

Installation and Operating Instructions for Brake DA 561, 560, 556 FEM(A)

E09.817e



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RINGSPANN	Installation and operating instructions Brake DA 561, 560, 556 FEM(A) Spring activated – Electrically released			E 09.817e	
Date: 23.06.2026	Issue: 1	Drawn: MAPM	Checked: EISF	Pages: 30	Page: 2

IMPORTANT

Please read these instructions carefully before installing and operating the product. Your particular attention is drawn to the notes on safety.

These installation and operating instructions are valid on condition that the product meets the selection criteria for its proper use. Selection and design of the product is not the subject of these installation and operating instructions.

Disregarding or misinterpreting this installation and operating instructions invalidates any product liability or warranty by RINGSPANN; the same applies if the product is taken apart or changed.

These installation and operating instructions should be kept in a safe place and should accompany the product if it is passed on to others – either on its own or as part of a machine – to make it accessible to the user.

Safety Notice

- Installation and operation of this product should only be carried out by skilled personnel.
- Repairs may only be carried out by the manufacturer or accredited RINGSPANN agents.
- If a malfunction is indicated, the product or the machine into which it is installed, should be stopped immediately and either RINGSPANN or an accredited RINGSPANN agent should be informed.
- Switch off the power supply before commencing work on electrical components.
- Rotating machine elements must be protected by the purchaser to prevent accidental contact.
- Supplies abroad are subject to the safety laws prevailing in those countries.

This is a translation of the German original version!

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

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1. Description of the caliper

1.1 Operating principle

These installation and operating instructions apply to the following brake calipers:

- DA 561 FEM / FEA
- DA 560 FEM / FEA
- DA 556 FEM / FEA

with and without additional options.

The braking force is generated by spring washers. Electrical power is required to power the magnet that compresses these spring washers and keeps the brake caliper in the released condition. The arrangement and stacking of the spring washers are preset at the factory. This setting, in combination with the brake pad clearance adjustment, determines the resulting clamping force.

The “**FEA**” version described in this manual features **automatic** wear adjustment. On these versions with automatic adjustment, the lining wear is automatically compensated to maintain the nominal lining clearance and prevent any loss of braking force.

The “**FEM**” version described in this manual features **manual** wear adjustment. On these versions with manual adjustment, the lining wear must be compensated by a manual adjustment of the gap between pads and the brake disc to prevent a loss of braking force.

The brake calipers are equipped with a manual release mechanism that mechanically maintains the brake caliper in the released position without the need for an electrical power supply. This function is intended for installation and maintenance work when the power supply is not available. The manual release must be disengaged for normal brake operation.

An identification plate (Figure 1.1) with a 16-digit part number is mounted to each brake caliper. The exact design and configuration of the brake caliper are defined exclusively by this part number. Please read these installation and operating instructions carefully before installing or operating the brake. Always observe the drawings referenced in the individual sections.

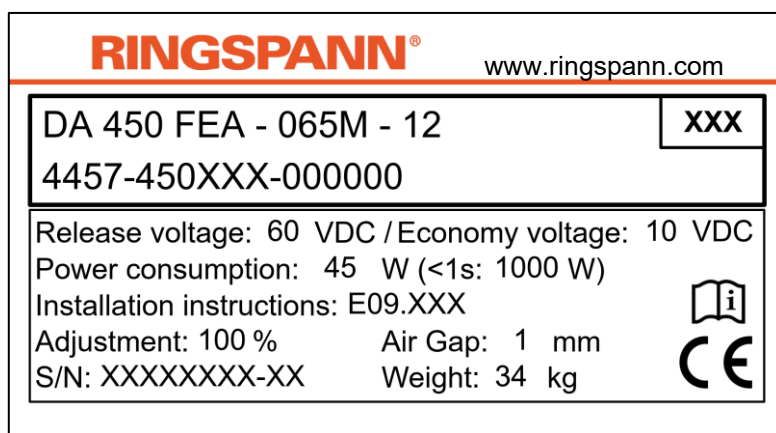


Figure 1.1

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Safety must be given the highest priority during all work performed on the brake. Before performing any work on the brake, switch off the drive unit.

Rotating components (e.g. the brake disc) must be secured by the operator to prevent accidental contact.

1.2 Delivery condition

The brake caliper is supplied in the following condition:

- In manual release position, i.e. mechanically locked in released position.
- With brake pads installed.
- Adjusted to the nominal brake pad clearance
- Braking force set to the nominal value or according to customer specifications.
- Optional mechanical switches or sensors adjusted.

As well as these instructions, please also consider the catalogue data for the brake at www.RINGSPANN.com and the drawings in the individual sections.



Life-threatening danger!

The brake disc must be completely degreased before coming into contact with the brake linings. If the brake linings are contaminated with grease or oil, the nominal braking force is not guaranteed.

The brake caliper can be a safety-relevant machine component. All adjustments, settings, and repair work may only be carried out by qualified personnel.

The brake caliper is supplied in the manual release position (manually locked in the released state). The brake force is preset. To ensure correct brake function, the instructions in this manual must be strictly followed before commissioning.

When assembling, operating and maintaining the brake it is to be ensured that the entire drive train is secured against being switched on unintentionally. Moving parts can cause severe injury. Rotating parts (e.g. brake disc) must be secured by the operator against unintentional touching.

Strongly pre-loaded pressure springs are installed in the thrusters of the brake. The spring thruster may only be disassembled by the factory.

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2. Installation

2.1 Installing the disc

Ensure that the brake disc is correctly positioned and securely mounted on its hub or shaft. Check that the lateral runout of the brake disc does not exceed 0.2 mm per side.

Check that the disc thickness is as ordered and according to the designation printed on the brake:

Example: DA 560 FEA – 065M – **12** **12** = 12,7 mm (see data sheet)



Attention!

If these conditions are not met, the brake caliper cannot be installed or cannot operate properly.

Before installing the brake, clean the brake disc with alcohol, e.g. methylated spirit (ethyl alcohol) or isopropyl alcohol. Alternatively, use a water-based surfactant solution, such as soapy water or an equivalent cleaning agent.

If the brake disc is cleaned with thinner, acetone or brake cleaner, ensure that these substances and any residues do not come into direct contact with the friction pads. This is particularly important for holding brakes, because no dynamic braking takes place to remove solvent residues from the brake disc.



Attention!

The disc must be degreased and free of deposits to prevent any reduction in the coefficient of friction. Residues of oil and corrosion protection agents significantly reduce the coefficient of friction and, consequently, the braking and holding torque.

As well as these instructions, please also consider the drawing data sheet for the brake at www.RINGSPANN.com and the drawings in the individual sections.

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2.2 Installing the brake caliper

Ensure that the mounting surface is clean and dry. Mount the brake caliper on stable, vibration-free machine components to ensure quiet operation without screeching noise. Tighten the screws with a torque wrench.

During installation, ensure that the brake pads are centred and in full contact with the brake disc. The centre lines of the brake arms must point towards the centre of the brake disc. The maximum permissible lateral runout of the brake disc is 0.2 mm. Greater lateral movement may cause the brake unit to rattle or vibrate.

Tooling:

- Feeler gauges, metal ruler + dimensional control devices (caliper, depth gauge).
- Torque wrench (200 Nm)
- 21 mm A/F sockets
- 2 x Ø15 gauges
- Shim blocks

Procedure:

1. Lift the assembly with suitable slings and position it on the brake disc. The caliper is not equipped with a lifting eye. Assembly weight: 20 kg.
2. Centre the brake caliper laterally relative to the brake disc within ± 2.5 mm. Insert two fixing screws at positions a and b as shown below, but do not tighten them yet.

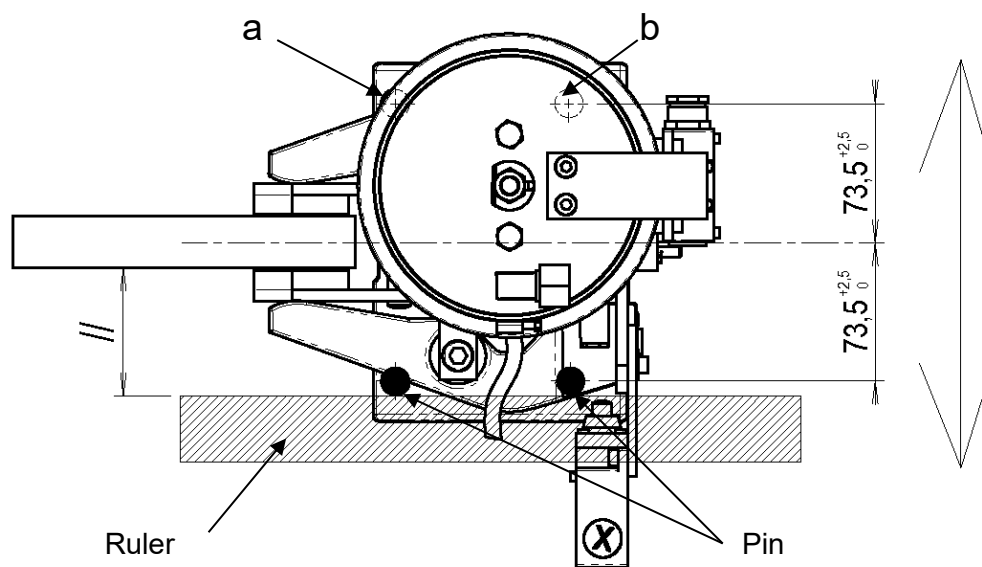
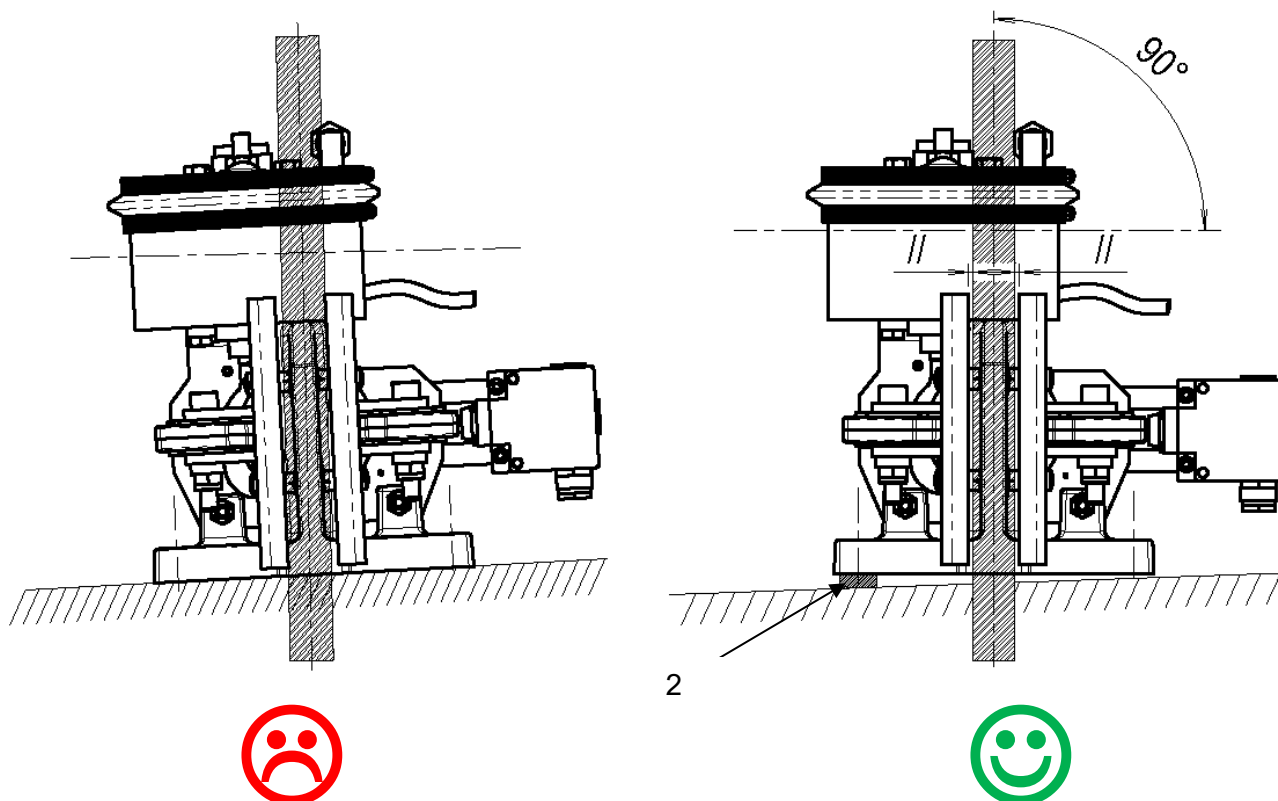


Figure 2.1

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3. Check the parallelism of the pads relative to the disc using a set of feeler gauges: max. 0.2 mm over the length of the pad.
4. Place a ruler against the two gauges and check that the parallelism error does not exceed $\pm 4\%$.

If necessary, wedge the backing plate using shims **2** located near the fixing screws.



5. Tighten the four fixing screws on the base plate to the torque specified below:

	FASTENING HOLE OF THE BASE PLATE	BOLTS
DA 556 FEM / FEA DA 560 FEM / FEA DA 561 FEM / FEA	4 holes $\varnothing 15$	4 x M14 class 8.8 Cs: 121 N·m $\pm 10\%$ $\mu=0.15$

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2.3 Electrical Connection

The brake caliper is equipped with a 2-core cable, 2 m long, item **17**. Connect this cable to an ESE or ESP automatic economy power supply.

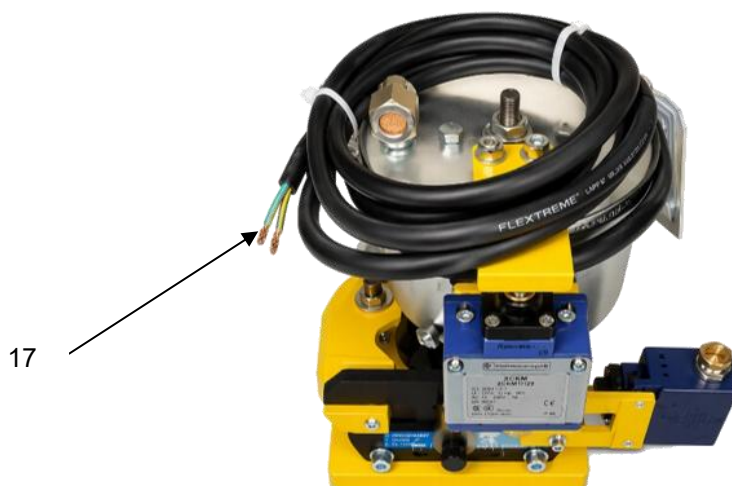


Figure 2.2

For versions with a junction box, connect a 3-core cable with protective earth conductor between the terminal block and the ESE/ESP power supply.

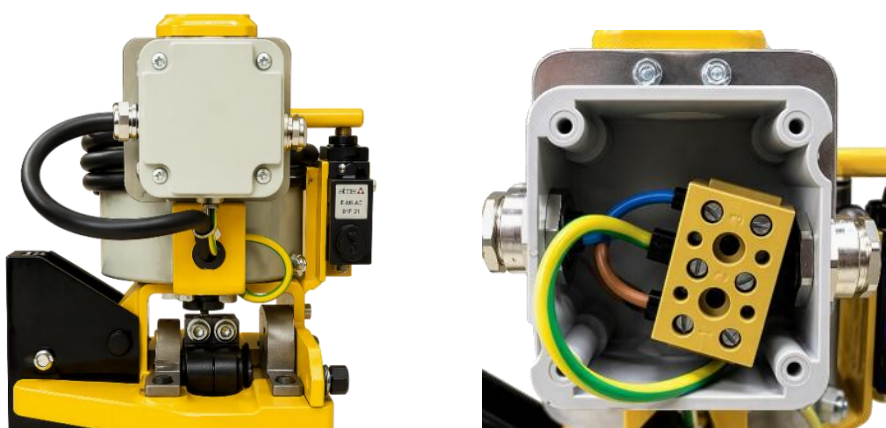


Figure 2.3



Attention!

Refer to the power pack manual:

Make sure that the fuse rating is correct depending on the caliper.
 Note the minimum size and the max. resistance of connecting cables.

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2.4 Deactivating the manual release



Attention!

The manual release must be deactivated for the brake to operate correctly.

With the screw version ref. **1**

When the caliper is in operating mode, it is essential that the manual release screws 1 are removed and stored in the "parking" position. To avoid contaminating the coil air gap, the 2 free holes must be sealed with the 2 plastic plugs 7 located on the "parking" support Figure 2.5.

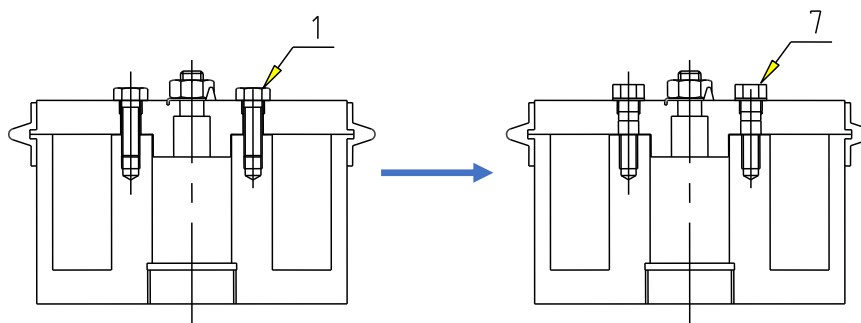


Figure 2.4



Figure 2.5

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2.5 Checking the pad gap



Attention!

The pad gap is set at factory on a disc according to the ordered disc thickness of the material code.

The total gap between the brake pads and disc surface must always be between 0,7 and 1 mm. If this is not the case, follow the corresponding adjustment procedure.

Use feeler gauges to check that the total clearance between the pads and the disc (a+b) is between 0.7 and 1 mm.

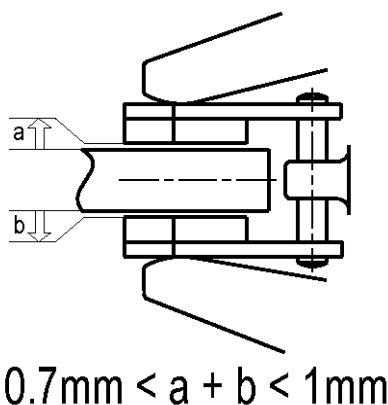


Figure 2.6



Information

For brake DA 561/560/556 FEA with automatic wear adjustment, the air gap may be initially set to a larger value. The brake must then be actuated several times to allow the correct air gap between the pad and the disc to be established automatically.

2.6 Checking the general operation.

1. Check that the manual release is deactivated according to chapter 0.
2. Check that any electrical connections are correct.
3. Operate the caliper, under no-load conditions, with disc rotating, about twenty times to bed in the pads.

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Attention!

The disc must be free of grease and any deposits or dirt.

For the caliper to function properly, the manual release nut item **5** must be loosened fully until it rests on the washer item **4** (do not force).



Information

The system is now operational.

3. Maintenance

3.1 Activation / Deactivation of the manual release

With the screw version ref. **1**



Attention!

The manual release must be deactivated for the brake to operate correctly.

Activation

1. Remove the two caps **7** screwed onto the top of the coil (13 mm on flat surfaces) and screw them onto the "parking" support located on the side of the coil.
2. Unscrew the two H screws for manual release **1** from the "parking" bracket (13 mm flat head) and screw them onto the coil in place of the plugs **7**.

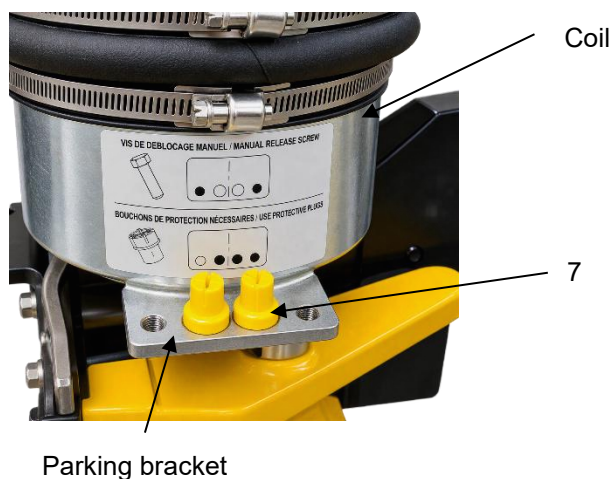


Figure 3.1

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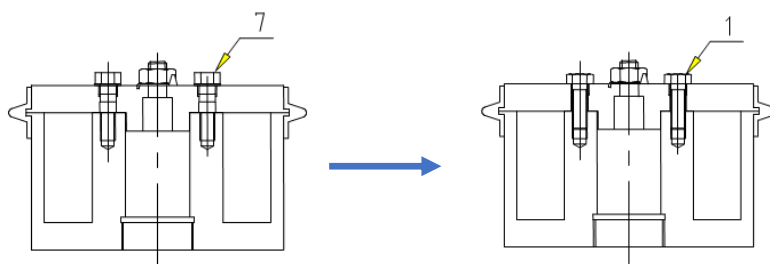
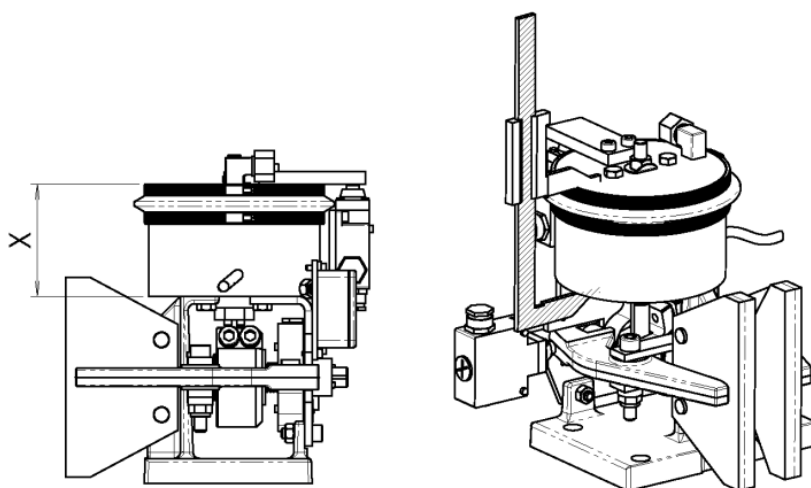


Figure 3.2



Information

To adjust the pad gap, ensure that the manual release is fully engaged:
Check dimension X: 90 ± 0.5 mm



Deactivation

Remove the two manual release screws H 1 (13 mm on flat surfaces) and replace them with the two plugs 7.



Information

The plugs 7 are important to prevent the coil air gap from becoming clogged.

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3.2 Routine checks

After an emergency braking

Regularly check that the total pad clearance is between 0,7 and 1 mm. Adjust if necessary.

Check the surface of the disc, which must be free of grease and deposits, and particularly the absence of dark marks on the brake track of the disc, which may be caused by overheating of the lining. If there are any traces or doubts, first clean the disc tracks with a degreasing agent such as:

- KF quick-drying degreaser (CRC industries).

Every year

Remove the linings for a visual inspection: the surface of the friction material should be matt. If it has a "glazed" appearance, with missing material around the edges or at the saw cut, or burnt spots, it is essential to replace both linings with new RINGSPANN linings, whatever their degree of wear.

Regularly check that the pad clearance is still between 0,7 and 1 mm.
Adjust if necessary.

Check the surface of the disc, which must be free of grease and deposits, and particularly the absence of black marks on the brake track of the disc, which may be caused by overheating of the lining.

If there are any traces or doubts, first clean the disc tracks with a degreasing agent such as:

- KF quick-drying degreaser (CRC industries).

When the remaining pad thickness reaches 2 mm on one pad, replace both pads. (see chapter 3.4).

To ensure the correct operation of calipers, it is necessary to check the following points each time the pads are changed or at least once a year:

After removing the used pads and before fitting the new pads:

1. Ensure that the pads slide correctly on the pins marked 6, otherwise replace the pins.
2. Check the general condition of the moving parts. Lubricate if necessary.
We recommend MOLYSLIP copper grease.
3. Check the condition of the coil air gap bellows.
4. Check the exhaust filter.

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Attention!

Do not place grease on the braking surface of the disc.

Every five years of operation or after 2 million cycles

Arrange for a thorough overhaul of the caliper exclusively at the ATV workshop, which will include at least the replacement of:

- Bushes and shafts.
- Spring washers.
- Pads *.
- Other parts as deemed necessary.

In addition there will be an inspection of the coil isolation and the condition of the magnet.

***Note:** The conditions for replacing pads are defined in the instructions supplied in the spare pad packaging.



Attention!

Regularly check the gap between the pads and the disc.
The nominal pad gap is 0,7 to 1 mm.
If this value is exceeded, braking torque will be reduced.



Attention!

The pad gap is set at factory on a disc according to the ordered disc thickness of the material code.
The total gap between the brake pads and disc surface must always be between 0,7 and 1 mm. If this is not the case, follow the corresponding adjustment procedure.



Attention!

If at least one of the pads reaches a remaining thickness of 2 mm or its service life limit, proceed as per paragraph "lining replacement". Failure to do so will result in loss of braking.

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3.3 Adjusting pad gap

Tools: 13 mm flat spanner.

The brake is opened electrically or, if it is in the manual release position, check dimension X (see chapter 3.1).

1. To reduce the clearance, turn the square on shaft **3** (13 mm flat) anticlockwise to obtain a total clearance of between 0.7 and 1 mm between the pads and the disc.
2. To increase the clearance, push cam **2** towards the pads and turn it clockwise by ¼ turn, then re-turn it to the rear position so that its hub engages on the square of axle **3** until it rests on pin **19**.
3. Remove the two manual release screws **1**, if applicable, and replace them with the two caps **7** screwed onto the parking support. (See chapter 2.4 or 3.1).

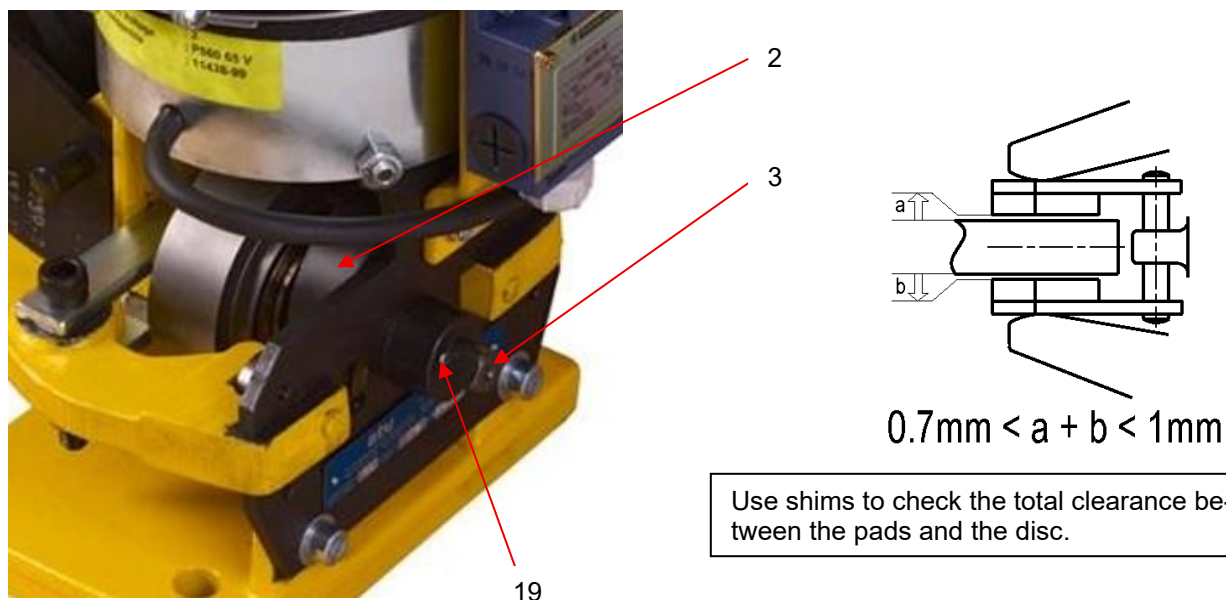


Figure 3.3



Attention!

If at least one of the pads reaches a remaining thickness of 2 mm or its service life limit, proceed as per paragraph “lining replacement”. Failure to do so will result in loss of braking.

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Attention!

The manual release must be deactivated for the brake to operate correctly.



Information

When fitting new brake pads:
Operate the brake without load, with the disc rotating about twenty times, to clean the pads.

3.4 Replacement of the pads

Tools: 13 mm spanner on flats.

Procedure:

1. Set the caliper to manual release position.
2. To obtain maximum spacing between the pads **4**, push the cam **2** towards the pads and turn it clockwise $\frac{1}{4}$ turn, then return it to the rear position so that its hub engages on the square of the axle **3** until it rests on the pin **19**.
3. Rotate the levers **6**, all on one side, to release a pad **4**.
4. Remove this pad from pins **G06** and then extract it parallel to the disc.
5. Fit a new pad, ensuring that it is properly engaged in pins **G06**.
6. After pivoting the levers on the other side, replace the other pad.
7. Then adjust the pad gap according to chapter 3.3.

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Figure 3.4



Information

For FEA brakes with automatic wear adjustment, the air gap may be initially set to a larger value. The brake must then be actuated several times to allow the correct air gap between the pad and the disc to be established automatically.

3.5 Torque setting



Information

The torque is factory set and checked using a test bench.

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3.6 Adjustment of the monitoring switches

The switches are factory set and do not need any adjustment.

The switch item **CO** indicates the “open” position of the caliper.
It is triggered by the stop plate connected to the displacement of the armature.
The switch head is pushed when the clamp is open.

The switch **CR** is set, depending on the pad wear compensation the brake has:

FEA: Signal, if the brake pads need to be replaced

FEM: Signal, if the air gap between brake pads and brake disc needs to be adjusted.

It is triggered by the stop plate connected to the displacement of the armature.

FEM: The adjustment contact is activated when the pad gap reaches > 1.5mm.



Important

The attachment screws of the switches, stop plates and switch brackets must all be locked with adhesive (LOCTITE Normal thread lock 243).

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4. Spare parts

Ref.	Description	Brake versions	Item code	Qty
Pads (30 mm thick disc)				
4	Set of brake pads (consisting of 2 pads ref. 4)	DA 556 - DA 560 – DA 561	JG056ATV 132	1
Pads (15 mm thick disc)				
4	Set of brake pads (consisting of 2 pads ref. 4)	DA 556 - DA 560 – DA 561	JG056ATV 132 D15	1
Electrical switches (excluding special designs)				
12, 14, 15	Brake off monitoring switch Brake applied/wear monitoring switch	DA 556 - DA 560 – DA 561	CON XCK M110	1
16	Manual release monitoring switch on bridge	DA 556 - DA 560 – DA 561	CON XCK M115	1
Supplies				
18	Sintered filter	DA 556 - DA 560 – DA 561	FOUPAST100	1
Complete coil (excluding special voltages)				
Complete with armature, seal fitted				
		DA 556 SE	BOBCOM-56SE-65	1
		DA 560 SE	BOBCOM-560SE-65	1
		DA 561 SE	BOBCOM-561SE-65	1

When placing an order, please specify:

- Type and number of the caliper, and item number of the part required.

5. Options

This chapter describes the various options available on the brake:

5.1 Manual release with lever

Deactivation

1. Turn lever **11** anticlockwise to completely release the armature.
2. Lock the lever with nut **5**.

Activation

1. Unlock nut **5**.
2. Turn lever **11** clockwise to open the caliper manually.

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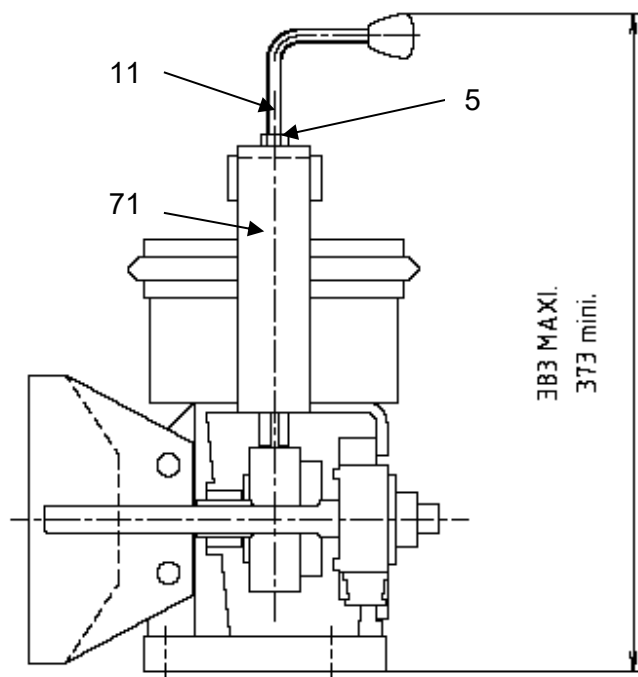


Figure 5.1

5.2 Load lowering lever type 'deadman' (with lever Ref. 81)

1. Position lever **81** on the square male impression of pin **3**.
2. Turn clockwise to open the caliper (torque <50Nm).
3. Release the lever to close the caliper.

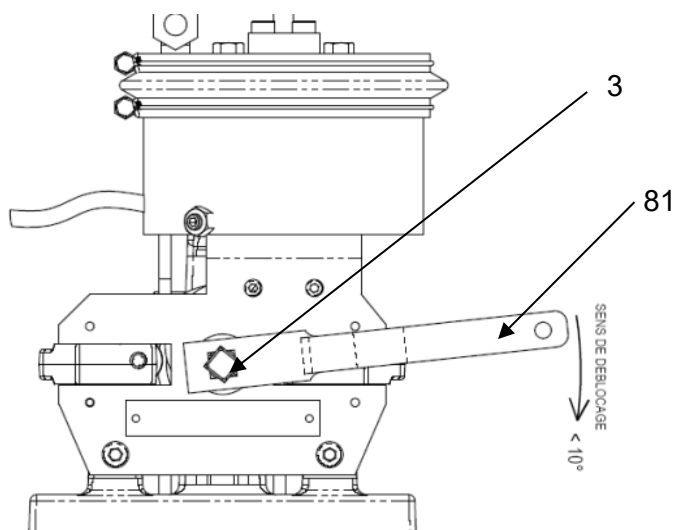


Figure 5.2

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Important

NEVER TURN COUNTER-CLOCKWISE.



Attention

This operation may alter the brake force adjustment. After performing this operation, the correct brake setting must be checked and, if necessary, readjusted by qualified personnel

5.3 Brake off monitoring switch



Information

The monitoring switch is factory-set and does not require adjustment.

Monitoring switch **12** indicates the status of the caliper [**closed** or **open**]. It is operated by stop **13**, which is linked to the movement of the actuator.

The monitoring switch must be activated when the caliper is open.

Bipolar "O+F" snap-action monitoring switch

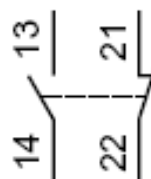
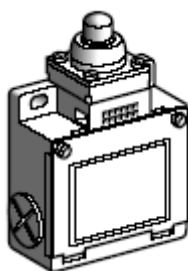


Figure 5.3

Cable gland with clamping capacity of 6 to 11 mm
Connect to terminals 13–14 inside the monitoring switch.

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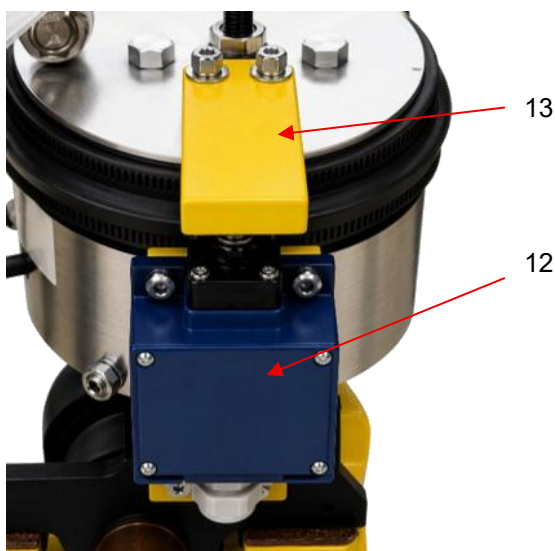


Figure 5.4

In case of replacement:

Tools: 4 mm flat spanner
No adjustment necessary.



Note

The screws securing the monitoring switches, stops and monitoring switch supports must all be se-cured with adhesive (LOCTITE Standard Threadlocker 243).

5.4 Brake off monitoring switch and brake applied monitoring switch



Note

The monitoring switch is factory set and does not require adjustment.

Contact **12** indicates the status of the caliper [**open**].
It is operated by stop **13**, which is linked to the movement of the actuator.
The contact must be pressed when the caliper is open.

Contact **15** indicates the status of the caliper [**closed**].
It is operated by stop **13**, which is linked to the movement of the actuator.
The contact must be pressed when the caliper is closed.

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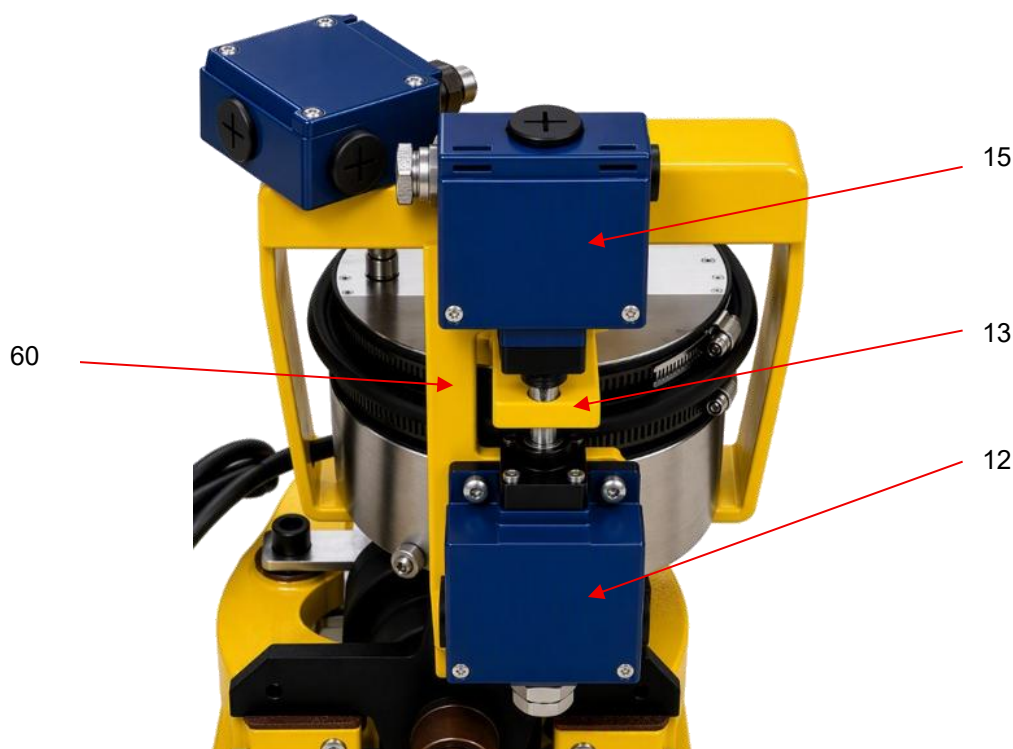


Figure 5.5

If the brake off monitoring switch needs to be adjusted:

Tools: 4 mm flat spanner.

1. Power the caliper.
2. Adjust the position of bracket **60** so that monitoring switch **12** is engaged.
3. Tighten the fixing screws on support **60**.

If the brake applied monitoring switch needs to be adjusted:

1. Disconnect the power supply.
2. Adjust the position of monitoring switch **15** so that it is engaged.
3. Tighten the bracket fixing screws.



Note

The fixing screws for the monitoring switches, stops and monitoring switch brackets must all be secured with adhesive (LOCTITE Standard Threadlocker 243).

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5.5 Brake off monitoring switch (space-saving option)



Note

The contacts are factory-set and do not require adjustment.

The brake off monitoring switch **22** indicates the status of the caliper [**open**]. It is operated by stop **23**, which is linked to the movement of the actuator. The contact must be pressed when the caliper is open.

The brake applied monitoring switch **25** indicates the status of the caliper [**closed**]. It is operated by stop **23**, which is linked to the movement of the actuator. The contact must be pressed when the caliper is closed.

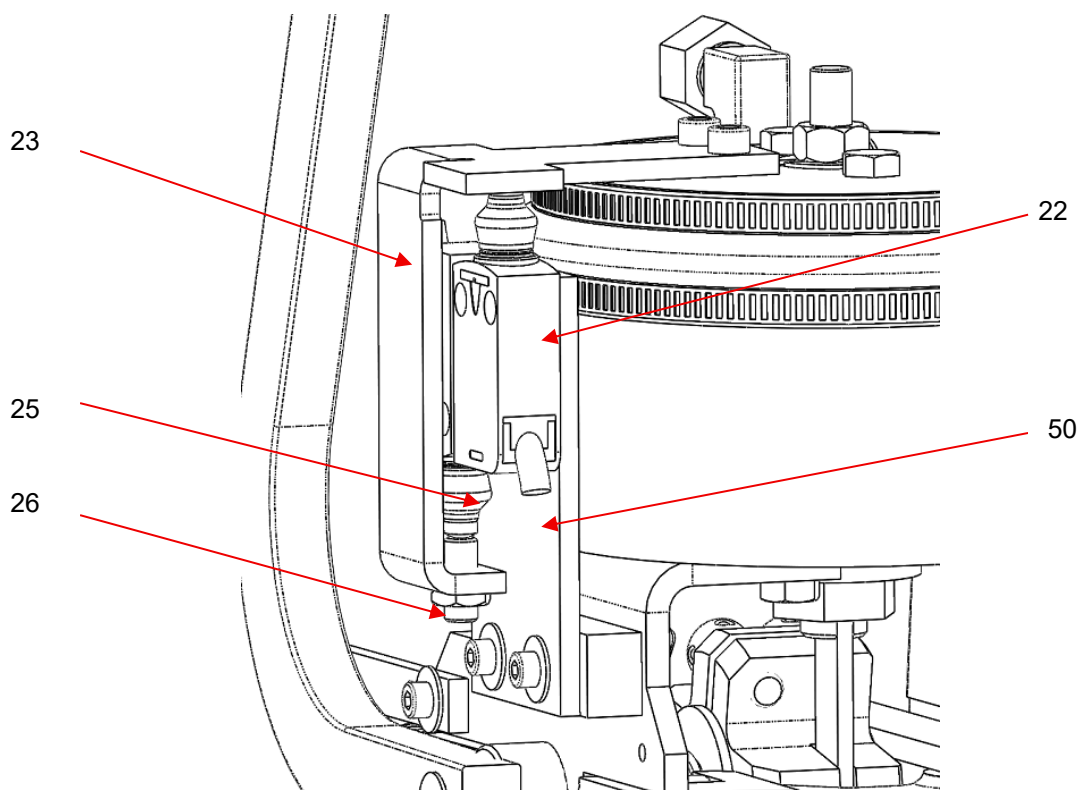


Figure 5.6

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If the adjustment of the brake off monitoring switch is necessary:

Tools: 4 mm flat spanner.

1. Power the caliper.
2. Lower screw Hc **26** to release pad gap monitoring switch **25**.
3. Adjust the position of bracket **50** so that brake off monitoring switch **22** is engaged.
4. Tighten the 2 screws securing bracket **50**.

If the brake applied monitoring switch needs to be adjusted:

4. Disconnect the power supply.
5. Adjust screw Hc 26 until monitoring switch 25 is engaged.
6. Lock the lock nut.



Note

The screws securing the monitoring switches, stops and monitoring switch brackets must all be secured with adhesive (LOCTITE Standard Thread-locker 243).

5.6 On-bridge hand release monitoring switch



Note

The contact is factory-set and does not require adjustment.

Contact **16** is used to check the manual opening status of the caliper.
It is operated by washer **24**, which is linked to the movement of lever **11**.

The monitoring switch is activated when the caliper is manually released.

Bipolar "O+F" snap-action monitoring switch

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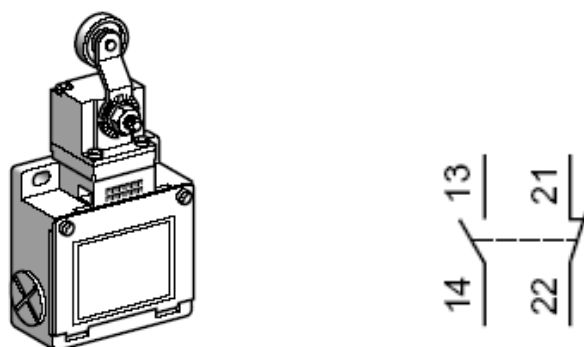


Figure 5.7

Cable gland with clamping capacity of 6 to 11 mm
Connect to terminals 13–14 inside the monitoring switch.

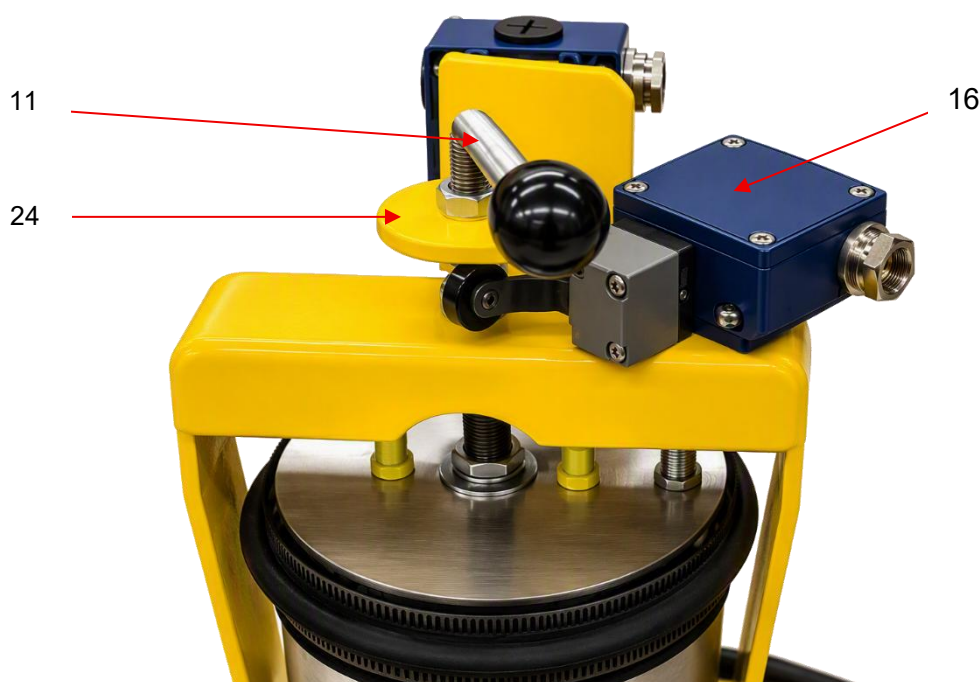


Figure 5.8

For replacement:

Tools: 4 mm flat spanner.



Note

The monitoring switch fixing screws must be secured with adhesive (LOCTITE Standard Threadlocker 243).

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5.7 Wear limit monitoring switch



Note

The monitoring switch is factory-set and does not require adjustment.

Contact **14** is designed to signal when the pads need to be replaced. It is operated by lever **6**, which is linked to the movement of cam **2**.

The monitoring switch is activated when the pads need to be replaced.

To adjust the total wear monitoring switch:

Tools: 4 mm flat spanner.

With the caliper fitted with new pads and clamped onto the disc:

1. Place the end of the monitoring switch 4 mm from lever **6**.
2. Tighten the fixing screws.

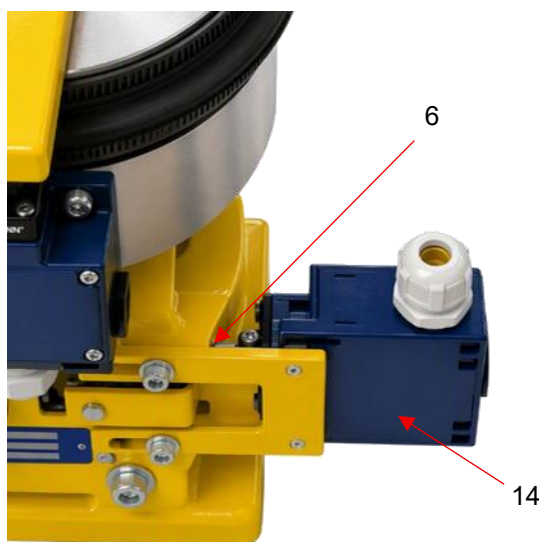


Figure 5.9



Note

The fixing screws for the monitoring switches and monitoring switch support must all be secured with adhesive (LOCTITE Standard Threadlocker 243).

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6. Operating Faults

TYPE	CHECK	REMEDY
The caliper does not open.	Power supply voltage present . Nominal voltage : -10% max.	Restore the voltage.
	Fuse position	Set fuse to the correct position.
	Release voltage (between 40 and 60 V) for ≈ 1 seconds	Replace control board.
	Clearance between linings between between 0.7 and 1 mm.	Re-adjust.
The caliper does not remain open.	Power supply ≈ 10 V	Replace the control board.
	Coil air gap clogged, armature does not come into contact.	Clean the coil air gap. Check the condition of the seal and filter Ref. 18.
Abnormal heating of the disc during start-up.	Insufficient clearance between the pad and the disc in the open position.	Readjust the pad. Ensure pad gap is between 0.7 and 1 mm.
	Correct installation of the caliper.	Realign the caliper according to chapter 2.2.

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7. Reference drawing

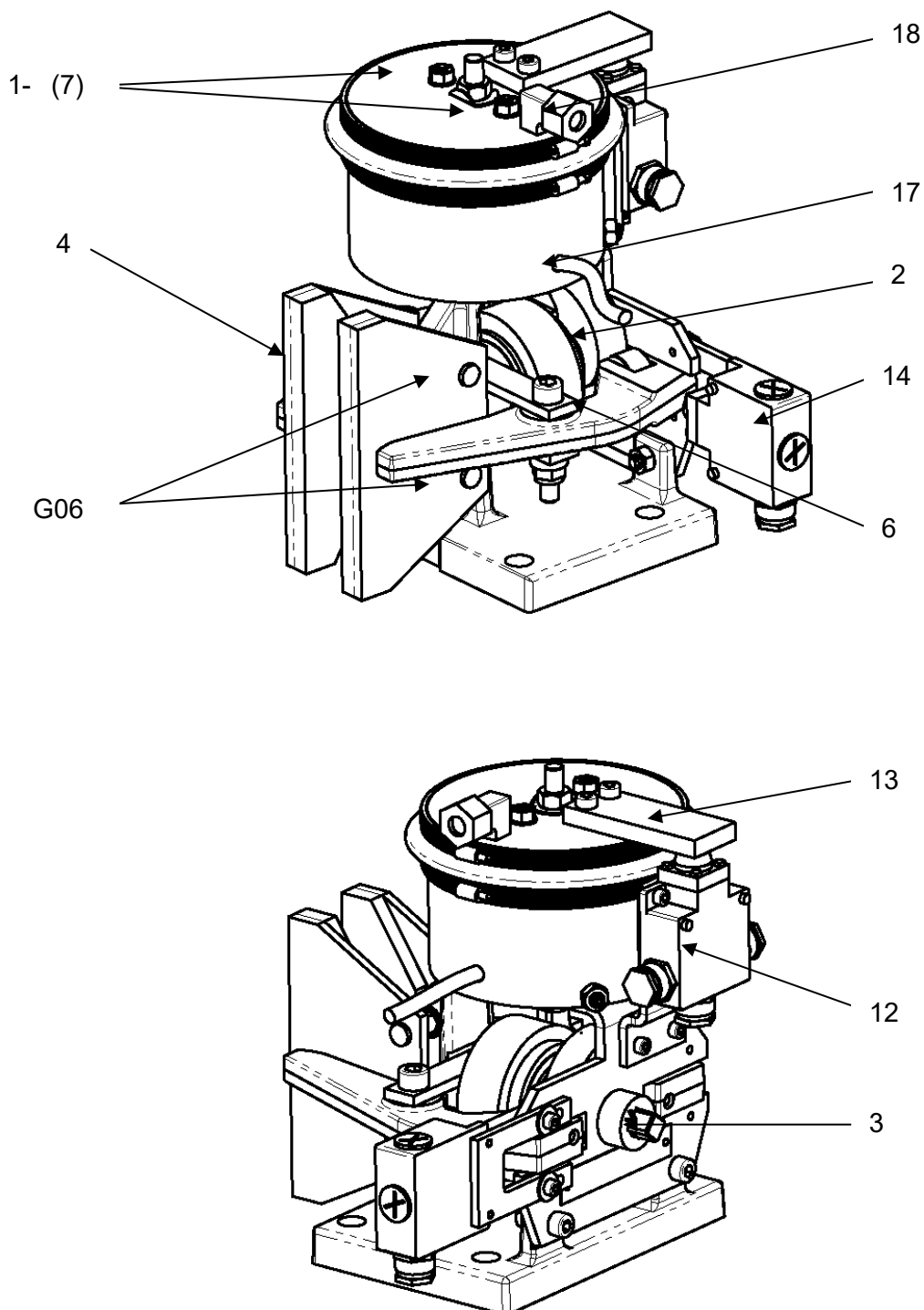


Figure 7.1