

Eclipse Servo Motor Brake




Flange Mounted, Pneumatically Engaged, Spring Released
Sizes 2, 3, 4, and 5



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
(651) 484-5900

www.nexengroup.com

	<p style="text-align: center;"> DANGER</p> <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>	
---	---	---

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	4
General Safety Precautions	4
Installation:	
Mounted on the Shaft End of a Motor	5
Mounted between a Gear Reducer and a Motor	7
Lubrication	8
Air Connections	8
Operation	9
Brake Assembly	9
Troubleshooting	11
Replacement Parts List	12
Accessories	12
Warranty	13

GENERAL SPECIFICATIONS


Size	Min Holding Torque	Torsional Rigidity (Estimated)	Inertia (Calculated)	Weight	Min. Disengagement Air Pressure
Size 2	1.9 Nm [17 in-lb]	4431 Nm/RAD [3267 ft*lb/RAD]	0.00002 kg*m ² [0.0005 lb*ft ²]	56 watts [0.075 HPT]	1.1 kg [2.5 lbs]
Size 3	11.3 Nm [100 in-lb]	5287 Nm/RAD [3900 ft*lb/RAD]	0.00007 kg*m ² [0.0016 lb*ft ²]	104 watts [0.14 HPT]	2 kg [4.5 lbs]
Size 4	22.6 Nm [200 in-lb]	7456 Nm/RAD [5500 ft*lb/RAD]	0.00024 kg*m ² [0.0058 lb*ft ²]	135 watts [0.18 HPT]	4.5 kg [9.9 lbs]
Size 5	45.2 Nm [400 in-lb]	23448 Nm/RAD [17294 ft*lb/RAD]	0.00117 kg*m ² [0.0276 lb*ft ²]	149 watts [0.20 HPT]	7.5 kg [16.6 lbs]

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



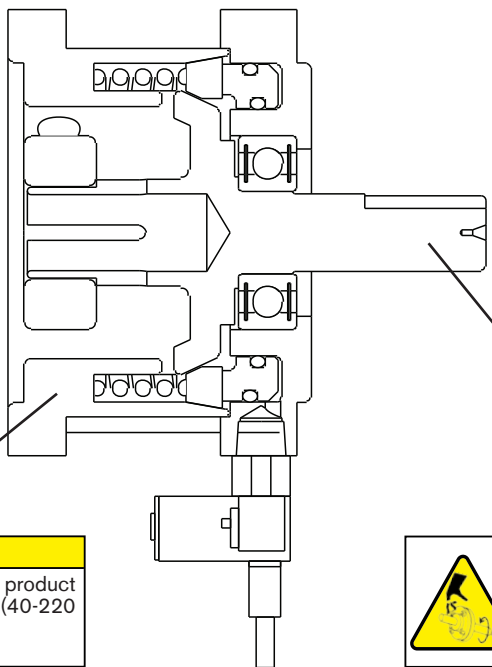
CAUTION
Watch for sharp features when interacting with this product. The parts have complex shapes and machined edges.




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




WARNING
The output shaft needs to be enclosed either by gear reducer or appropriate guarding. Failure to guard could result in serious bodily injury.





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



WARNING
The output shaft needs to be enclosed either by gear reducer or appropriate guarding. Failure to guard could result in serious bodily injury.

INSTALLATION

INSTALLATION ONTO MOTOR SHAFT

NOTE: Refer to Figures 1, 2 & 3.

Prior to performing any installation steps, Nexen recommends applying air pressure to the Servo Brake. When air pressure is applied, the brake will remain engaged, and the shaft will not rotate. This will aid in the following installation operations.

1. Place the Clamping Collar (Item 7) on the input (female) end of the servo brake shaft. Finger tighten the cap screw until the Collar is nearly snug. Then slide the Collar down the Shaft until it is firmly against the shaft step.

NOTE: The Clamp Collar for size 4 and 5 requires two cap screws to provide necessary clamp load.

2. Remove the Access Plugs (Item 14) from the Input Flange (Item 10). Rotate the Clamping Collar (Item 7) until the cap screw is lined up with the access hole. Then insert an Allen driver or a T-handle wrench through and engage the head of the cap screw. Leave this driver or wrench in place while you perform the next two steps.

CAUTION: Do not lubricate either the Clamping Collar or the Shaft. Any lubricant on the contact surfaces could result in torque transfer failure. If necessary, clean the Shaft with a non-petroleum based solvent, such as isopropyl alcohol, and wipe dry before assembly.

3. Slide the Motor Shaft into the input (female) end of the Output Shaft (Item 1) until the Flanges of the Motor and Brake come together.
4. Using four customer-supplied Socket Head Cap Screws (See Table 3), bolt the Flanges together. Tighten the cap screws evenly to the recommended torques listed in Table 3 (Page 7).
5. Using the Allen driver or wrench used in Step 2, tighten the cap screws in the Clamping Collar (Item 7) to the recommended torque listed in Table 2 (Page 7).

CAUTION: Under-tightening the Collar may cause slippage between the motor and the Brake. This can cause damage to the System, Motor and/or Brake.

6. Reinstall the Access Plugs (Item 14) into the access holes on the Input Flange (Item 10).

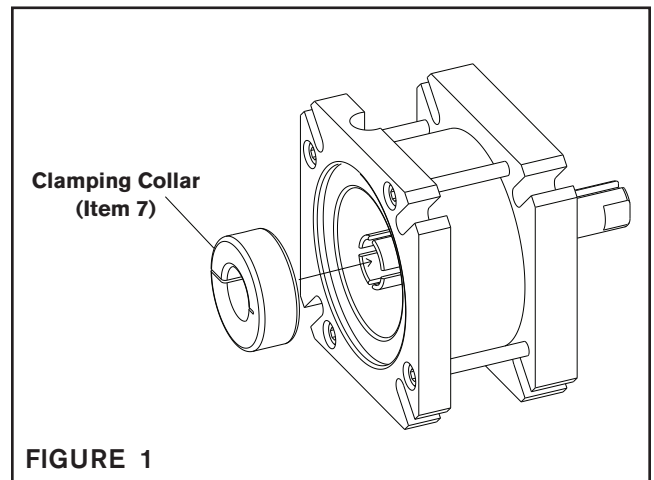


FIGURE 1

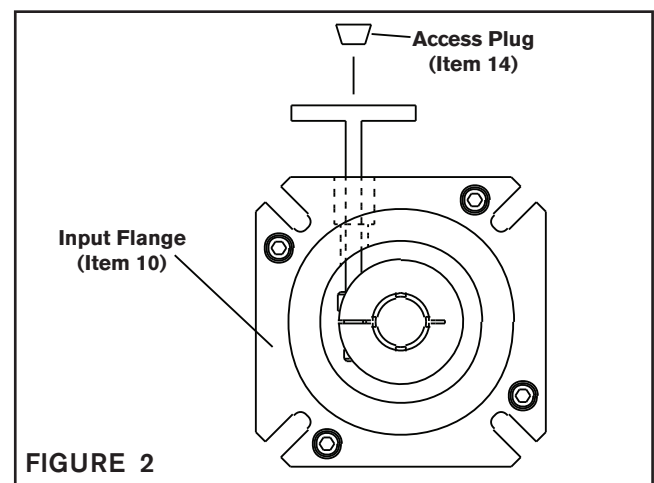


FIGURE 2

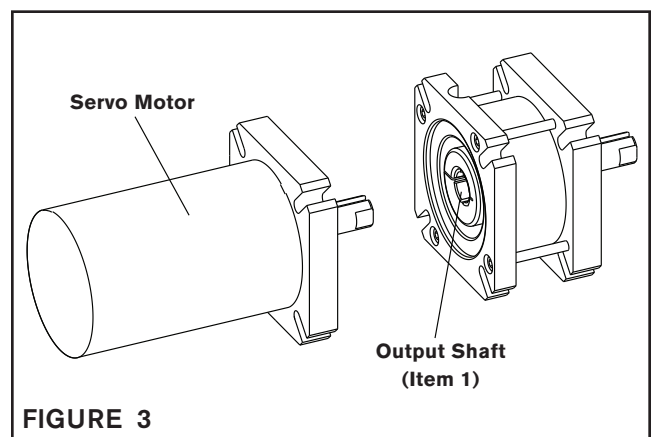



FIGURE 3

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

INSTALLATION

MOUNTED ON THE SHAFT END OF A MOTOR (continued)

7. 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 (Nexen 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. Refer to Figure 4.

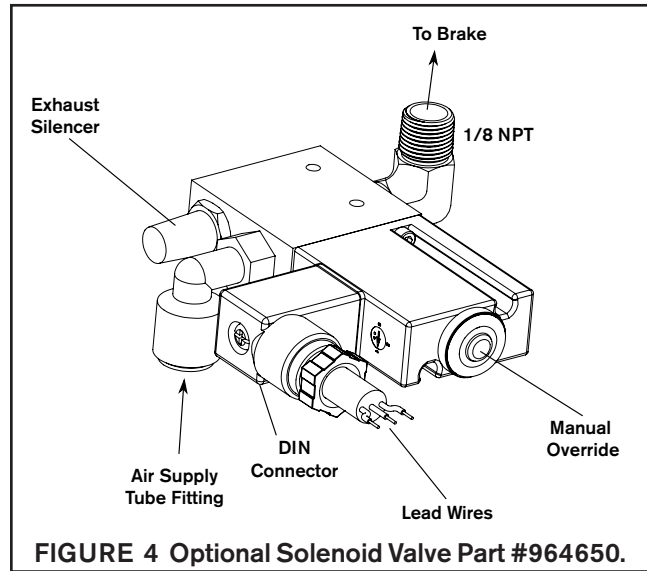


FIGURE 4 Optional Solenoid Valve Part #964650.

	CAUTION
	The Servo Brake will engage if you depress the domed button at the 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 engaged. Unit has been designed to engage before (at or below) 5.5 bar [80 psi]. Required engagement 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.

8. Assemble the air line to the valve.
9. Connect the lead wires from the valve to the brake control connection points on the Motor Drive or the PLC. Refer to Table 1.
Lead Wire Cable:
Brown wire = positive
White wire = common
Green wire = ground
10. Attach the Gear Reducer or the load to the Brake Shaft.

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

TABLE 1

OPTIONAL SOLENOID VALVE SPECIFICATIONS				
Voltage	Power	Resistance	Current	CV
Standard Coil: 24VDC	4 Watts	145 Ohms	.17 Amps	.25

	CAUTION
	24 VDC valve connector has a suppression diode installed across the coil. Observe proper voltage polarity or connector damage will result.

INSTALLATION

MOUNTED BETWEEN A GEAR REDUCER AND A MOTOR

NOTE: Refer to Figure 5.

1. To mount the Servo Brake to the Motor, follow steps 1-11 on pages 5-6.
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 3.
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.

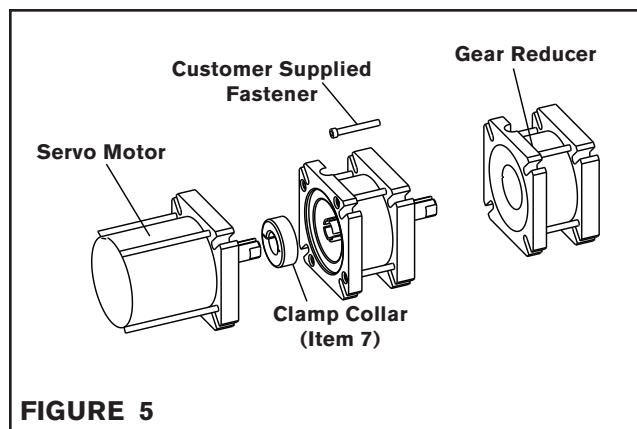


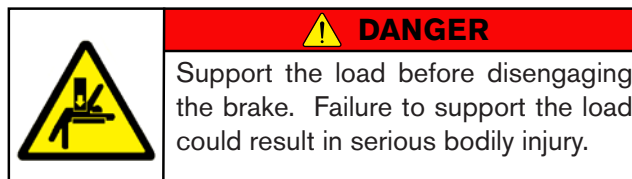
FIGURE 5

TABLE 2

Brake Model	Shaft Size	Cap Screw	Recommended Collar Screw Torque
Size 2	14 mm	M5	9.5 N-m [84.1 in-lb]
Size 3	16 mm	M6	16.0 N-m [142.0 in-lb]
Size 4	15 mm	M6	16.0 N-m [142.0 in-lb]
Size 5	24 mm	M6	16.0 N-m [142.0 in-lb]

TABLE 3

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]



LUBRICATION

NOTE

Note: Nexen pneumatically actuated devices require clean, pressure regulated air for maximum performance and life. Nexen pneumatically operated devices pneumatic seals are lubricated 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.

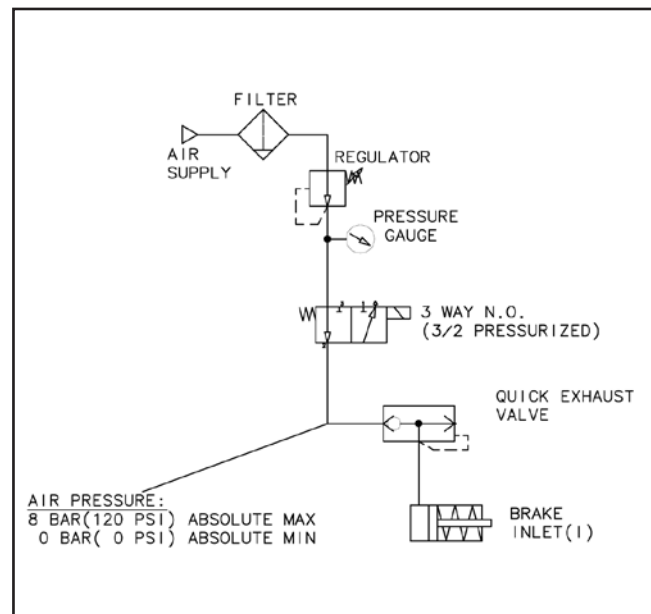
AIR CONNECTIONS

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.



OPERATION

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



	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: $\text{Time} = \text{Volume} / (\text{Power} * \text{Wear Rate})$.

TABLE 4

Sizes	Max RPM
Size 2	9,000
Size 3	8,000
Size 4	5,000
Size 5	4,500

	CAUTION
	The temperature limits for this product line are 4.5-100 Degree Celsius (40-220 Degree F).

BRAKE ASSEMBLY

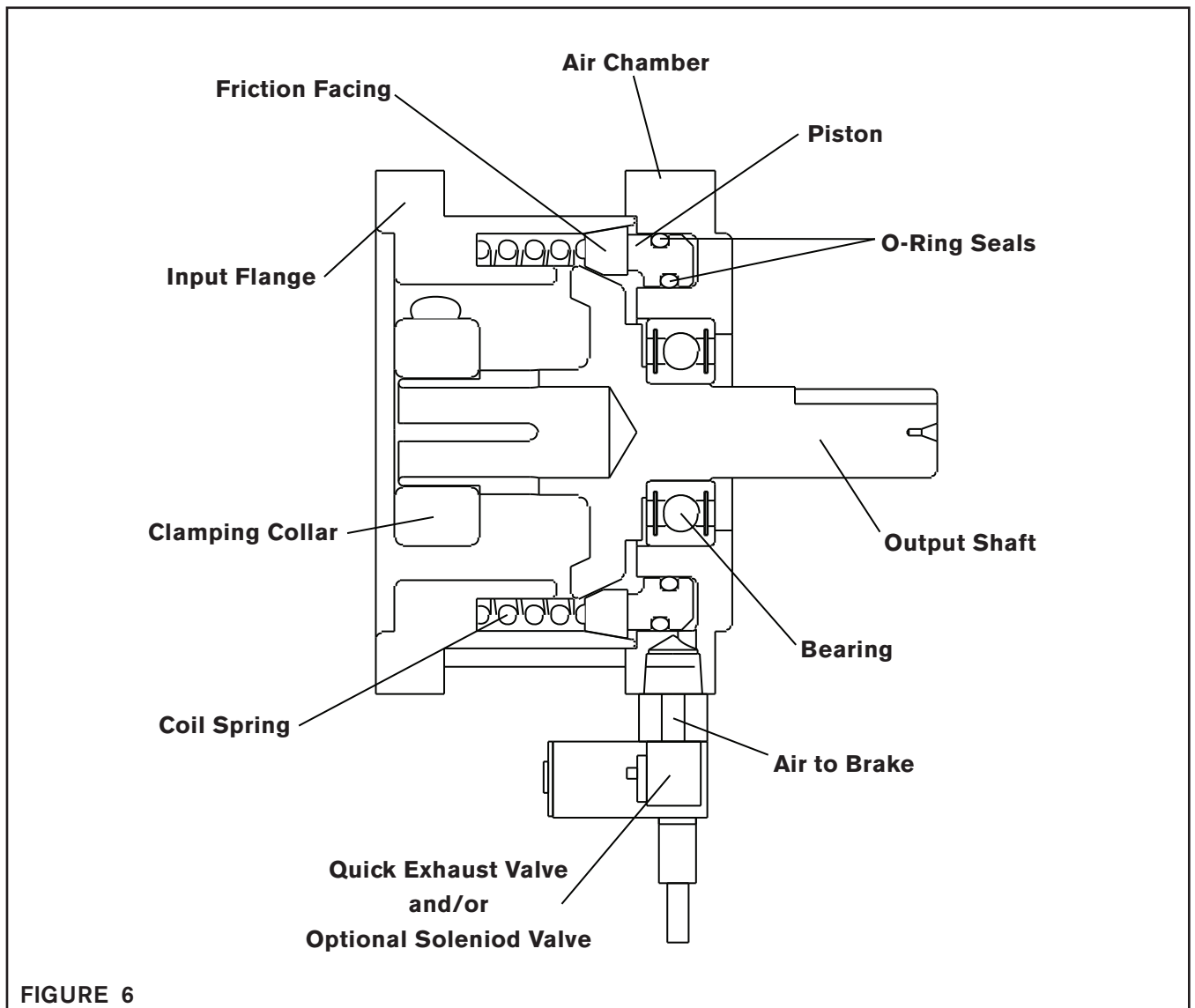


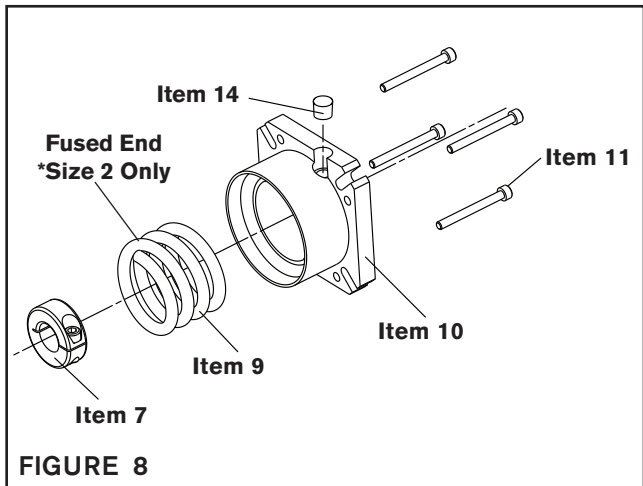
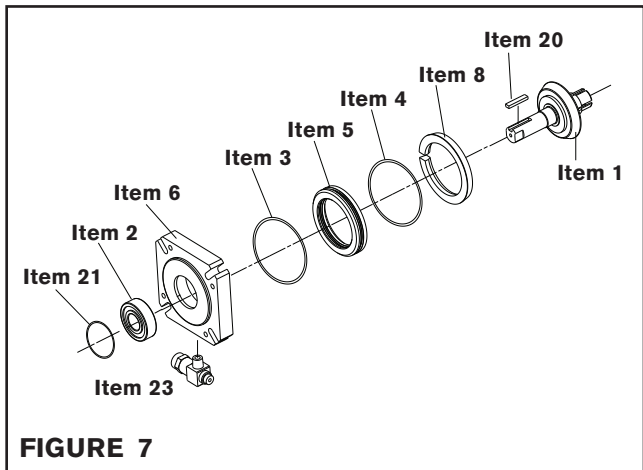
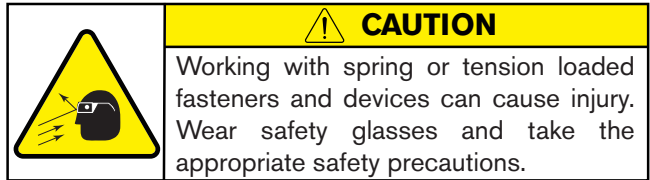
FIGURE 6

BRAKE ASSEMBLY

SIZES 2, 3, 4, 5

NOTE: Refer to Figures 7 & 8.

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.
3. Remove the Piston (Item 5) 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. Remove the Retaining Ring (Item 21) and 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 old Loctite®.
7. Apply a 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. Reinstall the retaining ring.
12. 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.
13. Slide the Piston (Item 5) into the Air Chamber (Item 6).
14. Clean the friction surface of the Input Flange and Output Shaft (Item 6) with solvent.



(continued...)

BRAKE ASSEMBLY (continued...)

15. Position the Friction Facing on top of the piston with the narrow end of the taper pointing up. Use care to ensure that the Friction Facing is concentric to the piston, as this will aid in the installation of the output shaft in step 16.
16. 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).
17. Replace the Spring (Item 9) and Input Flange (Item 10).

NOTE: On the Size 2 Spring, one end will be fused. Be sure that the fused end is down and makes contact with the facing (Item 8).

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. Refer to Table 5 for the recommended assembly torque values.

TABLE 5

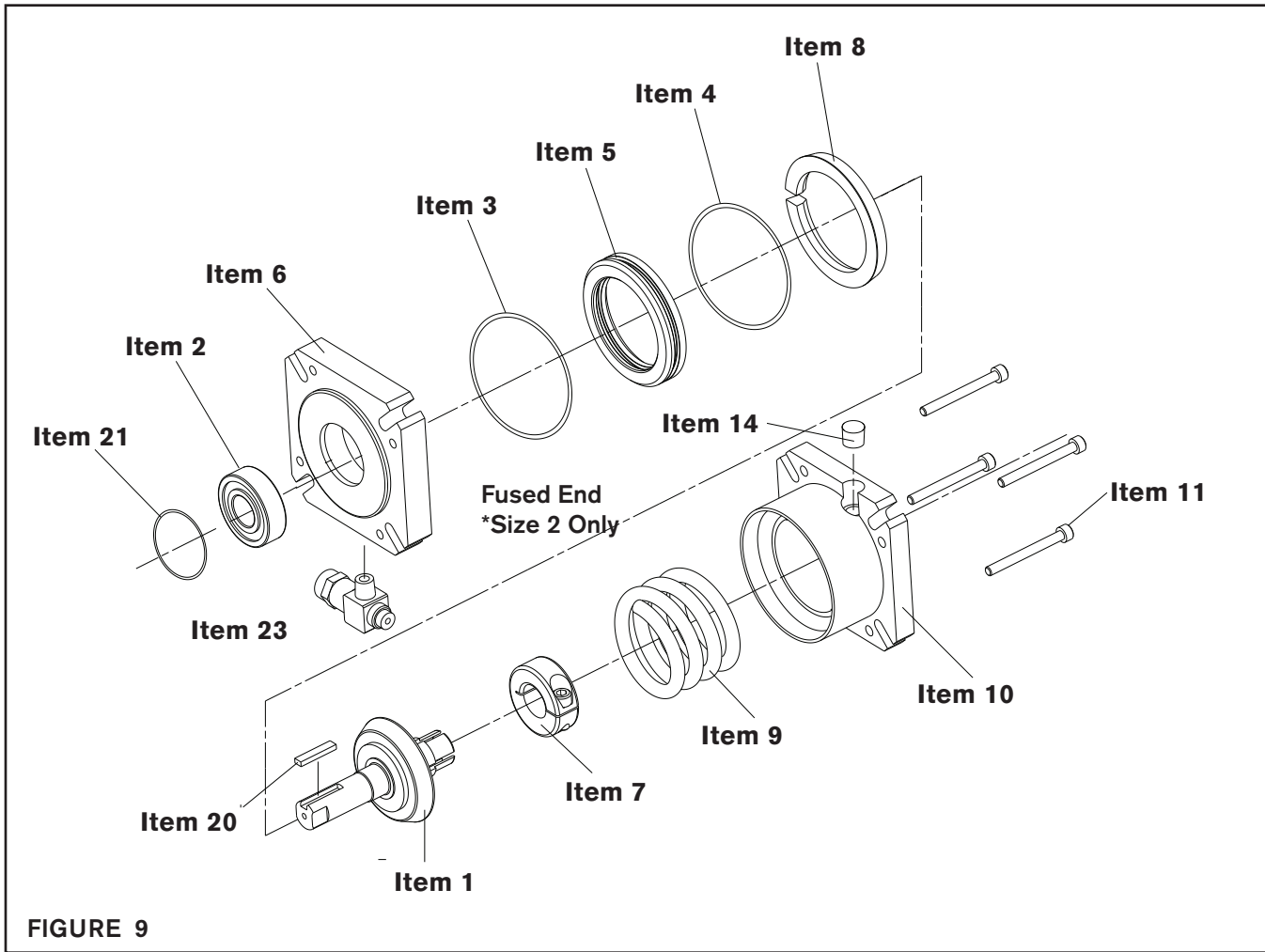
Brake Model	Socket Head Cap Screw (Item 11)	Recommended Assembly Torque
Size 2	M4	4.2-5.4 Nm [37-48 in-lb]
Size 3	M5	7.0-9.2 Nm [62-81 in-lb]
Size 4	M6	9.2-11.9 Nm [81-105 in-lb]
Size 5	M8	26.2-34.0 Nm [232-301 in-lb]

TROUBLESHOOTING

Problem	Probable Cause	Solution
Failure to disengage (brake).	Weak or broken spring.	Replace broken spring.
Failure to engage (1).	Control valve malfunction - air not getting to the brake.	Check for low air pressure or replace the control valve. NOTE: Pressure needed to engage should NOT exceed 80 psi.
Failure to engage (2).	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

To order replacement parts, indicate servo brake model size, item number, item description, and quantity. Replacement parts are available through your local Nexen Distributor.



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	Clamping Collar	1
8	Friction Facing	1
9	Spring	1
10	Input Flange	1
11	Socket Head Cap Screw	4
12	Solenoid Valve (Optional)	1
14	Access Plug	1
20	Key	1
21	Retaining Ring	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[®]

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

800.843.7445
Fax: 651.286.1099
www.nexengroup.com

ISO 9001 Certified