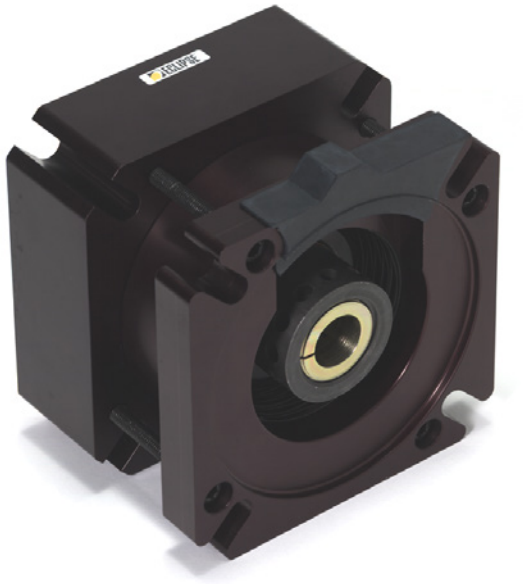
nexen®

ECLIPSE™ PRODUCTS

User Manual



FLANGE MOUNTED, AIR RELEASED, SPRING ENGAGED SERVO BRAKE
Sizes 2, 3, 4 and 5

CE

RoHS compliant

FORM NO. L-21004-K-0914

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.

Technical Support: 800-843-7445
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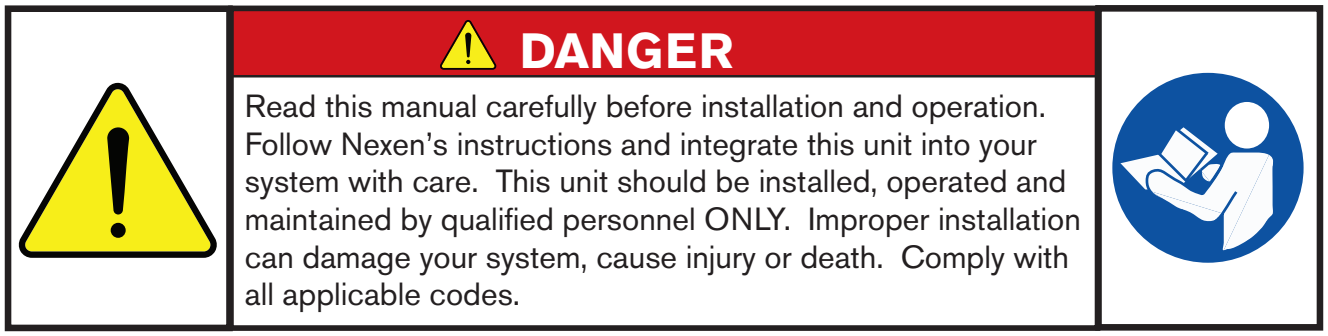


This document is the original, non-translated, version.

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.

Nexen Group, Inc.
560 Oak Grove Parkway
Vadnais Heights, Minnesota 55127

ISO 9001 Certified

Table of Contents

GENERAL SPECIFICATIONS

Size	Min Holding Torque	Torsional Rigidity (Estimated)	Inertia (Calculated)	Weight	Min. Disengagement Air Pressure
Size 2	2.25 Nm [1.66 ft*lb]	6180 Nm/RAD [4550 ft*lb/RAD]	0.00002 kg*m^2 [0.0005 lb*ft^2]	1.1 kg [2.4 lbs]	5.5 bar [80 psi]
Size 3	8 Nm [5.90 ft*lb]	9613 Nm/RAD [7090 ft*lb/RAD]	0.00005 kg*m^2 [0.0012 lb*ft^2]	1.5 kg [3.2 lbs]	5.5 bar [80 psi]
Size 4	22 Nm [16.2 ft*lb]	23,796 Nm/RAD [17,550 ft*lb/RAD]	0.00031 kg*m^2 [0.0074 lb*ft^2]	3 kg [8.5 lbs]	5.5 bar [80 psi]
Size 5	45 Nm [33 ft*lb]	36,184 Nm/RAD [26,690 ft*lb/RAD]	0.00114 kg*m^2 [0.0271 lb*ft^2]	6.3 kg [13.8 lbs]	5.5 bar [80 psi]

Pneumatic units accept an optional solenoid valve (normally closed) controlled by 24VDC at 104 mA. Solenoid valves are fitted with 18" flying leads standard. To order the solenoid valve (optional), please refer to Nexen product #964650.

GENERAL SAFETY PRECAUTIONS

⚠ CAUTION

Watch for sharp features when interacting with this product. The parts have complex shapes and machined edges.

⚠ WARNING

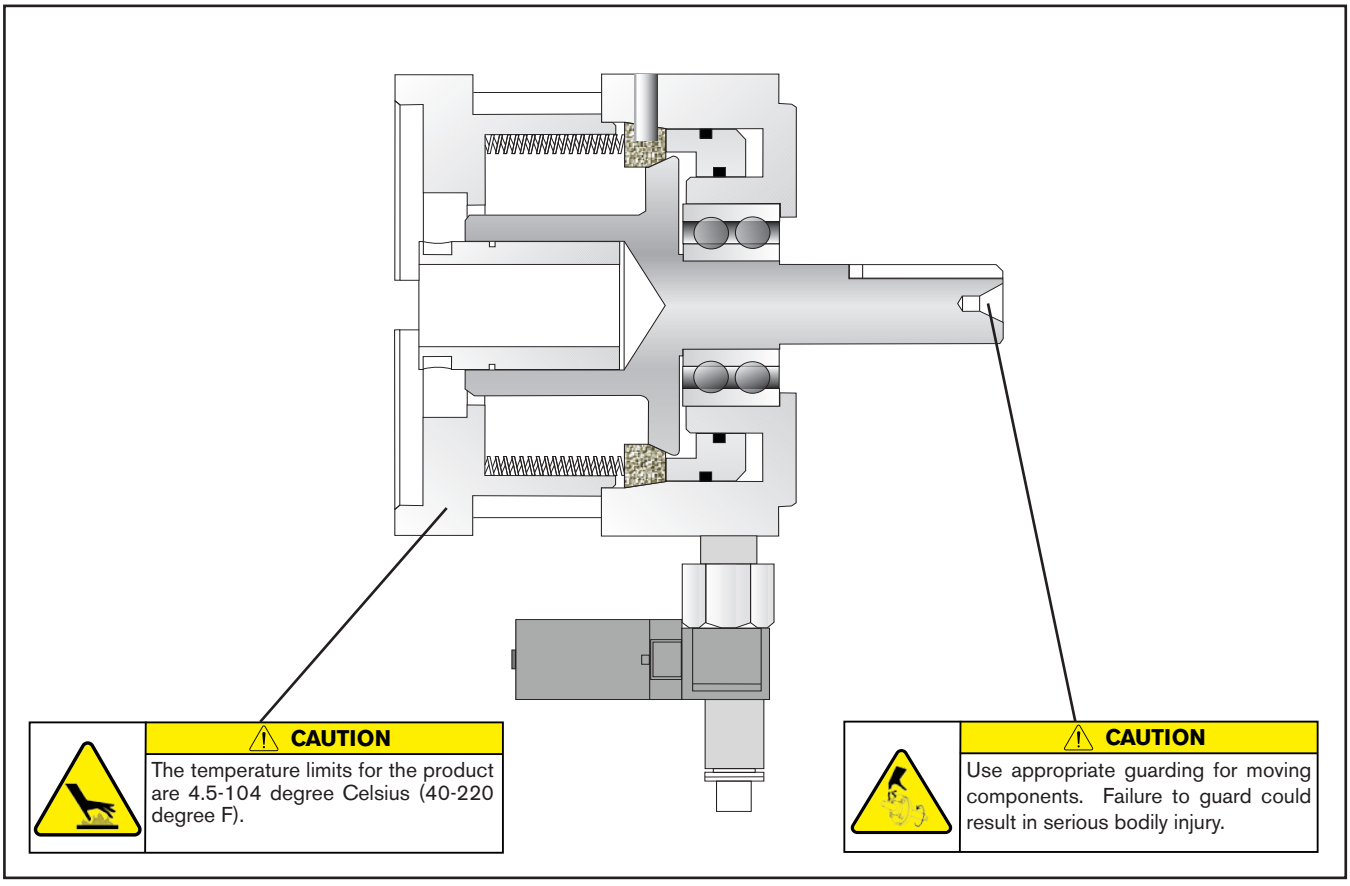
This product is capable of emitting a spark if misused, therefore it is not recommended for use in any explosive environment.

⚠ CAUTION

Use appropriate guarding for moving components. Failure to guard could result in serious bodily injury.

⚠ 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

The temperature limits for the product are 4.5-104 degree Celsius (40-220 degree F).

⚠ CAUTION

Use appropriate guarding for moving components. Failure to guard could result in serious bodily injury.

MOUNTED ON THE SHAFT END OF A MOTOR

NOTE: Refer to Figures 1, 2, 3.

1. Insert the Keyless Bushing (Item 7) into the Servo Brake.

2. Turn the Keyless Bushing (Item 7) **counter**clockwise to maximize the Keyless Bushing's inside diameter.

   Note: Do not lubricate either the Keyless Bushing or the Shaft. The use of any lubricant on the contact surfaces could result in Bushing failure. If necessary, clean the Shaft with a non-petroleum based solvent, such as isopropyl alcohol.

3. Insert the Motor Shaft into the Keyless Bushing (Item 7) until the Flanges of the Motor and Brake meet.

4. Loosely bolt the Flanges together on at least two diagonally opposite corners using customer supplied fasteners.

⚠ CAUTION

Do not over-torque the Fasteners. Over tightening can lead to premature bearing failure. Finger tighten only.

5. Remove the Access Plug (Item 14) from the access slot in the Input Flange (Item 10). Use an open end adjustable wrench to grasp the end of the brake shaft on its flat surface and hold it stable while you tighten the Keyless Bushing (Item 7) with the supplied wrench. Refer to Table 1 for the recommended torque values.

⚠ CAUTION

Overtightening the Bushing can damage the Bushing or the Shaft. Combine length of the torque wrench with the Nexen Wrench to determine the proper torque values.

NOTE: The wrench that is supplied with Servo Brake sizes 2 and 3 is designed to accept a 3/8" drive, extension handle. The wrench that is supplied with Servo Brake size 4 and 5 is designed to accept a 1/2" drive, extension handle.

6. Torque the customer supplied fasteners that join the Flanges together to the recommended values on Table 2.

7. Insert the Access Plug (Item 14) into the access slot in the Input Flange (Item 10).

FIGURE 1

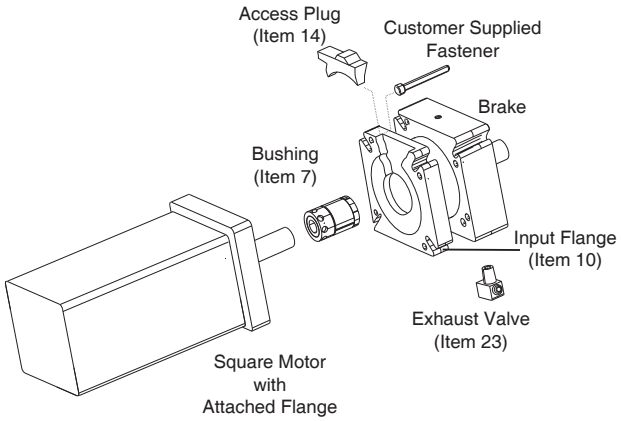
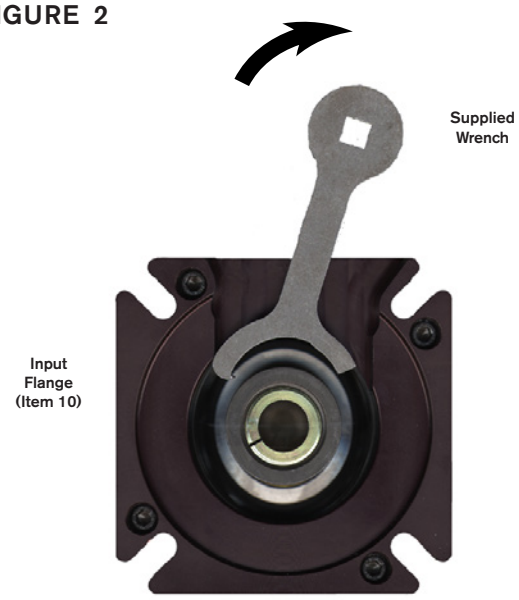


FIGURE 2



⚠ DANGER

Support the load before disengaging the brake. Failure to support the load could result in serious bodily injury.

continued...

MOUNTED ON THE SHAFT END OF A MOTOR (continued)

8. **Standard Configuration:**

   Attach the Quick Exhaust Valve (Item 23) to the brake. Use Teflon tape and/or pipe sealant on the threads.

   With Optional Solenoid:

   If you are using the optional Solenoid Valve (Part #964650), the Quick Exhaust Valve is unnecessary. Assemble the optional Solenoid Valve directly to the brake using the supplied fittings. Use Teflon tape and/or pipe sealant on the threads. The fitting for the air line itself is O-ring sealed and does not require tape or sealant.

   Note: The Servo Brake will disengage if you depress the domed button on top of the Solenoid Valve (if air pressure is supplied). The LED will illuminate when the Solenoid Valve is actuated and the Servo Brake is disengaged. Unit has been designed to release before (at or below) 5.5 bar [80 psi]. Required disengagement pressure higher than 5.5 bar [80 psi] may indicate improper assembly.

   NOTE: Align the air inlet ports in the down position to allow condensation to drain out of the air chamber.

9. Assemble the air line to the valve

10. Connect the lead wires from the valve to the brake control connection points on the Motor Drive or the PLC. Refer to Table 3.
    Lead Wire Cable:
    Brown wire = positive
    White wire = common
    Green wire = ground

11. Assemble the Gear Reducer or the load to the Brake Shaft.

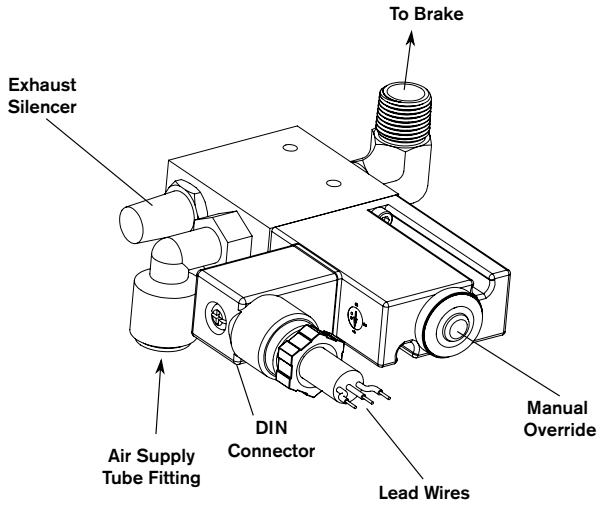


FIGURE 3 Optional Solenoid Valve Part #964650.

DANGER

Support the load before disengaging the brake. Failure to support the load could result in serious bodily injury.

MOUNTED BETWEEN A GEAR REDUCER AND A MOTOR

NOTE: Refer to Figure 4

1. To mount the Servo Brake to the Motor refer to the INSTALLATION section.
2. Insert the Brake Shaft into the customer supplied gear reducer coupling. Use the supplied key, if required.
3. Use customer supplied screws, washers and nuts to bolt the flanges together. Apply Loctite® 242 to the threads of the screws. For recommended torque values, refer to Table 2.
4. Tighten the Coupling. Refer to the instructions that are supplied with the Gear Reducer.
5. Install any plugs or related items that are detailed in the Gear Reducer instructions.

FIGURE 4

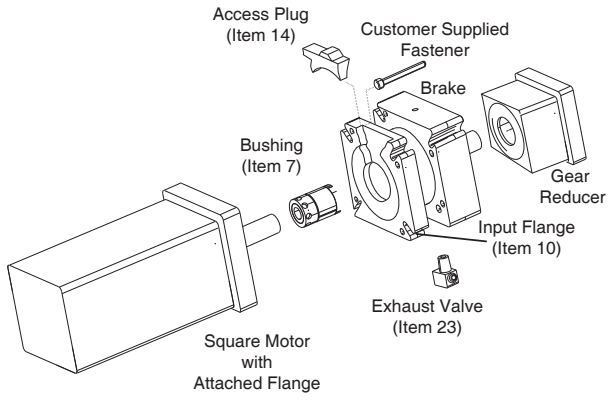


TABLE 1

Brake Model	Shaft Size	Recommended Bushing Torque	Supplied Wrench Length	Torque Required Using Supplied Wrench
Size 2	6mm-10mm	17.0 N-m (150 in/lb)	76.2 mm (3.0 in)	13.6 N-m (120 in/lb)
Size 2	11mm-16mm	22.6 N-m (200 in/lb)	76.2 mm (3.0 in)	18.0 N-m (160 in/lb)
Size 3	11mm-16mm	22.6 N-m (200 in/lb)	76.2 mm (3.0 in)	18.0 N-m (160 in/lb)
Size 4	19mm-25mm	84.4 N-m (750 in/lb)	101.6 mm (4.0 in)	65.0 N-m (575 in/lb)
Size 5	19mm-25mm	84.4 N-m (750 in/lb)	101.6 mm (4.0 in)	65.0 N-m (575 in/lb)
Size 5	28mm-32mm	113.0 N-m (1000 in/lb)	101.6 mm (4.0 in)	86.0 N-m (760 in/lb)

TABLE 2

Brake Model	Socket Head Cap Screw (Customer Supplied)	Recommended Fastening Torque
Size 2	M5	7 Nm (63 in/lb)
Size 3	M6	12 Nm (107 in/lb)
Size 4	M8	29 Nm (260 in/lb)
Size 5	M10	58 Nm (520 in/lb)

TABLE 3

OPTIONAL SOLENOID VALVE SPECIFICATIONS				
Voltage	**Power**	**Resistance**	**Current**	**CV**
Standard Coil: 24VDC	2.5 Watts	235 Ohms	.100 Amps	.08

⚠ DANGER

Support the load before disengaging the brake. Failure to support the load could result in serious bodily injury.

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.

Nexen product's bearings are shielded and pre-lubricated, and require no further lubrication.

LUBRICATOR DRIP RATE SETTINGS

⚠ CAUTION

These settings are for Nexen supplied lubricators. If you are not using a Nexen lubricator, calibration must follow the manufacturer's suggested procedure.

1. Close and disconnect the air line from the unit.
2. Turn the Lubricator Adjustment Knob counterclockwise three complete turns.
3. Open the air line.
4. Close the air line to the unit when a drop of oil forms in the Lubricator Sight Gage.
5. Connect the air line to the unit.
6. Turn the Lubricator Adjustment Knob clockwise until closed.
7. Turn the Lubricator Adjustment Knob counterclockwise one-third turn.
8. Open the air line to the unit.

AIR CONNECTIONS

All Nexen pneumatically actuated devices require clean and dry air, which meet or exceeds ISO 8573.1:2001 Class 4.4.3 quality.

NOTE

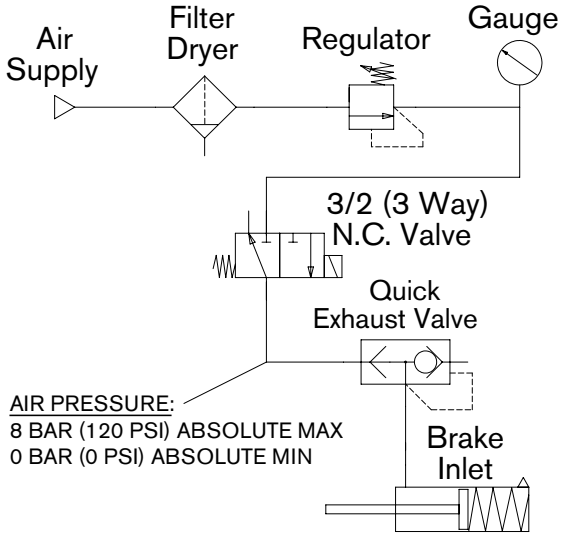
For quick response, Nexen recommends a quick exhaust valve and short air lines between the Control Valves and the unit. Align the air inlet ports to a down position to allow condensation to drain out of the air chambers of the product.

⚠ CAUTION

Low air pressure will cause slippage and overheating. Excessive air pressure will cause abrupt starts and stops, reducing product life.

The following is a common air supply scheme used with this product. This is an example and not an all-inclusive list. All air circuits to be used with this product must be designed following ISO 4414 guidelines.

Typical Brake Control Circuit



OPERATION

⚠ WARNING

Never exceed maximum operating speeds listed for your product. (See Table 4).

TABLE 4

Sizes	Max RPM
Size 2-5	10,000

⚠ CAUTION

Never exceed life of facing material. Facing life depends on the volume of material and the total energy over the life of the unit. Expected life (in hrs) can be found by: Time=Volume/(Power*Wear Rate).

⚠ CAUTION

The temperature limits for this product line are 4.5-104 Degree Celsius (40-220 Degree F).

BRAKE ASSEMBLY

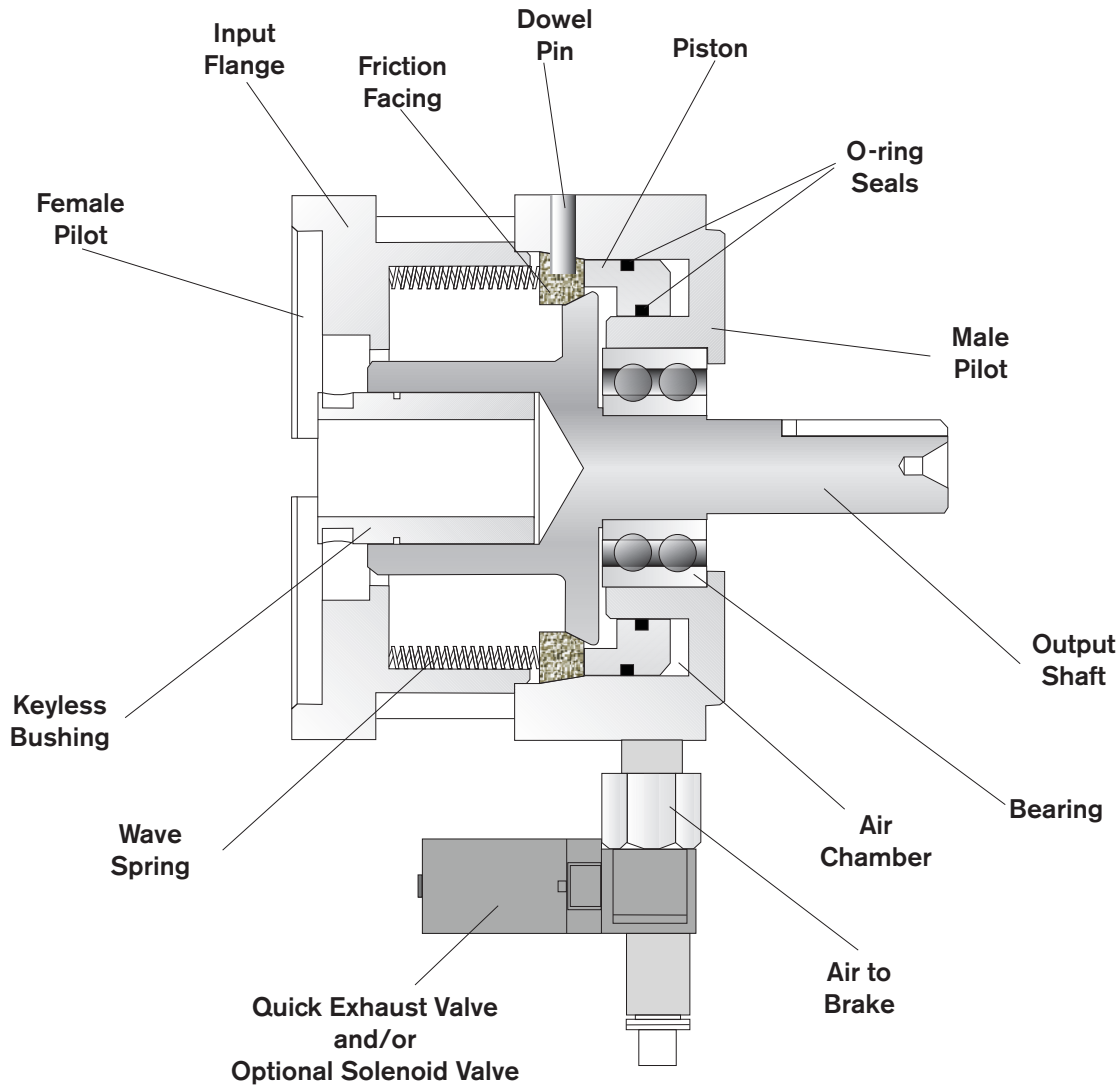


FIGURE 5

BEARING, O-RING, SEALS AND WAVE SPRING ASSEMBLY

SIZES 2, 3, 4, 5

NOTE: Refer to Figures 6 and 7

1. Alternately and evenly, remove the four Socket Head Cap Screws (Item 11) and separate the Air Chamber (Item 6) from the Input Flange (Item 10).

2. Remove the Output Shaft (Item 1) from the Ball Bearing (Item 2) by pressing in on the output shaft. Remove the dowel pin (Item 21) by pressing the Dowel Pin into the Air Chamber (Item 6).

3. Remove the Piston (Item 5) and Wave Spring (Item 9) from the Air Chamber (Item 6). You may need to apply compressed air to the air inlet to remove the Piston.

4. Remove the old O-ring Seals (Items 3, 4) from the Piston.

5. Press the Bearing (Item 2) out of the Air Chamber (Item 6).

6. Clean the bearing bore of the Air Chamber (Item 6) with fresh solvent, removing all old Loctite®.

7. Apply continuous bead of Loctite® 680 around the inner circumference of the Air Chamber (Item 6) bearing bore.

8. Carefully align the outer race of the new Bearing (Item 2) with the bore of the Air Chamber (Item 6).

9. Supporting the Air Chamber (Item 6) and pressing on the outer race of the new Bearing (Item 2), press the new Bearing into the Air Chamber.

10. Visually inspect the inner diameter grooves and the outer diameter grooves of the Piston (Item 5) for debris. Clean as necessary.

11. Coat the O-ring contact surfaces of the Air Chamber (Item 6), the Piston (Item 5), and the O-ring Seals (Items 3, 4) with a thin film of O-ring lubricant and install the new O-ring Seals.

12. Slide the Piston (Item 5) into the Air Chamber (Item 6).

13. Install the replacement Dowel Pin (Item 21) so that it is flush with the outer edge of the Air Chamber (Item 6).

14. Clean the friction surface of the Air Chamber (Item 6) with solvent.

⚠ CAUTION

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

FIGURE 6

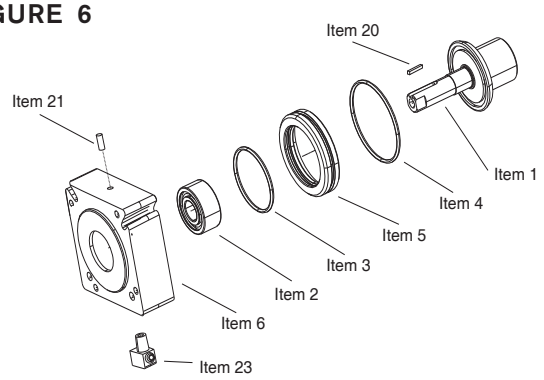
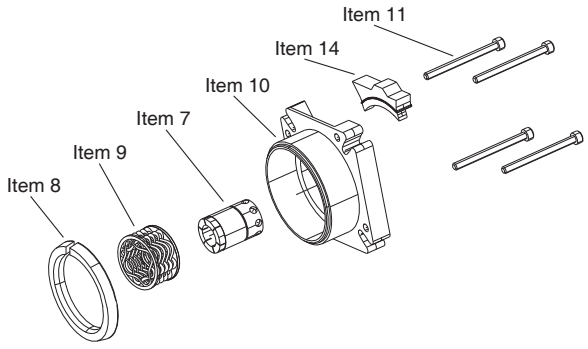


FIGURE 7



(continued...)

15. Support the inner race of the new Ball Bearing (Item 2) and press the Output Shaft (Item 1) into the new Bearing (Item 2) and Air Chamber (Item 6).

16. Place the Friction Facing (Item 8) into the Air Chamber (Item 6) so that the angled surfaces match up with the wall of the Air Chamber and the tapered disc of the Output Shaft (Item 1). The gap in the Friction Facing must straddle the Dowel Pin (Item 21).

17. Replace the Wave Spring (Item 9) and Input Flange (Item 10).

    Note: Keep the Wave Spring centered relative to the Friction Facing. If the Wave Spring is not centered, the brake could fail to disengage during operation.

18. Apply a drop of Loctite® 242 to the threads of the Socket Head Cap Screws (Item 11).

19. Reinstall and tighten the four Socket Head Cap Screws (Item 11), securing the Air Chamber (Item 6) to the Input Flange (Item 10). Alternate as you tighten the four Socket Head Cap Screws so that the input flange remains evenly parallel to the Air Chamber and does not pinch the Wave Spring (Item 9). Refer to Table 5 for the recommended assembly torque values.

    Note: The Servo Brake could fail to disengage if the Wave Spring becomes pinched between the Friction Facing and the Input Flange.

TABLE 5

Brake Model	Socket Head Cap Screw (Item 11)	Recommended Assembly Torque
Size 2	M4	4.2-5.4 Nm (37-48 in/lb)
Size 3	M5	7.0-9.2 Nm (62-81 in/lb)
Size 4	M6	9.2-11.9 Nm (81-105 in/lb)
Size 5	M8	26.2-34.0 Nm (232-301 in/lb)

FRICTION FACING ASSEMBLY

NOTE: Refer to Figures 8 and 9

1. Alternately and evenly, remove the four Socket Head Cap Screws (Item 11) and separate the Air Chamber (Item 6) from the Input Flange (Item 10).

2. Remove the Input Flange (Item 10) and the Wave Spring (Item 9).

3. Remove and replace the Friction Facing (Item 8) in the Air Chamber (Item 6). Make certain that the angled sides mate with the wall of the Air Chamber and the tapered disc of the Output Shaft (Item 1). The gap in the Friction Facing must straddle the Dowel Pin (Item 21).

4. Replace the Wave Spring (Item 9) and Input Flange (Item 10).

   Note: Keep the Wave Spring centered relative to the Friction Facing. If the Wave Spring is not centered, the brake could fail to disengage.

5. Apply a drop of Loctite® 242 to the threads of the Socket Head Cap Screws (Item 11).

6. Reinstall and tighten the four Socket Head Cap Screws (Item 11), securing the Air Chamber (Item 6) to the Input Flange (Item 10). Alternate as you tighten the four Socket Head Cap Screws so that the input flange remains evenly parallel to the air chamber and does not pinch the Wave Spring (Item 9). Refer to Table 5 for the recommended assembly torque values.

   Note: The Servo Brake could fail to disengage if the Wave Spring becomes pinched between the Friction Facing and the Input Flange.

⚠ CAUTION

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

FIGURE 8

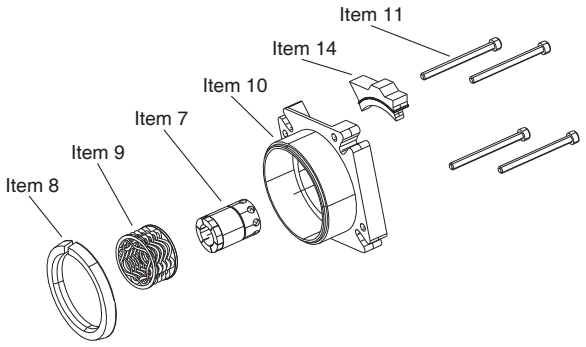
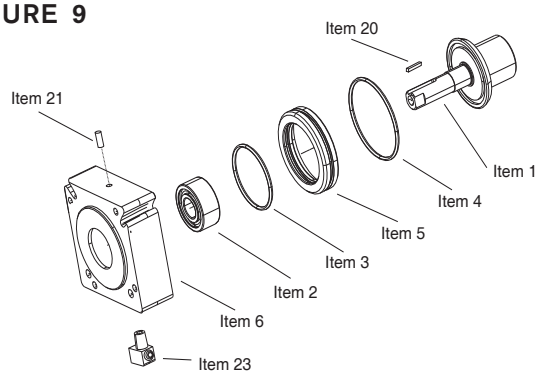


FIGURE 9



TROUBLESHOOTING

Problem	Probable Cause	Solution
Failure to engage (brake).	Weak or broken wave spring.	Replace the wave spring.
Failure to disengage.	Control valve malfunction - air not getting to the brake.	Check for low air pressure or replace the control valve. NOTE: Unit has been designed to release before (at or below) 5.5 Bar [80 psi]. Required disengagement pressure higher than 5.5 bar [80 psi] may indicate improper assembly.
	After re-assembly, the Input flange is pinching the spring.	Carefully reinstall Flange.
	Air is leaking around the O-ring seals.	Replace the O-rings.
Loss of torque.	Friction Facing is worn or dirty.	Replace the friction facing.

REPLACEMENT PARTS LIST

The Item or "Balloon" Number for all Nexen Products is used for part identification on all Product Parts List, Product Price List, Unit Assembly Drawings, Bills of Materials, and Instruction Manuals.

When ordering replacement parts, specify model designation, item number, part description, and quantity. Purchase replacement parts through your local Nexen Distributor.

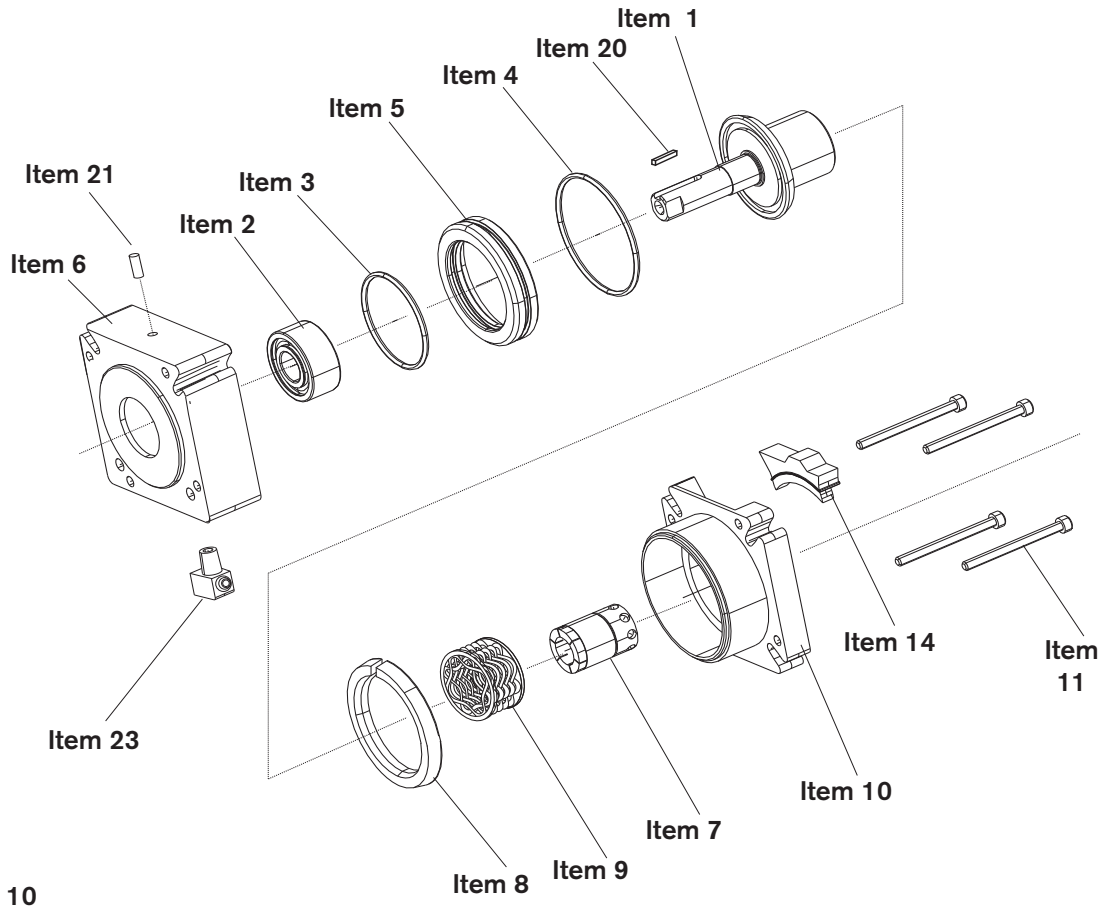


FIGURE 10

ITEM	DESCRIPTION	QTY
1	Output Shaft	1
2	Ball Bearing	1
3	O-ring Seal	1
4	O-ring Seal	1
5	Piston	1
6	Air Chamber	1
7	Keyless Bushing	1
8	Friction Facing	1
9	Wave Spring	1
10	Input Flange	1
11	Socket Head Cap Screw	4
12	Solenoid Valve (Optional)	1
14	Access Plug	1
20	Square Key	1
21	Dowel Pin	1
23	Quick Exhaust Valve, Eclipse	1

ACCESSORIES

DESCRIPTION	PROD. NO.
Optional Solenoid Valve	964650

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.

Limitation on Nexen's Liability
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.

Inspection
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.

Limitation on Actions
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.

nexen

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