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AIR CHAMP® PRODUCTS

User Manual



Enclosed Tooth Clutches 5HP-E Series

CE






FORM NO. L-20203-G-0814

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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www.nexengroup.com

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|---|---|---|
|  | <div data-bbox="537 562 834 617"> DANGER</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 ONLY. Improper installation can damage your system, cause injury or death. Comply with all applicable codes.</p> |  |
|---|---|---|

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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ISO 9001 Certified

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GENERAL SPECIFICATIONS


| Specifications | |
|---------------------|------------------------------|
| Torque | Up to 3730 Nm (33000 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 33.6 kg (74 lbs) |

GENERAL SAFETY PRECAUTIONS




CAUTION

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




CAUTION

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




CAUTION

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




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.




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."



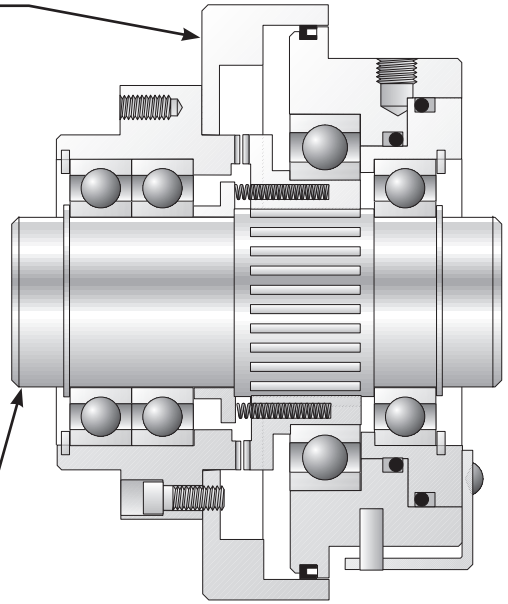
CAUTION

The temperature limits for this product are 4.5°-100° C (40°-220° F).



CAUTION

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



INTRODUCTION

Nexen 5HP-E Multi Position Tooth Clutches are designed for applications that require a high starting torque without 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 depends on 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 speed is within the limits of the selected 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 inertia load (**WK²**). 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 P.S.I.
WK² = referred Inertia Lb. • Ft²

EXAMPLE: The required differential engagement speed using a Model 5H45P-E clutch at 60 psi is 150 RPM (Clutch rotating at 1250, machine component at 1100). The referred inertia is 3 Lb. • Ft². 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-E operating at 60 psi with a load of 3 Lb. • Ft².

TABLE 1 CONSTANTS FOR CLUTCHES

| Clutch | Constant | Clutch | Constant |
|---------|----------|---------|----------|
| 5H30P-E | 2.10 | 5H50P-E | 1.26 |
| 5H35P-E | 1.80 | 5H60P-E | 1.05 |
| 5H40P-E | 1.57 | 5H80P-E | 0.78 |
| 5H45P-E | 1.40 | | |

NOTE

The Differential Speed Formula does not estimate:

- **RPM which prevents ratcheting.**
- **acceleration time.**
- **tooth stress after engagement.**



CAUTION

If differential speed exceeds the clutch limitations, ratcheting of the teeth can occur and shorten clutch life.

INSTALLATION

Nexen 5HPE Series clutches have a drive flange with two bearings, a pilot diameter, and tapped holes for mounting a pulley, sprocket, or the Nexen Clutch Coupling (Refer to Sales Brochure L-21479) (See Table 2 for recommended tightening torques).

NOTE

Nexen recommends using a red anaerobic thread locking compound on Pilot Mounting Bolts.



CAUTION

Do not connect in-line without the use of a flexible coupling half. The internal construction of 5HPE and Series Clutches will not allow any misalignment tolerances. If a coupling is required, use the Nexen Clutch Coupling (Refer to Nexen Clutch Coupling brochure 20208).

NOTE

Nexen 5HP-E is shaft mounted using a customer supplied full length key.

REFER TO FIGURE 1.

1. Install Nexen Clutch Coupling, Bearing Supported Pulley, Sprocket, or Gear (See Table 2).
2. Insert customer supplied key into shaft.
3. Slide Clutch onto shaft and customer supplied key.

NOTE

Whenever possible, arrange the input drive to the clutch through the drive flange to prevent clutch bearings from rotating unnecessarily.

4. Using Set Screws (Item 18 and 19*), secure Clutch to shaft.

NOTE

A locking collar with three set screws is used in 5H80P-E models.

5. Tighten Set Screws (Item 18 and 19*) to recommended torque (See Table 3).

NOTE

Align air inlet port to the six o'clock down position to allow condensation to drain out of the exhaust port.

TABLE 2 RECOMMENDED TIGHTENING TORQUES

| Model | Torque | Model | Torque |
|---------|---------------------|---------|-----------------------|
| 5H30P-E | 13 ft-lbs [17.6 Nm] | 5H50P-E | 48 ft-lbs [65 Nm] |
| 5H35P-E | 13 ft-lbs [17.6 Nm] | 5H60P-E | 48 ft-lbs [65 Nm] |
| 5H40P-E | 13 ft-lbs [17.6 Nm] | 5H80P-E | 119 ft-lbs [161.3 Nm] |
| 5H45P-E | 13 ft-lbs [17.6 Nm] | | |

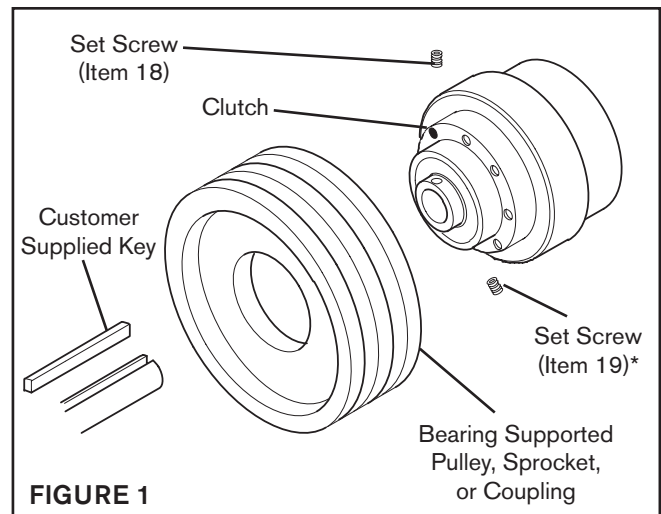


FIGURE 1
* Item 19 is a locking collar in 5H80P-E models.

TABLE 3 RECOMMENDED TIGHTENING TORQUES

| Model | Torque (Item 18) | Torque (Item 19) |
|---------|--------------------|--------------------|
| 5H30P-E | 21 in-lbs [2.4 Nm] | 61 in-lbs [6.9 Nm] |
| 5H35P-E | 21 in-lbs [2.4 Nm] | 61 in-lbs [6.9 Nm] |
| 5H40P-E | 21 in-lbs [2.4 Nm] | 61 in-lbs [6.9 Nm] |
| 5H45P-E | 21 in-lbs [2.4 Nm] | 61 in-lbs [6.9 Nm] |
| 5H50P-E | 21 in-lbs [2.4 Nm] | 61 in-lbs [6.9 Nm] |
| 5H60P-E | 21 in-lbs [2.4 Nm] | 61 in-lbs [6.9 Nm] |
| 5H80P-E | 21 in-lbs [2.4 Nm] | 61 in-lbs [6.9 Nm] |

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

Mounting positions of Tooth Clutches may be horizontal or vertical. Nexen recommends the Drive Flange faces up to enhance the spring return when mounting tooth clutches in the vertical position.

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.

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 ensure smooth clutch engagement and disengagement.

FACE TEETH

Periodically lubricate Drive Flange Assembly Face Teeth and Drive Ring (Item 17) with NEVER-SEEZ®.

NOTE

Clutch must be disassembled to lubricate Spline and Face Teeth.

AIR CONNECTIONS

All Nexen pneumatically actuated devices require clean and dry air, which meets 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 unit. Align the air inlet ports to a down position to allow condensation to drain out of the air chambers of the product.

NOTE

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

Although Nexen 5HP-E Enclosed 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.

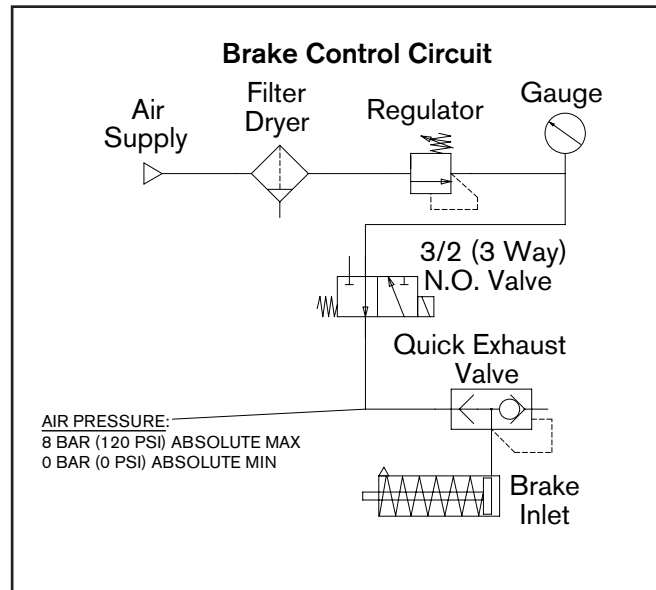
Due to bearing seal drag, the cylinder/piston assembly will rotate, resulting in hose breakage when clutch is engaged. Resting the hose against a support mounted parallel to the clutch centerline stops this rotation and will prevent the hose from breaking.




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.




OPERATION




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° C (40°-220° F).



WARNING

Never exceed maximum operating speeds listed for your product (See Table 4).

TABLE 4

| Size | Max RPM |
|---------|---------|
| 5H30P-E | 1650 |
| 5H35P-E | 1350 |
| 5H40P-E | 1350 |
| 5H45P-E | 1200 |
| 5H50P-E | 1100 |
| 5H60P-E | 1000 |
| 5H80P-E | 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 the Hub spline or in the Air Chamber | Lubricate the Hub spline or check the lubrication of the Air Chamber. |
| | Rigid pip or tubing is being used for the air line connections. | Use flexible tubing for the air line connections. |
| | A rigid inline coupling is mounted directly to the Drive Flange. | Use Nexen's Flexible Clutch Coupling for inline applications. Never connect a rigid coupling directly to the Drive Flange. |
| Failure to Disengage | Unexhausted air due to a control valve malfunction | Replace the control valve. |
| | Broken Return Springs | Replace the Return Springs. |
| | Lack of lubrication on the Hub spline or in the Air Chamber | Lubricate the Hub spline or check the lubrication of the Air Chamber. |
| | A rigid inline coupling is mounted directly to the Drive Flange | Use Nexen's Flexible Clutch Coupling for inline applications. Never connect a rigid coupling directly to the Drive Flange. |
| Tooth Wear or Clicking Sound | Excessive engagement RPM, or unintentional disengagement due to torque overload | Contact Nexen for clutch specifications. |
| Bearing Failure | Limit the air pressure to 80 psi. Excessive air pressure increases the thrust load on the bearings. | |
| | Stay within specified speed limits as specified in the OPERATIONS SECTION. | |
| | Use Nexen's Flexible Clutch Coupling for inline applications. Never connect a rigid coupling directly to the Drive Flange. | |
| | Avoid applying excessive overhung loads to Pilot Mount Clutches. Wide pulleys or sprockets which extend beyond the end of the clutch will increase the radial load and reduce bearing life. | |

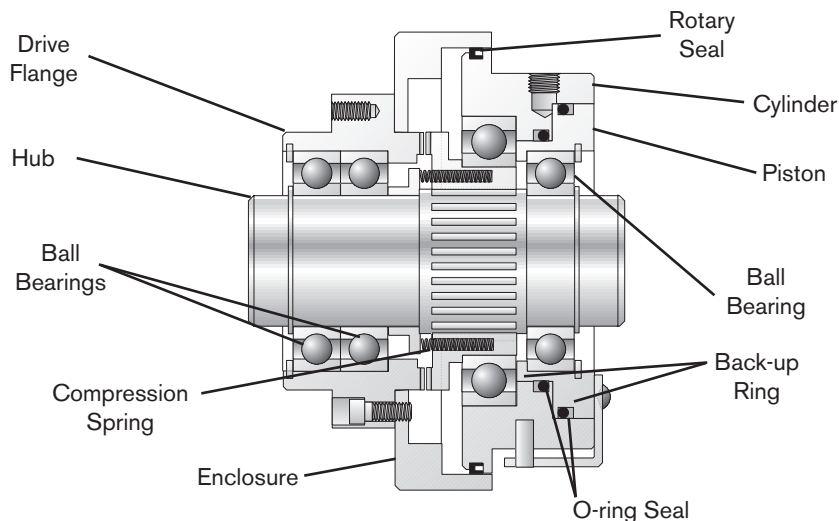
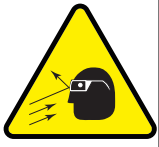


FIGURE 2

PARTS REPLACEMENT



CAUTION

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

REFER TO FIGURES 3-6.

1. Remove the Set Screws (Item 18 and 19).

NOTE

A Locking collar with three set screws is used in 5H80P-E models.

2. Remove the Retaining Ring (Item 14).
3. Fully supporting the lip of Drive Flange Assembly press the Hub (Item 1) and Piston/Cylinder Assembly out of the Drive Flange Assembly.
4. Remove the old Rotary Seal (Item 4).
5. Remove the Retaining Ring (Item 14).
6. Fully supporting the Cylinder/Piston Assembly, press the Hub (Item 1) out of the Cylinder/Piston Assembly.
7. Remove the old Compression Springs (Item 8).
8. Remove the Retaining Ring (Item 13).
9. Press the old Ball Bearings (Item 12) out of the Drive Flange Assembly.
10. Clean bore of Drive Flange Assembly with fresh solvent making sure all old Loctite® residue is removed.

NOTE

When installing new Ball Bearings, carefully align the Ball Bearing O.D. with Drive Flange Assembly bore to prevent Ball Bearing misalignment.

11. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Ball Bearings (Item 12); then, press the new Ball Bearings into the Drive Flange Assembly.
12. Reinstall the Retaining Ring (Item 13).
13. Remove the Drive Flange (Item 22) from the Piston Cylinder Assembly.

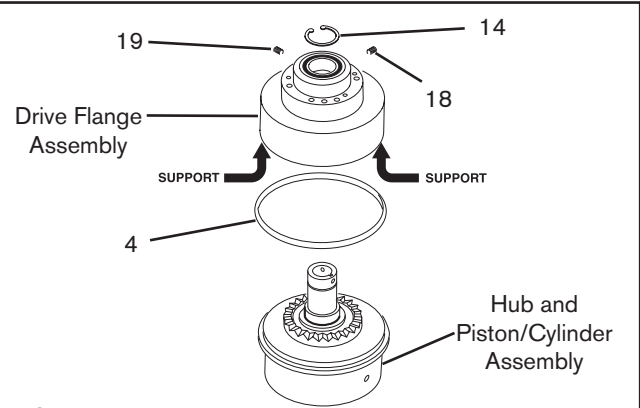


FIGURE 3

* Item 19 is a locking collar in 5H80P-E models.

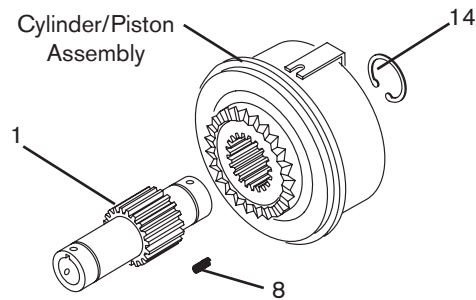


FIGURE 4

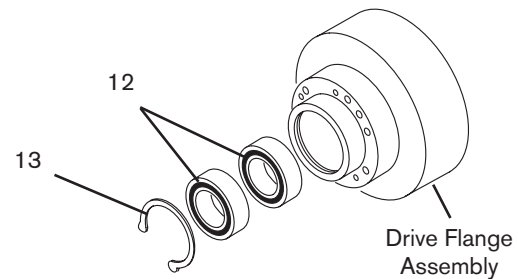


FIGURE 5

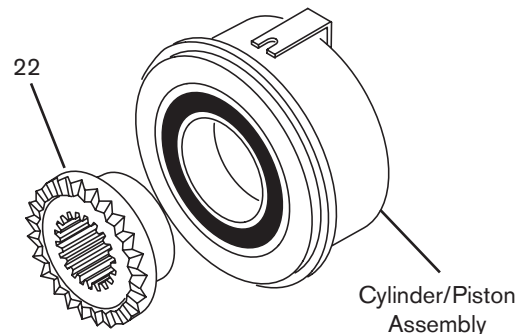


FIGURE 6

PARTS REPLACEMENT (continued)

REFER TO FIGURES 7-10.

14. Separate Piston (Item 3) from Cylinder (Item 2).
15. Remove the old O-ring Seals (Items 15 and 16) and Back Up Seals (Items 20 and 21) from the Piston (Item 3) and Cylinder (Item 2).
16. Press Ball Bearing (Item 11) out of Cylinder (Item 2).
17. Clean the bearing bore of the Cylinder (Item 2) with fresh solvent making sure all old Loctite® residue is removed.
18. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Ball Bearing (Item 11); then, press the new Ball Bearing into the Cylinder (Item 2).
18. Remove the Retaining Ring (Item 13) from the Piston (Item 3).
19. Press the old Ball Bearing (Item 12) out of the Piston (Item 3).
20. Clean bearing bore of Piston (Item 3) with fresh solvent. Make sure all old Loctite® residue is removed.
21. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Ball Bearing (Item 12); then, press the new Ball Bearing into the Piston (Item 3).
22. Reinstall the Retaining Ring (Item 13).
23. Coat o-ring contact surfaces of Piston (Item 3) and Cylinder (Item 2) with a thin film of o-ring lubricant.
24. Coat the new O-ring Seals (Items 15 and 16) with a thin film of o-ring lubricant.

NOTE

When installing new O-ring Seals and Back-up Rings make sure the curved surface of the Back-up Ring matches surface of O-ring Seal. The Back-up Rings must be installed on the non-pressurized side of the O-ring Seals.

25. Install the new O-ring Seals (Items 15 and 16) and Back-up Rings (Items 20 and 21) on the Piston (Item 3) and Cylinder (Item 2).

NOTE

Use caution when pressing the Piston into the Cylinder to avoid damaging O-ring Seals and Back-up Rings.

26. Press the Piston (Item 3) into the Cylinder (Item 2).

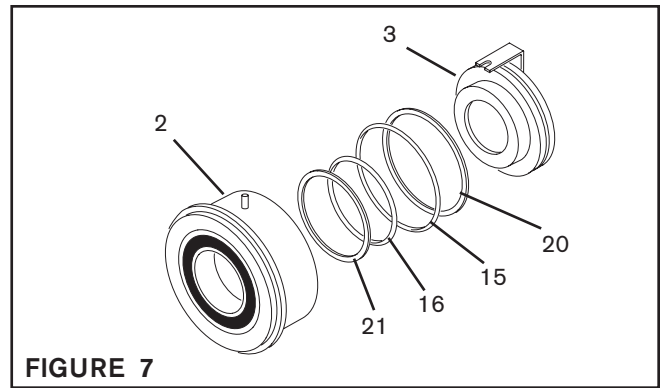


FIGURE 7

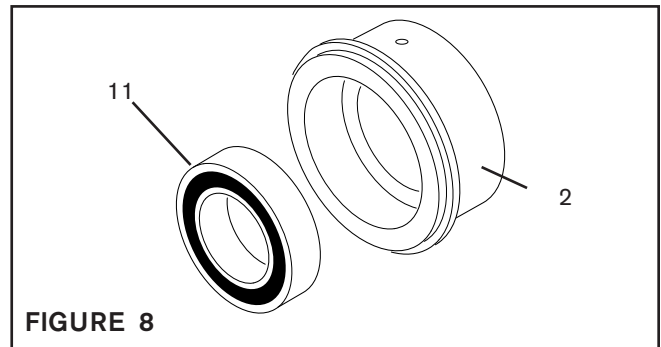


FIGURE 8

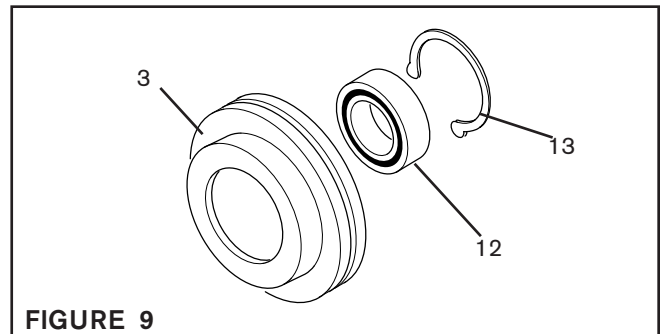


FIGURE 9

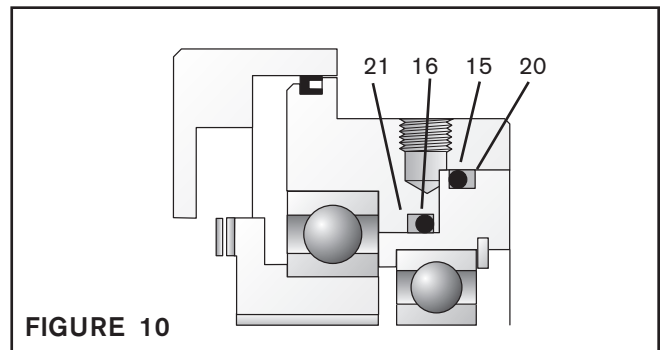


FIGURE 10

PARTS REPLACEMENT (continued)

REFER TO FIGURES 11-13.

- 27. Slide the Drive Flange (Item 22) into the Cylinder (Item 2) and Ball Bearing (Item 11).
- 28. Install new Compression Springs (Item 8).
- 29. Coat the spline teeth of the Hub (Item 1) with NEVER-SEEZ® and slide the Hub (Item 1) into the Drive Flange.
- 30. Reinstall the Retaining Ring (Item 14).

NOTE

The back of the Rotary Seal must be installed facing the Drive Flange Assembly end of the clutch.

- 31. Install the new Rotary Seal (Item 4) into the groove in Cylinder.

NOTE

Use caution when sliding Drive Flange Assembly onto Cylinder/Piston Assembly to avoid damage to Rotary Seal.

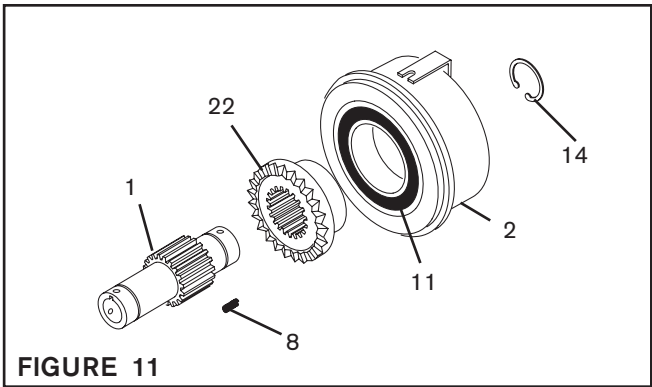


FIGURE 11

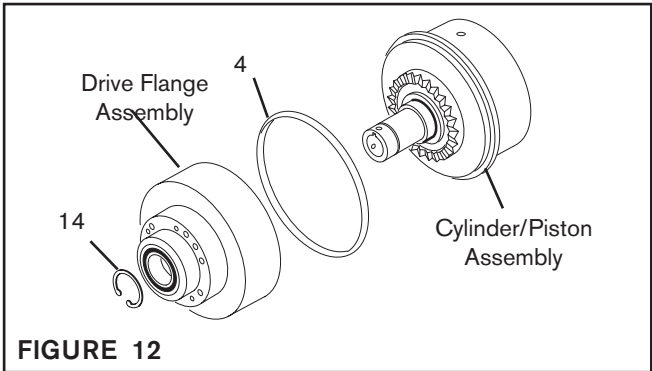


FIGURE 12

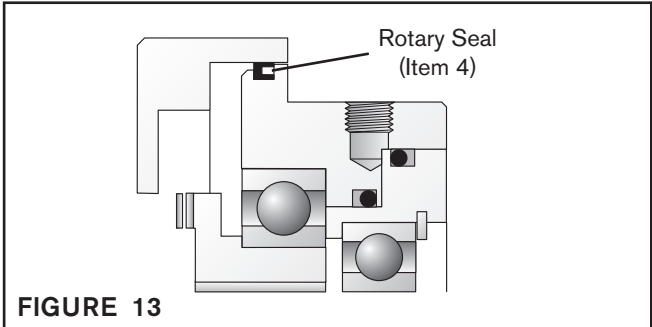


FIGURE 13

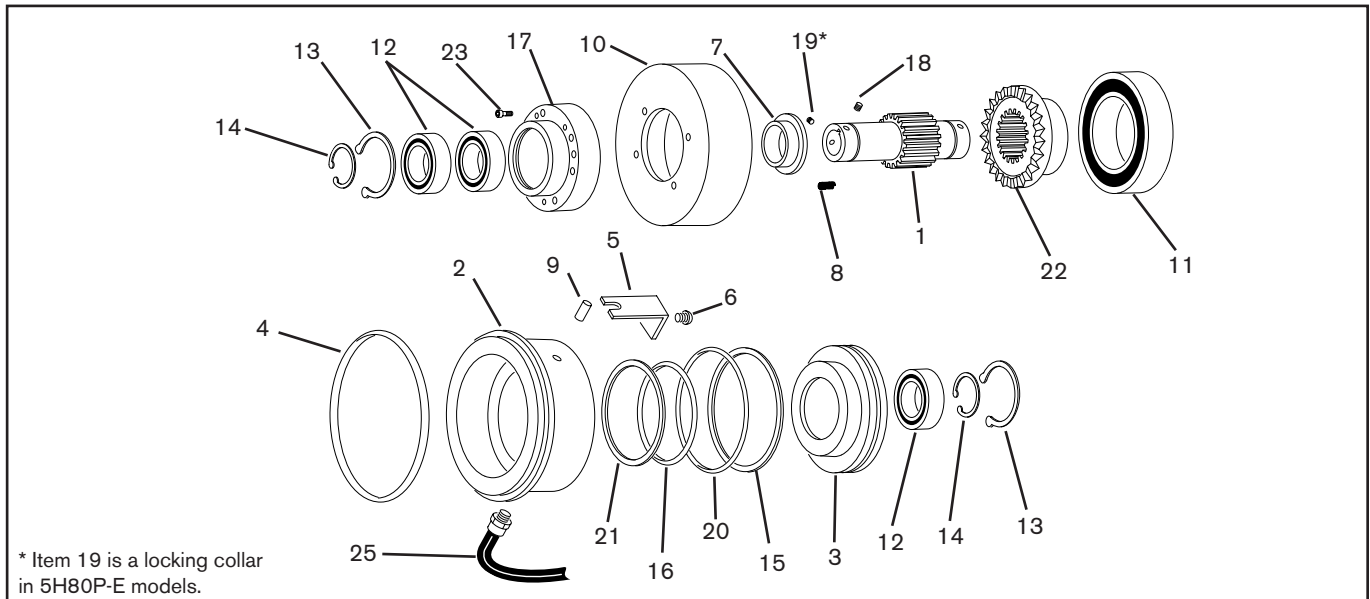
REPAIR KITS

| Model | Repair Kit Number | Model | Repair Kit Number |
|---------|-------------------|---------|-------------------|
| 5H30P-E | 913008 | 5H50P-E | 913048 |
| 5H35P-E | 913018 | 5H60P-E | 913058 |
| 5H40P-E | 913028 | 5H80P-E | 913117 |
| 5H45P-E | 913038 | | |

REPLACEMENT PARTS LIST

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.



| ITEM | Description | QUANTITY | | | | | | |
|-----------------|-----------------------|----------|---------|---------|---------|---------|---------|---------|
| | | 5H30P-E | 5H35P-E | 5H40P-E | 5H45P-E | 5H50P-E | 5H60P-E | 5H80P-E |
| 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 | Rotary Seal | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | Anti-Rotation Clip | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 6 | Button Head Cap Screw | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 7 | Backing Plate | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | Compression Spring | 9 | 3 | 4 | 5 | 6 | 7 | 10 |
| 10 | Enclosure | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 ¹ | Ball Bearing | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12 ¹ | Ball Bearing | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 13 | Retaining Ring (Int.) | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 14 | Retaining Ring (Ext.) | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 15 ¹ | O-ring Seal (Large) | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 16 ¹ | O-ring Seal (Small) | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 17 | Drive Flange | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 18 | Set Screw (Small) | 2 | 2 | 2 | 2 | 2 | 2 | 3 |
| 19* | Set Screw (Large) | 4 | 4 | 4 | 4 | 4 | 4 | ** |
| 20 ¹ | Back-Up Ring (Large) | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 21 ¹ | Back-Up Ring (Small) | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 22 | Drive Ring | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 23 | Socket Head Cap Screw | 3 | 3 | 3 | 3 | 3 | 3 | 4 |
| 25 | Air Line | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

¹ Repair Kit Items

* Item 19 is a locking collar in 5H80P-E models.

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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