

Installation and Operating Instructions for Brake Caliper HW 075 FHM

E09.742e



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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 this 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.

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.

<p>This is a translation of the German original version!</p>

<p>In case of inconsistencies between the German and English version of this installation and operating instruction, the German version shall prevail.</p>
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1. General notes

1.1 General safety instructions

Please read these installation and operating instructions carefully before installing and operating the brake. Please refer 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



Life-threatening danger!

When assembling, operating and maintaining the brake it is to be ensured that the entire drive train is secured against being switched on unintentionally. Moving parts can cause severe injury. Rotating parts (e.g. brake disc) must be secured by the operator against unintentional touching.

2. Design and function/ parts list

2.1 Function

The brake is a machine element with which accelerated masses can be safely slowed down. In combination with a brake disc, you have a complete brake for the effective safeguarding of machines and systems. Thanks to its universal design, it fulfils the following functions:

- As a holding brake, it prevents a stationary shaft from starting unintentionally.
- As a stopping brake, it brings a rotating shaft to a halt.
- As a control brake, it maintains a particular tensile force within the material.

The braking force is produced by springs and the brake is opened by means of oil pressure.

If there is pad wear on the friction blocks, the holding or braking torque will decrease since the pre-load of the springs in the springed thruster will have gone down. Brake torque readjustment is necessary in the event of pad wear.

2.2 Markings

These operating instructions apply:

- model brake saddle HW 075 FHM
- installation on horizontal brake discs and vertical brake discs in combination with horizontal shafts

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- for models with and without switches
- for different brake pad material and for brake pads with signal cables.
- Mounting the brake on different brackets

There is a type plate on the brake with a 16-digit article number. The exact design of the brake is defined by this article number only.

As well as these instructions, please also consider the catalogue data for the brake at www.ringspann.com and the drawings in the individual sections.

2.3 Drawings and Parts Lists

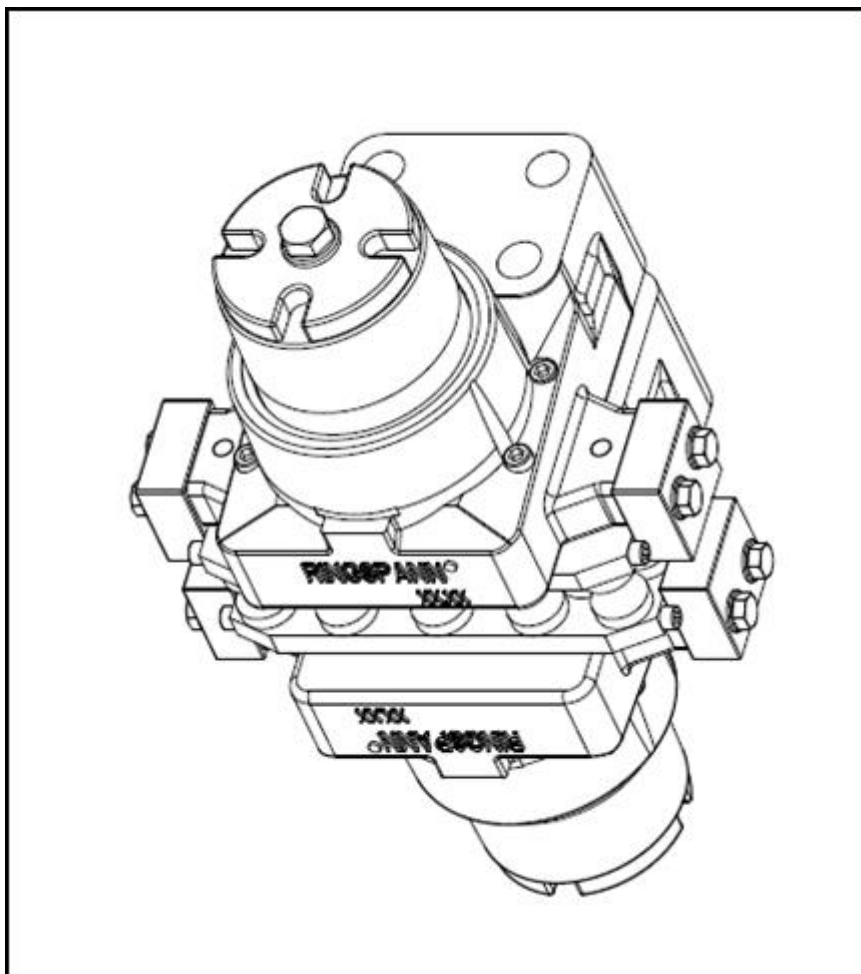


Fig. 2.1

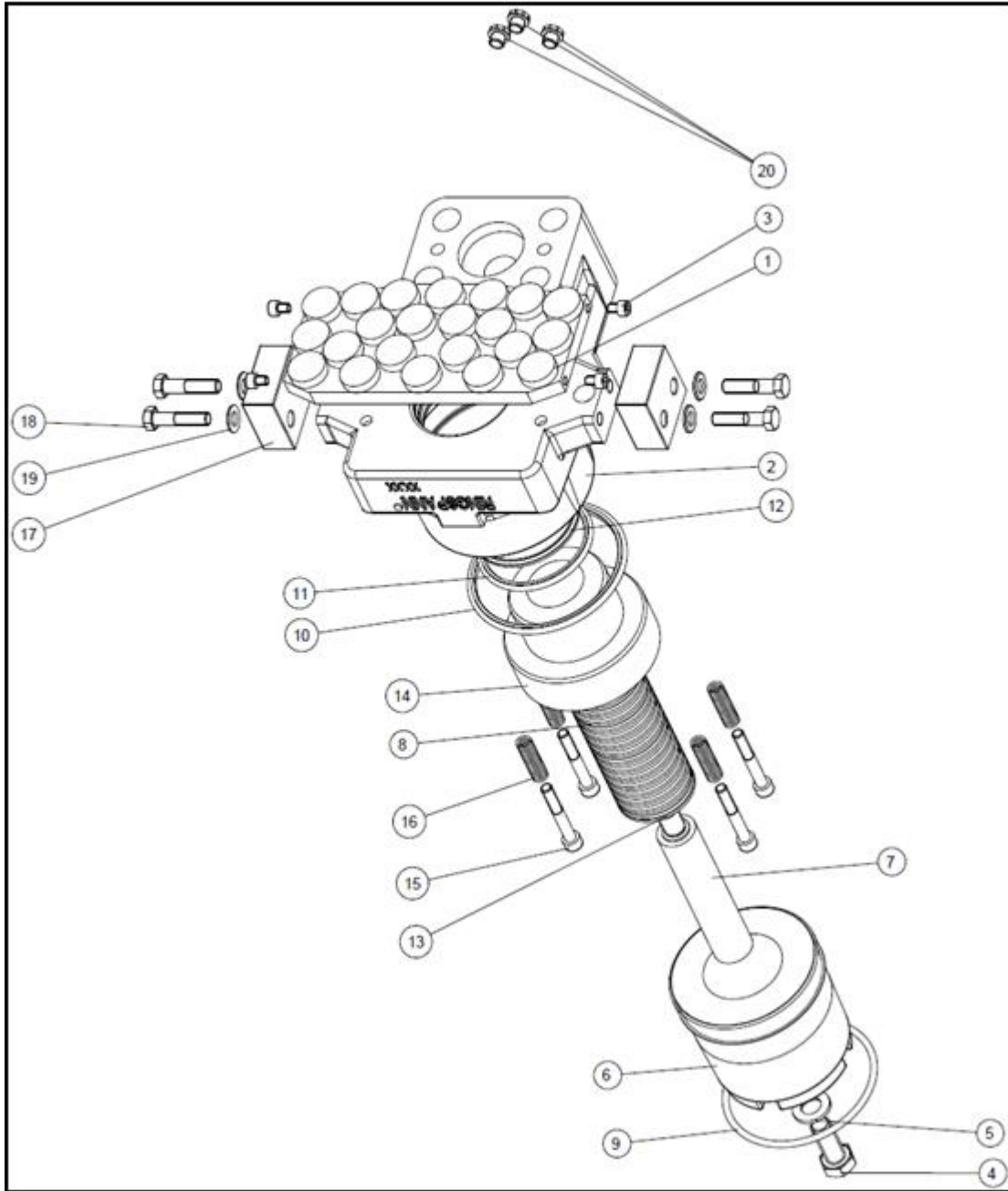


Fig. 2.2

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Part	Nomenclature	Quantity
1	Set Brake pad HW(S)	1
2	Brake caliper housing for H 075 FHM	2
3	Cylinder screw M8x10 DIN EN ISO 4762-8.8	8
4	Hexagon head screw M18x1,5x60 DIN EN ISO 8676-10.9	2
5	Washer A 18 GN 6339-18,5-34-5BT	2
6	Spring retainer for HW 075 FHM	2
7	Guide rod for HW 075 FHM	2
8	Beleville spring A71 DIN 2093 to Aus. max.	84
9	O-ring 126,37 x 6,99	2
10	Turcon Glyd Ring T RT0301300–T46 N	2
11	Turcon-Stepseal 2K RSK300900–T46 N	2
12	Turcon-Excluder 2 WE3200750-T46V	2
13	Supporting disc S 56x72x3 to Aus. Max.	14
14	Piston for HW 075 FHM	2
15	Cylinder screw M10x70 DIN EN ISO 4762-A2-70	8
16	Pressure spring RDF - 2199	8
17	Holding plate	4
18	Hexagonal screw M12x50 DIN EN ISO 4014-10.9	8
19	Washer B13 DIN EN ISO 7089-ST galvanized	8
20	Stopper plug R ¼" KASTO GPN 700	6

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3. Intended use

The standard brake caliper may be used only in systems with a maximum hydraulic pressure of 140 bar and in accordance with the technical data.

The brake has been designed for use as a holding, control and stopping brake. Use for any other purpose will be deemed improper. 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. Impermissible use

Operating the brake caliper under higher pressure than that specified in the technical data 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 as delivered

The brake caliper is tested prior to delivery. The brake calliper is delivered ready to install. The brake cylinder is fixed in the open position by 2 screws M18x1.5x60 assembly locking screw item 4. The delivered consignment consists of 2 brake caliper halves and 1 set of brake pads. Sensors are supplied separately if ordered as an option.

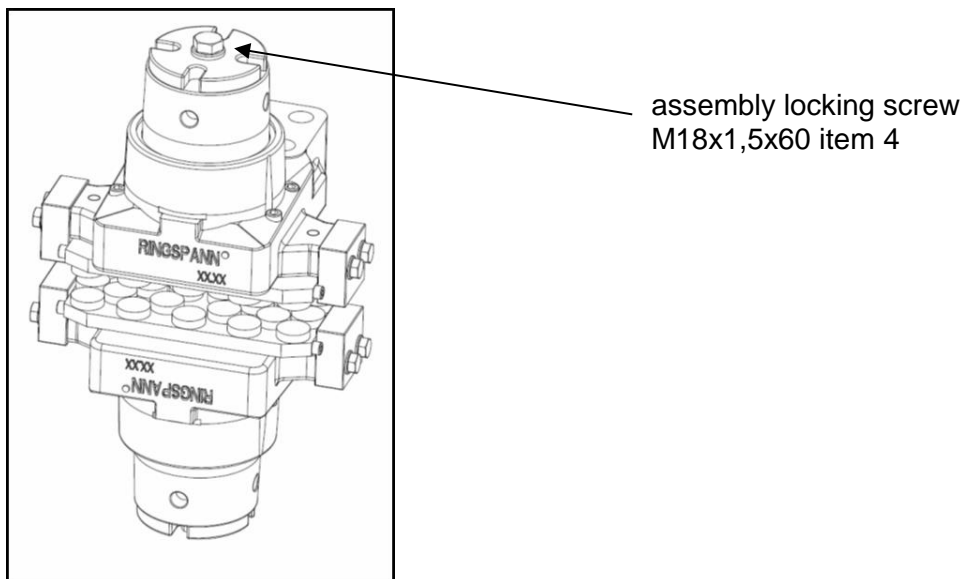


Fig. 5.1



Please note!

The locking screw M18x1,5x60 item. 4 can be easily removed and mounted if the brake is pressurized with hydraulic pressure before mounting or removing the locking screw.

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6. Handling and storage

The technical data of the brake such as oil pressure, clamping force, oil volume, dimensions and weight are shown on the catalogue pages for the brake. The current data can also be found on the RINGSPANN website www.RINGSPANN.de.

For the transport and handling are on the casting a thread bore M 10x30 deep.

The brake is delivered in preserved condition and can be stored for 12 months in an enclosed and dry place. It is to be made sure that no condensation develops. Damp storage rooms are not suitable. If storing the brake for a period longer than 12 months, as well as after any transport, the brake must be activated once in order to prevent the seals from getting stuck down.

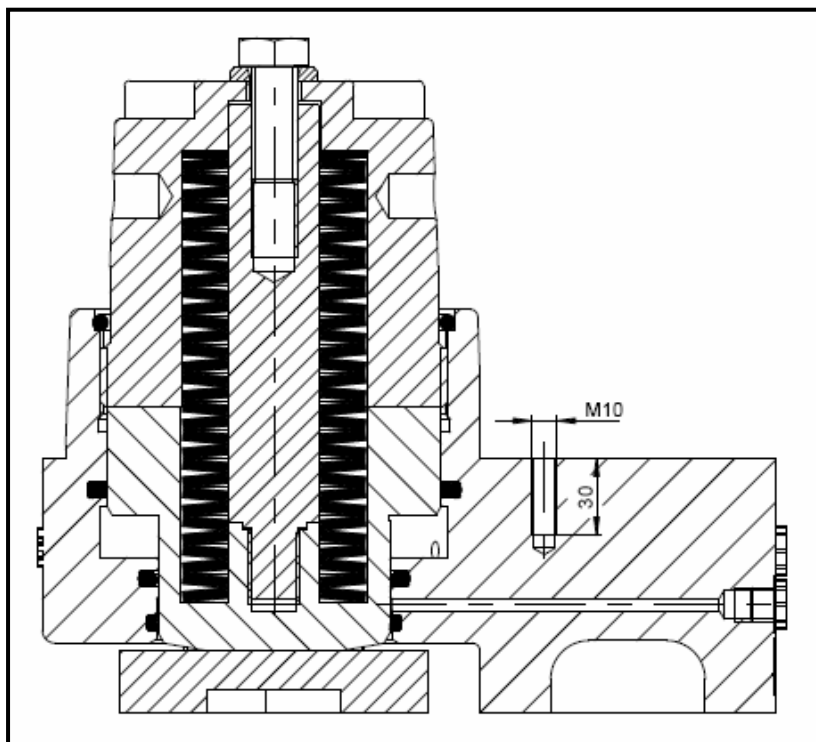


Fig. 6.1

7. Technical prerequisite for reliable operation

Fastening the brake to stable and low-vibration machine parts will ensure quiet braking without creaking.

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8. Installation the RINGSPANN brake

8.1 General instructions for assembly and installation

Before installing the brake, the brake disc must be cleaned with alcohol (e.g. spirit (ethanol) or isopropyl alcohol) or with water-based tenside solutions (soapy water or the like).

If cleaning the brake disc with a diluent, acetone or brake cleaning agent, it must be ensured that these agents and no residues of these agents come into direct contact with the friction pads. This must be ensured for pure holding brakes in particular, since no dynamic braking takes place that would remove any diluent residues from the brake disc.



Caution!

Residues from oil and anti-rust agent considerably reduce the coefficient of friction and therefore also the braking and holding torque!

8.2 Assembly and installation



Caution!

The brake caliper must not be exposed to hydraulic pressure during assembly/installation. If hydraulic pressure escapes during assembly, the brake can suddenly close!

The standard brake calliper is fastened to the machine part with 4 screws M24-10.9 tightening torque 1017 Nm. Tightening torque calculated with $\mu_G = 0.12$ as the average coefficient of friction in the thread and $\mu_K = 0.12$ as the coefficient of friction in the head support according to VDI 2230 Page 1 of Feb. 2003.

(The screws are not included in the delivery).

The thickness of the customer's connection plate 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.

Before assembly it is to be checked whether the the customer connection part is even and the concentricity between the brake disc and mounting surface is within a tolerance of 0.3 mm.

Examine the axial movement of the brake disc. The axial movement must not be greater than ± 0.3 mm.

The maximum permissible axial run-out of the brake disc is 0.1 mm; a greater axial run-out can lead to the brake unit rattling and shaking.

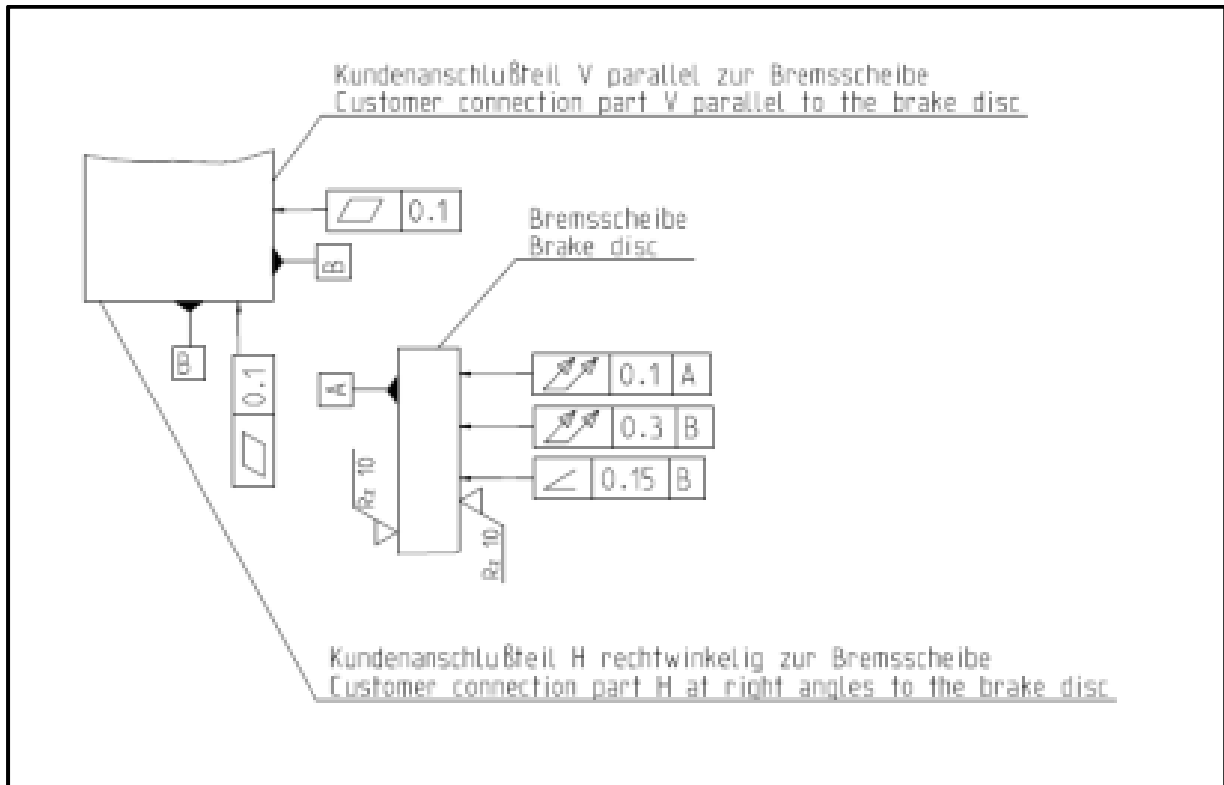


Fig. 8.1

The customer connection part for the brake as well as the brake disc must be checked for dimensional accuracy. For this purpose, the connection dimensions shown on the catalogue data sheet or installation drawing are to be checked.



Caution!

Check to ensure that the brake disc rotates freely.



Caution!

If the brake caliper is manually released with a manual release screw, this locking screw item 4 must be removed again for a functional brake!

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8.3 Setting/ adjusting the brake pad gap

The distance from both sides of the friction pads to the brake disc should be approx. 1.5 mm when new.



Please note!

The brake pad gap must be adjusted following initial installation or replacement of brake pads or other individual components. The gap between the brake pads and the brake disc should at new condition be approx. 1,5 mm on each side.

The adjustment of the friction pads distance must be carried out during assembly and in case of wear of the friction pads. condition be approx. 1,5 mm on each side. The gap can be adjust over tuning the spring casting item 6 Fig. 2.2



Please note!

The locking screw M18x1,5x60 item. 4 can be easily removed and mounted if the brake is pressurized with hydraulic pressure before mounting or removing the locking screw.



Caution!

The adjustment of the friction pads distance must be carried out during assembly and in case of wear of the friction pads. The locking screw M18x1,5x60 pos. 4 must be removed again for a functional brake!

8.4 Installing the threaded connection and bleeding the brake



Caution!

The hydraulic actuation of the brake caliper must be carried out in such a way that both caliper halves are actuated simultaneously with the same pressure. Delayed actuation between the caliper halves can lead to brake malfunctions or to impermissible shocks and vibrations in the system.

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.

**Caution!**

The hydraulic actuation of the brake caliper must be carried out in such a way that both caliper halves are actuated simultaneously with the same pressure. Delayed actuation between the caliper halves can lead to brake malfunctions or to impermissible shocks and vibrations in the system.

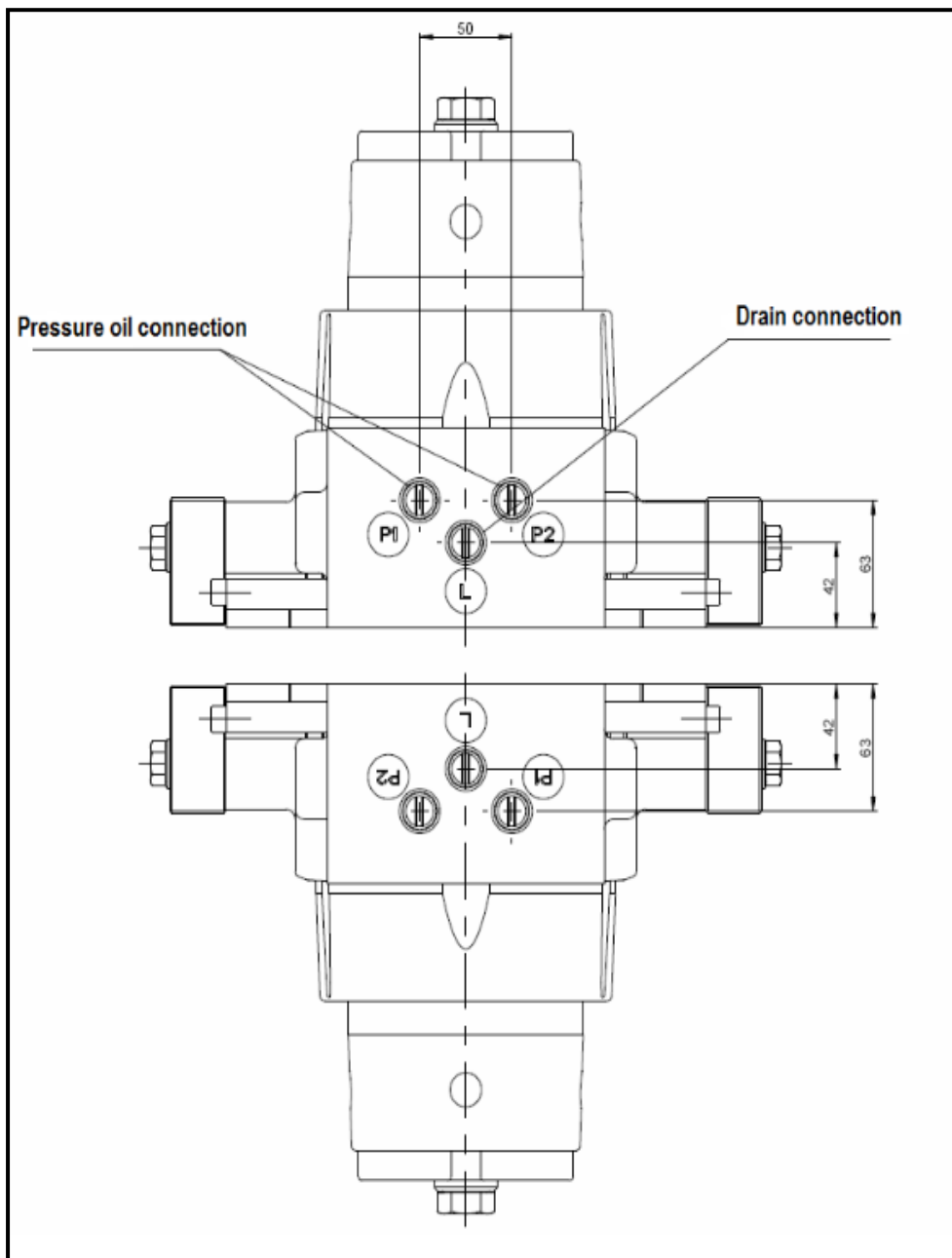


Fig. 8.2

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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.

The hydraulic system must be bled during initial installation, when seals are changed or other work is performed on the hydraulic system. If the hydraulic fluid circulation system is configured, the hydraulic system can be bled alternatively by circulating the hydraulic fluid.



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 140 bar.


Oil volume: per 1 mm piston stroke = 14 cm³ per brake caliper (1 caliper = 2 halves)
max. oil volume (at max. brake pad wear) = 89 cm³ 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.

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

Connect the signal cable via a signal lamp to a 24V power source. If the maximum permissible brake pad wear limit is reached, contact to the neutral conductor is effected and the signal light goes on. As an option, RINGSPANN offers a wear indicator as friction pad wear monitoring for the brakes, which signals when the friction pad wear limit is reached. The indicator lamp in the wear indicator shows that the friction blocks need to be changed. In addition, the output relay can be used to trigger a signal in the machine control system.

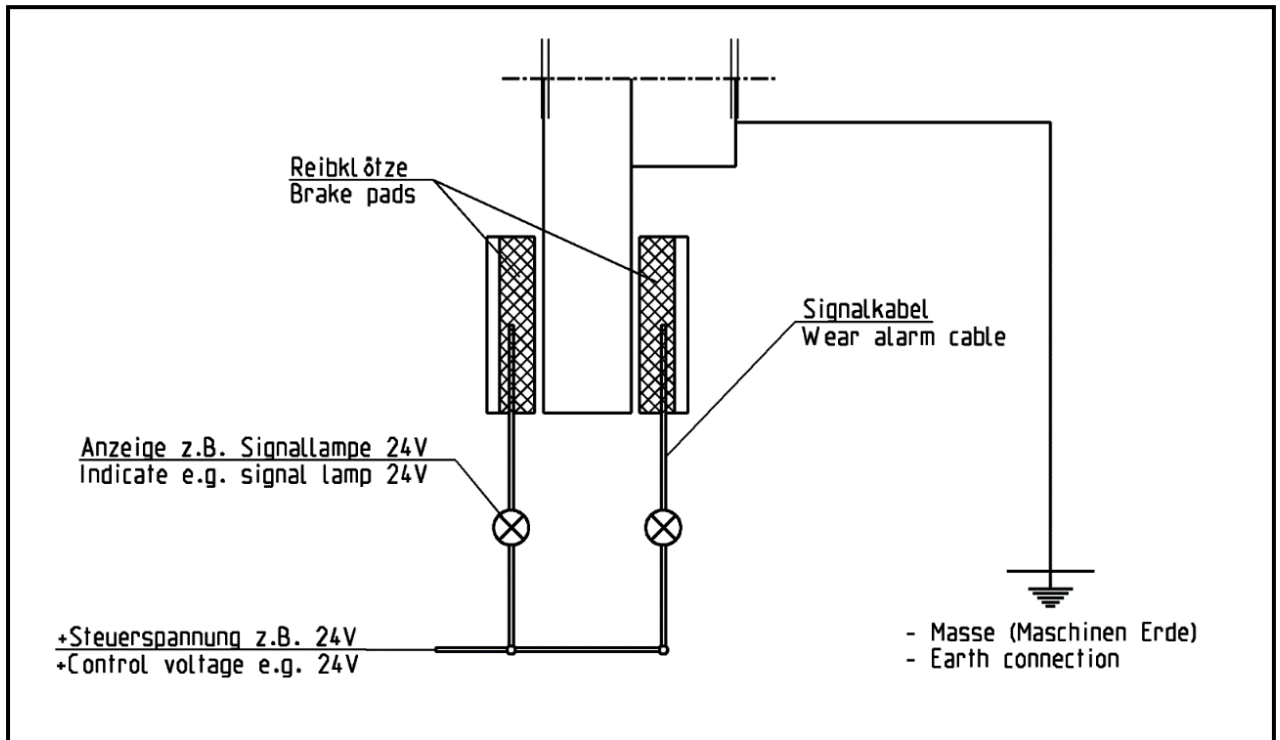


Fig. 8.3

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9. Start-up

Prior to commissioning, the caliper to apply pressure and the two safety screws M18x1,5x 60 item 4 to remove. You can protect the hole from dust with a supplied part plug KAPSTO GPN 300-F18. Only full-face contact of the two friction pads item 1 on the brake disc as well as a rapid heating of the friction linings to approx. 200°C will ensure an optimal braking effect. It is therefore necessary to brake several times and for a short duration when the brake disc is rotating.



Caution!

If the brakes are used as holding brakes, the braking torques can not be attained. Reduction of the braking torques of up to 50% are possible.

10. Disassembling the brake



Life-threatening danger!

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 against accidental contact.



Caution!

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

Secure the open position with the supplied screws M18x1,5x60 item 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 now remove from the mounting surfaces.

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11. Maintenance

11.1 General maintenance

Maintenance must be performed on the brake caliper at intervals of 4 weeks up to 12 weeks depending upon the operating load.

Perform the following checks during every maintenance operation:

- Check brake pads for wear
- Check the bolt connection between the brake calliper and the machine component as well as the bolt connections for the retaining plates for tightness.
- Check hydraulic lines and hydraulic 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 after every 8.000 hours or operation or once per year.



Caution!

Brake pads must not come in contact with grease.
Brake pads must not come in contact with hydraulic fluid.

11.2 Permissible brake pad wear and replacement of the brake pads



Life-threatening danger!

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



Important!

The brake pads have a thickness of 24mm friction lining 9mm when new. The residual friction lining thickness of 3 mm is necessary, the brake pads should than be exchanged in pairs.

Only original RINGSPANN friction pads may be used.


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

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Before replacing the friction pads of the brake the caliper has to be activate with hydraulic pressure. The two locking screws M18x1,5x60 item 4 mounted and then 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 item 17 at each the caliper-halves.

Remove the 4 cylinder screws M10x70 item 15. Note that the cylinder screws are slightly pre-tensed by the compression springs item 16. Pull the old brake pads out from the side. Change the 4 screws from the old pad to the new pad inserting the new brake pads. Fix the brake pads with the 4 cylinder screws M10x70 and the 4 compression springs.

	<p>Caution!</p> <p>Please note the compression springs are under slight pressure</p>
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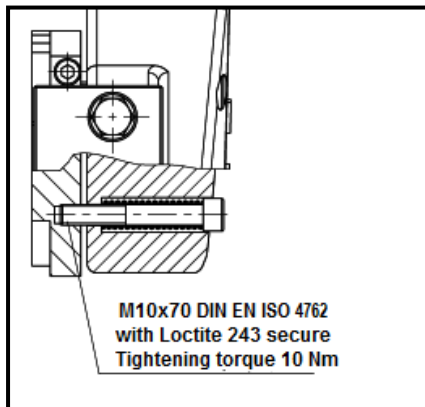



Fig. 11.1

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

	<p>Caution!</p> <p>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!</p>
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Assembling the holding plate item 17. The tightening torque of the screws M12x50-10.9, item 18 tightening torque 123 Nm. Tightening torque calculated with $\mu_G = 0.12$ as the average coefficient of friction in the thread and $\mu_K = 0.12$ as the coefficient of friction in the head support according to VDI 2230 Page 1 of Feb. 2003.

After changing the brake pads, point 8.3 Adjusting/adjusting the brake pads must be carried out.

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Caution!

Please note the compression springs are under slight pressure

11.3 Replacing seals, strippers and piston gaskets



Caution!

Brake pads must not come in contact with hydraulic fluid.



Life-threatening danger!

When disassembling the brake it is to be ensured that the entire drive train is secured against being switched on unintentionally. Rotating parts can cause severe injury. Rotating parts (e.g. brake disc) must be secured by the operator against unintentional touching.



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 item 15 that keep the brake pads. Note that the cylinder screws are slightly pre-tensed by the compression springs item 16. Turn the spring retainer from the brake housing H 075 FHM item 6. Please note the arrangement of the disc spring you have to take down for reassembling.



Please note!

Please note the quantity arrangement of the disc spring and supportdiscs.

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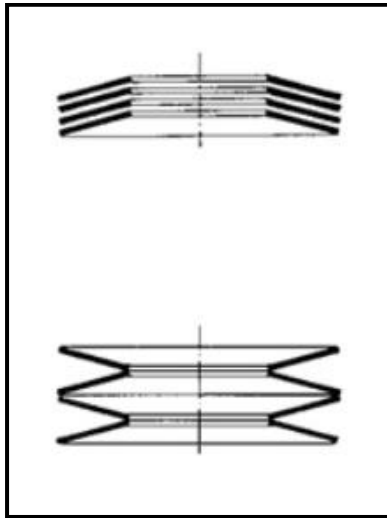


Fig. 11.2

Hold or clamp the brake caliper housing item 2 firm in place. Push the brake piston item 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 item 10, Turcon-Excluder 2 item 12 and then the Turcon-Stepseal 2K item 11 from the brake caliper housing item 2.

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 11.3. 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 Molycote 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 disc spring with the same arrangement and the supporting disk to Fig.11.3, turn the spring retainer item 6 lightly lubricated with Molycote back into the brake caliper housing to the extent a 246 mm to Fig. 11.3. Now tense with the security screw M18x1,5x60 item 4 the plate springs. To the facilitate assembly of the safety screws, can give also be hydraulic pressure to the brake caliper at mounting the safety screws M18x1,5x60 item 4. As final step, push the O-ring item 9 back in the housing.

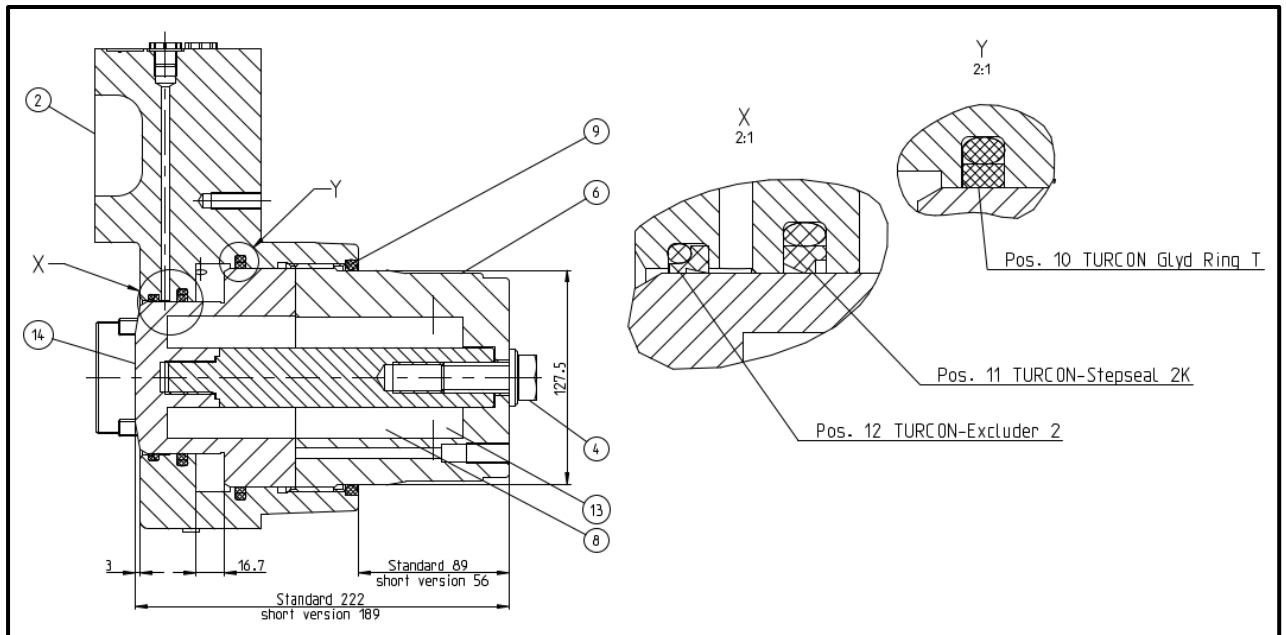


Fig. 11.3



Please note!

Please note brake caliper version standard or special version shortened spring casing. The difference is the length of the spring casing in the 33mm shorter spring casing short version, the adjustment dimension is 56mm instead of 89mm and the dimension piston+spring casing is 189mm instead of 222mm.

Then mount the brake pad as described in Chapter 11.2 and the brake saddle to the machine frame as described in Chapter 8 and 9.

12. Options

12.1 Inductive proximity switch installing and connecting



Life-threatening danger!

The inductive proximity switch may only be assembled and changed when the system or the work machine is stationary!

The inductive proximity switch M12x1, length 65 mm, with a stainless steel housing, is enclosed loosely with the supply.

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

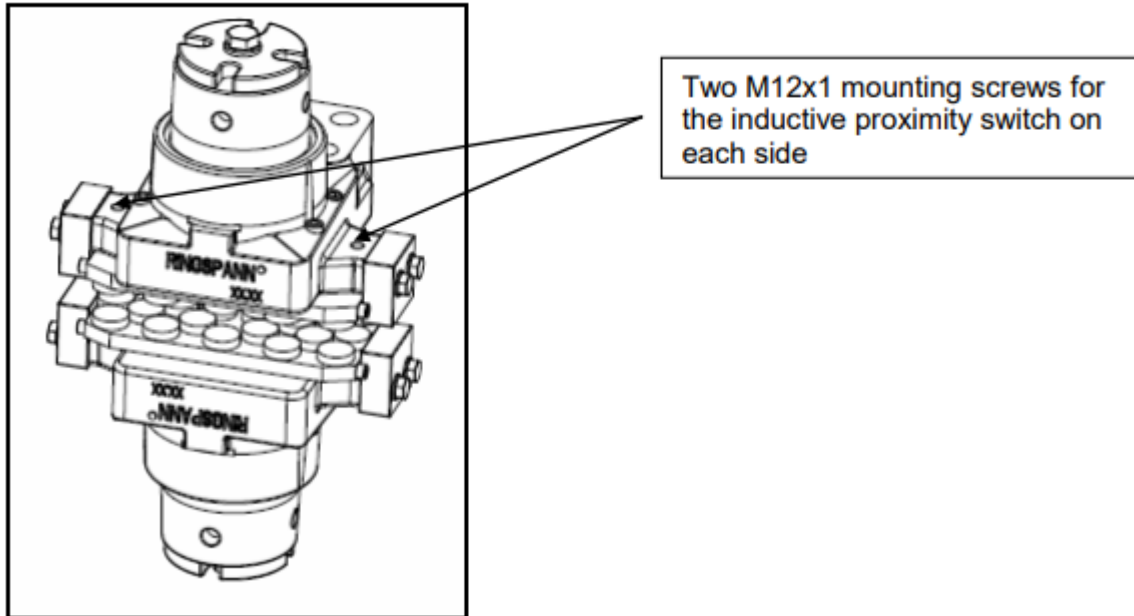


Fig. 12.1

Switching function:	PNP (NO)	Switching distance:	2 mm flush
Operating voltage:	10...30 V DC	Operating current:	0...200 mA
Idle current:	< or = 17 mA	Residual current:	< or = 0.5 mA
Voltage drop:	< or = 3 V	Short-circuit protection:	pulsing
Reverse polarity protection:	Yes	Switching display:	Multi-hole LED
Temp. range:	-25 to +70°C	Type of protection:	IP 67
Connection type:	V1-Connector	Housing:	Stainless steel

Connection diagram of the inductive proximity switch

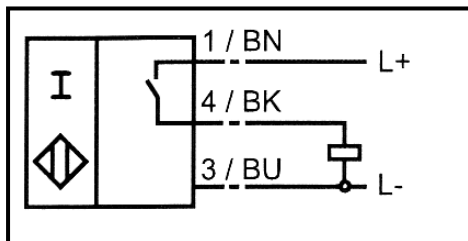


Fig. 12.2

**Please note!**

The inductive proximity sensor must be positioned in such a way that it is damped if the brake is under hydraulic pressure (the LED on the inductive proximity switch glows). When the brake is activated (brake close), 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 is under hydraulic pressure 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.