General Product Description

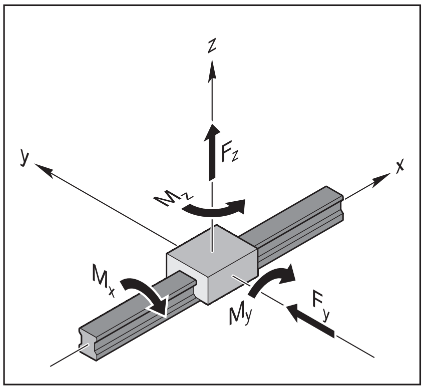
General Technical Data and Calculations

Forces and load moments

In Rexroth Roller Rail Systems the running tracks are arranged at a compression angle of 45°.
This results in the same high load capacity of the entire system in all four major planes of load application. The runner blocks may be subjected to both forces and load moments.

Forces in the four major planes of load application
- Pull F_z (positive z-direction)
- Push $-F_z$ (negative z-direction)
- Side load F_y (positive y-direction)
- Side load $-F_y$ (negative y-direction)

Moment loads
- Moment M_x (about the x-axis)
- Moment M_y (about the y-axis)
- Moment M_z (about the z-axis)



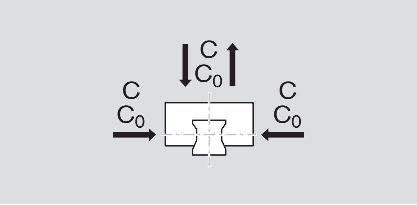
Definition of load capacities

Dynamic load capacity C
The radial loading of constant magnitude and direction which a linear rolling bearing can theoretically endure for a nominal life of 10^5 meters distance traveled (as per ISO 14728 Part 1).

Note:
The dynamic load capacities given in the tables are mostly 20% above the DIN or ISO values. They have been proven in tests.

Static load capacity C_0
Static load in the load direction that corresponds to a calculated load in the center of the contact point with the greatest load between the rolling element and track zone (guide rail) of 4000 MPa.

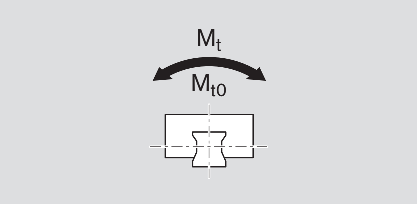
Note:
With this load on the contact point, a permanent overall deformation of the rolling element and track zone occurs, corresponding to around 0.0001 times the roller body diameter (as per ISO 14728 Part 1).



Definition of moment load capacities

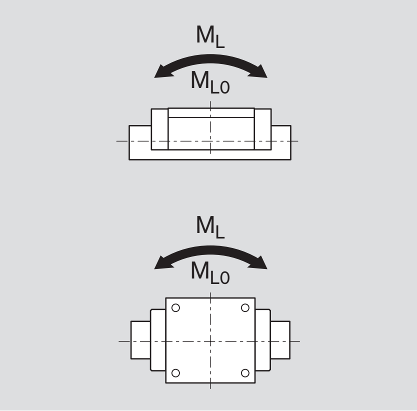
Dynamic torsional moment load capacity M_t
Comparative dynamic moment about the longitudinal axis x which causes a load equivalent to the dynamic load capacity C.

Static torsional moment load capacity M_{t0}
Comparative static moment about the longitudinal axis x which causes a load equivalent to the static load capacity C_0.



Dynamic longitudinal moment load capacity M_L
Comparative dynamic moment about the transverse axis y or the vertical axis z which causes a load equivalent to the dynamic load capacity C.

Static longitudinal moment load capacity M_{L0}
Comparative static moment about the transverse axis y or the vertical axis z which causes a load equivalent to the dynamic load capacity C_0.



Definition and calculation of the nominal life

The calculated service life which an individual linear rolling bearing, or a group of apparently identical rolling element bearings operating under the same conditions, can attain with a 90% probability, with contemporary, commonly used materials and manufacturing quality under conventional operating conditions (to ISO 14728 Part 1) and optimal installation conditions.

If 90% probability is not sufficient, the nominal life values must be reduced by the factor a_1 as given in the table below.

Probability %	Factor a_1
90	1.00
95	0.62
96	0.53
97	0.44
98	0.33
99	0.21

Nominal life in meters

$$(1)\quad L_{10} = \left(\frac{C}{F_m}\right)^{\frac{10}{3}} \cdot 10^5 \text{ m}$$

L_{10} = nominal life (m)
C = dynamic load capacity (N)
F_m = equivalent dynamic load on the bearing (N)

Service life in operating hours at constant stroke length and stroke frequency

If the stroke length s and the stroke frequency n are constant throughout the service life, the service life in operating hours can be calculated using formula (2).

$$(2)\quad L_{h\,10} = \frac{L_{10}}{2 \cdot s \cdot n \cdot 60}$$

L_{10} = nominal life (m)
$L_{h\,10}$ = nominal life (h)
s = length of stroke (m)
n = stroke repetition rate (full cycles) (min^{-1})

Service life in operating hours at average speed

Alternatively, the service life in operating hours at average speed v_m can be calculated using formula (3).

$$(3)\quad L_{h\,10} = \frac{L_{10}}{60 \cdot v_m}$$

L_{10} = nominal life (m)
$L_{h\,10}$ = nominal life (h)
v_m = average speed (m/min)

When the speed is varied in steps, this average speed v_m is calculated using the discrete time steps q_{tn} of the individual load levels (4).

v_m = average speed (m/min)
$v_1 \dots v_n$ = discrete speed steps (m/min)
$q_{t1} \dots q_{tn}$ = discrete time steps for $v_1 \dots v_n$ (%)

$$(4)\quad v_m = \frac{q_{t1} \cdot |v_1| + q_{t2} \cdot |v_2| + \dots + q_{tn} \cdot |v_n|}{100\ \%}$$

Notes

ISO 14728 Part 1 limits the applicability of formula (1) to equivalent dynamic loads $F_m < 0.5$ C.

However, our tests have demonstrated that – under ideal operating conditions – this nominal life formula can be applied up to loads of $F_m = C$.

For stroke lengths less than 2 · runner block length B_1 (see dimension tables), a reduction in load capacity may have to be taken into account. Please consult us.

General Product Description

General Technical Data and Calculations

Load on bearings for calculation of nominal life

Recommended minimum load ratios

$$\text{Dynamic load ratio} = \frac{C}{F_{m,\,max}}$$

$$\text{Static load ratio} = \frac{C}{F_{eff,\,max}}$$

Note

In general, the load ratio should not fall below the minimum value of 4.0 for both dynamic and static loads. A higher load ratio is always required in applications requiring high rigidity and/or long life.

For pulling loads, the strength of the screws must verified. Please refer to the “Mounting Instructions” section.

Combined equivalent load on bearing

With formula (5) all of the partial loads in a particular load case can be factored in to calculate the combined equivalent load on the bearing.

Notes

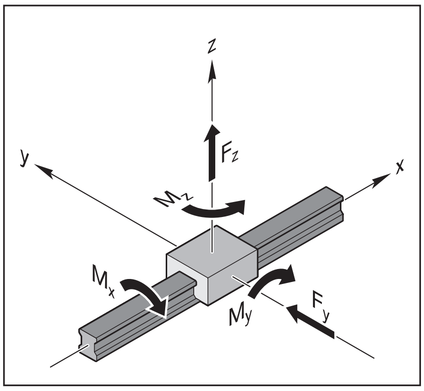
The calculation of the moment loads as shown in formula (5) applies only for applications with one single rail and one runner block. The formula is simpler for other combinations.

The forces and load moments shown in the coordinate system can also act in the opposite direction.
An external load acting at an angle on the runner block is to be broken down into its F_y and F_z components, and these values are then to be used in formula (5). The structure of the runner blocks allows this simplified calculation.

$$(5) \quad F_{comb} = |F_y| + |F_z| + C \cdot \frac{|M_x|}{M_t} + C \cdot \frac{|M_y|}{M_L} + C \cdot \frac{|M_z|}{M_L}$$

F_{comb} = combined equivalent load on bearing (N)
$F_{m,\,max}$ = largest effective equivalent load on bearing (N)
$F_{eff,\,max}$ = maximum load occurring during the travel cycle (N)
F_y = external load due to a resulting force in the y-direction (N)
F_z = external load due to a resulting force in the z-direction (N)
C = dynamic load capacity[1)] (N)
C_0 = static load capacity[1)] (N)
M_t = dynamic torsional moment load capacity[1)] (Nm)
M_L = dynamic longitudinal moment load capacity[1)] (Nm)
M_x = load due to a resulting moment load about the x-axis (Nm)
M_y = load due to a resulting moment load about the y-axis (Nm)
M_z = load due to a resulting moment load about the z-axis (Nm)

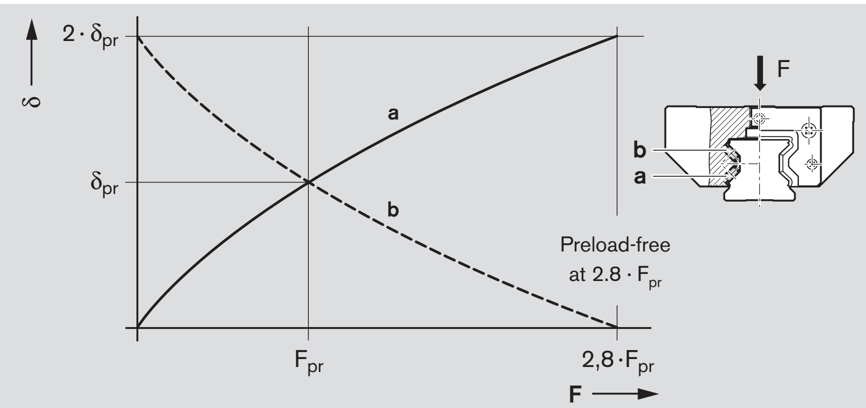
1) See tables for values



Allowance for internal preload force F_{pr}

To increase the rigidity and accuracy of the guide system preloaded runner blocks should be used (see also “Selection of System Preload”).

When runner blocks in preload classes C2 and C3 are used, it may be necessary to take the internal preload force into account since the two rows of rollers a and b are designed to be oversized and are therefore preloaded against each other with an internal preload force F_{pr} which causes them to deflect by the amount δ_{pr} (see chart).



a = loaded (lower) row of rollers
b = non-loaded (upper) row of rollers
δ = deflection of rollers at F
δ_{pr} = deflection of rollers at F_{pr}
F = load on the runner block
F_{pr} = internal preload force

Effective equivalent load on bearing

When an external load reaches 2.8 times the internal preload force F_{pr}, one row of rollers becomes preload-free.

Note
For highly dynamic load cases, the combined equivalent load on the bearings should be $F_{comb} < 2.8 \cdot F_{pr}$ in order to avoid damage to the roller bearings due to slip.

2 different cases should be considered:

Case 1: $F_{comb} > 2.8 \cdot F_{pr}$

In case 1, the internal preload force F_{pr} has no effect on the service life:

$$F_{eff} = F_{comb} \quad (6)$$

Case 2: $F_{comb} \leq 2.8 \cdot F_{pr}$

In case 2 the preload force F_{pr} is factored into the calculation of the effective equivalent load on the bearings:

$$F_{eff} = \left(\frac{F_{comb}}{2{,}8 \cdot F_{pr}} + 1\right)^{\frac{3}{2}} \cdot F_{pr} \quad (7)$$

F_{comb} = combined equivalent load on bearing (N)
F_{eff} = effective equivalent load on bearing (N)
F_{pr} = preload force (N)

F_{pr} = 8% C (at preload class C2)
F_{pr} = 13% C (at preload class C3)

Equivalent dynamic load on bearing

For varying load levels, calculate the equivalent dynamic load on the bearings using formula (8).

$$F_m = \sqrt[\frac{10}{3}]{(F_{eff\,1})^{\frac{10}{3}} \cdot \frac{q_{s1}}{100\,\%} + (F_{eff\,2})^{\frac{10}{3}} \cdot \frac{q_{s2}}{100\,\%} + \ldots + (F_{eff\,n})^{\frac{10}{3}} \cdot \frac{q_{sn}}{100\,\%}} \quad (8)$$

F_m = equivalent total dynamic load on bearing (N)
$F_{eff\,1} \ldots F_{eff\,n}$ = uniform effective single loads (m/min)
$q_{s1} \ldots q_{sn}$ = discrete travel steps for $F_{eff\,1} \ldots F_{eff\,n}$ (%)

Equivalent static load on bearing

For combined static external loads – vertical and horizontal – in conjunction with a static torsional or longitudinal moment load, calculate the equivalent static bearing on the load $F_{0\,comb}$ using formula (9).

$$F_{0\,comb} = |F_{0y}| + |F_{0z}| + C_0 \cdot \frac{|M_{0x}|}{M_{t0}} + C_0 \cdot \frac{|M_{0y}|}{M_{L0}} + C_0 \cdot \frac{|M_{0z}|}{M_{L0}} \quad (9)$$

$F_{0\,comb}$ = static equivalent load on bearing (N)
F_{0y} = external static load due to a force in the y-direction (N)
F_{0z} = external static load due to a force in the z-direction (N)
C_0 = static load capacity[1)] (N)
M_{t0} = static torsional moment load capacity[1)] (Nm)
M_{L0} = static longitudinal moment load capacity[1)] (Nm)
1) See tables for values

M_{0x} = load due to a static moment load about the x-axis (Nm)
M_{0y} = load due to a static moment load about the y-axis (Nm)
M_{0z} = load due to a static moment load about the z-axis (Nm)

Notes
The equivalent static load on the bearing $F_{0\,comb}$ must not exceed the static load capacity C_0. Formula (9) only applies if a single guide rail is used.

An external load acting at an angle on the runner block is to be broken down into its F_{0y} and F_{0z} components, and these values are then to be used in formula (9).

General Product Description

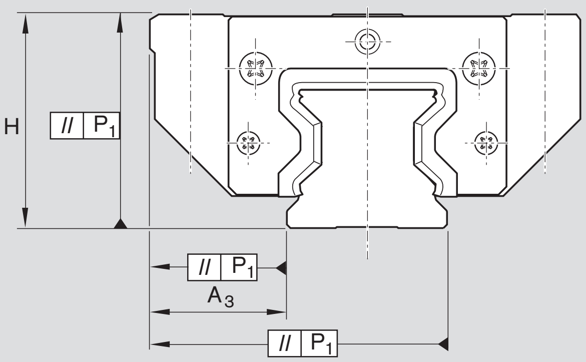
Selection of Accuracy Classes

Accuracy classes and their tolerances for Standard and Heavy Duty Roller Rail Systems

Standard roller rail systems are offered in up to five different accuracy classes, and heavy duty roller rail systems in up to three accuracy classes. For details of the available runner blocks and guide rails, see the "Part numbers" tables.

Built-in interchangeability through precision machining
Rexroth manufactures its guide rails and runner blocks with such high precision, especially in the roller track zone, that each individual component element can be replaced by another at any time.
For example, a runner block can be used without problems on various guide rails of the same size.
This applies equally to the use of different runner blocks on one and the same guide rail.

Abbreviations
RB/GR = runner block and guide rail hard chrome plated
GR = only guide rail hard chrome plated



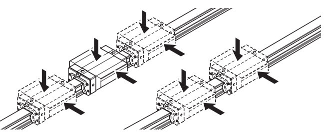
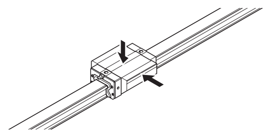
Standard and heavy duty roller rail systems, steel version

Accuracy classes	Dimensional tolerances (µm)		Max. difference in dimension H and A_3 on one guide rail (µm)
	H	A_3	$\Delta H, \Delta A_3$
H	±40	±20	15
P	±20	±10	7
SP	±10	±7	5
GP[1)]	(±10) 10	±7	5
UP	±5	±5	3

1) Dimension H: (±10) sorted by height (GP) to 10 µm (see "Combination of Accuracy Classes")

Standard and heavy duty RRS Resist CR, matte silver hard chrome plated

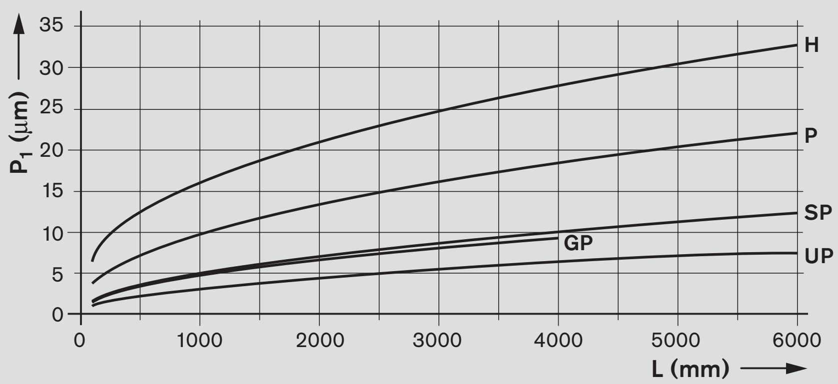
	H		A_3		$\Delta H, \Delta A_3$	
	RB/GR	GR	RB/GR	GR	RB/GR	GR
H	+47 –38	+44 –39	±23	+19 –24	18	15
P	+27 –18	+24 –19	±13	+9 –14	10	7
SP	+17 –8	+14 –9	±10	+6 –11	8	5

	H | A_3	$\Delta H, \Delta A_3$
		
Measured at middle of runner block	For any runner block/rail combination at any position on rail	For different runner blocks at same position on rail

Parallelism offset P_1 of the roller rail system in service

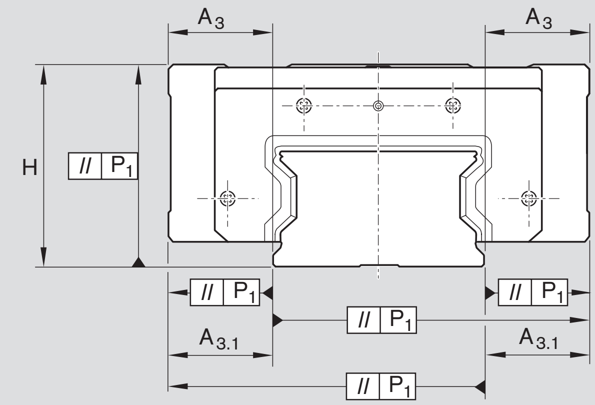
Values measured at middle of runner block for roller rail systems without surface coating.
For hard chrome plated guide rails the values may increase by up to 2 µm.

Key to graph
P_1 = parallelism offset (µm)
L = rail length (mm)



Accuracy classes and their tolerances for Wide Roller Rail Systems

Wide roller rail systems are offered in up to three different accuracy classes. For details of the available runner blocks and guide rails, see the “Part numbers” tables.



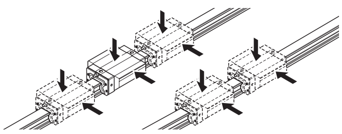
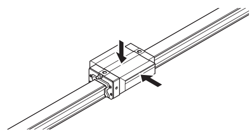
Wide roller rail systems, steel version

Accuracy classes	Dimensional tolerances (μm)			Max. difference in dimension H and A_3 on one guide rail (μm)	
	H	A_3	$A_{3.1}$	ΔH, ΔA_3	$\Delta A_{3.1}$
H	±40	±20	+26/–24	15	17
P	±20	±10	+15/–13	7	9
SP	±10	±7	+12/–10	5	7

Wide roller rail systems, Resist CR, matte silver hard chrome plated

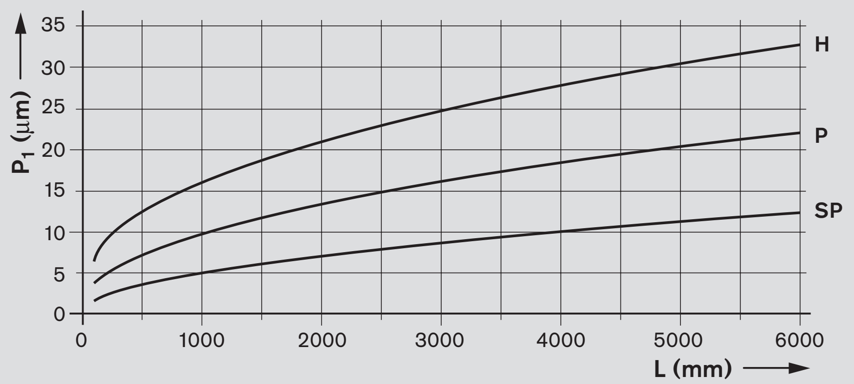
	H		A_3		$A_{3.1}$		ΔH, ΔA_3		$\Delta A_{3.1}$	
	RB/GR	GR	RB/GR	GR	RB/GR	GR	RB/GR	GR	RB/GR	GR
H	+47 –38	+44 –39	±23	+19 –24	+29 –27	+25 –28	18	15	20	17
P	+27 –18	+24 –19	±13	+9 –14	+18 –16	+14 –17	10	7	12	9
SP	+17 –8	+14 –9	±10	+9 –14	+18 –16	+14 –17	10	7	12	9

Abbreviations
RB/GR = runner block and guide rail hard chrome plated
GR = only guide rail hard chrome plated

	H	A_3	$A_{3.1}$	ΔH, ΔA_3	$\Delta A_{3.1}$
					
Measured at middle of runner block	For any runner block/rail combination at any position on rail			For different runner blocks at same position on rail	

Parallelism offset P_1 of the roller rail system in service

Values measured at middle of runner block for roller rail systems without surface coating.
For hard chrome plated guide rails the values may increase by up to 2 μm.



Key to graph
P_1 = parallelism offset (μm)
L = rail length (mm)

General Product Description

Selection of Accuracy Classes

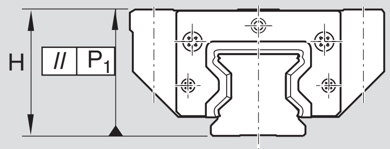
Combination of accuracy classes

Accuracy classes			Guide rail class				
Runner block class	Dimensional tolerances		H µm	P µm	SP µm	GP µm	UP µm
H	Tolerance for dimension H	µm	±40	±24	±15	–	±11
	Tolerance for dimension A_3	µm	±20	±14	±12	–	±11
	Max. difference in dimension H and A_3 on one rail	µm	15	15	15	–	15
P	Tolerance for dimension H	µm	±36	±20	±11	–	±7
	Tolerance for dimension A_3	µm	±16	±10	±8	–	±7
	Max. difference in dimension H and A_3 on one rail	µm	7	7	7	–	7
SP	Tolerance for dimension H	µm	±35	±19	±10	(±10)[1] ±5	±6
	Tolerance for dimension A_3	µm	±15	±9	±7	±7	±6
	Max. difference in dimension H and A_3 on one rail	µm	5	5	5	5	5
UP	Tolerance for dimension H	µm	±34	±18	±9	±4	±5
	Tolerance for dimension A_3	µm	±14	±8	±6	±6	±5
	Max. difference in dimension H and A_3 on one rail	µm	3	3	3	3	3

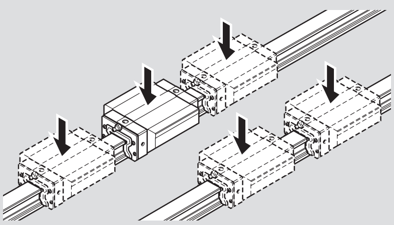
1) Dimension H: (±10) sorted by height (GP) to 10 µm (see “Combination: Runner block SP with guide rail GP”)

Combination: Runner block SP with guide rail GP

Tolerances for dimension H



Measured at middle of runner block over the entire rail length

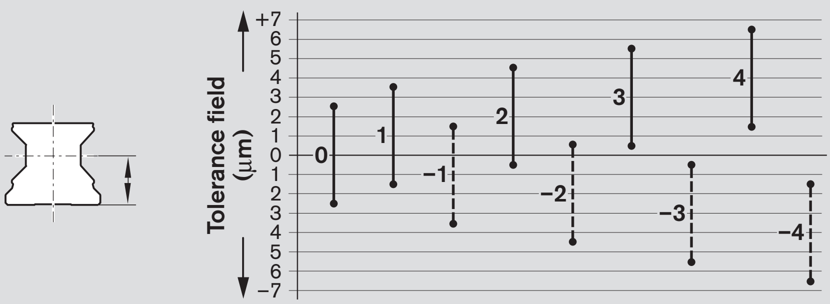


Dimension H (±10) sorted by height (GP) to ±5 ... 10 µm:
Applies for any combination of runner blocks with accuracy class SP and guide rails R1805 .68 .. with the same sorting dimension, e.g. $-1^{\pm 2.5}$ µm, over the entire rail length.

Sorting code on the guide rail and the additional label, e.g. GP –1, GP +3, etc.

When ordering, please state the quantity per sorting dimension, e.g. 2 pcs per sorting dimension.

Height sorting of the guide rails



Recommendations for combining accuracy classes

Recommended for **close spacing of runner block** and short strokes:
Runner block in higher accuracy class than guide rail.

Recommended for **larger runner block spacing** and long strokes:
Guide rail in higher accuracy class than runner block.

Caution!
For runner blocks and guide rails in Resist CR, matte silver hard chrome plated, different tolerances apply for the dimensions H and A_3 (see “Accuracy classes and their tolerances”).

Travel accuracy

Perfected roller entry and exit zones in the runner blocks and optimized spacing of the mounting screws provide unmatched travel accuracy with very low pulsation.

These high accuracy systems are especially suitable for high-precision machining processes, measurement systems, high-precision scanners, EDM equipment, etc.

General Product Descriptions

Selection of System Preload

Definition of the preload class

Preloading force relative to the dynamic load capacity C of the respective runner block.

Example

- Runner block FNS R1851 423 10
- Preload class C2
- Dynamic load capacity C = 92,300 N (value taken from runner block table)

Calculation:
C2 = 8% C = 7384 N

This runner block is preloaded with a base load of 7384 N.

Selection of the preload class

Code	Preload	Application area
C1	**3% C**	Special version on request
C2	**8% C**	For precise guide systems with both high external loading and high demands on overall rigidity; also recommended for single rail systems. Above average moment loads can be absorbed without significant elastic deflection. Further improved overall rigidity with only medium moment loads.
C3	**13% C**	For highly rigid guide systems such as precision machine tools, etc. Above average loads and moments can be absorbed with the least possible elastic deflection. Runner blocks with preload C3 available in accuracy classes P, SP (GP) and UP only.

Recommended preload for roller runner blocks

Preference should be given to runner blocks with preload C2.

Runner blocks with preload C1 are available on request (special versions).

Recommended preload and accuracy class combinations

Recommended for preload C2:
Accuracy classes H and P

Recommended for preload C3:
Accuracy classes P and SP (GP)

Combination of hard chrome plated runner blocks with hard chrome plated guide rails

When hard chrome plated runner blocks with preload C2 = 8% C (or C3 = 13% C) are combined with hard chrome plated guide rails, the preload increases to approx. 10% C (or approx. 15% C).

Standard Runner Blocks, Steel version

Product Description

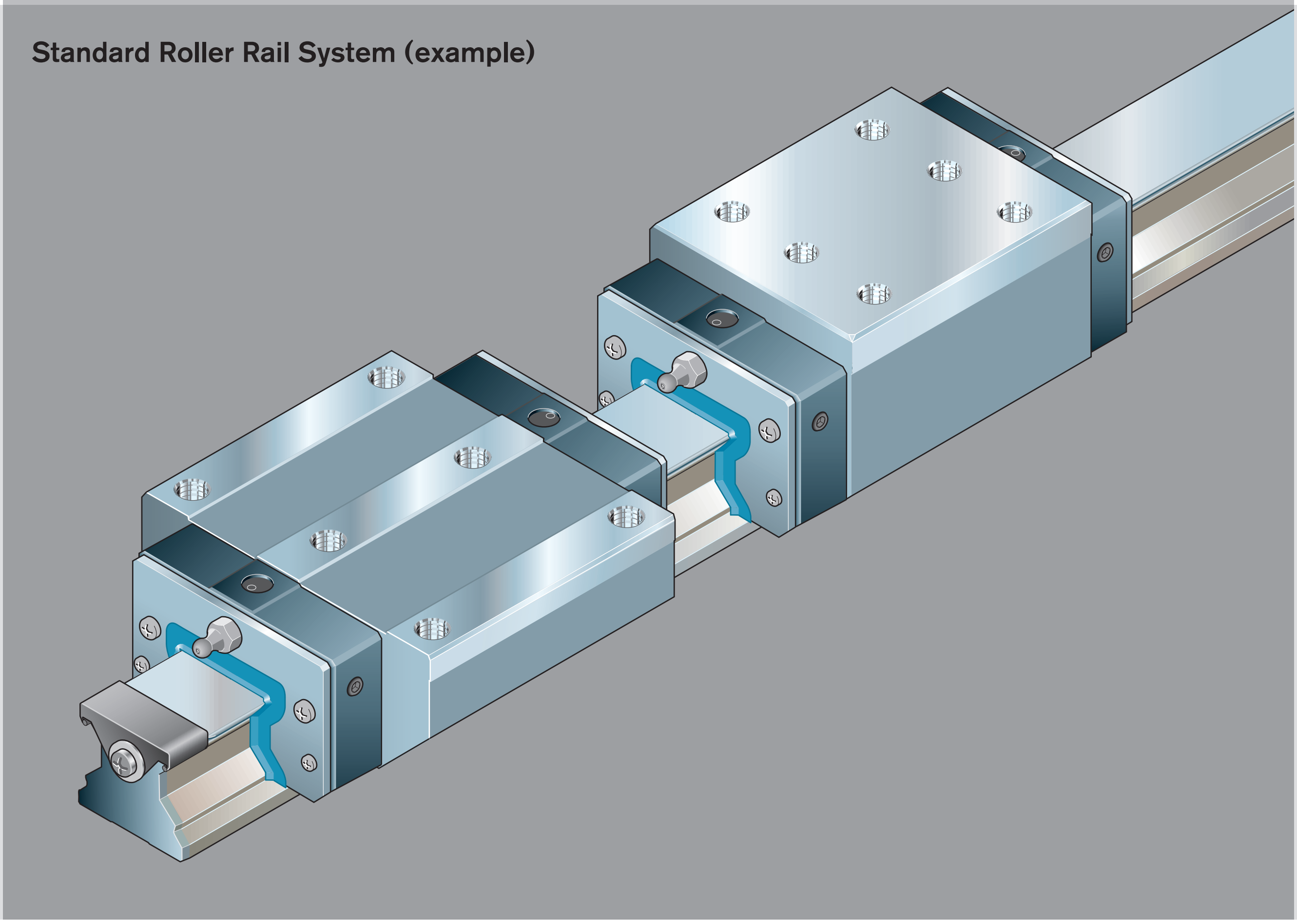
Outstanding features

- Standard runner blocks are suitable for all typical applications.
- Runner blocks can also be supplied for special conditions of installation and use and for special working environments.
- High torque capacity
- Same high load capacities in all four major planes of load application
- Highest rigidity in all load directions when additional mounting screws are used in two holes provided at the center of the runner block.
- Unrestricted interchangeability
- Unlimited combinability: any guide rail version can be paired with any runner block version.
- Accessories can be simply attached to the ends of the runner block.
- Mounting of attachments to runner block from above or below

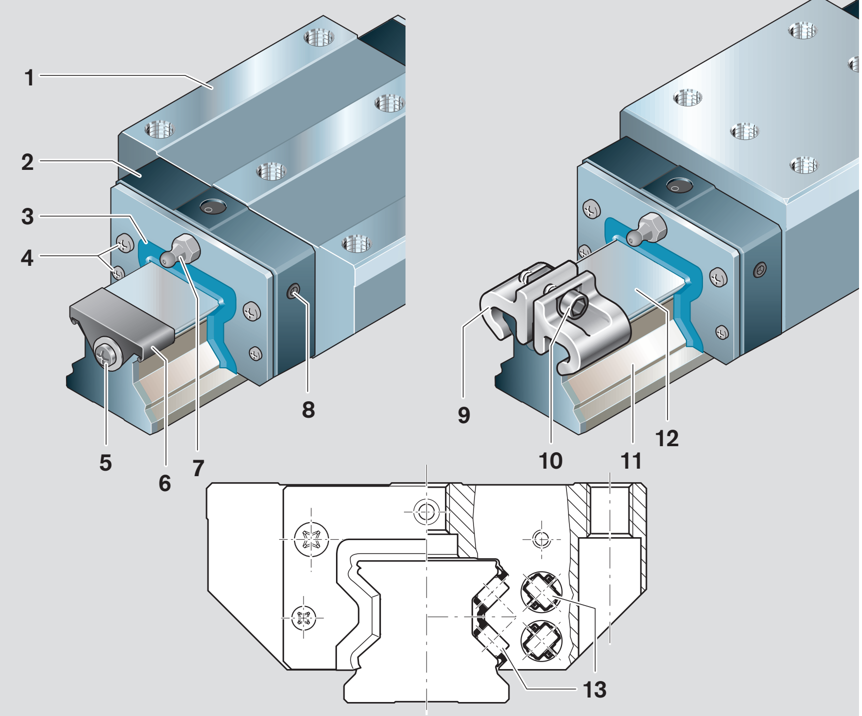
Further highlights

- Lube ports on all sides for maximum ease of maintenance
- Novel lube duct design minimizes lubricant consumption.
- Runner blocks made from antifriction bearing steel, with hardened and ground raceways
- Smooth running thanks to optimized roller recirculation and guidance
- Optimized entry-section geometry and high number of rollers per track minimizes variation in elastic deflection.
- The runner block simply slides off its arbor and onto the rail.
- End seals integrated as standard for better sealing of all running tracks and to protect plastic parts

Standard Roller Rail System (example)



Material specifications



1 Runner block body: antifriction bearing steel
2 End cap: plastic (alternative: aluminum)
3 End seal: 1.4301 (corrosion-resistant spring steel to EN 10088) with polymer seal
4 Mounting screws: stainless steel A2
5 Screw: stainless steel A2
  Washer: galvanized steel
6 Protective cap: plastic
7 Lube nipple: galvanized carbon steel
8 Screw plug: carbon steel (side lube hole)
9 Strip clamp: anodized aluminum
10 Clamping screw/nut: 1.4301
11 Guide rail: heat-treatable steel
12 Cover strip: 1.4301
13 Rollers: antifriction bearing steel

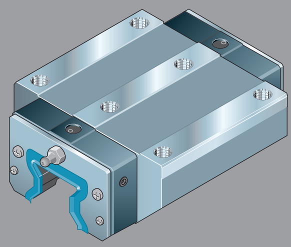
Standard Runner Blocks, Steel version

Product Description

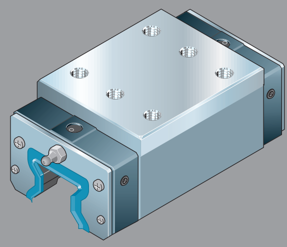
Runner blocks

Standard runner blocks are suitable for almost all applications.

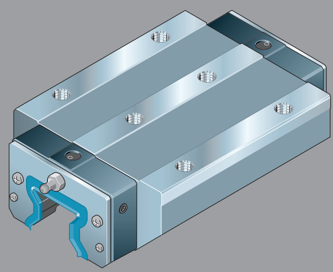
FNS R1851 ... 10



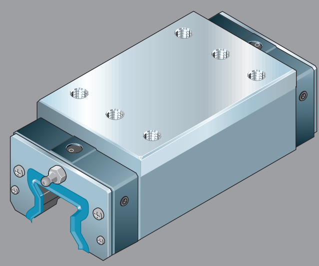
SNH R1821 ... 10



FLS R1853 ... 10



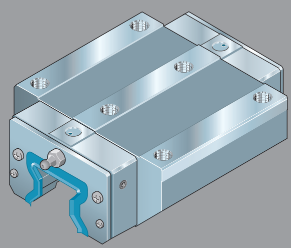
SLH R1824 ... 10



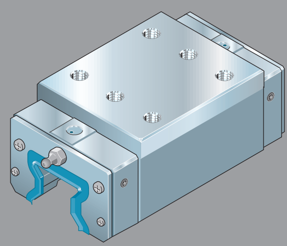
Runner blocks with aluminum end caps

Special feature:
These runner blocks are recommended for especially demanding conditions of use.

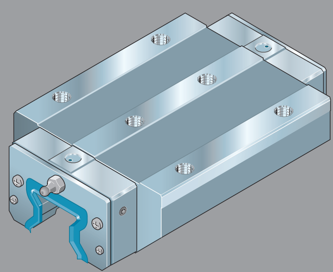
FNS R1851 ... 13



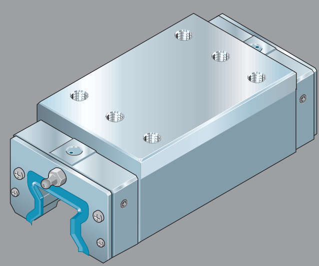
SNH R1821 ... 13



FLS R1853 ... 13



SLH R1824 ... 13



Runner block short names

FNS = Flanged, normal, standard height
FLS = Flanged, long, standard height
SNH = Slimline, normal, high
SLH = Slimline, long, high

Options

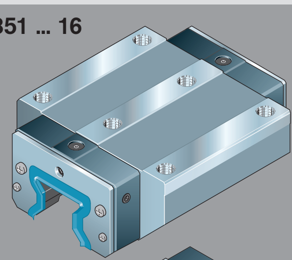
Corrosion-resistant runner blocks, Resist CR, matte silver hard chrome plated, see section on “Standard Runner Blocks, Resist CR”.

Runner Blocks for oil and grease lubrication from above

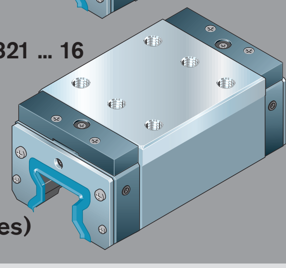
Special feature:
Runner blocks R18.. ... 16 have been prepared for oil and grease lubrication from above. In the high runner bocks S.H, the vertical clearance between the end caps and an attachment mounting surface with integrated lube adapters has been designed for ease of maintenance.

How to recognize them:
The top lube holes at both ends have already been opened, but they are closed with screws for shipment (O-rings for sealing the lube fittings are provided with the runner blocks).

FNS R1851 ... 16



SNH R1821 ... 16



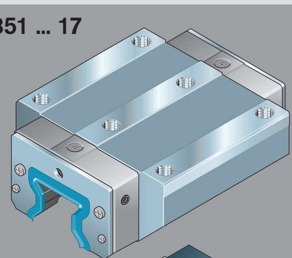
(Examples)

Runner blocks (exclusively) for central oil lubrication via dosing valves

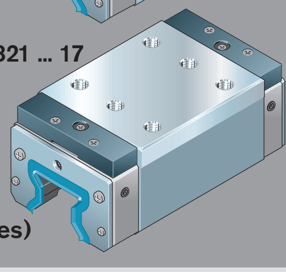
Special feature:
Runner blocks R18.. ... 17 have smaller lube ducts. They need only small quantities of lube oil even when wall-mounted and are therefore suitable for all mounting orientations.

How to recognize them:
The end caps are gray. In the high runner blocks S.H, the vertical clearance between the end caps and an attachment mounting surface with integrated lube adapters has been designed for ease of maintenance.
The top lube holes at both ends have already been opened, but they are closed with screws for shipment (O-rings for sealing the lube fittings are provided with the runner blocks).

FNS R1851 ... 17



SNH R1821 ... 17



(Examples)

Runner blocks for wall mounting

Special feature:
Runner blocks R18.. ... 18 are especially suitable for wall mounting. For lubrication, both lube holes on the end face must be used – to ensure proper lubrication of the upper and lower raceways.

Runner blocks size 65 (only)
Special feature:
The runner block FLS R1859 620 31 for wall mounting is available in size 65 (only) with accuracy class SP and preload class C3 (13% C).

The dimensions, load capacities, rigidity and moment loads correspond to those of standard runner block FLS R1853 631 10.

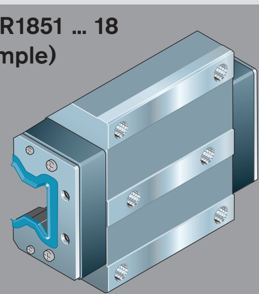
For short-stroke applications, lubricant must be applied to all (four) lube holes.

How to recognize them:
The runner blocks have two lube holes at each end face for oil lubrication.

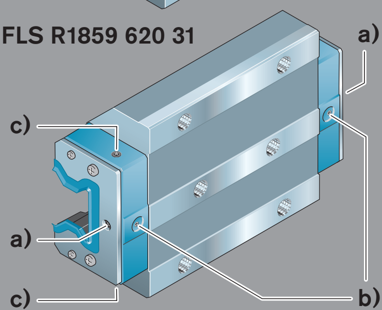
Lube fittings must be attached at both ends faces (a) or at both ends of the attachment mounting surface (b) – to ensure proper lubrication of the upper and lower raceways.
The side holes (c) cannot be used!

How to recognize them:
The end caps are blue.

FNS R1851 ... 18
(Example)



FLS R1859 620 31



Standard Runner Blocks, Steel version

Rigidity

Rigidity of the roller rail system at preload C2

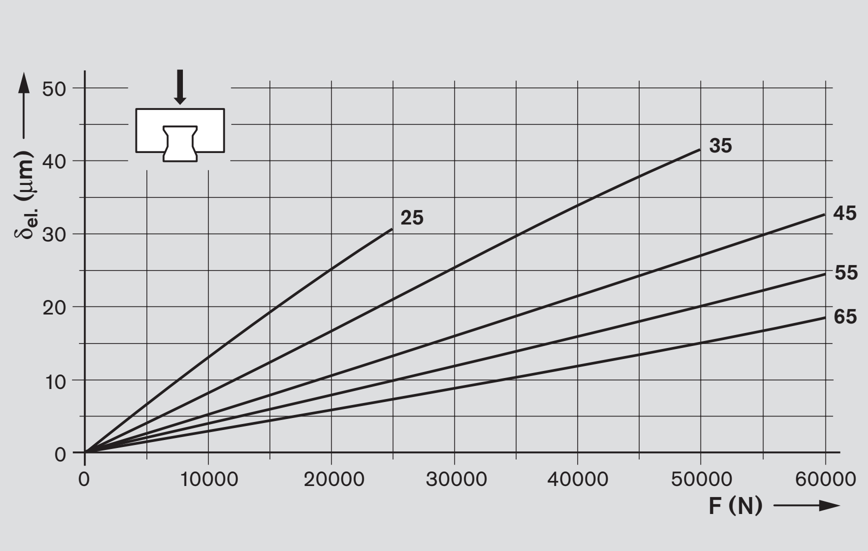
Standard runner block FNS R1851

Sizes 25 to 65

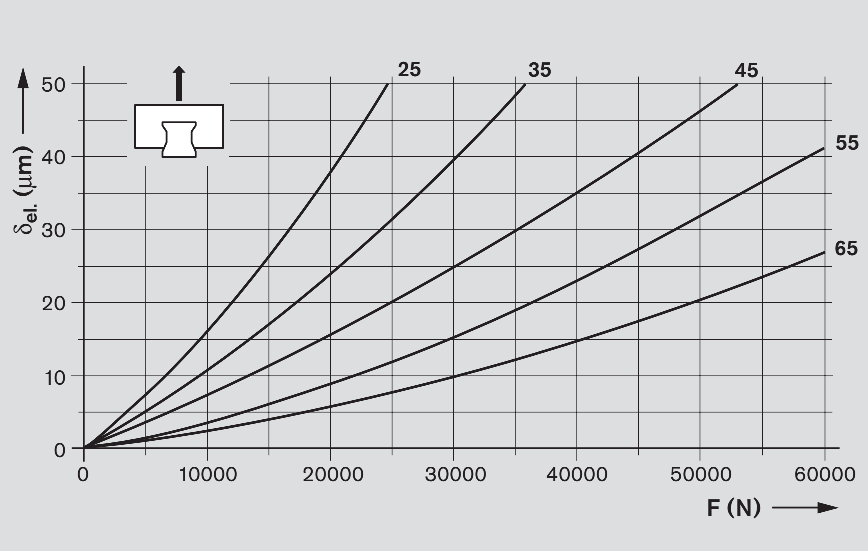
measured values

Runner block mounted using 6 screws:
- 4 outer screws of strength class 12.9
- 2 centerline screws of strength class 8.8

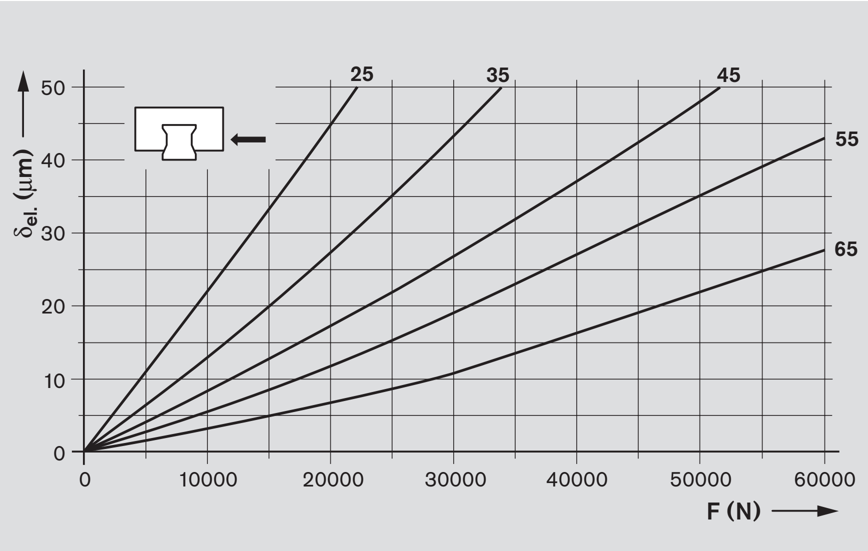
1. Down load



2. Lift-off load



3. Side load



Preload class

C2 = preload 8% C

Key to graph

$\delta_{el.}$ = elastic deflection (µm)

F = load (N)

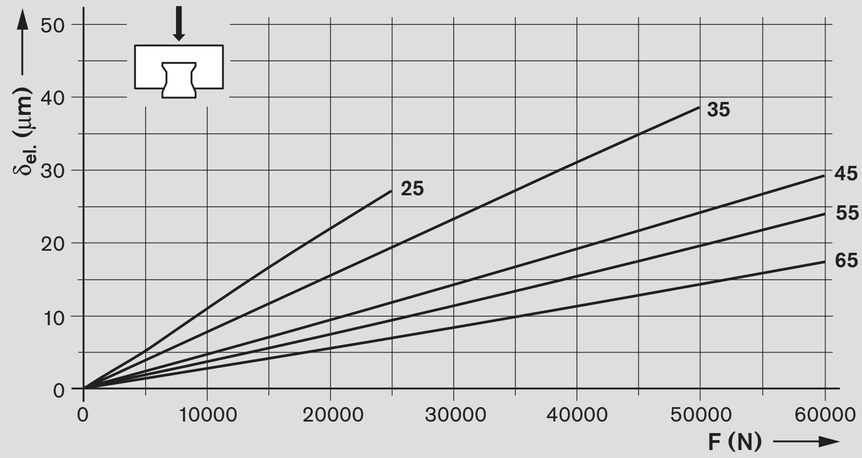
Rigidity of the roller rail system at preload C3

Standard runner block FNS R1851

Sizes 25 to 65

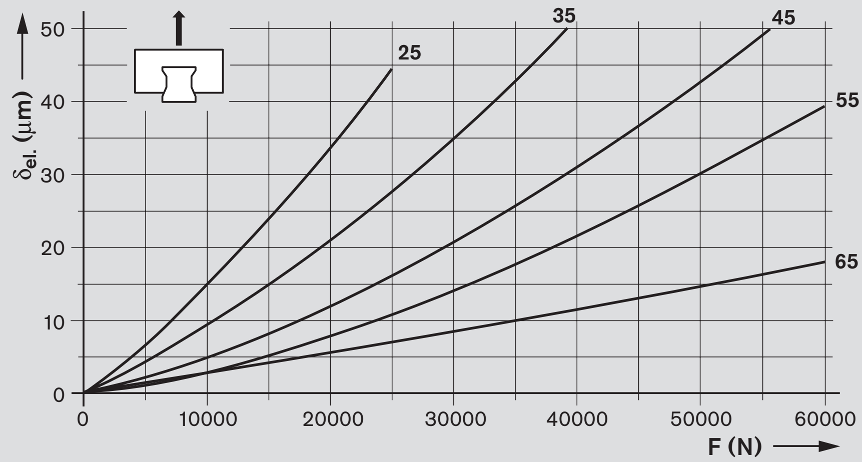
measured values

Runner block mounted using 6 screws:
- 4 outer screws of strength class 12.9
- 2 centerline screws of strength class 8.8

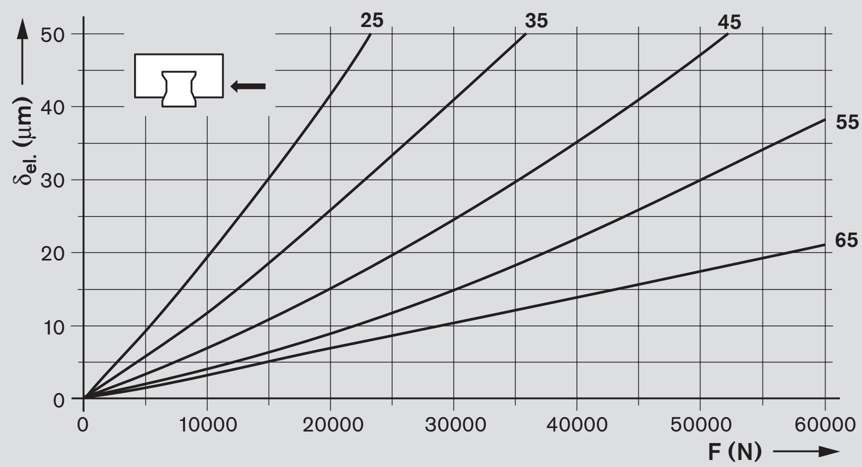


1. Down load

2. Lift-off load



3. Side load



Preload class
C3 = preload 13% C

Key to graph

$\delta_{el.}$	=	elastic deflection	(µm)
F	=	load	(N)

Standard Runner Blocks, Steel version

Rigidity

Rigidity of the roller rail system at preload C2

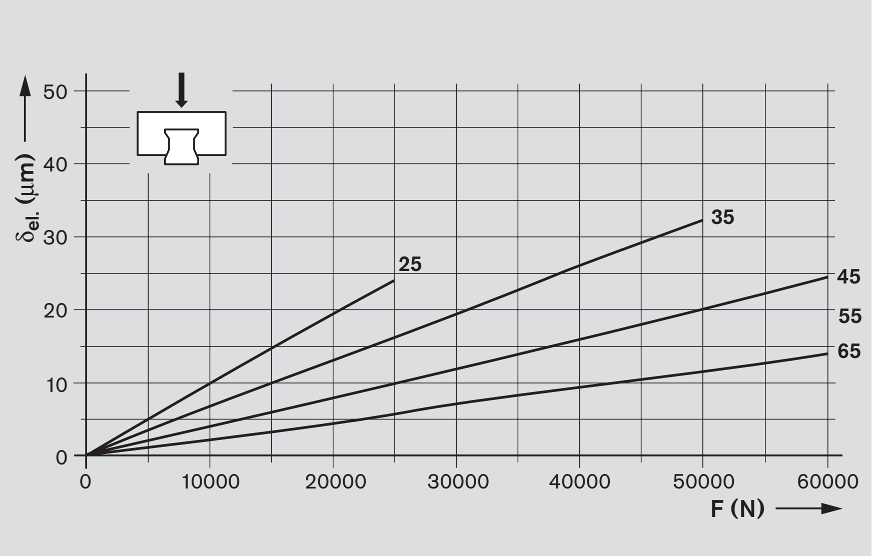
Standard runner block FLS R1853

Sizes 25 to 65

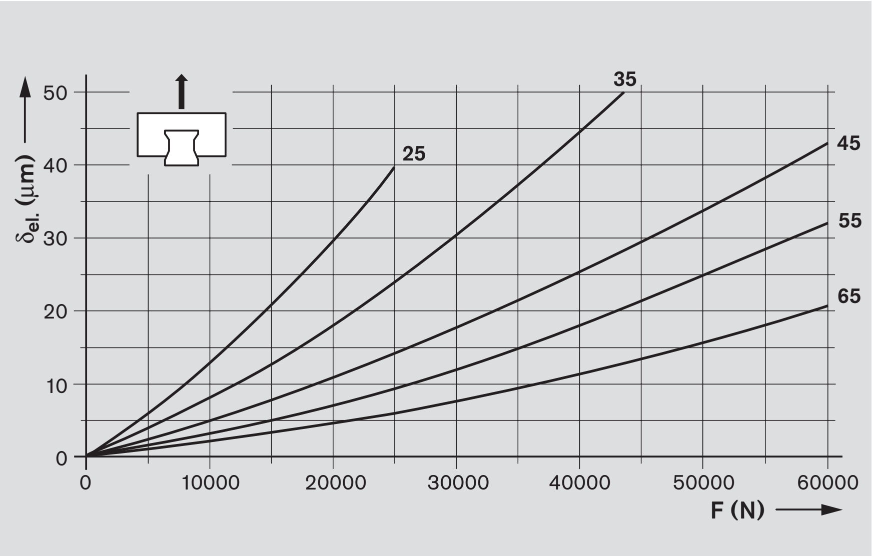
——— measured values

Runner block mounted using 6 screws:
– 4 outer screws of strength class 12.9
– 2 centerline screws of strength class 8.8

1. Down load



2. Lift-off load



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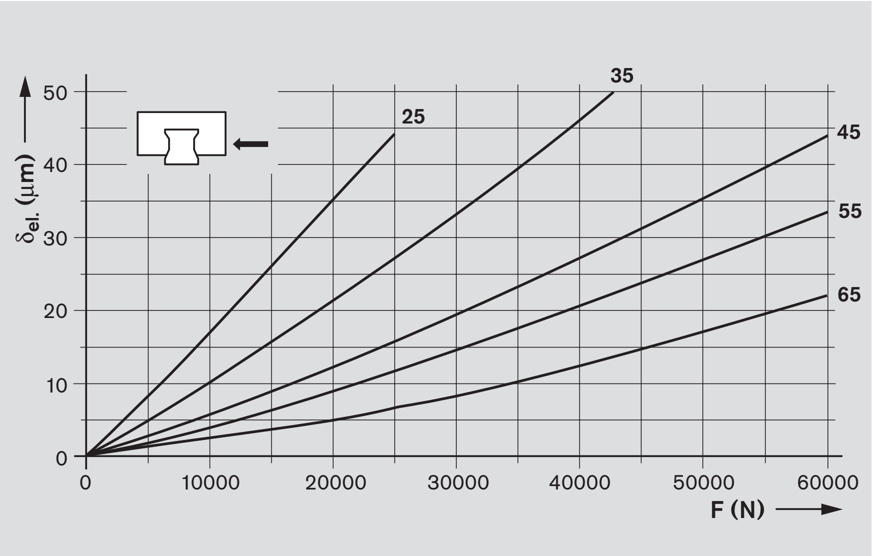


Preload class
C2 = preload 8% C

Key to graph
$\delta_{el.}$ = elastic deflection (µm)
F = load (N)

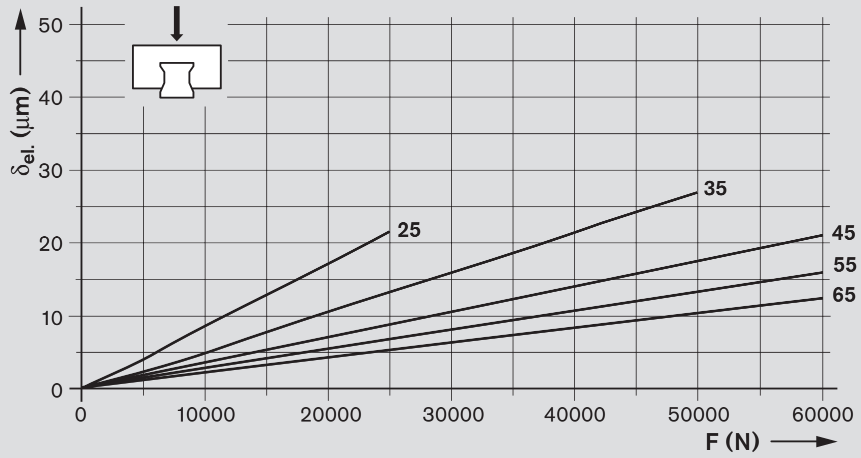
Rigidity of the roller rail system at preload C3

Standard runner block FLS R1853

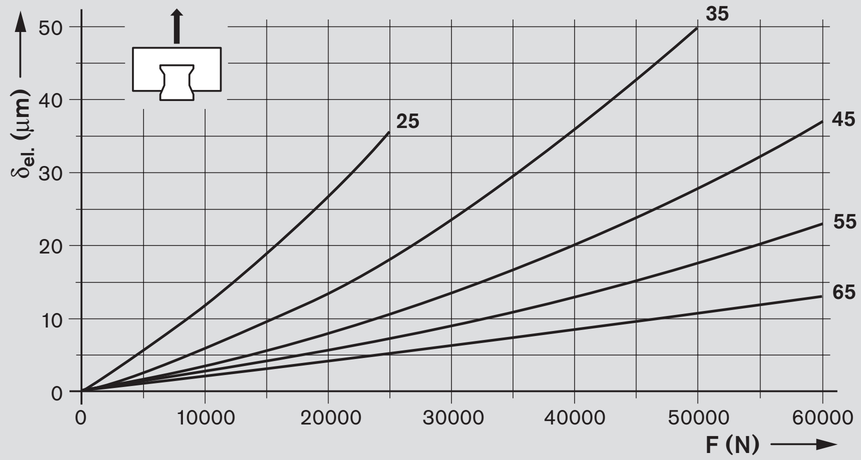
Sizes 25 to 65
———— measured values

Runner block mounted using 6 screws:
- 4 outer screws of strength class 12.9
- 2 centerline screws of strength class 8.8

1. Down load



2. Lift-off load



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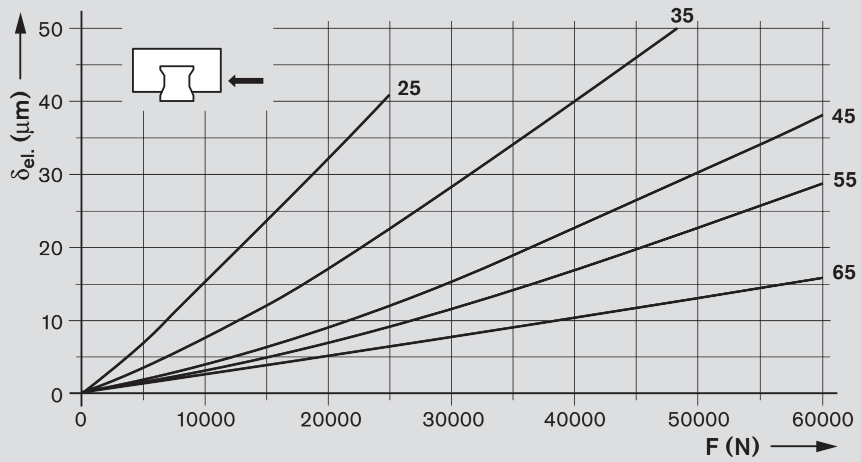


Preload class
C3 = preload 13% C

Key to graph

$\delta_{el.}$	=	elastic deflection	(µm)
F	=	load	(N)

Standard Runner Blocks, Steel version

Rigidity

Rigidity of the roller rail system at preload C2

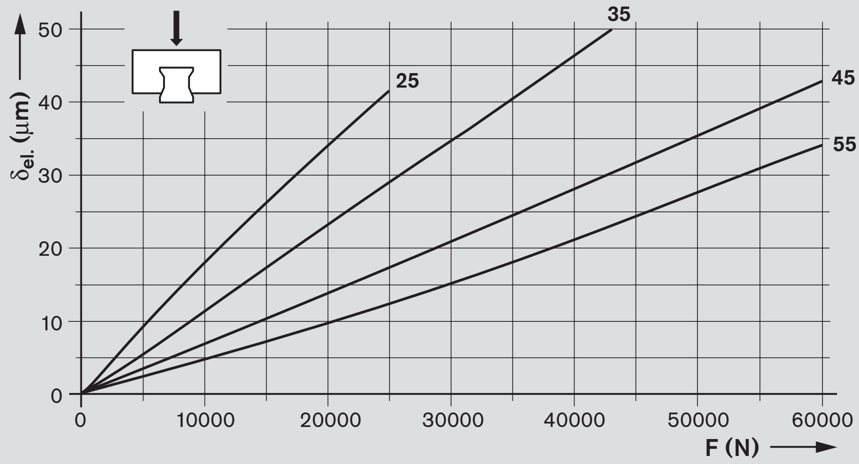
Standard runner block SNH R1821

Sizes 25 to 55

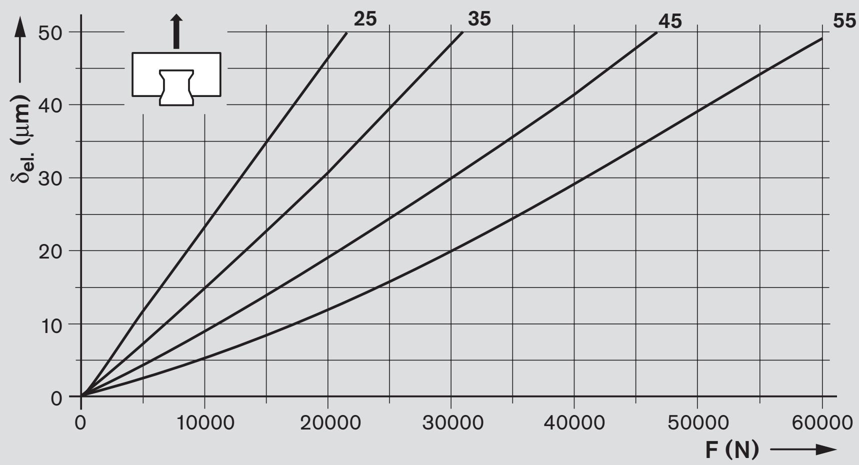
measured values

Runner block mounted using 6 screws of strength class 12.9

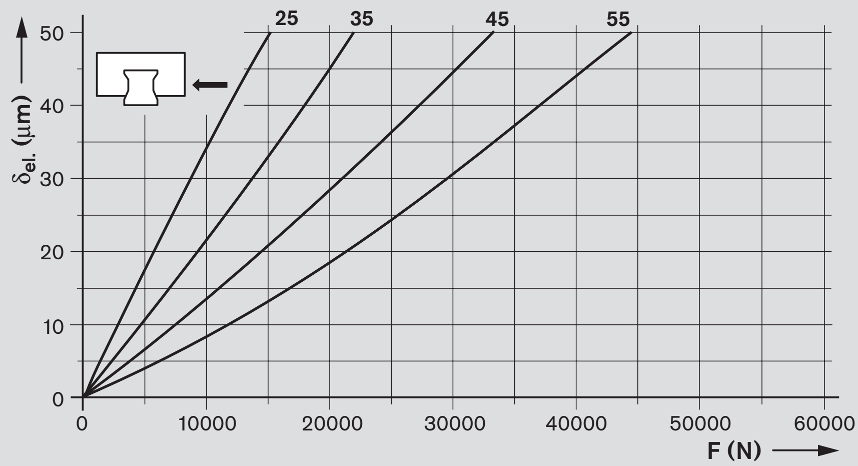
1. Down load



2. Lift-off load



3. Side load



Preload class

C2 = preload 8% C

Key to graph

$\delta_{el.}$ = elastic deflection (µm)

F = load (N)

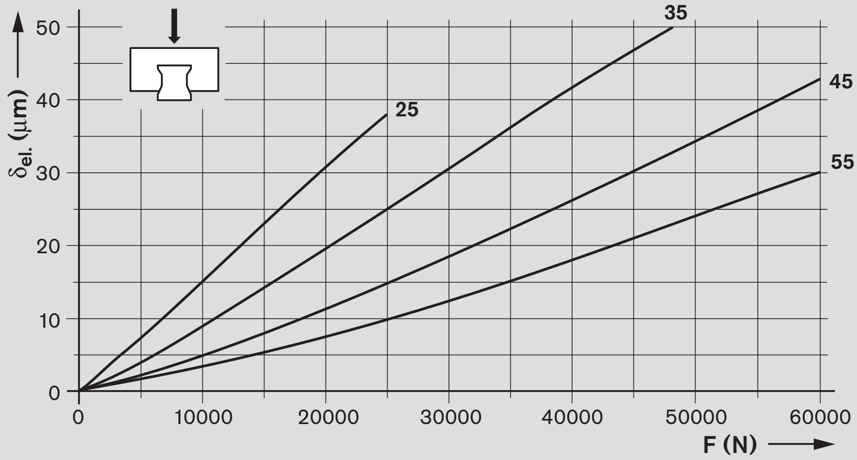
Rigidity of the roller rail system at preload C3

Standard runner block SNH R1821

Sizes 25 to 55

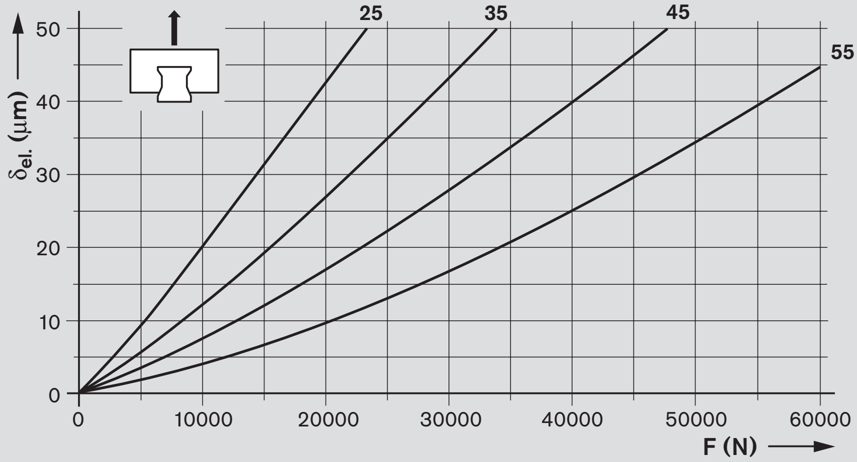
——— measured values

Runner block mounted using 6 screws of strength class 12.9

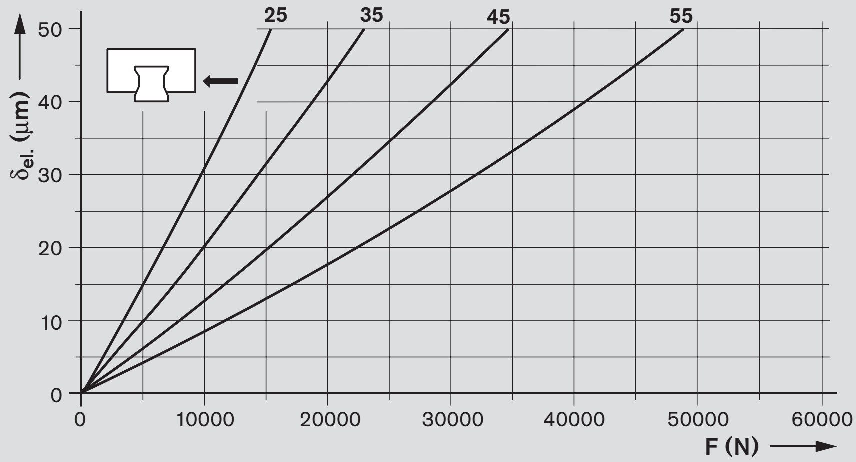


1. Down load

2. Lift-off load



3. Side load



Preload class
C3 = preload 13% C

Key to graph
$\delta_{el.}$ = elastic deflection (µm)
F = load (N)

Standard Runner Blocks, Steel version

Rigidity

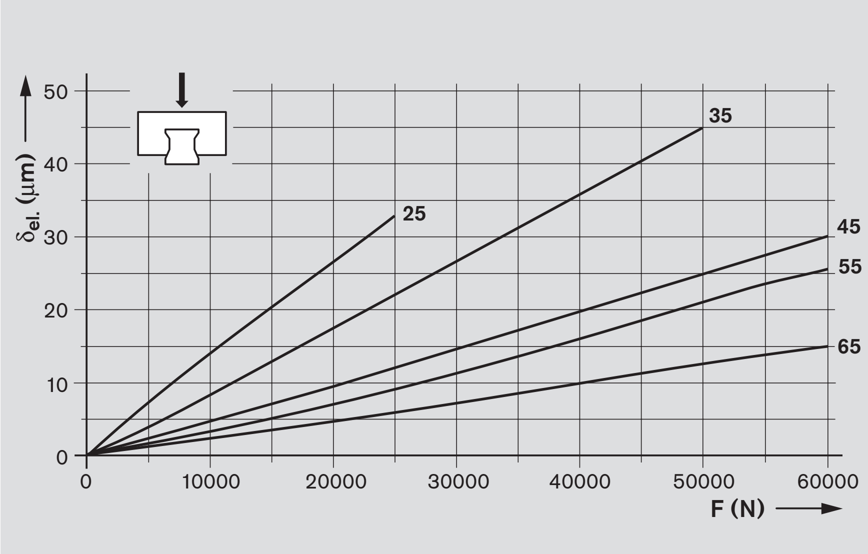
Rigidity of the roller rail system at preload C2

Standard runner blocks
SLH R1824 (sizes 25 to 55) and
SLS R1824 (size 65)

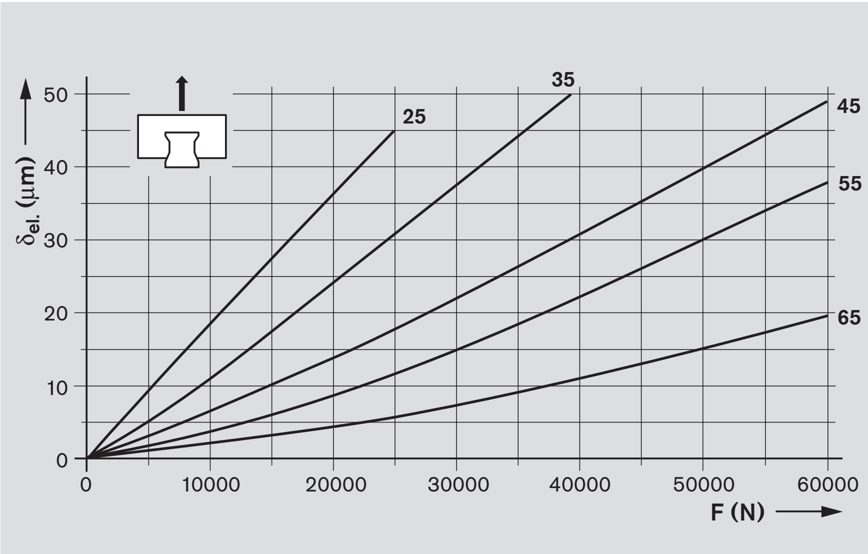
Sizes 25 to 65
——— measured values

Runner block mounted using 6 screws of strength class 12.9

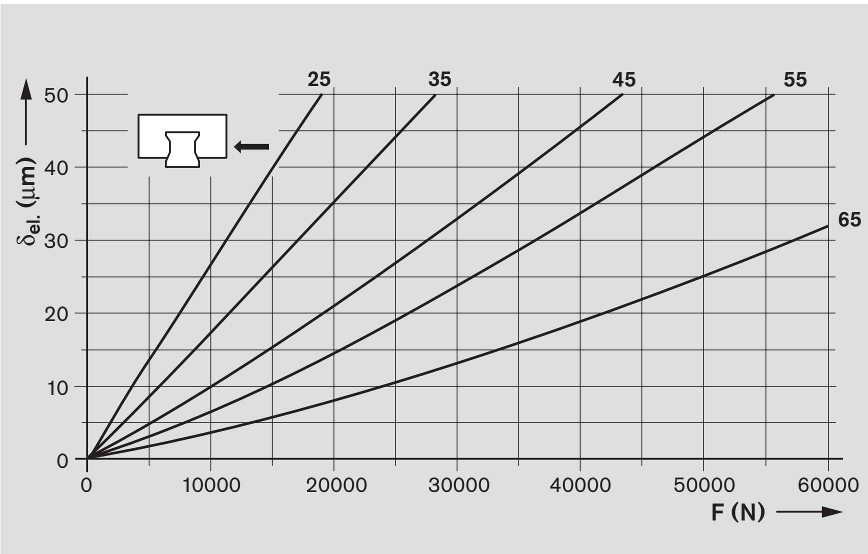
1. Down load



2. Lift-off load



3. Side load



Preload class
C2 = preload 8% C

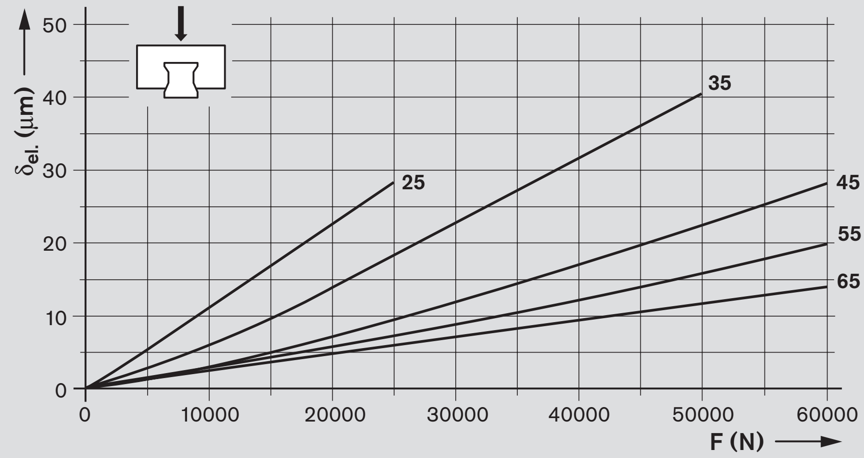
Key to graph
$\delta_{el.}$ = elastic deflection (µm)
F = load (N)

Rigidity of the roller rail system at preload C3

Standard runner blocks
SLH R1824 (sizes 25 to 55) and
SLS R1824 (size 65)

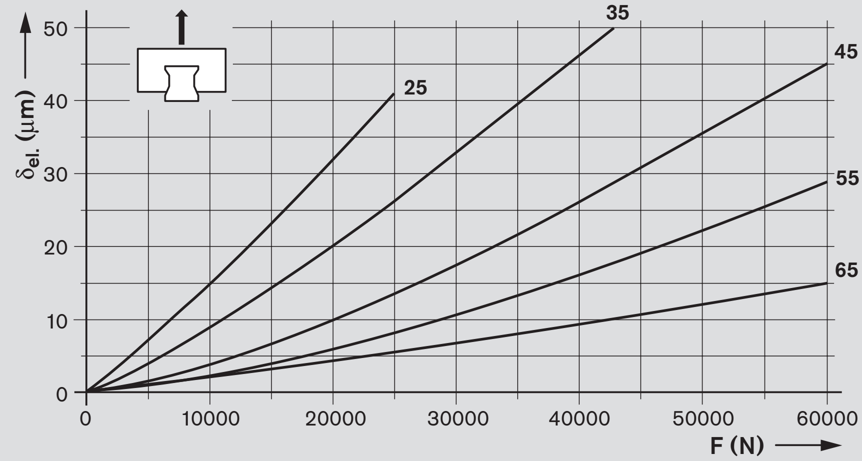
Sizes 25 to 65
——— measured values

Runner block mounted using
6 screws of strength class 12.9

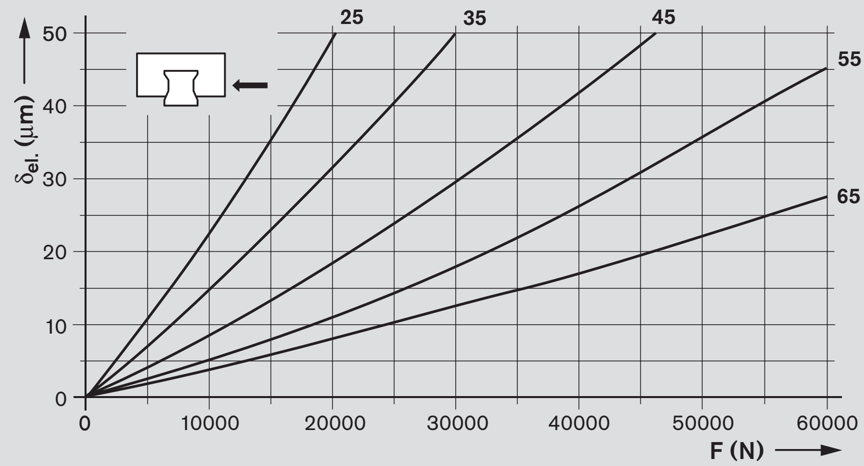


1. Down load

2. Lift-off load



3. Side load



Preload class
C3 = preload 13% C

Key to graph

$\delta_{el.}$	=	elastic deflection	(µm)
F	=	load	(N)

Wide Roller Rail Systems

Product Description

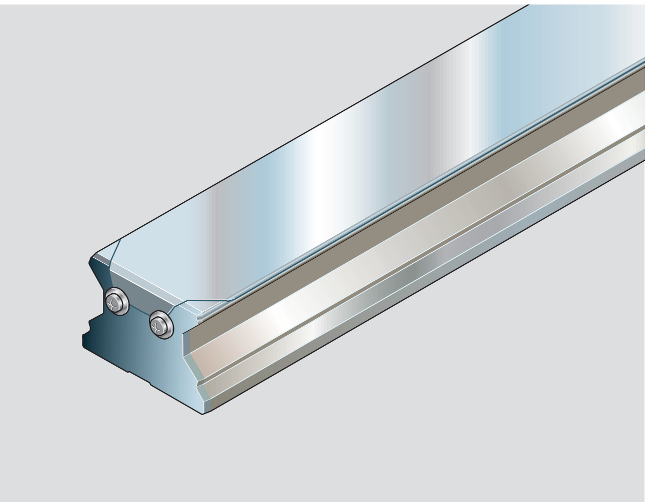
Outstanding features

- Wide runner blocks for applications with high moment loads and enhanced rigidity
- Improved travel characteristics
- Four reference edges on runner block for precise alignment in machine structure
- Very high torque capacity
- Very high torsional moment and torsional rigidity
- Improved rigidity under lift-off and side loading conditions through four additional mounting screw holes at the center of the runner block
- Mounting of attachments to runner block from above or below

Further highlights

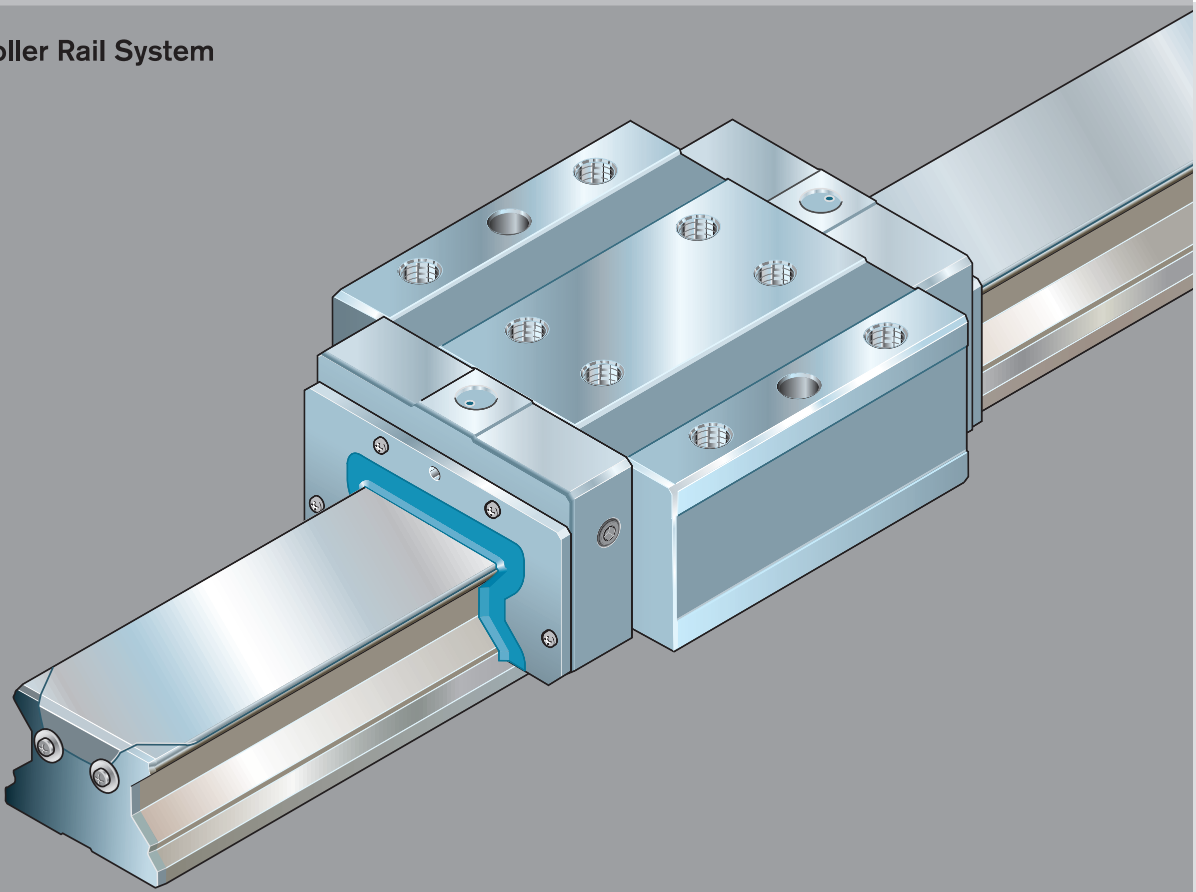
- Lube ports on all sides for maximum ease of maintenance
- Novel lube duct design minimizes lubricant consumption.
- Runner blocks made from antifriction bearing steel, with hardened and ground raceways (guide rails also with hardened raceways and ground on all sides)
- Smooth running thanks to optimized roller recirculation and guidance
- Optimized entry-section geometry and high number of rollers per track minimizes variation in elastic deflection.
- Aluminum end caps
- End seals integrated as standard for better sealing of all running tracks and to protect plastic parts

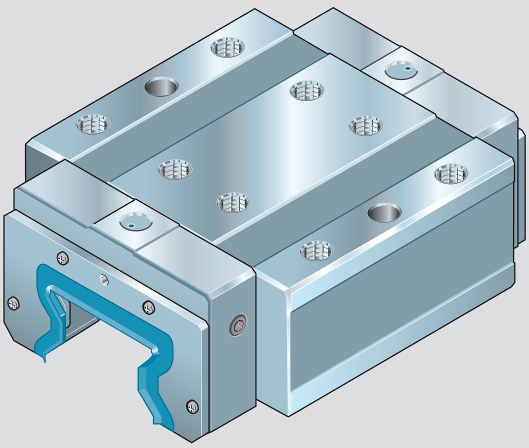
Options
- Corrosion-resistant wide runner blocks and guide rails in Resist CR, matte silver hard chrome plated, available in accuracy class H (preload C2)

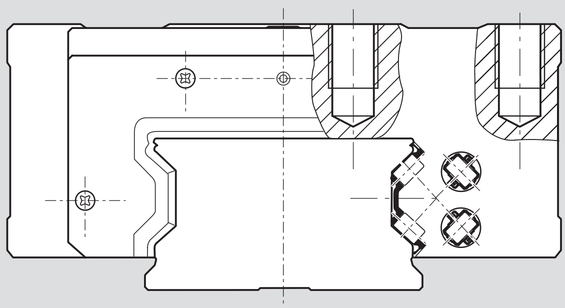


Proven cover strip for guide rail mounting holes
- A **single** cover **for all** holes – saves time and money
- Stainless spring steel to EN 10088
- Easy to fit – simply clip on and secure

Wide Roller Rail System







Runner block wide, long, standard height BLS R1872
- Aluminum end caps
- End seals integrated as standard for better sealing of all running tracks and to protect plastic parts

Optimal roller guidance design
- Smooth running thanks to optimized roller recirculation and guidance

Wide Roller Rail Systems

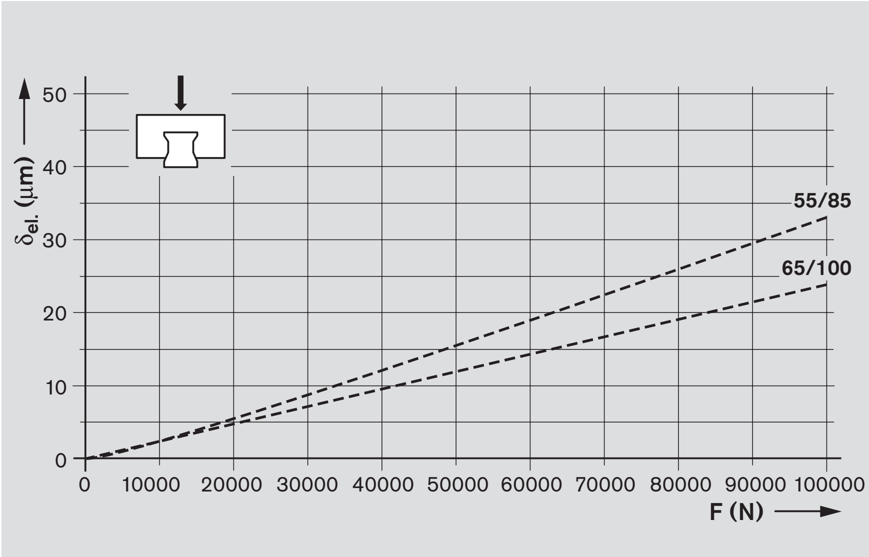
Rigidity

Rigidity of the roller rail system at preload C2

Wide runner block BLS R1872

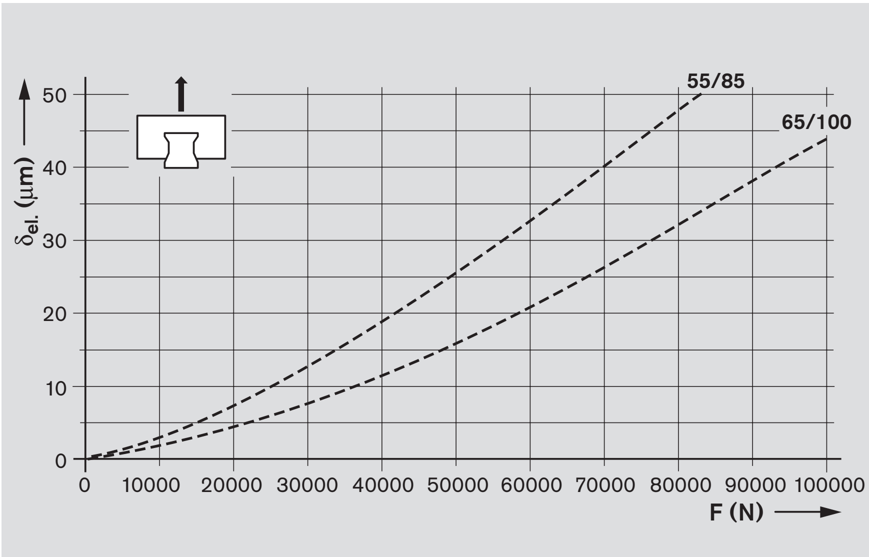
Sizes 55/85 and 65/100
- - - - - - - - - - - - calculated values

Runner block mounted using 8 screws and the upper reference edges only
– All screws of strength class 12.9

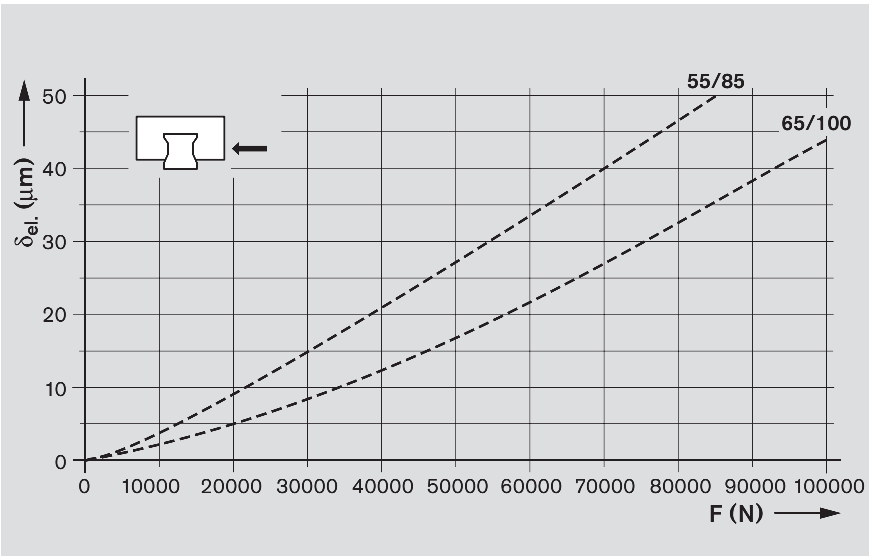


1. Down load

2. Lift-off load



3. Side load



Preload class
C2 = preload 8% C

Key to graph
$\delta_{el.}$ = elastic deflection (μm)
F = load (N)

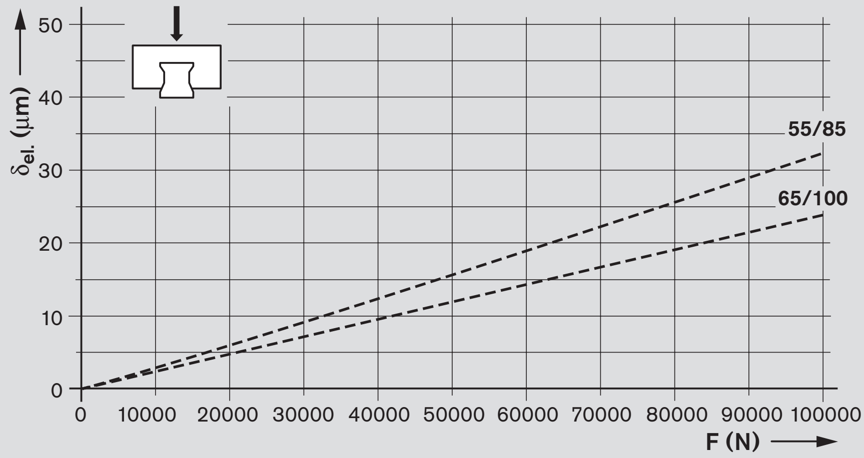
Rigidity of the roller rail system at preload C2

Wide runner block BLS R1872

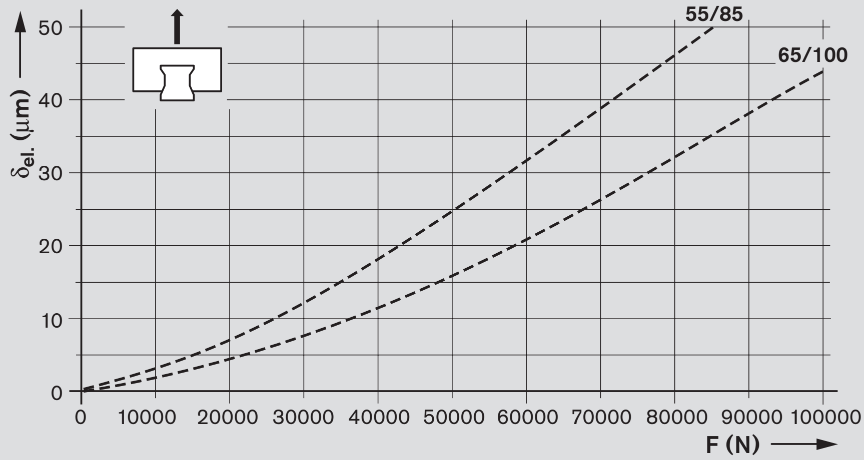
Sizes 55/85 and 65/100
------------ calculated values

Runner block mounted using 8 screws and all 4 reference edges (top and bottom)
– All screws of strength class 12.9

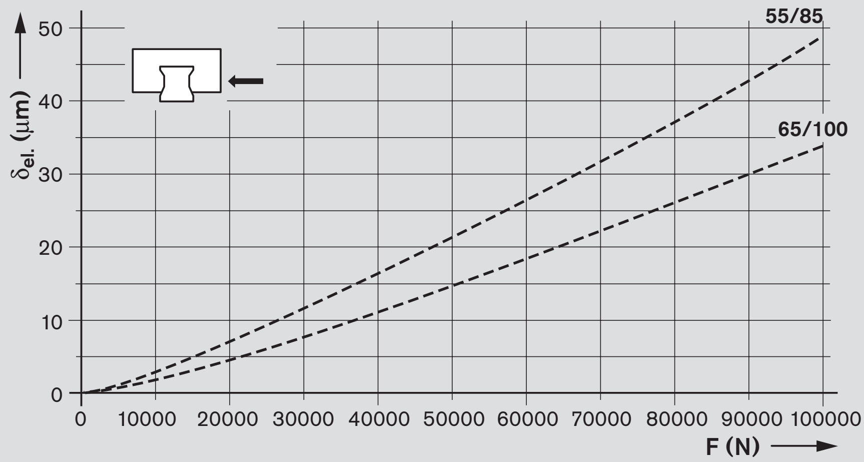
1. Down load



2. Lift-off load



3. Side load



Preload class
C2 = preload 8% C

Key to graph

$\delta_{el.}$	=	elastic deflection	(µm)
F	=	load	(N)

Wide Roller Rail Systems

Rigidity

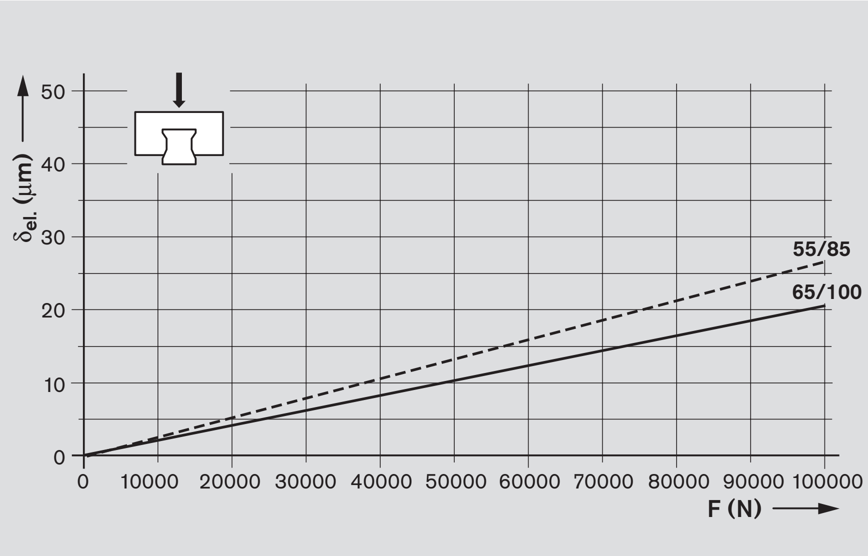
Rigidity of the roller rail system at preload C3

Wide runner block BLS R1872

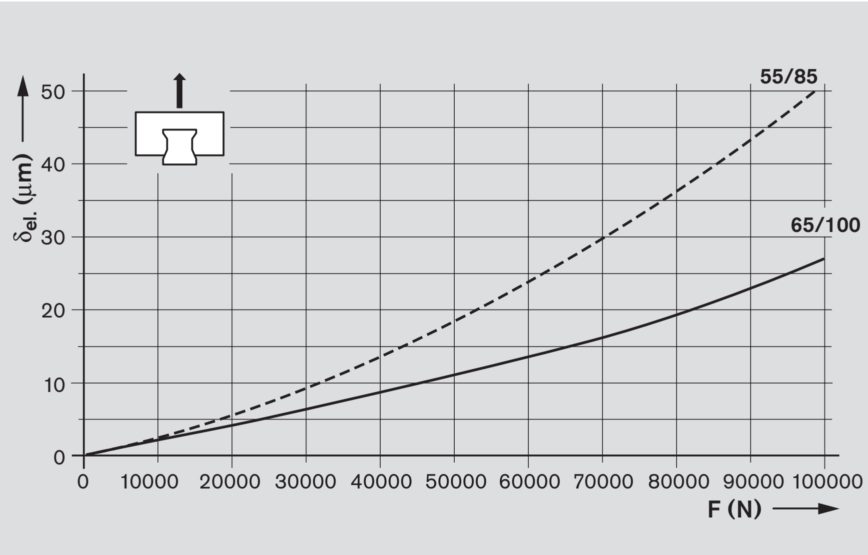
Size 55/85
------------ calculated values
Size 65/100
———————— measured values

Runner block mounted using 8 screws and the upper reference edges only
– All screws of strength class 12.9

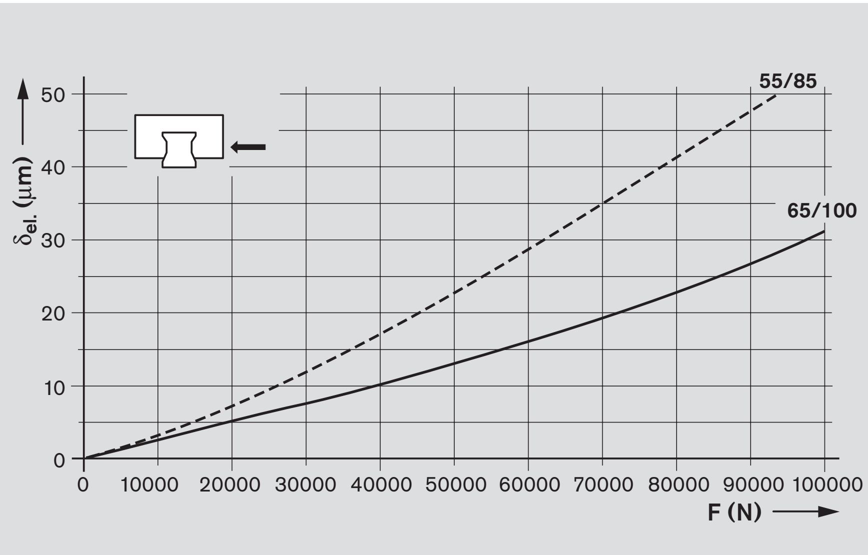
1. Down load



2. Lift-off load



3. Side load



Preload class
C3 = preload 13% C

Key to graph
$\delta_{el.}$ = elastic deflection (µm)
F = load (N)

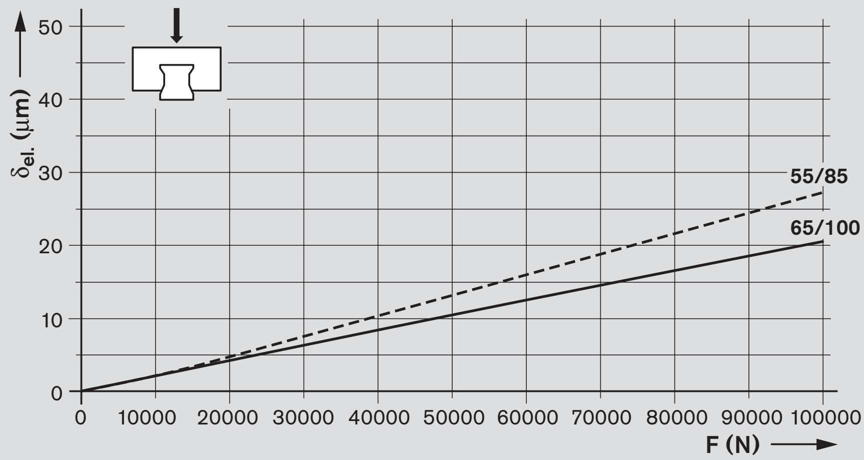
Rigidity of the roller rail system at preload C3

Wide runner block BLS R1872

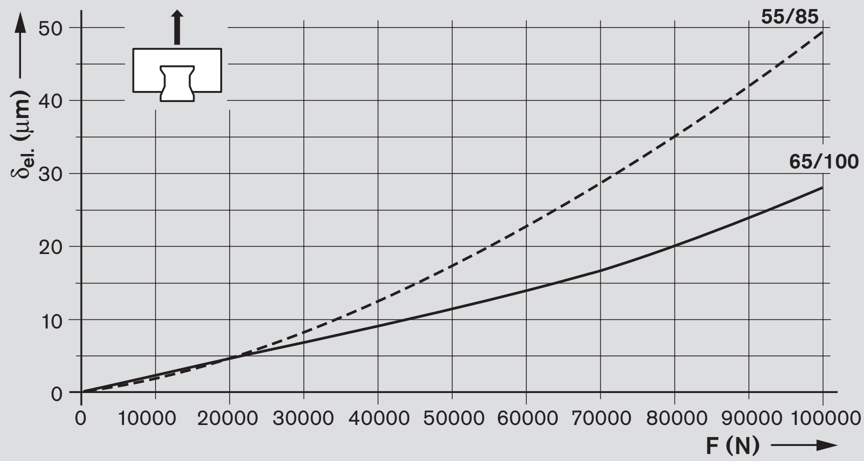
Size 55/85
------------ calculated values
Size 65/100
———————— measured values

Runner block mounted using 8 screws and all 4 reference edges (top and bottom)
– All screws of strength class 12.9

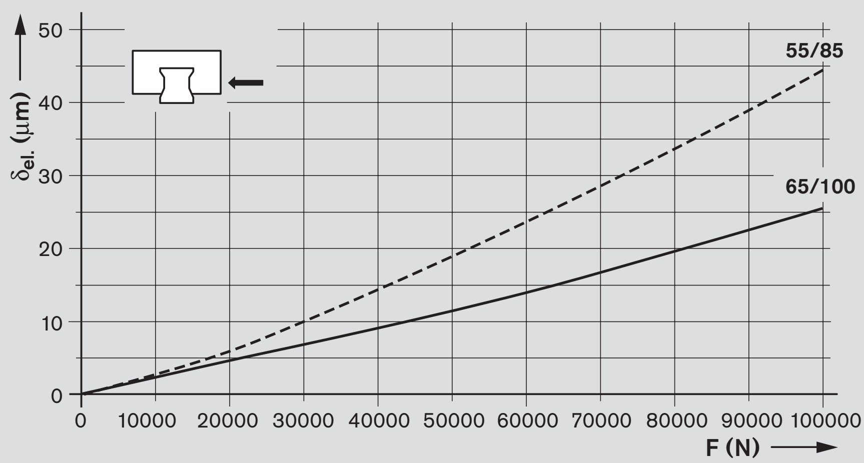
1. Down load



2. Lift-off load



3. Side load



Preload class
C3 = preload 13% C

Key to graph
$\delta_{el.}$ = elastic deflection (µm)
F = load (N)

Mounting Instructions

General Mounting Instructions

General notes

The following installation notes apply to all Roller Rail Systems.

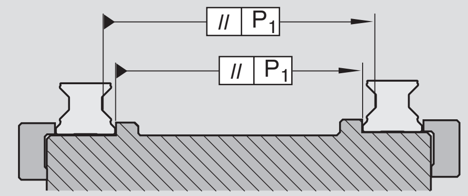
⚠ **In overhead mounting orientations (suspended top down) the runner block could possibly come away from the rail due to loss or breakage of rollers. Secure the runner block against falling!**

Rexroth roller rail systems are high quality, precision manufactured products and must therefore be handled with the utmost care in transit and during subsequent installation. The same care must be taken with cover strips.
All steel parts are treated with anticorrosion oil prior to shipment.
It is not necessary to remove this oil provided the recommended lubricants are used.

Parallelism offset of mounted rails

Values measured at the guide rails and at the runner blocks

The parallelism offset P_1 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 this on the service life can generally be neglected.



Roller Rail System	Size	Parallelism offset P_1 (mm) for preload class C2	C3
Standard	25	0.007	0.005
	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	100	0.029	0.022
	125	0.034	0.026

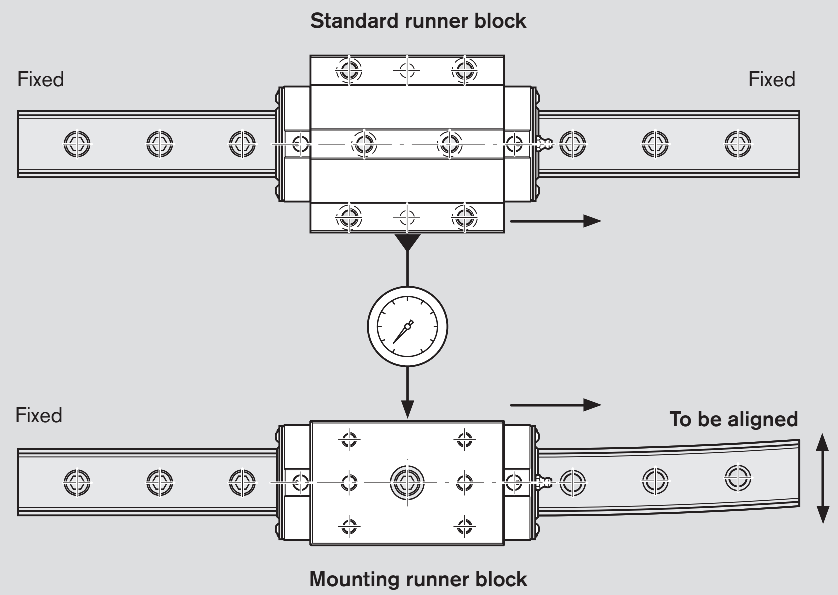
Preload classes
C2 = preload 8% C
C3 = preload 13% C

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

Mounting with mounting runner block



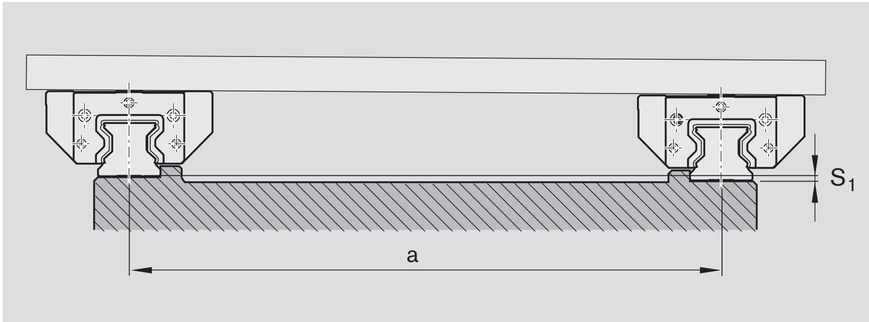
Mounting Instructions

General Mounting Instructions

Vertical offset

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

Permissible vertical offset in the transverse direction S_1



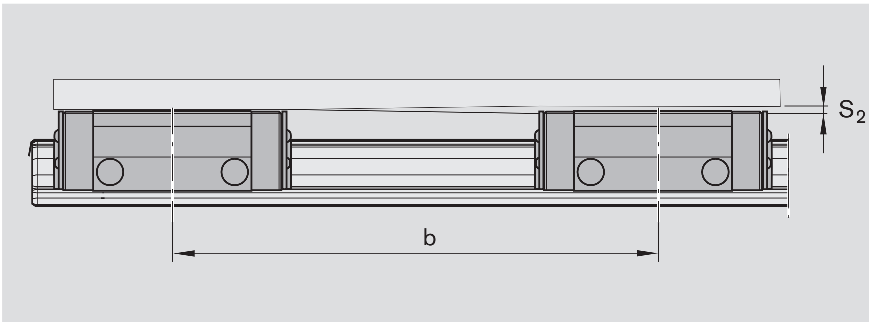
The tolerance for dimension H, as given the table with accuracy classes in the "General Product Description" section, must be deducted from the permissible vertical offset S_1.

$$S_1 = a \cdot Y$$

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

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

Permissible vertical offset in the longitudinal direction S_2



The tolerance "max. difference in dimension H on the same rail", as given the table with accuracy classes in the „General Product Description" section, must be deducted from the permissible vertical offset S_2.

$$S_2 = b \cdot X$$

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

Calculation factor	For runner block length	
	Standard	Long
X	$4.3 \cdot 10^{-5}$	$3.0 \cdot 10^{-5}$

Runner block with standard length
- Standard roller rail system FNS R1851, SNH R1821
- Heavy duty roller rail system FNS R1861

Runner block, long
- Standard roller rail system FLS R1853, SLH R1824
- Wide roller rail system BLS R1872
- Heavy duty roller rail system FLS R1863

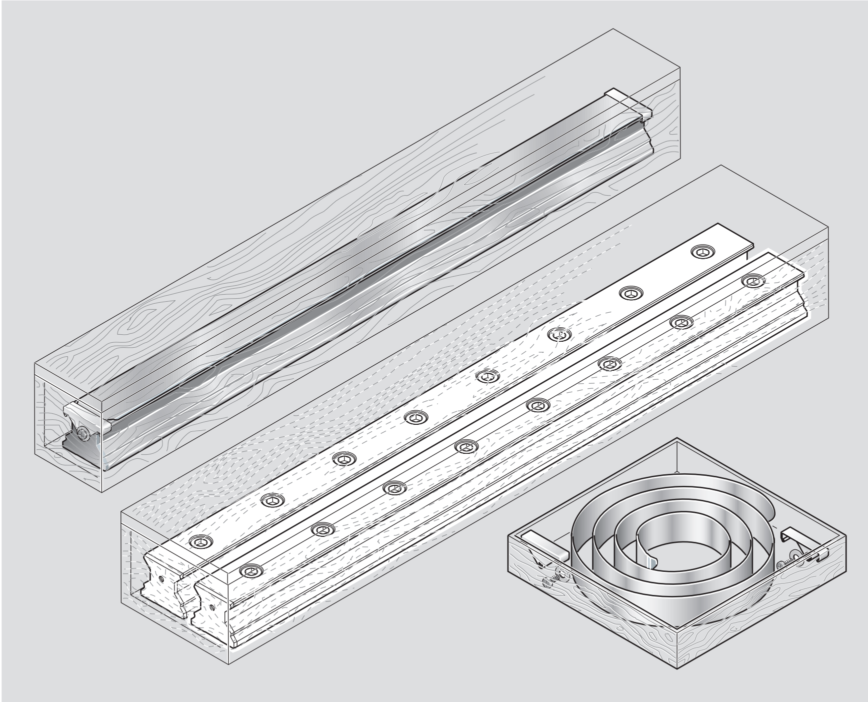
Mounting Instructions

General Mounting Instructions

Shipment of guide rails

One-piece 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 caps screwed on.
If required, guide rails can also be supplied with a separate cover strip.

Composite guide rails
The cover strip and protective 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 guide rails.
The cover strips have one angled down and one straight end (strip tongue).

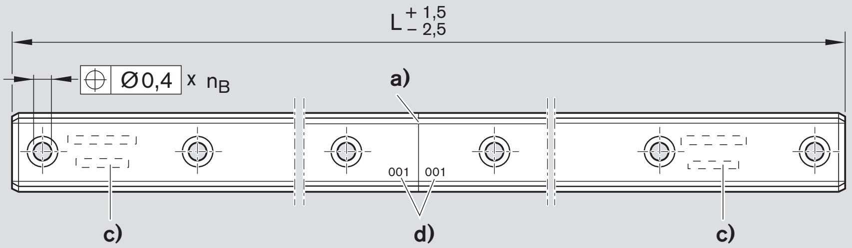


Composite guide rails

Matching sections of a composite guide rail are identified as such by a label on the packaging.

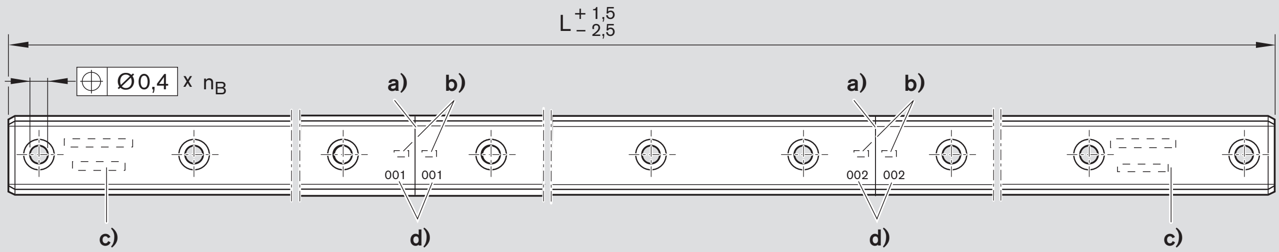
All sections of the same rail have the same number, which is marked on the top of the guide rail.

Standard guide rail made up of two sections



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

Standard guide rail made up of three or more sections



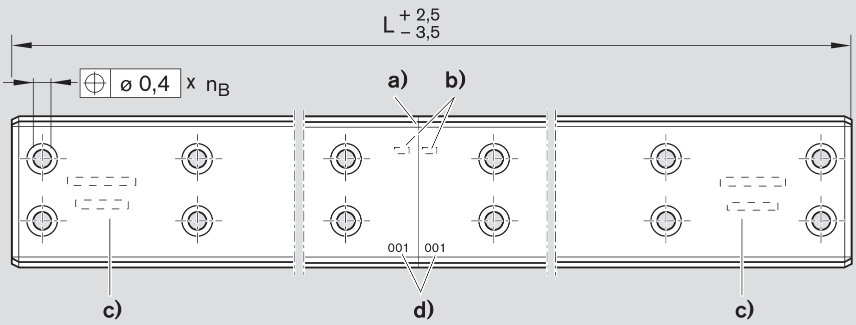
Note on cover strip
For composite rails, a cover strip to cover the total length L is supplied separately along with the rails.

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

Mounting Instructions

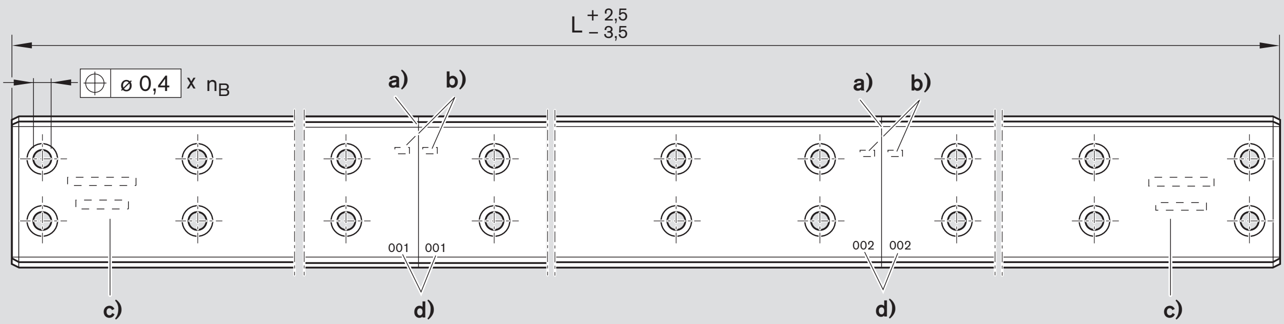
General Mounting Instructions

Wide guide rail made up of two sections

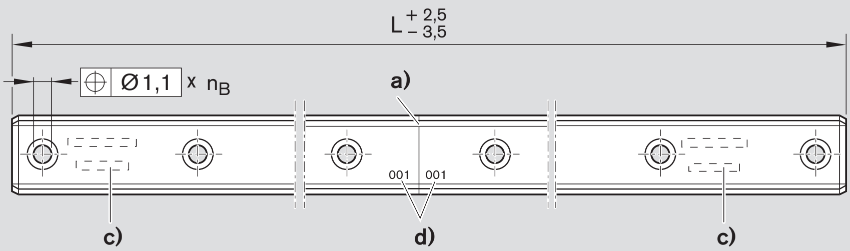


n_B Number of holes
- **a)** Joint (sharp-edged, now also in hard chrome plated guide rails)
- **b)** Rail number
- **c)** Full rail identification on first and last sections
- **d)** Joint number

Wide guide rail made up of three or more sections

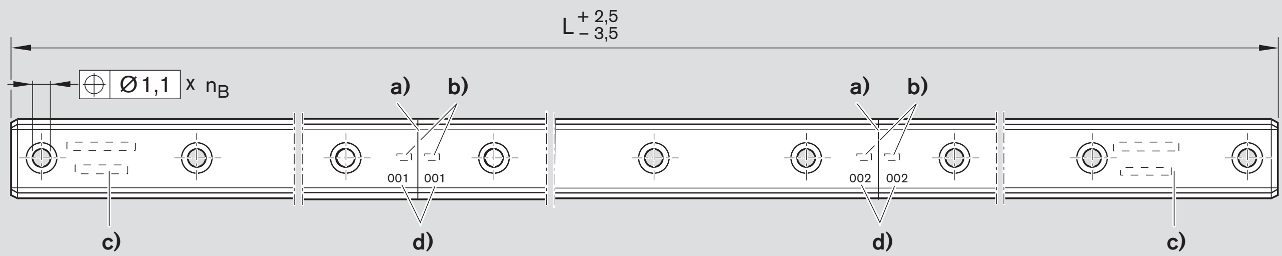


Heavy duty guide rail made up of two sections



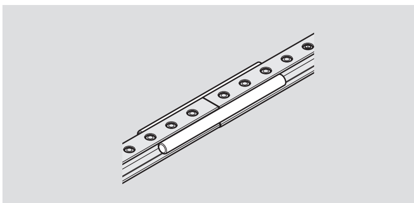
n_B Number of holes
- **a)** Joint (sharp-edged, now also in hard chrome plated guide rails)
- **b)** Rail number
- **c)** Full rail identification on first and last sections
- **d)** Joint number

Heavy duty guide rail made up of three or more sections



Note on cover strip
For composite rails, a cover strip to cover the total length L is supplied separately along with the rails.

Adjusting shaft
The sections of composite 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

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

Notes
- For 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 “Mounting”).
- Use a mounting runner block (see “General Mounting Instructions”).
- Install mounting hole plugs or a cover strip (see the relevant Mounting Instructions!):

A After mounting the 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”).
The plugs must be flush with the rail surface before mounting the runner block!

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

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

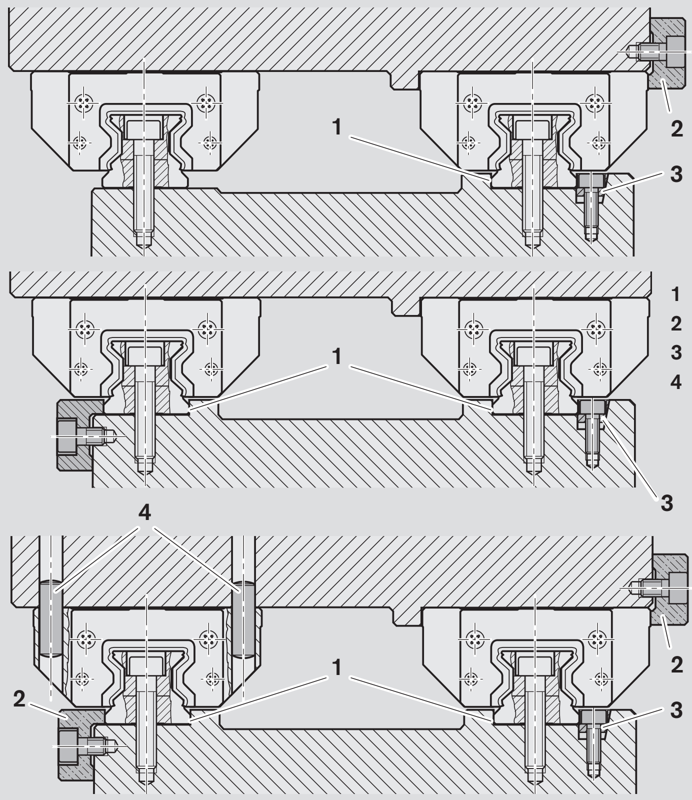
⚠ **Always fit steel mounting hole plugs before pushing on the runner blocks! Before mounting the runner block, oil or grease the sealing lips of the runner block and the bevel on the end face of the guide rail!**

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

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

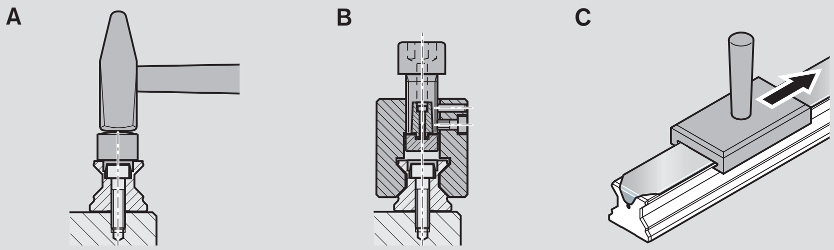
- Detailed information on the mounting procedure can be found in “Mounting Instructions for Roller Rail Systems.”

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

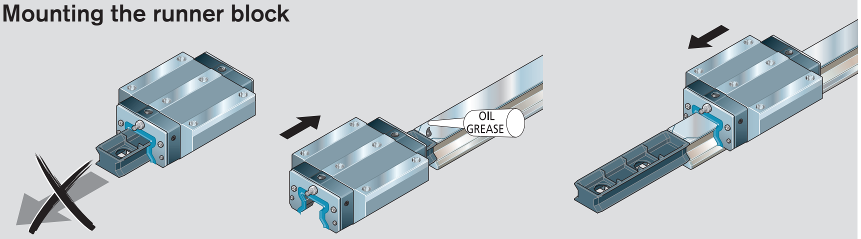


1 Reference edge
2 Clamping strip
3 Wedge profile
4 Locating pins

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



Mounting the runner block



⚠ **The transport and mounting arbor must remain in the runner block until the block is pushed onto the guide rail. Otherwise, rollers may be lost!**

⚠ **Use the mounting arbor again to remove runner blocks from the rail! When not installed on the guide rails, the runner blocks should always be kept on the arbor!**

Mounting Instructions

Mounting

Load on the screw connections between the guide rail and the mounting base

The high-performance capability of Roller Rail Systems permits the load limits for screw connections as specified in DIN 645-1 to be exceeded. The most critical point is the screw connection between the guide rail and the mounting base. Screw connections for which the loads **F** or moment loads **M_t** exceed the relevant load limits in the table must be separately recalculated (see VDI Guideline 2230).

The values shown in the table apply under the following conditions:
- Mounting screws quality 12.9
- Screws tightened with a torque wrench
- Screws lightly oiled (for screws in quality 8.8, an approximation factor of 0.6 can be applied).
- Parts screwed down to steel or cast iron bases
- Screw-in depth at least 2x thread diameter

Standard roller rail systems

Guide rail	Size	Static lift-off loads F and moment loads M_t Runner block, standard length SNH R1821, FNS R1851		Runner block, long SLH (SLS) R1824, FLS R1853	
		F_{max} N	$M_{t\,max}$ Nm	F_{max} N	$M_{t\,max}$ Nm
R1805	**25**	34 300	360	39 200	410
R1806	**35**	64 500	1 030	73 800	1 180
R1845	**45**	157 800	3 390	180 400	3 870
	55	216 800	5 400	247 800	6 100
	65	296 000	8 900	339 400	10 100
R1807	**25**	34 300	360	39 200	410
R1847	**35**	64 500	1 030	73 800	1 180
	45	157 800	3 390	180 400	3 870
	55	216 800	5 400	247 800	6 100
	65	296 000	8 900	339 400	10 100

Wide roller rail systems

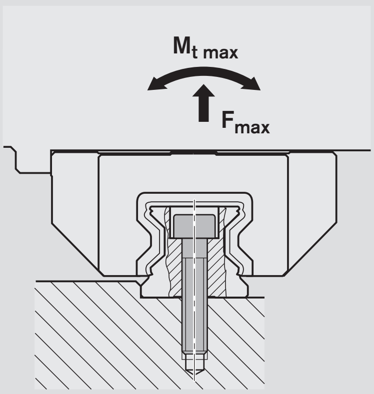
Guide rail	Size	Static lift-off loads F and moment loads M_t Runner block, long BLS R1872	
		F_{max} N	$M_{t\,max}$ Nm
R1875	**55/85**	360 000	10 100
R1873	**65/100**	494 000	16 500

Heavy duty roller rail systems

Guide rail	Size	Static lift-off loads F and moment loads M_t Runner block, standard length FNS R1861		Runner block, long FLS R1863	
		F_{max} N	$M_{t\,max}$ Nm	F_{max} N	$M_{t\,max}$ Nm
R1835	**100**	686 000	33 270	784 000	38 000
R1865	**125**	1 102 500	66 150	1 260 000	75 600

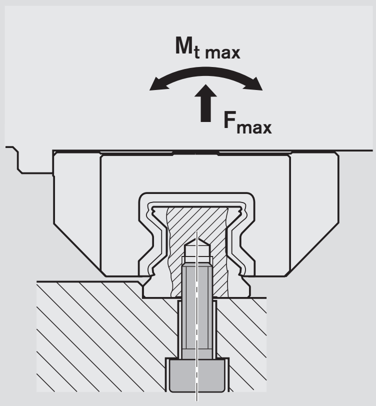
Guide rail for mounting from above

Standard: R1805, R1806, R1845
Wide: R1875, R1873
Heavy duty: R1835, R1865



Guide rail for mounting from below

Standard: R1807, R1847



Mounting Instructions

Mounting

Standard Roller Rail Systems

Reference edges and corner radii

Combination examples

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

Mounting and lubrication

For details of runner block and 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.”

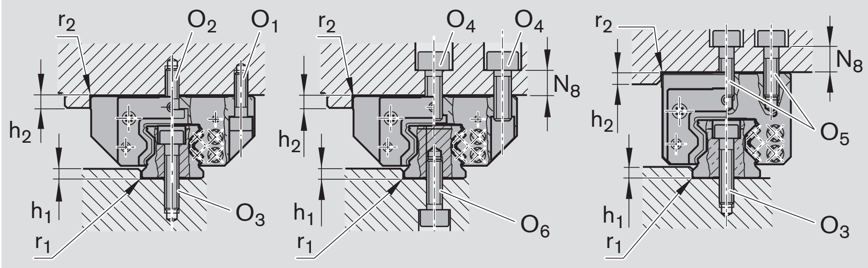
Standard runner blocks
FNS R1851, FLS R1853
(flanged)

Guide rails
R1805, R1806, R1845, R1846
(for mounting from above)

Guide rails
R1807, R1847
(for mounting from below)

Standard runner blocks
SNH R1821, SLH (SLS) R1824
(slimline)

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
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

1) When using braking and clamping units, please take account of the values H_1 from the “Braking and Clamping Units” catalog.

Mounting screws

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

Please refer to the section “Load on the screw connections between the guide rail and the mounting base.”

Size	Screw sizes					
	Runner block				Guide rail	
	O_1 ISO 4762 4 pieces	O_2 1) DIN 6912 2 pieces	O_4 1) 2) ISO 4762 6 pieces	O_5 ISO 4762 6 pieces	O_3 ISO 4762	O_6 ISO 4762
25	M6x20	M6x16	M8x20	M6x18	M6x30	M6x20
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

1) For runner block mounting using 6 screws:
Tighten the centerline screws O_2, O_4 or O_5 with the tightening torque for strength class 8.8.
2) For runner block mounting from above with only 4 O_4 screws:
Permissible side load 1/3 lower, and lower rigidity

Permissible side load

The recommended limits for permissible side loads without additional lateral retention indicate the approximate upper limits for screws in two strength classes. In other cases, the permissible side load must be calculated from the screw tension force. This can be up to about 15% less when using screws in strength class 10.9 instead of 12.9.

Screw strength class	Permissible side load without lateral retention 1)					
	Runner block				Guide rail	
	O_1	O_2	O_4	O_5	O_3	O_6
8.8 2)	9% C	13% C 4)	20% C	13% C	10% C	10% C
8.8 3)	7% C	11% C 4)	16% C	11% C	7% C	7% C
12.9 2)	15% C	19% C 4)	30% C	22% C	17% C	17% C
12.9 3)	12% C	16% C 4)	23% C	18% C	12% C	12% C

1) Calculated with friction coefficient $\mu = 0.125$
2) Runner blocks FNS, SNH
3) Runner blocks FLS, SLH
4) For mounting with 2 O_2 screws and 4 O_1 screws

Recommended tightening torques

For $\mu_K = \mu_G = 0.125$

		M6	M8	M10	M12	M14	M16
8.8	Nm max	9.5	23	46	80	125	195
10.9	Nm max	13.0	32	64	110	180	275
12.9	Nm max	16.0	39	77	135	215	330

Mounting Instructions

Mounting

Standard Roller Rail Systems

Locating pins

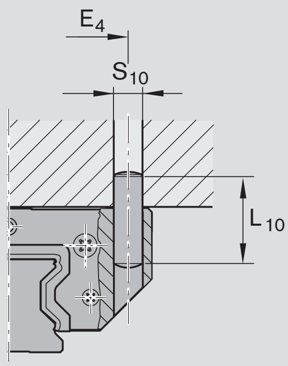
⚠ **If the recommended limits for permissible side loads are exceeded, the runner block must be additionally fixed!**

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

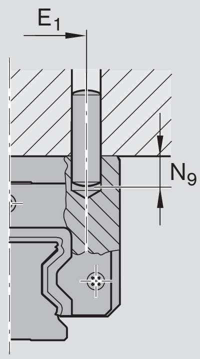
Notes
Rough-drilled holes made for production reasons may exist at the recommended pin hole positions on the runner block centerline (dia. < S_{10}). These may be bored open to accommodate the locating pins.

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 runner blocks
FNS R1851, FLS R1853
(flanged)



Standard runner blocks
SNH R1821, SLH (SLS) R1824
(slimline)



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

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

Mounting Instructions

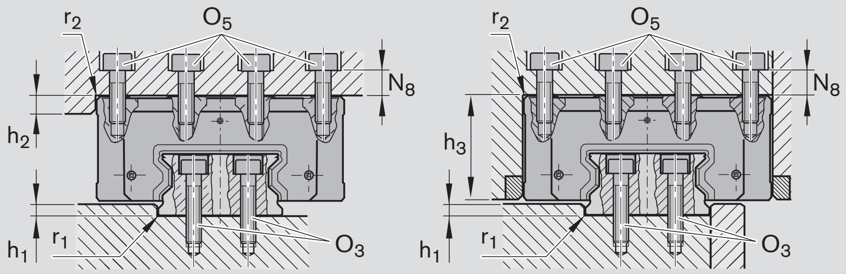
Mounting

Wide Roller Rail Systems

Reference edges and corner radii

Mounting and lubrication
For details of runner block and 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 runner blocks BLS R1872
Guide rails R1873, R1875
(for mounting from above)



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

b) Fixing of the 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!**

Please refer to the section “Load on the screw connections between the guide rail and the mounting base.”

Size	Screw sizes	
	Runner block O_5 ISO 4762 6 pieces	Guide rail O_3 ISO 4762
55/85	M12x50	M12x30
65/100	M14x60	M14x35

Permissible side load
The recommended limits for permissible side loads without additional lateral retention indicate the approximate upper limits for screws in two strength classes. In other cases, the permissible side load must be calculated from the screw tension force. This can be up to about 15% less when using screws in strength class 10.9 instead of 12.9.

Screw strength class	Permissible side load without lateral retention1)	
	Runner block O_5	Guide rail O_3
8.8	16% C2)	16% C
12.9	27% C2)	27% C

1) Calculated with friction coefficient $\mu = 0.125$
2) For runner block mounting using 8 screws

Recommended tightening torques
For $\mu_K = \mu_G = 0.125$

Strength class		M12	M14
8.8	**Nm max**	80	125
10.9		110	180
12.9		135	215

Mounting Instructions

Mounting

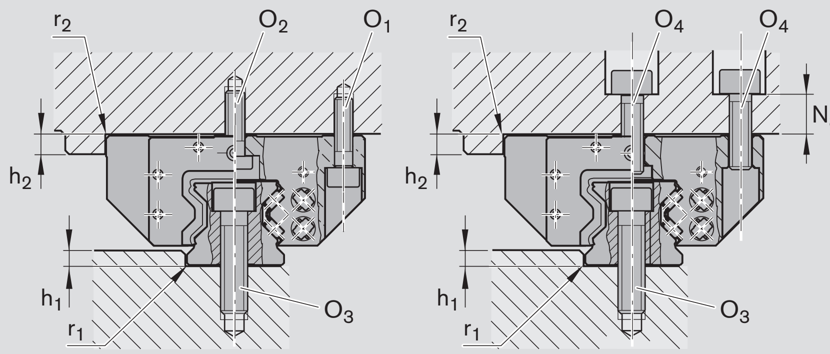
Heavy Duty Roller Rail Systems

Reference edges and corner radii

Mounting and lubrication

For details of runner block and guide rail mounting, see "General Mounting Instructions."
To facilitate the mounting of heavy duty 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 runner blocks FNS R1861, FLS 1863
Guide rails R1835, 1865
(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!**

Please refer to the section "Load on the screw connections between the guide rail and the mounting base."

Size	Screw sizes			
	Runner block			Guide rail
	O_1	O_2 1)	O_4 1) 2)	O_3
	ISO 4762	DIN 6912	ISO 4762	ISO 4762
	6 pieces	3 pieces	9 pieces	
100	M16x60	M16x55	M20x60	M24x100
125	M24x85	M24x70	M27x80	M30x120

1) For runner block mounting using 9 screws:
Tighten the centerline screws O_2, or O_4 along the rail with the tightening torque for strength class 8.8.
2) For runner block fixing from above using only 6 O_4 screws:
Permissible side load 1/3 lower, and lower rigidity

Permissible side load

The recommended limits for permissible side loads without additional lateral retention indicate the approximate upper limits for screws in two strength classes. In other cases, the permissible side load must be calculated from the screw tension force. This can be up to about 15% less when using screws in strength class 10.9 instead of 12.9.

Screw strength class	Permissible side load without lateral retention 1)			
	Runner block			Guide rail
	O_1	O_2	O_4	O_3
8.8 2)	9% C	13% C 4)	20% C	10% C
8.8 3)	7% C	11% C 4)	16% C	7% C
12.9 2)	15% C	19% C 4)	30% C	17% C
12.9 3)	12% C	16% C 4)	23% C	12% C

1) Calculated with friction coefficient $\mu = 0.125$
2) Runner block FNS R1861
3) Runner block FLS R1863
4) For mounting with 3 O_2 screws and 6 O_1 screws

Recommended tightening torques

For $\mu_K = \mu_G = 0.125$

		M16	M20	M24	M27	M30
8.8	Nm max	195	390	660	980	1 350
10.9	Nm max	280	560	930	1 400	1 850
12.9	Nm max	330	650	1 100	1 650	2 250

Lubrication and Maintenance

Lubrication

Rexroth Roller Rail Systems are delivered filled with an anti-corrosion agent.

Immediately after mounting the runner blocks (before start-up), make sure the system has sufficient initial lubrication (basic lubrication).

Depending on the runner block type, the following lubricant types are possible:
– Both grease and oil
– Oil only

Grease lubrication using grease guns or progressive feeder systems

Recommended grease types
We recommend using **Dynalub 510** with the following properties:
– High performance lithium soap grease, consistency class NLGI 2, to DIN 51818 (KP2K-20 to DIN 51825)
– Good water resistance
– Corrosion protection
– Temperature range: –20 to +80°C

Under conventional environmental conditions this ground-fiber, homogeneous grease is ideally suited for the lubrication of linear elements:
– At loads of up to 50% C
– For short-stroke applications > 1 mm
– For the permissible speed range of Roller Rail Systems

The product and safety data sheets can be found on our website at www.boschrexroth.de/brl.
Please also read the notes on page 154 of this catalog!

Part numbers for Dynalub 510:
– R3416 037 00 (cartridge 400 g)
– R3416 035 00 (hobbock 25 kg)

Initial lubrication of the runner blocks (basic lubrication)

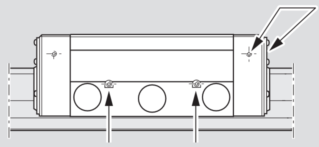
Stroke ≥ 2 · runner block length B_1 (normal stroke)
- For initial lubrication, mount one lube fitting per runner block, at either of the two end caps!
-

Initial lubrication is applied in three partial quantities as specified in table 1:
1. Grease the runner block with the first partial quantity as per Table 1, pressing it in slowly with the help of a grease gun.
2. Slide the runner block back and forth over at least three times the block length (size 125: at least 300 mm) for three full cycles.
3. Repeat steps 1. and 2. twice more.
4. Check whether a film of lubricant is visible on the guide rail.

Size	Initial lubrication (normal stroke) Partial quantity cm³
25	0.8 (3x)
35	0.9 (3x)
45	1.0 (3x)
55	1.4 (3x)
65	2.7 (3x)
55/85	1.8 (3x)
65/100	3.2 (3x)
100	15.0 (3x)
125	as shown in Fig. 1

Table 1

Initial lubrication for size 125
At one of the end face or side lube ports **on either** of the two end caps:
25 cm³ (3x)



and on the runner block body at all four side lube ports:
7.5 cm³ (3x) per port

Fig. 1

Stroke < 2 · runner block length B_1 (short stroke)
- Install and lubricate two lube fittings per runner block, one on each of the two end caps!

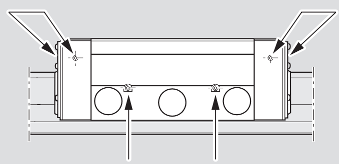
Initial lubrication is applied to each fitting in three partial quantities as specified in table 2:
1. Grease each fitting on the runner block with the first partial quantity as per Table 2, pressing it in slowly with the help of a grease gun.
2. to 4. Repeat the procedure as for initial lubrication (normal stroke).

Size	Initial lubrication (short stroke) Partial quantity per port	
	1st end cm³	2nd end cm³
25	0.8 (3x)	0.8 (3x)
35	0.9 (3x)	0.9 (3x)
45	1.0 (3x)	1.0 (3x)
55	1.4 (3x)	1.4 (3x)
65	2.7 (3x)	2.7 (3x)
55/85	1.8 (3x)	1.8 (3x)
65/100	3.2 (3x)	3.2 (3x)
100	15.0 (3x)	15.0 (3x)
125	Lube ports 1st end, 2nd end **and** sides as shown in Fig. 2	

Table 2

Initial lubrication for size 125
At two lube ports, **one on each** of the two end caps:

25 cm³ (3x) 25 cm³ (3x)



and on the runner block body at all four side lube ports:
7.5 cm³ (3x) per port

Fig. 2

Lubrication and Maintenance

Lubrication

Grease lubrication using grease guns or progressive feeder systems (continued)

Relubrication of runner blocks

Stroke ≥ 2 · runner block length B_1 (normal stroke)

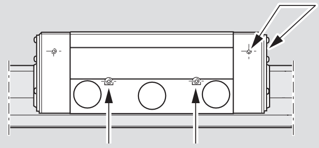
- When the travel distance shown as the relubrication interval in Fig. 5 has been reached, apply the relubrication quantity as specified in Table 3.

Please also read the notes on relubrication on page 154 of this catalog!

Size	Relubrication (normal stroke) cm³
25	0.8
35	0.9
45	1.0
55	1.4
65	2.7
55/85	1.8
65/100	3.2
100	15.0
125	as shown in Fig. 3

Table 3

Relubrication for size 125
At one of the end face or side lube ports **on either** of the two end caps: 55 cm³



or on the runner block body at all four side lube ports: 15 cm³ per port

Fig. 3

Stroke < 2 · runner block length B_1 (short stroke)

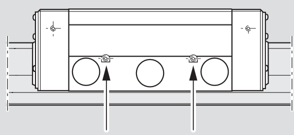
- When the travel distance shown as the relubrication interval in Fig. 5 has been reached, apply the relubrication quantity as specified in Table 4.
- At each lubrication cycle the runner block should be traversed through a lubricating stroke of 3 · runner block length B_1. In any case, the lubricating stroke must be at least the length of the runner block. If the largest possible lubricating stroke is smaller than the runner block length B_1, lubricant must be applied to the guide rail. Please consult us for details.

Please also read the notes on relubrication on page 154 of this catalog!

Size	Relubrication (short stroke) per port	
	1st end cm³	2nd end cm³
25	0.8	0.8
35	0.9	0.9
45	1.0	1.0
55	1.4	1.4
65	2.7	2.7
55/85	1.8	1.8
65/100	3.2	3.2
100	15.0	15.0
125	Side ports as shown in Fig. 4	

Table 4

Relubrication for size 125



On the runner block body at all four side lube ports: 15 cm³ per port

Fig. 4

Lubrication and Maintenance

Lubrication

Grease lubrication using grease guns or progressive feeder systems (continued)

Load-dependent relubrication intervals for grease lubrication using grease guns or progressive feeder systems ("dry axes")

Sizes 25 to 125

The following conditions apply:
- Grease lubricant Dynalub 510
- or alternatively
  Castrol Longtime PD 2
- Maximum speed:
  $v_{max} = 2$ m/s
- No exposure to metalworking fluids
- Standard seals
- Ambient temperature:
  T = 20 – 30°C

Key to graph

s	=	relubrication interval expressed as travel	(km)
C	=	dynamic load capacity	(N)
F	=	equivalent dynamic load	(N)

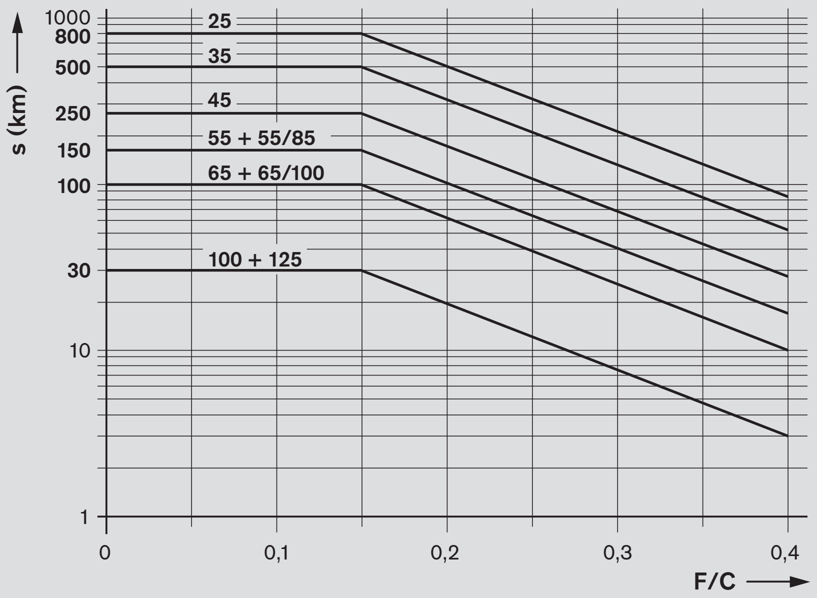


Fig. 5

Notes
The load ratio F/C is the quotient of the equivalent dynamic load on the bearing F (making allowance for a preload of 8% C or 13% C) divided by the dynamic load capacity C (see "General Technical Data and Calculations").

For relubrication intervals in applications involving exposure to metalworking fluids, please consult us.

⚠ **If other lubricants are used, this may lead to a reduction in the relubrication intervals, the achievable travel in short-stroke applications, and the load capacities. Possible chemical interactions between the plastic materials, lubricants and preservative oils must also be taken into account.**

⚠ **Do not use greases containing solid particles (e.g., graphite or MoS_2)!**

⚠ **When using progressive feeder systems, do not go below the minimum dosing quantity for relubrication as given in Table 9.**

⚠ **If the system is to be exposed to metalworking fluids, always apply 2 to 5 lubricant pulses at the beginning or when the system has been at a standstill for a longer period. If possible, apply lubricant while the system is in motion. Carry out cleaning and lubricating strokes (see "Maintenance").**

⚠ **If the application conditions involve dirt, vibrations, impacts, etc. we recommend shortening the relubrication intervals accordingly.
Even under normal operating conditions, the system must be relubricated at the latest after 2 years due to aging of the grease.**

If your application involves more demanding environmental requirements (such as clean room, vacuum, food industry environment, increased exposure to fluids or aggressive media, extreme temperatures), please consult us. These situations must be investigated on a case by case basis and may require the use of a special lubricant. Be sure to have all the information concerning your application at hand when contacting us.

⚠ **Switching from grease to oil lubrication while the system is in service is not possible as the lubrication ducts are already filled with grease, and oil will not be able to pass through them.**

Lubrication

Liquid grease lubrication via single-line piston distributor systems

Liquid grease lubrication
We recommend using **Dynalub 520** with the following properties:
- High performance lithium soap grease, consistency class NLGI 00, to DIN 51818 (GP00K-20 to DIN 51826)
- Good water resistance
- Corrosion protection
- Temperature range: −20 to +80°C

Under conventional environmental conditions this ground-fiber, homogeneous grease is ideally suited for the lubrication of linear elements:
- In single-line centralized lubrication systems
- At loads of up to 50% C
- For short-stroke applications > 1 mm
- For the permissible speed range of Roller Rail Systems
- For miniature versions

The product and safety data sheets can be found on our website at www.boschrexroth.de/brl.
Please also read the notes on page 158 of this catalog!

Part numbers for Dynalub 520:
- R3416 043 00 (cartridge 400 g)
- R3416 042 00 (bucket 5 kg)

Initial lubrication of the runner blocks (basic lubrication)

We recommend applying initial lubrication with a manual grease gun before connecting the equipment to the centralized lubrication system.

If initial lubrication is nevertheless carried out via the centralized lubrication system, it is essential that all lines and piston distributors should be filled. The pulse count can then be calculated from the partial quantities and the piston distributor size according to Table 9.

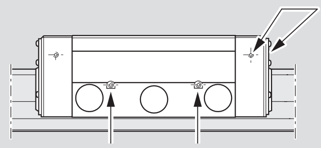
Stroke ≥ 2 · runner block length B_1 (normal stroke)
- For initial lubrication, mount one lube fitting per runner block, at either of the two end caps!

Initial lubrication is applied in three partial quantities as specified in table 5:
1. Grease the runner block with the first partial quantity as per Table 5, pressing it in slowly with the help of a grease gun.
2. Slide the runner block back and forth over at least three times the block length (size 125: at least 300 mm) for three full cycles.
3. Repeat steps 1. and 2. twice more.
4. Check whether a film of lubricant is visible on the guide rail.

Size	Initial lubrication (normal stroke) Partial quantity cm^3
25	0.8 (3x)
35	0.9 (3x)
45	1.0 (3x)
55	1.4 (3x)
65	2.7 (3x)
55/85	1.8 (3x)
65/100	3.2 (3x)
100	15.0 (3x)
125	as shown in Fig. 6

Table 5

Initial lubrication for size 125
At one of the end face or side lube ports **on either** of the two end caps:
25 cm^3 (3x)



and on the runner block body at all four side lube ports:
7.5 cm^3 (3x) per port

Fig. 6

Stroke < 2 · runner block length B_1 (short stroke)
- Install and lubricate two lube fittings per runner block, one on each of the two end caps!

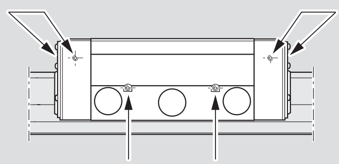
Initial lubrication is applied to each fitting in three partial quantities as specified in table 6:
1. Grease each fitting on the runner block with the first partial quantity as per Table 6, pressing it in slowly with the help of a grease gun.
2. to 4. Repeat the procedure as for initial lubrication (normal stroke).

Size	Initial lubrication (short stroke) Partial quantity per port	
	1st end cm^3	2nd end cm^3
25	0.8 (3x)	0.8 (3x)
35	0.9 (3x)	0.9 (3x)
45	1.0 (3x)	1.0 (3x)
55	1.4 (3x)	1.4 (3x)
65	2.7 (3x)	2.7 (3x)
55/85	1.8 (3x)	1.8 (3x)
65/100	3.2 (3x)	3.2 (3x)
100	15.0 (3x)	15.0 (3x)
125	Lube ports 1st end, 2nd end **and** sides as shown in Fig. 7	

Table 6

Initial lubrication for size 25
At two lube ports, **one on each** of the two end caps:

25 cm^3 (3x) 25 cm^3 (3x)



and on the runner block body at all four side lube ports:
7.5 cm^3 (3x) per port

Fig. 7

Lubrication

Liquid grease lubrication via single-line piston distributor systems (continued)

Relubrication of runner blocks

Stroke ≥ 2 · runner block length B_1 (normal stroke)

- Apply the minimum quantity according to Table 7 to the lube port until the relubrication interval as specified (in Fig. 10) has been reached.

Notes

The required pulse count is the quotient (as a whole number) of the minimum relubrication quantity according to Table 7 and the smallest permissible piston dis-tributor size (i.e. the minimum pulse quantity) according to Table 9. The smallest permissible piston distributor size also depends on the mounting orientation.

The lubricant cycle time can then be obtained by dividing the relubrication interval (according to Fig. 10) by the calculated pulse count (see design example on page 163).

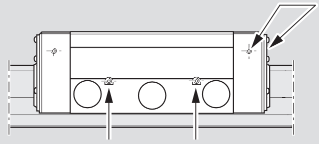
Size	Relubrication (normal stroke) cm³
25	0.8
35	0.9
45	1.0
55	1.4
65	2.7
55/85	1.8
65/100	3.2
100	15.0
125	as shown in Fig. 8

Table 7

Please also read the notes on relubrication on page 158 of this catalog!

Relubrication for size 125

At one of the end face or side lube ports **on either** of the two end caps: 55 cm³



or on the runner block body at all four side lube ports: 15 cm³ per port

Fig. 8

Stroke < 2 · runner block length B_1 (short stroke)

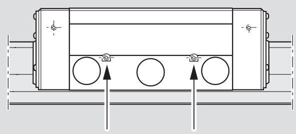
- Apply the minimum quantity according to Table 8 per lube port until the relubrication interval as specified (in Fig. 10) has been reached.
  Calculate the required pulse count and lubricant cycle time in the same way as for relubrication (normal stroke).
- At each lubrication cycle the runner block should be traversed through a lubricating stroke of 3 · runner block length B_1. In any case, the lubricating stroke must be at least the length of the runner block. If the largest possible lubricating stroke is smaller than the runner block length B_1, lubricant must be applied to the guide rail. Please consult us for details.

Please also read the notes on relubrication on page 158 of this catalog!

Size	Relubrication (short stroke) per port	
	1st end cm³	2nd end cm³
25	0.8	0.8
35	0.9	0.9
45	1.0	1.0
55	1.4	1.4
65	2.7	2.7
55/85	1.8	1.8
65/100	3.2	3.2
100	15.0	15.0
125	Side ports as shown in Fig. 9	

Table 8

Relubrication for size 125



On the runner block body at all four side lube ports: 15 cm³ per port

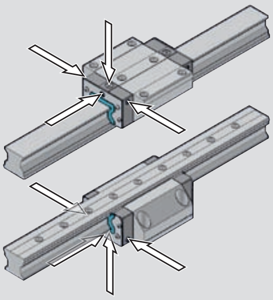
Fig. 9

Lubrication and Maintenance

Lubrication

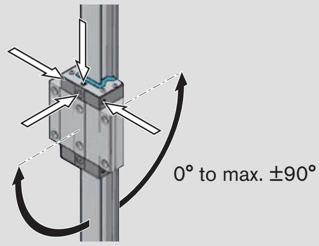
Liquid grease lubrication via single-line piston distributor systems (continued)

Mounting orientation I – normal stroke
Horizontal
1 lube fitting at **either** of the two end caps



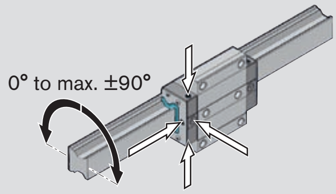
Horizontal, top-down
Same port

Mounting orientation II – normal stroke
Vertical to slanting horizontal
1 lube port at top end cap



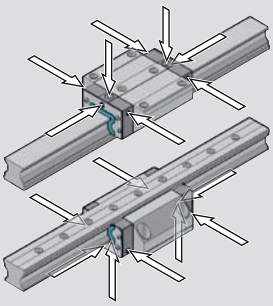
Vertical to slanting, top-down
Same port

Mounting orientation III – normal stroke
Wall mounting
1 lube fitting at **either** of the two end caps



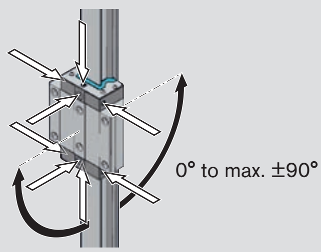
For runner block R1859 620 31, 2 lube ports, **one on each** end cap, **either** at the end face **or** on the mounting face

Mounting orientation IV – short stroke
Horizontal
2 lube ports, **one on each** of the two end caps



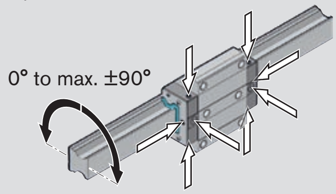
Horizontal, top-down
Same port

Mounting orientation V – short stroke
Vertical to slanting horizontal
2 lube ports, **one on each** of the two end caps (top and bottom)



Vertical to slanting, top-down
Same port

Mounting orientation VI – short stroke
Wall mounting
2 lube ports, **one on each** of the two end caps



Not possible
with runner block R1859 620 31

Smallest permissible piston distributor sizes for liquid grease lubrication through single-line centralized systems[1)]

Runner blocks		Smallest permissible piston distributor size (⇔ minimum pulse quantity) per lube port (cm³) for liquid grease, NLGI class 00 Size								
Part numbers	**Mounting orientations**	**25**	**35**	**45**	**55**	**65**	**55/85**	**65/100**	**100**	**125**
R18.. ... 10 or ... 60 or	**Horizontal I, IV**	0.06	0.1	0.1	0.16	0.2	0.6	0.6	1.5	1.5
R18.. ... 13 or ... 63 or	**Vertical II, V**	0.06	0.1	0.1	0.16	0.2	0.6	0.6	1.5	1.5
R18.. ... 16 or ... 66	**Wall mounting III, VI**	0.10	0.2	0.4	0.40	0.6	1.0	1.5	1.5 (3x)[2)]	1.5 (3x)[2)3)]
R1859 620 31	**Wall mounting III**	–	–	–	–	0.1	–	–	–	–

Table 9

1) Applies under the following conditions: Dynalub 520 (or alternatively Castrol Longtime PD 00) and piston distributors from Vogel
2) Sizes 100 and 125: Either three pulses in short succession or three metering valves each delivering one pulse simultaneously
3) Size 125: 1.5 cm³ per port when all four ports in the runner block body are used

Lubrication

Liquid grease lubrication via single-line piston distributor systems (continued)

Load-dependent relubrication intervals for liquid grease lubrication via single-line piston distributor systems (“dry axes”)

Sizes 25 to 125

The following conditions apply:
- Liquid grease Dynalub 520 or alternatively Castrol Longtime PD 00
- Maximum speed: $v_{max} = 2$ m/s
- No exposure to metalworking fluids
- Standard seals
- Ambient temperature: T = 20 – 30°C

Key to graph

s	=	relubrication interval expressed as travel	(km)
C	=	dynamic load capacity	(N)
F	=	equivalent dynamic load	(N)

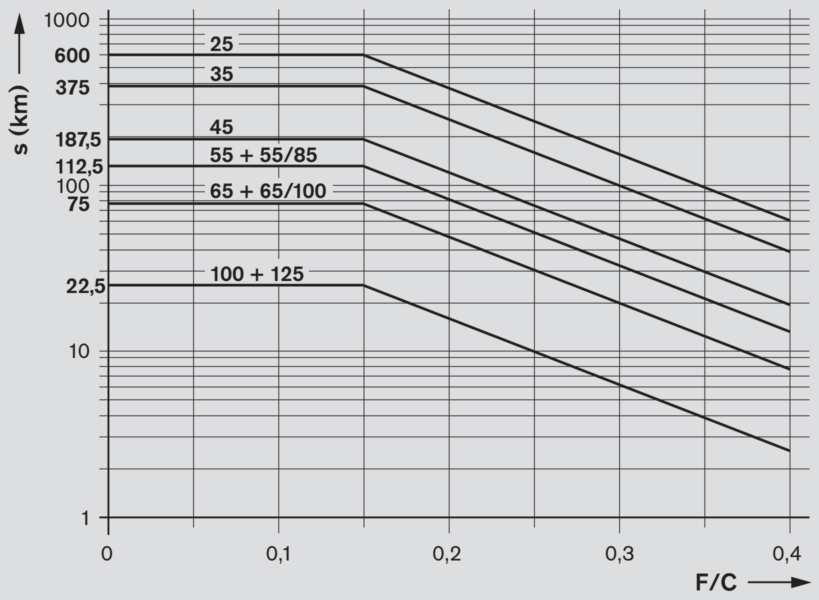


Fig. 10

For relubrication intervals in applications involving exposure to metalworking fluids, please consult us.
Without taking distance traveled into account
Assume 3 to 4 pulses per hour as a guide value for relubrication.

Notes
The load ratio F/C is the quotient of the equivalent dynamic load on the bearing F (making allowance for a preload of 8% C or 13% C) divided by the dynamic load capacity C (see “General Technical Data and Calculations”).

⚠ **If other lubricants are used, this may lead to a reduction in the relubrication intervals, the achievable travel in short-stroke applications, and the load capacities. Possible chemical interactions between the plastic materials, lubricants and preservative oils must also be taken into account. In addition, the suitability of the lubricant for use in single-line centralized lubrication systems must be ensured.**

⚠ **Do not use greases containing solid particles (e.g., graphite or MoS_2)!**

⚠ **If the system is to be exposed to metalworking fluids, always apply 2 to 5 lubricant pulses at the beginning or when the system has been at a standstill for a longer period. If possible, apply lubricant while the system is in motion. Carry out cleaning and lubricating cycles (see “Maintenance”).**

⚠ **If the application conditions involve dirt, vibrations, impacts, etc. we recommend shortening the relubrication intervals accordingly. Even under normal operating conditions, the system must be relubricated at the latest after 2 years due to aging of the grease.**

If your application involves more demanding environmental requirements (such as clean room, vacuum, food industry environment, increased exposure to fluids or aggressive media, extreme temperatures), please consult us. These situations must be investigated on a case by case basis and may require the use of a special lubricant. Be sure to have all the information concerning your application at hand when contacting us.

⚠ **Switching from grease to oil lubrication while the system is in service is not possible as the lubrication ducts are already filled with grease, and oil will not be able to pass through them.**

We recommend using piston distributors from Vogel. These should be installed as close as possible to the lube ports of the runner bocks.
Long lines and small line diameters should be avoided, and the lines should be laid on an upward slant.

A selection of possible lube fittings is given in the section “General Accessories – Runner Blocks” (for more information, you should also consult the manufacturer of your lubrication system).

If other consumers are connected to the single-line centralized lubrication system, the weakest link in the chain will determine the lubrication cycle time.

Lubrication

Oil lubrication via single-line piston distributor systems

Oil lubricant
We recommend using **Shell Tonna S 220** with the following properties:
- Special demulsifying oil CLP or CGLP to DIN 51517-3 for machine bed tracks and tool guides
- A blend of highly refined mineral oils and additives
- Can be used even when mixed with significant quantities of metalworking fluids

Please also read the notes on page 162 of this catalog!

Initial lubrication of the runner blocks (basic lubrication)

We recommend applying initial lubrication with a manual grease gun before connecting the equipment to the centralized lubrication system.

If initial lubrication is nevertheless carried out via the centralized lubrication system, it is essential that all lines and piston distributors should be filled. The pulse count can then be calculated from the partial quantities and the piston distributor size according to Table 14.

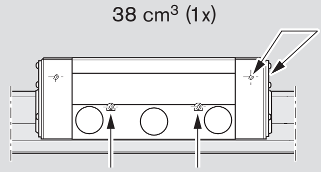
Stroke ≥ 2 · runner block length B_1 (normal stroke)
- For initial lubrication, mount one lube fitting per runner block, at either of the two end caps!

Initial lubrication is applied in two partial quantities as specified in table 10:
1. Apply the first of the oil quantities as specified in table 10 to the runner block.
2. Slide the runner block back and forth over at least three times the block length (size 125: at least 300 mm) for three full cycles.
3. Repeat steps 1. and 2.
4. Check whether a film of lubricant is visible on the guide rail.

Size	Initial lubrication (normal stroke) Partial quantity cm³
25	1.2 (2x)
35	1.3 (2x)
45	1.5 (2x)
55	2.0 (2x)
65	4.0 (2x)
55/85	2.7 (2x)
65/100	4.8 (2x)
100	11.0 (2x)
125	as shown in Fig. 11

Table 10

Initial lubrication for size 125
At one of the end face or side lube ports on **either** of the two end caps:
38 cm³ (1x)



and on the runner block body at all four side lube ports:
9 cm³ (1x) per port

Fig. 11

Stroke < 2 · runner block length B_1 (short stroke)
- Install and lubricate two lube fittings per runner block, one on each of the two end caps!

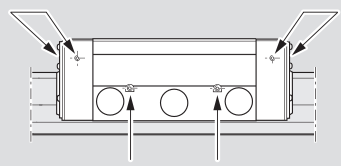
Initial lubrication is applied in two partial quantities per lube fitting as specified in table 11:
1. Apply the first of the oil quantities as specified in table 11 to each of the lube fittings on the runner block.
2. to 4. Repeat the procedure as for initial lubrication (normal stroke).

Size	Initial lubrication (short stroke) Partial quantity per port	
	1st end cm³	2nd end cm³
25	1.2 (2x)	1.2 (2x)
35	1.3 (2x)	1.3 (2x)
45	1.5 (2x)	1.5 (2x)
55	2.0 (2x)	2.0 (2x)
65	4.0 (2x)	4.0 (2x)
55/85	2.7 (2x)	2.7 (2x)
65/100	4.8 (2x)	4.8 (2x)
100	11.0 (2x)	11.0 (2x)
125	Lube ports 1st end, 2nd end **and** sides as shown in Fig. 12	

Table 11

Initial lubrication for size 125
At two lube ports,
one on each of the two end caps:

38 cm³ (1x) 38 cm³ (1x)



and on the runner block body at all four side lube ports:
9 cm³ (1x) per port

Fig. 12

Lubrication

Oil lubrication via single-line piston distributor systems (continued)

Relubrication of runner blocks

Stroke ≥ 2 · runner block length B_1 (normal stroke)

- Apply the minimum quantity according to Table 12 to the lube port until the relubrication interval as specified (in Fig. 15) has been reached.

Notes

The required pulse count is the quotient (as a whole number) of the minimum relubrication quantity according to Table 12 and the smallest permissible piston distributor size (i.e. the minimum pulse quantity) according to Table 14. The smallest permissible piston distributor size also depends on the mounting orientation.

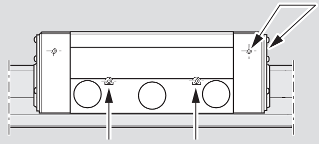
The lubricant cycle time can then be obtained by dividing the relubrication interval (according to Fig. 15) by the calculated pulse count.

Size	Relubrication (normal stroke) cm³
25	1.2
35	1.3
45	1.5
55	2.0
65	4.0
55/85	2.7
65/100	4.8
100	11.0
125	as shown in Fig. 13

Table 12

Please also read the notes on relubrication on page 162 of this catalog!

Relubrication for size 125
At one of the lube ports **on either** of the two end caps: 38 cm³



or on the runner block body at all four side lube ports: 9 cm³ per port

Fig. 13

Stroke < 2 · runner block length B_1 (short stroke)

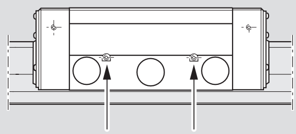
- Apply the minimum quantity according to Table 13 per lube port until the relubrication interval as specified (in Fig. 15) has been reached.
  Calculate the required pulse count and lubricant cycle time in the same way as for relubrication (normal stroke).
- At each lubrication cycle the runner block should be traversed through a lubricating stroke of 3 · runner block length B_1. In any case, the lubricating stroke must be at least the length of the runner block. If the largest possible lubricating stroke is smaller than the runner block length B_1, lubricant must be applied to the guide rail. Please consult us for details.

Please also read the notes on relubrication on page 162 of this catalog!

Size	Relubrication (short stroke) per port 1st end cm³	2nd end cm³
25	1.2	1.2
35	1.3	1.3
45	1.5	1.5
55	2.0	2.0
65	4.0	4.0
55/85	2.7	2.7
65/100	4.8	4.8
100	11.0	11.0
125	Side ports as shown in Fig. 14	

Table 13

Relubrication for size 125



On the runner block body at all four side lube ports: 9 cm³ per port

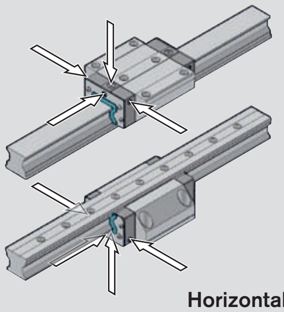
Fig. 14

Lubrication and Maintenance

Lubrication

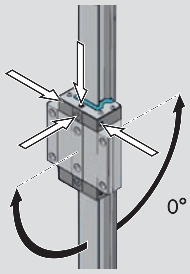
Oil lubrication via single-line piston distributor systems (continued)

Mounting orientation I – normal stroke
Horizontal
1 lube fitting at **either** of the two end caps



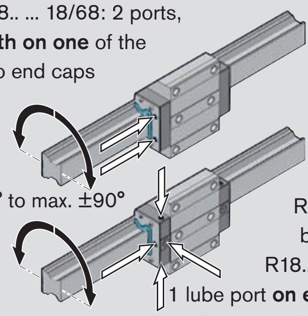
Horizontal, top-down
Same port

Mounting orientation II – normal stroke
Vertical to slanting horizontal
1 lube port at top end cap



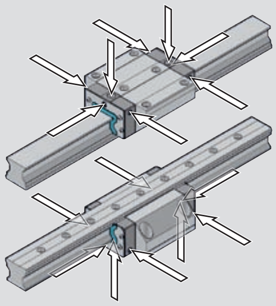
Vertical to slanting, top-down
Same port

Mounting orientation III – normal stroke
Wall mounting
R18.. ... 18/68: 2 ports, **both on one** of the two end caps



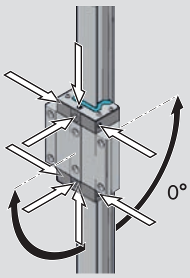
Runner blocks R18.. ... 1.: 1 lube port **on either** of the two end caps; R1859 620 31: 2 ports, **one on each** end cap, **either** at the end face **or** on the mounting face

Mounting orientation IV – short stroke
Horizontal
2 lube ports, **one on each** of the two end caps



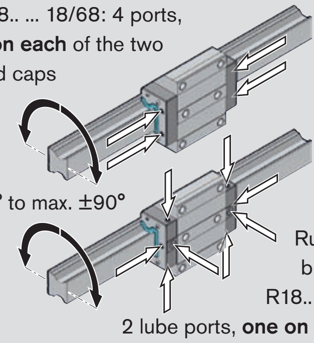
Top-down
Same port

Mounting orientation V – short stroke
Vertical to slanting horizontal
2 lube ports, **one on each** of the two end caps (top and bottom)



Vertical to slanting, top-down
Same port

Mounting orientation VI – short stroke
Wall mounting
R18.. ... 18/68: 4 ports, **2 on each** of the two end caps



Runner blocks R18.. ... 1.: 2 lube ports, **one on each** of the two end caps
Not possible with runner block R1859 620 31

Smallest permissible piston distributor sizes for oil lubrication via single-line centralized systems[1]

Runner blocks		Smallest permissible piston distributor size (⇔ minimum pulse quantity) per lube port (cm³) at oil viscosity 220 mm²/s Size								
Part numbers	**Mounting orientations**	**25**	**35**	**45**	**55**	**65**	**55/85**	**65/100**	**100**	**125**
R18.. ... 10 or ... 60 or	**Horizontal I, IV**	0.06	0.10	0.10	0.16	0.2	0.6	0.6	1.5	1.5
R18.. ... 13 or ... 63 or	**Vertical II, V**	0.06	0.10	0.10	0.16	0.2	0.6	0.6	1.5	1.5
R18.. ... 16 or ... 66	**Wall mounting III, VI[2]**	0.10	0.20	0.40	0.40	0.6	1.0	1.5	1.5 (3x)[3]	1.5 (3x)[3)4]
R18.. ... 17 or ... 67	**Horizontal I, IV**	–	0.06	0.06	0.10	–	–	–	–	–
	Vertical II, V	–	0.06	0.06	0.10	–	–	–	–	–
	Wall mounting III, VI[2]	–	0.06	0.10	0.16	–	–	–	–	–
R18.. ... 18 or ... 68	**Wall mounting III, VI[2]**	–	0.06	0.06	0.10	–	–	–	–	–
R1859 620 31	**Wall mounting III**	–	–	–	–	0.1	–	–	–	–

Table 14

1) Applies under the following conditions: Lube oil Shell Tonna S 220 using piston distributors from Vogel
2) Please note the varying **suitability of the runner bocks for the mounting orientations wall mounting III, VI**:
   +++ **runner blocks R18.. ... 18 or ... 68**
   ++ **runner blocks R18.. ... 17 or ... 67**
   + **runner blocks R18.. ... 10/13/16 or ... 60/63/66**
3) Sizes 100 and 125: Either three pulses in short succession or three metering valves delivering one pulse simultaneously
4) Size 125: 1.5 cm³ per port when all four ports in the runner block body are used

Lubrication and Maintenance

Lubrication

Oil lubrication via single-line piston distributor systems (continued)

Load-dependent relubrication intervals for oil lubrication via single-line piston distributor systems ("dry axes")

Sizes 25 to 125

The following conditions apply:
- Shell Tonna S 220
- Maximum speed: $v_{max} = 2$ m/s
- No exposure to metalworking fluids
- Standard seals
- Ambient temperature: T = 20 – 30°C

Key to graph

s	=	relubrication interval expressed as travel	(km)
C	=	dynamic load capacity	(N)
F	=	equivalent dynamic load	(N)

Notes

The load ratio F/C is the quotient of the equivalent dynamic load on the bearing F (making allowance for a preload of 8% C or 13% C) divided by the dynamic load capacity C (see "General Technical Data and Calculations").

⚠ **If other lubricants are used, this may lead to a reduction in the relubrication intervals, the achievable travel in short-stroke applications, and the load capacities. Possible chemical interactions between the plastic materials, lubricants and preservative oils must also be taken into account. In addition, the suitability of the lubricant for use in single-line centralized lubrication systems must be ensured.**

⚠ **Do not use greases containing solid particles (e.g., graphite or MoS_2)!**

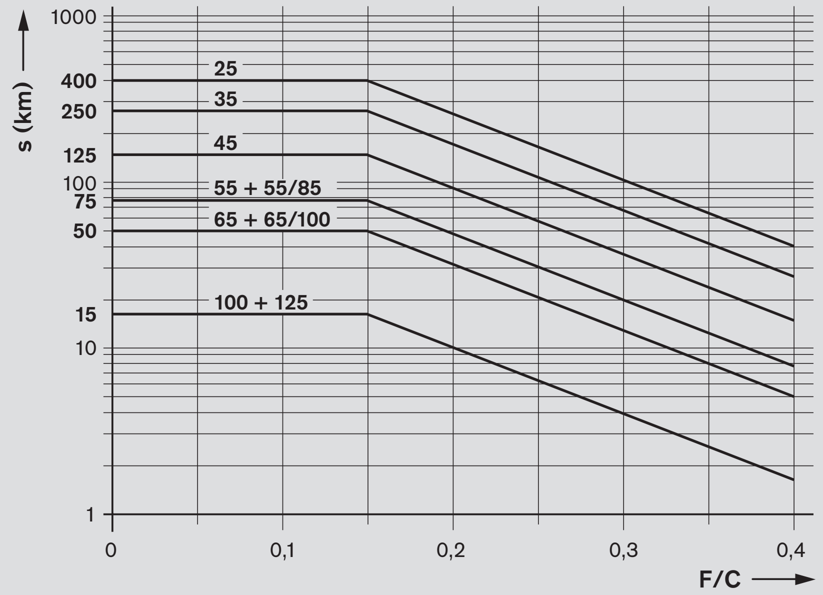


Fig. 15

For relubrication intervals in applications involving exposure to metalworking fluids, please consult us.
Without taking distance traveled into account
Assume 3 to 4 pulses per hour as a guide value for relubrication.

⚠ **If the system is to be exposed to metalworking fluids, always apply 2 to 5 lubricant pulses at the beginning or when the system has been at a standstill for a longer period. If possible, apply lubricant while the system is in motion. Carry out cleaning and lubricating cycles (see "Maintenance").**

⚠ **If the application conditions involve dirt, vibrations, impacts, etc. we recommend shortening the relubrication intervals accordingly.**

If your application involves more demanding environmental requirements (such as clean room, vacuum, food industry environment, increased exposure to fluids or aggressive media, extreme temperatures), please consult us. These situations must be investigated on a case by case basis and may require the use of a special lubricant. Be sure to have all the information concerning your application at hand when contacting us.

⚠ **Switching from grease to oil lubrication while the system is in service is not possible as the lubrication ducts are already filled with grease, and oil will not be able to pass through them.**

We recommend using piston distributors from Vogel. These should be installed as close as possible to the lube ports of the runner bocks. Long lines and small line diameters should be avoided, and the lines should be laid on an upward slant.

A selection of possible lube fittings is given in the section "General Accessories – Runner Blocks" (for more information, you should also consult the manufacturer of your lubrication system).

If other consumers are connected to the single-line centralized lubrication system, the weakest link in the chain will determine the lubrication cycle time.

Lubrication

Design calculation example for lubrication of a typical 2-axis application with centralized lubrication

X-axis

Component or parameter	Given data
Runner block	Size 45; 4 blocks; C = 92,300 N; part numbers: R1851 423 10 (catalog page 38)
Guide rail	Size 45; 2 rails; L = 1,500 mm; part numbers: R1805 463 61 (catalog page 64)
Equivalent dynamic load on bearing	F = 20,768 N (per runner block) taking into account the preload (in this case 8% C)
Stroke	500 mm
Average speed	$v_m = 1$ m/s
Temperature	20 to 30°C
Mounting orientation	Horizontal
Lubrication	Single-line centralized lubrication system for all axes with liquid grease Dynalub 520
Exposure to contaminants	No exposure to fluids, chips, dust

Design variables	Design input (per runner block)	Information sources
1. Normal or short stroke?	Normal stroke: Stroke ≥ 2 · runner block length B_1 500 mm ≥ 2 · 101.5 mm ? 500 mm ≥ 203 mm i.e. normal stroke	– Normal stroke formula from catalog page 155, B_1 from catalog page 39
2. Initial lubrication quantity	Initial lubrication quantity: 1.0 cm³ (3x)	– Initial lubrication quantity from Table 5
3. Relubrication quantity	Relubrication quantity: 1.0 cm³	– Relubrication quantity from Table 7
4. Mounting orientation	Mounting orientation I – normal stroke (horizontal)	– Mounting orientation from catalog page 157
5. Piston distributor size	Permissible piston distributor size: 0.1 cm³	– Piston distributor size from Table 9 For size 45, mounting orientation I
6. Pulse count	$\text{Pulse count} = \frac{1.0\ \text{cm}^3}{0.1\ \text{cm}^3} = 10$	– $\text{Pulse count} = \frac{\text{relubrication quantity}}{\text{perm. piston distributor size}}$
7. Load ratio	$\text{Load ratio} = \frac{20{,}768\ \text{N}}{92{,}300\ \text{N}} = 0.225$	– $\text{Load ratio} = \frac{F}{C}$ F and C from given data
8. Relubrication interval	Relubrication interval: 90 km	– Relubrication interval from Table 10: – Curve size 45 at load ratio 0.22
9. Lubrication cycle	$\text{Lubrication cycle} = \frac{90\ \text{km}}{10} = 9\ \text{km}$	– $\text{Lube cycle} = \frac{\text{relubrication interval}}{\text{pulse count}}$

Interim result (X-axis)

For the X-axis, a minimum quantity of 0.1 cm³ Dynalub 520 must be supplied to each runner block every 9 km.

Lubrication and Maintenance

Lubrication

Y-axis

Component or parameter	Given data
Runner block	Size 35; 4 blocks; C = 56,300 N; part numbers: R1851 323 10 (catalog page 38)
Guide rail	Size 35; 2 rails; L = 1,000 mm; part numbers: R1805 333 61
Equivalent dynamic load on bearing	F = 8,445 N (per runner block) taking into account the preload (in this case 8% C)
Stroke	50 mm
Average speed	v_m = 1 m/s
Temperature	20 to 30°C
Mounting orientation	Vertical
Lubrication	Single-line centralized lubrication system for all axes with liquid grease Dynalub 520
Exposure to contaminants	No exposure to fluids, chips, dust

Design variables	Design input (per runner block)	Information sources
1. Normal or short stroke?	Normal stroke: Stroke ≥ 2 · runner block length B_1 50 mm ≥ 2 · 79.6 mm ? 50 mm < 159.6 mm i.e. short stroke	– Normal stroke formula from catalog page 155, B_1 from catalog page 39
2. Initial lubrication quantity	2 lube ports, initial lubrication quantity per lube port: 0.9 cm^3 (3x)	– Initial lubrication quantity from Table 5
3. Relubrication quantity	2 lube ports, relubrication quantity per port: 0.9 cm^3	– Relubrication quantity from Table 7
4. Mounting orientation	Mounting orientation V – short stroke (vertical)	– Mounting orientation from catalog page 157
5. Piston distributor size	Permissible piston distributor size: 0.1 cm^3	– Piston distributor size from Table 9 for size 35, mounting orientation V
6. Pulse count	$\text{Pulse count} = \frac{0.9\ cm^3}{0.1\ cm^3} = 9$	– Formula as for X-axis
7. Load ratio	$\text{Load ratio} = \frac{8{,}445\ N}{56{,}300\ N} = 0.15$	– Formula as for X-axis, F and C from given data
8. Relubrication interval	Relubrication interval: 375 km	– Relubrication interval from Fig. 10: – Curve size 35 at load ratio 0.15
9. Lubrication cycle	$\text{Lubrication cycle} = \frac{375\ km}{9} = 42\ km$	– Formula as for X-axis

Interim result (Y-axis)

For the Y-axis, a minimum quantity of 0.1 cm^3 Dynalub 520 must be supplied to each runner block every 42 km.

End result (two-axis lubrication)

Since both the axes in this example are supplied by a single-line centralized lubrication system, the X-axis with its smaller lube cycle (9 km) determines the overall cycle of the system, i.e. the Y-axis will also be lubricated every 9 km.
The number of ports and the minimum lubricant quantities determined for each axis remain the same.

Lubrication and Maintenance

Lubrication

Lubrication from above

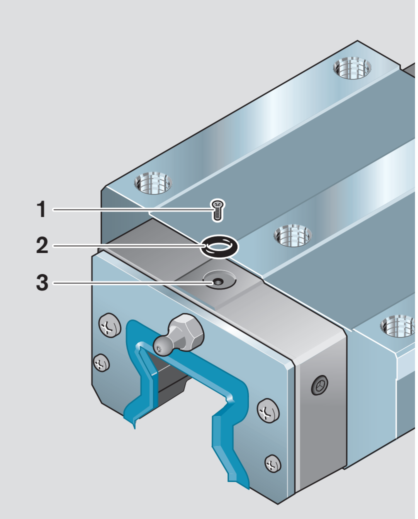
Standard runner blocks with open lube ports for lubrication from above

The following new standard runner blocks have lube ports opened at the top:
– **R18.. ... 16** or **... 66**
– **R18.. ... 17** or **... 67**

In the new standard runner blocks for lubrication from above the top lube holes have already been opened, but they are closed with screws for shipment.
In the high runner blocks S.H, slimline ... high, the vertical clearance between the end caps and an attachment mounting surface with integrated lube adapters has been designed for ease of maintenance (see Fig. B).

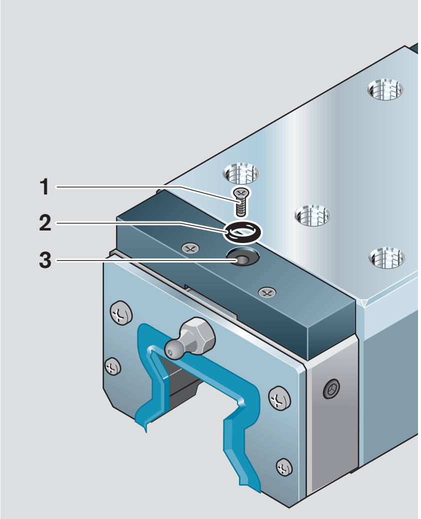
- Remove screw (1) from the lube hole (3).
- Insert O-ring (2) in the recess (O-ring is supplied with the runner block).

A



Runner block FNS
R1851 ... 17 or ... 67
flanged, normal, standard height
(example)

B



Runner block SNH
R1821 ... 17 or ... 67
slimline, normal, high
(example)

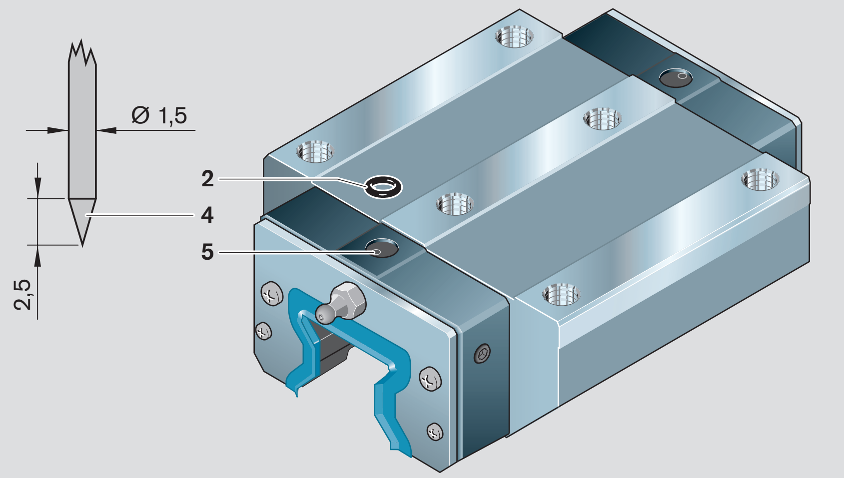
Subsequent opening of a lube hole at the top for standard runner blocks F.S and S.H and for heavy duty runner blocks

If a lube hole is to be opened up at the top of standard or heavy duty runner blocks, the following points should be noted:

⚠ **In the O-ring recess there is a further pre-formed small recess (5). Do not use a drill to open this. Risk of contamination!**

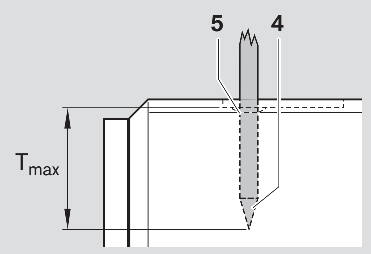
- Heat up a pointed metal punch (4) with diameter of 1.5 mm.
- Carefully punch through the recess (5) to open the lube hole.
- Do not exceed the permissible depth T_{max} as specified in the table!
- Insert O-ring (2) in the recess (O-ring is **not** supplied with the runner block).

For subsequent lubrication from above of high runner blocks S.H, use a lube adapter (not included in supply scope; please consult us).



Runner block FNS
R185. ... 10 or ... 60
flanged, normal, standard height
(example)

Size	Lube hole at top: Maximum permissible depth for punching open T_{max} (mm)
25	4
35	5
45	5
55	5
65	5
100	5



Maintenance

Cleaning cycle

Dirt can settle and encrust on guide rails, especially when these are not enclosed.
To ensure that seals and cover strips retain their functionality, this dirt must be removed at regular intervals.

It is advisable to run the machine through at least one full cleaning cycle over the entire installed rail length every 8 hours. Depending on the amount of soiling and on the coolant used, more frequent cleaning may be required.

Before shutting down the machine, always run two cleaning cycles over the entire installed rail length, followed by at least two lubrication cycles over the entire installed rail length.

Checking accessories

All accessories used for scraping or wiping the guide rails must be checked at regular intervals.
In environments with heavy soiling, it is advisable to replace all the parts in the soiled area.
We recommend checking the accessories at least once a year.