Installation Instructions

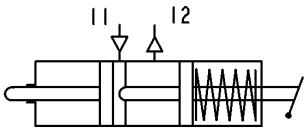
August 2010

NG4 Double Diaphragm Spring Brake for S-cam Applications

Specification, installation and wind-off procedure

Spring brakes are used to provide the service, secondary and parking brake functions on commercial vehicles with pneumatically braked drum brakes.
These instructions cover the safe removal of an old spring brake and the correct procedure for installing a new one.

Graphic symbol: DIN ISO 1219

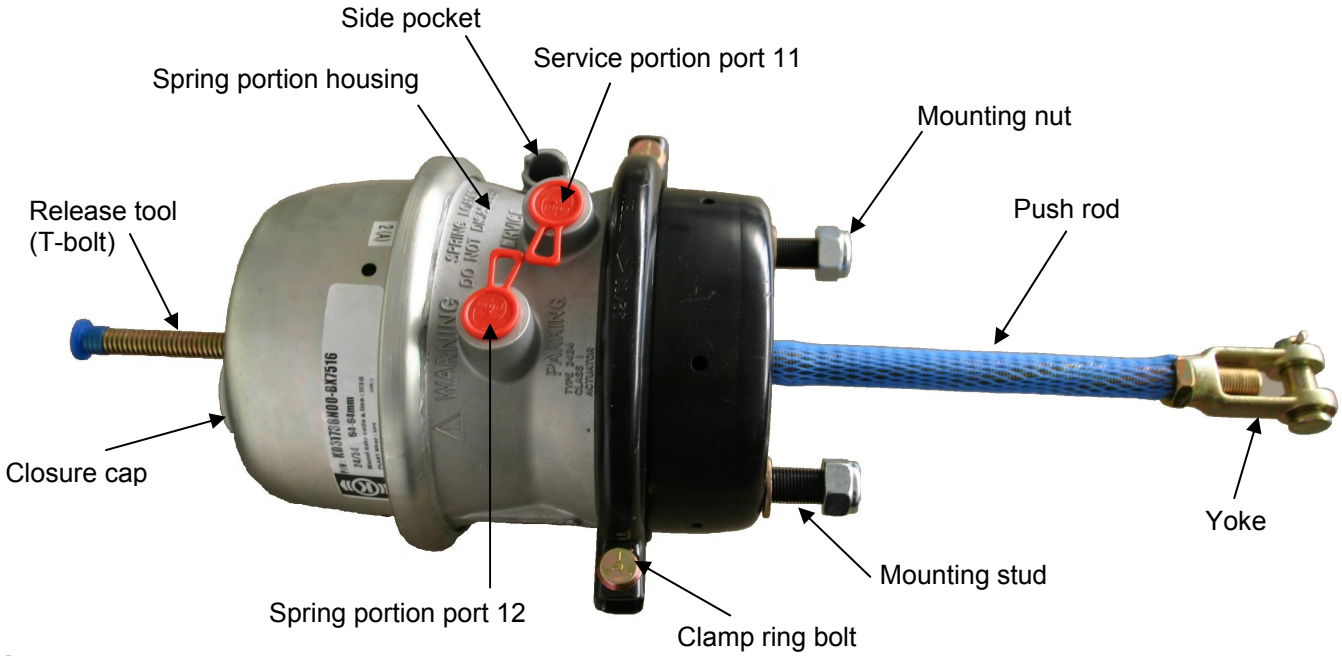


Safety and Environment guidelines

Refer to document Y075876 in Documentation Download section at www.Knorr-BremseCVS.com

Notes:

- **Spring brakes must always be replaced as instructed using genuine service kits and parts.**
- **We recommend that spring brakes are replaced as a pair**
- **Spring brakes contain a very powerful spring which can cause serious injury if the wrong parts, tools or methods are used!**



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Before removal of an old spring brake from a vehicle, the following spring caging process MUST be followed (also referred to as winding-off the spring brake):

1. This procedure will be made much easier if air pressure (6.6 - 8.0bar) is applied to port 12 to compress the power spring before inserting release tool.
2. Remove the closure cap from the keyhole located at the rear centre of the spring brake.
3. Remove the release tool (T-bolt) assembly from the side pocket of the spring brake.
4. Insert the release tool through the release tool keyhole and into the power spring piston plate.
5. Turn the release tool 1/4 turn clockwise.
6. Pull on the release tool to ensure the T-section is properly seated.
7. Assemble the release tool washer and nut onto the release bolt and finger tighten only. If caging is being done manually - it is recommended that some type of lubrication is applied to the release bolt threads prior to tightening.
8. To cage the spring brake's power spring, turn the release tool nut clockwise with a hand wrench. The maximum torque should not exceed 68Nm. If the spring has not previously been compressed by the use of air (see step 1 above), verify that the push rod is retracting during the process and that the release bolt is extending from inside the spring brake housing. (DO NOT USE A HIGH SPEED AND/OR POWER DRIVEN IMPACT WRENCH)
9. Rotate the release tool nut clockwise until an increased resistance is encountered; this should indicate proper caging is complete.
   IMPORTANT: To ensure the power spring is fully caged, the extended release tool length should measure at least the 'X' dimension as shown in the table below when measured from the nut to the end of the screw. WARNING: DO NOT USE AN IMPACT WRENCH AND DO NOT OVER TORQUE THE RELEASE BOLT SINCE THIS CAN CAUSE DAMAGE TO THE SPRING BRAKE.
10. If air pressure had previously been applied in step 1, it should now be released.

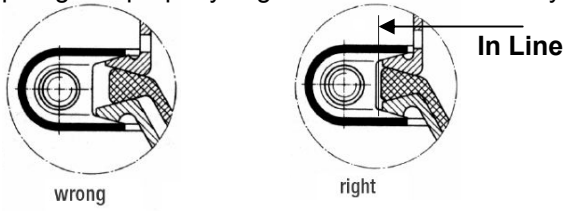
Spring brake removal

1. With the power spring caged and all air pressure drained from the air brake system; disconnect the air hoses from the ports 11 and 12.
2. Remove split pin and yoke pin from the yoke assembly.
3. While supporting the spring brake in position, remove and discard the mounting nuts. *Nuts and washers must not be re-used*. Remove the spring brake.

Configuring the replacement spring brake

NOTE: *For proper installation, the position of the ports and/or clamp ring 'ears' of the replacement spring brake may need to be move to correspond with the positions on the old unit.*
NOTE: *See Warranty Claims on p4 of this document.*

1. Apply 1bar of air pressure to the service port 11.
2. To prevent the push rod retracting when the air pressure is removed, after first protecting the thread, clamp the push rod at the point it emerges from the front plate with locking pliers.
3. Release the air pressure.
4. Unscrew the clamp ring nuts and remove the two piece clamp ring whilst taking care to support the service portion.
5. Position the spring portion ports with respect to the mounting studs, as needed.
6. Make sure that the diaphragm is properly aligned and seated centrally.



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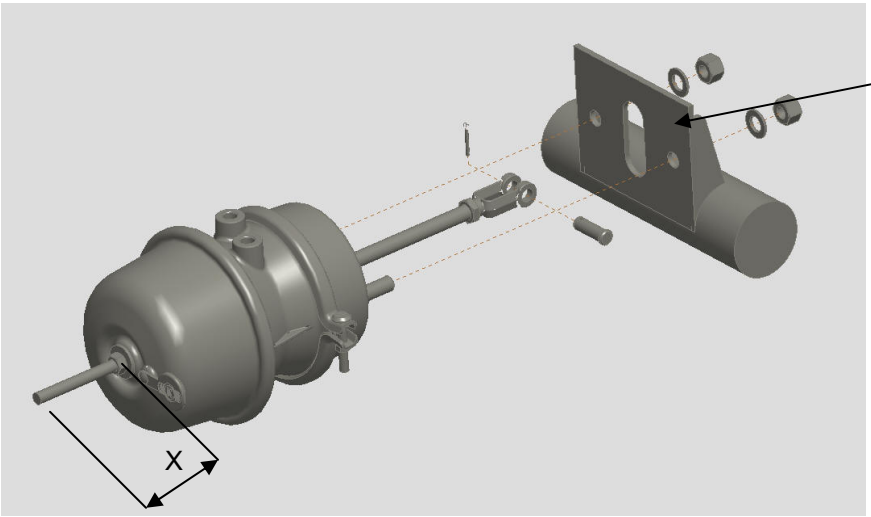
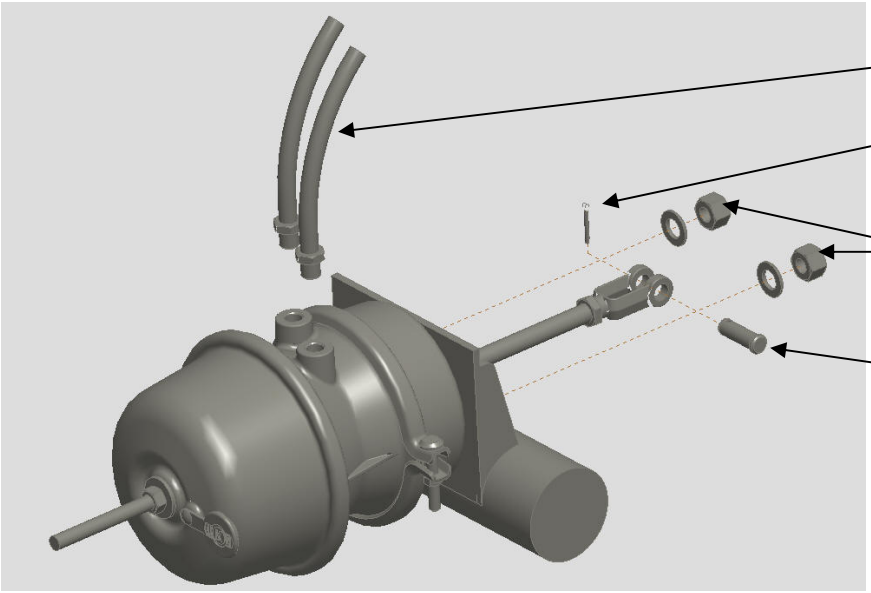
7. Refit the clamp rings so that the ‘ears’ are in the correct position relative to the mounting studs.
8. Tighten each clamp ring nut evenly in an alternating pattern and finally to a torque of 30 - 54Nm.
9. Carefully inspect the clamp ring to ensure that it is correctly seated.
10. Apply pressure to service port 11 - do not exceed 1bar. Remove the locking pliers from the push rod.
11. Perform the leakage test as described below.

Spring brake installation



Be certain that mounting bracket surface is free of debris, burrs, cracks and is flat within 0.4mm

TYPE	STROKE	CAGING TOOL LENGTH 'X' (FULLY CAGED)
20/24	57	74
24/24	64	86
24/30	64	86
24/30	76	86
30/30	64	86



1. Clean and inspect the mounting bracket.
2. If the service replacement spring brake contains a long fully threaded push rod, cut the rod to the correct length for the application. Verify that there is no interference throughout the full range of motion of the slack adjuster.
3. Install the spring brake using new mounting nuts. Torque the mounting nuts alternatively to 180 - 210Nm.
4. Adjust the yoke on the push rod and/or rotate the slack adjuster (refer to the slack adjuster manufacturer’s instructions) to meet the yoke. NEVER pull the push rod to meet the slack adjuster. *A maximum of 3° deviation can be accepted between the push rod and its centreline during the complete push rod travel.*

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5. Apply grease to the yoke pin. Connect the yoke to the slack adjuster with the yoke pin and split pin
6. Connect service brake hose to port 11 and parking brake hose to port 12. Tighten fittings to 40 +5Nm.

Uncaging the spring (also referred to as winding on the spring brake)

1. After the spring brake has been properly installed on its bracket and properly attached to the slack adjuster, release the vehicle's park brake to apply air to port 12. Alternatively, connect a regulated air line to port 12 and supply 6.6 – 8.0bar.
2. Turn the release tool nut anti-clockwise with a hand wrench until the caging tool is loose. Remove release tool nut and washer. (DO NOT USE HIGH SPEED OR POWER DRIVEN IMPACT WRENCH)
3. Push release tool in, turn it 1/4 turn anti-clockwise and remove it from the key hole.
4. With hands clear of moving parts, slowly apply the parking brake to release the air pressure to the parking brake port 12.
5. Place release tool in its holder on the spring brake body with the T-head down and seated in the slot. Fit washer and nut on exposed threads (this allows the washer to protect the holder cavity and caging bolt from corrosion) and torque to 14 - 20Nm.
6. IMPORTANT: Fit the closure cap in the keyhole - lift all around the edge of the cap to ensure it is firmly seated. Failure to do so may result in corrosion and foreign material ingestion through the key hole which will invalidate the warranty.

Operating and leakage tests

A. OPERATING TEST

1. Apply brakes and observe the push rod moves out promptly and without binding.
2. Release brakes and observe that the push rods return to the released position promptly and without binding.
3. Check push rod travel. Push rod travel should be as short as possible without brakes dragging. Adjust the travel of the push rod at the slack adjuster if necessary, following the slack adjuster manufacturer's instructions.

B. LEAKAGE TEST

1. Make and hold a full brake application.
2. Using soap solution, coat the clamp rings. If leakage is detected, tighten the clamp ring nuts only enough to stop leakage. DO NOT OVERTIGHTEN as this can damage sealing surfaces or the clamp ring.
3. Coat the area around push rod hole (loosen boot if necessary). No leakage is permitted. If leakage is detected, the diaphragm may need to be replaced.
4. Coat the hose fitting, no leakage is permitted.

Warranty claims

Claims under warranty for leakage from the clamp ring interface will not be honoured if the leakage is assessed to be as a direct result of re-orientation of the air ports or clamp rings.

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