

## Installation and Operating Instruction for Brake Caliper DU 060 PFM

E 09.680e



Any questions? Please contact us.

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<b>RINGSPANN</b>	<b>Installation and Operating Instruction for Brake Caliper DU 060 PFM pneumatically activated – spring released</b>			<b>E 09.680 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 remarks

The DU 060 PFM brake caliper are a machine component use to achieve safe and reliable braking of accelerated masses. Combined with a brake disc, the calliper forms a complete brake capable of securing machines and machine systems effectively.

By virtue of its universal design concept, it performs the following functions:

- As a holding/parking brake, it prevents inadvertent activation of an idle shaft.
- As a stopping brake, it quickly brings a rotating shaft to a standstill in the event of power failures or emergency system shut-downs, for example.
- As a control brake, it ensures adherence to a specific material traction force.

### 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.

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

### 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

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

### 2.2 Markings

These installation and operating instructions apply to:

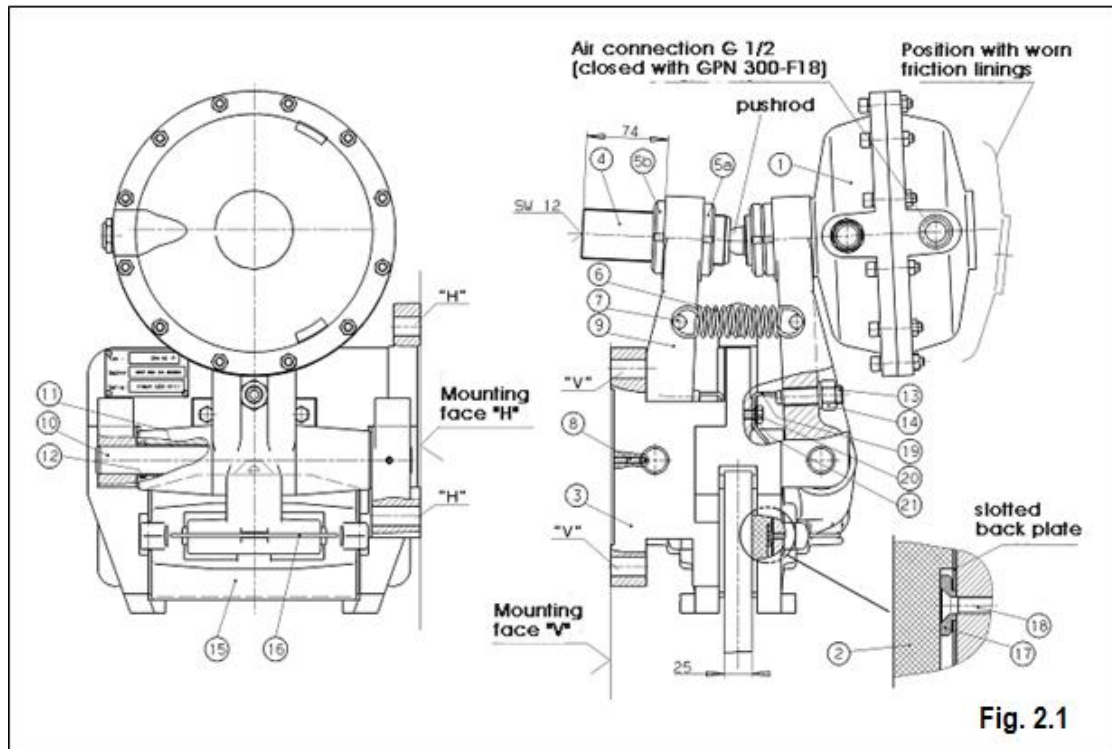
- the model DU 060 PFM, right-mounted brake chamber, see Fig. 2.1 in Section 2.3
- the model DU 060 PFM, left-mounted brake chamber.
- the model DV 060 PFM
- mounting on brake discs with thickness 25 or 40 mm.
- the version with holder for inductive proximity switch, with and without encoder
- various types of brake pads with and without wear signal cable in the brake pad.

Depending on the construction requirements is the caliper parallel (mounting face V) or in the right-angle (mounting face H) to the brake disc attached.

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.

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### 2.3 Drawing and parts list



Part	Nomenclature	Quantity	Part number
1	Brake chamber for DU 060 PFM	1	3514.230.102.000000
2	Brake pad BK 6800 (Standard)	2	2472.040.025.A00102*
	Brake pad BK 6905		2472.040.025.A00103*
	Brake pad BK 8006		2472.040.025.A00105*
3	Frame (25 mm brake disc thickness)	1	2474.300.001.000000
	Frame (40 mm brake disc thickness)		2474.300.003.000000
	Frame DV (25 mm brake disc thickness)		2474.300.004.000000
4	Support bolt	1	2725.045.604.000000
5	Grooved nut KM 9	2	5130.045.002.000000
6	Return spring	2	2701.025.008.000000
7	Grooved pin	4	5236.012.004.000000
8	Threaded pin M 6x16	4	5012.006.055.000000
9	Lever	2	2475.320.001.000000
10	Shaft	2	2714.025.601.000000
11	Sliding bearing	4	5313.025.004.000000
12	Wiper	4	5139.025.102.000000
13	Threaded pin M 16x60	2	5012.016.053.000000
14	Hexagonal nut, self locking	2	5113.016.001.000000
15	Swivel mount	2	2476.206.001.000000
16	Spring bracket for swivel mount	2	2701.157.001.000000
17	Holding disc for brake pad	2	2771.018.103.000000
18	Countersunk screw M 5x16 DIN 7991	2	5005.005.120.000000
19	Sheet metal bracket	2	2789.110.002.000000
20	Hexagonal screw	4	5019.008.004.000000
21	Disc 8,4 DIN 125-St	4	5105.008.001.000000

\* Part number for 1 brake pad

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### 3. Proper use / specific purpose

The brake caliper may be used only in systems with max. 6 bar of pneumatic pressure and in accordance with the technical specifications.

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

The brake caliper is delivered standard with a clamping gap of approx. 26 mm or 41 mm between the brake pads. (Brake disc thickness plus a distance of 0.5 mm as the air gap between the brake pads and the brake disc on both sides).

### 6. Handling and storage

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 must be activated at least once in order to prevent seal adhesion.

### 7. Technical requirements for safe and reliable operation

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

### 8. Installing the RINGSPANN brake caliper

#### 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.).

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 rustproofing residues reduce the friction coefficient and thus the transmissible braking torque substantially!

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## 8.2 Installation



### Caution!

When mounting of the brake caliper may can not the brake chamber of the brake caliper to be supplied with compressed air.

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 levers must point to the centre 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 4 M16 screws (mounting face V) or 3 M16 screws (mounting face H); strength class 8.8. Screws must be tightened with a torque spanner (tightening torque 195 Nm).



### Caution!

Check to ensure that the brake disc rotates freely.

### Check the following connections for tightness:

- brake caliper to machine component
- brake chamber to brake caliper lever arm
- support bolts on the brake caliper lever arm

### Check the following for proper seal:

- brake chamber
- hose connection



### Caution!

The brake chamber has a G ½ (Whitworth pipe thread DIN ISO 228-1) compressed air connection. The compressed air connection must be effected with a flexible hose with a minimum diameter of 6 mm in order to prevent the impairment of pressure cylinder movement during operation. Operating pressure may range from 1 to 6 bar, depending on braking torque; maximum operating pressure 6 bar.

The pressure cylinder can be operated with oiled or unoled compressed air. Compressed air must be filtered, dried and dehumidifies.

(solid material class 5 – impurities larger than 40 µm must be eliminated with the aid of suitable filters – pressure dew point +2°C ). When using unoled compressed air, please ensure that the compressed air contains on ozone, as ozone will cause more rapid aging of the diaphragm.

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The following oils are recommended for use in the maintenance units when oiled compressed air is used:

<u>Suitable oils</u>	<u>Viscosity at 20° C (mm<sup>2</sup>/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

Air volume: At full piston stroke, (maximum brake pad wear and no stroke adjustment via the support bolts) the max. air volume is 2 000 cm<sup>3</sup> /Hub.  
In new condition (no brake pad wear) approx. 280 cm<sup>3</sup>.  
(see our publication No. 46)

### 8.3 Setting the gap between the brake pads and the brake disc



#### **Caution!**

The brake chamber of the brake caliper when may be set the air gap between the brake pad and the brake disc is not supplied with compressed air.

The brake caliper is set by the manufacturer to the required gap of 26 mm or 41 mm. (Brake disc thickness of 25 or 40 mm and a lateral distance of 0.5 mm between the brake disc and the brake pads (Fig. 2.1, pos. 2). If the gaps on the right and left side of the brake disc is not uniform once the brake caliper has been mounted to the machine component, the gaps must be corrected as follows:

- Turn the threaded pin M16x60, (Fig. 2.1, pos. 13) clockwise (right) to reduce the associated air gap.
- Turn the threaded pin M16x60, (Fig. 2.1, pos. 13) counter-clockwise (left) to enlarge the associated air gap.
- Set both lever arms evenly.



#### **Information!**

Increases the air gap not, when turning counterclockwise , then presses the support bolts (Fig. 2.1, pos. 4) on the pushrod of the brake chamber.  
To increase the air gap must the left grooved nut (Fig 2.1, pos. 5b) first solved, and then the support bolt while holding the right grooved nut (Fig. 2.1, pos. 5a) back screw until the distance between support bolt and pushrod is 3 -5 mm.  
Set the air gap between brake disk and brake pad to the desired distance.  
Then turn the support bolts back up to the pushrod until it rests on the pushrod and then a half turn back (This is a distance of approximately 0.8 mm between the bolt and pushrod). Tighten both grooved nuts tightly.



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**Caution!**

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

**9. Commissioning**

9.1 Running in

An optimum braking effect can be achieved only when the brake pads (2) are in full contact with the brake disc and have been heated briefly to approx. 200°C. Therefore, it is necessary to perform multiple brief braking operations (running in) at low pneumatic pressure (1-2 bar) while the brake disc is rotating.



**Caution!**

If the brake cannot be run in, the braking torques specified in our publication No. 46 cannot be achieved. Braking torques may be reduced by as much as 50%.

**10. Maintenance and repairs**

10.1 General maintenance

Depending upon operating parameters, maintenance must be performed on the brake caliper at intervals of between 4 and 12 weeks.

- Check both brake calliper arms for ease of movement.
- Clean all bearing and glide points
- Oil or grease bearing and glide points



**Caution!**

Brake pads may not be exposed to contact with lubricants.

Check the following connections for tightness:

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

Check the following for proper seal:

- brake chamber
- hose connection

(leaks can be detected easily and quickly with a product such as "Güpoflex LECKSUCHER", manufactured by: GÜPO GmbH, 77694 Kehl, Germany telephone +49 07851/4044-45)

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## 10.2 Permissible brake pad wear and brake pad replacement



### **Caution!**

The brake pads may worn only to a residual thickness of 9 mm. (At this thickness, the maximum possible swivel range of the brake levers is exhausted and no further braking power is available.)  
Brake pads must always be replaced in pairs.



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

The brake pads may be replaced only when the Plant or the working machine is standstill!



### **Caution!**

The spring bracket (Fig. 2.1, pos. 16) which support the swivel mounts (Fig. 2.1, pos. 15) against the lever arms (Fig. 2.1, pos. 9) must not be released.

## Replacing of brake pads

- Remove the two return springs (Fig. 2.1, pos. 6), the 4 screws (Fig. 2.1, pos. 20) and the sheet metal brackets (Fig. 2.1, pos.19).
- Screw the threaded pins M16 (Fig. 2.1, pos.13) as far back that you can the brake pads (Fig. 2.1, pos. 2) can pull out easily by means of a wire hook or pincer in the direction of the brake lever end.
- Insert the new brake pads. Make sure that the slotted back plates of the brake pads on the holding discs (Fig. 2.1, pos.17) positioned over the swivel mounts so that the brake pads are kept on the swivel mounts.
- Then install again the previously removed parts (screws, sheet metal brackets and return spring).
- Set the air gap again one, as described in Section 8.3.

Have you made a stroke adjustment as described under Section 10.3, you must loosen the two grooved nuts (Fig. 2.1, pos. 5a and 5b) from the support bolts (Fig. 2.1, pos.4) and the support bolts to the distance 74 + 4 mm (see Fig. 2.1), – theoretical dimension for new brake pads modify.

Tighten the nuts only finger tight, since this later by the air gap setting solve again must.

## 10.3 Braking stroke adjustment

When the friction material is abraded (worn), the gap between the brake disc and the brake pads is enlarged. The required braking stroke increases. The braking stroke can be adjusted as described.

- Turn It has the adjustment screws in the brake lever (threaded pin M16, Fig. 2.1, pos. 13) clockwise, until the original value of about 0.5 mm between the friction pads and the disc is again. (Check with feeler gauge).

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- Loosen the left grooved nut (Fig. 2.1, pos.5b) and screw it back.
- Turn the support bolts while holding the right grooved nut (Fig. 2.1, pos. 5a) clockwise up to the pushrod until it rests on the pushrod.
- Then turn the support bolts a half turn back (This is a distance of approximately 0.8 mm between a support bolts and pushrod).
- Tighten both locknuts (grooved nuts) tightly.



**Information!**

The braking stroke increases with brake pad wear. Brake engagement time becomes slightly longer.



**Danger to life and limb!**

The brake pads may be replaced only when the Plant or the working machine is standstill!



**Caution!**

Brake pads must always be replaced in pairs.



**Caution!**

Make sure that before replacement of the brake pads no pressed air at the brake caliper is supplied.

10.4 Disassembly and replacement of consumable parts in the brake chamber

The brake chamber is defective, if the pushrod no moves itself when air pressure to the piston is applied, or if the brake chamber air blows.



**Information!**

In the interest of safety, the inspection and repair of a defective brake chamber should always be performed at the RINGSPANN plant.  
If this is not possible due to special circumstance, we request that you consult us before proceeding.



**Danger to life and limb!**

The seals may be replaced only when the Plant or the working machine is standstill!

**11. Installation of a inductive proximity switch (optional)**

With a holder, on the support bolt (Fig.2.1, pos.4) and the pushrod of the brake chamber fixed, can with a installed inductive proximity switch the status "caliper open" will queried.

A suitable proximity switch (see pos. 4 of the parts list) can be supplied by us.

11.1 Drawing and parts list: mounting a inductive proximity switch.

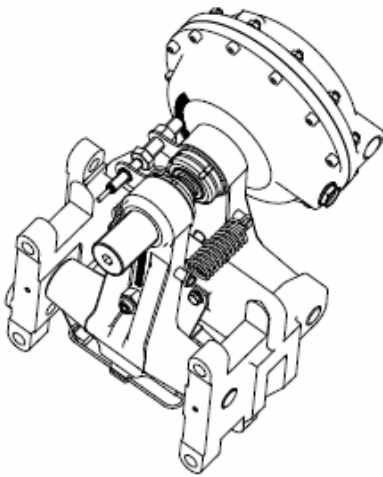


Fig. 11.1

**option: cultivation of proximity switch**

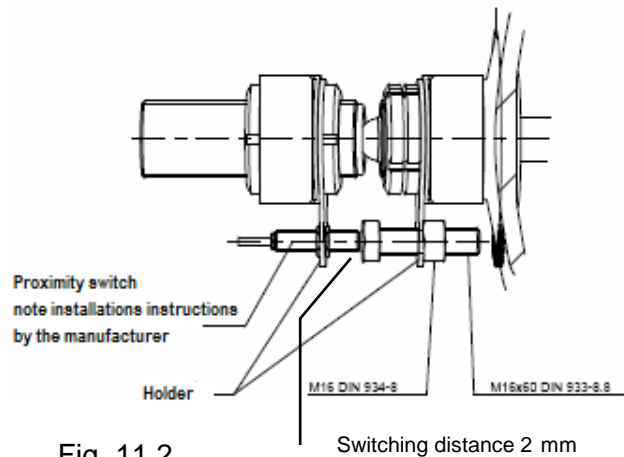


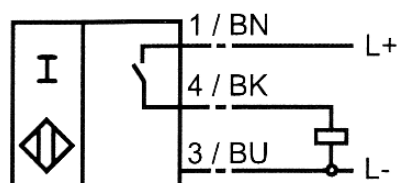
Fig. 11.2

Part	Nomenclature	Quantity	Part number
1	Holder for inductive proximity switch M12	2	2769.070.005.000000
2	Hexagonal screw M16 x 60 ISO 4017	1	5019.016.011.000000
3	Hexagonal nut M16 ISO 4032	1	5101.016.001.000000
4	Inductive proximity switch witch plug connection	1	3502.112.004.B024VG

11.2. Electrical connection inductive proximity switch

Switching function	: PNP (closer)	Switch gap	: 2 mm flush
Op. voltage	: 10...30 V DC	Op. current	: 0...200 mA
Idle current	: < or = 17 mA	Residual current	: < or = 0,5 mA
Voltage drop	: < or = 3 V	Short-circ. protection	: cyclical
Volt reverse protection:	protected	Control display	: multipoint LED
Temp. range	: -25 to +70°C	Safety class	: IP 67
Connection	: V1 plug	Housing	: stainless steel

Fig. 11.3: Proximity switch wiring scheme



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### Information!

The proximity switch is to be arranged so that, when the brake chamber is not pressurized with air, is attenuated (the LED shine on the proximity switch ). When the brake chamber is supplied with pressured air, it moves out of the field of switch, the proximity switch is not longer attenuated and the LED goes out.

### Procedure for installing or replacing the proximity switch:

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



### Caution!

Please observe the following instructions exactly. Otherwise the proximity switch may be damaged.

- Ensure that the brake chamber is not applied with pressure air (brake caliper in gear). Position the inductive proximity switch at a distance of about 1.5 mm to a screw head (Fig. 11.2)
- Secure it in this position with the counter nut from support bolt and brake chamber.
- Connect the proximity switch. The LED of the proximity switch must glow.
- Test the proximity switch for proper function by activating the brake caliper several times in succession.



### Caution!

After wear adjustment of the brake pads the inductive proximity switch must again new adjusted.