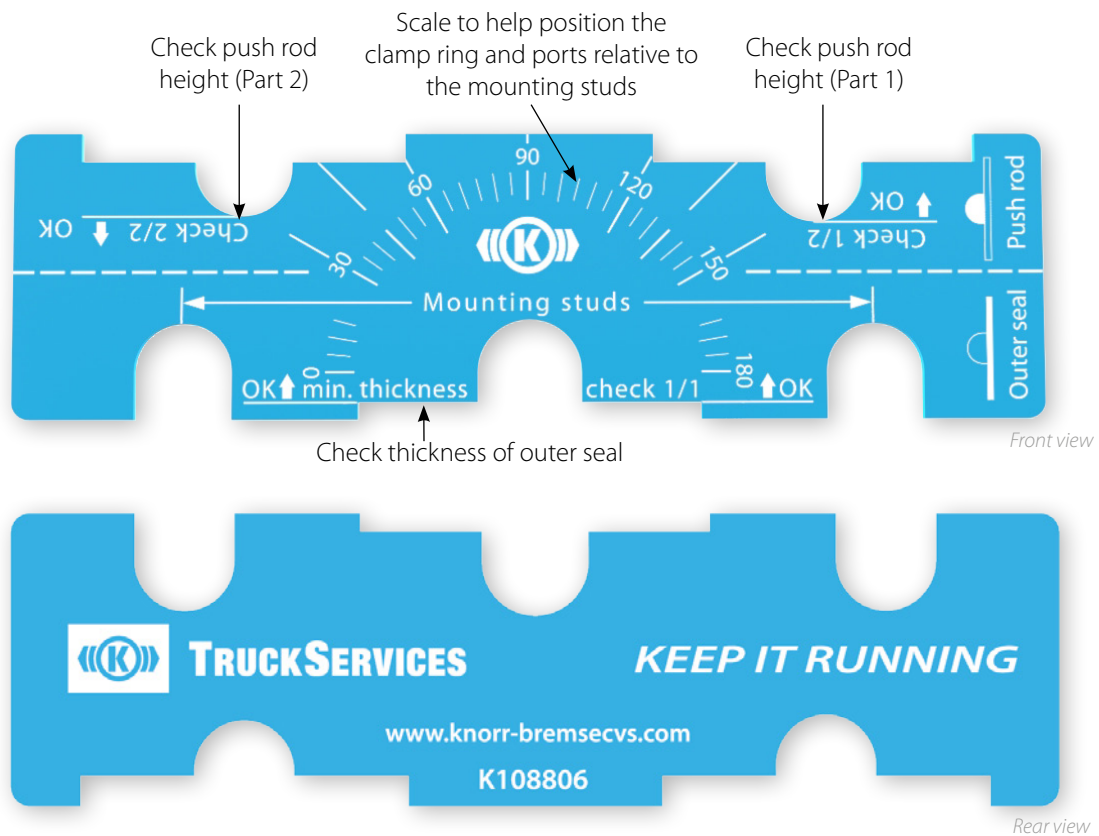


TRUCKSERVICES ACTUATOR MAINTENANCE GAUGE



EVERY VEHICLE TELLS ITS STORY. KEEP IT RUNNING

...means that we constantly strive to improve our service concepts and provide you with specifically designed tools to ensure that your vehicle is back on the road as fast as possible. As one of the leading commercial vehicle braking system manufacturers, we combine excellence in both air disc brake and brake actuator products and offer you the optimum sealing arrangement between the actuator and caliper. A secure connection and seal are fundamental elements affecting the performance and durability of the wheel brake and the safety of the vehicle, driver and load.

As an additional service we are introducing our new brake actuator maintenance gauge. By following a few simple steps, the gauge enables an easy test of the actuator's interface seal for Knorr-Bremse air disc brake. Furthermore, during maintenance with an original Knorr-Bremse actuator kit, or when fully replacing a spring brake with a rationalized unit, the gauge helps the operator to correctly re-assemble the components.

Your benefits:

- » Supports maintenance process and leads to quick service decisions
- » Reduction of downtime
- » Cost efficiency: service kits can be used in a more rapid manner
- » Ensures orientation of actuator corresponds exactly with original installation

The following pages give a simple step-by-step guide of how to use the gauge to service an actuator or set-up a new actuator to the same parameters as the original.

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Note: If service work is carried out on a vehicle based on information provided herein, it is the responsibility of the workshop to ensure the vehicle is fully tested and in full functional order before the vehicle is returned into service. Knorr-Bremse accepts no liability for problems caused as a result of appropriate tests not being carried out.

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Safety and Environmental Guidelines:

Note: The safety advice listed below is applicable to general service and diagnostic work on braking systems. Also observe any recommendations from the axle or vehicle manufacturer concerning towing, jacking-up and securing the vehicle.

CAUTION: KNORR-BREMSE IS NOT LIABLE FOR ANY INJURIES OR DAMAGES CAUSED BY IMPROPER USE OF SPECIFIED SERVICE KITS AND/OR SERVICE TOOLS. FURTHERMORE, MISUSE OF TOOLS OR INCORRECT INSTALLATION OR APPLICATION OF SERVICE KITS MAY RESULT IN DAMAGE OR POTENTIALLY UNSAFE VEHICLE OPERATIONS. IN THIS CASE, KNORR-BREMSE DOES NOT HAVE ANY WARRANTY OBLIGATIONS.

Before and during working on or around compressed air systems and devices, the following precautions should be observed:

- 1 Always wear safety glasses when working with air pressure.
- 2 Never exceed the vehicle manufacturer's recommended air pressures.
- 3 Never look into air jets or direct them at anyone.
- 4 Never connect or disconnect a hose or line containing pressure; it may whip as air escapes.
- 5 When removing or servicing a product, ensure all pressure related to the specific system it is contained in has been depleted to 0 bar. Be aware that if the vehicle is equipped with an air dryer system, it can also contain air pressure along with its purge reservoir, if fitted, even after pressure has been drained from the other reservoirs.
- 6 If it is necessary to drain the air pressure from reservoirs, etc., keep away from brake actuator push rods and levers since they may move as system pressure drops. On vehicles fitted with air suspension, it is advised when undertaking such work, to support the chassis from sudden lowering and therefore prevent any possibility of being trapped between the chassis and axle or ground.
- 7 Park the vehicle on a level surface, apply the parking brakes, and always chock the wheels as depleting vehicle air system pressure may cause the vehicle to roll.
- 8 When working under or around the vehicle, and particularly when working in the engine compartment, the engine should be shut off and the ignition key removed. Where circumstances require that the engine be running, EXTREME CAUTION should be taken to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components. Additionally, it is advisable to place a clear sign on or near the steering wheel advising that there is work in progress on the vehicle.
- 9 When working on vehicles equipped with air suspension, to guard against injury due to unexpected downward movement of the chassis caused by sudden pressure loss in the suspension system, ensure that the vehicle chassis is mechanically supported with a 'prop' between the chassis and the axle or between the chassis and the ground.
- 10 Examine all pipework for signs of kinks, dents, abrasion, drying out or overheating. Be aware that kinks in pipework may result in air pressure being trapped in the pipework and associated equipment. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems. Check the attachment of all pipework; it should be installed so that it cannot abrade or be subjected to excessive heat.
- 11 Components with stripped threads or damaged/corroded parts must be replaced completely. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle or component manufacturer.
- 12 Never attempt to install, remove, disassemble or assemble a device until you have read and thoroughly understood the recommended procedures. Some units contain powerful springs and injury can result if not properly dismantled and reassembled. Use only the correct tools and observe all precautions pertaining to use of those tools.
- 13 Before removing any device note its position and the connections of all pipework so that the replacement/serviced device can be properly installed. Ensure that adequate support or assistance is provided for the removal/installation of heavy items.
- 14 Only use genuine replacement parts, components and kits as supplied by Knorr-Bremse or the vehicle manufacturer. Only use the recommended tools as specified in related Knorr-Bremse instructions.
- 15 The serviced or replaced product must be checked for correct function and effectiveness.
- 16 If products have been dismantled, serviced or replaced, whose performance could affect braking performance or system behaviour, this should be checked on a roller dynamometer. Bear in mind that a lower performance may be experienced during the bedding-in phase if new brake pads/linings and/or brake discs/drums have been fitted.
- 17 The use of impact screwdrivers or impact wrenches in conjunction with Knorr-Bremse service tools for air disc brakes is not permitted. The service tools are not designed for such use. It is likely that the tools or the vehicle will be damaged and there is a serious risk of injury – see Caution on previous page.
- 18 Do not use compressed air to clean the disc brake. Avoid air contamination of brake dust.
- 19 Prior to returning the vehicle to service, make certain that all components and the complete brake systems are leak free and restored to their proper operating condition.

Welding

To avoid damage to electronic components when carrying out electrical welding, the following precautions should be observed:

- 1 In all cases, before starting any electrical welding, remove all connections from any electronic control units or modules, noting their position and the order in which they are removed.
- 2 When re-inserting the electrical connectors (in reverse order) it is essential that they are fitted to their correct assigned position - if necessary this must be checked by PC Diagnostics.



Disposal of Waste Equipment by Business Users in the European Union

This symbol on the product, packaging or in user instructions, indicates that this product must not be disposed of with other general waste. Instead, it is your responsibility to dispose of the waste electrical and electronic parts of this product by handing them over to a company or organisation authorised for the recycling of waste electrical and electronic equipment. For more information about arrangements for waste equipment disposal please contact your Knorr-Bremse distributor or local Knorr-Bremse representative.

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How to use the TruckServices Actuator Maintenance Gauge

Push Rod Height Check

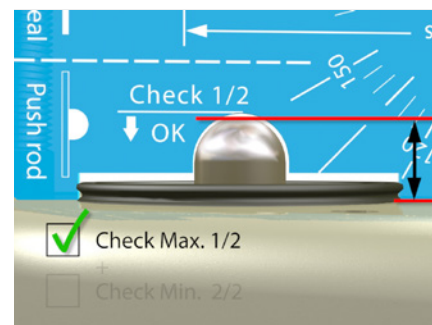
It is necessary to check the height against both the maximum and minimum gauge recesses.

Step 1 of 2)

Use the recess marked "Check 1/2" to check against the **maximum** permitted height.



If the gauge does not lie flat on the actuator due to interference with the push rod the check has failed.



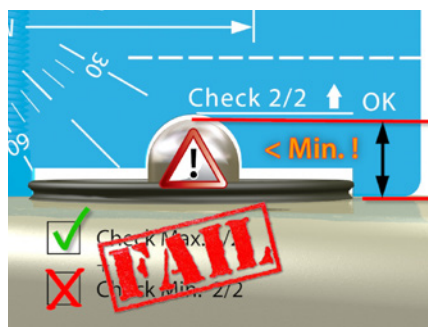
If the gauge lies flat on the actuator and there is no interference with the push rod, the check has passed and you should move on to test for minimum permitted height.

Step 2 of 2)

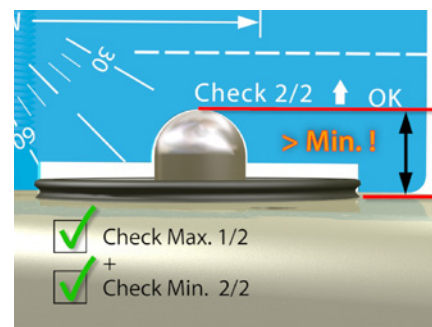
Use the recess marked "Check 2/2" to check against the **minimum** permitted height.

Note:

The push rod height is in the permitted range only when both tests are passed.



If the push rod height is lower than the "OK" line, the check has failed.



If the push rod is a perfect fit and reaches the "OK" line, or if the gauge does not lie flat on the actuator, the check has passed.

Seal Height Check

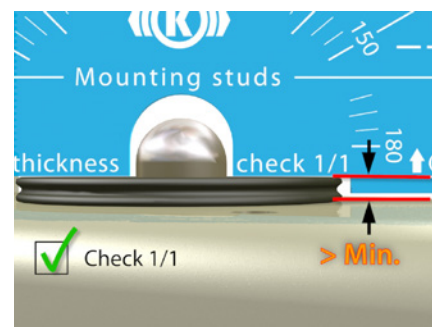
Use the central recess on the gauge to check the permitted height.

Note:

If any of the above tests have failed, the brake actuator has to be either repaired using a genuine Knorr-Bremse service kit or replaced with a new complete unit.



The height of the seal should not drop below 3 mm. If the seal height is lower than the line marked "min. thickness check 1/1", the check has failed.

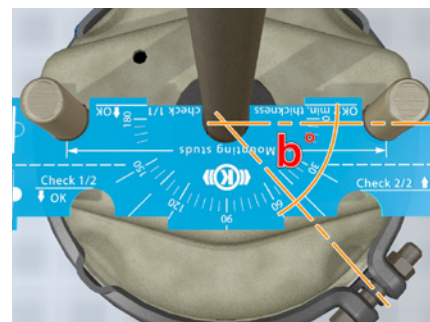
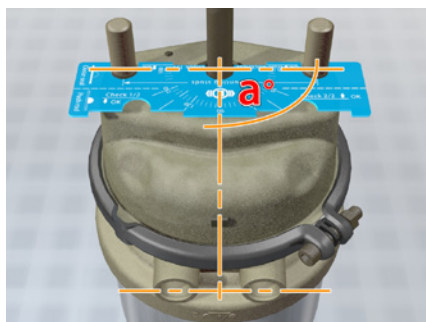


If the seal height reaches the line or the gauge does not lie flat on the actuator due to interference with the seal, the check has passed.

Clamp ring and Air Port Angles Check

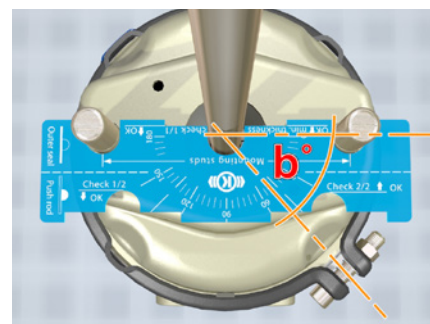
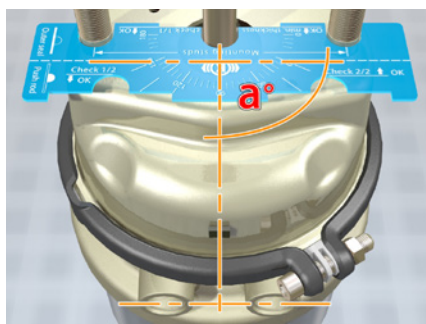
This can be used for disc or S-Cam brake actuators.

Whether you are replacing an actuator with a rationalised unit or servicing it, you will firstly need to take note of the positions of the clamp ring and the air ports of the old unit.



Step 1

Note the positions of the air ports (angle "A") and clamp ring (angle "B") of the old unit.



Step 2

For the re-assembled actuator or new actuator, take the recorded angles ("A" and "B") from the original unit and after re-assembly adjust the air port position and the clamp ring position accordingly.

Important notes:

- » Lubricate the push rod and the sealing area with molybdenum-free Rhenolit HLT2.
- » Ensure the actuator vent hole at the lowest position is not plugged once installed.
- » Use new mounting nuts – these are self-locking and should not be reused. Tighten the nuts in alternate stages and finally to a torque of 180 + 30 Nm.
- » Please refer to our website www.knorr-bremsecvs.com for our genuine products and our service manuals in the "Product Search" and "Downloads" area.

Disclaimer:

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