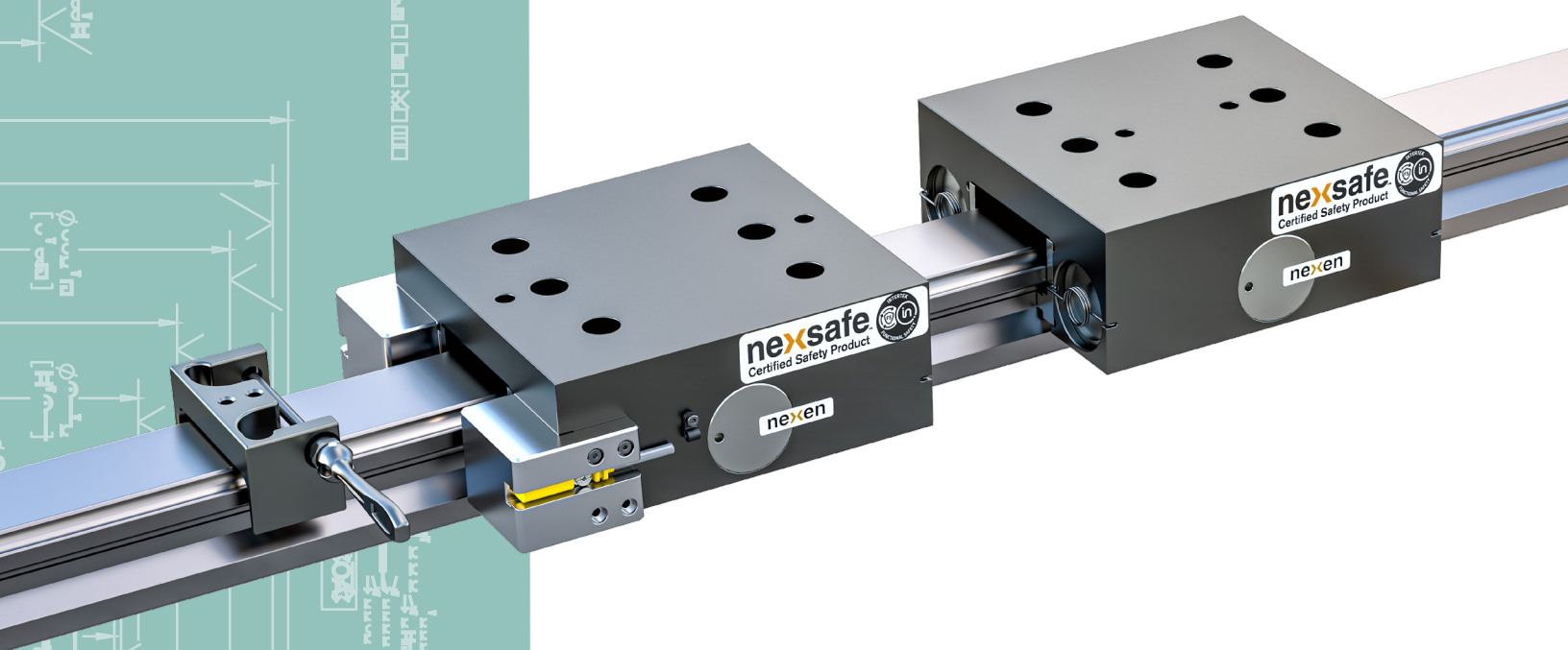




Linear Profile Guide Rail Brakes

Technical Data Sheet



NexSafe® Safety Rated Rail Brake

Spring Engaged, Air Released

Page 2

Manual Rail Brake

Manual Engaged and Released

Page 11

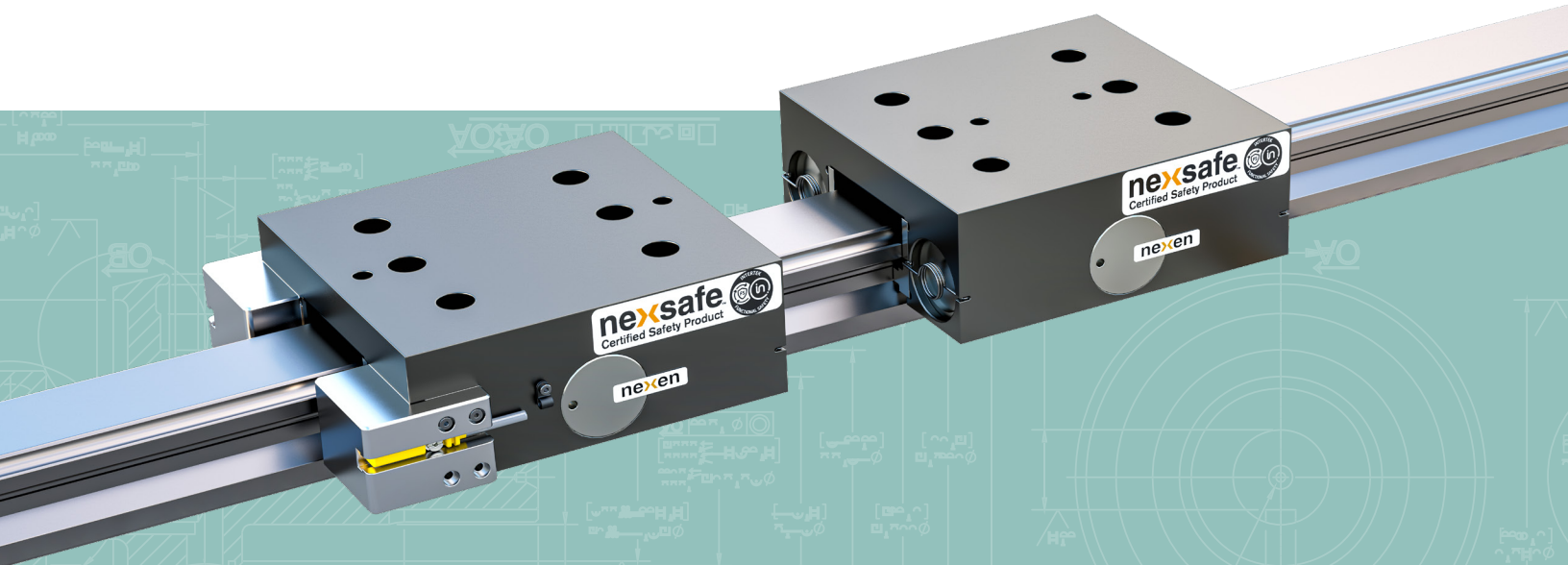
nexsafe®
Certified Safety Products



A New Standard in Performance

Nexen's series of linear profile guide rail brakes use spring force to secure the load in holding applications. Superior response time and high force for stopping and holding in e-stop and power-off situations. Each rail brake clamps directly onto the guide rail to provide positive braking and holding in all axes, with no effect on bearing surfaces.

nexsafe
Certified Safety Products



Key Features Include:

- Low backlash for accurate position holding
- Brake geometry is similar to linear bearing cassettes for easy installation
- Provides stiffness and eliminates vibration in linear drives
- Large clearance between brake and rail compensates for installation misalignment
- No lubrication or periodic maintenance required
- Models available to fit most common profile guide rails
- Highest spring engaged/air released holding force on the market

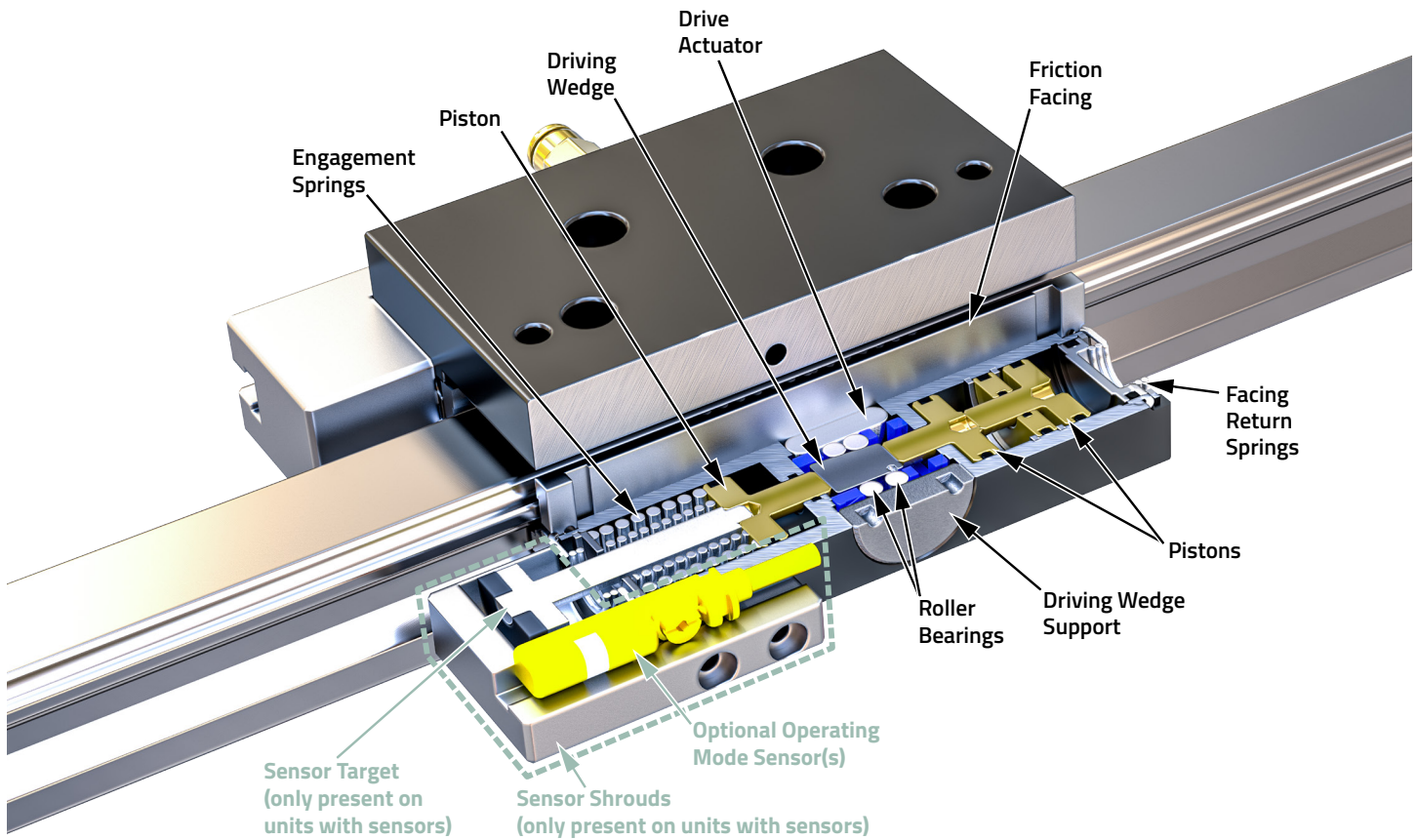
Nexen's Spring Engaged, Air Released Rail Brakes are safety rated to comply with international safety standard ISO 13849-1. Category Level up to 4 and Performance Level up to e, able to be achieved using Nexsafe products in recommended configuration.



- ✓ CAT 4 PL e
- ✓ SIL 3

Certificate NO. FS-CRT-0006
intertek.com/directories/

Rail Brake Specifications



Specifications

Model	Holding Force (F) (Minimum)	Backlash at Full Brake Force (Maximum)	Release Pressure (Minimum)	Engagement Time ² (t _e)	Mass ³ (Average)	Service Temperature	Cycle Life (B ₁₀)
RB15B	500 N [112 lbs]	Up to 0.10 mm [0.004 in]	5.5 bar [80 psi]	0.049 sec	0.41 Kg [0.904 lbs]	4.5 to 65.5°C [40 to 150°F]	2 Million Cycles
RB20B	800 N [180 lbs]	Up to 0.13 mm [0.005 in]	5.5 bar [80 psi]	0.044 sec	0.62 Kg [1.367 lbs]		
RB25B	1000 N [225 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.050 sec	0.84 Kg [1.86 lbs]		
RB30B	1300 N [292 lbs]	Up to .020 mm [0.008 in]	5.5 bar [80 psi]	0.070 sec	1.54 Kg [3.40 lbs]		
RB35B	1600 N [360 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.070 sec	2.04 Kg [4.50 lbs]		
RB45B	2600 N [585 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.080 sec	3.48 Kg [7.68 lbs]		
RBL55B ¹	2600 N [585 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.225 sec	5.21 Kg [11.49 lbs]	4.5 to 65.5°C [40 to 150°F]	1 Million Cycles
RBL65B ¹	3400 N [764 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.230 sec	7.10 Kg [15.65 lbs]		

Contact Nexen if one or more of these specifications must be modified for your application.

1. RBL55B & RBL65B are not currently safety rated, nor are they available with operating mode sensors.

2. Average, full engagement time with up to 2 meters length of 4 mm, polyurethane tube, and 1.4 Cv, 24 Volt directional control valve and no quick exhaust.

3. Mass shown is for standard units. Units with operating mode sensors have up to 0.25 kg in additional mass. (Mass includes all lengths of cabling).

Rail Brake Product Numbers by Rail Type

Rail/Carriage Manufacturer	Rail Type	RB15B	RB20B	RB25B	RB30B	RB35B	RB45B	RBL55B	RBL65B
ABBA	BRH/BRR	968217	968218	968112	968219	968220	968221	N/A	N/A
HIWIN	HGR ¹	968179 ²	968178	968161	968107	968174	968181	968261	Call Us ³
IKO	LWH	968132	968127	968158	968115	968171	968184	968254	968259 ⁴
	LRX	968134	968129	968160	968116	968173	968182	968253	968258 ⁴
	LWE	968133	968128	968159	968117	968172	968183	N/A	N/A
INA	KUSE	N/A	968148	968154	968118	968167	968194	N/A	N/A
	KUVE	968137	968143	968155	968108	968168	968195	N/A	N/A
LINTECH	HRC/ARC	968214	968215	968216	Call Us ³	Call Us ³	Call Us ³	N/A	N/A
NB	SGL ¹	968223 ²	Call Us ³	Call Us ³	Call Us ³	Call Us ³	Call Us ³	N/A	N/A
NOOK	NH	Call Us ³	Call Us ³	968213	Call Us ³	968198	Call Us ³	N/A	N/A
	NHRC / NARC	Call Us ³	Call Us ³	968233	Call Us ³	968238	Call Us ³	N/A	N/A
NSK	LS / NS	968138	968144	968156	968119	968169	N/A	N/A	N/A
	RA	Call Us ³	Call Us ³	Call Us ³	Call Us ³	Call Us ³	968191	Call Us ³	Call Us ³
	LH / NH	968131	968125	968157	968120	968170	968185	968255	968260 ⁴
PMI	MSA	968200	968201	968202	968203	968204	968205	Call Us ³	Call Us ³
ROCKFORD	RPG	968217	968218	968112	968219	968220	968221	N/A	N/A
ROLLON	MRRO	Call Us ³	Call Us ³	968235	Call Us ³	Call Us ³	N/A	N/A	N/A
SBC	SBG	Call Us ³	968188	Call Us ³	Call Us ³	Call Us ³	Call Us ³	Call Us ³	Call Us ³
	SBI	Call Us ³	968186	Call Us ³	Call Us ³	Call Us ³	Call Us ³	Call Us ³	Call Us ³
SCHNEEBERGER	MR	N/A	N/A	968162	N/A	Call Us ³	968206	Call Us ³	Call Us ³
EWEILLIX (SKF)	LLRHS..A	968139	968146	968152	968105	968165	Call Us ³	N/A	N/A
	LLRHS..LA	968139	968146	968153	968105	968165	Call Us ³	N/A	N/A
	LLRHS..SA	968139	968146	968153	968105	968165	Call Us ³	N/A	N/A
	LLTHR	Call Us ³	Call Us ³	968121	968111	Call Us ³	Call Us ³	N/A	N/A
STAR (BOSCH) (REXROTH)	1605	968139	968146	968152	968105	968165	968187	Call Us ³	Call Us ³
	1607	968139	968146	968152	968105	968165	968187	Call Us ³	Call Us ³
	1645	968139	968146	968152	968105	968165	968187	Call Us ³	Call Us ³
	1647	968139	968146	968152	968105	968165	968187	Call Us ³	Call Us ³
	1805	N/A	N/A	968153	Call Us ³	968166	968197	Call Us ³	Call Us ³
	1807	N/A	N/A	968153	Call Us ³	968166	968197	Call Us ³	Call Us ³
TBI	TRH	968207	968208	968209	968210	968211	Call Us ³	Call Us ³	Call Us ³
THK	HSR	968135 ²	968145	968130	968102	968101	968193	968252	968257 ⁴
	SHS	968141 ²	968147	968150	968106	968163	968190	968250	968256 ⁴
	SRG	968136	968142	968126	968114	968164	968192	968251	Call Us ³
	SR ¹	968177 ²	968180	968151	968113	968176	N/A	N/A	N/A
THOMSON	400	Call Us ³	968149	Call Us ³	968122	Call Us ³	Call Us ³	Call Us ³	N/A
N/A	40mm Rectangle	Call Us ³	Call Us ³	Call Us ³	Call Us ³	Call Us ³	968199	Call Us ³	Call Us ³

Contact Nexen if you don't see the rail listed above for your application, or need operating mode sensors for your application.

All Rail Brakes shown are Safety Rated and can be modified to add operating mode sensors, except sizes 55 & 65.

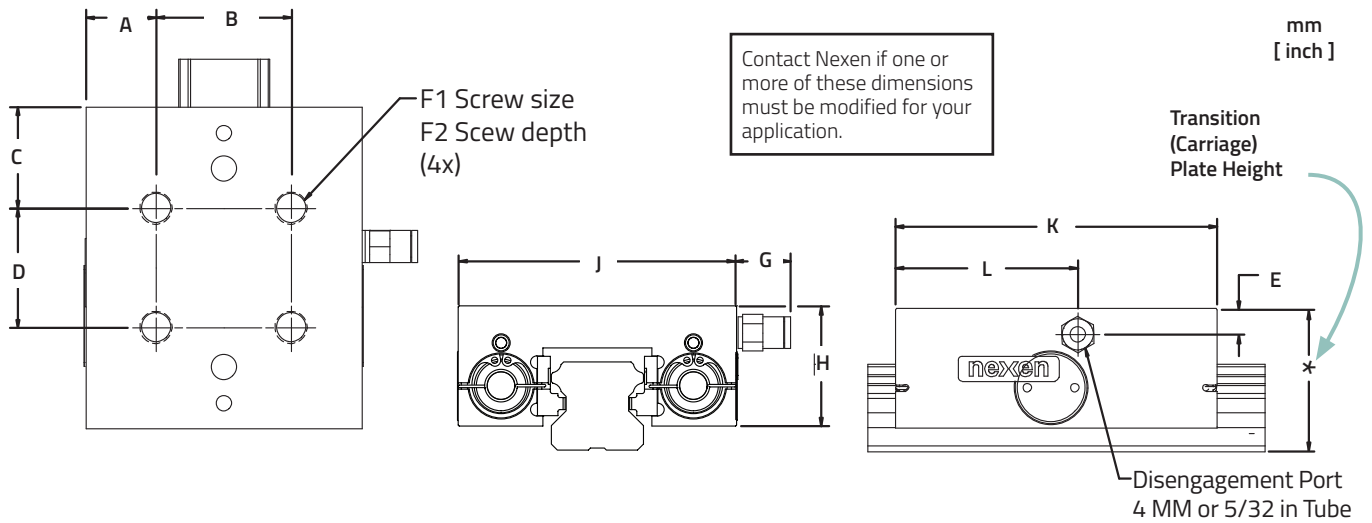
All Rail brakes shown above have a release pressure of 5.5 bar [80 PSI], many rail types/sizes are available with release pressures below 4.1 bar [60 PSI].

^[1] Rail brake holding forces are 10% less than shown on the previous page when used with THK: "SR", Hiwin: "HGR" and NB: "SGL" rail types.

^[2] RB15 product numbers 968135, 968141, 968177, 968223 and 968179 have a holding force of 400 N [90 lbs].

^[3] Contact Nexen for Availability. ⁴ RBL65 Not Recommended for E-Stops.

Rail Brake Dimensions

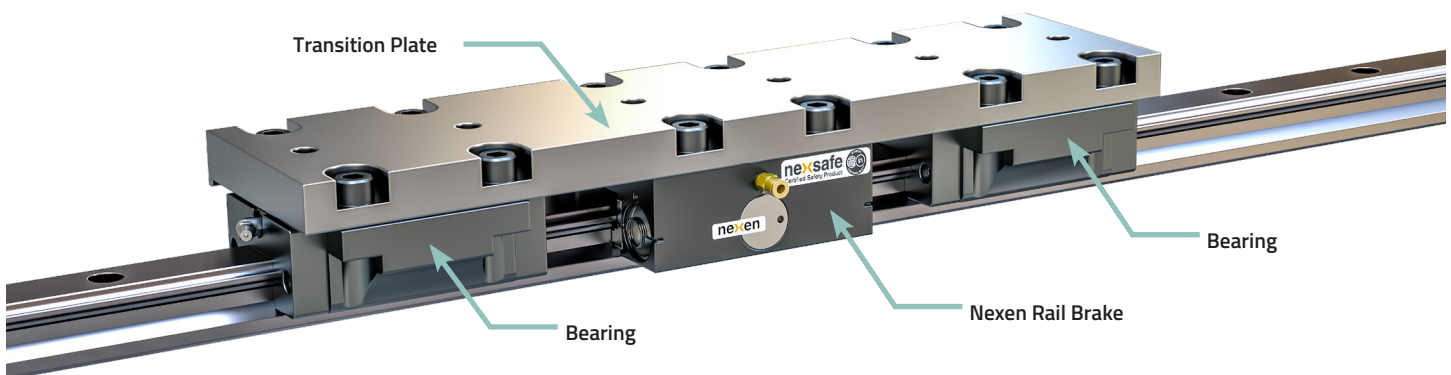


Model	A	B	C	D	E	F1	F2	G	H	J	K	L	Threaded Port
RB15B	14.25 [0.561]	26.00 [1.024]	20.50 [0.807]	26.00 [1.024]	5.0 [0.20]	M5 x 0.8-6H	5.20 [0.210]	13.90 [0.550]	21.00 [0.827]	54.50 [2.146]	67.00 [2.640]	41.00 [1.610]	M5 x 0.8-6H
RB20B	17.25 [0.679]	30.00 [1.181]	23.50 [0.930]	30.00 [1.181]	5.0 [0.20]	M6 x 1.00-6H	7.20 [0.280]	13.90 [0.550]	25.50 [1.004]	64.50 [2.539]	77.00 [3.030]	45.00 [1.770]	M5 x 0.8-6H
RB25B	17.75 [0.699]	34.00 [1.339]	25.50 [1.000]	30.00 [1.181]	7.0 [0.28]	M8 x 1.25-6H	9.00 [0.340]	13.90 [0.550]	30.00 [1.181]	69.50 [2.736]	80.90 [3.190]	45.90 [1.810]	M5 x 0.8-6H
RB30B	8.75 [0.344]	72.00 [2.835]	24.00 [0.940]	52.00 [2.047]	7.0 [0.28]	M10 x 1.5-6H	9.00 [0.350]	13.90 [0.550]	35.00 [1.378]	89.50 [3.524]	100.00 [3.937]	48.00 [1.890]	M6 x 1.0-6H
RB35B	8.75 [0.344]	82.00 [3.228]	22.00 [0.870]	62.00 [2.441]	9.0 [0.35]	M10 x 1.5-6H	9.00 [0.350]	13.90 [0.550]	40.00 [1.575]	99.50 [3.917]	106.00 [4.173]	52.20 [2.055]	M6 x 1.0-6H
RB45B	27.25 [1.073]	65.00 [2.559]	28.50 [1.120]	70.00 [2.756]	12.5 [0.49]	M12 x 1.75-6H	14.00 [0.550]	13.90 [0.550]	50.00 [1.969]	119.50 [4.705]	127.00 [5.000]	63.20 [2.49]	M6 x 1.0-6H
RBL55B	27.5 [1.08]	75.00 [2.953]	26.0 [1.02]	75.00 [2.953]	12.5 [0.49]	M12 x 1.75-6H	14.00 [0.550]	14.70 [0.579]	58.00 [2.283]	130.00 [5.118]	127.00 [5.000]	62.60 [2.465]	M6 x 1.0-6H
RBL65B	32.0 [1.26]	76.00 [2.992]	28.5 [1.12]	70.00 [2.756]	15.0 [0.59]	M16 x 2.00-6H	20.00 [0.787]	14.70 [0.579]	75.00 [2.953]	140.00 [5.512]	127.00 [5.000]	75.00 [2.953]	M6 x 1.0-6H

*Additional dimensions and tolerances are available in the drawings and CAD models on the product pages on Nexen's website.
See Page 9 for optional operating mode sensor dimensions.

Typical Mounting Arrangement

Note: Refer to Drawings and CAD models on www.nexengroup.com to determine if Nexen's Rail Brake and the application's Bearings have the same Transition (Carriage) Plate height. If not, the Transition (Carriage) Plate must have a stepped portion or adapters must be used.



Rail Brake Sample Calculations for Emergency Stops

Sample Data

Brake Model ^{1, 2}	Holding Force (F) ¹	Engagement Time (t _e) ¹	Acceleration of Gravity (g)	Mass of Load (m)	Load Velocity (V)
RB25B	1000 N	0.050 sec	9.8 m/s ²	45.4 kg	0.50 m/s

¹For brake specifications, see Specifications Table on page 4.

²RBL65B not recommended for E-Stops.

Horizontal Travel (X and Y axis)

Dynamic Stopping Time (in seconds):

$$t_T = \frac{m \cdot V}{F} + t_e$$

$$t_T = \frac{45.4 \cdot 0.50}{1000} + .050 = 0.073 \text{ seconds}$$

Dynamic Stopping Distance (in meters):

Distance of Travel During Brake Engagement (L_e)

$$L_e = V \cdot t_e$$

$$L_e = 0.5 \cdot 0.050 = 0.025 \text{ meters}$$

Stopping Distance (L_s) at Full Brake Force

$$L_s = \frac{0.5 \cdot m \cdot V^2}{F}$$

$$L_s = \frac{0.5 \cdot 45.4 \cdot 0.50^2}{1000} = 0.006 \text{ meters}$$

Total Travel Distance

$$L_T = L_e + L_s$$

$$L_T = 0.025 + 0.006 = 0.031 \text{ meters or 31 mm}$$

In this example, the load will travel 31 mm [1.22 in] from the time the RB25B engages until the system is brought to a complete stop.

Vertical travel (Downward) (Z axis)

Dynamic Stopping Time (in seconds):

$$t_T = \frac{m \cdot (g \cdot t_e + V)}{[F - (m \cdot g)]} + t_e$$

$$t_T = \frac{45.4 \cdot (9.8 \cdot 0.050 + 0.50)}{[1000 - (45.4 \cdot 9.8)]} + 0.050 = 0.131 \text{ seconds}$$

Dynamic Stopping Distance (in meters):

Distance of Travel During Brake Engagement (L_e)

$$L_e = 0.5 \cdot (t_e^2) \cdot g + V \cdot t_e$$

$$L_e = 0.5 \cdot (.050^2) \cdot 9.8 + .5 \cdot .050 = 0.037 \text{ meters}$$

Stopping Distance (L_s) at Full Brake Force

$$L_s = 0.5 \cdot [(t_e \cdot g) + V] \cdot (t_T - t_e)$$

$$L_s = 0.5 \cdot [(0.050 \cdot 9.8) + 0.5] \cdot (0.131 - 0.050)$$

$$L_s = 0.040 \text{ meters}$$

Total Travel Distance

$$L_T = L_e + L_s$$

$$L_T = 0.037 + 0.040 = 0.077 \text{ meters or 77 mm}$$

In this example, the load will travel 77 mm [3.03 in] from the time the RB25B engages until the system is brought to a complete stop.

Safety Rating

With third party certification carried out by Intertek®, Nexen's Rail Brakes are safety certified components capable of meeting the following ratings per safety standard ISO 13849-1:2015.

Cycle Life (B_{100}) of 4 million cycles

Common Cause Failure (CCF) is 75%

Mission Time is 10 Years

Average Cycle Rate (t_{cycle}) is the mean operation time between two cycles defined by your system.

Mean Time to Dangerous Failure ($MTTF_D$) is dependent on average operation time with a maximum of 100 years.

Maximum Operation Time (T_{100}) is $MTTF_D/10$.

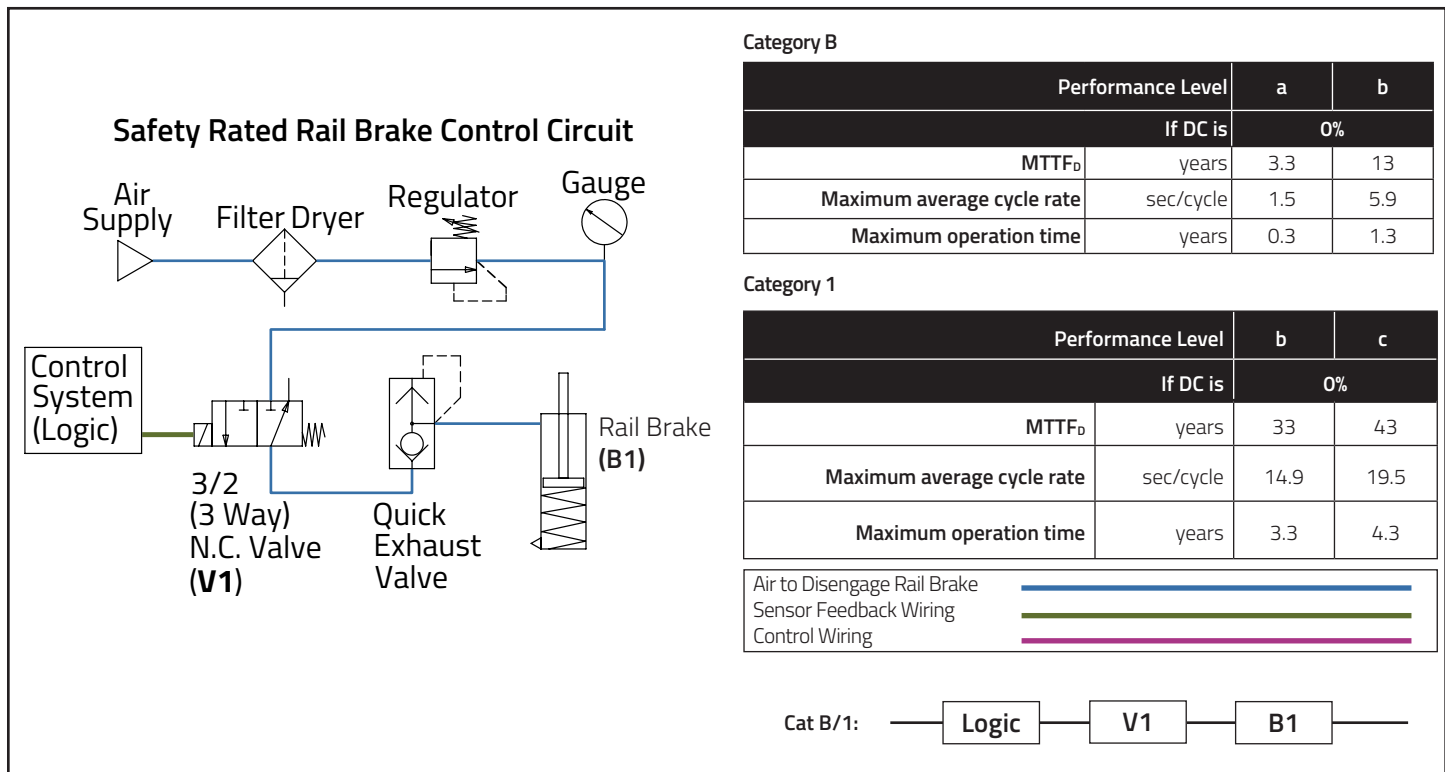
Diagnostic Coverage (DC) is dependent on brake redundancy and sensor setup:

If DC is 0%	If DC is 60%	If DC is 90%	If DC is 99%
No sensor feedback necessary.	Feedback sensor shall be used to monitor the operating mode of brake.	Feedback sensor shall be used to monitor the operating mode of brake. The brake must be cycled engaged and disengaged at least this often to check for brake functionality:	
		Every 3 months	Once every day

Calculation Assumptions

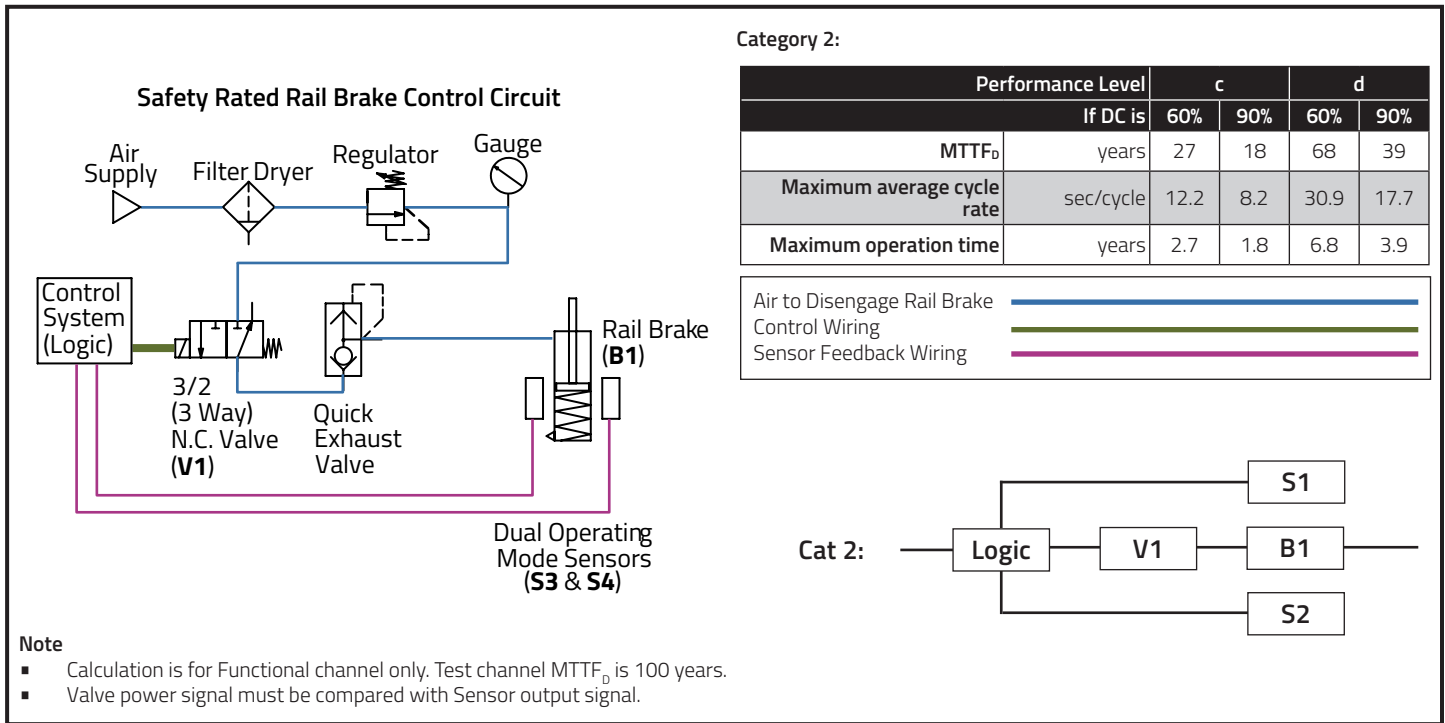
- System can be reduced to a single channel with Logic, Valve, and Brake
- $MTTF_D$ is selected based on the category, performance level and diagnostic coverage; t_{cycle} is back figured to provide a maximum cycle rate (rounded up)
- B_{100} for a pneumatic valve is 20,000,000 per 13849-1:2015(E), Annex C, Table C.1 PFH for logic is 1.5×10^{-8} based on common industry manufacturers
- 260 operational days per year (five days per week)
- 16 operation hours per day (two eight-hour shifts)

Category B or Category 1 Example: One Brake, No Sensors

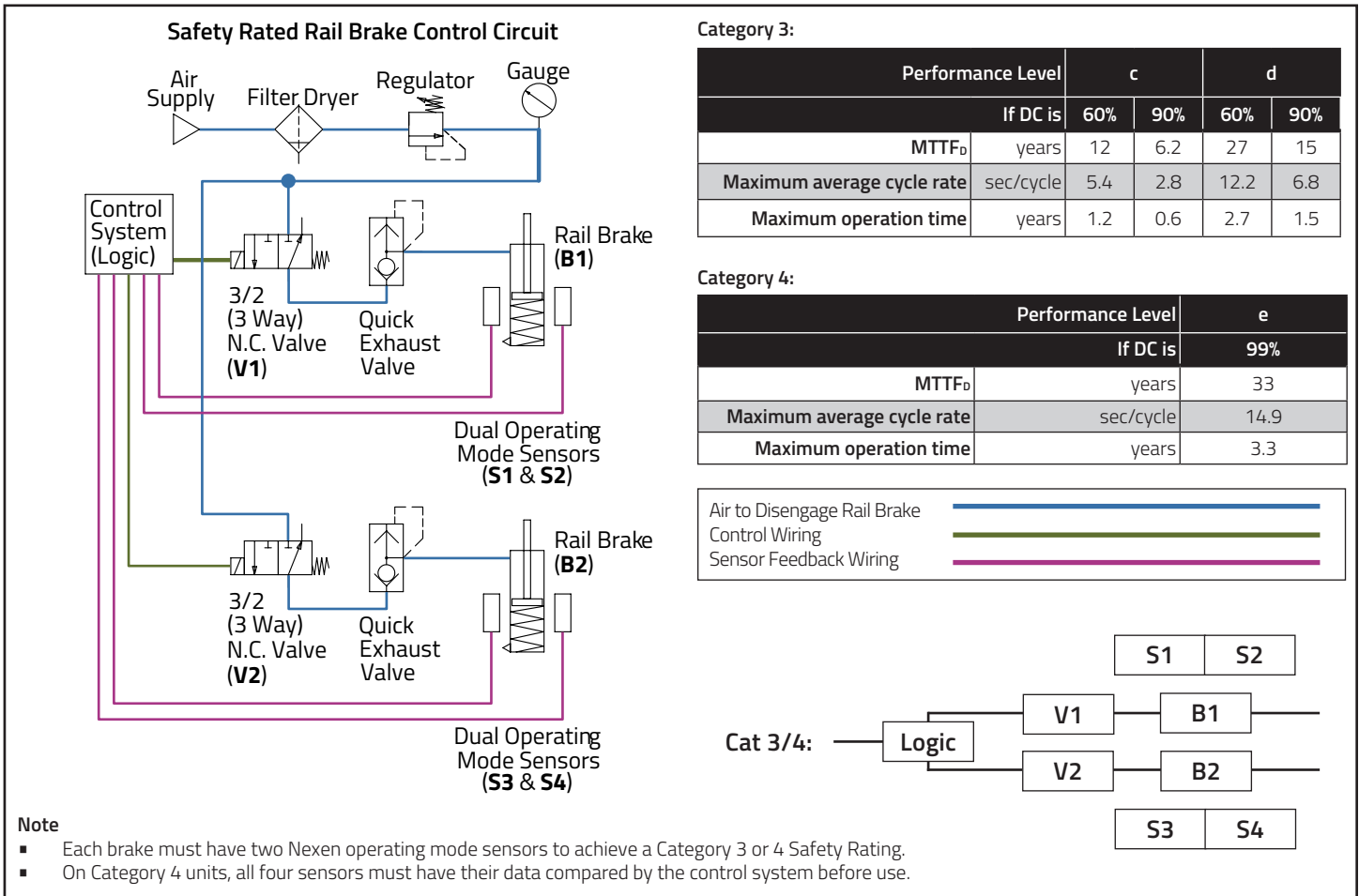


Safety Rating

Category 2: One Brake, Two Sensors



Category 3 or Category 4 Example: Two Redundant Brakes, Two Sensors on Each



Safety Rating

Safety Rating Compliance

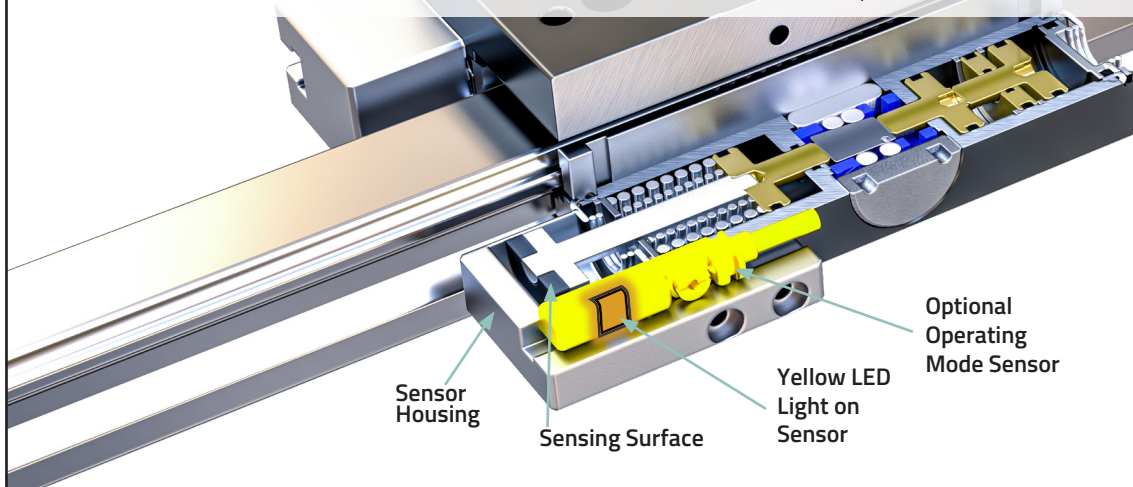
Nexen's Rail Brakes are Safety Rated by Intertek® and available with Operating Mode Sensors. By using the Operating Mode Sensor for either Engagement or Disengagement, system manufacturer's are able to gain higher safety category ratings per ISO 13849-1. Rating of the overall safety channel is the responsibility of the system manufacturer.

Industry 4.0 Solution

Nexen's Rail Brake Operating Mode Sensors for either Engagement or Disengagement are Industry 4.0 compatible and can provide information to maximize machine efficiency.

Having this information available aids with:

- Accurate Linear Positioning
- Predictive Maintenance
- Operational Feedback



Each of the two optional Proximity sensors can sense the following functions of the Rail Brake:

Disengagement Sensor Definition

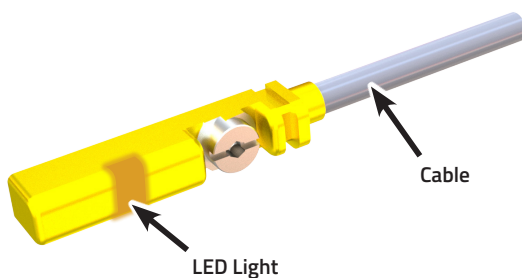
Sensor is activated when the rated air pressure is applied and the piston and facing pair move to a disengaged position.

Engagement Sensor Definition

Sensor is activated when the pistons and facing pair move out of the disengaged position into a position in which the facings will transmit force to the rail.

Operating Mode Sensors

The Operating Mode Sensor(s) can be used to signal Engagement or Disengagement of the brake on the rail. In an effort to give the system manufacturer the most versatility, the Operating Mode Sensors can be setup as Engagement or Disengagement and either redundant or individual states. The Safety Rail Brake comes equipped with either one or two sensor housings; sensor housings must be factory installed. The sensors, ordered separately, are available in both PNP and NPN modes.



Sensor Specifications

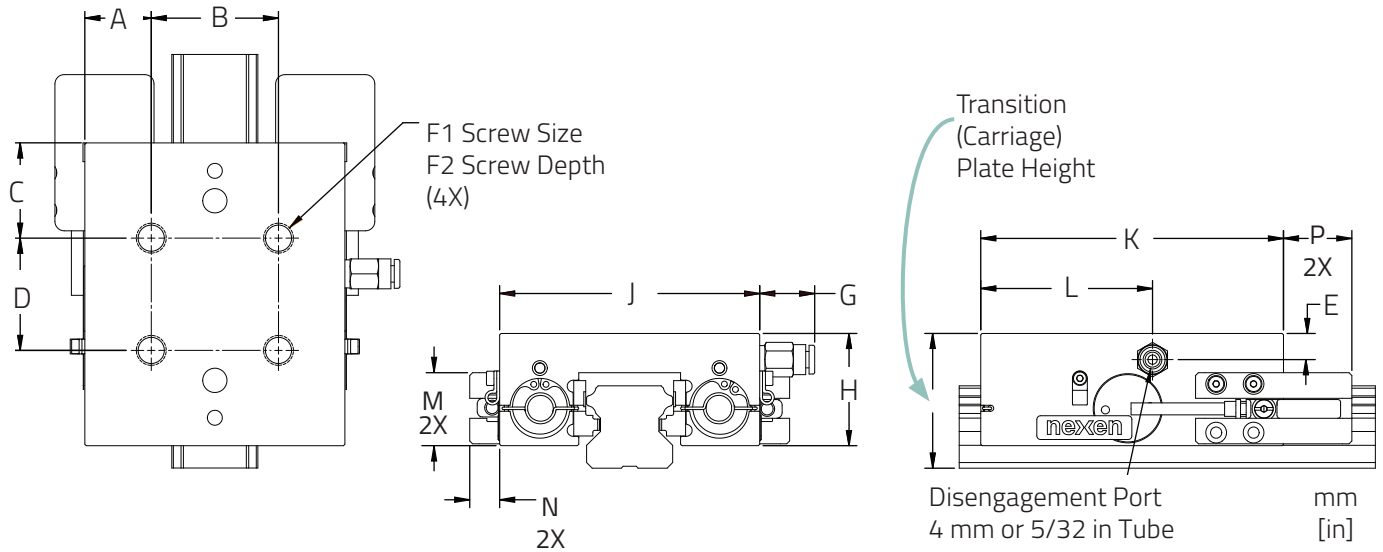
Sensor Type	Magneto-resistive
Supply Voltage	10 to 30 VDC
Operational Current	≤ 150 mA
Switching Type	Normally Open
	PNP and NPN Available
Switching State Indicator	LED, Yellow
Cable Length	Flying Leads: 7 m [22.9 ft] M8/M12 Connectors: 0.3 m [12 in]
Protection Class	IP68
Protection	Short Circuit, Wire Breakage and Reverse Polarity Protection

Available Sensors

Sensor Product Number	Type	Cable End
966195	PNP (Sourcing)	Flying Leads
966190	NPN (Sinking)	Flying Leads
966239	PNP (Sourcing)	M8 Connector
966240	PNP (Sourcing)	M12 Connector

Safety Rating

These Dimensions are the same as standard units, see **Page 5**



The following dimensions apply only to Nexen's optional sensor setup, which may be installed on Safety Rated Rail Brake units.

Additional dimensions and tolerances are available in the drawings and CAD models on the product pages at www.nexengroup.com

Contact Nexen if one or more of these dimensions must be modified for your application.


Model	M mm [in]	N mm [in]	P mm [in]
RB15B	19.3 [0.76]	8.0 [0.31]	18.3 [0.72]
RB20B	19.3 [0.76]	8.0 [0.31]	18.3 [0.72]
RB25B	19.5 [0.77]	8.0 [0.31]	18.3 [0.72]
RB30B	28.0 [1.10]	8.0 [0.31]	18.5 [0.73]
RB35B	28.0 [1.10]	8.0 [0.31]	18.5 [0.73]
RB45B	33.0 [1.30]	8.0 [0.31]	18.5 [0.73]
RBL55B	N/A, Not available with optional operating mode sensors.		
RBL65B	N/A, Not available with optional operating mode sensors.		

A New Standard In Performance

Manual Rail Brake

Nexen’s linear profile guide rail brakes use a manually actuated lever to secure the load in holding applications. The brake has no effect on bearing surfaces and provides positive zero backlash holding in all axes. Compared to pneumatic and electric rail brakes, the compact footprint allows for ease of installation.

Nexen’s Manual Rail Brake is engineered for dependable performance, providing an industry-leading braking solution for linear profile guide rails. An unrelated, redundant safety system is recommended if personnel safety is required. Nexen’s manual rail brakes are not safety-rated.



Key features include:

- Easy operation. No wiring. No air lines.
- Zero backlash for accurate position holding
- Brake is compact for ease of installation
- Brakes engagement status is apparent via lever position
- Ideal for power-off and holding applications
- Large clearance between brake and rail compensates for installation misalignment
- Models available to fit most common profile guide rails
- Static holding cycle life in excess of one hundred thousand cycles

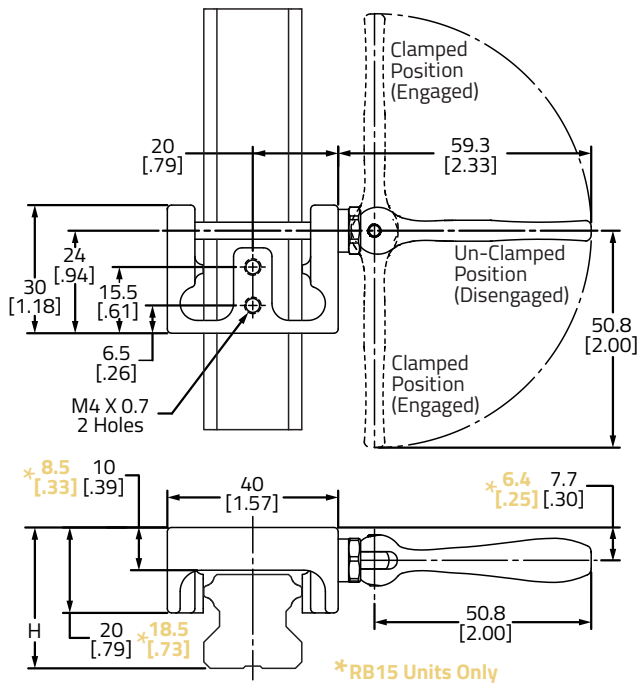
Manual Rail Brake: Product Description

Example: RBM 25 - THK - HSR

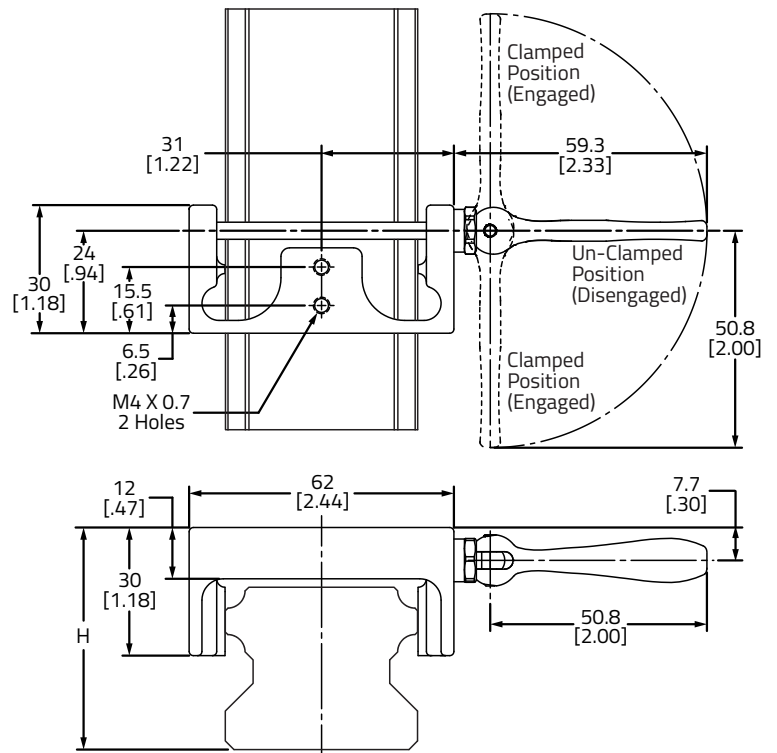
Product Type	Rail Size	Rail Manufacturer	Rail Model
Manual Rail Brake	15	THK	HSR
	20		SHS
	25		SR
	30	IKO	LWH / MH
	35		LWE / ME
	45	NSK	NH / LH
			NS / LS
		HWIN	HGR

* Brake not compatible with Size 45 NSK-NS/LS Rail

Dimensions and Holding Force



Size: 15, 20 & 25 Rail



Size: 30, 35 & 45 Rail

Contact Nexen if your rail is not listed below.

Rail Size	Rail Manufacturer THK	Rail Manufacturer IKO	Rail Manufacturer NSK	Rail Manufacturer HIWIN	H (mm)	Weight (g)	Rated Static Holding Force (N)
15	SHS, SR	-	NS/LS	-	22.5	79	400 *
	HSR	LWE/ME, LWH/MH	NH/LH	-	24		
20	SR	LWE/ME	NS/LS	-	26.5	88	
	SHS	-	-	-	27		
	HSR	LWH/MH	NH/LH	HGR	28.5		
25	SR	-	NS/LS	-	28.5	85	
	-	LWE/ME	-	-	30		
	SHS	-	-	-	31.5		
	HSR	LWH/MH	NH/LH	-	33		
30	SHS, SR	-	NS/LS	-	36	140	
	-	LWE/ME, LWH/MH	-	-	38		
	HSR	-	NH/LH	-	40		
35	SHS	-	-	-	40	138	
	HSR, SR	LWE/ME, LWH/MH	NS/LS, NH/LH	-	42		
45	SHS	-	-	-	46	135	
	-	LWE/ME, LWH/MH	-	-	48		
	SR	-	-	-	50		
	HSR	-	NH/LH	-	52		

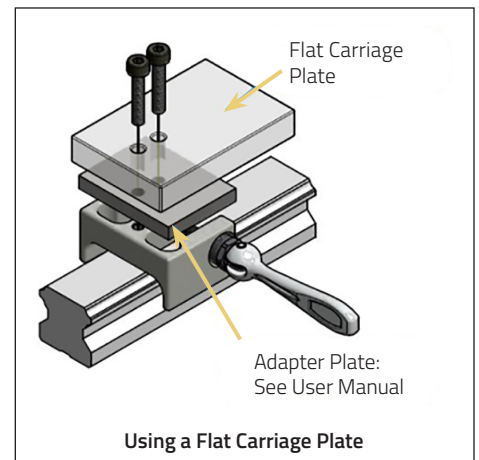
* Actual holding force may be reduced by approximately 50%, when rail or clamping surface of brake is not clean. (Grease, excessive oil, excessive dust, debris or metallic wear powder.)

- Holding force may decrease on certain types of rails.

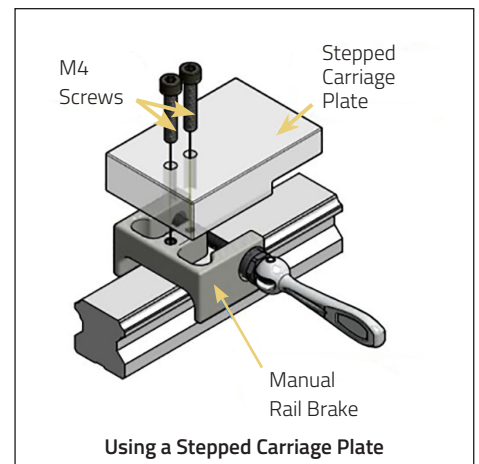
- Brake must be adjusted once every six months, or once every 10,000 operations (static cycles) to maintain rated holding force.

- Nexen Manual Rail Brake is not **CE** rated.

Installation Examples



Using a Flat Carriage Plate



Using a Stepped Carriage Plate

See User Manual for Installation Instructions

[illegible]

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[illegible]

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