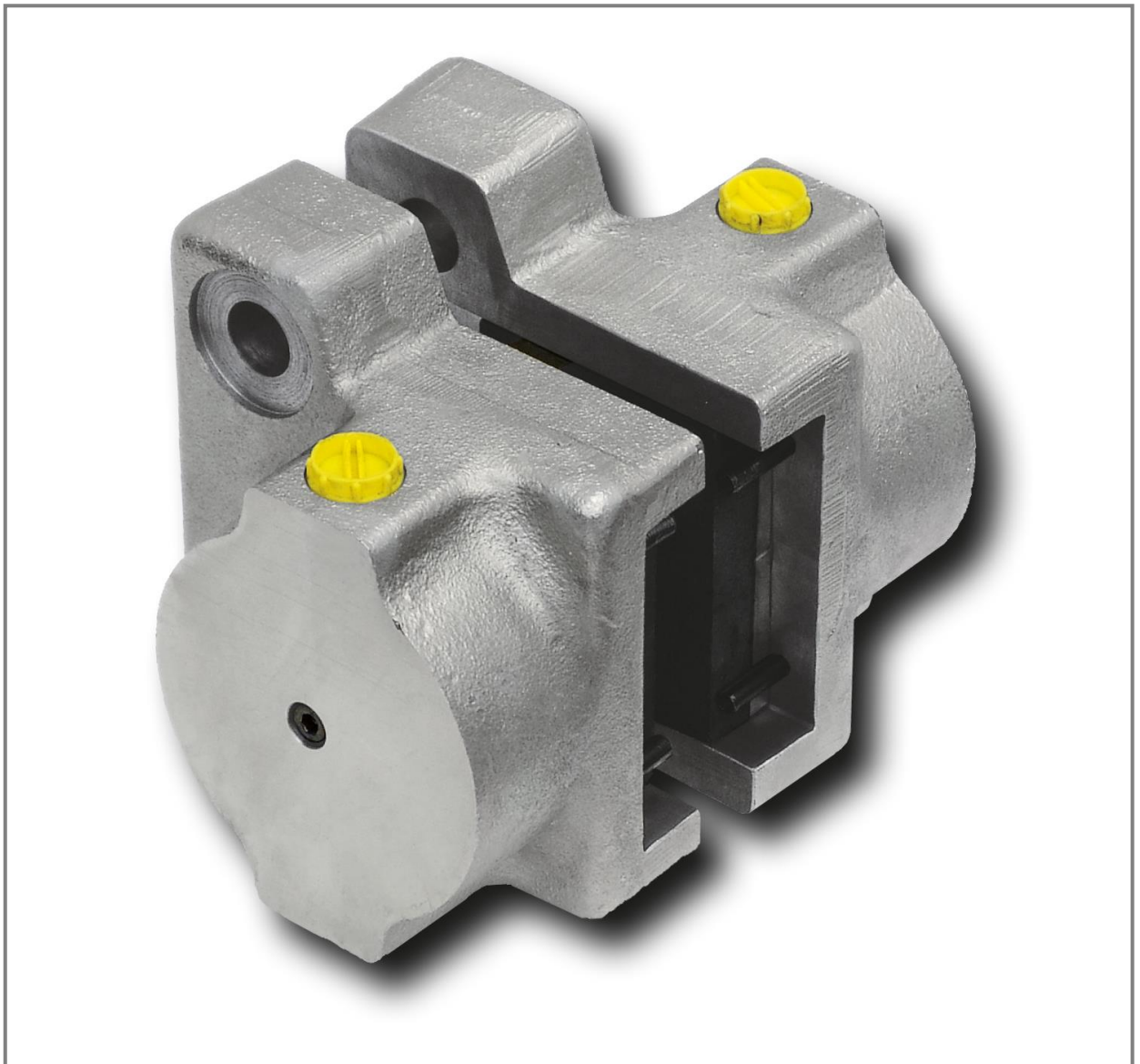


**Installation and Operating Instructions for
Brake Calipers HW 040/063/100 HFA**

E09.611e



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RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated	E 09.611e			
Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21	Page: 2

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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RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated			E 09.611e	
	Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21 Page: 3

Contents

1. General notes

- 1.1 General safety instructions
- 1.2 Special safety instructions

2. Design and function/ parts list

- 2.1 Function
- 2.2 Markings
- 2.3 Drawings and Parts Lists

3. Intended use

4. Impermissible use

5. Condition as delivered

6. Handling and storage

7. Technical prerequisite for reliable operation

8. Installation the RINGSPANN brake

- 8.1 General instructions for assembly and installation
- 8.2 Assembly and installation
- 8.3 Setting/ adjusting the brake pad gap
- 8.4 Installing the threaded connection and bleeding the brake
- 8.5 Connecting the signal cable (optional for organic brake pads)

9. Start-up

10. Disassembling the brake

11. Maintenance

- 11.1 General maintenance
- 11.2 Permissible brake pad wear and replacement of the brake pads
- 11.3 Replacing seals, strippers and piston gaskets

12. Installing the inductive proximity switch (option)

- 12.1 Mounting and connection of inductive sensors for position monitoring

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated			E 09.611e	
Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21	Page: 4

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 calipers HW 040 HFA, HW 063 HFA and HW 100 HFA are machine components 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.
- As a control brake, it maintains a particular tensile force within the material.

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

2.2 Markings

These installation and operating instructions apply to:

- the standard brake caliper HW 040 HFA, HW 063 HFA and HW 100 HFA
- the standard version HW xx HFA; The „F“ in the designation “HFA” stands for "spring released".
- the version without spring released

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated			E 09.611e	
	Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21
					Page: 5

- the different friction materials for friction pads and for friction pads with signal cable.
- the brake with proximity switch.
- for installation on a vertical brake discs in combination with horizontal shafts! For horizontal disc we ask for consultation.

There is a type plate on the brake with a 16-digit part 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

Brake calliper HW 040 HFA

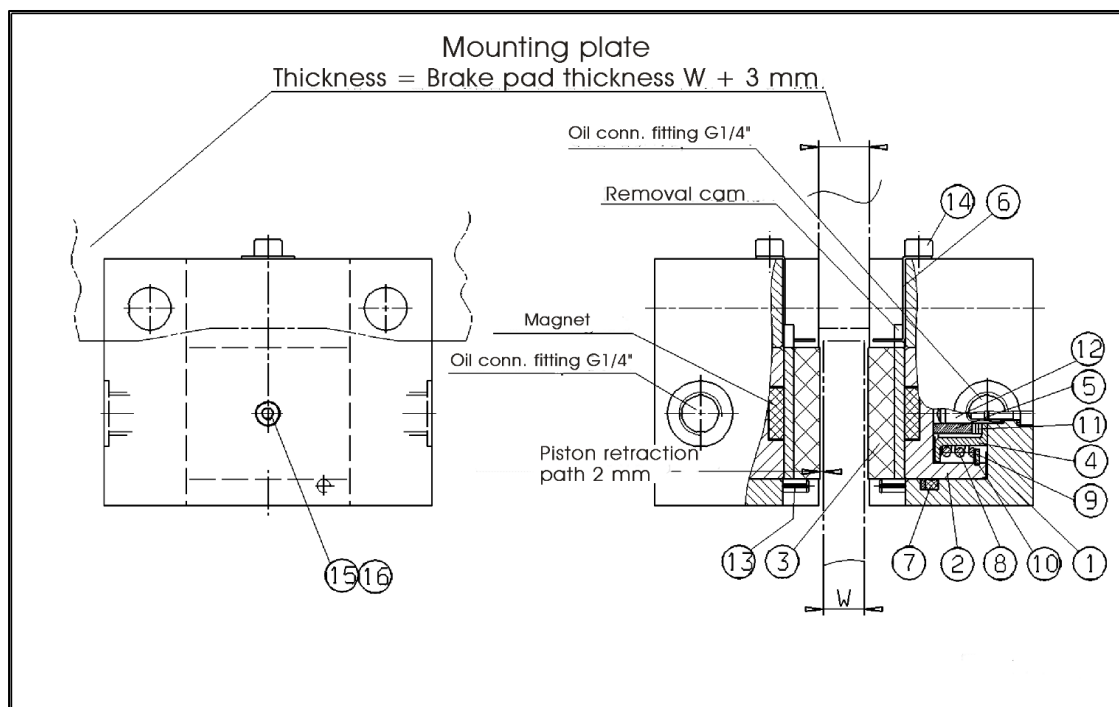


Fig. 2.1

Part	Nomenclature	Quantity
1	Brake housing	2
2	Piston	2
3	Set brake pad	1
4	Bushing	2
5	Bushing	2
6	Holding bracket	2
7	Piston gasket	2
8	Pressure spring	2

Part	Nomenclature	Quantity
9	Circlip	2
10	Shim	2
11	Grip ring G 6x1	6
12	Cylindrical pin 6x20-A-St	2
13	Clamping sleeve 4X16 DIN EN ISO 8752	2
14	Head screw (for holding bracket)	2
15	Head screw	2
16	USIT-ring U4,5X7,0X1,0	2

Brake calliper HW 063 HFA

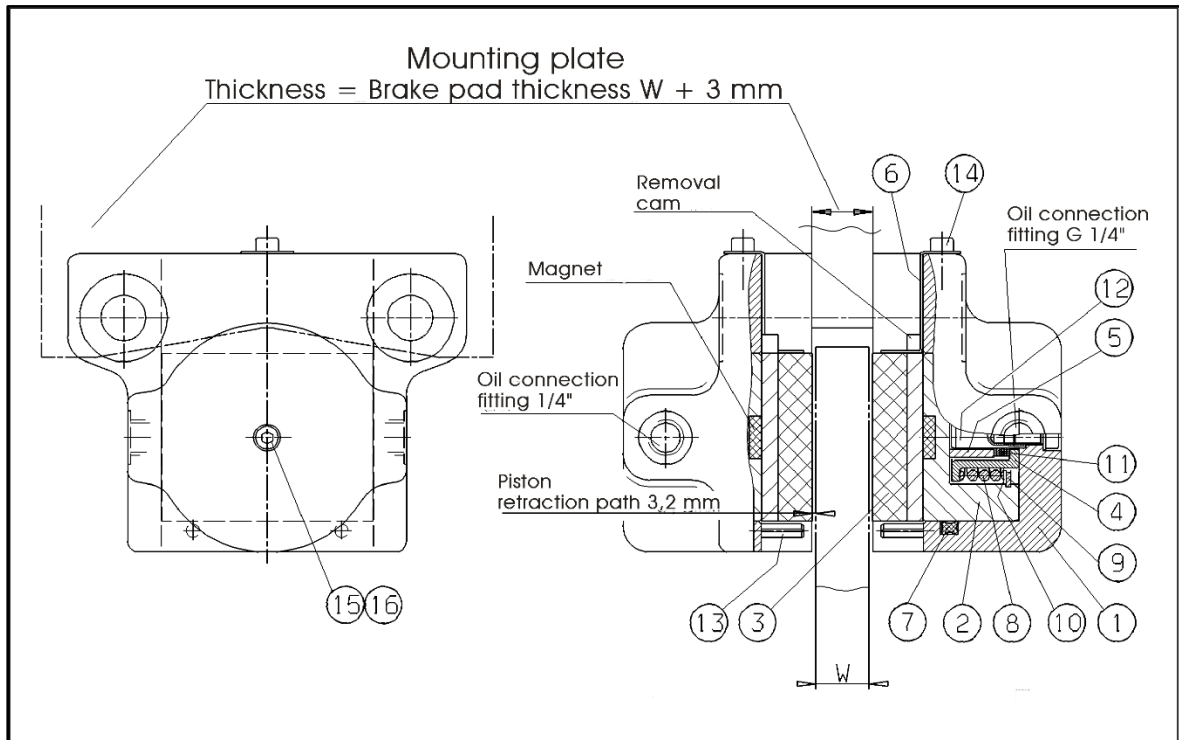


Fig. 2.2

Part	Nomenclature	Quantity
1	Brake housing	2
2	Piston	2
3	Set brake pad	1
4	Sleeve	2
5	Bushing	2
6	Holding bracket	2
7	Piston gasket	2
8	Pressure spring	2

Part	Nomenclature	Quantity
9	Circlip	2
10	Shim 25x35x1 DIN 988	2
11	Grip ring G 8x1	12
12	Cylindrical pin	2
13	Clamping sleeve	4
14	Head screw (for holding bracket)	2
15	Head screw	2
16	USIT-ring	2

Brake calliper HW 100 HFA

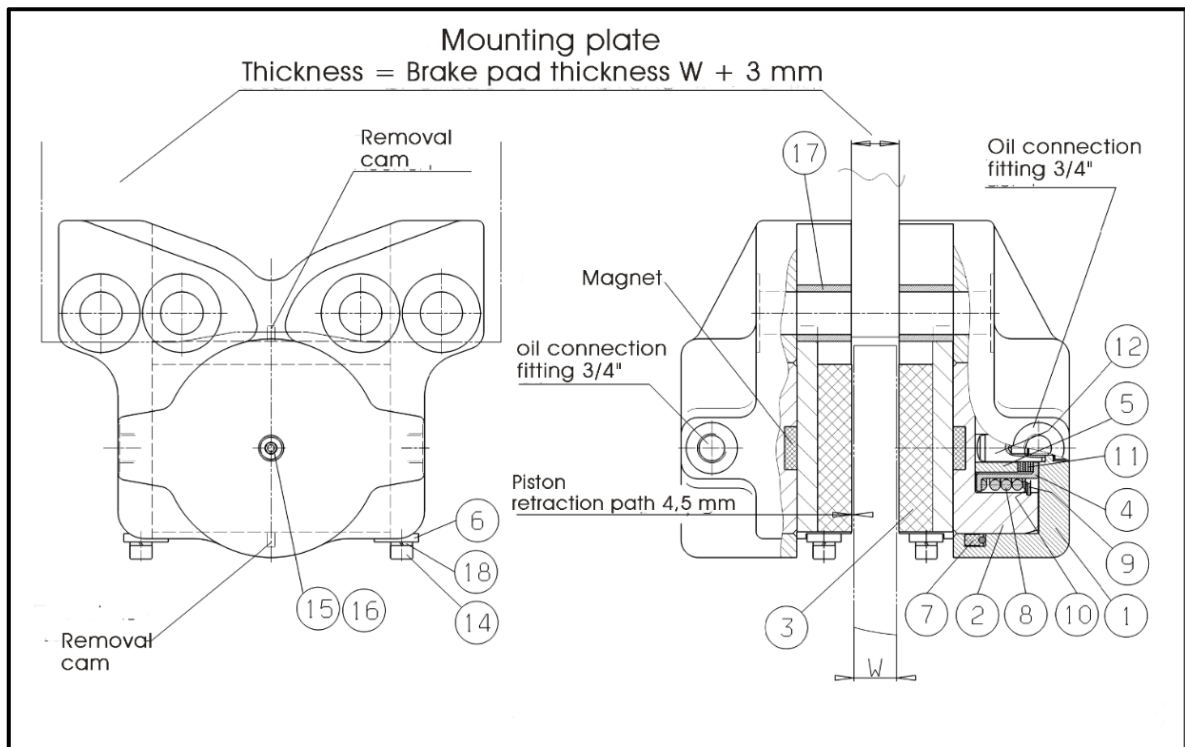


Fig. 2.3

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated			E 09.611e	
	Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21 Page: 8

Part	Nomenclature	Quantity
1	Brake saddle housing	2
2	Piston	2
3	Set Brake pad	1
4	Sleeve	2
5	Bushing	2
6	Holding plate	4
7	Piston gasket	2
8	Pressure spring	2
9	Circlip	2

Part	Nomenclature	Quantity
10	Shimdisc 40X50X1 DIN 988	2
11	Grip ring G 16x1,5	12
12	Cylindrical pin	2
14	Head screw (for holding bracket)	4
15	Head screw	2
16	USIT-ring	2
17	Spacer bushing	4
18	Spring washer	4

3. Intended use

The standard brake caliper may be used only in systems with a maximum hydraulic pressure of 90 bar and in accordance with the technical data. When using special brake calipers, please refer to the associated technical drawing.

In the standard type HFA (with spring release) ventilate the brake pads down to a residual pressure in the hydraulic < 0.3 bar. An automatic wear adjustment ensures constant piston stroke.

The brake caliper is designed for use as a holding/parking brake, control brake and/or as stopping 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. 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.

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated			E 09.611e	
Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21	Page: 9



Attention!

The brake caliper may only be operated in the installed condition with brake pad and brake disc!

5. Condition as delivered

The brake caliper is tested prior to delivery. Test pressure is 100 bar.
The delivered consignment consists of 2 brake caliper halves and 1 set of brake pads.
Sensors are supplied separately if ordered as an option.

6. Handling and storage

The weight of the caliper depending on the execution HW 040 approx. 5.5 kg, HW 063 approx. 8kg and HW 100 approx. 30 kg.

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. Moist storage areas are unsuitable. Brakes stored for longer than 12 months and after each transport, the brake must be activated in installed condition at least once in order to prevent sticking of the seal.

7. Technical prerequisite for reliable operation

Mounting the brake to stable, low-vibration machine components ensures low-screech, low-noise braking.

8. Installation the RINGSPANN brake

8.1 General instructions for assembly and installation

Before installing the brake caliper, 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.



Caution!

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

8.2 Assembly and installation

	<p>Caution!</p> <p>The brake caliper must not be exposed to hydraulic pressure during assembly/installation.</p>
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Prior to installation, check to ensure that the mounting surface is even and concentric run between the brake disc and the mounting surface is within the tolerance range of 0.3 mm. Ensure that the parallel gap of 0.2 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 ± 0.3 mm.

Maximum permissible lateral brake disc wobble is 0.1 mm. Greater wobble may cause rattling and shaking of the brake unit.

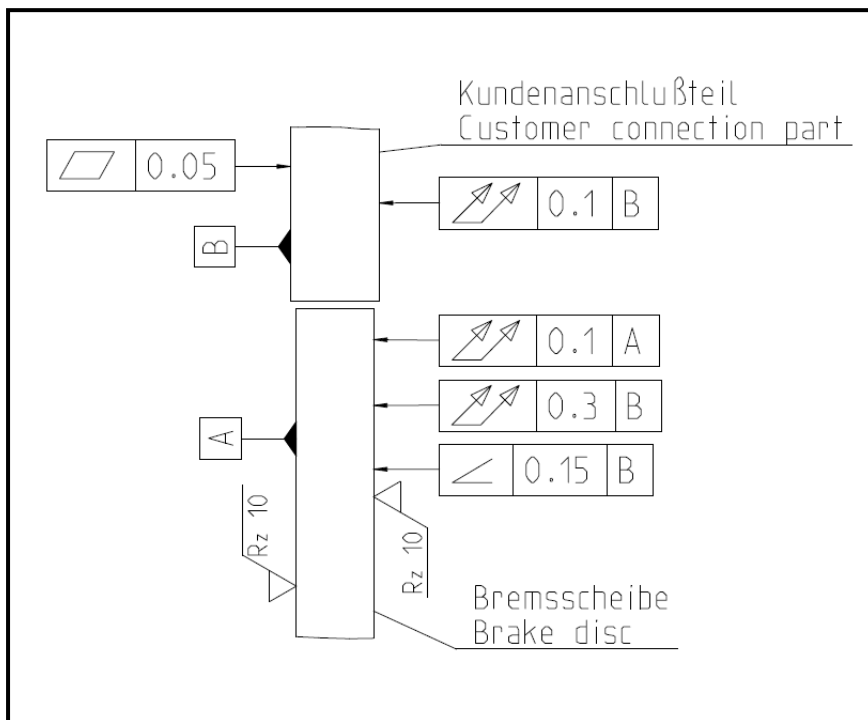



Fig 8.1

	<p>Caution!</p> <p>Check to ensure that the brake disc rotates freely.</p>
---	---

Securing the brake caliper to stable, low-vibration machine elements guarantees low-screech and low-noise braking. The two halves of the standard brake caliper are attached with screws or threaded bolts to the mounting plate or the machine components. The width of the mounting plate between the two brake caliper halves should equal brake disc thickness plus 3 mm. The gap on each side must measure exactly 1.5 mm in order to prevent additional axial pressure on the brake disc shaft during braking operations.

Please use screws/bolts of quality grade 10.9 or 12.9 for the standard brake.

Type	Number of screws/bolts	Screw/Bolt size	Tightening torques*	
			grade 10.9	grade 12.9
HW 040 HFA	2	M 12	123 Nm	144 Nm
HW 063 HFA	2	M 16	302 Nm	354 Nm
HW 100 HFA	4	M 24	1017 Nm	1190 Nm

*) calculated with $\mu_K = \mu_G = 0.12$ as the average coefficient of friction in the thread bores (from VDI Guidelines 2230, version 2001).

8.3 Setting/ adjusting the brake pad gap

The setting of the distance of the brake pads takes place after the mounting of the brake caliper automatically. The gap between the brake pads and the brake disc should always be approx. 1,5 mm on each side. During installation, ensure that the brake pads are centred and in full contact with the surface of the brake disc.



Caution!

During installation, ensure that the brake pads are centred and in full contact with the surface of the brake disc. The gap between the brake pads and the brake disc should always be approx. 1.5 mm on each side. Please observe maximum the wear limit.

8.4 Installing the threaded connection and bleeding the brake

Hydraulic hoses should be used as hydraulic fluid lines. The connection of the pressure oil lines to the brake caliper halves must be symmetrical to ensure that both brake pistons extend simultaneously.



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.

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated			E 09.611e	
Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21	Page: 12

The connection is connected to one of the two pressure oil connections. The other bore is used as a vent bore and must be sealed with a metal screw plug.

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.

Connection threading:

HW 040 HFA = G 1/4"
HW 063 HFA = G 1/4"
HW 100 HFA = G 3/8"

Hydraulic fluid:

Alloyed mineral oil equivalent to Group HLP (DIN 51525 or API classification SC, SD or SE).

Hydraulic fluid quantities:

HW 040 HFA: max. 20 cm³
HW 063 HFA: max. 20 cm³
HW 100 HFA: max. 292 cm³

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 hydraulic system must never be operated at a higher pressure than the approved. The maximum operating pressure standard brake is 90 bar.



Information!

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



Caution!

It is important to ensure that the brake pads do not rub against the brake disc when the brake caliper is open.

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.

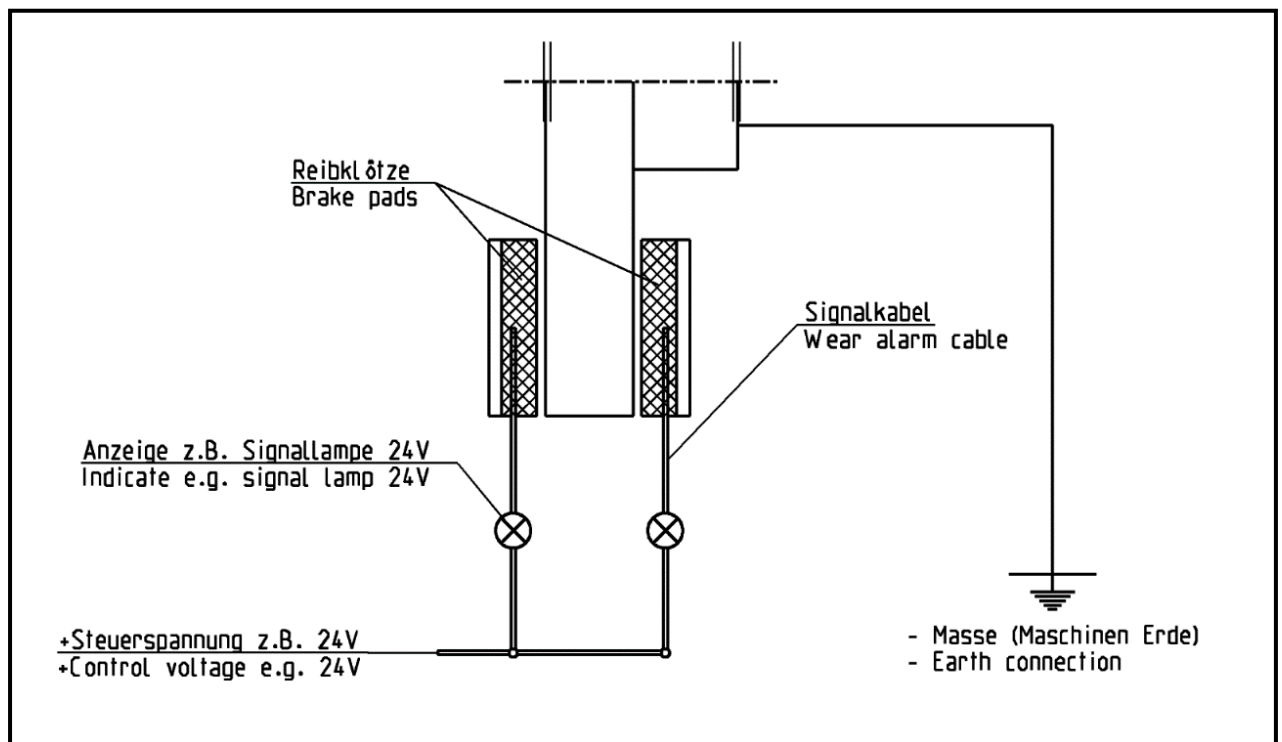


Fig. 8.2

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated	E 09.611e		
Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21 Page: 14

9. Start-up

The entire surface of both brake pads must be in contact with the brake disc in order to achieve the optimum braking effect. The brake pads must also be heated briefly to approx. 200°C. Therefore, multiple brief braking operations under low hydraulic pressure are required to heat the brake pads for the run in process.



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.

Drain hydraulic fluid completely.



Caution!

Secure the brake for disassembly.

Disconnect the hydraulic lines from the brake caliper. Secure the brake for disassembly. Remove the screws used to hold the brake in place. The brake caliper can now be removed from the mounting surface.

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated			E 09.611e	
Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21	Page: 15

11. Maintenance

11.1 General maintenance

Maintenance must be performed on the brake caliper at intervals of 4 weeks up to once a year, 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 caliper and the machine component as well as the bolt connections for the retaining plates for tightness.
- Check hydraulic lines and hydraulic connections for leaks.
- Observe fluid change intervals! Change mineral after every 8.000 hours of operation or once per year.



Caution!

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!



Caution!

Brake pads must always be replaced in pairs.

Only original RINGSPANN friction pads may be used.

Before replacing the brake pads, ensure that the mass held by the brake is secured to prevent movement, as parts of the brake must be loosened/removed for replacement.



Caution!

Ensure that the brake caliper is not under hydraulic pressure before replacing the brake pads.

Permissible brake pad wear

Brake pads must always be replaced in pairs!

Pads must be replaced with the thickness of the mounting plate and the remaining pad material is reduced to the following values:

HW model:	040	060	100
Thickness in mm	6	8	15

Ensure that the hydraulic fluid line is free of residual pressure, e.g. by removing the bleeder plug, as fluid is forced back into the system during brake pad replacement.

Replacing brake pads for HW 040 HFA and HW 063 HFA

- Remove the holding brackets hold the brake pads in place.
- Pull the brake pads out of the brake caliper halves with pliers (attached to removal cams).
- Press the piston completely into the brake housing.
- If the inductive sensor option is available, disassemble the inductive sensor or turn the inductive sensor back to the inner surface of the brake housing so that the sensor cannot be damaged, see Figure 12.1.
- Insert the new brake pads and attach the holding brackets.
- If the inductive encoder option is available, refer to chapter 12 for resetting the inductive encoder.
- Ensure that brake pad material is free of oil and grease.

Replacing brake pads for HW 100 HFA

- Remove the two inner mounting bolts and the spacer bushings.
- Pull the brake pads out of the brake caliper halves with pliers (attached to removal cams).
- Press the piston completely into the brake housing.
- If the inductive sensor option is available, disassemble the inductive sensor or turn the inductive sensor back to the inner surface of the brake housing so that the sensor cannot be damaged, see Figure 12.1.

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated			E 09.611e	
	Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21 Page: 17

- Insert the new brake pads. Replace the spacer bushings and tighten the mounting bolts to the specified torque.
- Alternatively, if sufficient space is available, you may replace the brake pads by removing the holding plates (6) toward the inside (direction of brake disc axle).
- If the inductive encoder option is available, refer to chapter 12 for resetting the inductive encoder.
- Ensure that brake pad material is free of oil and grease.

11.3 Replacing seals, strippers and piston gaskets

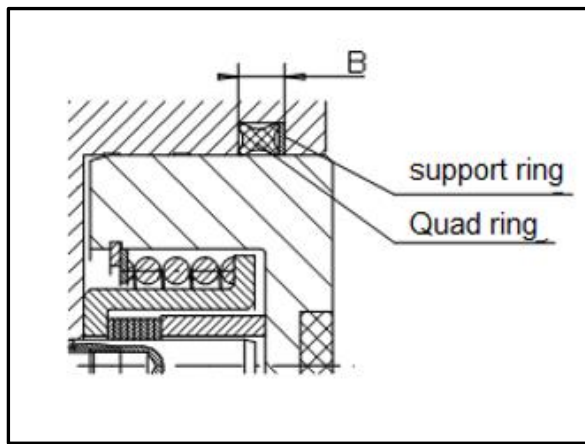


Fig. 11.1 HW 040 HFA and HW 063 HFA

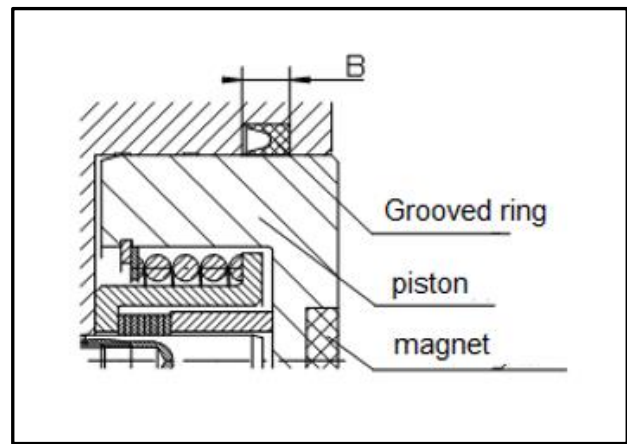


Fig. 11.2 HW 100 HFA

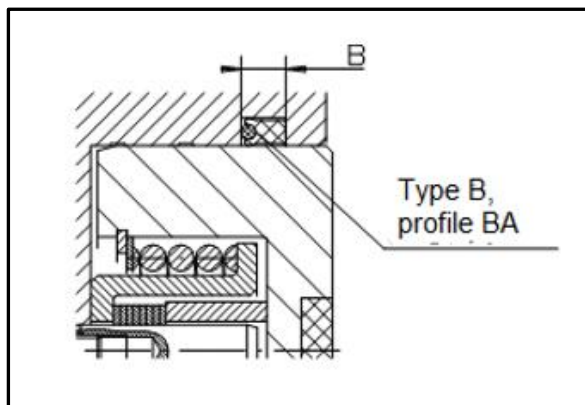


Fig. 11.3 HW 040 HFA and HW 063 HFA

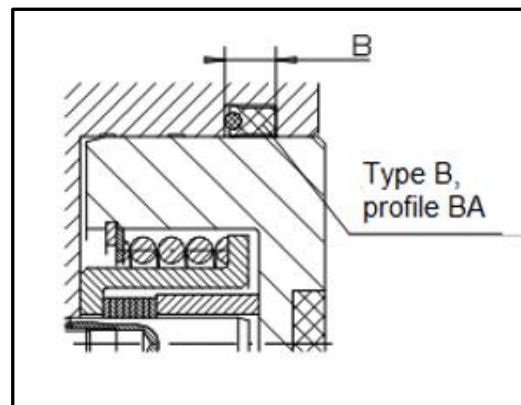


Fig. 11.4 HW 100 HFA



Life-threatening danger!

Seals/gaskets may be replaced only with the equipment system and/or working machine is at a complete standstill!

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated	E 09.611e		
Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21 Page: 18



Caution!

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

Maximum cleanliness is essential during work on the hydraulic system. Every part must be cleaned with a solvent, dried and stored dust-free. Dirt shortens the life of seals and gaskets significantly. Inspect the surfaces of the brake housing and the brake pistons. Surface damage may destroy seals/gaskets immediately. Before mounting the gasket, check the installation dimension B.

Replacing of piston gasket

For HW 040 to HW 100 (without retraction)

- Disconnect the brake caliper from the machine component and remove the brake pads.
- Close one connection bore in the brake housing with a plug.
- Connect the other bore to a hydraulic hand pump.
- Hold or clamp the brake housing firmly in place.
- Press the piston out with the hand pump.
- Remove the old piston gaskets.
- Please check before assemble every surface of the piston and the casing of damages.
- The pistonhole in the brake housing must be lightly greased with assembly grease before mounting the new seal.
- Oil the new seal.
- Assemble the new the piston gaskets.
- Press the piston with a press or a plastic hammer into the cylinder bore of the brake housing to the stop point and ensure that it is centred.

For HW 040 HFA to HW 100 HFA (with retraction)

- Remove the brake caliper and replace the gaskets as described above.
- Before pressing in the piston, centre the gripper rings (1) in the piston (2) relative to the bore or to the outside circumference of the piston with a tapered pin.
- Press the piston with a press into the cylinder bore of the brake housing to the stop point and ensure that it is centred.

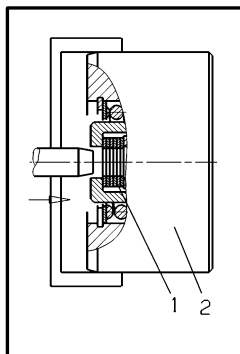


Fig. 11.5

Piston gaskets:

Type	Gasket typ	Dimension B (mm)	Gasket part no.
HW 040 HFA	Quad ring with support ring	5,4 ^{+0,2}	5134-047003-000000 5137-040401-000000
	Rod gasket Type B, profile BA	8 ^{+0,2}	5155-040081-000000
HW 063 HFA	Quad ring with support ring	6,6 ^{+0,2}	5134-073004-000000 5137-063304-000000
	Rod gasket Type B, profile BA	9,6 ^{+0,25}	5155-063081-000000
HW 100 HFA	Rod gasket Type B, profile BA	12,1 ^{+0,25}	5155-100081-000000
	Grooved ring Type C1	7,5 ^{+0,2}	5155-100001-000000
	Grooved ring Type N100-11	6,9 ^{+0,2}	5138-100301-000000

12. Installing the inductive proximity switch (option)

12.1 Mounting and connection of inductive sensors for position monitoring



Life-threatening danger!

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

If the brake is switch prepared, it is possible to mount a sensor on each brake caliper half.

The inductive proximity switch M12x1, length 65 mm, with a stainless steel housing, is enclosed loosely with the supply. M12x1 threaded hole is provided on the brake caliper halves for mounting the inductive sensor for operating condition monitoring of the released brake. For sizes HW 040 and HW 063, a pin for detection is mounted on the friction lining. For the HW 100 brake caliper, the rear side of the friction lining is detected.

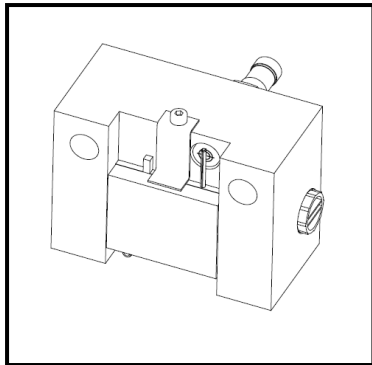


Bild 12.1

Switching function:	PNP (normally open contact)	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:	Synchronising
Reverse polarity protection:	Yes	Switching display:	Multi-hole LED
Temp. range:	-25 to +70°C	Type of protection:	IP 67
Connection type:	V1 appliance plug	Housing:	Stainless steel

Connection diagram of the inductive proximity switch

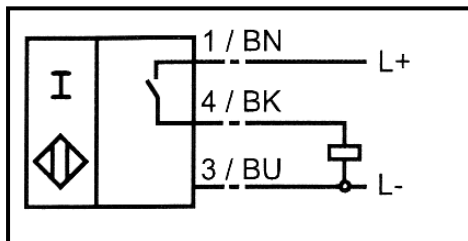


Fig. 12.2



Information!

The inductive proximity switch is to be arranged in such a way that it is activated in depressurised state (the LED at the inductive proximity switch shines). If the brake is activated, the piston moves out of the housing and pushes the friction block onto the brake disc. The inductive proximity switch is then no longer activated. The LED at the inductive proximity switch goes out.

In the case of HFA brake calipers with automatic wear adjustment, the inductive sensor is not automatically adjusted in the event of friction block wear. The setting of the inductive sensor in the non-actuated state in the event of friction block wear must be readjusted manually if the LED on the inductive sensor no longer lights up when the brake is depressurized. For each adjustment/ readjustment, also check the friction block wear limit, see also Chapter 11.2.

RINGSPANN	Installation and Operating Instructions for Brake Calipers HW 040/063/100 HFA hydraulically activated			E 09.611e
Date: 19.01.2023	Issue: 18	drawn: BAHS	checked: EISF	Pages: 21 Page: 21

Work sequence for mounting, or in the case that exchanging the inductive proximity switch is necessary with a switching gap of 2 mm:

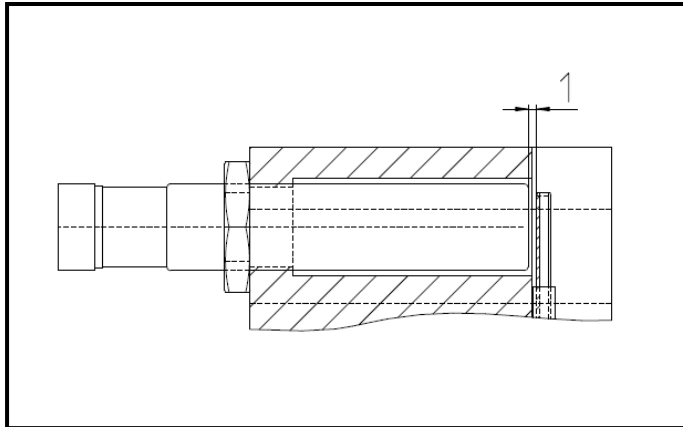


Fig. 12.3

- Assemble the inductive proximity switch when the brake is pressurised.
- Screw the inductive proximity switch into the brake housing until there is a distance of approx. 1 mm between the inductive proximity switch and the pin or the back of the base plate of the friction block.
- Secure this position with the counter nut.
- Attach the inductive proximity switch. The LED of the inductive proximity switch should shine.
- Test for proper functioning by repeatedly activating the brake.



Important!

Follow the exact work steps described, since otherwise the inductive proximity switch could get damaged.