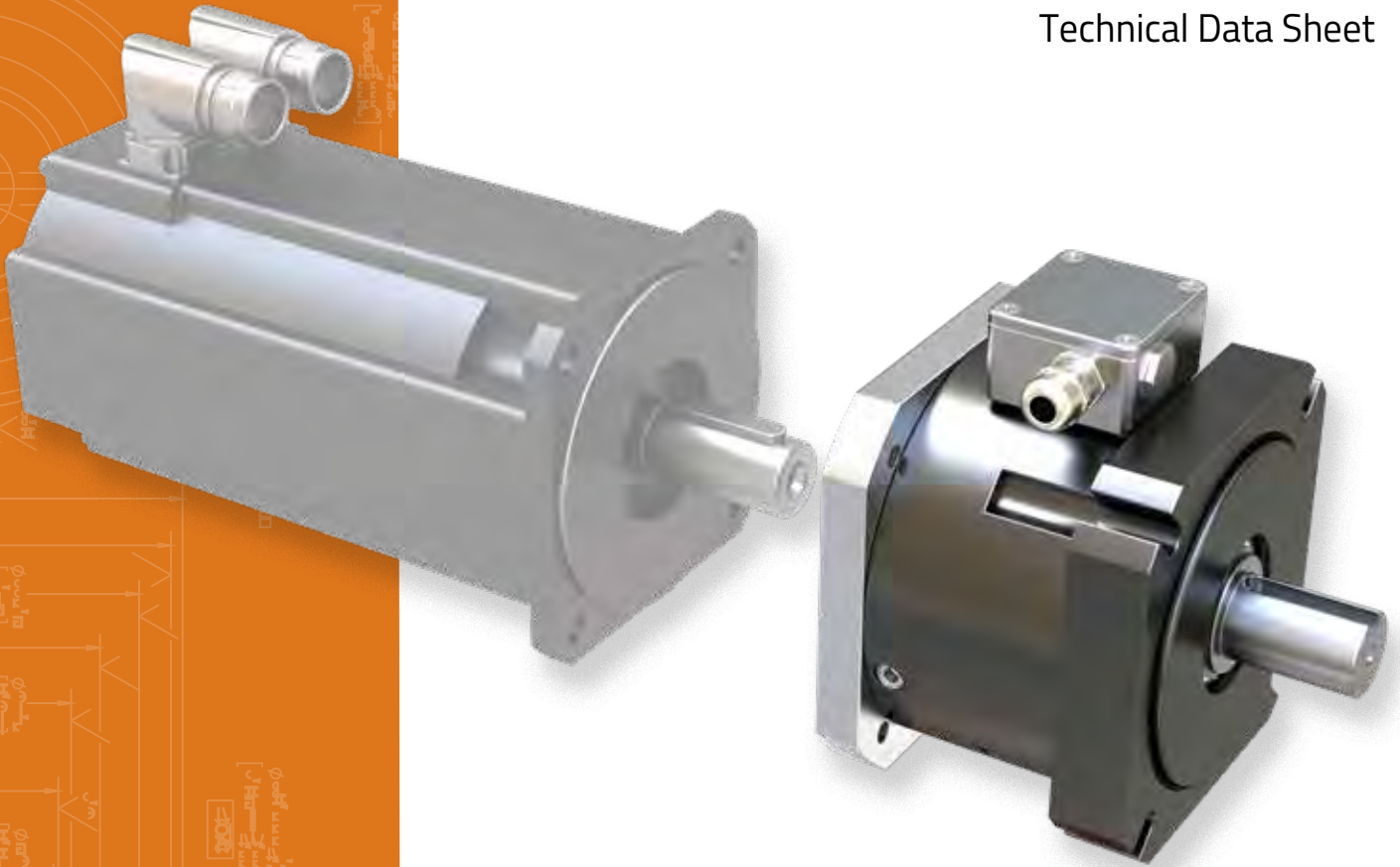


nexen®

Electric Servomotor Brakes Technical Data Sheet



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evolve



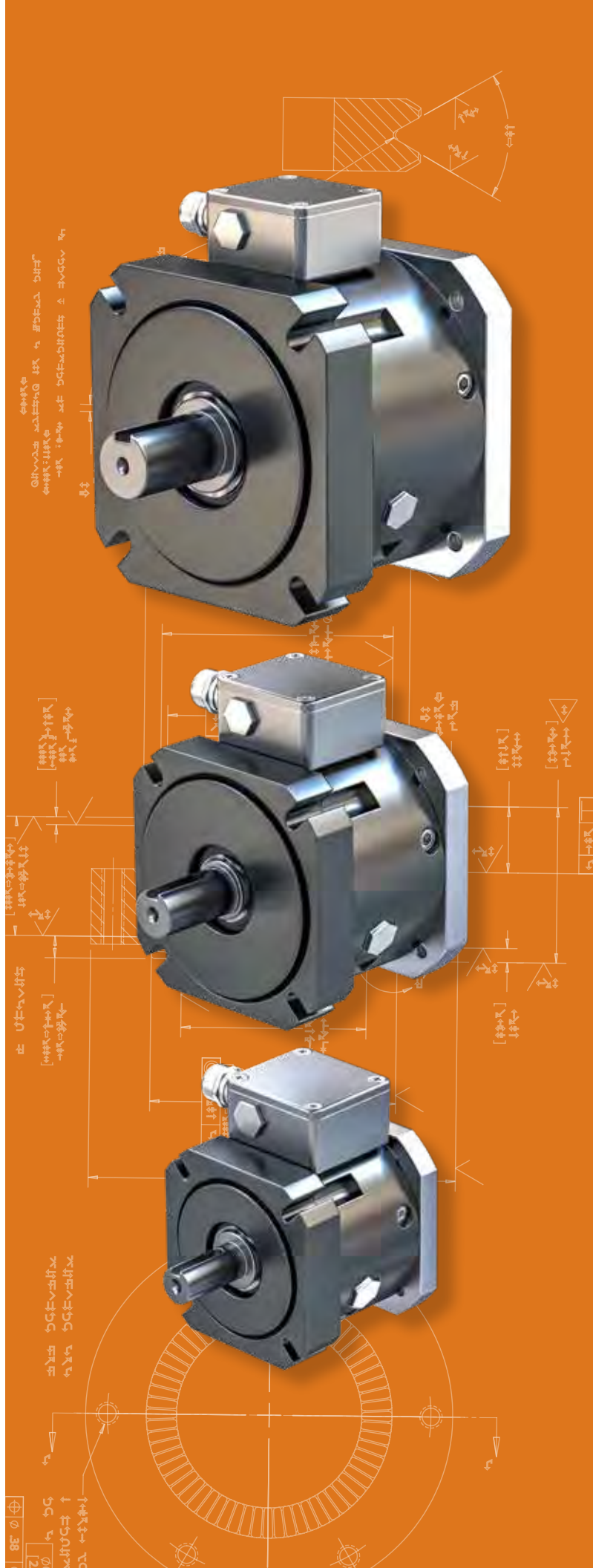
Electric Servomotor Brake

As engineering experts in designing the most reliable pneumatic clutches and brakes, Nexen Group has taken the next step and is redefining the electric brake market by creating the Evolve line of Electric Servomotor Brakes.

Nexen's Zero Backlash Electric Servomotor Brakes are spring engaged and electrically released, providing customers with the long-lasting performance they have come to expect from Nexen Group.

Key Features Include:

- 100 mm, 125 mm and 155 mm frame sizes available
- Easily mounts between a servo/stepper motor and a gearbox
- Spring engaged – electrically released
- Two friction interfaces for increased torque
- Zero Backlash via flex disc and rotor
- Double Row Angular Contact Bearing
- Shaft with integrated clamp collar
- 24 VDC standard coil
- Fast delivery times
- Made in the USA



The New Standard in Electric Servomotor Brakes

Nexen's Evolve Electric Servomotor Brakes are designed to exceed industry standards for the most demanding applications.

Standard Voltage Option
Available in 24 VDC.

Ease of Installation

Air gap is set at the factory, so there's no need for initial adjustment or fine tuning in the field. Rated torques are achievable out of the box.

Zero Backlash Holding

Nexen utilizes a flexible friction rotor and flexible discs for true Zero Backlash up to 100% of holding torque.

Zero Backlash Coupling

The easy to install split-hub shaft collar, with backup keyway, prevents backlash for smooth stopping and precision holding up to, and beyond, the minimum holding torque.

Rugged

One piece, solid shaft increases torsional rigidity.

Overhung Load

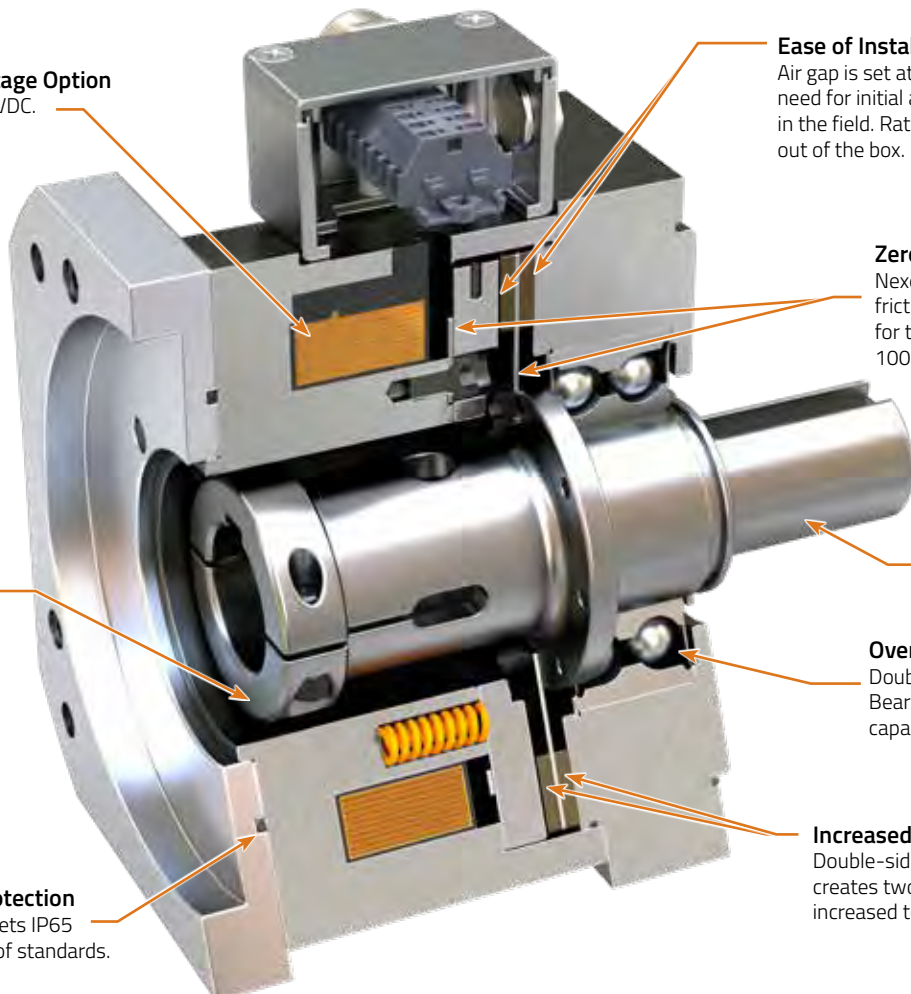
Double Row Angular Contact Bearing delivers overhung load capacity and axial rigidity.

Environment Protection


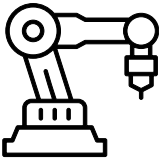
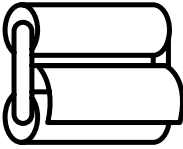

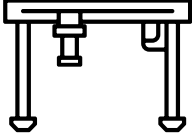
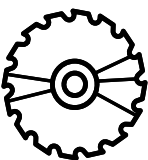
Sealed housing meets IP65 dust and waterproof standards.

Increased Torque

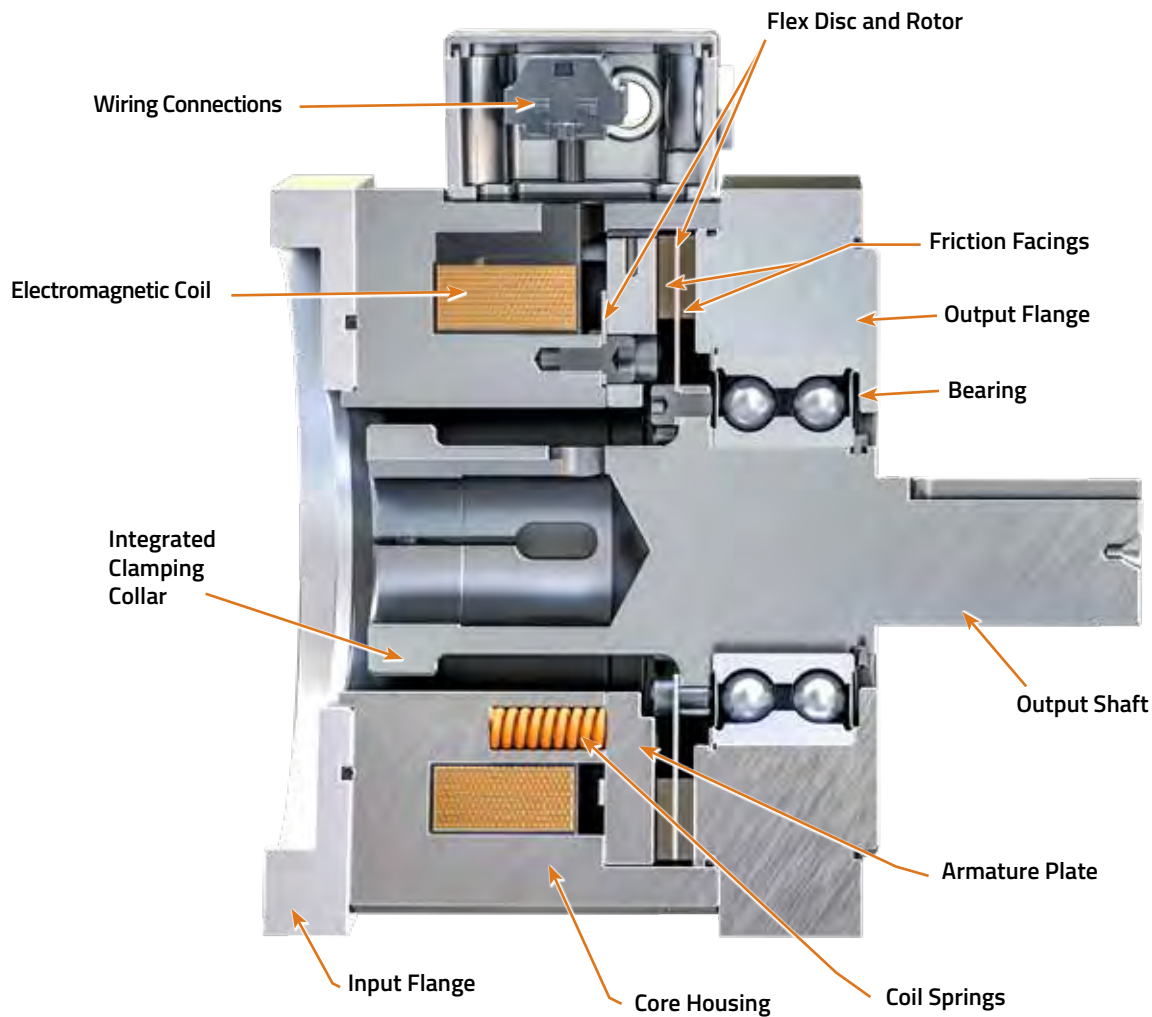
Double-sided friction rotor creates two friction interfaces for increased torque capacity.



Applications

					
Food Production	Robotics	Converting	Metal Processing	Gantry	Wood Processing

Cross-Sectional Drawing



Operating Detail

- The Nexen Electric Servomotor Brake is spring engaged, electrically released.
- In a de-energized state, the double-sided friction disc assembly is constrained between the output flange and the armature plate by compression springs.
- Torque is transmitted through the shaft to the armature plate via flexible discs, resulting in a Zero Backlash connection up to 100% of holding torque.
- When energized, the resulting magnetic flux counteracts the spring force and pulls the armature plate back, allowing the friction disc assembly to flex back into a relaxed position so that the hub can spin freely.
- If power is lost or interrupted, the unit will revert to its engaged state, clamping the friction disc and preventing rotation.

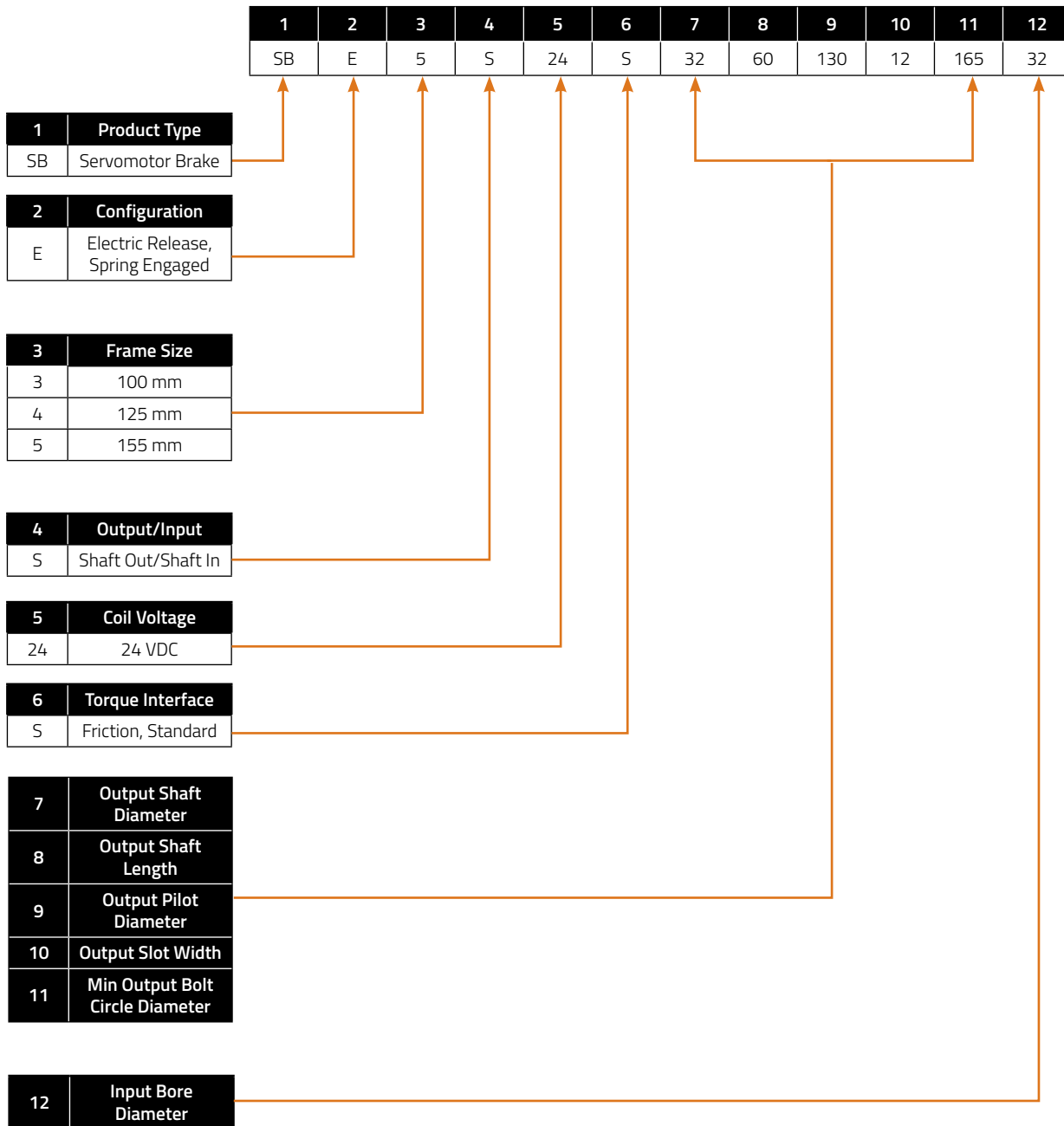
Guidelines

- Nexen's Electric Servomotor Brakes are designed as a holding brake, capable of Emergency Stops. Not intended for dynamic stopping applications.
- Operating Nexen's Electric Servomotor Brakes over their rated temperatures will adversely affect brake performance. The brake's actuation and torque ratings should be validated in the application environment to confirm the proper functionality and duty cycle.

Product Nomenclature

The diagram below explains the nomenclature of an Electric Servomotor Brake model number.

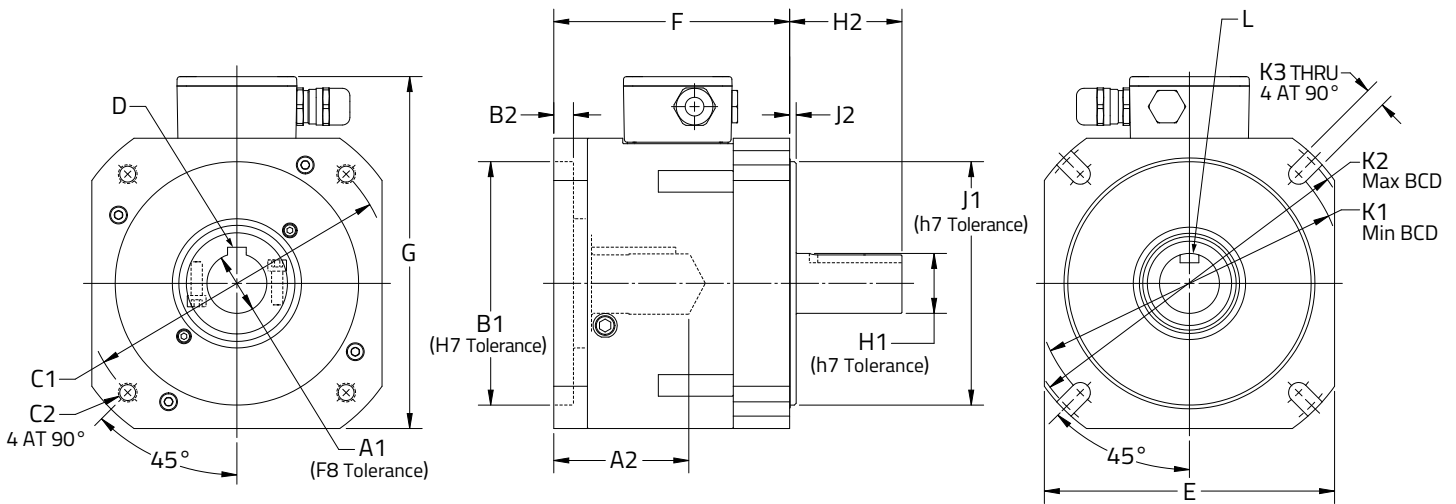
Example: Size 5 Electric Servomotor Brake with a 24 VDC coil — SBE-S24S-32-60-130-12-165-32



All dimensions are in mm

Approximate Dimensions

The following section contains the approximate dimensions for each size of the Electric Servomotor Brake. When specifying a new brake for an application, always verify product information with the user manual and sales drawing. Please visit www.nexengroup.com for user manuals, product dimensions, and specifications.



Contact Nexen to configure an Electric Servomotor Brake's dimensions for your application.

		Size 3	Size 4	Size 5	
Input	Bore Diameter, F8	A1	14-19	19-24	24-32
	Bore Depth	A2	55.5	64.9	72.1-83
	Pilot Diameter Female, H7	B1	73.025-80	95-110	110-130
	Pilot Depth	B2	6	9	10.5
	Bolt Circle Diameter	C1	98.43-100	130	165
	Bolt Hole	C2	M5 X 0.8, M6 X 1.0	M8 X 1.25	M10 X 1.5
Housing	Keyway W X H	D	5 X 5, 6 X 6	6 X 6, 8 X 7	8 X 7, 10 X 8
	Flange Width	E	100	125	155
	Length	F	94.76	106.74	125.98
Output	Overall Height	G	131.7	157.2	188
	Shaft Diameter, h7	H1	14-19	19-24	24-32
	Shaft Length	H2	30-40	40-50	50-80
	Pilot Diameter Male, h7	J1	73.025-80	95-110	110-130
	Pilot Extension	J2	2.01	3	3.5
	Min Bolt Circle Diameter	K1	98.43-100	130	165
	Max Bolt Circle Diameter	K2	114.25	144.25	184.25
	Slot Width	K3	6-7	10	12
Keyway W X H	L	5 X 5, 6 X 6	6 X 6, 8 X 7	8 X 7, 10 X 8	

All dimensions shown in millimeters unless otherwise specified.

Specifications

Listed below are the standard specifications for the Nexen Electric Servomotor Brakes. The brakes can be configured differently to meet application requirements. Contact Nexen for configuration modifications.

	Specification	Units	Size 3	Size 4	Size 5
Mechanical	Min Static Brake Torque	Nm [ftlb]	5 [3.7]	10 [7.4]	27 [19.9]
	Transmittable Torque Rating ⁽¹⁾	Nm [ftlb]	Up to 45 [33.2]	Up to 95 [70.1]	Up to 235 [173.3]
	Torsional Rigidity	Nm/rad [ftlb/rad]	23,789 [17,546]	45,441 [33,516]	121,131 [89,341]
	Engagement Time ⁽⁵⁾	ms	35	95	160
	Magnetic Field Delay Time ⁽⁵⁾	ms	25	65	85
	Release Time ⁽⁵⁾	ms	60	70	150
	Max Speed ⁽²⁾	RPM	7,000	6,000	5,000
	Continuous Speed	RPM	5,000	4,000	3,000
	Backlash	ArcSec	0		
	B ₁₀		2 million		
	Overhung Load ⁽³⁾	N [lb]	Up to 550 [123.6]	Up to 1,000 [224.8]	Up to 2,000 [449.6]
	Total Hub Inertia ⁽⁴⁾	kgm ² [lbft ²]	Up to 0.00014 [0.00329]	Up to 0.00036 [0.00864]	Up to 0.00103 [0.02444]
	Weight	kg [lb]	4.5 [9.9]	7.7 [17.0]	14.1 [31.1]
	Ambient Temperature	°C [°F]	-20 to 40 [-4 to 104]		
	Max Service Temperature @ Output Flange	°C [°F]	100 [212]		
Electrical	System Voltage	VDC	24		
	Magnetic Coil Voltage	VDC	24		
	Power to Release Brake	W	28	32	45

1. Transmittable torque ratings are attainable without a key and are dependent on shaft diameter. See Transmittable Torque table for more information.
2. Duty cycle at Max Speed must be modulated to not exceed Max Service Temperature.
3. Overhung loads are based on shaft diameter and the radial force distance. See Overhung Load for more information.
4. Inertia is calculated at maximum shaft diameter. See Shaft, Hub and Rotor Inertia section for more information.
5. Response times shown are an average value for new brakes. See Response Time section for more information.

Emergency Stopping

Specification	Units	Size 3	Size 4	Size 5
Peak Energy Input	Joules Per Stop	5,400	7,100	13,300
Total Energy Input Over Facing Life	Joules X 10 ⁶	20	36	130

Emergency Stopping

- Is Infrequent and intermittent, up to four stops per hour
- Capable of stopping energy input up to values shown in table
- May reduce braking performance

Being spring engaged and electrically released, the Electric Servomotor Brake provides safe braking in emergency stops and power failures. Designed as a holding brake, Nexen's Electric Servomotor Brake is not intended for dynamic stopping applications.

Refer to the Energy Input table for peak energy per stop and total energy over the life of the friction facing that the brake can withstand and maintain operation. Use these peak values if infrequent emergency stops are expected. The energy input and total life of the brake will vary based on the application, as the values will depend on both the total inertia and speed that the brake must stop. Please contact Nexen Group for assistance with energy input due to emergency stopping.

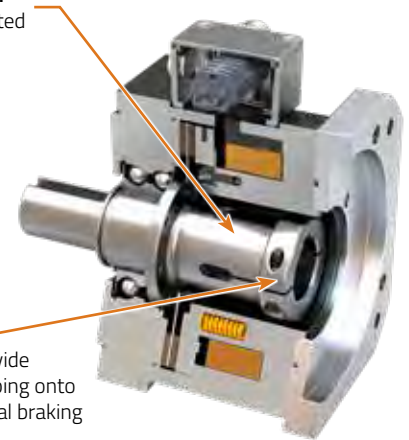
Transmittable Torque

The transmittable torque through the clamp collar connection is attainable without a key and can vary based on the bore diameter. See table below for standard metric clamp collar sizes. Please contact Nexen for other bore diameter transmittable torque ratings.

Bore Diameter (mm)	Transmittable Torque (Nm)		
	Size 3	Size 4	Size 5
14	28		
16	40		
19	45	65	
24		95	
28			150
32			235

One Piece Hub with Integrated Clamp Collar

The clamp collar is integrated into the hub for increased rigidity and durability.



Dual Clamp Collar Screws

Two screws at 180° provide significantly better clamping onto the input shaft for optimal braking and power transmission.

Shaft, Hub and Rotor Inertia

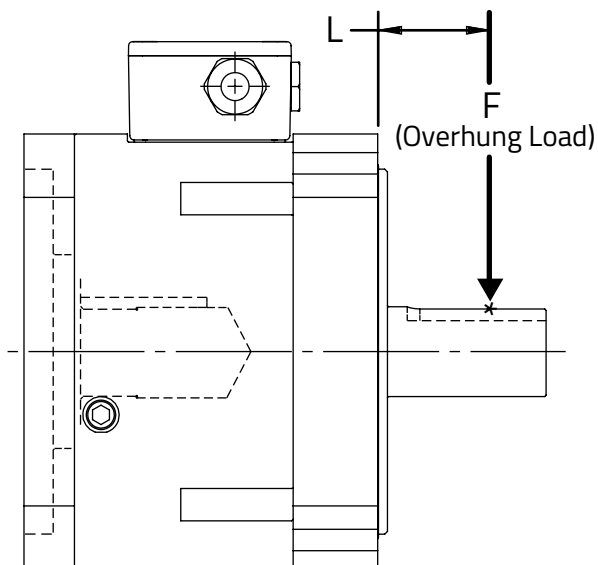
The inertia of the rotating components, including the shaft, hub, and rotor, varies based on the Input Bore and Output Shaft. The Inertia Table shows the total brake inertia for metric clamp collar and shaft sizes. The table assumes the Bore Diameter and Shaft Diameter are the same. Please contact Nexen for other Bore and Shaft Inertia ratings.

Bore and Shaft Diameter (mm)	Inertia (kgm ²)		
	Size 3	Size 4	Size 5
14	0.00013		
16	0.00013		
19	0.00014	0.00034	
24		0.00036	
28			0.00099
32			0.00103

Overhung Load

Overhung Loads are calculated with a pure radial force applied perpendicular to the shaft. Refer to table below for overhung loads for standard metric shaft diameters. Please contact Nexen for other shaft diameter ratings.

Shaft Diameter (mm)	Overhung Load F (N)		
	Size 3	Size 4	Size 5
14	200		
16	400		
19	550	750	
24		1,000	1,000
28			1,500
32			2,000
Distance L (mm)	20	25	30
Nominal Bearing Life (hours)	30,000	30,000	25,000



Response Time

The response times shown are for a brake operating within the stated temperature specifications with a nominal air gap, nominal torque, and circuit voltage protections in place. Switching times can vary significantly based on temperature, air gap (facing wear), and the controlling circuit and components.

Average Response Times ⁽¹⁾ Standard Units		Size 3	Size 4	Size 5
Engagement Time (ms)	t_1	35	95	160
Magnetic Field Delay Time (ms)	t_{11}	25	65	85
Release Time (ms)	t_2	60	70	150

1. Typical switching time tolerances are $\pm 25\%$.

Response times shown are an average for new brakes. As the friction facings wear, the air gap will increase, which will lengthen response times.

t_1 = Engagement Time [ms]. The time from voltage removal to reaching 90% of rated torque.

t_{11} = Magnetic Field Delay Time [ms]. The time from voltage removal to an initial torque reading.

t_2 = Release Time [ms]. The time from voltage applied to zero torque.

The relationship between current, voltage, and torque versus time can be seen in the graph.

t_1 = Engagement Time

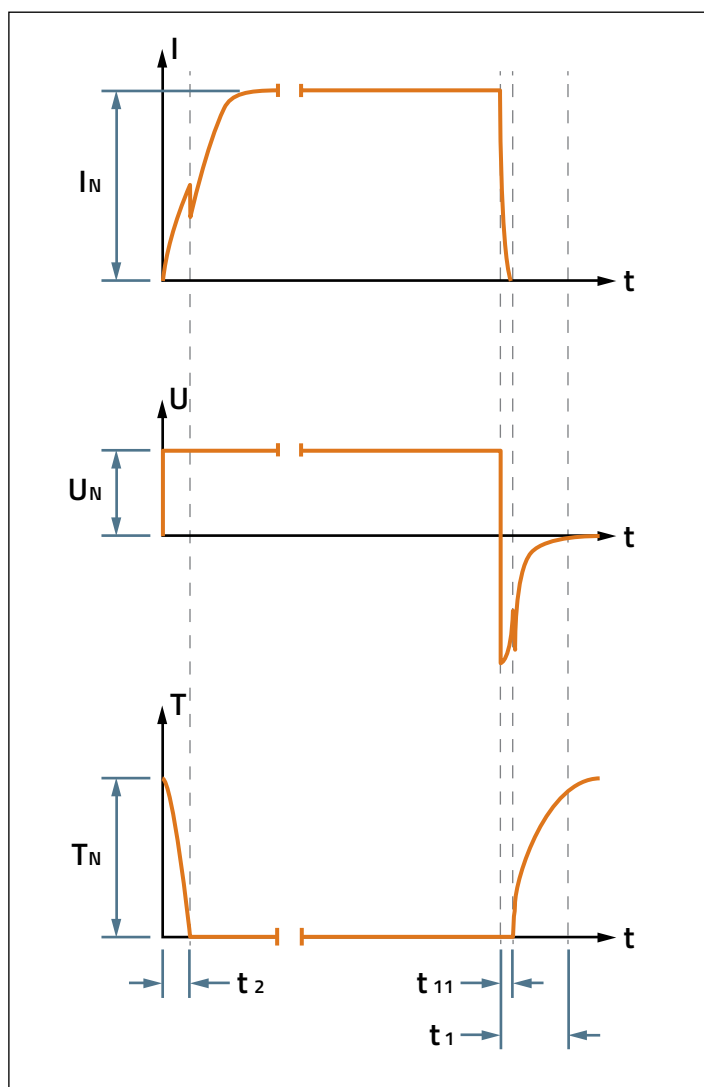
I_N = Nominal Coil Current

t_{11} = Magnetic Field Delay Time

U_N = Nominal Coil Voltage

t_2 = Release Time

T_N = Nominal Torque



Appendix: Definitions

Backlash

Industry standards define backlash less than 3.2 μm as Zero Backlash. Nexen's Electric Servomotor Brakes are designed for backlash-free performance by utilizing a flexible disc to transfer torque through the brake to maintain Zero Backlash. The electric servomotor brake also incorporates a split hub shaft collar with a backup keyway to provide Zero Backlash connections.

Corrosion Resistance

Various corrosion protection options are available; contact Nexen for all options.

Emergency Stopping

Emergency stopping is used to stop a machine in the event of a jam, malfunction, or power loss. Nexen's Electric Servomotor Brakes can withstand infrequent emergency stopping.

Environmental Standards

Nexen complies with international environment directives CE, RoHS, REACH and Conflict Minerals. Contact Nexen for conformance documentation.

IP65 Dust and Waterproof Standards

Nexen's Electric Servomotor Brakes are completely enclosed to meet IP65 standards.

Overhung Load (Also Called Side Loading)

In overhung load applications, the load force is applied to the shaft beyond the support point and perpendicular to the shaft. Refer to product specifications for permissible load allowed.

Static Holding

Nexen's Electric Servomotor Brake is designed to function as a static holding brake. Static holding occurs when the unit is in a braking position while the shaft has stopped. At this point, the brake is used to hold the mechanism or machine in place.

Torsional Rigidity

Nexen's Electric Servomotor Brakes offer high torsional rigidity and can withstand a high twisting force without affecting performance. This is beneficial in any system where precision positioning is required.

Transmittable Torque Rating

Transmittable torque is the maximum rated amount of torque that can be passed from a motor through the brake and into a gearbox or other output. Transmittable torque accounts for clamp-collar holding force and output shaft strength.

Engineering Support



Nexen Group engineers and manufactures precision motion control for OEM machine designers, system integrators, and maintenance personnel, keeping equipment running trouble-free in the harshest environments.

Contact Nexen Group to see how our engineers can help design the must-have motion control products for your next project.



- CE
- RoHS
- REACH
- Conflict Minerals

nexen

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