




## 5HP-SP Single Position Tooth Clutches



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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	<div data-bbox="537 558 834 611"> <b>DANGER</b></div> <p>Read this manual carefully before installation and operation. Follow Nexen's instructions and integrate this unit into your system with care. This unit should be installed, operated and maintained by qualified personnel <b>ONLY</b>. Improper installation can damage your system, cause injury or death. Comply with all applicable codes.</p>	
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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.

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## GENERAL SPECIFICATIONS


Specifications:	
Torque	Up to 3610 Nm (32000 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 32 kg (70 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".



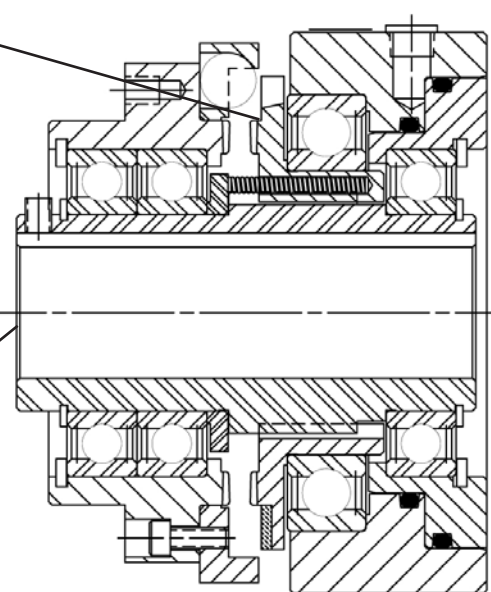
**WARNING**


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



**CAUTION**

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





**CAUTION**

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

## INTRODUCTION

Nexen “5HP-SP” Single Position Tooth Clutches are designed for applications where exact timing of two components is required. When engaged, static air pressure squeezes the teeth together (*in the same position each time*) that lock in for absolutely no slippage or loss of torque.

Tooth clutches are normally engaged when stationary. In certain circumstances, such as low RPM, tooth clutches can be engaged at differential speed 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 selected tooth clutch.

### DIFFERENTIAL SPEED FORMULA

Use the Differential Speed Formula to find the allowable engagement speed (**N**) at a specific air pressure setting (**P**) with a given inertial load (**WK<sup>2</sup>**). This formula expresses the relationship of the variables involved that 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).

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

Where: **N** = Differential RPM Limit Clutch

**V** = Constant for Clutch (See Table 1)

**P** = Operational Pressure. PSI

**WK<sup>2</sup>** = Referred Inertia lb. • ft<sup>2</sup>

**EXAMPLE:** The required differential engagement speed using a Model “5H45P-SP” clutch at 60 PSI is 150 RPM. (Clutch rotating at 1250, machine component rotating at 1100). The referred inertial is 3 lb. • ft<sup>2</sup>. The differential RPM limit for the clutch is:

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


150 RPM is within the limit of the “5H45P-SP” operating at 60 PSI with a load of 3 lb. • ft<sup>2</sup>.

**TABLE 1**  
**CONSTANTS FOR CLUTCHES**

CLUTCH	CONSTANT	CLUTCH	CONSTANT
5H30P-SP	2.10	5H50P-SP	1.26
5H35P-SP	1.80	5H60P-SP	1.05
5H40P-SP	1.57	5H70P-SP	.90
5H45P-SP	1.40	5H80P-SP	.78

NOTE: Formula does not estimate:

- 1 RPM that prevents ratcheting.
- 2 Acceleration time.
- 3 Tooth stress after engagement.

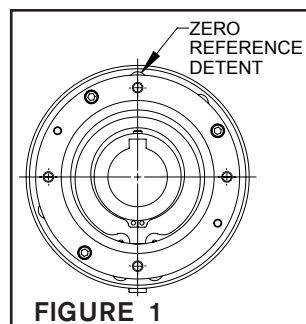
	<b>CAUTION</b>
	If differential speed exceeds the clutch limitations, ratcheting of the teeth can occur that will shorten clutch life.

## INSTALLATION

The “5HP-SP” Clutch has a drive flange with two bearings, a pilot diameter, and tapped holes for mounting a pulley, sprocket, or Nexen’s Flexible Coupling (See Table 2 for recommended tightening torques).

### Single Position Tooth Clutch Synchronization

The clutch keyway and one mounting hole are aligned to orient the clutch for single positioning as shown in Fig. 1. The clutch face teeth engage in one location when the clutch is activated.



**FIGURE 1**

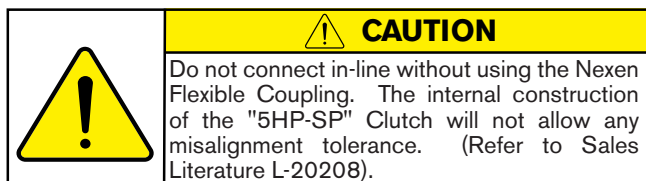
**TABLE 2**

Model	Screw Size metric [inch]	Tightening Torque
5H30P-SP	M6 [1/4-20]	17.6 Nm [13 ft.lb.]
5H35P-SP	M6 [1/4-20]	17.6 Nm [13 ft.lb.]
5H40P-SP	M6 [1/4-20]	17.6 Nm [13 ft.lb.]
5H45P-SP	M6 [1/4-20]	17.6 Nm [13 ft.lb.]
5H50P-SP	M8 [5/16-18]	36.6 Nm [27 ft.lb.]
5H60P-SP	M8 [5/16-18]	36.6 Nm [27 ft.lb.]
5H70P-SP	M10 [1/2-13]	161.3 Nm [119 ft.lb.]
5H80P-SP	M12 [1/2-13]	161.3 Nm [119 ft.lb.]

**NOTE:** Nexen recommends using a Red anaerobic thread locking compound on Pilot Mounting Bolts.

## INSTALLATION (continued)

Nexen's Flexible Coupling combined with "5HP-SP" Tooth Clutches provides high misalignment capabilities for in-line shaft connections.



Mounting positions of the Tooth Clutch may be vertical or horizontal. In the vertical position Nexen recommends locating the drive flange in an upward position to enhance the spring return function.

To prevent the clutch bearings from unnecessary rotation, align the input drive to the clutch through the drive flange whenever possible.

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

An optional Hub Collar is available if set screws are required on the opposite end of the clutch. Order the Collar by Product Number (See Table 3).

The optional Hub Collar requires drilling and tapping of holes in the end of the clutch hub. Use the Collar as a hole location template.

**NOTE: All "5HP-SP" Clutches mount on a full shaft using a customer supplied full length key.**

**Refer to Figure 2.**

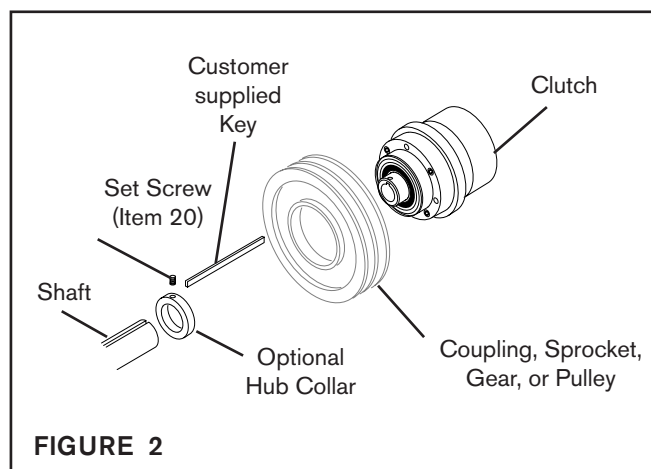
- A. Install Nexen's Flexible Coupling, pulley, sprocket, or gear (See Table 2).
- B. Insert customer supplied key.
- C. Slide optional Locking Hub Collar if used.
- D. Slide Clutch onto shaft and customer supplied key.
- E. Using Set Screws (Item 20) Secure Clutch to shaft.
- F. Tighten Set Screws (Item 20) to recommended torque (See Table 4).

**TABLE 3**

For Model	Collar O.D.	BORE		Product No.	Tapped Holes required	B.C.
		IN	MM			
5H30PSP	1-5/8	.875	22.23	924300	(3) 6-32	1-3/16
5H35PSP	1-15/16	1.125	28.58	924400	(3) 6-32	1-7/16
5H40PSP	1-15/16	1.250	31.75	924500	(4) 4-40	1-1/2
5H45PSP	2-5/8	1.500	38.10	924600	(3) 8-32	1-29/32
5H50PSP	2-3/4	1.750	44.45	924700	(3) 8-32	2-5/32
5H60PSP	3-1/8	1.937	49.20	924800	(3) 10-32	2-7/16
5H70PSP	3-1/2	2.187	55.55	924900	(3) 10-32	2-11/16
5H80PSP	4	2.937	74.60	925000	(3) 10-24	3-19/64

**TABLE 4**

MODEL	RECOMMENDED SET SCREW TIGHTENING TORQUE
5H30PSP	13.8 In. Lb.
5H35PSP	13.8 In. Lb.
5H40PSP	13.8 In. Lb.
5H45PSP	13.8 In. Lb.
5H50PSP	6.6 Ft. Lb.
5H60PSP	6.6 Ft. Lb.
5H70PSP	59.6 Ft. Lb.
5HP80PSP	59.6 Ft. Lb.



**FIGURE 2**

## 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.

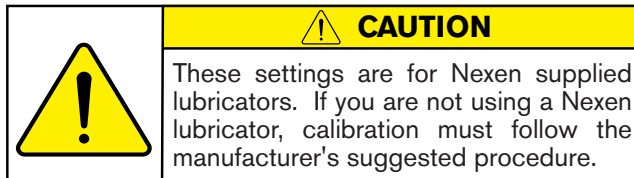
However, some customers prefer to use an air line lubricator, which injects oil into the pressurized air, forcing an oil mist into the air chamber. This is acceptable, but care must be taken to ensure once an air mist lubrication system is used, it is continually used over the life of the product as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



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.

## SPLINE.

Although the Spline has been lubricated at the factory with a high temperature, anti-seize lubricating compound, Nexen recommends periodic lubrication of this component to insure smooth clutch engagement and disengagement.

NOTE: Clutch must be disassembled to lubricate Spline (See Disassembly instructions).

## FACE TEETH.

Lubricate Drive Flange Face Teeth and Ring Drive with aerosol 'Never-Seez'® or equivalent whenever visual inspection shows a need for lubrication.

## AIR CONNECTIONS

Although "5HP-SP" Tooth Clutches are air actuated with a maximum operating air pressure of 80 PSI, use only enough air pressure to deliver ample torque for the application. Operating air pressures over 80 PSI will eventually cause bearing and seal damage.

Due to bearing seal drag, the cylinder/piston assembly will rotate, resulting in hose breakage when the clutch is engaged. For Models 30 through 60, resting the hose against a support mounted parallel to the clutch centerline stops this rotation.

On Models 70 and 80, where seal drag is more apparent, have a 3/8-16 hole tapped 180° from the air inlet. Then install a bolt or stud in this hole. Resting the bolt or stud against a support relieves stress on the hose.

## AIR CONNECTIONS (continued)

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

### NOTE

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



### CAUTION

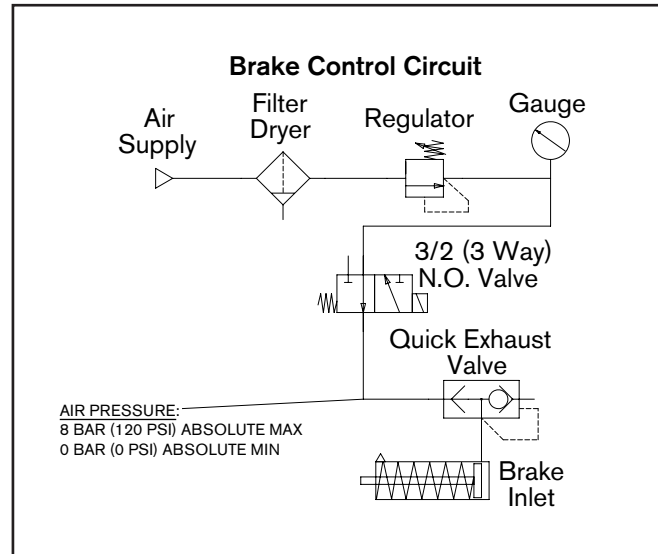
Low air pressure will cause slippage and overheating. Excessive air pressure will cause abrupt starts and stops, reducing product life.



### CAUTION

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

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.



## OPERATION



### WARNING

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



### CAUTION

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



### 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".

TABLE 5

Size	Max RPM
5H30PSP	3700
5H35PSP	3200
5H40PSP	3000
5H45PSP	3000
5H50PSP	3000
5H60PSP	2400
5H70PSP	2000
5H80PSP	2000



## TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
<b>Failure to Engage.</b>	Control Valve malfunction or low air pressure.	Check system for air leaks or replace Control Valve.
	Lack of lubrication on Hub Spline or in Air Chamber.	Lubricate Hub Spline and check Air Chamber 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.
<b>Failure to Disengage.</b>	Lack of lubrication on Hub Spline or in Air Chamber.	Lubricate Hub Spline and check Air Chamber 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.
<b>Tooth Wear or Clicking Sound.</b>	Excessive engagement RPM or unintentional disengagement due to torque overload.	Contact Nexen for Clutch specifications.
<b>Bearing Failure</b>	Limit air pressure to 80 PSI. Excessive air pressure increases the thrust load on the bearings.	
	Stay within the maximum specified speed limits as specified in the "Air Champ" catalog.	
	Use Nexen's Flexible Coupling for in-line applications. Do not connect a rigid coupling directly to the Drive Flange.	
	Avoid applying excessive overhung loads to Pilot Mount "5HP-SP" Clutches. Wide pulleys or sprockets which extend beyond the end of the clutch will increase the radial load and reduce bearing life.	

## PARTS REPLACEMENT

### A. DISASSEMBLY.

Refer to Figures 3-5.

1. Remove all Set Screws (Item 20). On Models 5H70P-SP" and "5H80P-SP" the Set Screw Collar (Item 25) must be removed also.



#### 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 Retaining Ring (Item 14).
3. Press Hub (Item 1) out of Drive Flange.

**NOTE:** If a press is not available, use a bearing puller to remove Drive Flange Assembly from Hub.

4. Remove Backing Plate (Item 7).

**NOTE:** Backing Plate is initially assembled with 680 Loctite®. A bearing puller may be required to remove it.

5. Remove Springs (Item 8).
6. Separate Cylinder ((Item 2), Drive Ring, and Bearing (Item 11) from the Hub (Item 1), Piston (Item 3), and Piston Bearing (Item 12).
7. At this point, if bearings are not being replaced, O-Rings (Items 15 & 16) can be replaced and the Hub Spline can be relubricated without further disassembly.
  - a. Coat O-Ring surfaces of Piston (Item 3) and Cylinder (Item 2) with a thin film of O-Ring lubricant.
  - b. Coat O-Ring (Items 15 & 16) with a thin film of O-Ring lubricant.
  - c. Install new O-Rings.
  - d. Coat Hub Spline Teeth with 'Never-Seez'®.

**NOTE:** If bearings are not being replaced, go to "Paragraph C, REASSEMBLY".

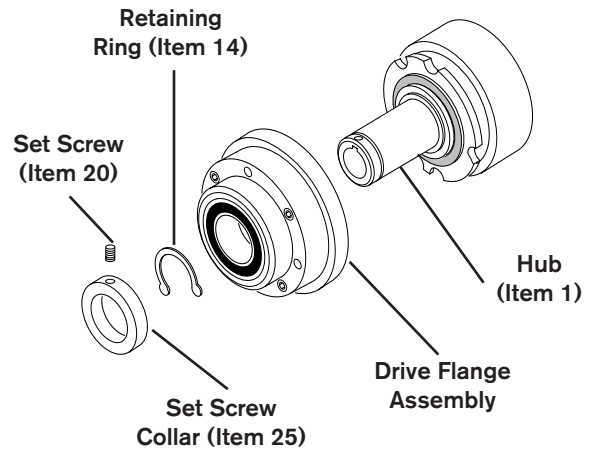


FIGURE 3

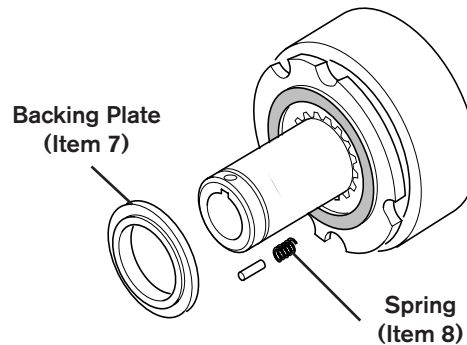


FIGURE 4

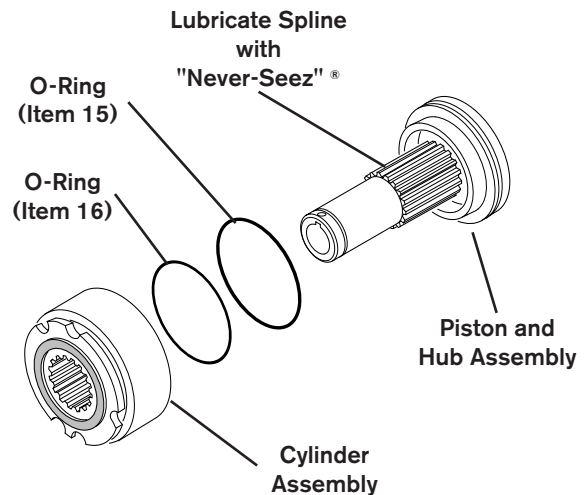


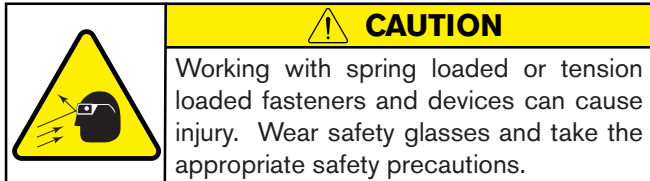
FIGURE 5

## PARTS REPLACEMENT (continued)

### B. BEARING REPLACEMENT

Refer to Figures 6-8.

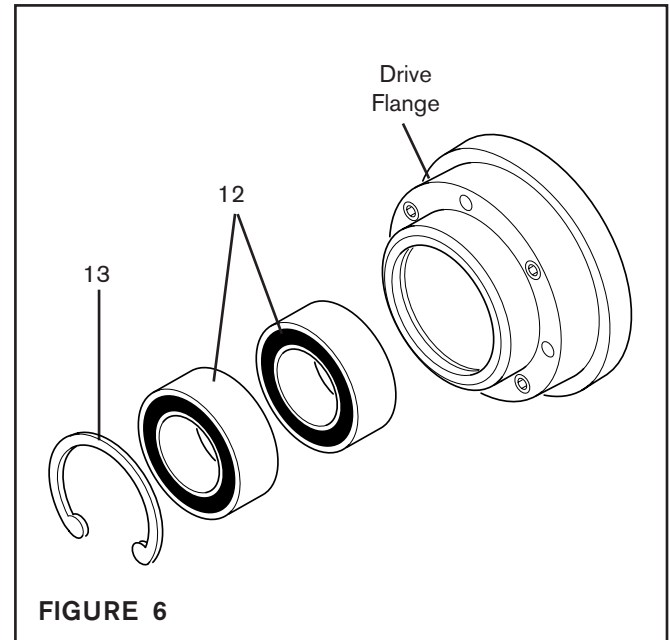
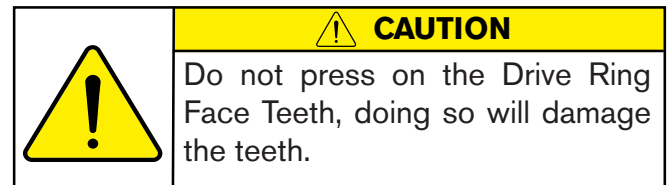
#### 1. Drive Flange Bearings (Item 12)



- a. Remove Retaining Ring (Item 13).
- b. Push Bearings (Item 12) out of Drive Flange Assembly (Item 17).
- c. Clean Bore of Drive Flange Assembly with fresh safety solvent.
- d. Apply Loctite® 680 to O.D. of new Bearings and press new Bearings into Drive Flange Assembly.

**NOTE: When installing new Bearings, carefully align Bearing O.D. with Drive Flange bore to prevent Bearing misalignment.**

- e. Install Retaining Ring (Item 13).

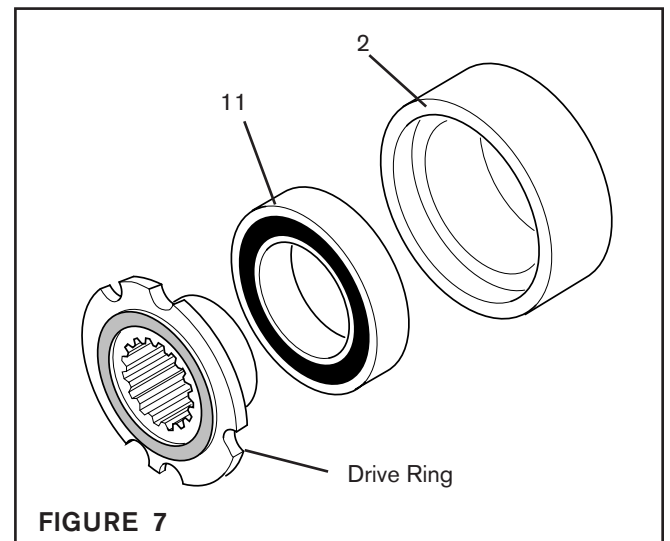


#### 2. Cylinder Bearing (Item 11)

- a. Press Drive Ring out of Cylinder Bearing (Item 11), and Cylinder (Item 2).
- b. Press Cylinder Bearing (Item 11) out of Cylinder (Item 2).
- c. Clean Bore of Cylinder with fresh safety solvent.
- d. Apply Loctite® 680 to O.D. of new Bearings and press new Bearings into Cylinder.

**NOTE: When installing new Bearings, carefully align Bearing O.D. with the Cylinder bore to prevent slivers of aluminum from getting trapped under the bearing and causing misalignment.**

- e. Supporting the inner race of the new Bearing, press the Drive Ring into the new Bearing.



## PARTS REPLACEMENT (continued)

### 3. Piston Bearing (Item 12).



#### CAUTION

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

- a. Remove Retaining Ring (Item 14).
- b. Press Hub (Item 1) out of Piston (Item 3) and Piston Bearing (Item 12).
- c. Remove Retaining Ring (Item 13).
- d. Press Bearing (Item 12) out of Piston (Item 3).
- e. Clean Bore of Piston with fresh safety solvent.
- f. Apply Loctite® 680 to O.D. of new Bearings and press new Bearing into Piston.

**NOTE: When installing new Bearings, carefully align Bearing O.D. with the Piston bore to prevent slivers of aluminum from getting trapped under the bearing and causing misalignment.**

- g. Install Retaining Ring (Item 13).
- h. Supporting the inner race of the new Bearing; press the Hub into the new Bearing and Piston.
- i. Replace Retaining Ring (Item 14).

## C. REASSEMBLY.

Refer to Figures 9-11.

1. Coat O-Ring surfaces of Piston (Item 3) and Cylinder (Item 2) with a thin film of O-Ring lubricant.
2. Coat O-Rings (Items 15 & 16) with a thin film of O-Ring lubricant
3. Install new O-Rings.
4. Coat Hub Spline Teeth with 'Never-Seez'®.
5. Slide Cylinder Assembly onto Hub and Piston Assembly.

**NOTE:** Hub Keyway must be directly opposite the two closely spaced Detent Holes of Drive Ring.

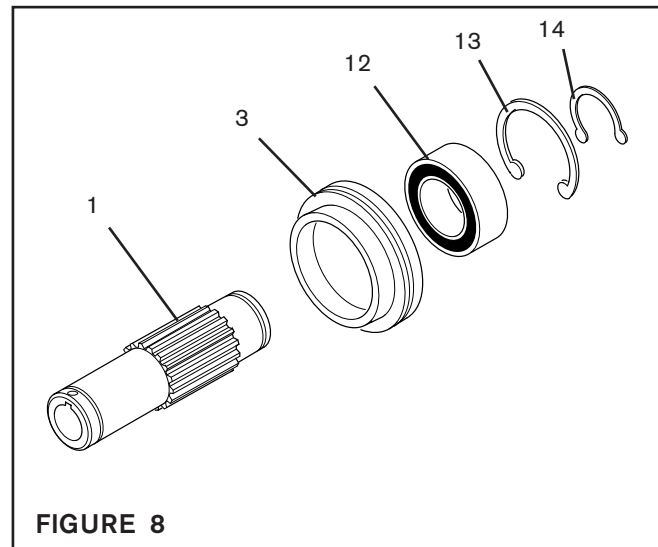


FIGURE 8

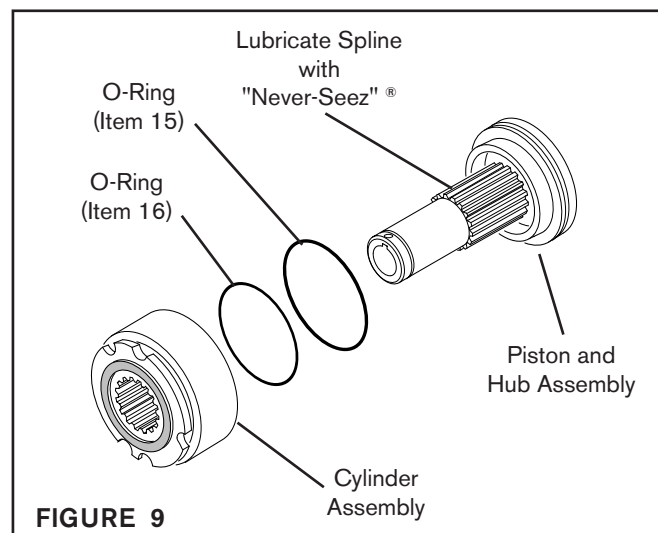
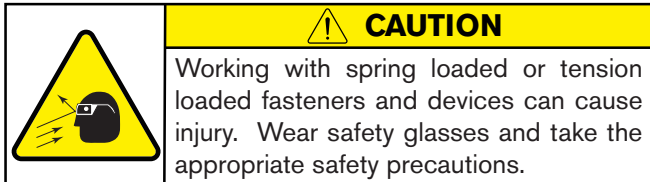


FIGURE 9

## PARTS REPLACEMENT (continued)



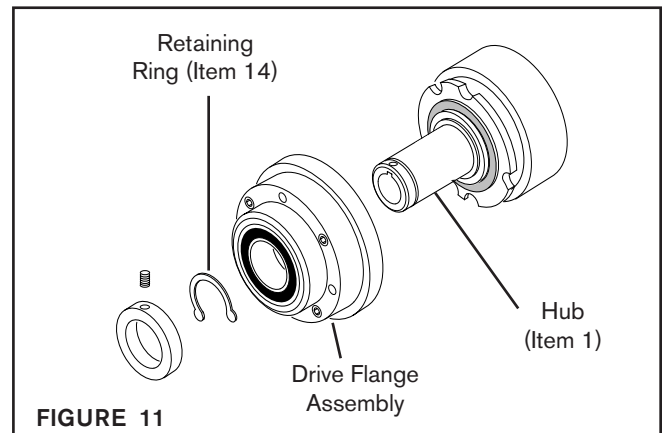
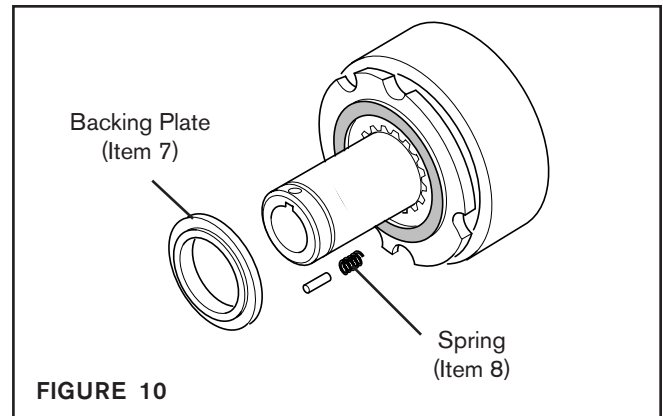
6. Install Springs (Item 8).
7. Clean bearing surface of Hub and I.D. of Backing Plate (Item 7) with safety solvent.
8. Apply Loctite® 680 to I.D. of Backing Plate and slide Backing Plate onto Hub.

**NOTE: 1/32 lip on Backing Plate must be facing away from Springs.**

9. Fully supporting inner race of Drive Flange Bearings, press Hub and Cylinder/Piston Assembly into Drive flange (See Fig. 11).

**NOTE: Hub Keyway must be directly opposite the two closely spaced Detent Holes of Drive Flange Assembly.**

10. Install Retaining Ring (Item 14).



## REPAIR KITS

The Repair Kits listed include: Springs, all Bearings, and O-Rings (all sizes).

When ordering Repair Kits, specify Model Number, and Product Number.

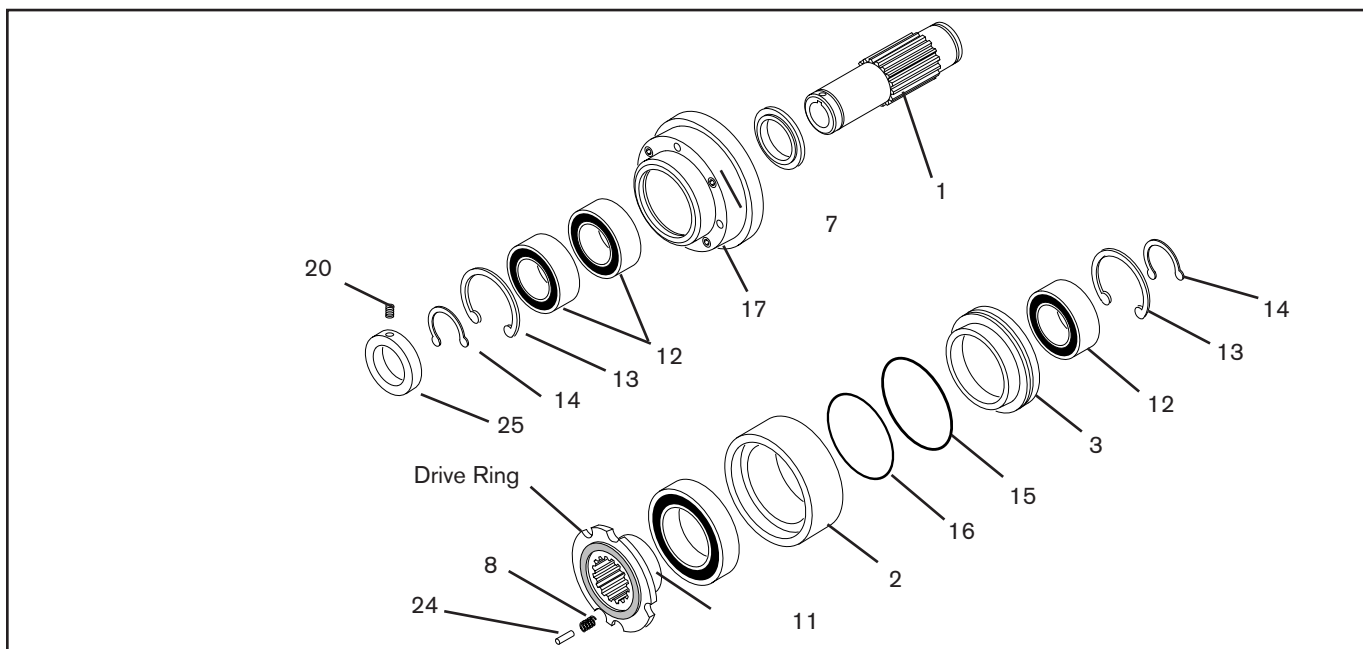
Model No.	Kit No.	Model No.	Kit No.
5H30PSP	913300	5H35PSP	913400
5H40PSP	913500	5H45PSP	913600
5H50PSP	913700	5H60PSP	913800
5H70PSP	914000	5H80PSP	913900

## 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.

## REPLACEMENT PARTS (continued)



PART NO.	DESCRIPTION	QUANTITY							
		30	35	40	45	50	60	70	80
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
7	Backing Plate	1	1	1	1	1	1	1	1
8*	Spring	6	10	12	13	15	18	21	21
11*	Cylinder Bearing	1	1	1	1	1	1	1	1
12*	Piston & Drive Flange Bearing	3	3	3	3	3	3	3	3
13	Retaining Ring	2	2	2	2	2	2	2	2
14	Retaining Ring	2	2	2	2	2	2	2	2
15*	O'ring (Large)	1	1	1	1	1	1	1	1
16*	O'ring (Small)	1	1	1	1	1	1	1	1
17**	Drive Flange Assembly	1	1	1	1	1	1	1	1
18	Plug Neoprene (Not Shown)	1	1	1	1	1	1	1	1
19	Hose Assembly (Not Shown)	1	1	1	1	1	1	1	1
20	Set Screw	2	2	2	2	2	2	2	2
24	Spring Stiffening Pin	6	10	12	13	15	18	21	21
25	Set Screw Collar (Model 70 & 80 only)	-	-	-	-	-	-	1	1

\* Repair Kit Items

\*\* Drive Flange Assembly consists of: Drive Flange, Ball Carrier, Poasioning Balls, and Ring Drive.

## WARRANTY

### Warranties

Nexen warrants that the Products will (a) be free from any defects in material or workmanship for a period of 12 months from the date of shipment, and (b) will meet and perform in accordance with the specifications in any engineering drawing specifically for the Product that is in Nexen's current product catalogue, or that is accessible at the Nexen website, or that is attached to this Quotation and that specifically refers to this Quotation by its number, subject in all cases to any limitations and exclusions set out in the drawing. NEXEN MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. This warranty applies only if: (a) the Product has been installed, used and maintained in accordance with any applicable Nexen installation or maintenance manual for the Product; (b) the alleged defect is not attributable to normal wear and tear; (c) the Product has not been altered, misused or used for purposes other than those for which it was intended; and (d) Buyer has given written notice of the alleged defect to Nexen, and delivered the allegedly defective Product to Nexen, within one year of the date of shipment.

### Exclusive Remedy

The exclusive remedy for the Buyer for any breach of any warranties provided in connection with this agreement will be, at the election of Nexen: (a) repair or replacement with new, serviceably used, or reconditioned parts or products; or (b) issuance of credit in the amount of the purchase price paid to Nexen by the Buyer for the Products.

### Agent's Authority

Buyer agrees that no agent, employee or representative of Nexen has authority to bind Nexen to any affirmation, representation, or warranty concerning the Products other than those warranties expressly set forth herein.

### Limitation on Nexen's Liability

TO THE EXTENT PERMITTED BY LAW NEXEN SHALL HAVE NO LIABILITY TO BUYER OR ANY OTHER PERSON FOR INCIDENTAL DAMAGES, SPECIAL DAMAGES, CONSEQUENTIAL DAMAGES OR OTHER DAMAGES OF ANY KIND OR NATURE WHATSOEVER, WHETHER ARISING OUT OF BREACH OF WARRANTY OR OTHER BREACH OF CONTRACT, NEGLIGENCE OR OTHER TORT, OR OTHERWISE, EVEN IF NEXEN SHALL HAVE BEEN ADVISED OF THE POSSIBILITY OR LIKELIHOOD OF SUCH POTENTIAL LOSS OR DAMAGE. For all of the purposes hereof, the term "consequential damages" shall include lost profits, penalties, delay damages, liquidated damages or other damages and liabilities which Buyer shall be obligated to pay or which Buyer may incur based upon, related to or arising out of its contracts with its customers or other third parties. In no event shall Nexen be liable for any amount of damages in excess of amounts paid by Buyer for Products or services as to which a breach of contract has been determined to exist. The parties expressly agree that the price for the Products and the services was determined in consideration of the limitation on damages set forth herein and such limitation has been specifically bargained for and constitutes an agreed allocation of risk which shall survive the determination of any court of competent jurisdiction that any remedy herein fails of its essential purpose.

### Inspection

Buyer shall inspect all shipments of Products upon arrival and shall notify Nexen in writing, of any shortages or other failures to conform to these terms and conditions which are reasonably discoverable upon arrival without opening any carton or box in which the Products are contained. Such notice shall be sent within 14 days following arrival. All notifications shall be accompanied by packing slips, inspection reports and other documents necessary to support Buyer's claims. In addition to the foregoing obligations, in the event that Buyer receives Products that Buyer did not order, Buyer shall return the erroneously shipped Products to Nexen within thirty (30) days of the date of the invoice for such Products; Nexen will pay reasonable freight charges for the timely return of the erroneously shipped Products, and issue a credit to Buyer for the returned Products at the price Buyer paid for them, including any shipping expenses that Nexen charged Buyer. All shortages, overages and nonconformities not reported to Nexen as required by this section will be deemed waived.

### Limitation on Actions

No action, regardless of form, arising out of any transaction to which these terms and conditions are applicable may be brought by the Buyer more than one year after the cause of action has accrued.

**nexen**®

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