

**SPRING-ENGAGED BRAKES FOR
ROTARY & LINEAR APPLICATIONS** >>>

Product & Application Guide

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IMPORTANT NOTICE! Nexen recommends regular inspection of the spring-engaged brake’s holding force and suggests the installation of a sensor integrated into the control system to detect engagement and disengagement.

Nexen expects spring-engaged products to be used correctly and is not responsible for injuries, damages, and operational malfunctions if:

- The product’s “User Manual” instructions are ignored or neglected
- The brakes are used inappropriately
- The brakes are modified
- The brakes are handled, operated, or maintained incorrectly
- A proper service factor was not used
- Spring engaged brakes are used in high cycle applications that can fatigue the engagement springs or cause breakage reducing the braking or holding force

Redundant and backup systems are recommended particularly if there is potential risk of loads falling in vertical axes where personnel might be endangered. Redundant systems are typically two brakes working independent of each other and are capable of stopping and holding the load individually if one or the other fails to engage.

**Nexen offers reliable solutions for
braking & holding applications**



INTRODUCTION TO SPRING ENGAGED BRAKES

Nexen continues to work closely with major manufacturing organizations that want to reduce the risk of harm to people, equipment, or the environment, that may arise from the operation of a section of production equipment. An intelligent risk-reduction strategy protects personnel, machines, and the environment, increases productivity, improves efficiency and increases uptime. The result of these partnerships is a growing range of spring-engaged, air released brakes and linear clamping elements.

Studies in Europe and Japan show that most robot accidents do not occur under normal operating conditions, but rather during programming, maintenance, repair and testing. Adequate safety measures are therefore required to prevent loads from falling or axes from moving when performing maintenance tasks or partially powering up the equipment.

Even in purely horizontal movements, many systems utilize brakes to prevent coasting during machine-stops triggered by the opening of a movable guard or other safety barrier.

Nexen offers the most dependable technology available for E-Stop and holding applications. High holding force and zero or low backlash provide accurate positioning and increased stiffness of equipment, resulting in higher quality end products.

Nexen's spring engaged-air released brakes are much more energy efficient than electric products. They only use about 1.2 watts to power the pneumatic control valve versus at least 100 times more for the power supply and magnetic coils electric brakes require when being held in their released state.

The electric coils also saturate the electric brake with heat while released reducing it's ability to stop a load due to brake fade. Heat also degrades the winding insulation, bearing seals and lubrication, and the facing material, reducing brake life.

Air released brakes if they ever need servicing can be rebuilt very economically vs. electrically released brakes that usually are not cost effective to rebuild saving you money and reducing the environmental impact.

These benefits give you a better performing brake that improves your processes and lowers the cost of ownership.

A wide range of options with consistent, performance means Nexen has a braking solution for most new or retrofit applications. Regardless of the application, count on Nexen to offer high performance stopping and holding products with these great features:

- Short stopping distance
- High stopping/holding torque or linear force
- High heat absorption capacity
- Long life
- Easy integration
- Low energy consumption
- Fastest response
- No displacement when locking/unlocking*
- Zero or low backlash*

*Varies with model

NEXEN'S SPRING-ENGAGED BRAKE SOLUTIONS INCLUDE:

- Profile Guide Rail Brakes
- Rod Locks
- Servomotor Brakes
- Ball Screw Brakes
- Flange-Mounted Brakes
- Shaft-Mounted Brakes
- Caliper Brakes
- Tooth Interface Devices
- Spring-Engaged Brake/Air-Engaged Clutch Combinations

PROFILE GUIDE RAIL BRAKES

Nexen's RB (rail brake) series offers holding and E-stop capability in power-off situations. Rail brakes clamp onto the center of profile guide rails to provide positive braking and holding in all axes without touching the bearing surface of the rail. High holding force and very low backlash make it ideal for accurate position holding where drive train backlash or lack of rigidity could allow excessive movement.



- Available for profile guide rail sizes: 15, 20, 25, 30, 35, 45
- Spring-engaged, air-released
- Static holding force from up to 585 lbs [2,600 N]
- Low backlash: 0.004 - 0.200 in [0.10 - 0.2 mm]
- Fast engagement: 0.049 - 0.080 seconds
- Fits guide rails from companies like THK, NSK, IKO, Hiwin, INA, SKF, Star, and Schneeberger
- Does not contact and bearing raceways so has no impact on guide rail life
- Brake body geometry matches the guide rail bearings making design and installation easier
- Rail brakes can hold the load in position while failed reducers or motors are replaced
- Suitable for infrequent dynamic E-stops
- Brake shoe gap is adjustable
- Brake shoes are user replaceable
- Large brake shoe/guide rail contact area for consistent performance and low wear
- Two internal independent braking mechanisms for redundancy
- Can be stacked for higher holding forces
- About 1.2 watts of energy consumption while released
- Can provide redundant braking to brake-motors
- Can allow smaller drive systems to position the load and then the rail brake holds position while high force operations are performed that would over power the drive system
- Maintenance free



Nexen's RBR (rail brake roller) is a cost effective, light-weight solution for holding applications on guide rail systems. The unique design uses a horizontal air/spring chamber to apply force on the rail through a wedge and roller mechanism.

Available for profile guide rail sizes: 20, 30, & 35

E-Stops
Power-off Stopping/Holding
Accurate Position Holding

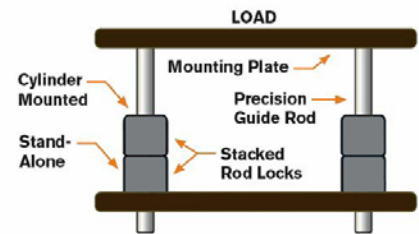
APPLICATIONS

ROD LOCKS

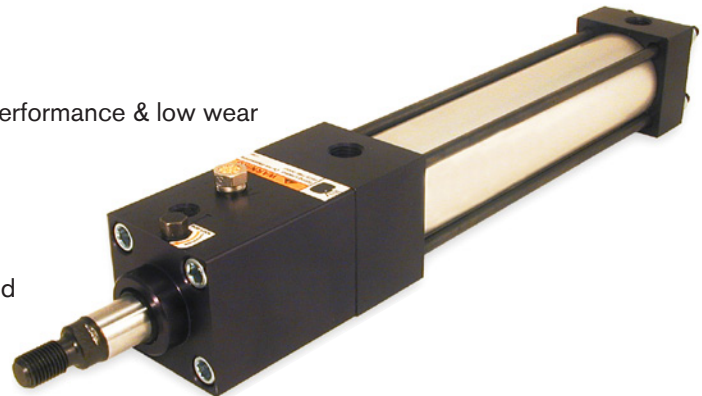


Nexen RL rod locks provide incredible holding force on NFPA and ISO cylinders, and precision rods in a small package. Their internal clamping collar spreads the clamping load over a large area on the rod ensuring it doesn't damage it and gives a long life. Very low backlash and no rod displacement when engaging/disengaging allows accurate positioning. Optional manual release allows rod movement without air pressure and engagement/disengagement sensor provides lock mode feedback in critical applications.

- 16 sizes available
- Static holding force from 180 - 8560 lbs [890 - 38,077 N]
- Low backlash: 0.002 - 0.008 in [0.05 - 0.20 mm]
- Fast engagement 0.030 - 0.115 sec
- Holding forces exceed cylinder-extending force at 100 psi [6.9 Bar]
- 60 psi release
- Same holding force in both directions
- Sizes for most ISO and NFPA pneumatic cylinder brands
- More compact than competitive models
- Stand-alone versions with dual guide bearings and seals for precision guide rod applications
- Anodized aluminum housing for corrosion resistance
- No rod displacement during lock engagement/disengagement
- Suitable for infrequent dynamic E-stops
- Multiple springs assure reliable performance even if one spring breaks
- Rod locks can be stacked to increase the holding force on a single guide rod
- Sensor for engaged/disengaged feedback
- Manual release models default to the locked position
- Accepts standard air cylinder accessories like, seals, scrapers, and mounting brackets
- Large locking collar/rod contact area for consistent performance & low wear
- Rated for at least 1,000,000 cycles
- IP67 rated exceeds NEMA 4X
- Complies with ISO 6431 standards
- About 1.2 watts of energy consumption while released
- Maintenance free



In vertical applications, multiple rod locks can be stacked to obtain a higher holding force.



Nexen's cylinder mounted Rod Locks match the cylinder profile for easy, compact integration

APPLICATIONS

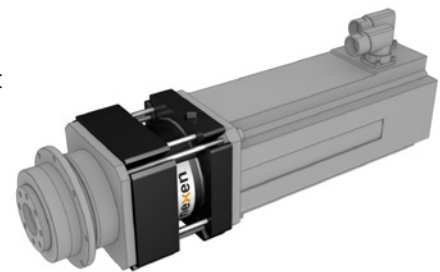
- Accurate Position Holding
- E-Stops
- Power-Off Stopping/Holding

SERVOMOTOR BRAKES

Nexen's servo motor brake is designed to mount to the shaft end of servomotors up to 20 horsepower. The brakes input and output features can be the same or different allowing it to act as an adapter between dissimilar mounting features. The input end bore accepts the motor shaft and is fixed inside the brake with a split-hub-shaft collar arrangement. With higher torque, and durability, than other braking options and true zero backlash and high rigidity so drive system accuracy is not effected.



- Seven sizes to fit servomotors up to 20 horsepower
- Models available for NEMA 23, 34, and 42 frame sizes
- Mounts on the output flange of a servomotor
- Output shafts and flanges can match the motor/reducer flanges and shafts or can differ and act as an adapter between different motor/reducer mounting features
- Shaft/bore sizes from 0.250 - 1.980 in [6.4 - 48 mm]
- Models for most motor/gear head combinations - others upon request
- Speeds up to 10,000 RPM
- True zero backlash
- Minimum static torque from 20 - 1100 in-lbs [2.25 - 125 Nm]
- At least 50% more torque than competitive add on electric servo brakes
- Unlike servo-brake-motors is capable of stalling the servomotor
- Can withstand repeated E-Stops that destroy other servo brakes or brakemotors
- Low inertia
- High torsional rigidity
- Servomotor can be replaced while brake holds the load in place
- Meets IP67 dust and waterproof standards
- Can serve as a redundant or secondary brake to a brake-motor
- Very low energy consumption while released unlike electric brakes
- Maintenance free



Accurate Position Holding
E-Stops
Power-Off Stopping/Holding

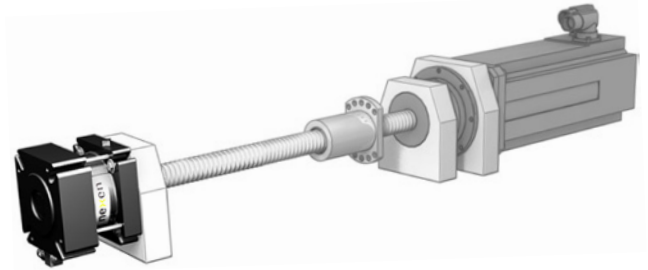
APPLICATIONS

BALL SCREW BRAKES



Nexen's Ball Screw Brakes provide reliable holding in a compact package, overcoming a common problem found in vertical ball screw applications. During a power loss the motor has no holding torque allowing the ball screw to back drive and the load to drop. Even when a brake-motor is used the brake tends to be weak and doesn't withstand many E-stops before failing. Ball Screw brakes connect to the machined end of a ball screw to prevent back driving, load drops, and equipment damage even if the motor or reducer fails.

- Five models with torque up to 1100 in-lbs [125 Nm]
- Speeds up to 10,000 RPM
- True zero backlash
- Low inertia
- High torsional rigidity
- Directly couples to the machined, non-driven end of a ball screw
- Uses a coupling that allows axial displacement due to ball screw thermal growth
- Meets IP67 dust and waterproof standards
- Prevents ball screw back-drive and load drops in vertical applications
- Can serve as a redundant or secondary brake to a brake-motor
- Can support loads or maintain position while failed reducers or motors are replaced
- Very low energy consumption while released unlike electric brakes
- Maintenance free



APPLICATIONS

Accurate Position Holding
E-Stops
Power-Off Stopping/Holding

FLANGE-MOUNTED BRAKES



Nexen has several flange-mount, spring-engaged brake designs. These are mounted directly on NEMA and IEC flanged motors and/or gearboxes. The SE and FMBES models can also be foot mounted with input shafts.

EMB Brakes



Specifications

5 Sizes	NEMA 56-256 TC
4 Sizes	IEC 71A-132S
Holding Torque	400-1100 in-lbs [45-124 Nm]
Release Pressure	40-80 psi [580-1160 bar]

Key Features

Zero Backlash Holding
Fast Response
Totally Enclosed
Low Inertia

SE Brakes



Specifications

Sizes	5 sizes
Shaft Diameters	0.625-1.375 in [15.8-34.9 mm]
Holding Torque	100-2000 in-lbs [11-226 Nm]
Release Pressure	30-50 psi [435-725 bar]

Key Features

Manual Release
Low Inertia
Easy Facing Replacement
8 Springs

FMBES Brakes



Specifications

Sizes	6 sizes
Shaft Diameters	0.625-1.375 in [15.8-34.9 mm]
Holding Torque	100-900 in-lbs [11-102 Nm]
Release Pressure	30-60 psi [435-870 bar]

Key Features

Long Friction Facing Life
Enclosed, Nickle Plated Design
Manual Release
3 to 15 Springs
IP 54 Rated

APPLICATIONS

E-Stops
Power-Off Stopping/Holding
Accurate Position Holding

SHAFT-MOUNTED BRAKES

Nexen spring-engaged, shaft-mount brakes are a self-contained package, easy to install and service.

They provide high dynamic torque, and their ventilated discs can handle a lot of heat, making them ideal as emergency stopping brakes. Long facing life ensures low maintenance with little down-time.



SSE & TSE Brakes



Specifications

Sizes	6 sizes
Shaft Diameter	up to 3.500 in [88.9 mm]
Holding Torque	450-8000 in-lbs [51-904 Nm]
Release Pressure	50-90 psi [725-1305 bar]

Key Features

Ventilated Discs
Long Friction Facing Life
Easy Facing Replacement
Multiple Spring Design (6 to 16 springs)

SE Brakes



Specifications

Sizes	5 sizes
Shaft Diameters	0.625-1.375 in [15.8-34.9 mm]
Holding Torque	100-2000 in-lbs [11-226 Nm]
Release Pressure	30-50 psi [435-725 bar]

Key Features

Manual Release
Low Inertia
Multiple Discs
Flange or Shaft Mounting
8 Springs

DFB / QFB Brakes



Specifications

Sizes	6 sizes
Shaft Diameter	up to 6.500 in [165.1 mm]
Holding Torque	165,000 in-lbs [18,642 Nm]
Release Pressure	70 psi [1015 bar]

Key Features

Low Inertia
Long friction facing life
Ventilated Discs
Easy Air Gap Adjustment
Multiple spring design (10 to 15 springs)

I300



Specifications

Sizes	1 size
Shaft Diameter	up to 2.750 in [70 mm]
Holding Torque	5,300 in-lbs [600 Nm]
Release Pressure	60 psi [4.1 bar]

Key Features

True Zero Backlash
Stackable
Flange or Shaft Mounted
Keyless Coupling

E-Stops
Accurate Position Holding
Power-Off Stopping/Holding

APPLICATIONS

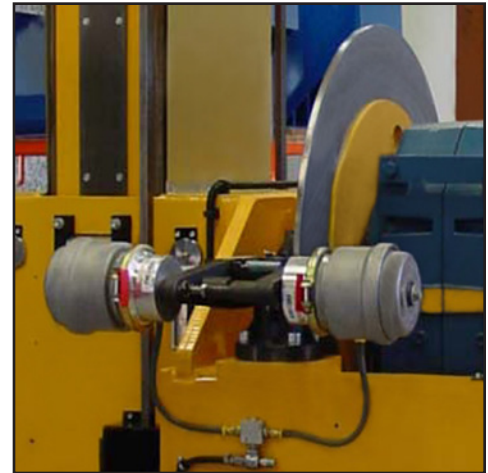
CALIPER BRAKES



Caliper brakes are a popular design when high stopping or holding torque is required. By combining the disc diameter of your choice and one or more calipers equally distributed around that disc you can build a custom system with standard components. Caliper brakes can also be used in linear applications by clamping on a suitable rail.

Nexen offers various sizes and styles of spring engaged air released calipers and discs that go with them.

- Five spring-engaged, air-released models in twelve sizes: DBSE, BC, BD, VC500, SPC
- High Static Torque: 700 - 50,000 in-lbs [79 - 5,650 Nm] using Nexen rotors, higher with larger customer supplied rotors
- Multiple calipers can be used on a single rotor to increase torque
- Nexen provided rotor bore sizes from 0.5 - 6.5 inches [12.7 - 165.1 mm]
- Rotors mount with readily available QD bushings for various shaft sizes
- Rotor speeds up to 4,500 RPM with Nexen rotors
- Post and foot mount versions
- Manual release on some models
- Nickel plating available on some models
- Some caliper models can adapt to a range of customer provided disc thicknesses
- Can clamp on rails to generate up to 6700 lbs [29,800 N] of linear braking/holding force
- **Hydraulic release versions of some models**
- Very low energy consumption while released unlike electric brakes
- Low or no maintenance



Spring engaged caliper brakes tend to lose some of their holding force as the springs decompress do to the friction facing material wearing away. When this type of brake is used in applications with frequent dynamic stops, it will result in higher maintenance costs due to frequent brake facing to rotor gap inspections and adjustments.

Nexen has developed an innovative answer to this challenge with the VC500 caliper brake. The linkage of this brake compensates for the loss of spring force due to facing wear by an increase of the spring force amplification factor, which totally eliminates the requirement for facing gap adjustments over the entire life of the unit while providing consistent braking power.

APPLICATIONS

- E-Stops
- Power-Off Stopping/Holding
- Rotary and Linear

FLANGE-MOUNTED CLUTCH-BRAKES

Nexen's FMCBES and DAP series clutch-brake combinations feature a spring-engaged brake and an air-engaged clutch. The brake is normally on until air is applied to a single port to engage the clutch while simultaneously disengaging the brake.

- Two models- 13 sizes: FMCBES (11) and DAP (2)
- Static clutch torque from 232 - 680 in-lbs [26 - 77 Nm]
- Static brake torque from 142-495 in-lbs [16 - 56 Nm]
- Shaft/bore sizes from 0.626 - 1.375 in [14 - 42 mm]
- Fits NEMA motor frames 48 to 215TC or IEC 71A to 160M
- Speeds up to 3600 rpm
- Foot mount adapters and shafted input units optional
- Manual release on DAP
- Nickel-plated BISSC certified FMCBES models available
- IP54 rated wash-down protection available on some models
- Very low energy consumption while brake is released unlike electric brakes
- Maintenance free



SPRING-ENGAGED TOOTH CLUTCHES

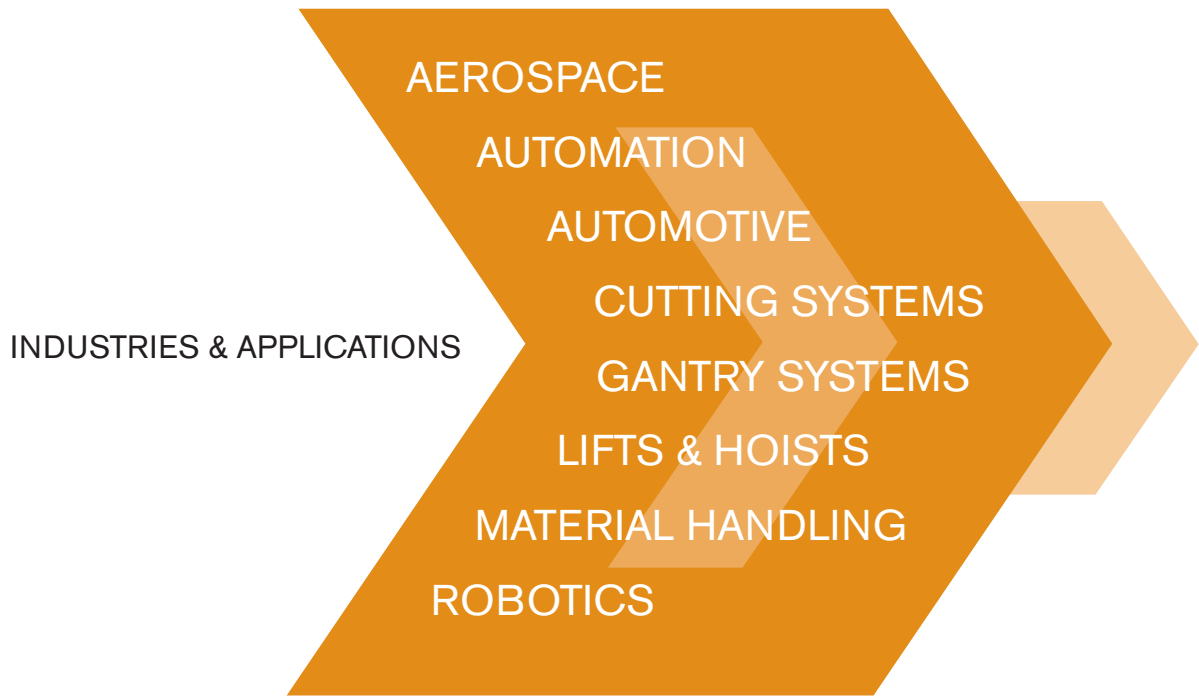


Nexen's 5HP-SE series: Spring-engaged tooth clutches provide the ultimate high torque holding in a small package when used as a brake. Mounting is simply a matter of fixing the pilot or drive flange to a stationary machine component. Spring-engaged tooth devices must be engaged at zero speed.

- Eight sizes with 42 models
- Torque range from 880 - 46,000 in-lbs [99 - 5197 Nm]
- Bore sizes from 1.250 - 3.938 in [31.75 - 100 mm]
- Speeds up to 3,700 rpm
- From 1 - 244 locking positions
- Wash-down models with nickel plated IP54 rated enclosures
- Flange or pilot output designs
- Optional sensor for engaged/disengage feedback
- Very low energy consumption while released unlike electric brakes
- Maintenance free

Power-Off Holding

APPLICATIONS



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In accordance with Nexen's established policy of constant product improvement, the specifications contained in this document are subject to change without notice. Technical data listed in this document are based on the latest information available at the time of printing and are also subject to change without notice. For current information, please consult www.nexengroup.com or contact Nexen's Technical Support Group at the location to the right.

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