

SAF Brake Cylinders for disc brakes

Installation and Service Guide

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Safety Information

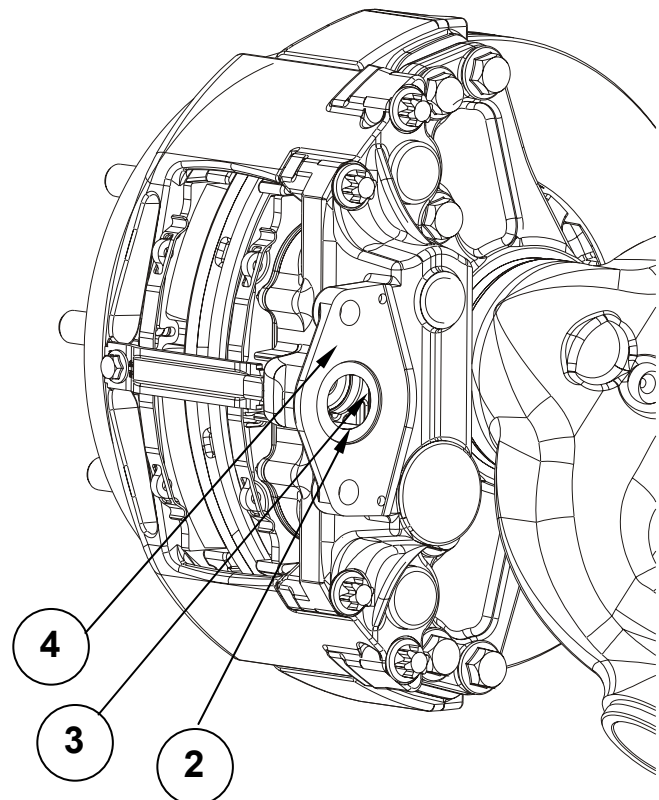
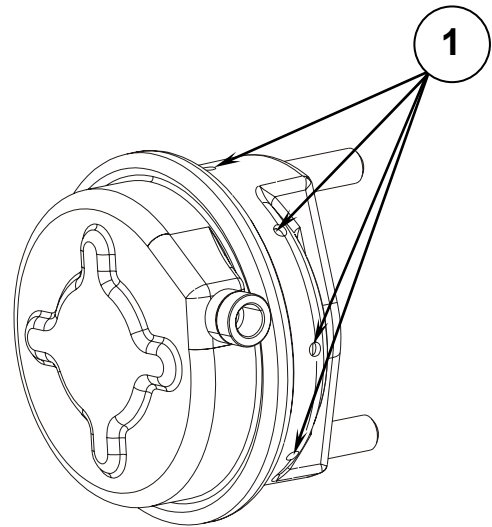
- **IMPORTANT:**
During all work on the brake system, always block the wheels of the trailer in order to prevent the trailer rolling away.
- **CAUTION:**
The brake cylinder internal parts are under a spring preload of approx. 10,000 N. Mishandling or opening the brake cylinders can result in serious injuries or even death and is therefore strictly forbidden.
- **WARNING:**
Should the brake cylinders show signs of material damage, significant corrosion or other damage indicating a safety risk or incorrect function of the brake cylinders, the brake cylinders must be immediately replaced by qualified service personnel (brake specialist or motor mechanic). Take particular care when handling damaged brake cylinders. The opening of damaged brake cylinders is strictly forbidden.
- **CAUTION:**
If, during installation of the double diaphragm cylinders, the parking brake section is not released using the release tool bolt, the plunger of the brake cylinder may not fully engage in the lever arm of the disc brake. This can result in a limited function of the brake and serious damage and/or severe or even fatal injuries.
- **CAUTION:**
During operation, the release tool bolt must always be removed and stored in the bracket provided on the cylinder housing. The release tool bolt serves only for the manual caging of the parking brake with the trailer in pressure-free state (e.g. disconnected trailer without compressed air supply).
- **CAUTION:**
The drain vent holes of the brake cylinders must always be open. If the bottom-most drain vents are closed, this can result in damage to the brakes. SAF accepts no liability for damage caused by closed bottom-most drain vents.

Installation of the SAF Brake Cylinders

The SAF brake cylinders are normally supplied ready for installation. Generally the drain vents are open. The SAF double diaphragm cylinders with parking brake section are supplied with mounted release tool bolt and released parking brake function.

Installation of the Single Diaphragm Cylinder

- Check that all the drain vent holes (1) are open. If necessary, completely remove the dust plug.
- **CAUTION:**
If the bottom-most drain vent hole is closed, this can result in damage to the brake.
- **CAUTION:**
SAF accepts no liability for damage caused by the bottom-most drain vent holes being closed.
- The sealing surface on the brake calliper (2) must be free from dirt and corrosion.
- Before installation of the single diaphragm cylinder, grease the spherical cap (3) in the brake lever. Be sure to observe and strictly comply with the brake manufacturer's instructions and recommendations here.
- Inspect the flange surface on the brake calliper (4) for flatness and cleanliness. Clean, if necessary.
- Also inspect the plungers, seals and flange surfaces of the brake cylinder for soiling and damage. Clean, if necessary.
- Move the diaphragm cylinder to its final position, ensuring that the plunger of the brake cylinder engages in the spherical cap of the brake lever.
- If the plunger is not in the correct position, it can be corrected as follows:
Pressurise the service brake section of the brake cylinder with compressed air five times and then relieve the pressure again. If the connecting rod has still not moved to the middle or if no compressed air is available, try to manoeuvre the connecting rod into the middle manually by careful shaking and pushing.



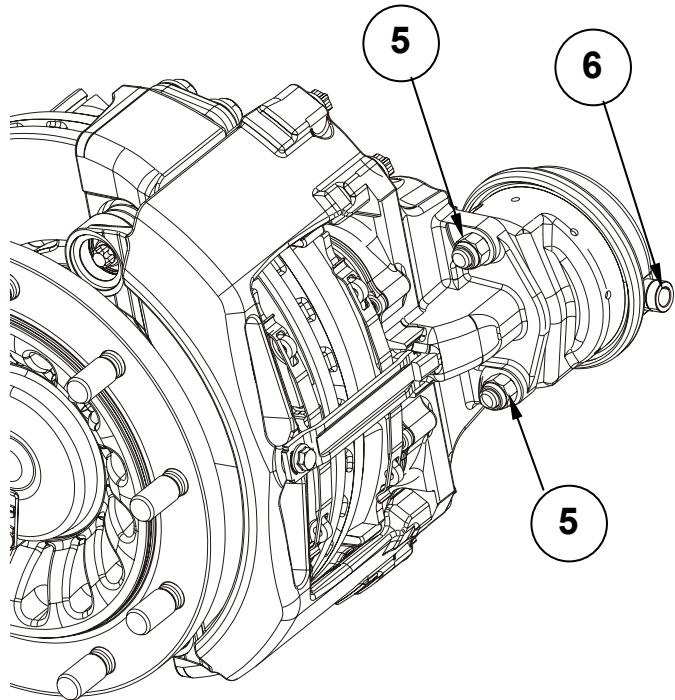
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- Screw on fastening nuts SAF 4 427 4043 80 symmetrically by hand until the brake cylinder is in full contact. Then torque the fastening nuts symmetrically to 120 Nm; then tighten the fastening nuts finally and symmetrically to 210⁻³⁰ Nm.
- **CAUTION:**
Only new SAF fastening nuts M16x1.5 to DIN EN ISO 10513 may be used. Washers must not be used.
- Torque the connecting elements of the compressed air lines on the air connections (6) of the brake cylinder to 40^{±5} Nm. Be sure to observe the instructions from the manufacturers of the connecting elements.
- **CAUTION:**
When connecting the compressed air lines, be sure to observe the circuit diagrams and instructions of the trailer manufacturer.

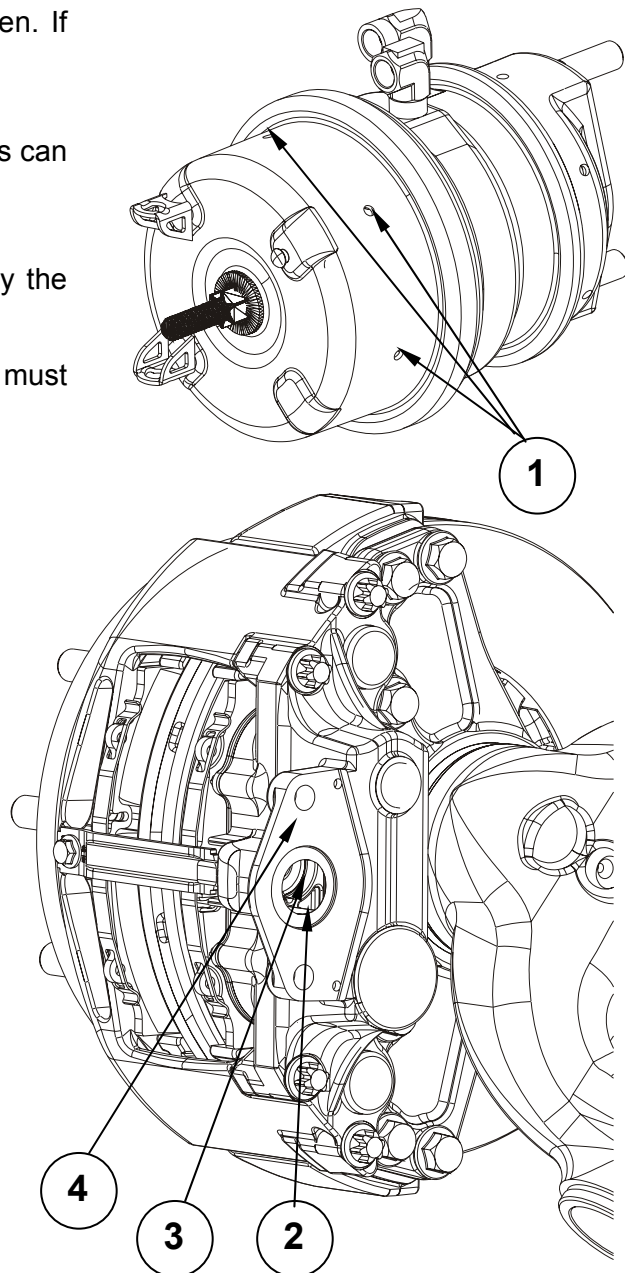
Air connections allocation:
Service brake part (6)

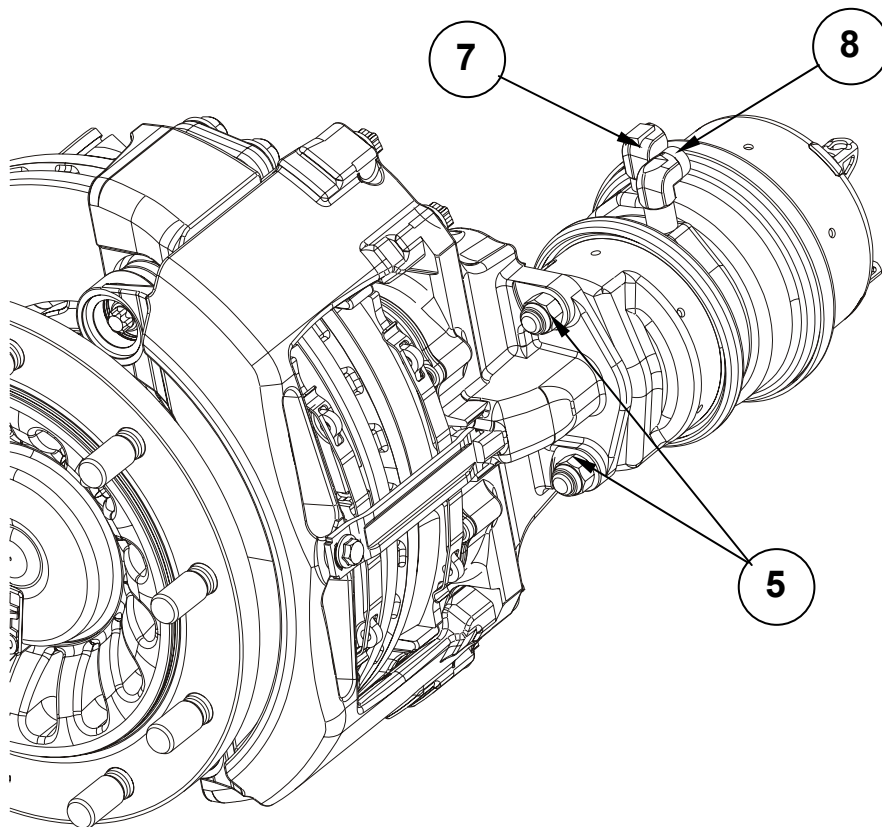
- **CAUTION:**
After installation, be sure to carry out a function check of the service brake system.



Installation of the Double Diaphragm Cylinder

- Check that all the drain vent holes (1) are open. If necessary, completely remove the dust plug.
- **CAUTION:**
If the bottom-most drain vent hole is closed, this can result in damage to the brake.
- **CAUTION:**
SAF accepts no liability for damage caused by the bottom-most drain vent holes being closed.
- The sealing surface on the brake calliper (2) must be free from dirt and corrosion.
- Before installation of the double diaphragm cylinder, grease the spherical cap (3) in the brake lever. Be sure to observe and strictly comply with the brake manufacturer's instructions and recommendations here.
- Inspect the flange surface on the brake calliper (4) for flatness and cleanliness. Clean, if necessary.
- Also inspect the plungers, seals and flange surfaces of the brake cylinder for soiling and damage. Clean, if necessary.
- Check that the parking brake function is disengaged (normal delivery condition) and that the release tool bolt is installed. If the parking brake function is not disengaged, please refer on the disengagement of the parking brake function.
- Move the double diaphragm cylinder to its final position, ensuring that the plunger of the brake cylinder engages in the spherical cap of the brake lever.
- If the plunger is not in the correct position, it can be corrected as follows: Pressurise the service brake section of the brake cylinder with compressed air five times and then relieve the pressure again. If the connecting rod has still not moved to the middle or if no compressed air is available, try to manoeuvre the connecting rod into the middle manually by careful shaking and pushing.
- Screw on fastening nuts SAF 4 427 4043 80 (5) symmetrically by hand until the brake cylinder is in full contact. Then torque the fastening nuts symmetrically to 100 Nm; then tighten the fastening nuts finally and symmetrically to 180⁺³⁰ Nm.





- **CAUTION:**
Only new SAF fastening nuts M16x1.5 to DIN EN ISO 10513 may be used. Washers must not be used.
- Torque the connecting elements of the compressed air lines on the air connections **(7+8)** of the brake cylinder to 40^{+5} Nm. Be sure to observe the instructions from the manufacturers of the connecting elements.
- **CAUTION:**
When connecting the compressed air lines, be sure to observe the circuit diagrams and instructions of the trailer manufacturer.

Air connections allocation:

Parking brake part **(7)**

Service brake part **(8)**

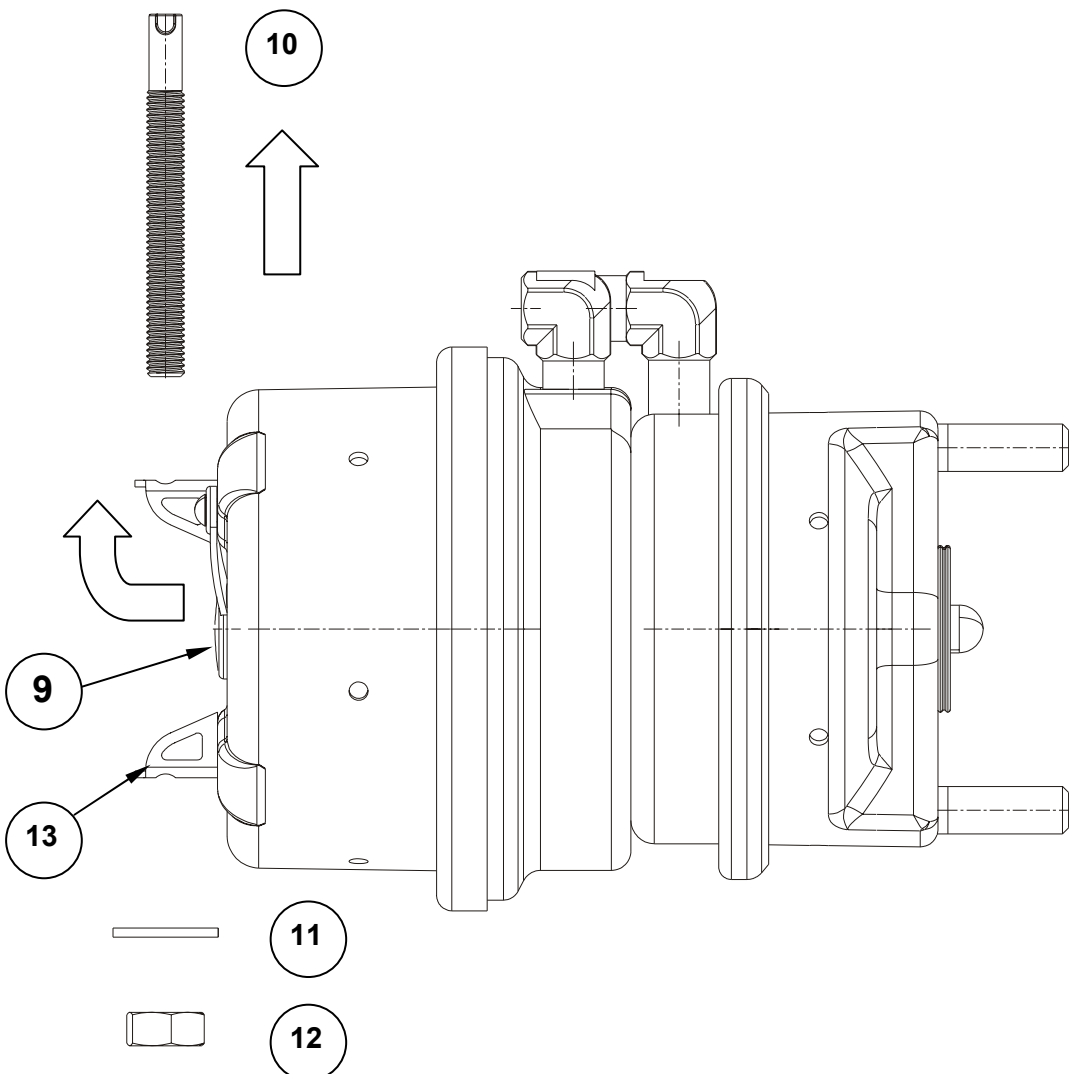
- **CAUTION:**
During operation, the release tool bolt must always be removed and stored in the bracket provided on the cylinder housing. The release tool bolt serves only for the manual caging of the parking brake with the trailer in pressure-free state (e.g. disconnected trailer without compressed air supply). See also section: Removal of the release tool bolt.
- **CAUTION:**
After installation, be sure to carry out a function check of the service and parking brake system.

Mechanical Release (Caging) and Blocking of the Parking Brake with Double Diaphragm Brake Cylinders

The parking brake should preferably be released (caged) by using compressed air. If no compressed air is available, the parking brake can alternatively be caged solely using the release tool bolt supplied.

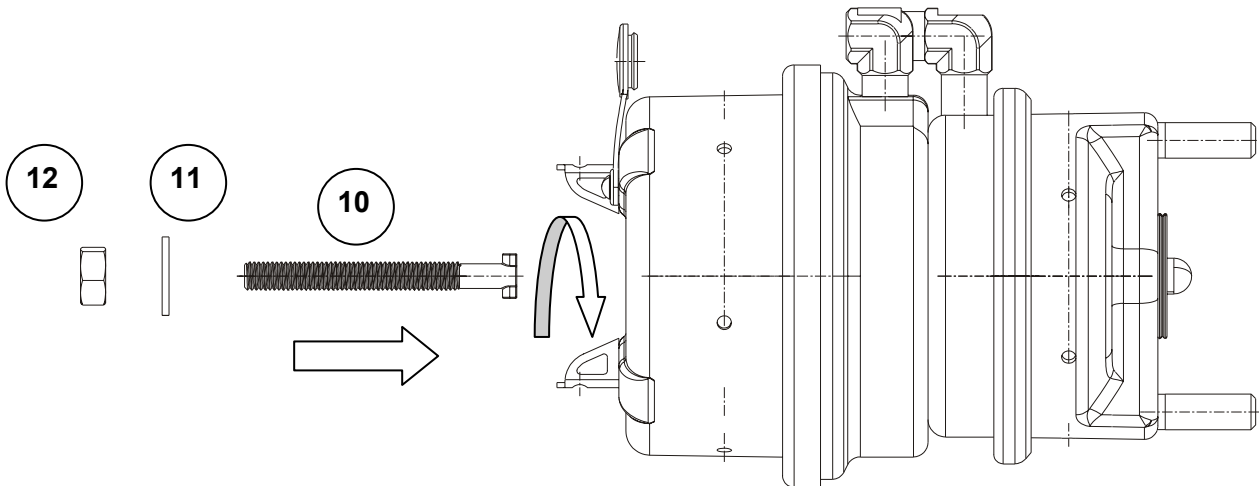
Caging the Parking Brake using Release Tool Bolt with Compressed Air

- Remove the dust plug (9) from the release tool bolt access hole in the middle of the cylinder housing.
- Remove the release tool bolt (10), washer (11) and nut (12) from its holder (13).



- Apply a vehicle or workshop air pressure of 8.3 bar (120 psi), but at least 6.2 bar (90 psi), to the parking brake side of the double diaphragm cylinder. Apply the brake three times and release. Maintain the air pressure obtained.

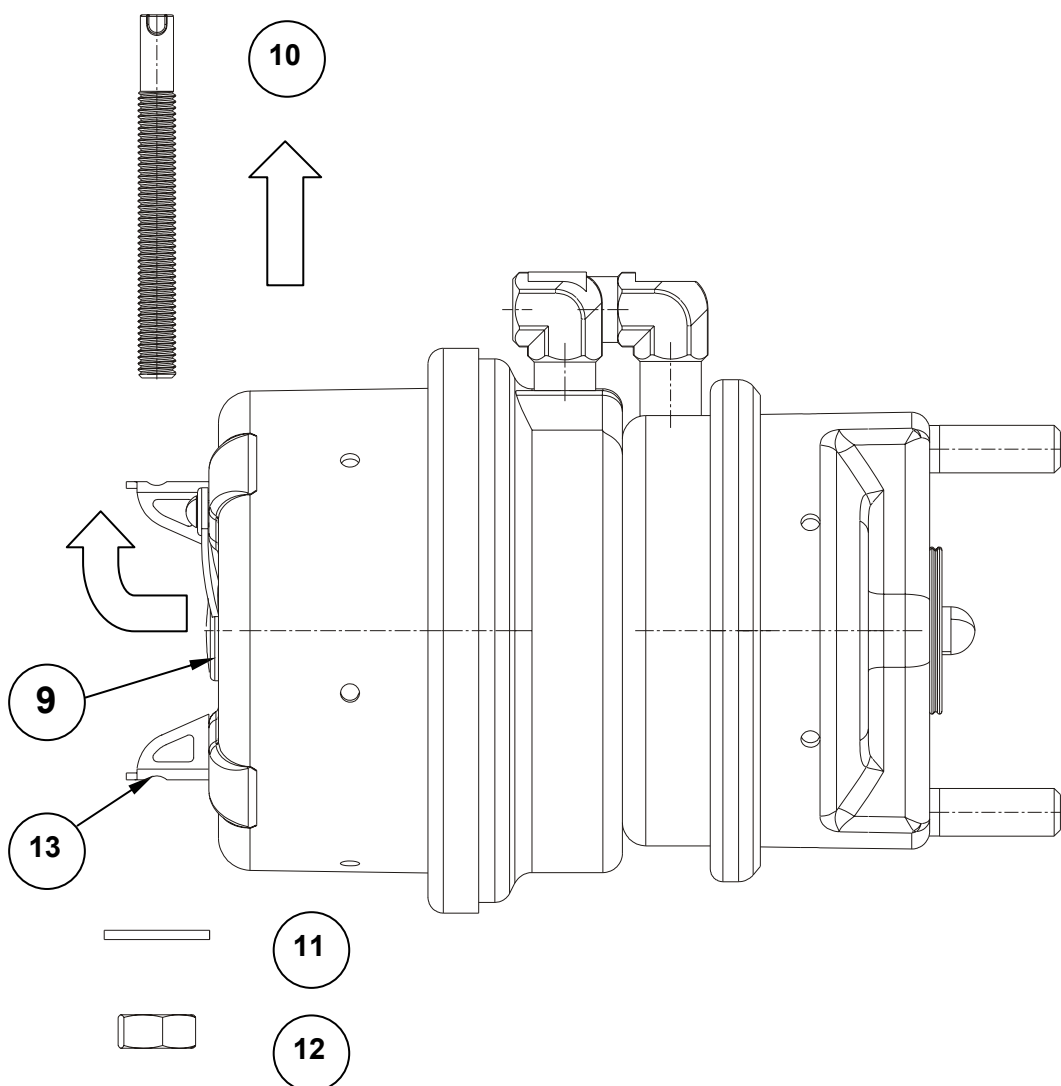
- Insert the release tool bolt (**10**) through the access hole provided until engages with the mating piece (pressure plate) inside the brake cylinder.
- Ensure that the release tool bolt engages correctly in the recesses of the pressure plate by turning the bolt 1/4 turn clockwise and at the same time pulling outwards. If the bolt is correctly engaged in the pressure plate, it cannot be turned more than 1/4 turn and cannot be pulled out by more than 19 mm.



- Place the washer (**11**) of the release tool bolt onto the spindle and tighten the nut (**12**) finger-tight.
- **CAUTION:**
Do not torque the nut to more than 47 Nm. Do not use an impact wrench. Over-tightening the nut can cause damage to the pressure plate, washer and brake cylinder housing. This could lead to the sudden release of the main spring and possible springing out of further cylinder parts with the consequent result of serious material damage and/or severe or even fatal injuries.
- The parking brake is now caged. Relieve the air pressure.

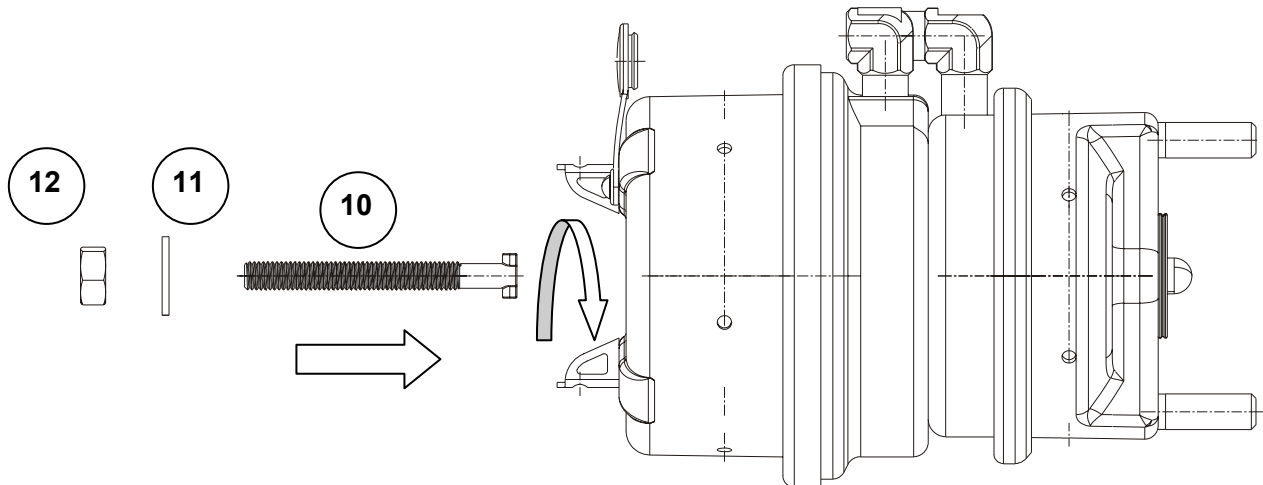
Mechanical Caging of the Parking Brake using Release Tool Bolt without Additional Compressed Air

- **CAUTION:**
This manual method should only be employed if the brake is not already caged delivery and no compressed air is available. The preferred method of caging is by using compressed air. Use this method only if the brake cylinders are not pressurised.
- Remove the dust plug (9) from the release tool bolt access hole (10) in the middle of the cylinder housing.



- Remove the release tool bolt, washer (11) and nut (12) from its holder (13).
- Ensure that the pressure plate is in the right position (distance to housing cover approx. 63 – 76 mm).
- Insert the release tool bolt (10) through the access hole provided until engages with the mating piece (pressure plate) inside the brake cylinder.

- Ensure that the release tool bolt engages correctly in the recesses of the pressure plate by turning the bolt 1/4 turn clockwise and at the same time pulling outwards. If the bolt is correctly engaged in the pressure plate, it cannot be turned more than 1/4 turn and cannot be pulled out by more than 19 mm.



- Place the washer (11) of the release tool bolt onto the spindle and tighten the nut (12) finger-tight.
- **CAUTION:**
Do not torque the nut (12) to more than 47 Nm. Do not use an impact wrench. Over-tightening the nut can cause damage to the pressure plate, washer and brake cylinder housing. This could lead to the sudden release of the main spring and possible springing out of further cylinder parts with the consequent result of serious material damage and/or severe or even fatal injuries.
- During the tightening of the nut, the actuating plunger of the cylinder must be pulled back into the housing. Stop tightening the nut when the actuating plunger can no longer be pulled back into the housing and the maximum permissible torque of 47 Nm is reached.
- The parking brake is now caged.

Removal of the Release Tool Bolt

- Cage the parking brake using compressed air.
- Remove the release tool bolt together with the washer and nut.
- Insert the release tool bolt, washer and nut into the holder provided on the cylinder head and torque the nut to 7-15 Nm an.
- Be sure to close the release tool bolt access hole with the dust plug again.
- **CAUTION:**
After removal of the release tool bolt, be sure to carry out a function check of the service and parking brake system.