



Operating Manual for Disc Brake Type: SB 8.2

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G E R M A N Y

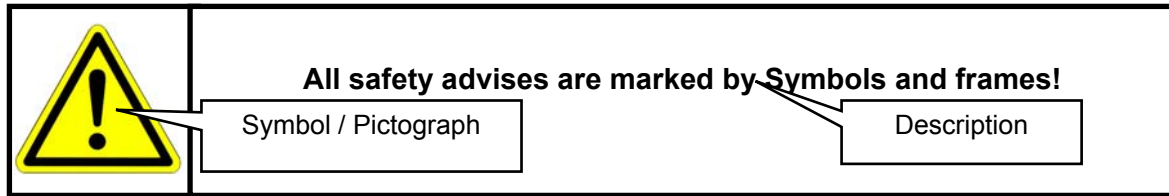
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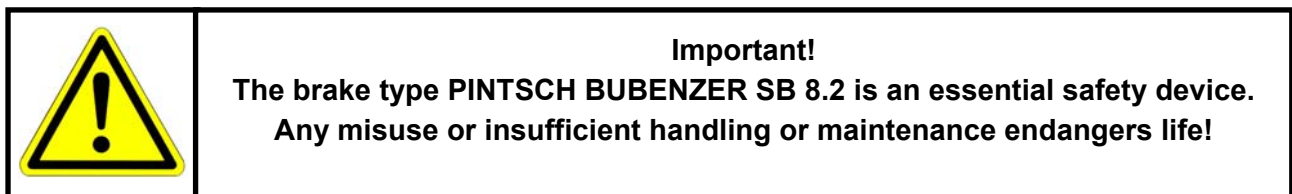
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1 Safety regulations

Note: warnings and other security rules are presented like this throughout the manual:



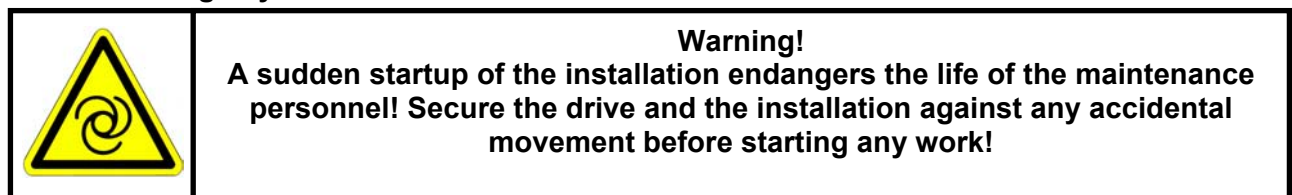
The brake may only be used in the way described in chapter 2.3 “Description and designated use”. The safety of your brake / brake-system depends on proper and regular inspection and maintenance. Study the manual before starting the installation. If in doubt, please don’t hesitate to contact our service-department or your local retailer. info@pintschbubenzner.de



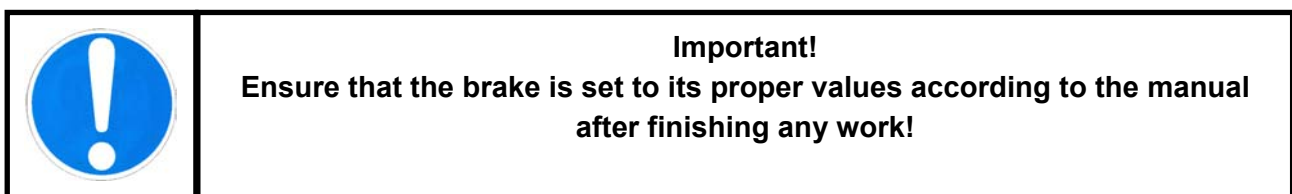
Also study the following manuals and Regulations:

- Operating manual of the installation
- Safety precautions of the installation
- Valid Safety regulations

Before starting any work with the brake:



- Don’t use any mechanical devices to block the brake.
- Ensure, that the drive is disconnected from the electrical power supply.
- Ensure, that the brake is disconnected from the electrical power supply.
- Any electrical work is only to be done by a trained electrician.
- Use only genuine PINTSCH BUBENZER spare-parts.
- The brake must never be disassembled further than described in the manual.



2 Brake

2.1 Introduction

This manual has been written to the best of our knowledge. It is intended to familiarize the operation and maintenance personnel with the function, the handling, the maintenance and the safety regulations of the power unit. Furthermore these instructions should make sure that **trained and qualified personnel** is able to handle the power unit according to its designated use. However the manual can't cover all the possible circumstances at the place of operation. If you have any questions concerning the power unit or this manual, please contact PINTSCH BUBENZER quoting the type and serial number of the power unit as given on the typeplate.

2.2 Warranty

The warranty and its duration depend on the contract. For details on the supplier's warranty please refer to the terms of the contract. Any warranty- or liability-claims are excluded in case they occur because of one or more of the following conditions:

- Non-designated use of the brake.
- Improper handling, setup, operation and maintenance of the brake by the operating company.
- Neglection of the regulations and notes in this manual concerning transport, setting up, operation and maintenance of the brake.
- Improper maintenance and repairs of the brake.
- Improper monitoring of components, which are prone to wear.
- Catastrophes, external objects and forces and force majeure.
- Changes at the brake without approval of PINTSCH BUBENZER.

The information in this manual has been checked thoroughly. Nevertheless we can't accept liability for errors.

2.3 Brake-description and designated use

The brakes PINTSCH BUBENZER Type SB 8.2 are meant exclusively as disc brakes for the conditions specified in the order together with the designated brake disc. The brake is designed as a holding brake and emergency brake. It is designed for dynamic braking within the limits given in section 2.4. This version of the brake is not suitable for use in areas with explosion hazards and not certified according to ATEX.

Any other use or any further change of the brake is strictly forbidden! Ignoring the regulations for the designated use and /or the instructions for setup and maintenance endangers life and leads to the loss of any warranty by the manufacturer!

The disc brake SB 8.2 is released (opened) electro-hydraulically by a thruster and is actuated (closed) by spring force. In case of an emergency-stop or a power failure the brake sets automatically. It can be released by a manual release lever. Braking distance and braking time are designed for the designated use but may vary depending upon the circumstances (e.g. load, direction of movement). The braking torque can be adjusted continuously by means of an adjustment nut. The brake is equipped with non-asbestos organic linings. Shoe clamping pins

prevent the aluminum brake shoes from tilting and grinding at the brake disc while the brake is released.

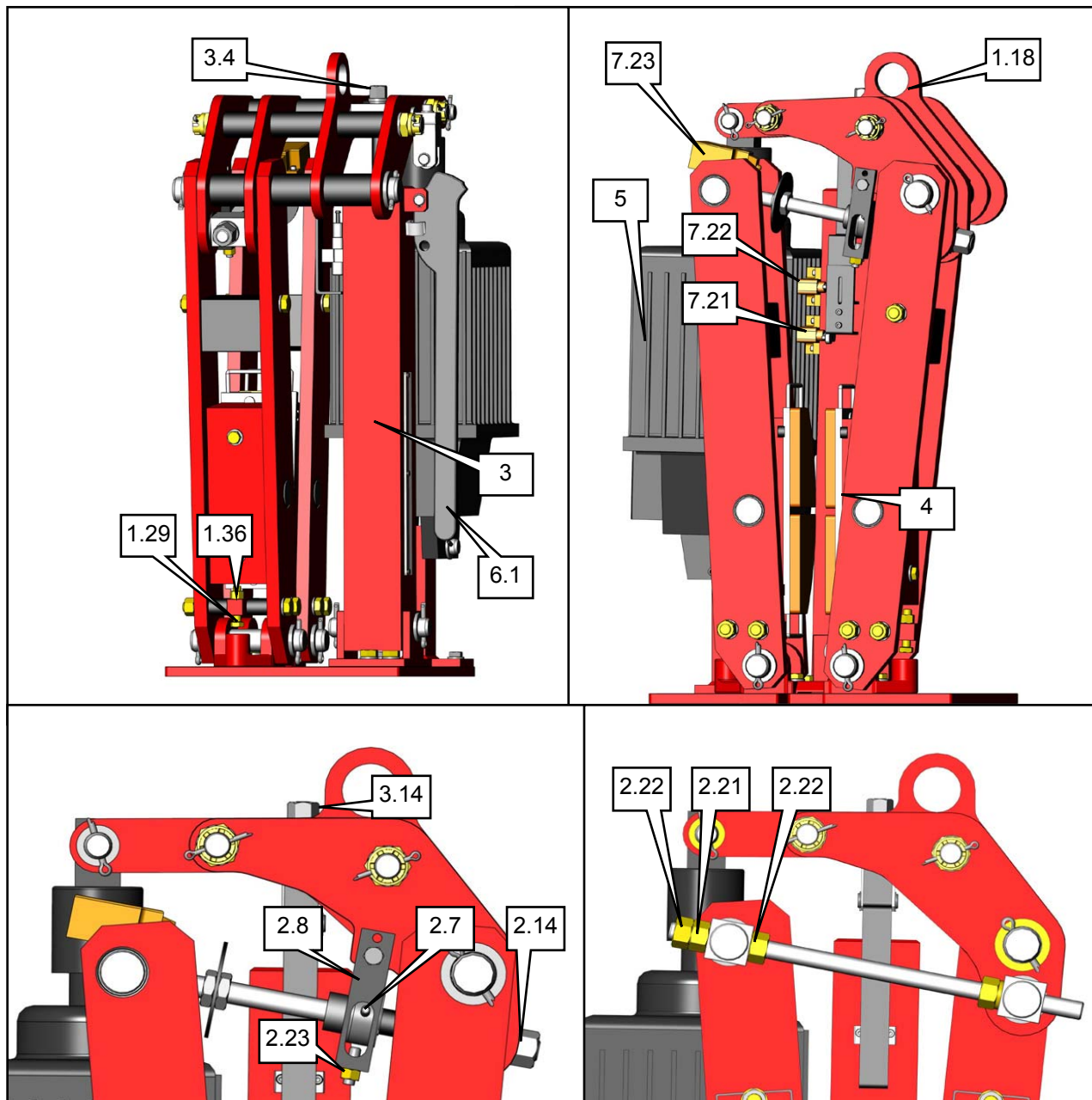
The wear can be compensated manually or, as an option, by an automatic wear compensator (AWC). Limit switches for the release and wear control as well as a manual release lever are further options. The SB 8.2 can be connected to a suitable control system.

2.4 Technical data

Refer to Data sheet in the appendix.

	Organic linings Type 03	Sintered linings Type 02
Maximum running speed (long time)	30 m/s	90 m/s
Maximum disc temperature (long time)	300-400°C	650°C
Maximum running speed (short time)	30 m/s	105 m/s
Maximum disc temperature (short time)	300-400°C	900°C

Overview SB 8.2



Pos.	Item	Pos.	Item
1.18	Lifting ore	3	Spring unit
1.29	Stop screw	3.4	Torque-scale
1.36	Lock nut	3.14	Adjusting nut - torque
2	AWC	4	Brake pad carrier with brake pad
2.7	Catch	5	Thruster
2.8	Catch pin	6.1	Manual release lever
2.14	Adjusting nut AWC	7.21	Limit switch – Set control
2.21	Adjusting nut (Version w/o AWC)	7.22	Limit switch – Release control
2.22	Lock nut (Version w/o AWC)	7.23	Limit switch – wear control

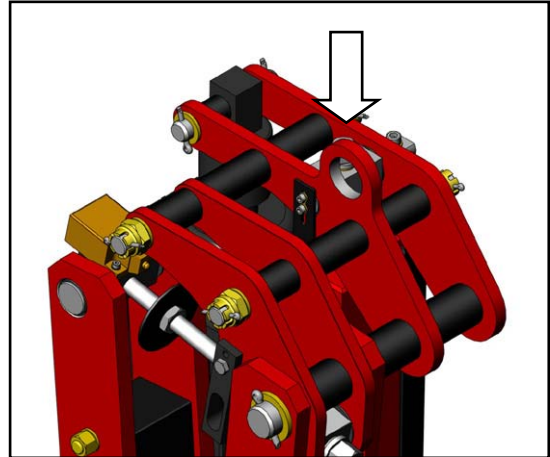
2.5 State of shipment and storage instructions

- The brake is shipped ready to mount and tested.
- The brake is shipped with spring under tension, if a thruster is mounted.



Important!

The complete brake has a weight of more than 200 Kg. Always use proper lifting devices and transport the brake using the lifting ore!



- Store and transport the brake dust- and waterproof.
- Protect the brake during the whole storage- and transport time against damage.

In case of additional painting, do **NOT** contaminate:

- Hinges or joints
- Brake disc surfaces
- Brake pads
- Spindle and AWC
- Rod of the thruster
- Electrical components
- Signs and plates

If the brake isn't installed directly after delivery heed the following instructions:

- Store and / or transport the brakes dust- and waterproof with drying agent until installation.
- Protect the brake against external damages during the complete storage- / transport-period.

3 Set-up of the brake



Warning!
A sudden startup of the installation endangers the life of the maintenance personnel! Secure the drive and the installation against any accidental movement before starting any work!

Before mounting the brake check

- The brake disc runs true
- The brake disc surface as well as the brake pads are clean and free from dirt and grease
- Positions of the mounting-bores
- Evenness and cleanliness of the mounting surface
- Cleanliness of the brake pads

3.1 Mounting and aligning of the brake

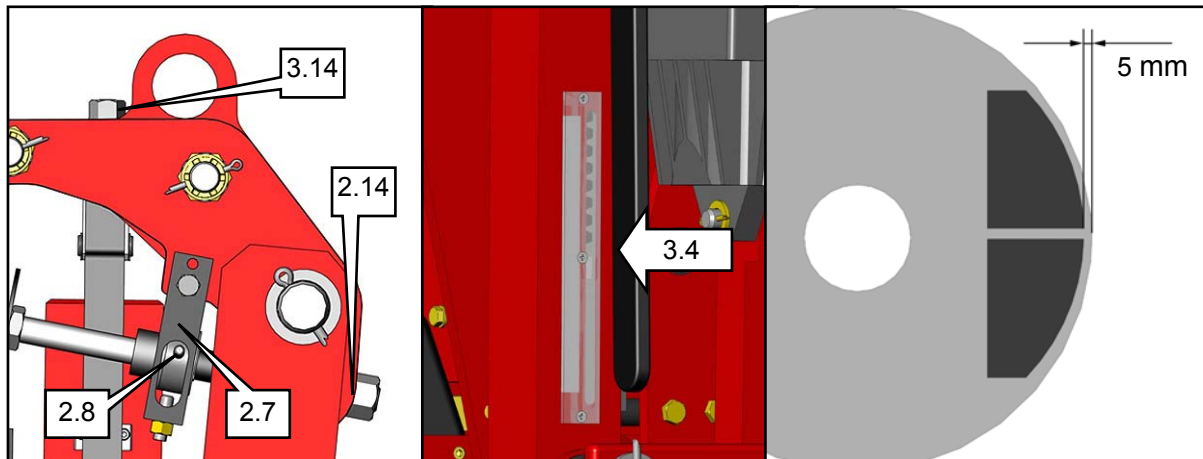


Fig. 1:

- **Completely release brake spring:** Rotate nut (3.14) counter clockwise.
- **Notice:** Turning the nut (2.2) counter clockwise may damage the AWC when the catch (2.7) is mounted! To avoid this, **dismount catch (2.7).**
- Rotate nut (2.2) counter clockwise \Rightarrow Brake pads move away from brake disc.
- Mount brake onto brake disc according to drawing (also refer to data sheet in the appendix).
- The centre line of the brake disc must coincide with the centre line of the brake.
 - Tolerance: 2 mm.
- The brake disc's outer diameter must exceed the brake pads 5 mm (Fig.2 - right)
 - Note: Use outline of the brake pad, not of the brake pad carrier!
- Use shims to adjust differences in height if necessary.
- Screw bolts (Class 8.8) with shims into the base but **don't tighten them yet.**
 - Bolts and shims are not included in our scope of supply.
- Rotate nut (3.14) clockwise until the **upper edge (3.4)** of the torque indicator shows about 1/3 of the nominal braking torque (3.20).
- Close brake by turning nut (2.2) **clockwise.**
- Brake aligns itself to the brake disc.
- Check brake alignment.
- Tighten mounting bolts to nominal torque (refer to appendix).

3.2 Set equal air gaps

The brake levers are centered by adjusting bolts which are set by locking nuts. The centering of the brake levers is done with the brake **completely released!**

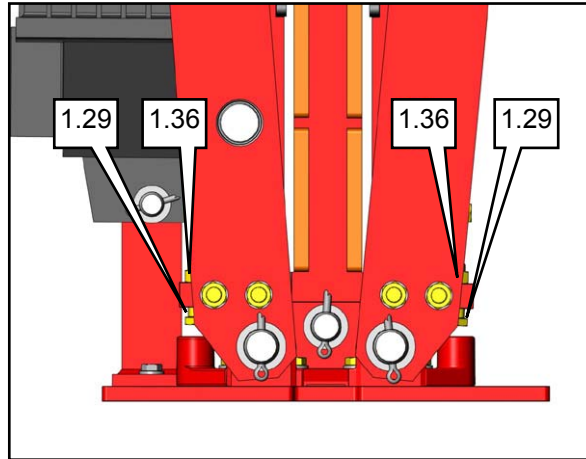


Fig. 2:

- Release (open) the brake by energizing the thruster.
- Loosen lock-nuts (1.36) on both levers.
- Turn stop-screw (1.29) until the space between linings and brake disc surface is equal on both sides.
- Tighten both lock-nuts (1.36).



Caution!

When the brake pad wear is compensated, the levers are “lifted out of the adjusting bolts”. Check the adjusting bolts regularly. Reset if necessary!

3.3 Electrical connection of the brake



Danger!

**The applied electrical voltages are dangerous to life!
The electrical connection and all other electrical tasks must only be done
by a trained electrician!**

Connect thruster according to supplier's data. Please refer to manual-manual for ELDRO / ELHY-thrusters, included in this documentation! Refer to the type plate for the electrical data.

- Connections have to be flexible, as the brake must move freely.
- Tighten cable connections.

3.4 Running in of the brake pads

The running in of the brake pads is essential to insure an even contact pattern on the pad which will avoid uneven loading of part of the surface and any resultant damage. The brake can be damaged when it is run in under unsuitable conditions!

Do not exceed the following values during running in.

	Organic linings- Type 03	Sintered linings -Type 02
Maximum running speed	30 m/s	75 m/s
Maximum disc temperature	200°C	250°C
Maximum braking time	5 Seconds	15 Seconds

- Set limit switches Release- / Set-control out of order.
- Dismount catch (2.7).
- Let motor run on HALF nominal speed.
- Close brake by turning the adjusting nut (2.2) clockwise, until the brake pads make contact with the brake.
- Open and close brake several times (2.2) until the complete brake pad surface of the brake pad is run in.
- Dismount brake pad (4) to check contact pattern (Section 4).
- Note: The braking torque achieved can be related to the current take-up of the electric motor!
- Remount catch and set reserve stroke (Section 3.6)

3.5 Set braking torque

Rotate adjusting nut (3.14) clockwise, until the **upper** edge of the torque indicator (3.4) shows the required braking torque on the scale (3.20)

Note: The permissible minimum braking torque is 50% of the rated maximum braking torque.

3.6 Set reserve stroke



Warning!
A reserve stroke of less than S_{1min} can lead to a brake failure! Always check
and if necessary reset brake!
Mortal danger!

Reserve stroke-adjustment for brakes without AWC

- Measure S1 (Fig. 4) with brake closed.
- Loosen locking nuts (2.22).
- Turn Nut (2.21) **clockwise** until the piston rod of the thruster has reached the necessary value for S1 (table 1).
- Reset locking nuts (2.22).

Reserve stroke-adjustment for brakes with AWC



Notice!

A counter clockwise turn of nut (2.14) may damage the AWC when the catch (2.7) is mounted! To avoid this follow the instructions:

Note: **Adjust** brake in **released** condition. **Check** adjustment when the brake is **set**!

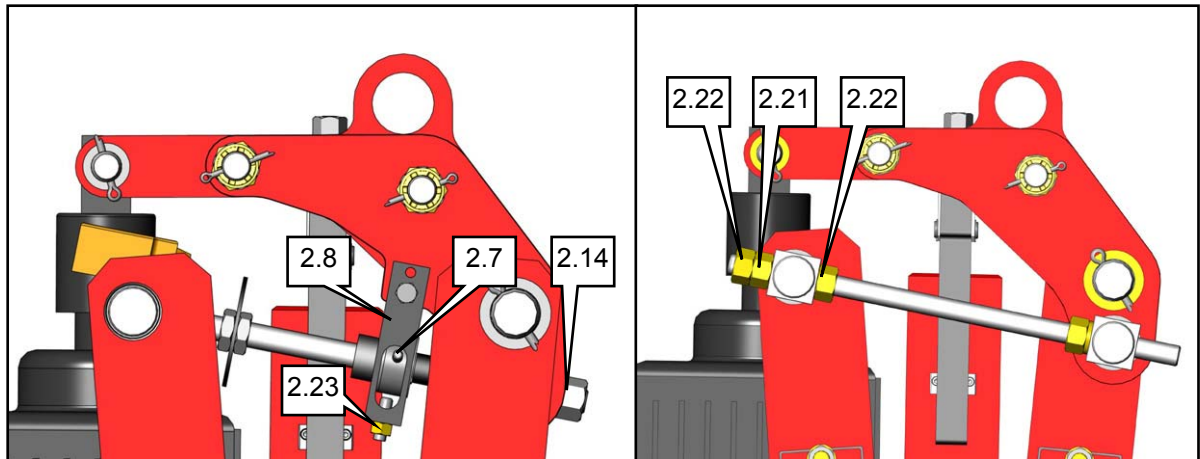


Fig. 3

- Dismount catch (2.7) by unscrewing bolt (2.23).
- Release brake with thruster.

Increase reserve stroke:

- Turn Nut (2.14) **clockwise** until the piston rod of the thruster (Fig. 4) has reached the necessary value for S1 (table 1).

Decrease reserve stroke:

- Unscrew bolt (2.23) and remove catch (2.7).
- Turn Nut (2.14) **counterclockwise** until the piston rod of the thruster (Fig. 4) has reached the necessary value for S1 (table 1).
- After finishing all tasks make sure the catch (2.7) is reinstalled correctly:
- The guidance pin (2.8) has to be within the catch (2.7).

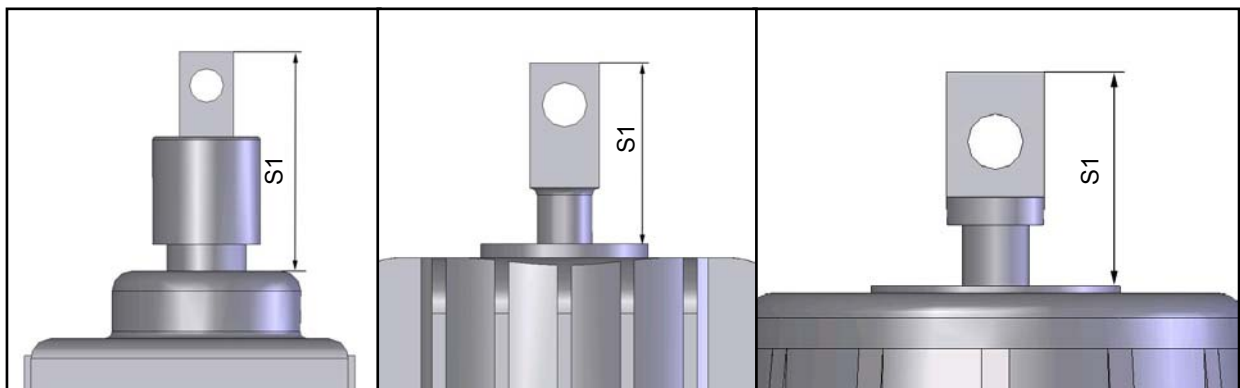


Fig. 4: piston rods of the different ELDRO-thrusters


and ELHY-Thrusters

Thruster Type	S ₀ = Piston rod in lowest pos.	S ₁ = Brake set	S ₂ = Brake released	S ₁ = S _{1min} => Readjust Brake!
ED 50/6	54 mm	64 mm	114 mm	59 mm
ED 80/6	54 mm	64 mm	114 mm	59 mm
ED 121/6	145 mm	155 mm	205 mm	150 mm
ED 201/6	145 mm	155 mm	205 mm	150 mm
ED 50/12	54 mm	104 mm	174 mm	70 mm
ED 80/12	54 mm	104 mm	174 mm	70 mm
ED 121/12	205 mm	255 mm	325 mm	220 mm
ED 201/12	205 mm	255 mm	325 mm	220 mm
EB 500-60	85 mm	95 mm	145 mm	90 mm
EB 800-60	60 mm	70 mm	120 mm	65 mm
EB 1250-60	133 mm	143 mm	193 mm	138 mm
EB 2000-60	157 mm	167 mm	217 mm	162 mm
EB 500-120	113 mm	163 mm	233 mm	128 mm
EB 800-120	57 mm	107 mm	177 mm	75 mm
EB 1250-120	193 mm	243 mm	313 mm	208 mm
EB 2000-120	106 mm	156 mm	226 mm	131 mm

Tolerance + 3 mm / -1 mm – Short stroke thruster / + 5 mm / -5 mm – Long stroke thrusters

Table 1: Thruster settings

3.7 Check limit switches



Caution!

In case limit switches are mounted (refer to scope of supply), they must not be put out of service, overridden or blocked in any other way. Else the safe use of the brake is no longer given!

Release control / set control – mechanical version

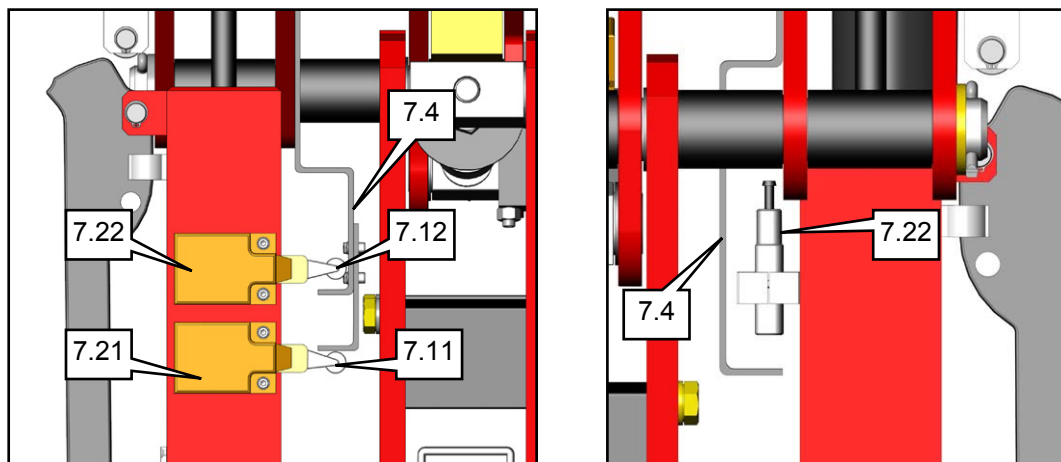


Fig. 5:

When the brake is released, the lever (7.4) moves upwards

- The lever (7.4) moves the roll (7.12) upwards.
- The limit switch release control (7.22) is actuated when the brake is **completely released**.
- The limit switch set control (7.21) is deactivated.

When the brake is set the lever (7.4) moves downwards

- The lever (7.4) moves the roll (7.11) downwards.
- The limit switch set control (7.21) is actuated when the brake is **completely released**.
- The limit switch release control (7.22) is deactivated.

Release control - sensor

When the brake is released, the lever (7.4) moves upwards

- The limit switch release control (7.22) is actuated, when the lever (7.4) comes into the range of the sensor (7.22).

Wear control

The switch is mounted at the main spindle. When the brake is adjusted correctly, the switch isn't actuated. With growing wear, the actuating disc (7.5) moves closer to the switch (7.23). When the wear reaches the critical value, the switch is actuated by the disc (7.5) pressing down the tip (7.13).

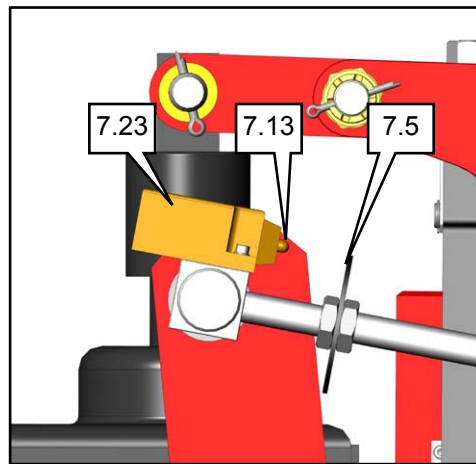




Fig. 6:

3.8 Function control

Release and set the brake several times. Check the following:

- Is dimension "S₁" reached, when the brake is set? (Table¹)
If NO: Repeat section 3.6
- Is there an equal air gap between brake pads and brake disc, when the brake is released?
If NO: Repeat section 3.2
- Did you set the required braking torque?
If NO: Repeat section 3.5
- Is catch (2.8) properly installed and fitted into its place?
If NO: Adjust according to section 3.6
- Is the catch-pin (2.8) inside the catch (2.7)?
If NO: Adjust according to section 3.6
- Is the catch-pin (2.8) touched by the catch (2.7) during operation of the brake?
If YES: The AWC is not yet completely run in. Set and release the brake, until the catch pin (2.8) isn't touched any more.
- Is the required braking distance achieved?
If YES: Setup finished!
If NO: Reset braking torque (Section 3.5)

4 Maintenance

	<p>Warning!</p> <p>A sudden startup of the installation endangers the life of the maintenance personnel! Secure the drive and the installation against any accidental movement before starting any work!</p>
	<p>Notice!</p> <p>The use of spare parts, not meant for this brake, can lead to a malfunction of the brake or damage the brake!</p> <p>Only use original PINTSCH BUBENZER spare parts!!</p>

4.1 Regular maintenance tasks

Check:

All 100 - 150 operating hours



All 450 operating hours or monthly (Holding brakes without dynamic braking)

In case the brake hasn't been used for six months

- Function of the brake/brake system
- Brake shoe lift-off
- Lining wear/lining thickness
- Condition of the brake disc
- Thruster reserve stroke
- Easy mobility of the brake linkage
- Brake spring tension (torque)
- Adjustment of limit switches, hand release devices and other optional equipment
- Possible wear of the automatic wear compensator (if ordered)

Check the brake/brake system outside the regular inspection intervals if:

- Prolonged braking times or -distances appear
- Extreme operating conditions appear:
 - ⇒ Overspeeding of the brake disc
 - ⇒ And/or excessive braking times
- A limit switch indicates lining wear or lack of releasing stroke
- After a longer period of brake-standstill or drive standstill.
- An emergency stop occurred.

	<p>Attention!</p> <p>Cotter pins at pins have to be opened, so they can't fall out (left). Cotter pins at castellated nuts have to be opened completely (right)!</p>	
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DO NOT DISENGAGE the automatic wear compensator, as otherwise lining wear must be compensated manually!

4.2 Lubrication

Because of the maintenance-free bushings installed on the brake, no lubrication is needed.

4.3 Additional Maintenance for Hoist Gear Brakes

The following are in addition to the visual inspection of the brakes every 100-150 operating hours. In Germany brake tests must be performed for the hoist brakes once a year. (German regulation VBG9). These brake tests must be carried out without electric controlled deceleration. Where German crane operation legislation is not applied, we recommend the following:

Dynamic brake test

- perform under no load condition (Spreader) 3-4 braking cycles at maximum lowering speed and/or

Static brake test (hoist drives with 2 service disc brakes)

- perform with nominal (rated) load
- lift up load approx. 30 Centimeters (12 inches)

Open one brake by using the hand release. The second brake must hold the load safely. If it does not, check or repeat brake adjustment and section 3.0 (Commissioning). After passing the static brake test, run one dynamic brake test.



Subsequent to repair of a brake with used brake pads

When mounting a brake with used brake pads proceed as though it is a new installation, to insure that the surfaces are mated-in (match).

Important Note

In case of exclusive static use as holding brake or low dynamic braking requirement as is commonly the case on new cranes and especially container cranes, the surface of the sintered lining will tend to accumulate dust particles which can reduce the friction factor and thus the available braking torque. These dust particles in the brake pad surface can be removed by performing the annual dynamic brake test. Where it is not possible to carry out dynamic load tests at regular intervals, we recommend changing brake pads every 2 years. If brake pads removed from the brake are in otherwise good condition i.e. free from oil contamination, even wear pattern, no visible cracks or deformation and well above minimum residual pad thickness, they can be reconditioned by grinding or machining approx. 0.5mm off the surface.

4.4 Use of manual release lever (Option)

	<p>Warning!</p> <p>When using the manual release lever, there is no safety device active any more! Mortal danger!</p> <p>Always make sure nothing can move out of control.</p>
	<p>Danger!</p> <p>Release brake SLOWLY, so an attached load can't move out of control!</p> <p>Mortal Danger!</p>

The manual release lever (Fig. 11 - 6.1) is not part of the standard scope of supply. By means of the lever the brake may be released manually in case of an emergency-situation, e.g. to lower a load after an emergency stop.



Warning!
The lever is not suited to keep the brake open for maintenance tasks.
Mortal danger!

Always watch the load (2nd operator) so you don't miss the point, where the brake releases. Pull the lever upwards **SLOWLY** to open the brake (arrow). If the lever is released, before it has reached its locking position (completely released), the brake automatically closes. It is possible to provide the brake without a catch for the lever. Check scope of supply. By means of the lever the load can be released controlled. As an option the manual release lever can be equipped with a limit-switch for release control (Fig. 7).

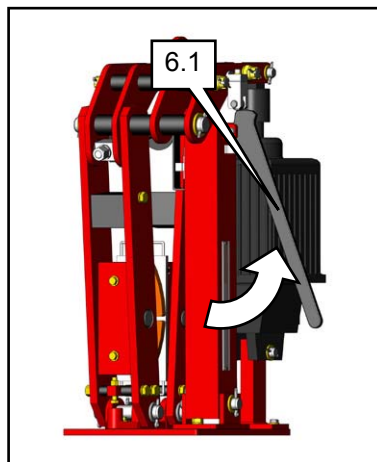


Fig. 7:

4.5 Maintenance of the AWC

The catch (Fig. 2.7) and the freewheel (Fig. 2.6) may be object to wear. Recognized by a constant reduction of the reserve stroke in case of lining wear, although the AWC is actuated.

Procedure:

- Rotate nut (2.2) clockwise to compensate lining wear and thus the reduced reserve stroke. (Refer to section 3.5)
- Replace worn parts resp. the complete AWC unit as soon as possible!

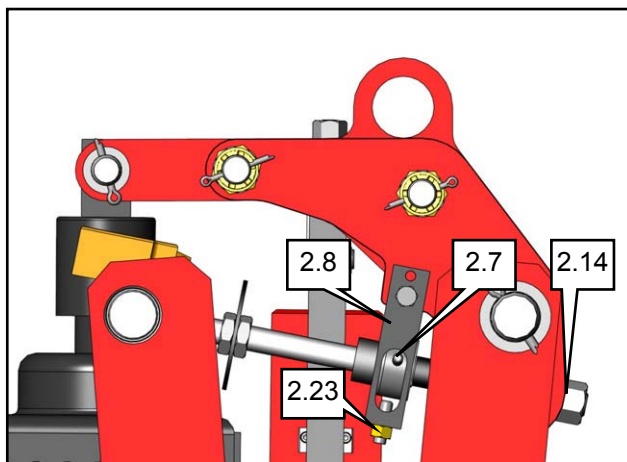


Fig. 8:

Notes:

- For this task, 2 persons are necessary.

- Store all removed parts in the correct order of assembly.
- Do not mix up the spacer tubes, because they are different in length!
- Remove the 2 cotter pins of the castellated nuts (1.49) as well as cotter pin (1.23).
- Screw off castellated nuts (1.49) and remove washers on indicated side.
 - Note: The nuts on the other side can remain!
- Pull out threaded pins (1.25) **slowly** into arrow direction, until both levers (1.4 / 1.5) are free.
Caution: The spacer tubes are loose now and may fall into the brake!

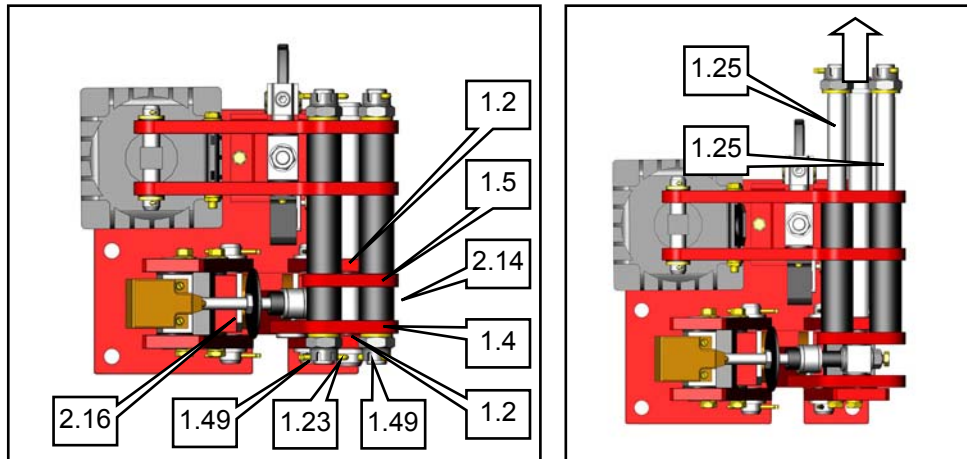


Fig. 9:

Caution! When pulling out the bolts (1.23) the levers (1.4 / 1.5) may tilt and fall over! Secure both levers (1.4 / 1.5) against falling over!

- Pull pin (1.23) slowly into arrow direction, until both levers (1.4 / 1.5) are free.
- Important: Pin (1.23) must remain in lever bearing (1.2)!

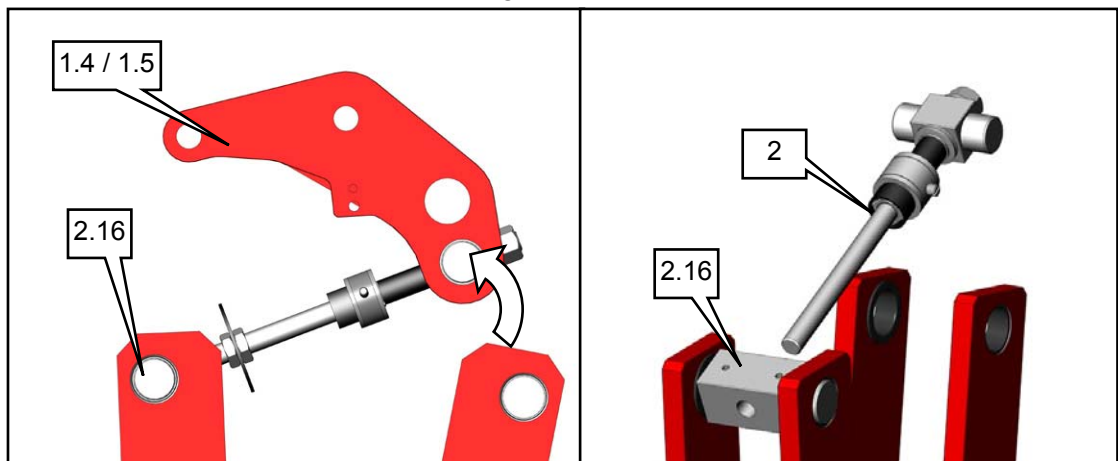


Fig. 10



- Swivel both levers (1.4 / 1.5) complete with AWC unit (2) upwards (Fig. 12 left).
- Remove levers (1.4 / 1.5) from AWC unit (3)
- Turn nut (2.14) counter clockwise to remove the unit from crosspiece (2.16).

It is usually not necessary to remove the crosspiece!

- Check thread of crosspiece (2.16) for cleanliness.
- Grease the new spindle.
- Turn the spindle of the new AWC unit (2) inside the crosspiece (2.16) (approx. 10 rotations).
- Put on both levers (1.4 / 1.5) to the new AWC unit and swivel the whole unit back between the brake levers (1.2).

- Push pin (1.23) through the appropriate bores of the levers (1.4 / 1.5) and spacer tubes!
- Fix washers in place with a slight touch of grease!
- Mount the spacer tubes on their original position. Refer to circular impressions on the levers.
- Push back threaded pins (1.25) with appropriate spacer tubes into levers (1.4 / 1.5).
- Screw on castellated nuts (1.49) with washers.
- Tighten these nuts with a torque wrench to **400 Nm**.
- If the holes of the castellated nuts do not coincide with the cotter pin bore:
- Go on tightening, until the holes for the cotter pin coincide.
- Secure all pins with cotter pins.

4.6 Exchanging of brake pads

	<p style="text-align: center;">Warning!</p> <p style="text-align: center;">During the braking process the brake disc and the brake shoes heat up!</p> <p style="text-align: center;">Danger of burning!</p> <p style="text-align: center;">Let brake disc and brake cool down before changing the brake pads!</p>
	<p style="text-align: center;">Important!</p> <p style="text-align: center;">Always exchange BOTH brake pads!</p> <p style="text-align: center;">Otherwise the brake might not work properly!</p>

Minimum thickness of the linings:

- Glued linings: 3 mm
- Riveted linings / Glued and riveted linings: 5 mm

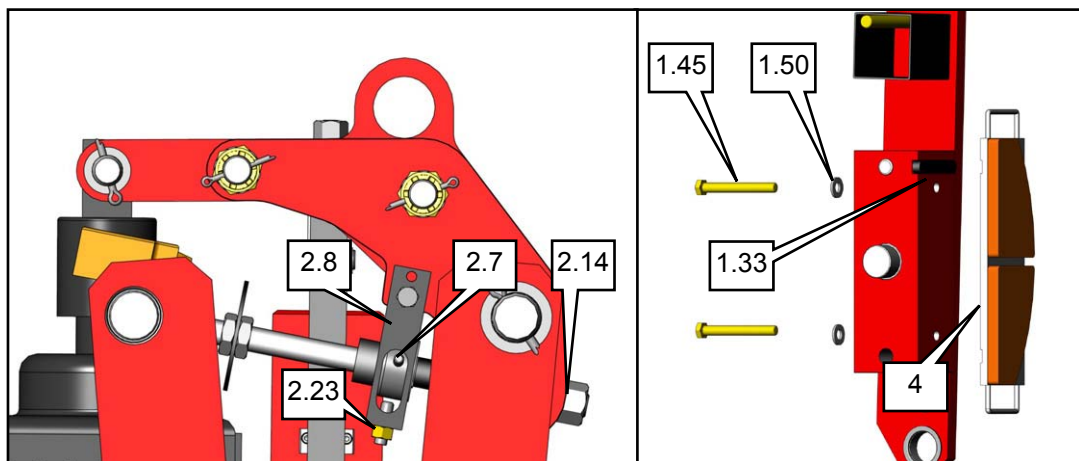


Fig. 11:

- **Release brake spring:** Turn nut (3.14) counter clockwise.
- Version w/o AWC: Loosen lock nuts (2.22). (Section 3.6)
- Version with AWC: Disable AWC (Section 3.6).
- Turn nut (2.14) counter clockwise ⇒ Brake shoes move away from brake disc.
- Screw both bolts (1.45) out of brake pads (4).
- Hold brake pads (4) at top handle.
- **Caution when removing the brake pads!** Heed weight of brake pads (4)!

- Lift brake pads (4) from key (1.33).
- Remove old brake pad (4).
- Check new brake pad (4) for cleanliness, clean if necessary (Emery paper).
- Put new brake pads on the key (1.33) and tighten it by screws (1.45) to the brake shoe.
- **Do not forget new Nordlock washers (1.50)!**
- Readjust and run-in brake according to section 3.

4.7 Exchange of limit switches

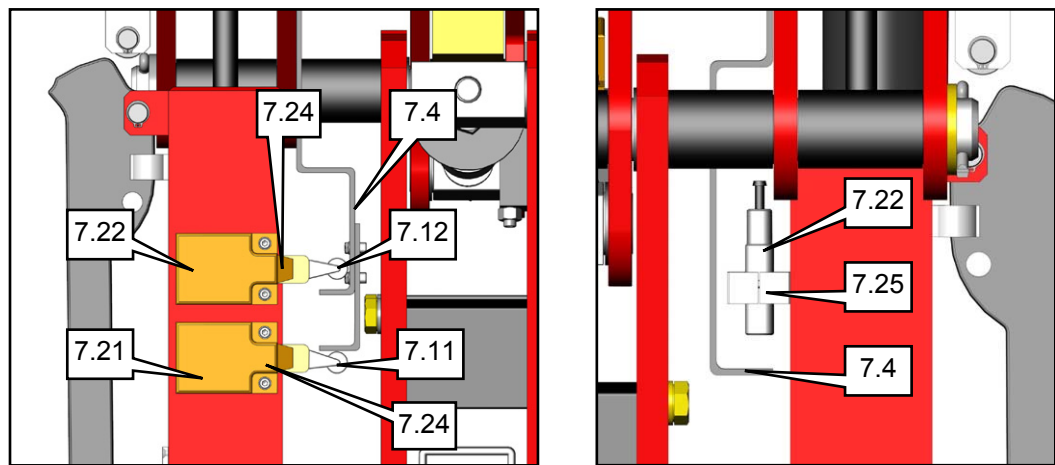


Fig. 12:

Release control / set control – mechanical execution

- Dismount and disconnect limit switch (7.22).
- Mount new limit switch (7.22) with two bolts.
- Connect limit switch according to data sheet (included in this documentation).
- Loosen bolt (7.24).
- Pull out lever (7.12) slightly and adjust.
- Push lever (7.12) back on toothed wheel.
- Retighten bolt (7.24).
- Release and close the brake.
- Check function and adjust if necessary.

Release control –Touchless execution

- Open bloc clamp (7.25).
- Exchange limit switch (7.22).
- Connect new switch (7.22) electrically.
- Set gap between limit switch and lever to 4 millimeter
- Close block clamp (7.25) with two screws.
- Release and close the brake.
- Check function and adjust if necessary.

Wear control

- Measure distance to switching disc (7.5).
- Dismount and disconnect limit switch (7.23).
- Mount new switch (7.23) with two bolts.
- Reset switch (7.23) to original position.
- Release and close the brake.
- Check function and adjust if necessary.

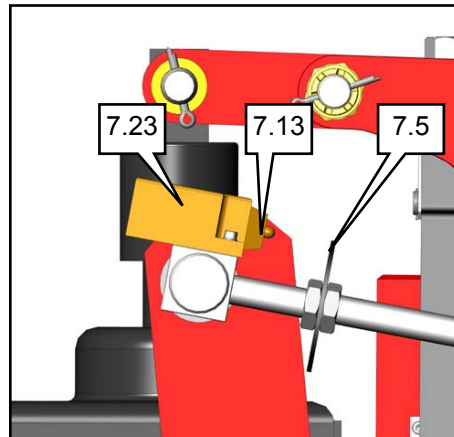


Fig. 13:

4.8 Exchange bolts and bushes

For this, the brake has to be disassembled. Secure the installation against accidental movement!

- Open brake by releasing the brake tension.
- Release brake completely by adjusting nut.
- Dismount brake
- Before removing the bushes note positions.
- Don't damage the bores when removing the bushes.
- Clean and debur bores if necessary.
- Note the mounting-direction of the bushes. Refer to exploded views in section 7
- Don't damage or jam the bushes when driving / pressing them into the levers.
- Reset brake to operating values according to section 3!

4.9 Exchange thruster

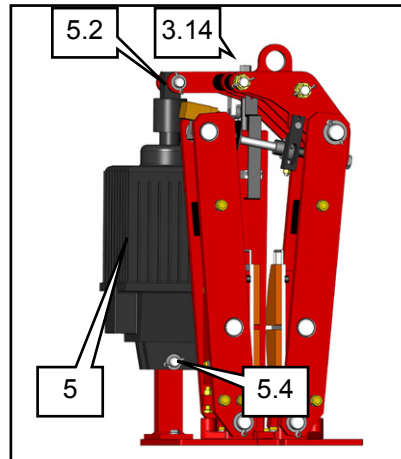


Fig. 14:

- Disconnect thruster (5).
- Dismount limit switch if mounted.
- Release brake spring tension (3.14).



Caution!
When the upper bolt (5.2) is pulled out, the thruster may tilt and fall.
Secure the thruster against accidental movements!
Danger of injury!

- Remove cotter pins and washers from Eldro (5.2 and 5.4).
- Attach thruster (5) with e.g. a rope to a suitable lifting device.
- Loosen and remove bolts (5.2 and 5.4).
- Exchange thruster (5).
- Reassemble brake
- Connect new thruster

4.10 Exchange Spring unit

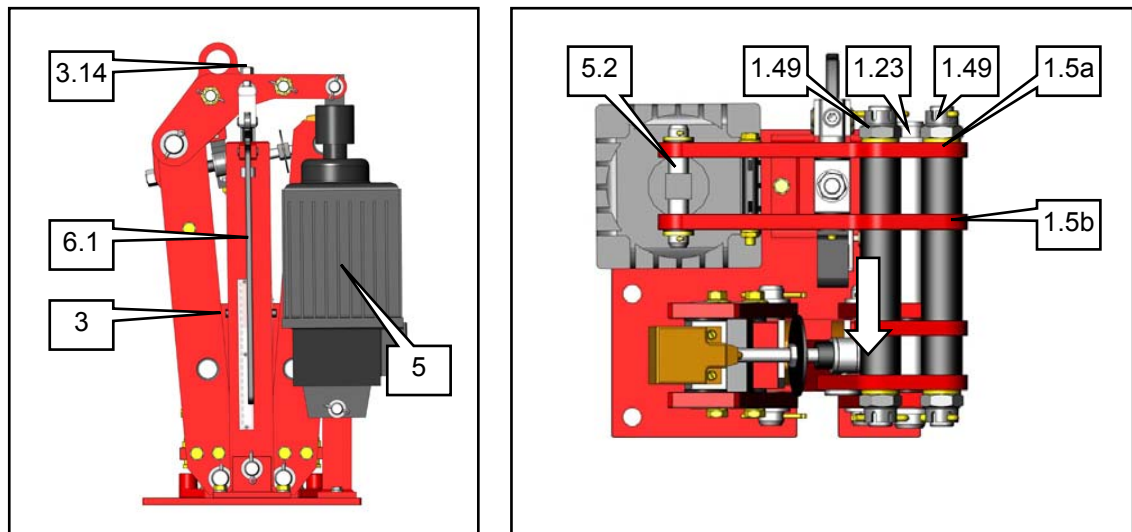


Fig. 15:

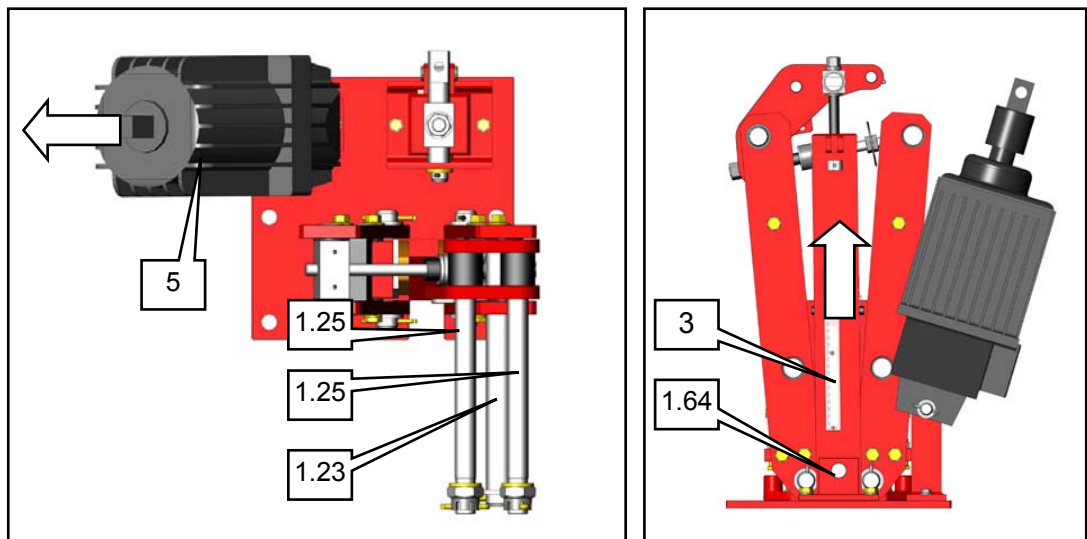


Fig. 16:

- Release brake spring tension (3.14).
- If mounted: remove manual release lever (6.1), Roll carrier.
- Pull thruster-sided cotter pins from pins (1.23 and 1.25).
- Unscrew castellated nuts (1.49) and remove washers (1.49, 1.23 and 1.25).
- Remove elbow lever 1 (1.5a).
- **Secure the thruster and other movable parts against accidental movement!**
- Pull pins (1.25) out of lever 2 (1.5b).
- Tilt thruster (5) carefully away from spring tube (3).
- Secure thruster (5) against further movement.
- Remove elbow lever 2 (1.5b).
- Remove cotter pins and washers from pin (1.64) from lower end of spring tube (3).
- Pull pin (1.64) out of spring tube (3).
- Pull spring tube (3) upwards out of the brake.
- Mount new spring unit.
- Reassemble brake by following the steps in reverse order to the mounting of the castellated nuts.
 - Grease washers slightly
 - Position them on the levers, referring to the imprints.
- Tighten castellated nuts (1.49) with a torque wrench to **400 Nm**.
- If the bores for the cotter pins don't match the bores in the castellated nuts, tighten further.
- Secure all pins and castellated nuts with new cotter pins.
- Remount manual release lever (6.1), Roll carrier if they were dismantled.

5 Putting out of service and disposal

When the brake is put out of service, the following instructions have to be heeded to help avoiding dangers to life, material and environment:

The brake must only be put out of service and disposed by trained and qualified personnel.

Always heed the applying laws and regulations!



Important!
Because of the weight of the brake always use proper lifting devices and transport the brake using the lifting ore!
Danger of injury!



Warning!
A sudden startup of the installation endangers the life of the working personnel! Secure the drive and the installation against any accidental movement before starting any work!



Danger!
The applied electrical voltages are dangerous to life!
The electrical connection and all other electrical tasks must only be done by a trained electrician!



Take care that the hydraulic fluids, lubricants and other used substances as well as oil-soiled parts are disposed environmental friendly and in compliance with the corresponding laws and regulations!
Electronic scrap has to be disposed separately.

6 Troubleshooting



Symptom	Possible reason	Action	Section
Brake doesn't close	Brake is mechanically blocked	Check	-
	Brake is manually released	Manually close	4.4
	Spring tension to low	Adjust spring tension	3.4
	Spring damaged	Exchange spring unit	4.10
	Signal „open“ is active	Check connection	ES
	Limit switch malfunctioning	Check connection	ES
		Check lever / actuating devices	4.7
		Exchange limit switch	4.7
	Reserve stroke to small	Adjust reserve stroke	3.5
	Brake pads worn	Exchange brake pads	4.6
Brake doesn't open	Brake is mechanically blocked	Check	-
	Adjusting bolts have been set, while brake was closed.	Readjust bolts	3.2
	Spring tension to high	Adjust spring tension	3.5
	Signal „close“ is active	Check connection	ES
	Limit switch malfunctioning	Check connection	ES
		Check lever / actuating devices	4.7
		Exchange limit switch	4.7
	Reserve stroke to big	Adjust reserve stroke	3.6
	No power supply	Check electrical supply and connection	3.3
	Thruster damaged	Exchange thruster	4.9
Braking distance to long	Spring tension to low	Adjust spring tension	3.4
	Brake pads have uneven contact	Align brake	3.1
	Brake pads haven't been run in correctly	Run in brake pads	3.4
	Reserve stroke to small	Set Reserve-stroke	3.6
	AWC doesn't work properly	Check and readjust.	4.5
	Brake pads soiled	Brake clean	-
	Brake soiled	Clean brake	-
	Brake pads worn	Exchange brake pads	4.6
	Brake disc worn	Exchange brake disc	BS

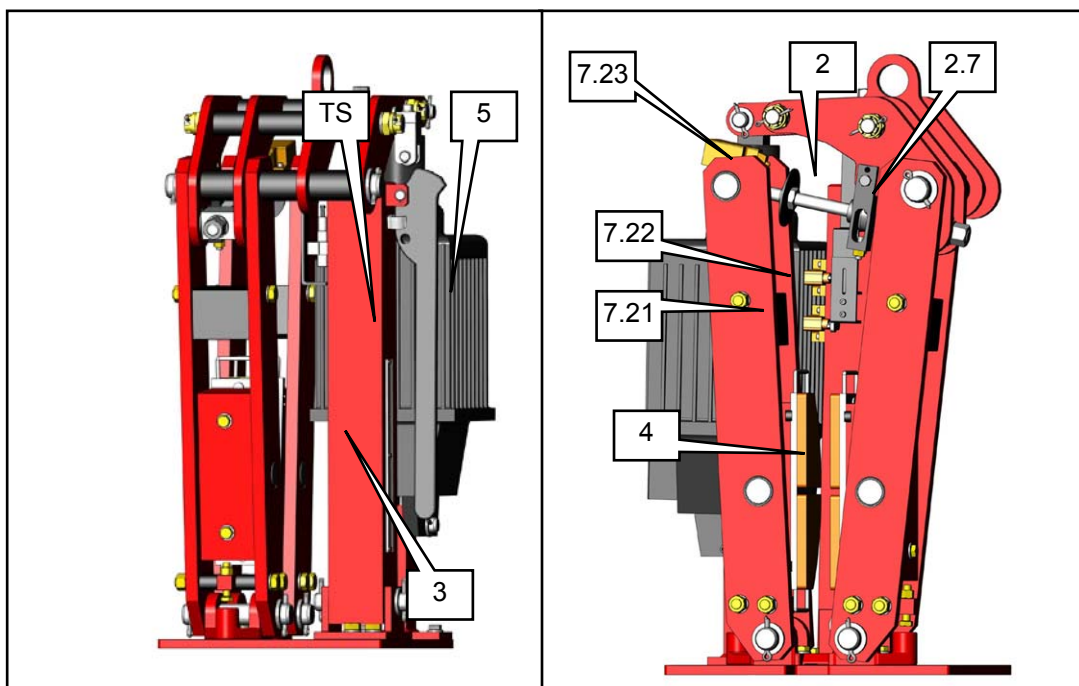
Note:

ES - Data sheet of the limit switch

BS - Manual of the brake disc

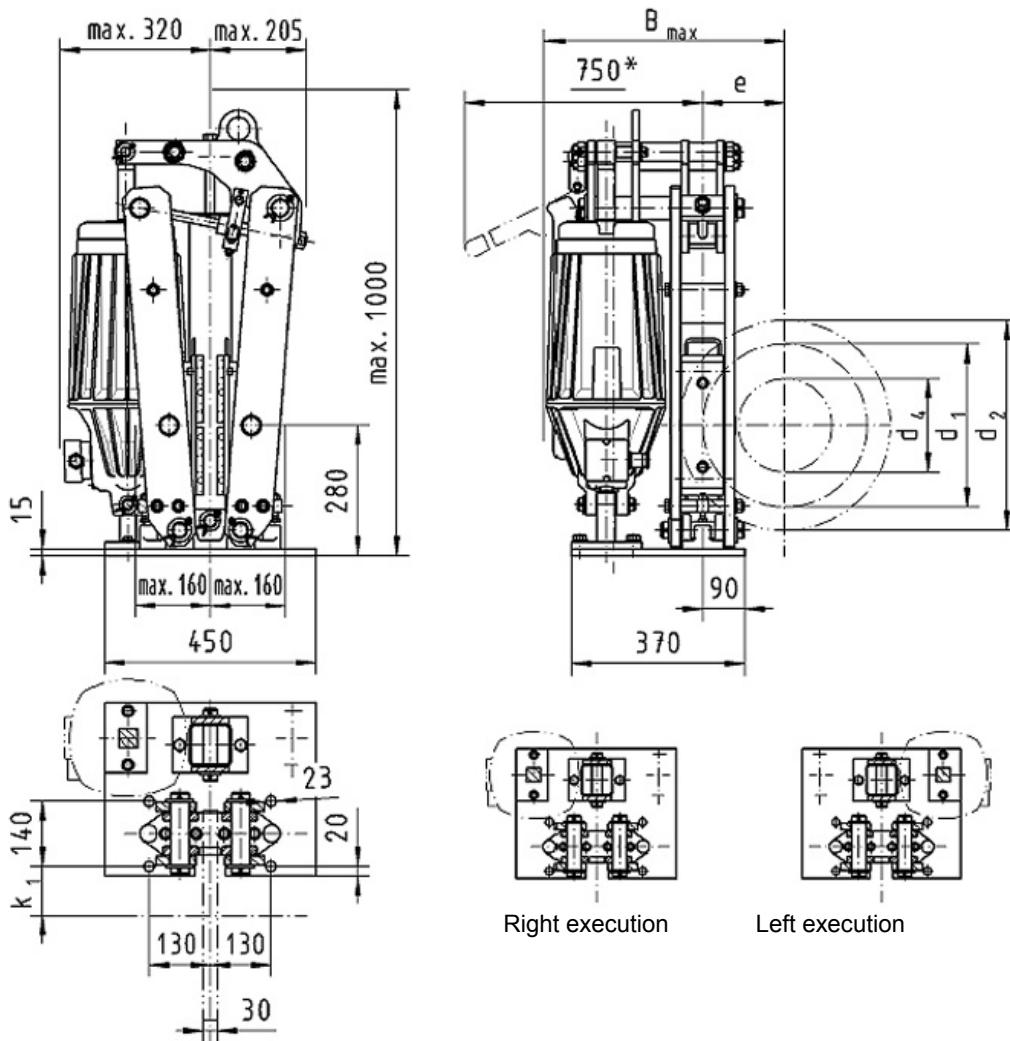
7 Spare parts

	<p>Important!</p> <p>In case of ordering, please indicate the type and the serial no. of the brake which is located on the type plate (see below: "TS") of the brake!</p>
	<p>Notice!</p> <p>The use of spare parts, not meant for this brake, can lead to a malfunction of the brake or damage the brake!</p> <p>Only use original PINTSCH BUBENZER spare parts!!</p>



Pos.	Nr.	Type
2	1	AWC complete (Version with AWC)
2.7	1	Catch (Version with AWC)
3	1	Spring tube
4	2	Brake shoe with brake pad
5	1	Thruster
7.21	1	Limit switch – Set control
7.22	1	Limit switch – Release control – mechanical version
7.22	1	Limit switch – Release control – touchless version
7.23	1	Limit switch – Wear control
-	1	Spindle (Version w/o AWC)
-	1	Set of bolts (does one brake)
-	1	Set of bushes (does one brake)

8 Appendix



For crane brake lay-out use safety factors documented in the FEM 1.001, Section 1
All dimensions in mm. Alterations reserved without notice

1) If ordered with manual release lever

*) Average friction factor of standard material combination

Weight: 180Kg W/o thruster		Thruster – Type				EB500/60 EB500/120	EB800/60 EB800/120	EB1250/60 EB1250/120	EB2000/60 EB2000/120	Ed50/6 Ed50/12	Ed80/6 Ed80/12	Ed121/6 Ed121/12	Ed201/6 Ed201/12
						11.3	18.3	24.5	33.5	7.3	12.3	19.3	30.0
						Contact Force in kN							
Disc- \varnothing	Friction- \varnothing	Hub- \varnothing	Braking Torque M _{Br} in Nm										
			Friction factor $\mu = 0,4$										
d ₂	d ₁	d ₄	e	k ₁	B _{max}								
450	350	200	175	105	510	1580	2560	3430	4690	1000	1700	2700	4200
500	400	250	200	130	535	1810	2930	3920	5360	1200	2000	3100	4800
560	460	310	230	160	565	2080	370	4510	6160	1400	2300	3600	5500
630	530	380	265	195	600	2395	3880	5190	7100		2600	4100	6400
710	610	460	305	235	640	2760	4465	59870	8175			4700	7300



Important!
Used Nordlock-washers must not be used again!
These tightening torques apply for:
 $\mu_{\text{compl.}} = 0,12$ (black or bonderd, slightly oiled)

Coarse-pitch thread – with / without NORD-LOCK-washers							
Size	Tightening Torques M_A						SW [mm]
	8.8		10.9		12.9		
	[Nm]	[Lbf*ft]	[Nm]	[Lbf*ft]	[Nm]	[Lbf*ft]	
M4	3	2.3	4.6	3.4	5.1	3.8	7
M5	5.9	4.4	8.6	6.3	10	7.4	8
M6	10.1	7.5	14.9	11.0	17.4	12.8	10
M8	24.6	18.2	36.1	26.6	42.2	31.1	13
M10	48	35.4	71	52.4	83	61.3	17 (16)
M12	84	62.0	123	90.8	144	106.3	19 (18)
M14	133	98.2	195	143.9	229	169.0	22 (21)
M16	206	152.0	302	222.9	354	261.3	24
M18	295	217.7	421	310.7	492	363.1	27
M20	415	306.3	592	436.9	692	510.7	30
M22	567	418.4	807	595.6	945	697.4	32 (34)
M24	714	526.9	1015	749.1	1190	878.2	36
M27	1050	774.9	1496	1104.0	1750	1291.5	41
M30	1428	1053.9	2033	1500.4	2380	1756.4	46