nexen®

# AIR CHAMP® PRODUCTS

User Manual


# BMK Compact Caliper Brake

## BMK1800, BMK3000, BMK Disc-Hub 150, BMK Disc-Hub 250

CE

RoHS compliant 2002/95/EC

FORM NO. L-21697-A-0520

In accordance with Nexen's established policy of constant product improvement, the specifications contained in this manual are subject to change without notice. Technical data listed in this manual are based on the latest information available at the time of printing and are also subject to change without notice.

Technical Support: 800-843-7445
(651) 484-5900

www.nexengroup.com

**DANGER**

Read this manual carefully before installation and operation. Follow Nexen's instructions and integrate this unit into your system with care. This unit should be installed, operated and maintained by qualified personnel ONLY. Improper installation can damage your system, cause injury or death. Comply with all applicable codes.

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

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ISO 9001 Certified

## Table of Contents

## GENERAL SPECIFICATIONS

150mm and 250mm O.D. Disc Hubs with configurable bores are available for purchase.

| | | BMK1800 | BMK3000 |
|---|---|---|---|
| **Braking Action** | | Air Engaged, Spring Released | |
| **Maximum Disc Speed** | With 150mm [5.90in] O.D. Disc-Hub | 3800 RPM | |
| | With 250mm [9.84in] O.D. Disc-Hub | 2200 RPM | |
| **Dynamic Braking Torque** [1] | With 150mm [5.90in] O.D. Disc-Hub | 99 Nm [876 in-lbs] | 172 Nm [1522 in-lbs] |
| | With 250mm [9.84in] O.D. Disc-Hub | 172 Nm [1522 in-lbs] | 321 Nm [2841 in-lbs] |
| **Dynamic Braking Force** | | 1600 N [360 lbs] | 3000 N [674 lbs] |
| **Maximum Air Pressure** | | 6 bar [87 psi] | |
| **Maximum BMK Disc-Hub Temperature** [1] | | 150°C [302°F] | |

[1] Dynamic Braking Torque Rating is Achieved with Brake Facings and Disc-Hub at 100°C [212°F]. Lower operating temperatures should result in 60 to 70% of Dynamic Braking Torque Rating.

## GENERAL SAFETY PRECAUTIONS

**⚠ CAUTION**

The Disc-Hub needs to be enclosed with appropriate guarding. Failure to guard could result in serious bodily injury. Nexen recommends the machine builder designs guarding in compliance with OSHA 29 CFR 1910.

**⚠ CAUTION**

Never exceed life of facing material. Facing life depends on the volume of material and the total energy over the life of the unit. Expected life (in hrs) can be found by: Time=Volume/(Power*Wear Rate).

**⚠ CAUTION**

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

**⚠ WARNING**

Keep indoors. This product is intended for indoor environments only. Use of the brake outdoors will damage components.

**⚠ CAUTION**

The temperature limit for this product line is 150 Degree Celsius (302 Degrees Fahrenheit).

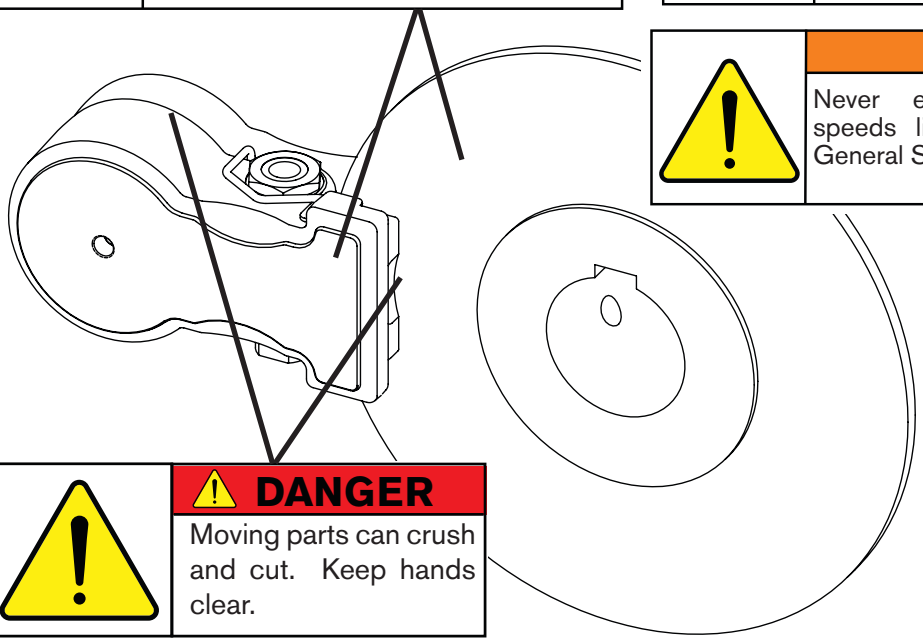
**⚠ WARNING**

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



**⚠ WARNING**

Never exceed maximum operating speeds listed for your product. See General Specifications Section.





**⚠ DANGER**

Moving parts can crush and cut. Keep hands clear.

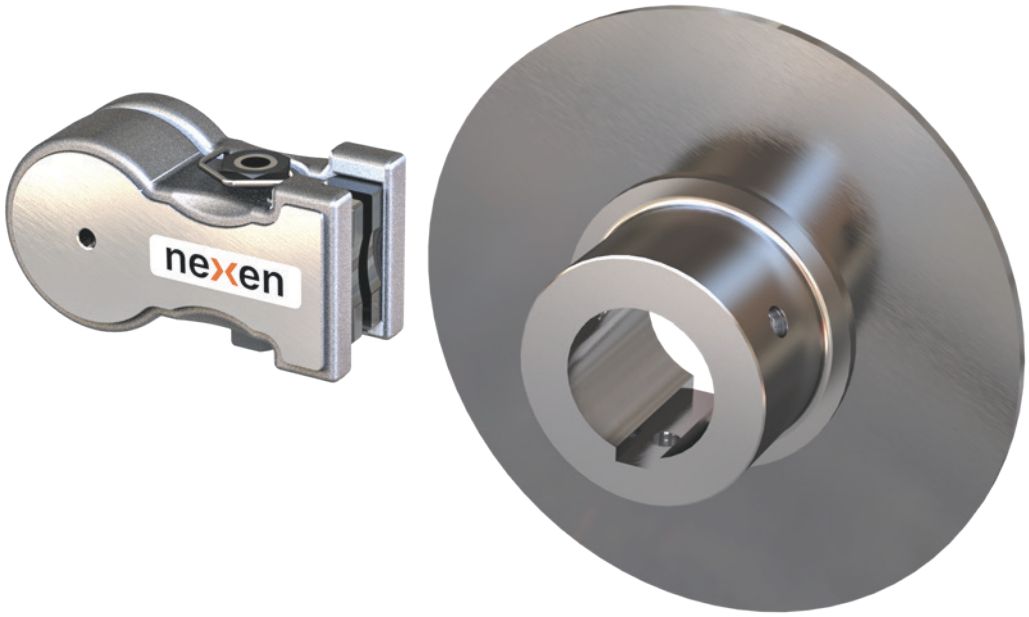
Figure 1

## PRODUCT DESCRIPTION

The BMK caliper brakes engage when air pressure is applied to the unit. The air pressure axially moves the piston in a manner that levers the arms apart and presses the friction facings into both sides of the disc. When the air pressure is exhausted from the brake, the brake is held in the released position by the return spring. Flexible configuration of the disc-hub to match customer shafting specifications ensures the right fit for many applications. BMK brakes can be used in linear braking applications as well.

**NOTE**

The proper installation and maintenance of these brakes must be observed for proper use of unit and to prevent damage.




## MAINTENANCE

The caliper brake is lubricated from the factory.

The following lubrication may be used on all parts of the brake as specified in the maintenance section of this manual to lubricate the unit during rebuilds.

| BMK Brake Lubrication | |
|---|---|
| **BMK 1800** | Syowa Shell Co., Ltd., ALBANIA No. 3 or equivalent |
| **BMK 3000** | Kyodo Yushi Co., Ltd., Multemp AC-D or equivalent |

See Figure 9

| BMK1800 Rebuild Kits | | |
|---|---|---|
| Facing Kit | Kit No. 835324 | Friction Facing, Qty 2 (Item 5) |
| Rebuild Kit | Kit No. 835323 | Friction Facing, Qty 2 (Item 5)<br>Piston Seal, Qty 1 (Item 8)<br>Return Spring, Qty 1 (Item 10) |

See Figure 10

| BMK3000 Rebuild Kits | | |
|---|---|---|
| Facing Kit | Kit No. 835334 | Friction Facing, Qty 2 (Item 5) |
| Rebuild Kit | Kit No. 835333 | Friction Facing, Qty 2 (Item 5)<br>Piston Seal, Qty 1 (Item 7)<br>Return Spring, Qty 1 (Item 8) |

## DIMENSIONS FOR INSTALLATION: CALIPER BRAKE

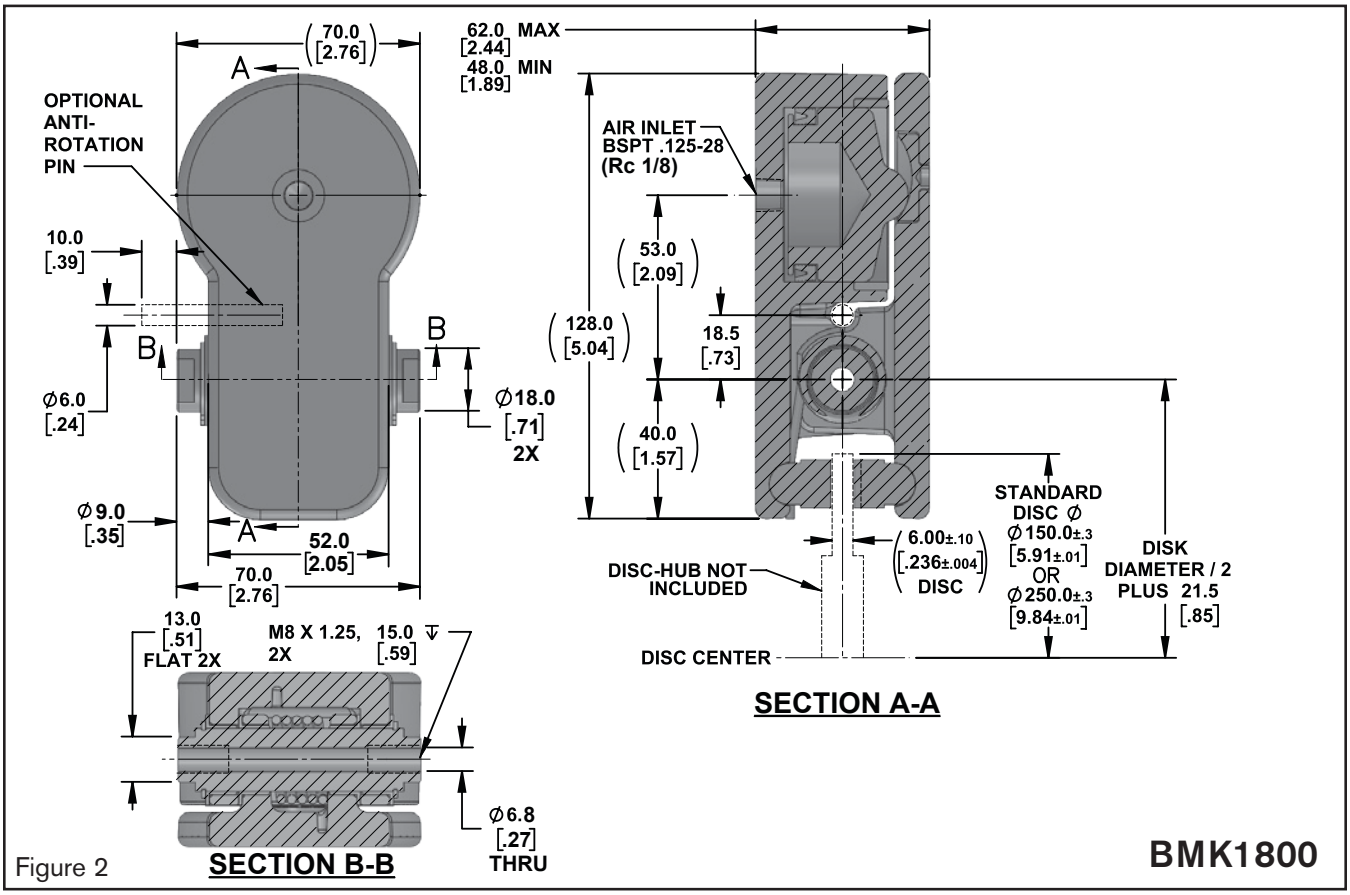



Figure 2

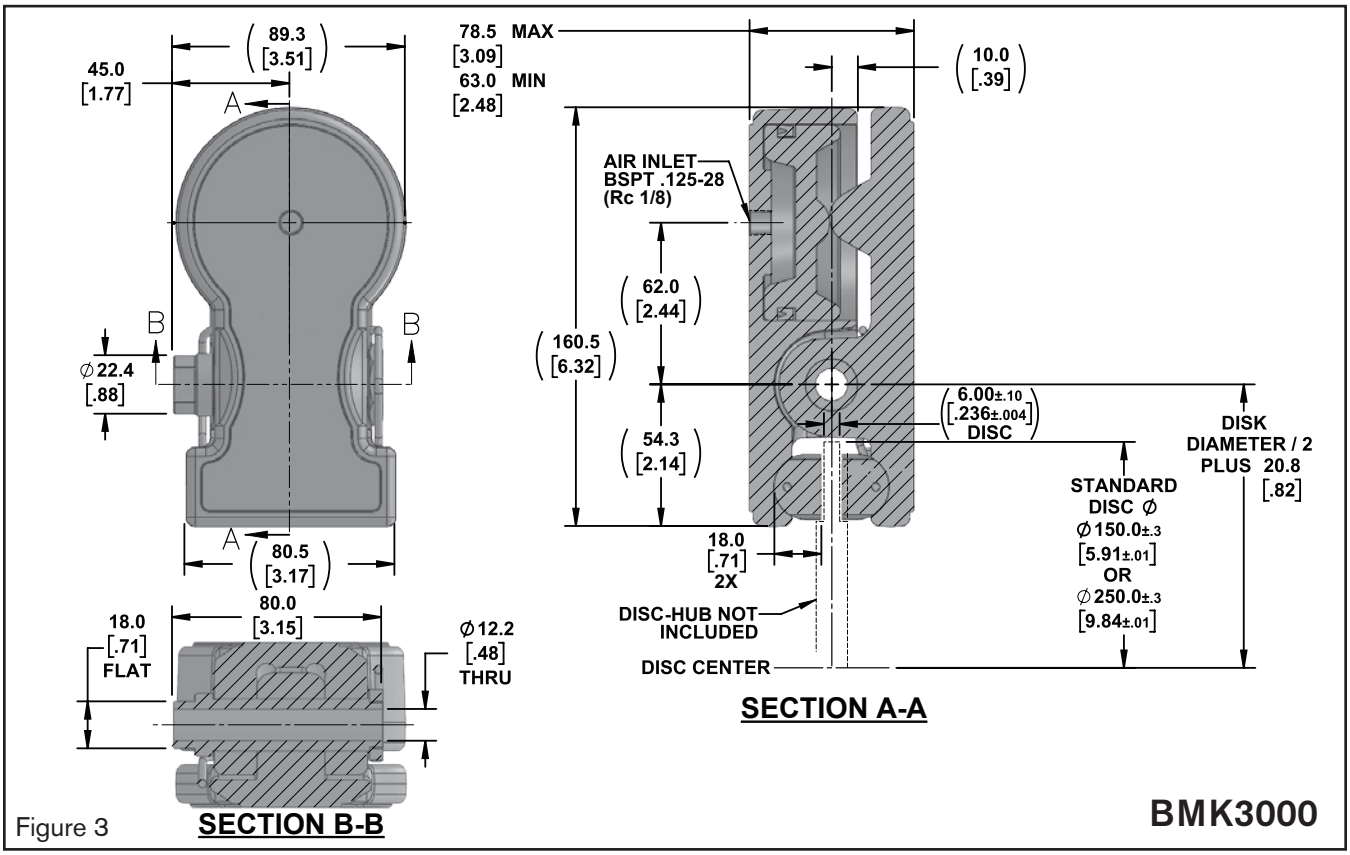
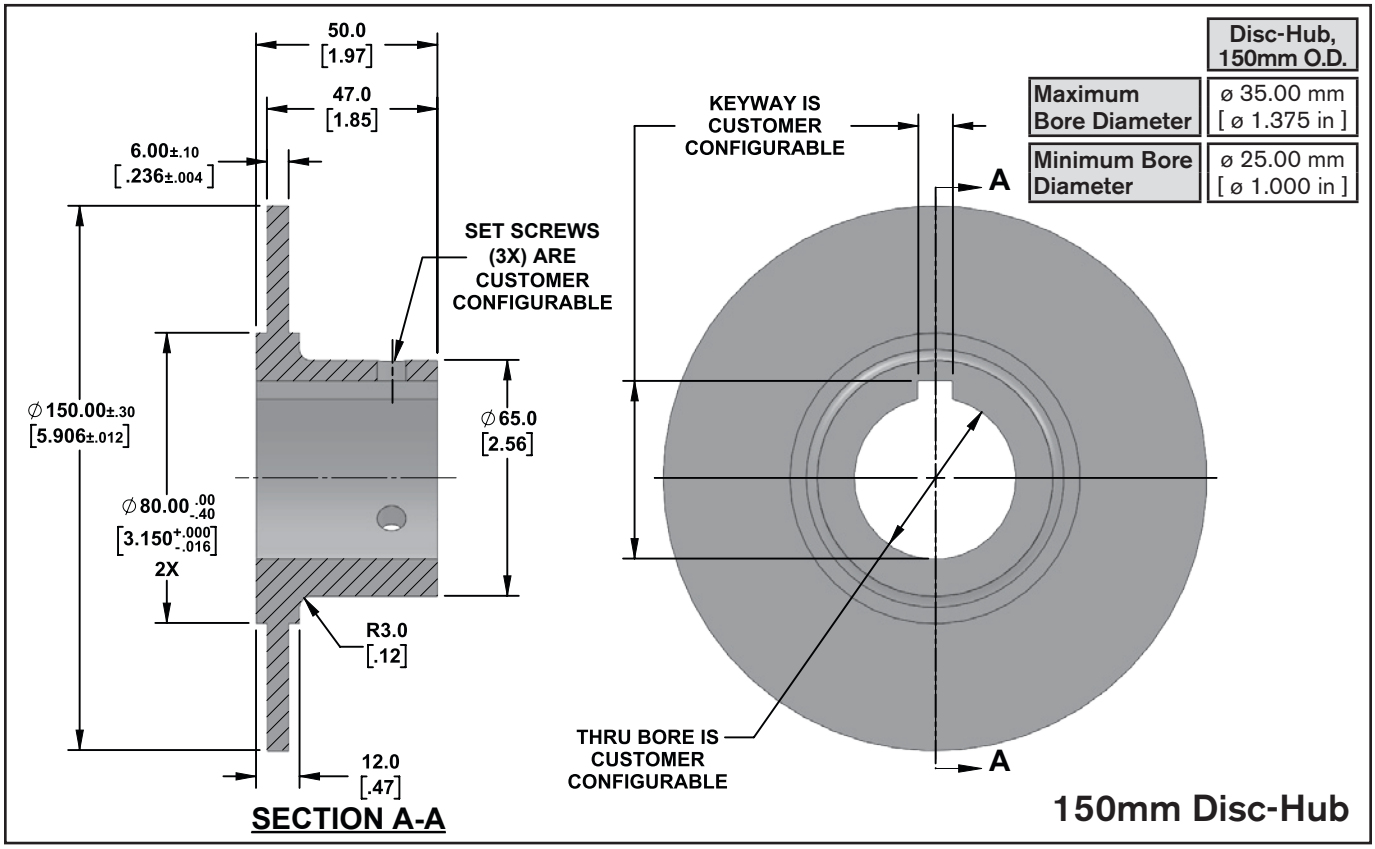
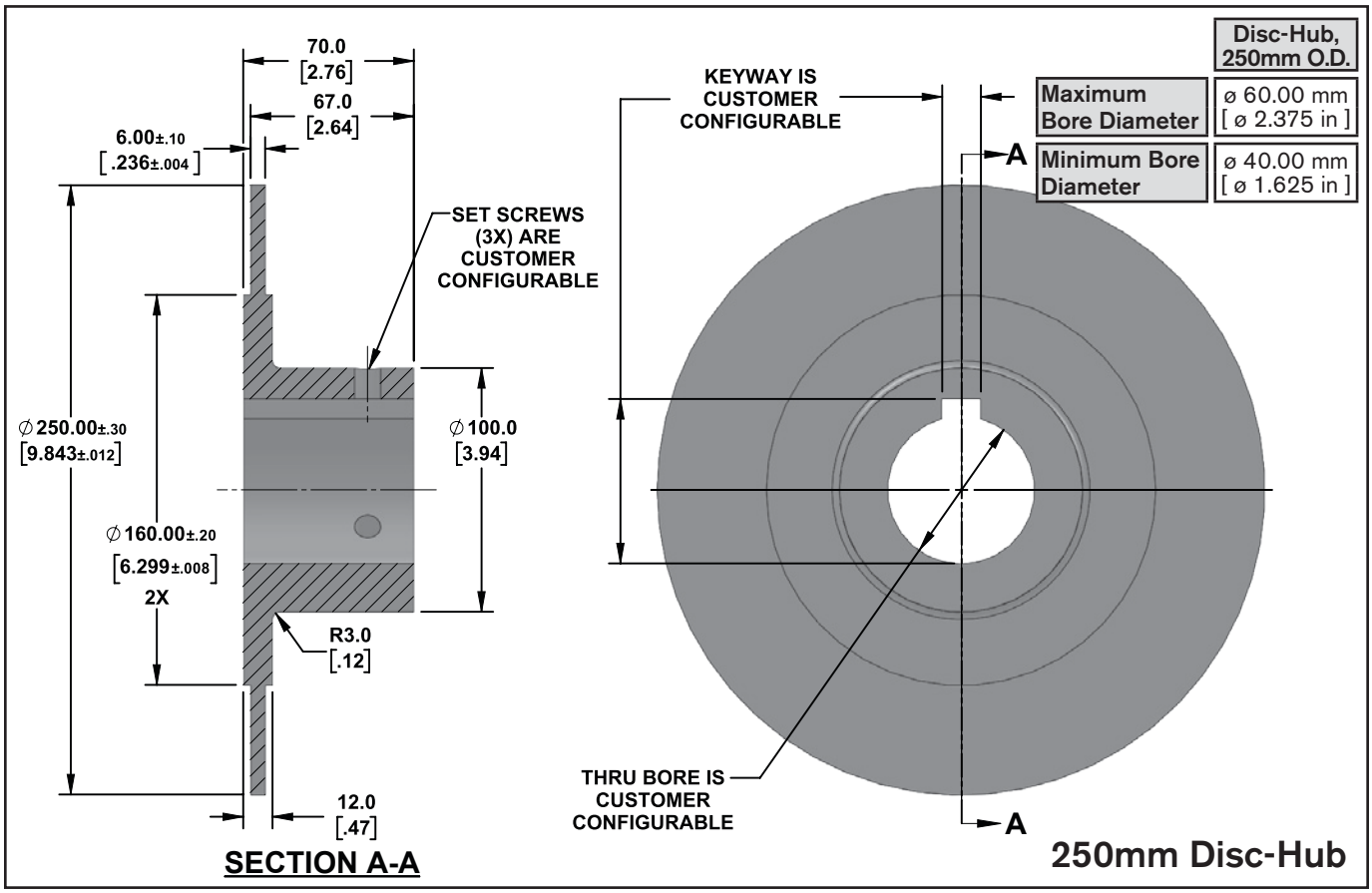



Figure 3

**NOTE**: Basic dimensions shown for selection purposes only and subject to change. Visit www.nexengroup.com for detailed drawings and CAD models before designing into your system.

## DIMENSIONS FOR INSTALLATION: DISC-HUB




**NOTE**: Basic dimensions shown for selection purposes only and subject to change. Visit www.nexengroup.com for detailed drawings and CAD models before designing into your system.

## INSTALLATION

1. Remove oil, dust and debris from both faces of the disc that contact the Friction Facings.
2. Install the disc onto the shaft. **Runout** between the disc surface and the shaft should be less than **0.1 mm [.004 in]**
3. Install the (Customer Supplied) Spring Dowel Pin (Item 11) into the customer machine frame. The Spring Dowel Pin keeps the brake aligned with the disc to prevent interference between the brake's friction facings and the disc while the brake is disengaged.
4. Mount the brake so the radius of the disc runs approximately 1.5 mm past the Friction Facings. Each Friction Facing should be an equal distance from the Disc surface. See the Sales CAD Drawing for specific brake installation dimensions.
5. The BMK1800 brake can be bolted to the customer machine frame one of two ways:
   a. A M8 X 1.25 (Class 12.9) screw with a flat washer, installed through the customer machine frame and fastened into the 15 mm [.19 in] deep threaded hole on either side of the brake's Pivot Pin (Item 4).
   b. A M6 (Class 12.9) screw with a flat washer, installed through the 6.7 mm [.26 in] diameter through hole in the brake and threading into the customer machine frame.

   The BMK3000 brake is bolted to the customer machine frame by a M12 (Class 12.9) screw with a flat washer, installed through the 12.2 mm [.48 in] through hole in the brake and fastened into the customer machine frame. See the Sales CAD Drawing for specific screw length dimensions.

| Model / Mounting Method | Qty | Customer Supplied Hardware Description |
|---|---|---|
| BMK1800 Screw (Bolt) Threaded from Bottom | 1 | M8 X 1.25 Screw (Bolt), Class 12.9 |
| | 1 | M8 Flat Washer |
| | 1 | 6mm Diameter Spring Dowel Pin |
| BMK1800 Screw (Bolt) Thru from Top | 1 | M6 Screw (Bolt), Class 12.9 |
| | 1 | M6 Flat Washer |
| | 1 | 6mm Diameter Spring Dowel Pin |
| BMK3000 Screw (Bolt) Thru from Top | 1 | M12 Screw (Bolt), Class 12.9 |
| | 1 | M12 Flat Washer |
| | 1 | 5mm Diameter Spring Dowel Pin |

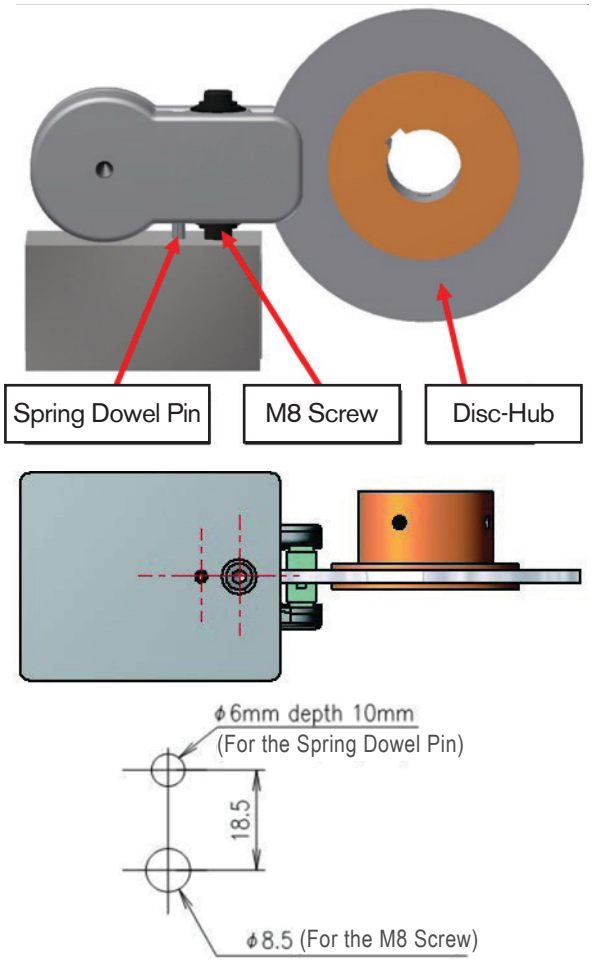
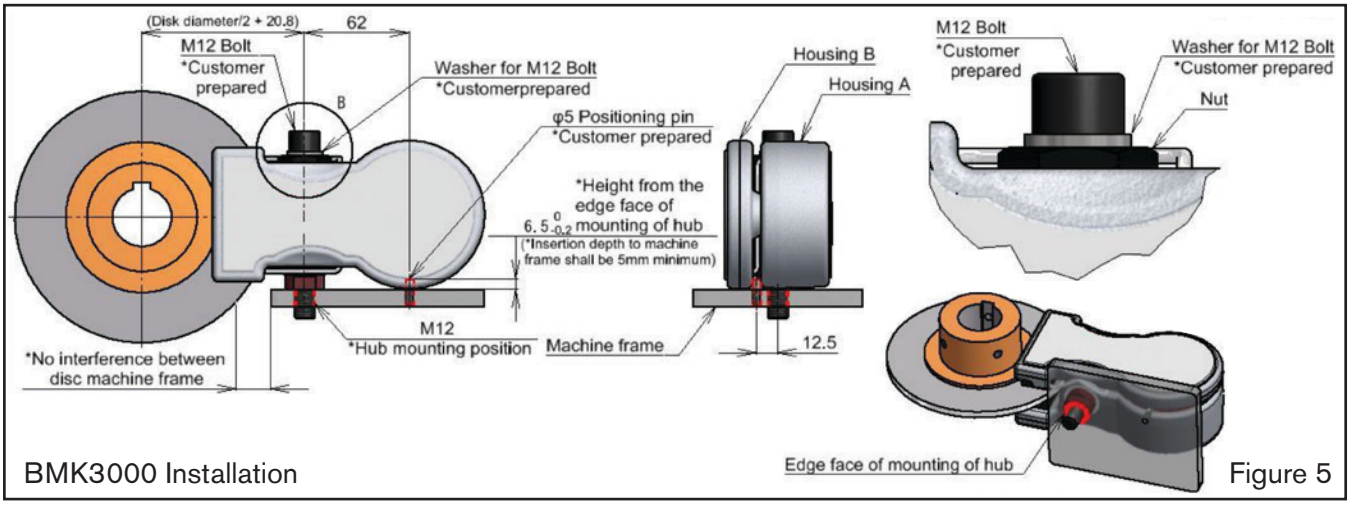



Figure 4 BMK1800 Installation

**IMPORTANT**

Carefully follow Installation Steps 1 - 5 to ensure a successful Caliper Brake installation into your system.

**NOTE**: Basic dimensions shown for reference purposes only and subject to change. Visit www.nexengroup.com for detailed drawings and CAD models before designing into your system.




BMK3000 Installation Figure 5

## AIR 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 NOT acceptable to for use on this brake.**

## AIR CONNECTIONS

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

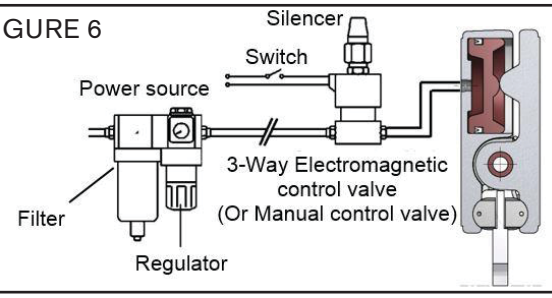
**NOTE**

**For quick response, Nexen recommends a quick exhaust valve and short air lines between the Control Valves and the unit. 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.

FIGURE 6




Attach the air supply line to the air inlet or the quick exhaust valve depending on configuration selected:

**Basic Configuration:**
Attach a standard air fitting to the brake. Use teflon tape and/or pipe sealant on the threads. This configuration will have slower response times.

**Standard Configuration:**
Attach the optional Quick Exhaust Valve (Nexen Part #945100) to the brake. Use teflon tape and/or pipe sealant on the threads. Nexen Part #945100 has female NPT .125-27 threads, NPT/BSPT adapters will be necessary.

**NOTE: Align the air inlet ports in the down position to allow condensation to drain out of the air chamber.**

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.

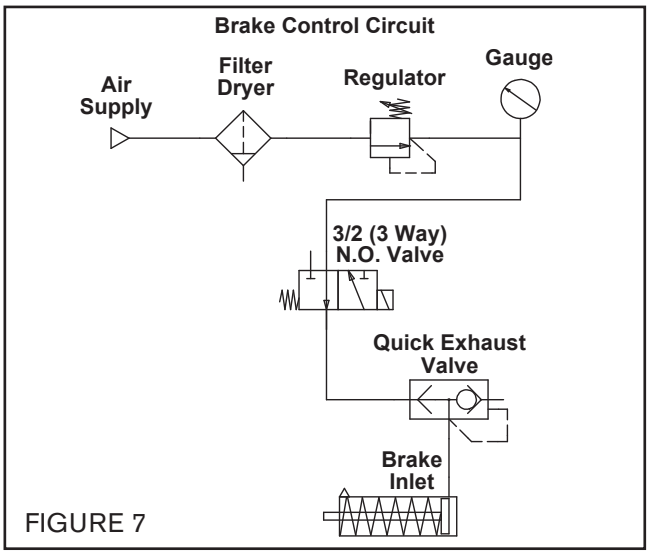



FIGURE 7

NOTES:

1. Use thread sealing tape or a gasket on the air inlet fitting when installing in the caliper brake. Make sure there is no air leakage when installing.
2. Avoid seal tape going into the brake.
3. The recommended tightening torque of the BSPT .125-28 (Rc 1/8) air inlet fitting is 7 to 9 Nm [62 to 80 in-lb].
4. For quick brake engagement response times, air tubing 200 mm or shorter between the control valve and the brake is recommended. A quick exhaust valve is also recommended for fast release times.

**⚠ DANGER**

Support the load before disengaging the brake. Failure to support the load could result in serious bodily injury.

## TROUBLESHOOTING

| Problem | Cause | Solution |
|---|---|---|
| Loss of holding force. | Air leakage due to piston O-ring damage, improper installation or lack of lubrication. | Lubricate and replace and O-ring. |
| | Brake facing gap has become too large due to wear of the caliper brake friction facing or the disc-hub. | Perform the gap adjustment procedure per the maintenance section of this user manual. |
| | Polluted air supply / lack of proper air pressure. | Verify quality and pressure of air supply. Verify function of the air control valve. |
| Brake facings drag on disc. | Return spring has been damaged or displaced. | Replace return spring. |
| If the problem with your brake cannot be solved with the solutions above, please contact Nexen. | | |

| | | |
|---|---|---|
| **Maximum Allowable Wear Amount (Each Facing)** | **BMK1800 & BMK3000:** | 2 mm [.08 in] |

## BMK1800

*Denotes Rebuild Kit Item
BMK1800 Rebuild Kit No. 835323

†Denotes Facing Kit Item
BMK1800 Facing Kit No. 835324

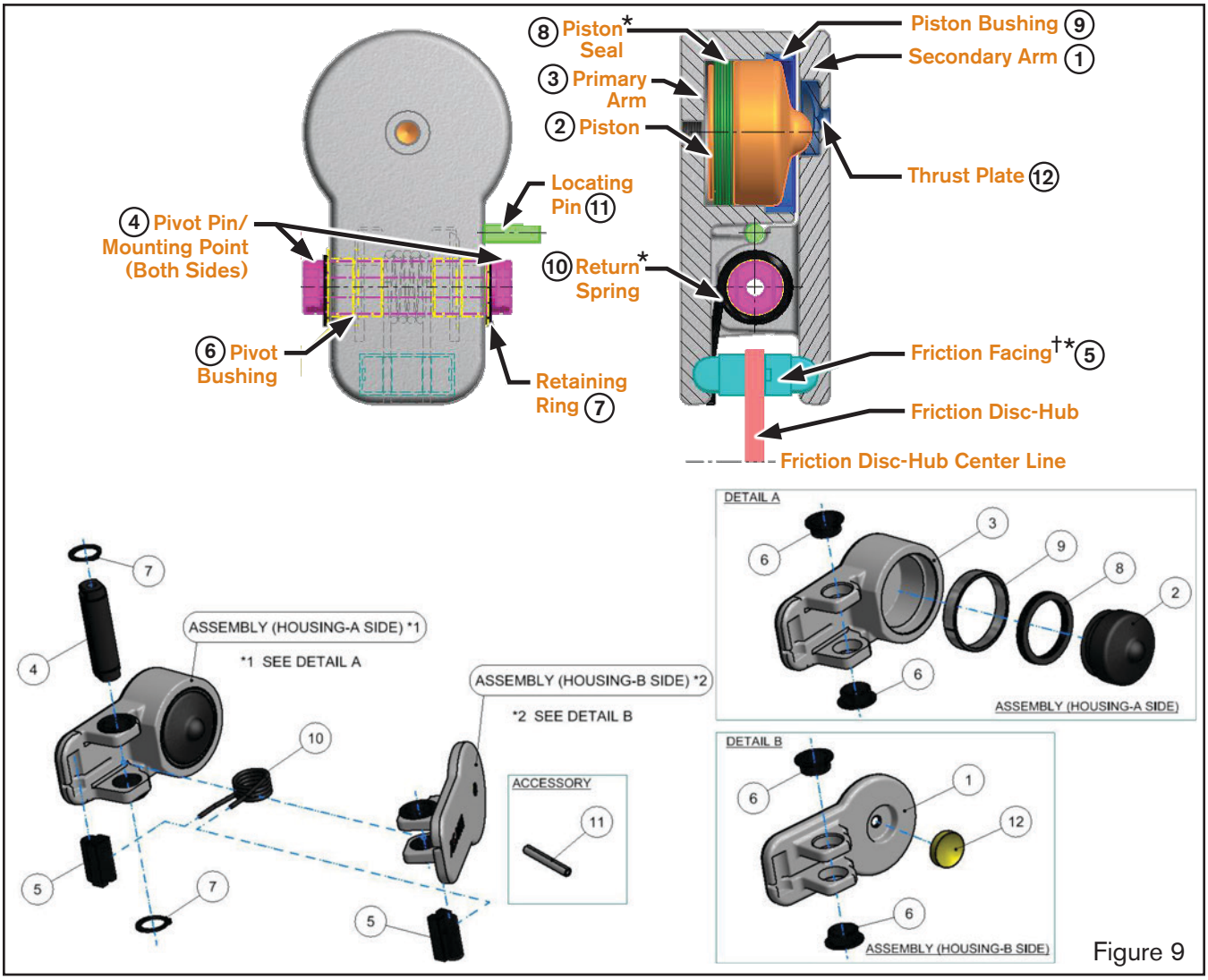
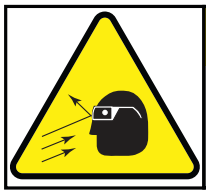



Figure 9

### BMK 1800 DISASSEMBLY PROCEDURE

1. Remove Retaining Rings (Item 7) that are attached to each end of the Pivot Pin (Item 4).
2. Remove the Pivot Pin (Item 4) from the Primary Arm (Item 3) and Secondary Arm (Item 1).
3. The Primary Arm and Secondary Arm will separate when the Pivot Pin (Item 4) is removed. Use caution when allowing the Primary Arm and Secondary Arm to separate as Return Spring (Item 10) is under load and presents a hazard. Friction Facings (Item 5) are held in place by the Return Spring and will come loose.
4. Apply a low amount of air pressure to the air inlet (BSPT .125-28) to remove the Piston (Item 2). Use caution during this step, the Piston could exit the Primary Arm with force, and must be trapped as it exits the Primary Arm.



**⚠ CAUTION**

Spring contains stored energy, use caution while removing.

### BMK1800 REASSEMBLY PROCEDURE

1. Components shall be cleaned before re-assembly. Ensure the Thrust Plate (Item 12) and two Pivot Bushings (Item 6) are secure in the Secondary Arm (Item 1). Ensure the Piston Bushing (Item 9) and two Pivot Bushings (Item 6) are secure in the Primary Arm (Item 3).
2. Apply the recommended grease (Syowa Shell Co., Ltd., ALBANIA No. 3 or equivalent) to the Piston Seal (Item 8) and install onto the Piston (Item 2) with the Piston Seal open end facing towards the air inlet. Both are installed into the Primary Arm (Item 3).
3. Install Friction Facings (Item 5) into the grooves of Primary Arm (Item 3) and Secondary Arm (Item 1).
4. Insert ends of Return Spring (Item 10) into the holes of the Friction Facings (Item 5).
5. Place the Return Spring (Item 10) in Secondary Arm (Item 1) as shown, lining up the Return Spring hole with the Bushing (Item 6) holes.
6. Insert Pivot Pin (Item 4) into the Bushings (Item 6).
7. Install Retaining Rings (Item 7) on the ends of the Pivot Pin (Item 4).

## BMK3000

*Denotes Rebuild Kit Item
BMK3000 Rebuild Kit No. 835333

†Denotes Facing Kit Item
BMK3000 Facing Kit No. 835334

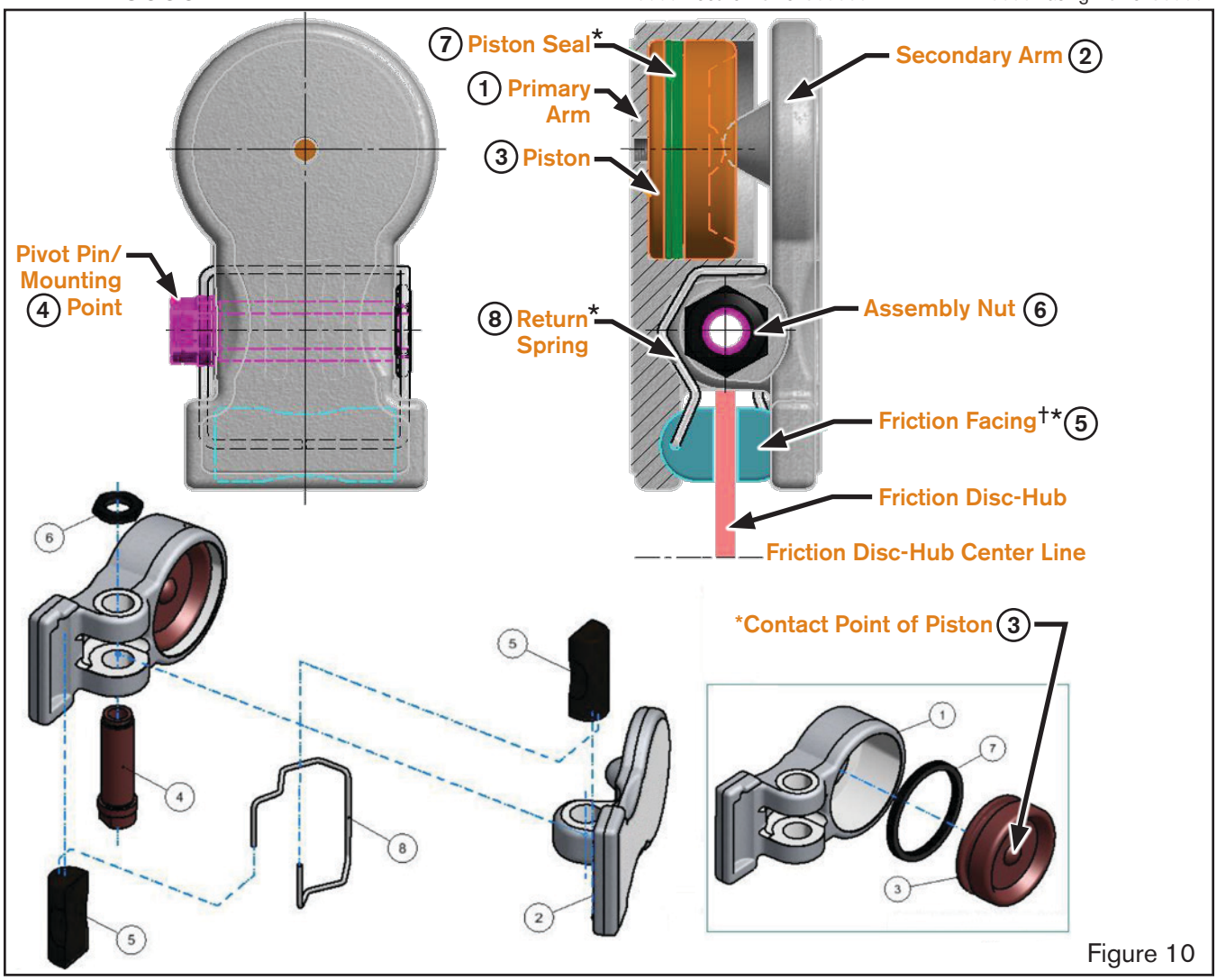
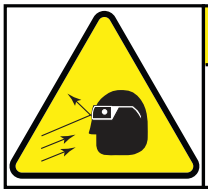



Figure 10

### BMK 3000 DISASSEMBLY PROCEDURE

1. Remove the Assembly Nut (Item 6) which is threaded onto the Pivot Pin (Item 4).
2. Remove the Pivot Pin (Item 4) from the Primary Arm (Item 1) and Secondary Arm (Item 2).
3. The Primary Arm and Secondary Arm will separate when the Pivot Pin is removed. Use caution when allowing the Primary Arm and Secondary Arm to separate as Return Spring (Item 8) is under load and presents a hazard. Friction Facings (Item 5) are held in place by the Return Spring and will come loose.
4. Apply a low amount of air pressure to the air inlet (BSPT .125-28) to remove the Piston (Item 3). Use caution during this step, the Piston could exit the Primary Arm with force, and must be trapped as it exits the Primary Arm.



**⚠ CAUTION**

Spring contains stored energy, use caution while removing.

### BMK 3000 REASSEMBLY PROCEDURE

1. Components shall be cleaned before re-assembly.
2. Apply a thin layer of the recommended grease (Kyodo Yushi Co., Ltd., Multemp AC-D or equivalent) to the following areas:
   - Primary Arm (Item 1) bore where the Piston (Item 3) is installed
   - Primary Arm (Item 1) and Secondary Arm (Item 2) holes that contact the Pivot Axis (Item 4)
   - Pivot Pin outer diameter
   - Point of Piston that contacts Secondary Arm (Item 2)
3. Install Seal (Item 7) onto Piston (Item 3) with the open end of the seal facing the air inlet, then install the Piston (Item 3) into Primary Arm (Item 1) facing the direction shown.
4. Insert ends of Return Spring (Item 8) into the holes of the Friction Facings (Item 5).
5. Install Friction Facings (Item 5) into the grooves of Primary Arm (Item 1) and Secondary Arm (Item 2).
6. Locate the Return Spring (Item 8) as shown and then line up the holes in the Primary Arm (Item 1) and Secondary Arm (Item 2) and insert the Pivot Pin (Item 4).
7. Install Assembly Nut (Item 6) on Pivot Pin (Item 4) and tighten to 5 Nm [44 in-lb] of torque.

## 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.

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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.

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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.

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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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