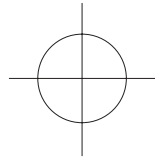


AIR CHAMP® PRODUCTS

User Manual



METRIC FLANGE MOUNTED ENCLOSED CLUTCH WITH SPRING ENGAGED BRAKE FMCBES MODELS 110-14, 130-19, 130-24, 7-28, 7-38, 8-38, AND 8-42

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



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.

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

ISO 9001 Certified

INSTALLATION ----- 4
 AIR CONNECTIONS ----- 5
 LUBRICATION ----- 5
 TROUBLESHOOTING ----- 6
 PARTS REPLACEMENT
 FRICTION FACINGS
 FMCBES 110-14, 130-19, AND 130-24 ----- 7
 FMCBES 7-28, 7-38, 8-38, AND 8-42 ----- 8
 HOUSING BEARING
 FMCBES 110-14 ----- 9
 FEMALE PILOT BEARING
 FMCBES 130-19, 130-24, 7-28, 7-38, 8-38, AND 8-42 ----- 9
 PISTON BEARING AND O-RING SEALS ----- 10
 MALE PILOT BEARINGS AND O-RING SEALS
 FMCBES 110-14,130-19, 130-24, 7-28, 8-38, AND 8-42 ----- 12
 FMCBES 7-38 ----- 13
 INPUT UNIT
 FMCBES 110-14 ----- 14
 FMCBES 130-19 AND 130-24 ----- 15
 FMCBES 7-28, 7-38, 8-38, AND 8-42 ----- 15
 PARTS LIST–FMCBES ----- 16
 REPLACEMENT PARTS ----- 21
 PARTS LIST–INPUT UNIT ----- 22
 WARRANTY ----- 23

INSTALLATION

MOUNTED ON THE SHAFT END OF A MOTOR

1. Insert the customer supplied key into the motor shaft keyway (See Figure 1).
2. Slide the FMCBES onto the motor shaft, then secure it to the motor using customer supplied socket head cap screws and lock washers (See Figure 1).
3. Align the hole in the FMCBES Housing with the Set Screw in the Drive Disc.
4. Tighten the Set Screw (Item 34) and then install the Plug (Item 35) (See Figure 1).

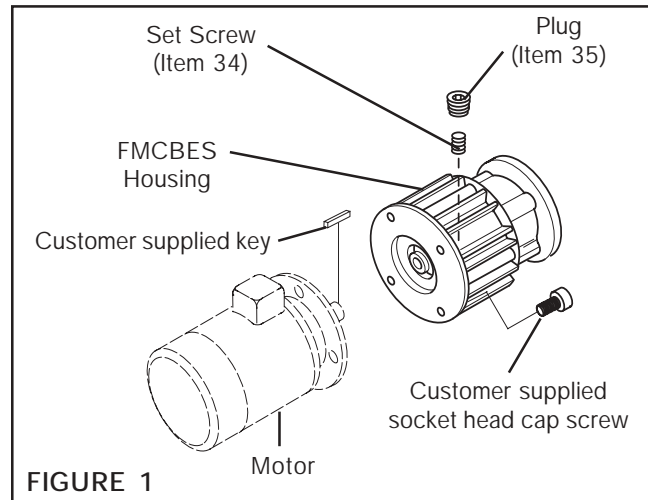


FIGURE 1

MOUNTED BETWEEN A GEAR REDUCER AND A MOTOR

1. Insert the Key (Item 26) into the output shaft of the FMCBES (See Figure 2).
2. Slide the FMCBES output shaft into the gear reducer (See Figure 2).
3. Secure the FMCBES to the gear reducer using customer supplied socket head cap screws, lock washers, and nuts (See Figure 2).
4. Insert the customer supplied key into the motor shaft keyway (See Figure 2).
5. Slide the motor into the FMCBES and secure it to the FMCBES using customer supplied socket head cap screws and lock washers (See Figure 2).
6. Align the hole in the FMCBES Housing with the Set Screw in the Drive Disc.
7. Tighten the Set Screw (Item 34) and then install the Plug (Item 35) (See Figure 2).

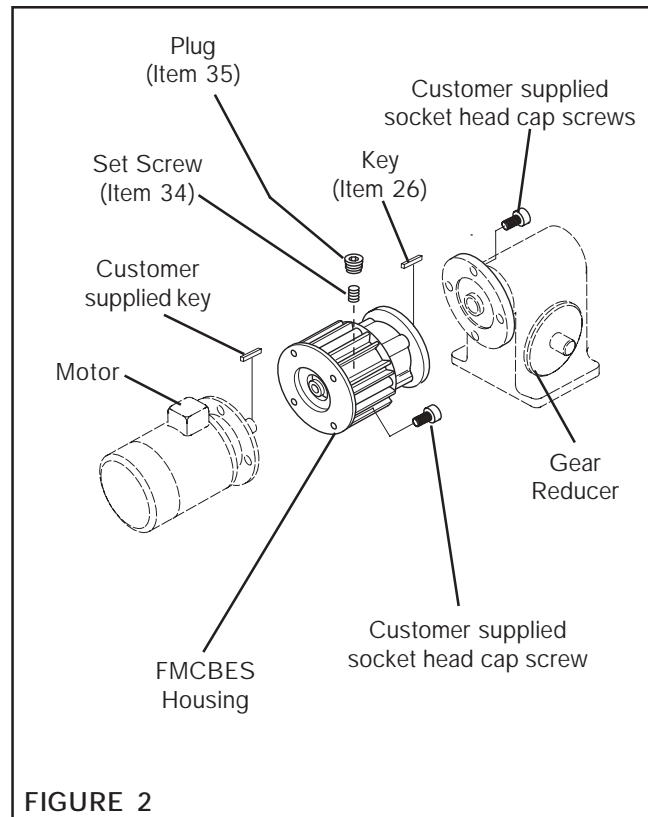


FIGURE 2



AIR CONNECTIONS

NOTE: For quick response, Nexen recommends a quick exhaust valve and short air line between the Control Valve and the FMCBES. Align the air inlet port to a down position to allow condensation to drain out of the air chamber. The Metric FMCBES has ISO 7/1-Rc 1/8 port.

LUBRICATION

Pneumatically actuated devices require clean, pressure regulated, and lubricated air for maximum performance and long life. The most effective and economical way to lubricate the Metric FMCBES is with an Air Line Lubricator, which injects oil into the pressurized air, forcing an oil mist into the air chamber.

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

Synthetic lubricants are not recommended.

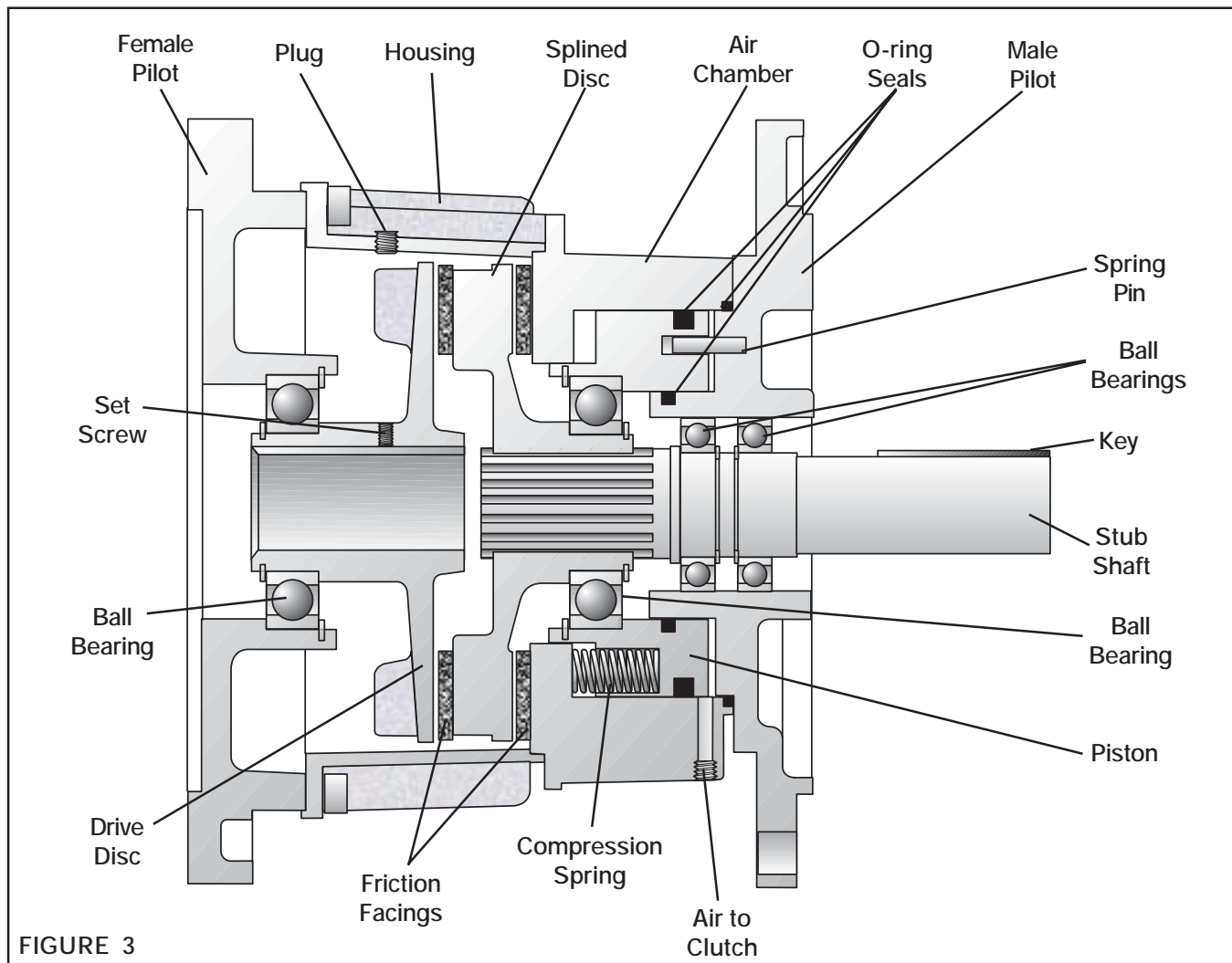
LUBRICATOR DRIP RATE SETTINGS

NOTE: These settings are for Nexen supplied lubricators. If you are not using a Nexen lubricator, 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. 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 counterclockwise until closed.
7. Turn the Lubricator Adjustment Knob clockwise one-third turn.
8. Open the air line to the unit.

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	SOLUTION
Failure to engage (clutch).	Air not getting to the FMCBES 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 engage (brake).	Weak or broken Compression Springs.	Replace the Compression Springs.
	Lack of lubrication on Stub Shaft spline.	Lubricate Stub Shaft spline.
Failure to disengage (clutch).	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.
Failure to disengage (brake).	Air not getting to the FMCBES 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.
Loss of torque.	Air leaks around the O-ring Seals.	Replace the O-ring Seals.
	Worn or dirty Friction Facings.	Replace the Friction Facings.



PARTS REPLACEMENT-FRICTION FACINGS

NOTE: The following sections are arranged by model. Verify that you are in the correct section for your model.

FMCBES 110-14, 130-19, AND 130-24

NOTE: If an Input Unit is installed on the FMCBES, it must be removed before servicing the FMCBES. Remove the Plug (Item 35) and loosen the Set Screw (Item 34) to release the FMCBES from the Input Unit shaft (See Figure 4).

1. Remove the four Socket Head Cap Screws (Item 14) and separate the two halves of the FMCBES (See Figure 4).
2. Remove the six old Flat Head Screws (Item 12) and the first old split Friction Facing (Item 11) (See Figure 5).

NOTE: Apply sufficient air pressure to the brake to release the brake portion of the FMCBES.

3. Align the holes in the Splined Disc (Item 9) with the Flat Head Screws (Item 12) that secure the second split Friction Facing (Item 11) (See Figure 5).
4. Remove the six old Flat Head Screws (Item 12) and the second old Friction Facing (Item 11) (See Figure 5).
5. Install the first new split Friction Facing (Item 11) and new Flat Head Screws (Item 12) (See Figure 5).
6. Tighten the six new Flat Head Screws (Item 12) to 22 In. Lbs. [2.5 N•m] torque.

NOTE: Release the air pressure to the FMCBES.

7. Install the second new split Friction Facing (Item 11) and new Flat Head Screws (Item 12) (See Figure 5).
8. Tighten the six new Flat Head Screws (Item 12) to 22 In. Lbs. [2.5 N•m] torque.
9. Apply a drop of Loctite[®] 242 to the threads of the Socket Head Cap Screws (Item 14) (See Figure 4).
10. Install and tighten the four Socket Head Cap Screws (Item 14), securing the two halves of the FMCBES to 10.5 Ft. Lbs. [14.2 N•m] torque for Model 110-14 and 24.5 Ft. Lbs. [33.2 N•m] torque for Models 130-19 and 130-24.

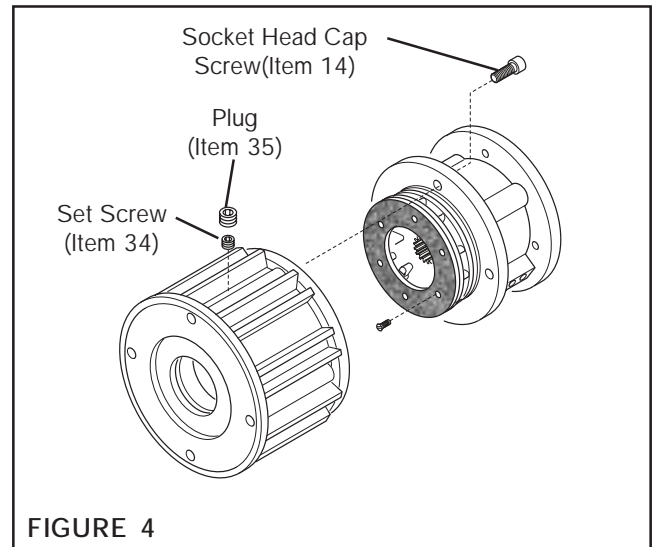


FIGURE 4

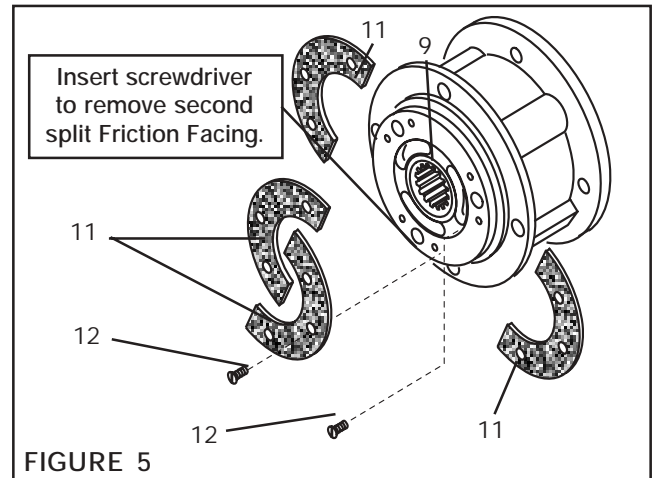


FIGURE 5

PARTS REPLACEMENT – FRICTION FACINGS

FMCBES 7-28, 7-38, 8-38, AND 8-42

NOTE: If an Input Unit is installed on the FMCBES, it must be removed before servicing the FMCBES. Remove the Plug (Item 35) and loosen the Set Screw (Item 34) to release the FMCBES from the Input Unit shaft (See Figure 6).

1. Remove the four Socket Head Cap Screws (Item 8) and separate the two halves of the FMCBES (See Figure 6).
2. Remove the six old Flat Head Screws (Item 12), the first old split Friction Facing (Item 11) (See Figure 7).

NOTE: Apply sufficient air pressure to the brake to release the brake portion of the FMCBES.

3. Align the holes in the Splined Disc (Item 9) with the Flat Head Screws (Item 12) that secure the second split Friction Facing (Item 11) (See Figure 7).
4. Remove the six old Flat Head Screws (Item 12) and the second old Friction Facing (Item 11) (See Figure 7).
5. Install the first new split Friction Facing (Item 11) and new Flat Head Screws (Item 12) (See Figure 7).
6. Tighten the six new Flat Head Screws (Item 12) to 36 In. Lbs. [4.0 N•m] torque.

NOTE: Release the air pressure to the FMCBES.

7. Install the second new split Friction Facing (Item 11), new Flat Head Screws (Item 12) (See Figure 7).
8. Tighten the six new Flat Head Screws (Item 12) to 36 In. Lbs. [4.0 N•m] torque.
9. Apply a drop of Loctite^o 242 to the threads of the Socket Head Cap Screws (Item 8) (See Figure 6).
10. Install and tighten the four Socket Head Cap Screws (Item 8) securing the two halves of the FMCBES to 24.5 Ft. Lbs. [33.2 N•m] torque for FMCBES 7-28 and 7-38, and 49.5 Ft. Lbs. [67.1 N•m] torque for Models 8-38 and 8-42.

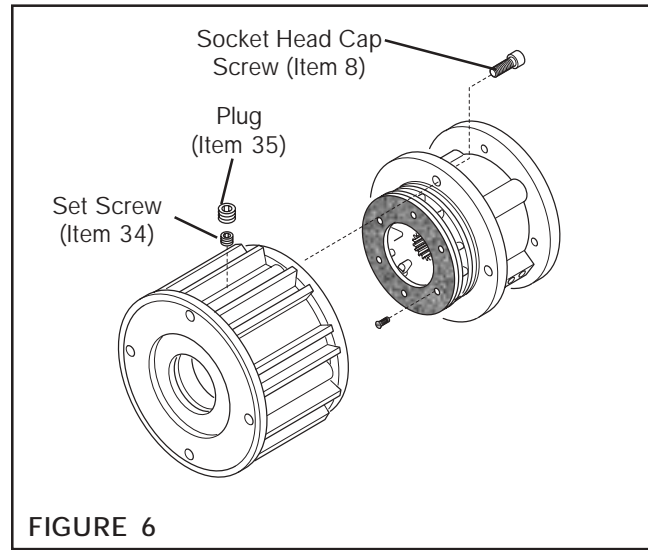


FIGURE 6

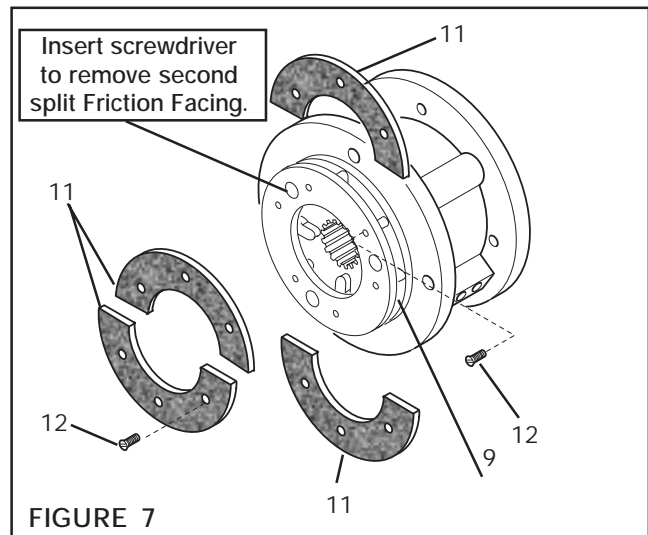



FIGURE 7

PARTS REPLACEMENT – HOUSING BEARING

NOTE: The following sections are arranged by model. Verify that you are in the correct section for your model.

FMCBES 110-14

1. Remove the four Socket Head Cap Screws (Item 14) and slide the Housing (Item 7), Bearing (Item 2), and the Drive Disc (Item 4) out of the FMCBES (See Figure 8).

 **WARNING**

Special attention should be exercised when working with retaining rings. Always wear safety goggles when working with spring or tension loaded fasteners or devices.

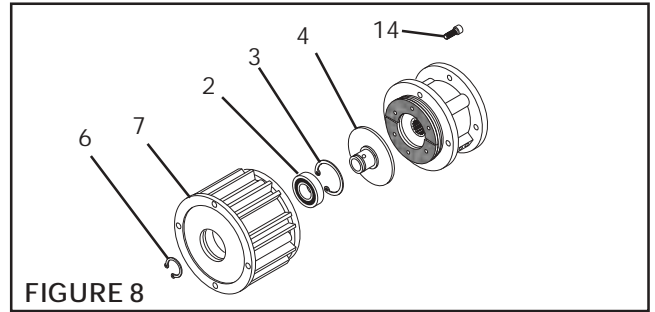


FIGURE 8

2. Remove Retaining Ring (Item 6) (See Figure 8).
3. Press the Drive Disc (Item 4) out of the Bearing (Item 2) and the Housing (Item 7) (See Figure 8).
4. Remove Retaining Ring (Item 3) (See Figure 8).
5. Fully supporting the Housing (Item 7), press the old Bearing (Item 2) out of the Housing (Item 7) (See Figure 8).

NOTE: Do not reuse the bearing. Applying force to the inner bearing race to remove a bearing held by the outer race causes damage to the bearing.


6. Clean the bearing bore of the Housing (Item 7) with fresh safety solvent, making sure all old Loctite® residue is removed (See Figure 8).
7. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Bearing (Item 2) (See Figure 8).

8. Carefully align the outer race of the new Bearing (Item 2) with the bore of the Housing (Item 7) (See Figure 8).
9. Supporting the Housing (Item 7) and pressing on the outer race of the new Bearing (Item 2), press the new Bearing into the Housing (See Figure 8).
10. Reinstall Retaining Ring (Item 3) (See Figure 8).
11. Support the inner race of the new Bearing (Item 2) and press the Drive Disc (Item 4) into the new Bearing and Housing (Item 7) (See Figure 8).
12. Reinstall Retaining Ring (Item 6) (See Figure 8).
13. Apply a drop of Loctite® 242 to the threads of the Socket Head Cap Screws (Item 14) (See Figure 8).
14. Slide the Housing (Item 7), Bearing (Item 2), and Drive Disc (Item 4) into the FMCBES and reinstall the four Socket Head Cap Screws (Item 14) (See Figure 8).
15. Tighten the four Socket Head Cap Screws to 10.5 Ft. Lbs. [14.2 N•m] torque.

PARTS REPLACEMENT – FEMALE PILOT BEARING

FMCBES 130-19, 130-24, 7-28, 7-38, 8-38, AND 8-42

1. Remove four Socket Head Cap Screws (Item 8) and slide the Female Pilot (Item 1), Bearing (Item 2), and the Drive Disc (Item 4) out of the FMCBES (See Figure 9).

 **WARNING**

Special attention should be exercised when working with retaining rings. Always wear safety goggles when working with spring or tension loaded fasteners or devices.

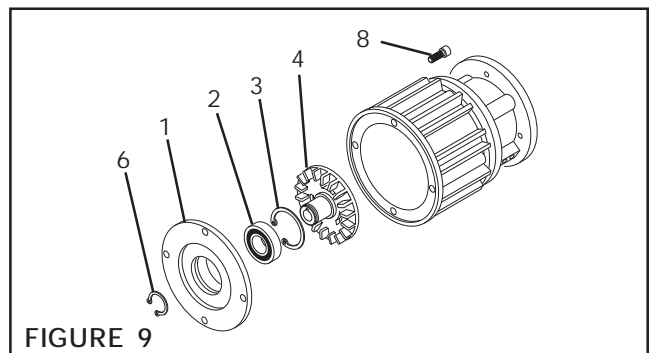


FIGURE 9

2. Remove Retaining Ring (Item 6) (See Figure 9).
3. Press the Drive Disc (Item 4) out of the Bearing (Item 2) and the Female Pilot (Item 1) (See Figure 9).
4. Remove Retaining Ring (Item 3) (See Figure 9).
5. Fully supporting the Female Pilot (Item 1), press the old Bearing (Item 2) out of the Female Pilot (Item 1) (See Figure 9).

NOTE: Do not reuse the bearing. Applying force to the inner bearing race to remove a bearing held by the outer race causes damage to the bearing.

6. Clean the bearing bore of the Female Pilot (Item 1) with fresh safety solvent, making sure all old Loctite^o residue is removed (See Figure 9).
7. Apply an adequate amount of Loctite^o 680 to evenly coat the outer race of the new Bearing (Item 2) (See Figure 9).
8. Carefully align the outer race of the new Bearing (Item 2) with the bore of the Female Pilot (Item 1) (See Figure 9).
9. Supporting the Female Pilot (Item 1) and pressing on the outer race of the new Bearing (Item 2), press the new Bearing into the Female Pilot (See Figure 9).

11. Support the inner race of the new Bearing (Item 2) and press the Drive Disc (Item 4) into the new Bearing and Female Pilot (Item 1) (See Figure 9).
12. Reinstall Retaining Ring (Item 6) (See Figure 9).
13. Apply a drop of Loctite^o 242 to the threads of the Socket Head Cap Screws (Item 8) (See Figure 9).
14. Slide the Female Pilot (Item 1), Bearing (Item 2), and Drive Disc (Item 4) into the FMCBES and reinstall the four Socket Head Cap Screws (Item 8) (See Figure 9).
15. Tighten four Socket Head Cap Screws (Item 8) to the recommended torque (See Table 1).

TABLE 1

FMCBES MODEL	RECOMMENDED TIGHTENING TORQUES SOCKET HEAD CAP SCREW (ITEM 8)
130-19	14.2 Nm [10.5 ft-lbs]
130-24	14.2 Nm [10.5 ft-lbs]
7-28	33.2 Nm [24.5 ft-lbs]
7-38	33.2 Nm [24.5 ft-lbs]
8-38	67.1 Nm [49.5 ft-lbs]
8-42	67.1 Nm [49.5 ft-lbs]

PARTS REPLACEMENT—PISTON BEARING AND O-RING SEALS

FMCBES 110-14, 130-19, 130-24, 7-28, 7-38, 8-38, AND 8-42

NOTE: Socket Head Cap Screws are Item 14 for Models 110-14, 130-19, and 130-24, and Item 8 for all other models.

1. Remove the four Socket Head Cap Screws and separate the Air Chamber (Item 13) from the Housing (Item 7) (See Figure 10).
2. Remove the four Socket Head Cap Screws (Item 14) securing the Male Pilot (Item 18) to the Air Chamber (Item 13) (See Figure 10).
3. Remove the Male Pilot (Item 18) and Stub Shaft (Item 23) from the Air Chamber (Item 13) (See Figure 10).

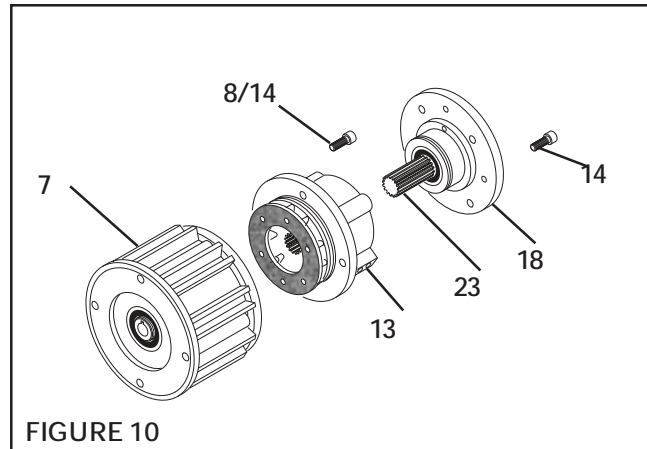
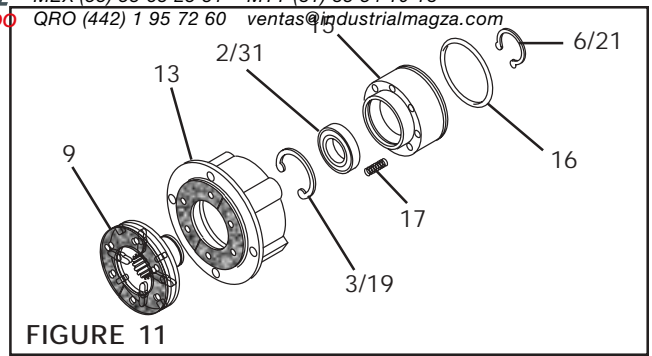


FIGURE 10

WARNING

The Piston is spring loaded and under extreme pressure. Special attention should be also exercised when working with retaining rings. Always wear safety goggles when working with spring or tension loaded fasteners or devices. Failure to follow the disassembly instructions may result in serious bodily injury.

4. Using a "C"-clamp or arbor press with fixture, press the Piston (Item 15) into the Air Chamber (Item 13); then, remove the Retaining Ring (Item 21 for Model 7-38 and Item 6 for all other Models) from the Splined Disc (Item 9) (See Figure 11).
5. Supporting the Air Chamber (Item 13) and Piston (Item 15), press the Splined Disc (Item 9) from the Bearing (Item 31 for Model 7-38 and Item 2 for all other Models) (See Figure 11).
6. Slowly remove the "C"-clamp or arbor press with fixture.



⚠ WARNING

The Piston is spring loaded and under extreme pressure. Use caution when releasing the arbor press with fixture.

7. Remove the Piston (Item 15) and Compression Springs (Item 17) from the Air Chamber (Item 13) (See Figure 11).
8. Remove the Retaining Ring (Item 19 for Model 7-38 and Item 3 for all other Models) from the Piston (See Figure 11).
9. Remove the old O-ring Seal (Item 16) from the Piston (See Figure 11).
10. Press the Bearing (Item 31 for Model 7-38 and Item 2 for all other models) out of the Piston (Item 15) (See Figure 11).
11. Clean the bearing bore of the Piston with fresh safety solvent, making sure all old Loctite^o residue is removed.
12. Apply an adequate amount of Loctite^o 680 to evenly coat the outer race of the new Bearing.
13. Carefully align the outer race of the new Bearing (Item 31 for Model 7-38 and Item 2 for all other Models) with the bore of the Piston (Item 15) (See Figure 11).
14. Supporting the Piston and pressing on the outer race of the new Bearing, press the new Bearing into the Piston.
15. Reinstall the Retaining Ring (Item 19 for Model 7-38 and Item 3 for all other Models), securing the Bearing to the Piston.

TABLE 2

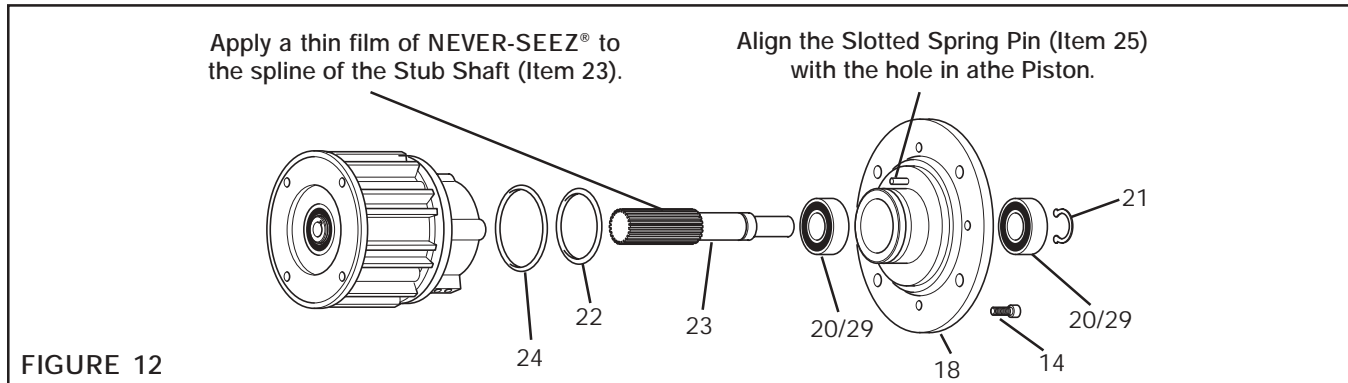
FMCBES MODEL	RECOMMENDED TIGHTENING TORQUES SOCKET HEAD CAP SCREW (ITEM 8)
130-19	14.2 Nm [10.5 ft-lb]
130-24	14.2 Nm [10.5 ft-lb]
7-28	33.2 Nm [24.5 ft-lb]
7-38	33.2 Nm [24.5 ft-lb]
8-38	67.1 Nm [49.5 ft-lb]
8-42	67.1 Nm [49.5 ft-lb]

16. Coat the o-ring contact surfaces of the Air Chamber, Piston, and the O-ring Seal with a thin film of o-ring lubricant and install the new O-ring Seal (Item 16) (See Figure 11).
17. Reinstall the Compression Springs (Item 17) into the Piston (Item 15) (See Figure 10).
18. Slide the Piston (Item 15) into the Air Chamber (Item 13).
19. Use a "C"-clamp or arbor press with fixture to compress the Piston (Item 15) into the Air Chamber (Item 13).
20. Support the inner race of the new Bearing and press the Splined Disc into the new Bearing and Piston.
21. Reinstall the Retaining Ring (Item 21 for Model 7-38 and Item 6 for all other Models) that secures the Splined Disc to the Bearing.
22. Remove the "C"-clamp or arbor press with fixture.
23. Apply a drop of Loctite^o 242 to the threads of the Socket Head Cap Screws (Item 14 for Models 130-19 and 130-24 and Item 8 for all other Models).
24. Reinstall and tighten the four Socket Head Cap Screws, securing the Air Chamber (Item 13) to the Housing (Item 7) to the recommended torque (See Figure 11 and Table 2).


PARTS REPLACEMENT—MALE PILOT BEARINGS AND O-RING SEALS

NOTE: The following sections are arranged by model. Verify that you are in the correct section for your model.

MODELS 110-14, 130-19, 130-24, 7-28, 8-38, AND 8-42



1. Remove the O-ring Seals (Items 22 and 24) from the Male Pilot (Item 18) (See Figure 12).

 **WARNING**

Special attention should be exercised when working with retaining rings. Always wear safety goggles when working with spring or tension loaded fasteners or devices.

2. Remove the Retaining Ring (Item 21) from the Stub Shaft (Item 23) (See Figure 12).
3. Press the Stub Shaft (Item 23) out of the Male Pilot (Item 18) (See Figure 12).

NOTE: One old Bearing (Item 20 for Models 130-19, 130-24, and 8-42 and Item 29 for Models 7-28 and 8-38) will remain attached to the Stub Shaft (Item 23) (See Figure 12).

4. Press the old Bearing from the Stub Shaft (Item 23) (See Figure 12).
5. Press the other old Bearing out of the Male Pilot (Item 18) (See Figure 12).

NOTE: It is not necessary to remove the Retaining Ring from the inside of the Male Pilot.

6. Clean the bearing bore of the Male Pilot with fresh safety solvent, making sure all old Loctite® residue is removed.
7. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of one new Bearing.
8. Carefully align the outer race of the new Bearing (Item 20 or 29) with the bore of the output side of the Male Pilot.

TABLE 3

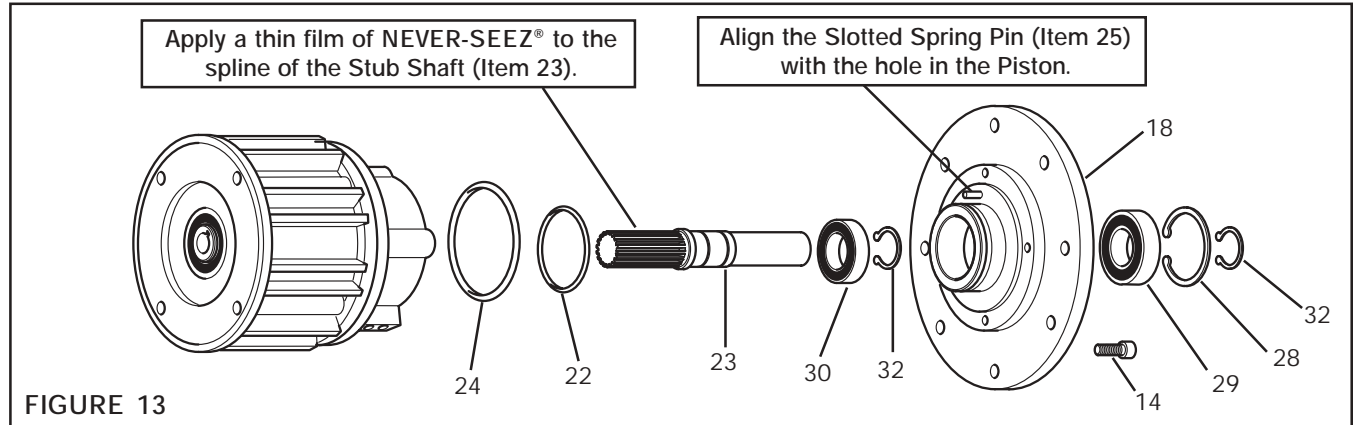
FMCBES MODEL	RECOMMENDED TIGHTENING TORQUE SOCKET HEAD CAP SCREW (ITEM 14)
110-14	14.2 Nm [10.5 ft-lbs]
130-19	33.2 Nm [24.5 ft-lbs]
130-24	33.2 Nm [24.5 ft-lbs]
7-28	33.2 Nm [24.5 ft-lbs]
8-38	67.1 Nm [49.5 ft-lbs]
8-42	67.1 Nm [49.5 ft-lbs]

9. While supporting the Male Pilot and pressing on the outer race, press the new Bearing until it is seated against the Retaining Ring (Item 21) inside the Male Pilot (See Figure 12).
10. Press the new Bearing onto the Stub Shaft (Item 23) (See Figure 12).
11. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the second new Bearing.
12. Carefully align the outer race of the new Bearing with the bore of the Male Pilot.
13. While pressing on the outer race of the first new Bearing and supporting the inner race of the new Bearing already in the Male Pilot, press the new Bearing and Stub Shaft into the Male Pilot until it is seated against the Retaining Ring inside Male Pilot (See Figure 12).
14. Reinstall Retaining Ring (Item 21) (See Figure 12).
15. Coat the o-ring contact surfaces of the Male Pilot, Piston, and the new O-ring Seals (Items 22 and 24) with a thin film of fresh o-ring lubricant.
16. Install the new O-ring Seals onto the Male Pilot (See Figure 12).

17. Apply a thin film of NEVER-SEEZ[®] to the spline of the Stub Shaft (Item 23).
18. Align the Slotted Spring Pin (Item 25) on the Male Pilot with the hole in the Piston.
19. Slide the Male Pilot and Stub Shaft into the FMCBES (See Figure 12).
20. Apply a drop of Loctite[®] 680 to the threads of the four Socket Head Cap Screws (Item 14).
21. Reinstall the four Socket Head Cap Screws (Item 14), securing the Male Pilot (Item 18) to the Air Chamber (Item 13) (See Figure 12).
22. Tighten the four Socket Head Cap Screws (Item 14) to the recommended torque (See Table 3).

PARTS REPLACEMENT-MALE PILOT BEARINGS AND O-RING SEALS

FMCBES 7-38



1. Remove the O-ring Seals (Items 22 and 24) from the Male Pilot (Item 18) (See Figure 13).

WARNING
 Special attention should be exercised when working with retaining rings. Always wear safety goggles when working with spring or tension loaded fasteners or devices.

2. Remove the Retaining Ring (Item 32) from the Stub Shaft (Item 23) (See Figure 13).
3. Press the Stub Shaft (Item 23) out of the Male Pilot (Item 18) (See Figure 13).

NOTE: One old Bearing (Item 30) will remain attached to the Stub Shaft (Item 23) (See Figure 13).

4. Remove the second Retaining Ring (Item 32) from the Stub Shaft (Item 23) (See Figure 13).
5. Press the old Bearing (Item 30) from the Stub Shaft (See Figure 13).
6. Remove the Retaining Ring (Item 28) from the Male Pilot (Item 18); then, press the old Bearing (Item 29) out of the Male Pilot (See Figure 13).
7. Clean the bearing bore of the Male Pilot (Item 18) with fresh safety solvent, making sure all old Loctite[®] residue is removed (See Figure 13).

8. Press the new Bearing (Item 30) onto the Stub Shaft (Item 23) (See Figure 13).
9. Reinstall one Retaining Ring (Item 32) to secure the new Bearing in place on the Stub Shaft (Item 23) (See Figure 13).
10. Apply an adequate amount of Loctite[®] 680 to evenly coat the outer race of the new Bearing (Item 29).
11. Carefully align the outer race of the new Bearing (Item 30) with the bore of the output side of the Male Pilot (See Figure 13).
12. While supporting the Male Pilot and pressing on the outer race, press the new Bearing until it is seated against the Retaining Ring (Item 28) inside the Male Pilot (See Figure 13).
13. Apply an adequate amount of Loctite[®] 680 to evenly coat the outer race of the second new Bearing (Item 30) (See Figure 13).
14. Carefully align the outer race of the new Bearing (Item 30) with the bore of the Male Pilot.
15. While supporting the inner race of Bearing (Item 29) and pressing on the outer race of the Bearing (Item 30), press the new Bearing and Stub Shaft into the Male Pilot and Bearing (See Figure 20).

16. Reinstall the Retaining Ring (Item 32) (See Figure 13).
17. Coat the o-ring contact surface of the Male Pilot, Piston, and the new O-ring Seals with a thin film of fresh o-ring lubricant and install the new O-ring Seals (Items 22 and 24) onto the Male Pilot (See Figures 13).
18. Apply a thin film of NEVER-SEEZ® to the spline of the Stub Shaft (Item 23).
19. Align the Slotted Spring Pin on the Male Pilot with the hole in the Piston.
20. Slide the Male Pilot and Stub Shaft into the FMCBES (See Figure 13).
21. Apply a drop of Loctite® 242 to the threads of the four Socket Head Cap Screws (Item 14) (See Figure 13).
22. Reinstall the four Socket Head Cap Screws (Item 14), securing the Male Pilot (Item 18) to the Air Chamber (Item 13) (See Figure 13).
23. Tighten the four Socket Head Cap Screws (Item 14) to 24.5 Ft. Lbs. [33.2 N•m] torque.

PARTS REPLACEMENT-INPUT UNIT

NOTE: The following sections are arranged by model. Verify that you are in the correct section for your model.

FMCBES 110-14

NOTE: Remove the Plug (Item 35) and loosen the Set Screw (Item 34) one full turn to release the Input Unit shaft from the FMCBES. Both the Plug (Item 35) and Set Screw (Item 34) are located on the FMCBES Housing (See Figure 4).

1. Remove the Socket Head Cap Screws (Item 29) and Lock Washers (Item 30); then, remove the Input Unit from the FMCBES.



WARNING

Special attention should be exercised when working with retaining rings. Always wear safety goggles when working with spring or tension loaded fasteners or devices.

2. Remove the Retaining Ring (Item 34) from the output end of the Input Unit (See Figure 14).
3. Fully supporting the Flange (Item 27), press the Shaft (Item 28) out of Input Unit (See Figure 14).

NOTE: Bearing (Item 19) will come out of the Flange (Item 27) with the Shaft (Item 28) (See Figure 14).

4. Remove the Retaining Ring (Item 35) from the Shaft (Item 28) (See Figure 14).
5. Press the old Bearing (Item 19) off the Shaft (Item 28) (See Figure 14).

NOTE: Do not reuse the old Bearing (Item 19). Applying force to the inner bearing race to remove a bearing held by the outer race causes damage to the bearing.

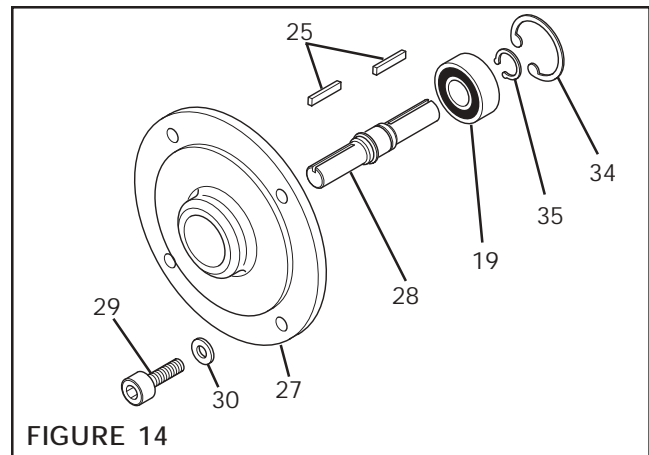


FIGURE 14

6. Clean the bearing bore of the Flange (Item 27) with fresh safety solvent, making sure all old Loctite® residue is removed.
7. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Bearing (Item 29).
8. Carefully align the outer race of the new Bearing (Item 19) with the bore of the Flange (Item 27) and press the new Bearing into place (See Figure 14).
9. Reinstall Retaining Ring (Item 34) (See Figure 14).
10. Fully supporting the inner race of the Bearing (Item 19), press the Shaft (Item 28) into the Bearing until the Retaining Ring (Item 35) on the Shaft is seated against Bearing (See Figure 14).
11. Reinstall the second Retaining Ring (Item 35).

NOTE: Remove the Plug (Item 35) and loosen the Set Screw (Item 34) one full turn to release the Input Unit shaft from the FMCBES. Both the Plug (Item 35) and Set Screw (Item 34) are located on the FMCBES Housing (See Figure 4).

1. Remove the Socket Head Cap Screws (Item 29), Lock Washers (Item 30), and Hex. Nuts (Item 31); then, remove the Input Unit from the FMCBES.
2. Fully supporting the Input Unit, press the Shaft (Item 28) out of the Input Unit (See Figure 15).
3. Using a bearing puller, remove the Bearing (Item 19) from the Flange (Item 27) (See Figure 15).

NOTE: Do not reuse the bearing. Applying force to the inner bearing race to remove a bearing held by the outer race causes damage to the bearing.

4. Clean the bearing bore of the Flange (Item 27) with fresh safety solvent, making sure all old Loctite^o residue is removed.

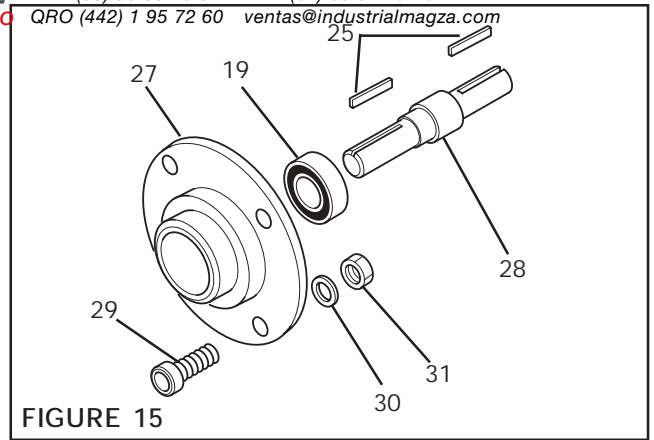



FIGURE 15

5. Apply an adequate amount of Loctite^o 680 to evenly coat the outer race of the new Bearing (Item 19) (See Figure 15).
6. Carefully align the outer race of the new Bearing (Item 19) with the bore of the Flange (Item 27) and press the new Bearing into place (See Figure 15).
7. Press the Shaft (Item 28) into the Input Unit (See Figure 15).

FMCBES 7-28, 7-38, 8-38, AND 8-42

NOTE: Remove the Plug (Item 35) and loosen the Set Screw (Item 34) one full turn to release the Input Unit shaft from the FMCBES. Both the Plug (Item 35) and Set Screw (Item 34) are located on the FMCBES Housing (See Figure 6).

1. Remove the Socket Head Cap Screws (Item 37), Lock Washers (Item 38); then, remove the Input Unit from the FMCBES.

 **WARNING**

Special attention should be exercised when working with retaining rings. Always wear safety goggles when working with spring or tension loaded fasteners or devices.

2. Remove the Retaining Ring (Item 28) from the output end of the Input Unit (See Figure 16).
3. Fully supporting the Flange (Item 35), press the Shaft (Item 36) out of Input Unit (See Figure 16).

NOTE: Bearing (Item 29) will come out of the Flange (Item 35) with the Shaft (Item 36) (See Figure 16).

4. Remove the Retaining Ring (Item 32) from the Shaft (Item 36) (See Figure 16).

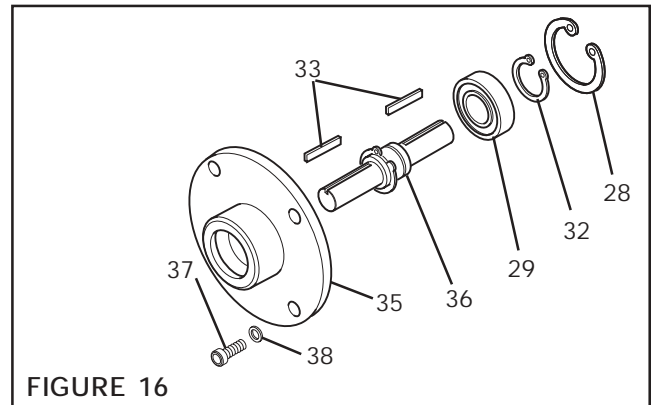


FIGURE 16

5. Press the old Bearing (Item 29) off the Shaft (Item 36) (See Figure 16).

NOTE: Do not reuse the old Bearing (Item 29). Applying force to the inner bearing race to remove a bearing held by the outer race causes damage to the bearing.

6. Clean the bearing bore of the Flange (Item 35) with fresh safety solvent, making sure all old Loctite^o residue is removed.
7. Apply an adequate amount of Loctite^o 680 to evenly coat the outer race of the new Bearing (Item 29).

8. Carefully align the outer race of the new Bearing (Item 29) with the bore of the Flange (Item 35) and press the new Bearing into place (See Figure 16).

10. Fully supporting the inner race of the Bearing (Item 29), press the Shaft (Item 36) into the Bearing until the Retaining Ring (Item 32) is seated against the Bearing (See Figure 16).

9. Reinstall the Retaining Ring (Item 28) (See Figure 16).

11. Reinstall the second Retaining Ring (Item 32) (See Figure 16).

PARTS LIST-FMCBES

FMCBES 110-14

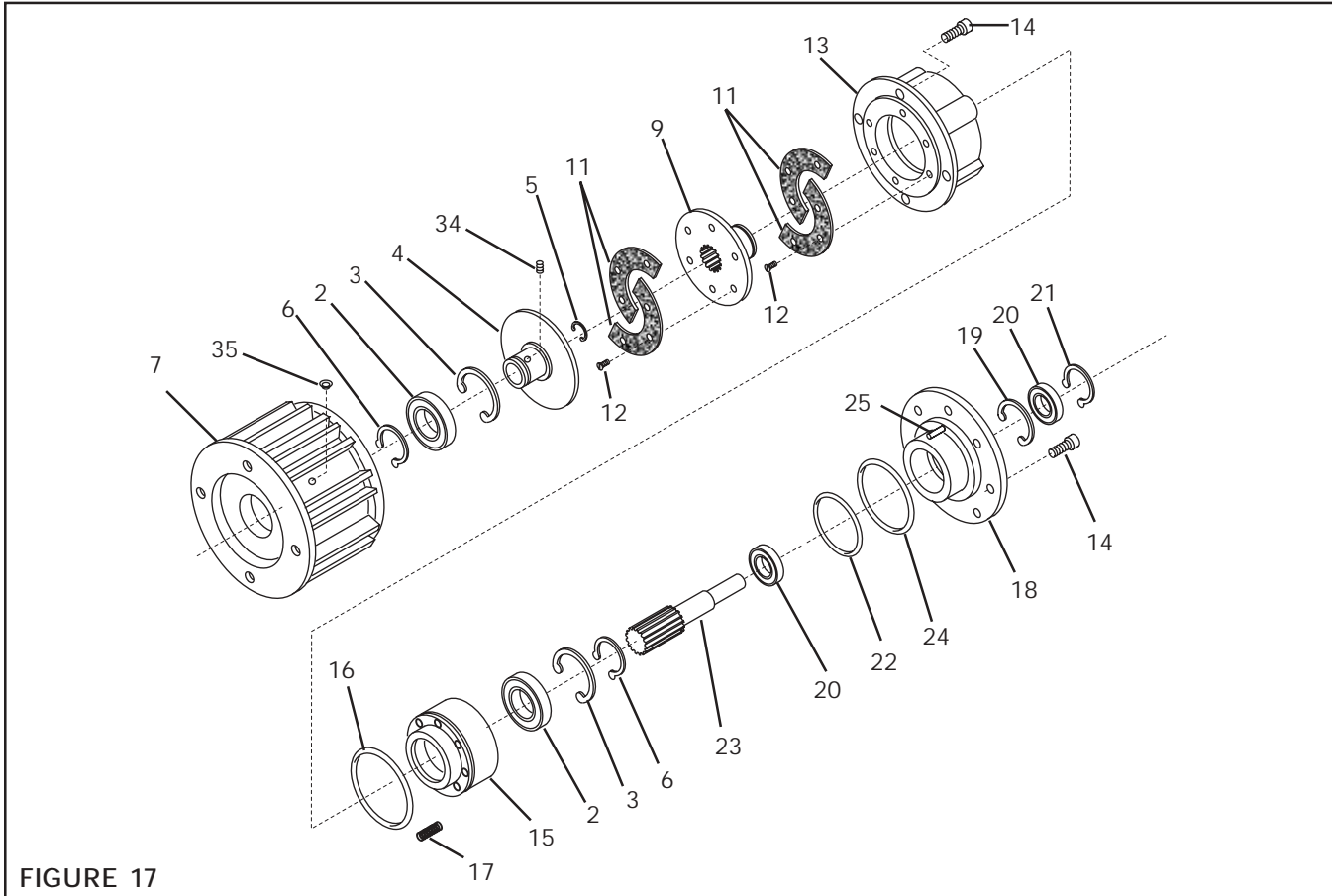


FIGURE 17

ITEM	DESCRIPTION	QTY
2 ¹	Bearing	2
3	Retaining Ring (Int.)	2
4	Drive Disc	1
5	Retaining Ring (Int.)	1
6	Retaining Ring (Ext.)	2
7	Housing	1
9	Splined Disc	1
11 ²	Friction Facing	2
12 ²	Flat Head Screw (M5-0.8)	12
13	Air Chamber	1
14	Socket Head Cap Screw (M8-1.25)	8
15	Piston	1
16 ¹	O-ring Seal	1

ITEM	DESCRIPTION	QTY
17	Compression Spring	12
18	Male Pilot	1
19	Retaining Ring (Int.)	1
20 ¹	Bearing	2
21	Retaining Ring (Ext.)	1
22 ¹	O-ring Seal	1
23	Stub Shaft	1
24 ¹	O-ring Seal	1
25	Slotted Spring Pin	1
26	Key (Not Shown)	1
34	Set Screw	1
35	Plug (0.125 NPTF)	1

¹ Denotes Repair Kit items.
Repair Kit No. 801401.

² Denotes Facing Kit items.
Facing Kit No. 801448 (two kits required per unit).

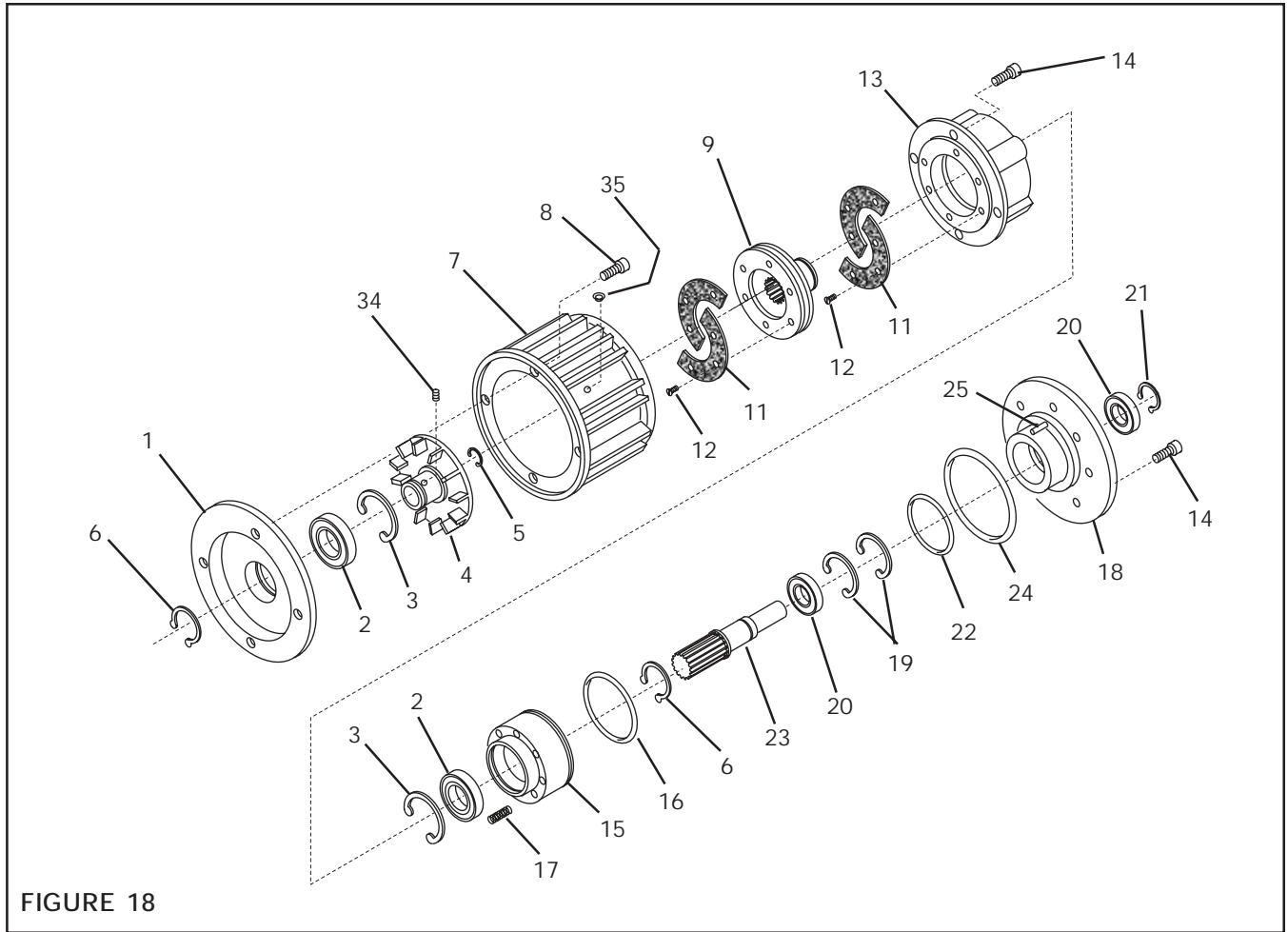


FIGURE 18

ITEM	DESCRIPTION	QTY
1	Female Pilot	1
2 ¹	Bearing	2
3	Retaining Ring (Int.)	2
4	Drive Disc	1
5	Retaining Ring (Int.)	1
6	Retaining Ring (Ext.)	2
7	Housing	1
8	Socket Head Cap Screw (M6-1.0)	4
9	Splined Disc	1
11 ²	Friction Facing	2
12 ²	Flat Head Screw (M5-0.8)	12
13	Air Chamber	1
14	Socket Head Cap Screw (M8-1.25)	8

¹ Denotes Repair Kit items.
Repair Kit No. 801402.

ITEM	DESCRIPTION	QTY
15	Piston	1
16 ¹	O-ring Seal	1
17	Compression Spring	12
18	Male Pilot	1
19	Retaining Ring (Int.)	2
20 ¹	Bearing	2
21	Retaining Ring (Ext.)	1
22 ¹	O-ring Seal	1
23	Stub Shaft	1
24 ¹	O-ring Seal	1
25	Slotted Spring Pin	1
26	Key (Not Shown)	1
34	Set Screw	1
35	Plug (0.125 NPTF)	1

² Denotes Facing Kit items.
Facing Kit No. 801430 (two kits required per unit).

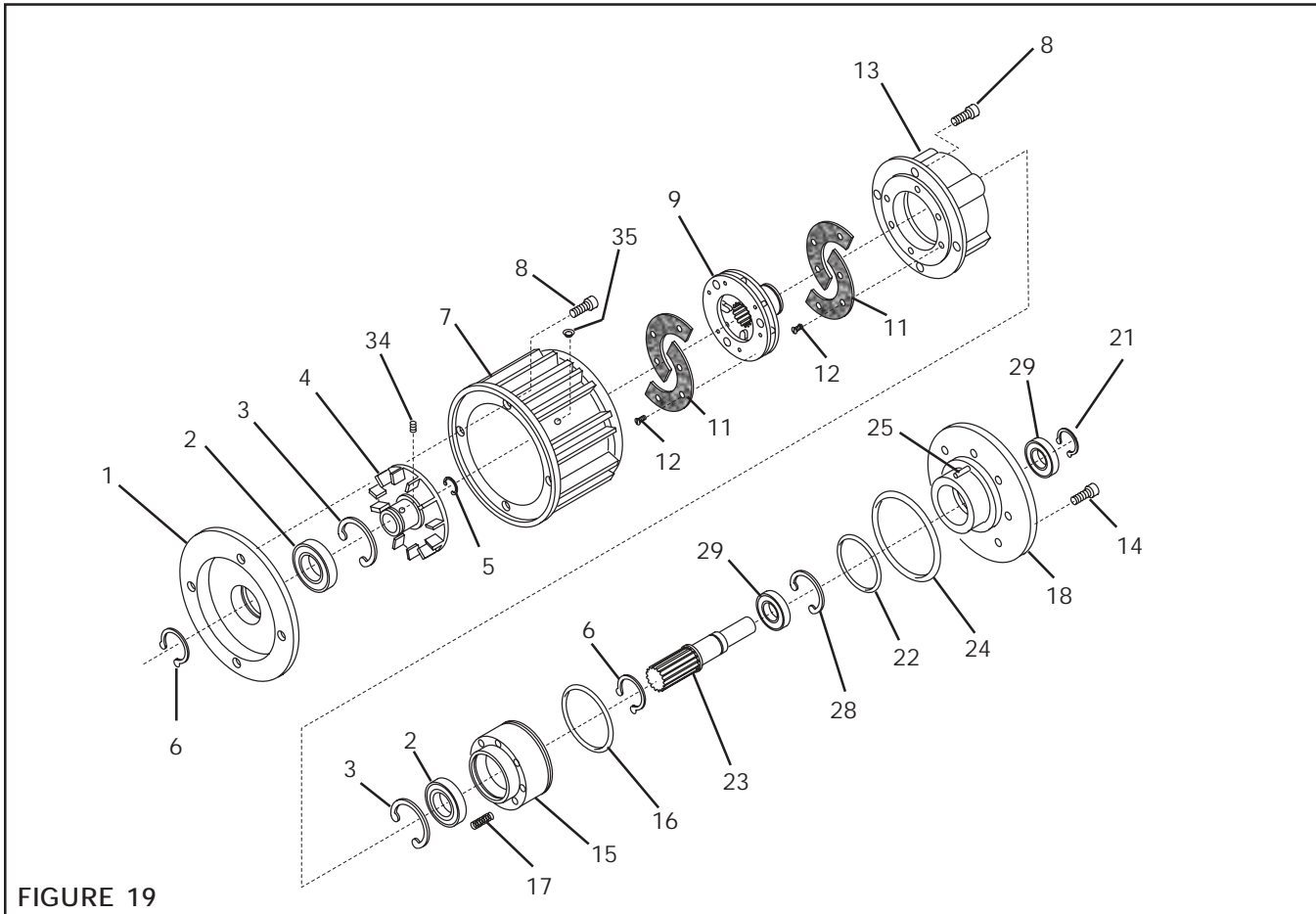


FIGURE 19

ITEM	DESCRIPTION	QTY
1	Female Pilot	1
2 ¹	Bearing	2
3	Retaining Ring (Int.)	2
4	Drive Disc	1
5	Retaining Ring (Int.)	1
6	Retaining Ring (Ext.)	2
7	Housing	1
8	Socket Head Cap Screw (M8-1.25)	8
9	Splined Disc	1
11 ²	Friction Facing	2
12 ²	Flat Head Screw (M6-1.0)	12
13	Air Chamber	1
14	Socket Head Cap Screw (M8-1.25)	4
15	Piston	1

ITEM	DESCRIPTION	QTY
16 ¹	O-ring Seal	1
17	Compression Spring	12
18	Male Pilot	1
21	Retaining Ring (Ext.)	1
22 ¹	O-ring Seal	1
23	Stub Shaft	1
24 ¹	O-ring Seal	1
25	Slotted Spring Pin	1
26	Key (Not Shown)	1
28	Retaining Ring (Int.)	1
29 ¹	Bearing	2
34	Set Screw (M8-1.25)	1
35	Plug (0.250 NPTF)	1

¹ Denotes Repair Kit items.
 Repair Kit No. 801662.

² Denotes Facing Kit items.
 Facing Kit No. 801605 (two kits required per unit).

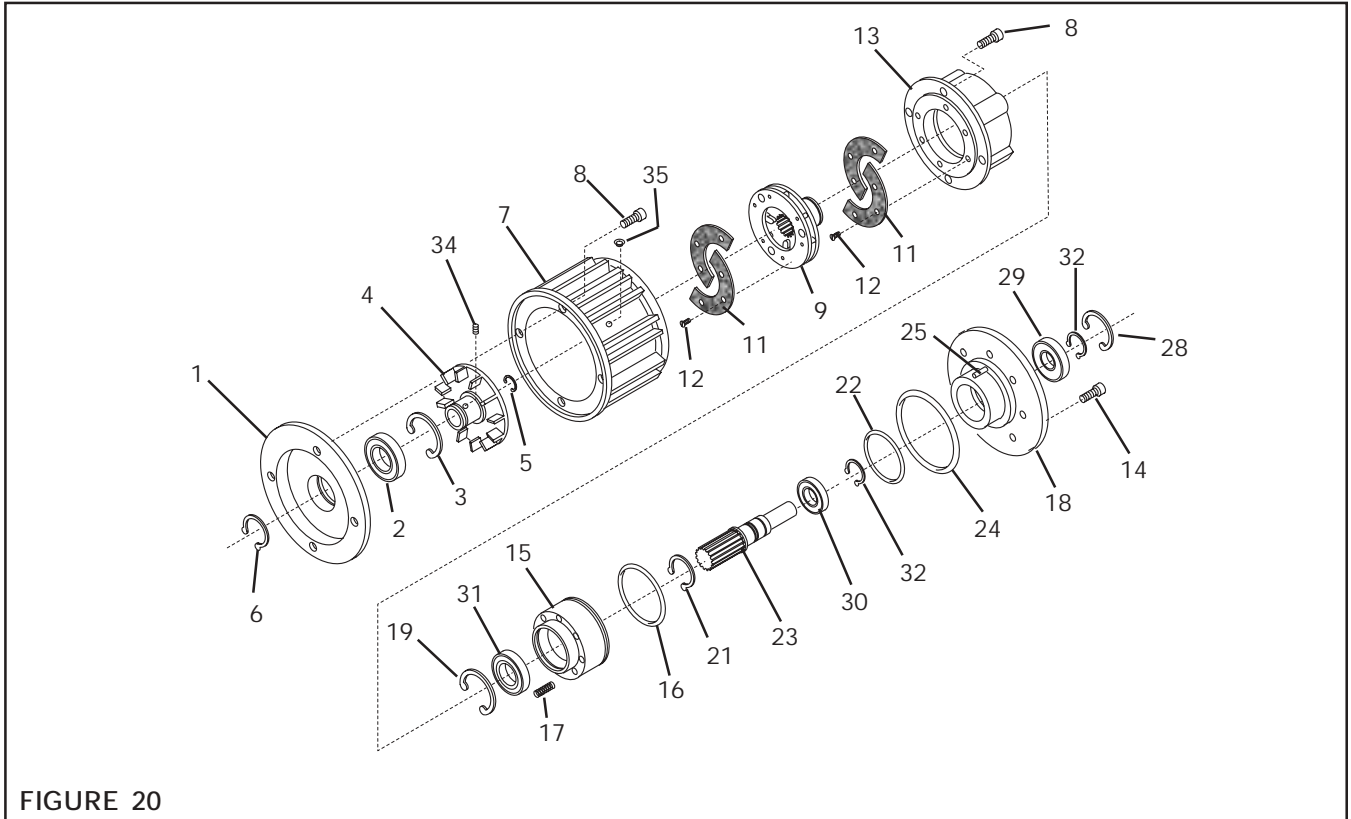


FIGURE 20

ITEM	DESCRIPTION	QTY
1	Female Pilot	1
2 ¹	Bearing	1
3	Retaining Ring (Int.)	1
4	Drive Disc	1
5	Retaining Ring (Int.)	1
6	Retaining Ring (Ext.)	1
7	Housing	1
8	Socket Head Cap Screw (M8-1.25)	8
9	Splined Disc	1
11 ²	Friction Facing	2
12 ²	Flat Head Screw (M6-1.0)	12
13	Air Chamber	1
14	Socket Head Cap Screw (M8-1.25)	4
15	Piston	1
16 ¹	O-ring Seal	1

ITEM	DESCRIPTION	QTY
17	Compression Spring	12
18	Male Pilot	1
19	Retaining Ring (Int.)	1
21	Retaining Ring (Ext.)	1
22 ¹	O-ring Seal	1
23	Stub Shaft	1
24 ¹	O-ring Seal	1
25	Slotted Spring Pin	1
26	Key (Not Shown)	1
28	Retaining Ring (Int.)	1
29 ¹	Bearing	1
30 ¹	Bearing	1
31 ¹	Bearing	1
32	Retaining Ring (Ext.)	2
34	Set Screw (M8-1.25)	1
35	Plug (0.250 NPTF)	1

¹ Denotes Repair Kit items.
 Repair Kit No. 801661.

² Denotes Facing Kit items.
 Facing Kit No. 801645 (two kits required per unit).

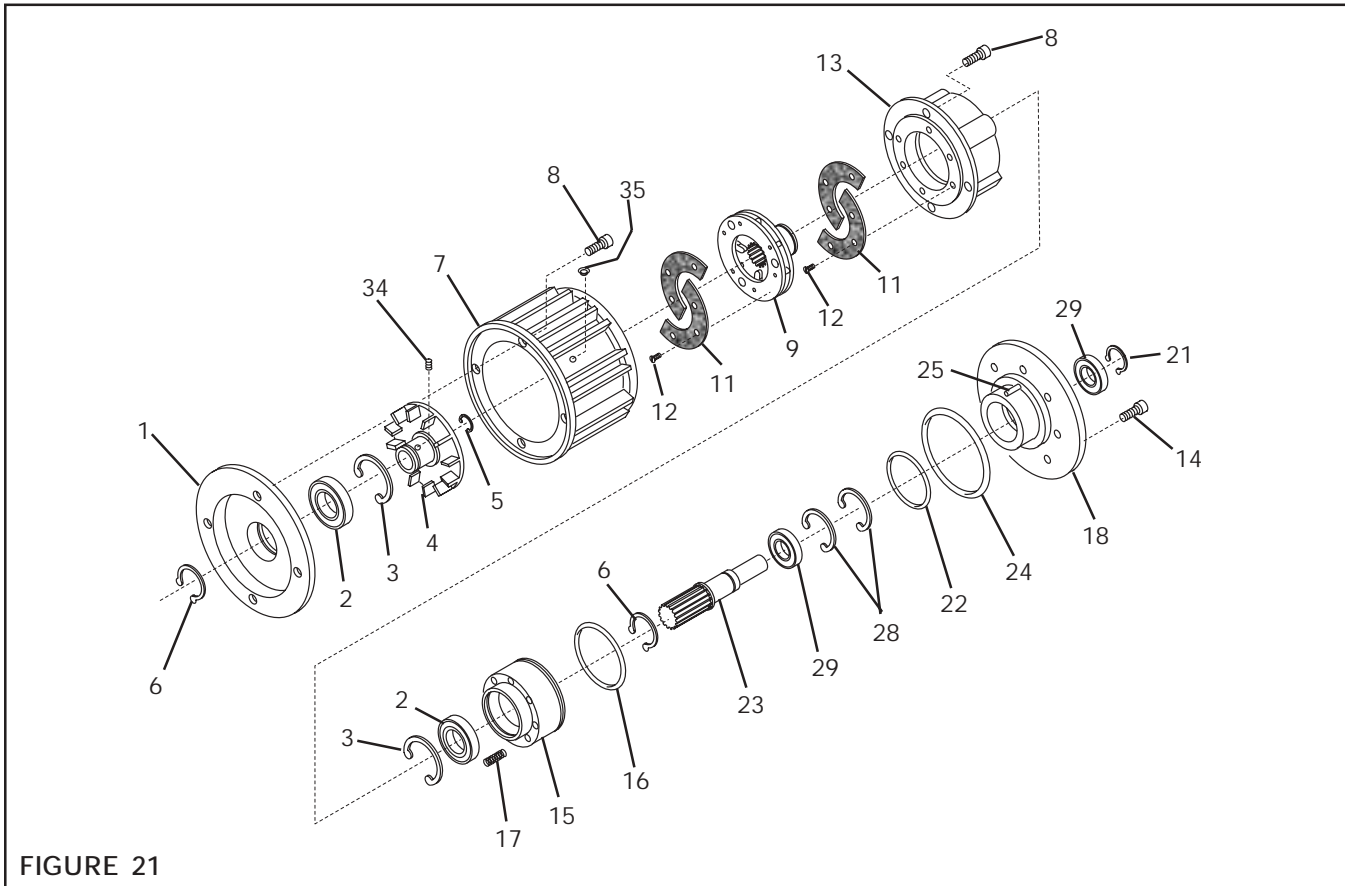


FIGURE 21

ITEM	DESCRIPTION	QTY
1	Female Pilot	1
2 ¹	Bearing	2
3	Retaining Ring (Int.)	2
4	Drive Disc	1
5	Retaining Ring (Int.)	1
6	Retaining Ring (Ext.)	2
7	Housing	1
8	Socket Head Cap Screw (M10-1.5)	8
9	Splined Disc	1
11 ²	Friction Facing	2
12 ²	Flat Head Screw (M6-1.0)	12
13	Air Chamber	1
14	Socket Head Cap Screw (M10-1.5)	4
15	Piston	1

ITEM	DESCRIPTION	QTY
16 ¹	O-ring Seal	1
17	Compression Spring	10
18	Male Pilot	1
21	Retaining Ring (Ext.)	1
22 ¹	O-ring Seal	1
23	Stub Shaft	1
24 ¹	O-ring Seal	1
25	Slotted Spring Pin	1
26	Key (Not Shown)	1
28	Retaining Ring (Int.)	2
29 ¹	Bearing	2
34	Set Screw (M10-1.5)	1
35	Plug (0.250 NPTF)	1

¹ Denotes Repair Kit items.
 Repair Kit No. 801664.

² Denotes Facing Kit items.
 Facing Kit No. 801647 (two kits required per unit).

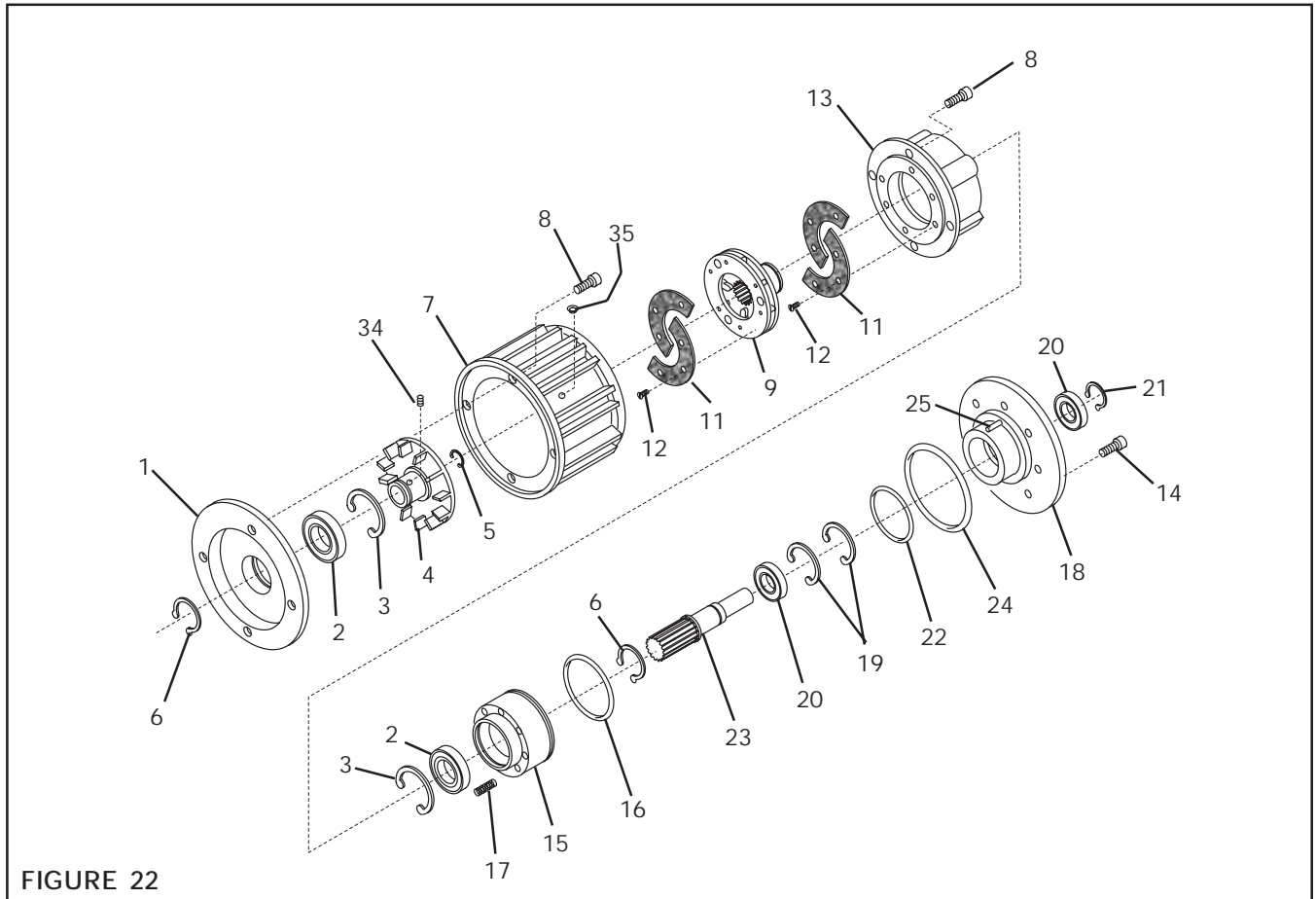


FIGURE 22

ITEM	DESCRIPTION	QTY
1	Female Pilot	1
2 ¹	Bearing	2
3	Retaining Ring (Int.)	2
4	Drive Disc	1
5	Retaining Ring (Int.)	1
6	Retaining Ring (Ext.)	2
7	Housing	1
8	Socket Head Cap Screw (M10-1.5)	8
9	Splined Disc	1
11 ²	Friction Facing	2
12 ²	Flat Head Screw (M6-1.0)	12
13	Air Chamber	1
14	Socket Head Cap Screw (M10-1.5)	4
15	Piston	1

ITEM	DESCRIPTION	QTY
16 ¹	O-ring Seal	1
17	Compression Spring	10
18	Male Pilot	1
19	Retaining Ring (Int.)	2
20 ¹	Bearing	2
21	Retaining Ring (Ext.)	1
22 ¹	O-ring Seal	1
23	Stub Shaft	1
24 ¹	O-ring Seal	1
25	Slotted Spring Pin	1
26	Key (Not Shown)	1
27	Male Pilot	1
34	Set Screw (M10-1.5)	1
35	Plug (0.250 NPTF)	1

¹ Denotes Repair Kit items.
 Repair Kit No. 801405.

² Denotes Facing Kit items.
 Facing Kit No. 801649 (two kits required per unit).

REPLACEMENT PARTS

The item or balloon number for all Nexen products is used for part identification on all product parts lists, product price lists, 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.

PARTS LIST-INPUT UNIT

MODELS 110-14

ITEM	DESCRIPTION	QTY
19 ¹	Bearing	1
25	Key	2
27	Flange	1
28	Shaft	1
29	Socket Head Cap Screw	4
30	Lock Washer	4
34	Retaining Ring (Int.)	1
35	Retaining Ring (Ext.)	2

¹ Denotes Repair Kit item.
 Repair Kit No. 801437.

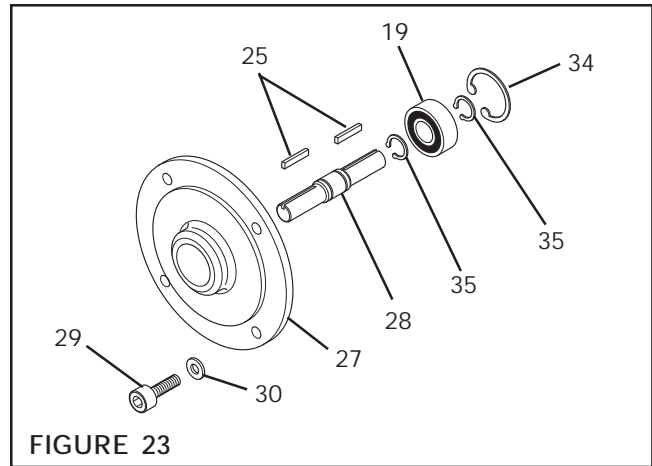


FIGURE 23

MODELS 130-19 AND 130-24

ITEM	DESCRIPTION	QTY
19 ¹	Bearing	1
25	Key	2
27	Flange	1
28	Shaft	1
29	Socket Head Cap Screw	4
30	Lock Washer	4
31	Hex. Nut	4

¹ Denotes Repair Kit item.
 Repair Kit No. 801429.

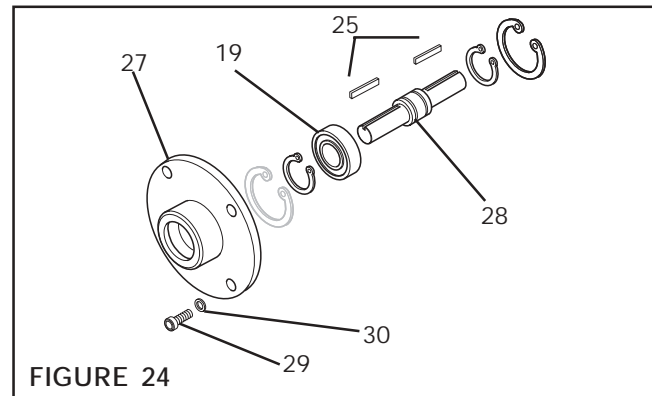


FIGURE 24

MODELS 7-28, 7-38, 8-38, AND 8-42

ITEM	DESCRIPTION	QTY
28	Retaining Ring (Int.)	*
29 ¹	Bearing	1
32	Retaining Ring (Ext.)	2
33	Key	2
35	Flange	1
36	Shaft	1
37	Socket Head Cap Screw	4
38	Lock Washer	4

¹ Denotes Repair Kit item.
 FMCBES 7-28 Repair Kit No. 801641.
 FMCBES 7-38 Repair Kit No. 801642.
 FMCBES 8-38 Repair Kit No. 801642.
 FMCBES 8-42 Repair Kit No. 801643.

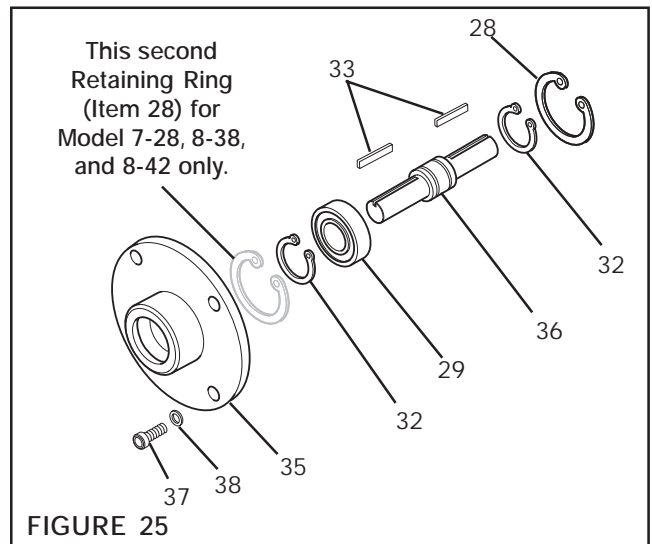


FIGURE 25

* FMCBES Models 7-28, 8-38, and 8-42 have two Retaining Rings.
 FMCBES Model 7-38 has one Retaining Ring.



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 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.

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.

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