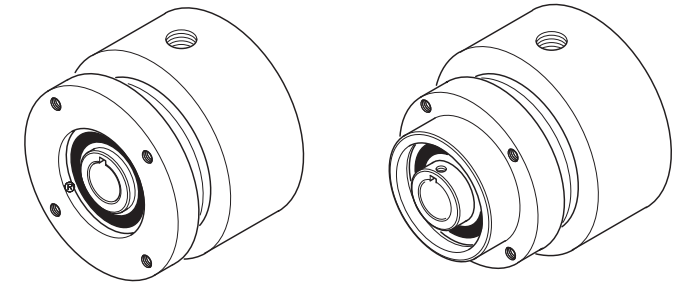
nexen®

AIR CHAMP® PRODUCTS

User Manual



Multiposition Tooth Clutches

Models 5H30, 5H35, 5H40, 5H45, 5H50, 5H60, and 5H70; 5H30S, 5H30P, 5H35P, 5H40P, 5H45P, 5H50P, 5H60P, 5H70P, 5H80P, and 5H100P

CE

RoHS compliant

FORM NO. L-20008-W-0414

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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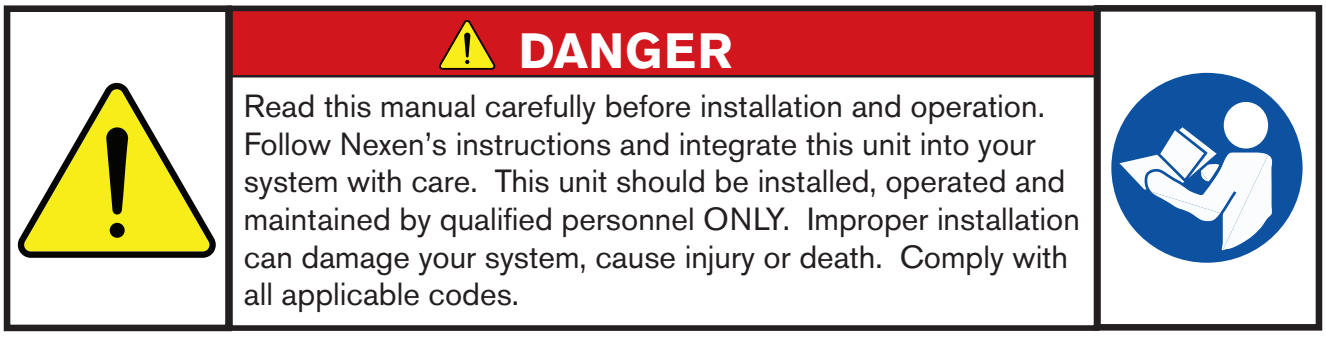


This document is the original, non-translated, version.

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

Specifications:	
Torque	5H: Up to 1980 Nm (17500 in-lbs) 5HP: Up to 6410 Nm (55000 in-lbs)
Actuation Pressure	1 - 5.5 bar (14.5 - 80 psi)
Service Temperature	4.5 - 104 C (40 - 220 F)
Approximate Weight	Up to 77 kg (170 lbs)

GENERAL SAFETY PRECAUTIONS

⚠ CAUTION

Use lifting aids and proper lifting techniques when installing, removing, or placing this product in service.

⚠ CAUTION

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

⚠ CAUTION

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

⚠ CAUTION

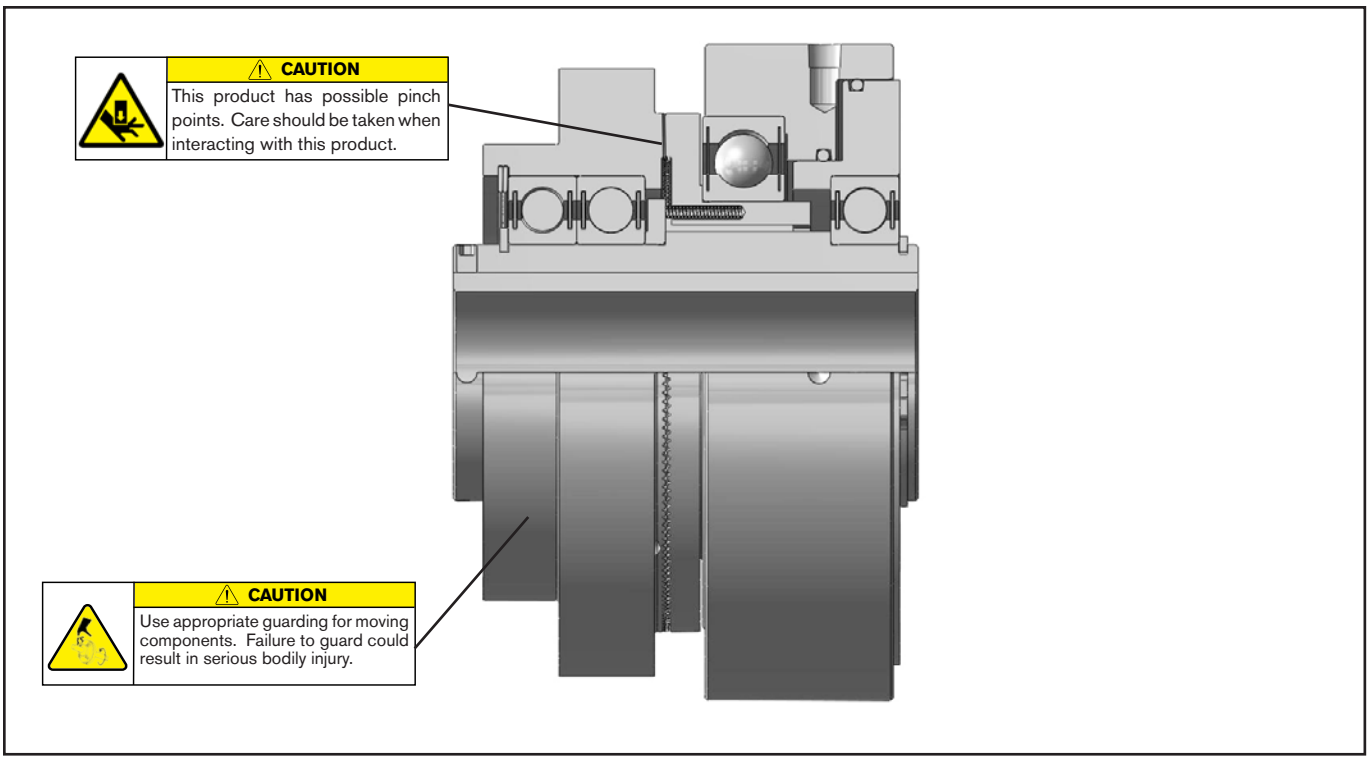
This product has possible pinch points. Care should be taken when interacting with this product.

⚠ WARNING

Ensure proper guarding of the product is used. Nexen recommends the machine builder design guarding in compliance with OSHA 29 CFR 1910 "Occupational Safety and Health Hazards".

⚠ WARNING

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



INTRODUCTION

Nexen 5H and 5HP Multiposition Tooth Clutches are designed for applications requiring a high starting torque with no slipping.

Tooth Clutches are normally engaged when stationary. In certain circumstances, such as low RPM, Tooth Clutches can be engaged at differential speeds up to 150 RPM. The allowable engagement speed is a function of the rotational inertia of the mass being accelerated and the air pressure applied.

If the Tooth Clutch is to be engaged in other than static conditions, solve the following Differential Speed Formula to make sure the application's differential speed is within the limits of the clutch selected.

Use the Differential Speed Formula to find the allowable engagement speed (**N**) at a specific air pressure setting (**P**) with a given inertia load (**WK²**). This formula expresses the relationship of the variables involved which effect the impact of the face teeth during engagement. Tooth damage can occur when tooth velocity and air pressure settings are too high (i.e., a smaller clutch has a lower tooth velocity at any given RPM and a small clutch has less driver inertia).

Use the following formula:

$$N = \frac{V(10^4)}{(P\text{-}22)\sqrt{WK^2}}$$

With: **N** = Differential RPM Limit Clutch
V = Constant for Clutch (See Table 1)
P = Operational Pressure, psi.
WK² = Referred Inertia Lb. Ft²

EXAMPLE: The required differential engagement speed using a 5H45 Tooth Clutch at 60 psi is 150 RPM (Tooth Clutch rotating at 1250, machine component rotating at 1100). The referred inertia is 3 Lb. Ft². The differential RPM limit for the clutch is:

$$N = \frac{1.4\ (10^4)}{(60\text{-}22)\sqrt{3}} = 213 \text{ RPM}$$

150 RPM is within the limit of the 5H45 operating at 60 psi with a load of 3 Lb. Ft.².

TABLE 1
CLUTCH CONSTANTS

CLUTCH	CONSTANT (V)	CLUTCH	CONSTANT (V)
5H30 5H30P	2.1	5H50 5H50P	1.26
5H35 5H35P	1.8	5H60 5H60P	1.05
5H40 5H40P	1.57	5H70 5H70P	0.90
5H45 5H45P	1.4	5H80P 5H100P	0.78 0.63

NOTE: The Differential Speed Formula does not estimate RPM which prevents ratcheting, acceleration time, and tooth stress after engagement.

⚠ CAUTION

If differential speed exceeds tooth clutch limitations, racheting of the teeth can occur which will shorten clutch life.

INSTALLATION

5H Tooth Clutches have a drive flange with a single bearing and tapped mounting holes. 5HP Tooth Clutches have a drive flange with two bearings, a pilot diameter, and tapped holes for mounting a pulley, sprocket, gear, or coupling adaptor (See Table 2 for recommended tightening torques of Grade 8 socket head cap screws).

NOTE: Nexen recommends using a red anaerobic thread locking compound on pilot mounting bolts.

Your Nexen Distributor carries Flexible Couplings specifically designed for Nexen Tooth Clutches.

⚠ CAUTION

Do not connect the Clutch in-line without using the Nexen Flexible Coupling. The internal construction of the 5H Tooth Clutches will not allow misalignment tolerances. (Refer to Sales Literature L-20208).

An optional Hub Collar is available if set screws are required on the end opposite the Drive Flange or Pilot Mount for 5HP models. This optional Hub Collar requires drilling and tapping of holes in the end of the clutch (See Table 3 for tapped hole dimensions and use the collar as a hole location template).

NOTE: Both 5H and 5HP Tooth Clutches mount on a full shaft using a customer supplied full length key.

1. Install the Flexible Coupling or bearing supported pulley, sprocket, or gear (See Figure 1 and Table 1).

2. Insert the customer supplied key into the shaft (See Figure 1).

3. Slide the Tooth Clutch onto the shaft and customer supplied key (See Figure 1).

   NOTE: Whenever possible, arrange the input drive to the Tooth Clutch through the Drive Flange to prevent clutch Ball Bearings from rotating unnecessarily.

4. Using the Set Screws (Item 16), secure the Tooth Clutch to the Shaft (See Figure 1).

TABLE 2

MODEL	TORQUE	MODEL	TORQUE
5H30	8.3 Ft. Lbs. [11.3 Nm]	5H30P	8.3 Ft. Lbs. [11.3 Nm]
5H35	8.3 Ft. Lbs. [11.3 Nm]	5H35P	8.3 Ft. Lbs. [11.3 Nm]
5H40	8.3 Ft. Lbs. [11.3 Nm]	5H40P	8.3 Ft. Lbs. [11.3 Nm]
5H45	8.3 Ft. Lbs. [11.3 Nm]	5H45P	8.3 Ft. Lbs. [11.3 Nm]
5H50	48 Ft. Lbs. [65.1 Nm]	5H50P	27 Ft. Lbs. [36.6 Nm]
5H60	48 Ft. Lbs. [65.1 Nm]	5H60P	27 Ft. Lbs. [36.6 Nm]
5H70	48 Ft. Lbs. [65.1 Nm]	5H70P	119 Ft. Lbs. [161.3 Nm]
-	-	5H80P	119 Ft. Lbs. [161.3 Nm]
-	-	5H100P	119 Ft. Lbs. [161.3 Nm]

TABLE 3

MODEL	COLLAR O.D.	BORE	PROD. NO.	TAPPED HOLES REQD.	B.C.
5H30P	1.625"	0.875"	924300	(3) 0.138-32	1.187"
5H35P	1.938"	1.125"	924400	(3) 0.138-32	1.438"
5H40P	1.938"	1.250"	924500	(4) 0.112-40	1.500"
5H45P	2.625"	1.500"	924600	(3) 0.164.32	1.906"
5H50P	2.750"	1.750"	924700	(3) 0.164-32	2.156"
5H60P	3.125"	1.937"	924800	(3) 0.190-32	2.438"
5H70P	3.500"	2.187"	924900	(3) 0.190-32	2.687"
5H80P	4.000"	2.937"	925000	(3) 0.190-24	3.300"

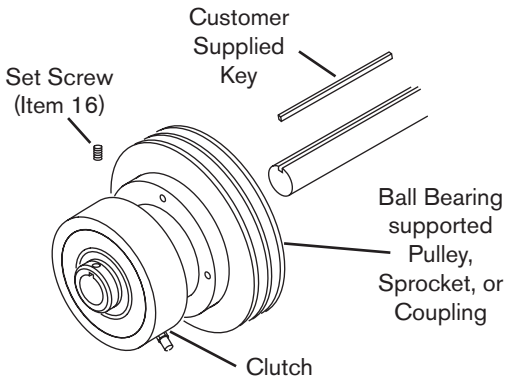


FIGURE 1

5. Tighten the Set Screws (Item 16) to the recommended torque (See Table 4).

NOTE: In severe use applications, the Tooth Clutch may tend to move axially along the shaft. To prevent this axial movement, confine the Tooth Clutch between its shoulders or insert spring pins through the clutch hub into the shaft.

Tooth Clutches may be mounted horizontally or vertically. Nexen recommends the Drive Flange face up to enhance spring return function when mounting Tooth Clutches in the vertical position.

TABLE 4
RECOMMENDED TIGHTENING TORQUE (ITEM16)

MODEL	TORQUE	MODEL	TORQUE
5H30	13.8 In. Lbs. [1.55 Nm]	5H30P	13.8 In. Lbs. [1.55 Nm]
5H35	13.8 In. Lbs. [1.55 Nm]	5H35P	13.8 In. Lbs. [1.55 Nm]
5H40	13.8 In. Lbs. [1.55 Nm]	5H40P	13.8 In. Lbs. [1.55 Nm]
5H45	13.8 In. Lbs. [1.55 Nm]	5H45P	13.8 In. Lbs. [1.55 Nm]
5H50	6.6 Ft. Lbs. [8.94 Nm]	5H50P	6.6 Ft. Lbs. [8.94 Nm]
5H60	6.6 Ft. Lbs. [8.94 Nm]	5H60P	6.6 Ft. Lbs. [8.94 Nm]
5H70	6.6 Ft. Lbs. [8.94 Nm]	5H70P	6.6 Ft. Lbs. [8.94 Nm]
-	-	5H80P	100 Ft. Lbs. [135.6 Nm]
-	-	5H100P	167 Ft. Lbs. [226 Nm]

LUBRICATION

NOTE

Nexen pneumatically actuated devices require clean, pressure regulated air for maximum performance and life. All seals in Nexen pneumatically operated devices are lubricated for life, and do not require additional lubrication.

However, some customers prefer to use an air line lubricator, which injects oil into the pressurized air, forcing an oil mist into the air chamber. This is acceptable, but care must be taken to ensure once an air mist lubrication system is used, it is continually used over the life of the product as the oil mist may wash free the factory installed lubrication.

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

Synthetic lubricants are not recommended.

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

LUBRICATOR DRIP RATE SETTINGS

⚠ CAUTION

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

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

AIR CONNECTIONS

Although 5H Tooth Clutches are air actuated with a maximum operating air pressure of 80 psi [5.52 bar], use only enough air pressure to deliver ample torque for the application. Operating air pressures in excess of 80 psi [5.52 bar] will eventually cause accelerated bearing and O-Ring seal damage.

Due to bearing seal drag, the cylinder/piston assembly will rotate, resulting in hose breakage when clutch is engaged. For models 5H30(P) through 5H60(P), resting the hose against a support mounted parallel to the clutch centerline stops this rotation.

On 5H70(P) and 5H80(P), where seal drag is more apparent, a 3/8-16 tapped hole is provided 180° from the air inlet. Install a bolt or stud in this hole and rest it against a support to relieve stress on the hose. On the 5H100P, a 1/2-13 tapped hole is provided.

NOTE

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

⚠ CAUTION

Rigid pipe or tubing when connected directly to the clutch will prevent proper actuation of the clutch. Use only flexible hose or tubing when making air line connections to clutch.

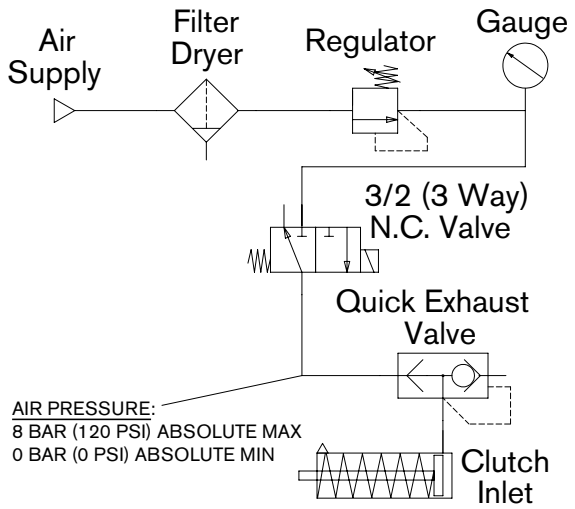
All Nexen pneumatically actuated devices require clean and dry air, which meet or exceeds ISO 8573.1:2001 Class 4.4.3 quality.

⚠ CAUTION

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

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

Typical Clutch Control Circuit



OPERATION

⚠ WARNING

Never exceed maximum operating speeds listed for your product. (See Table 5).

⚠ WARNING

Ensure proper guarding of the product is used. Nexen recommends the machine builder design guarding in compliance with OSHA 29 CFR 1910 “Occupational Safety and Health Hazards”.

⚠ CAUTION

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

TABLE 5

Size	Max RPM
5H20P	4000
5H30, 5H30P	3700
5H35, 5H35P	3200
5H40, 5H40P	3000
5H45, 5H45P	3000
5H50, 5H50P	3000
5H60, 5H60P	2400
5H70, 5H70P	2000
5H80P	2000
5H100P	1000

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Failure to engage.	Control Valve malfunction or low air pressure.	Check system for air leaks or replace Control Valve.
	Lack of lubrication on Hub spline or on O-Ring Seals.	Lubricate Hub spline and check O-Ring Seal lubrication.
	Using rigid pipe or tubing for air line connections.	Use flexible tubing for air line connections.
	Use of a rigid coupling connected directly to the Drive Flange.	Use Nexen's flexible Coupling.
Failure to disengage.	Lack of lubrication on Hub spline or on O-Ring Seals.	Lubricate Hub spline and check O-Ring Seal lubrication.
	Unexhausted air, due to Control Valve malfunction.	Replace Control Valve.
	Broken Return Springs.	Replace Return Springs.
	Use of a rigid coupling connected directly to the Drive Flange.	Use Nexen's flexible Coupling.
Tooth wear or clicking sound.	Excessive engagement RPM, or unintentional disengagement due to torque overload.	Contact Nexen for Clutch specifications.
Bearing failure.	Excessive air pressure increases the thrust load on the bearings.	Limit air pressure to 80 psi [5.52 bar].
	Exceeding maximum/minimum specified speed limit.	Stay within the maximum specified speed limits as specified in the "Air Champ" catalog.
	Coupling misapplied.	Use Nexen's Flexible Couplings for in-line applications. Do not connect a rigid coupling directly to the Drive Flange.
	Wide pulleys or sprockets which extend beyond the end of the clutch will increase the radial load and reduce bearing life.	Avoid applying excessive overhung loads to Pilot Mount 5HP Tooth Clutches.

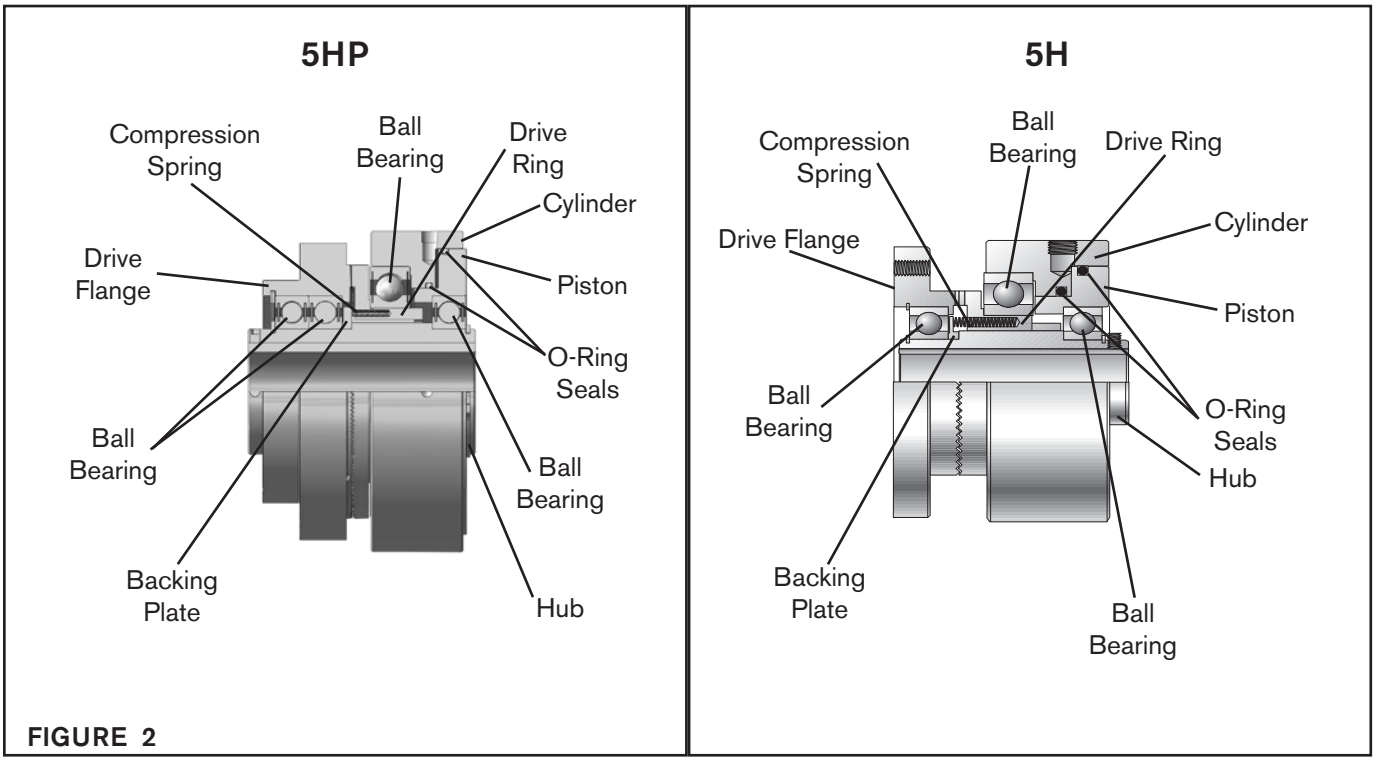


FIGURE 2

PARTS REPLACEMENT: 5H30 - 5H70

Refer to Figures 3 - 6.

⚠ CAUTION

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

1. Remove the Retaining Ring (Item 11).

2. Press the Drive Flange (Item 5) and Hub (Item 1) out of the Cylinder (Item 2) and Drive Ring (Item 4).

   NOTE: Model 5H70 Tooth Clutch uses Spring Stiffener Pins (Item 24) that must be removed with the old Compression Springs (Item 7).

3. Remove the old Compression Springs (Item 7) and if required, the Spring Stiffener Pins (Item 24).

   NOTE: At this point, the spline on the Hub (Item 1) can be lubricated with Never-Seez® without further disassembly.

4. Separate the Piston (Item 3) from the Cylinder (Item 2)

5. Remove and discard the old O-ring Seals (Items 12 and 13).

6. Press the old Ball Bearing (Item 8) and Drive Ring (Item 4) out of the Cylinder (Item 2).

7. Press the old Ball Bearing (Item 9) out of the Piston (Item 3).

8. Using a bearing puller, remove the Drive Ring (Item 4) from the Ball Bearing (Item 8)

9. Clean the bearing bore of the Cylinder (Item 2) and Piston (Item 3) with fresh safety solvent, making sure all old Loctite® residue is removed.

   NOTE: When installing the new Ball Bearings into the aluminum Piston (Item 3) and Cylinder (Item 2), carefully align the new Ball Bearings with the bearing bore of the Cylinder (Item 2) and Piston (Item 3) to prevent slivers of aluminum from becoming trapped under the new Ball Bearings and causing Ball Bearing misalignment.

10. Apply an adequate amount of Loctite® 680 to evenly coat the outer races of the new Ball Bearings (Items 8 and 9); then, press the new Ball Bearing (Item 8) into the Cylinder (Item 2) and the new Ball Bearing (Item 9) into the Piston (Item 3).

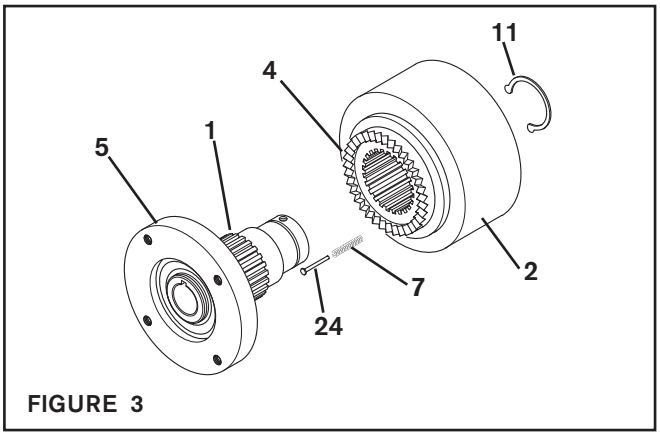


FIGURE 3

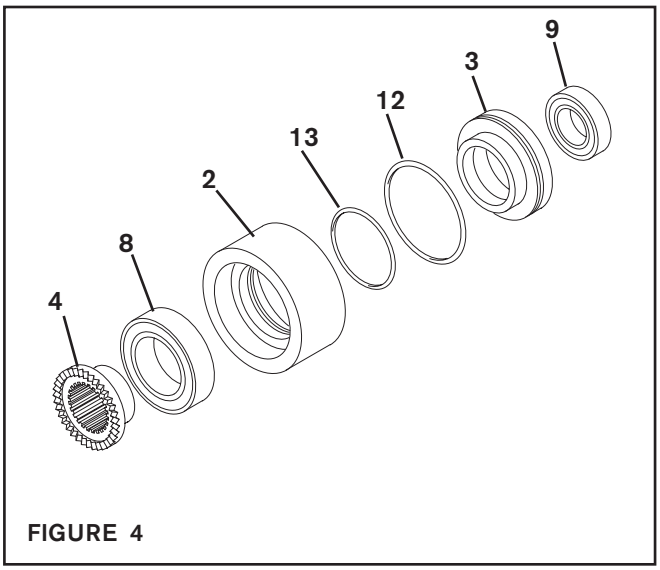


FIGURE 4

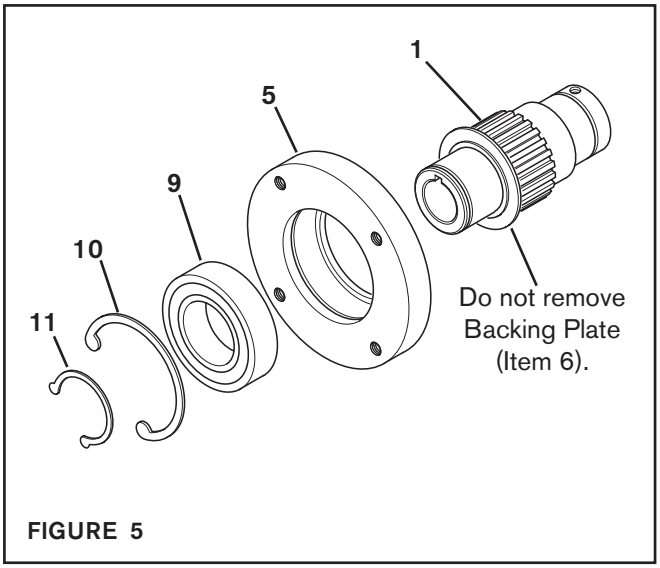


FIGURE 5

PARTS REPLACEMENT: (5H30 - 5H70 continued)

11. Apply a thin coat of O-Ring lubricant to the O-Ring contact surfaces of the Piston (Item 3), Cylinder (Item 2), and the new O-Ring Seals (Items 12 and 13).

12. Install the new O-Ring Seal (Item 13) into the Cylinder (Item 2) and the new O-Ring Seal (Item 12) onto the Piston (Item 3).

13. Making sure not to damage the new O-rings Seals (Items 12 and 13), press the Piston (Item 3) into the Cylinder (Item 2).

14. Press the Drive Ring (Item 4) into the new Ball Bearing (Item 8) and Cylinder (Item 2).

15. Remove the Retaining Ring (Item 11).

16. Press the Hub (Item 1) out of the Drive Flange (Item 5).

NOTE: Do not remove the Backing Plate (Item 6) from the Hub (Item 1).

17. Remove the Retaining Ring (Item 10) from the Drive Flange (Item 5).

18. Press the old Ball Bearing (Item 9) out of the Drive Flange (Item 5).

19. Clean the bearing bore of the Drive Flange (Item 5) with fresh safety solvent, making sure all old Loctite® residue is removed.

20. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Ball Bearing (Item 9); then, press the new Ball Bearing (Item 9) into the Drive Flange (Item 5).

21. Reinstall the Retaining Ring (Item 10).

22. Press the Hub (Item 1) into the Drive Flange (Item 5) and new Ball Bearing (Item 9); then, reinstall the Retaining Ring (Item 11).

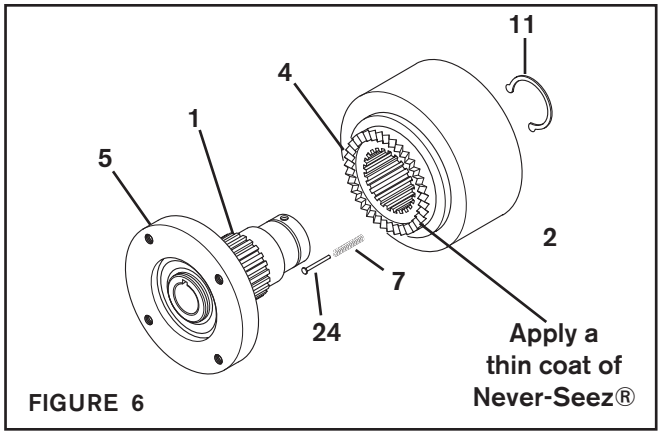


FIGURE 6

23. Install the new Compression Springs (Item 7) and if required, the Spring Stiffener Pins (Item 24).

24. Apply a thin coat of Never-Seez® to the teeth of the Drive Ring (Item 4).

25. Press the Drive Flange (Item 5) and Hub (Item 1) into the Cylinder (Item 2) and Drive Ring (Item 4).

26. Reinstall the Retaining Ring (Item 11).

PARTS REPLACEMENT: 5H30P - 5H70P

Refer to Figures 7 - 10.

⚠ CAUTION

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

1. Remove the Retaining Ring (Item 11).

2. Press the Drive Flange (Item 15) and Hub (Item 1) out of Cylinder (Item 2) and Drive Ring (Item 4).

NOTE: Model 5H70P Tooth Clutch uses Spring Stiffener Pins (Item 24) that must be removed with the old Compression Springs (Item 7).

3. Remove the old Compression Springs (Item 7) and if required, the Spring Stiffener Pins (Item 24).

NOTE: At this point, the spline on the Hub (Item 1) can be lubricated with Never-Seez® without further disassembly.

4. Separate the Piston (Item 3) from the Cylinder (Item 2).

5. Remove and discard the old O-Ring Seals (Items 12 and 13).

6. Press the old Ball Bearing (Item 8) and Drive Ring (Item 4) out of the Cylinder (Item 2).

7. Press the old Ball Bearing (Item 9) out of the Piston (Item 3).

8. Using a bearing puller, remove the Drive Ring (Item 4) from the Ball Bearing (Item 8).

9. Clean the bearing bore of the Cylinder (Item 2) and Piston (Item 3) with fresh safety solvent, making sure all old Loctite® residue is removed.

NOTE: When installing the new Ball Bearings into the aluminum Piston (Item 3) and Cylinder (Item 2), carefully align the new Ball Bearings with the bearing bore of the Cylinder (Item 2) and Piston (Item 3) to prevent slivers of aluminum from becoming trapped under the new Ball Bearings and causing Ball Bearing misalignment.

10. Apply an adequate amount of Loctite® 680 to evenly coat the outer races of the new Ball Bearings (Items 8 and 9); then, press the new Ball Bearing (Item 8) into the Cylinder (Item 2) and the new Ball Bearing (Item 9) into the Piston (Item 3).

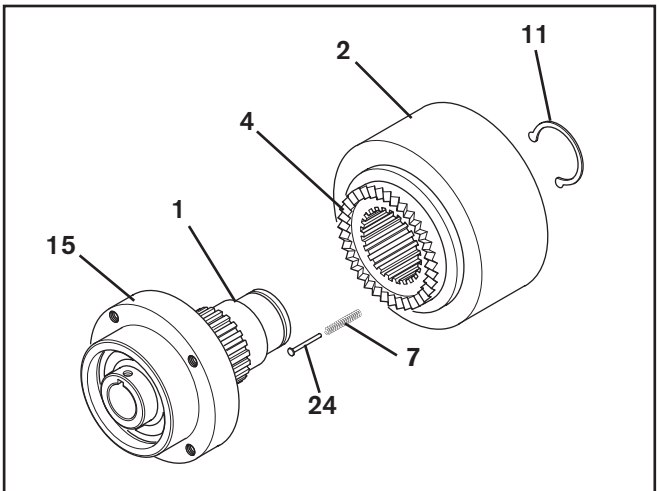


FIGURE 7

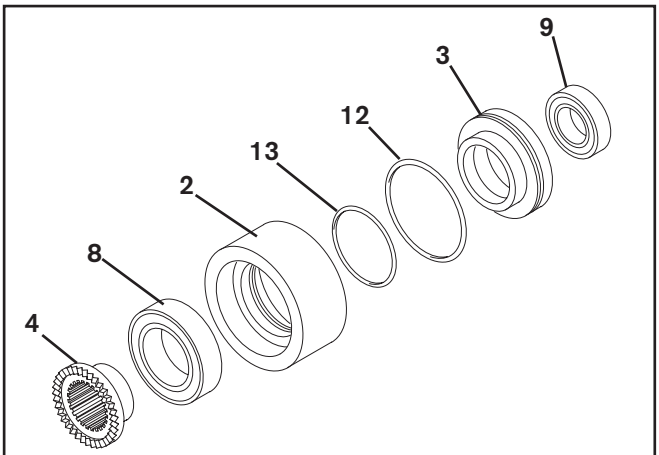


FIGURE 8

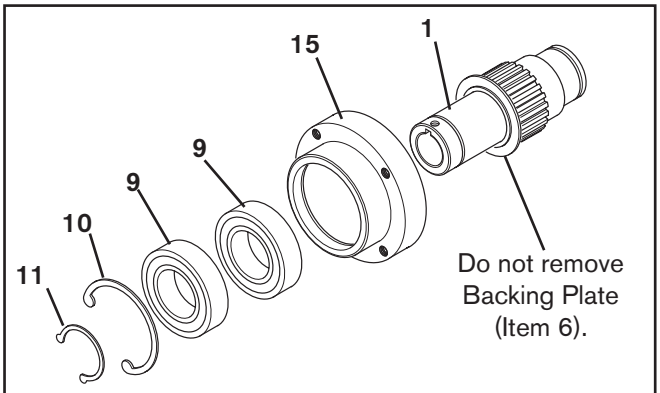


FIGURE 9

PARTS REPLACEMENT: (5H30P - 5H70P continued)

11. Apply a thin coat of O-Ring lubricant to the O-Ring contact surfaces of the Piston (Item 3), Cylinder (Item 2), and the new O-Ring Seals (Items 12 and 13).

12. Install the new O-Ring Seal (Item 13) into the Cylinder (Item 2) and the new O-Ring Seal (Item 12) onto the Piston (Item 3).

13. Making sure not to damage the new O-rings Seals (Items 12 and 13), press the Piston (Item 3) into the Cylinder (Item 2).

14. Press the Drive Ring (Item 4) into the new Ball Bearing (Item 8) and Cylinder (Item 2).

⚠ CAUTION

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

15. Remove the Retaining Ring (Item 11).

16. Press the Hub (Item 1) out of the Drive Flange (Item 15).

NOTE: Do not remove the Backing Plate (Item 6) from the Hub (Item 1).

17. Remove the Retaining Ring (Item 10) from the Drive Flange (Item 15).

18. Press the two old Ball Bearings (Item 9) out of the Drive Flange (Item 15).

19. Clean the bearing bore of the Drive Flange (Item 15) with fresh safety solvent, making sure all old Loctite® residue is removed.

20. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the two new Ball Bearings (Item 9); then, press the two new Ball Bearings (Item 9) into the Drive Flange (Item 15).

21. Reinstall the Retaining Ring (Item 10).

22. Press the Hub (Item 1) into the Drive Flange (Item 15) and new Ball Bearings (Item 9); then, reinstall the Retaining Ring (Item 11).

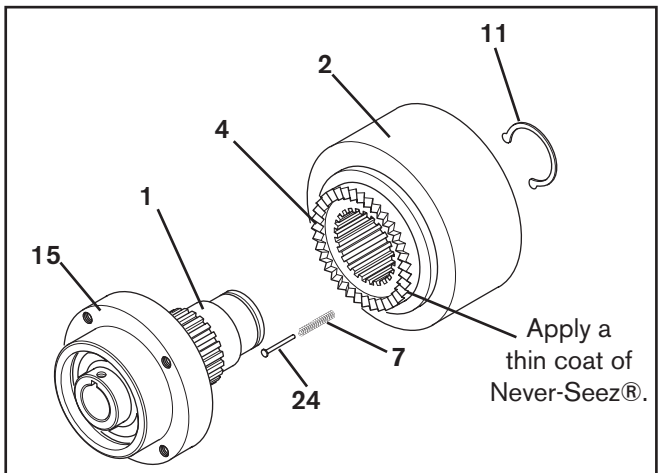


FIGURE 10

23. Install the new Compression Springs (Item 7) and if required, the Spring Stiffener Pins (Item 24).

24. Apply a thin coat of Never-Seez® to the teeth of the Drive Ring (Item 4).

25. Press the Drive Flange (Item 15) and Hub (Item 1) into the Cylinder (Item 2) and Drive Ring (Item 4).

26. Reinstall the Retaining Ring (Item 11).

PARTS REPLACEMENT: 5H80P

Refer to Figures 11 - 14.

⚠ CAUTION

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

1. Remove the Retaining Ring (Item 11).

2. Press the Drive Flange (Item 15) and Hub (Item 1) out of the Cylinder (Item 2) and Drive Ring (Item 4).

3. Remove the old Compression Springs (Item 7) and Spring Stiffener Pins (Item 24).

NOTE: At this point the spline on the Hub (Item 1) can be lubricated with Never-Seez® without further disassembly.

4. Separate the Piston (Item 3) from the Cylinder (Item 2).

5. Remove and discard the old O-Ring Seals (Items 12 and 13).

6. Press the old Ball Bearing (Item 8) and Drive Ring (Item 4) out of the Cylinder (Item 2).

7. Press the old Ball Bearing (Item 9) out of the Piston (Item 3).

8. Using a bearing puller, remove the Drive Ring (Item 4) from the Ball Bearing (Item 8).

9. Clean the bearing bore of the Cylinder (Item 2) and Piston (Item 3) with fresh safety solvent, making sure all old Loctite® residue is removed.

NOTE: When installing the new Ball Bearings into the aluminum Piston (Item 3) and Cylinder (Item 2), carefully align the new Ball Bearings with the bearing bore of the Cylinder (Item 2) and Piston (Item 3) to prevent slivers of aluminum from becoming trapped under the new Ball Bearings and causing Ball Bearing misalignment.

10. Apply an adequate amount of Loctite® 680 to evenly coat the outer races of the new Ball Bearings (Items 8 and 9); then, press the new Ball Bearing (Item 8) into the Cylinder (Item 2) and the new Ball Bearing (Item 9) into the Piston (Item 3).

11. Apply a thin coat of O-Ring lubricant to the O-Ring contact surfaces of the Piston (Item 3), Cylinder (Item 2), and the new O-Ring Seals (Items 12 and 13).

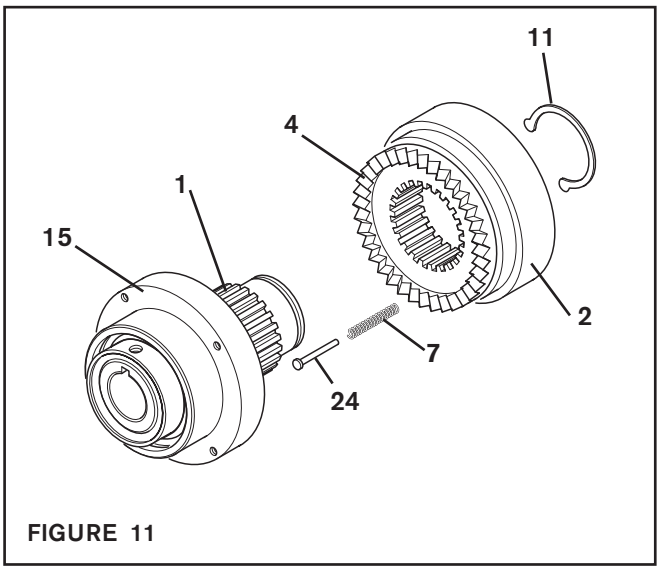


FIGURE 11

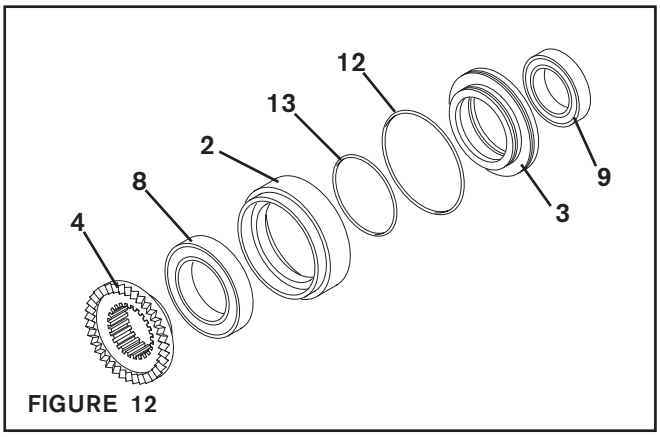


FIGURE 12

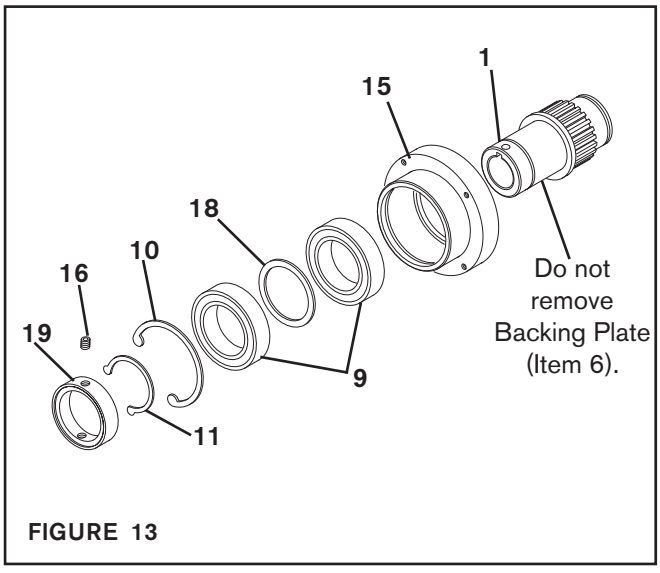


FIGURE 13

PARTS REPLACEMENT: (5H80P continued)

12. Install the new O-Ring Seal (Item 13) into the Cylinder (Item 2) and the new O-Ring Seal (Item 12) onto the Piston (Item 3).

13. Making sure not to damage the new O-rings Seals (Items 12 and 13), press the Piston (Item 3) into the Cylinder (Item 2).

14. Press the Drive Ring (Item 4) into the new Ball Bearing (Item 8) and Cylinder (Item 2).

15. Loosen the Set Screws (Item 16) and remove the Locking Collar (Item 19).

⚠ CAUTION

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

16. Remove the Retaining Ring (Item 11).

17. Press the Hub (Item 1) out of the Drive Flange (Item 15).

NOTE: Do not remove the Backing Plate (Item 6) from the Hub (Item 1).

18. Remove the Retaining Ring (Item 10) from the Drive Flange (Item 15).

19. Press the two old Ball Bearings (Item 9) and Spacer (Item 18) out of the Drive Flange (Item 15).

20. Clean the bearing bore of the Drive Flange (Item 15) with fresh safety solvent, making sure all old Loctite® residue is removed.

21. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the two new Ball Bearings (Item 9); then, press the two new Ball Bearings (Item 9) and Spacer (Item 18) into the Drive Flange (Item 15).

22. Reinstall the Retaining Ring (Item 10).

23. Press the Hub (Item 1) into the Drive Flange (Item 15) and new Ball Bearing (Item 9); then, reinstall the Retaining Ring (Item 11).

24. Install the Locking Collar (Item 19) and secure it to the Hub (Item 1) with the Set Screws (Item 16).

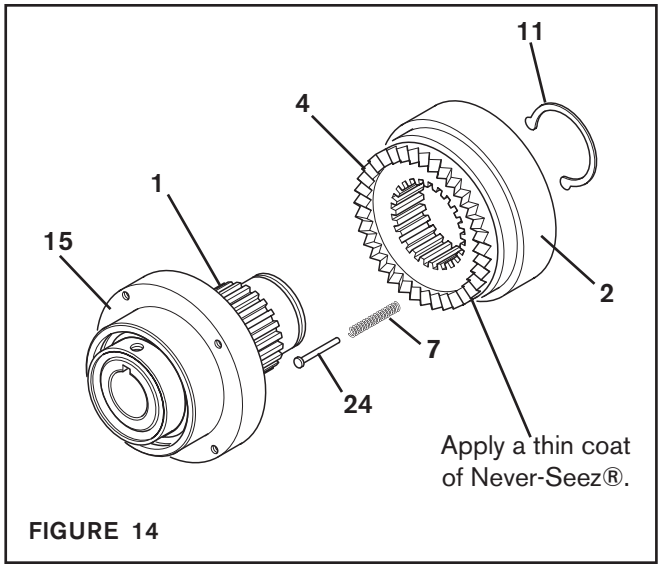


FIGURE 14

25. Install the new Compression Springs (Item 7) and Spring Stiffener Pins (Item 24).

26. Apply a thin coat of Never-Seez® to the teeth of the Drive Ring (Item 4).

27. Press the Drive Flange (Item 15) and Hub (Item 1) into the Cylinder (Item 2) and Drive Ring (Item 4).

28. Reinstall the Retaining Ring (Item 11).

PARTS REPLACEMENT - 5H100P

Refer to Figures 15-18.

1. Loosen the Set Screws (Item 16) and remove the Locking Collar (Item 19).

⚠ CAUTION

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

2. Remove the Retaining Ring (Item 11).

3. Remove the Spacer (Item 18).

4. Press the Drive Flange (Item 15) and Hub (Item 1) off the Cylinder (Item 2) and Drive Ring (Item 4).

5. Remove the old Compression Springs (Item 7).

NOTE: At this point, the spline on the Hub (Item 1) can be lubricated, with Never-Seez® without further disassembly.

6. Separate the Piston (Item 3) from the Cylinder (Item 2)

7. Remove and discard the old O-Ring Seals (Items 12 and 13).

8. Remove the Retaining Ring (Item 10).

9. Press the old Ball Bearing (Item 8) and Drive Ring (Item 4) out of the Cylinder (Item 2).

10. Press the old Ball Bearing (Item 9) out of the Piston (Item 3).

11. Using a bearing puller, remove the Drive Ring (Item 4) from the Ball Bearing (Item 8).

12. Clean the bearing bore of the Cylinder (Item 2) and Piston (Item 3) with fresh safety solvent, making sure all old Loctite® residue is removed.

13. Apply an adequate amount of Loctite® 680 to evenly coat the outer races of the new Ball Bearings (Items 8 and 9); then, press the new Ball Bearing (Item 8) into the Cylinder (Item 2) and the new Ball Bearing (Item 9) into the Piston (Item 3).

14. Reinstall the Retaining Ring (Item 10).

15. Apply a thin coat of O-Ring lubricant to the O-Ring contact surfaces of the Piston (Item 3), Cylinder (Item 2), and the new O-Ring Seals (Items 12 and 13).

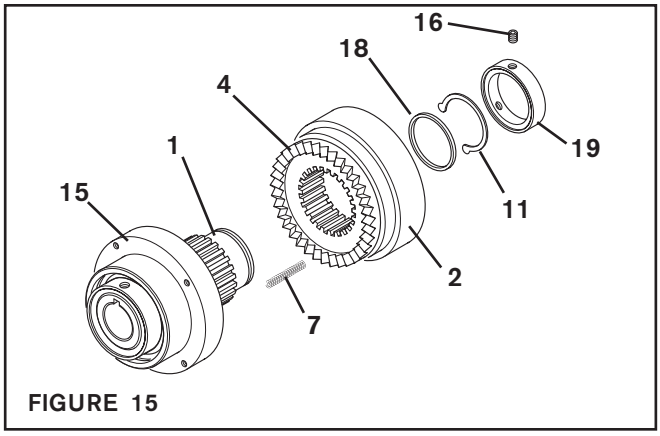


FIGURE 15

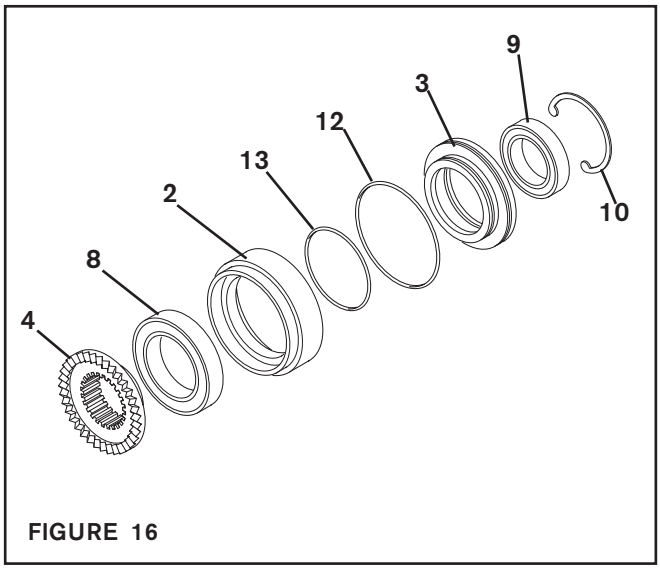


FIGURE 16

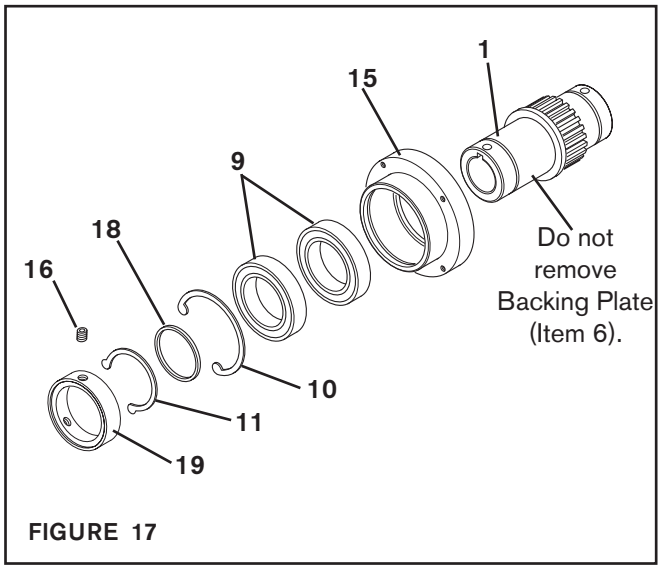


FIGURE 17

16. Install the new O-Ring Seal (Item 13) into the Cylinder (Item 2) and the new O-Ring Seal (Item 12) onto the Piston (Item 3).

17. Making sure not to damage the new O-rings Seals (Items 12 and 13), press the Piston (Item 3) into the Cylinder (Item 2).

18. Press the Drive Ring (Item 4) into the new Ball Bearing (Item 8) and Cylinder (Item 2).

19. Loosen the Set Screws (Item 16) and remove the Locking Collar (Item 19).

⚠ CAUTION

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

20. Remove the Retaining Ring (Item 11).

21. Remove the Spacer (Item 18).

22. Press the Hub (Item 1) out of the Drive Flange (Item 15).

NOTE: Do not remove the Backing Plate (Item 6) from the Hub (Item 1).

23. Remove the Retaining Ring (Item 10) from the Drive Flange (Item 15).

24. Press the two old Ball Bearings (Item 9) out of the Drive Flange (Item 15).

25. Clean the bearing bore of the Drive Flange (Item 15) with fresh safety solvent, making sure all old Loctite® residue is removed.

26. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the two new Ball Bearings (Item 9); then, press the two new Ball Bearings (Item 9) into the Drive Flange (Item 15).

27. Reinstall the Retaining Ring (Item 10).

28. Press the Hub (Item 1) into the Drive Flange (Item 15) and new Ball Bearings (Item 9).

29. Install the Spacer (Item 18).

30. Reinstall the Retaining Ring (Item 11).

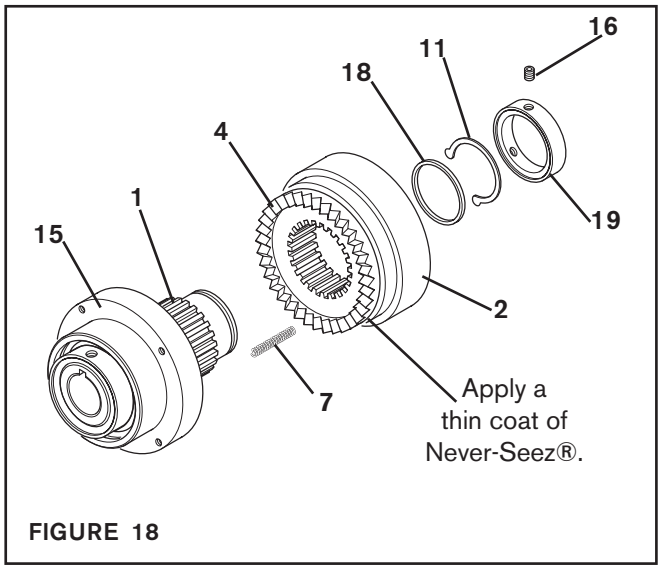


FIGURE 18

31. Install the Locking Collar (Item 19) and secure it to the Hub (Item 1) with the Set Screws (Item 16).

32. Install the new Compression Springs (Item 7).

33. Apply a thin coat of Never-Seez® to the teeth of the Drive Ring (Item 4).

34. Press the Drive Flange (Item 15) and Hub (Item 1) into the Cylinder (Item 2) and Drive Ring (Item 4).

35. Install the Spacer (Item 18).

36. Reinstall the Retaining Ring (Item 11).

37. Install the Locking Collar (Item 19) and secure it to the Hub (Item 1) with the Set Screws (Item 16)

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.

5H30 - 5H70

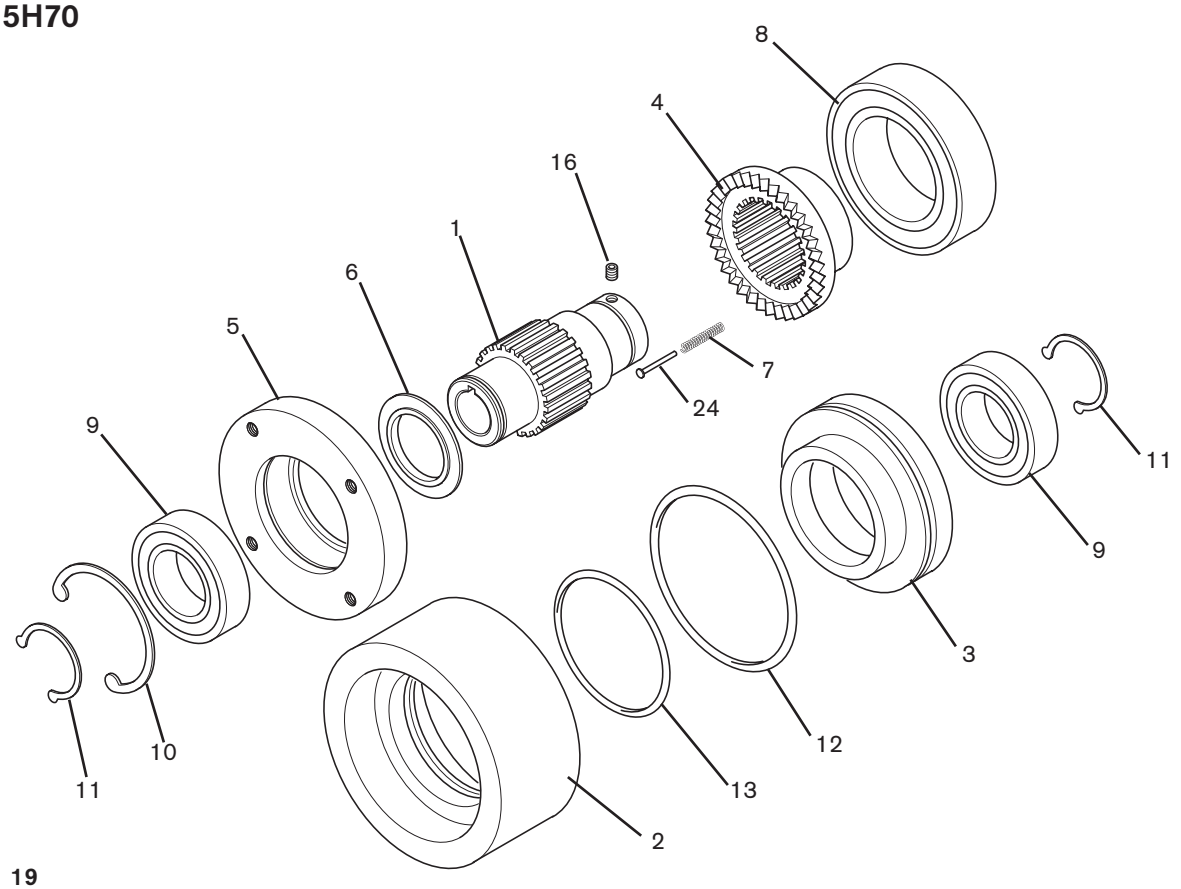


FIGURE 19

ITEM	DESCRIPTION	QUANTITY							
		5H30	5H35	5H40	5H45	5H50	5H60	5H70	5H30S
1	Hub	1	1	1	1	1	1	1	1
2	Cylinder	1	1	1	1	1	1	1	1
3	Piston	1	1	1	1	1	1	1	1
4	Drive Ring	1	1	1	1	1	1	1	1
5	Drive Flange/Drive Sprocket	1	1	1	1	1	1	1	1
6	Backing Plate	1	1	1	1	1	1	1	1
7[1]	Compression Spring	9	3	4	5	6	7	8	9
8[1]	Ball Bearing (Cylinder)	1	1	1	1	1	1	1	1
9[1]	Ball Bearing (Piston and Drive Flange)	1	1	1	1	1	1	1	2
10	Retaining Ring (Int.)	1	1	1	1	1	1	1	1
11	Retaining Ring (Ext.)	1	1	1	1	1	1	1	1
12[1]	O-Ring Seal (Large)	1	1	1	1	1	1	1	1
13[1]	O-Ring Seal (Small)	1	1	1	1	1	1	1	1
14	Hose Assembly (Not Shown)	1	1	1	1	1	1	1	1
16	Set Screw	2	2	2	2	2	2	2	2
24	Spring Stiffener Pin	-	-	-	-	-	-	8	-

[1] Denotes Repair Kit item.

REPLACEMENT PARTS (continued)

5H30P - 5H70P

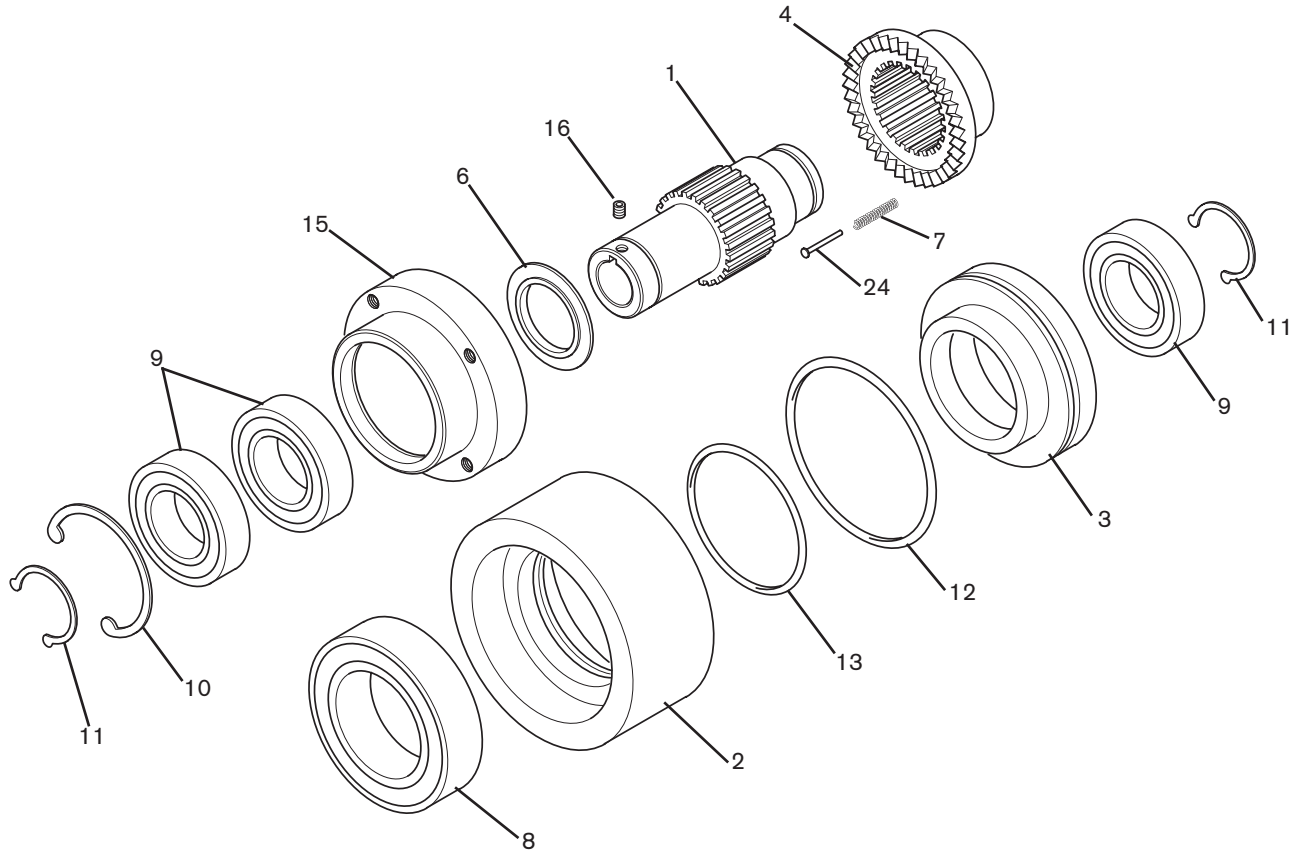


FIGURE 20

ITEM	DESCRIPTION	QUANTITY						
		5H30P	5H35P	5H40P	5H45P	5H50P	5H60P	5H70P
1	Hub	1	1	1	1	1	1	1
2	Cylinder	1	1	1	1	1	1	1
3	Piston	1	1	1	1	1	1	1
4	Drive Ring	1	1	1	1	1	1	1
5	Drive Flange/Drive Sprocket	1	1	1	1	1	1	1
6	Backing Plate	1	1	1	1	1	1	1
7[1]	Compression Spring	9	3	4	5	6	7	8
8[1]	Ball Bearing (Cylinder)	1	1	1	1	1	1	1
9[1]	Ball Bearing (Piston and Drive Flange)	3	3	3	3	3	3	3
10	Retaining Ring (Int.)	1	1	1	1	1	1	1
11	Retaining Ring (Ext.)	2	2	2	2	2	2	2
12[1]	O-Ring Seal (Large)	1	1	1	1	1	1	1
13[1]	O-Ring Seal (Small)	1	1	1	1	1	1	1
14	Hose Assembly (Not Shown)	1	1	1	1	1	1	1
15	Drive Flange (Pilot Mount)	1	1	1	1	1	1	1
16	Set Screw	2	2	2	2	2	2	2
24	Spring Stiffener Pin	-	-	-	-	-	-	8

[1] Denotes Repair Kit item.

REPLACEMENT PARTS (continued)

5H80P

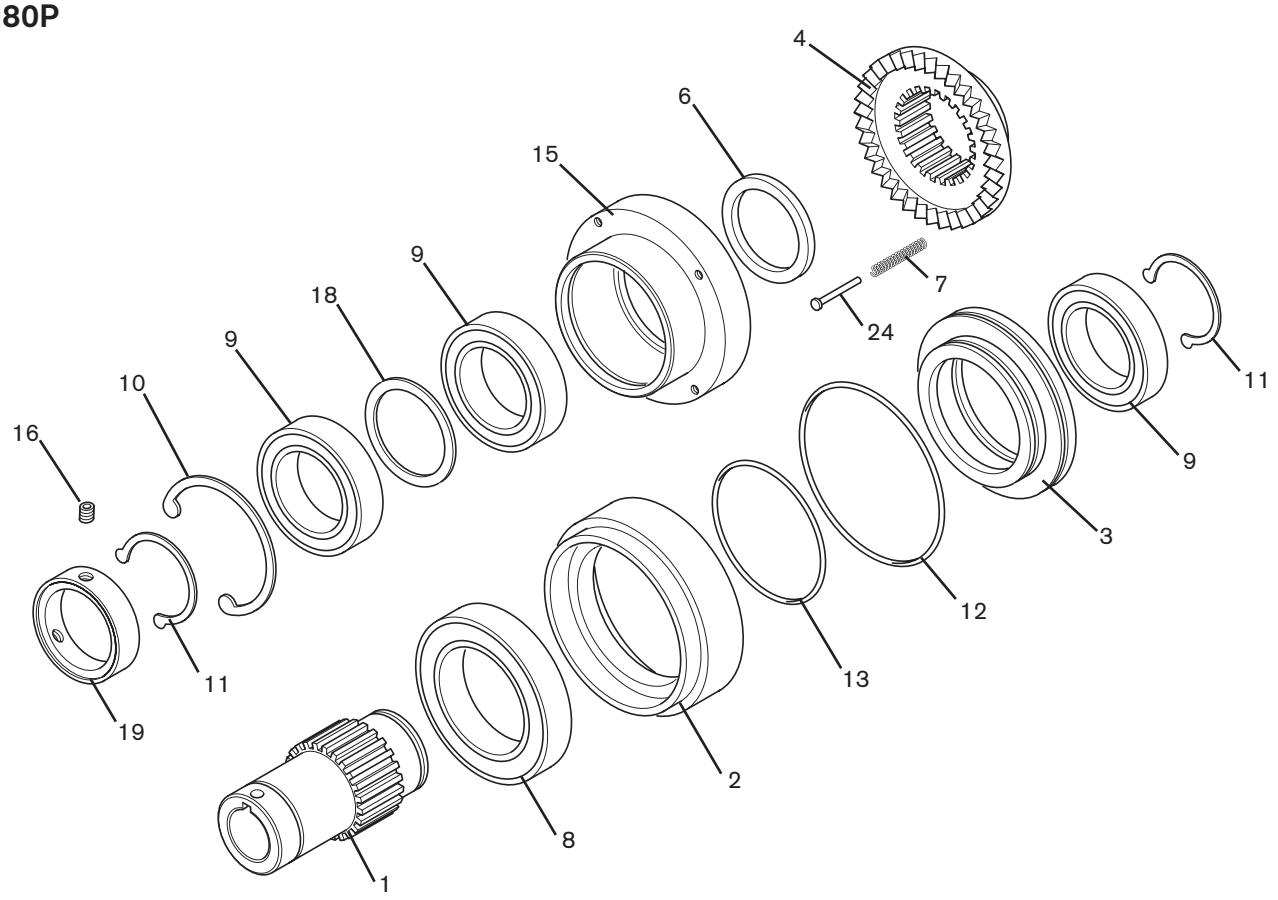


FIGURE 21

ITEM	DESCRIPTION	QTY
1	Hub	1
2	Cylinder	1
3	Piston	1
4	Drive Ring	1
6	Backing Plate	1
7[1]	Compression Spring	10
8[1]	Ball Bearing (Cylinder)	1
9[1]	Ball Bearing (Piston and Drive Flange)	3
10	Retaining Ring (Int.)	1

ITEM	DESCRIPTION	QTY
11	Retaining Ring (Ext.)	2
12[1]	O-Ring Seal (Large)	1
13[1]	O-Ring Seal (Small)	1
14	Hose Assembly (Not Shown)	1
15	Drive Flange (Pilot Mount)	1
16	Set Screw	3
18	Spacer	1
19	Locking Collar	1
24	Spring Stiffener Pin	10

[1] Denotes Repair Kit item.

REPLACEMENT PARTS (continued)

5H100P

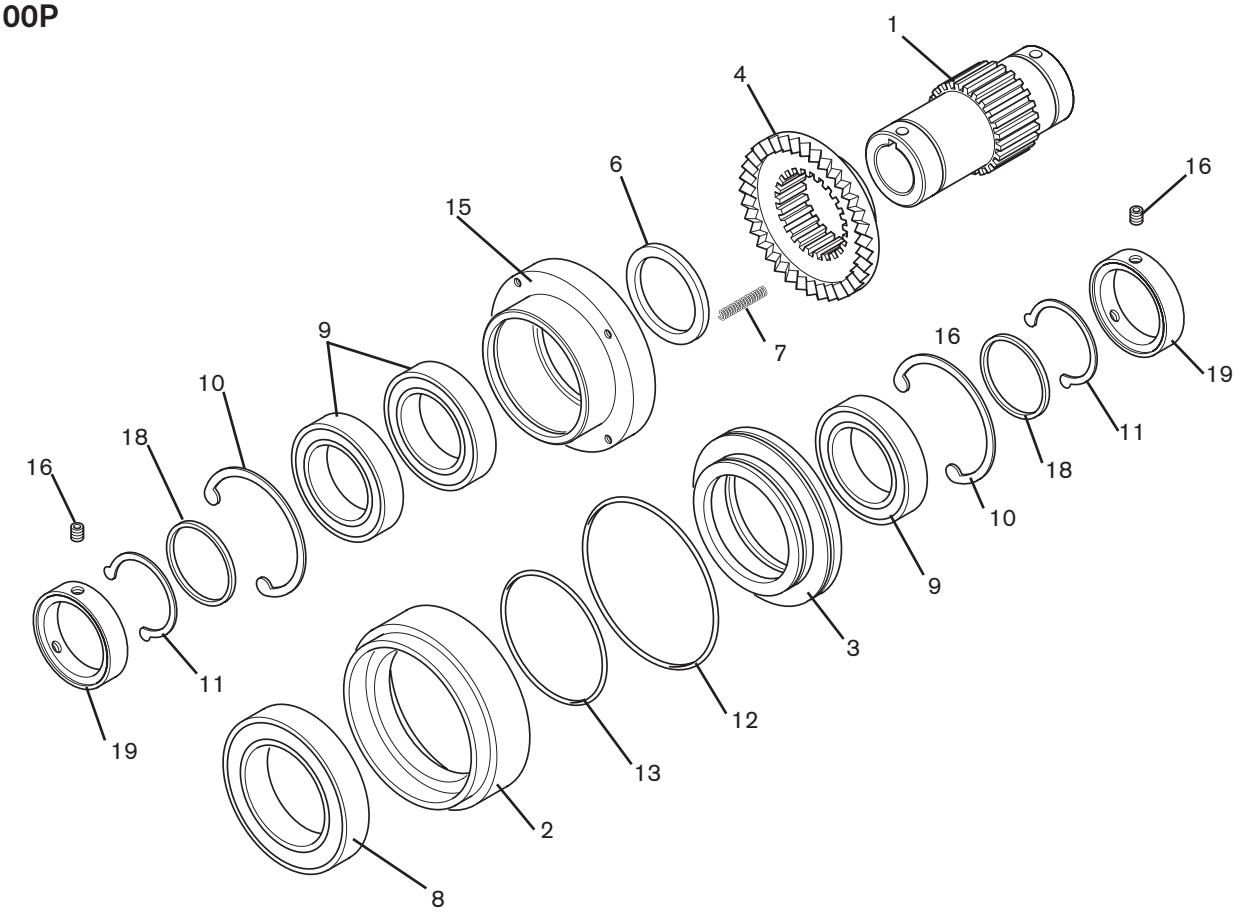


FIGURE 22

ITEM	DESCRIPTION	QTY
1	Hub	1
2	Cylinder	1
3	Piston	1
4	Drive Ring	1
6	Backing Plate	1
7[1]	Compression Spring	12
8[1]	Ball Bearing (Cylinder)	1
9[1]	Ball Bearing (Piston and Drive Flange)	3
10	Retaining Ring (Int.)	2

ITEM	DESCRIPTION	QTY
11	Retaining Ring (Ext.)	2
12[1]	O-Ring Seal (Large)	1
13[1]	O-Ring Seal (Small)	1
14	Hose Assembly (Not Shown)	1
15	Drive Flange (Pilot Mount)	1
16	Set Screw	6
18	Spacer	2
19	Locking Collar	2

[1] Denotes Repair Kit item.

REPAIR KITS

When ordering Repair Kits, specify model number and product number to ensure prompt, accurate delivery. Purchase Repair Kits through your local Nexen Distributor.

The following Repair Kits include: Compression Springs, O-Rings, and all Ball Bearings.

MODEL	REPAIR KIT
5H30	916200
5H35	916300
5H40	916400
5H45	916500
5H50	916600
5H60	916700
5H70	916800

MODEL	REPAIR KIT
5H30P	916900
5H35P	917000
5H40P	917100
5H45P	917200
5H50P	917300
5H60P	917400
5H70P	917500
5H80P	916100
5H100P	916710

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.

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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.

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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.

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