General Mounting Instructions

General notes

The following installation notes apply to all Roller Rail Systems.

Rexroth Roller Rail Systems are high-grade quality products. Particular care must be taken during transportation and subsequent mounting. The same care must be taken with cover strips.

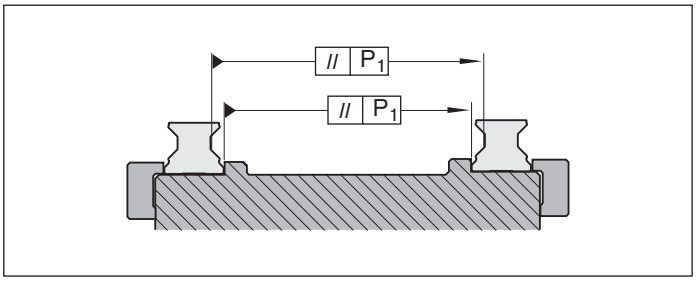
All steel parts are protected with anti-corrosion oil. It is not necessary to remove this oil, provided that the recommended lubricants are used.

⚠ In overhead mounting orientations (suspended top down) the roller runner block could possibly come away from the guide rail due to loss or breakage of rollers. Secure the roller runner block against falling!

Parallelism offset of the installed rails

Values measured at the guide rails and at the roller runner blocks
The parallelism offset P1 causes a slight increase in preload on one side of the assembly.
As long as the values specified in the table are met, the effect of parallelism offsets on the service life can generally be neglected.

Preload classes
C1, C2, C3



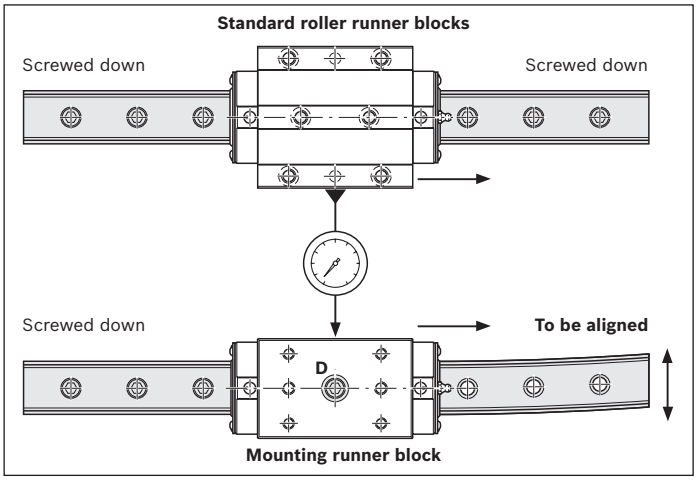
Roller rail system	Size	Parallelism offset P_1 (mm) for preload class	
		C2	C3
Standard	25	0.007	0.005
	30	0.009	0.006
	35	0.010	0.007
	45	0.012	0.009
	55	0.016	0.011
	65	0.022	0.016
Wide	55/85	0.016	0.011
	65/100	0.022	0.016
Heavy duty	65FXS	0.022	0.016
	100	0.029	0.022
	125	0.034	0.026

Mounting with mounting runner block

The central hole D in the mounting runner block allows precise measurement of the relative rail position. The rail mounting screws can also be driven down through this hole.

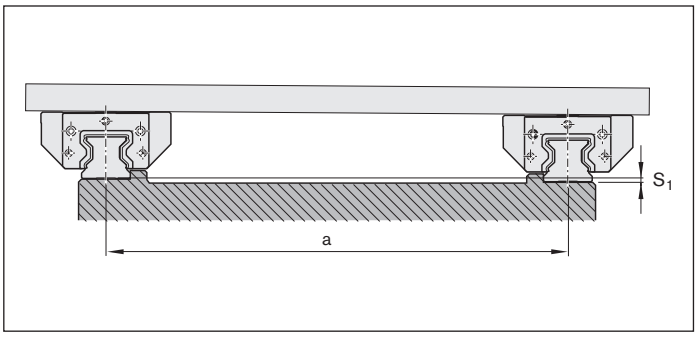
Aligning the rails

1. Align and mount the first guide rail using a graduated straightedge.
2. Set up a mounting bridge with dial gauge between the roller runner blocks.
3. Move both roller runner blocks in parallel until hole D in the mounting runner block is positioned precisely above a mounting hole in the rail.
4. Align the guide rail manually until the dial gauge shows the correct dimension.
5. Then screw down the rail through hole D in the mounting runner block.



Vertical offset

Provided the vertical offset is kept within the stated tolerances for S_1 and S_2, its influence on the service life is generally negligible.



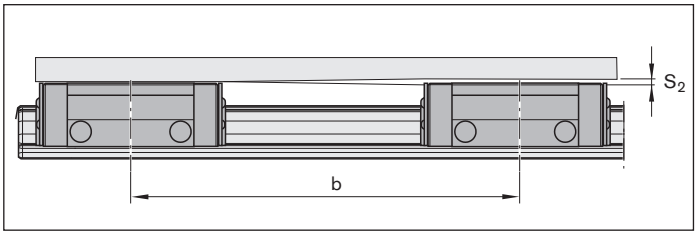
Permissible vertical offset in the transverse direction S_1
The tolerance for dimension H, as given in the table with accuracy classes in the “General Product Description” section, must be deducted from the permissible vertical offset S_1 of the roller guide rails.

Calculation factor	for preload class	
	C2	C3
Y	$1.7 \cdot 10^{-4}$	$1.2 \cdot 10^{-4}$

$$S_1 = a \cdot Y$$

S_1 = permissible vertical offset of the guide rails (mm)
a = distance between guide rails (mm)
Y = calculation factor

Permissible vertical offset in the longitudinal direction S_2
The tolerance “max. difference in dimensions H on the same rail”, as given in the table with accuracy classes in the “General Product Description” section, must be deducted from the permissible vertical offset S_2 of the roller runner blocks.



Calculation factor	for runner block length		
	Normal	Long	Extra long
X	$4.3 \cdot 10^{-5}$	$3.0 \cdot 10^{-5}$	$2.2 \cdot 10^{-5}$

$$S_2 = b \cdot X$$

S_2 = permissible vertical offset of the runner blocks (mm)
b = distance between runner blocks (mm)
X = calculation factor

Roller runner block normal

- Standard roller rail system FNS R1851, SNS R1822, SNH R1821
- Heavy duty roller rail system FNS R1861

Roller runner block long

- Standard roller rail system FLS R1853, SLH R1824, SLS R1823
- Wide roller rail system BLS R1872
- Heavy duty roller rail system FLS R1863

Roller runner block extra long

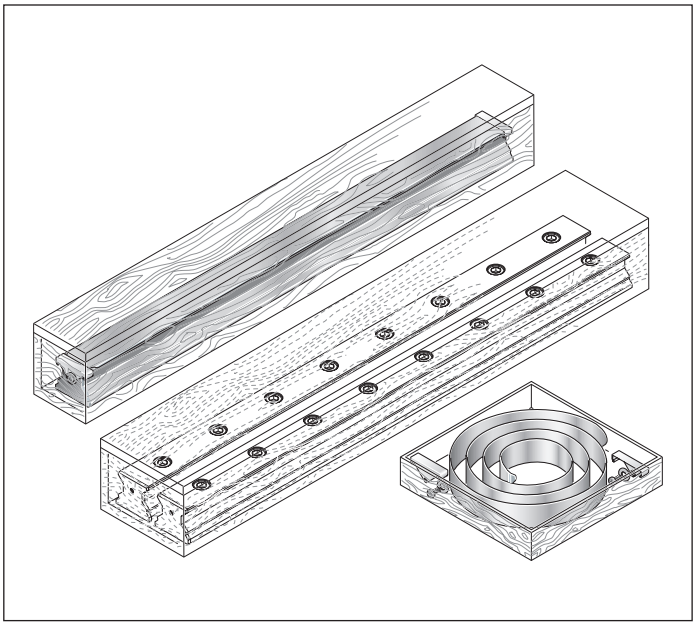
- Heavy duty roller rail system FLS R1854

General Mounting Instructions

Delivery of the roller guide rails

One-piece roller guide rails
Standard: One-piece roller guide rails with cover strip are shipped with the cover strip clipped on, both ends angled down and with protective end caps screwed on.
If required, roller guide rails can also be supplied with a separate cover strip.

Composite roller guide rails
The cover strip and protective end caps are supplied complete with screws and washers in a separate packing unit. The packing unit is marked with the same manufacturing job number as the labels on the roller guide rails.
The cover strips have one angled down and one straight end (strip tongue).

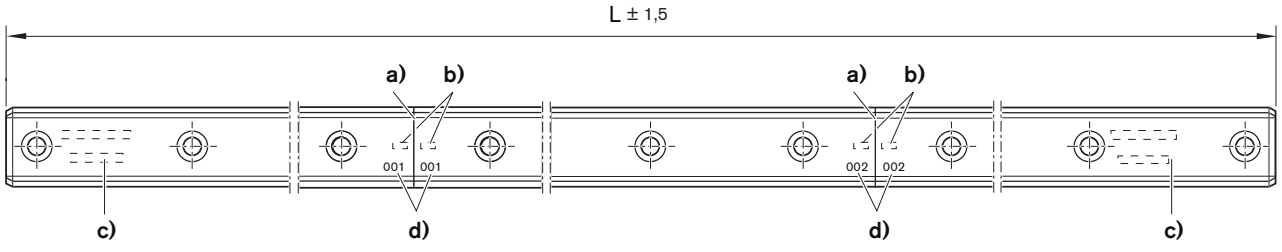


Composite roller guide rails

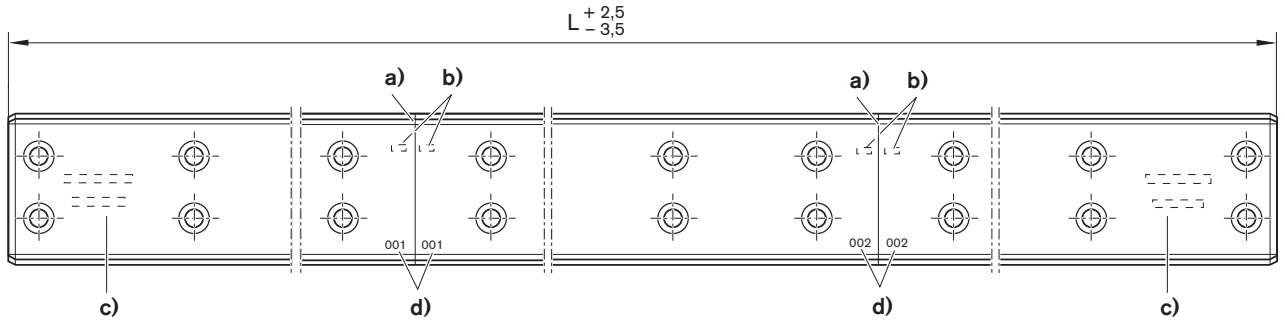
Matching sections of a composite roller guide rail are identified as such by a label on the packaging. All sections of the same rail have the same serial rail number. The numbering is marked on the top of the roller guide rail.

Note on cover strip
For composite roller guide rails, a one-piece cover strip to cover the total length L is supplied separately.

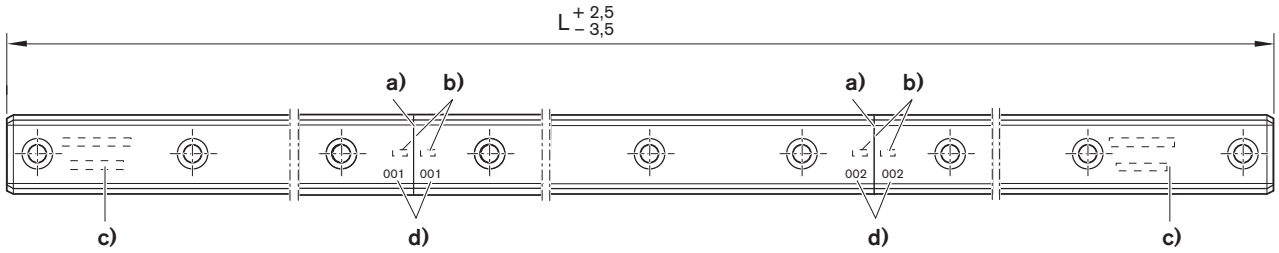
Standard roller guide rail



Wide roller guide rail



Heavy duty roller guide rail



a) Joint (sharp-edged, now also in hard chrome plated roller guide rails)
b) Rail number
c) Full rail identification on first and last sections
d) Joint number

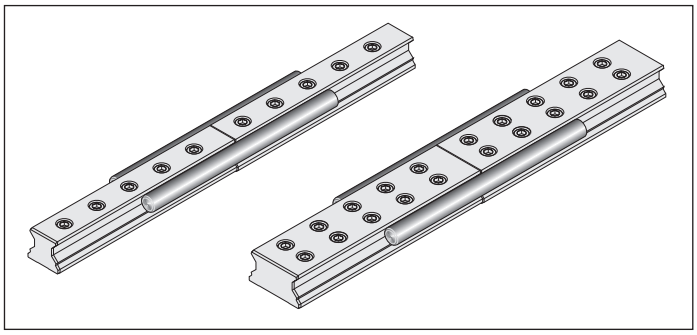
Note on adjoining structure

Permissible hole position tolerances on the mounting holes for the adjoining structure

Size	Hole position tolerance (mm)
25 - 35	Ø 0.2
45 - 100	Ø 0.3
125	Ø 0.6

Adjusting shaft

The sections of composite roller guide rails can be aligned with the aid of an adjusting shaft. For more detailed information see “Accessories” and “Mounting Instructions for Roller Rail Systems.”



General Mounting Instructions

Mounting examples

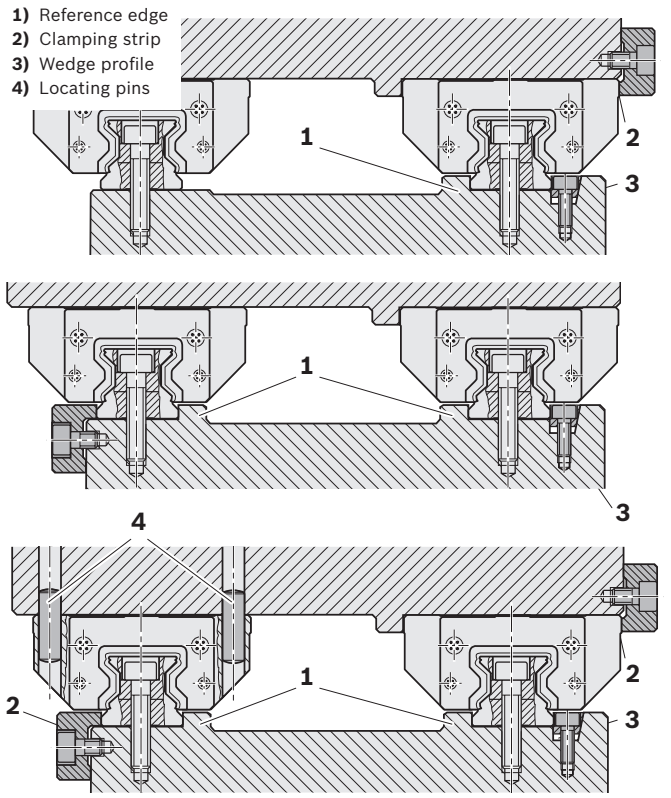
Roller guide rails

Each roller guide rail has ground reference surfaces on both sides. These are not marked, since each roller guide rail can be mounted to the left or the right of a reference edge (1) for lateral retention.

Notes

- For roller guide rails without lateral retention, we recommend using a straightedge to make sure the rails are properly aligned and parallel during assembly (recommended limits for side load if no additional lateral retention is provided, see “Fastening”).
- Use a mounting runner block (see “General Mounting Instructions”).
- Install mounting hole plugs or a cover strip (see the relevant Mounting Instructions)!

Lateral retention of the guide rails and/or runner blocks (example)

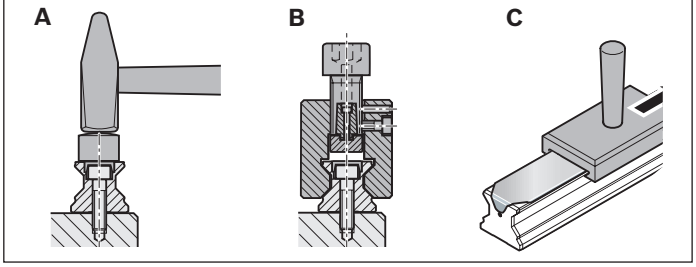


A After mounting the roller guide rails, tap the plastic mounting hole plugs into the screw holes with the aid of a plastic pad until flush with the surface of the rail.

B To fit steel mounting hole plugs, always use the special mounting tool (see “Accessories”). Equalize any difference in height between roller guide rails. Only then can the roller runner blocks be mounted.

C For roller guide rails with cover strip, see “Notes on cover strip.”

Installing mounting hole plugs or a cover strip to the guide rail



Roller runner blocks

Standard and heavy duty roller runner blocks have one ground reference edge (1) on each side, while wide roller runner blocks have two (total of four) (dimension V_1 in the dimension drawings).

⚠ Always fit steel mounting hole plugs before pushing on the roller runner blocks! Before mounting the runner block, oil or grease the sealing lips of the runner block and the bevel on the end face of the roller guide rail!

- After sliding the roller runner block onto the rail, check that it moves easily.

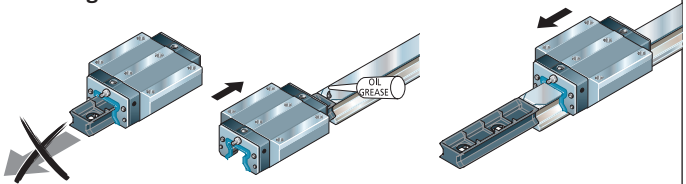
⚠ Then apply initial lubrication (see “Lubrication” section)!

- Detailed information on the mounting procedure can be found in “Mounting Instructions for Roller Rail Systems.”

⚠ The roller runner block must remain on the arbor (mounting aid) until it is slid onto the roller guide rail! Otherwise, rollers may be lost!

⚠ Use the arbor if the roller runner block is removed from the roller guide rail!
When not installed on the rails, the roller runner blocks should always be kept on the arbor!

Mounting the roller runner blocks

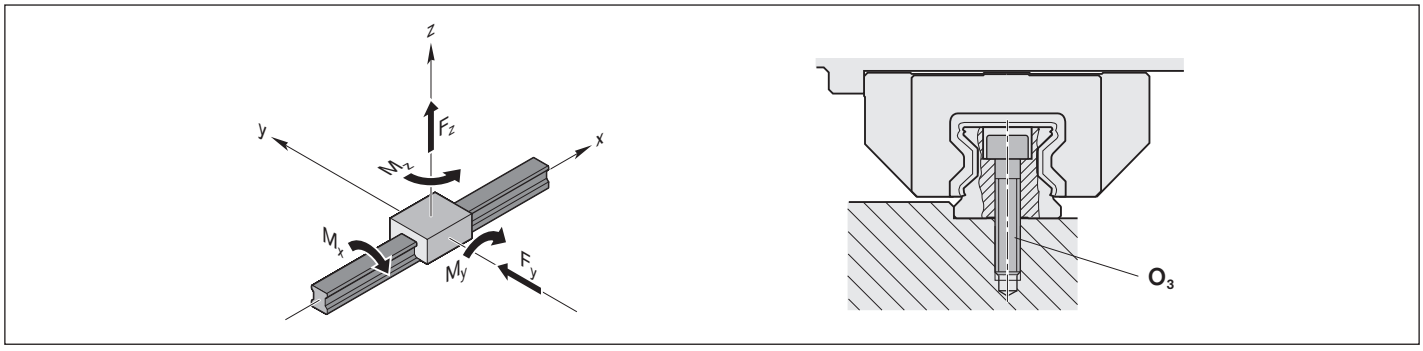


Fastening

Calculating threaded connections

The threaded connections in runner block and guide rail produce maximum traction forces $F_{0\,z\,max}$, maximum static torsional moments $M_{0\,x\,max}$ and maximum static side load $F_{0\,y\,max}$ without stop strips that the linear guide can transfer.
The maximum load on a profiled guide rail is defined not only by the static load-bearing capacity C_0 in accordance with ISO 14728 Part 2 and the static moments M_{t0} from the rolling contact, but also by the threaded connections.
As a rule runner blocks are fastened using 4 or 6 screws. Roller guide rails have one or two rows of threaded connections at regular intervals, whereby the screws located directly under the runner block are subject to the most stress. If the runner block and rail are fastened with screws in the same strength class, the connection between the rail and the mounting base (O_3) is critical to the maximum forces and moments that can be transferred.
The values in the table for strength class 8.8 are taken from DIN 637 (August 2013): Rolling bearings – Safety regulations for dimensioning and operation of profiled rail systems with recirculating rolling elements. Threaded connections with strength classes 10.9 and 12.9 are calculated based on the dimensions in the catalog (screw sizes, block lengths, clamping lengths, screw-in depths, bore diameters, rail hole distribution, rail width, etc.). Refer to VDI 2230 when recalculating other threaded connections. The maximum static traction force and maximum static torsional moment of a roller rail system are the product of the sum of the axial forces on the rail screws within the flow of forces. However, for the maximum static side load, the sum of the clamping forces on the rail screws within the flow of forces is crucial.
Input values:

- Friction coefficient in thread μ_G = 0.125
- Friction coefficient on top surface μ_K = 0.125
- Friction coefficient in joint μ_T = 0.125
- Torque wrench tightening factor α_A = 1.5

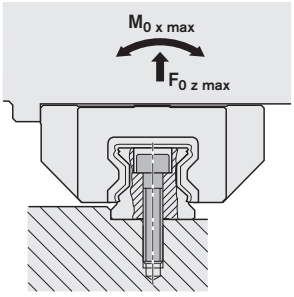


Maximum static traction forces and torsional moments on profiled rail systems (as per DIN 637)

The threaded connections in a profiled rail system can only transfer a limited traction force F_z or a limited torsional moment M_x. If these limit values are exceeded, the guide will lift off of the adjacent structure or the threaded connection will fail. The maximum values for a guide are the product of the maximum possible axial force on a threaded connection in the guide rail. The specified maximum static load should not be exceeded.
The table values are guidelines for the maximum static traction force $F_{0\,z\,max}$ and torsional moments $M_{0\,x\,max}$ that are only applicable when the following conditions are met:

- Screw sizes, screw quantity and connecting dimensions as listed in the catalog
- Same mounting screw strength class for blocks and rails
- Steel adjacent structure
- Traction force F_z or torsional moment M_x are static
- Traction force F_z and torsional moment M_x do not occur simultaneously
- No interaction with side load F_y or longitudinal moment M_y/M_z

If these conditions are not met, recalculate the threaded connection in accordance with VDI 2230. If the applied loads are just below the limit values, Bosch Rexroth also recommends checking the threaded connections.



Roller rail systems				
Size	**Standard length** 		**Long** 	
	$F_{0\ z\ max}$ (N)	**$M_{0\ x\ max}$ (Nm)**	**$F_{0\ z\ max}$ (N)**	**$M_{0\ x\ max}$ (Nm)**
Strength class 8.8 (as per DIN 637)				
25	18 800	200	21 500	230
30*)				
35	36 900	590	42 200	680
45	91 700	1 900	104 800	2 200
55	127 400	3 200	145 600	3 600
65	176 400	5 200	201 700	6 000
100	419 400	19 700	479 300	22 500
125	677 700	39 800	774 500	45 500
55/85			216 000	6 060
65/100			296 000	9 900
Strength class 10.9 (calculated with Rexroth roller rail system dimensions)				
25	31700	330	36300	380
30*)				
35	57000	910	65100	1040
45	140000	3000	159000	3430
55	193000	4820	220000	5510
65	267000	8010	305000	9150
100	612000	29700	699000	33900
125	980000	58800	1120000	67200
55/85			305000	8560
65/100			419000	14000
Strength class 12.9 (calculated with Rexroth roller rail system dimensions)				
25	37900	400	43400	460
30*)				
35	67800	1080	77500	1240
45	165000	3550	189000	4060
55	228000	5690	260000	6500
65	315000	9440	360000	10800
100	719000	34900	822000	39900
125	1151000	69100	1315000	78900
55/85			360000	10100
65/100			494000	16500

***)** In preparation

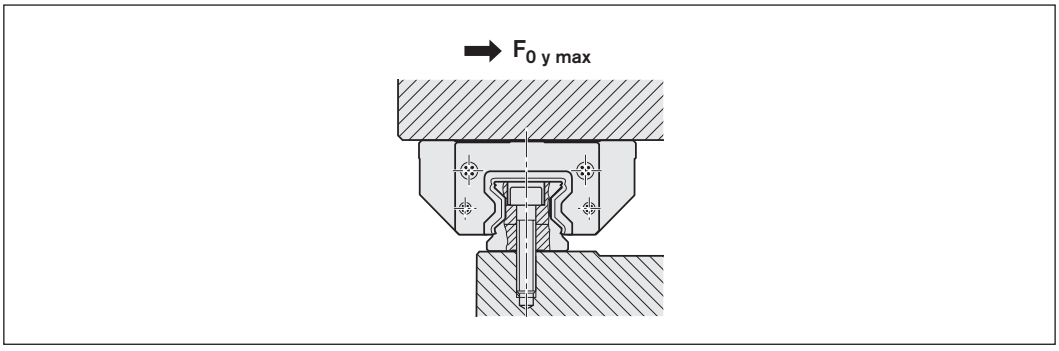
Fastening

Maximum static side load without stop strips (as per DIN 637)

For a secure structure, Rexroth recommends using stop strips on the runner block and guide rail. If stop strips are not used on the runner block or the rail, then if a load is applied in the transverse direction the guide may slip. The clamping force on the threaded connection is too low as soon as the side loads in the table are exceeded.
The table values are guidelines for the maximum static side loads $F_{0\,y\,max}$ that are only applicable when the following conditions are met:

- Screw sizes, screw quantity and connecting dimensions as listed in the catalog
- Same mounting screw strength class for blocks and rails
- Steel adjacent structure
- No interaction with traction force F_z, torsional moments M_x or longitudinal moments M_y/M_z

If these conditions are not met, recalculate the threaded connection in accordance with VDI 2230. If the applied loads are just below the limit values, Bosch Rexroth also recommends checking the threaded connections.



Roller rail systems

	Strength class					
	8.8		10.9		12.9	
Size	Standard length	Long	Standard length	Long	Standard length	Long
	$F_{0\,y\,max}$ (N)	$F_{0\,y\,max}$ (N)	$F_{0\,y\,max}$ (N)	$F_{0\,y\,max}$ (N)	$F_{0\,y\,max}$ (N)	$F_{0\,y\,max}$ (N)
25	1400	1600	2230	2550	2660	3040
30[*)]						
35	2800	3200	4210	4820	5010	5730
45	6900	7900	10000	11500	11900	13600
55	9600	10900	14000	16000	16500	18900
65	13200	15100	19400	22100	22800	26100
100	31500	36000	44200	50500	52000	59400
125	50800	58100	71200	81400	83700	95600
55/85		26400		37800		44600
65/100		42500		60800		71700

***)** In preparation

Tightening torques for profiled rail systems (as per DIN 637)

The tightening torques for screw strength class 8.8 correspond to DIN 637. The tightening torques for screw strength classes 10.9 and 12.9 were calculated for the dimensions of a Rexroth roller rail system.

	Tightening torques M_A (Nm) for strength class		
	8.8	**10.9**	**12.9**
M6	10	15	17
M8	25	36	43
M10	49	71	83
M12	83	120	140
M14	130	190	230
M16	200	300	350
M20	410	590	690
M24	700	1000	1170
M27	1040	1480	1740
M30	1400	1990	2330

Fastening

Reference edges and corner radii

Combination examples

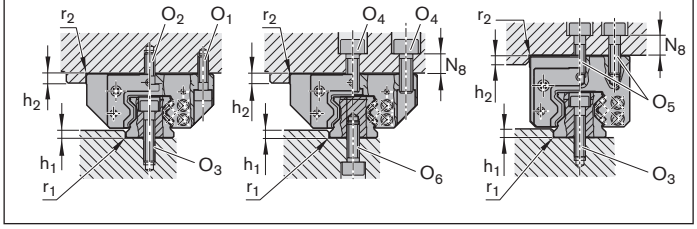
The combinations shown here are examples. Basically, any roller runner block may be combined with any of the roller guide rail types offered.

Mounting and lubrication

For details of roller runner block and roller guide rail mounting, see “General Mounting Instructions.”
For initial and in-service lubrication, see “Lubrication.”
Detailed information on the mounting procedure can be found in “Mounting Instructions for Roller Rail Systems.”

Standard roller rail systems

Standard roller runner blocks FNS R1851, FLS R1853 (flanged)		**Standard roller runner blocks SNH R1821, SLH (SLS) R1824** (slimline)
Roller guide rails R1805, R1806, R1845, R1846 (for mounting from above)	**Roller guide rails R1807, R1847** (for mounting from below)	**Roller guide rails R1805, R1806, R1845, R1846** (for mounting from above)



Size	Dimensions (mm)					
	$h_{1\,min}$	$h_{1\,max}$ 1)	h_2	N_8	$r_{1\,max}$	$r_{2\,max}$
25	3.0	4.5	5	10	0.8	0.8
30*)						
35	3.5	5.0	6	13	0.8	0.8
45	4.5	7.0	8	14	0.8	0.8
55	7.0	9.0	10	20	1.2	1.0
65	7.0	9.0	14	22	1.2	1.0

***)** In preparation

1) When using clamping and braking units, please take account of the values H_1.

Mounting screws

⚠ Always check the strength factor of the screws in the case of high lift-off loads!

Size	Screw sizes					
	Roller runner blocks				Roller guide rails	
	O_1 ISO 4762 4 pcs	O_2 1) DIN 6912 2 pcs	O_4 1) 2) ISO 4762 6 pcs	O_5 ISO 4762 6 pcs	O_3 ISO 4762	O_6 ISO 4762
25	M6x20	M6x16	M8x20	M6x18	M6x30	M6x20
30*)						
35	M8x25	M8x20	M10x25	M8x25	M8x35	M8x25
45	M10x30	M10x25	M12x30	M10x30	M12x45	M12x30
55	M12x40	M12x30	M14x40	M12x35	M14x50	M14x40
65	M14x45	M14x35	M16x45	M16x40	M16x60	M16x45

***)** In preparation

1) For fixing of the roller runner block with 6 screws: Tighten the middle screws (O_2, O_4) to a tightening torque for strength class 8.8

2) For fixing of the roller runner block from above with only 4 O_4 screws: Permissible side load 1/3 lower, and lower rigidity

Locating pins

⚠ If the recommended limits for permissible side loads are exceeded, the roller runner block must be additionally fixed!

Possible pin types

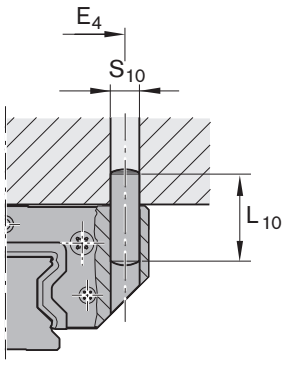
- Taper pin (hardened) or
- Straight pin ISO 8734

Notes

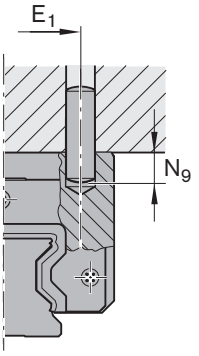
Rough-drilled holes made for production reasons may exist at the recommended pin hole positions on the runner block centerline (Ø < S_{10}). These may be bored open to accommodate the locating pins.

If the locating pins have to be driven in at another point, dimension E_2 must not be exceeded in the longitudinal direction (for dimension E_2, see the tables for the individual runner block types).
Observe dimensions E_1 and E_4!

Standard roller runner blocks
FNS R1851, FLS R1853
(flanged)



Standard roller runner blocks
SNH R1821, SNS R1822
SLS R1823, SLH R1824
(slimline)



Size	Dimensions (mm)				
	E_1	E_4	L_{10} [1)]	$N_{9\ max}$	S_{10} [1)]
25	35	55	32	9	6
30*)					
35	50	80	40	13	8
45	60	98	50	18	10
55	75	114	60	19	12
65	76	140	60	22	14

***)** In preparation

1) Taper pin (hardened) or straight pin (ISO 8734)

Fastening

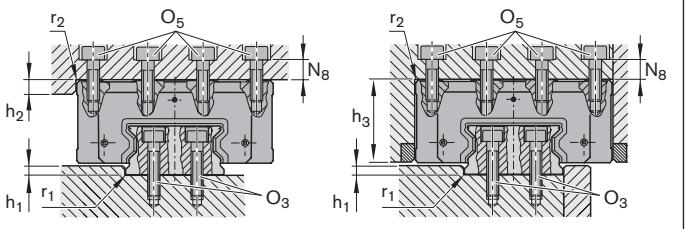
Reference edges and corner radii

Mounting and lubrication

For details of roller runner block and roller guide rail mounting, see “General Mounting Instructions.”
For initial and in-service lubrication, see “Lubrication.”
Detailed information on the mounting procedure can be found in “Mounting Instructions for Roller Rail Systems.”

Wide roller rail systems

Wide roller runner block BLS R1872
Roller guide rails R1873, R1875
(for mounting from above)



a) Fixing of the roller runner block at only one reference edge

a) Fixing of the roller runner block at all four reference edges
– All reference edges must be fixed without play.

Size	Dimensions (mm)						
	$h_{1\,min}$	$h_{1\,max}$	h_2	h_3	N_8	$r_{1\,max}$	$r_{2\,max}$
55/85	7.0	9.0	10	84	14	1.2	1.0
65/100	7.0	9.0	14	66.5	20	1.2	1.0

Mounting screws

⚠ Always check the strength factor of the screws in the case of high lift-off loads!

Size	Screw sizes	
	Roller runner blocks O_5 **ISO 4762 6 pcs**	**Roller guide rails** O_3 **ISO 4762**
55/85	M12x50	M12x30
65/100	M14x60	M14x35

Reference edges and corner radii

Mounting and lubrication

For details of roller runner block and roller guide rail mounting, see “General Mounting Instructions.”

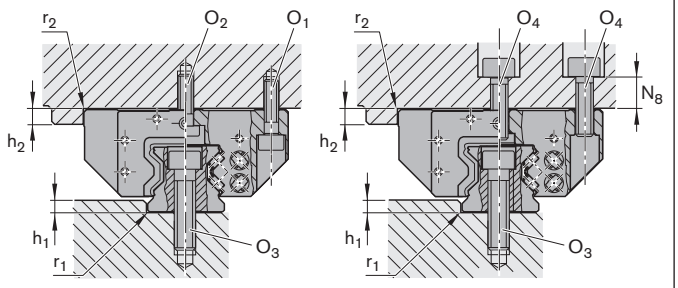
To facilitate the mounting of heavy duty roller runner blocks on the rail, a mounting aid is available on request (see “Accessories”).

For initial and in-service lubrication, see “Lubrication.”

Detailed information on the mounting procedure can be found in “Mounting Instructions for Roller Rail Systems.”

Heavy-duty roller rail systems

FNS R1861, FLS 1863 heavy-duty roller runner blocks
R1835, 1865 roller guide rails
(for mounting from above)



Size	Dimensions (mm)					
	$h_{1\,min}$	$h_{1\,max}$	h_2	N_8	$r_{1\,max}$	$r_{2\,max}$
100	10	14	18	30	1.8	1.3
125	15	20	23	40	1.8	1.8

Mounting screws

⚠ Always check the strength factor of the screws in the case of high lift-off loads!

Size	Screw sizes			
	Roller runner blocks			Roller guide rails
	O_1 ISO 4762 6 pcs	O_2 [1] DIN 6912 3 pcs	O_4 [1) 2)] ISO 4762 9 pcs	O_3 ISO 4762
100	M16x60	M16x55	M20x60	M24x100
125	M24x85	M24x70	M27x80	M30x120

1) For fixing of the roller runner block with 9 screws: Tighten the centerline screws O_2 or O_4 along the roller guide rail with the tightening torque for strength class 8.8

2) For fixing of the roller runner block from above with only 6 O_4 screws: Permissible side load 1/3 lower, and lower rigidity