



# Operating Manual for Drum Brake Type: EBN 200-400

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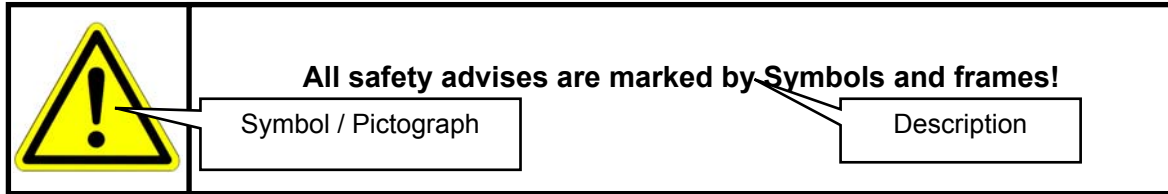
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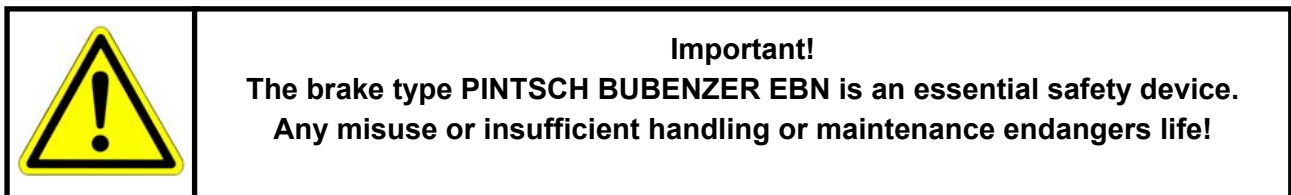
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## 1 Safety regulations

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



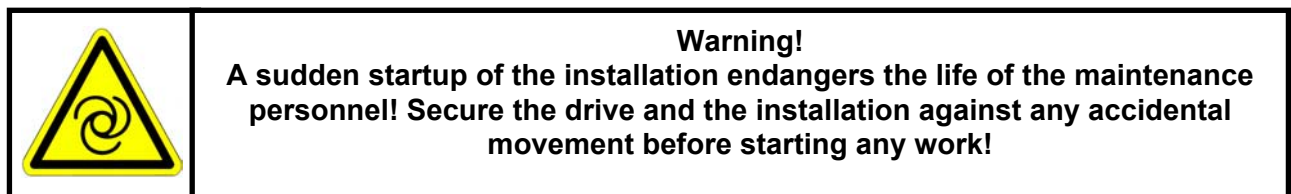
The brake may only be used in the way described in chapter 2.3 "Description and designated use". The safety of your brake / brake-system depends on proper and regular inspection and maintenance. Study the manual before starting the installation. If in doubt, please don't hesitate to contact our service-department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



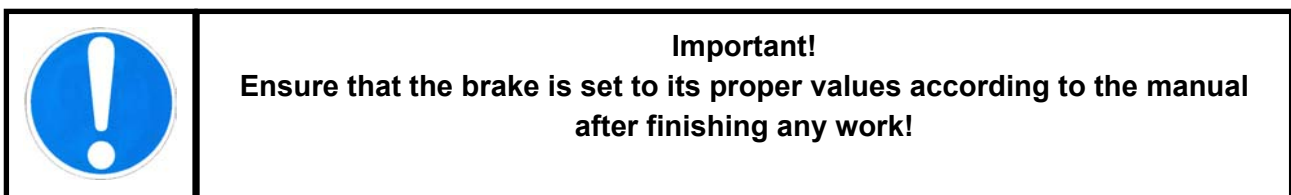
Also study the following manuals and Regulations:

- 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.



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## 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.
- Neglect 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.

Pos.	Item	Pos.	Item
1.8	Thrust piece	3.12	Catch pin
1.13	Stop Screw	3.14	Adjusting Nut for Reserve Stroke
1.15	Lock Nut(s)	3.18	Catch
2	Brake Spring	3.19	Bolts
2.6	Braking torque indicator	3.20	nuts
2.8	Adjusting Nut for braking torque	4	Thruster
2.18	Braking torque scale	5	Brake Shoe with Lining
3.1	Adjusting Spindle	6.1	Manual release lever (Option)
3.11	Lock Nut(s)		

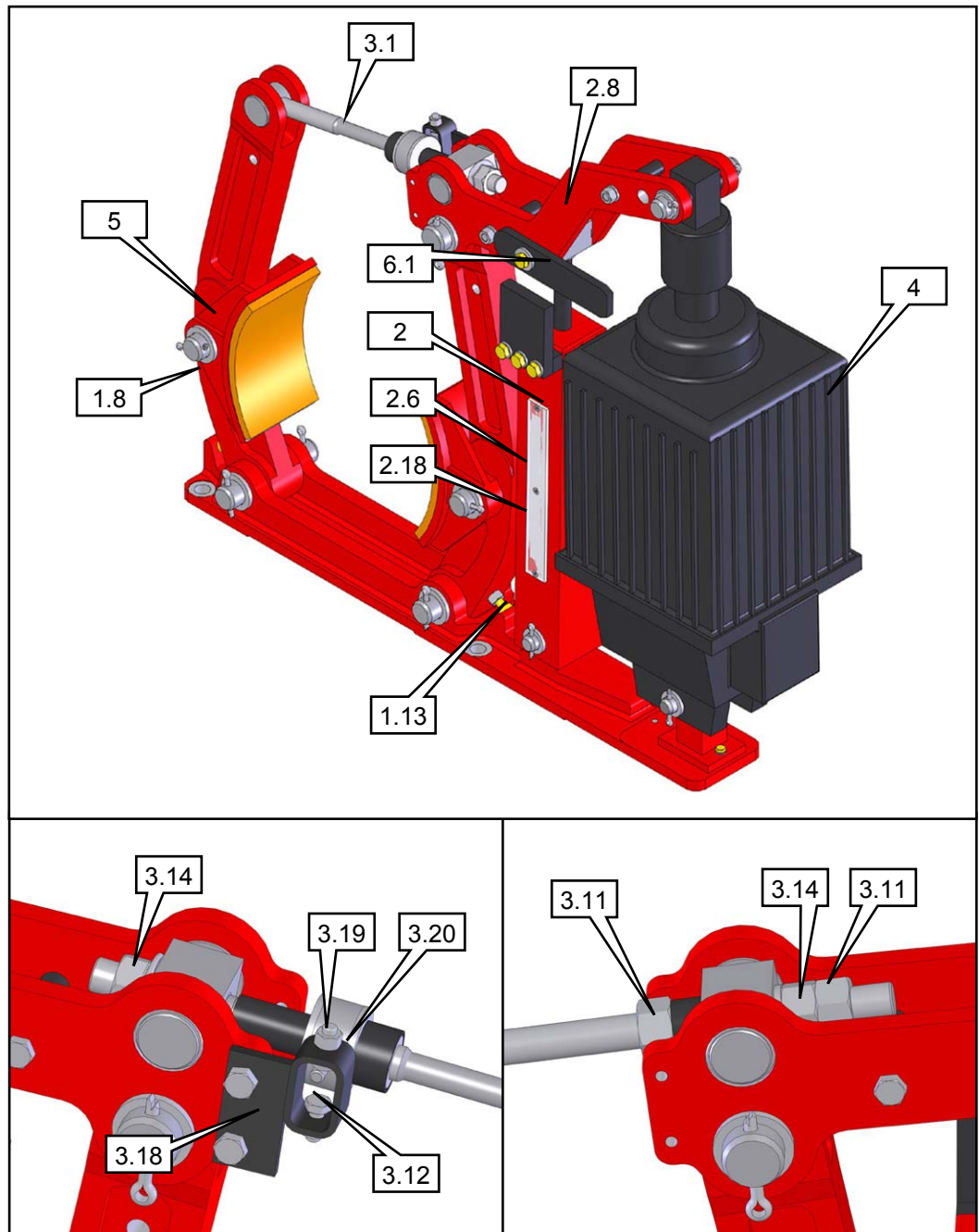


Fig.1:

## 2.3 Brake-description and designated use

The drum brakes of the PINTSCH BUBENZER EBN-series are meant exclusively for the conditions specified in the order. 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. The brake may be mounted upright or – equipped with suitable guide rollers – lying on its side. The brake is not suitable for use in areas with explosion hazards and is 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 brake is released (opened) electrohydraulically by a thruster and is actuated (closed) by spring force. In case of an emergency-stop or a power failure the brake sets automatically. 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 drum 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, also available with limit switch, are further options. The rake can be protected by a cover. For this execution the brake is equipped with special lower lever pins with mounting bolts



### Notice!

**Depending on the size of the brake differences in the construction can occur. In case this has influences on the handling it is pointed out. Else only one size is depicted.**


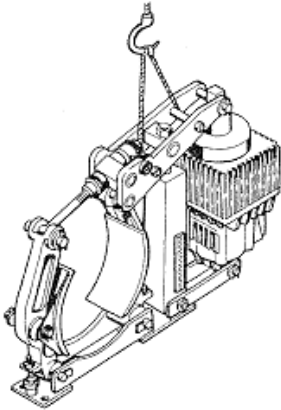
## 2.4 Technical data

Maximum running speed:	30 m/s
Maximum drum temperature:	200°C
Maximum braking time:	5 Seconds
Maximum braking torque:	refer to Data sheet in section7.

## 2.5 State of shipment and storage instructions

The brake is shipped ready to mount. The braking torque has been tested by the supplier and the AWC has been adjusted (if ordered). The setting of the braking torque and the equal brake pad lift off as well as the running in of the brake pads can only be done, when the brake is mounted. These tasks are described in chapter 3.

The brake is delivered without mounting devices.

 <p><b>Important!</b> Depending on the size (refer to type plate) the brake can have a weight of more than 80 Kg. Always use proper lifting devices and transport the brake according to this picture!</p>	
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- 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 drum surfaces
- Brake pads
- Spindle and AWC (option)
- 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 Setup of the brake

	<p style="text-align: center;"><b>Danger!</b></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 style="text-align: center;"><b>Warning!</b></p> <p>Fingers and other limbs can be squeezed or crushed by the brake linkage! <b>Danger of injury!</b></p> <p style="text-align: center;">Stay clear of the brake linkage during operation of the brake!</p>

#### 3.1 Mounting and aligning of the brake

	<p style="text-align: center;"><b>Notice!</b></p> <p>For the safe use, the drum brake type PINTSCH BUBENZER EBN has to be centered to the brake drum! Heed the following instructions!</p>
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- Mount the brake on the brake drum.
- Screw bolts (Class 8.8) into the base but don't tighten them yet.
- Use shims to adjust differences in height if necessary.  
→ Bolts and shims are not included in our scope of supply.
- If the brake is mounted lying on its side, the guide rollers must have contact with the base surface and have to be freely movable.

The brake levers and the brake shoes are movable. The brake pads would have full contact on the brake drum, even when the brake is not aligned correctly. But in this case the brake pads wouldn't be loaded equally. Thus one pad would heat up more and wear faster. The coupling (K) is centered to the brake drum. The two bolts (1.4) are centered to the brake. The brake can be aligned with these reference points, that are easily accessible.

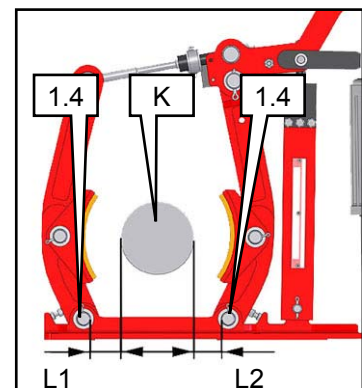


Fig. 2

- Close brake manually:
  - Turn braking torque adjusting nut (2.8) clockwise until the **upper edge** of the torque indicator (2.18) reaches 1/3 of the braking torque at the braking torque scale (2.6).
- Both brake pads have to have full contact on the brake drum
- Attach a perpendicular (L) to the coupling (K). When the base is even and clean a right angle may also be used.
  - Hold a ruler (M) horizontally to the inner side of the corresponding bolt (1.4).
  - Now read L1 where the perpendicular meets the ruler.
  - Repeat these steps at the other side for L2.
    - Attention: Check the chamfer of the bolt. Don't hold the ruler to the chamfer at one side and on the other side to the outer diameter of the bolt.



- L1 and L2 must not differ more than 2 mm!

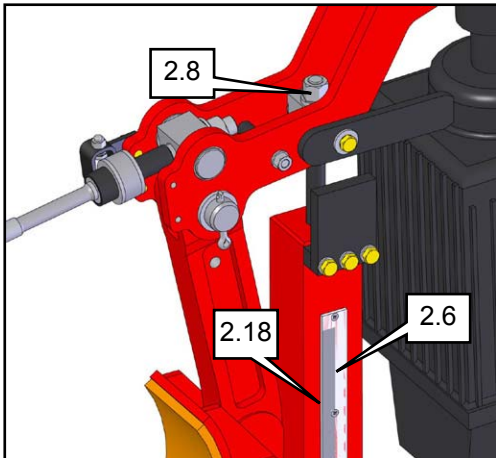


Fig. 3:

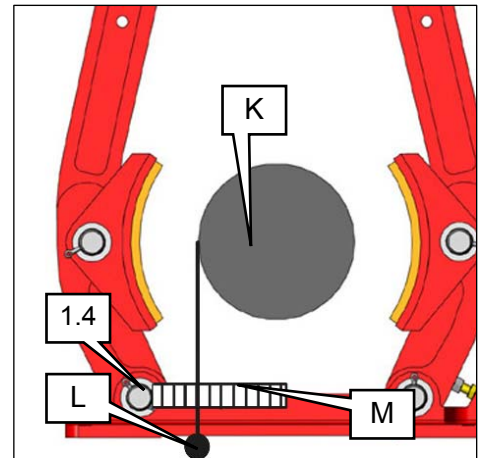


Fig. 4:

- If necessary move brake. **Attention: The brake has to be completely released!**
- Repeat measurements.
- Make sure, both braking shoes have full contact on the brake drum.
- Tighten the Mounting bolts with a torque-wrench to the necessary tightening torque (refer to. appendix).

### 3.2 Electrical connection of the brake

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



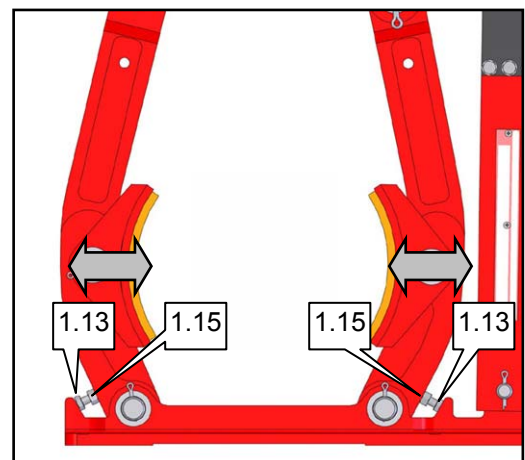
**Danger!**  
The applied electrical voltages are dangerous to life!  
The electrical connection and all other electrical tasks must only be done by a trained electrician!

### 3.3 Setting of equal air gap width

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!**

- Release (open) the brake by energizing the thruster.
- Loosen lock-nuts (1.15) on both levers.
- Turn stop-screw (1.13) until the space between linings and brake drum surface is equal on both sides.
- Tighten both lock-nuts (1.15).

Fig. 5



**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!

### 3.4 Set braking torque

- Turn nut (Fig. 8.1) clockwise, until the **upper** edge of the torque indicator (Fig. 8.2) coincides with the required braking torque on the scale (Fig. 8.3).
- Actuate brake several times to check the setting.
- Reset if necessary.

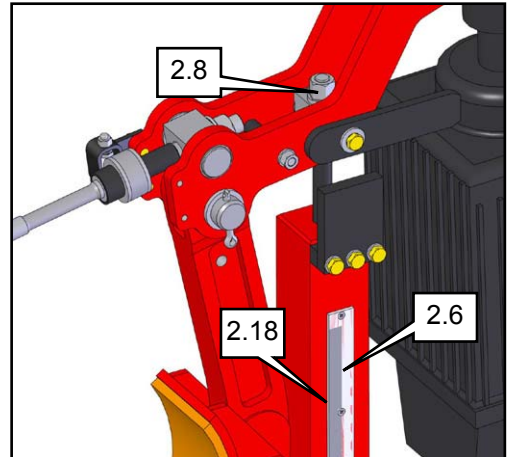



Fig. 6

### 3.5 Set reserve stroke

	<p style="text-align: center;"><b>Warning!</b> A reserve stroke of less than <math>S_{1min}</math> can lead to a brake failure! Always check and if necessary reset brake! <b>Mortal danger!</b></p>
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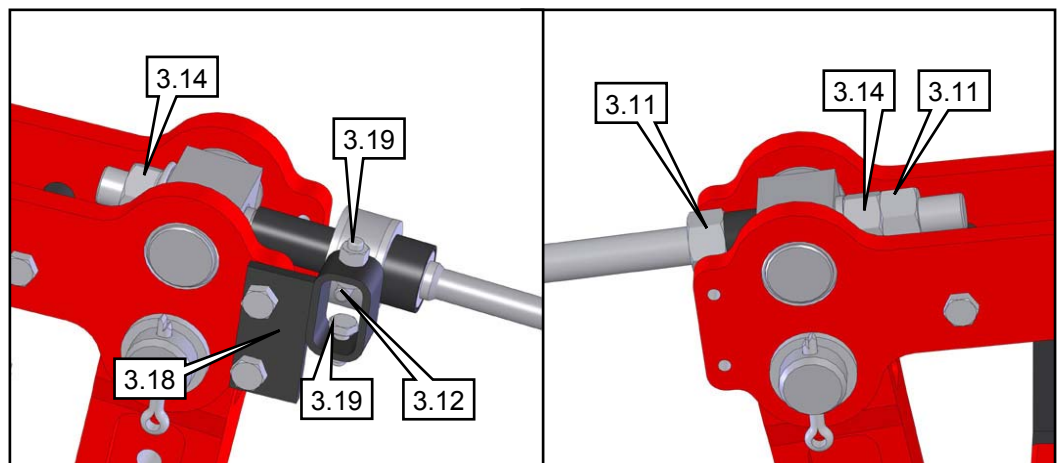



Fig. 7:

#### Reserve stroke-adjustment for brakes without AWC

- Measure  $S_1$  (Fig. 8) with brake closed.
- Loosen locking nuts (3.11).
- Turn Nut (3.14) **clockwise** until the piston rod of the thruster has reached the necessary value for  $S_1$  (table 1).
- Reset locking nuts (3.14).

Reserve stroke-adjustment for brakes with AWC

	<p><b>Notice!</b></p> <p>A counter clockwise turn of nut (3.14) may damage the AWC when the catch (3.18) is connected! To avoid this follow the instructions:</p>
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**Don't change the adjustment of the bolts (3.19)!**

- Unscrew bolts and remove catch (3.18).

Increase reserve stroke:

- Turn Nut (3.14) **clockwise** until the piston rod of the thruster has reached the necessary value for S1 (table 1).

Decrease reserve stroke:

- Turn Nut (3.14) **counterclockwise** until the piston rod of the thruster (Fig. 8) has reached the necessary value for S1 (table 1).
- After finishing all tasks make sure the catch (3.18) is reinstalled correctly:
- The catch pin (3.12) has to be between the two bolts (3.19).

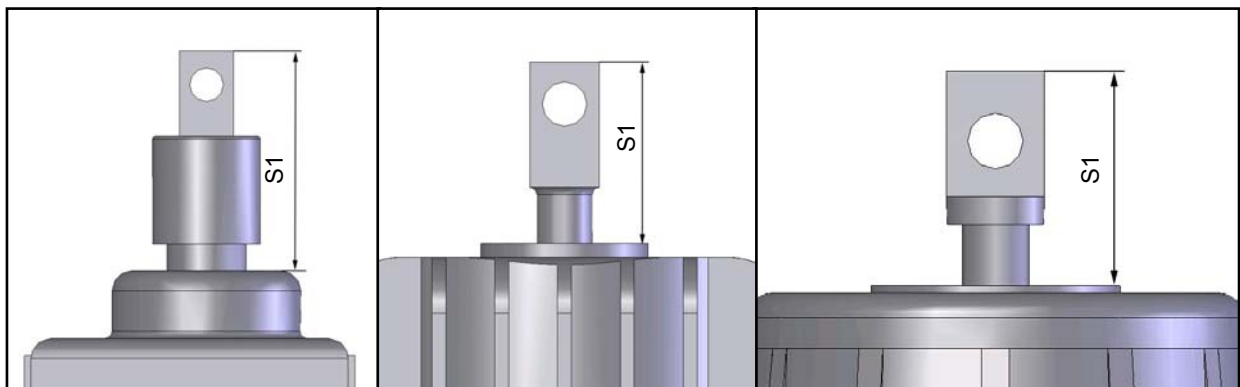


Fig. 8: piston rods of the different ELDRO-thrusters

and ELHY-Thrusters

Thruster Type	S <sub>0</sub> = Piston rod in lowest pos.	S <sub>1</sub> = Brake set	S <sub>2</sub> = Brake released	S <sub>1</sub> = S <sub>1 min</sub> => <b>Readjust Brake!</b>
ED 23/5	38 mm	48 mm	88 mm	43 mm
ED 30/5	49 mm	59 mm	99 mm	54 mm
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 301/6	145 mm	155 mm	205 mm	150 mm
EB 80/60	60 mm	70 mm	120 mm	65 mm
EB 125/60	133 mm	143 mm	193 mm	138 mm
EB 220-50	41 mm	51 mm	91 mm	46 mm
EB 300-50	47 mm	57 mm	97 mm	54 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 3000-60	61 mm	71 mm	121 mm	66 mm

Table 1: Tolerance S<sub>1</sub>: + 3 mm / -1 mm

### 3.6 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!

The brake can be equipped with limit switches for

- Release control
- Set control
- Manual release control

The switches are set ex work. The resetting, e.g. in case of a repair, is described in section 4.

#### Release control

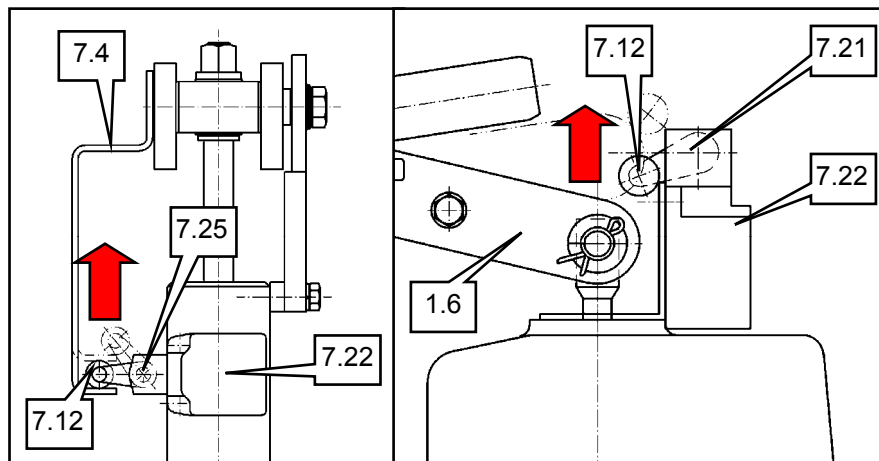


Fig. 9a: release control at spring tube    Fig. 9b: release control at thruster

When the brake is released, the switch is actuated:

- Mounted at spring tube (Fig. 9a): The actuating plate (7.4) moves the roll at the lever (7.12) upwards (arrow).
- Mounted at thruster (Fig. 9b): The lever (1.6) moves the roll (7.12) upwards (arrow).
- The limit switch (7.22) is actuated as soon as the brake is **completely released**.
- As soon as the brake is set, the switching roll moves back to its original position.

#### Wear control

Both executions are 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) moves closer towards. As soon as the wear reaches the critical value, the switch is actuated.

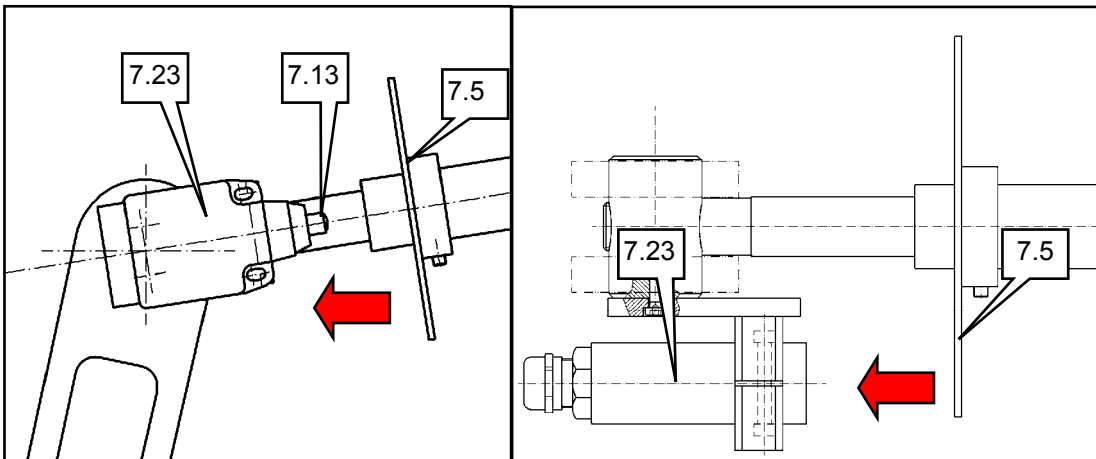


Fig. 10a: Control with mechanical switch

Fig. 10b: control with contact-less sensor

- Mechanical execution: The switch is actuated when the disc (7.5) presses down the tip (7.13).
- Touchless execution: The switch is actuated, when the disc (7.5) reaches the preset area in front of the sensor (7.23).

### Manual release control

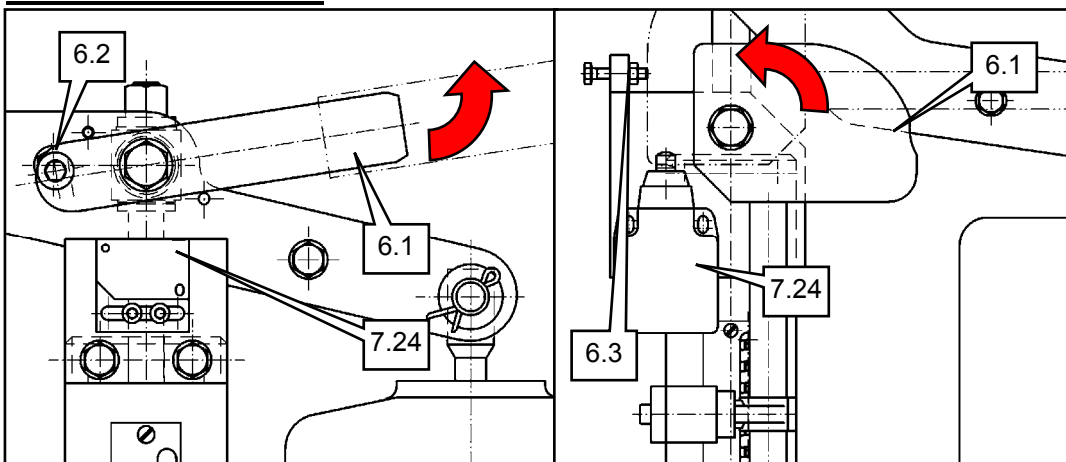


Fig. 11a: Touchless sensor

Fig. 11b: mechanical switch

Control with touchless sensor (Fig. 11 a):

- A bolt (6.2), mounted at the manual release lever (6.1) serves as an actuator for the limit switch (7.24). When the brake is released by the manual release lever (7.24) (Arrow), the sensor (7.24) is actuated.
- As soon as the lever (6.1) moves back to its original position, the switch (7.24) is set back to its previous state.

Control with mechanical switch (Fig. 11 b):

- The lever (6.1) is moved in arrow direction until it reaches the stop (6.3).
- The lever (6.1) actuates the limit switch (7.24).
- As soon as the lever (6.1) moves back to its original position, the switch (7.24) is reset to its previous state.

### 3.7 Function control

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

- Is dimension "S<sub>1</sub>" reached, when the brake is set? (Table 2)
  - If not: Repeat section 3.5.
- Is there an equal air gap between brake shoes and brake drum, when the brake is released?
  - If not: Repeat section 3.3.
- Is the required braking torque set?
  - If not: Repeat section 3.4

Brakes with AWC only:

- Is the catch (3.18) properly installed and fitted into its place?
  - If not: refer to section 3.5
- Is the catch-pin (3.12) placed between both screws (3.19)?
  - If not: refer to section 3.5
- Is the catch-pin (3.12) touched by screws (3.19) during operation of the brake?
  - If yes: Setting of the AWC is not yet complete. Set and release brake until AWC is set.

### 3.8 Running in of the brake

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.

Maximum running speed:	30 m/s
Maximum drum temperature:	200°C
Maximum braking time:	5 Seconds
Maximum braking torque:	s. Data sheet

- The braking torque achieved can be related to the current take-up of the electric motor.
- Running-in is completed as soon as the stopping distance at rated load and maximum speed is not reducing any further after repeated braking operations.
- During running in the reserve stroke has to be checked and – if necessary – reset after 25 – 30 braking cycles (section 3.5).

The running in can be done in two ways

#### Running in under load

- Load drive with approx. half rated load.
- Run drive with half lowering speed.
- Carry out approx. 10 to 15 emergency-stops.
- Repeat procedure several times at gradually increasing speed up to maximum speed.
- Check reserve stroke at the thruster.
- Readjust if necessary.
- Load drive with rated load.
- Run drive with half lowering speed.
- Carry out approx. 10 to 15 emergency-stops.

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**Running-in with brake applied**




- Adjust braking torque to approx. 50 % of the required braking torque
- Run drive motor with half speed against the closed brake for approx. 5 cycles.
- Release brake after each cycle.
- Increase braking torque to 75 % of the required braking torque.
- Run drive motor with full speed against the closed brake for approx. 5 cycles.
- Release brake after each cycle.
- Adjust braking torque to 100 %.
- Run drive motor with full speed against the closed brake for approx. 5 cycles.
- Release brake after each cycle.
- Attention: Don't brake longer than 5 seconds! (s. above)

Check: Is the required braking distance achieved?

If YES: Setup finished!

If NO: Reset braking torque (Section 3.4)

## 4 Maintenance

	<p style="text-align: center;"><b>Danger!</b></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 style="text-align: center;"><b>Warning!</b></p> <p>Fingers and other limbs can be squeezed or crushed by the brake linkage! <b>Danger of injury!</b></p> <p style="text-align: center;">Stay clear of the brake linkage during operation of the brake!</p>
	<p style="text-align: center;"><b>Notice!</b></p> <p>Ensure that the brake is set to its proper values according to the manual after finishing any work!</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 drum
- 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 drum
  - ⇒ 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.

**DO NOT DISENGAGE the automatic wear compensator, as otherwise lining wear must be compensated manually!**

	<p style="text-align: center;"><b>Attention!</b></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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## 4.2 Lubrication


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

## 4.3 Use of manual release lever (Option)

The manual release lever (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.

	<p><b>Warning!</b> When using the manual release lever, there is no safety device active any more! <b>Mortal danger!</b> Always make sure nothing can move out of control.</p>
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Always watch the load (2<sup>nd</sup> operator) so you don't miss the point, where the brake releases. With the execution (Fig.12 left) an additional tube has to be mounted to the lever (scope of supply). This extension has to be removed after finishing all tasks! Pull the lever upwards **SLOWLY** to open the brake. 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. 12 right).

	<p><b>Warning!</b> The lever is not suited to keep the brake open for maintenance tasks. <b>Mortal danger!</b></p>
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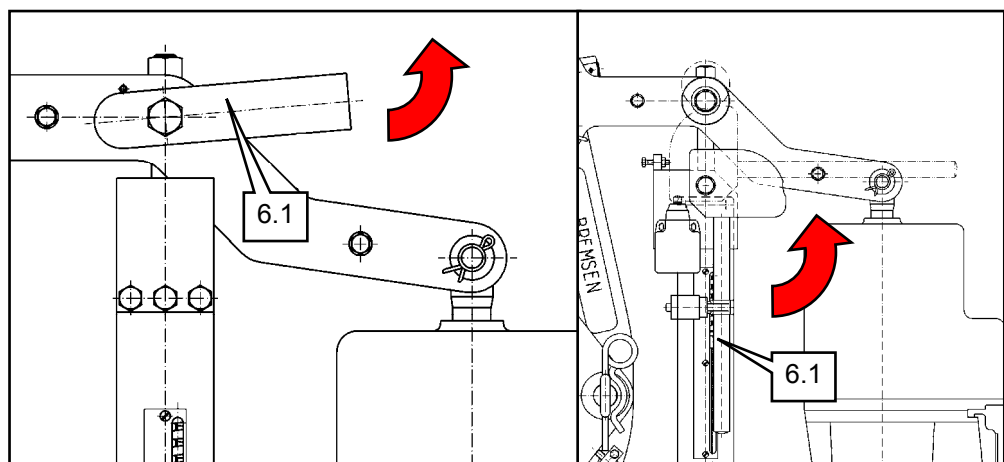


Fig. 12:

#### 4.4 Brake drum wear

Replace brake drum when:

- Cracks appear
- The wear exceeds 2mm of brake drum diameter

In case of brake drum wear:

- Check/Readjust the braking torque (section 3.4).
- Check/Readjust brake shoe lift-off (section 3.2).
- Check/Readjust the reserve stroke at the thruster (section 3.5).

#### 4.5 Maintenance of the AWC

The catch (3.18) and the freewheel (3.4) may be subject to wear. Recognized by a constant reduction of the reserve stroke in case of lining wear, although the AWC is actuated.

Procedure:

- Rotate nut (3.14) 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!

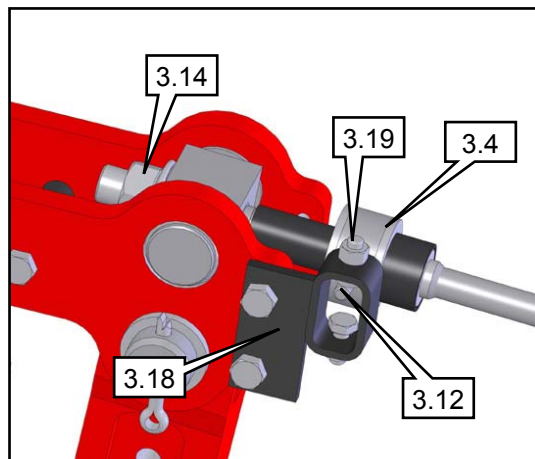


Fig. 13:

##### Exchange of catch:

- The catch is delivered completely set.
- Exchange according to section 3.5.

##### Exchange of freewheel – for this the complete AWC is exchanged:

- Secure the movable parts (levers, etc.) against tilting! Danger of squeezing.
- Open centering bolts.
- Release brake spring tension.
- Dismount catch.
- Remove cotter pins from Eldro (upper pin) (4.2) and lever (1.6).
- Loosen and remove bolts (1.14).
- Dismount lever (1.3).
- Screw AWC out of crosspiece (3.3).
- Screw new AWC into crosspiece.
  - Tip of AWC has to coincide with crosspiece (Fig. 14 right).
- Reassemble brake.
- Reset brake according to section 3

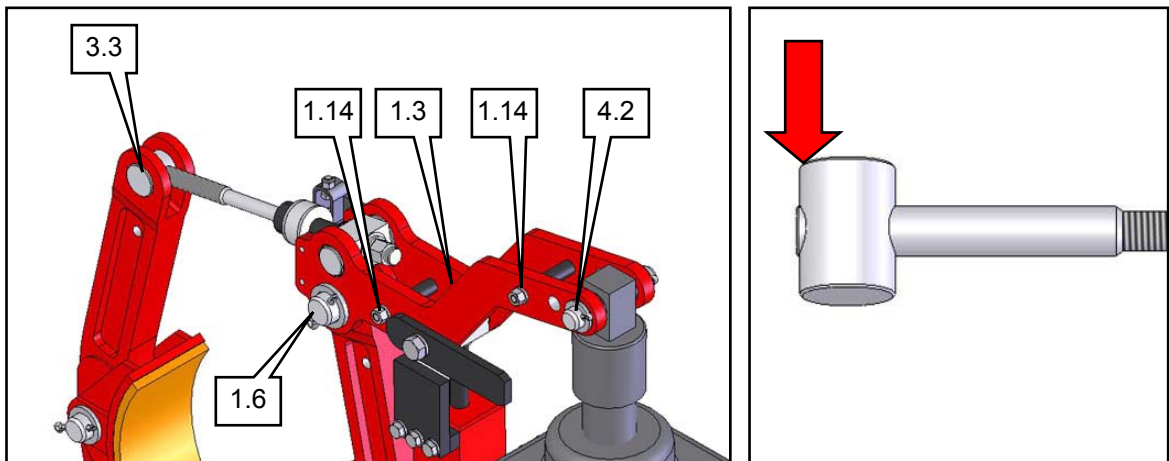




Fig. 14:

#### 4.6 Brake shoe replacement

	<p style="text-align: center;"><b>Notice!</b></p> <p style="text-align: center;">The use of spare parts, not meant for this brake, can lead to a malfunction of the brake or damage the brake!</p> <p style="text-align: center;"><b>Only use original PINTSCH BUBENZER spare parts!!</b></p>
	<p style="text-align: center;"><b>Warning!</b></p> <p style="text-align: center;">During the braking process the brake drum and the brake shoes heat up!</p> <p style="text-align: center;"><b>Danger of burning!</b></p> <p style="text-align: center;">Let brake drum and brake cool down before changing the brake pads!</p>

Minimum thickness of the linings:

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

##### Brake without AWC

- Loosen Locking nuts (3.11).

##### Brake with AWC

- Unscrew bolts and remove catch (3.18).
- After finishing all tasks make sure the catch (3.18) is reinstalled correctly:
- The guidance pin (3.12) has to be between the two bolts (3.19).

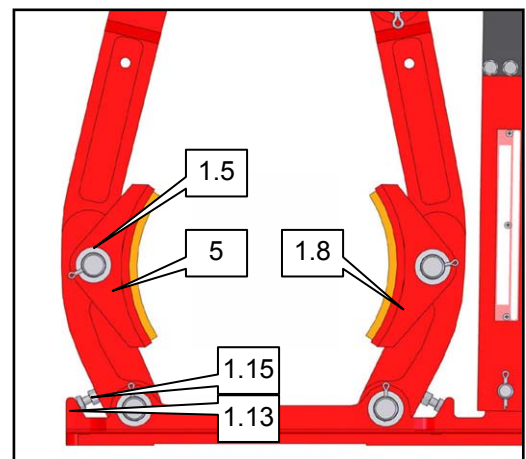


Fig. 15:

- Loosen locking nuts (1.15).
- Loosen adjusting bolts (1.13) for some revolutions.
- Turn Nut (3.14) counter clockwise.  
⇒ Brake shoes (5) move away from brake drum.
- Remove cotter pins and washers from brake shoe bolt (1.5).
- Remove brake shoe bolt (1.5).
- Pull out brake shoes (5) towards spindle (Arrow).

When mounting new brake shoes note that the thrust pieces (1.8) stand out wide enough to hold the brake shoes in position. For brake sizes bigger than EBN 315 2 operators are needed:

Operator 1: Push inwards and hold both thrust pieces with screwdriver.

Operator 2: Put in and adjust new brake shoe.

## 4.7 Replacement of limit switches

### Release control

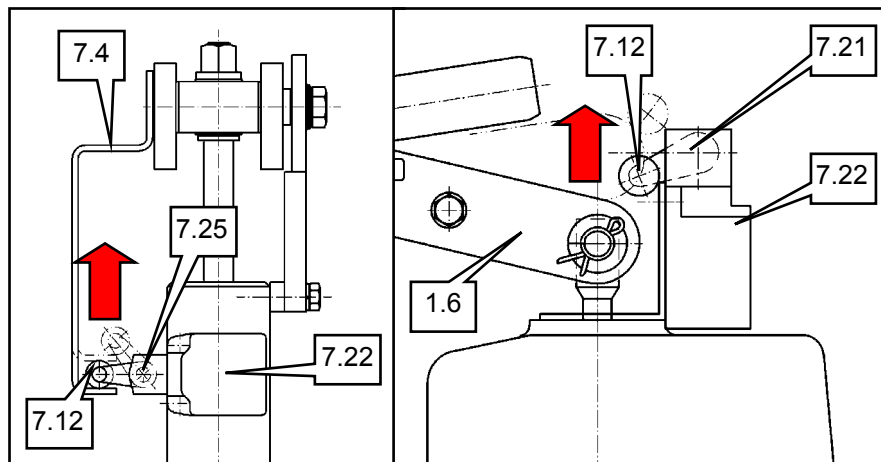


Fig. 16:

The limit switch (7.22) is mounted to the spring tube (left) / angled iron (right) with two bolts.

- Remove bolts.
- Dismount limit switch (7.22).
- Disconnect limit switch (7.22).
- Mount new limit switch (7.22).
- Secure limit switch (7.22) with two bolts.
- Connect limit switch according to data sheet (included in this documentation).
- Loosen bolt (7.25).
- Pull out lever (7.12) slightly.
- Adjust lever (7.12).
- Push lever (7.12) back on toothed wheel.
- Retighten bolt (7.25).
- Release and close the brake.
- Check function and adjust if necessary.

---

## Wear control / manual release control

The mechanical switches are mounted with two bolts, the contact-less with a clamp.

- Mark original positions
  - For wear control: measure distance to switching disc.
- Dismount limit switch (remove two bolts / open clamp).
- Disconnect limit switch.
- Mount new switch.
- Secure it with two bolts / clamp.
- Reset switch to original position.
- Release and close the brake.
- Check function and adjust if necessary.

## 4.8 Exchanging bolts and bushes

To exchange the bushes, the brake has to be disassembled. This means it has to be dismantled, depending on the installation. **Secure the installation against any accidental movement!**

- Open brake by releasing the brake tension.
- Open centering bolts.
- 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.
- 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 Exchanging the thruster

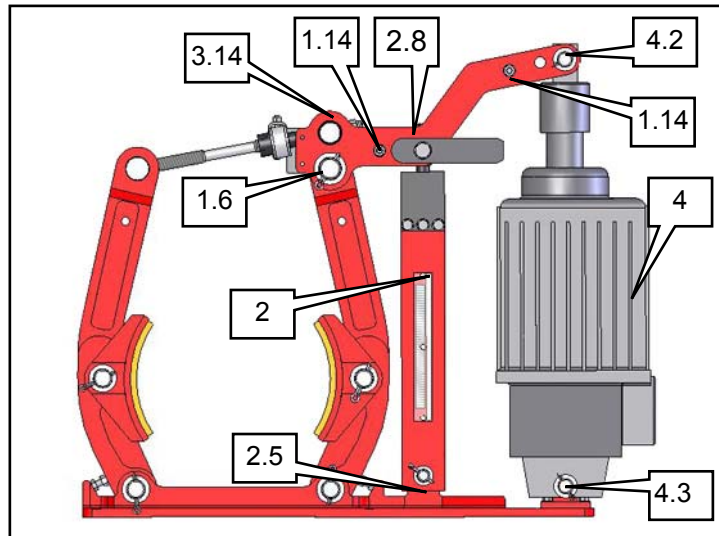


Fig. 18:

- Secure the movable parts (levers, etc.) against tilting! Danger of squeezing.
- Release brake spring tension (2.8).
- Open brake completely by adjusting nut (3.14).
- Dismount limit switch if mounted (Refer to section 4.7).
- Disconnect thruster (4).
- Remove cotter pins and washers from Eldro (upper pin 4.2) and (lower pin 4.3).
- Attach thruster (4) with e.g. a rope to a suitable lifting device.
- Loosen and remove bolts (upper pin 4.2) and (lower pin 4.3).
- Exchange thruster (4).
- Reassemble brake
- Reset brake to its original values.

## 4.10 Exchanging the spring unit

- Secure the movable parts (levers, etc.) against tilting! Danger of squeezing.
- Release brake spring tension (2.8).
- Open brake completely by adjusting nut (3.14).
- Dismount limit switch if mounted (Refer to section 4.7).
- Remove cotter pins and washers from Eldro (upper pin) (4.2) and lever (1.6).
- Remove bolts (1.14).
- Remove upper levers.
- Remove lower bolt (2.5) at spring tube (2).
- Exchange spring unit (2) with crosspiece.
- Reassemble brake
- Reset brake to its original values.

## 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 environmentally friendly and in compliance with the corresponding laws and regulations!  
Electronic scrap has to be disposed separately.

## 6 Troubleshooting



Symptom	Possible reason	Action	Section
<b>Brake doesn't close</b>	Brake is mechanically blocked	Check	-
	Brake is manually released	Manually close	-
	Spring tension to low	Adjust spring tension	3.4
	Spring damaged	Exchange spring unit	4.10
	Signal „open“ is active	Check connection	-
	Limit switch malfunctioning	Check connection	DB
		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	
<b>Brake doesn't open</b>	Brake is mechanically blocked	Check	-
	Adjusting bolt (3) has been tightened while brake was closed.	Adjust equal brake pad lift off	3.3
	Spring tension to high	Adjust spring tension	3.4
	Signal „close“ is active	Check connection	-
	Limit switch malfunctioning	Check connection	DB
		Check lever / actuating devices	4.7
		Exchange limit switch	4.7
	Reserve stroke to big	Adjust reserve stroke	3.5
	No power supply	Check electrical supply and connection	3.2
Thruster damaged	Exchange thruster	4.9	
<b>Braking distance to long</b>	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	3.7
	Reserve stroke to small	Set Reserve-stroke	3.5
	Brake pads soiled	Brake clean	-
	Brake soiled	Clean brake	-
	Brake pads worn	Exchange brake pads	4.6
	Brake disc worn	Exchange brake disc	-

Note:

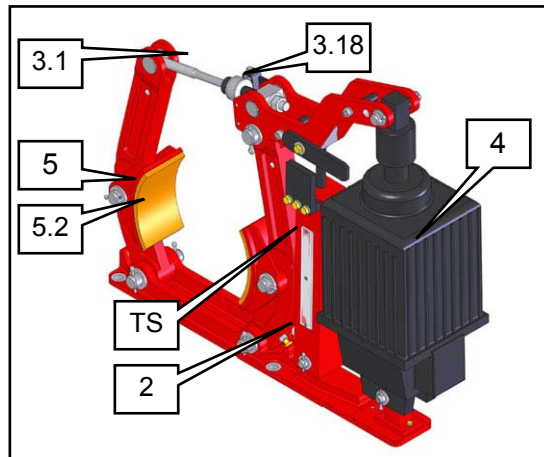
DB - Data sheet of the limit switch



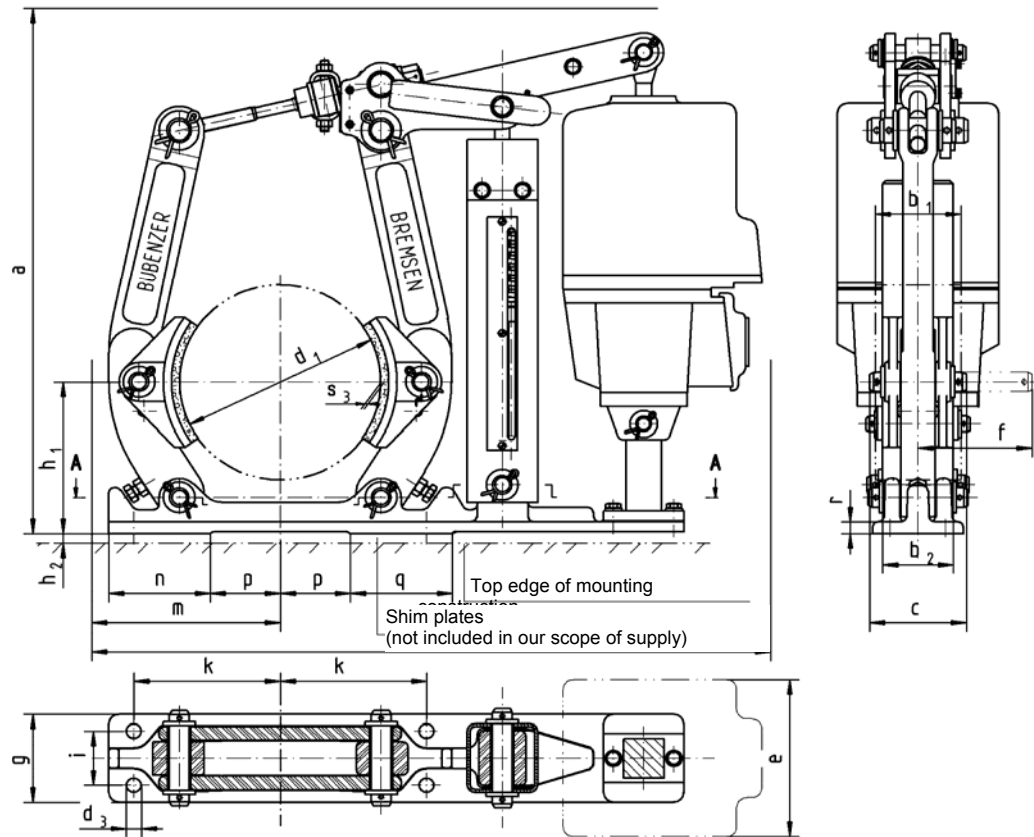
## 7 Spare parts

	<p style="text-align: center;"><b>Important!</b></p> <p style="text-align: center;">In case of ordering, please indicate the type and the serial no. of the brake which is located on the type plate of the brake!</p>
	<p style="text-align: center;"><b>Notice!</b></p> <p style="text-align: center;">The use of spare parts, not meant for this brake, can lead to a malfunction of the brake or damage the brake!</p> <p style="text-align: center;"><b>Only use original PINTSCH BUBENZER spare parts!!</b></p>

No.	Quantity per brake	Part designation	Remarks
2	1	Brake spring unit	Ready for installation
3.1	1	Spindle	Brakes w/o AWC only
3.18	1	Catch	Brakes w/ AWC only
4	1	Thruster	See data plate for specifications
5	2	Brake shoe	Complete w/ lining (riveted or glued)
5.1	2	Brake lining	Incl. rivets
W/o	1	AWC compl.	Incl. spindle, w/o parts 6
W/o	1	Bushing kit	Does one brake
W/o	2	Pin kit	Does one brake



## 8 Appendix



F = Required space to remove brake shoe pin  
All dimensions in mm. Alterations reserved without notice  
Average friction factor of standard material combination

Brake Type	Thruster Type	$M_{BRmax}$ [Nm] $\mu=0,4^*$	$a_{max}$	b1	b2	c	d1	d3	e	f	g	h1	h2	i	k	$l_{max}$	m	n	p	q	r	s3	kg
200-23/5	Ed 23/5	300	500	75	70	96	200	14	160	115	90	155	5	55	145	665	185	100	70	100	12	1	22
200-30/5	Ed 30/5	380	563						195							705							
200-50/6	Ed 50/6	600	563						195							705							
250-23/5	Ed 23/5	320	500	95	90	115	250	18	160	135	100	185	5	65	180	770	205	105	95	105	13	1,2	28
250-30/5	Ed 30/5	450	572						195							810							
250-50/6	Ed 50/6	750	582						195							810							
250-80/6	Ed 80/6	1200	582	118	110	140	315	18	160	165	110	225	5	80	220	920	300	110	133	240	13	1,2	47
315-30/5	Ed 30/5	540	665						195							1000							
315-50/6	Ed 50/6	1000	665						195							1000							
315-80/6	Ed 80/6	1650	665	150	140	167	400	22	240	195	140	270	10	100	270	990	310	135	165	280	15	1,5	82
315-121/6	Ed 121/6	2500	790						195							1075							
400-50/6	Ed 50/6	1100	680						240							1065							
400-80/6	Ed 80/6	1700	680	150	140	167	400	22	195	195	140	270	10	100	270	1075	310	135	165	280	15	1,5	82
400-121/6	Ed 121/6	2650	790						240							1065							
400-201/6	Ed 201/6	4000	790						240							1065							
200-220/50	EB220/50	300	500	75	70	96	200	14	160	115	90	155	5	55	145	665	185	100	70	100	12	1	22
200-300/50	EB300/50	380	563						195							705							
200-500/60	EB500/60	600	563						195							705							
250-200/50	EB220/50	320	500	95	90	115	250	18	160	135	100	185	5	65	180	770	205	105	95	105	13	1,2	28
250-300/60	EB300/50	450	572						195							810							
250-500/60	EB500/60	750	582						195							810							
250-800/60	EB800/60	1200	582	118	110	140	315	18	160	165	110	225	5	80	220	920	300	110	133	240	13	1,2	47
315-300/50	EB300/50	540	665						195							1000							
315-500/60	EB500/60	1000	665						195							1000							
315-800/60	EB800/60	1650	665	150	140	167	400	22	240	195	140	270	10	100	270	990	310	135	165	280	15	1,5	82
315-1250/60	EB1250/60	2500	790						195							1075							
400-500/60	EB500/60	1100	680						240							1065							
400-800/60	EB800/60	1700	680	150	140	167	400	22	195	195	140	270	10	100	270	1075	310	135	165	280	15	1,5	82
400-1250/60	EB1250/60	2650	790						240							1065							
400-2000/60	EB2000/60	4000	790						240							1065							



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

Coarse-pitch thread – with or 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]	
<b>M4</b>	3	2.3	4.6	3.4	5.1	3.8	4
<b>M5</b>	5.9	4.4	8.6	6.3	10	7.4	7,9
<b>M6</b>	10.1	7.5	14.9	11.0	17.4	12.8	14
<b>M8</b>	24.6	18.2	36.1	26.6	42.2	31.1	33
<b>M10</b>	48	35.4	71	52.4	83	61.3	66
<b>M12</b>	84	62.0	123	90.8	144	106.3	115
<b>M14</b>	133	98.2	195	143.9	229	169.0	180
<b>M16</b>	206	152.0	302	222.9	354	261.3	280
<b>M18</b>	295	217.7	421	310.7	492	363.1	390
<b>M20</b>	415	306.3	592	436.9	692	510.7	550
<b>M22</b>	567	418.4	807	595.6	945	697.4	750
<b>M24</b>	714	526.9	1015	749.1	1190	878.2	950
<b>M27</b>	1050	774.9	1496	1104.0	1750	1291.5	1400
<b>M30</b>	1428	1053.9	2033	1500.4	2380	1756.4	1900