LINEAR MOTION CONTROL

Technical Data Sheet

Profile Rail Brake

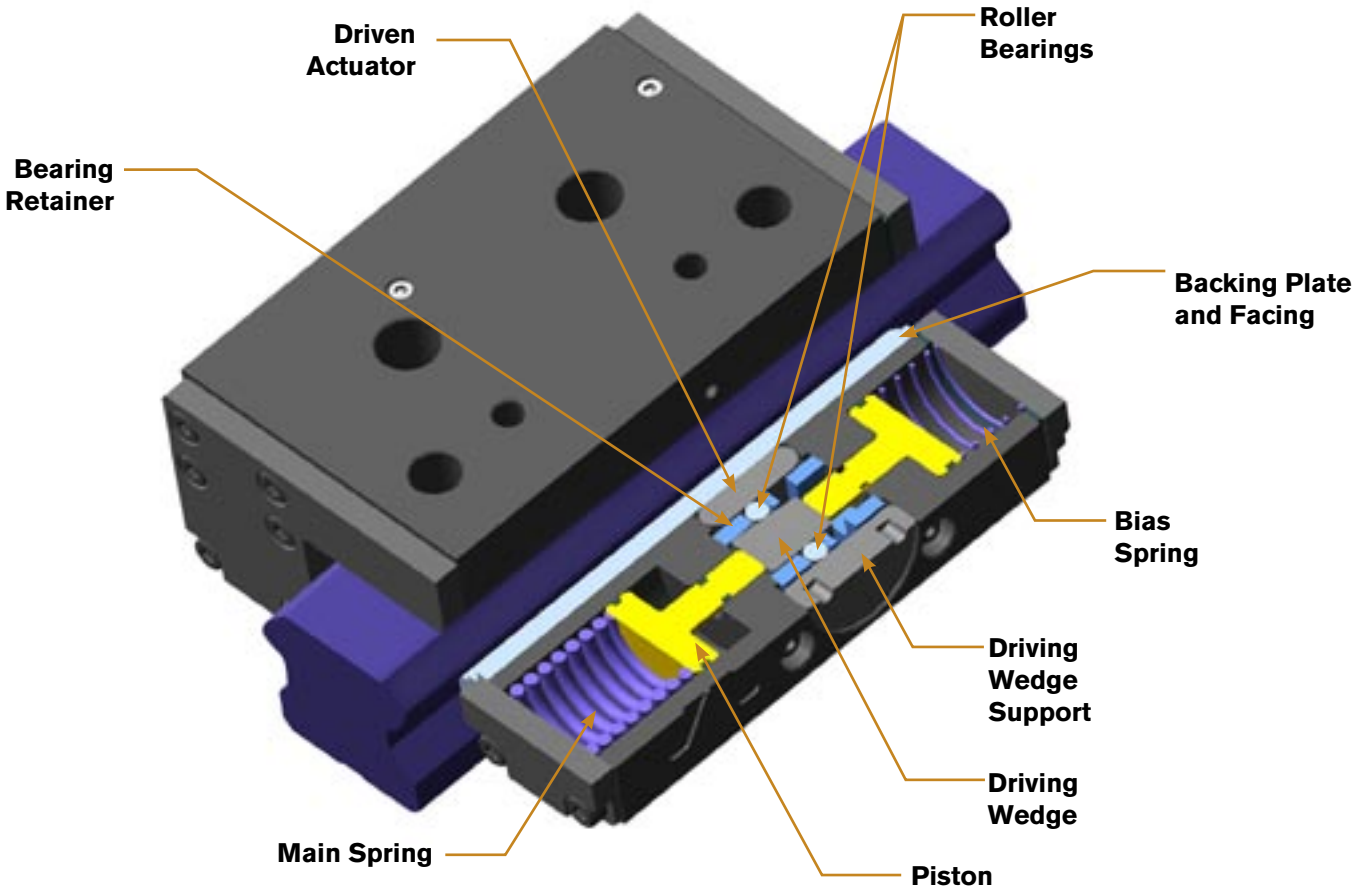
Fits 15, 20, 25, 35, and 45 mm Profile Guide Rails

Nexen's RB Series of linear profile guide rail brakes uses 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 RB brake clamps directly onto the center of the guide rail to provide positive braking and holding in all axes. These profile rail brakes hold position accurately by eliminating drive train backlash and elasticity.

Nexen's RB Series is engineered for dependable performance. With a revolutionary set of patent pending features, the RB Series provides an industry leading braking solution for linear profile guide rails. If personnel safety is required, an unrelated, redundant safety system is recommended.

- Highest air released holding force on the market
- Spring engaged, air released for power-off, e-stop and holding applications
- Configurations to fit most profile guide rails
  - (Hiwin, NSK, SKF, IKO, INA, Star, THK)
- Brake geometry is similar to system bearing cassettes for easy installation
- Low backlash for accurate position holding
- Adjustable facing gap for optimum brake performance
- Field servicable friction facing replacement
- Large friction facing contact area
- No lubrication or periodic maintenance required
- Provides stiffness and eliminates vibration in linear drives

Rail Brake Cutaway



Rail Brake Product Numbers by Rail Type

Rail/Carriage Manufacturer	Rail Type	RB15	RB20	RB25	RB35	RB45
THK	HSR	960135[2]	960145	960130	960101	960193
	SHS	960141	960147	960150	960163	960190
	SRG	960136	960142	960126	960164	960192
	SR[1]	960177[2]	960180	960151	960176	960191
STAR	1605	960139	960146	960152	960165	960187
	1607	960139	960146	960152	960165	960187
	1645	960139	960146	960152	960165	960187
	1647	960139	960146	960152	960165	960187
	1805	N/A	N/A	960153	960166	960188
	1807	N/A	N/A	960153	960166	960188
Hiwin	HGR[1]	960179[2]	960178	960161	960174	960181
INA	KUSE	N/A	960148	960154	960167	N/A
	KUVE	960137	960143	960154	960168	N/A
NSK	LS	960138	960144	960156	960169	960186
	LH	960131	960125	960157	960170	960185
Schneeberger	MR	N/A	N/A	960162	960175	N/A
IKO	LWH	960132	960127	960158	960171	960184
	LRX	960134	960129	960160	960173	960182
	LWE	960133	960128	960159	960172	960183
SKF	LLRHS..A	960139	960146	960152	960165	N/A
	LLRHS..LA	960139	960146	960153	960165	N/A
	LLRHS..SA	960139	960146	960153	960165	N/A

Specifications

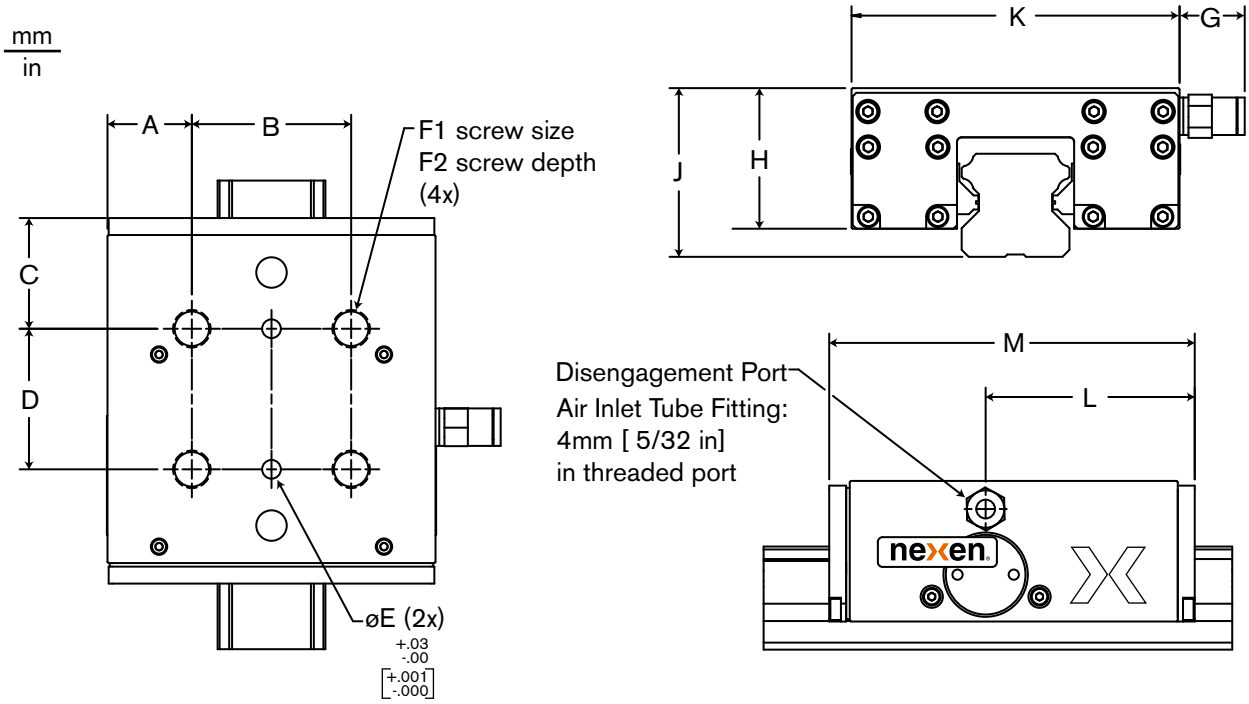
Model	Holding Force (minimum)	Backlash at Full Brake Force (maximum)	Release Pressure (minimum)	Engagement Time[3]	Mass (average)
RB15	500 N [112 lbs]	Up to 0.10 mm [0.004 in]	5.5 bar [80 psi]	0.049 sec.	0.41 Kg [0.904 lbs]
RB20	800 N [180 lbs]	Up to 0.13 mm [0.005 in]	5.5 bar [80 psi]	0.044 sec	0.62 Kg [1.367 lbs]
RB25	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]
RB35	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]
RB45	2600 N [585 lbs]	Less than 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.080 sec.	3.48 Kg [7.68 lbs]

[1] Rail brake holding forces are 10% less than show above when used with THK, “SR” and Hiwin “HGR” rail types.

[2] RB15 product numbers 960135, 960177 and 960179 have a holding force of 400 N [90 lbs]

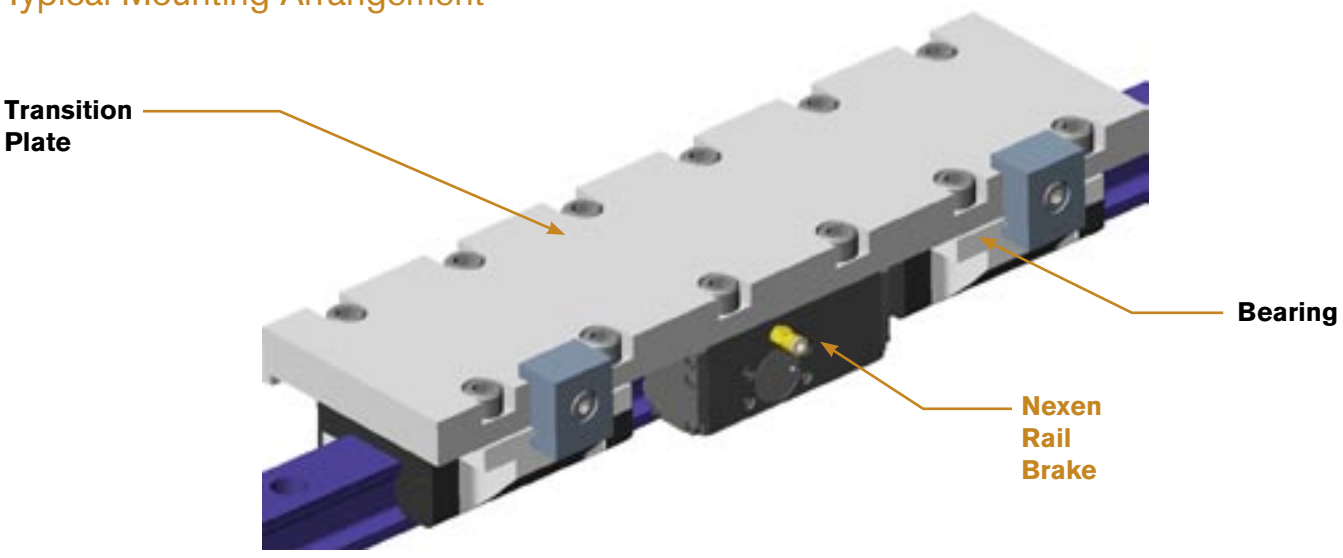
[3] Average, full engagement time with up to 2 meters length of 4mm, polyurethene tube, and 1.4 C_v, 24 volt directional control valve and no quick exhaust.

Profile Rail Brake, Approximate Dimensions



Model	A	B	C	D	øE	F1	F2	G	H	J	K	L	M	Threaded Port
RB15	14.50 [0.571]	26.00 [1.024]	19.12 [0.753]	26.0 [1.024]	3.00 [0.118]	M5 x 0.8-6H	6.2 [0.24]	14.22 [0.560]	20.50 [0.807]	24.00 [0.945]	55.00 [2.165]	50.1 [1.97]	65.00 [2.56]	M3 x 0.5-6H
RB20	16.50 [0.650]	30.00 [1.181]	20.6 [0.81]	30.00 [1.181]	4.00 [0.157]	M6 x 1.0-6H	7.2 [0.29]	14.22 [0.560]	25.50 [1.004]	30.00 [1.181]	63.00 [2.480]	34.6 [1.36]	72.00 [2.83]	M3 x 0.5-6H
RB25	18.00 [0.709]	34.00 [1.339]	23.6 [0.93]	30.00 [1.181]	4.00 [0.157]	M8 x 1.25-6H	9.0 [0.34]	13.9 [0.55]	30.00 [1.181]	36.00 [1.417]	70.00 [2.756]	44.6 [1.76]	78.0 [3.07]	M5 x 0.8-6H
RB35	8.75 [0.344]	82.00 [3.228]	19.1 [0.75]	62.00 [2.441]	6.00 [0.236]	M10 x 1.5-6H	9.0 [0.35]	13.9 [0.55]	40.00 [1.575]	48.00 [1.890]	100.00 [3.937]	59.1 [2.33]	101.0 [3.98]	M6 x 1.0-6H
RB45	27.50 [1.083]	65.00 [2.559]	24.6 [0.97]	70.00 [2.756]	6.35 [0.250]	M12 x 1.75-6H	14.0 [0.55]	13.9 [0.55]	50.00 [1.969]	60.00 [2.362]	120.00 [4.724]	68.4 [2.69]	120.0 [4.72]	M6 x 1.0-6H

Typical Mounting Arrangement



Rail Brake Sample Calculations for Emergency Stops

SAMPLE DATA

Brake Model	Brake Force (F)	Brake Engagement Time (t_e)	Acceleration of Gravity (g)	Mass of Load (m)	Load Velocity (V)
RB25	1000 N	0.050 seconds	9.8 m/s^2	45.4 kg	0.50 m/s

HORIZONTAL TRAVEL
(X and Y axis)

Dynamic Stopping Time (in seconds)

$$t_s = \frac{m \cdot V}{F}$$

$$t_s = \frac{45.4 \cdot 0.50}{F} = 0.023 \text{ seconds}$$

Stopping Distance (in meters) at full brake force

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

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

Distance of Travel During Brake Engagement

$$d_e = V \cdot t_e$$

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

Total Travel Distance

$$d_T = d_s + d_e$$

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

In this example, the load will travel 31 mm [1.22 in] from the time the RB25 engages until the system is brought to a complete stop.

VERTICAL TRAVEL
(Z axis)

Dynamic Stopping Time

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

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

Stopping Distance (d_s) at full brake force

Step A $= 0.5(g - F\backslash m)\, t_s^2$
$= 0.5(9.8 - 1000\backslash 45.4)0.131^2 = -.105$

Step B $= [F/m\ (t_e) + V]t_s$
$= [1000/45.4\ (0.050) + 0.50]0.131 = 0.210$

Step C $= 0.5(F/m)t_e^2$
$= 0.5(1000/45.4)0.050^2 = 0.028$

$d_s = A + B - C$
$= - .\ 105 + .210 - .028$
$= 0.077$ meters or 77 mm

Total Travel Distance

$$d_T = d_s = 0.077 \text{ meters or } 77 \text{ mm}$$

In this example, the load will travel 77 mm [3.03 in] from the time the RB25 engages until the system is brought to a complete stop.

nexen®

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