to ensure the reliability of the system, only those 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 a 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.

4 Assembly

4.10 Disassembly of the brake

In order to avoid any personal injuries, protect the brake on both sides by means of the assembly lock.

- Remove the screw plug (component 1.20) or the sensor (component 4) on both sides from the setting nut (component 1.7).
- Put the opening pressure (see table 2) onto the hydraulic system.
- Hand-tighten the screw with the disk (assembly lock, see illustration 11) on both sides into the setting nut (component 1.7).
- Release the pressure fully from the hydraulic system.

Please make sure that the entire brake/hydraulic 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 screw plug located at the highest point (component 1.13) from the venting hole (see illustrations 9 and 10).
- Drain the hydraulic oil completely from the brake.
- Dispose of the hydraulic oil as per chapter 4.12.
- Disconnect the drain and pressure oil line from the brake.
- Screw the screw plugs (component 1.13) into all pressure ports or venting holes (see illustrations 7 to 10).
- Remove the 6-off connection screws serving for fixing the brake to the connection plate.
- Take out both halves of the brake.

If you intend to disassemble one half of the brake only, pull out the 6-off connection screws until the faces of the connection screws are flush with the connection plate respectively stand.

4.11 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.

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.

4 Assembly

4.12 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.
- **Sensors**
  Electrical components have to be treated as electrical 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

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

☞ **Replace the brake pads in both halves of the brake simultaneously.**

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

! **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.**

- Remove the screw plug (component 1.20) or the sensor (component 4) on both sidesfrom the setting nut (component 1.7).
- Put the opening pressure (see table 2) onto the hydraulic system.
- Hand-tighten the screw with the disk (assembly lock, see illustration 11) on both sides into the centering pin (component 1.8).
- Release the pressure fully from the hydraulic system.
- Inspect the position of the setting nut (component 1.7) on both sides. If necessary, set it to the right dimension (see illustration 12).
- Disassemble the pad holders (component 1.14) on both sides for one half.
- Remove the pad retraction sets (component 2) on both sides.
- Replace the brake pads that have worn off. Insert the brake pads (component 3) fully into the housing on both sides.
- Hand-tighten the pad holders (component 1.14) on both sides by each 2-off cap screws (component 1.15) first. Tighten the screws at the tightening torque T_A = 890 Nm.

5 Maintenance

5.1 Replacement of brake pads

- Mount the pad retraction sets (component 2) on both sides by shifting the pressure spring (component 2.2) onto the pin (component 2.1). Screw the pin with the pressure spring into the brake pad against a stop.

☞ Secure the screw connection (component 2.1) on both sides on the brake pad additionally against working loose, e. g. conglutinating with Loctite (average strength).

- Repeat chapter 4.8 *Setting/re-setting of the brake*
- Please make sure that the brake disk can rotate freely while not touching the brake pads or the housing.

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

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

5.2 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 4.10 *Disassembly of brakes*.
- Remove the pad retracting sets (component 2) on both sides.
- Take out the brake pads (component 3).

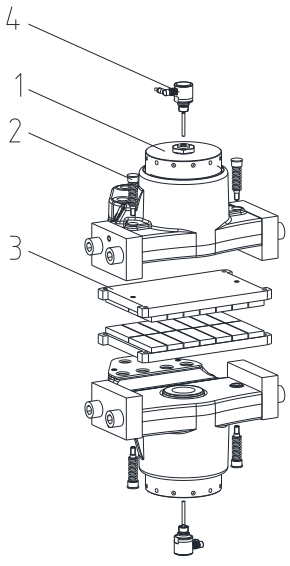

Illustration 13: KTR-STOP® M-xxx B-xx-xx

5 Maintenance

5.2 Maintenance of the brake / replacement of single parts

- Remove the O-ring (component 1.9) on both sides.
- Put the opening pressure (see table 2) onto the hydraulic system.
- Remove the screw with the disk (assembly lock, see illustration 11) on both sides from the centering pin (component 1.8).
- Release the pressure from the hydraulic system.
- Unscrew the setting nut (component 1.7) on both sides from the housing.
- Remove the set of disk springs (component 1.6) on both sides.

☞ **Please make use of a tool to ensure that you can provide for the same arrangement of disk springs, disk and adjustment washer(s) with re-assembly of the brake.**

- Press the brake piston (component 1.2) carefully out of the housing (if necessary, use some hydraulic oil).
- Remove the gaskets (component 1.4 and 1.5) and the scraper (component 1.3).

☞ **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.

⚠ **Please observe the manufacturer's instructions regarding the use of solvents.**

- Insert new gaskets (component 1.4 and 1.5) and scrapers (component 1.3 and 1.19) on both sides into the housing. For that purpose the components may be heart-shaped (see illustration 15).

⚠ **The gasket and scraper have to be installed in the right direction (see illustration 16).**

☞ **With a new assembly 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 the scraper with hydraulic oil (see illustration 16).

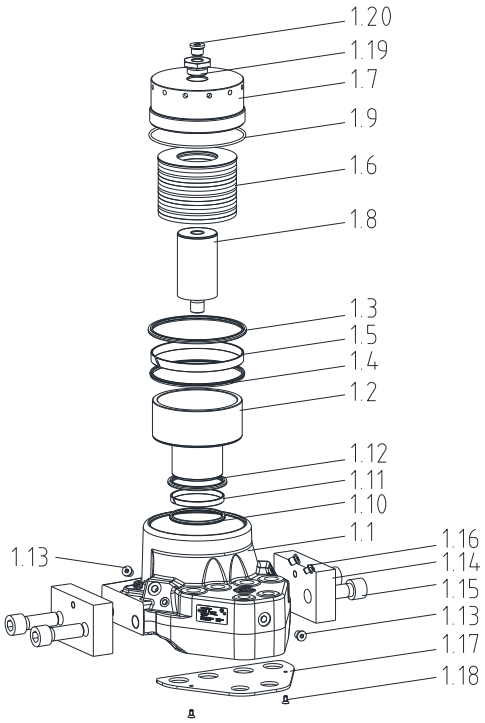

Illustration 14: Housing with single parts

5 Maintenance

5.2 Maintenance of the brake / replacement of single parts

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

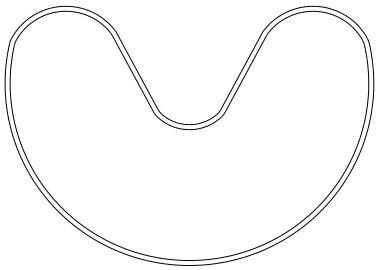

Illustration 15: Assembly of gasket and scraper

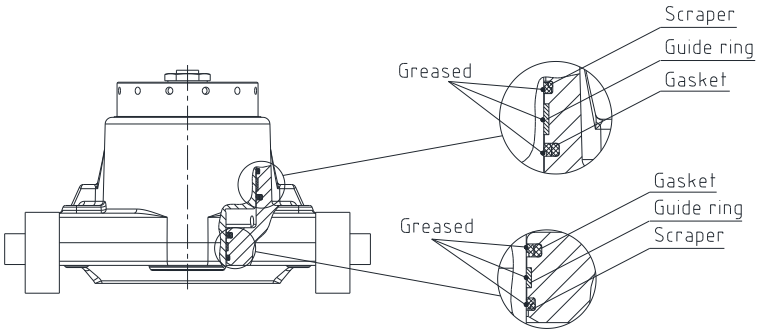

Illustration 16

Inspect the surfaces of the brake piston and the hole 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 piston (component 1.2) into the housing and press it against a stop.
- Shift the set of disk springs (component 1.6) into the brake piston (component 1.2). Make sure that the disks are located on top.

Grease the disk springs properly with Molykote MoS_2.
Please make sure that the set of disk springs is mounted in the same arrangement as it was supplied.
If a new set of disk springs is used, the condition of supply needs to be observed in detail.

- Screw the setting nut (component 1.7) into the housing and set it to the right dimension (see illustration 12).
- Put the opening pressure (see table 2) onto the hydraulic system.
- Hand-tighten the screw with the disk (assembly lock, see illustration 11) into the setting nut (component 1.7).
- Release the pressure from the hydraulic system.
- Insert a new O-ring (component 1.9) between the housing and the setting nut.
- Repeat chapters 4.2 to 4.8.

5.3 Maintenance and service

KTR-STOP® M-xxx B-xx-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, please perform repairs accordingly.

6 Accessories - Sensor

6.1 Technical Data „State/wear sensor“

Operation of sensor

There are two micro switches in the housing of the sensor. The spacer pin activates the switches in two different positions.

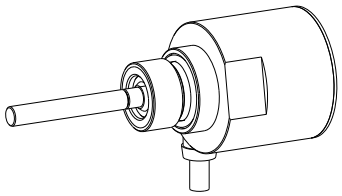

Illustration 17: State/wear sensor

Table 5: Switching status of status (switch S1) and wear switch (switch S2) depending on the activating status of the brake.

Status of brake	Status of brake pad	Switch S1 (status signal on/off) 1)	Switch S2 (wear signal) 1)	
		1 - 4 2)	2 - 3 2)	2 - 5 2)
Sensor not mounted	-	0	0	1
Brake not activated (unlocked)	-	1	1	0
Brake activated (locked)	No wear	0	1	0
	Resetting necessary	0	0	1

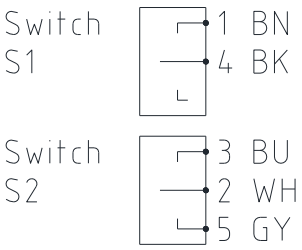

Illustration 18: Switch position

1) Status of brake
on = brake unlocked
off = brake locked

2) Switch position
0 = unlocked
1 = locked

Switch S2 only shows the wear status reliably when the brake is activated (locked). If the brake is not activated (unlocked), a statement about the condition of wear cannot be given.

☞ **The wear of the brake pad is only measured if the brake is activated. If the brake is not activated, there is no signal.**

☞ **„Resetting necessary“ is displayed as soon as the brake pad has worn off in a way that resetting has become necessary.**

⚠ **The brake pad has to be reset as soon as the signal status „resetting necessary“ is activated.**
Brake pads having a balance of pad height of less than 2 mm have to be replaced by return.
Please note chapter 5.1 *Replacement of brake pads*.

Fail-safe operation

A proper operating condition is only ensured if the state/wear sensor is wired properly. This provides a signal since a switch (NO) is locked which is normally unlocked.

⚠ **In case of damages like, for example, faulty cables, bad connections, etc. the signals need to disappear.**

6 Accessories - Sensor

6.1 Technical Data „State/wear sensor“

Technical data:

Operating temperature	- 40 °C to + 85 °C
Max. voltage	30 V DC/AC
Switching current	100 mA
Protection class	IP 65 (mounted)
Width across flats	24 mm
Max. tightening torque G 1/2	20 Nm
Max. tightening torque M12	hand-tight
Length of cable	5 m, 10 m or 15 m
Material of cable	PUR
Dimension of cable	5 * 0,34 mm²

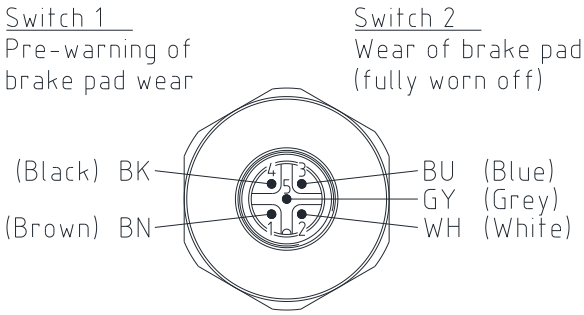

Illustration 19: Pin assignment of plug-in connection

6.2 Assembly / start-up

- Remove the screw plug (component 1.20) from the setting nut (component 1.7).
- Hand-tighten the sensor (component 4) into the settting nut first (see illustration 20).
- Tighten the sensor at the tightening torque T_A = 20 Nm.
- Provide for the electric connection according to the plug-in connection (see illustration 19).

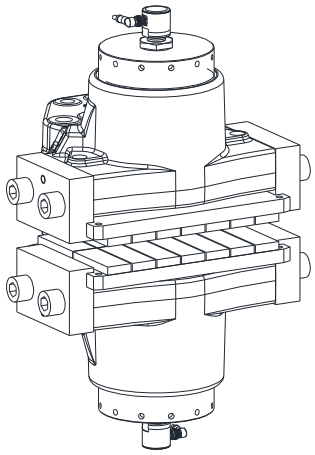

Illustration 20: Assembly of state/wear sensor