


**nexen**<sup>®</sup>

# AIR CHAMP<sup>®</sup> PRODUCTS

User Manual



 **INDUSTRIAL MAGZA**<sup>®</sup>  
DIST. AUTORIZADO  
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## Caliper Brake WINDCAL 90

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  
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# WARNING

Read this manual carefully before installation and operation.

Follow Nexen's instructions and integrate this unit into your system with care.

This unit should be installed, operated and maintained by qualified personnel ONLY.

Improper installation can damage your system or cause injury or death.

Comply with all applicable codes.

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## INTRODUCTION

Read this manual carefully, making full use of its explanations and instructions. The “Know How” of safe, continuous, trouble-free operation depends on the degree of your understanding of the system and your willingness to keep all components in proper operating condition. Pay particular attention to all NOTES, CAUTIONS, and WARNINGS to avoid the risk of personal injury or property damage. It is important to understand that these NOTES, CAUTIONS, and WARNINGS are not exhaustive. Nexen cannot possibly know or evaluate all conceivable methods in which service may be performed, or the possible hazardous consequences of each method. Accordingly, anyone who uses a procedure that is not recommended by Nexen must first satisfy themselves that neither their safety or the safety of the product will be jeopardized by the service method selected.

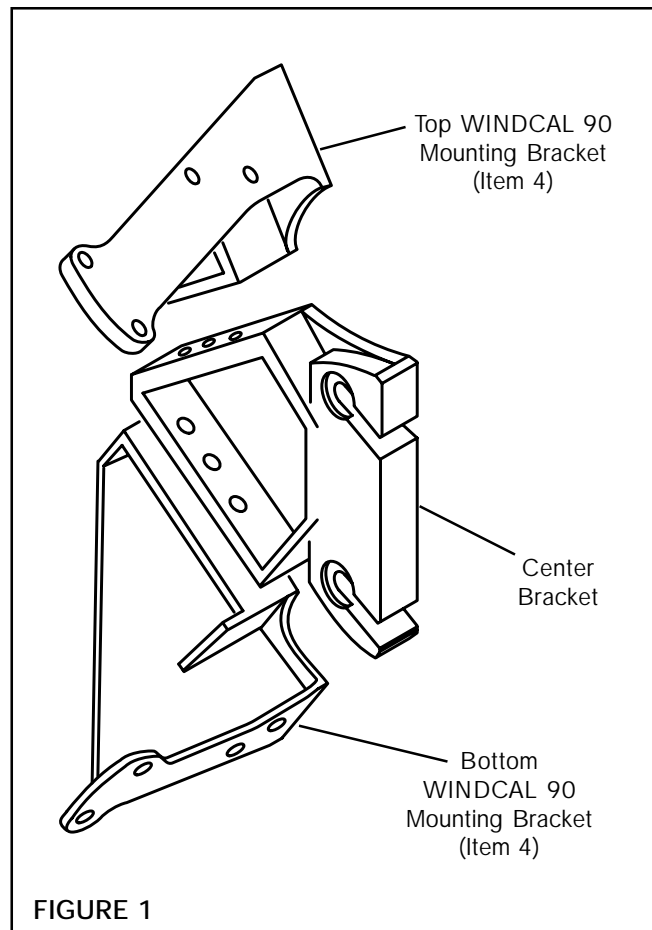
Nexen’s WINDCAL 90 brake is a spring engaged, pneumatically released brake that mounts to gearboxes to control maximum windturbine propeller speed. The twin caliper arms have a unique 90 degree bend that allows the brake to fit between the gearbox and the disc on 75 KW windturbines.

Released by air pressure, means there are no hydraulic reservoirs to fill, and no hydraulic lines or pumps to leak fluid into the environment. The soft start twin calipers of Nexen’s WINDCAL 90 engage smoothly and gradually to start and stop the entire transmission line without shock damage.

Because the WINDCAL 90 bolts directly to the gearbox, no expensive modifications are required, and the retrofit can be done right in the tower.

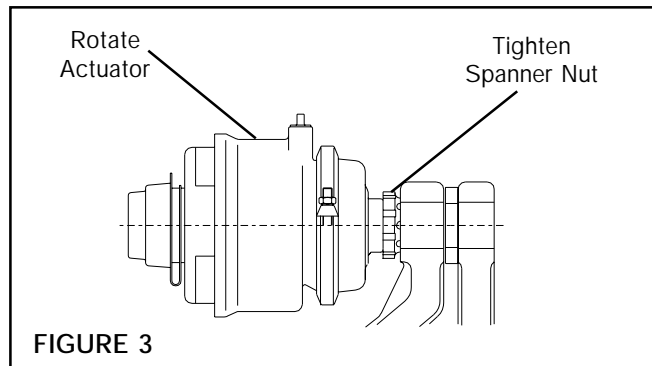
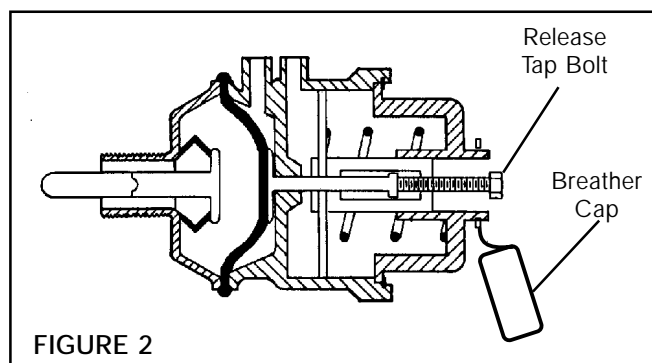
## INSTALLATION

1. Using customer supplied fasteners, install Center Bracket onto gearbox (See Fig. 1).
2. Install Top WINDCAL Brake Assembly.
  - a. Align Mounting Bracket (Item 4) on Top WINDCAL Brake Assembly as shown (See Fig. 1).
  - b. Using three 500-13 UNC-2A Hex. Head Cap Screws, Washers, and Hex. Nuts, secure Top WINDCAL Brake Assembly to Center Bracket.
  - c. Tighten Hex. Head Cap Screws to 105 Ft. Lbs. [142 Nm] torque.
3. Install Bottom WINDCAL Brake Assembly.
  - a. Align Mounting Bracket (Item 4) on Bottom WINDCAL Brake Assembly as shown (See Fig. 1).
  - b. Using three 500-13 UNC-2A Hex. Head Cap Screws, Washers, and Hex. Nuts, secure Bottom WINDCAL Brake Assembly to Center Bracket.
  - c. Tighten Hex. Head Cap Screws to 105 Ft. Lbs. [142 Nm] torque.



## PRIMARY ADJUSTMENT

1. Manually release Spring Actuators.
  - a. Remove Breather Cap (See Fig. 2)
  - b. With a deep 9/16" socket wrench, unscrew the Tap Bolt of each Actuator See Fig. 2).
  - c. Rotate Actuators until the gap between the rotors and friction facings is approximately 0.05 to 0.10 inch on each side of the rotor.
2. Tighten Spanner Nut to 150 Ft. Lbs. [203 Nm torque (See Fig. 3).
3. Tighten Tap Bolts to 10 to 15 Ft. Lbs [11 to 20 Nm] torque.
4. Replace Breather Cap.



## AIR CONNECTIONS

Pneumatically actuated devices require clean, pressure regulated air for maximum performance and long life. Your Nexen Distributor carries filters and regulators specifically designed to operate with Nexen brakes.

Customer supplied items are: one Tee, one Flow Control Valve (Nexen Prod. No. 940425), one Quick Exhaust Valve (Nexen Prod. No. 945125), and one Solenoid Valve (Nexen Prod. No. 949004). All other required items are furnished by Nexen.

NOTE: The Actuator Air Connections may be rotated 360° by loosening the Ring Clamp and rotating the Actuator Head. Tighten Ring Clamp Bolts to 25-35 Ft. Lbs. [34-47 Nm] torque.



### WARNING

Do not use rigid pipe or tubing when connecting air lines directly to the brake. Do not allow unshielded air lines to rub on metal surfaces of edges as this will result in rapid deterioration of the air lines.

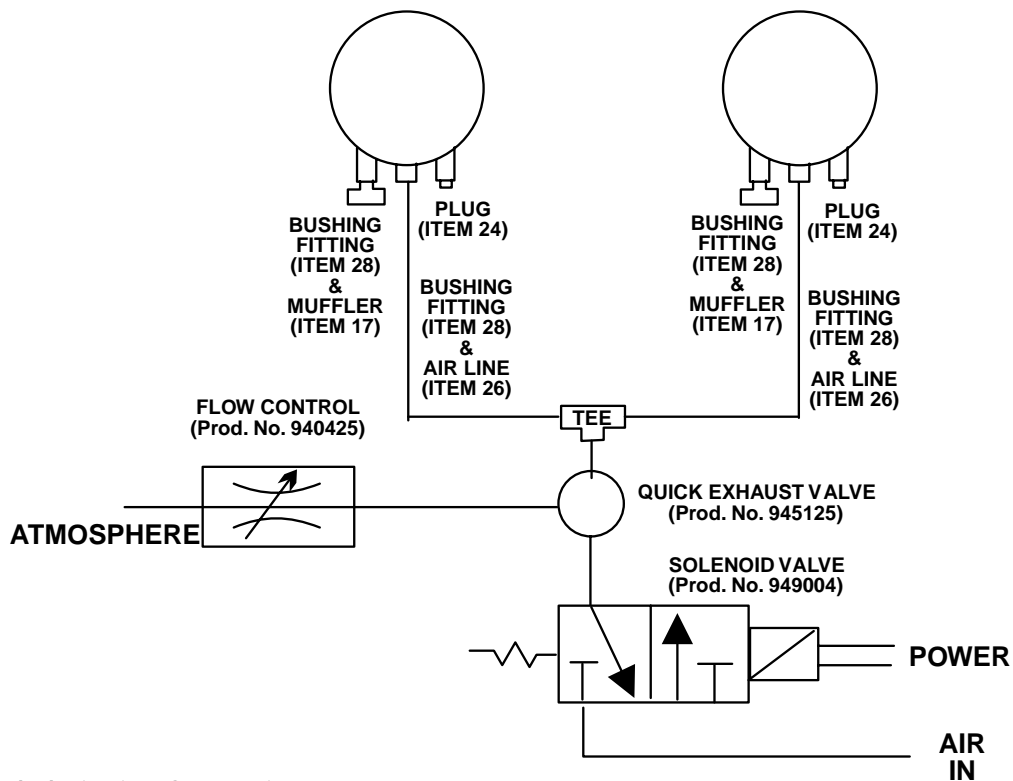
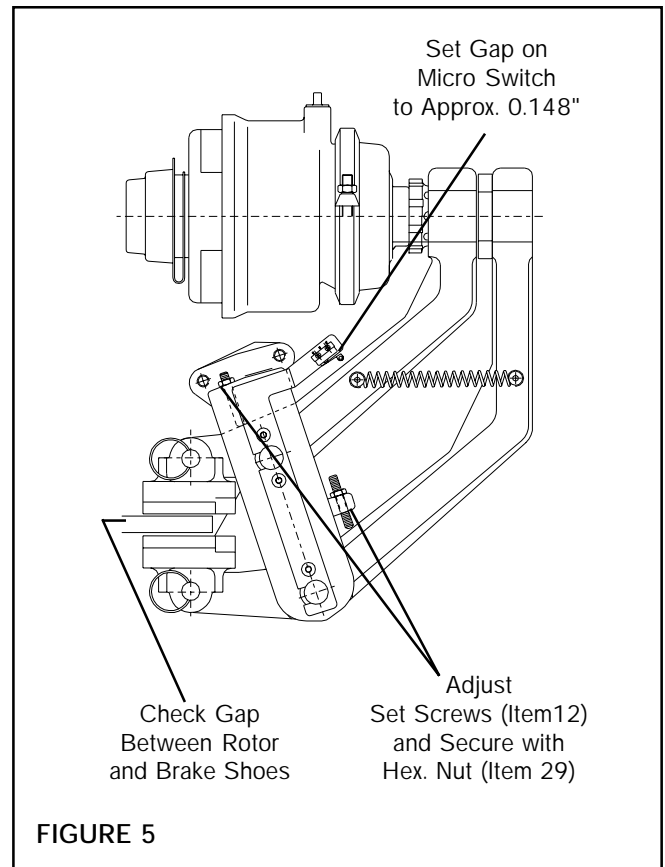


FIGURE 4  
Recommended Air Line Connections

## FINAL ADJUSTMENT

1. Apply air pressure to disengage brake, and make sure that Shoes are centered and adjusted to the correct gap in relation to the rotor.
  - a. Gap between shoes and rotor should be 0.10 to 0.05 inches on each side of the rotor (See Fig. 5).
  - b. If the gap requires adjustment refer to **INSTALLATION**, Primary Adjustment.

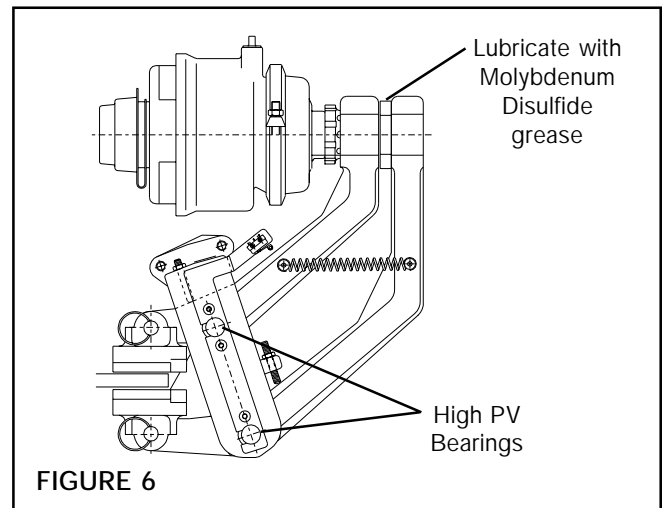
- c. Tighten Set Screws (Item 12) until they are snug, but not tight against Brake Arms (See Fig. 5).
  - d. Tighten Hex Head Nut, securing Set Screws (Item 12) into place (See Fig. 5).
2. Limit Switch (*When using a Customer supplied Wear Indicator.*)
    - a. With air pressure still applied to the brake, set the gap between Micro Switch (Item 32) contact arm and Brake Arm (See Fig. 5).
    - b. Loosen Micro Switch Adjustment Screws and slide Micro Switch until the gap between the Micro Switch and Brake Arm is 0.148 inches (See Fig. 5).
    - c. Tighten Micro Switch Adjustment Screws.
    - d. Connect electrical leads of Micro Switch to the customer supplied Wear Indicator



## LUBRICATION

All pivot points on the WINDCAL 90 Brake use self lubricated High PV bearings.

The sliding spherical contact between the Adjustment Screw (Item 5) and Piston Rod (Item 13) should be lubricated with a molybdenum disulfide base grease (See Fig. 6)



## MAINTENANCE

1. Replace breather cap air filter when dirty.
2. Inspect canister exterior for damage. Replace if damaged.
3. Check tightness of all air line connections and condition of all air lines. Tighten loose air lines, and replace damaged air lines.
4. Lubricate items that require lubrication.

## PARTS REPLACEMENT

### FRICITION FACINGS (ITEM 9)

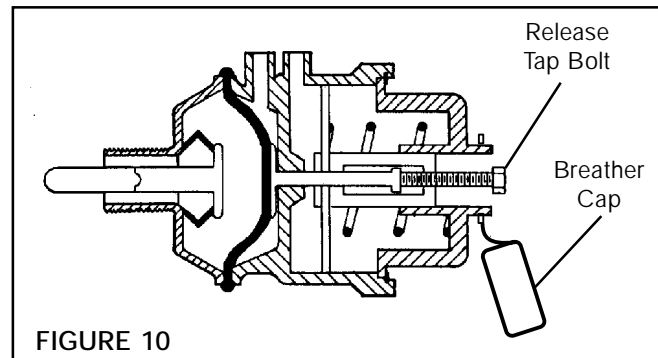
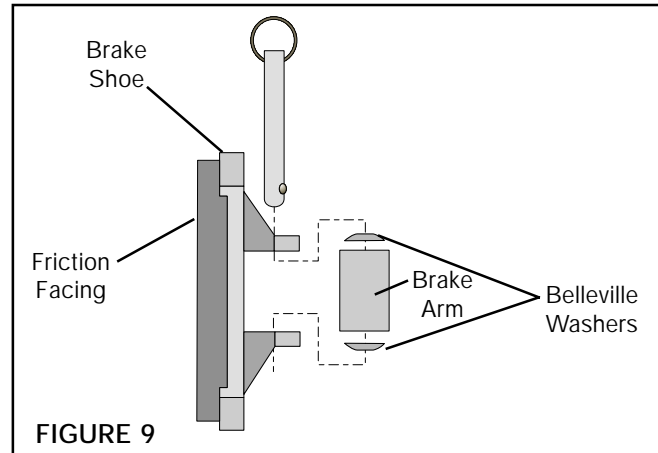
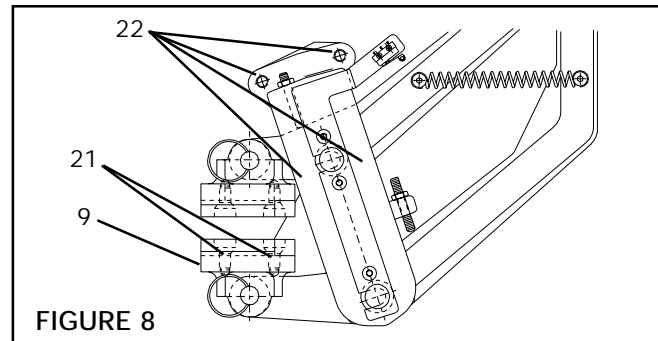
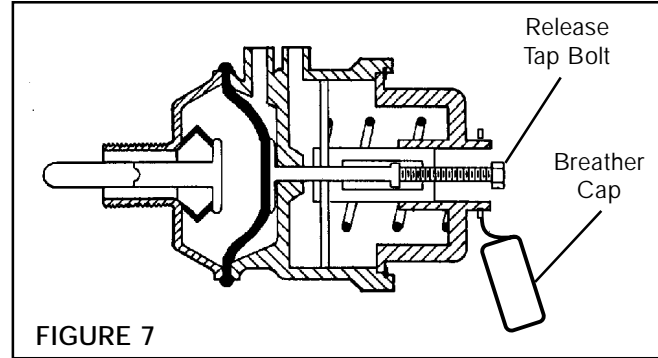
1. Release air pressure to brake.
2. Manually release Spring Actuators.
  - a. Remove Breather Cap (See Fig. 7)
  - b. With a deep 9/16" socket wrench, unscrew the Actuator Tap Bolt (See Fig. 7).
3. Loosen Socket Head Cap Screws (Items 22) and remove Brake assemblies from the Upper and Lower Mounting Brackets (Item 4) (See Fig. 8).
4. Rotate the Brake Shoe assembly to allow access to the Friction Facings (Item 9) and Machine Screws (Item 21).
5. Remove Machine Screws (Item 21) and worn Friction Facings (Item 9).
6. Install new Friction Facings (Item 9) and Machine Screws (Item 21)
7. Tighten Machine Screws (Item 21) to 9 Ft. Lbs. [12 Nm] torque.

NOTE: If the Brake Shoe Assembly has been removed the Belleville Washers (Item 15) must be installed with the cup of the washer towards the Brake Arm (See Fig. 9).

8. Secure the Brake Assemblies to their respective Mounting Brackets and tighten Socket Head Cap Screws (Item 22) to 40 Ft. Lbs. [54 Nm] torque.
9. Perform the Primary Adjustment (See **INSTALLATION**, Primary Adjustment).
10. Perform Final Adjustment (See **FINAL ADJUSTMENT**).

### SLEEVE BEARING (ITEM 18)

1. Release air pressure to brake.
2. Manually release Spring Actuators.
  - a. Remove Breather Cap (See Fig. 10)
  - b. With a deep 9/16" socket wrench, unscrew the Actuator Tap Bolt (See Fig. 10).





3. Loosen Socket Head Cap Screws (Items 22) and remove Brake assemblies from the Upper and Lower Mounting Brackets (Item 4) (See Fig. 11).
4. Remove Extension Spring (Item 7) (See Fig. 11).
5. Remove Detent Pins (Item 20) and Brake Shoe Assembly (Item 8) (See Fig. 11).
6. Remove Cap Screws (Item 27) and Pin Retaining Plate (Item 6) (See Fig. 11).
7. Remove Pivot Pins (Item 11) and the Upper and Lower Brake Arms (Items 2 & 3) from the Main Frame (Item 1) (See Fig. 11).
8. Press the worn Sleeve Bearings (Item (18) out of the Upper and Lower Brake Arms (Items 2 & 3).
9. Press new Sleeve Bearings (Item 18) into the Upper and Lower Brake Arms (Items 2 & 3).
10. Slide the Upper and Lower Brake Arms (Items 2 & 3) back into the Main Frame (Item 1).
11. Press the Pivot Pins (Item 11) back into the Main Frame (Item 1) and Upper and Lower Brake Arms (Items 2 & 3).
12. Replace the Pin Retaining Plate (Item 6), and the Cap Screws (Item 27).
13. Tighten the Cap Screws (Item 21) to 9 Ft. Lbs. [12 Nm] torque.
14. Replace Extension Spring (Item 7).
15. Install the Brake Shoe Assembly (Item 8) and the Detent Pins (Item 20) onto the Upper and Lower Brake Arms (Items 2 & 3).

NOTE: When installing the Brake Shoe Assembly, the Belleville Washers (Item 15) must be installed with the cup of the washer towards the Brake Arm (See Fig. 12).

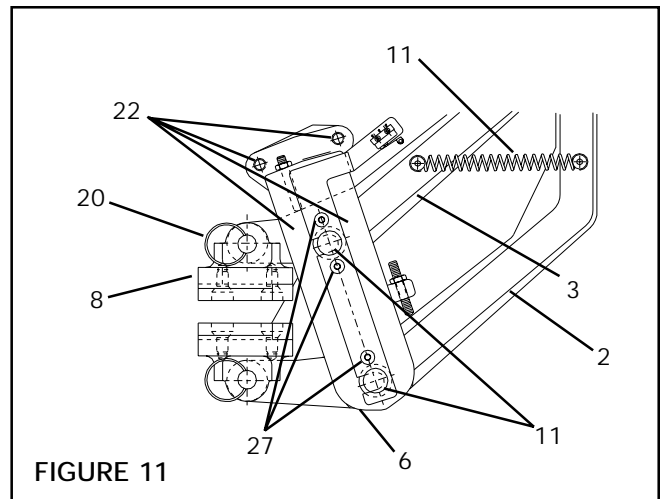


FIGURE 11

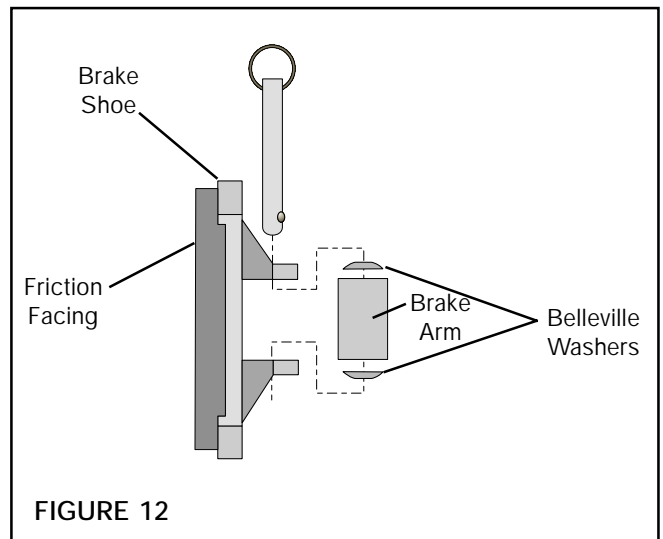


FIGURE 12

16. Secure the Brake Assemblies to their respective Mounting Brackets and tighten Socket Head Cap Screws (Item 22) to 40 Ft. Lbs. [54 Nm] torque.
17. Perform the Primary Adjustment (See **INSTALLATION**, Primary Adjustment).
18. Perform Final Adjustment (See **FINAL ADJUSTMENT**).

## REPLACEMENT PARTS

The item or balloon number for all Nexen products is used for part identification on all product parts lists, product price lists, unit assembly drawings, bills of materials, and instruction manuals.

When ordering replacement parts, specify model designation, item number, part description, and quantity. Purchase replacement parts through your local Nexen Distributor.

# PARTS LIST

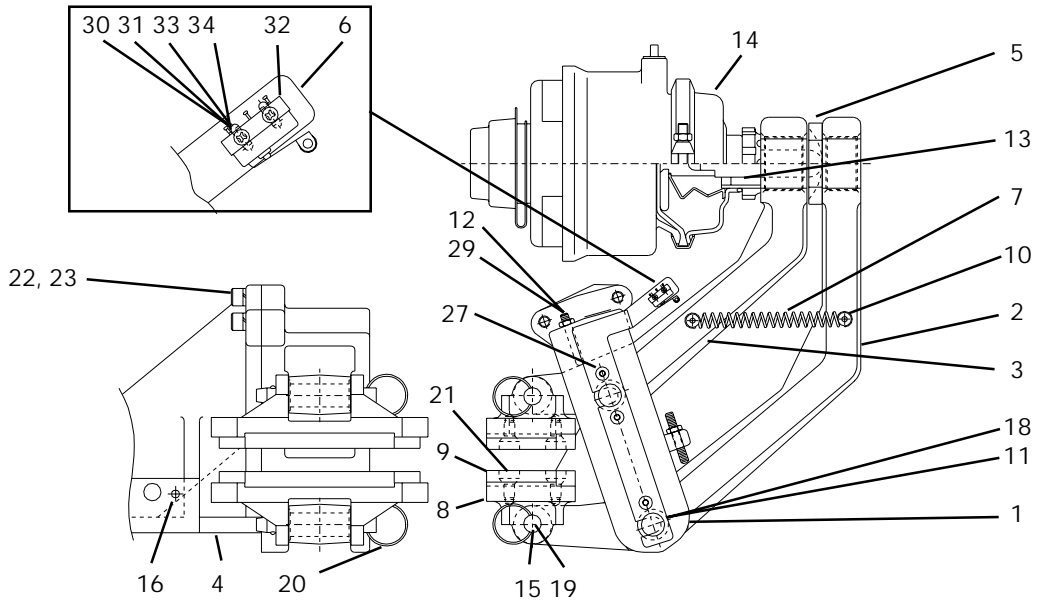
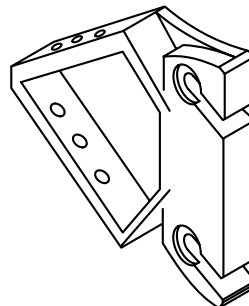


FIGURE 13

WINDCAL 90 CALIPER BRAKE		TOP	BOTTOM
ITEM	DESCRIPTION	QTY	QTY
1	Main Frame	1	1
2	Upper Arm (Brake)	1	1
3	Lower Arm (Brake)	1	1
4	Mounting Bracket	1	1
5	Adjustment Screw	1	1
6	Retaining Pin Plate	1	1
7	Extension Spring	2	2
8	Brake Shoe	2	2
9	Friction Facing	2	2
10	Socket Head Shoulder Screw	4	4
11	Pivot Arm Pin	2	2
12	Set Screw	2	2
13	Piston Rod	1	1
14	Brake Actuator	1	1
15	Belleville Washer	4	4
16	Dowel Pin	2	2
17	Exhaust Muffler (Not Shown)	1	1
18	Sleeve Bearing	4	4
19	Sleeve Bearing	4	4

WINDCAL 90 CALIPER BRAKE		TOP	BOTTOM
ITEM	DESCRIPTION	QTY	QTY
20	Detent Pin	2	2
21	Flat Head Screw	8	8
22	Socket Head Cap Screw	4	4
23	Spring Lock Washer	4	4
24	Plug Fitting (Not Shown)	1	1
25	Conn. Fitting (Not Shown)	2	2
26	Hose Assembly (Not shown)	2	2
27	Socket Head Cap Screw	3	3
28	Bushing Fitting (Not Shown)	2	2
29	Hex. Nut	2	2
30	Pan Head Machine Screw	2	2
31	Flat Washer	4	4
32	Micro Switch	1	1
33	Lock Washer	2	2
34	Hex. Nut	2	2
35	Hex. Hd. Screw (Not Shown)	3	3
36	Hex, Nut (Not Shown)	3	3
37	Lock Washer (Not Shown)	3	3



Center Mounting  
Bracket  
Nexen Prod. No.  
30080

FIGURE 14

## WARRANTIES

### Warranties

Nexen warrants that the Products will be free from any defects in material or workmanship for a period of 12 months from the date of shipment. NEXEN MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. This warranty applies only if (a) the Product has been installed, used and maintained in accordance with any applicable Nexen installation or maintenance manual for the Product; (b) the alleged defect is not attributable to normal wear and tear; (c) the Product has not been altered, misused or used for purposes other than those for which it was intended; and (d) Buyer has given written notice of the alleged defect to Nexen, and delivered the allegedly defective Product to Nexen, within one year of the date of shipment.

### Exclusive Remedy

The exclusive remedy of the Buyer for any breach of the warranties set out above will be, at the sole discretion of Nexen, a repair or replacement with new, serviceably used or reconditioned Product, or issuance of credit in the amount of the purchase price paid to Nexen by the Buyer for the Products.

### Limitation of Nexen's Liability

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

### Limitation of Damages

In no event shall Nexen be liable for any consequential, indirect, incidental, or special damages of any nature whatsoever, including without limitation, lost profits arising from the sale or use of the Products.

### Warranty Claim Procedures

To make a claim under this warranty, the claimant must give written notice of the alleged defect to whom the Product was purchased from and deliver the Product to same within one year of the date on which the alleged defect first became apparent.

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