

# AIR CHAMP PRODUCTS

USER MANUAL



**NEMA 48C Flange Mounted, Enclosed, Clutch Brake**  
**FMCBE Model 500**

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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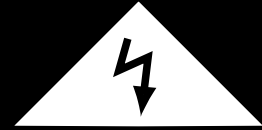
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**ISO 9001 Certified**



# 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.

Hazardous Voltages can cause injury or death.

Improper installation can damage your system or cause injury or death.

Comply with all applicable codes.



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## -NOTES-

## INSTALLATION

### MOUNTED ON THE SHAFT END OF A MOTOR

NOTE: Refer to Figure 1

1. Align the motor shaft so that the flat area is facing up, in the twelve o'clock position (toward the top of the motor).
2. Align the FMCBE Model 500 with the set screw access in the twelve o'clock position and the air inlet ports in the six o'clock position. This alignment allows condensation to drain from the ports.
3. Align the Set Screw (which is in the Disc Drive) so that the Set Screw (item 26) is positioned above the flat in the motor shaft (not shown).
4. Slide the FMCBE Model 500 onto the motor shaft and be careful to maintain the alignment of the motor shaft. Secure the FMCBE Model 500 to the motor with the customer supplied fasteners.
5. Tighten the Set Screw (Item 26) and install the Plug (Item 27).

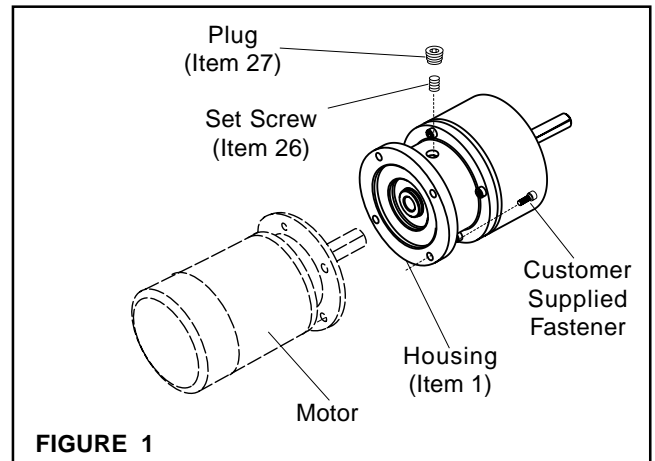


FIGURE 1

### MOUNTED BETWEEN A GEAR REDUCER AND A MOTOR

NOTE: Refer to Figure 2

1. Align the motor shaft so that the flat area is facing up, in the twelve o'clock position (toward the top of the motor).
2. Align the FMCBE Model 500 with the set screw access in the twelve o'clock position and the air inlet ports in the six o'clock position. This alignment allows condensation to drain from the ports.
3. Align the Set Screw (which is in the Disc Drive) so that the Set Screw (item 26) is positioned above the flat in the motor shaft (not shown).
4. Slide the FMCBE Model 500 onto the motor shaft and be careful to maintain the alignment of the motor shaft. Secure the FMCBE Model 500 to the motor with the customer supplied fasteners.
5. Tighten the Set Screw (item 26) and install the Plug (item 27).
6. Carefully slide the Stub Shaft into the Gear Reducer.
7. Use the customer supplied fasteners to secure the FMCBE Model 500 to the Gear Reducer.

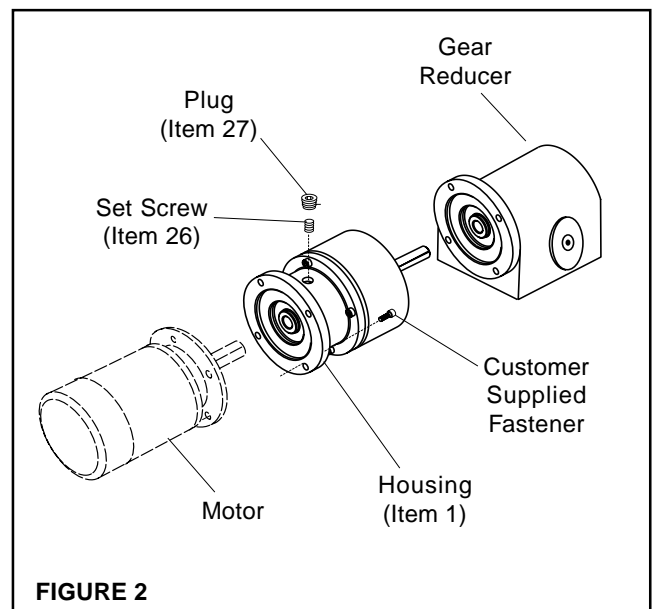


FIGURE 2

## AIR CONNECTIONS (NPT Style)

### NOTICE

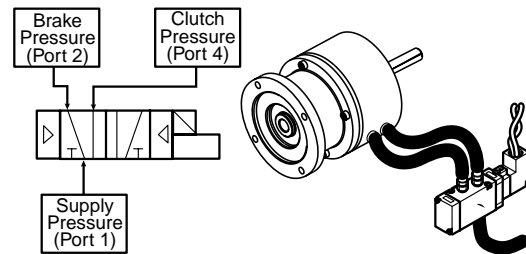
For quick response, Nexen recommends installing a quick exhaust valve and short air lines between the Control Valves and the FMCBE Model 500. Align the air inlet ports to the down position to allow condensation to drain out of the air chambers. The FMCBE Model 500 Clutch Brake has 1/8-27 NPT ports.

**NOTE:** There are numerous valve combinations. The suggestions listed below are the most common.

### 4-WAY CONTROL VALVE

**NOTE:** Refer to Figure 3

1. If you want the brake engaged when the solenoid is de-energized, then connect Port 2 to the brake and Port 4 to the clutch.
2. Connect the air supply line to inlet Port 1.

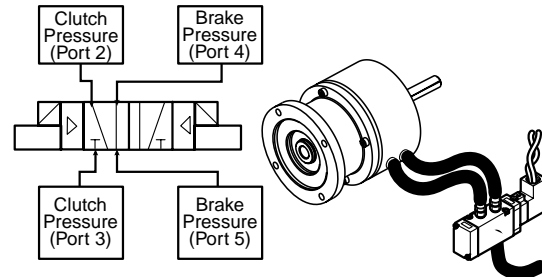


**FIGURE 3**

### 5-WAY CONTROL VALVE

**NOTE:** Refer to Figure 4

1. If you want the brake engaged and "OFF" when the solenoid is de-energized, then connect Port 4 to the brake and Port 2 to the clutch.
2. Connect the brake air supply line to Port 5. Connect the clutch air supply line to Port 3.

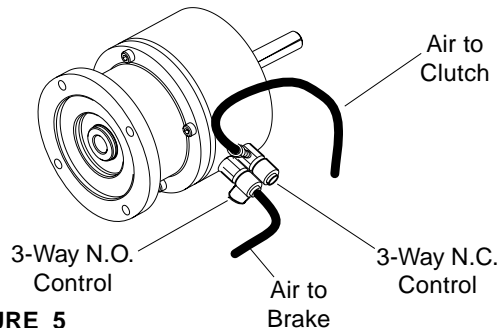


**FIGURE 4**

### 3-WAY CONTROL VALVES

**NOTE:** Refer to Figure 5

1. Install the 3-Way N.O. Control into the brake inlet port. Install the 3-Way N.C. Control into the clutch inlet port.
2. Connect the air supply line to the inlet port (marked "IN") on the top of the 3-Way N.O. Control. Connect an air supply line to the inlet port marked "IN" on the side of the 3-Way N.C. Control.



**FIGURE 5**

### NOTICE

When the 3-Way N.O. Control is de-energized, air flows directly to the brake. When the 3-Way N.O. Control is energized, air exhausts from the brake.

When the 3-Way N.C. Control is de-energized, air exhausts from the clutch. When the 3-Way N.C. Control is energized, air flows to the clutch.



## AIR PREPARATION

### LUBRICATED AIR

Nexen recommends one drop of oil for every 20 cubic feet of air.

### NON-LUBRICATED AIR

Nexen recommends the use of filtered, lubricated air to avoid premature seal wear and extend the life of the seal. However, because the seals are lubricated prior to product assembly, they can operate with clean, dry non-lubricated air, when conditions do not allow the use of lubricated air. The preparation of the air is critical to the life of clutch-brake seals. Filter the air to 5 microns or better to prepare the air.. The dew point specification should be 40°F or lower.

### LUBRICATOR DRIP RATE SETTINGS

#### NOTICE

**The settings below are for Nexen supplied lubricators.  
If you are not using a Nexen lubricator,  
then calibration must replicate the following procedure.**

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

## AIR AND ELECTRICAL CONNECTIONS (Integral Valve Style)

NOTE: Refer to Table 1 and Figures 6 and 7:

1. Connect the air supply to the inlet port.
2. Place the gasket on the Solenoid Valve (Item 36).  
  
NOTE: If you do not install the gasket, you may not get a proper seal. An improper seal can cause corrosion in a moist environment.
3. Plug the DIN Connector (Item 40) into the Solenoid Valve (Item 36).
4. Tighten the pan head screw included on the DIN Connector (Item 40).
5. Connect the lead wires of the DIN Connector (Item 40) to an appropriate power source (See Table 1). Observe polarity when you connect any device marked "+" and "-".

Lead Wire Cable:

Brown wire = positive  
White wire = common  
Green wire = ground

NOTE: The 115 VDC rectified lead wire contains a full bridge rectifier and surge suppressor which converts AC power to rectified AC power and provides circuit protection.

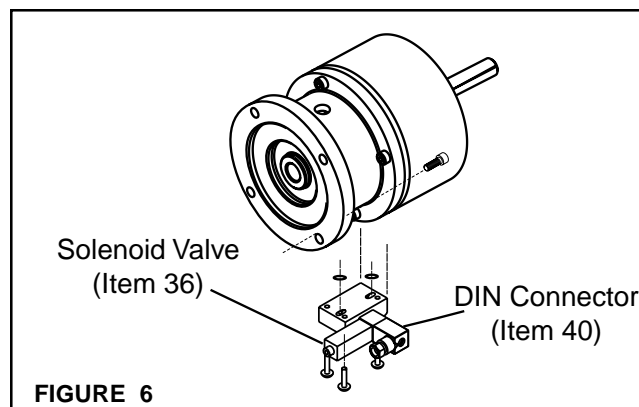


FIGURE 6

Table 1 - Spool Specifications				
Power	Voltage	Resistance	Current	Solenoid Part #
Standard Coil: 115 VDC*	2.5 Watts	5500 Ohms	.021 Amps	4919
Optional Coils: (Contact Nexen) 24 VDC	0.6 Watts	1100 Ohms	.027 Amps	4961
* A Nexen rectifier lead wire is supplied for the 115 VDC and can be used for AC (50/60 Hz) or DC operation.				

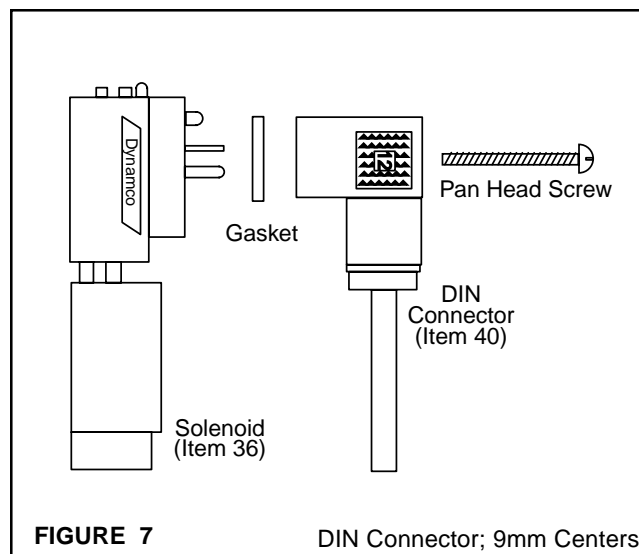
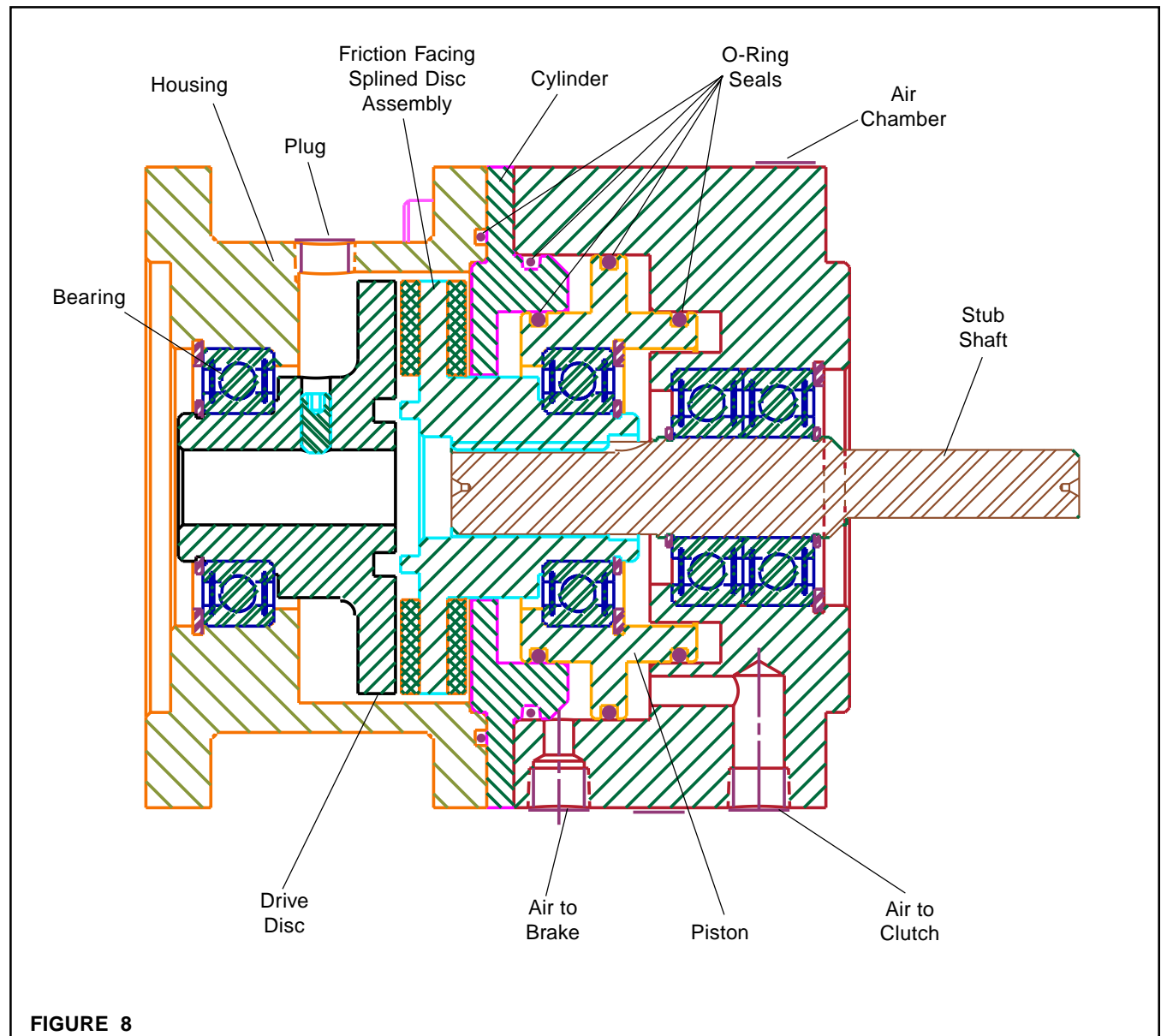


FIGURE 7

DIN Connector; 9mm Centers

## FMCBE Model 500 Assembly (NPT Style)



## FMCBE Assembly

NOTE: Refer to Figures 9, 10 11, 12 and 13

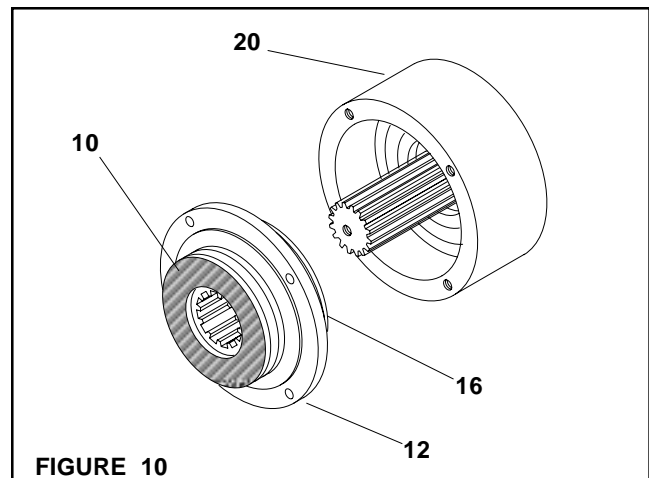
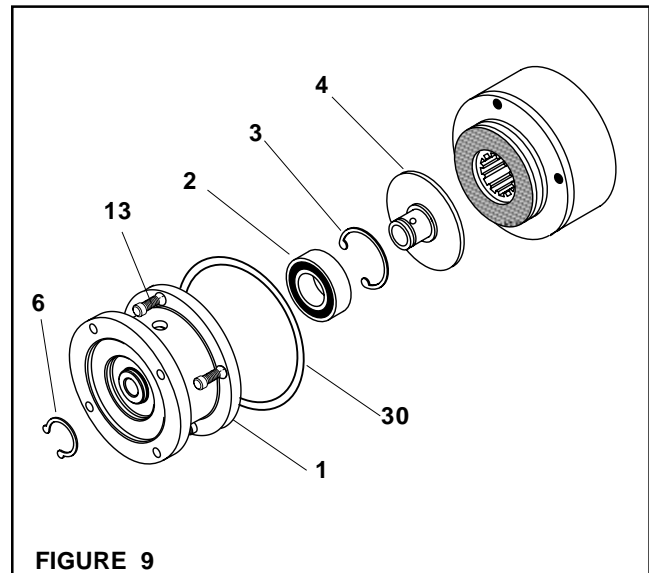
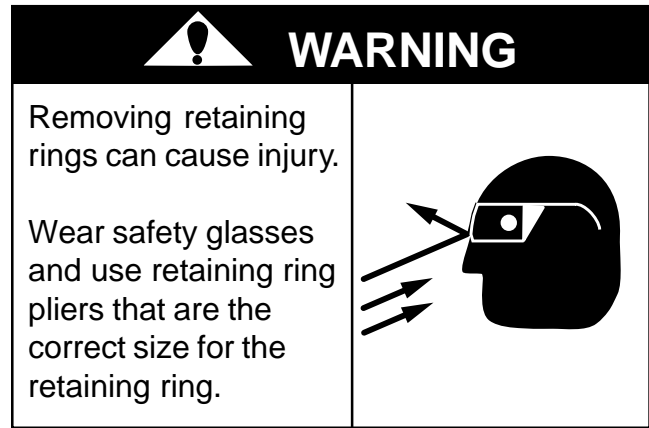
1. Remove the four Socket Head Cap Screws (Item 13) and slide the Housing (Item 1), the Bearing (Item 2) and the Drive Disc (Item 4) out of the FMCBE.
2. Remove the O-Ring (Item 30) from the Housing (Item 1).
3. Remove the Retaining Ring (Item 6).
4. Press the Drive Disc (Item 4) out of the Bearing (Item 2) and the Housing (Item 1).
5. Remove the Retaining Ring (Item 3) from the Housing (Item 1).
6. Support the Housing (Item 1) and press the old Bearing (Item 2) out of the Housing.

NOTE: Removing the bearing damages it. Do not reuse the bearing.

7. Clean the bearing bore of the Housing (Item 1) with fresh safety solvent. Make sure that all of the old Loctite® residue is removed.
8. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Bearing (Item 2).
9. Carefully align the outer race of the new Bearing (Item 2) with the bore of the Housing (Item 1).
10. Support the Housing (Item 1), press on the outer race of the new Bearing and press the new Bearing (Item 2) into the Housing.
11. Reinstall the Retaining Ring (Item 3).
12. Support the inner race of the new Bearing (Item 2) and press the Drive Disc (Item 4) into the new Bearing and Housing (Item 1).

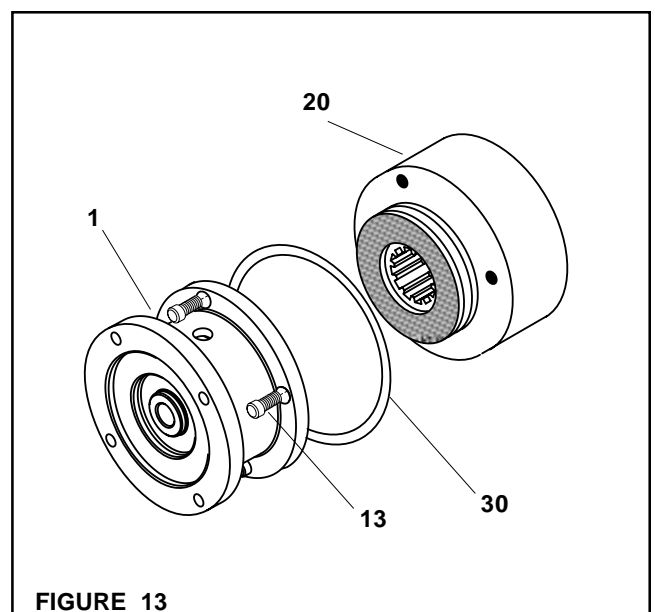
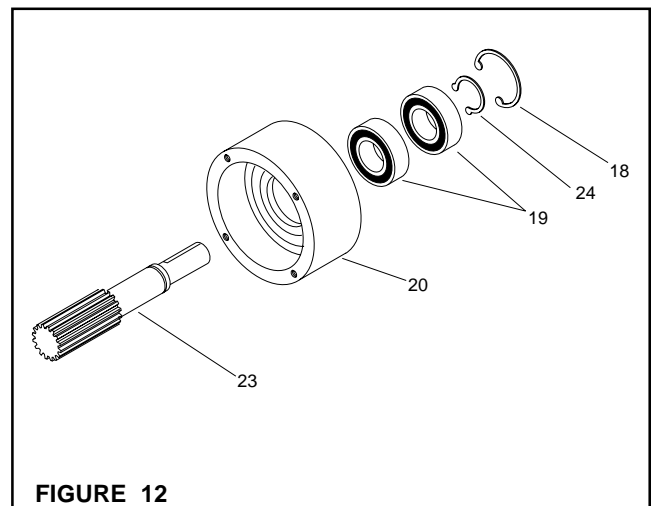
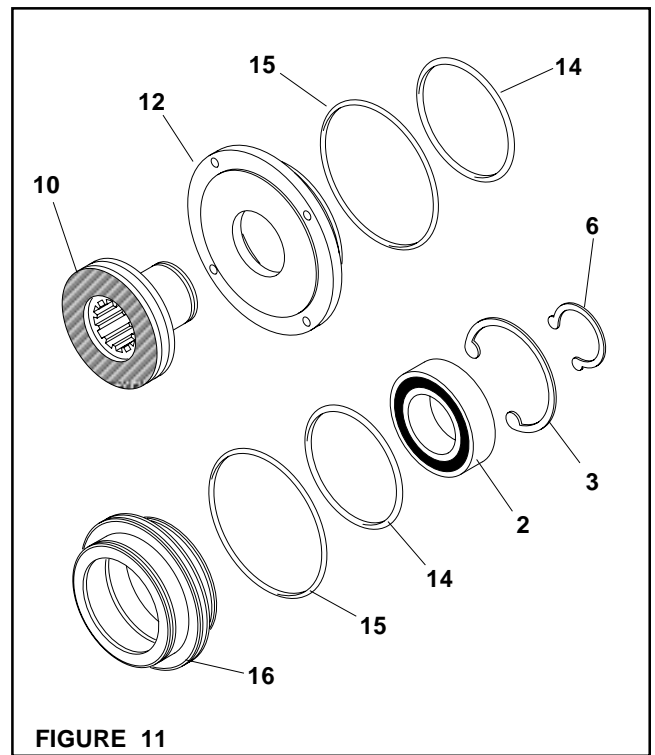
13. Reinstall the Retaining Ring (Item 6).
14. Slide the Friction Facing Splined Disc Assembly (Item 10), the Cylinder (Item 12) and the Piston (Item 16) out of the Air Chamber (Item 20).
15. Remove the Retaining Ring (Item 6) and press the Friction Facing/Splined Disc Assembly (Item 10) out of the Cylinder (Item 12) and the Piston (Item 16).
16. Slide the Piston (Item 16) out of the Cylinder (Item 12), then remove the old O-Ring Seals (Items 14 and 15) from the Piston and the Cylinder.
17. Remove the Retaining Ring (Item 3) from the Piston (Item 16), then press the old Bearing (Item 2) out of the Piston.
18. Clean the bearing bore of the Piston (Item 16) with fresh safety solvent. Make sure that all of the old Loctite® residue is removed.
19. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Bearing (Item 2).

(Continued...)



## FMCBE Assembly (continued)

20. Support the Piston (Item 16), press on the outer race of the new Bearing (Item 2), press the new Bearing (Item 2) into the Piston.
21. Reinstall the Retaining Ring (Item 3).
22. Clean the O-Ring grooves and contact surfaces of the Piston (Item 16) and Cylinder (Item 12) with fresh safety solvent. Lubricate the O-Ring grooves and contact surfaces with fresh O-Ring lubricant.
23. Lubricate and install the new O-Ring Seals (Items 14 and 15) onto the Piston (Item 16) and Cylinder (Item 12), then slide the Piston back into the Cylinder.
24. Support the inner race of the new Bearing (Item 2) and press the new Friction Facing Splined Disc Assembly (Item 10) into the Cylinder, the Piston, and the new Bearing.
25. Reinstall the Retaining Ring (Item 6).
26. Remove the Retaining Ring (Item 24) from the Stub Shaft (Item 23).
27. Press the Stub Shaft (Item 23) out of the Bearings (Item 19).
28. Remove the Retaining Ring (Item 18) from the Air Chamber (Item 20).
29. Press the old Bearings (Item 19) out of the Air Chamber (Item 20).
30. Clean the bearing bore of the Air Chamber (Item 20) with fresh safety solvent. Make sure that all of the old Loctite® residue is removed.
31. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Bearings (Item 19).
32. Support the Air Chamber (Item 20), press on the outer race of the new Bearings (Item 19) and press the new Bearings into the Air Chamber.
33. Reinstall the Retaining Ring (Item 18).
34. Support the inner race of the new Bearings (Item 19) and press the Shaft (Item 23) into the new Bearing and Air Chamber (Item 20).
35. Reinstall the Retaining Ring (Item 24).
36. Slide the Friction Facing Splined Disc Assembly (Item 10), the Cylinder (Item 12), and the Piston (Item 16) into the Air Chamber (Item 20).
37. Clean and reinstall the O-Ring (Item 30) into the Housing (Item 1).
38. Apply a drop of Loctite® 242 to the threads of the four Socket Head Cap Screws (Item 13). Use the four Socket Head Cap Screws to secure the Air Chamber (Item 20) to the Housing (Item 1).
39. Evenly tighten the four socket Head Cap Screws to 5.4- 7.0Nm (48-62 in/lbs). Alternate between the four screws as you tighten them.



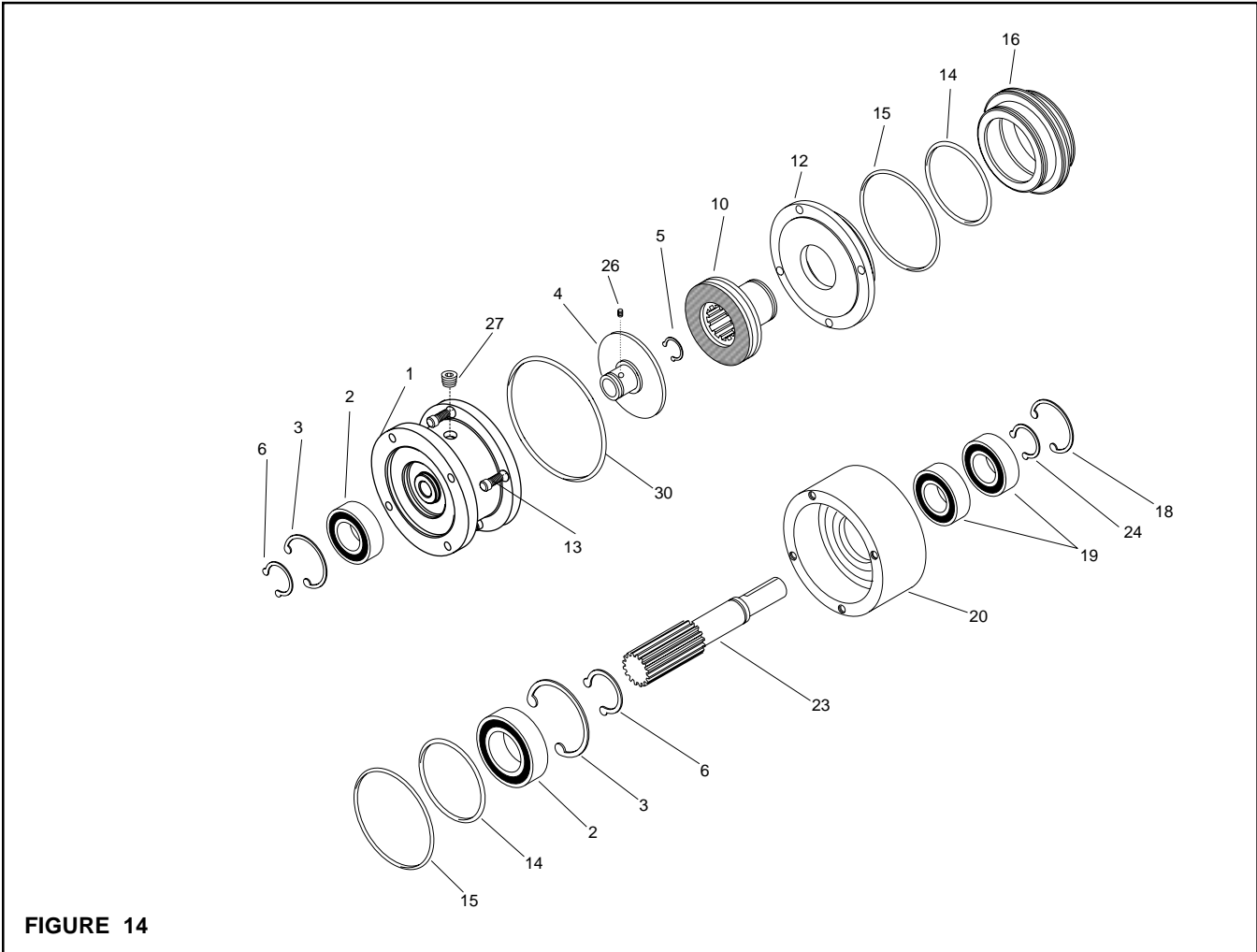
## TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	SOLUTION
Failure to engage.	Air not getting to the FMCBE due to a control valve malfunction.	Check for a control valve malfunction or low air pressure and replace the control valve if necessary.
	Lack of lubrication on Stub Shaft Spline.	Lubricate Stub Shaft spline.
	Air leaks around the O-Ring Seals.	Replace the O-Ring Seals.
Failure to disengage.	Unexhausted air due to a control valve malfunction.	Check for a control valve malfunction and replace the control valve if necessary.
	Lack of lubrication on Stub Shaft Spline.	Lubricate Stub Shaft spline.
Loss of torque.	Air leaks around the O-Ring Seals.	Replace the O-Ring Seals.
	Worn or dirty Friction Facings.	Replace the Friction Facings.

REPLACEMENT PARTS LIST

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

FMCBE-NPT Style (see figure 14)



ITEM	DESCRIPTION	QTY
1	Housing	1
2 <sup>1</sup>	Bearing	2
3	Retaining Ring (Int.)	2
4	Drive Disc	1
5	Retaining Ring (Int.)	1
6	Retaining Ring (Ext.)	2
10 <sup>1</sup>	Friction Facing Splined Disc Assy.	1
12	Cylinder	1
13	Socket Head Cap Screw (M5X0.8)	4
14 <sup>1</sup>	O-Ring Seal	2

ITEM	DESCRIPTION	QTY
15 <sup>1</sup>	O-Ring Seal	2
16	Piston	1
18	Retaining Ring (Int.)	1
19 <sup>1</sup>	Bearing	2
20	Air Chamber	1
23	Stub Shaft	1
24	Retaining Ring (Ext.)	1
26	Set Screw	1
27	Plug (.125 NPTF)	1
30	O-Ring Seal	1

<sup>1</sup> Denotes Repair Kit item (Repair Kit No. 801362).

REPLACEMENT PARTS LIST continued

FMCBE-Integral Valve Style (see figure 15)

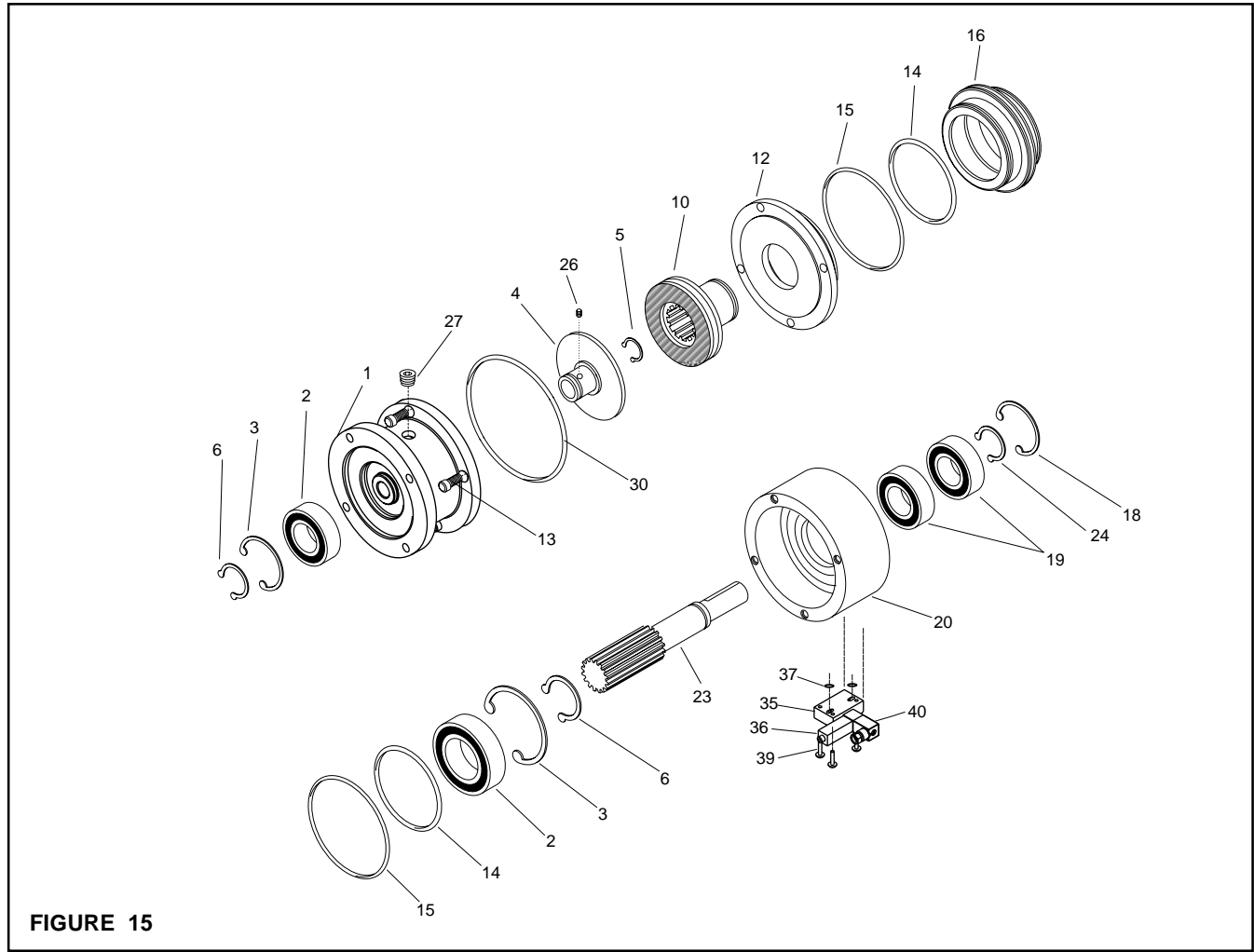


FIGURE 15

ITEM	DESCRIPTION	QTY
1	Housing	1
2 <sup>1</sup>	Bearing	2
3	Retaining Ring (Int.)	2
4	Drive Disc	1
5	Retaining Ring (Int.)	1
6	Retaining Ring (Ext.)	2
10 <sup>1</sup>	Friction Facing Splined Disc Assy.	1
12	Cylinder	1
13	Socket Head Cap Screw (M5X0.8)	4
14 <sup>1</sup>	O-Ring Seal	2
15 <sup>1</sup>	O-Ring Seal	2
16	Piston	1
18	Retaining Ring (Int.)	1

ITEM	DESCRIPTION	QTY
19 <sup>1</sup>	Bearing	2
20	Air Chamber	1
23	Stub Shaft	1
24	Retaining Ring (Ext.)	1
26	Set Screw	1
27	Plug (.125 NPTF)	1
30	O-Ring Seal	1
35	Manifold	1
36	Solenoid Valve	1
37	O-Ring Seal	2
39	Socket Head Cap Screw (M3 x 0.5)	3
40	DIN Connector	1

<sup>1</sup> Denotes Repair Kit item (Repair Kit No. 801362).



# WARRANTY

Nexen Group, Inc. (Nexen) warrants its product(s) [the Product(s)] will be free from defects in materials and workmanship under normal use and service conditions for a period of 12 months from the date of shipment. NO OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY, OR OF FITNESS FOR A PARTICULAR PURPOSE, ARE GIVEN, AND ALL SUCH OTHER WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED.

## Conditions

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) the claimant has complied with the warranty claim procedures set out below in Warranty Claim Procedures.

## Exclusive Remedy

"The sole and exclusive remedy for a breach of this warrant shall be, at Nexen's sole election, repair or replacement with new, serviceably used or reconditioned Product, or issuance of a credit in the amount of the current Nexen discounted price for the Product."

## 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 Nexen and deliver the Product to Nexen within one year of the date on which the alleged defect first became apparent.

**nexen**<sup>TM</sup>

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