nexen®

AIR CHAMP® PRODUCTS

User Manual

Mechanical Torque Limiter

FORM NO. L-21219-F-0719

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

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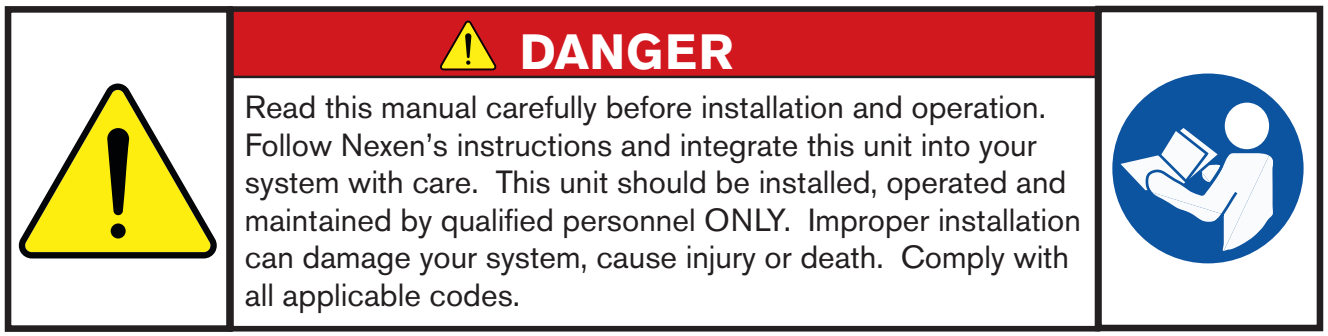

This document is the original, non-translated, version.

Conformity Declaration: In accordance with Appendix II B of CE Machinery Directive (2006/42/EC):

A Declaration of Incorporation of Partly Completed Machinery evaluation for the applicable EU directives was carried out for this product in accordance with the Machinery Directive. The declaration of incorporation is set out in writing in a separate document and can be requested if required.

This machinery is incomplete and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the applicable provisions of the Directive.

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ISO 9001 Certified

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Installation and Operating Instructions for Nexen Mechanical Torque Limiters

Carefully read and complete the following installation, operation and maintenance procedures for the Nexen mechanical torque limiters. Failure to follow these procedures may result in poor performance and/or the failure of the torque limiter.

WARNING

Installation of these torque limiters should only be preformed by a qualified technician.

General Functioning

Nexen mechanical torque limiters are ball detent style overload clutches. They protect drive and driven mechanical components from damage associated with torque overloads. Backlash free torque transmission is accomplished by a series of steel balls (4) nested in hardened detents (5). Disc springs (2) push against an actuation ring (3) keeping the balls nested. The disengagement torque is adjustable by means of an adjustable ring (1). In the event of an overload, the actuation ring moves axially allowing the balls to come out of the detents separating the drive and driven elements. The movement of the actuation ring can be sensed by a proximity sensor (6) triggering the drive to shut down.

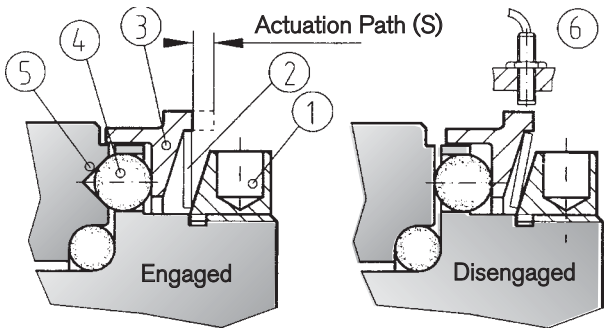


Figure 1

Single-Position / Multi- Position

In a torque overload, for the single-position design (standard) and multi-position design, the spring disengages to allow the balls to come out of their detents separating the drive and driven elements. Very low residual spring pressure remains so that the MTL will re-engage once the torque is reduced below the overload setting.

CAUTION

Re-engagement may only be effected at low speed.

Full Disengagement (FD), Free Wheeling

When an overload occurs the full disengagement design provides permanent separation of the drive and driven elements and is commonly used where a proximity sensor is not an option.

Re-engagement is not automatic. The actuating springs (Belleville washers) flip over center and must be manually pushed back into position to re-engage after an overload occurs. This MTL is re-engaged manually every 60° (six positions). Other positions available on request.

Low residual friction of the full disengagement version allows for multiple revolutions of the clutch to take place with minimal wear.

Applications: High-speed shafts 2500 rpm or more where the ball and detent could be damaged from repeated attempts to re-engage.

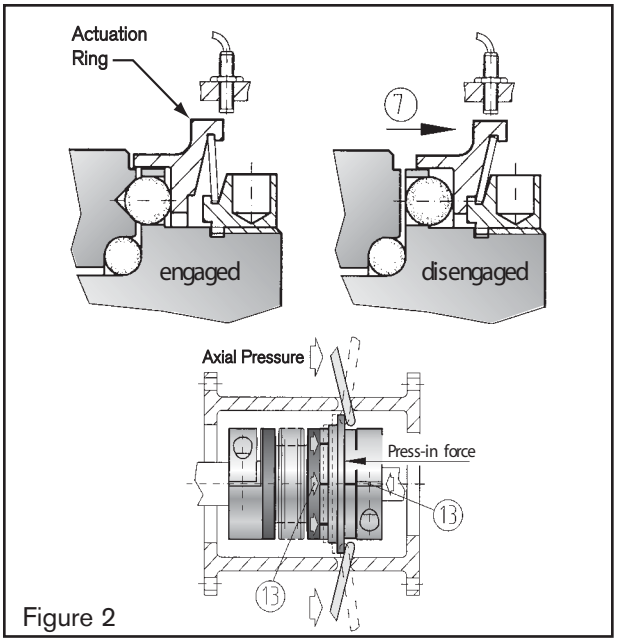


Figure 2

Full Disengagement (FD), Free Wheeling

Put light pressure on the disengagement detection ring with an installation tool using two pry bars or screwdrivers.

Approximate Engagement (Press-In) Force	
Model	**Engagement Force**
MTL15-xxx-FD	20-40 N [5-10 lbs]
MTL30-xxx-FD	25-50 N [6-12 lbs]
MTL60-xxx-FD	30-60 N [7-14 lbs]
MTL150-xxx-FD	35-70 N [8-16 lbs]
MTL200-xxx-FD	35-70 N [8-16 lbs]
MTL300-xxx-FD	50-100 N [11-22 lbs]
MTL500-xxx-FD	60-120 N [13-26 lbs]
MTL800-xxx-FD	500-1000 N [112-224 lbs]
MTL1500-xxx-FD	2000-3000 N [550-1100 lbs]

⚠ CAUTION

Re-engagement should only be performed when the MTL is not rotating!

⚠ WARNING

Do not attempt to effect an overload (disengagement) manually. The forces to disengage are much higher than the forces to re-engage. Damage to the actuating ring is likely if disengage forces are applied with a pry tool.

MOUNTING

Mounting Preparation

All mounting surfaces including shafts, bores, keys and key ways must be clean and free of burrs, nicks or dents. Inspect shaft diameters; MTL bore diameters, key and key-way dimensions and tolerances. All Nexen torque limiter bores are machined to ISO tolerance H7. Clearances between shaft and hub bores are maintained to 0.01 and 0.05 mm. A light coating of oil is recommended to ease the mounting process and will not affect the clamping force of the hub.

⚠ CAUTION

Do not use sliding grease or oils and grease with molybdenum disulfide or other high pressure additives.

Mounting Drive Elements to Mechanical Torque Limiter (MTL)

Table 1

Series	Belt Pre-tensioning Force Max. N [lbs]	Distance From - to mm [in]	Fastening Screws	Tightening Torque Nm [ft-lbs]
	A	B	Clamping Hub	
15	1400 [315]	7-14 [.28 - .55]	M4	4 [3]
20/30	1800 [405]	8-18 [.31 - .71]	M5	4 [3]
40/60	2300 [517]	8-18 [.31 - .71]	M5	7 [5]
80/150	3000 [674]	12-20 [.47 - .79]	M6	12 [9]
200	3500 [787]	12-22 [.47 - .87]	M6	14 [10]
300	4500 [1012]	12-23 [.47 - .91]	M8	18 [13]
500	5600 [1259]	12-25 [.47 - .98]	M8	25 [18]
800	8000 [1798]	14-34 [.55 - 1.34]	M10	36 [27]
1500	12000 [2698]	20-42 [.79 - 1.65]	M12	70 [52]

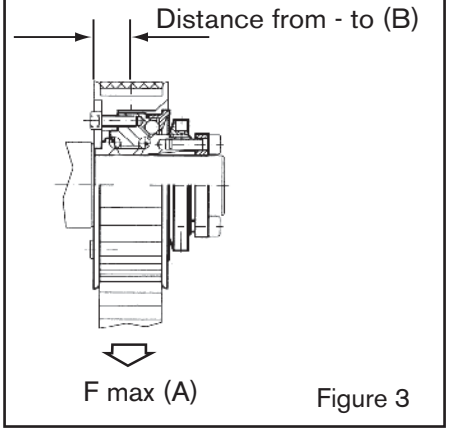


Figure 3

Center the drive element (i.e. timing belt pulley or gear) onto the connecting flange of the MTL and fasten with screws. If the center of the radial load falls over the middle of the MTL an additional support bearing is not required. (Figure 3). Please observe the maximum allowable radial load for each MTL sized as indicated in Table 3. Excess radial load will affect the performance of the MTL.

SAFETY ALERT

Rotating torque limiters can be very dangerous. Proper guarding should be in place at all times and is the responsibility of the machine builder, user or operator. Do not approach or touch a torque limiter while it is rotating. Make sure that the machine is "Locked Out" and cannot be accidentally started during installation or maintenance of the torque limiter.

Mounting and Dismounting: Model MTL

Mounting:

Slide the MTL on the shaft to the proper axial position. Using a torque wrench, uniformly tighten the clamping screws using a cross-wise tightening pattern until all the clamping screws are evenly tightened to the correct tightening torque as given in Table 1. While tightening, the MTL may move slightly towards the tapered bushing.

Keyed bore models do not include integral set screws. Use a lock collar to secure the unit axially along the shaft.

Dismounting:

Loosen the clamping screw. Insert the three jack screws into the tapered holes on the tapered segment. Apply even pressure to remove the tapered segment. Remove the MTL.

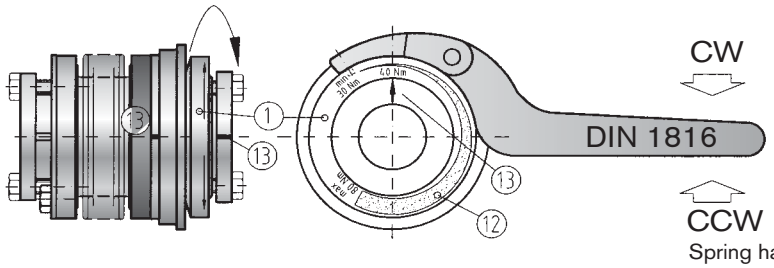
CAUTION

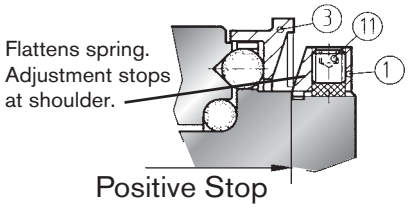
Further tightening of the clamping screws may destroy the tapered bushing connection.

NOTE

Prior to reassembly make sure that the jackscrews are raised to their original position.

Disengagement Torque Setting





1	Adjustment Nut
11	Fastening Screw / Plastic cushion not shown
3	Steel Actuation Ring
12	Adjustment Range
13	Marking

Figure 4

Nexen torque limiters are factory set to minimum disengagement torque within a specific range, which is marked on the MTL. The adjustment range (min/max) is also marked on the adjustment ring. The customer can adjust the disengagement torque as long as it falls into the range (12)indicated on the adjustment ring.

CAUTION

Nexen torque limiters incorporate disc springs that exhibit a special spring characteristic. It is important to stay in the max-min range of the MTL.

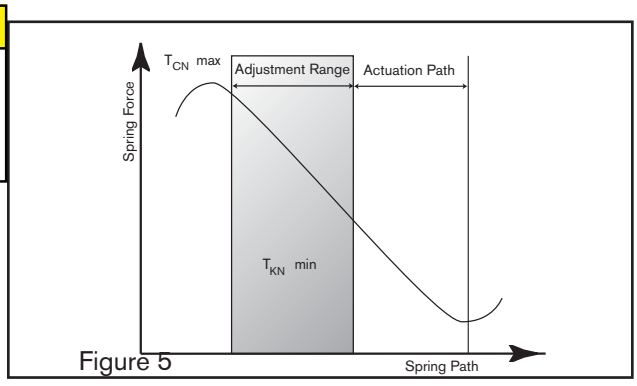
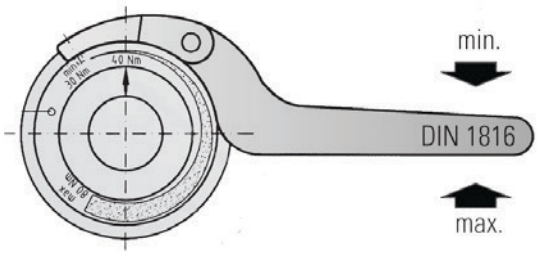


Figure 5

To adjust the disengagement torque, loosen the locking screws (11) and rotate the adjustment ring using the spanner wrench to the desired new setting. Tighten set screws and test the torque limiter. Note: The set screws are used with plastic inserts to prevent hub thread damage.

Accessories

Torque Adjusting Wrench DIN 1816



Note: MTL Size 10 is adjusted by hand.
No wrench needed.

Note: The recommended spanner wrenches for MTL Sizes 500, 800, 1500 & 2500 are available from J.W. Winco, Inc. www.jwwinco.com.

MTL Size	Spanner Wrenches			
	Ring Dia.	Pin Dia.	Nexen #	J.W. Winco
15 ALL	49 mm	4 mm	170660	
30 ALL	55 mm	4 mm	170661	
60 ALL	66 mm	5 mm	171469	
150 ALL	82 mm	5 mm	171470	
200	90 mm	6 mm	170662	
200 Full Disengagement	98 mm	5 mm	171471	
300 ALL	114 mm	6 mm	170663	
500 ALL	126 mm	8 mm		A55012
800	134 mm	8 mm		A55020
800 Full Disengagement	144 mm	8 mm		A55020
1500 ALL	163 mm	8 mm		A55038
2500	210 mm	10 mm		A55053
2500 Full Disengagement	226 mm	10 mm		A55053

Emergency Switch Function

The axial movement of the actuation ring (3) can be sensed with a proximity sensor (6). The distance the actuator ring move is given in Table 3 and is important for the selection of the appropriate sensing device. Mount the sensing device on a solid support keeping the distance shown in Figure 6.

NOTE

Test the switch prior to the delivery of a machine using this device.

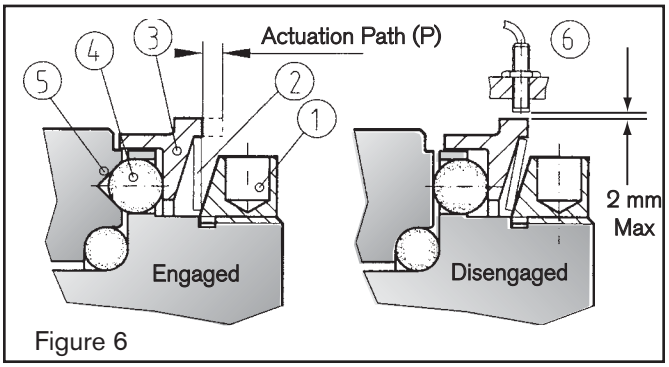


Figure 6

Table 3

MTL Size	15	30	60	150	200	300	500	800	1500	2500
Maximum Radial Load Capacity N [lbs}	1400 [315]	1800 [405]	2300 [519]	3000 [674]	3500 [787]	4500 [1012]	5600 [1259]	8000 [1798]	12000 [2698]	20000 [4496]
(P) From - To mm [in]	1,5 [0.06]	1,5 [0.06]	1,7 [0.07]	1,9 [0.07]	2,2 [0.09]	2,2 [0.09]	2,2 [0.09]	2,2 [0.09]	3,0 [0.12]	3,0 [0.12]

Transport

Nexen mechanical torque limiters are delivered ready for installation. After incoming inspection the torque limiter should be stored in its original packaging until it is ready for installation. A copy of this installation, operation and maintenance manual should be kept with the torque limiter.

Coupling Adapters - For Inch-Bored, Elastomer (Spider) Couplings

Table 2

Series	A	B	C	D	E	F	Fastener	Tightening Torque
15	37 [1.465]	20 [0.787]	13 [0.520]	19.05 [0.750]	12 [0.480]	56 [2.205]	M4	4 Nm [3 ft/lbs]
30	44 [1.740]	22 [0.866]	18 [0.697]	19.05 [0.750]	12 [0.480]	64 [2.520]	M5	4 Nm [3 ft/lbs]
60	48 [1.886]	25 [0.984]	17 [0.665]	25.40 [1.000]	17 [0.669]	74 [2.913]	M5	7 Nm [5 ft/lbs]
150	52 [2.063]	25 [0.984]	20 [0.803]	25.40 [1.000]	17 [0.669]	90 [3.543]	M6	12 Nm [9 ft/lbs]
200	68 [2.677]	40 [1.575]	22 [0.846]	38.10 [1.500]	17 [0.669]	98 [3.858]	M6	14 Nm [10 ft/lbs]
300	73 [2.854]	40 [1.575]	25 [0.984]	38.10 [1.500]	17 [0.669]	114 [4.488]	M8	18 Nm [13 ft/lbs]
500	82 [3.209]	40 [1.575]	33 [1.299]	38.10 [1.500]	26 [1.024]	128 [5.039]	M8	25 Nm [18 ft/lbs]
800	92 [3.630]	50 [1.969]	31 [1.228]	50.80 [2.000]	31 [1.221]	140 [5.512]	M10	36 Nm [27 ft/lbs]
1500	99 [3.894]	50 [1.969]	39 [1.532]	50.80 [2.000]	31 [1.221]	170 [6.693]	M12	70 Nm [52 ft/lbs]
2500	143 [5.638]	80 [3.150]	51 [2.016]	76.20 [3.000]	51 [2.005]	240 [9.449]	M16	180 Nm [132 ft/lbs]

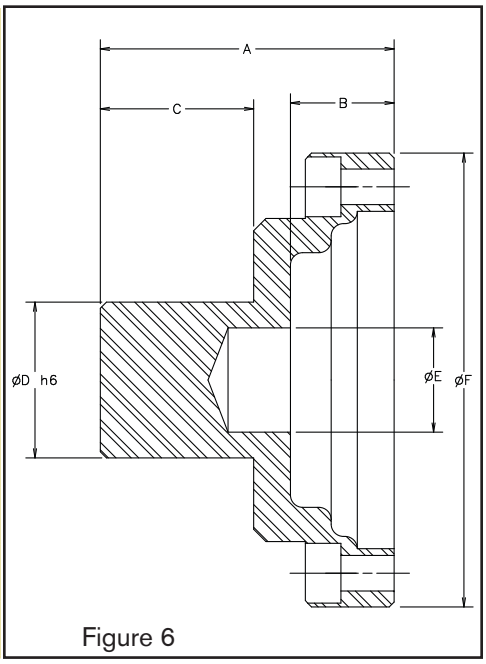


Figure 6

Maintenance

Nexen torque limiters are maintenance free as long as they are properly mounted and the maximum misalignment and radial load values are not exceeded. The internal components are permanently greased for lifetime lubrication.

⚠ CAUTION

Disassembly of the torque limiter will void the warranty.

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.

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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.

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

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