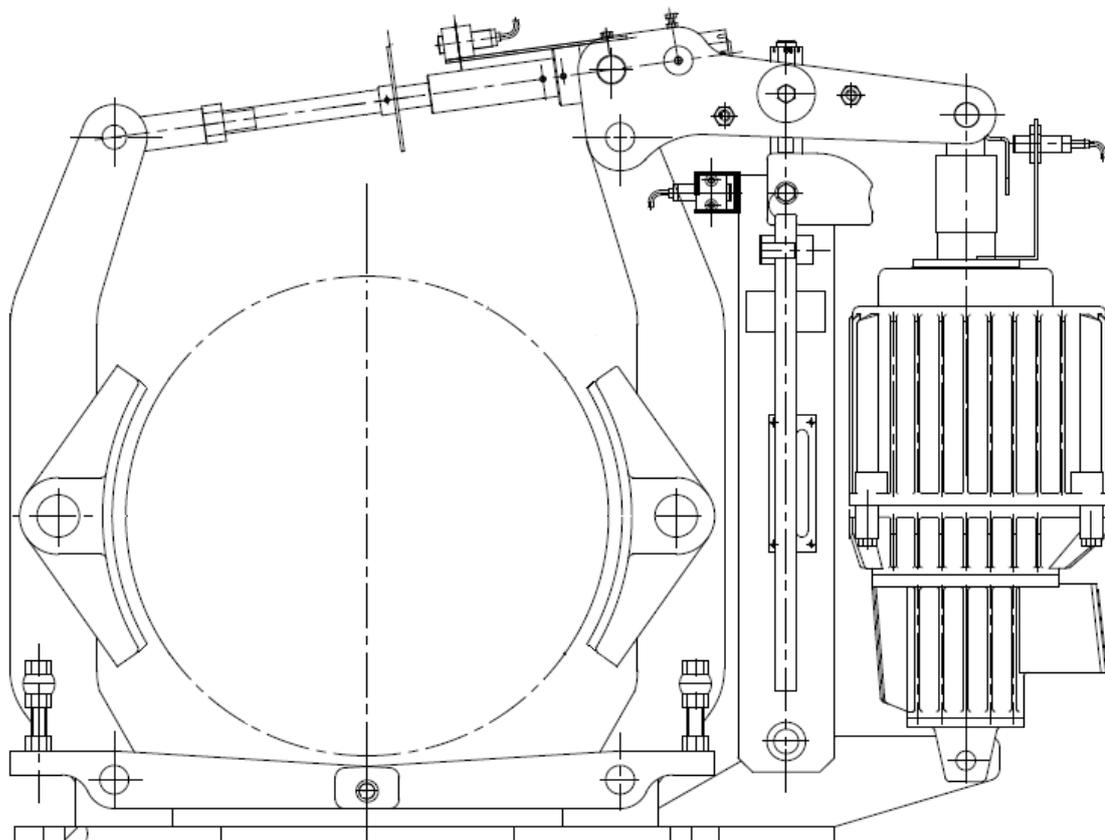


Furka® *FTB* Series Drum Brake



Date: 25.08.2025

AW

Checked:

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1. Safety regulations

The safety of your brake / brake-system depends on proper and regular inspection and maintenance. Study thoroughly the entire manual before installing and operating the brake. If in doubt, please don't hesitate to contact our service-department or your local retailer.

Safety and advice symbols:

	Warning of personal injury	This signal indicates a threat of danger. If this danger is not avoided, this will result in death or serious injuries.
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	Warning of product damages	This symbol indicates a warning which may contribute to prevent material or machine damage.
	General advice	This symbol indicates information that helps to avoid adverse results and conditions.

Important:

→ Installation, adjustment, operation and maintenance must be carried out by qualified, skilled personnel, and must comply with safety procedures.

	Important! The Furka® brake type FTB is an essential safety device. Any misuse or insufficient handling or maintenance endangers life!
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Also study the following manuals and regulations:

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

→ The safety of this brake and brake system depends on correct and periodic inspection and maintenance.

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

1.1 Safety precautions

	Secure the drive and the installation against any accidental movement before starting any work! Reading the operating instructions is indispensable.
---	---

- The following applies to all work and operations with the brake: Safety first
- 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 (thruster) is disconnected from the electrical power supply.

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- Any electrical work is only to be done by a trained electrician.
- Only use original Furka® spare parts
- The brake must not be disassembled further than described in the manual.

1.2 Warranty

The warranty and its duration depends 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 of the brake without approval of Furka®.
- The information in this manual has been checked thoroughly. Nevertheless we can't accept liability for errors.
- Use of non-original spare parts

2. Brake

2.1 Description and designated use of brake

The FTB type drum brake is spring applied and electro-hydraulically released. When the brake is actuated (closed), the brake linings are pressed against the rotating/stationary drum creating the necessary friction. The friction between the brake linings and the drum causes the drum to stop rotating. Brake torque is generated by the brake spring that is located in the spring tube. The brake force is transferred to the brake shoes via the brake leverage (brake arms). In case of an emergency stop or a power failure the brake closes automatically. The design is fail-safe. The brake torque is infinitely variable. To open the brake the thruster must be energized. It is then compressing the brake spring, generating an air gap that allows the brake drum to spin freely. FTB drum brakes are used as service brakes on heavy duty equipment like cranes, conveyors, steel mill equipment etc. . This version of FTB brake is not certified acc. to ATEX and cannot be used in explosion hazard zones.

The brake torque is adjustable (pl. see data sheet in the annex). Brake torque depends on:

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- Contact force of the linings
- Coefficient of friction
- Brake drum diameter

It can be also released by a manual release lever. Lining wear is compensated by an automatic wear compensator. Proximity sensors to indicate “brake released”, “brake released by hand release lever” and “lining wear” are included as standard. A synchronization linkage to centre the brake on the drum is standard on all brakes of this class.

2.2 Transportation and storage instructions

The weight of the brake depending on the size is between 25...232kg. Please use suitable cranes or jacks to handle the brake (refer to Fig.1).

The brakes are delivered reliably protected against corrosion. They should be stored in a clean, enclosed and dry place. If not directly installed, the brake must be protected against damages and environmental influences.

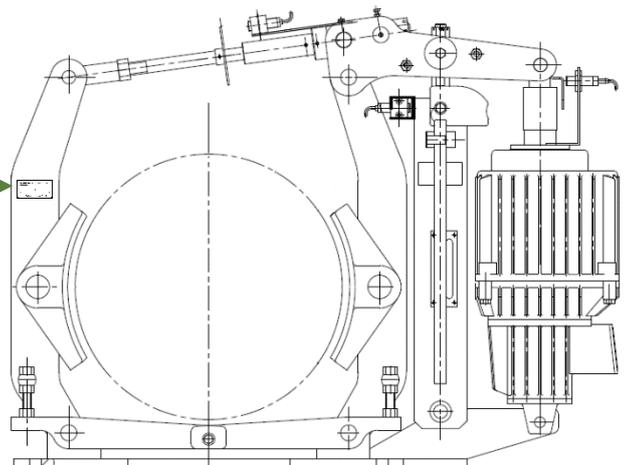
In case of additional painting, do not contaminate:

- Bolts and hinged joints
- Brake disc surfaces
- Brake pad
- Connecting shaft
- Self-compensating device
- Piston rod of thruster
- Contact surface of equalizing lever
- Electrical component
- Nameplate

2.3 Nameplate



Fig. 1: Drum brake nameplate



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3. Design, installation and brake adjustments

3.1 Structural drawing

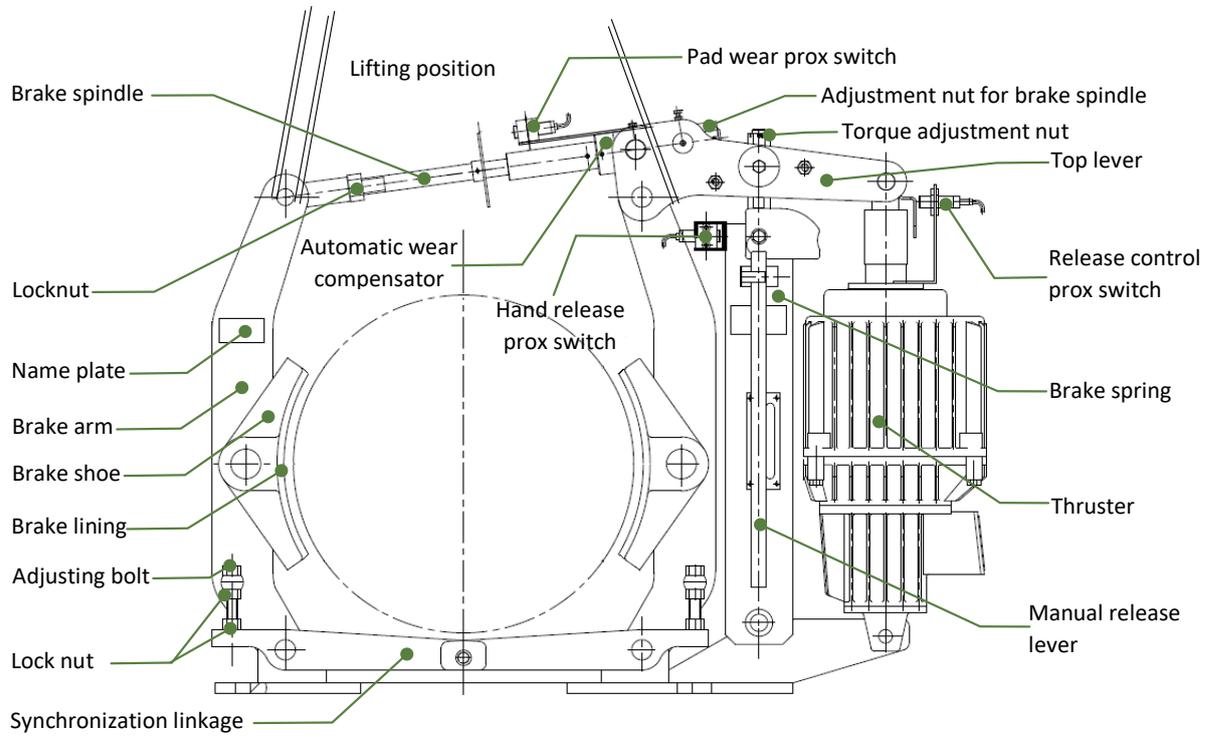


Fig. 2: Brake overview

3.2 Installation

3.2.1 Basic brake inspection

- Check whether all parts and components of the brake are complete;
- Check whether brake mechanism and hinged joints are operable.
- Check whether there is any oil (grease), paint or other contaminants sticking on the brake lining, which may affect the coefficient of friction.
- Check whether the content of nameplate complies with type selection.

The installation of the brakes should be started only when all the points listed above apply.

	<p>Never put your fingers between the brake drum and the brake shoe when closing the brake to avoid serious hand injuries. Make sure, that the brake is fully secured against closing before starting any maintenance work.</p>
	<p>Caution: Risk of injury due to pre-tensioned springs. When working on the released brake, make sure that the brake is secured against unintentional closing.</p>

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3.2.2 Brake drum inspection

The surface of the brake drum must have no defects such as corrosion, oil (grease) contamination, unevenness, damage due to welding etc.. It is strictly forbidden to use brake drums with cracks or other defects.

The radial runout for the brake discs with respect of the axis of rotation must not exceed:

0.1mm - for brake drums ≤ 500 mm

0.15mm - for brake drums > 500 mm

Average roughness depth in the contact area of the brake linings should be $3.2\mu\text{m}$.

3.2.3 Design and inspection of the brake support

The brake support must be checked for dimensional accuracy. Please check in particular if bore pattern of brake support and baseplate do match.

If the brake support is installed together with the brake, they must be secured (by bolts) after they have been aligned accurately. If the mounting bores of the brake support have not been machined, they shall be drilled after the brake has primarily been aligned, then fix the brake.

The relative tolerance between the brake support and the brake drum (refer to fig 2) should not exceed the specification in table 1.

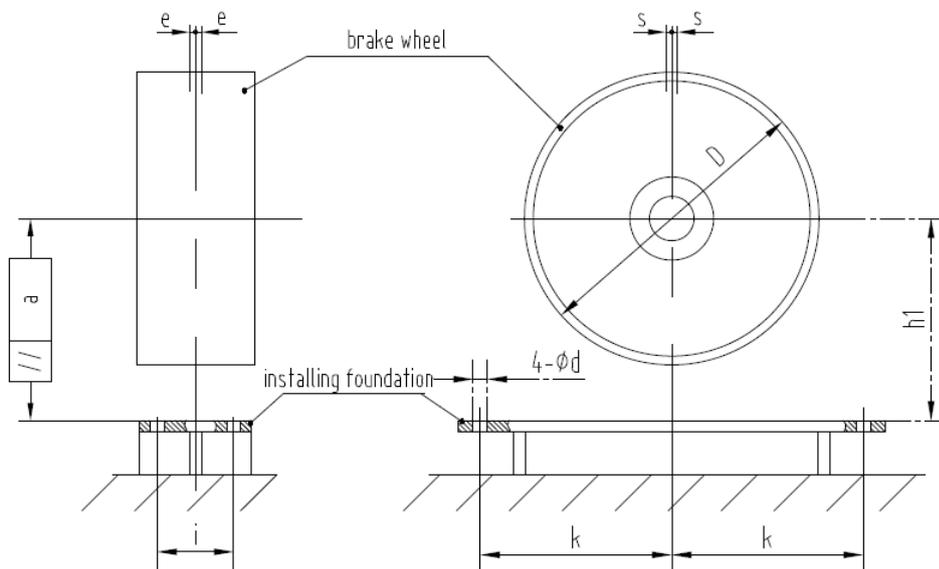


Fig. 3: Brake alignment

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Brake drum \varnothing	Center height h_1 [mm]		K [mm]		l [mm]		Center deviation [mm]		Parallelism [mm]
	nominal	tolerance	nominal	tolerance	nominal	tolerance	S≤	e≤	a
160	132	±0,6	130	±0,5	55	±0,5	±1,5	±1,5	0,5
200	160		145						
250	190		180		65				
315	225 (230)	±1,2	220	80					
400	280		270	100					
500	335 (340)	±1,5	325	±0,8	130	±2,5	±3	0,8	

Tab. 1: Brake installation

3.2.4 Brake installation

Please lift brake according to figure 1, don't use the brake spindle to lift the brake!

- Before installing the brake, the synchronization linkage needs to be adjusted on one side.
- Loosen the lock and adjustment nuts (refer to fig 3) that the lever arms can move freely.

Dismantle the catch of the automatic wear compensator! Then, open the brake by rotating the brake spindle counter-clockwise (CCW) until the air gap is 5mm larger than the brake drum diameter.

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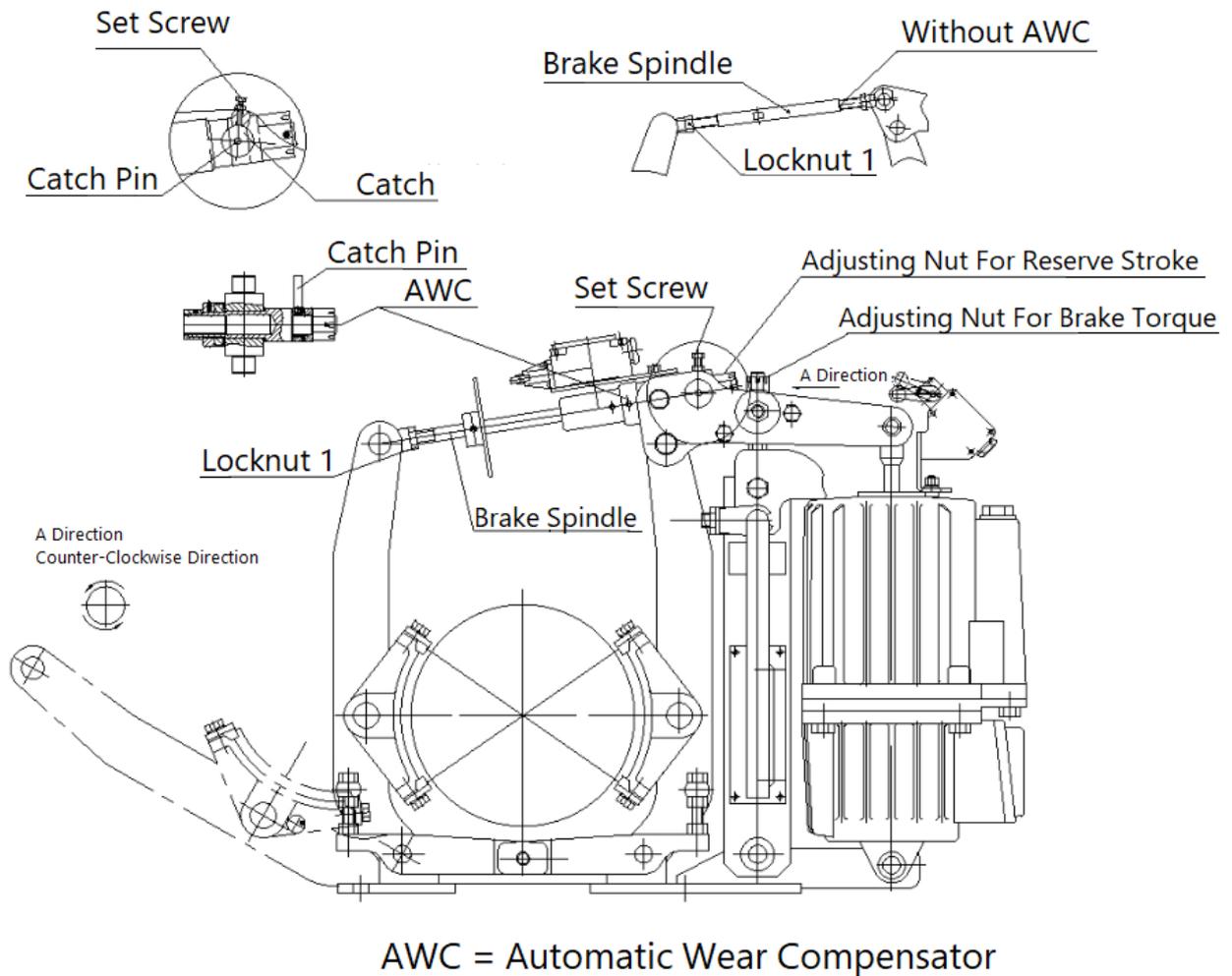


Fig. 4: Brake overview

If not yet done lower the brake torque as much as possible by turning the torque adjustment nut counter-clockwise (CCW). Then pull the pin between brake spindle and brake arm like shown in fig. 4. The brake arm can be moved sideways. You can now slide the base plate underneath the brake drum. Mount brake arm with pin again. Align the brake roughly that the connection bolts can be inserted in the bores (do not yet tighten).

Clockwise (CW) rotate the AWC adjustment to adjust the thruster reserve stroke (check data on table 2).

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<i>Brake size</i>	<i>Reserve stroke h_b</i> <i>[mm]</i> <i>Rated</i>	<i>Brake size</i>	<i>Reserve stroke h_b</i> <i>[mm]</i> <i>Rated</i>
<i>FTB160-220</i>	15±2	<i>FTB315-800</i>	18±2
<i>FTB200-220</i>		<i>FTB400-500</i>	20±2
<i>FTB200-300</i>		<i>FTB400-800</i>	
<i>FTB250-220</i>		<i>FTB400-1250</i>	25±2
<i>FTB250-300</i>	<i>FTB500-800</i>		
<i>FTB250-500</i>	25±2	<i>FTB500-1250</i>	20±2
<i>FTB315-300</i>	10±2	<i>FTB500-2000</i>	
<i>FTB315-500</i>	18±2		

Tab. 2: Reserve stroke setting



The catch has to be removed before rotating the AWC-adjusting nut. Make sure that the brake spindle is not unscrewed from the cross piece.

Place the released brake on the installation position. Check whether the installation position is correct on the basis of the sketch.

After the brake has been roughly aligned, the screw of the self-centering device must be loosen, so that the centering mechanism can move freely. Then the fastening screws can be inserted loosely into the base plate (bolt specification see table 4) Note: Do not yet fully tighten at this time (fastening material is not Furka® scope of supply).

For type I brake, Close the brake by clockwise (CW) rotating the AWC-adjusting nut (Pos. 8), until the lifting rod of the thruster is moving upward for approx. 5mm. The brake aligns itself to the disc.

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Install and tighten the catch. Note: The catch pin has to be within the catch. Now the bolts of the base plate shall be tightened.

3.2.5 Electrical connection



The applied electrical voltages are dangerous to life. Any electrical work has to be done by a qualified electrician. The earthing conductor must always be connected before all other cables.

Before connecting please check if main supply voltage and frequency correspond to the data on the name plate. Please check the manual of the thruster supplier. Connections have to be flexible and the brake must move freely. Check all cable connections for being proper tightened.

The brake shall be energized intermittently for 20~30 times to realize self-centering and aligning adjustment during brake operation. Check the brake for equal air gaps, reserve stroke settings, and for proper alignment of the linings.

Please study the installation manual of the thruster manufactures. They provide detailed information how to connect the brake electrically.

3.3 Adjustments

Adjustments include brake torque adjustment, air gap adjustment, thruster reserve stroke adjustment and the setting of the automatic wear compensator.



Each adjustment should be done during the initial installation and after the linings have been changed.

3.3.1 Brake torque setting

For brake torque adjustments the brake must be in the closed position. Clockwise (CW) rotate torque-adjusting nut (Pos. 1) with a spanner, brake torque will increase, on the contrary, the brake torque will decrease.(refer to fig 6). The upper edge of the spring force indicator shows the brake torque.

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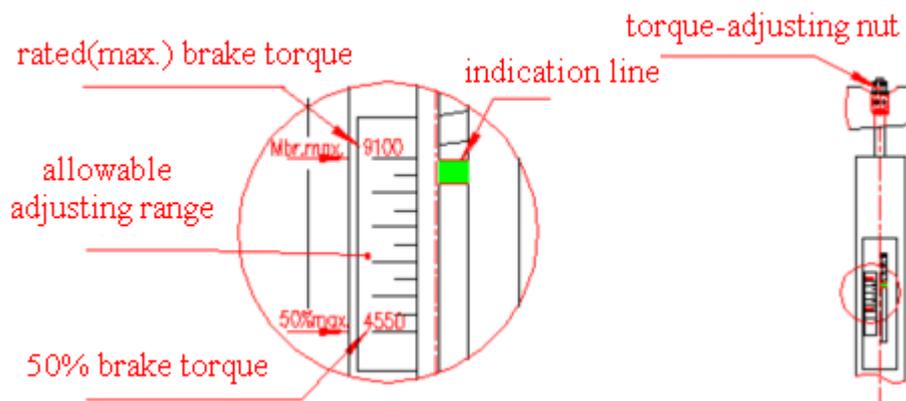


Fig. 5: Brake torque setting

3.3.2 Thruster reserve stroke adjustment



The catch must be always removed in case of setting the air gap of the brake. Please check table 2 for reserve stroke settings. Don't forget to install it again after settings have been made.

Adjusting methods as follows: Energize the thruster separately to open the brake, rotate the AWC-adjusting nut (Pos. 8) until the thruster piston is moving upwards or downwards. Close the brake; Measure the reserve stroke (h_b) of the thruster. (data for reserve stroke of thruster please refer to fig. 5 and table 4)

Increase reserve stroke:

For I type brake, clockwise (CW) rotate the AWC-adjusting nut (Pos. 8) until measurement h_b is set.

For II type brake, counter-clockwise (CCW) rotate the clearance-adjusting nut (Pos. 8) until measurement h_b is set.

Reduce reserve stroke:

For I type brake, counter-clockwise (CCW) rotate the AWC adjusting nut (Pos. 8) until measurement h_b is set.

For II type brake, clockwise (CW) rotate the clearance adjusting nut (Pos. 8) until measurement h_b is set.

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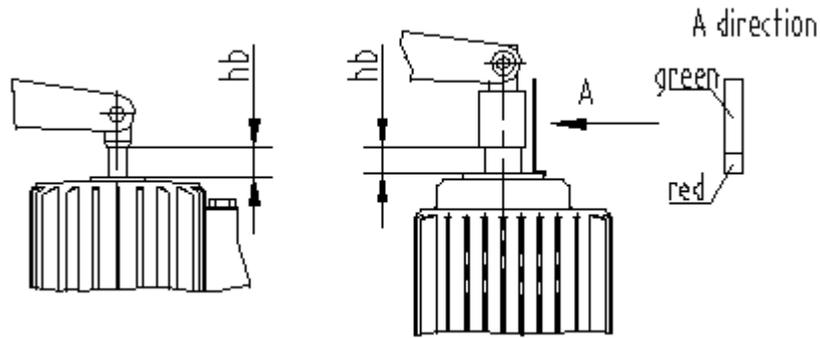


Fig. 6: Reserve stroke setting

After the reserve stroke is set, please re-install catch (Pos.3) correctly and make sure that the catch pin (Pos. 2) is running within the bore of the catch (Pos. 3). If the catch pin does not protrude far enough in the catch it must be turned out counter clockwise (CCW). When the brake is opened ,the distance between the catch pin (Pos. 2) and set screw (Pos. 1) is about 0.5-1 mm; when the brake is closed, the distance between the catch pin (Pos. 2) and inner bore diameter of the catch (Pos. 3) is about 0.5-1 mm (refer to fig. 6).

3.3.3 Adjustment of synchronization linkage

The synchronization linkage centres the brake to the brake drum. If it is adjusted correctly both brake shoes are showing an equal air gap.

Refer to fig 7: Open the brake by thruster and check the air gap between the brake lining and brake drum. If the air gap is not equal, loose locknut (Pos. 1) and turn the lock nut (Pos. 2) at the side with the smaller gap.

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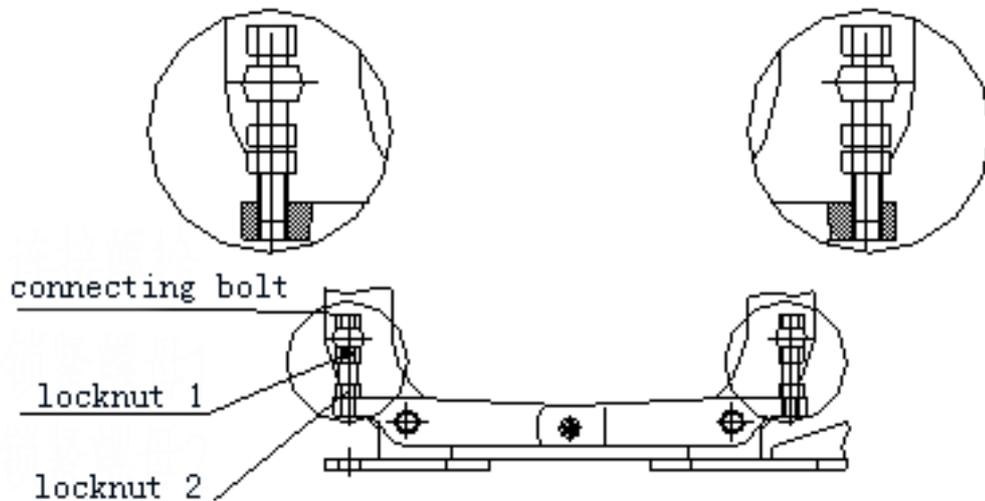


Fig. 7: Synchronization linkage



The air gap varies depending on how the brake is released, whether with thruster or with hand release lever. For basic adjustments the brake should be always released by thruster.

3.3.4 Limit switch adjustments

The brake is normally equipped with following limit switches:

1. Hand release limit-switch: Indicates when the brake has been released by manual release lever.
2. Release limit switch: Indicates when the brake has been released electrically (by thruster).
3. Close limit switch: indicates when the brake is closed.
4. Pad wear limit switch: Indicates when the linings are worn out.



If the wear sensor feedbacks the signal “brake pads worn”, brake pads must be replaced immediately.

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3.3.4.1 Connect limit switches

Wiring of close and release limit switch is shown as fig. 8 with molded 2m cable, capacity of contactors: 20~250V AC/400mA and 10~300V DC/300mA. (Note: BN is brown, BU is blue)

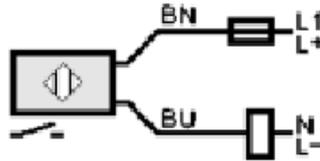


Fig. 8: Proximity sensor release (close) control

Wiring of hand release and pad wear limit switch is shown as fig.9, with molded 2m cable, capacity of contactors: 20~250V AC/400mA and 10~300V DC/300mA. (Note: BN is brown, BU is blue)

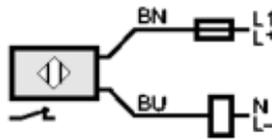


Fig. 9: Proximity sensor wear control (manual release)

3.3.4.2 Adjustments of release limit switch

(refer to fig.8)

Loosen the two locknuts of the release limit switch (Pos.1). Move the switch in direction of the sensing range when the brake is opened. Finally tighten the locknut.

3.3.4.3 Adjustments of pad wear limit switch

When the brake is in close condition, please adjust distance A from sensor head to actuator plate. It should meet the values in table 5; therefore loosen the screw on the actuator plate, and move in the required position.

Data in table 3 are based on a brake in “closed position”, new installation w/o any lining wear.

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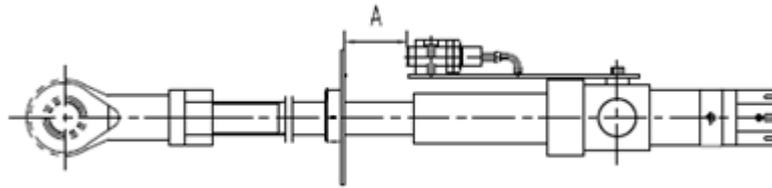


Fig. 10: Prox sensor wear control settings

Brake type	Measurement A [mm]	Measurement C [mm]
FTB160-220	27	22
FTB200-220	27	22
FTB200-300	27	22
FTB250-220	23	18
FTB250-300	23	18
FTB250-500	27	22
FTB315-300	30	25
FTB315-500	30	25
FTB315-800	30	25
FTB400-500	37	32
FTB400-800	37	32
FTB400-1250	40	35
FTB500-800	35	30
FTB500-1250	35	30
FTB500-2000	35	30

Tab. 3: Wear proximity switch settings

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Proper functioning of the limit switches increases the safety of the brake and the drive. The limit switches should not be put out of operation.

3.4 Functional test

Open and close the brake several times and check following items:

Whether the required brake torque has been set?

If not, repeat 3.3.1.

Check the reserve stroke of the thruster when the brake is closed.

If not correct, repeat 3.3.2.

Whether the position of the catch pin for AWC is correct?

If not, adjust according to 3.3.3.

Equal air gap when the brake is opened

If not, repeat 3.3.4.

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4. Operation

4.1 Manual release device

	<p>There is no other safety device when the brake is manually released. The drive needs to be secured against any accidental movement.</p>
	<p>Before actuating the manual release lever make sure that the load is secured. In case of lowering suspended loads the brake must be <u>slowly</u> opened to avoid slipping of the load. Direct communication between operator and spotter required.</p>

The brake is equipped with a manual release device as standard to enable to be opened manually. The hand release device is primarily required in emergency situations, e.g. when the load must be lowered when the crane is in a de-energized state. When the hand release is no longer required, it is essential to ensure that the brake is closed. A brake opened by manual brake release during normal operation can prevent the brake from closing, which can lead to fatal accidents.

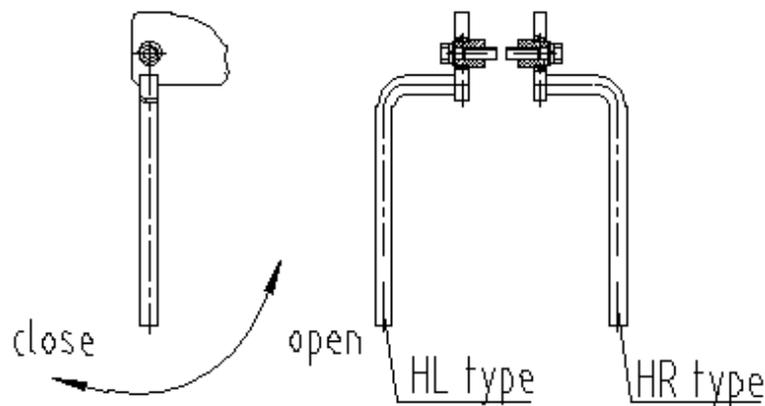


Fig. 11: Synchronization linkage

Rotate the manual release lever in the “open” direction to open the brake and in the “Close” direction to close the brake (fig. 10).

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4.2 Running-in procedure (Bedding in and pad conditioning)



The running-in procedure must be performed after the initial installation of the brake as well as after a brake pad or a brake drum change.

The running-in procedure of the linings is of decisive importance in order to achieve a sufficient contact surface between linings and brake drum.

4.2.1 Basic check

The following points should be checked for correct installation:

- Check if thruster type, voltage and frequency (check the nameplate) and the wiring of thruster comply to the specification
- Check brake adjustments
- Check if there is any oil (grease) contaminating the surface of the brake drum or the brake linings. Brake drum and brake pad should be clean and dry.

Before starting the running-in procedure:

- Limit switches for release and close control must be bridged.
- Dismount catch

Close the brake by CW turning the AWC adjustment nut until the brake pads touch the brake drum. While the motor is running open and close the brake several times until the entire surface of the linings is completely run-in.

Remove the brake shoes and check the contact pattern.

A typical test to measure brake torque is to drag the brake drum through the closed brake measuring the current consumption of the electric motor.

Don't forget to mount the catch again and to set the thruster reserve stroke properly.

Ideally, there is an overlap of 80% or more between the brake pad and the brake drum otherwise the brake torques, shown in the catalogue, cannot be achieved.

Please check during the running-in procedure:

- Contact pattern between linings and brake drum
- Brake drum temperature (should not exceed 200 °C)
- Whether the screw joint is loosened

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5. Maintenance



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

Please only use genuine Furka® spare parts.

5.1 Regular maintenance

5.1.1 Check intervals

- Perform daily maintenance and self-inspection at least once a month.
- Perform a complete inspection once a year.

5.1.2 Performance of the brake and condition of brake drum

- Brake shoe
Check/re-adjust brake shoe (refer to fig 3.3.4)

- Wear situation and thickness of brake linings

If the thickness of the friction material is less than the value in Table 6, the brake pad should be replaced by a new one.

- Status of brake drum

Replace the brake drum when the following condition occurs:

- When the brake drum has a crack or wear of 1 mm on both sides
- The brake drum has grooves whose depth exceeds 1.5 mm

- Reserve stroke of thruster
Check/re-adjust the reserve stroke of thruster(refer to 3.3.2)

- Whether the connecting bolts are not seized.
If there is jamming phenomenon, then remove or replace the bushings;

- Spring force (brake torque)

Check/re-adjust the braking torque(refer to 3.3.1);

- Limit switches
Check if the limit switches are working properly.

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- Please do not remove the automatic wear compensator, otherwise lining wear must be compensated manually.
- Cotter pins must be opened, ensure that they will not be loosen.

5.1.3 Additional maintenance

Inspect the brake outside normal maintenance intervals if:

- the stopping distance/time is too long
- limit switches indicate worn out linings or not enough reserve stroke
- emergency stops have been performed
- overspeed situations/excessive braking times have occurred
- thruster leakage has occurred
- the machine/system has been at a standstill for a long time
- The brake has been not in use for a long time

5.2 Lubrication

FTB brakes are using maintenance free bushings. There is no need for greasing! If the (connecting) bolts move unyieldingly, please remove the blockage or replace the bushings.

5.3 Brake shoe change



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

Brake shoes must be changed when the thickness of the lining material is less then shown in table 4.

Brake size	Brake pad thickness [mm]	C [mm]
FTB 160	2	0.6 – 1.0
FTB 200		0.8 – 1.2
FTB 250		1.0 – 1.3
FTB 315	3	1.0 – 1.5
FTB 400		1.2 – 2.0
FTB 500		

Tab. 4: Brake pad thickness

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Replacing worn brake shoes is not a one sided matter. They are always replaced in pairs. So if the brake shoe on the right side is completely worn out, but not yet completely on the left side, both still need to be replaced!

- Check if the friction surface of the new brake pad is clean, if not, please clean it (with sandpaper or alcohol);
- Remove the catch-pin from the AWC
- Loosen the locknuts of the synchronization linkage
- Turn the brake spindle counter-clockwise (CCW) in order to achieve an air gap.
- Remove the brake shoe bolts.
- Move the worn out brake shoes on top to get them out of the brake. Insert the new brake shoe.

Insert the catch-pin after the brake shoe has been installed. Check centring, reserve stroke setting and torque setting.

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6. Failure analyses and troubleshooting

<i>Fault</i>	<i>Possible cause</i>	<i>Remedy</i>
Brake does not open	Thruster motor not running	Check for wiring errors and cable connections
	Thruster motor not running (switched off by trigger, e.g. motor protection switch)	Check fuse elements and motor protection switch
	Thruster motor not running Rotor is blocked (bearing problems etc.)	Replace thruster
	Missing/not enough thruster oil	Top up oil
	Spring tension too high	Adjust spring tension
	Limit switch problem	Check connection, change limit switch
	Too big reserve stroke	Adjust reserve stroke
Braking distance too long	Spring tension too low	Adjust spring tension
	Brake pads have uneven wear pattern	Align brake
	Missing running-in procedure	Perform running-in procedure
	Too small reserve stroke	Adjust reserve stroke
	AWC does not work correctly	Adjust AWC and catch
	Brake drum worn	Change brake drum
	Linings worn	Change linings
Brake doesn't close	Manual release lever actuated	Manually close
	Spring tension too low	Increase contact force/brake torque
	Reserve stroke too small	Adjust reserve stroke

Tab. 5: Trouble shooting

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7. Spare parts

<i>Name</i>	<i>Part-number</i>
FTB 200 - brake shoe with lining	700094
FTB 250 - brake shoe with lining	700093
FTB 315 - brake shoe with lining	700092
FTB 400 - brake shoe with lining	700091
FTB 500 - brake shoe with lining	700090

Tab. 6: Spare parts

The part numbers given refer to one piece. Please note that the brake shoes should always be replaced in pairs. Two pieces are therefore always required.

8. Disposal

The disposal of the individual materials must be carried out in accordance with the legal and national regulations of your country or your company's internal specifications

The brake to be scrapped should be dismantled into its individual parts and disposed of separately according to the various materials in accordance with the applicable regulations.

Dismantling should be carried out by competent personnel. There are no special dangers as long as suitable tools and equipment are used.

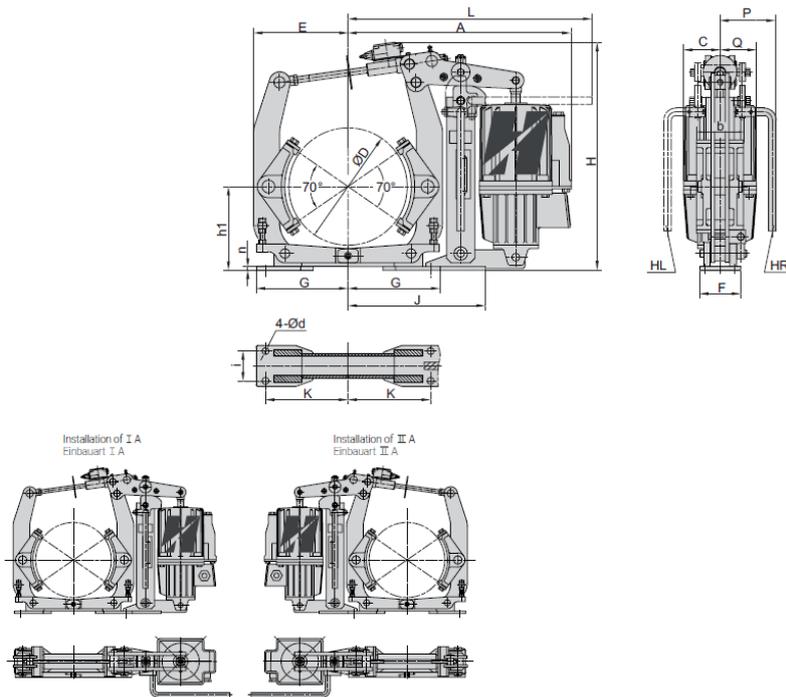
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9. Technical annex

Tightening torques acc. to VDI 2230-1:2015								
Bolts with metric standard thread:			DIN ISO 68, DIN ISO 724, DIN 13-19					
Spanner size of hex bolts			DIN EN ISO 4014 bis DIN EN ISO 4018					
Screws with external hexagonal round:			DIN 34800					
Socket-head cap screws:			DIN EN ISO 4762					
Bore "medium"			DIN EN 20273					
	$\mu=0.12$ $\mu=\mu_G=\mu_K$ Friction on the thread / head rest							
	Metric Class						Spanner size	
	8.8		10.9		12.9		acc. to ISO 4014 etc.	acc. to DIN
	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	mm	mm
M3	1.3	1.0	1.91	1.4	2.24	1.7	5.5	5.5
M3.5	2.01	1.48	2.96	2.18	3.46	2.55	6	6
M4	2.99	2.2	4.39	3.2	5.14	3.8	7	7
M5	5.9	4.35	8.66	6.39	10.1	7.45	8	8
M6	10.2	7.5	15	11.1	17.5	12.9	10	10
M8	24.7	18.2	36.3	26.8	42.4	31.3	13	13
M10	48.6	35.8	71	52.4	84	62.0	16	17
M12	84	62	123	91	144	106	19	19
M14	133	98.1	195	143.8	229	168.9	21	22
M16	205	151	301	222	353	260	24	24
M18	295	217.6	420	309.8	491	362.1	27	27
M20	415	306	591	436	692	510	30	30
M22	567	418.2	808	596.0	946	697.7	34	32
M24	715	527	1018	751	1191	878	36	36
M27	1054	777.4	1501	1107.1	1756	1295.2	41	41
M30	1432	1056	2040	1505	2387	1761	46	46
M33	1934	1426.4	2755	2032.0	3224	2377.9	50	50
M36	2489	1836	3544	2614	4148	3059	55	55
M39	3216	2372	4581	3379	5360	3953	60	60

Fig. 12: Tightening torques

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Dimensions and technical data | Abmessungen und technische Daten

Brake type Typ	Thruster type Lüftgerät	Brake torque static [Nm] stat. Brems- moment [Nm]	Dimensions (mm) Abmessungen (mm)																		Weight (kg) Gewicht (kg)	
			D	h1	k	l	d	n	b	F	G	J	E	H	C	P	A		Q			L
			A	B	A	B																
FTB160-220	eFD 220-50	80~160	160	132	130	55	14	6	65	90	150	210	145	430	80	135	440	405	80	120	440	25
FTB200-220	eFD 220-50	100~200	200	160	145	55	14	8	70	90	165	245	170	510	80	135	450	415	80	120	440	39
FTB200-300	eFD 300-50	140~280																				42
FTB250-220	eFD 220-50	125~250	250	190	180	65	18	10	90	100	200	275	205	525	80	135	545	510	80	120	535	47
FTB250-300	eFD 300-50	160~315																				49
FTB250-500	eFD 500-80	250~500												595	97	152	545	485	97	157	600	61
FTB315-300	eFD 300-50	200~400	315	230	220	80	18	10	110	110	245	358	260	620	80	135	570	535	80	120	560	80
FTB315-500	eFD 500-80	315~630																				97
FTB315-800	eFD 800-80	500~1000												88								
FTB400-500	eFD 500-80	400~800	400	280	270	100	22	12	140	140	300	420	305	745	97	152	655	595	97	157	710	108
FTB400-800	eFD 800-80	630~1250																				110
FTB400-1250	eFD 1250-80	1000~2000												815	120	175	705	675	120	150	890	133
FTB500-800	eFD 800-80	800~1600	500	340	325	130	22	16	180	180	365	484	370	865	97	152	780	720	97	157	785	202
FTB500-1250	eFD 1250-80	1250~2500																				120
FTB500-2000	eFD 2000-80	2000~4000												208								

Fig. 13: FTB data sheet

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