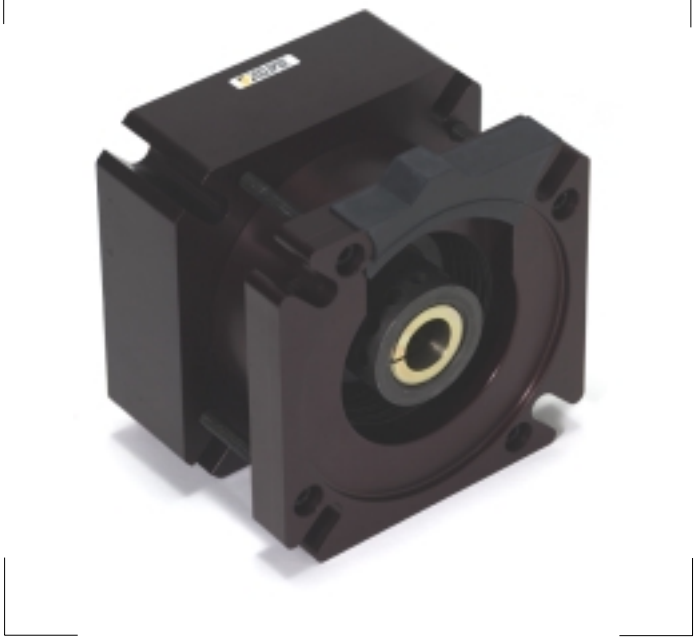
nexen®

ECLIPSE™ PRODUCTS

User Manual



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

FORM NO. L-21004-F-0901

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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ISO 9001 Certified

DANGER

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 or cause injury or death.

Comply with all applicable codes.

Table of Contents

INSTALLATION

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.

   Caution: 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. Overtightening 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 (page 3) 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 (page 3).

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

continued...

FIGURE 1

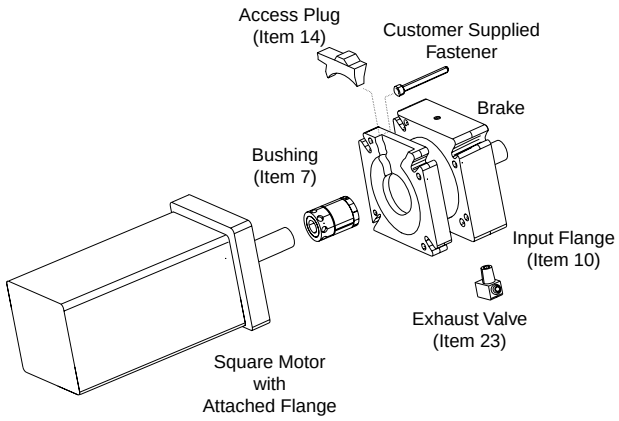
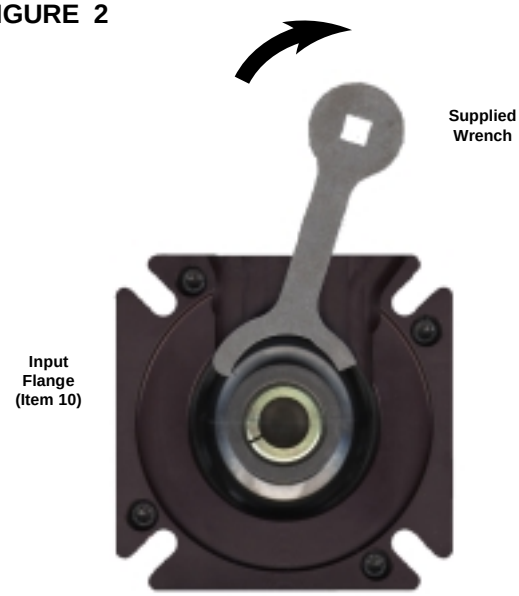


FIGURE 2



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)

8. Assemble the Quick Exhaust Valve (Item 23) to the Servo Brake. Use Teflon tape and/or pipe sealant on the threads. If you are using the optional Solenoid Valve (Item 12) in conjunction with the Quick Exhaust Valve, assemble the Solenoid Valve to the Quick Exhaust Valve. If you use the two valves in conjunction with each other, the brake engagement time will decrease.

9. If you are using the optional Solenoid Valve (Item 12) in place of the Quick Exhaust Valve (Item 23), then, assemble the optional Solenoid Valve directly to the Servo 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.

   CAUTION: The Servo Brake will disengage if you depress the brass button on 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.

10. Assemble the air line to the valve

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

12. The lead wire contains a full bridge rectifier and surge suppressor which converts AC power to rectified AC power and provides circuit protection.

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

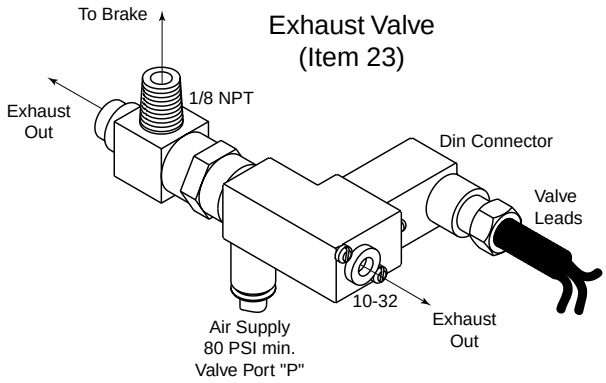


FIGURE 3

DANGER

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

INSTALLATION

MOUNTED BETWEEN A GEAR REDUCER AND A MOTOR

NOTE: Refer to Figure 2

1. To mount the Servo Brake to the Motor, follow steps 1-11 on pages 1-2.
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

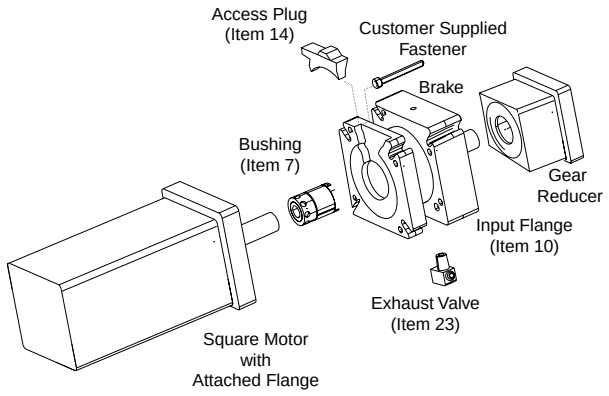


TABLE 1

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

* Can be used as either AC (50/60 Hz) or DC.
Use Nexen's rectifier lead wire for AC (50/60 Hz) operation.

DANGER

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

AIR PREPARATION

For long life, the Brake requires clean and pressure regulated air (filtered to five microns or better). Nexen does not recommend lubricated air for this product.

BRAKE ASSEMBLY

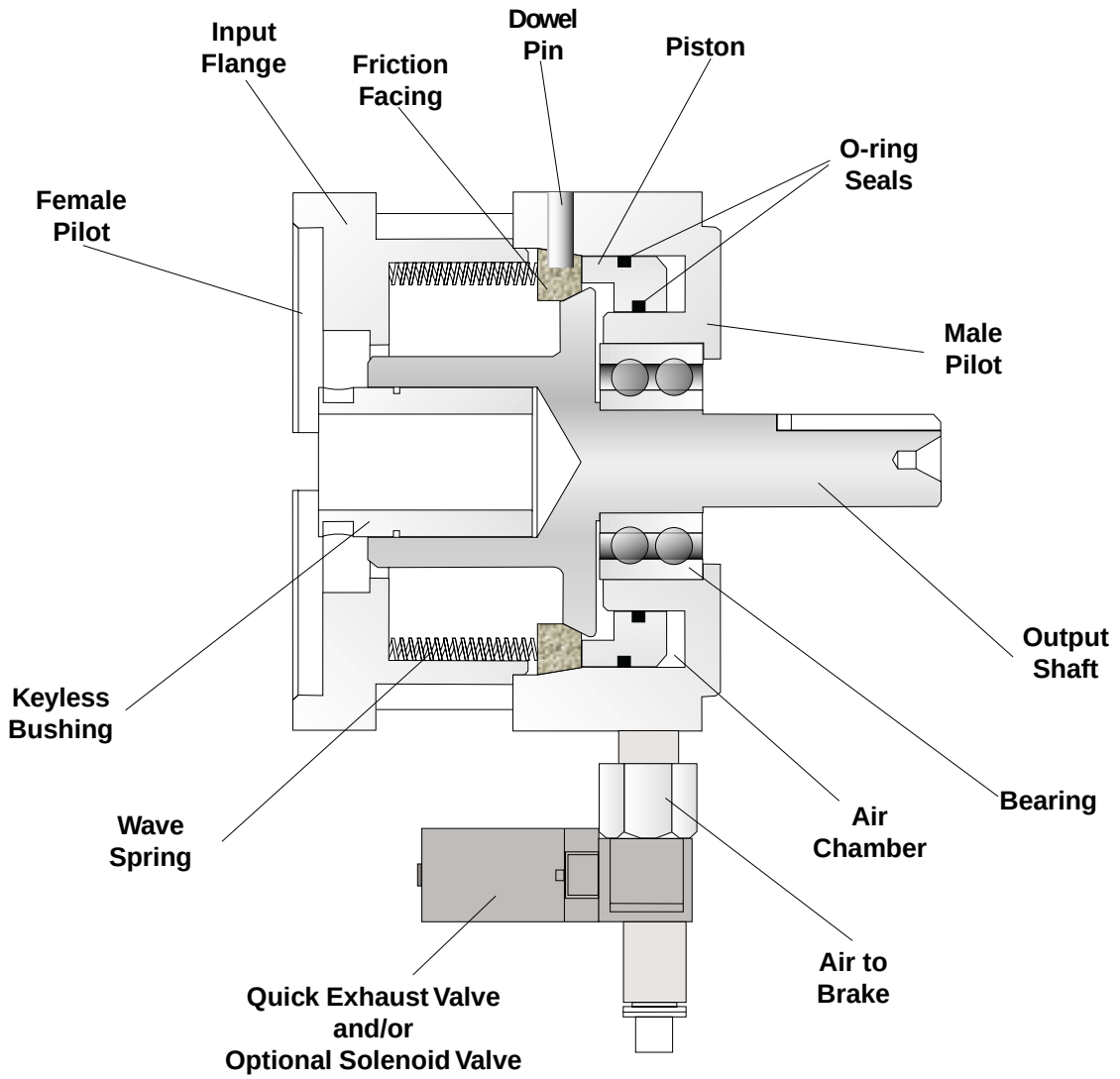


FIGURE 5

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.

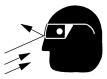
11. Coat the O-ring contact surfaces of the Air Chamber (Item 6), the Piston (Item 5), and the O-ring Seals (Items 3, 4) with a thin film of O-ring lubricant and install the new O-ring Seals.

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.

DANGER



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

FIGURE 6

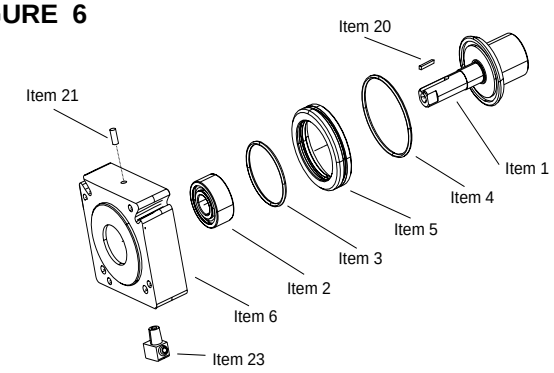
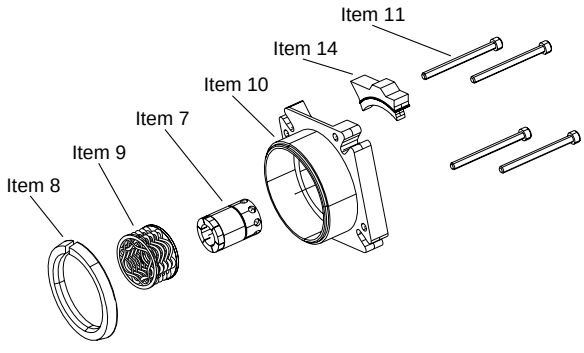


FIGURE 7



(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).

    CAUTION: 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 4 for the recommended assembly torque values.

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

TABLE 4

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).

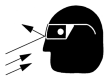
   CAUTION: Keep the Wave Spring centered relative to the Friction Facing. If the Wave Spring is not centered, the brake could fail to disengage.

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 4 (page 6) for the recommended assembly torque values.

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

DANGER



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

FIGURE 8

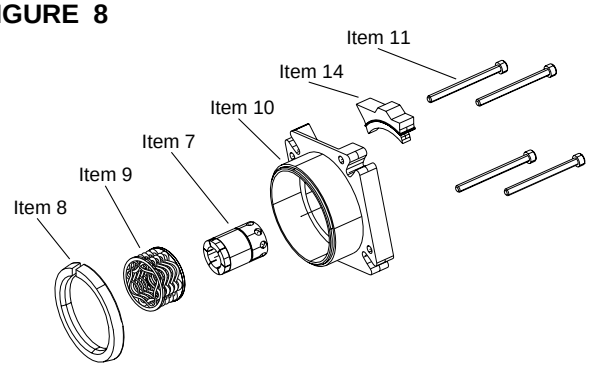
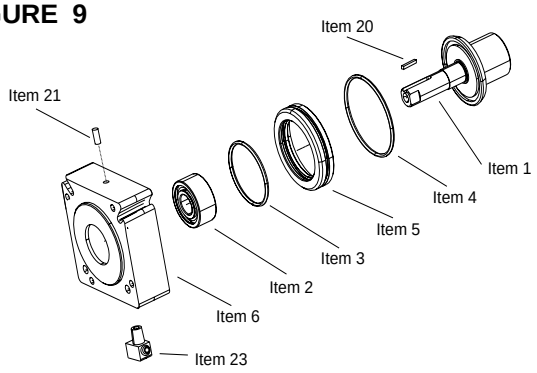


FIGURE 9



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 (page 4).
	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.

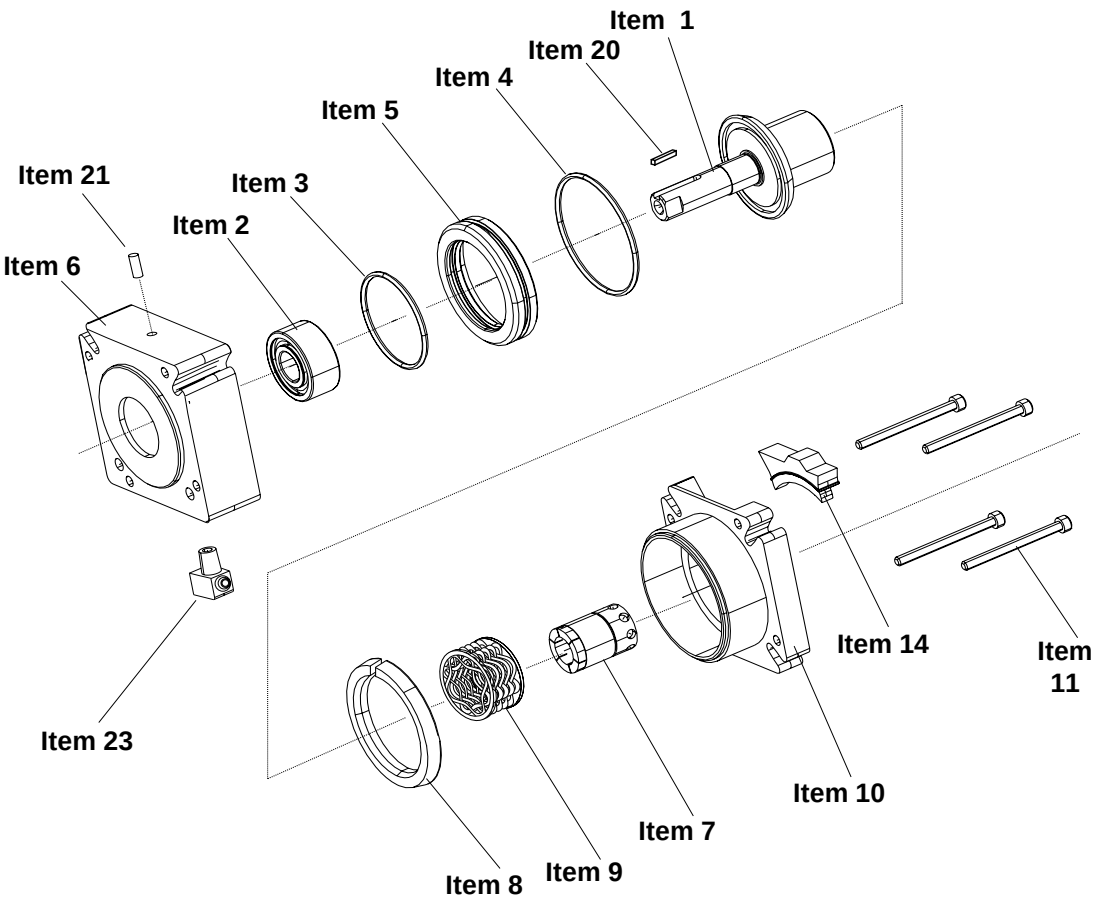


FIGURE 10

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

SPECIFICATIONS

Size	Min Holding Torque	Max RPM	Torsional Rigidity	Inertia w/ coupling	Overhung Load	Weight
2	2.25Nm (20in•lb)	10,000	6180Nm/rad (4550 lb•ft/rad)	.5kg•cm^2 (.0004in•lb•s^2)	833 N (190 lbs)	1.1 kg (2.4 lbs)
3	8Nm (70in•lb)	10,000	9613Nm/rad (7090 lb•ft/rad)	.77kg•cm^2 (.0007in•lb•s^2)	1070 N (240 lbs)	1.5 kg (3.2 lbs)
4	22Nm (200in•lb)	6,000	23810Nm/rad (17550 lb•ft/rad)	6.7kg•cm^2 (.0059in•lb•s^2)	2334 N (525 lbs)	3.9 kg (8.5 lbs)
5	45Nm (400in•lb)	3,500	22562Nm/rad (16640 lb•ft/rad)	15kg•cm^2 (.0133in•lb•s^2)	2447 N (550 lbs)	6.3 kg (13.8 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.

ACCESSORIES

DESCRIPTION	PROD. NO.
Optional Solenoid Valve	964650

WARRANTY

Warranties

Nexen warrants that the Products will be free from any defects in material or workmanship for a period of 12 months from the date of shipment. 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 of the Buyer for any breach of the warranties set out above will be, at the sole discretion of Nexen, a repair or replacement with new, serviceably used or reconditioned Product, or issuance of credit in the amount of the purchase price paid to Nexen by the Buyer for the Products.

Limitation of 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 images, 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.

Limitation of Damages

In no event shall Nexen be liable for any consequential, indirect, incidental, or special damages of any nature whatsoever, including without limitation, lost profits arising from the sale or use of the Products.

Warranty Claim Procedures

To make a claim under this warranty, the claimant must give written notice of the alleged defect to whom the Product was purchased from and deliver the Product to same within one year of the date on which the alleged defect first became apparent.

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