

## Installation and Operating Instructions for Brake Caliper DV / DH 030 FHM

E 09.674e



Any questions? Please contact us.

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<b>RINGSPANN</b>	<b>Installation and Operating Instructions for Brake Caliper DH / DV 030 FHM spring activated, hydraulically released</b>	<b>E 09.674 e</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 information

These installation and operating instructions apply to:

- the DV 030 FHM with left-mounted brake chamber as shown in Fig. 3.1 in Section 3, for mounting on a 12.5-mm or 25-mm disc brake thickness.
- the DV 30 FHM with right-mounted brake chamber
- the DH 30 FHM, brake caliper mounted at the right angle to the brake disc
- various types of brake-pads, e.g. with wear alarm cable, increased glide speed, double friction surface or other special brake pad materials.

An identification plate with a 16-digit part number is affixed to the caliper. The precise design of the brake caliper is defined by this part number only.

Please consult the drawings in each section when using this 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

The brake caliper is used as a stopping and parking brake.

Braking force is generated by a spring in the brake chamber (1). It is released (opened) hydraulically with compressed oil. If brake pads (2) are worn, braking and holding force is diminished, as the tension in the spring is reduced.

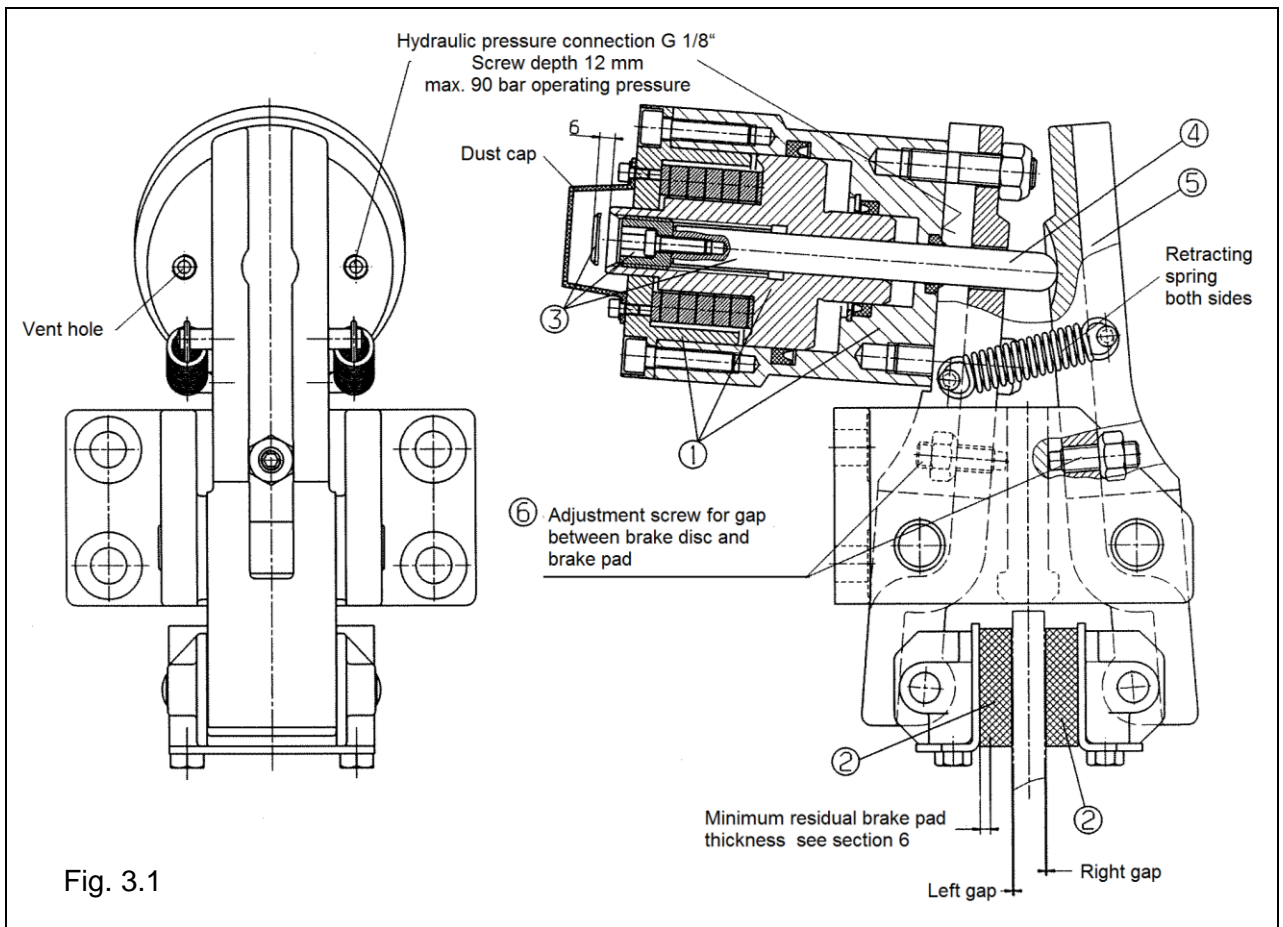
If brake pads are worn, brake pad wear must be checked and braking force adjusted as described in Section 6.2 and 6.3.

The brake can be released manually in the event of hydraulic system failure (Section 8).

The brake chamber (Pos. 1, see parts list) may only be dismantled by the manufacturer.

Rotating parts must be secured by the user against inadvertent contact (e.g. brake disc).

### 3. Drawing and parts list



#### Parts list:

Part	Nomenclature	Quantity	Part number
1	Brake chamber	1	3514-100122-000000
2	Standard brake pad for brake calipers: 4457-301807-000000 4457-301808-000000 4457-301809-000000	2	2472-005013-A00112*

\* Part number for 1 piece brake pad

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#### 4. Condition on delivery

The brake caliper is not ready for operation as delivered. The brake caliper is delivered with a gap of 13.5 mm or 26.0 mm between the brake pads. This makes it possible to install and remove the caliper without hydraulic pressure.



#### **Caution!**

In order to ensure that the brake caliper functions properly, all of the steps listed in section 5.1 through 5.4 must be performed!

#### 5. Installing the RINGSPANN brake caliper

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.



#### **Caution!**

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

##### 5.1 Installation

As delivered, the pushrod unit (3) is turned outward by 6 mm. This makes it possible to install the brake caliper with a hydraulic fluid connection and thus without hydraulic pressure.

The brake caliper should be mounted to stable, vibration-free machine components in order to ensure noise-free, non-screech.

During installation, it is essential to ensure that brake pads are centred and in full contact with the brake disc (the midlines of the brake arm must point to the midpoint of the brake disc). Maximum permissible lateral brake disc wobble is 0.2 mm. Greater wobble may cause rattling and shaking of the brake unit.

The brake caliper is mounted to the machine component with using 4 M12 bolts (strength class 8.8).

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## 5.2 Hydraulic line connection

Maximum operating pressure is 90 bar; a minimum of 24 bar is required to release the brake.

The threaded hydraulic fluid inlet on the brake chamber is G 1/8" (Whitworth threaded pipe in accordance with DIN ISO 228-1).

The recommended hydraulic fluid is 15 W 40 motor oil; alternatively, an alloyed mineral oil that meets the specifications of the HLP group in accordance with DIN 51 525 or API classification SC, SD, SE may be used.

The hydraulic fluid line is connected to one of the two G 1/8" bores in the mounting flange. The second bore serves as an vent hole and must be sealed with a threaded plug.

Each stroke requires approx. 7 cm<sup>3</sup> of hydraulic fluid (not accounting for brake pad wear).

## 5.3 Brake caliper adjustment



### **Caution!**

The braking/holding force must be adjusted prior to initial operation.

- Pressurize the brake chamber with least 24 bar and maximally with 90 bar pressure oil.

### Note:

Subsequent operating pressure must be equal to or greater than this initial setup pressure, as otherwise the brake caliper will not open completely during normal operation, which can result in brake pad rubbing.

- Remove the dust cap on the brake chamber by loosening the two M 4 x 8 DIN EN ISO 4762 hexagonal socket screws.
- Turn both threaded pins M10 DIN EN ISO 4028 (6) counter-clockwise, approx. 2 full turns.
- Turn the pushrod unit (3) with an socket screw wrench SW 10 clockwise until the pushrod (4) abuts with the lever (5). Then set a small gap (0.2 – 0.4 mm) between the two brake pads and the brake disc by tightening further, ensuring that the brake pads do not rub against the disc. It is helpful to press one brake pad against the brake disc and to set the desired total gap between the disc and the other brake pad using a feeler gauge.

### Note:

The minimum adjustable gap depends on the actual degree of lateral brake disc wobble. Smaller gaps increase the wear reserve, i.e. the interval between brake caliper adjustments.

- Depending on the positions of the brake caliper and the brake disc axle, the laterally mounted brake chamber may generate a tipping force which results in an unequal gap between the two brake pads and the brake disc. In extreme cases, one brake pad may come to rest against the brake disc, while the total gap shifts to the other side of the disc. This causes constant rubbing by this brake pad during operation. The gap can be adjusted (distributed equally) by turning the threaded pins (6). Determine where the gap between a brake pad (brake lever) and the brake disc is larger, then turn the corresponding threaded pin (6) clockwise to set an equal gap on both sides of the disc.

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**Caution!**

It is important to ensure that the brake pads (2) do not rub against the brake disc when the brake is released.

- Remove hydraulic pressure from the brake. The brake closes and full braking force is available.
- Replace the dust cap.

5.4 Running-in procedure

Optimum braking effect is achieved only when both brake pads (2) are in full contact with the brake disc and the brake pads have attained a temperature of approx. 200°C. This requires multiple, brief braking while the brake disc is rotating (run-in).



**Caution!**

If breaking-in is not performed, the braking forces cited in our catalogue no. 46 cannot be achieved. Reductions of up to 50% are possible.

Note:

If it is not possible to break in the unit while the brake caliper is fully engaged (exposed to full spring pressure), braking force can be reduced by decreasing oil pressure (< 20 bar).

**6. Maintenance**

Maintenance should be performed on the brake calliper at intervals of 4 to 12 weeks, depending upon the frequency and duration of operation.

6.1 General maintenance

- Check both brake caliper levers for ease of movement.
- Clean all bearings and glide points
- Lubricate all bearing and glide points.
- Check to ensure that the brake pads do not rub against the brake disc when the brake caliper is open, i.e. hat the gap is uniform on both sides. Adjust the brake gap is required (see Section 5.3).



**Caution!**

Brake pads must not be come in contact with lubricants.



Check for tight bolt / screw connections:

- brake caliper to machine component
- brake chamber to brake caliper lever arm
- brake pads to brake caliper leverarm

Check the following for proper seal / leaks:

- brake chamber
- hose connection

6.2 Checking/adjusting braking force (see Fig. 6.1)

- Check the braking force, i.e. spring tension. Remove the dust cap, engage (close) the brake caliper and measure how far the piston (7) in the spring pressure cylinder protrudes from the cylinder cover as shown in Fig.6.1 (Dimension "V").

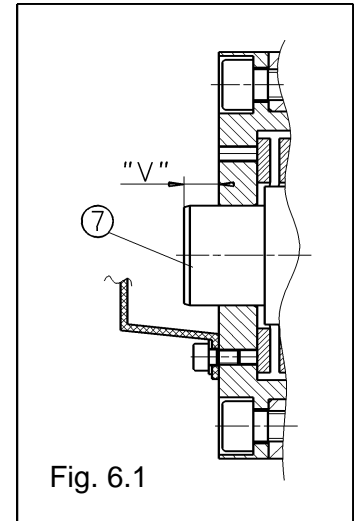


Fig. 6.1



**Caution!**

When brake pads are worn, spring tension decreases when the brake caliper is engaged and the length by which the piston (7) protrudes as shown in Fig. 6.1 is reduced. This reduces the braking torque. When the distance is reduced to 1.5 mm – at the latest (the piston is then in the end position) – braking force must be readjusted as described in section 5.3.

6.3 Brake pads wear control

Braking force decreases gradually as the result of brake pad wear. Brake pads should be adjusted as needed as described in section 5.3.

Table : Residual brake pad thickness

Brake disc thickness (mm)	Residual brake pad thickness, distance from the pad surface to the steel bearing plate. This value is the absolute minimum value (mm)
12,5	4,0
25,0	5,5



**Caution!**

Brake pads must always be replaced in pairs.

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## 7. Replacement of worn parts

### 7.1 Brake pads

Before replacing brake pads, ensure that the mass held in place by the brake is secured against shifting, as the brake must be disengaged (opened) to replace the brake pads. Apply hydraulic pressure to the spring pressure cylinder. The brake caliper opens. Remove the dust cap, turn the pushrod unit (3) back until it protrudes 6 mm from the piston (7). Turn the threaded pin (6) used as a stop back far enough so that the brake pads can be replaced easily.

An SW 13 open-ended or closed-ended spanner is required to remove and install the brake pads.

Once brake pads have been replaced, the braking torque and brake pad gap must be readjusted as described in section 5.3. The brake pads must also be run in (see section 5.4).

### 7.2 Brake chamber

The brake chamber is defective, if at pressure with hydraulic oil and subsequent removal, the pushrod (4) does not make any move or when fluid leaks from the brake chamber. Inspection and repairs must be performed by RINGSPANN.



#### **Caution! Danger of injury!**

A high-tension pressure spring is built into the brake chamber. When the cover bolts are loosened or removed, spring tension is not completely eliminated.

## 8. Releasing the brake after hydraulic system failure

In an emergency, the closed brake caliper can be opened with the support of the hydraulic system. Before performing this operation, ensure that the mass held in place by the brake is secured against shifting.

To perform this operation you need:

an SW 10 hex socket spanner with cross grip  
a screwdriver for M4-DIN EN ISO 4762 hexagonal socket screws

- Loosen the two M4x8 DIN EN ISO 4762 screws and remove the dust cap
- Turn the pushrod unit (3) counter-clockwise (left) approx 4 ½ to 5 revolutions against the active spring force. The brake caliper opens.
- After an emergency release, the brake caliper must be readjusted as described in section 5.3.