RINGSPANN®
Power Transmission

Installation and operating instructions for Brake DV/DH 025/030/035 FPM/FPA

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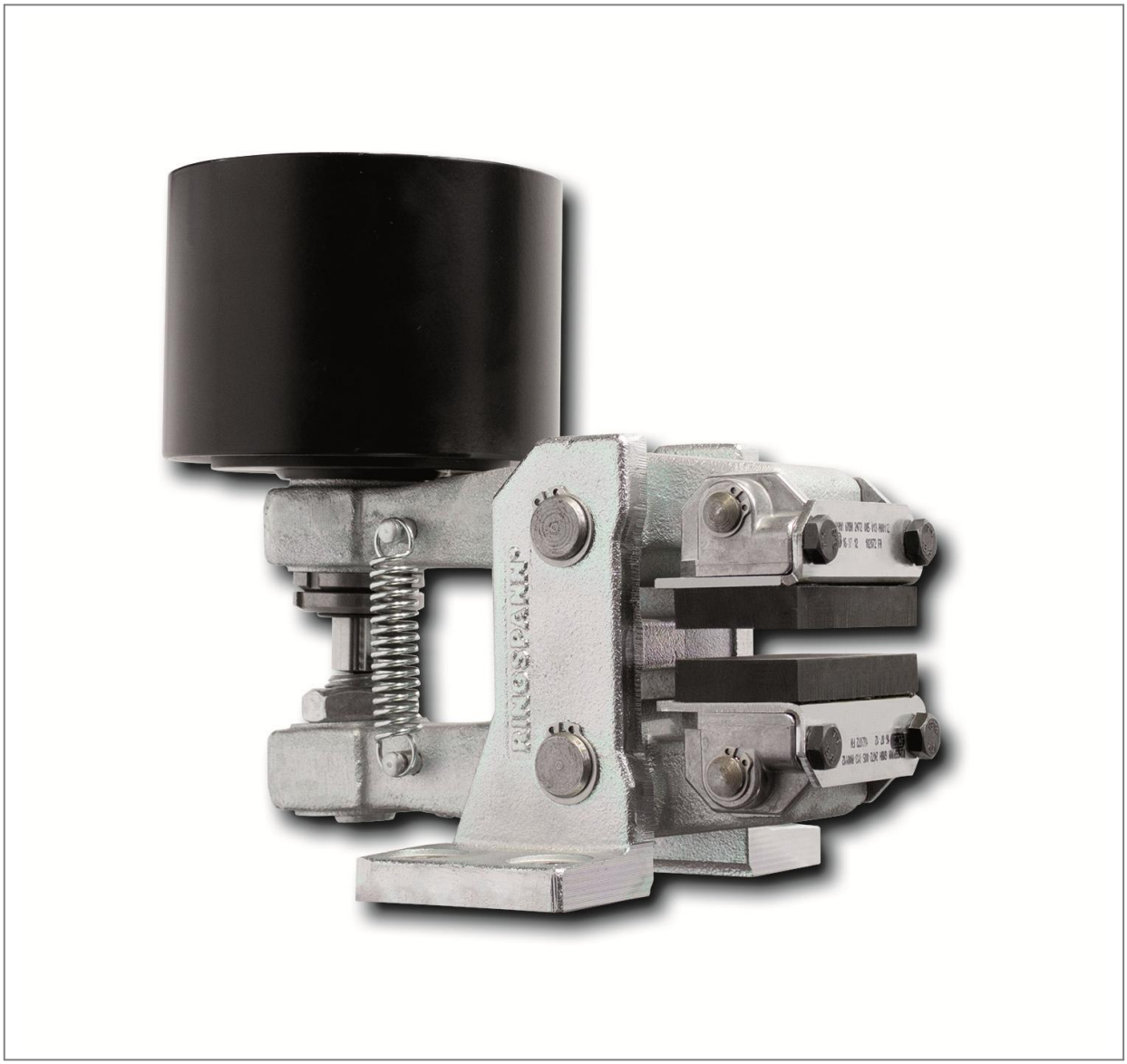

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Important

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 guarantee 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.

This is a translation of the German original version!

In case of inconsistencies between the German and English version of this installation and operating instruction, the German version shall prevail.

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 Identification
2.3 Drawing and parts list

3. Intended use

4. Impermissible use

5. Condition as delivered

6. Handling and storage

7. Technical prerequisite for reliable operation

8. Installing the RINGSPANN brake

8.1 General instructions regarding assembly and installation
8.2 Assembly description
8.3 Adjusting/readjusting the brake pad distance
8.4 Connecting the signal cable (optional)

9. Start-up

10. Disassembling the brake

11. Maintenance

11.1 General maintenance
11.2 Permissible pad wear and exchanging of the brake pad

12. Options sensor for operating state monitoring

12.1 Mounting and connection of inductive proximity switch for position monitoring

1. General notes

1.1 General safety instructions

Read these installation/operating instructions carefully before putting the brake into operation. Consider these instructions as well as the drawings in the individual sections.

All work with and on the brake is to be carried out taking into account that "safety is top priority".

Switch the drive unit off before carrying out work on the brake.

Rotating parts (e.g. brake disc) must be secured by the operator against unintentional touching.

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.

Strongly pre-loaded pressure springs are installed in the thrusters of the brake. The springed thruster may only be disassembled by the factory. When loosening the screws or the circlips, the springs' pre-load is suddenly released.

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 air pressure.

At the standard brake FPM with manually adjustment if pad wear on the brake pad, the holding or braking torque will decrease since the pre-load of the springs in the thruster will have gone down. Brake torque readjustment is necessary in the event of pad wear.

At the standard brake FPA with automatic adjustment if pad wear on the brake pad, the automatic adjustment push the thruster shaft no adjustment is necessary to pre-load of the springs in the thruster. The readjustment is necessary only for adjust gap both side between the brake pad and brake disc.

2.2 Identification

These operating instructions apply for:

- The execution V, parallel attachment to the machine.
- The execution H, right-angled attachment to the machine.
- For brake disc thickness W = 12.5, 25, 30, 40 and for special widths.
- With thruster mounted right.
- With thruster mounted left.
- With signal transmitter installation.
- With different brake pad variants (e.g. with cable for wear monitoring, higher sliding speed, double brake pad surface or special brake pad materials.)
- With manual and automatic spring force setting and special frame.

There is a type plate on the brake with a 16-digit material number. The exact design of the brake is defined by this material 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 Drawing and parts list

Illustration of brake DV, for execution DH see catalogue data

The brakes 025 are not available in DV version.

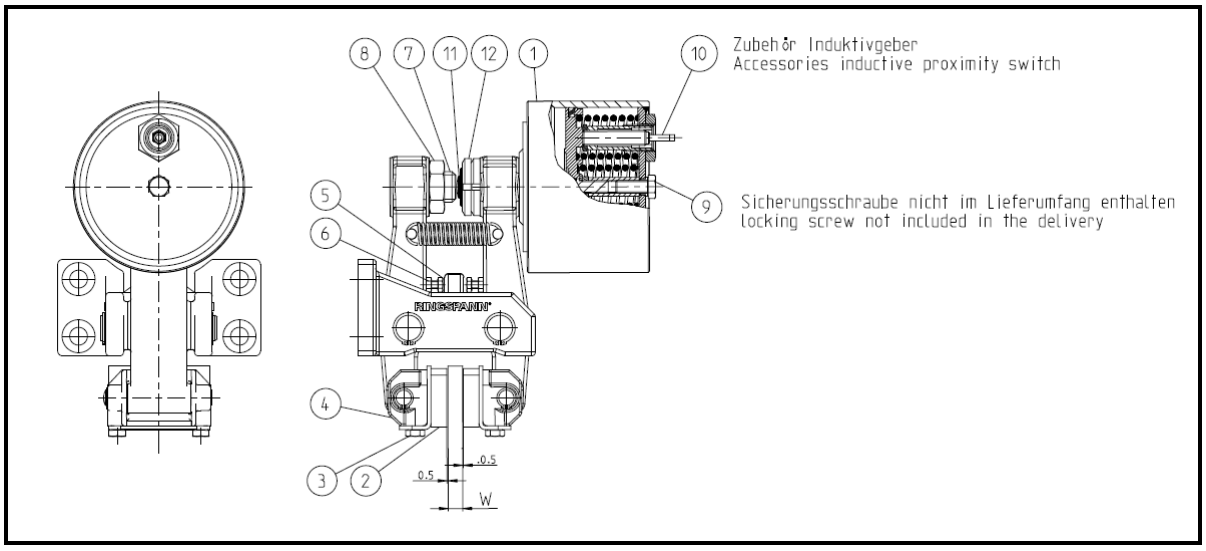

Fig. 2.1

Part	Designation	Quantity
1	Thruster	1
2	Brake pad	2
3	Screw for brake pad	4
4	Swivel piece	2
5	Adjusting screw	2
6	Nut	2
7	Set screw	1
8	Nut	1
9	Locking screw not included in the scope of supply	-
10	Sensor (kit) accessories	-

11	Tappet	1
12	Grooved nut KM 6	2

3. Intended use

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

4. Impermissible use

It is not permissible to operate the brake with a higher pressure than prescribed in the technical catalogue data or with other media. The application of compressed air must be carried out using air that is freed from dirt, pipe sinter, rust and condensation by a filter. Unauthorised constructional changes to the brake are also not allowed.

5. Condition as delivered

The brake is tested prior to delivery. The brake is delivered ready to install. The brake is delivered depressurised. Sensors are delivered separately.

When delivered, the brake has a clamping gap between the brake pad that is smaller than the brake disc thickness. When the brake is applied, the brake opens to the pre-set distance (brake disc thickness and an air gap on each side of 0.5mm).

6. Handling and storage

The technical data of the brake such as air pressure, clamping force, air 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.com.

The brake 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. Please note if you use the FPA automatic brake without brake disc do not often switch the brake otherwise the automatic will works and the brake pad wear compensation start the adjustment process.

7. Technical prerequisite for reliable operation

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

8. Installing the RINGSPANN brake

8.1 General instructions regarding 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 brake pad. 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.

Important!

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

8.2 Assembly description

Before mounting onto the brake disc, the brake calliper must be released (opened). This can be done by:

- Connecting the compressed air (for the necessary air pressure, please see the catalogue pages for the brake). The hose connection must be flexible.

Or by manually releasing by operator by hand using a locking screw for the following thrusters:

- M10x25 for thruster 035, 037, 045, 085, 095 and all 0XX variations
- M10x40 for thruster 102, 105, 111, 115, 122, 125 and all 1 variations

The standard brake callipers are fastened to the machine part with screws of strength class 8.8 or higher. (The screws are not included in the scope of supply. Please see the catalogue pages for quantities, sizes and lengths).

Caution - danger of injury!

If compressed air escapes during assembly, the brake can suddenly close!

Before assembly it is to be checked that the customer connection part is even and that the axial run-out between the brake disc and the mounting surface of the brake 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 lateral run-out of the brake disc is
0.1 mm. A greater lateral run-out can cause the brake unit to rattle and shake.

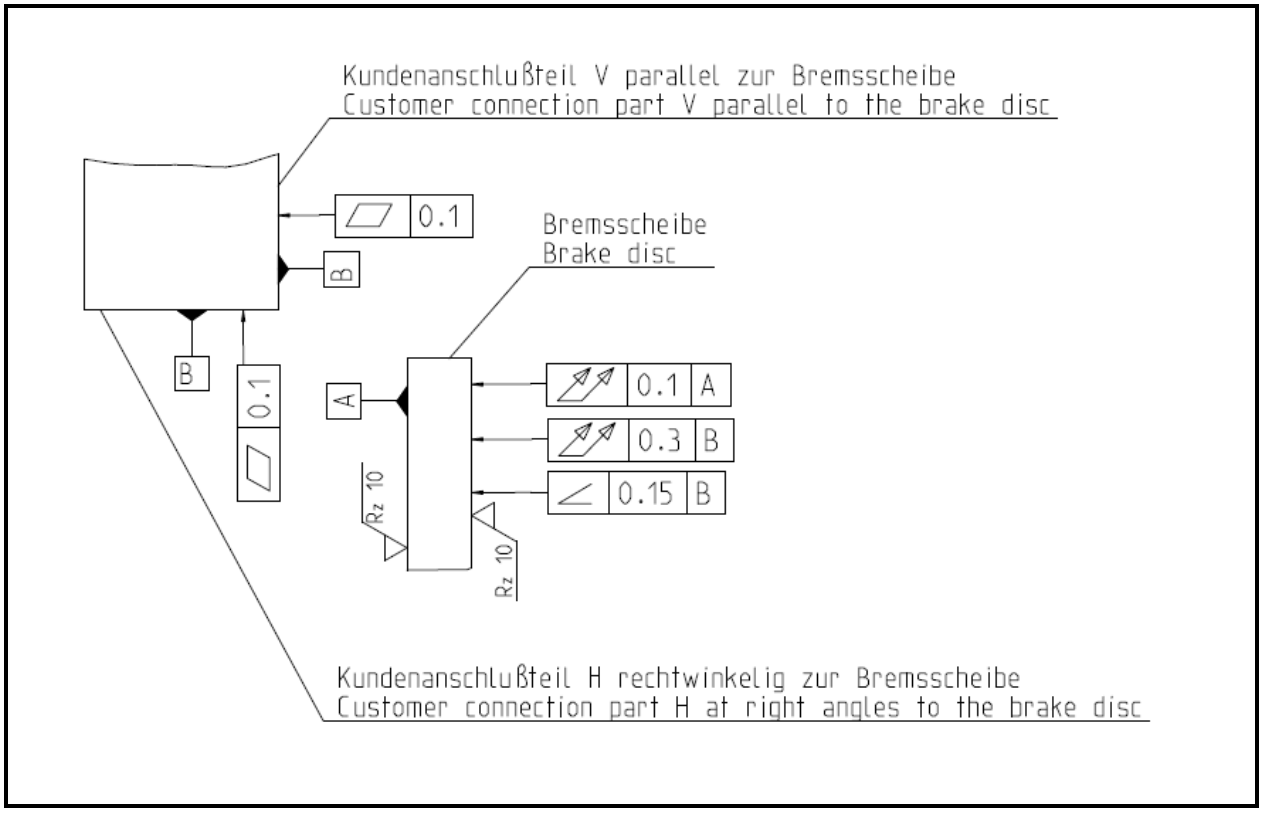

Fig. 8.1

The connecting plate 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.

Important!

Check whether the brake disc can be freely rotated.

Important!

If the brake calliper is manually released using a locking screw, this locking screw (item 9) must be removed again to ensure a functional brake!

8.3 Setting/ adjusting of the brake pad distance

The brake pad distance is set after the brake calliper has been assembled and after pad wear through adjusting/ readjusting, see Fig. 2.1.

There do exist two different versions of the brake. FPM with manual of adjustment pad wear and FPA with automatic adjustment of the pad wear. The FPA version is clearly recognizable. The set screw (item 7) has a slot, see Fig. 8.2.

The setting/ adjusting process of the FPM version manually brake has to be carried out with the set screw (item 7) and the two adjusting screws (item 5), shown in Fig. 2.1.

The setting/ adjusting process of the FPA version automatic brake has to be carried out only by using the two adjusting screw (item 5), shown in Fig. 2.1.

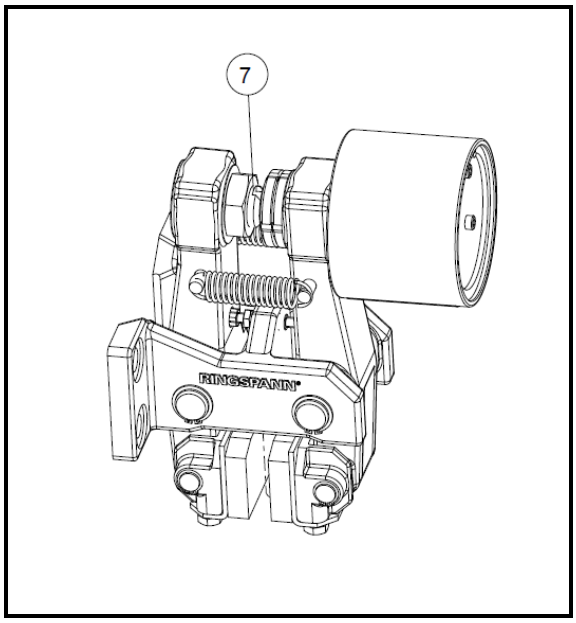

Fig. 8.2
Method setting/ adjusting FPA brake with automatic wear compensation

Adjusting process after friction wear

- Apply the appropriate air pressure to the thruster as given in the catalogue data.
- For the adjusting process loosen the nuts (item 6) and turn the adjusting screws (item 5) in the lever two full turns back.
- Measure the free gap between the brake pad and the brake disc. The free gap has to be 1mm overall or 0,5mm each side.
- If the gap is bigger than 1mm activate the brake multiple times. The automatic process start and will adjust the gap of 1mm.

- With the adjusting screws (item 5), the total clearance of 1mm on one side is evenly spread to 0.5mm on each side. Once the adjustment has been carried out, secure the position of the adjusting screws (item 5) using the nuts (item 6).

Setting process is required after replacing the brake pad. It is necessary to turn back the automatic wear compensation.

- Apply the appropriate air pressure to the thruster as given in the catalogue data.
- For the adjusting process loosen the nut (item 6) and turn the adjusting screws in the lever maximum turn back.
- Disassemble the brake pad and push back the lever with the slotted set screw (item 7) till the groove is out of the flats of the tappet. Save this position with a block, piece of wood for example. Turn back the tappet (item 11) till the end and turn forward approx 1/2 turn. Take care to place the flats of the tappet in proper position of the set screw. Please note turn forward until the tappet surface and the slut of the set screw (item 7) fit together.
- Assemble the new friction pad.
- Activate the brake multiple times The automatic will work and adjust the 1mm gap between the friction pad and the brake disc. Please note if the open position is secure with the locking screw (item 9) it has to be removed before adjusting process.
- With the adjusting screws (item 5), the total clearance of 1mm on one side is evenly spread to 0.5mm on each side. Once the adjustment has been carried out, secure the position of the adjusting screws (item 5) using the nuts (item 6).
- The adjusting/setting has to be made otherwise the pad wear can appears only at one side.

Important!

In case of pad wear the thruster starts the gap setup automatically. The even gap of 0.5 mm each side has to be adjusted manually!
This setup must be done to avoid grinding only at one pad. This would cause uneven wear of the pads.

Method setting/ adjusting FPM brake with manual wear compensation

Setting/ adjusting process after pad wear and after replacement of the brake pad.

- Apply the appropriate air pressure to the thruster as given in the catalogue data.
- For the purpose of adjusting, loosen the nut (item 6) and turn the adjusting screw (item 5) into the lever by approx. 2 full turn back.
- For the purpose of adjusting after replacement, loosen the nut (item 6) and turn the adjusting screw (item 5) into the lever max turn back back.
- Loosen the nut (item 8) at the set screw (item 7)
- If replacement necessary turn back the set screw (item 7) until you can disassemble the old brake pads and assemble the new brake pads
- Adjust the set screw (item 7). Set a total clearance between the brake pad and brake discs of 0.5mm on each side or of 1mm on one side.
- Secure the position of the set screw (item 7) using the nut (item 8).
- With the adjusting screws (item 5), the total clearance of 1mm on one side is evenly spread to 0.5 mm on each side. Once the adjustment has been carried out, secure the position of the adjusting screws (item 5) using the nuts (item 6).
- If there is wear to the brake pad, a braking force setting must be done as well as an adjustment/ readjustment of the brake pads in order to preserve the full braking torque.
- The spring pre-load can also be checked measuring the stroke of the tappet (item 11) by switching the brake. A stroke of 3 to 4 mm is normal. If the stroke becomes bigger adjusting/ readjusting may be necessary in order to achieve the maximum braking torque again.

Important!

In case of wear of the brake pads a setup of the pad gap must be done. Because of less spring force in the thruster the braking torque will be reduced. Each millimeter wear of the pads will cause 7 % reduction of the torque.

Important!

Before start-up, the air gap must be adjusted to 0.5 mm on each side!

Important!

It must be ensured that the brake pads (item 2) do not grind on the brake disc while the brake is released!

Important!

If for maintenance the brake is released by locking screw (item 9), this screw must be removed before operation.

8.4 Connecting the signal cable (optional)

Connect the signal cable (e.g. via a signal lamp) to a 24V control voltage. If the maximum friction lining abrasion limit is reached, contact with the neutral conductor will be made and the signal lamp will light up.

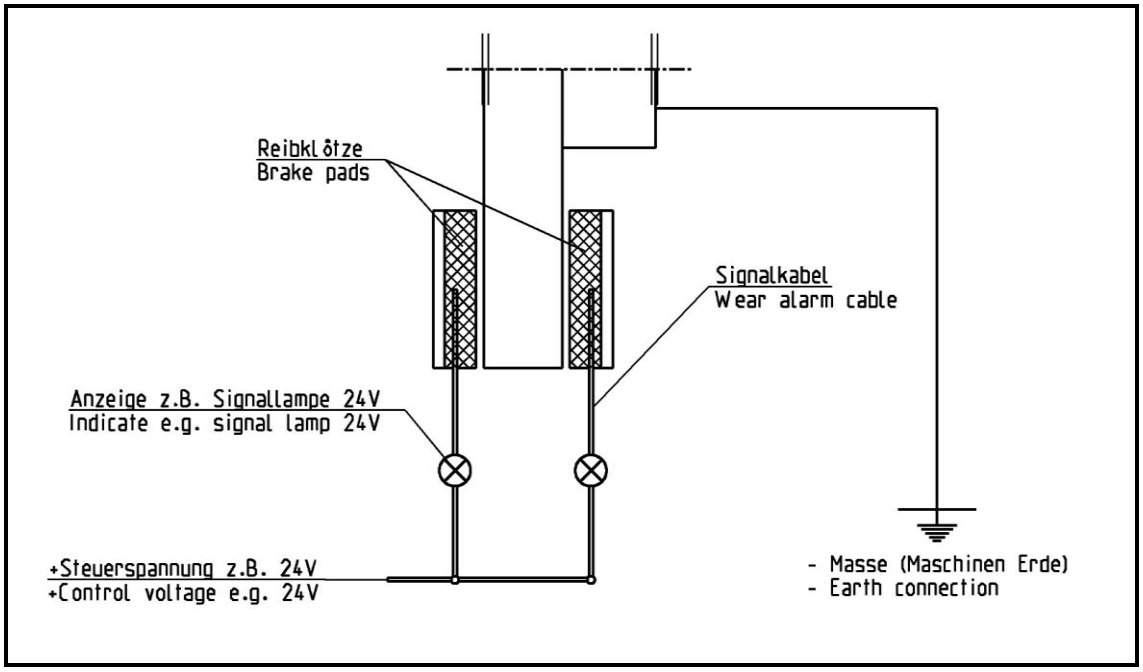

Fig. 8.3

9. Start-up

Only full-face contact of the two friction blocks (item 2) 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.

Important!

If the brake are used as holding brake, then the braking torques indicated in the catalogue will not be reached. Reductions of up to 50% of the braking torque are possible.

10. Disassembling the brake

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.

Apply the appropriate air pressure to the thruster as given in the catalogue data. If possible, secure this state using the locking screw. Remove the screws that serve for fastening the brake to the machine frame. The brake calliper can now be removed from the mounting surface.

11. Maintenance

11.1 General maintenance

Depending on how much the brake is used in operation, maintenance is to be carried out on it at intervals of 4 to 12 weeks.

The following is to be carried out during maintenance:

- Check the brake pad for wear.
- Check that, when the brake calliper is in release position, the brake pad do not grind on the brake disc and that there is an even air gap on both sides.
- Check the screw connection of the brake calliper and the screw connection of the brake pad are tighten.
- Check both brake calliper levers for ease of movement.
- Clean the bearing and sliding points.
- Oil or grease the bearing and sliding points.
- Check the thruster and hose connection for tightness.

Important!

The brake pad must not come into contact with the lubricant!

11.2 Permissible pad wear and exchanging of the brake pad

Life-threatening danger!

Brake pad may only be changed when the system or the work machine is stationary!

Important!

At a residual lining thickness of 5 mm, the brake pad always have to be exchanged in pairs.

Only original RINGSPANN brake pads may be used.

Before exchanging the brake pads, ensure that the mass held by the brake is secured against moving, since parts of the brake need to be loosened for this purpose.

Open the brake with the prescribed air pressure.

Perform brake pads exchange and adjust braking torque and clearance as described in section 8.3 please note the next 3 paragraphs.

After replacing the brake pads, tighten the screws (item 3) at the friction pads (item 2) slightly at first.

Apply the brake. The clamping force of the brake will cause the brake pads (item 2) to be pushed flat onto the swivel pieces (item 4), eliminating any air gap.

Now tighten the screws (item 3) with a tightening torque of 30 Nm.

Important!

If for maintenance the brake is released by the locking screw (item 9), this screw must be removed before operation.

Important!

After exchanging brake pads, a running-in process should be done in order to reach the maximum brake torque.

12. Options sensor for operating state monitoring

12.1 Mounting and connection of inductive transmitter for position monitoring:

Life-threatening danger!

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

The inductive proximity switches are enclosed loose with the delivery.

If a holder is needed to attach the inductive proximity switch to the brake, this can either be ordered separately or can be purchased as part of the sensor kit.

Inductive proximity switch of thrusters 025, 065, 101, 102, 105, 111, 115, 122, 125 and all thrustor with M8x1 thread

Switching function: PNP (normally open contact) Switching distance: 1.5 mm, flush-mountable

Operating voltage	: 10....30 V DC	Max. switching current	: 200 mA
Voltage drop	: < 2.5 V	Inverse-polarity protection	: Yes
Temp. range	: -25 to +70°C	Protection class	: IP 68
Connection type	: 3m PVC cable	Housing	: M8x1 steel, non-rusting

Connection diagram of the inductive proximity switch

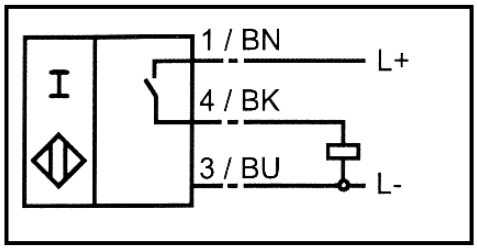

Fig. 12.1

Attachment of inductive proximity switch to the thruster

There is an M8x1 thread at the thruster for the connection of an inductive proximity switch.

If the thread on the pressure cylinder is larger than M8x1, you will need a sensorkit in this case please consult RINGSPANN.

Open the brake with the prescribed air pressure. Remove the plug M8x1 and turn the inductive proximity switch (item 10) into the M8 thread of the thruster casting by hand until it contact the piston. Now turn the inductive proximity switch back approx. ½ a turn and lock the position using a nut enclosed with the inductive proximity switch.

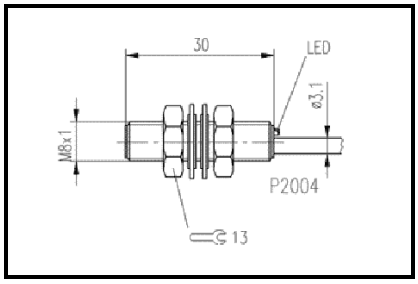

Fig. 12.2

Inductive proximity switch kit for brake thrusters 035, 045, 085, 095 and all thrustor with bigger hole than M8x1.

Switching function: PNP (normally open contact) Switching distance: 2 mm, flush-mountable

Operating voltage	: 10....30 V DC	Max. switching current	: 200 mA
Voltage drop	: < 3 V	Inverse-polarity protection	: Yes
Temp. range	: -25 to +70°C	Protection class	: IP 67
Connection type	: 2m PVC cable	Housing	: M12x1 steel, non-rusting

Connection diagram of the inductive proximity switch:

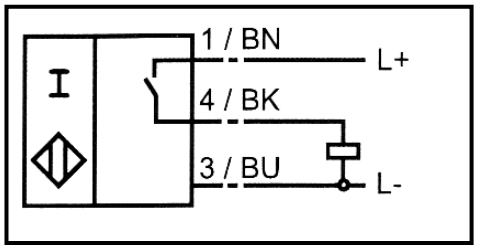

Fig. 12.3

For the attachment of the inductive proximity switch to the thrusters 035, 045, 085 and 095 see Fig. 12.4

Mount the inductive proximity switch (item 10) in the inductive proximity switch holder (item 10.1) and lock the inductive proximity switch flush with the nut (item 10.3).

Remove the plug at the thruster, Then open the brake with the prescribed pressure in accordance with the catalogue data sheet. Turn the inductive proximity switch holder into the thruster by hand until it contact the piston. Now turn the inductive proximity switch holder back approx. ½ a turn back and lock the position using the counter nut (item 10.2).

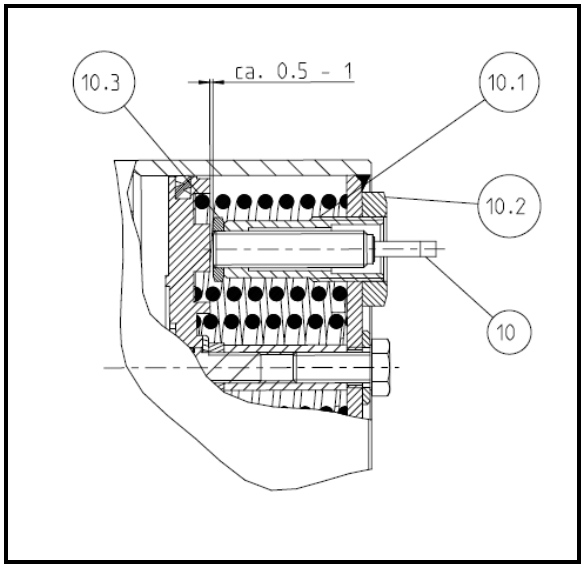

Fig. 12.4

Test for proper function by repeatedly activating the brake. If the brake is open, the LED of the inductive proximity switch must shine.