

**Installation and operating instructions for
Brake DS XXX FEM/FEA**

E 09.763e



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RINGSPANN	Installation and operating instructions for Brake DS XXX FEM/FEA spring activated – electro hydraulically released			E 09.763e	
Issue: 05.03.2018	Version: 1	Drawn: BAHS	Checked: EISF	Pages: 22	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 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.

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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 springed thrusters of the brake. The springed thruster may only be disassembled by the factory.

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.

The braking force is produced by springs, and the brake is opened electro hydraulically.

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

At the standard brake FEA with automatic adjustment if pad wear appears, the automatic adjustment works it is no wear adjustment necessary to pre-load of the springs in the thruster. The readjustment is necessary only for adjust gap each side between the friction pad and brake disc.

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2.2 Identification

These operating instructions apply:

- With signal transmitter installation.
- With different friction block variants (e.g. with cable for wear monitoring, higher sliding speed, double friction surface or special friction materials.)
- With manual and automatic wear compensation spring force.
- With special frame.
- With internal throttle valve can adjust delay time to 8 sec..
- With external adjustable brake spring.
- With micro-switch wear control and status control.
- With hand release lever.

There is a type plate on the brake with a 16-digit article 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 Drawing and parts list

Overview illustration of brake DS XXX with all options.

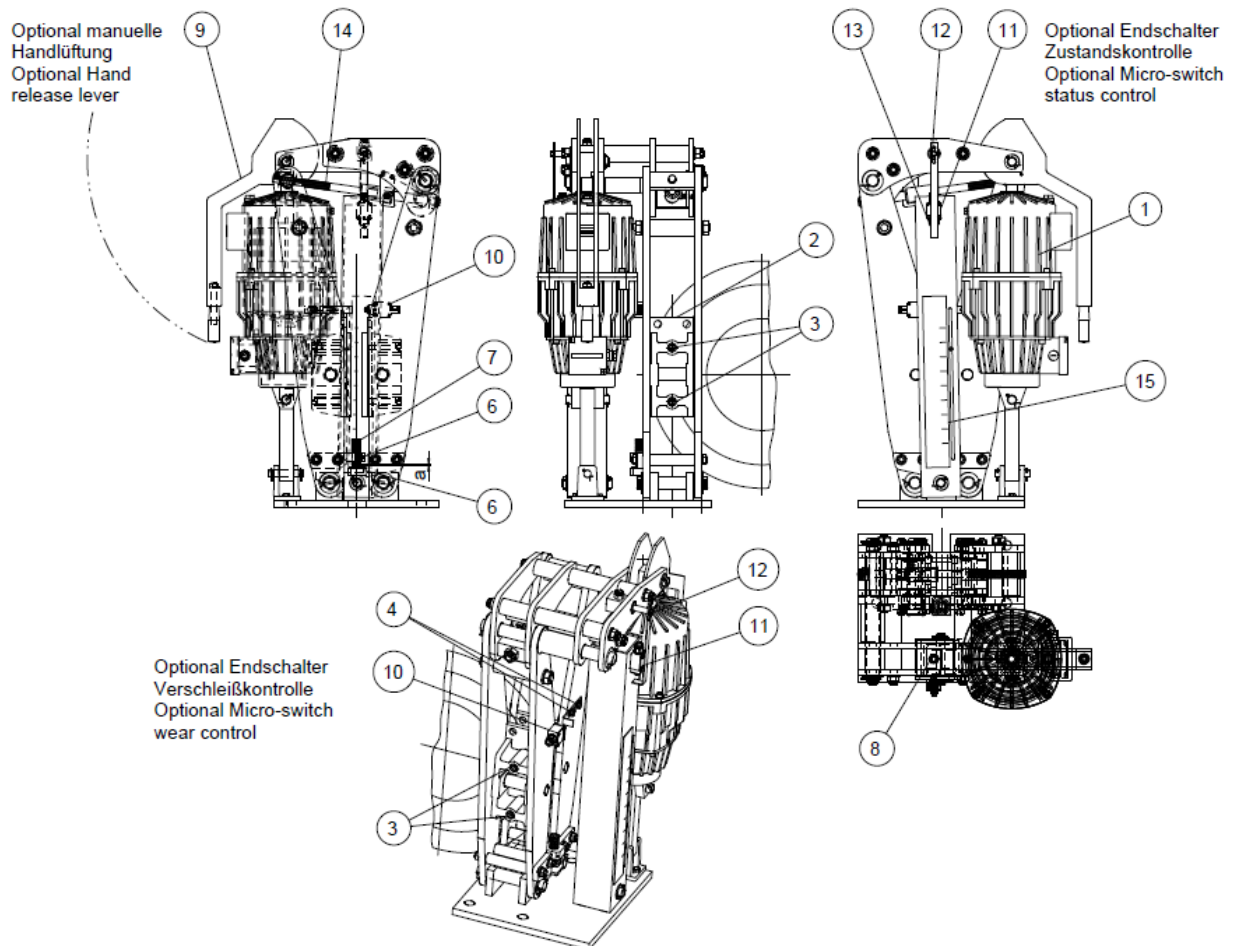


Fig. 2.1

Part	Designation	Quantity
1	Thruster	1
2	Brake pad	2
3	screw brake pad	4
4	Nut for adjustplate pad wear (optional)	2
5	Set screw for air gap adjustment	1

6	Set screw for fixing item 6	1
7	Set screw for air gap adjustment	1
8	Adjusting nut adjustable brake spring	1
9	Hand release lever (optional)	1
10	Micro-switch wear control (optional)	1
11	Micro-switch status control (optional)	1
12	Nut for adjusting part (optional)	1
13	Adjusting part for status control (optional)	1
14	Adjusting spindle	1
15	External adjustable brake spring (optional)	1

3. Intended use

The brake has been designed for use as a holding and stopping brake IP class 56.
The brake is suitable for upright installation on horizontal plain.
Use for any other purpose will be deemed improper.

4. Impermissible use

It is not permissible to operate the brake with another voltage than prescribed in the technical catalogue data or with other media. 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 not ready to install. The brake is delivered depressurised. Ordered micro switch are already installed.

When delivered, the clamping gap of the brake between the brake pad and the brake disc is to adjust. When the brake is applied, the brakepad has to be adjust on each side of 1.5mm.

6. Handling and storage

The technical data of the brake such as clamping force, oil 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.

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The brake is delivered in preserved condition and 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 FEA automatic brake without brake disc do not often switch the brake otherwise the automatic will work 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 friction pads. 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

Thrusters are always supplied complete with their oil filling HL10 to standard DIN 51524. The most employed oil mark is AGIP ACER MV10. Time by time, check out the oil level through the oil level control plug and eventually add it through the oil drain plug.

For HR (Heat Resistance up to 100°C) design, use the oil indicated on the name plate.

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Information!

The service life of the brake system will extend depending on how high the purity of the oil is.



Important!

Leaked oil must be completely removed. Leaks are to be removed immediately!

Before mounting onto the brake disc, the brake caliper must be released (opened) and adjusting the distance pad to the brake disc. This can be done by:

- Connecting the electrical connection and activate the brake
- Hand release (optional)
- Loosen the adjusting spindle item 14 in order to unreleased the brake for assembly
- Adjust the distance 1.5 free gap between pad and brake disc

The standard brake callipers are fastened to the machine part with 4 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 the brake is open with the electrical switch, do not switch the brake during assembly, the brake can suddenly close!

Before assembly it is to be checked that the customer connection part is even and that the rectangular between the brake disc and the mounting surface of the brake is within a tolerance of 0.2 mm.

Examine the axial movement of the brake drum. The axial movement must not be greater than ± 0.3 mm.

The maximum permissible lateral run-out of the brake drum is 0.1 mm. A greater lateral run-out can cause the brake unit to rattle and shake.

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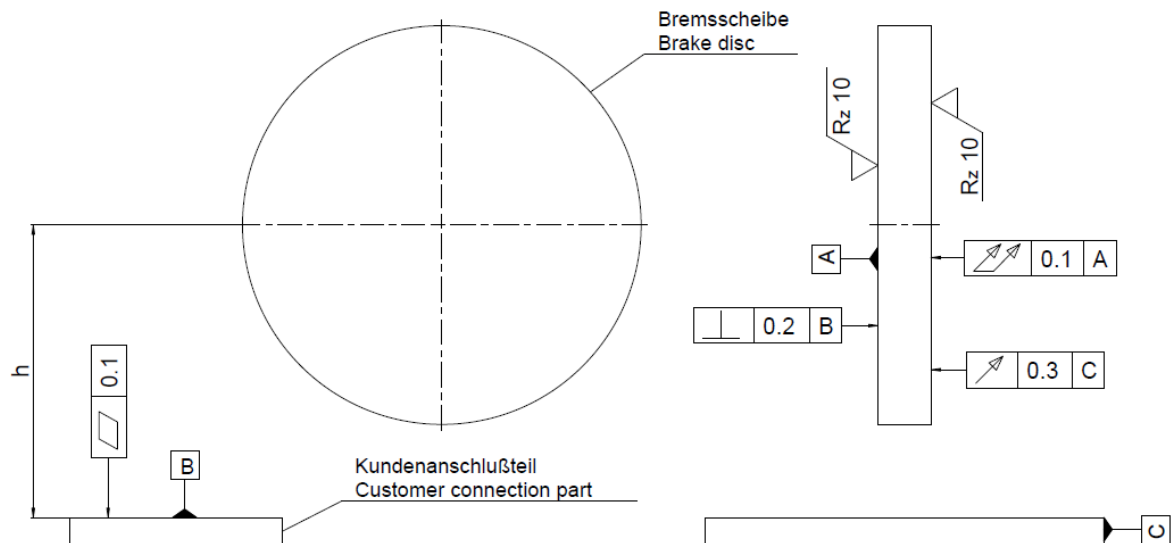


Fig. 8.1

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, this manual release must be removed again to ensure a functional brake!

Electric connection: The cable may entry from both sides of terminal box. The gland size is Pg11 for 451 thruster and Pg16 for all others thruster. Since the sense of rotation doesn't affect the thruster's function you don't need to respect any sequence by connecting the 3 phases.

Tension swings of $\pm 10\%$, even small changes in frequency affect the lifting force.
Direct parallel connection with crane motor should be avoided.

Don't switch on before having closed the terminal box cover and having connected the earth wire.

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Important!

Don't activate the brake before having closed the terminal box cover and having connected the earth wire!

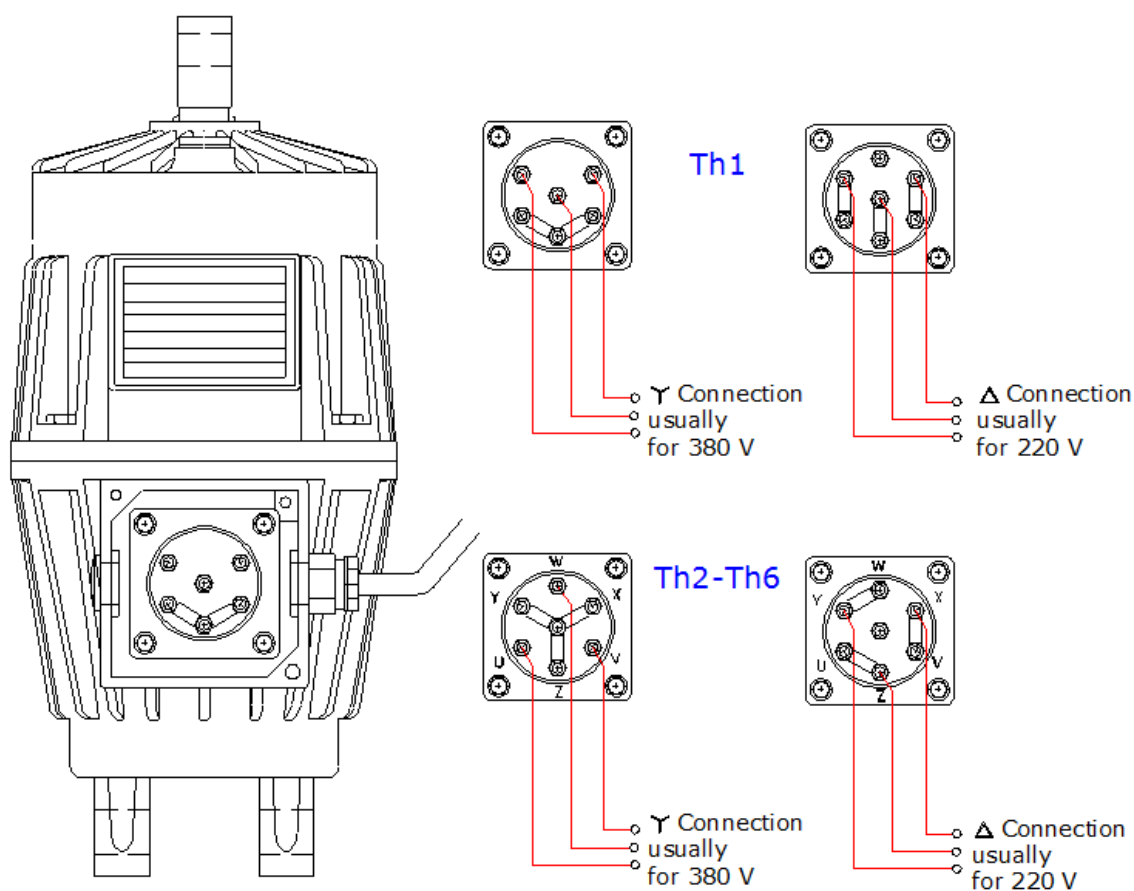


Fig. 8.2

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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. FEM with manual adjustment pad wear and FEA with automatic adjustment of the pad wear. The FEA version is clearly recognizable. The adjust spindle item 14 has a pin at the side, see Fig. 8.3.

The setting/adjusting process of the FEM version manually brake has to be carried out with the adjusting spindle item 14 and the two adjusting screws item 7, shown in Fig. 2.1.

The setting/adjusting process of the FEA version automatic brake has to be carried out only by using the two adjusting screw item 7, shown in Fig. 2.1.

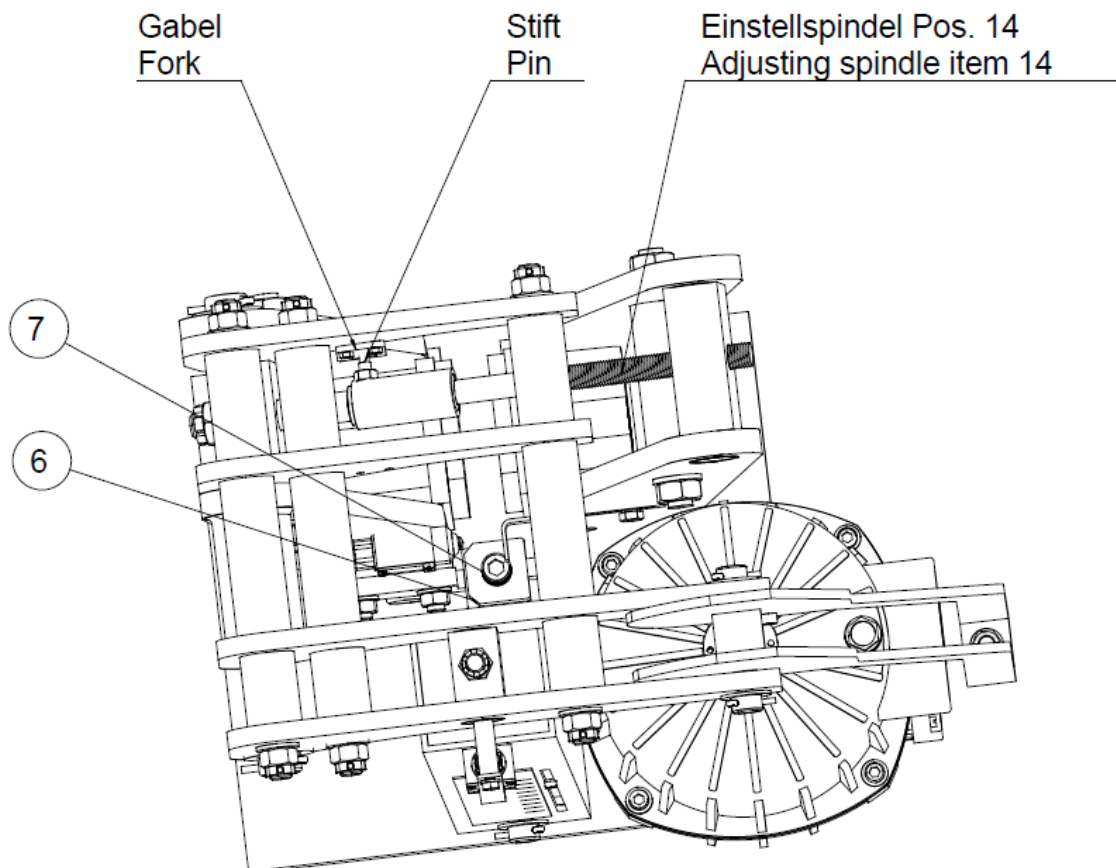


Fig. 8.3

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Maintenance setting / adjusting FEA automatic wear compensator

Maintenance FEA manual adjustment to accommodate pad wear

- Apply the brake.
- For the purpose of adjusting, loosen the nut item 6 and turn the adjusting screw item 7 into the lever by approx. 2 revolutions.
- The proper function of the automatic compensator can be easily evaluate by observing the piston stop-position across the times. It must remain constant! If the devise doesn't work correctly little by little, the piston stop- position will be lower and lower until the end position is reached, where the braking effect will miss with great danger for the personnel safety.
- It is achieved by means of a self-adjusting mechanism with a ball transfer unit that provides for an equal clearance of the linings from the disc surface **INSTALLATION:** At set brake, adjust the set screw item 7 until it gets in touch with the ball. Afterwards, lock the set screw item 7 by means of its set screw item 6.

Maintenance FEA manual setting / adjustment for changing brake pads with reset the automatic wear compensator

- Apply the brake.
- For the purpose of changing the brake pads, loosen the both screw item 3 both side loosen item 6 and turn the adjusting set screw item 7 max. revolutions back.
- Loosen the fork Fig. 8.3 and turn the adjusting spindle item 14 back until you have enough free space to mount the new brake pads.
- Now you can loosen srews item 3 the old brake pads and you can move the brake pads topward for easy exchange. The new pads mount in the same way fix the item 3
- Reassemble the fork Fig. 8.3 and activate the brake multiple times the automatic process will start and adjust the clear distance between the brake pads of approx. 3 mm.
- It is achieved by means of a self-adjusting mechanism with a ball transfer unit that provides for an equal clearance of the linings from the disc surface **INSTALLATION:** At set brake, adjust the set screw item 7 until it gets in touch with the ball. Afterwards, lock the set screw item 7 by means of its grub screw item 6.
- If there is wear to the brake pad, the automatic process will start and the braking force setting must not be performed but the balancing measure between the lever hast to adjust time by time to avoid uneven pad wear.



Important!

As the device provides the self-adjustment, no intervention is required for this function. Yet, by beginning it is valuable making sure that the device is working correctly, as it could have been damaged during transportation or installation. The setting at the automatic brake will only balancing the measure a Fig. 2.1 between the lever to avoid uneven pad wear!

If the thruster rod like Fig. 8.4 right side representation full inside the thruster there is the danger you will loose the hole clamping force. This state must be avoid.

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Method setting / adjusting FEM brake with manual setting:

Maintenance FEM manual adjustment to accommodate pad wear and brake pad change.

- Apply the brake.
- For the purpose of adjusting, loosen the set screw item 6 and turn the adjusting set screw item 7 into the lever by approx. 2 revolutions.
- Loosen for the adjusting the counter nut at the adjusting spindle item 14
- If you will change the brake pads turn the adjusting spindle back until you can change the brake pads by loosening the item 3.
- Apart from that adjust the adjust spindle item 14, set a total clearance between the brake pad and brake discs of 1.5 on either side or of 3 mm on one side.
- Secure the position of the adjust spindle item 14 using the counter nut of the adjust spindle item 14.
- With the adjusting set screws item 7, the total clearance of 3 mm on one side is evenly spread to 1.5 mm on either side Fig. 2.1 measure a on both side balancing. Once the adjustment has been carried out, secure the position of the adjusting screws item 7 using the grub screws item 6.
- If there is wear to the brake pad, a braking force setting must be performed 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 if you are measuring the travel of the thruster stroke item 1 on applying the brake. A travel of 1/3 of the max stroke is normal. If the distance travelled becomes greater, adjusting/readjusting may be necessary in order to achieve the maximum braking torque again.
- If the thruster rod like Fig. 8.4 right side representation full inside the thruster there is the danger you will loose the hole clamping force. This state must be avoid it is necessarily to adjust before!

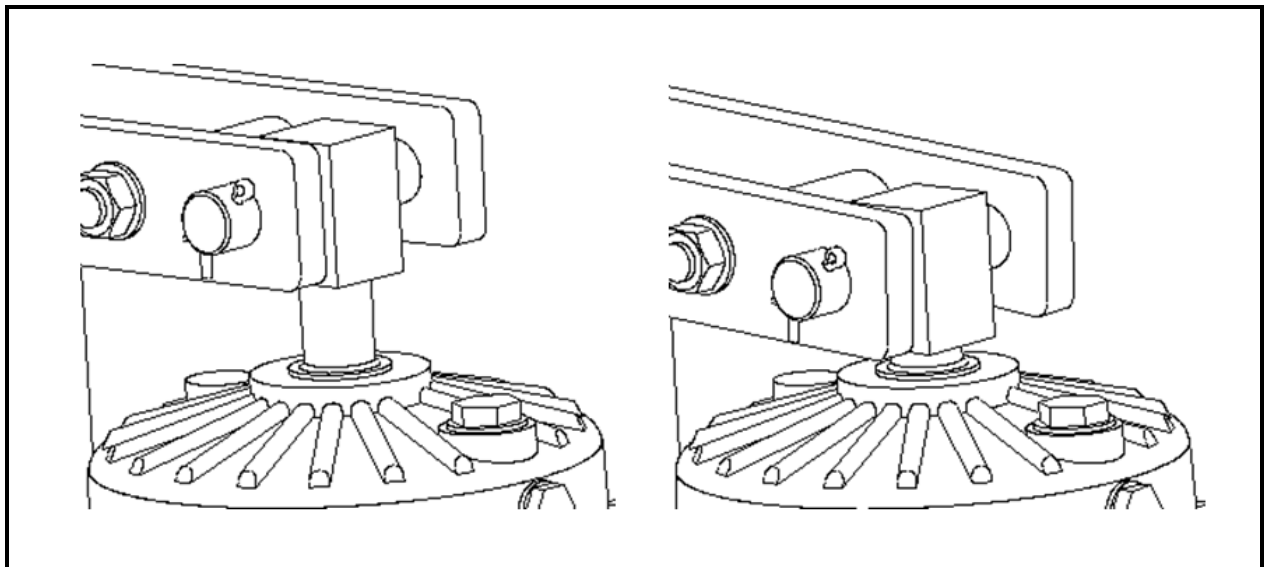


Fig. 8.4

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Important!

If the brake pads are worn, a braking force setting FEM brake must be performed through readjusting the brake pads. Wear to the brake pads will cause the springs in the thruster to be relaxed in closed position and reduce the transferable torque. The transferable torque is reduced by approx. 12% per mm of pad wear.



Important!

Before start-up, the air gap must be adjusted to 1.5 mm on either side!



Important!

It must be ensured that the brake pad item 2 do not grind on the brake drum while the brake is released!



Important!

If the brake is released by Hand release lever item 9, this hand release lever must be removed once the brake has been installed to ensure a functional brake!

If the thruster rod like Fig. 8.4 right side representation full inside the thruster there is the danger you will loose the hole clamping force. This state must be avoid it is necessarily to adjust before!

If you have the brake with EBS (external braking spring) it is housed into a square tube provided with a scala to easy torque setting over the adjusting nut item 8.



Important!

If you set the clamping force with the adjusting nut item 8 too low the braking torque can be too low to hold the load!

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8.4 Connecting the signal cable (optional)

Attach 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.

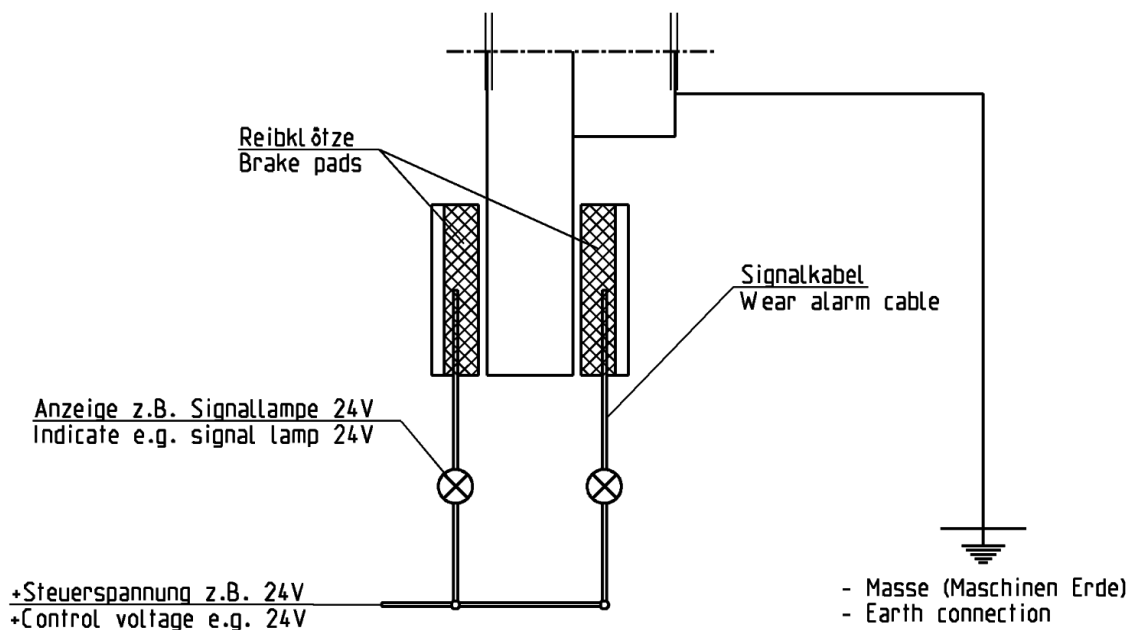


Fig. 8.5

9. Start-up

Only full-face contact of the two brake pad item 2 on the brake disk as well as a rapid heating of the brake pads 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 brakes are used as holding brakes, then the braking torques indicated in the catalogue will not be reached. Reductions of up to 50% of the braking torque are possible.

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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 drum) must be secured by the operator against unintentional touching.

The brake force can reset by loosen the adjusting spindle item 14 if you have the automatic brake dismantle the fork before. Then the brake pad are free you can removed 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 when performing maintenance:

- Check the brake pads for wear.
- Check that, when the brake calliper is released, the brake pads do not grind on the brake drum and that there is an even air gap on both sides.
- Check the screw connection of the brake.
- Check both brake calliper levers for ease of movement.
- Clean the bearing and sliding points.
- Oil or grease the bearing, adjust spindle and sliding points.
- Check the thruster for tightness and Oil level.



Important!

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

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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!

The brake pads have a thickness of 8 - 12 mm when new. The residual lining thickness of 2 mm is necessary, the brake pads are always 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 voltage.

Loosen the grup screws item 6. Turn the adjusting screw item 7 and threaded rod item 14 back until the brake pads item 2 can be exchanged without any problems.

FEM brake loosen before the counter nut
FEA brake loosen before the fork.

Dismantle the screws item 3. The brake pad must be pushed topward for easy change process. Change the brake pads and assemble screws item 3.

After exchanging brake pads, you must reset the brake torque and clearance as described in point 8.3.

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Important!

If the brake is opened by manual hand release, this manual hand release must be removed again once the brake has been installed to ensure a functional brake!



Important!

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

12. Accessories Sensor for operating state monitoring and hand release

12.1 Mounting and connection of micro switch for position monitoring and pad wear control (optional)

Please note if you have the option micro switch the micro switch delivery mounted on the brake.
The micro switch cannot mount afterwards.



Life-threatening danger!

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

General data

Ambient temperature: -25°C ... +80°C
Max. actuation frequency: 3600 operating cycles/hour
Mechanical endurance: 20 million operating cycles
Mounting position: any
Safety parameters: B10d: 40,000,000 for NC contacts

Voltage of the micro-switch

Alternating current: AC15 (50÷60 Hz)

Ue (V)	250	400	500
Ie (A)	6	4	1

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Direct current: DC

Ue (V)	24	125	250
Ie (A)	6	1,1	0,4

Protection against short circuits: fuse 10 A / 500 V type aM

Protection degree of the housing: IP67

In conformity with standard: UL 508, CSA 22.2 No.14

In conformity with the requirements of:

Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and
EMC Directive 2004/108/EC.

Connection diagram of the micro switch

Always connect the safety circuit to the NC contacts
(NC contacts: 11 - 12; 21 - 22 or 31 - 32)

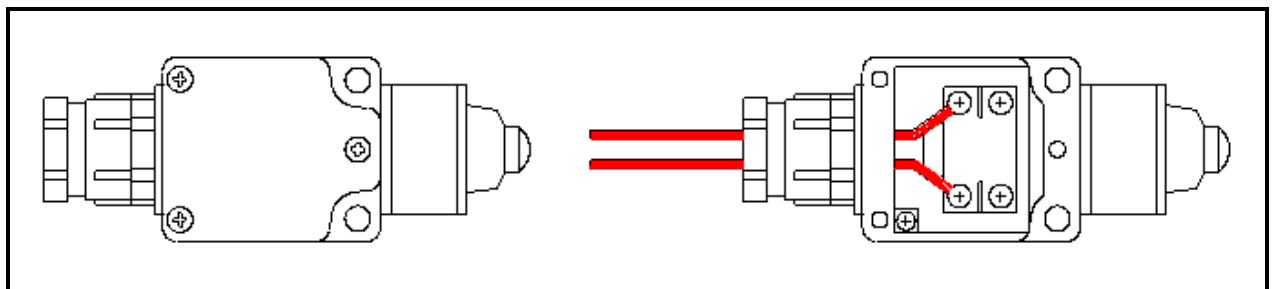


Fig. 12.1

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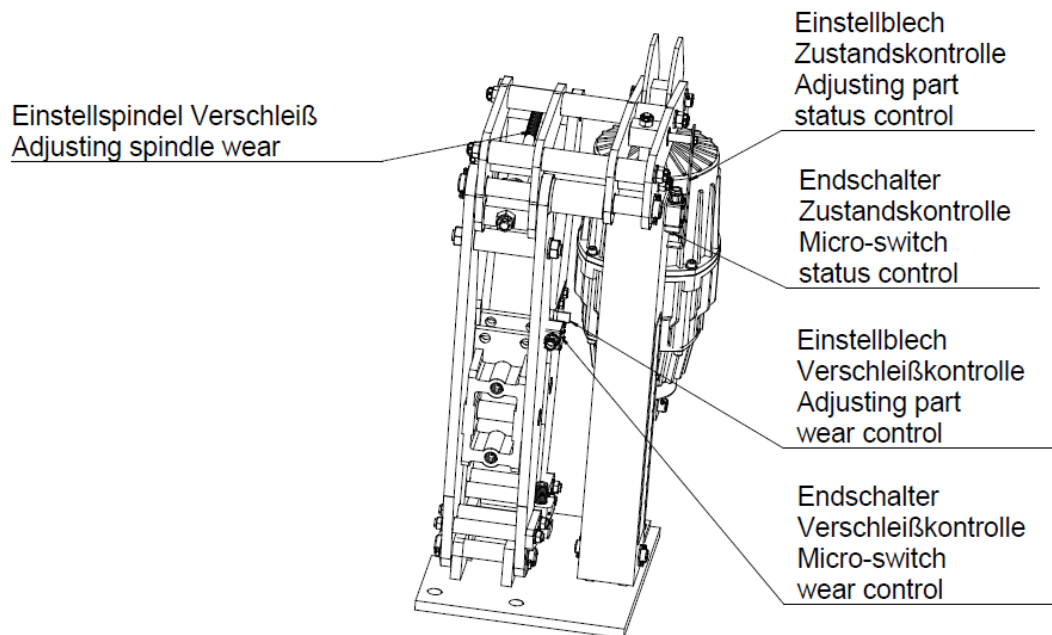


Fig. 12.2

The installation of the micro-switch brake on/off.

The micro-switch signaling brake on/off has the role of confirming the executed opening of the brake. Thank to this device, major damages to lifting motor can be prevented if the thruster fails.

The micro-switch is fixed with two screws at the brake. The adjusting of the switch can the operator make with the adjusting part item 13. If the brake is open the micro-switch switches and the signal comes if no signal come loose the nut item 12 Fig. 2.1 of the adjusting part and move the adjusting part item 13 again the taster of the micro-switch until the signal comes fix the nut item 12 of the adjusting part and test the proper function.

The installation of the micro-switch brake pad wear.

The micro-switch signaling brake pad wear warns that the lining thickness is coming to end and jaw replacement is needed. Thank to this device, the rubbing of the bare jaw on the drum surface is avoided and major damages can be prevented. Keep in mind that without friction pad, the braking performance drops dramatically, thus endangering the personnel safety.

The micro-switch is fixed with two screws at the brake. The adjusting of the switch can the operator make with the adjusting part. If the brake is open and the brake pads are new the adjusting part has the biggest distance if the brake pads wear comes to the end the adjusting part push the taster of the micro-switch and give the signal. If the signal pad wear comes to soon the adjusting parts brake pad wear has to be turn back.

Usually, the micro-switch signals for both function become apparent on the operator's push button board

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2.2 Hand release (optional)

If you have the option hand release there is a lever fixed mounted on the brake. If the operator turning the lever 180° degree figure 12.3 the brake is open and out of function. The operator has to close the brake manual with the lever turning back downside the lever in the closed position now the brake can normally work.



Important!

If the operator open the brake over the hand release the brake is out of order. For the correct function you have to close the hand release!

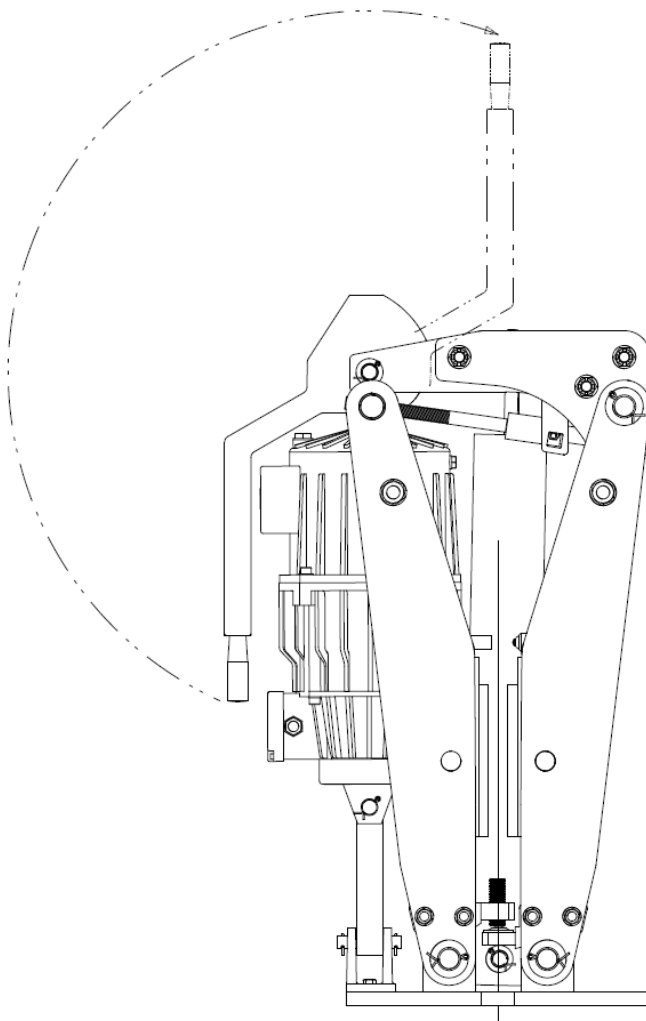


Fig. 12.3