

## Installation and Operating Instruction for Brake Caliper HW 075 FHM

E 09.742e



Any questions? Please contact us.

<b>RINGSPANN</b>	<b>Installation and Operating Instructions for Brake Caliper HW 075 FHM spring activated – hydraulic released</b>	<b>E 09.742e</b>			
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## IMPORTANT

Please read these instructions carefully before installing and operating the product. Your particular attention is drawn to the notes on safety.

These installation and operating instructions are valid on condition that the product meets the selection criteria for its proper use. Selection and design of the product is not the subject of these installation and operating instructions.

Disregarding or misinterpreting these installation and operating instructions invalidates any product liability or warranty by RINGSPANN; the same applies if the product is taken apart or changed.

These installation and operating instructions should be kept in a safe place and should accompany the product if it is passed on to others – either on its own or as part of a machine – to make it accessible to the user.

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## SAFETY NOTICE

- Installation and operation of this product should only be carried out by skilled personnel.
- Repairs may only be carried out by the manufacturer or accredited RINGSPANN agents.
- If a malfunction is indicated, the product or the machine into which it is installed, should be stopped immediately and either RINGSPANN or an accredited RINGSPANN agent should be informed.
- Switch off the power supply before commencing work on electrical components.
- Rotating machine elements must be protected by the purchaser to prevent accidental contact.
- Supplies abroad are subject to the safety laws prevailing in those countries.

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## 1. General remarks

### 1.1 General safety instructions

Please read these installation and operating instructions carefully before installing and operating the brake caliper. Please refer also to the drawings in the various sections.

Safety must be given the highest priority during all work performed on the brake.

Switch off the drive unit before performing work on the brake.

Rotating components (e.g. brake disc) must be secured by the operator to prevent accidental contact.

### 1.2 Special safety instructions



#### **Danger to life and limb!**

**It is essential to secure the entire drive train against inadvertent starts during brake installation and maintenance. Rotating components can cause severe injuries.**

**Therefore, rotating components (e.g. brake disc) must be secured by the operator to prevent accidental contact.**

## 2. Configuration and function / Parts list

### 2.1 Function

The brake caliper HW 075 FHM is a machine component used for the purpose of braking accelerated masses safely and reliably. The combination of brake caliper and brake disc provides a complete brake unit capable of securing machines and equipment system effectively. Thanks to its universal design, it can perform the following functions:

- As a holding or parking brake, it prevents the unintended start of a stationary shaft.
- As a stopping brake, it brings a rotating shaft to a complete standstill.

Braking force is generated by spring force. The brake caliper is released by hydraulic pressure.

### 2.2 Markings

These installation and operating instructions apply to

- model HW 075 FHM
- Installation on vertical brake discs (on horizontal shafts) and on horizontal brake discs
- for models with and without inductive proximity switches
- for various brake pad materials as well as brake pads with wear alarm cables.

Please refer to the drawings in the individual sections.

2.3 Drawing and Parts List

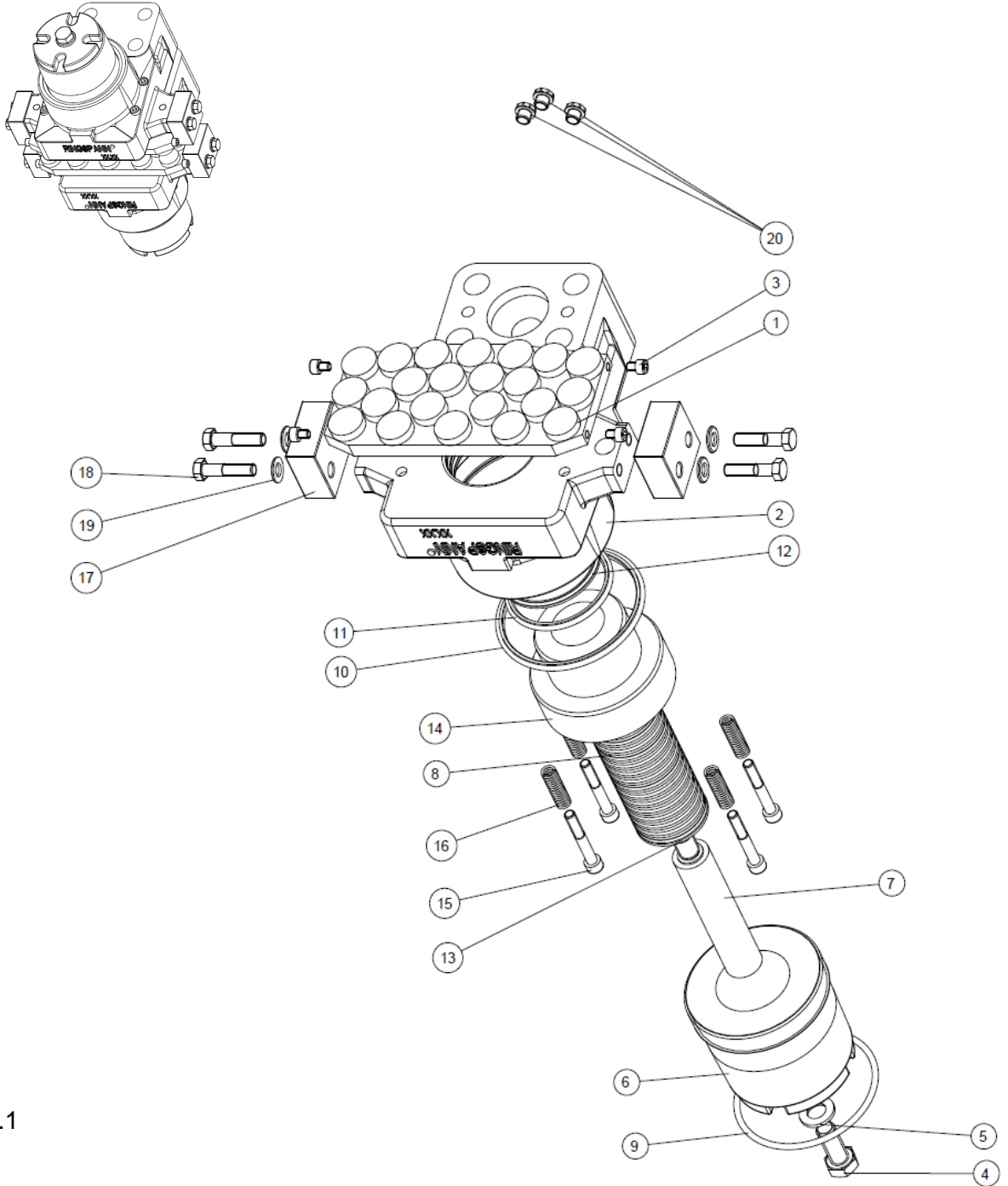


Fig. 2.1

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Part	Nomenclature	Quantity	Part number
1	Brake pad HW(S) 075 Sintermet. MD 550	2	2472-975000-A00106
2	Brake caliper housing for H 075 FHM	2	2478-260006-000000
3	Cylinder screw M8x10 DIN EN ISO 4762-8.8	8	5001-008501-000000
4	Hexagon head screw M18x1,5x60 DIN EN ISO 8676-10.9	2	5019-018010-000001
5	Washer A 18 GN 6339-18,5-34-5BT	2	5105-019001-000000
6	Spring retainer for HW 075 FHM	2	2792-135102-000000
7	Guide rod for HW 075 FHM	2	2732.040.603.000000
8	Disc spring A71 DIN 2093 to Aus. max.	42	1064-071002-000000
9	O-ring 126,37 x 6,99	2	5116-126000-000000
10	Turcon Glyd Ring T RT0301300–T46 N	2	5148-130902-000000
11	Turcon-Stepseal 2K RSK300900–T46 N	2	5148-090402-000000
12	Turcon-Excluder 2 WE3200750-T46V	2	5148-090411-000000
13	Supporting disc S 56x72x3	2	1741-072101-000000
14	Piston for HW 075 FHM	2	2478-075903-000000
15	Cylinder screw M10x70 DIN EN ISO 4762-A2-70	8	5001-010627-000000
16	Pressure spring RDF - 2199	8	2707-015004-000000
17	Holding plate	4	2769-066002-000000
18	Hexagonal screw M12x50 DIN EN ISO 4014-10.9	8	5018-012102-000000
19	Washer B13 DIN EN ISO 7089-ST galvanized	8	5105-013201-000000
20	Stopper plug R ¼" KASTO GPN 700	6	5025-013205-000000

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### 3. Proper use / specified purpose

The brake caliper may be used only in systems with a maximum hydraulic pressure of 125 bar and in accordance with the technical specification.

The brake caliper is designed for use as a holding/parking brake.

Other uses are improper and incompatible with the specified purpose. RINGSPANN assumes no liability for damages resulting from improper use. The risk is assumed by the user alone.

### 4. Improper use

Operating the brake caliper under higher pressure than that specified in the technical specifications or with other media is prohibited. Unauthorized constructive modifications of the brake caliper are similarly prohibited. RINGSPANN assumes no liability for damages resulting from improper use. The risk is assumed by the user alone

### 5. Condition on delivery

The brake caliper is inspected prior to delivery at a pressure of 160 bar

The unit is delivered as two brake caliper-halves. The position of the cylinder is fixed by two safety screws M18x1,5x60 (Pos. 4).

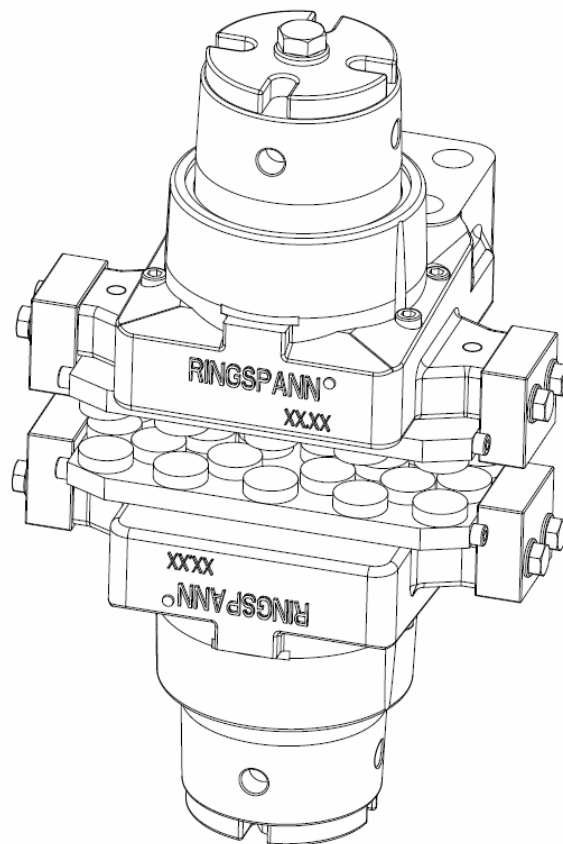


Fig. 5.1

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## 6. Handling and storage

Each brake caliper-half weighs approximately 45 kg. An M10 threaded transport bore is provided to facilitate handling.

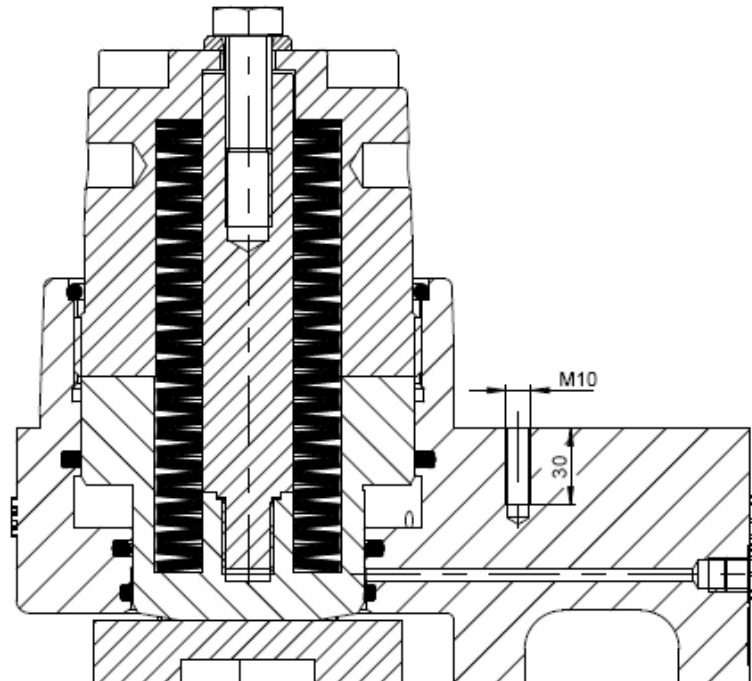


Fig. 6.1

The brake is delivered with anti-corrosion protection and can be stored in an enclosed, dry space for up to 12 months. It is important to prevent condensation from forming. Humid storage areas are unsuitable. Brakes stored for longer than 12 months must be activated at least once in order to prevent seal adhesion. Brakes must also be activated after every transport.

## 7. Technical requirements for safe and reliable operation

To ensure low-noise braking, the brake caliper should be mounted on stable, low-vibration machine components.

## 8. Installation of the RINGSPANN brake caliper

### 8.1 General instructions for assembly and installation

Before installing the brake, the brake disc must be cleaned with alcohol, e.g. ethyl or isopropyl alcohol or a water-based surfactant solution (soapy water, etc.) and then rubbed dry with a clean cloth.

When cleaning the brake disc with a thinner, acetone or a brake cleaning agent, it is important to ensure that neither these cleaners nor any cleaner residues come in contact with the brake pads. This is especially important in the case of brakes used only as parking brakes, as no dynamic braking operations take place during which thinner residues would be rubbed off the brake disc.



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**Caution!**

Oil and rust-proofing-agent residues reduced friction coefficient and thus diminish transmissible braking torque substantially!

8.2 Assembly and installation



**Caution!**

The two halves of the brake caliper must not be exposed to hydraulic pressure during assembly/installation.

During installation, it is essential to ensure that brake pads are centred and in full contact with the brake disc. Maximum permissible lateral brake disc wobble is 0.1 mm. Greater wobble may cause rattling and shaking of the brake unit.

Each half of the brake caliper is lubricated with MoS<sub>2</sub> and attached with 4 M24–12.9 screws. The recommended torque is 880 Nm. (Screws are not included in the delivery package)

The thickness of the customer's contact component between the two halves of the brake caliper must correspond exactly to the thickness of the brake disc + 3 mm. This provides for a distance of 1.5 mm between the brake disc and the brake pad on each side.

In order to ensure sufficient space for brake pad changes, a gap of at least 260 mm should be left on one side, so that the brake pads can be removed and installed easily.

Prior to installation, check to ensure that the mounting surface is smooth and concentric run between the brake disc and the mounting surface lies within a tolerance of 0.3 mm.

Check to ensure that the maximum permissible angular misalignment of 0.15 mm between the brake disc and the mounting surface is not exceeded.

Check the axial movement of the brake disc. Axial movement must not exceed  $\pm 0.3$  mm.



**Caution!**

Check to ensure that the brake disc rotates freely.

8.3 Assembling the bolt connection and bleeding the brake

Connect the pressure and oil drain connecting.

The connection is to one of the two pressure oil connections G ¼ in the brake caliper housing 075. The second hole can as vent hole or can be used for pressure transmission to the second brake caliper half. Before to installation of the leak oil line remove the stopper plug.

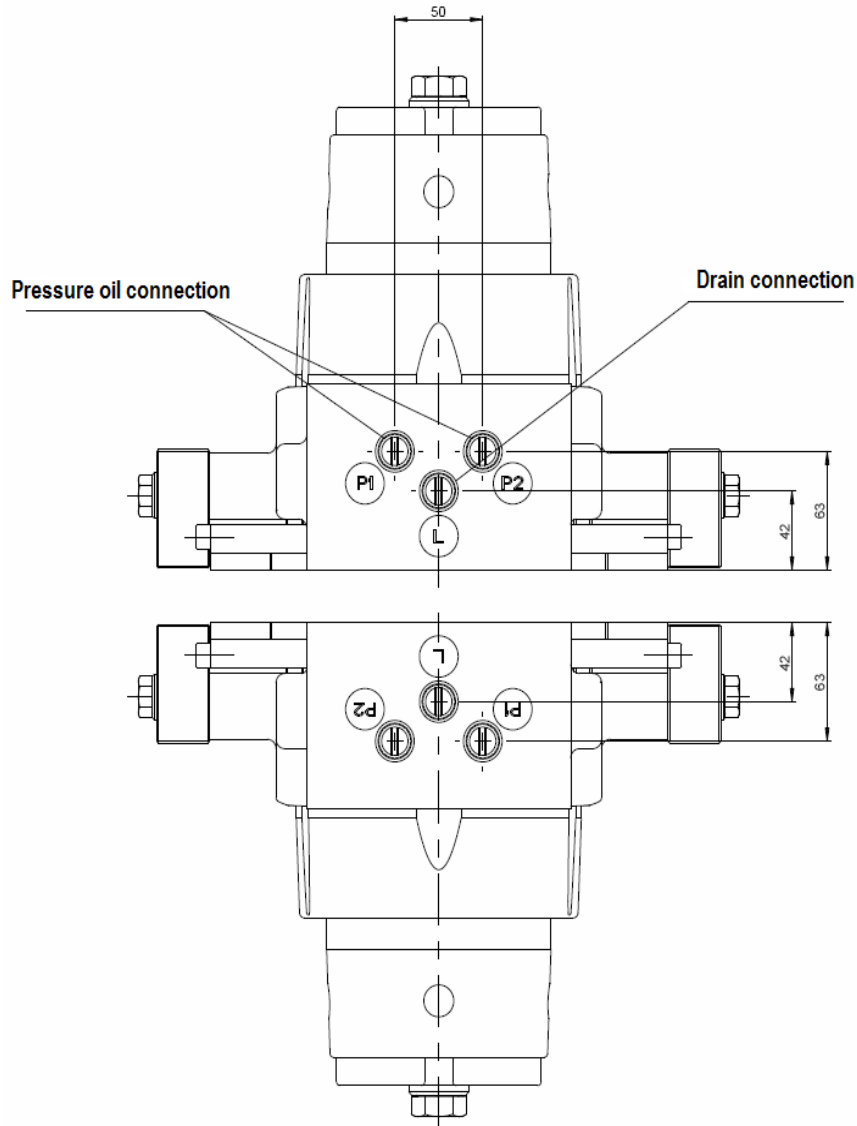


Fig. 8.2

Mounting to each of the vent holes measuring a mini connector or an automatic ventilation system. For this purpose, first remove the screw plug.



**Please note!**

The venting of the brake should be in horizontal installation on one of the pressure connections in the upper caliper-half.

For initial installation, gasket replacement or other work performed on the hydraulic system the hydraulic system must be bled.

If the system is designed for circulation from hydraulic oil, the hydraulic system can be bled by circulating the hydraulic oil.

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**Caution!**

Oil expelled from the system must be removed completely. Leaks must be repaired immediately.

Check to ensure that screws and other connections are tight:

- brake caliper to machine component

Check the following for absence of leaks:

- bolt connections and other connections



**Caution!**

The brake caliper has four hydraulic fluid connections marked P1 and P2, size G ¼ (Whitworth pipe thread DIN ISO 228-1) and two oil drain connections marked L, size G ¼ (Whitworth pipe thread DIN ISO 228-1). The hydraulic system must never be operated at a higher pressure than is specified for the system. The maximum permissible operating pressure is 125 bar.

Oil volume: per 1 mm piston stroke = 14 cm<sup>3</sup> per brake caliper (1 caliper = 2 halves)  
max. oil volume (at max. brake pad wear) = 89 cm<sup>3</sup> per brake caliper.

Alloyed mineral oil, Group HLP as defined in DIN 51525, or API class SC, SD or SE may be used as pressure fluid.



**Please note!**

The purer the hydraulic fluid, the longer service life of the brake system.



**Caution!**

It is essential to ensure that the brake pads do not rub against the brake disc when the brake is released.

8.4 Connecting the signal cable (optional for organic brake pads)

Connect the signal alarm cable to a 24V control voltage source, e.g. via a signal light. When the maximum permissible brake pad wear thickness is reached, a contact comes established with the neutral conductor and the signal lamp lights up.

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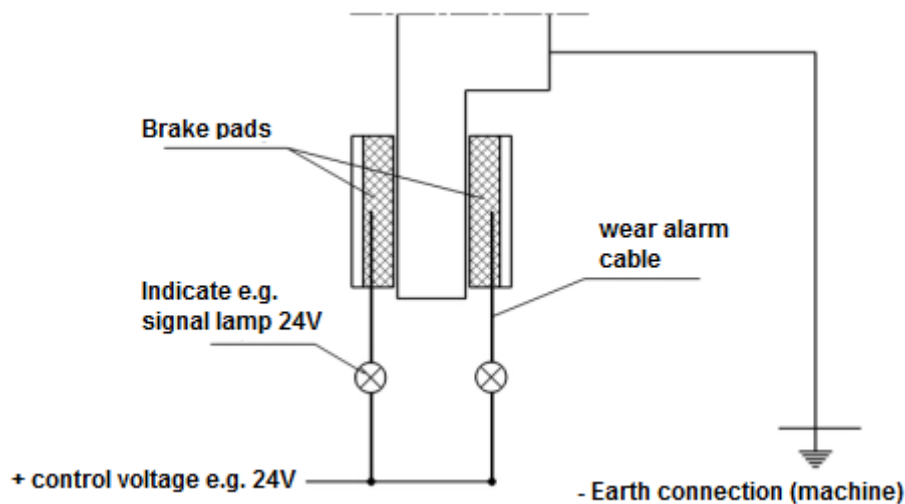


Fig. 8.3

## 9. Commissioning

Prior to commissioning, the caliper to apply pressure and the two safety screws M18x1,5x 60 (Pos. 4) to remove. You can the hole protect from dust with a plug KAPSTO GPN 300-F18, that is with the delivery. Now the brake is ready for operation. Full-surface contact between the two brake pads (1) and the brake disc as well as brief heating of the brake pads to approx. 200°C are required to ensure optimum braking. Therefore, multiple brief braking operations (running in) under low hydraulic pressure must be performed while the brake disc is rotating.



### Caution!

If the brake pads cannot be run in, the torques listed in our Publication 46 cannot be achieved. Reductions of up to 50% are possible.

## 10. Dismantling the brake



### Danger to life and limb!

When disassembling the brake it is essential to ensure that the entire drive train is secured against inadvertent activation. Rotating components can cause severe injuries. Therefore, rotating components (e.g. brake discs) must be secured by the operator to prevent accidental contact.

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**Caution!**

Ensure that no hydraulic pressure is applied to the brake caliper.

Secure the open position with the supplied screws M18x1,5x60 (Pos. 4). Disconnect the hydraulic lines from the brake caliper-halves. Remove the M24 mounting screws used to attach the brake caliper-halves. The brake caliper can then be removed from the mounting surfaces.

## 11. Lubrication

Oil or grease all bearing and glide points.



**Caution!**

Brake pads must not come in contact with lubricants.

## 12. Maintenance and repair

### 12.1 General maintenance

Maintenance must be performed on the brake caliper at intervals of between 4 and 12 weeks, depending upon the frequency and duration of operation.

Perform the following checks during every maintenance operation:

- Check brake pads for wear.
- Check the bolt connection between the brake caliper and the machine component and the bolt connection for the holding plates for solid compound.
- Check the hydraulic lines and -connections for leaks.
- Check the brake piston gasket system for proper seal by inspecting the oil leak lines. If there is oil in the oil leak lines, the gasket must be replaced
- Observe fluid change intervals! Change mineral oil after every 8.000 hours operation or once per year.



**Caution!**

Brake pads must not come in contact with mineral oil.

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## 12.2 Permissible brake pad wear and replacement of the brake pad



### **Danger to life and limb!**

Brake pads may be replaced only when the equipment system and/or the working machine is at a complete standstill!



### **Caution!**

Brake pads must not be worn to a residual thickness of less than 16 mm (mounting plate thickness plus remaining pad material). Brake pads must always be replaced in pairs.

Before replacing the brake pads (Pos. 1), ensure that the mass by the brake is secured to prevent movement, because parts of the brake must be loosened for replacement.

Before replacing the friction pads of the brake caliper to apply hydraulic pressure. The two security screws M18x1,5x60 (Pos.4) are to be mounted. Thereafter, the hydraulic pressure can be switched off again

Make sure that no oil pressure acts to the brake caliper; solve one of the two holding plates Pos. 17 at each the caliper-halves.

Remove the 4 cylinder screws M10x70 (Pos. 15). Note that the cylinder screws are slightly pre-tensed by the compression springs (Pos. 16). Pull the old brake pads out from the side. Inserting the new brake pads. Fix the brake pads with the 4 cylinder screws M10x70 and the 4 compression springs.

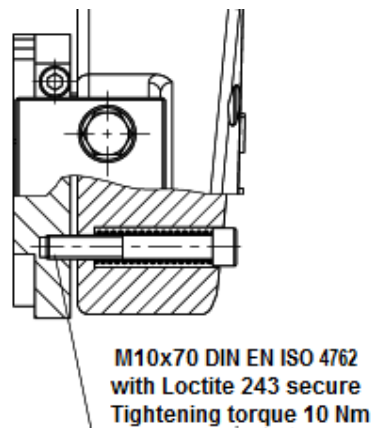


Fig. 12.1

Use Loctite 243 to secure the threads for the screws M10x70 (Pos. 15); tightening torque of the screws is 10 Nm.

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**Caution!**

The threaded bore in the brake pad is a tapped blind hole with a depth of approx. 10 mm. A tightening torque in excess of 10 Nm may damage or destroy the thread!

Attach the holding plate Pos. 17. The tightening torque of the screws M12x50, Pos. 18 is 125 Nm.

12.3 Replacment of gasket, wiper and piston seal



**Danger to life and limb!**

Gaskets may be replaced only when the equipment system and/or the working machine is at a complete standstill!



**Caution!**

Ensure that no hydraulic pressure is applied to the brake caliper. Observe the manufacturer's instructions when handling solvents.

Maximum possible cleanliness is essential when working on the hydraulic system. Each part must be cleaned in solvent, dried and stored protected in a dust-free place. Dirt reduces the service life of the gaskets substantially. Check the surfaces of the brake caliper housing and brake pistons for damage. Surface damage can destroy a gasket immediately.

Remove the brake caliper-halves. Remove the 4 cylinder screws M10x70 (Pos. 15) that keep the brake pads. Note that the cylinder screws are slightly pre-tensed by the compression springs (Pos. 16). Turn the spring retainer from the brake housing H 075 FHM (Pos. 6). Hold or clamp the brake caliper housing (Pos. 2) firmly in place. Push the brake piston (Pos. 14) out of the brake housing. Make sure that the brake pistons is pressed evenly out of the brake caliper housing.

Remove the seals Turcon Glyd Ring (Pos. 10), Turcon-Excluder 2 (Pos. 12) and then the Turcon-Stepseal 2K (Pos. 11) from the brake caliper housing.

Prior to assembly and installation, the brake caliper housing should be inspected for damage, cleaned and lubricated.

Install the new seals and the new double wiper in the brake caliper housing. Observe the correct installation position for the seals and the double wiper as shown in Fig 12.2. The incorporation should be occur by hand to ensure that the sealing edge is not damaged. The seal and the doble wiper can be inserted more easily be bending it into a kidney shape and laying it into the groove. Oiling the seal with a light coat of Molykote prior to assembly. Push the piston centric with a press or beat with a plastic hammer into the cylinder bore to the stop point. After insert the plate spring and the supporting disk to Fig.12.2, turn the spring retainer Pos.6 lightly lubricated with Molykote back into the brake caliper housing to the extent a 246 mm to Fig. 12.2. Now tense with the security screw M18x1,5x60 (Pos. 4) the plate springs. To the facilitate assembly of the safety

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screws, can give also be hydraulic pressure to the brake caliper at mounting the safety screws M18x1,5x60 (Pos. 4). As final step, push the O-ring (Pos. 9) back in the housing.

Designation	Clamping force kN	Plate springs per package n	Number of packages i
HW 075 FHM-010	10	1	34
HW 075 FHM-022	22	1	38
HW 075 FHM-030	30	2	19
HW 075 FHM-040	40	2	20
HW 075 FHM-055	50	3	14

Table 1

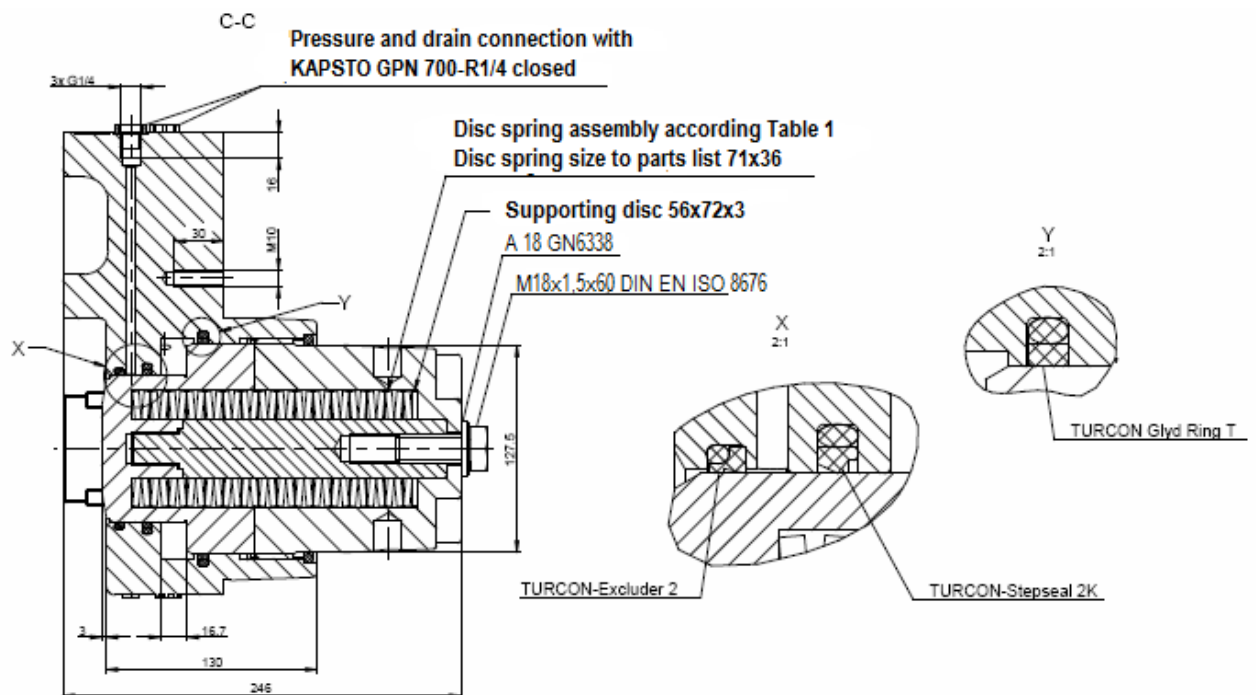


Fig. 12.2

Then mount the brake pad as described in Chapter 12.2; and the brake saddle to the machine frame as described in Chapter 8 and 9.



### 13. Accessories: Inductive proximity switch

#### 13.1. Installing and connecting the inductive proximity switch

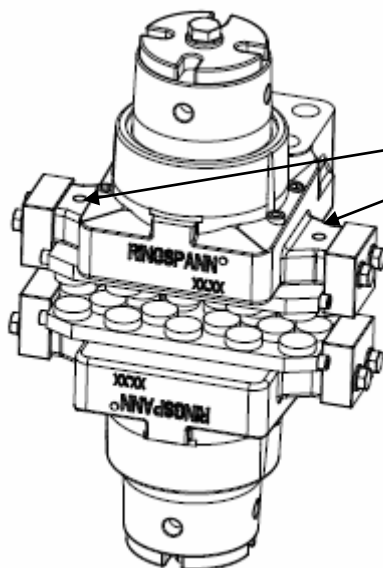


#### Danger to life and limb!

The inductive proximity switch may be installed and/or replaced only when the equipment system and/or working machine is at a complete standstill!

The 3502-112003-B024VG, M12x1, 65 mm inductive proximity switch with stainless steel housing is not delivered pre-mounted.

Two threaded bores (M12x1) are drilled in the brake housing as mounting bores for the inductive proximity switch.



Two M12x1 mounting screws for the inductive proximity switch on each side

Fig. 13.1

Switching function	: PNP (Closer)	Switching distance	: 2 mm flash
Operating voltage	: 10...30 V DC	max. op. current	: 0...200 mA
No-load current	: < or = 17 mA	Leakage current	: < or = 0.5 mA
Voltage drop	: < or = 3 V	Short-circuit protect	: clocking
Rev. Polarity protec.	: yes	Switch indicator	: multi-hole LED
Temp. Range	: -25 to +70°C	Safety class	: IP 67
Connection	: V1-Connector	Housing	: stainless steel

Circuit diagram of the inductive proximity switch

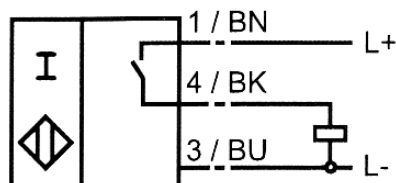


Fig. 13.2

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**Please note!**

The inductive proximity sensor must be positioned in such a way that it is damped in the absence of hydraulic pressure (the LED on the inductive proximity switch glows). When the brake is activated, the brake engages and the inductive proximity sensor moves out of the range of the switch and is no longer damped. The LED on the inductive proximity sensor goes out.

Procedure for installing or replacing the inductive proximity switch:

The following instructions apply to the proximity switch with 2 mm switching distance listed above.



**Caution!**

Please follow the described steps exactly in order to avoid damaging on the proximity switch:

- Install the inductive proximity switch only when the brake not stands under pressure.
- Screw the inductive proximity sensor into the brake caliper housing until the gap between the inductive proximity sensor and the back side of the brake pad is approx. 1.5 mm.
- Secure this position with counter nuts.
- Connect the inductive proximity switch on. The LED on the proximity switch must now glow.
- Test for proper function by activating the brake caliper several times in succession.