

## Installation and Operating Instructions for Brake Caliper DV and DH 020 FPM

E 09.615e



Any questions? Please contact us.

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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

This installation and operation instructions applies to

- the DV 020 FPM, brake caliper mounted parallel to the brake disc (frame construction V, see Fig. 3.1 in Section 3); brake chamber mounted on the right.
- the version with brake chamber mounted on the left (on the mounting side, see Fig. 3.2).
- the DH 020 FPM, brake caliper mounted at a right angle to the brake disc (frame construction H, see Fig. 3.3 in Section 3).
- for installation on a brake disc with a thickness of 12.5 mm.
- the various brake pad types, e.g. with cable for wear monitoring, higher glide speed, double friction surface and different pad materials.

An ID plate with a 16-place part number is mounted on the brake 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 instruction.

## 2. Configuration and function

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

Braking force is generated by a spring, pos. 16 (see Fig. 7.1 and 7.2 in Section 7.1). It is released (opened) pneumatically with compressed air. If brake pads (pos. 3, Fig. 3.1) are worn, braking and holding force is diminished, as the tension in the spring (pos. 16) is reduced.

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

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



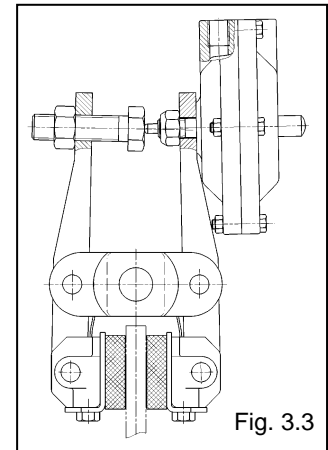
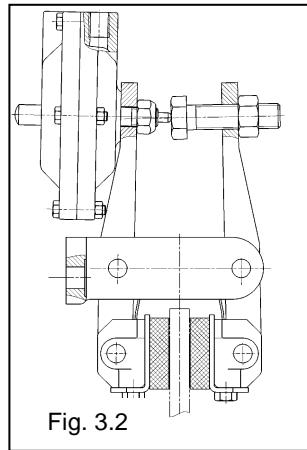
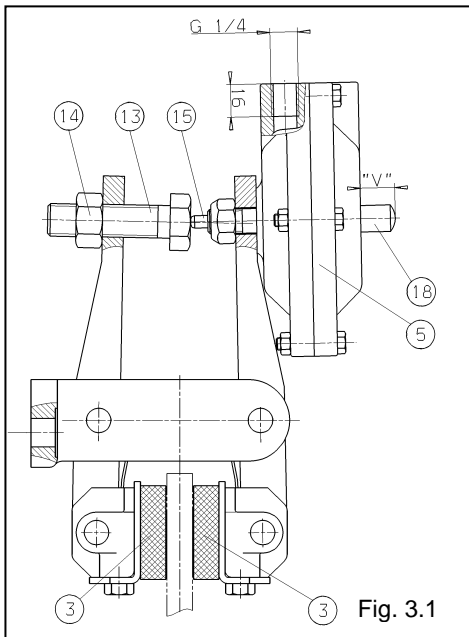
### **Danger to life and limb!**

**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.**

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### 3. Drawing and parts list



#### Parts list:

Part	Nomenclature	Quantity	Part number
5	Brake chamber 040	1	3514-032116-000000
	Brake chamber 030	1	3514-032108-000000
	Brake chamber 020	1	3514-032109-000000
3	Standard brake pad	2	2472-005013-A00112*
	Brake pad with wear alarm cable	1	2472-005013-A00101**
	Brake pad of BK 4773	2	2472-005013-A00102*
3	Brake pad of BK 5300	2	2472-005013-A00103*
	Brake pad, milled	2	2472-005013-A00115*
	Brake pad of BK 6905	2	2472-005013-A00117*

\* Part no. for 1 brake pad

\*\* Part no. for 1 set (2 ea.) of brake pads

### 4. Condition at delivery

The brake caliper is not ready for operation as delivered. The brake caliper is delivered with a clamping gap of 13.5 mm between brake pads. This allows for installation or mounting without compressed air pressure.

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## 5. Installation of 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

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

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 lever 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.

As a rule, the bolt (pos.13) shown in Fig. 3.1 is turned into the brake lever arm to the point at which the calliper can be mounted to the brake disc (thickness 12.5 mm) without air pressure. If this is not possible, loosen the nut (pos. 14) and turn the bolt (pos. 13) further into the brake lever arm.



### Caution!

Following mounting or installation, braking force must be adjusted as described in Section 5.3.

The brake caliper is using:           two M12 bolts (type DV 20 ) or.  
  one M20 bolt (type DH 20)  
  the strength class 8.8 attached to the machine part.

### 5.2 Compressed air connection

Brake chamber 040: minimum pressure 5,0 bar, maximum pressure 7 bar

Brake chamber 030: minimum pressure 3,5 bar, maximum pressure 7 bar

Brake chamber 020: minimum pressure 2,6 bar, maximum pressure 7 bar

A flexible hose connection is required. Please use hoses with a minimum diameter of 6 mm. Hose pressure must be at least 7 bar (preferable 12 bar) with a temperature range of approx. -20°C to +80°C.

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Air hoses are connected to the spring-pressure cylinder with a G ¼" fitting (Whitworth threaded pipe, DIN ISO 228-1).

Compressed air must be filtered to remove all dirt, pipe chips, rust and condensation. Purified air must then be enriched with a fine oil mist injected by a standard, commercially available conditioning unit. The quantity of oil added depends on the nominal air flow rate in l/min. and is specified by the manufacturer of the conditioning unit.

The following types of oil are recommended for conditioning units:

<u>Suitable oil</u>	<u>Viscosity at 20° C (mm²/s)</u>
Avia Avilub RSL 3	34
BP Energol HLP 40	27
ESSO Spinesso 34	23
Shell Tellus Öl C 10	22
Mobil VAC HLP 9	25,2

Maximum air consumption for each braking operation is approx. 17 cm³ .

### 5.3 Adjusting the brake caliper



#### **Caution!**

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

Pressurize the brake chamber to 5 to 6 bar.

#### Note:

Pressure during subsequent operation must be equal to or greater than this adjustment pressure, as the brake calliper will otherwise fail to open completely during normal operation, resulting in possible brake pad rubbing.

- Turn the bolt (13) on the pushrod (15) shown in Fig. 3.1 clockwise until gap between the brake pads and the brake disc is reduced to approx. 0.2 to 0.4 mm but the brake pads do not rub against the brake disc.

#### 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.

- Secure the screw (13) by tightening the nut (14).



#### **Caution!**

It is important to ensure that the brake pads (3) do not rub against the brake disc when the brake is released

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**Caution!**

Check to ensure that the brake disc rotates freely.



**Caution!**

The friction block distance must after initial assembly or after replacing the brake pads or other components be new adjusted.

When venting the brake chamber is now the full braking torque (holding torque) available.

5.4 Run-in procedure

Optimum braking effect is achieved only when both brake pads (3) 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 run-in is not performed, the braking forces cited in our publication no. 46 cannot be achieved. Reductions of up to 50% are possible.



**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.

Note:

If run-in is not possible with the fully vented brake caliper (exposed to full spring pressure), braking force can be reduced by decreasing air pressure (1...4 bar).

**6. Maintenance**

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

6.1 General maintenance

- Check both brake caliper lever arms for ease from movement.
- Clean all bearing and glide points
- Lubricate all bearing and glide points.



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Note:

It is important to ensure that the pushrod (pos. 15) is properly lubricated with grease at the exit point.



**Caution!**

Brake pads must not 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 lever arms
- brake chamber flange connection

Check the following for proper seal/leaks:

- hose connections  
(leaks can for example be determined easily and quickly with a commercial "leak searcher").

6.2 Checking and adjusting braking torque

- Check braking torque and spring tension.
- When the brake caliper is closed, measure how far the bolt (18) on the spring-pressure cylinder shown in Fig. 3.1 (see Section 3) protrudes toward the cylinder cover.



**Caution!**

When brake pads are worn, tension in the spring (pos.16, Fig. 7.2, Section 7) is reduced and the distance the bolt (18, Measure "V") shown in Fig. 3.1 protrudes is diminished. This reduces braking torque. At a protrusion distance of 7.5 mm, at the latest, braking force must be readjusted as described in Section 5.3.

6.3 Permissible brake pad wear and brake pad replacement

Brake pad material must have a thickness of at least 4 mm (from the top surface of the brake pad to the top surface of the steel mounting plate) Brake pads or brake linings (pos. 3) must always be replaced in pairs. For unscrewing and screwing on fixed spanners or ring spanners with SW 13 are needed.



**Danger to life and limb!**

Brake pads may only be replacing when the plant or the working machine is at complete standstill!

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## 7. Removal and replacement of worn parts in the brake chamber

The brake chamber is defective when the pushrod (pos. 15) does not move when pressure is applied or released or when air escapes from the brake chamber. To the extent possible, inspection and repair should be performed by the manufacturer only.

There are two types of brake chamber, which differ in external appearance as follows:

- |                                  |   |
|----------------------------------|---|
| Brake chamber 3514-032104-000000 | : no marking  |
| Brake chamber 3514-032116-000000 | : at point "A" (see Fig. 7.2), the number „116“ is punched into the unit; the cylinder cover also bears a yellow warning sign with "Gefahr Danger..." |



### Caution!

Brake chamber 3514-032116-000000 is equipped with a highly biased spring (16). Spring pressure is not completely relieved when the brake chamber flange bolts (19) are loosened or removed. The instructions in Section 7.2 must be followed when dismantling the spring!



### Danger to life and limb!

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

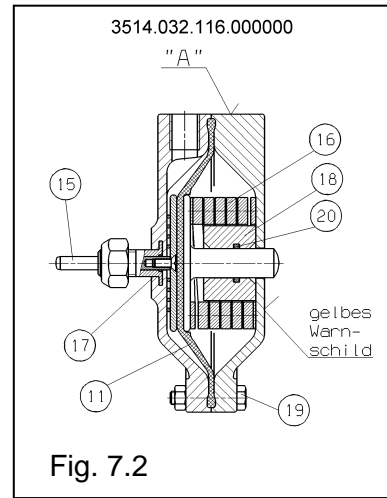
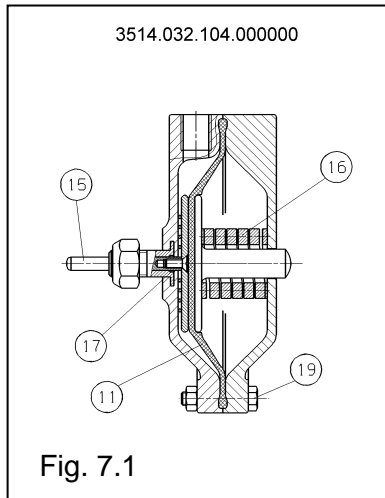
### Note:

If it becomes necessary to replace the pressure spring (16), see Fig. 7.1, in brake chamber of type 3514-032104-000000, this brake chamber must be converted to type 3514-032116-000000, as the pressure spring for type 3514.032.104.000000 is no longer available.

In this case, please order the conversion kit, part no. 3701-059001-000000, which contains parts 16, 18 and 20 as well as warning sticker. Install parts 16, 18 and 20 as described in Section 7.3.

Please ensure that the sticker with the warning "yellow warning label" is affixed to the brake chamber (see Fig. 7.2) and mark the brake chamber at point "A" (see Fig. 7.2) with the number "116". You also have the option of ordering a completely assembled brake chamber, part no. 3514-032116-000000 as a replacement part.

### 7.1 Drawing brake chamber (Standard - model)

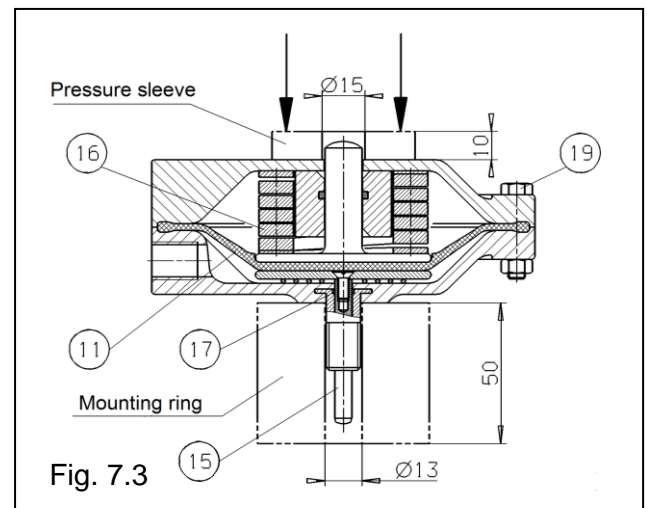


#### Parts list:

Part	Nomenclature	Quantity	Part number
11	Diaphragm	1	1473-130001-000000
16	Flat-wire pressure spring for brake chamber 3514-032116-000000	1	2701-059104-000000
17	O-ring 6x1	1	5116-006002-000000
18	Spacer bushing	1	2741-034110-000000
20	O-ring 12,3x2,4	1	5116-012003-000000

### 7.2 Removal and replacement of worn parts in the brake chamber

- Remove the bolts connecting the brake chamber to the brake caliper.
- Place the brake chamber on a mounting ring as shown in Fig 7.3 and lay a pressure sleeve on the brake chamber
- Pressurize the brake chamber with a force of 3.000 N with the aid of a press (e.g. a hand-lever press).
- Remove the flange bolts and nuts (19). Release press pressure gradually until the pressure spring (16) is fully relaxed.
- Remove the damaged or worn diaphragm (11) and/or O-ring (17).
- Clean individual parts, especially the pushrod (15).



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### 7.3 Installing the brake chamber

- Lubricate the pushrod, the pushrod guide bore and the O-ring (17) with ISOFLEX LDS 18 spez. grease.
- Assemble the individual parts as shown in Fig. 7.3. To assemble the flange bolts and nuts (19), use the mounting ring, pressure sleeve and press as shown in Fig. 7.3 and described in Section 7.2.
- Tighten the M6x30 DIN EN ISO 4014–8.8 flange bolts (19) uniformly in diagonal sequence to the stop point (tightening torque 10 Nm).
- Test for proper seal/leaks at 6-7 bar before mounting the brake chamber to the brake caliper.