

BD Caliper Brake




STANDARD



In accordance with Nexen's established policy of constant product improvement, the specifications contained in this manual are subject to change without notice. Technical data listed in this manual are based on the latest information available at the time of printing and are also subject to change without notice.

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	<div data-bbox="537 558 834 611"> DANGER</div> <p>Read this manual carefully before installation and operation. Follow Nexen's instructions and integrate this unit into your system with care. This unit should be installed, operated and maintained by qualified personnel ONLY. Improper installation can damage your system, cause injury or death. Comply with all applicable codes.</p>	
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This document is the original, non-translated, version.

Conformity Declaration: In accordance with Appendix II B of CE Machinery Directive (2006/42/EC):

A Declaration of Incorporation of Partly Completed Machinery evaluation for the applicable EU directives was carried out for this product in accordance with the Machinery Directive. The declaration of incorporation is set out in writing in a separate document and can be requested if required.

This machinery is incomplete and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the applicable provisions of the Directive.

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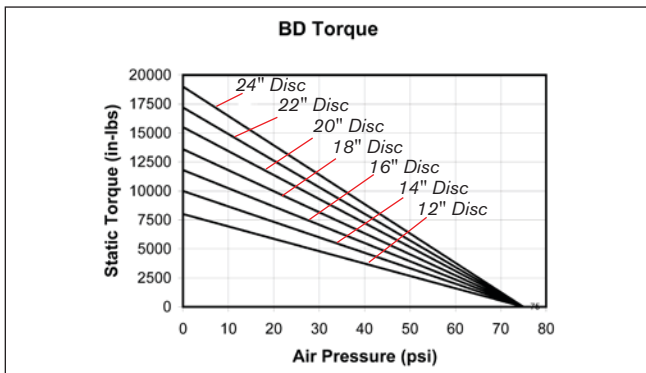
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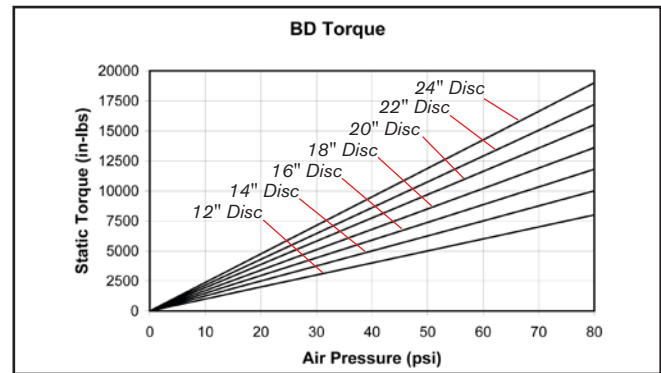
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GENERAL SPECIFICATIONS



Spring Engaged



Air Engaged

GENERAL SAFETY PRECAUTIONS



CAUTION

The temperature limits for the product are 4.5-100 degree Celsius (40-220 degree F).



CAUTION

Working with spring loaded or tension loaded fasteners and devices can cause injury. Wear safety glasses and take the appropriate safety precautions.



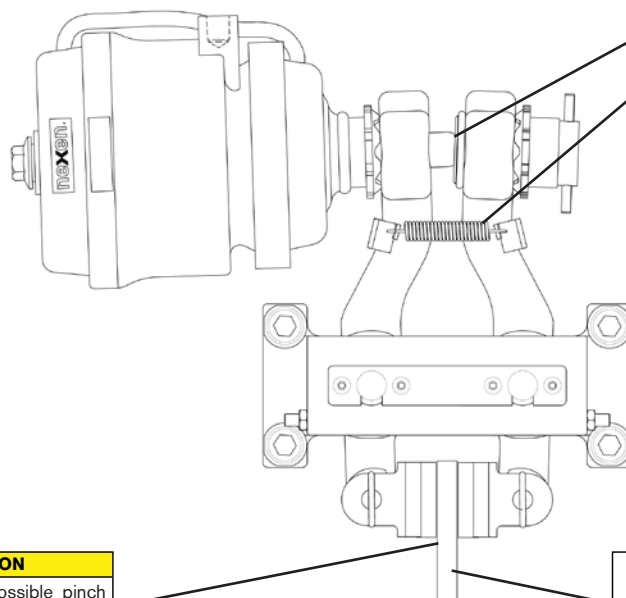
CAUTION

This product has possible pinch points. Care should be taken when interacting with this product.



WARNING

Ensure proper guarding of the product is used. Nexen recommends the machine builder design guarding in compliance with OSHA 29 CFR 1910 "Occupational Safety and Health Hazards".



CAUTION

This product has possible pinch points. Care should be taken when interacting with this product.



CAUTION

This product has possible pinch points. Care should be taken when interacting with this product.



CAUTION

Surface temperature may exceed safe handling limits during operation. Do not touch.

INTRODUCTION

BEFORE YOU BEGIN

Nexen has introduced a new actuator for BD Caliper Brake spring-engaged models. The old Three-Port Actuator is obsolete.

The new two actuator is geometrically different and the manual disengagement mechanism operates differently. The new actuator for the 60 psi release unit is unique in look from the new two port actuator.

The redesigned two-port model has a rubber hose on the exterior of the product used for balancing internal air pressure. The service and spring ports for this model have been redesigned and simplified.

The mounting procedures on both actuators are identical.


Review the summary of actuator differences below before beginning any installation or maintenance procedures.

NOTE

The installation and maintenance procedures for each model are located next to each other in this manual. Be sure to follow the appropriate instructions for each model.


SUMMARY OF DIFFERENCES IN BD ACTUATORS

	Obsolete 3 Port Actuator	2 Port Actuator	60 PSI Release Actuator
Overall Length	214 mm [8.41 in]	169 mm [6.67 in]	165 mm [6.5 in]
Diameter	160 mm [6.31 in]	163 mm [6.44 in]	184.2 mm [7.25 in]
Clamping Force	Refer to catalog data	5% greater	Refer to catalog
Hold-Off Pressure	4.96 bar [72 psi]	5.10 bar [74 psi]	4.1 bar [60 psi]
Power Spring	Telescoping	Non-coil clash	Multiple coil
Ports	One spring release and two plugged ports	One spring release and one plugged port	One spring release and one vent port



CAUTION

The user(s) of this equipment must comply with operating procedures and training of operating personnel as stated in the Occupational Safety and Health Act (OSHA) Standard (29 CFR 1910) Section 1910.219-K.



WARNING

The spring engaged, two port actuator must be replaced every 6 years or 250K cycles, whichever comes first.

Read this manual carefully, making full use of its explanations and instructions. The "Know How" of safe, continuous, trouble-free operation depends on the degree of your understanding of the system and your willingness to keep all components in proper operating condition. Pay particular attention to all NOTES, CAUTIONS, and WARNINGS to avoid the risk of personal injury or property damage. It is important to understand that these NOTES, CAUTIONS, and WARNINGS are not exhaustive. Nexen cannot possibly know or evaluate all conceivable methods in which service may be performed, or of the possible hazardous consequences of each method.

Accordingly, anyone who uses a procedure that is not recommended by Nexen must first satisfy themselves that neither their safety or the safety of the product will be jeopardized by the service method selected.

INSTALLATION

DISC

1. Thoroughly inspect the tapered bore of the disc hub and the tapered surface of the Q.D. bushing. Remove any dirt, grease, or foreign material from the disc hub and Q.D. bushing.



CAUTION

Do not use lubricants for this installation.

2. Assemble the Q.D. bushing into the disc hub, aligning the untapped holes in the bushing flange with the tapped holes in the disc hub.
3. Insert the pull-up bolts and alternately and evenly tighten them to the recommended torque (See Tables 1 and 2).

Note

Run-out is minimized if a Dial Indicator is used as the pull-up bolts are tightened. Place the contact tip of the Dial Indicator on the machined surface of the rotor to measure Run-out. Run-out should be less than 3.8mm (.015 in) See Figure 1).



CAUTION

If excessive tightening torque is applied, bursting pressures are created in the hub. There must be a gap between the flange of the Q.D. bushing and the disc hub to ensure a proper press fit of the Q.D. bushing onto the shaft.

4. To remove the Q.D. bushing, remove the pull-up bolts and reinsert into the threaded holes. Tighten the pull-up bolts to push the disc hub off the Q.D. bushing.

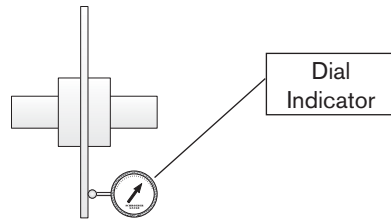


Figure 1

Table 1
Pull-up Bolt Torques For Non-Ventilated Discs

RECOMMENDED TIGHTENING TORQUES			
DIAMETER	PART NUMBER	Q.D. BUSHING	TORQUE
305 mm [12 in]	934201	SF	40.5 Nm [30 ft-lb]
356 mm [14 in]	934202	E	81 Nm [60 ft-lb]
406 mm [16 in]	934203	E	81 Nm [60 ft-lb]
457 mm [18 in]	934204	J	182.5 Nm 133 ft-lb
508 mm [20 in]	934205	J	182.5 Nm 133 ft-lb
559 mm [22 in]	934206	J	182.5 Nm 133 ft-lb
610 [24 in]	934207	J	182.5 Nm 133 ft-lb

Table 2
Pull-up Bolt Torques For Ventilated Discs

RECOMMENDED TIGHTENING TORQUES			
DIAMETER	PART NUMBER	Q.D. BUSHING	TORQUE
463.5 mm [18.25 in]	934200	J	182.5 Nm [135 ft-lb]
533 mm [21 in]	934300	J	182.5 Nm [135 ft-lb]
610 mm [24 in]	934400	J	182.5 Nm [135 ft-lb]

ACTUATOR

WARNING

Spring actuated brakes must be manually released prior to brake disassembly.
Refer to pages 16 & 17 for manual disengagement and re-engagement instructions.

Hold-off air pressure can be removed once unit is manually disengaged, and service performed
(See Figure 2).

Refer to Figure 3.

The actuator can be mounted on either side of the brake.

1. Pull Shoe Pins (Item 16) up and out.
2. Remove Shoes (Item 3).
3. Remove the 4 Cap Screws (Item 24).
4. Remove the Pivot Pin Retainer Plate (Item 6).
5. Press the Pivot Pins out (Item 7).
6. Slide Arms (Item 2) out of Main Frame (Item 1).
7. Position Arms and Actuator as desired.
8. Reverse the above procedure to reassemble the BD Caliper Brake.
9. Tighten the Cap Screws (Item 24) to 7-9 Nm [5-7 ft-lb] torque.

Re-Engagement

NOTE:

On spring engaged BD Caliper Brakes, apply 80-100 psi hold-off air pressure and: Refer to pages 16 & 17 for manual disengage and re-engage instructions.



CAUTION

Do not completely unscrew the bolt from the unit or the manual release mechanism will be disabled.

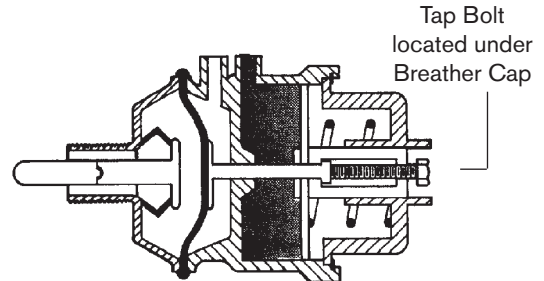


Figure 2a Obsolete Three-Port Actuator

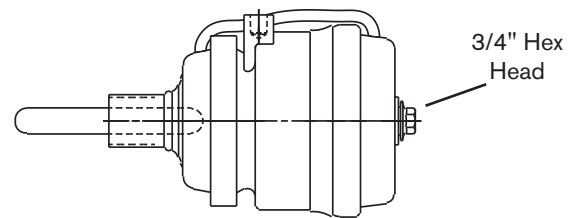


Figure 2b Two-Port Actuator

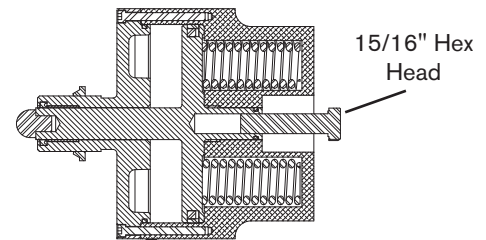


Figure 2c 60 PSI Actuator

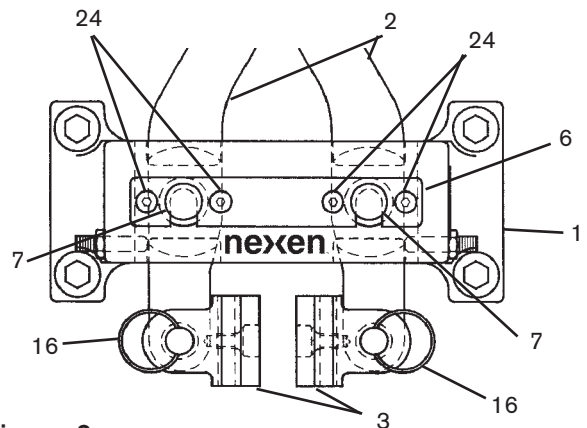


Figure 3

MAIN FRAME (MOUNTING BRAKE TO DISC)

NOTE

Set Screws (Item 50) and Nuts (Item 51) are provided to hold Arms (Item 2) in place when the BD Caliper Brake is used on vertical shaft installations (See Figure 4).

NOTE

If the BD Caliper Brake is spring engaged, release the brake by applying 5.17-6.90 bar [75-100 psi] hold-off air pressure.

1. Locate the BD Caliper Brake in the desired position in relation to the disc.

NOTE

If the BD Caliper Brake is air engaged, apply air to the brake to lock it into position in relation to the disc. If the BD Caliper is spring engaged, release the hold-off air pressure.

2. Lock the BD Caliper Brake in position in relation to the disc.
3. Align the customer supplied support with the Main Frame (Item 1) mounting holes (See Figure 4).

Note

The support must be capable of sustaining loads produced during braking.

If shims are used under the Main Frame (Item 1) mounting pads, care must be taken to prevent warping of the Main Frame when tightening the Cap Screws (Item 19) (See Figure 4).

4. Release the BD Caliper Brake from the disc.
5. Tighten the Cap Screws (Item 19) to 67.8 Nm [50 ft-lb] torque (See Figure 4).

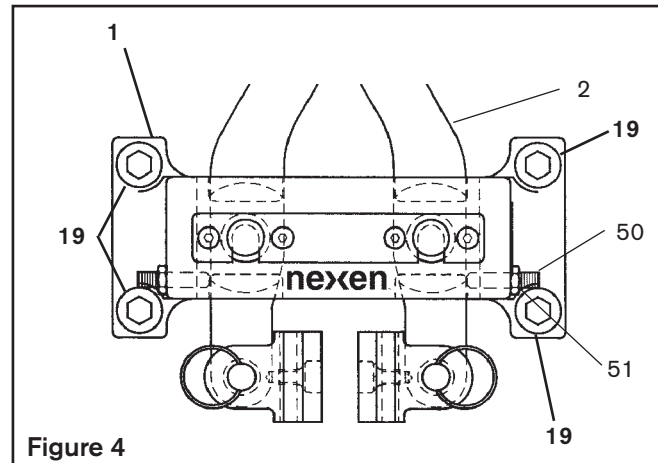


Figure 4



WARNING

The Cap Screws (Item 19) must sustain the loads produced by braking and preload produced by mounting torque. The torque rating specified above allows a significant load safety factor. Do not over torque cap screws.

FRICTION FACING CLEARANCE ADJUSTMENT

Note

For the Brakes listed in Table 3, the Friction Facing clearance gap has been preset at the factory for the Friction Disc width specified. The following adjustment process is necessary only if the Friction Disc being used does not have the same width as specified for the respective product that is being installed.

AIR ACTUATED

1. Loosen adjustment screw Spanner Nut (Item 12) (See Figure 5).
2. Loosen the Adjustment Screw (Item 8) until a 1/32 inch spacer can be slid between each of the Friction Facings (Item 4) and Friction Disc (See Figure 5).
3. Turn the Adjustment Screw (Item 8) in until the spacer can be just pulled out (See Figure 5).
4. Tighten the Spanner Nut (Item 12) to 13.6-20.3 Nm [10-14 ft-lb] torque (See Figure 5).

Table 3

PRODUCT NUMBER	FRICTION DISC WIDTH	PRODUCT NUMBER	FRICTION DISC WIDTH
933500	13 mm [0.50 in]	933594	25 mm [1.00 in]
933501	13 mm [0.50 in]	933595	25 mm [1.00 in]
933502	19 mm [0.75 in]	933600	13 mm [0.50 in]
933503	13 mm [0.50 in]	933601	13 mm [0.50 in]
933589	13 mm [0.50 in]	933602	13 mm [0.50 in]
933591	25 mm [1.00 in]	933692	13 mm [0.50 in]
933592	25 mm [1.00 in]	933693	13 mm [0.50 in]
933593	25 mm [1.00 in]	933694	13 mm [0.50 in]

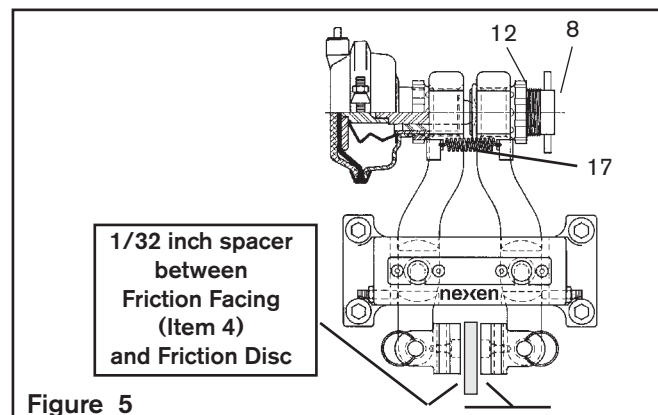


Figure 5

SPRING ACTUATED

Note
Friction facing adjustment on spring actuated units is accomplished while the brake is not actuated. Apply hold-off air pressure of 5.17-6.90 bar [75-100 psi] to release the spring Actuator.

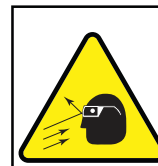


CAUTION

This product has possible pinch points. Care should be taken when interacting with this product.

1. Apply hold-off air pressure to release the spring Actuator (See Figure 6).

Note
Before performing step two, determine the actuator type and select either step 2a or 2b. Step four returns to general instructions used for both models.



CAUTION

Working with spring loaded or tension loaded fasteners and devices can cause injury. Wear safety glasses and take the appropriate safety precautions.

2. **Manually Disengage Brake:** Refer to pages 16 & 17 for manual disengagement and re-engagement instructions.
3. Loosen the adjustment screw Spanner Nut (Item 12) (See Figure 5).
4. Turn the Adjustment Screw (Item 8) until a 1/32 inch spacer can be slid between each of the Friction Facings (Item 4) and the Friction Disc (See Figure 5).
5. Turn the Adjustment Screw in until the spacer can just be pulled out.
6. Tighten the Spanner Nut (Item 12) to 13.6-20.3 Nm [10-15 ft-lb] torque.

Note
Ensure proper hold-off pressure has been maintained. (This will remove any tension on the tap bolt for easier release.)

7. **Manual Re-Engagement:** Refer to pages 16 & 17 for manual disengagement and re-engagement.
8. Remove hold-off air pressure to engage the spring Actuator.

SPRING BRAKE

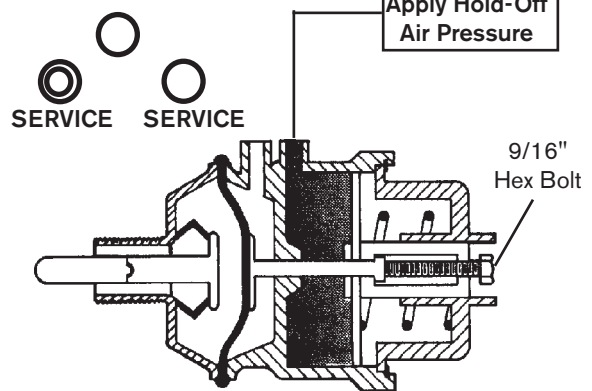


Figure 6a Obsolete Three-Port Actuator

Spring Brake

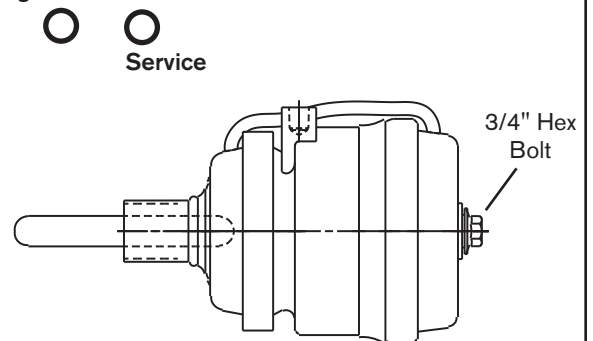


Figure 6b Two-Port Actuator

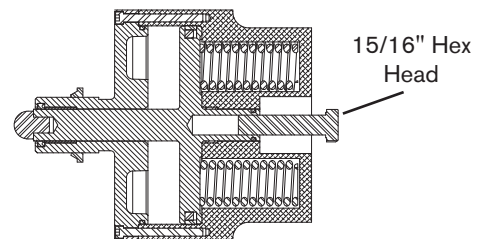


Figure 6c 60 PSI Actuator

AIR CONNECTIONS—GENERAL

NOTE

Maximum operating pressure is 6.90 bar [100 psi].

Pneumatically actuated devices require clean, pressure regulated, and lubricated air for maximum performance and long life. Your Nexen Distributor carries filters, regulators, and lubricators specifically designed to operate with Nexen clutches, brakes, and valves.

Piping diagrams are included in this manual for a variety of braking functions. Refer to OPERATIONAL MODES (See Page 12-14).

The actuator air connections may be rotated 360° by loosening the Ring Clamp and rotating the Actuator Head. If the actuator is spring engaged, first deactuate the brake and cage the spring.

1. Apply hold-off air pressure to release the spring Actuator (See Figure 6).

Note

Before performing step two, determine the actuator type and select either step 2a or 2b.

2. **Manual Disengagement:** Refer to pages 16 & 17 for manual disengagement and re-engagement instructions.
3. Adjust the ring clamp as required.

Note

Tighten Ring Clamp Bolts to 25-35 ft-lbs [34-47 Nm] torque.

A Hose Assembly (Item 23) is supplied and must be connected to the brake with sufficient slack to allow the Arms (Item 2) full movement without putting stress on the hose or hose couplings.

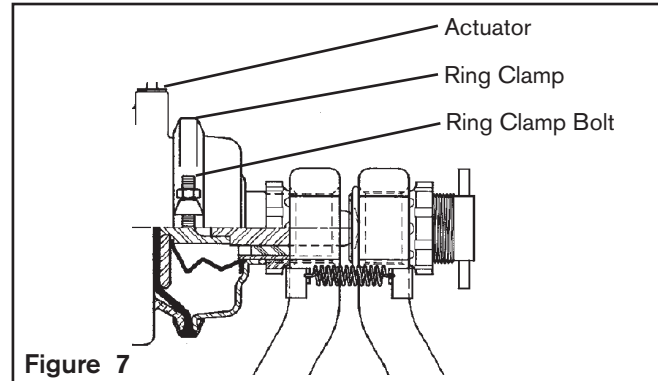


Figure 7

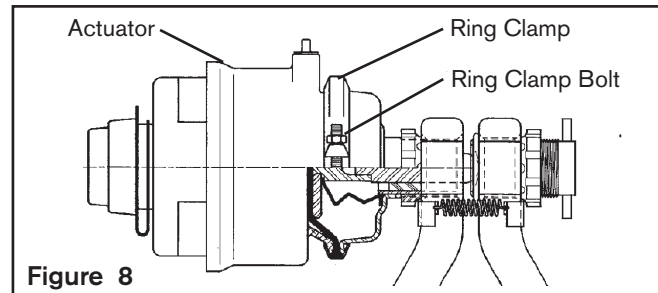


Figure 8

	WARNING
	<p>Do not use rigid pipe or tubing when connecting directly to the brake. Care must also be taken to prevent an unshielded air hose from rubbing on metal surfaces or edges; this will cause rapid deterioration of the hose.</p>

LUBRICATION

NOTE

Nexen pneumatically actuated devices require clean, pressure regulated air for maximum performance and life. All seals in Nexen pneumatically operated devices are lubricated for life, and do not require additional lubrication. However, some customers prefer to use an air line lubricator, which injects oil into the pressurized air, forcing an oil mist into the air chamber. This is acceptable, but care must be taken to ensure once an air mist lubrication system is used, it is continually used over the life of the product as the oil mist may wash free the factory installed lubrication.

Locate the lubricator above and within ten feet of the product, and use low viscosity oil such as SAE-10.

Synthetic lubricants are not recommended.

All pivot points on the BD Caliper Brake use self-lubricated high PV bearings.

For tension control applications where the disc is held at elevated temperatures for extended periods, use a light machine oil on Bearings (Items 14 and 15) (See Figure 9).

The sliding spherical contact between the Adjustment Screw (Item 8) and Piston Rod (Item 10) should be lubricated with a molybdenum disulfide based grease (See Figure 9).

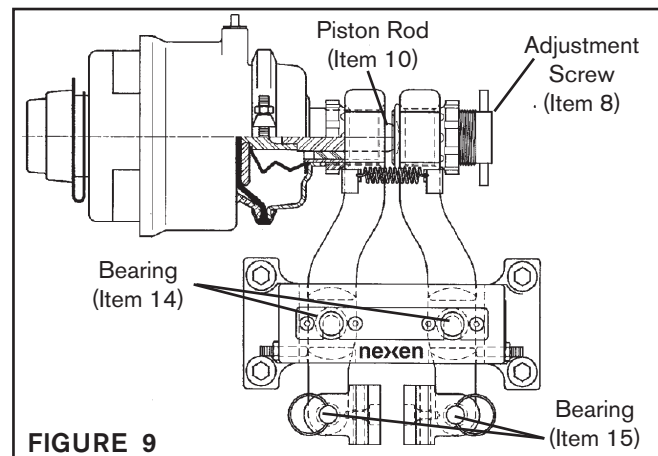
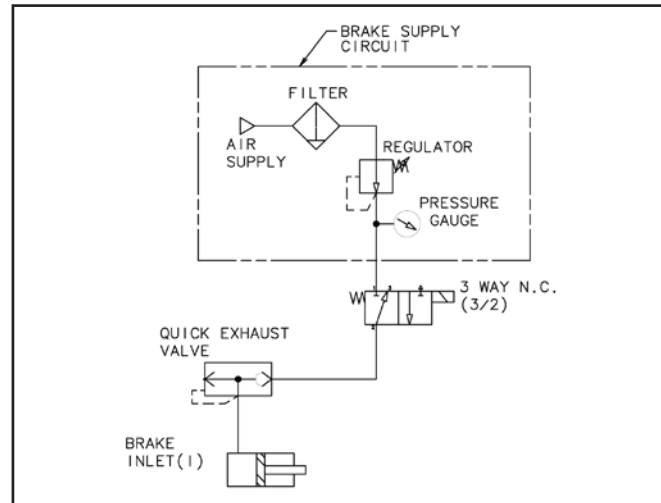
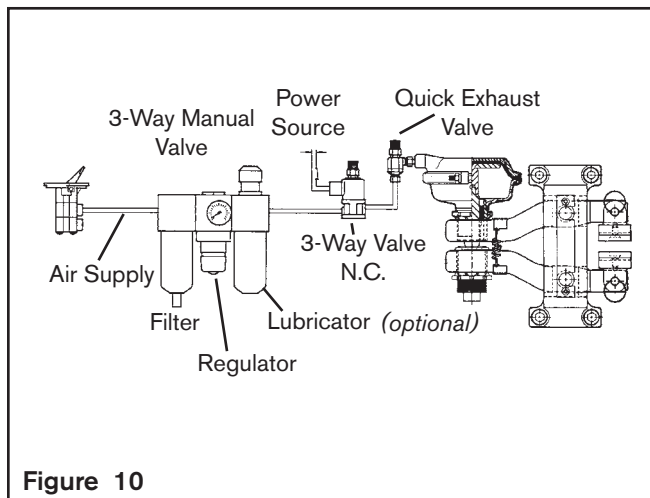


FIGURE 9

OPERATIONAL MODES

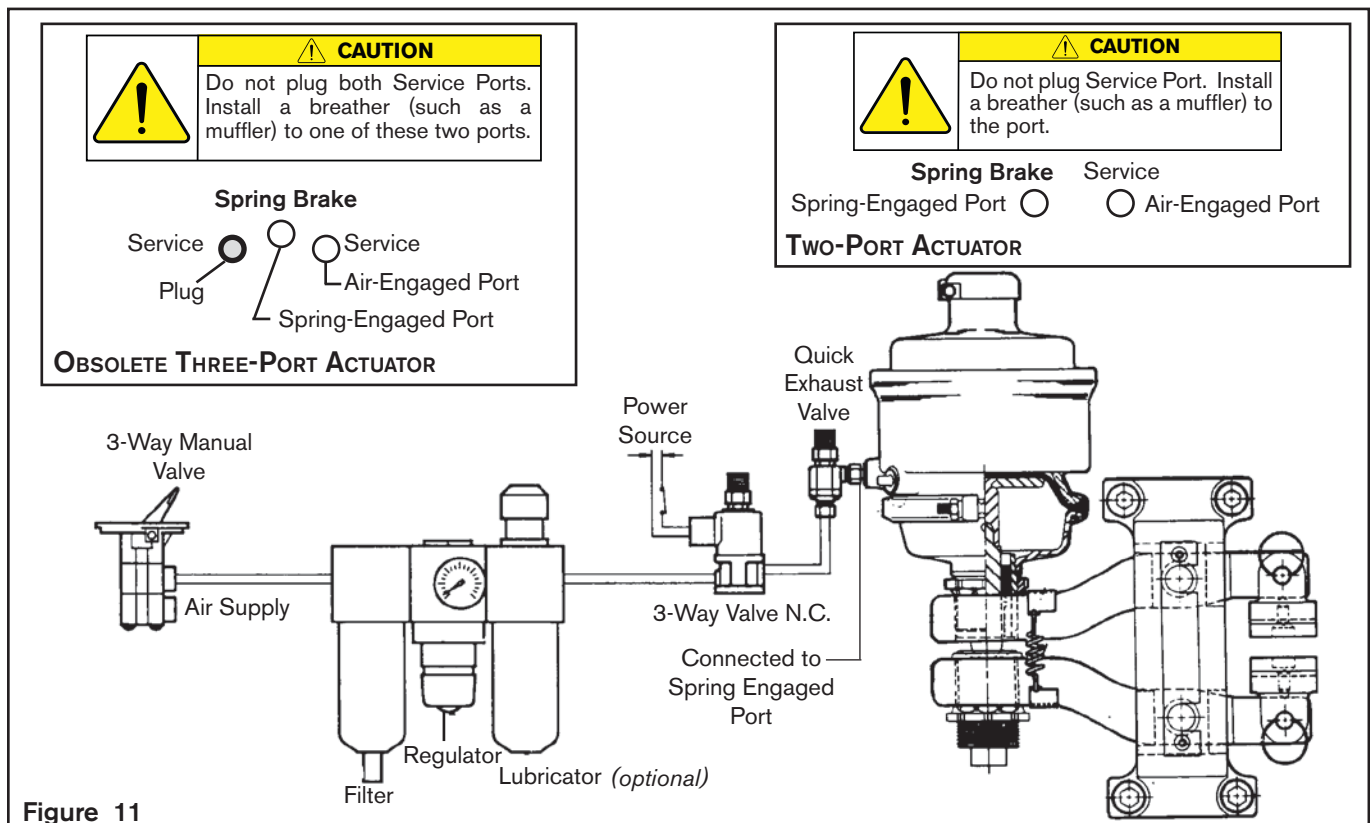
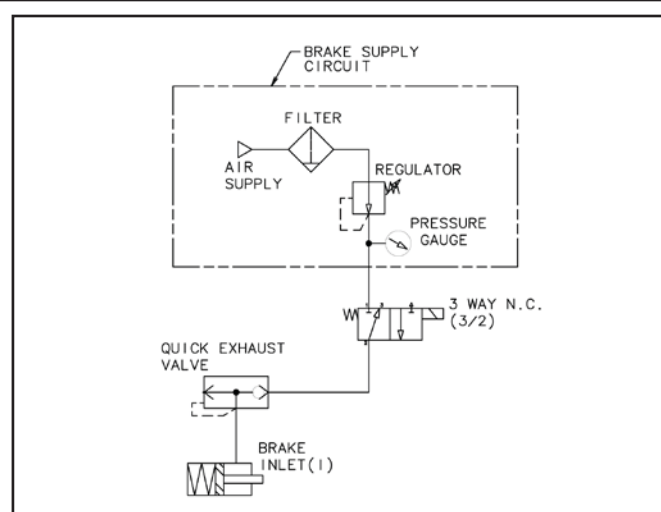
NORMAL AIR ENGAGED MODE

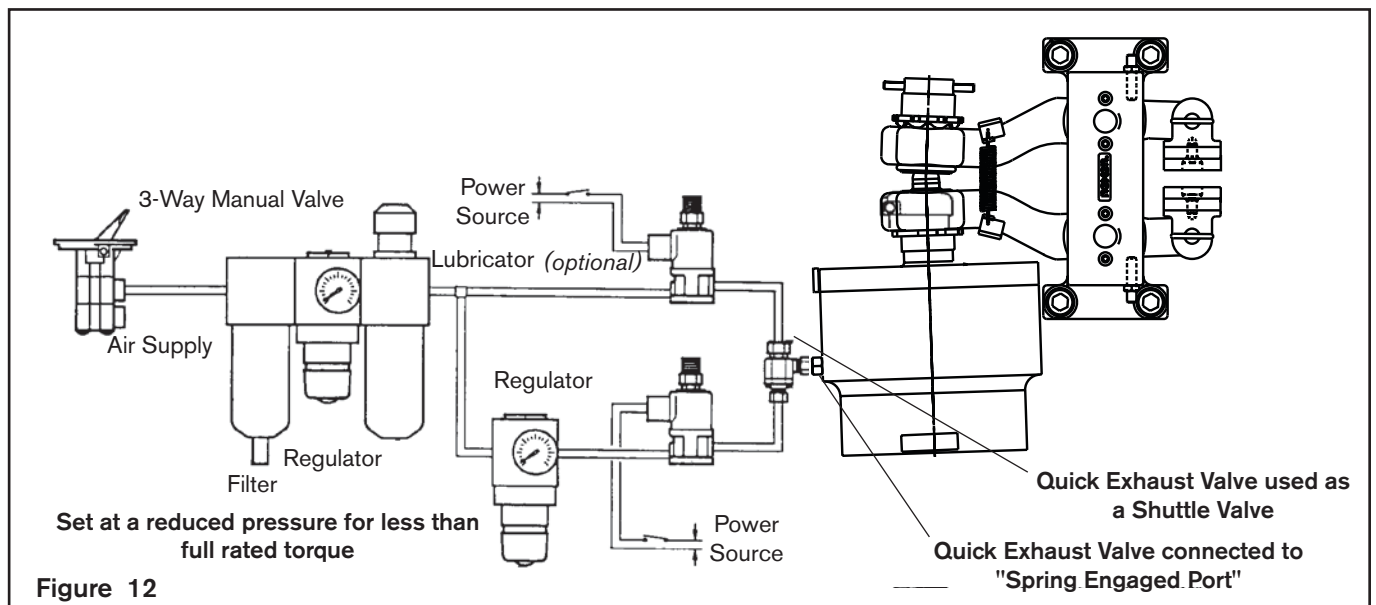
Below is a standard air brake control circuit. On-off air control is accomplished by the three-way valve. Torque is controlled by the regulation of air pressure (See Figure 10).



NORMAL SPRING ENGAGED MODE

This mode is for occasional duty, non-cyclic applications only. A hold-off air pressure of 5.17-6.90 bar [75-100 psi] is used to compress the spring inside the actuator canister. A control signal is used to release hold-off air pressure, thus applying full spring engaged torque to the disc (See Figure 11).

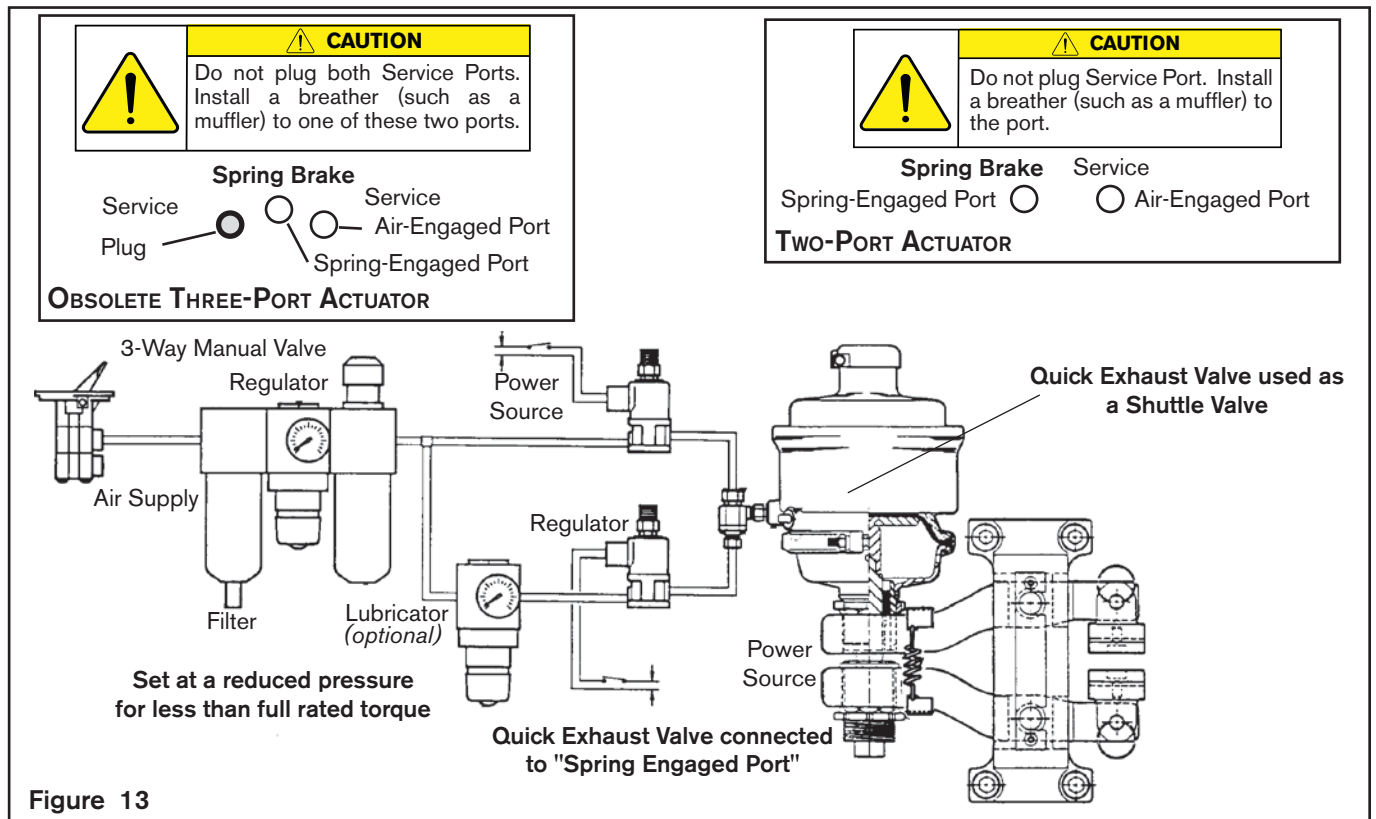
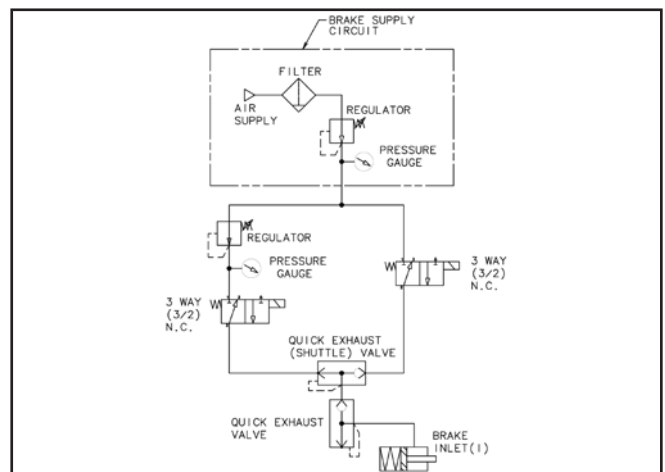




SPRING-ENGAGED / DUAL AIR MODE

This mode allows the selection of any value of spring engaged torque (from zero to full rated) available with a particular disc size by relieving a percentage of minimum hold-off air pressure (5.17 bar [75 psi]). The remaining pressure, balanced against the spring force, reduces the output of the Actuator (See Figure 13).


Example: A standard spring set brake with a 610 mm [24 inch] disc has a full rated spring-engaged torque of 2825 Nm [25,000 in-lb] when using the minimum hold-off air pressure of 5.17 bar [75 psi]. To achieve 60% of this torque (1694 Nm [15,000 in-lb]), relieve the hold-off air pressure 60% or 3.10 bar [45 psi], leaving 2.17 bar [30 psi] hold-off air pressure.



AIR OPERATED—SPRING ENGAGED MODE

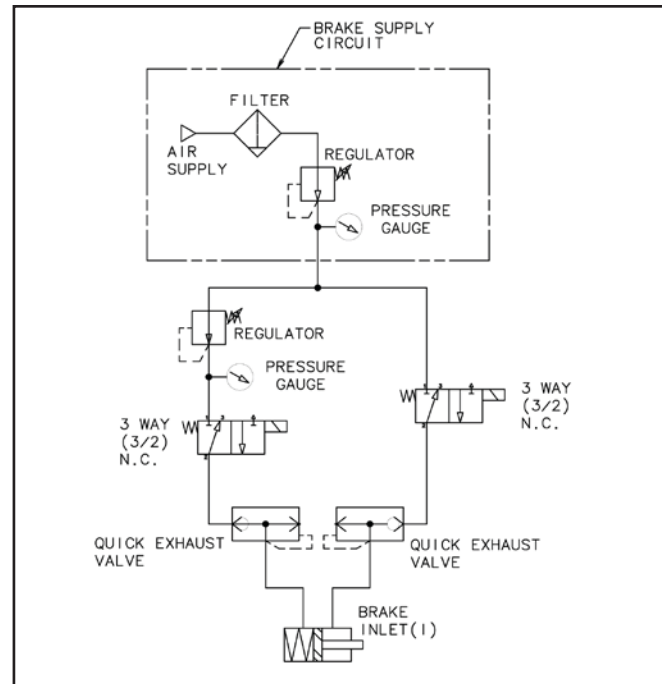
This mode combines the Normal Service Mode and the Normal Spring Engaged Mode. When engaged, air pressure plumbed into the "Air-Engaged Port" adds to the actuation force produced by the springs resulting in higher torque and substantially reduces the life of the brake. Operating in this manner induces loads that exceed normal design parameters for the brake, care should be taken when operating with this configuration.


(Not applicable for the 60 PSI canister)



WARNING

Applying the Normal Service Mode and the Spring Engaged Mode simultaneously is outside the normal operating range of the BD Caliper Brake. The loads produced in the Friction Facings (Item 4), Bearings (Item 14 and 15), and the machine shaft are up to twice the normal design loads.







CAUTION

Do not plug both Service Ports. Install a breather (such as a muffler) to one of these two ports.

Spring Brake



OBSOLETE THREE-PORT ACTUATOR



CAUTION

Do not plug Service Port. Install a breather (such as a muffler) to the port.

Spring Brake Service

Spring-Engaged Port Air-Engaged Port

TWO-PORT ACTUATOR

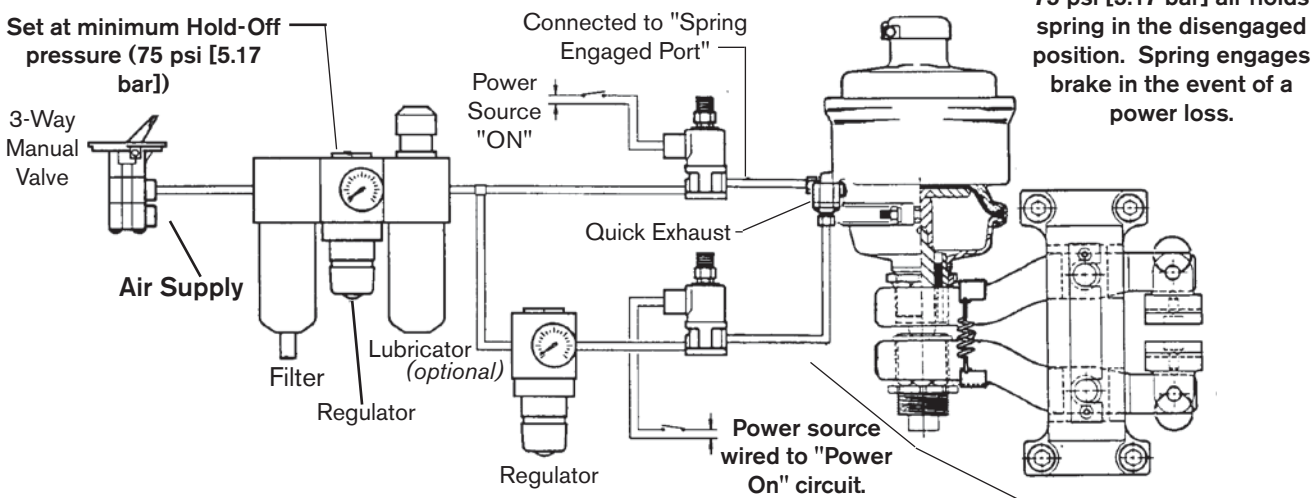


Figure 14

OPTION KIT FOR 3/4" WIDE DISC INSTALLATION (INCLUDED WITH BRAKE)

The use of 3/4 inch wide discs with the BD Caliper Brake requires a shorter Piston Rod (Item 10) and Return Springs (Item 17) for proper operation. (Not applicable for the 60 psi canister.)

WARNING

Spring actuated brakes must be manually released prior to brake disassembly. Refer to pages 16 & 17 for manual disengagement and re-engagement instructions.

Hold-off air pressure can be removed once unit is manually disengaged, and service performed (See Figure 15 a & b).



CAUTION

Working with spring loaded or tension loaded fasteners and devices can cause injury. Wear safety glasses and take the appropriate safety precautions.

1. Remove Return Spring (Item 17) and Shoes (Item 3) by removing Shoe Pins (Item 16) (See Figure 15).
2. Loosen the Spanner Nut (Item 12) and turn the Adjustment Screw (Item 8) counterclockwise until it is fully disengaged (See Figure 15).
3. Open the Arms (Item 2) at the actuator end and replace the Piston Rod (Item 10) (See Figure 19).
4. Reinstall the Shoes (Item 3), Shoe Pins (Item 16), and Return Spring (Item 17) (See Figure 15).
5. Reengage the brake.

NOTE

On spring engaged BD Caliper Brakes, apply hold-off air pressure and:

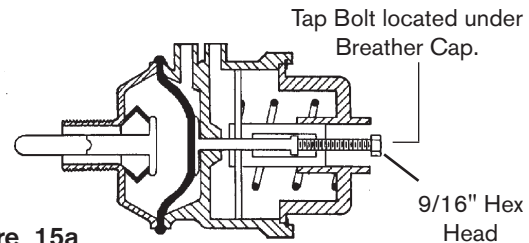


Figure 15a

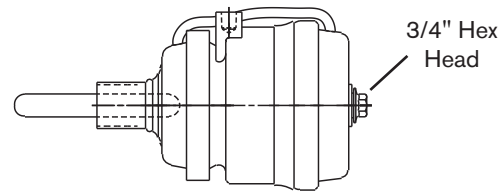


Figure 15b

Refer to pages 16 & 17 for manual disengagement and re-engagement instructions.

6. Perform friction facing adjustment (See FRICTION FACING CLEARANCE ADJUSTMENT).

MAINTENANCE

1. Adhere to the following bolt torques (See Table 4).
2. Clean Breather Cap air filter when dirty (spring engaged unit only).
3. Inspect canister exterior for damage. Replace canister if damaged.
4. Check tightness of all air line connections and condition of all air lines. Replace air lines if deterioration exists.
5. Inspect friction facings for wear. Replace if worn to approximately 5/16 inch thick.
6. Lubricate items requiring lubrication (See LUBRICATION).

TABLE 4

ITEM	DESCRIPTION	TORQUE
24	Cap Screws	7-9 Nm [5-7 ft-lb]
--	Actuator Clamp Ring (Bolt and Nut)	33.7-47.2 Nm [25-35 ft-lb]
19	Cap Screws	67.5 Nm [50 ft-lb]
12	Spanner Nut	13.6-20.3 Nm [10-15 ft-lb]
--	Actuator Mounting Tube (Spanner Nut)	13.6-20.3 Nm [10-15 ft-lb]
--	Tap Bolt (Spring-engaged only)	13.6-20.3 Nm [10-15 ft-lb]
18	Machine Screw	12-15 Nm [8-12 ft-lb]

TWO-PORT ACTUATOR FUNCTION

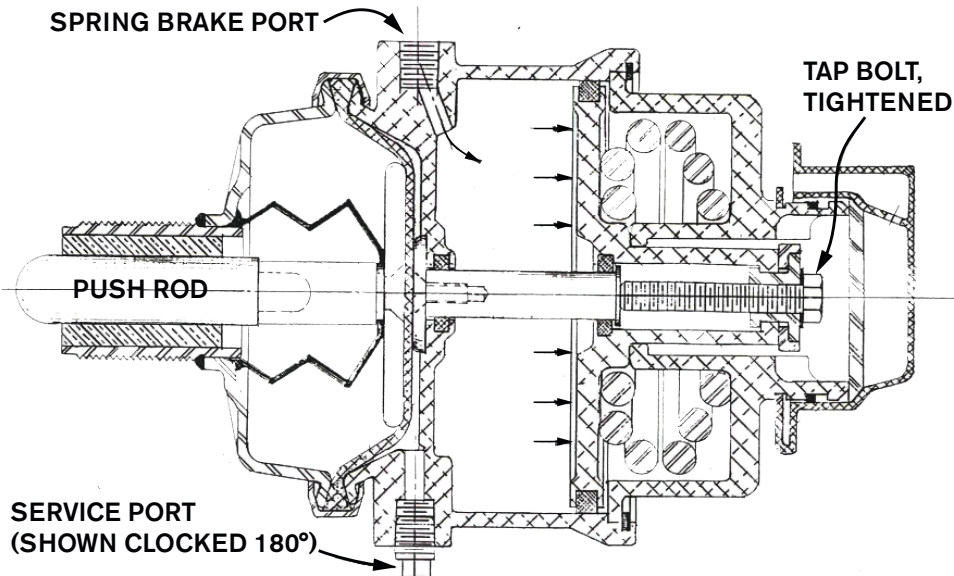


Figure 16

Refer to Figure 16.

BD BRAKE SPRING 2-PORT ACTUATOR FUNCTION

The actuator is shown with the spring actuator in the air released position.

The BD Spring Actuator is used for either cycling in the air engaged mode or for power-off, E-stops in the spring engaged mode. Refer to page 13, Figure 14 for a schematic showing how the controls are set up.

Two 3-way normally closed valves are used to direct air to either the SERVICE PORT or the SPRING BRAKE port. Activating the valve on the air supply line to the SPRING BRAKE port releases the “normally-on” spring engaged mode.

AIR ENGAGED MODE

The brake is cycled by directing air to the SERVICE PORT. Cycling is accomplished using the air actuated, diaphragm sealed chamber.

SPRING ENGAGED MODE

In a power-off situation, with both control valves de-energized, the air in SPRING BRAKE chamber exhausts and the spring pushes the PUSH ROD to engage the brake.

Using either the spring or the air activated diaphragm with a 24-inch disc produces full brake torque of 19,000 in-lbs. Reducing the torque in either engagement mode is accomplished by reducing air pressure. Spring engaged torque is reduced by lowering the release air pressure by the same percentage as the torque reduction.

DUAL ENGAGEMENT MODE

CAUTION: DO NOT USE THE ACTUATOR IN THE DUAL ENGAGEMENT MODE. RELEASING THE SPRING HOLD-OFF PRESSURE AND APPLYING AIR TO THE DIAPHRAGM ACTUATOR SIMULTANEOUSLY PRODUCES TOO MUCH TORQUE AND IS NOT RECOMMENDED!

REDUCING BRAKE TORQUE; AIR ENGAGED MODE

Torque is a linear function of air pressure. Simply set the regulator to for the desired torque.

Example: The air engaged BD Caliper Brake produces 19,000 in-lbs torque with a 24-inch disc at 80 psi. At 40 psi the torque is half or 9500 in-lbs.

MANUAL RELEASE PROCEDURES FOR SPRING ACTUATORS

OBSELETE THREE-PORT ACTUATOR ONLY

DISENGAGEMENT

The tap bolt under the breather cap is used to mechanically release the spring in the event of an actuator failure or machine service when hold-off air pressure is not available.

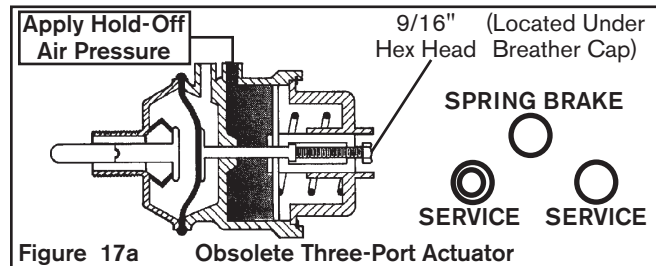
DO NOT USE THE TAP BOLT TO ADJUST THE FRICTION FACING GAP.

Use a 9/16 inch socket wrench to turn the tap bolt counterclockwise until the brake is released. (Approximately 40 turns or 0.83")

For easier turning of the tap bolt apply 80-100 psi hold-off air pressure to remove the tension.

After loosening the tap bolt exhaust the air from the spring chamber.

DO NOT USE AN IMPACT WRENCH.



CAUTION

This product has possible pinch points. Care should be taken when interacting with this product.



CAUTION

This product is spring loaded under extreme pressure. Do not disassemble actuator. If actuator malfunctions, replace actuator or contact Nexen.



CAUTION

Do not completely unscrew the bolt from the unit or the manual release mechanism will be disabled.

RE-ENGAGEMENT

Apply 90-100 psi air pressure and using a 9/16 socket wrench, turn the tap bolt clockwise and tighten to 50-60 ft.-lbs.

Do not exceed 74 ft.-lbs.

Remove hold-off pressure.

TWO-PORT ACTUATOR ONLY

DISENGAGEMENT

The hex bolt on the top of the canister is used to mechanically release the spring in the event of an actuator failure or machine service when hold-off air pressure is not available.

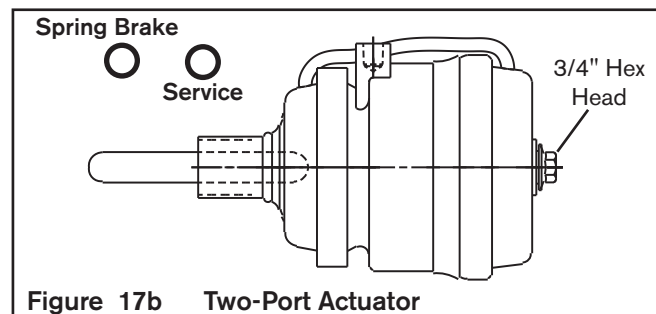
DO NOT USE THE HEX BOLT TO ADJUST THE FRICTION FACING GAP.

Use a 3/4 inch socket wrench to turn the hex bolt counterclockwise until the brake is released. (Approximately 40 turns or 0.83")

For easier turning of the tap bolt apply 80-100 psi hold-off air pressure to remove the tension.

After loosening the hex bolt exhaust the air from the spring chamber.

DO NOT USE AN IMPACT WRENCH.



CAUTION

This product has possible pinch points. Care should be taken when interacting with this product.



CAUTION

This product is spring loaded under extreme pressure. Do not disassemble actuator. If actuator malfunctions, replace actuator or contact Nexen.



CAUTION

Do not completely unscrew the bolt from the unit or the manual release mechanism will be disabled.

RE-ENGAGEMENT

Apply 80-100 psi air pressure and using a 15/16 socket wrench turn the hex bolt clockwise until the bolt head is flush against the actuator and tighten to 50-60 ft.-lbs.

Do not exceed 74 ft.-lbs.

Remove hold-off pressure.

60 PSI ACTUATOR ONLY

DISENGAGEMENT

A Cap Screw and Washer are shipped loose with the actuator assembly and are used to mechanically release the spring in the event of an actuator failure or machine service when hold-off air pressure is not available. **DO NOT USE THE CAP SCREW TO ADJUST THE FRICTION FACING GAP.**

Use a 15/16 inch hex wrench to turn the cap screw clockwise until the brake is released. For easier turning of the hex bolt apply 60-100 psi hold-off air pressure to remove the tension. After tightening the cap screw exhaust the air from the spring chamber.

RE-ENGAGEMENT

Apply 60-100 psi air pressure and use a 15/16 inch hex wrench to turn the cap screw counter-clockwise until it and the washer can be removed. Remove hold-off pressure.

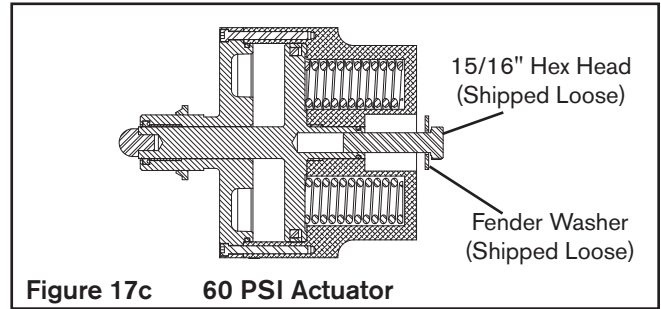


Figure 17c 60 PSI Actuator



CAUTION

This product has possible pinch points. Care should be taken when interacting with this product.



CAUTION

This product is spring loaded under extreme pressure. Do not disassemble. actuator. If actuator malfunctions, replace actuator or contact Nexen.

WARNING: Manually release the spring to perform the following functions:

- Page 7: Mount the actuator on the alternate side
- Page 8: Friction facing clearance adjustment
- Page 10: Air connections
- Page 15: Install the Option Kit for 3/4 inch wide discs
- Page 16: Maintenance
- Page 17: Parts replacement
- Page 18: High PV Bearing replacement
- Page 19: Diaphragm replacement

PARTS REPLACEMENT

FRICTION FACINGS

Note

When replacing Friction Facings (Item 4), inspect the Friction Disc for scoring or grooves. If necessary, the Friction Disc may be turned. A total of 0.762 mm [0.030 in] may be removed from each side of the Friction Disc before it is necessary to replace the Friction Disc.

On spring engaged BD Caliper Brakes, apply hold-off air pressure and:

Refer to pages 16 & 17 for manual disengage and re-engage instructions.

Refer to Figure 18

Using a socket, turn the manual release bolt clockwise until snug to fully cage (compress) the spring. (Refer to pages 16 & 17)

1. Remove Shoe Pins (Item 16) to release Friction Facing Shoe Assembly (Items 3 and 4) from Arms (Item 2).
2. Remove Friction Facings (Item 4) from the Shoes (Item 3) by removing the Machine Screws (Item 18).
3. Install new Friction Facings using new Machine Screws (Item 18).
4. Tighten the Machine Screws to 12-15 Nm [8-12 ft-lb] torque.

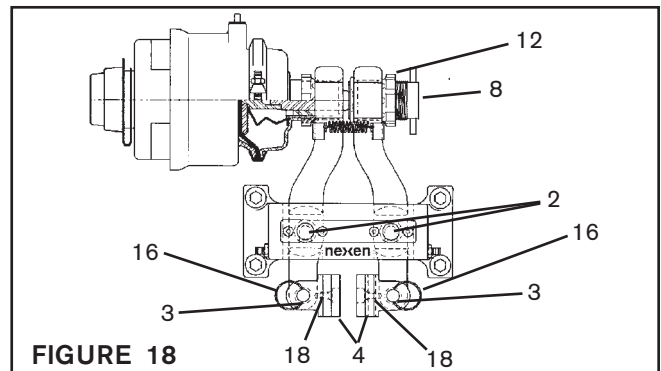


FIGURE 18

5. Loosen adjustment screw Spanner Nut (Item 12) and back out Adjustment Screw (Item 8) until the Friction Facings (Item 4) and Shoes (Item 3) will slide back into the Arms (Item 2).
6. Replace the Shoe Pins (Item 16).

Note

On spring engaged BD Caliper Brakes, apply hold-off air pressure and:

Refer to pages 16 & 17 for manual disengage and re-engage instructions.

Remove hold-off air pressure.

7. Perform Friction Facing adjustment (See FRICTION FACING CLEARANCE ADJUSTMENT).

HIGH PV BEARINGS (ITEMS 14 AND 15)

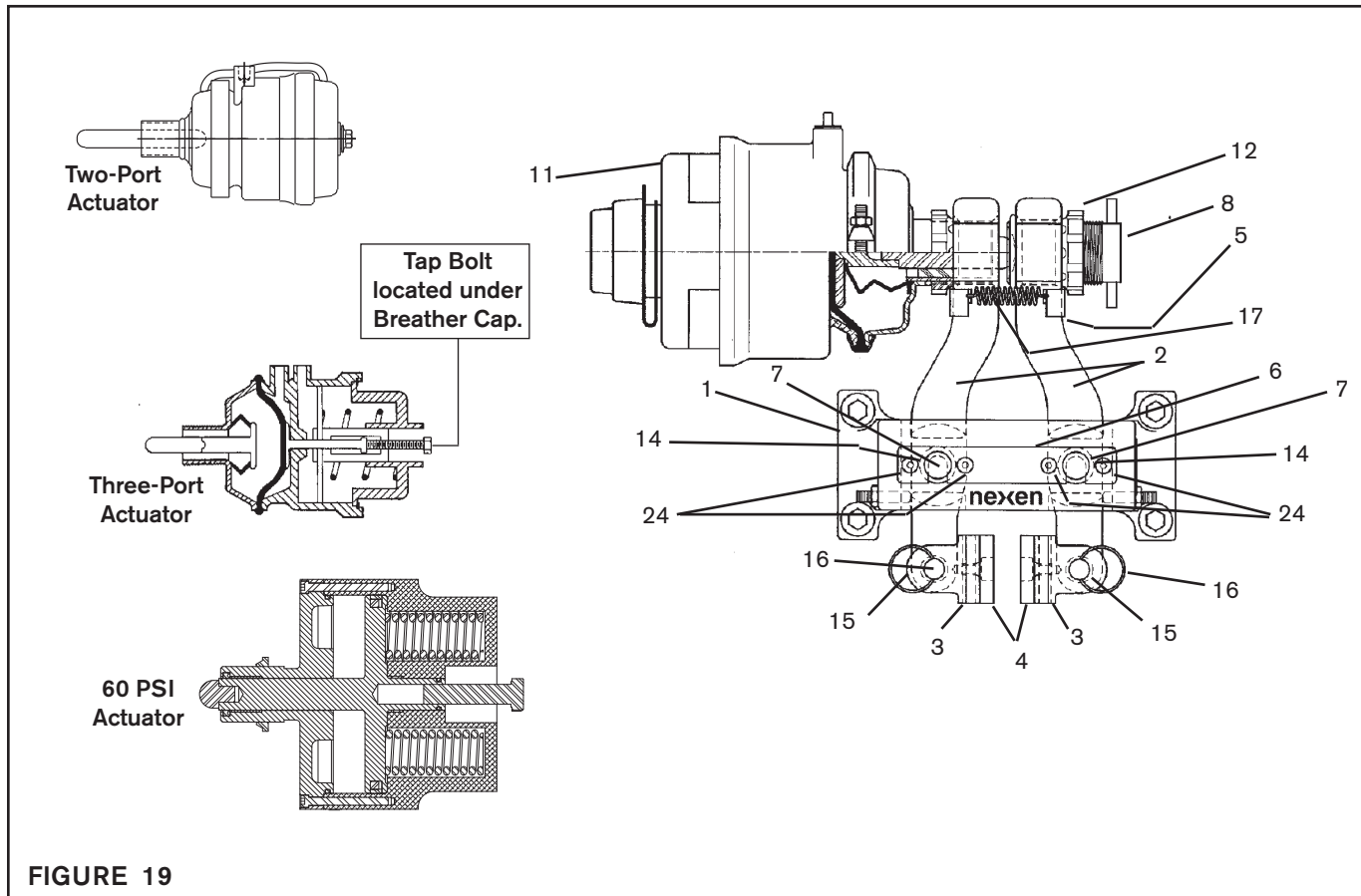


FIGURE 19

WARNING

Spring actuated brakes must be manually released prior to brake disassembly. Refer to pages 16 & 17 for manual disengagement and re-engagement instructions.

Hold-off air pressure can be removed once unit is manually disengaged, and service performed (See Figure 17 a, b & c).

Refer to Figure 19.

1. Loosen the Spanner Nut (Item 12).
2. Remove the Adjustment Screw (Item 8) and the Spanner Nut (Item 12) from the Arm (Item 2).
3. Remove the Actuator (Item 11) from the other Arm (Item 2).



CAUTION

Working with spring loaded or tension loaded fasteners and devices can cause injury. Wear safety glasses and take the appropriate safety precautions.

4. Remove the Return Springs (Item 17) and Spring Retainers (Item 5) from the Arms (Item 2).
5. Remove the Shoe Pins (Item 16) from the Arms (Item 2), Friction Facings (Item 4), and Shoes (Item 3).
6. Slide the Friction Facings (Item 4) and Shoes (Item 3) off of the Arms (Item 2).

7. Remove the four Cap Screws (Item 24) securing the Pivot Pin Retainer Plate (Item 6).
8. Remove the Pivot Pin Retainer Plate (Item 6).
9. Press the Pivot Pins (Item 7) out of the BD Caliper Brake.
10. Slide Arms (Item 2) out of Main Frame (Item 1).
11. Press the damaged Bearings (Item 14) out of the Main Frame (Item 1).
12. Press new Bearings (Item 14) into the Main Frame (Item 1).

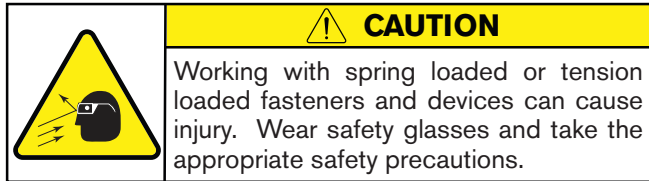
Note

The tops of the Bearings must be flush with the top of the Main Frame (Item 1).

13. Press the damaged Bearings (Item 15) out of the Shoes (Item 3).
14. Press new Bearings (Item 15) into Shoes (Item 3).
15. Slide the Arms (Item 2) back into the Main Frame (Item 1).

PARTS REPLACEMENT (continued)

16. Ream the new Bearings (Items 14 and 15) to fit the Pivot Pins (Item 7).
17. Reinstall the Pivot Pins (Item 7).
18. Reinstall the Pivot Pin Retainer Plate (Item 6).
19. Reinstall the four Cap Screws (Item 24) to secure Pivot Pin Retainer Plate (Item 6).
20. Tighten the four Cap Screws (Item 24) to 7.0-9.2 Nm [5-7 ft-lb] torque.
21. Slide the Friction Facings (Item 4) and Shoes (Item 3) onto the Arms (Item 2).
22. Reinstall the Shoe Pins (Item 16).



23. Reinstall the Spring Retainers (Item 5) and Return Springs (Item 17) onto the Arms (Item 2).
24. Screw the Actuator (Item 11) back onto the Arm (Item 2).
25. Screw the Adjustment Screw (Item 8) and the Spanner Nut (Item 12) onto the other Arm (Item 2).

Note

On spring engaged BD Caliper Brakes, apply hold-off air pressure and:
--

Refer to pages 16 & 17 for Manual Disengagement and Re-Engagement instructions.

26. Perform Friction Facing adjustment (See FRICTION FACING CLEARANCE ADJUSTMENT).

REPLACEMENT OF NON-FUNCTIONING 2 & 3 PORT SPRING ACTUATORS



Never remove the spring chamber retaining ring from a spring actuator. Improper disassembly could release the high energy spring (with a force up to 2,700 lbs) and cause serious bodily harm.

1. Manually release the brake. Refer to pages 16 & 17 for Manual Disengagement and Re-Engagement instructions.
2. Remove manually disengaged actuator from the caliper brake.
3. Order Replacement actuator. (#810493)

DIAPHRAM REPLACEMENT

The diaphragm, part #1555, is the air seal in the service chamber of the Spring/Air actuator and the Air Actuator. (See Figure 18).

Air/Spring Actuator:

1. Make sure the Air/Spring Actuator is manually released: Refer to pages 16 & 17 for Manual Disengagement and Re-Engagement instructions.
2. Use a spanner wrench to loosen the spanner nut and unscrew the Spring/Air Actuator from the brake arm.
3. Using a 9/16" wrench to remove the nut on the clamp ring. Hold the spring actuator securely in place, remove the clamp ring and remove the spring actuator from the service chamber.
4. Discard the old diaphragm and install a new diaphragm in the bottom recess of the Air/Spring Actuator.
5. Position the Air/Spring Actuator onto the housing/tube assembly and re-install clamp band.
6. Firmly tap the clamp band around its circumference while tightening the clamp band nut to ensure proper seating. Tighten nut to 20-25 ft.-lbs. torque.
7. Screw the actuator back into the arm and tighten the spanner nut to 10-14 ft.-lbs.
8. Apply air pressure to the service chamber and check for air leakage.

Refer to pages 16 & 17 for Manual Disengagement and Re-Engagement instructions.

Refer to page 8, "FRICTION FACING CLEARANCE ADJUSTMENT" for Air/Spring Actuator re-engagement and facing clearance adjustments.

Air Actuator:

1. Use a spanner wrench to loosen the spanner nut and unscrew the Air Actuator from the brake arm.
2. Using a 9/16" wrench to remove the nut on the clamp ring. Remove the clamp ring and remove the Air Actuator pressure cap.
3. Discard the old diaphragm and install a new diaphragm in the pressure cap.
4. Position the pressure cap onto the housing/tube assembly and reinstall the clamp bolt and nut.
5. Firmly tap around the circumference of the clamp ring with a hammer to assure full seating and tighten the nut to 25-30 ft.-lbs. torque.
6. Screw the actuator back into the arm and tighten the spanner nut to 10-14 ft.-lbs.
7. Apply air pressure to the service chamber and check for air leakage.

Refer to page 8, "FRICTION FACING CLEARANCE ADJUSTMENT" for Air/Spring Actuator re-engagement and facing clearance adjustments.

PARTS LIST

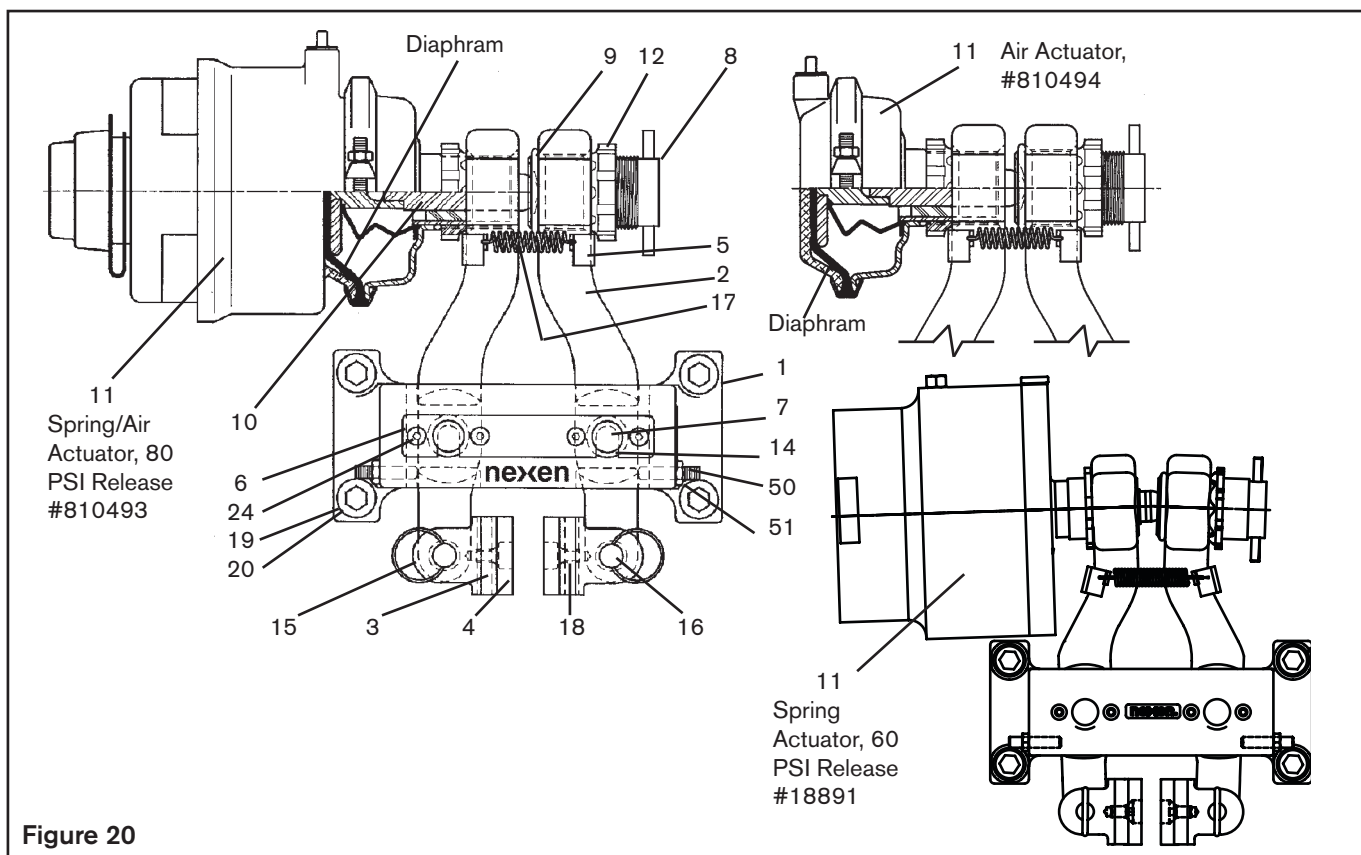


Figure 20

ITEM	DESCRIPTION	QTY
1	Main Frame	1
2	Arm	2
3	Shoe	2
4 ^{3,6}	Friction Facing	4
5	Spring Retainer	2
6	Pivot Pin Retainer Plate	1
7	Pivot Pin	2
8	Adjustment Screw	1
9	Adjustment Screw Retaining Ring	1
10 ⁴	Piston Rod	1
11 ¹	Actuator Assembly	1
12	Spanner Nut	1
13 ²	Muffler (Not Shown)	1
14 ^{3,5}	Bearing	4

ITEM	DESCRIPTION	QTY
15 ³	Bearing	4
16	Shoe Pin	2
17 ^{3,4}	Return Spring	2
18 ^{4,7}	Machine Screw	4
19	Cap Screw	4
20	Lock Washer	4
21 ²	Pipe Plug (Not Shown)	*
22	Adapter (Not Shown)	*
23	Hose Assembly (Not Shown)	*
24	Cap Screw	4
25	Bushing (Not Shown)	1
50	Set Screw	2
51	Jam Nut	2

¹ Refer to Figure 20 for Actuator descriptions and product / part numbers.

² Used on Air/Spring Actuated only.

³ Rebuild Kit items. Rebuild Kit Prod. No. 933900. Friction Facing Kit Prod. No. 934000.

⁴ 3/4" Disc option kit. Product No. 7077 (Not used on the 60 PSI Actuator)

⁵ Included with Item 1.

⁶ When SPC shoes are used, quantity will be 2.

⁷ When SPC shoes are used, quantity will be 8.

Diaphragm, Part #1555

WARRANTY

Warranties

Nexen warrants that the Products will (a) be free from any defects in material or workmanship for a period of 12 months from the date of shipment, and (b) will meet and perform in accordance with the specifications in any engineering drawing specifically for the Product that is in Nexen's current product catalogue, or that is accessible at the Nexen website, or that is attached to this Quotation and that specifically refers to this Quotation by its number, subject in all cases to any limitations and exclusions set out in the drawing. NEXEN MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. This warranty applies only if: (a) the Product has been installed, used and maintained in accordance with any applicable Nexen installation or maintenance manual for the Product; (b) the alleged defect is not attributable to normal wear and tear; (c) the Product has not been altered, misused or used for purposes other than those for which it was intended; and (d) Buyer has given written notice of the alleged defect to Nexen, and delivered the allegedly defective Product to Nexen, within one year of the date of shipment.

Exclusive Remedy

The exclusive remedy for the Buyer for any breach of any warranties provided in connection with this agreement will be, at the election of Nexen: (a) repair or replacement with new, serviceably used, or reconditioned parts or products; or (b) issuance of credit in the amount of the purchase price paid to Nexen by the Buyer for the Products.

Agent's Authority

Buyer agrees that no agent, employee or representative of Nexen has authority to bind Nexen to any affirmation, representation, or warranty concerning the Products other than those warranties expressly set forth herein.

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TO THE EXTENT PERMITTED BY LAW NEXEN SHALL HAVE NO LIABILITY TO BUYER OR ANY OTHER PERSON FOR INCIDENTAL DAMAGES, SPECIAL DAMAGES, CONSEQUENTIAL DAMAGES OR OTHER DAMAGES OF ANY KIND OR NATURE WHATSOEVER, WHETHER ARISING OUT OF BREACH OF WARRANTY OR OTHER BREACH OF CONTRACT, NEGLIGENCE OR OTHER TORT, OR OTHERWISE, EVEN IF NEXEN SHALL HAVE BEEN ADVISED OF THE POSSIBILITY OR LIKELIHOOD OF SUCH POTENTIAL LOSS OR DAMAGE. For all of the purposes hereof, the term "consequential damages" shall include lost profits, penalties, delay damages, liquidated damages or other damages and liabilities which Buyer shall be obligated to pay or which Buyer may incur based upon, related to or arising out of its contracts with its customers or other third parties. In no event shall Nexen be liable for any amount of damages in excess of amounts paid by Buyer for Products or services as to which a breach of contract has been determined to exist. The parties expressly agree that the price for the Products and the services was determined in consideration of the limitation on damages set forth herein and such limitation has been specifically bargained for and constitutes an agreed allocation of risk which shall survive the determination of any court of competent jurisdiction that any remedy herein fails of its essential purpose.

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Buyer shall inspect all shipments of Products upon arrival and shall notify Nexen in writing, of any shortages or other failures to conform to these terms and conditions which are reasonably discoverable upon arrival without opening any carton or box in which the Products are contained. Such notice shall be sent within 14 days following arrival. All notifications shall be accompanied by packing slips, inspection reports and other documents necessary to support Buyer's claims. In addition to the foregoing obligations, in the event that Buyer receives Products that Buyer did not order, Buyer shall return the erroneously shipped Products to Nexen within thirty (30) days of the date of the invoice for such Products; Nexen will pay reasonable freight charges for the timely return of the erroneously shipped Products, and issue a credit to Buyer for the returned Products at the price Buyer paid for them, including any shipping expenses that Nexen charged Buyer. All shortages, overages and nonconformities not reported to Nexen as required by this section will be deemed waived.

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No action, regardless of form, arising out of any transaction to which these terms and conditions are applicable may be brought by the Buyer more than one year after the cause of action has accrued.

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