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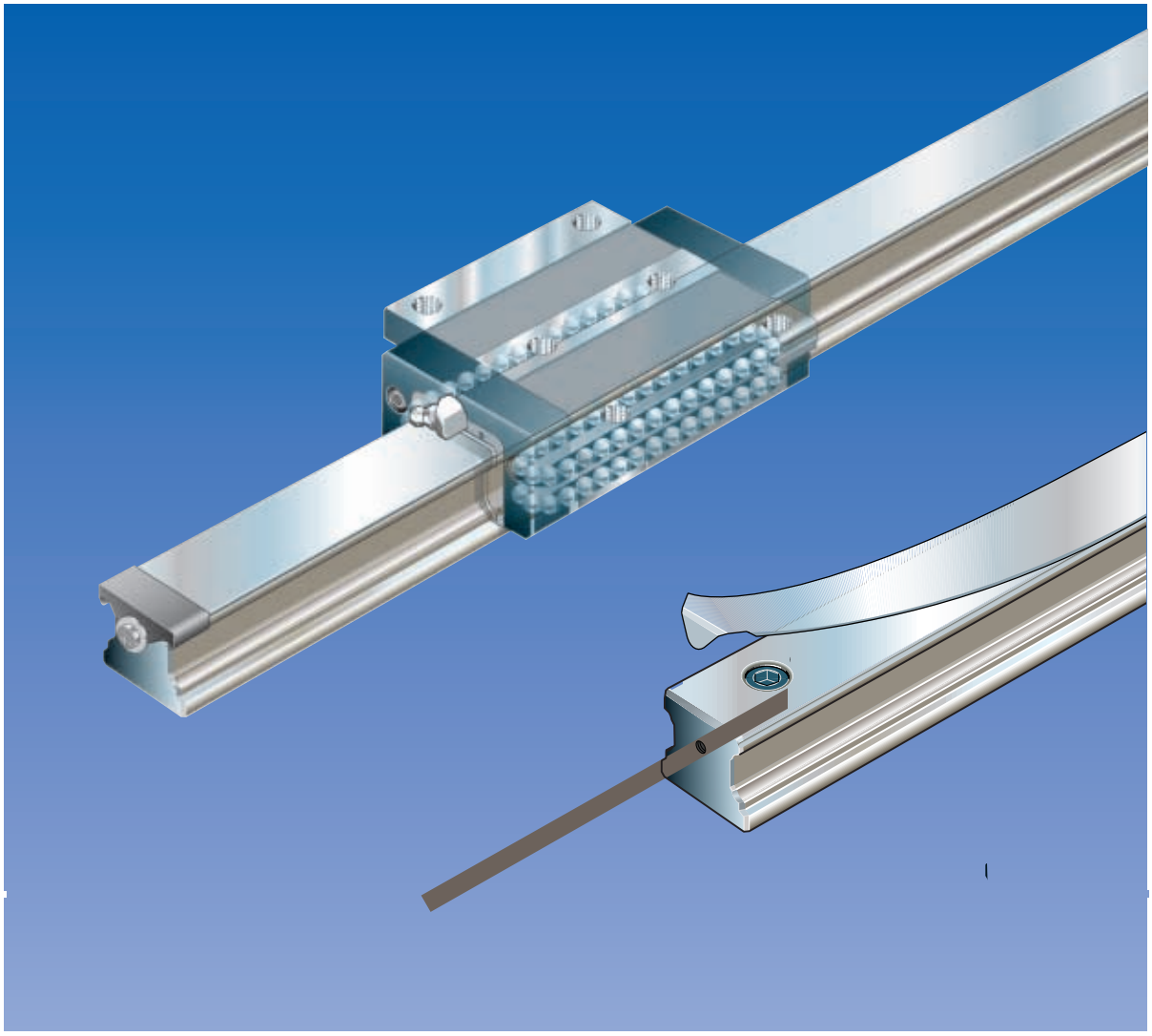
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Ball Rail® Systems

Linear Motion and
Assembly Technologies

RA 82 201

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STAR – Ball Rail® Systems
Product Overview

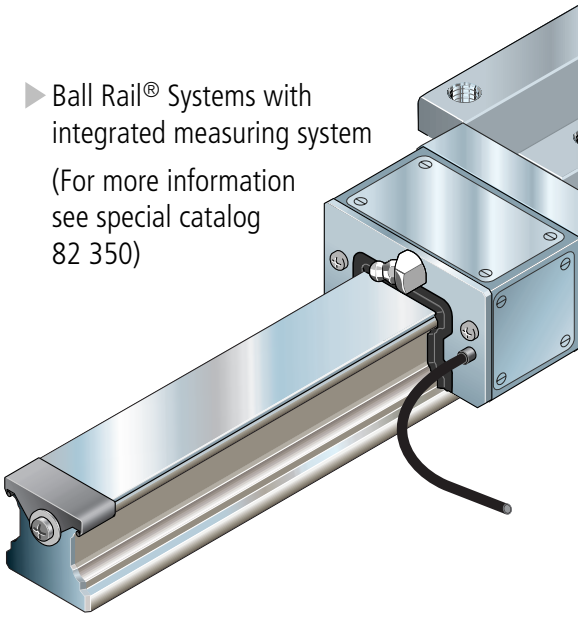
STAR Ball Rail® Systems were specially developed for use in machine tools and industrial robots calling for compact, rolling-element linear motion guideways. Ball Rail® Systems are available in various accuracy classes, each with extremely high load capacity and high rigidity.

These compact assemblies are available in 8 common sizes and offer the same high load capacities in all four main load directions.

Make up your own compact linear motion guideways from interchangeable standard stock elements...

STAR manufactures its guide rails and runner blocks with such high precision, especially in the ball track zone, that each individual component element can be replaced by another at any time.
This makes infinite combinations possible within each accuracy class.
Each element can be individually ordered and separately stocked.

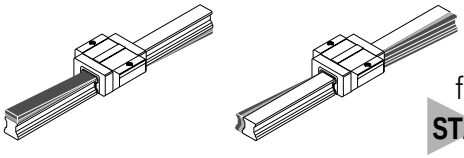
Both sides of the guide rail can be used as reference edges.



▶ Ball Rail® Systems with integrated measuring system

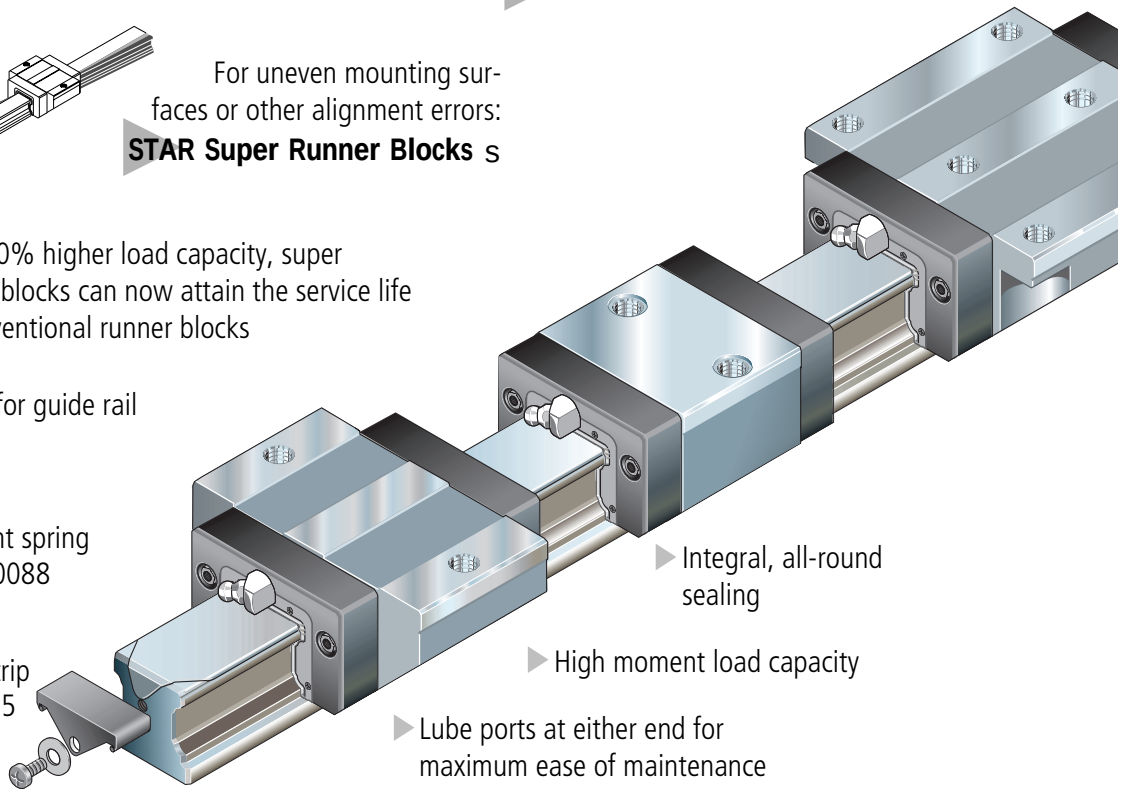
(For more information see special catalog 82 350)

For the majority of all applications:
▶ **STAR Runner Blocks, steel version**



For uneven mounting surfaces or other alignment errors:
▶ **STAR Super Runner Blocks** S

▶ With 30% higher load capacity, super runner blocks can now attain the service life of conventional runner blocks



Proven Rail Seal® cover strip for guide rail mounting holes:

- ▶ One cover for all holes
- ▶ Material: corrosion resistant spring steel to DIN 17230 / EN 10088
- ▶ Easy clip-on mounting
- ▶ 0.3 mm Rail Seal® cover strip as standard for sizes 35 - 65

▶ Integral, all-round sealing

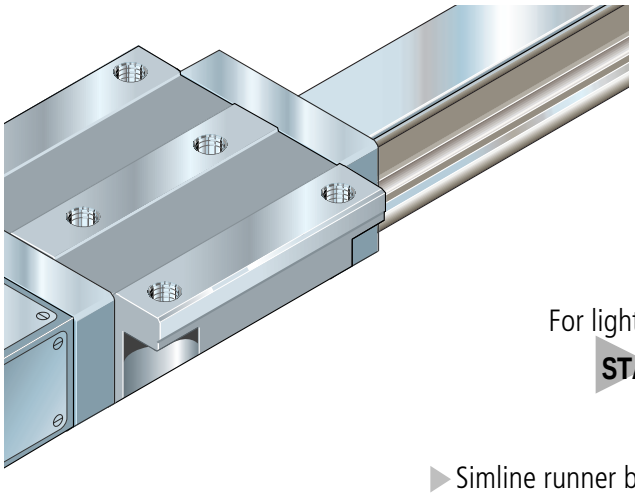
▶ High moment load capacity

▶ Lube ports at either end for maximum ease of maintenance

▶ One guide rail profile for all runner blocks

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30% higher dynamic load capacities and moments as standard in all accuracy classes:

- extends service life by a factor of 2.2
- field-proven
- Equal load rating in all four main load directions

For lightweight applications:
STAR Runner Blocks, aluminum version

Simline runner blocks for all configurations

For low-noise applications:
STAR Runner Blocks with spacer balls

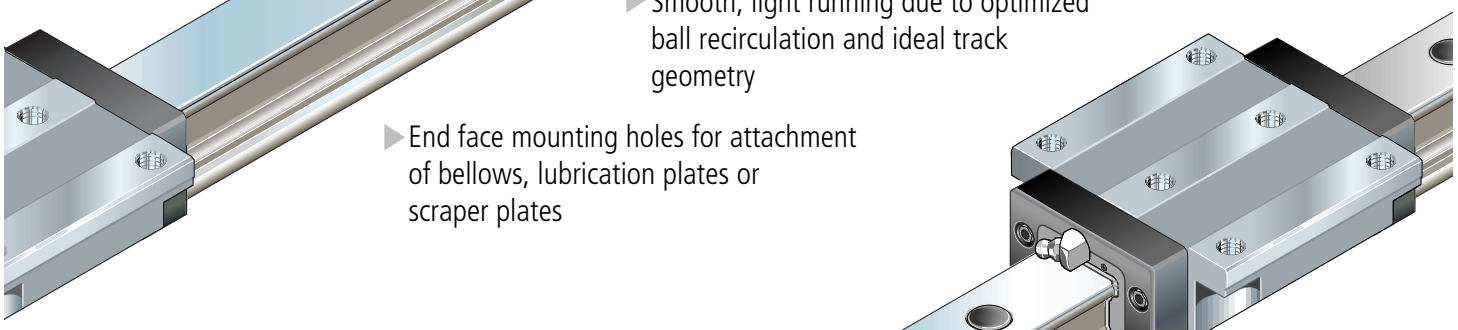
4 different preload classes

Mounting of flanged runner block from above or below

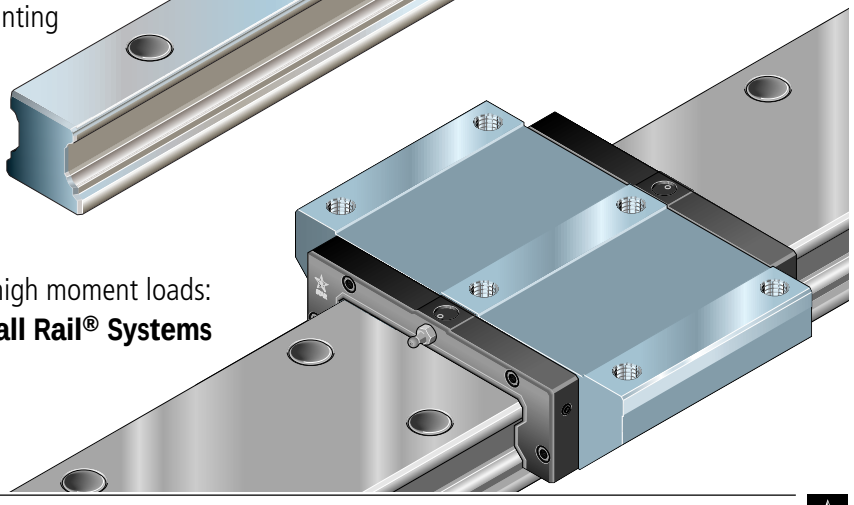
Optimized entry-zone geometry and the high number of balls per track greatly reduce variations in elastic deflection

Smooth, light running due to optimized ball recirculation and ideal track geometry

End face mounting holes for attachment of bellows, lubrication plates or scraper plates



Guide rail with mounting hole plugs

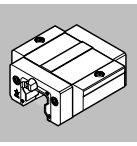
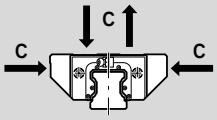
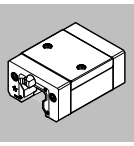
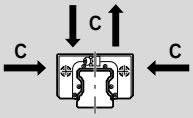
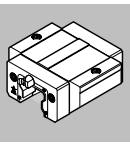
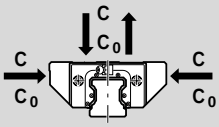
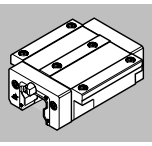
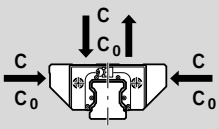
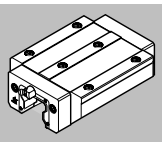
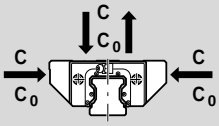
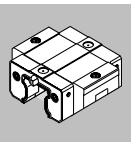
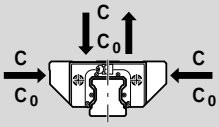
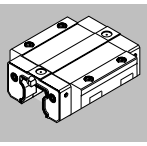
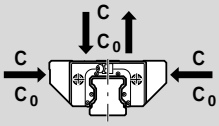
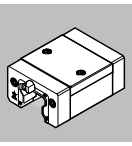
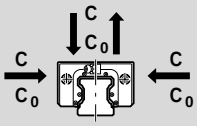
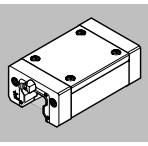
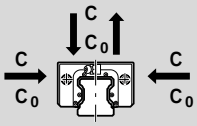
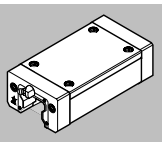
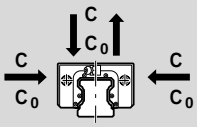


For high moment loads:
STAR Wide Ball Rail® Systems

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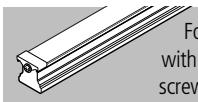
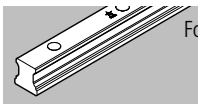
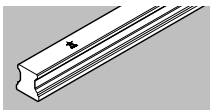
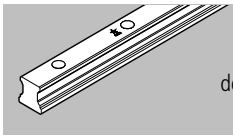
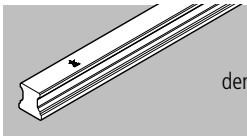
STAR – Ball Rail® Systems
Product Overview with Load Capacities

		Page	
Super runner blocks, steel version with self-aligning feature Observe maximum load! (for details, see individual types)	 Standard width, short **1661-**	**28**	
	 Slimline, short **1662-**	**30**	
Runner blocks, steel version	 Standard width, short **1665-**	**44**	
Special versions: All steel runner blocks in accuracy class N (clearance and preload 0.02 C) are also available: – with zinc-iron coating and yellow chromating (part numbers 16..-..4-30), – with low-friction seal (part numbers 16..-..4-11). Preferred versions: 1651,- 1653-, 1622- and 1623-.	 Standard width **1651-**	**46**	
	 Standard width, long **1653-**	**48**	
	 Standard width, short, low profile **1663-**	**50**	
	 Standard width, low profile **1693-**	**52**	
	 Slimline, short **1666-**	**54**	
	 Slimline **1622-**	**56**	
	 Slimline, long **1623-**	**58**	

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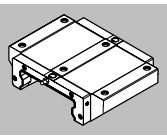
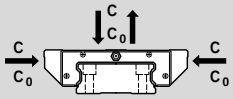
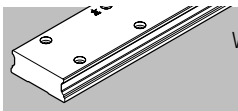
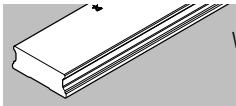
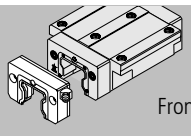
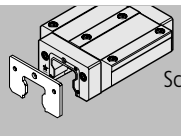
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STAR – Ball Rail® Systems
Product Overview with Load Capacities

		Page
Guide rails	 For mounting from above, with Rail Seal cover strip and screw-down protective caps* **1605-.6.-**	**80**
*Also available as special version: zinc-iron coating with yellow chromating in accuracy class N	 For mounting from above, with plastic (or steel) mounting hole plugs* **1605-.0.- (1606-.0.-)**	**82**
	 For mounting from below* **1607-**	**84**
	 For mounting from above – thin dense chrome plated **1645-**	**86**
	 For mounting from below – thin dense chrome plated **1647-**	**88**
	- Rail Seal mounting hole cover strip **- Mounting hole plugs** **- Protective caps**	

Basis for load capacities p. 11:

Determination of load dynamic capacity C is based on a travel life of 100,000 m to DIN 636. Load capacities on the basis of 50,000 m are also given for comparison.

Wide Ball Rail Systems Runner Blocks, steel version	 Wide **1671-**	**96**	
Wide Ball Rail Systems Guide rails	 Wide, for mounting from above* **1675-**	**98**	
*Also available as special version: zinc-iron coating with yellow chromating in accuracy class N	 Wide, for mounting from below* **1677-**	**100**	
Accessories	 Front lube unit	**102**	 Scraper plate

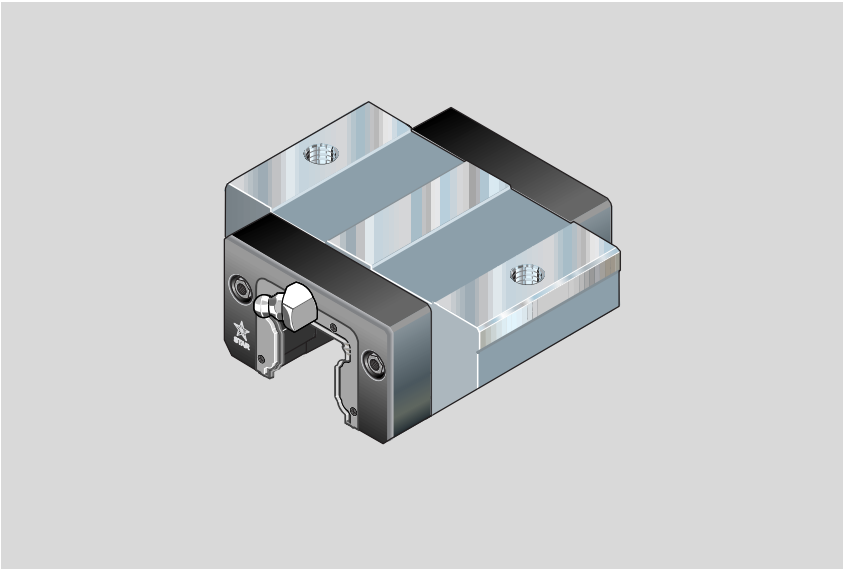
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STAR – Ball Rail® Systems
Super Runner Blocks S Steel Version

Super Runner Block S with self-aligning feature 1661-

Standard width, short



Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Part numbers

Size	Accuracy class	Part numbers for runner block for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
15	H	1661-193-10	1661-113-10
	N	1661-194-10	1661-114-10
20	H	1661-893-10	1661-813-10
	N	1661-894-10	1661-814-10
25	H	1661-293-10	1661-213-10
	N	1661-294-10	1661-214-10
30	H	1661-793-10	1661-713-10
	N	1661-794-10	1661-714-10
35	H	1661-393-10	1661-313-10
	N	1661-394-10	1661-314-10

Permissible load

When calculating the service life, use the maximum load capacity figure.

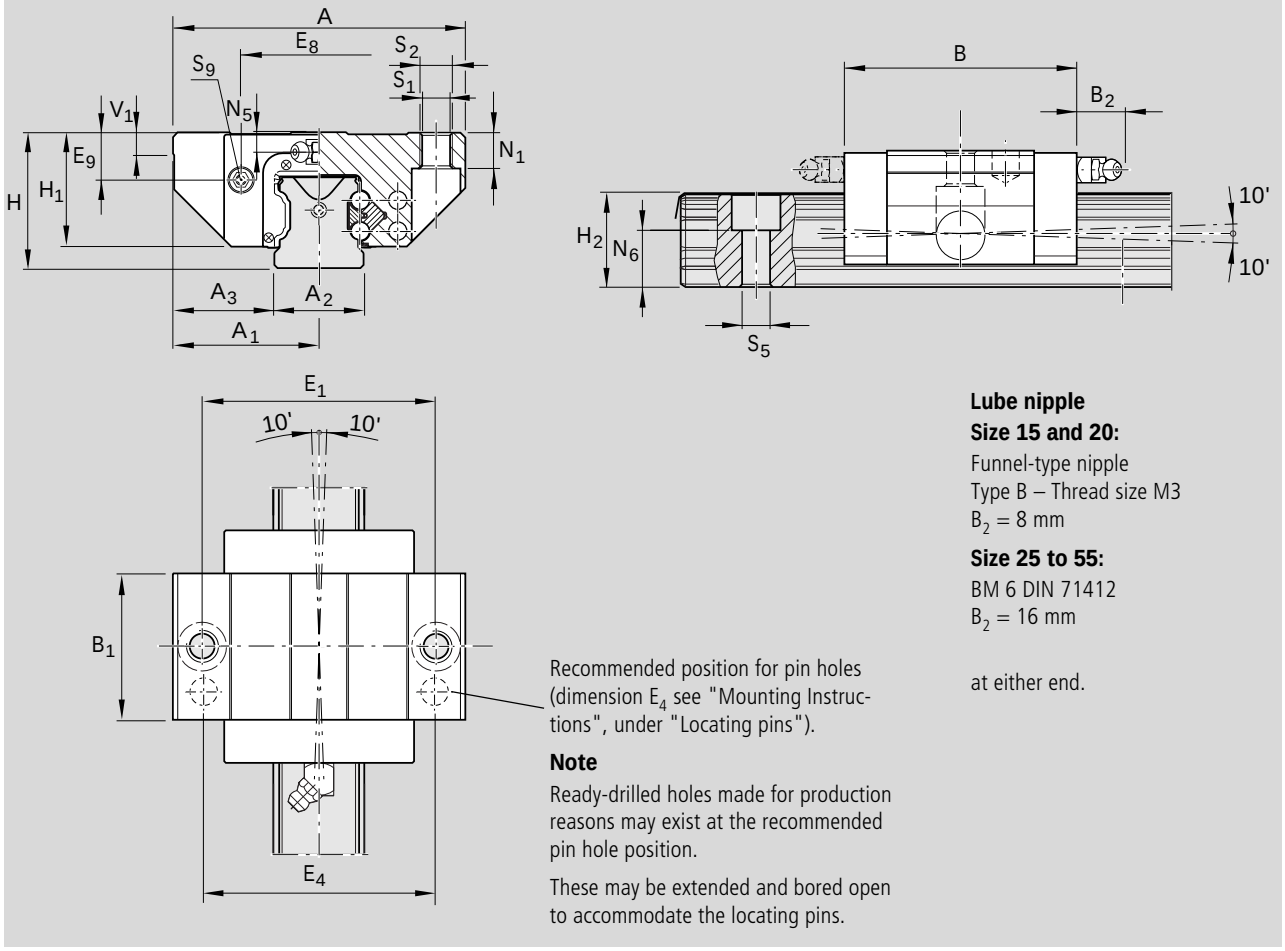
The permissible load is only limited for statistical purposes (see table).

Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C** and $\mathbf{M_t}$ in the table should be multiplied by 1.26.

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Recommended position for pin holes (dimension E_4 see "Mounting Instructions", under "Locating pins").

Note

Ready-drilled holes made for production reasons may exist at the recommended pin hole position.

These may be extended and bored open to accommodate the locating pins.

Lube nipple

Size 15 and 20:

Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

Size 25 to 55:

BM 6 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm) A	A_1	A_2	A_3	B	B_1	H	H_1	H_2[1)]	H_2[2)]	V_1	E_1	E_8	E_9	N_1
15	47	23.5	15	16.0	40.5	25.7	24	19.8	16.3	16.20	5.0	38	24.55	6.7	5.0
20	63	31.5	20	21.5	52.5	31.9	30	25.4	20.7	20.55	6.0	53	32.4	7.3	7.5
25	70	35.0	23	23.5	61.5	38.6	36	29.5	24.4	24.25	7.5	57	38.3	11.5	9.0
30	90	45.0	28	31.0	71.5	45.0	42	35.0	28.5	28.35	7.0	72	48.4	14.6	11.0
35	100	50.0	34	33.0	79.0	51.4	48	40.0	32.15	31.85	8.0	82	58.0	17.5	12.0

[1)] Dimension H_2 with Rail Seal cover strip

[2)] Dimension H_2 without Rail Seal cover strip

Size	Dimensions (mm) N_5	$N_6^{\pm 0.5}$	S_1	S_2	S_5	S_9	Mass (kg)	Load capacities (N) C dyn.	Permissible load (N) F_{max}	Moments (Nm) M_t dyn.	M_t max.
15	4.0	10.3	4.4	M5	4.4	M2.5-3.5deep	0.19	3 900	1 500	39	15
20	4.7	13.2	5.4	M6	6.0	M3-5 deep	0.43	10 100	3 900	130	50
25	5.5	15.2	6.8	M8	7.0	M3-5 deep	0.50	11 400	4 400	170	65
30	6.0	17.0	8.6	M10	9.0	M3-5 deep	0.90	15 800	6 100	270	105
35	7.0	20.5	8.6	M10	9.0	M3-5 deep	1.35	21 100	8 100	450	175

30% higher dynamic load capacities and moments than previous design

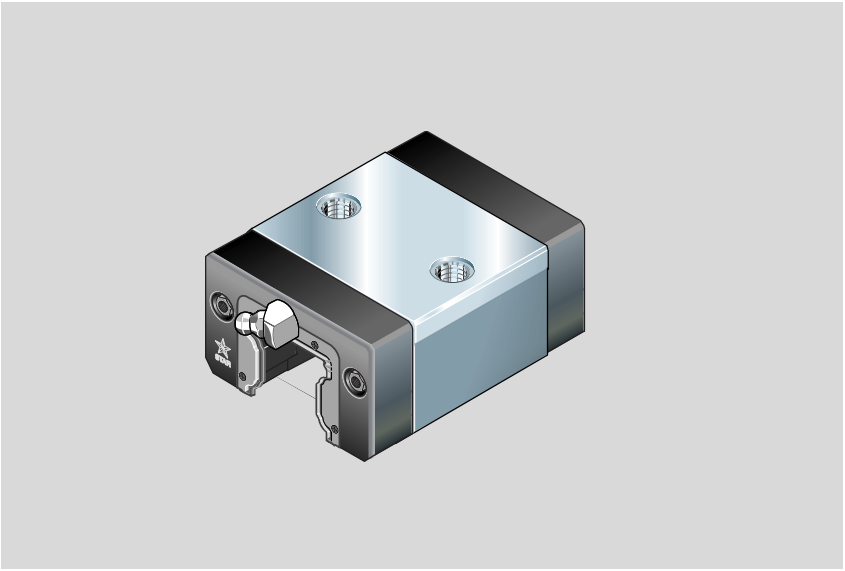
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STAR – Ball Rail® Systems
Super Runner Blocks S Steel Version

Super Runner Block S with self-aligning feature 1662-

Slimline, short



Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Part numbers

Size	Accuracy class	Part numbers for runner block for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
15	H	1662-193-10	1662-113-10
	N	1662-194-10	1662-114-10
20	H	1662-893-10	1662-813-10
	N	1662-894-10	1662-814-10
25	H	1662-293-10	1662-213-10
	N	1662-294-10	1662-214-10
30	H	1662-793-10	1662-713-10
	N	1662-794-10	1662-714-10
35	H	1662-393-10	1662-313-10
	N	1662-394-10	1662-314-10

Permissible load

When calculating the service life, use the maximum load capacity figure.

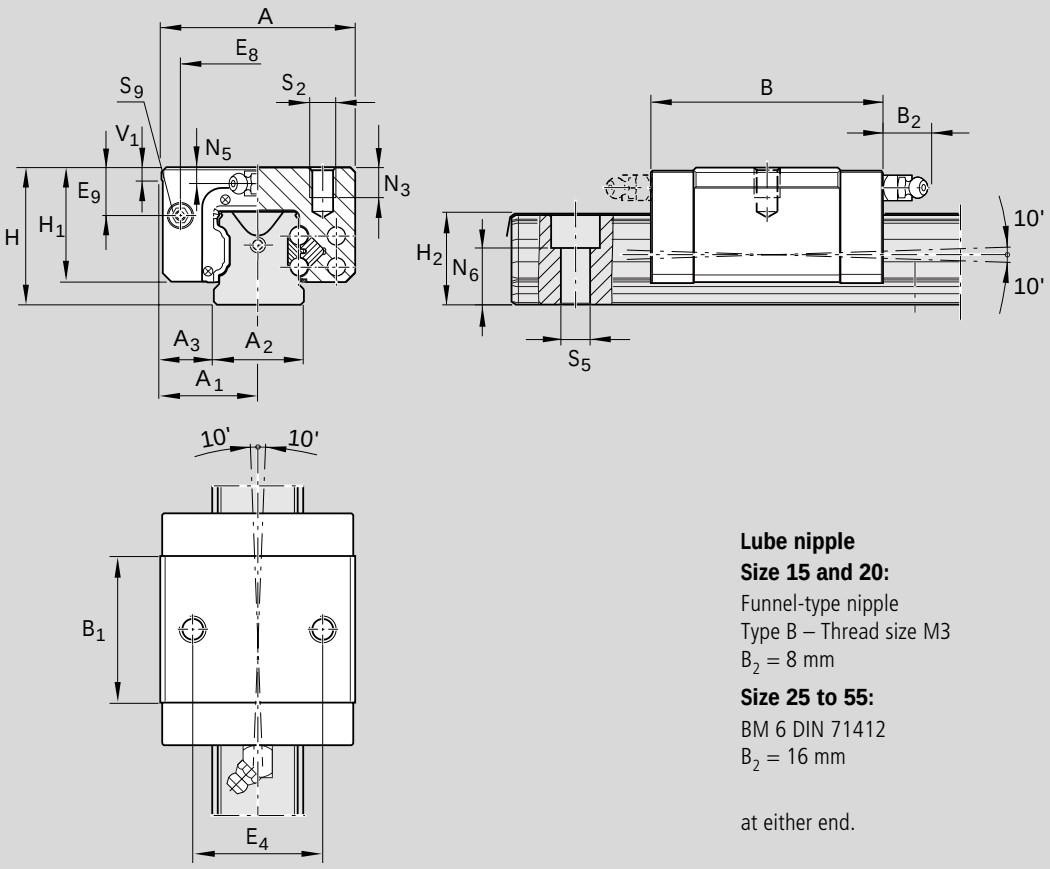
The permissible load is only limited for statistical purposes (see table).

Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C** and $\mathbf{M_t}$ in the table should be multiplied by 1.26.

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Lube nipple
Size 15 and 20:
Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

Size 25 to 55:
BM 6 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm)																	
	A	A_1	A_2	A_3	B	B_1	H	H_1	H_2 1)	H_2 2)	V_1	E_1	E_8	E_9				N_3
15	34	17	15	9.5	40.5	25.7	24	19.8	16.3	16.20	5.0	26	24.55	6.7				6.0
20	44	22	20	12.0	52.5	31.9	30	25.4	20.7	20.55	6.0	32	32.4	7.3				7.5
25	48	24	23	12.5	61.5	38.6	36	29.5	24.4	24.25	7.5	35	38.3	11.5				9.0
30	60	30	28	16.0	71.5	45.0	42	35.0	28.5	28.35	7.0	40	48.4	14.6				12.0
35	70	35	34	18.0	79.0	51.4	48	40.0	32.15	31.85	8.0	50	58.0	17.5				

1) Dimension H_2 with Rail Seal cover strip 2) Dimension H_2 without Rail Seal cover strip

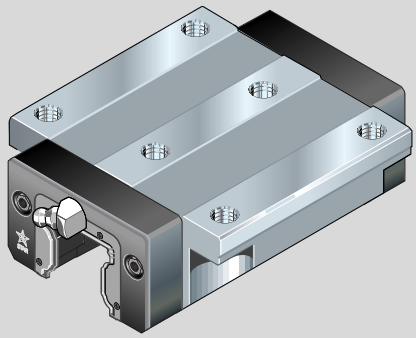
Size	Dimensions (mm)					Mass	Load capacities (N)	Permissible load (N)	Moments (Nm)	
	N_5	$N_6^{\pm 0.5}$	S_2	S_5	S_9	(kg)	C dyn.	F_{max}	M_t dyn.	M_t max.
15	4.0	10.3	M4	4.4	M2.5-3.5deep	0.12	3 900	1 500	39	15
20	4.7	13.2	M5	6.0	M3-5 deep	0.30	10 100	3 900	130	50
25	5.5	15.2	M6	7.0	M3-5 deep	0.40	11 400	4 400	170	65
30	6.0	17.0	M8	9.0	M3-5 deep	0.65	15 800	6 100	270	105
35	7.0	20.5	M8	9.0	M3-5 deep	0.95	21 100	8 100	450	175

30% higher dynamic load capacities and moments than previous design

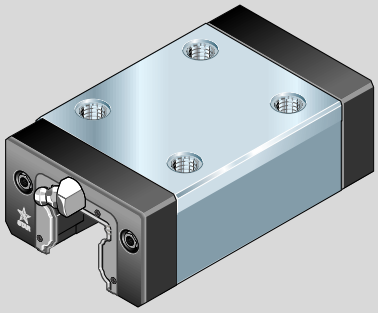
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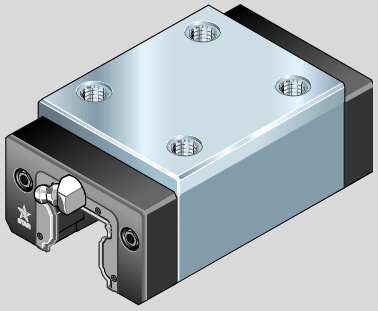
STAR – Ball Rail® Systems
Product Description Runner Blocks, Steel Version



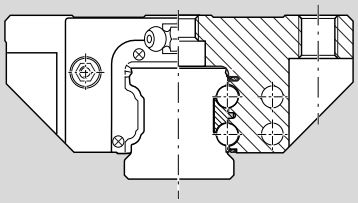
Standard width

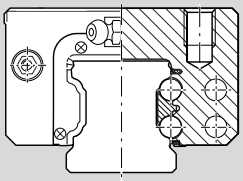


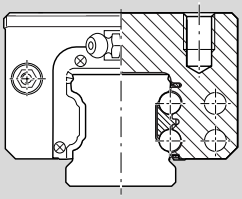
Slimline



Slimline, high

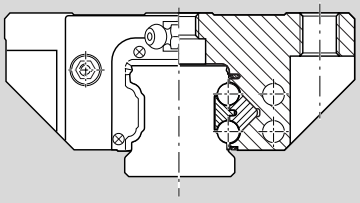


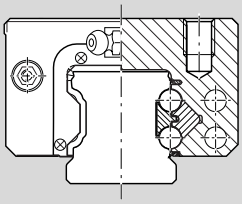


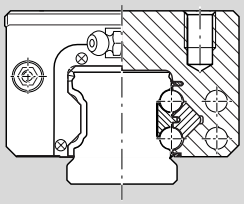


These figures are also valid for the long versions.

With steel load bearing plates







The Ball Rail® System consists of:

– A guide rail with all surfaces ground and ball track zones hardened

– A runner block with all surfaces ground and ball track zones hardened, made of rolling bearing steel or with hardened and ground steel load bearing plates with
  - cage designed for optimum ball recirculation
  - integral all-round sealing of all ball tracks
  - bearing steel balls

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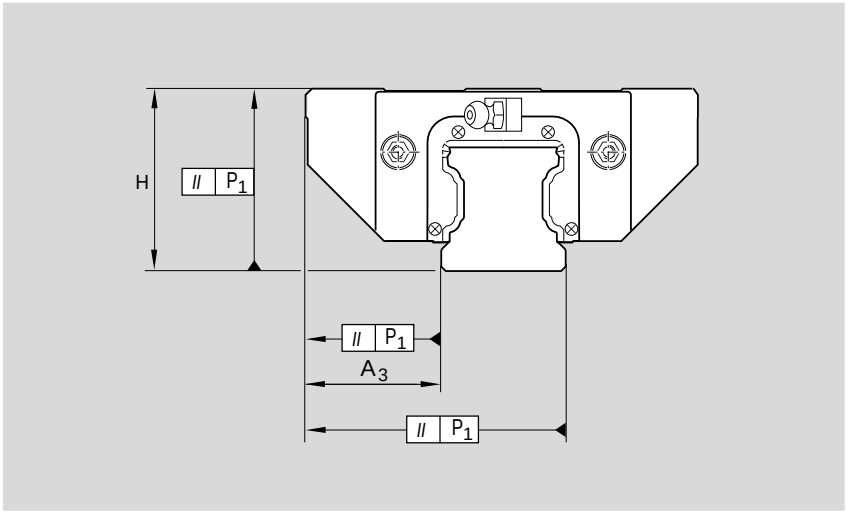
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Technical Data

Accuracy classes and their tolerances (µm)

STAR Ball Rail® Systems are offered in up to five different accuracy classes.

For available versions see table "Part Numbers".

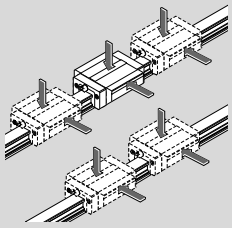
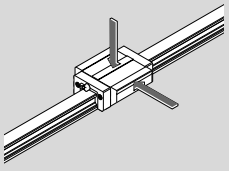


Built-in interchangeability through precision machining

STAR manufactures its guide rails and runner blocks with such high precision, especially in the ball track zone, that each individual component element can be replaced by another at any time.

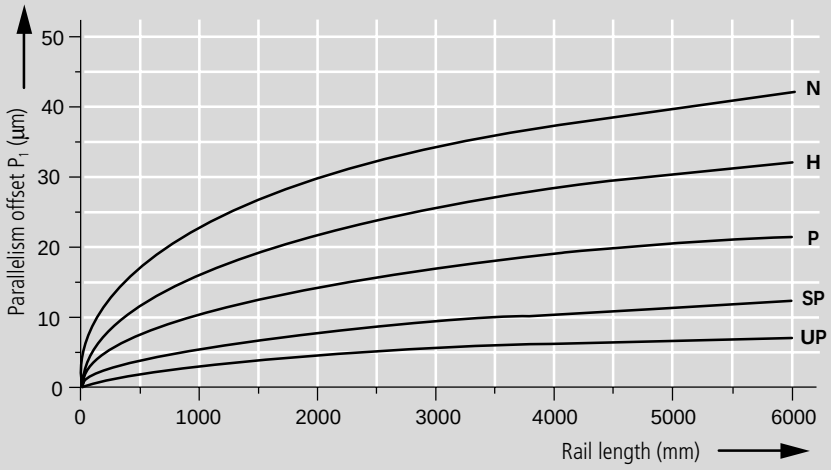
A runner block can be used without problems on various guide rails of the same size, for example.

This applies equally to the use of different runner blocks on one and the same guide rail.

Accuracy classes	Dimensional tolerances H and A_3 (µm) H	A_3	Max. difference in dimensions H and A_3 on the same rail Δ H, Δ A_3 (µm)
UP	± 5	± 5	3
SP	± 10	± 7	5
P	± 20	± 10	7
H	± 40	± 20	15
N	± 100	± 40	30
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 Ball Rail® System in service

Measured at middle of runner block



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STAR – Ball Rail® Systems
Technical Data – Runner Blocks, Steel Version

Rigidity of the Ball Rail® System at 0.08 C preload

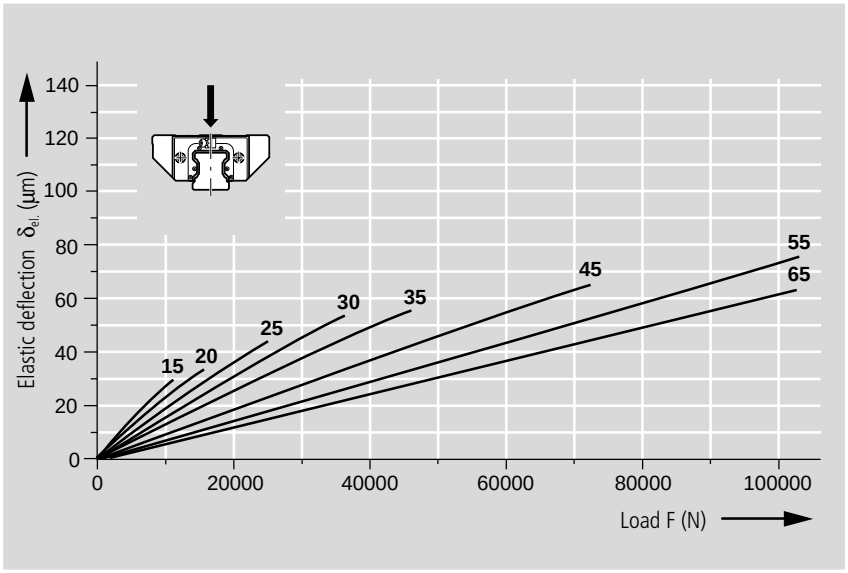
**Runner block 1651-
Standard width**

——————— **measured values**

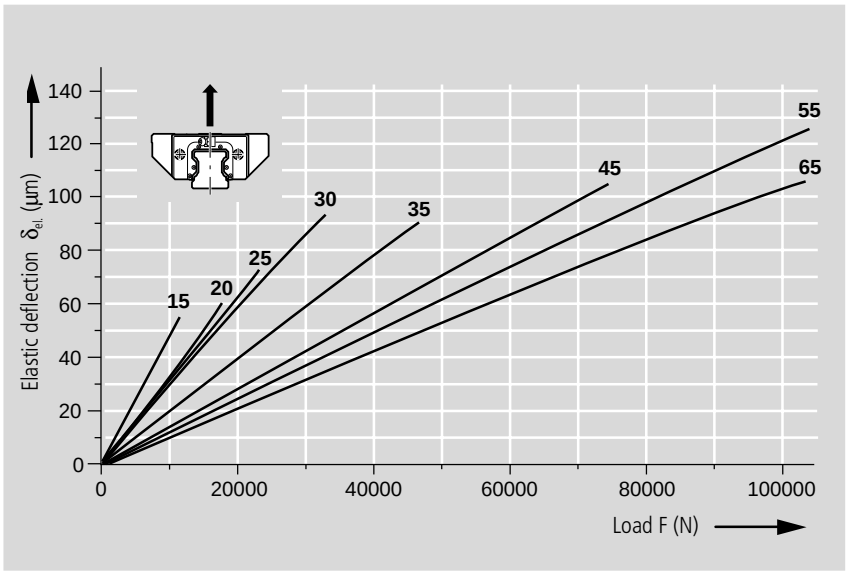
Runner block mounted using six screws:

– 4 outer screws of strength class 12.9
– 2 centerline screws of strength class 8.8

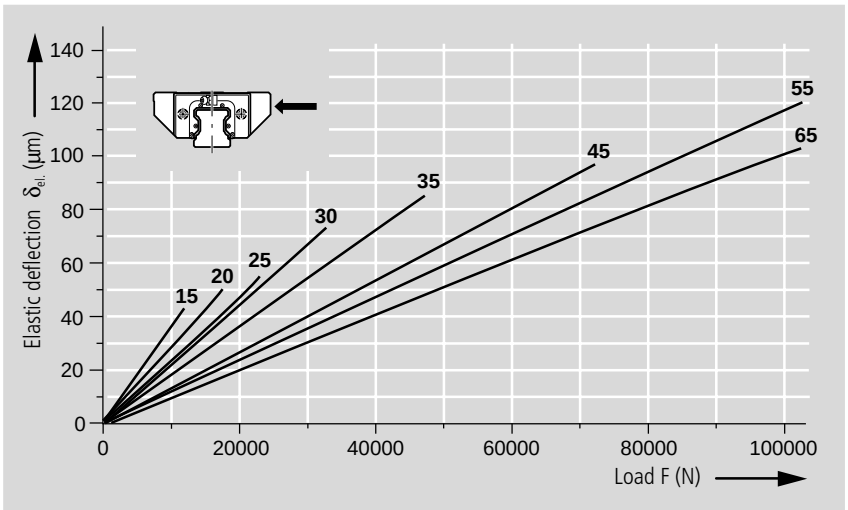
1. Down load



2. Lift-off load



3. Side load



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Rigidity of the Ball Rail® System at 0.02 C preload

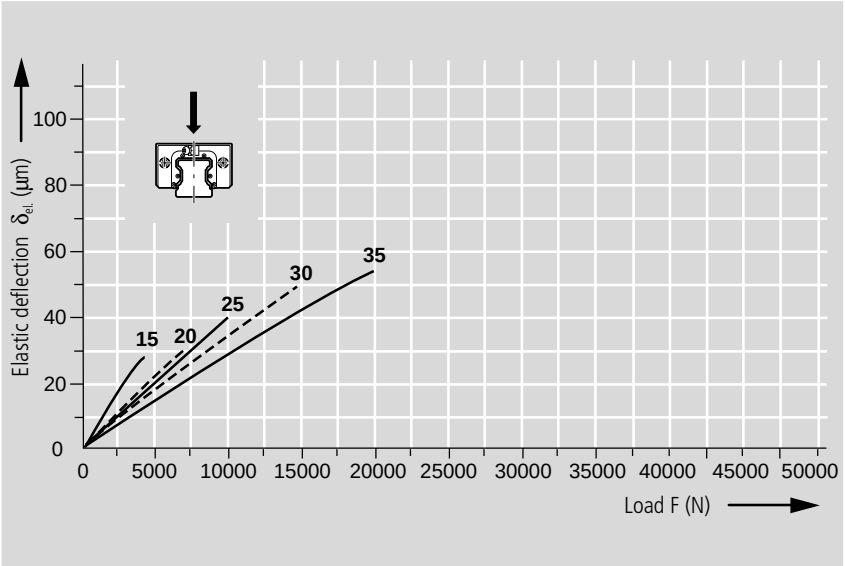
**Runner block 1666-
Slimline, short**

——————— **measured values**

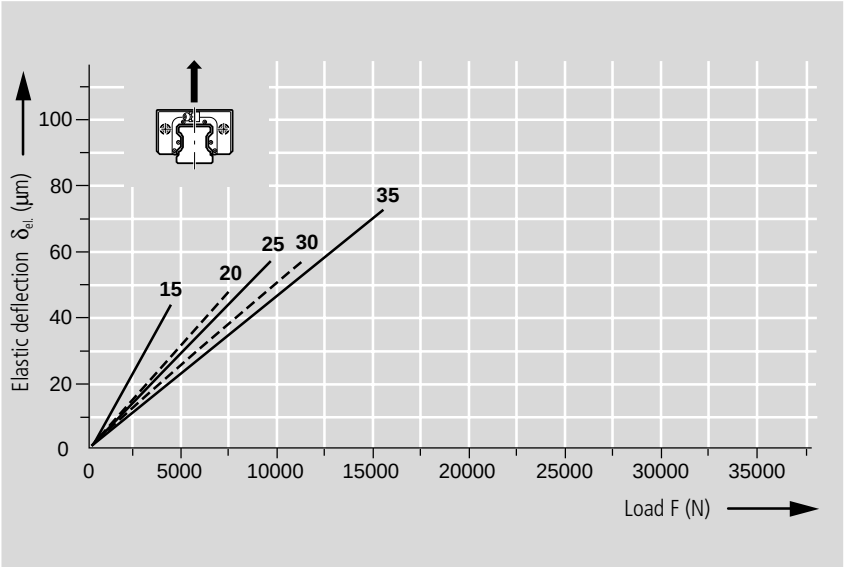
– – – – – – – – – – – – **calculated values**

Runner block mounted with two screws, screw strength class 8.8

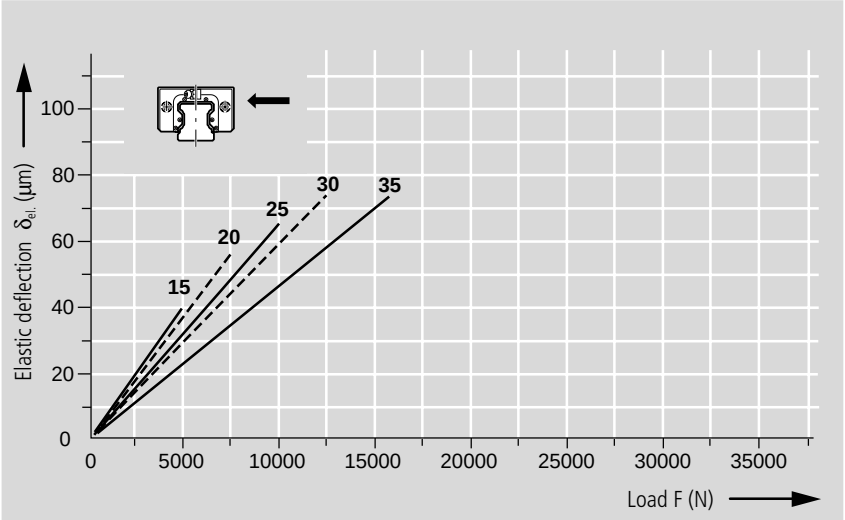
1. Down load



2. Lift-off load



3. Side load



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STAR – Ball Rail® Systems
Mounting Instructions

For guide rails with runner block

1621-, 1622-, 1623-, 1624-, 1651-, 1653-,1694-

Reference edges, corner radii, mounting screw sizes and tightening torque

Runner block 1651-, 1653-

– Standard width

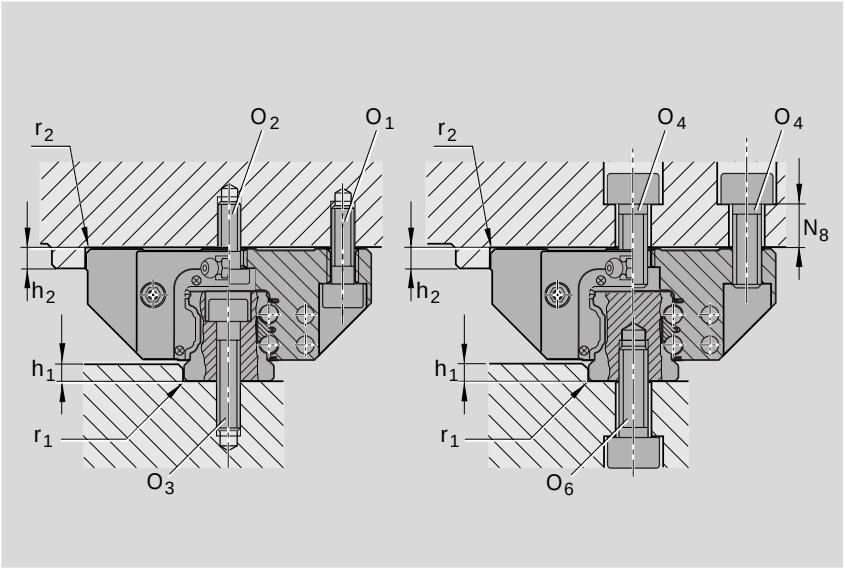
Guide rails

left:

– For mounting from above 1605-, 1645-

right:

– For mounting from below 1607-, 1647



Runner block 1621-, 1622-, 1623-, 1624-, 1694-

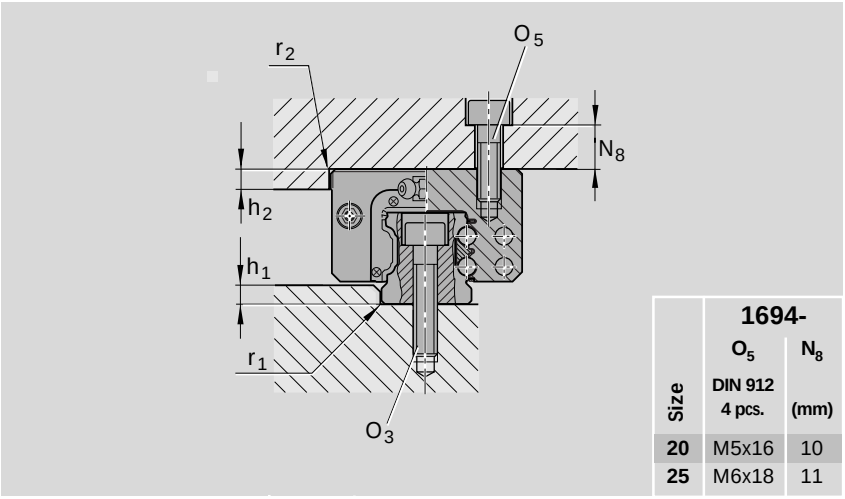
– Slimline

Guide rail

– For mounting from above 1605-,1645-

Note

The indicated combinations represent examples. It is on principle possible to combine any runner block with all the offered guide rail types.



Size	1694- O_5 DIN 912 4 pcs.	1694- N_8 (mm)
20	M5x16	10
25	M6x18	11

Dimensions and recommended limits for side load if no additional lateral retention is provided

Size	h_1 min. (mm)	h_1 max. (mm)	r_1 max. (mm)	h_2 (mm)	r_2 max. (mm)	O_1 DIN 912 4 pcs.	O_2 [2] DIN 6912 2 pcs.	O_4 [1)2)] DIN 912 6 pcs.	O_5 DIN 912 4 pcs.	O_3 DIN 912	O_6 DIN 912	N_8 (mm)
15	2.5	3.5	0.4	4	0.6	M4x12	M4x10	M5x12	M4x12	M4x20	M5x12	6
20	2.5	4.0	0.6	5	0.6	M5x16	M5x12	M6x16	M5x16	M5x25	M6x16	9
25	3.0	5.0	0.8	5	0.8	M6x20	M6x16	M8x20	M6x18	M6x30	M6x20	10
30	3.0	5.0	0.8	6	0.8	M8x25	M8x16	M10x20	M8x20	M8x30	M8x20	10
35	3.5	6.0	0.8	6	0.8	M8x25	M8x20	M10x25	M8x25	M8x35	M8x25	13
45	4.5	8.0	0.8	8	0.8	M10x30	M10x25	M12x30	M10x30	M12x45	M12x30	14
55	7.0	10.0	1.2	10	1.0	M12x40	M12x30	M14x40	M12x35	M14x50	M14x40	20
65	7.0	10.0	1.2	14	1.0	M14x45	M14x35	M16x45	M16x40	M16x60	M16x45	22

[1)] When mounting the runner block from above using only 4 O_4 screws:
- Permissible side force 1/3 lower
- Lower rigidity

[2)] For runner block mounting with 6 screws:
- Tighten the centerline screws with the torque for strength class 8.8

[3)] When mounting with 2 O_2 screws and 4 O_1 screws

– Runner block 1621-, 1622-,1651, 1694-

– Runner block 1623-, 1624-, 1653-

Screw strength class	Runner blocks				Guide rails		
8.8	0.11 C	0.15 C[3)]	0.23 C	0.11 C	0.06 C	0.06 C	
12.9	0.18 C	0.22 C[3)]	0.35 C	0.18 C	0.10 C	0.10 C	
8.8	0.08 C	0.13 C[3)]	0.18 C	0.08 C	0.04 C	0.04 C	
12.9	0.14 C	0.18 C[3)]	0.26 C	0.14 C	0.07 C	0.07 C	

Tightening torque of the mounting screws

		M4	M5	M6	M8	M10	M12	M14	M16
Nm	**8.8**	2.7	5.5	9.5	23	46	80	125	195
	12.9	4.6	9.5	16	39	77	135	215	340

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Locating pins

If the recommended values for permissible side forces are exceeded (see table), the runner block must be additionally fixed by means of locating pins or reference edges.

Recommended dimensions for the pin holes are indicated in the drawings and table.

Possible pin types

– Taper pin (hardened) or
– Straight pin DIN 6325

Note

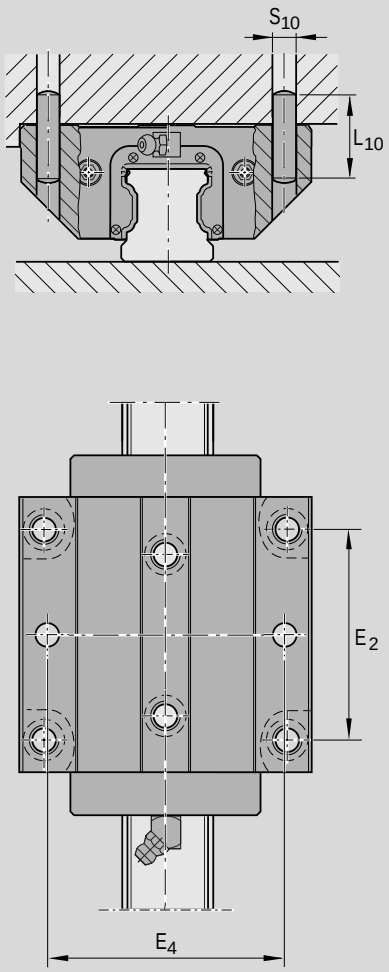
Ready-drilled holes made for production reasons may exist at the recommended pin hole positions ($ø < S_{10}$).

These may be extended and bored open to accommodate the locating pins.

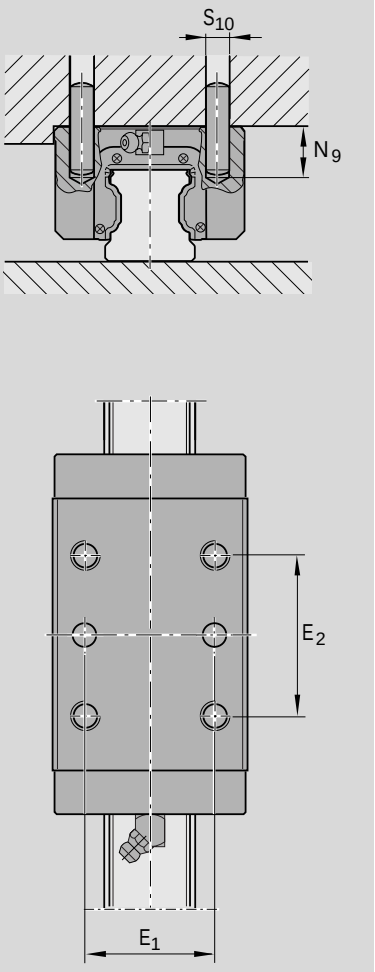
If the locating pins have to be driven in at another point (e.g. when the lube port is central), dimension E_2 must not be exceeded in the longitudinal direction (for dimension E_2, see the tables for the individual types).

Observe dimensions E_1 and E_4!

Only prepare the pin holes after the installation is complete (see also "General Mounting Instructions").



Standard width 1651-, 1653-



Slimline 1622-, 1623-
Slimline, high 1621-, 1624-
Slimline, low profile 1694-

Size	Dimensions (mm)					
	Taper pin (hardened) or Straight pin (DIN 6325)					1694-
	S_{10}	L_{10}	E_1	E_4	N_9 (max)	N_9 (max)
15	4	18	26	38	6.0	–
20	5	24	32	53	7.5	6.5
25	6	32	35	55	9.0	7.0
30	8	36	40	70	12.0	–
35	8	40	50	80	13.0	–
45	10	50	60	98	18.0	–
55	12	60	75	114	19.0	–
65	14	60	76	140	22.0	–

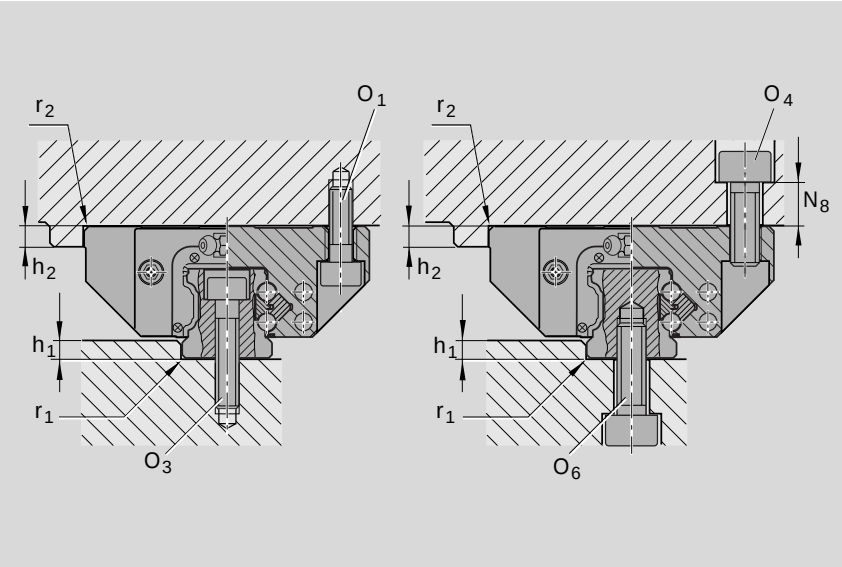
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STAR – Ball Rail® Systems
Mounting Instructions

For rail systems with runner block 1665-, 1666-

Reference edges, corner radii, mounting screw sizes and tightening torque



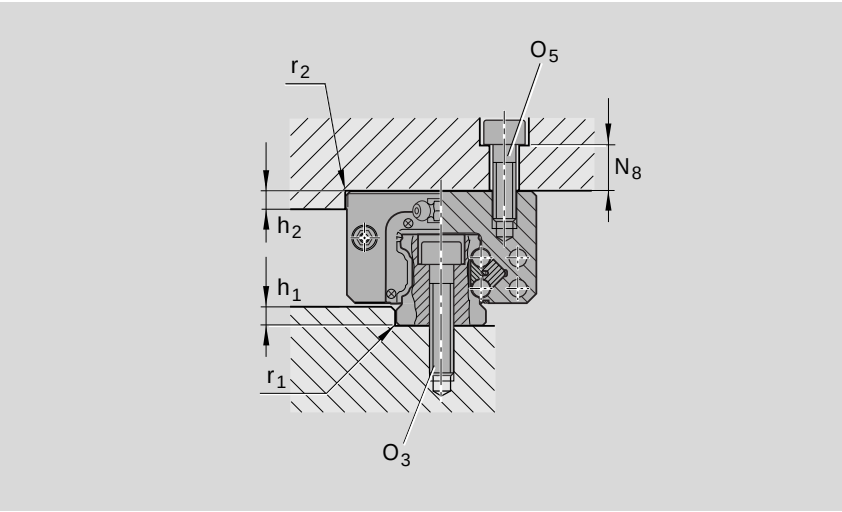
Runner block 1665-

– Standard width, short

Guide rails

left:
– For mounting from above 1605-

right:
– For mounting from below 1607-



Runner block 1666-

– Slimline, short

Guide rails

– For mounting from above 1605-

Note

The indicated combinations represent examples. It is on principle possible to combine any runner block with all the offered guide rail types.

Screw mounting of runner blocks using two screws is fully sufficient up to maximum load. (See maximum permissible force and moment loads indicated under the individual types.)

Dimensions and recommended limits for side load if no additional lateral retention is provided (Runner blocks 1665-, 1666-)

Size	h_1 min. (mm)	h_1 max. (mm)	r_1 max. (mm)	h_2 (mm)	r_2 max. (mm)	O_1 DIN 912 2 pcs.	O_4 DIN 912 2 pcs.	O_5 DIN 912 2 pcs.	O_3 DIN 912 (rail)	O_6 DIN 912 (rail)	N_8 (mm)
15	2.5	3.5	0.4	4	0.6	M4x12	M5x12	M4x12	M4x20	M5x12	6
20	2.5	4.0	0.6	5	0.6	M5x16	M6x16	M5x16	M5x25	M6x16	9
25	3.0	5.0	0.8	5	0.8	M6x20	M8x20	M6x18	M6x30	M6x20	10
30	3.0	5.0	0.8	6	0.8	M8x25	M10x20	M8x20	M8x30	M8x20	10
35	3.5	6.0	0.8	6	0.8	M8x25	M10x25	M8x25	M8x35	M8x25	13

Screw strength class	Runner blocks			Guide rails		
8.8	0.08 C	0.12 C	0.08 C	0.09 C	0.09 C	
12.9	0.13 C	0.21 C	0.13 C	0.15 C	0.15 C	

Tightening torque of the mounting screws

		M4	M5	M6	M8	M10	M12	M14	M16
Nm	**8.8**	2.7	5.5	9.5	23	46	80	125	195
	12.9	4.6	9.5	16	39	77	135	215	340

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Locating pins

If the recommended values for permissible side forces are exceeded, the runner block must be additionally fixed by means of locating pins or reference edges.

Recommended dimensions for the pin holes are indicated in the drawings and table.

Possible pin types

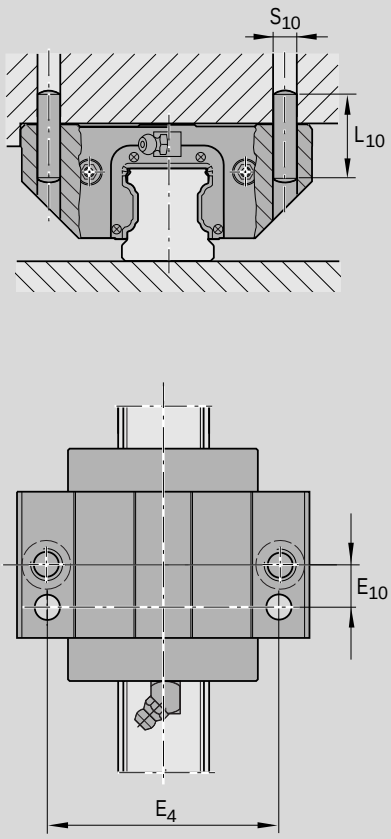
- Taper pin (hardened) or
- Straight pin DIN 6325

Note

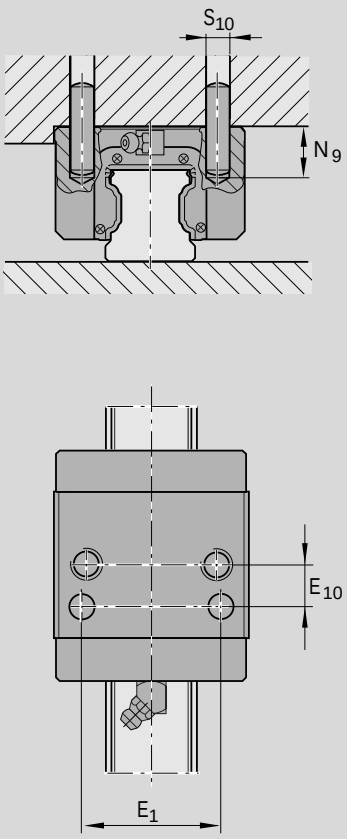
Ready-drilled holes made for production reasons may exist at the recommended pin hole positions ($ø < S_{10}$).

These may be extended and bored open to accommodate the locating pins.

Only prepare the pin holes after the installation is complete (see also "General Mounting Instructions").



Standard width, short 1665-



Slimline, short 1666-

Size	Dimensions (mm)					
	Taper pin (hardened) or Straight pin (DIN 6325)					
	S_{10}	L_{10}	E_1	E_4	E_{10}	N_9 (max)
15	4	18	26	38	9	3.0
20	5	24	32	53	10	3.5
25	6	32	35	55	11	7.0
30	8	36	40	70	14	10.0
35	8	40	50	80	15	12.0

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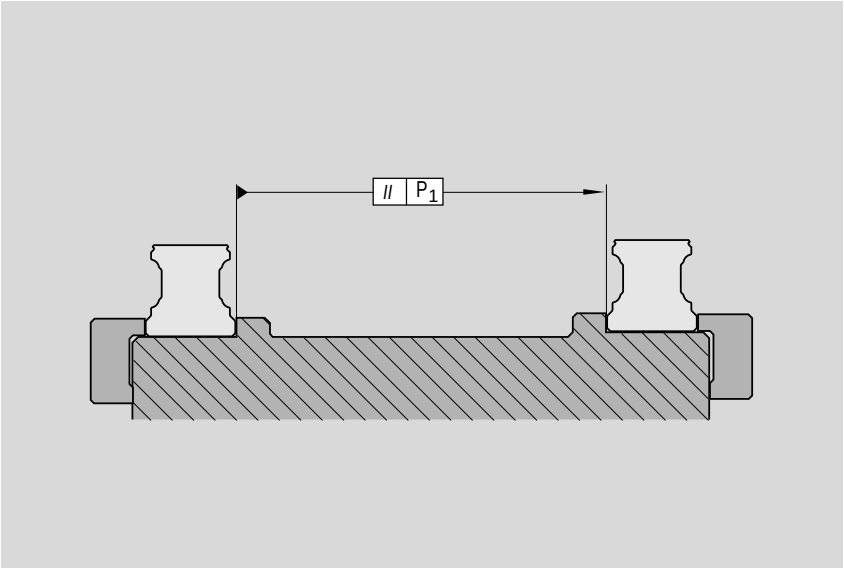
STAR – Ball Rail® Systems
Mounting Instructions – Runner Blocks, Steel Version

Parallelism offset of the rails after mounting

measured at the guide rails and at the runner blocks

The values for parallelism offset P_1 apply to all runner blocks of the standard range.

Values around 20% higher are permissible for the runner block 1665- (standard width, short) and 1666- (slimline, short).



Note

The parallelism offset P_1 causes a slight increase in preload on one side of the assembly.

If the tolerances given in the table are not exceeded, reduction in travel life will as a rule be negligible.

The given values apply to precision mounting. For standard mounting, double the stated values can be used.

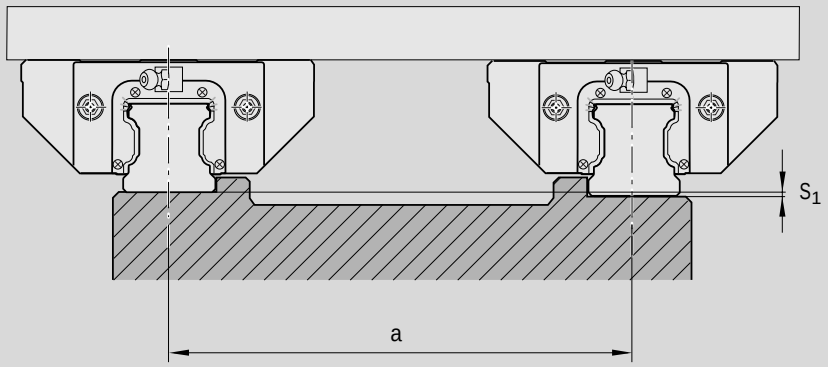
Size	Parallelism offset P_1 (mm)			
	up to approx. 10 µm clearance	Preload 0.02 C	Preload 0.08 C	Preload 0.13 C
15	0.015	0.009	0.005	0.004
20	0.018	0.011	0.006	0.004
25	0.019	0.012	0.007	0.005
30	0.021	0.014	0.009	0.006
35	0.023	0.015	0.010	0.007
45	0.028	0.019	0.012	0.009
55	0.035	0.025	0.016	0.011
65	0.048	0.035	0.022	0.016

Vertical offset

The vertical offset values apply to all runner blocks of the standard program.

Values around 20% higher are permissible for the runner block 1665- (standard width, short) and 1666- (slimline, short).

If the admissible vertical offset S_1 and S_2 is not exceeded, reduction in travel life will as a rule be negligible.



Permissible vertical offset in the transverse direction

The permissible vertical offset S_1 includes the tolerance for dimension H in accordance with the table given in the "Technical Data" section.

$$S_1 = a \cdot Y$$

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

Calculation factor	for preload class			
	up to approx. 10 µm clearance	Preload 0.02 C	Preload 0.08 C	Preload 0.13 C
Y	$4.3 \cdot 10^{-4}$	$2.8 \cdot 10^{-4}$	$1.7 \cdot 10^{-4}$	$1.2 \cdot 10^{-4}$

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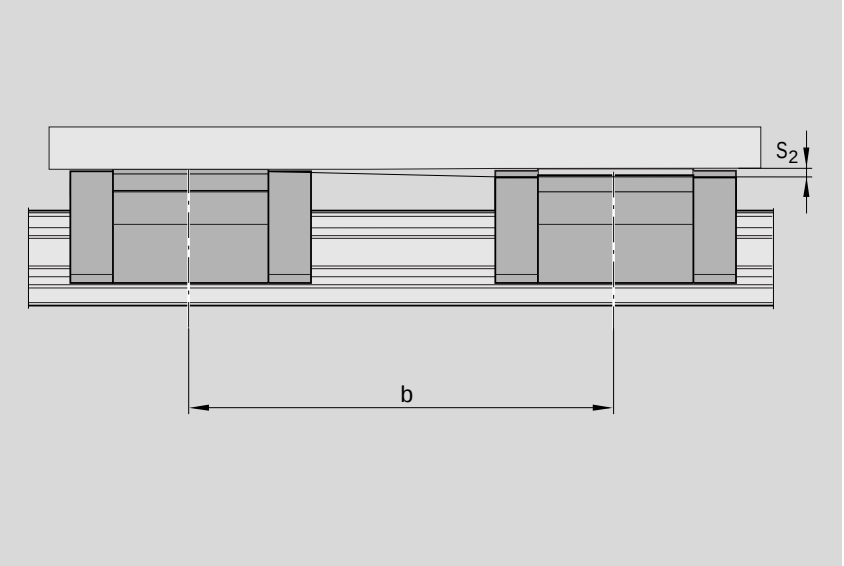
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Permissible vertical offset in the longitudinal direction

The permissible vertical offset S_2 includes the tolerance "Max. difference in dimension H on the same rail" in accordance with the table given in the "Technical Data" section.

Values around 40% higher are permissible for the runner block 1665- (standard width, short) and 1666- (slimline, short).

Values around 30% lower are permissible for runner block
1653- (standard width long),
1623- (slimline, long) and
1624- (slimline, high, long).



$S_2 = b \cdot 4.3 \cdot 10^{-5}$	S_2 = permissible vertical offset (mm) b = distance between runner blocks (mm)

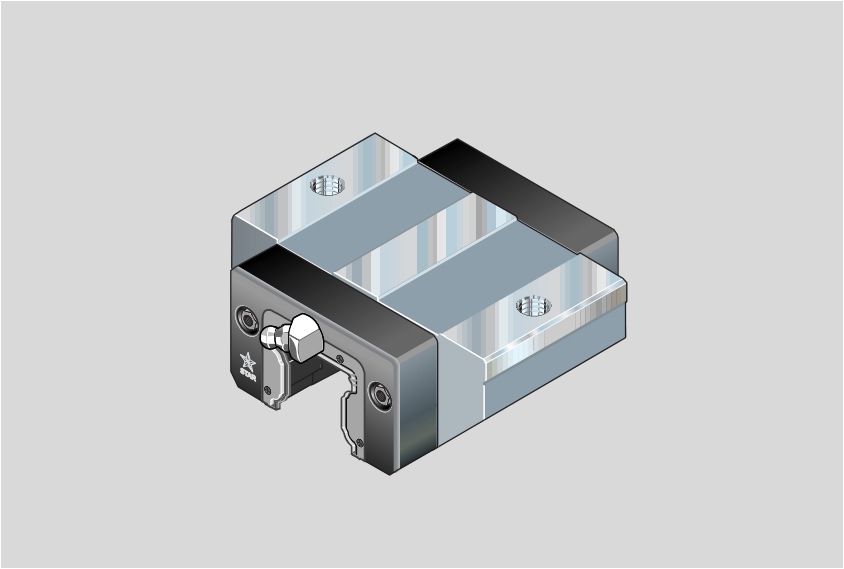
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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner Block 1665-

Standard width, short



Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Part numbers

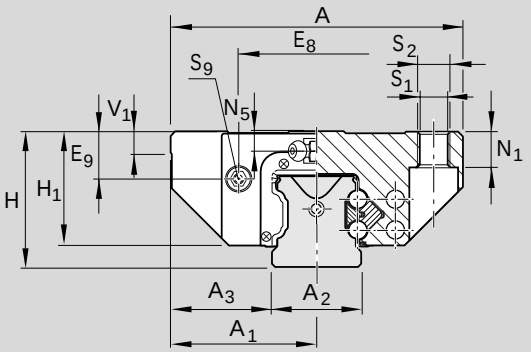
Size	Accuracy class	Part numbers for runner block for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
15	H	1665-193-10	1665-113-10
	N	1665-194-10	1665-114-10
20	H	1665-893-10	1665-813-10
	N	1665-894-10	1665-814-10
25	H	1665-293-10	1665-213-10
	N	1665-294-10	1665-214-10
30	H	1665-793-10	1665-713-10
	N	1665-794-10	1665-714-10
35	H	1665-393-10	1665-313-10
	N	1665-394-10	1665-314-10

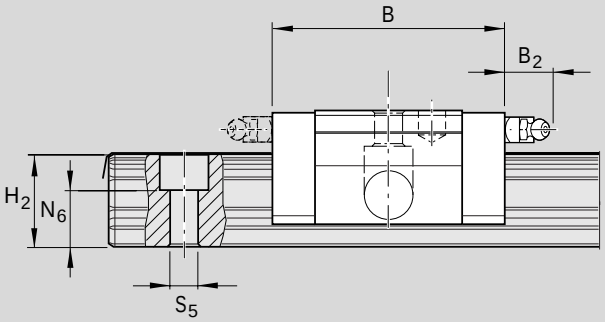
Note on dynamic load capacities and moments (see table)

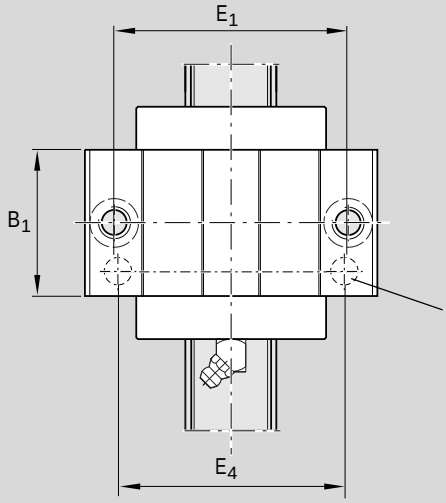
Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Recommended position for pin holes (dimension E_4 see "Mounting Instructions", under "Locating pins").

Note

Ready-drilled holes made for production reasons may exist at the recommended pin hole position.

These may be extended and bored open to accommodate the locating pins.

Lube nipple

Size 15 and 20:

Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

Size 25 to 35:

BM 6 DIN 71412
B_2 = 16 mm

at either end.

	Dimensions (mm)																	
Size	**A**	**A_1**	**A_2**	**A_3**	**B**	**B_1**	**H**	**H_1**	**H_2[1)]**	**H_2[2)]**	**V_1**	**E_1**			**E_8**	**E_9**		**N_1**
15	47	23.5	15	16.0	40.5	25.7	24	19.8	16.3	16.20	5.0	38			24.55	6.7		5.0
20	63	31.5	20	21.5	52.5	31.9	30	25.4	20.7	20.55	6.0	53			32.4	7.3		7.5
25	70	35.0	23	23.5	61.5	38.6	36	29.5	24.4	24.25	7.5	57			38.3	11.5		9.0
30	90	45.0	28	31.0	71.5	45.0	42	35.0	28.5	28.35	7.0	72			48.4	14.6		11.0
35	100	50.0	34	33.0	79.0	51.4	48	40.0	32.15	31.85	8.0	82			58.0	17.5		12.0

[1)] Dimension H_2 with Rail Seal® cover strip [2)] Dimension H_2 without Rail Seal® cover strip

								Load capacities (N)		Moments (Nm)			
	Dimensions (mm)						Mass	C	C_0	M_t	M_{t0}	M_L	M_{L0}
Size	**N_5**	**$N_6^{\pm 0.5}$**	**S_1**	**S_2**	**S_5**	**S_9**	**(kg)**	**dyn.**	**stat.**	**dyn.**	**stat.**	**dyn.**	**stat.**
15	4.0	10.3	4.4	M5	4.4	M2.5-3.5deep	0.19	5 400	8 100	52	80	19	28
20	4.7	13.2	5.4	M6	6.0	M3-5 deep	0.43	12 400	13 600	150	170	52	58
25	5.5	15.2	6.8	M8	7.0	M3-5 deep	0.50	15 900	18 200	230	260	82	94
30	6.0	17.0	8.6	M10	9.0	M3-5 deep	0.90	22 100	24 800	380	430	133	150
35	7.0	20.5	8.6	M10	9.0	M3-5 deep	1.35	29 300	32 400	640	700	200	220

30% higher dynamic load capacities and moments

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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner Block 1651-

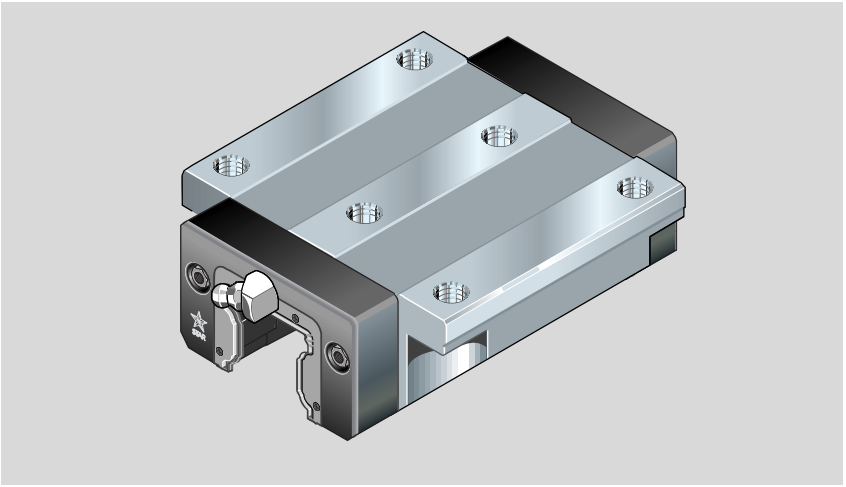
Standard width

Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Size 15 to 35 in accuracy class H (clearance and preload 0.02 C) also available as low noise runner blocks with spacer balls.
Dynamic load capacities and moments are reduced by 35%.
(Part numbers 1651-..3-12)



Part numbers

Size	Accuracy class	Part numbers for runner blocks for preload class			
		up to approx. 10 µm clearance	Preload 0.02 C	Preload 0.08 C	Preload 0.13 C
15	UP		1651-119-10*	1651-129-10*	1651-139-10*
	SP		1651-111-10*	1651-121-10*	1651-131-10*
	P		1651-112-10	1651-122-10	1651-132-10
	H	1651-193-10	1651-113-10	1651-123-10	
	N	1651-194-10	1651-114-10	1651-124-10	
20	UP		1651-819-10*	1651-829-10*	1651-839-10*
	SP		1651-811-10*	1651-821-10*	1651-831-10*
	P		1651-812-10	1651-822-10	1651-832-10
	H	1651-893-10	1651-813-10	1651-823-10	
	N	1651-894-10	1651-814-10	1651-824-10	
25	UP		1651-219-10*	1651-229-10*	1651-239-10*
	SP		1651-211-10*	1651-221-10*	1651-231-10*
	P		1651-212-10	1651-222-10	1651-232-10
	H	1651-293-10	1651-213-10	1651-223-10	
	N	1651-294-10	1651-214-10	1651-224-10	
30	UP		1651-719-10*	1651-729-10*	1651-739-10*
	SP		1651-711-10*	1651-721-10*	1651-731-10*
	P		1651-712-10	1651-722-10	1651-732-10
	H	1651-793-10	1651-713-10	1651-723-10	
	N	1651-794-10	1651-714-10	1651-724-10	
35	UP		1651-319-10*	1651-329-10*	1651-339-10*
	SP		1651-311-10*	1651-321-10*	1651-331-10*
	P		1651-312-10	1651-322-10	1651-332-10
	H	1651-393-10	1651-313-10	1651-323-10	
	N	1651-394-10	1651-314-10	1651-324-10	
45	UP		1651-419-10*	1651-429-10*	1651-439-10*
	SP		1651-411-10*	1651-421-10*	1651-431-10*
	P		1651-412-10	1651-422-10	1651-432-10
	H	1651-493-10	1651-413-10	1651-423-10	
	N	1651-494-10	1651-414-10	1651-424-10	
55	UP		1651-519-10*	1651-529-10*	1651-539-10*
	SP		1651-511-10*	1651-521-10*	1651-531-10*
	P		1651-512-10*	1651-522-10*	1651-532-10*
	H	1651-593-10*	1651-513-10*	1651-523-10*	
	N	1651-594-10*	1651-514-10*	1651-524-10*	
65	UP		1651-619-10*	1651-629-10*	1651-639-10*
	SP		1651-611-10*	1651-621-10*	1651-631-10*
	P		1651-612-10*	1651-622-10*	1651-632-10*
	H	1651-693-10*	1651-613-10*	1651-623-10*	
	N	1651-694-10*	1651-614-10*	1651-624-10*	

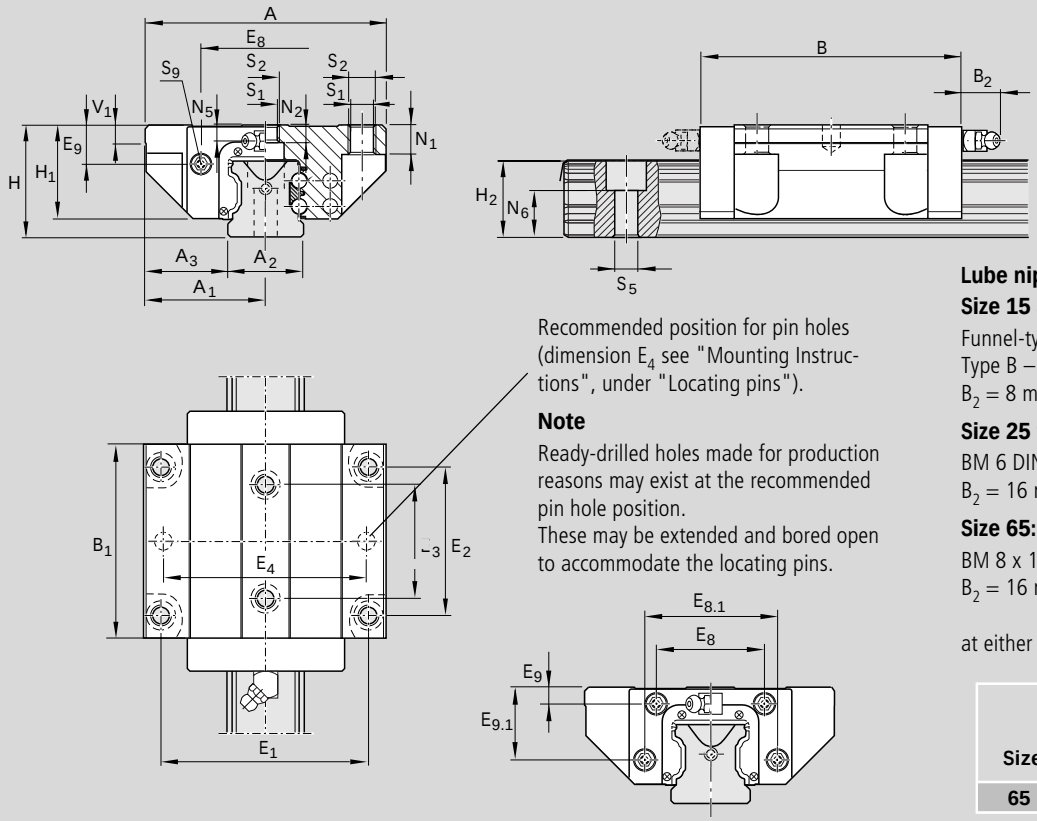
* 30% higher dynamic load capacities on request

Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Recommended position for pin holes (dimension E_4 see "Mounting Instructions", under "Locating pins").

Note

Ready-drilled holes made for production reasons may exist at the recommended pin hole position.
These may be extended and bored open to accommodate the locating pins.

Lube nipple

Size 15 and 20:

Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

Size 25 to 55:

BM 6 DIN 71412
B_2 = 16 mm

Size 65:

BM 8 x 1 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm) $E_{8.1}$	$E_{9.1}$
65	100	53.5

Size 65

Size	Dimensions (mm) A	A_1	A_2	A_3	B	B_1	H	H_1	H_2[1)]	H_2[2)]	V_1	E_1	E_2	E_3	E_8	E_9	N_1	N_2
15	47	23.5	15	16.0	54	39.2	24	19.8	16.3	16.20	5.0	38	30	26	24.55	6.7	5.0	4.4
20	63	31.5	20	21.5	70	49.6	30	25.0	20.7	20.55	6.0	53	40	35	32.4	7.3	7.5	5.2
25	70	35.0	23	23.5	81	57.8	36	29.5	24.4	24.25	7.5	57	45	40	38.3	11.5	9.0	7.0
30	90	45.0	28	31.0	94	67.4	42	35.0	28.5	28.35	7.0	72	52	44	48.4	14.6	11.0	8.0
35	100	50.0	34	33.0	105	77.0	48	40.0	32.15	31.85	8.0	82	62	52	58.0	17.5	12.0	10.2
45	120	60.0	45	37.5	133	97.0	60	50.0	40.15	39.85	10.0	100	80	60	70.0	21.0	15.0	12.4
55	140	70.0	53	43.5	159	115.5	70	57.0	48.15	47.85	12.0	116	95	70	80.0	22.3	18.0	13.5
65	170	85.0	63	53.5	188	139.6	90	76.0	60.15	59.85	15.0	142	110	82	76.0	11.0	23.0	14.0

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm) N_5	$N_6^{\pm 0.5}$	S_1	S_2	S_5	S_9	Mass (kg)	Load capacities (N) C dyn.	C_0 stat.	Moments (Nm) M_t dyn.	M_{t0} stat.	M_L dyn.	M_{L0} stat.
15	4.0	10.3	4.4	M5	4.4	M2.5-3.5deep	0.23	7 800	13 500	74	130	40	71
20	4.7	13.2	5.4	M6	6.0	M3-5deep	0.55	18 800	24 400	240	310	130	165
25	5.5	15.2	6.8	M8	7.0	M3-5deep	0.70	22 800	30 400	320	430	180	240
30	6.0	17.0	8.6	M10	9.0	M3-5deep	1.10	31 700	41 300	540	720	290	380
35	7.0	20.5	8.6	M10	9.0	M3-5deep	1.75	41 900	54 000	890	1 160	440	565
45	8.0	23.5	10.5	M12	14.0	M4-7deep	3.15	68 100	85 700	1 830	2 310	890	1 130
55	9.0	29.0	12.5	M14	16.0	M5-8deep	5.20	98 200	121 400	3 100	3 860	1 540	1 905
65	16.0	38.5	14.5	M16	18.0	M4-7deep	10.25	160 000	192 700	6 300	7 610	3 160	3 815

30% higher dynamic load capacities and moments

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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner block 1653-

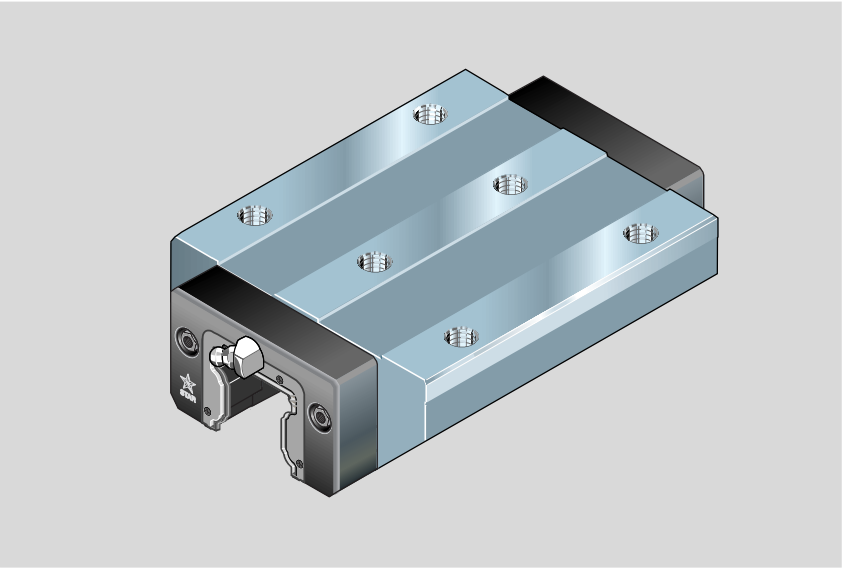
Standard width, long

Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Size 15 to 35 in accuracy class H (clearance and preload 0.02 C) also available as low noise runner blocks with spacer balls.
Dynamic load capacities and moments are reduced by 35%.
(Part numbers 1653-..3-12)



Part numbers

Size	Accuracy class	Part numbers for runner blocks for preload class			
		up to approx. 10 µm clearance	Preload 0.02 C	Preload 0.08 C	Preload 0.13 C
15	N	1653-194-10	1653-114-10		
20	UP		1653-819-10*	1653-829-10*	1653-839-10*
	SP		1653-811-10*	1653-821-10*	1653-831-10*
	P		1653-812-10	1653-822-10	1653-832-10
	H	1653-893-10	1653-813-10	1653-823-10	
	N	1653-894-10	1653-814-10	1653-824-10	
25	UP		1653-219-10*	1653-229-10*	1653-239-10*
	SP		1653-211-10*	1653-221-10*	1653-231-10*
	P		1653-212-10	1653-222-10	1653-232-10
	H	1653-293-10	1653-213-10	1653-223-10	
	N	1653-294-10	1653-214-10	1653-224-10	
30	UP		1653-719-10*	1653-729-10*	1653-739-10*
	SP		1653-711-10*	1653-721-10*	1653-731-10*
	P		1653-712-10	1653-722-10	1653-732-10
	H	1653-793-10	1653-713-10	1653-723-10	
	N	1653-794-10	1653-714-10	1653-724-10	
35	UP		1653-319-10*	1653-329-10*	1653-339-10*
	SP		1653-311-10*	1653-321-10*	1653-331-10*
	P		1653-312-10	1653-322-10	1653-332-10
	H	1653-393-10	1653-313-10	1653-323-10	
	N	1653-394-10	1653-314-10	1653-324-10	
45	UP		1653-419-10*	1653-429-10*	1653-439-10*
	SP		1653-411-10*	1653-421-10*	1653-431-10*
	P		1653-412-10	1653-422-10	1653-432-10
	H	1653-493-10	1653-413-10	1653-423-10	
	N	1653-494-10	1653-414-10	1653-424-10	
55	UP		1653-519-10*	1653-529-10*	1653-539-10*
	SP		1653-511-10*	1653-521-10*	1653-531-10*
	P		1653-512-10*	1653-522-10*	1653-532-10*
	H	1653-593-10*	1653-513-10*	1653-523-10*	
	N	1653-594-10*	1653-514-10*	1653-524-10*	
65	UP		1653-619-10*	1653-629-10*	1653-639-10*
	SP		1653-611-10*	1653-621-10*	1653-631-10*
	P		1653-612-10*	1653-622-10*	1653-632-10*
	H	1653-693-10*	1653-613-10*	1653-623-10*	
	N	1653-694-10*	1653-614-10*	1653-624-10*	

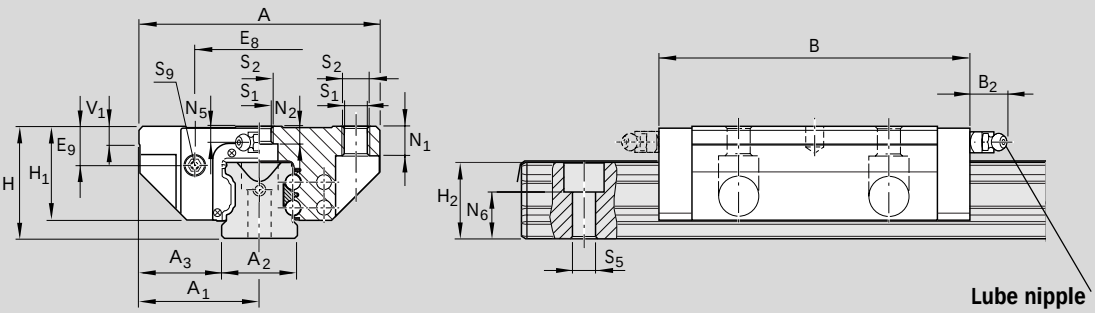
* 30% higher dynamic load capacities on request

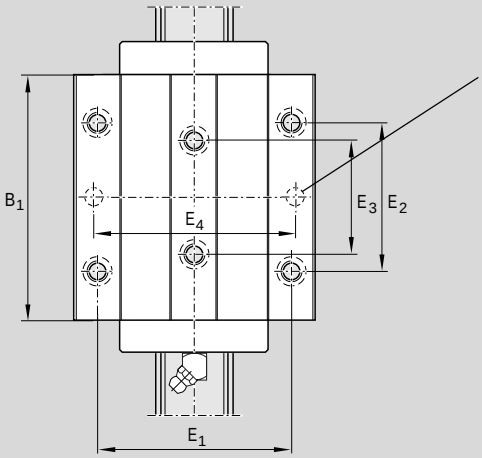
Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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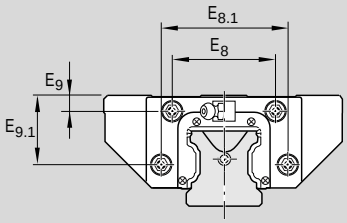




Recommended position for pin holes (dimension E_4 see "Mounting Instructions", under "Locating pins").

Note

Ready-drilled holes made for production reasons may exist at the recommended pin hole position.
These may be extended and bored open to accommodate the locating pins.



Size 65

Lube nipple

Size 20:
Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

Size 25 to 55:
BM 6 DIN 71412
B_2 = 16 mm

Size 65:
BM 8 x 1 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm) $E_{8.1}$	$E_{9.1}$
65	100	53.5

Size	Dimensions (mm) A	A_1	A_2	A_3	B	B_1	H	H_1	H_2 [1)]	H_2 [2)]	V_1	E_1	E_2	E_3	E_8	E_9	N_1	N_2
15	47	23.5	15	16.0	68.5	53.6	24	19.8	16.3	16.20	5.0	38	30	26	24.55	6.7	5.0	4.4
20	63	31.5	20	21.5	86.0	65.6	30	25.0	20.7	20.55	6.0	53	40	35	32.4	7.3	7.5	5.2
25	70	35.0	23	23.5	103.0	79.5	36	29.5	24.4	24.25	7.5	57	45	40	38.3	11.5	9.0	7.0
30	90	45.0	28	31.0	116.0	89.4	42	35.0	28.5	28.35	7.0	72	52	44	48.4	14.6	11.0	8.0
35	100	50.0	34	33.0	133.0	105.5	48	40.0	32.15	31.85	8.0	82	62	52	58.0	17.5	12.0	10.2
45	120	60.0	45	37.5	170.0	133.5	60	50.0	40.15	39.85	10.0	100	80	60	70.0	21.0	15.0	12.4
55	140	70.0	53	43.5	200.0	155.5	70	57.0	48.15	47.85	12.0	116	95	70	80.0	22.3	18.0	13.5
65	170	85.0	63	53.5	243.0	194.6	90	76.0	60.15	59.85	15.0	142	110	82	76.0	11.0	23.0	14.0

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm) N_5	$N_6^{\pm 0.5}$	S_1	S_2	S_5	S_9	Mass (kg)	Load capacities (N) C dyn.	C_0 stat.	M_t dyn.	M_{t0} stat.	Moments (Nm) M_L dyn.	M_{L0} stat.
15	4.0	10.3	4.4	M5	4.4	M2.5-3.5deep	0.32	10 000	20 200	130	190	98	150
20	4.7	13.2	5.4	M6	6	M3-5 deep	0.80	24 400	35 200	310	450	225	330
25	5.5	15.2	6.8	M8	7	M3-5 deep	1.00	30 400	45 500	430	650	345	510
30	6.0	17.0	8.6	M10	9	M3-5 deep	1.60	40 000	57 800	690	1 000	495	715
35	7.0	20.5	8.6	M10	9	M3-5 deep	2.45	55 600	81 000	1 200	1 740	830	1 215
45	8.0	23.5	10.5	M12	14	M4-7 deep	4.50	90 400	128 500	2 440	3 470	1 700	2 425
55	9.0	29.0	12.5	M14	16	M5-8 deep	7.50	124 200	170 000	3 950	5 400	2 630	3 600
65	16.0	38.5	14.5	M16	18	M4-7 deep	14.15	211 900	289 000	8 370	11 420	6 000	8 190

30% higher dynamic load capacities and moments

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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

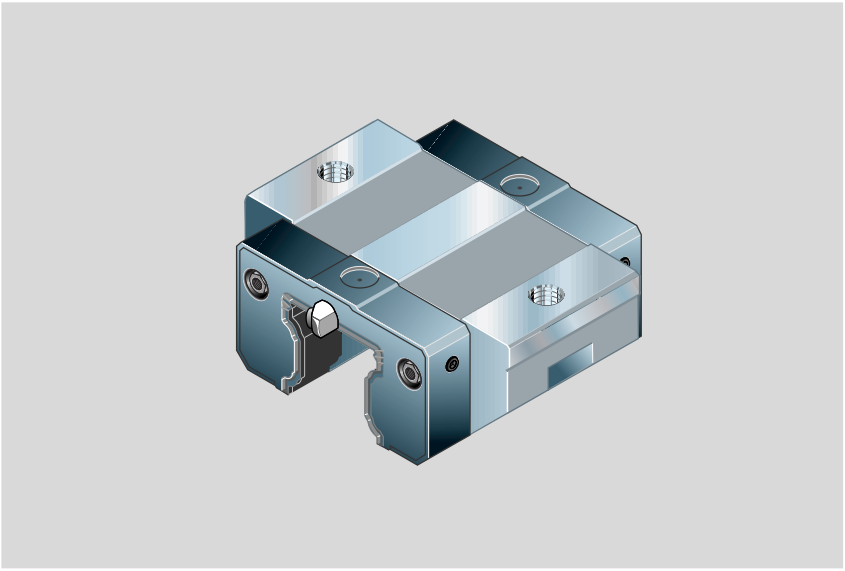
Runner block 1663-

Standard width, short, low profile

Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).



Part numbers

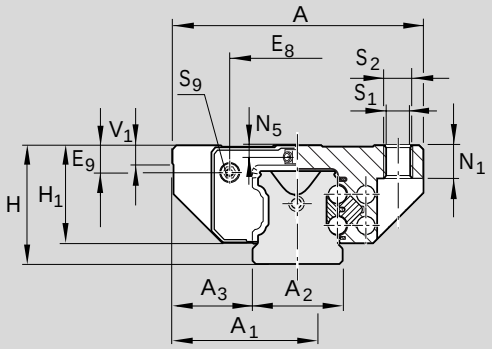
Size	Accuracy class	Part numbers for runner blocks for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
20	H	1663-893-10	1663-813-10
	N	1663-894-10	1663-814-10
25	H	1663-293-10	1663-213-10
	N	1663-294-10	1663-214-10

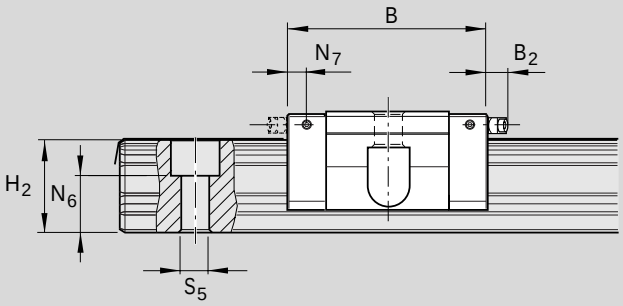
Note on dynamic load capacities and moments (see table)

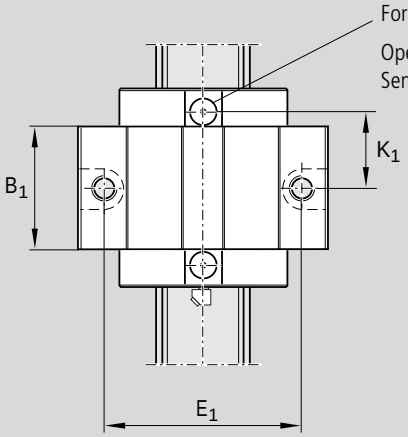
Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Lube port with additional anti-twist feature.

Lube nipple
Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

at either end.

Size 25:
Provided with ports at side.

Size	Dimensions (mm)																	
	A	A_1	A_2	A_3	B	B_1	H	H_1	H_2[1)]	H_2[2)]	V_1	E_1		E_8	E_9	K_1	N_1	N_5
20	59	29.5	20	19.5	55	31.9	28	23.0	20.7	20.55	6.0	49		30.5	5.6	20.1	7.7	3.6
25	73	36.5	23	25.0	62	38.6	33	26.5	24.4	24.25	7.5	60		38.3	8.5	24.5	9.3	4.1

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm)						Mass	Load capacities (N)		Moments (Nm)			
	$N_6^{\pm 0.5}$	N_7	S_1	S_2	S_5	S_9	(kg)	C dyn.	C_0 stat.	M_t dyn.	M_{t0} stat.	M_L dyn.	M_{L0} stat.
20	13.2	–	5.4	M6	6.0	M3-5 deep	0.43	9 600	13 600	120	170	40	58
25	15.2	6.0	6.8	M8	7.0	M3-5 deep	0.50	15 900*	18 200	235	260	82	94

*** 30% higher dynamic load capacity**

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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

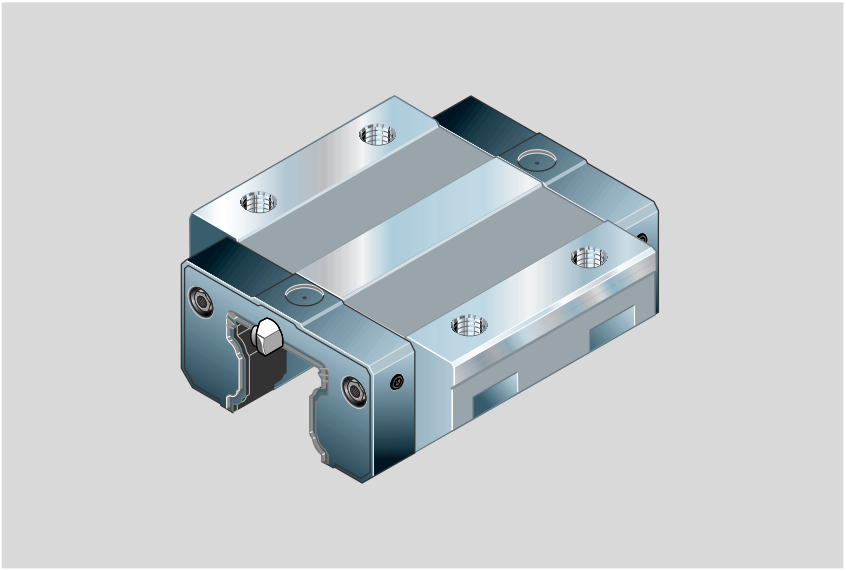
Runner block 1693-

Standard width, low profile

Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).



Part numbers

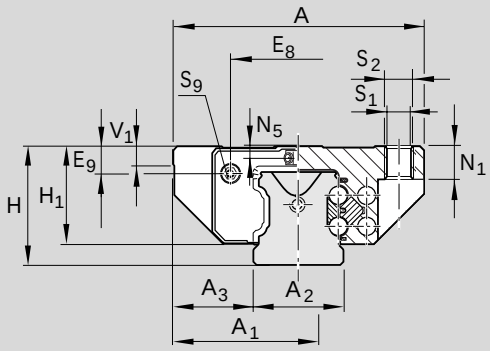
Size	Accuracy class	Part numbers for runner blocks for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
20	H	1693-893-10	1693-813-10
	N	1693-894-10	1693-814-10
25	H	1693-293-10	1693-213-10
	N	1693-294-10	1693-214-10

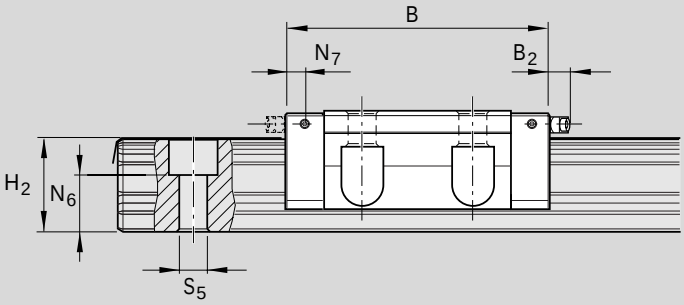
Note on dynamic load capacities and moments (see table)

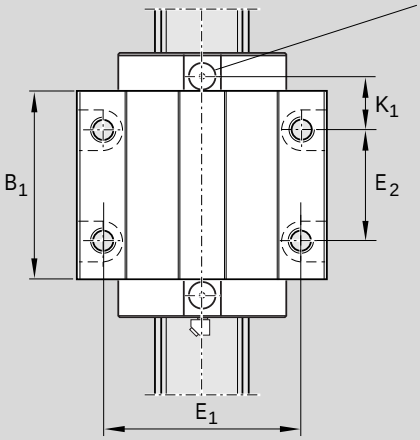
Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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For O-ring ø 5 · 1 mm

Open lube port if necessary. Send for instructions.

Lube port with additional anti-twist feature.

Lube nipple

Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

at either end.

Size 25:
Provided with ports at side.

Size	Dimensions (mm) A	A_1	A_2	A_3	B	B_1	H	H_1	H_2 [1]	H_2 [2]	V_1	E_1	E_2	E_8	E_9	K_1	N_1	N_5
20	59	29.5	20	19.5	72.5	49.6	28	23.0	20.7	20.55	6.0	49	32	30.5	5.6	13.0	7.7	3.6
25	73	36.5	23	25.0	81.0	57.8	33	26.5	24.4	24.25	7.5	60	35	38.3	8.5	16.6	9.3	4.1

[1] Dimension H_2 with Rail Seal® cover strip

[2] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm) $N_6^{\pm 0.5}$	N_7	S_1	S_2	S_5	S_9	Mass (kg)	Load capacities (N) C dyn.	C_0 stat.	Moments (Nm) M_t dyn.	M_{t0} stat.	M_L dyn.	M_{L0} stat.
20	13.2	–	5.4	M6	6.0	M3-5 deep	0.50	14 500	24 400	190	310	100	165
25	15.2	6.0	6.8	M8	7.0	M3-5 deep	0.65	22 800*	30 400	320	430	180	240

*** 30% higher dynamic load capacity**

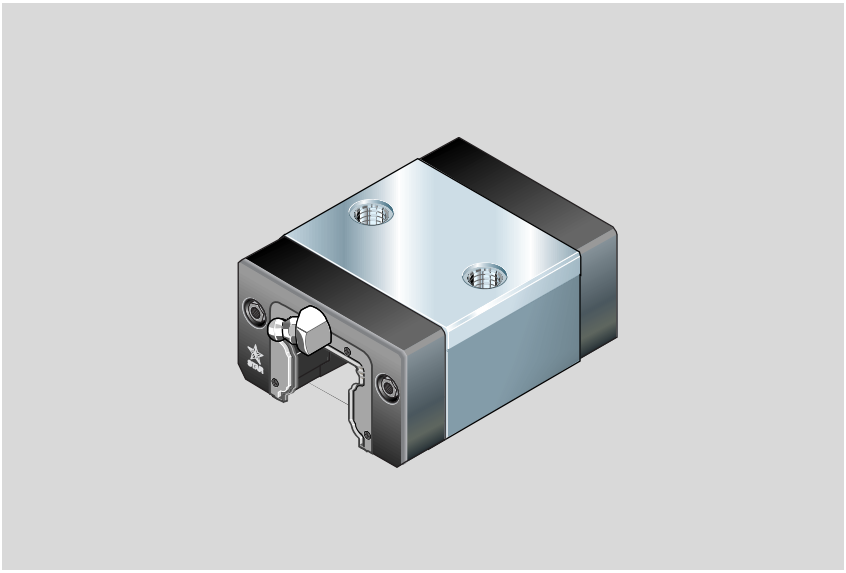
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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner block 1666-

Slimline, short



Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Part numbers

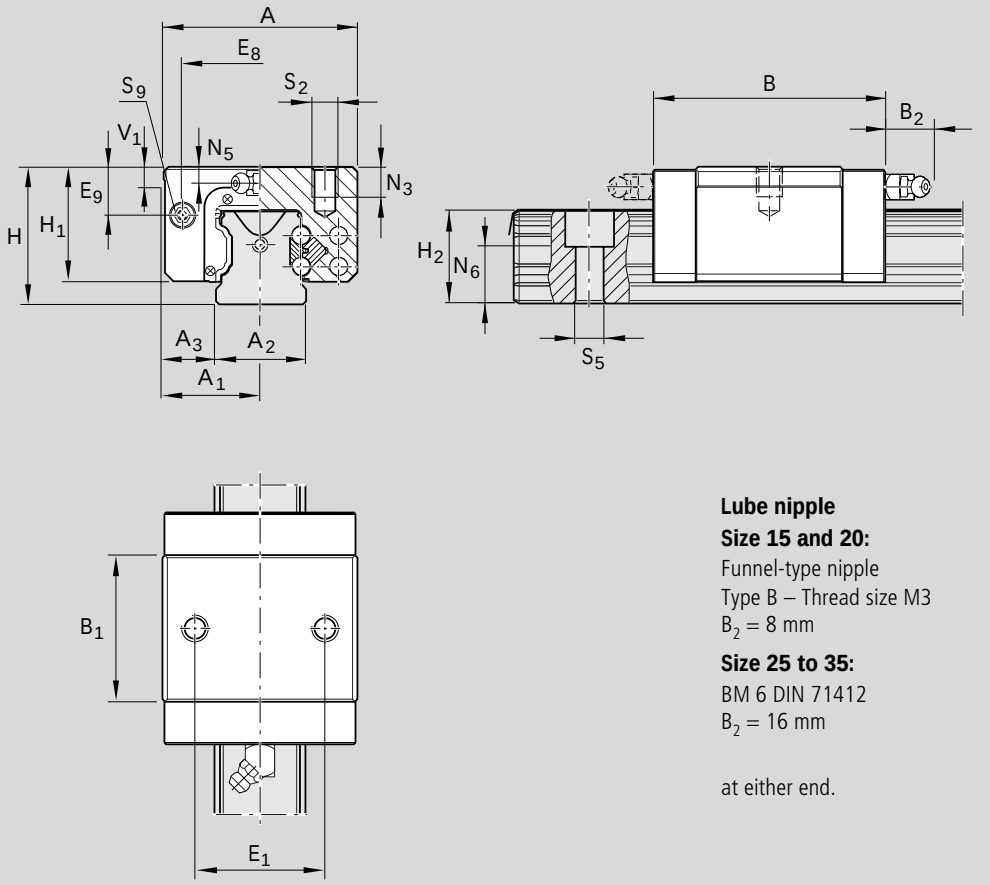
Size	Accuracy class	Part numbers for runner blocks for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
15	H	1666-193-10	1666-113-10
	N	1666-194-10	1666-114-10
20	H	1666-893-10	1666-813-10
	N	1666-894-10	1666-814-10
25	H	1666-293-10	1666-213-10
	N	1666-294-10	1666-214-10
30	H	1666-793-10	1666-713-10
	N	1666-794-10	1666-714-10
35	H	1666-393-10	1666-313-10
	N	1666-394-10	1666-314-10

Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Lube nipple

Size 15 and 20:
Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

Size 25 to 35:
BM 6 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm)																	
	A	A_1	A_2	A_3	B	B_1	H	H_1	H_2[1)]	H_2[2)]	V_1	E_1	E_8	E_9				N_3
15	34	17	15	9.5	40.5	25.7	24	19.8	16.3	16.20	5.0	26	24.55	6.7				6.0
20	44	22	20	12.0	52.5	31.9	30	25.4	20.7	20.55	6.0	32	32.4	7.3				7.5
25	48	24	23	12.5	61.5	38.6	36	29.5	24.4	24.25	7.5	35	38.3	11.5				9.0
30	60	30	28	16.0	71.5	45.0	42	35.0	28.5	28.35	7.0	40	48.4	14.6				12.0
35	70	35	34	18.0	79.0	51.4	48	40.0	32.15	31.85	8.0	50	58.0	17.5				13.0

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm)						Mass	Load capacities (N)		Moments (Nm)			
	N_5	$N_6^{\pm 0.5}$		S_2	S_5	S_9	(kg)	C dyn.	C_0 stat.	M_t dyn.	M_{t0} stat.	M_L dyn.	M_{L0} stat.
15	4.0	10.3		M4	4.4	M2.5-3.5deep	0.12	5 400	8 100	52	80	19	28
20	4.7	13.2		M5	6.0	M3-5 deep	0.30	12 400	13 600	150	170	52	58
25	5.5	15.2		M6	7.0	M3-5 deep	0.40	15 900	18 200	230	260	82	94
30	6.0	17.0		M8	9.0	M3-5 deep	0.65	22 100	24 800	380	430	133	150
35	7.0	20.5		M8	9.0	M3-5 deep	0.95	29 300	32 400	640	700	200	220

30% higher dynamic load capacities and moments

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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner block 1622-

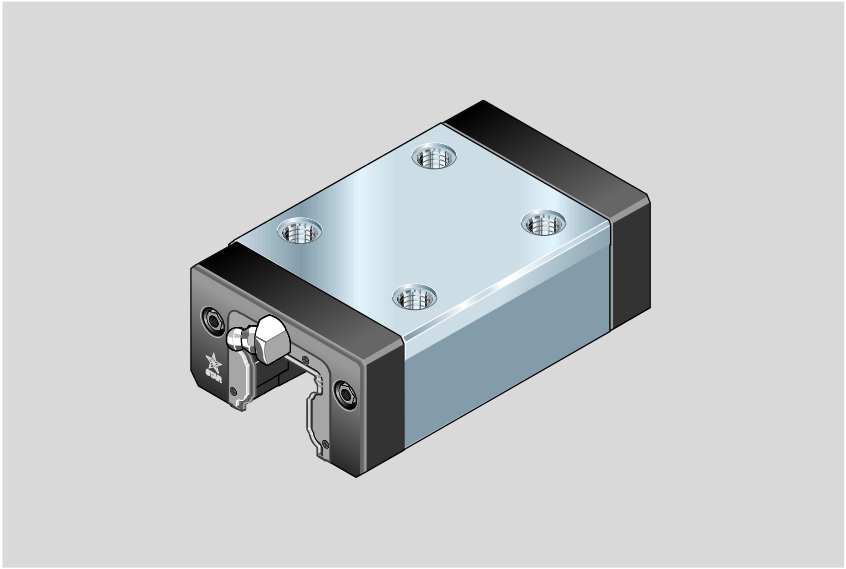
Slimline

Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Size 15 to 35 in accuracy class H (clearance and preload 0.02 C) also available as low noise runner blocks with spacer balls.
Dynamic load capacities and moments are reduced by 35%.
(Part numbers 1622-..3-12)



Part numbers

Size	Accuracy class	Part numbers for runner blocks for preload class			
		up to approx. 10 µm clearance	Preload 0.02 C	Preload 0.08 C	Preload 0.13 C
15	P		1622-112-10	1622-122-10	1622-132-10
	H	1622-193-10	1622-113-10	1622-123-10	
	N	1622-194-10	1622-114-10	1622-124-10	
20	P		1622-812-10	1622-822-10	1622-832-10
	H	1622-893-10	1622-813-10	1622-823-10	
	N	1622-894-10	1622-814-10	1622-824-10	
25	P		1622-212-10	1622-222-10	1622-232-10
	H	1622-293-10	1622-213-10	1622-223-10	
	N	1622-294-10	1622-214-10	1622-224-10	
30	P		1622-712-10	1622-722-10	1622-732-10
	H	1622-793-10	1622-713-10	1622-723-10	
	N	1622-794-10	1622-714-10	1622-724-10	
35	P		1622-312-10	1622-322-10	1622-332-10
	H	1622-393-10	1622-313-10	1622-323-10	
	N	1622-394-10	1622-314-10	1622-324-10	
45	P		1622-412-10	1622-422-10	1622-432-10
	H	1622-493-10	1622-413-10	1622-423-10	
	N	1622-494-10	1622-414-10	1622-424-10	
55	P		1622-512-10*	1622-522-10*	1622-532-10*
	H	1622-593-10*	1622-513-10*	1622-523-10*	
	N	1622-594-10*	1622-514-10*	1622-524-10*	
65	P		1622-612-10*	1622-622-10*	1622-632-10*
	H	1622-693-10*	1622-613-10*	1622-623-10*	
	N	1622-694-10*	1622-614-10*	1622-624-10*	

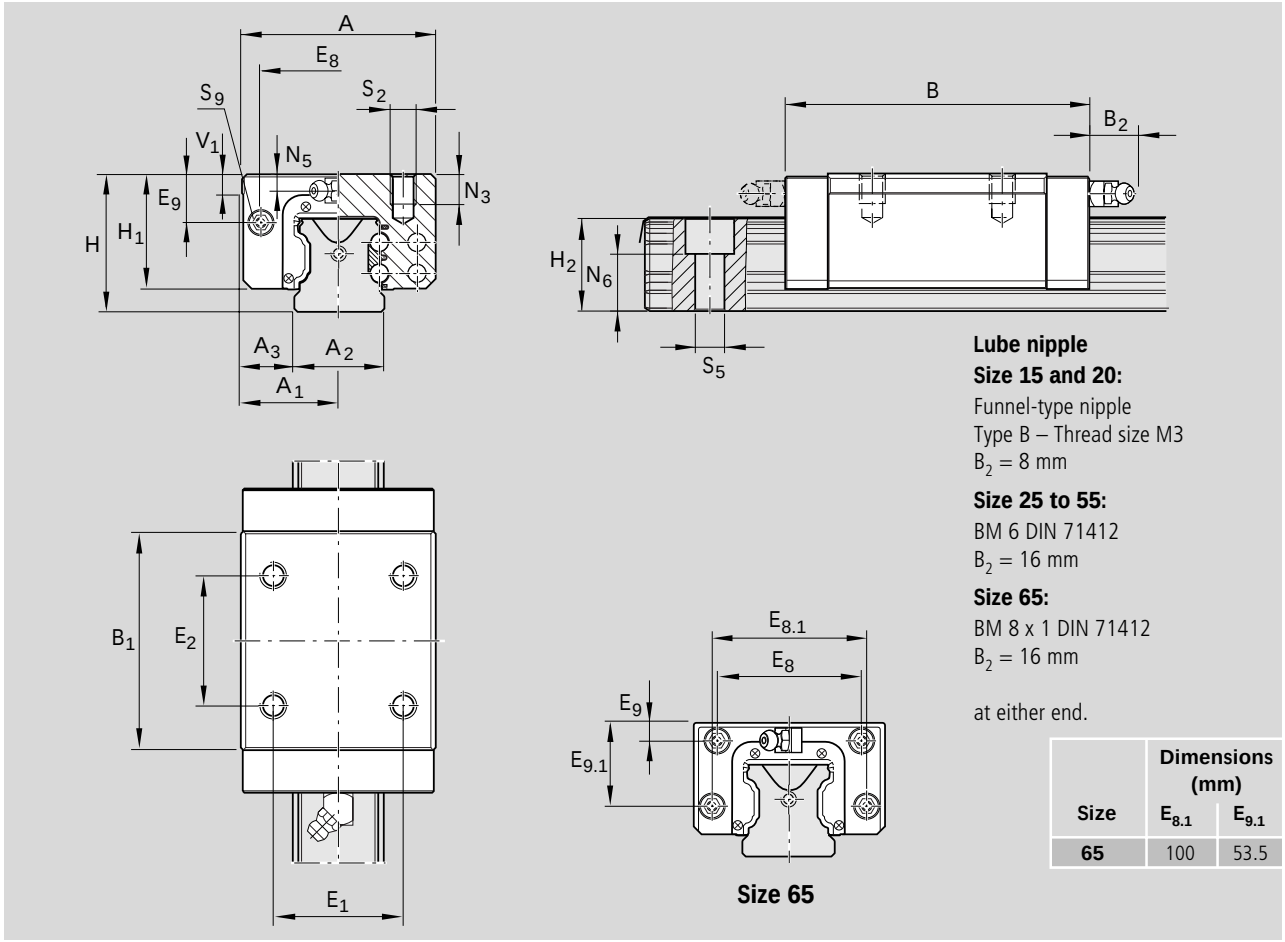
* 30% higher dynamic load capacities on request

Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Size 65

Lube nipple

Size 15 and 20:
Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

Size 25 to 55:
BM 6 DIN 71412
B_2 = 16 mm

Size 65:
BM 8 x 1 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm) $E_{8.1}$	$E_{9.1}$
65	100	53.5

Size	Dimensions (mm) A	A_1	A_2	A_3	B	B_1	H	H_1	H_2[1)]	H_2[2)]	V_1	E_1	E_2	E_8	E_9			N_3
15	34	17	15	9.5	54	39.2	24	19.8	16.3	16.20	5.0	26	26	24.55	6.7			6.0
20	44	22	20	12.0	70	49.6	30	25.4	20.7	20.55	6.0	32	36	32.4	7.3			7.5
25	48	24	23	12.5	81	57.8	36	29.5	24.4	24.25	7.5	35	35	38.3	11.5			9.0
30	60	30	28	16.0	94	67.4	42	35.0	28.5	28.35	7.0	40	40	48.4	14.6			12.0
35	70	35	34	18.0	105	77.0	48	40.0	32.15	31.85	8.0	50	50	58.0	17.5			13.0
45	86	43	45	20.5	133	97.0	60	50.0	40.15	39.85	10.0	60	60	70.0	21.0			18.0
55	100	50	53	23.5	159	115.5	70	57.0	48.15	47.85	12.0	75	75	80.0	22.3			19.0
65	126	63	63	31.5	188	139.6	90	76.0	60.15	59.85	15.0	76	70	76.0	11.0			21.0

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm) N_5	$N_6^{\pm 0.5}$		S_2	S_5	S_9	Mass (kg)	Load capacities (N) C dyn.	C_0 stat.	Moments (Nm) M_t dyn.	M_{t0} stat.	M_L dyn.	M_{L0} stat.
15	4.0	10.3		M4	4.4	M2.5-3.5deep	0.15	7 800	13 500	74	130	40	71
20	4.7	13.2		M5	6.0	M3-5 deep	0.40	18 800	24 400	240	310	130	165
25	5.5	15.2		M6	7.0	M3-5 deep	0.55	22 800	30 400	320	430	180	240
30	6.0	17.0		M8	9.0	M3-5 deep	0.90	31 700	41 300	540	720	290	380
35	7.0	20.5		M8	9.0	M3-5 deep	1.20	41 900	54 000	890	1 160	440	565
45	8.0	23.5		M10	14.0	M4-7 deep	2.30	68 100	85 700	1 830	2 310	890	1 130
55	9.0	29.0		M12	16.0	M5-8 deep	3.80	98 200	121 400	3 100	3 860	1 540	1 905
65	16.0	38.5		M16	18.0	M4-7 deep	6.90	160 000	192 700	6 300	7 610	3 160	3 815

30% higher dynamic load capacities and moments

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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner block 1623-

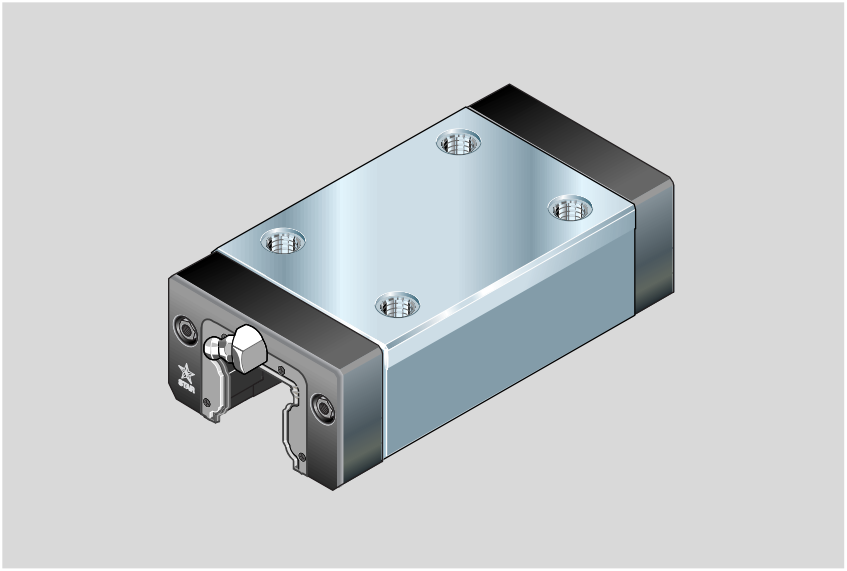
Slimline, long

Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Size 15 to 35 in accuracy class H (clearance and preload 0.02 C) also available as low noise runner blocks with spacer balls.
Dynamic load capacities and moments are reduced by 35%.
(Part numbers 1623-..3-12)



Part numbers

Size	Accuracy class	Part numbers for runner blocks for preload class			
		up to approx. 10 µm clearance	Preload 0.02 C	Preload 0.08 C	Preload 0.13 C
15	N	1623-194-10	1623-114-10		
20	P		1623-812-10	1623-822-10	1623-832-10
	H	1623-893-10	1623-813-10	1623-823-10	
	N	1623-894-10	1623-814-10	1623-824-10	
25	P		1623-212-10	1623-222-10	1623-232-10
	H	1623-293-10	1623-213-10	1623-223-10	
	N	1623-294-10	1623-214-10	1623-224-10	
30	P		1623-712-10	1623-722-10	1623-732-10
	H	1623-793-10	1623-713-10	1623-723-10	
	N	1623-794-10	1623-714-10	1623-724-10	
35	P		1623-312-10	1623-322-10	1623-332-10
	H	1623-393-10	1623-313-10	1623-323-10	
	N	1623-394-10	1623-314-10	1623-324-10	
45	P		1623-412-10	1623-422-10	1623-432-10
	H	1623-493-10	1623-413-10	1623-423-10	
	N	1623-494-10	1623-414-10	1623-424-10	
55	P		1623-512-10*	1623-522-10*	1623-532-10*
	H	1623-593-10*	1623-513-10*	1623-523-10*	
	N	1623-594-10*	1623-514-10*	1623-524-10*	
65	P		1623-612-10*	1623-622-10*	1623-632-10*
	H	1623-693-10*	1623-613-10*	1623-623-10*	
	N	1623-694-10*	1623-614-10*	1623-624-10*	

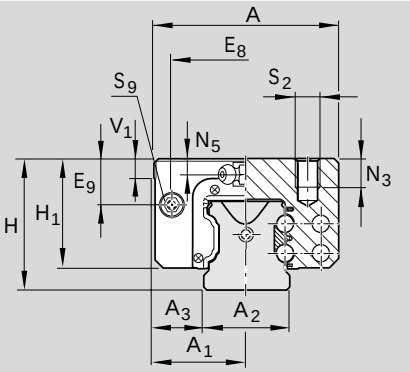
* 30% higher dynamic load capacities on request

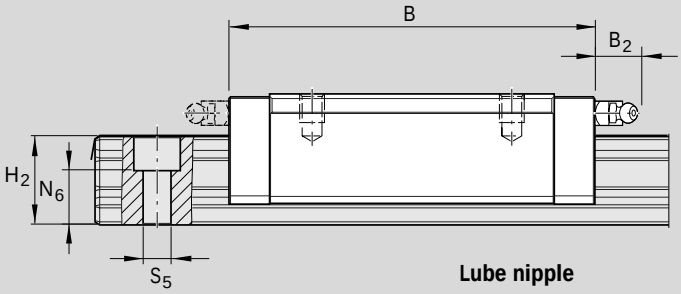
Note on dynamic load capacities and moments (see table)

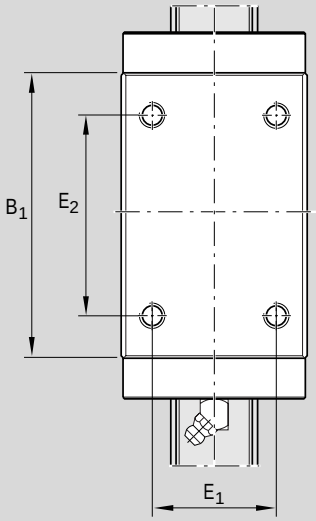
Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

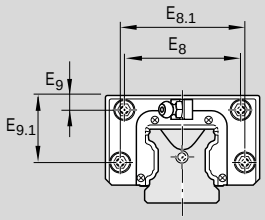
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Size 65

Lube nipple

Size 15 to 20:
Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

Size 25 to 55:
BM 6 DIN 71412
B_2 = 16 mm

Size 65:
BM 8 x 1 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm) $E_{8.1}$	$E_{9.1}$
65	100	53.5

	Dimensions (mm)																	
Size	**A**	**A_1**	**A_2**	**A_3**	**B**	**B_1**	**H**	**H_1**	**H_2[1)]**	**H_2[2)]**	**V_1**	**E_1**	**E_2**	**E_8**	**E_9**			**N_3**
15	34	17	15	9.5	68.5	53.6	24	19.8	16.3	16.2	5.0	26	26	24.55	6.7			6.0
20	44	22	20	12.0	86.0	65.6	30	25.4	20.7	20.55	6.0	32	50	32.4	7.3			7.5
25	48	24	23	12.5	103.0	79.5	36	29.5	24.4	24.25	7.5	35	50	38.3	11.5			9.0
30	60	30	28	16.0	116.0	89.4	42	35.0	28.5	28.35	7.0	40	60	48.4	14.6			12.0
35	70	35	34	18.0	133.0	105.5	48	40.0	32.15	31.85	8.0	50	72	58.0	17.5			13.0
45	86	43	45	20.5	170.0	133.5	60	50.0	40.15	39.85	10.0	60	80	70.0	21.0			18.0
55	100	50	53	23.5	200.0	155.5	70	57.0	48.15	47.85	12.0	75	95	80.0	22.3			19.0
65	126	63	63	31.5	243.0	194.6	90	76.0	60.15	59.85	15.0	76	120	76.0	11.0			21.0

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

								Load capacities (N)		Moments (Nm)			
	Dimensions (mm)						Mass	C	C_0	M_t	M_{t0}	M_L	M_{L0}
Size	**N_5**	**$N_6^{\pm 0.5}$**		**S_2**	**S_5**	**S_9**	**(kg)**	**dyn.**	**stat.**	**dyn.**	**stat.**	**dyn.**	**stat.**
15	4.0	10.3		M4	4.4	M2.5-3.5deep	0.2	10 000	20 200	130	190	98	150
20	4.7	13.2		M5	6.0	M3-5 deep	0.5	24 400	35 200	310	450	225	330
25	5.5	15.2		M6	7.0	M3-5 deep	0.7	30 400	45 500	430	650	345	510
30	6.0	17.0		M8	9.0	M3-5 deep	1.1	40 000	57 800	690	1 000	495	715
35	7.0	20.5		M8	9.0	M3-5 deep	1.7	55 600	81 000	1 200	1 740	830	1 215
45	8.0	23.5		M10	14.0	M4-7 deep	3.1	90 400	128 500	2 440	3 470	1 700	2 425
55	9.0	29.2		M12	16.0	M5-8 deep	4.8	124 200	170 000	3 950	5 400	2 630	3 600
65	16.0	38.5		M16	18.0	M4-7 deep	9.8	211 900	289 000	8 370	11 420	6 000	8 190

30% higher dynamic load capacities and moments

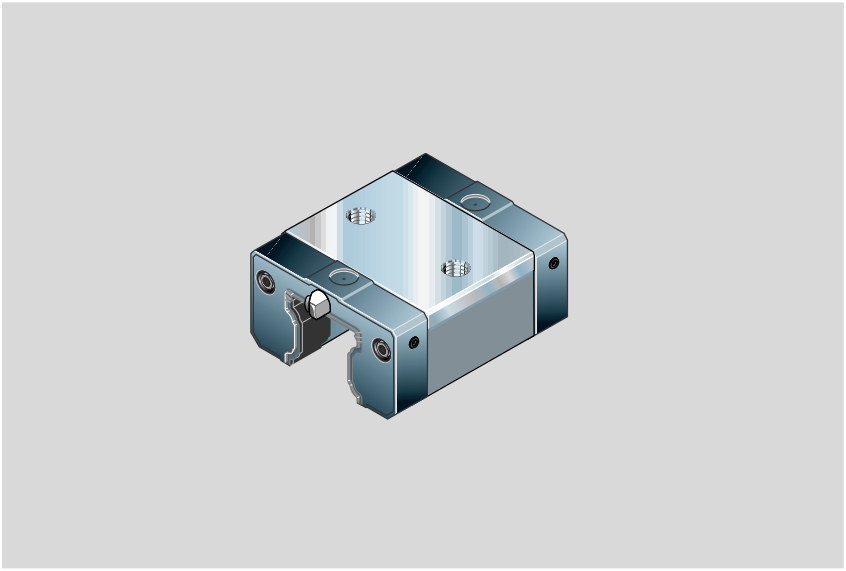
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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner block 1664-

Slimline, short, low profile



Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Part numbers

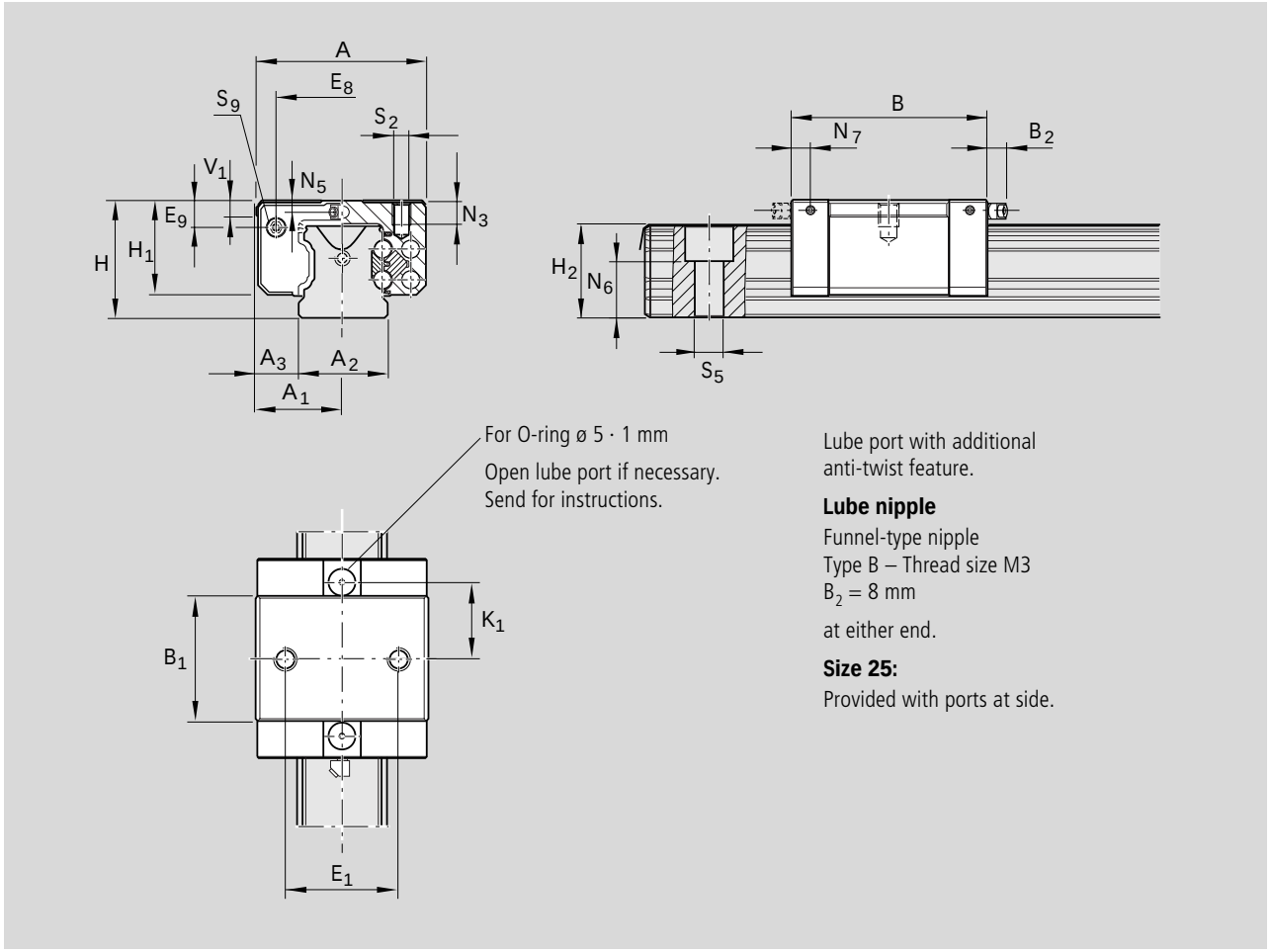
Size	Accuracy class	Part numbers for runner blocks for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
20	H	1664-893-10	1664-813-10
	N	1664-894-10	1664-814-10
25	H	1664-293-10	1664-213-10
	N	1664-294-10	1664-214-10

Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Lube port with additional anti-twist feature.

Lube nipple

Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

at either end.

Size 25:

Provided with ports at side.

Size	Dimensions (mm)																	
	A	A_1	A_2	A_3	B	B_1	H	H_1	H_2[1)]	H_2[2)]	V_1	E_1		E_8	E_9	K_1		N_3
20	42	21	20	11.0	55	31.9	28	23.0	20.7	20.55	6.0	32		30.5	5.6	20.1		6.3
25	48	24	23	12.5	62	38.6	33	26.5	24.4	24.25	7.5	35		38.3	8.5	24.5		7.0

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm)						Mass	Load capacities (N)		Moments (Nm)			
								C	C_0	M_t	M_{t0}	M_L	M_{L0}
	N_5	$N_6^{\pm 0.5}$	N_7	S_2	S_5	S_9	(kg)	dyn.	stat.	dyn.	stat.	dyn.	stat.
20	3.6	13.2	–	M5	6.0	M3-5 deep	0.30	9 600	13 600	120	170	40	58
25	4.1	15.2	6.0	M6	7.0	M3-5 deep	0.40	15 900*	18 200	235	260	82	94

*** 30% higher dynamic load capacity**

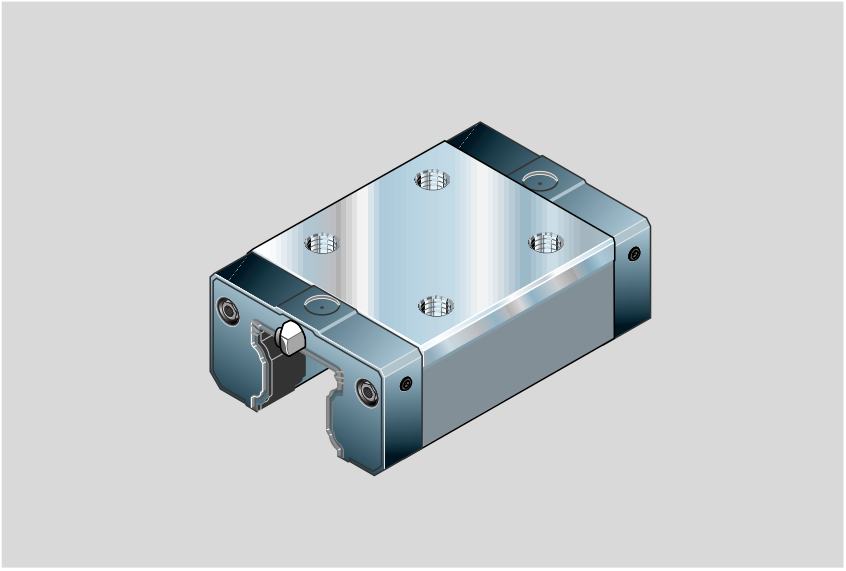
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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner block 1694-

Slimline, low profile



Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Part numbers

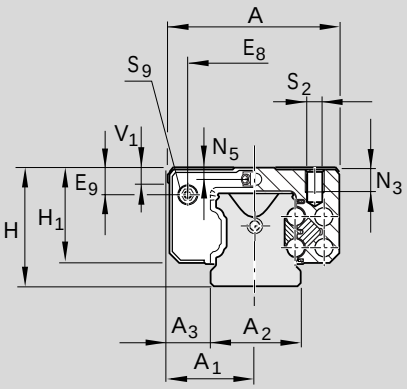
Size	Accuracy class	Part numbers for runner blocks for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
20	H	1694-893-10	1694-813-10
	N	1694-894-10	1694-814-10
25	H	1694-293-10	1694-213-10
	N	1694-294-10	1694-214-10

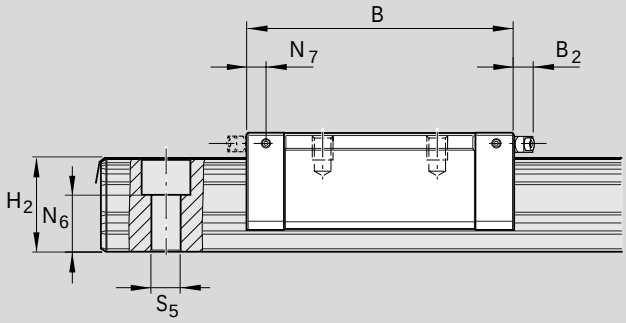
Note on dynamic load capacities and moments (see table)

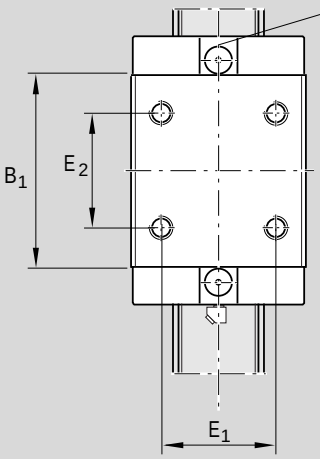
Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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For O-ring ø 5 · 1 mm

Open lube port if necessary.
Send for instructions.

Lube port with additional anti-twist feature.

Lube nipple

Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

at either end.

Size 25:
Provided with ports at side.

Maße (mm)																		
Größe	**A**	**A_1**	**A_2**	**A_3**	**B**	**B_1**	**H**	**H_1**	**H_2[1)]**	**H_2[2)]**	**V_1**	**E_1**	**E_2**	**E_8**	**E_9**	**K_1**		**N_3**
20	42	21	20	11.0	72.5	49.6	28	23.0	20.7	20.55	6.0	32	32	30.5	5.6	13.0		6.3
25	48	24	23	12.5	81.0	57.8	33	26.5	24.4	24.25	7.5	35	35	38.3	8.5	16.6		7.0

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

								Load capacities (N)		Moments (Nm)			
	Dimensions (mm)						Mass	C	C_0	M_t	M_{t0}	M_L	M_{L0}
Size	**N_5**	**$N_6^{\pm 0.5}$**	**N_7**	**S_2**	**S_5**	**S_9**	**(kg)**	**dyn.**	**stat.**	**dyn.**	**stat.**	**dyn.**	**stat.**
20	3.6	13.2	–	M5	6.0	M3-5 deep	0.40	14 500	24 400	190	310	100	165
25	4.1	15.2	6.0	M6	7.0	M3-5 deep	0.55	22 800*	30 400	320	430	180	240

*** 30% higher dynamic load capacity**

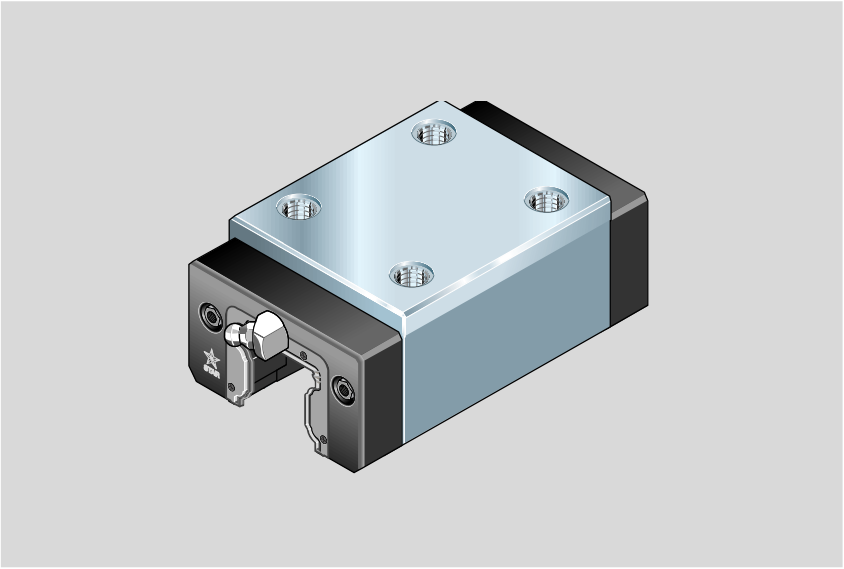
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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner block 1621-

Slimline, high



Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Part numbers

Size	Accuracy class	Part numbers for runner blocks for preload class			
		up to approx. 10 µm clearance	Preload 0.02 C	Preload 0.08 C	Preload 0.13 C
15	P		1621-112-10	1621-122-10	1621-132-10
	H	1621-193-10	1621-113-10	1621-123-10	
	N	1621-194-10	1621-114-10	1621-124-10	
25	P		1621-212-10	1621-222-10	1621-232-10
	H	1621-293-10	1621-213-10	1621-223-10	
	N	1621-294-10	1621-214-10	1621-224-10	
30	P		1621-712-10	1621-722-10	1621-732-10
	H	1621-793-10	1621-713-10	1621-723-10	
	N	1621-794-10	1621-714-10	1621-724-10	
35	P		1621-312-10	1621-322-10	1621-332-10
	H	1621-393-10	1621-313-10	1621-323-10	
	N	1621-394-10	1621-314-10	1621-324-10	
45	P		1621-412-10	1621-422-10	1621-432-10
	H	1621-493-10	1621-413-10	1621-423-10	
	N	1621-494-10	1621-414-10	1621-424-10	
55	P		1621-512-10*	1621-522-10*	1621-532-10*
	H	1621-593-10*	1621-513-10*	1621-523-10*	
	N	1621-594-10*	1621-514-10*	1621-524-10*	

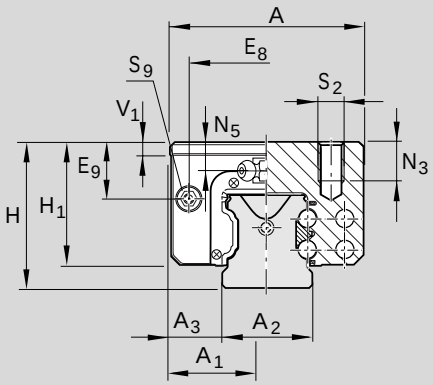
* 30% higher dynamic load capacities on request

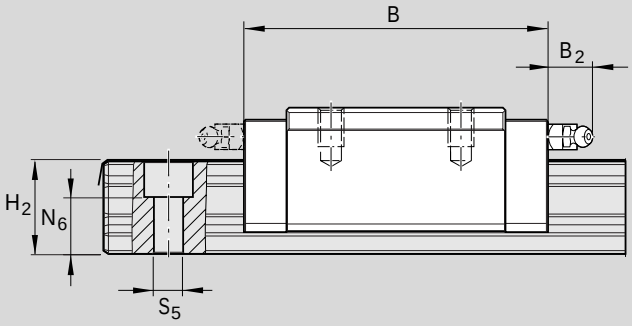
Note on dynamic load capacities and moments (see table)

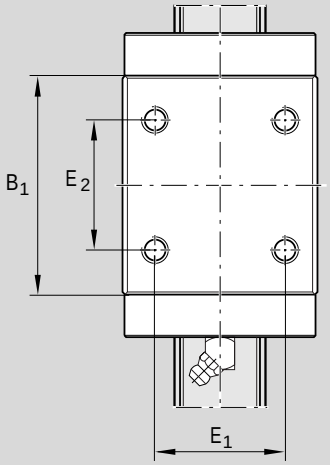
Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Lube nipple

Size 15:
Funnel-type nipple
Type B – Thread size M3
B_2 = 8 mm

Size 25 to 55:
BM 6 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm) A	A_1	A_2	A_3	B	B_1	H	H_1	H_2[1)]	H_2[2)]	V_1	E_1	E_2	E_8	E_9			N_3
15	34	17	15	9.5	54.0	39.2	28	23.8	16.3	16.20	5.0	26	26	24.55	10.7			6
25	48	24	23	12.5	81.0	57.8	40	33.5	24.4	24.25	7.5	35	35	38.3	15.5			9
30	60	30	28	16.0	94.0	67.4	45	38.0	28.5	28.35	7.0	40	40	48.4	17.6			12
35	70	35	34	18.0	105.0	77.0	55	47.0	32.15	31.85	8.0	50	50	58.0	24.5			13
45	86	43	45	20.5	133.0	97.0	70	60.0	40.15	39.85	10.0	60	60	70.0	31.0			18
55	100	50	53	23.5	159.0	115.5	80	67.0	48.15	47.85	12.0	75	75	80.0	32.3			19

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm) N_5	$N_6^{\pm 0.5}$		S_2	S_5	S_9	Mass (kg)	Load capacities (N) C dyn.	C_0 stat.	Moments (Nm) M_t dyn.	M_{t0} stat.	M_L dyn.	M_{L0} stat.
15	8.0	10.3		M4	4.4	M2.5-3.5deep	0.20	7 800	13 500	74	130	40	71
25	9.5	15.2		M6	7.0	M3-5 deep	0.65	22 800	30 400	320	430	180	240
30	9.0	17.0		M8	9.0	M3-5 deep	1.00	31 700	41 300	540	720	290	380
35	14.0	20.5		M8	9.0	M3-5 deep	1.50	41 900	54 000	890	1 160	440	565
45	18.0	23.5		M10	14.0	M4-7 deep	3.00	68 100	85 700	1 830	2 310	890	1 130
55	19.0	29.0		M12	16.0	M5-8 deep	4.70	98 200	121 400	3 100	3 860	1 540	1 905

30% higher dynamic load capacities and moments

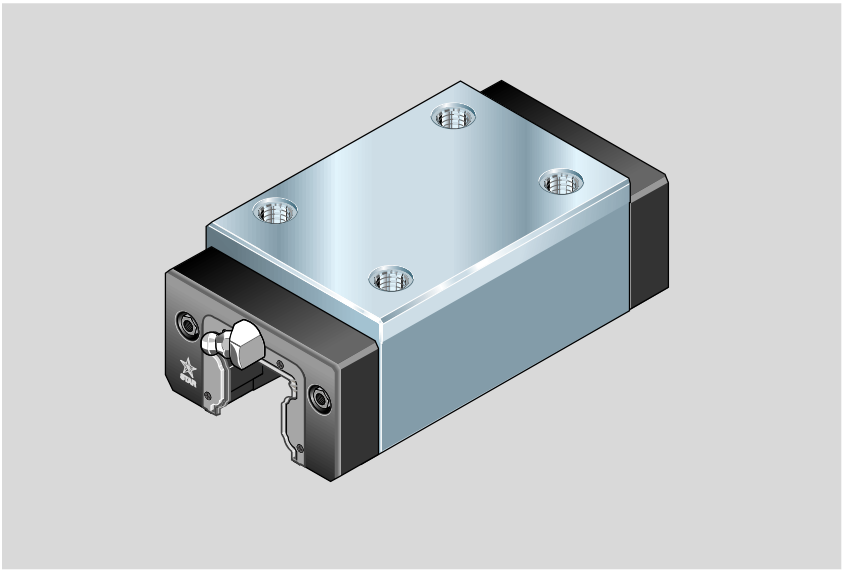
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STAR – Ball Rail® Systems
Runner Blocks, Steel Version

Runner block 1624-

Slimline, high, long



Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating (part numbers 16..-..4-30),
– with low friction seals (part numbers 16..-..4-11).

Part numbers

Size	Accuracy class	Part numbers for runner blocks for preload class			
		up to approx. 10 µm clearance	Preload 0.02 C	Preload 0.08 C	Preload 0.13 C
25	P		1624-212-10	1624-222-10	1624-232-10
	H	1624-293-10	1624-213-10	1624-223-10	
	N	1624-294-10	1624-214-10	1624-224-10	
30	P		1624-712-10	1624-722-10	1624-732-10
	H	1624-793-10	1624-713-10	1624-723-10	
	N	1624-794-10	1624-714-10	1624-724-10	
35	P		1624-312-10	1624-322-10	1624-332-10
	H	1624-393-10	1624-313-10	1624-323-10	
	N	1624-394-10	1624-314-10	1624-324-10	
45	P		1624-412-10	1624-422-10	1624-432-10
	H	1624-493-10	1624-413-10	1624-423-10	
	N	1624-494-10	1624-414-10	1624-424-10	
55	P		1624-512-10*	1624-522-10*	1624-532-10*
	H	1624-593-10*	1624-513-10*	1624-523-10*	
	N	1624-594-10*	1624-514-10*	1624-524-10*	

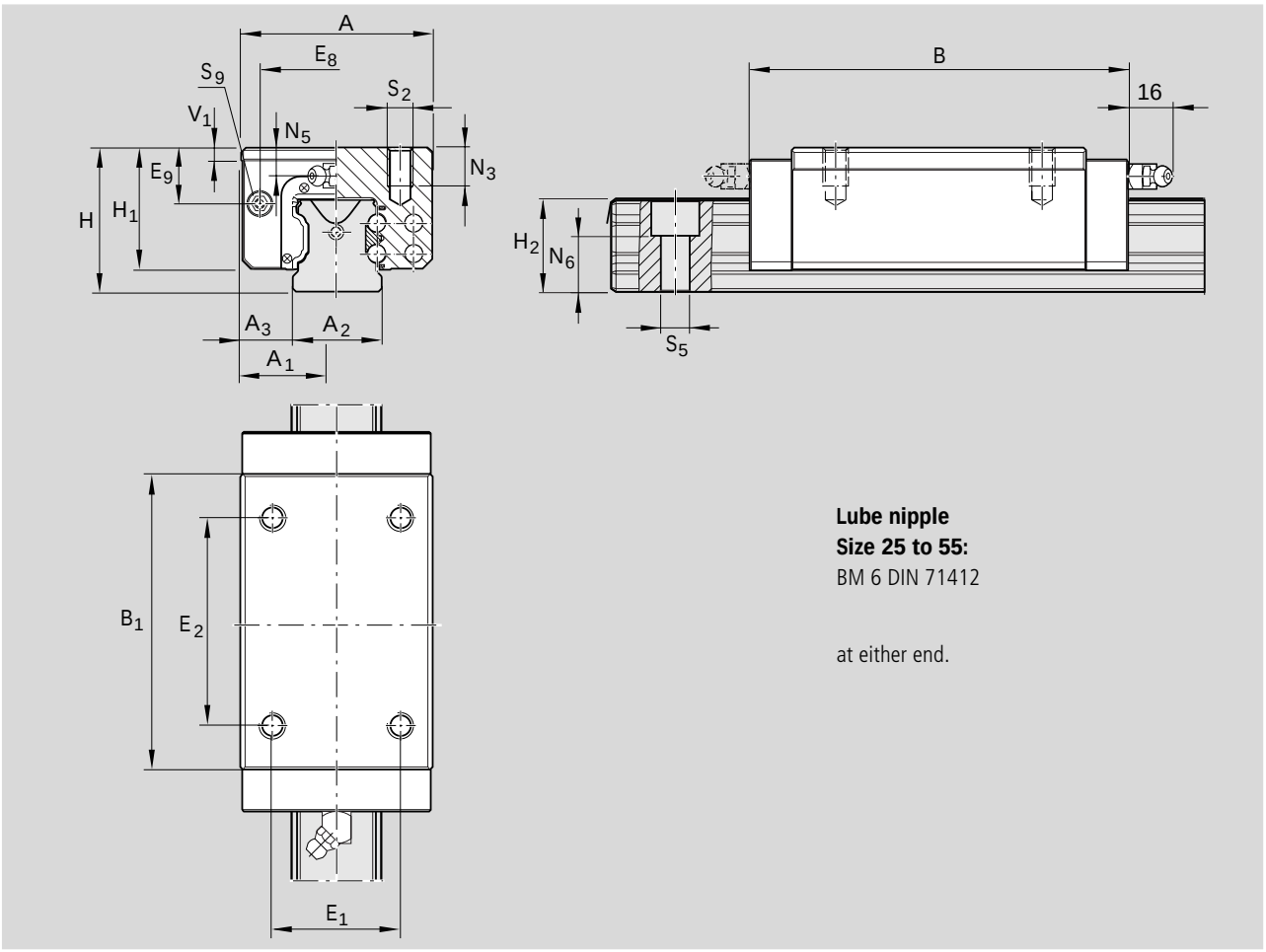
* 30% higher dynamic load capacities on request

Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Lube nipple
Size 25 to 55:
BM 6 DIN 71412

at either end.

Size	Dimensions (mm)																	
	A	A_1	A_2	A_3	B	B_1	H	H_1	H_2 [1)]	H_2 [2)]	V_1	E_1	E_2	E_8	E_9			N_3
25	48	24	23	12.5	103	79.5	40	33.5	24.4	24.25	7.5	35	50	38.3	15.5			9
30	60	30	28	16.0	116	89.4	45	38.0	28.5	28.35	7.0	40	60	48.4	17.6			12
35	70	35	34	18.0	133	105.5	55	47.0	32.15	31.85	8.0	50	72	58.0	24.5			13
45	86	43	45	20.5	170	133.5	70	60.0	40.15	39.85	10.0	60	80	70.0	31.0			18
55	100	50	53	23.5	200	155.5	80	67.0	48.15	47.85	12.0	75	95	80.0	32.3			19

[1)] Dimension H_2 with Rail Seal® cover strip strip

[2)] Dimension H_2 without Rail Seal® cover

Size	Dimensions (mm)						Mass (kg)	Load capacities (N)		Moments (Nm)			
	N_5	$N_6^{\pm 0.5}$		S_2	S_5	S_9		C dyn.	C_0 stat.	M_t dyn.	M_{t0} stat.	M_L dyn.	M_{L0} stat.
25	9.5	15.2		M6	7.0	M3-5 deep	0.85	30 400	45 500	430	650	345	510
30	9.0	17.0		M8	9.0	M3-5 deep	1.25	40 000	57 800	690	1 000	495	715
35	14.0	20.5		M8	9.0	M3-5 deep	2.10	55 600	81 000	1 200	1 740	830	1 215
45	18.0	23.5		M10	14.0	M4-7 deep	4.00	90 400	128 500	2 440	3 470	1 700	2 425
55	19.0	29.0		M12	16.0	M5-8 deep	6.00	124 200	170 000	3 950	5 400	2 630	3 600

30% higher dynamic load capacities and moments

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STAR – Ball Rail® Systems
Product Overview – Runner Blocks, Aluminum Version

STAR Ball Rail® Systems with aluminum runner blocks were specifically devel-oped for use in industrial robots and general purpose machines calling for compact, rolling-element linear motion guideways and are available in different accuracy classes, each with high load capacity and high rigidity.

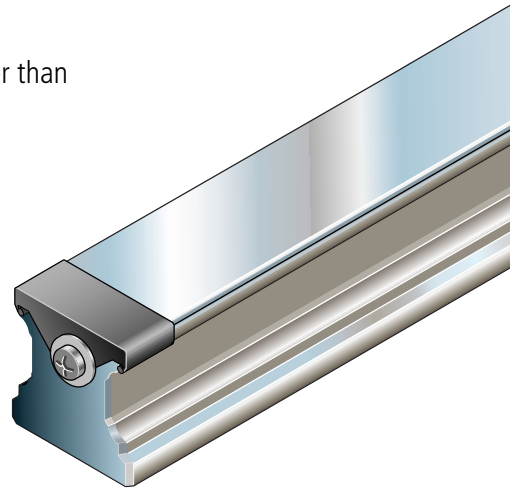
These compact and weight-saving assemblies are available in 6 common sizes and offer the same high dynamic load capacities in all four main load directions.

Make up your own compact linear motion guideways from interchangeable standard stock elements...

STAR manufactures its guide rails and runner blocks with such high precision, especially in the ball track zone, that each individual component element can be replaced by another at any time. This makes infinite combinations possible within each accuracy class.
Each element can be individually ordered and separately stocked.

Both sides of the guide rail can be used as reference edges.
The runner block is simply pushed onto the rail.

- Lube ports possible at either end for added ease of maintenance
- Very low weight: 60% lighter than the equivalent steel version
- Greater permissible parallelism offset as well as greater permissible vertical and horizontal offset of mounting surfaces
- Guide rails in accuracy class N also available with surface protection
- End face mounting holes for attachment of bellows or scraper plates
- Accuracy classes H and N can be combined with any of the rails in each accuracy class
- For mounting from above or below

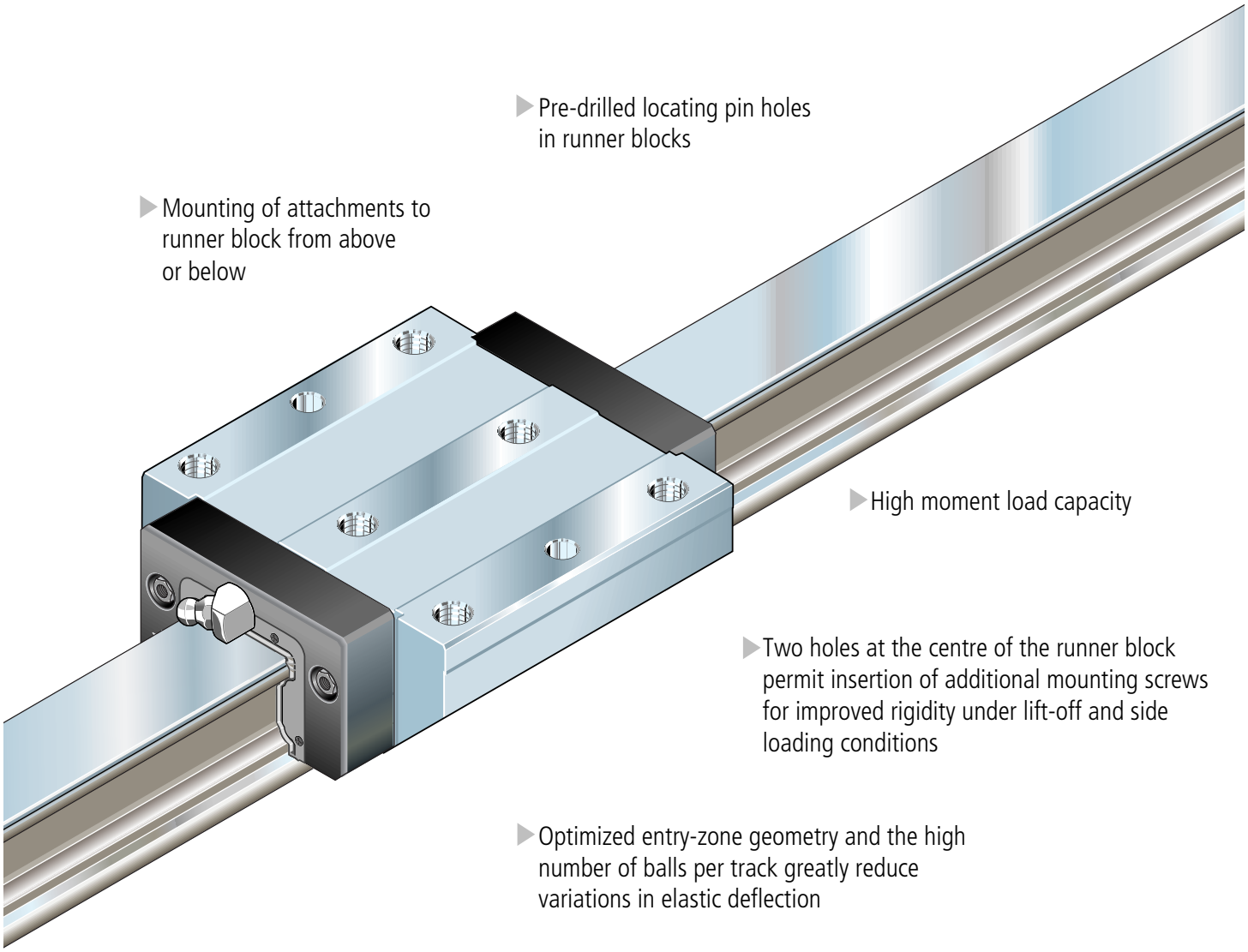


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30% higher dynamic load capacities and moments than previous design.

- extends service life by a factor of 2.2
- field-proven
- identical in all four main load directions



Pre-drilled locating pin holes in runner blocks

Mounting of attachments to runner block from above or below

High moment load capacity

Two holes at the centre of the runner block permit insertion of additional mounting screws for improved rigidity under lift-off and side loading conditions

Optimized entry-zone geometry and the high number of balls per track greatly reduce variations in elastic deflection

Smooth, light running due to optimized ball recirculation and ideal track geometry

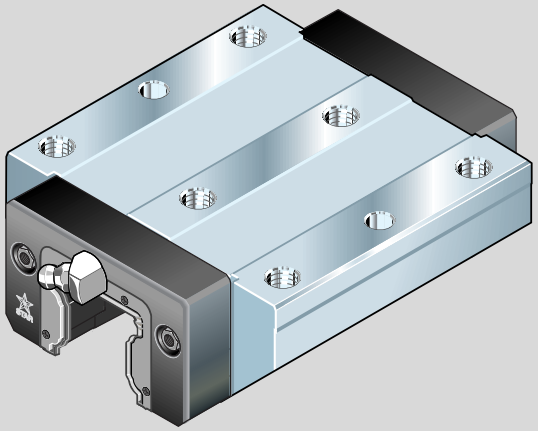
Proven Rail Seal® cover strip for guide rail mounting holes:

- One cover for all holes
- Material: corrosion resistant spring steel to DIN 17230 / EN 10088
- Easy clip-on mounting

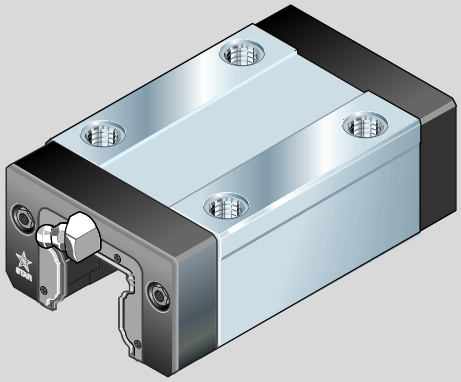
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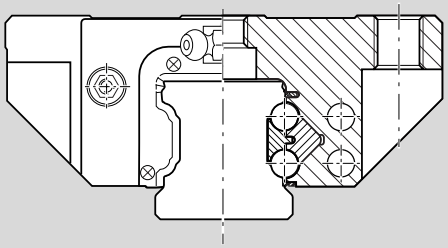
STAR – Ball Rail® Systems
Product Description – Runner Blocks, Aluminum Version

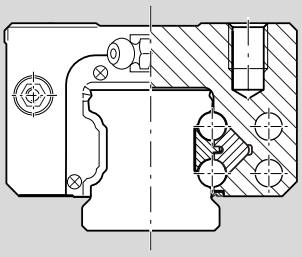


Standard width



Slimline





The Ball Rail® System consists of:

– A guide rail with all surfaces ground and ball track zones hardened

– A high-strength aluminum alloy runner block with
  - hardened and ground steel load bearing plates with ball tracks
  - cage designed for optimum ball recirculation
  - integral all-round sealing of all tracks
  - bearing steel balls

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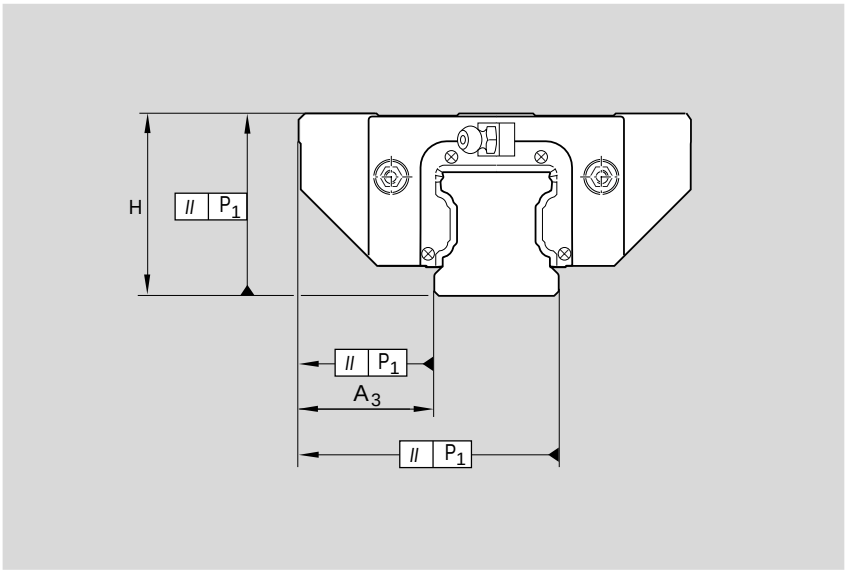
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Technical Data – Runner Blocks, Aluminum Version

Accuracy classes and their tolerances (µm)

STAR Ball Rail® Systems with runner blocks in aluminum are offered in two different accuracy classes.

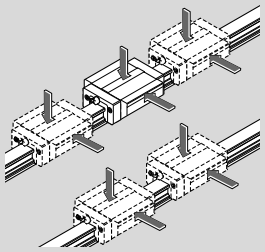
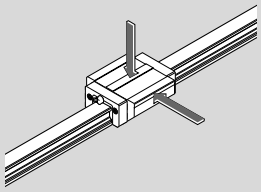
However, these can be combined with guide rails of all accuracy classes.



Built-in interchangeability through precision machining

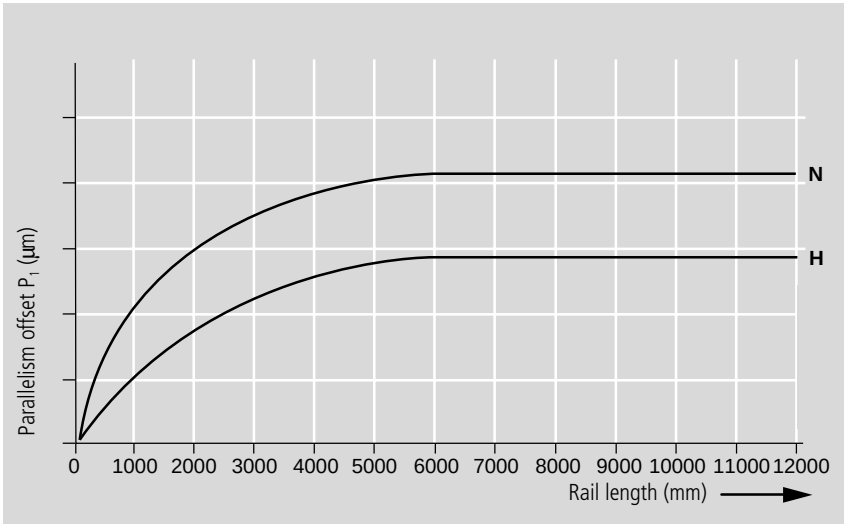
STAR manufactures its guide rails and runner blocks with such high precision, especially in the ball track zone, that each individual component element can be replaced by another at any time.

A runner block can be used without problems on various guide rails of the same size, for example.
This applies equally to the use of different runner blocks on one and the same guide rail.

Accuracy classes	Dimensional tolerances H and A_3 (µm) H	A_3	Max difference in dimensions H and A_3 on the same rail Δ H, Δ A_3 (µm)
H	± 40	± 20	15
N	± 100	± 40	30
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 Ball Rail System in service

Measured at middle of runner block



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STAR – Ball Rail® Systems
Technical Data – Runner Blocks, Aluminum Version

Rigidity of the Ball Rail® System at 0.02 C preload

**Runner block 1631-
Standard width**

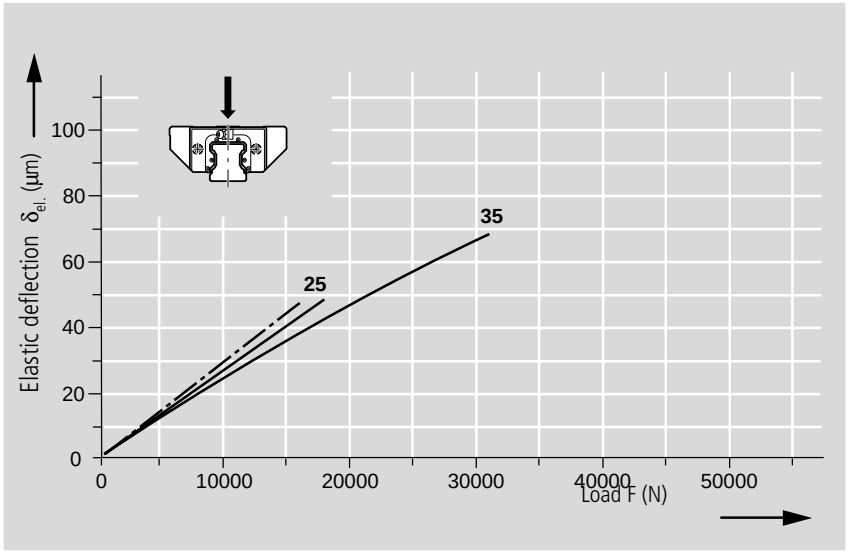
——————— **measured values**

Runner block mounted with 6 screws, screw strength 8.8

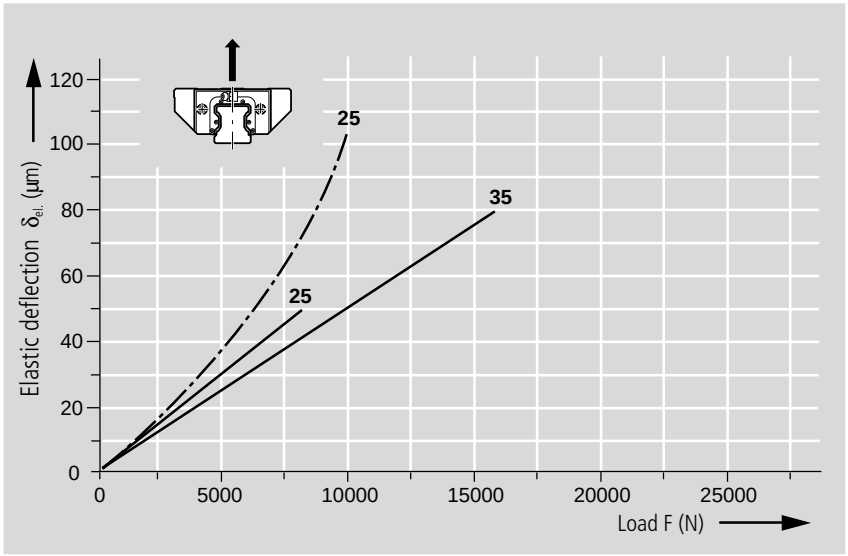
– - —— - —— - —— - – **measured values**

Runner block mounted with 4 screws, screw strength 8.8

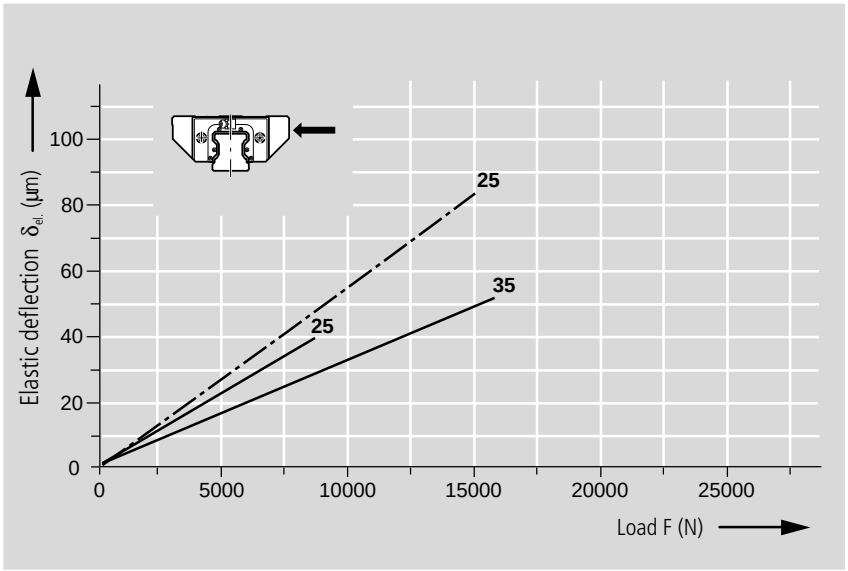
1. Down load



2. Lift-off load



3. Side load

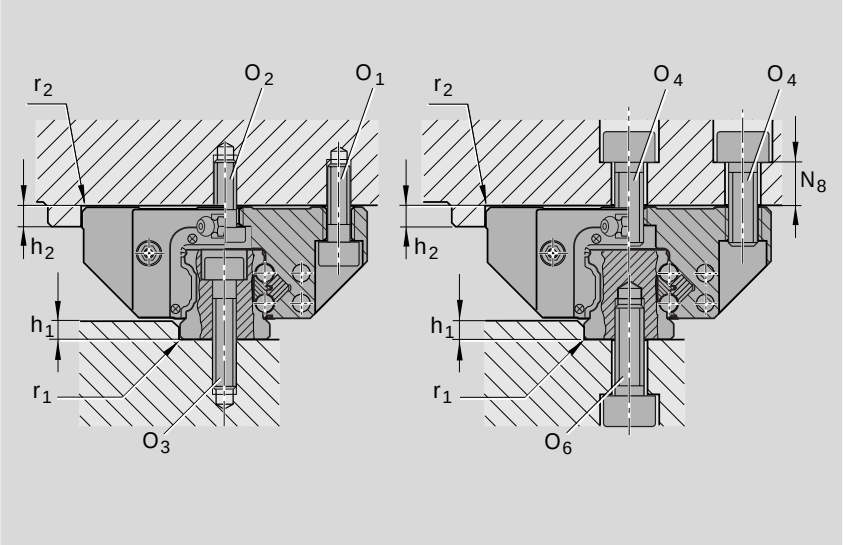


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Mounting Instructions – Aluminum Runner Blocks

Reference edges, corner radii, mounting screw sizes and tightening torque



Runner block 1631-

– Standard width

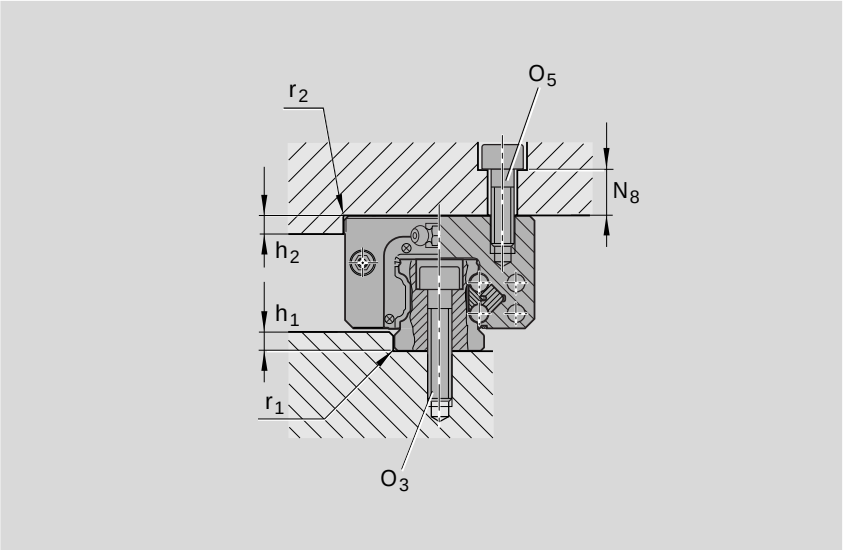
Guide rails

left:
– For mounting from above 1605, 1645-

right:
– For mounting from below 1607, 1647-

Runner block 1632-

– Slimline



Guide rails

– For mounting from above 1605-, 1645-

Note

The indicated combinations represent examples. It is on principle possible to combine any runner block with all the offered guide rail types.

Dimensions and recommended limits for side load if no additional lateral retention is provided

Size	h_1 min. (mm)	h_1 max. (mm)	r_1 max. (mm)	h_2 (mm)	r_2 max. (mm)	O_1 DIN 912 4 pcs.	O_2 DIN 6912 2 pcs.	O_4 DIN 912 6 pcs.	O_5 DIN 912 4 pcs.	O_3 DIN 912	O_6 DIN 912	N_8 (mm)
15	2.5	3.5	0.4	4	0.6	M4x12	M4x10	M5x12	M4x12	M4x20	M5x12	6
25	3.0	5.0	0.8	5	0.8	M6x20	M6x16	M8x20	M6x18	M6x30	M6x20	10
30	3.0	5.0	0.8	6	0.8	M8x25	M8x16	M10x20	M8x20	M8x30	M8x20	10
35	3.5	6.0	0.8	6	0.8	M8x25	M8x20	M10x25	M8x25	M8x35	M8x25	13

Screw strength class	Runner blocks				Guide rails		
8.8	0.11 C	0.15 C[1)]	0.23 C	0.11C	0.06 C	0.06 C	

[1)] When mounting with 4 O_1 screws and 2 O_2 screws

Tightening torque of the mounting screws

		M4	M5	M6	M8	M10	M12	M14	M16
Nm	**8.8**	2.7	5.5	9.5	23	46	80	125	195

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STAR – Ball Rail® Systems
Mounting Instructions – Aluminum Runner Blocks

Locating pins

If the recommended values for permissible side forces are exceeded, the runner block must be additionally fixed by means of locating pins or reference edges.

Possible pin types

- Taper pin (hardened) or
- Straight pin DIN 6325

Note

Runner block Standard width 1631-:

Pin holes already pedrilled as illustrated

Runner block Slimline 1632-:

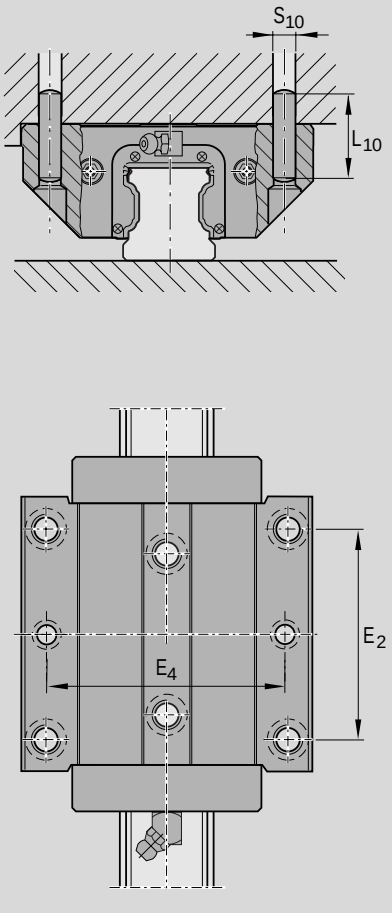
Recommended dimensions for the pin holes are indicated in the drawings and table.

For both types of runner blocks:

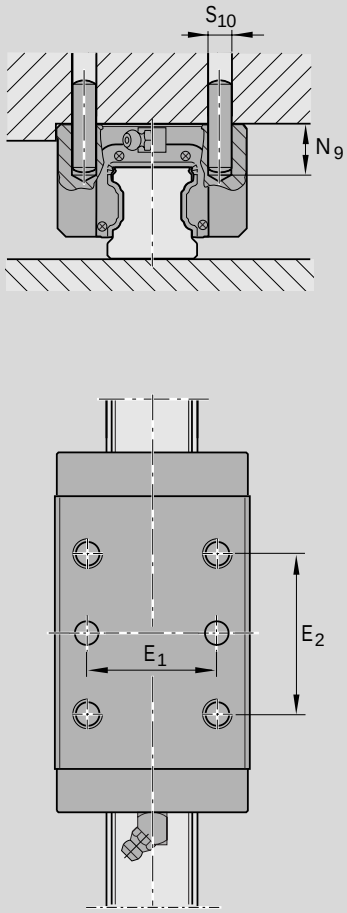
If the locating pins have to be driven in at another point (e.g. when the lube port is central), dimension E_2 must not be exceeded in the longitudinal direction (for dimension E_2, see the tables for the individual types).

Observe dimensions E_1 and E_4!

Only prepare the pin holes after the installation is complete (see also "General Mounting Instructions").



Standard width 1631-



Slimline 1632-

Size	Taper pin (hardened) Straight pin (DIN 6325)		Dimensions (mm)		
	S_{10}	L_{10}	E_1	E_4	N_9 (max)
15	4	18	26	38	6.0
25	6	32	35	55	9.0
30	8	36	40	70	12.0
35	8	40	50	80	13.0

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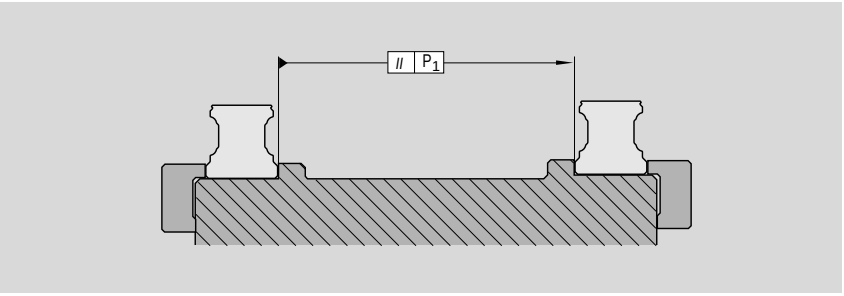
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Parallelism of the rails after mounting

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. If the tolerances given in the table are not exceeded, reduction in travel life will as a rule be negligible.

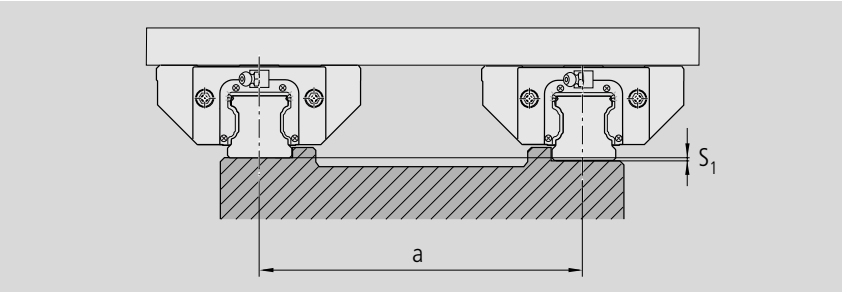
The given values apply to precision mounting. For standard mounting, double the stated values can be used.



Size	Parallelism offset P_1 (mm)	
	up to approx. 10 µm clearance	Preload 0.02 C
15	0.021	0.014
25	0.026	0.017
30	0.029	0.019
35	0.035	0.022

Vertical offset

Provided the permissible vertical offset S_1 and S_2 is not exceeded, any resultant reduction in travel life will as a rule be negligible.



Permissible vertical offset in the transverse direction

The permissible vertical offset S_1 includes the tolerance for dimension H in accordance with the table given in the "Technical Data" section.

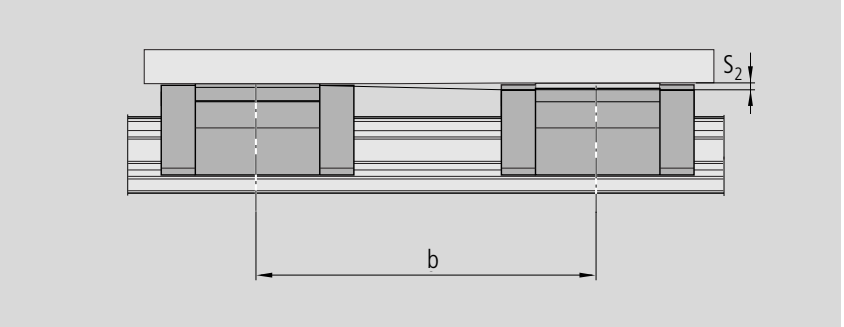
$$S_1 = a \cdot Y$$

S_1 = Permissible vertical offset (mm)
a = Distance between rails (mm)
Y = Calculation factor

Calculation factor	for preload class	
	up to approx. 10 µm clearance	Preload 0.02 C
Y	$7 \cdot 10^{-4}$	$5 \cdot 10^{-4}$

Permissible vertical offset in the longitudinal direction

The permissible vertical offset S_2 takes into account the tolerance for the "max. difference in dimensions H on the same rail" according to the table given in the "Technical Data" section.



$$S_2 = b \cdot 6 \cdot 10^{-5}$$

S_2 = Permissible vertical offset (mm)
b = Distance between runner blocks (mm)

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STAR – Ball Rail® Systems
Runner Blocks, Aluminum Version

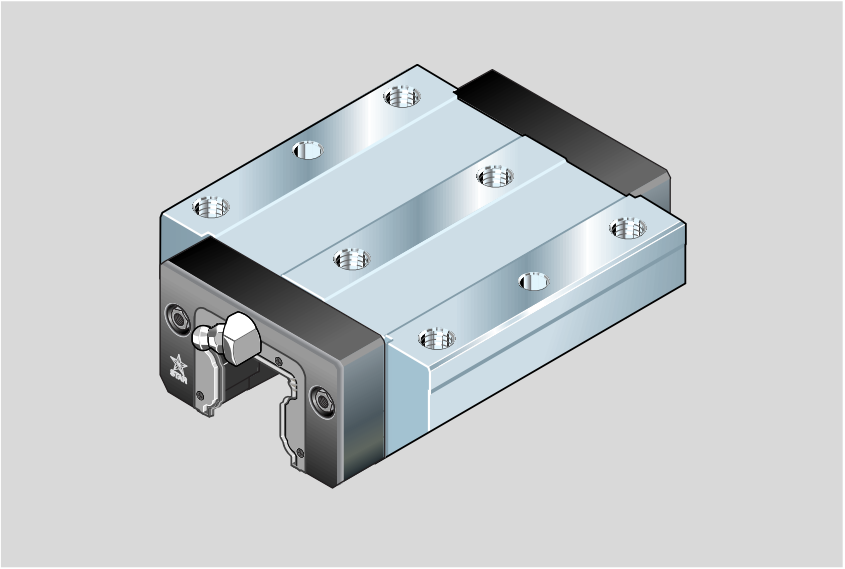
Runner block 1631-

Standard width

Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are available:

– with low-friction seals (Part numbers 16..-..4-11).



Part numbers

Sizes 45 and 55 available as special versions.

Size	Accuracy class	Part numbers for runner blocks for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
15	H	1631-193-10	1631-113-10
	N	1631-194-10	1631-114-10
25	H	1631-293-10	1631-213-10
	N	1631-294-10	1631-214-10
30	H	1631-793-10	1631-713-10
	N	1631-794-10	1631-714-10
35	H	1631-393-10	1631-313-10
	N	1631-394-10	1631-314-10

Permissible load

When calculating the service life, use the maximum load capacity figure.

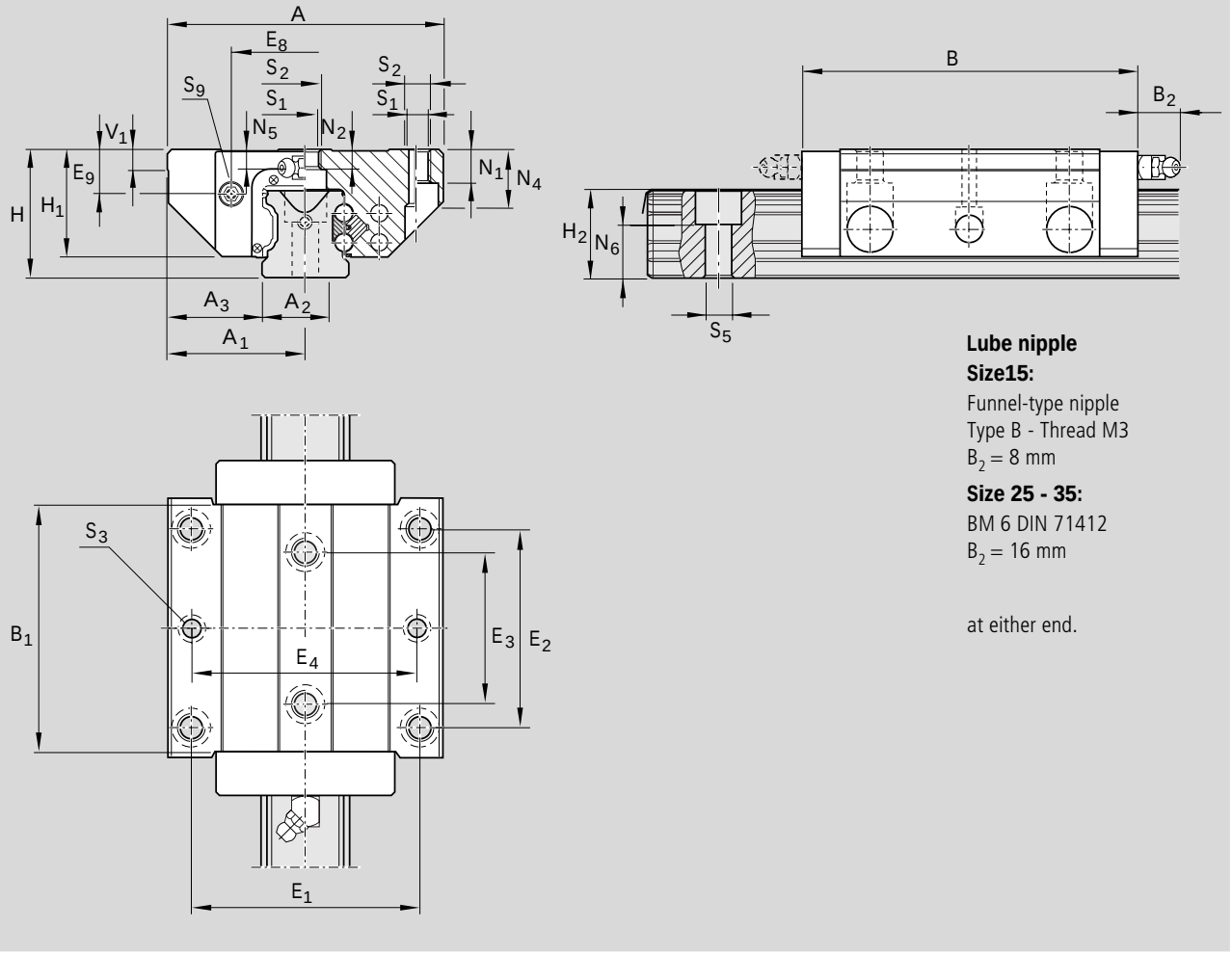
The permissible load is only limited for statistical purposes (see table).

Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Lube nipple
Size15:
Funnel-type nipple
Type B - Thread M3
B_2 = 8 mm
Size 25 - 35:
BM 6 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm)																			
	A	A_1	A_2	A_3	B	B_1	H	H_1	H_2 [1]	H_2 [2]	V_1	E_1	E_2	E_3	E_4	E_8	E_9	N_1	N_2	N_4
15	47	23.5	15	16.0	54	39.2	24	19.8	16.3	16.20	5.0	38	30	26	38	24.55	6.7	5	4.4	10
25	70	35.0	23	23.5	81.0	57.8	36	29.5	24.4	24.25	7.5	57	45	40	55	38.3	11.5	9	7.0	18
30	90	45.0	28	31.0	94.0	67.4	42	35.0	28.5	28.35	7.0	72	52	44	70	48.4	14.6	11	8.0	18
35	100	50.0	34	33.0	105.0	77.0	48	40.0	32.15	31.85	8.0	82	62	52	80	58.0	17.5	12	10.2	21

[1] Dimension H_2 with Rail Seal® cover strip

[2] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm)							Mass (kg)	Load capacities (N) C dyn.	Permissible load (N) F_{max}	Moments (Nm) M_t dyn.	M_t max.	M_L dyn.	M_L max.
	N_5	$N_6^{\pm 0.5}$	S_1	S_2	S_3	S_5	S_9							
15	4.0	10.3	4.4	M5	3.7	4.4	M2.5-3.5deep	0.15	7 800	3 000	74	29	40	16
25	5.5	15.2	6.8	M8	5.7	7.0	M3-5 deep	0.35	22 800	8 800	320	125	180	70
30	6.0	17.0	8.6	M10	7.7	9.0	M3-5 deep	0.45	31 700	12 200	540	210	290	110
35	7.0	20.5	8.6	M10	7.7	9.0	M3-5 deep	0.80	41 900	16 200	890	345	440	170

30% higher dynamic load capacities and moments

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STAR – Ball Rail® Systems
Runner Blocks, Aluminum Version

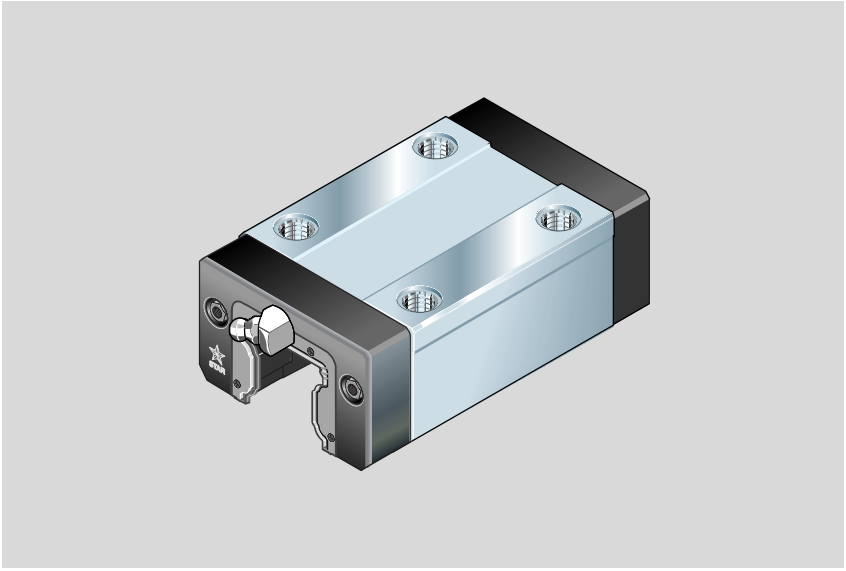
Runner block 1632-

Slimline

Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are available:

– with low-friction seals (Part numbers 16..-..4-11).



Part numbers

Sizes 45 and 55 available as special versions.

Size	Accuracy class	Part numbers for runner blocks for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
15	H	1632-193-10	1632-113-10
	N	1632-194-10	1632-114-10
25	H	1632-293-10	1632-213-10
	N	1632-294-10	1632-214-10
30	H	1632-793-10	1632-713-10
	N	1632-794-10	1632-714-10
35	H	1632-393-10	1632-313-10
	N	1632-394-10	1632-314-10

Permissible load

When calculating the service life, use the maximum load capacity figure.

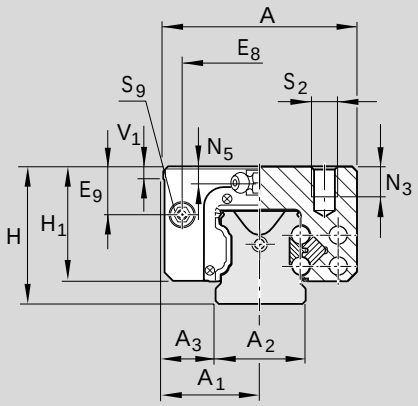
The permissible load is only limited for statistical purposes (see table).

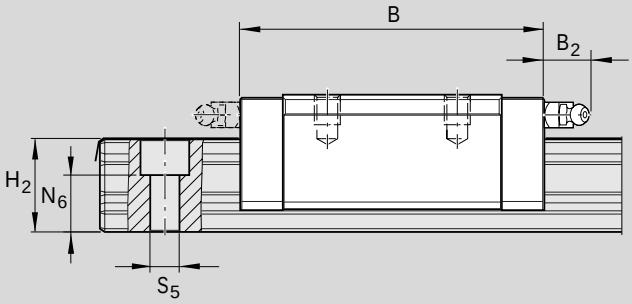
Note on dynamic load capacities and moments (see table)

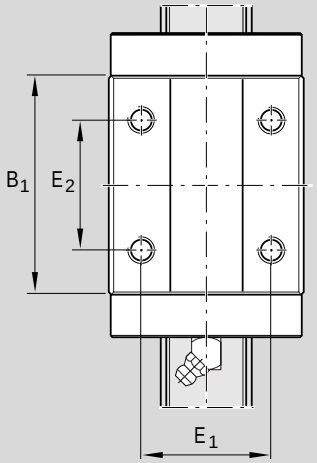
Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26.

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Lube nipple

Size15:

Funnel-type nipple
Type B - Thread M3
B_2 = 8 mm

Size 25 - 35:

BM 6 DIN 71412
B_2 = 16 mm

at either end.

Size	Dimensions (mm)																	
	A	A_1	A_2	A_3	B	B_1	H	H_1	H_2[1)]	H_2[2)]	V_1	E_1	E_2	E_8	E_9			N_3
15	34	17	15	9.5	53.5	39.2	24	19.8	16.3	16.20	5.0	26	26	-	-			6
25	48	24	23	12.5	81.0	57.8	36	29.5	24.4	24.25	7.5	35	35	38.3	11.5			9
30	60	30	28	16.0	94.0	67.4	42	35.0	28.5	28.35	7.0	40	40	48.4	14.6			12
35	70	35	34	18.0	105.0	77.0	48	40.0	32.15	31.85	8.0	50	50	58.0	17.5			13

[1)] Dimension H_2 with Rail Seal® cover strip

[2)] Dimension H_2 without Rail Seal® cover strip

Size	Dimensions (mm)						Mass	Load capacities (N)	Permissible load (N)	Moments (Nm)			
	N_5	$N_6^{\pm 0.5}$		S_2	S_5	S_9	(kg)	C dyn.	F_{max}	M_t dyn.	M_t max.	M_L dyn.	M_L max.
15	4.0	10.3		M4	4.4	M2.5-3.5deep	0.08	7 800	3 000	74	29	40	16
25	5.5	15.2		M6	7.0	M3-5 deep	0.25	22 800	8 800	320	125	180	70
30	6.0	17.0		M8	9.0	M3-5 deep	0.45	31 700	12 200	540	290	290	110
35	7.0	20.5		M8	9.0	M3-5 deep	0.60	41 900	16 200	890	440	440	170

30% higher dynamic load capacities and moments

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STAR – Ball Rail® Systems
Technical Data – Wide Ball Rail® Systems

Rigidity of the wide Ball Rail® System at 0.02 C preload

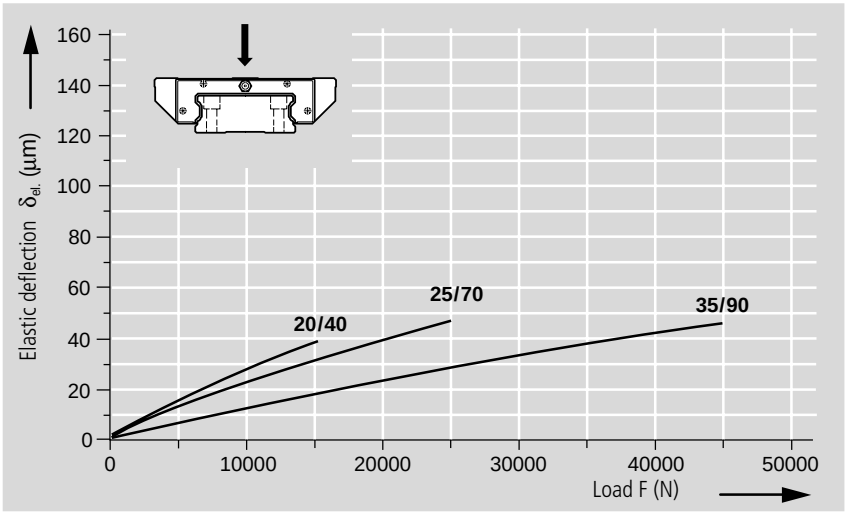
**Runner block 1671-
Wide**

measured values

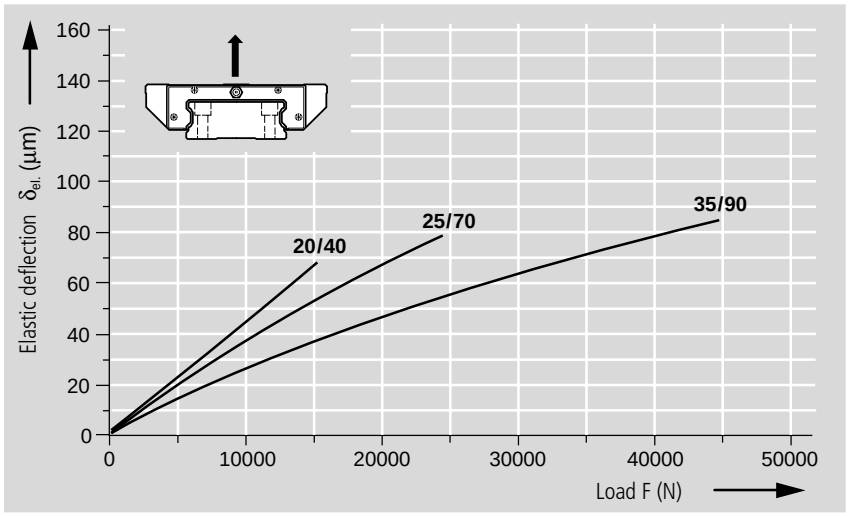
Runner block mounted with six screws:

– 4 outer screws of strength class 12.9
– 2 centerline screws of strength class 8.8

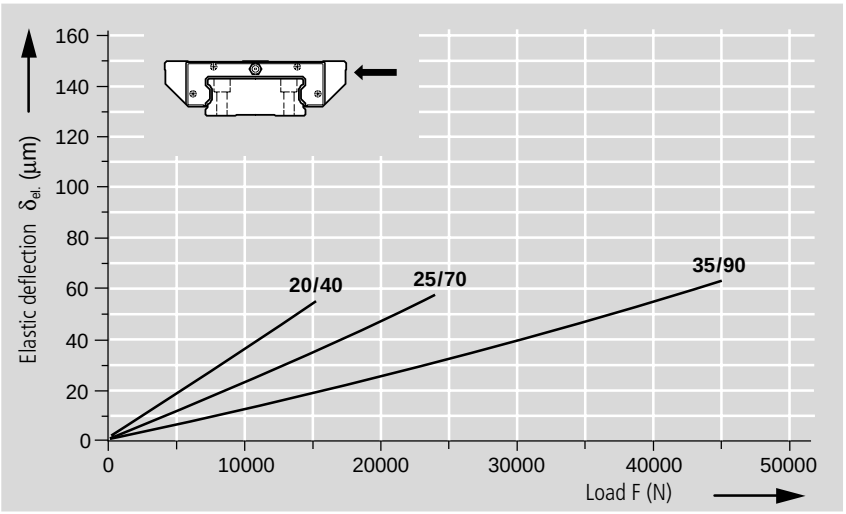
1. Down load



2. Lift-off load



3. Side load



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Mounting Instructions

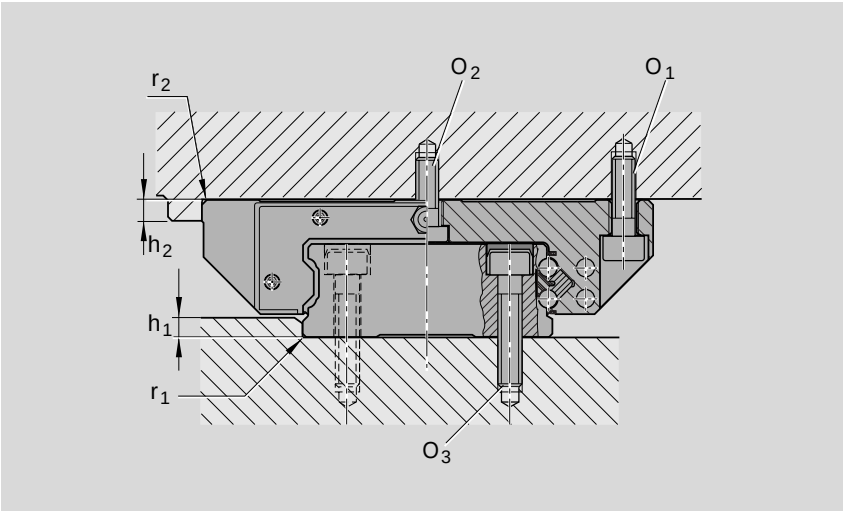
Reference edges, corner radii, mounting screw sizes and tightening torque

Runner block 1671-

– Wide

Guide rail:

– Wide, for mounting from above 1675-

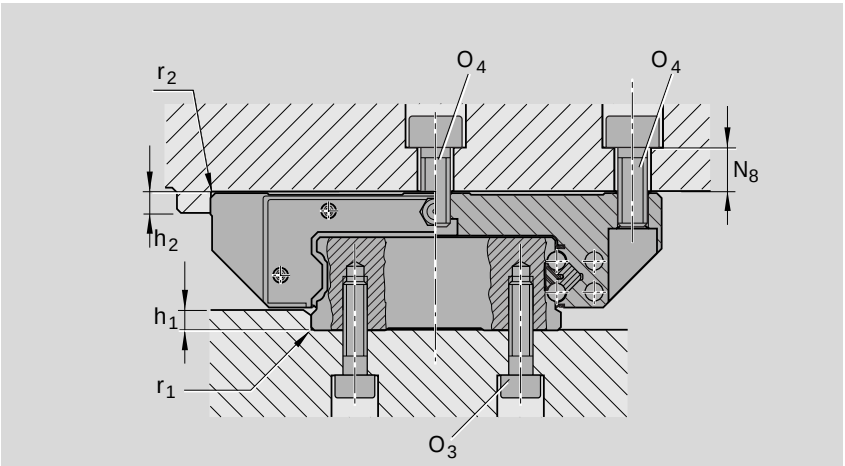


Runner block1671-

– Wide

Guide rail:

– Wide, for mounting from below 1677-



Dimensions and recommended limits for side load if no additional lateral retention is provided

[1]) When mounting the runner block from above using only 4 O_4 screws:
- Permissible side force 1/3 lower
- Lower stiffness

[2]) For runner block mounting with 6 screws:
- Tighten the centerline screws with the torque for strength class 8.8.

[3]) When mounting with 2 O_2 screws and 4 O_1 screws

Size	h_1 min. (mm)	h_1 max. (mm)	r_1 max. (mm)	h_2 max. (mm)	r_2 (mm)	O_1 DIN 912 4 pcs.	O_2[2]) DIN 6912 2 pcs.	O_4[1)2)] DIN 912 6 pcs.	O_3 DIN 912	N_8 (mm)
20/40	2.0	3.0	0.5	4	0.5	M5x16	M5x12	M6x16	M4x20	9.5
25/70	3.0	4.5	0.8	5	0.8	M6x20	M6x16	M8x20	M6x30	10.0
35/90	3.5	6.0	0.8	6	0.8	M8x25	M8x20	M10x25	M8x35	13.0

Screw strength class	Runner block			Rails	
8.8	0.08 C	0.11[3]) C	0.16 C	0.08 C	
12.9	0.13 C	0.16[3]) C	0.24 C	0.13 C	

Tightening torque of the mounting screws

		M4	M5	M6	M8	M10
Nm	**8.8**	2.7	5.5	9.5	23	46
	12.9	4.6	9.5	16	39	77

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STAR – Ball Rail® Systems
Wide Ball Rail® Systems

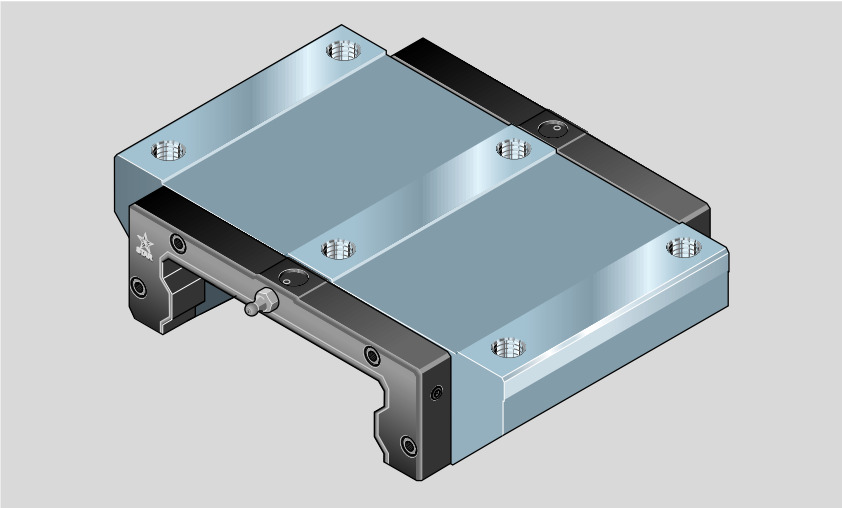
Runner blocks steel version 1671-

Wide

Special versions:

Runner blocks in accuracy class N (clearance and preload 0.02 C) are also available:

– with zinc-iron coating and yellow chromating
(Part numbers 16..-..4-30).



Part numbers

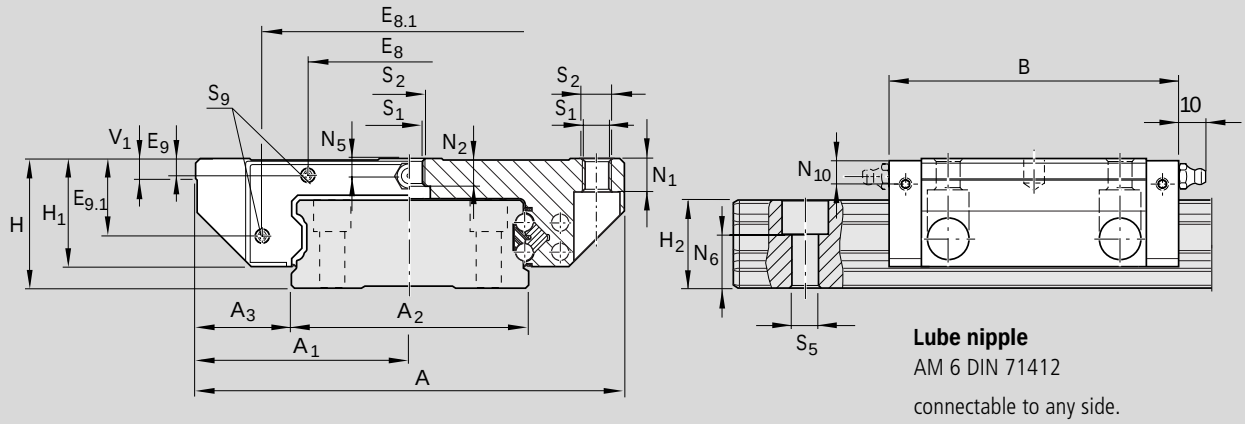
Size	Accuracy class	Part numbers for runner blocks for preload class	
		up to approx. 10 µm clearance	Preload 0.02 C
20/40	P		1671-812-10
	H	1671-893-10	1671-813-10
	N	1671-894-10	1671-814-10
25/70	P		1671-212-10
	H	1671-293-10	1671-213-10
	N	1671-294-10	1671-214-10
35/90	P		1671-312-10
	H	1671-393-10	1671-313-10
	N	1671-394-10	1671-314-10

Note on dynamic load capacities and moments (see table)

Determination of dynamic load capacities and moments is based on a travel life of 100,000 m.
For comparison with the 50,000 m travel sometimes applied for rail-type guideways, the figures for **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ in the table should be multiplied by 1.26 .

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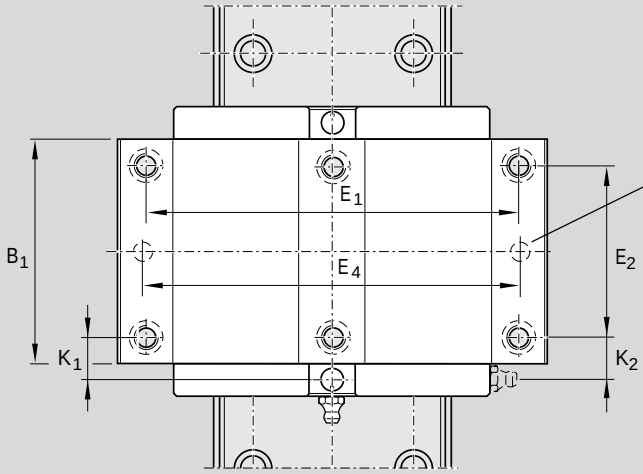
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Lube nipple
AM 6 DIN 71412

connectable to any side.

The runner block features two additional lube ports for the connecting structure.



Recommended position for pin holes (dimension E_4, see table).

Note

Ready-drilled holes made for production reasons may exist at the recommended pin hole position.

These may be extended and bored open to accommodate the locating pin.

	Dimensions (mm)		
Size	**E_4**	**ø**	**Depth**
20/40	70	4.7	7
25/70	107	5.7	8
35/90	144	7.7	8

	Dimensions (mm)																		
Size	**A**	**A_1**	**A_2**	**A_3**	**B**	**B_1**	**H**	**H_1**	**H_2**	**V_1**	**E_1**	**E_2**	**E_8**	**$E_{8.1}$**	**E_9**	**$E_{9.1}$**	**N_1**	**N_2**	**N_5**
20/40	80	40	42	19.0	73	52.0	27	23.5	19.05	6.0	70	40	36.0	57.5	3.55	15.5	7.7	3.7	4.0
25/70	120	60	69	25.5	105	79.5	35	30.0	23.40	7.5	107	60	70.2	90.7	5.6	20.3	9.0	7.0	5.5
35/90	162	81	90	36.0	142	113.6	50	42.5	32.00	8.0	144	80	79.0	116.0	6.8	29.9	14.0	12.0	9.0

									Load capacities (N)		Moments (Nm)			
	Dimensions (mm)							Mass	C	C_0	M_t	M_{t0}	M_L	M_{L0}
Size	**$N_6^{\pm 0.5}$**	**N_{10}**	**S_1**	**S_2**	**K_1**	**K_2**	**S_9**	**(kg)**	**dyn.**	**stat.**	**dyn.**	**stat.**	**dyn.**	**stat.**
20/40	13.2	5.5	5.4	M6	10.6	11.0	M2.5-3.5deep	0.45	15 600	24 100	370	640	116	200
25/70	14.4	8.0	6.4	M8	15.4	16.3	M3-5 deep	1.70	30 400*	45 500	1 130	1 690	345	510
35/90	20.5	9.0	8.4	M10	22.8	24.8	M3-5 deep	3.70	58 200*	86 300	2 880	4 270	920	1 370

*** 30 % higher dynamic load capacities and moments**

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STAR – Ball Rail® Systems
Wide Ball Rail® Systems

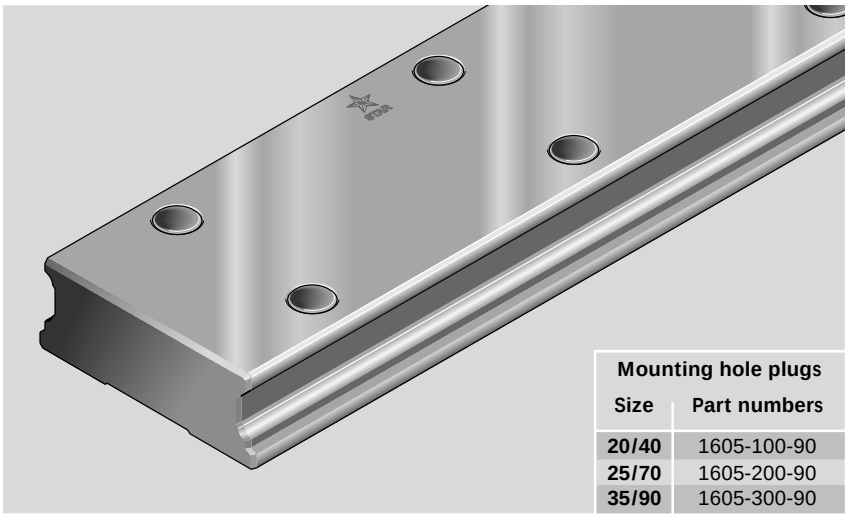
Guide Rail 1675-

Wide, for mounting from above

– Plastic mounting hole plugs are supplied along with the rail. Reordering data: see table inset on right for part numbers.
– For special applications: Guide rails for steel mounting hole plugs, Part numbers: **1676-.5.-**

Steel mounting hole plugs to be ordered separately.
A mounting jig with instruction leaflet is available for mounting steel mounting hole plugs.

Size	Part numbers Mounting jig
25/70	1619-210-40
35/90	1619-310-40



Mounting hole plugs	
Size	**Part numbers**
20/40	1605-100-90
25/70	1605-200-90
35/90	1605-300-90

Special version:
Zinc-iron coating with yellow chromating in accuracy class N.

Part numbers:

1674-.14-3. (end faces uncoated)
1674-.14-4. (end faces coated)

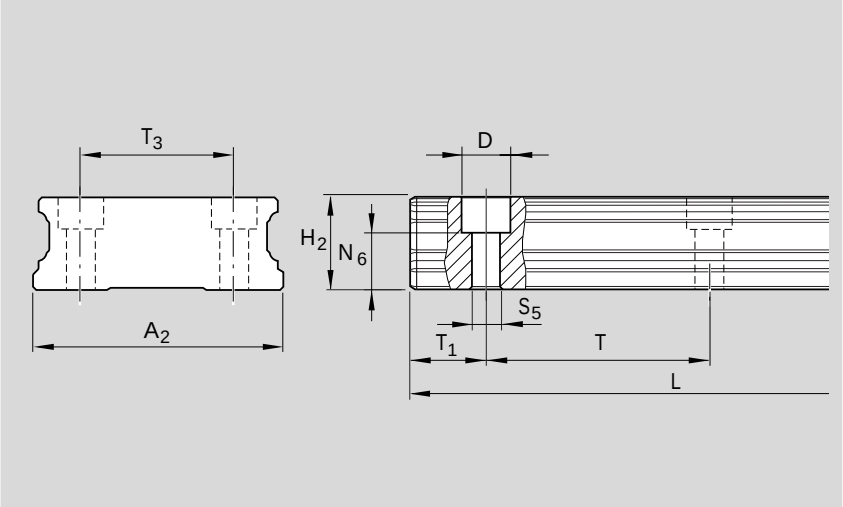
Part numbers

Size	Accuracy class	Guide Rail One-piece	Guide Rail Composite
		Part number, Rail length L (mm)	Part number, Number of sections Rail length L (mm)
20/40	P	1675-802-31,....	1675-852-3.,....
	H	1675-803-31,....	1675-853-3.,....
	N	1675-804-31,....	1675-854-3.,....
25/70	P	1675-202-31,....	1675-202-3.,....
	H	1675-203-31,....	1675-203-3.,....
	N	1675-204-31,....	1675-204-3.,....
35/90	P	1675-302-31,....	1675-302-3.,....
	H	1675-303-31,....	1675-303-3.,....
	N	1675-304-31,....	1675-304-3.,....

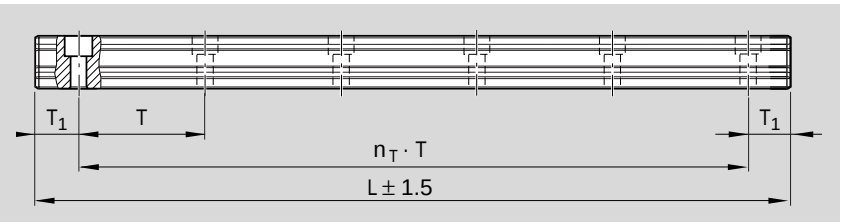
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Dimensions and masses



Size	Dimensions (mm)										Mass
	A_2	H_2	$N_6^{\pm 0.5}$	D	S_5	$T_{1S}^{\pm 0.5}$	T_{1min}	T	T_3	L_{max}	kg/m
20/40	42	19.05	13.2	7.4	4.4	28	10	60	24	4 000	5.3
25/70	69	23.40	14.4	11.0	7.0	38	10	80	40	4 000	11.6
35/90	90	32.00	20.5	15.0	9.0	38	12	80	60	4 000	21.0



$$L = n_B \cdot T - 4$$

or

$$L = n_T \cdot T + 2 \cdot T_{1S}$$

L	= rail length	(mm)
T	= hole spacing*)	(mm)
T_{1S}	= preferred dimension*)	(mm)
n_B	= number of holes per row	
n_T	= number of spaces	

*) see table for values

Ordering a guide rail

Ordering example 1:

Guide rail size 35/90,
accuracy class H,
rail length 1756 mm,
(21 · T, number of holes $n_B = 22$
giving 44 holes in 2 rows)
Ordering data: **1675-303-31, 1756 mm**

Intermediate lengths

Calculation of rail length L and ordering examples:

- The preferred dimension is T_{1S}
- If T_{1S} cannot be used, then
  - Select an end space T_1 between T_{1S} and $T_{1\ min}$
  - Do not go below the minimum spacing $T_{1\ min}$!

Note

- T_1, $T_{1\ min}$, T_{1S} are the same at either end of the rail.

Ordering example 2 (up to L_{max}):

Guide rail size 35/90,
accuracy class P,
rail length 1676 mm,
(20 · T, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 21$ giving 42 holes in 2 rows)

Ordering data:

Part number, length (mm)
T_{1S} / $n_T \cdot T$ / T_{1S} (mm)

1675-302-31, 1676 mm
38 / 20 · 80 / 38 mm

Rail lengths above L_{max} are made up of fitted rail sections mounted end to end.

Ordering example 3 (over L_{max}):

Guide rail size 35/90,
accuracy class P,
rail length 5036 mm, 2 sections
(62 · T, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 63$ giving 126 holes in 2 rows)

Ordering data:

Part number and number of sections, length (mm)
T_{1S} / $n_T \cdot T$ / T_{1S} (mm)

1675-302-32, 5036 mm
38 / 62 · 80 / 38 mm

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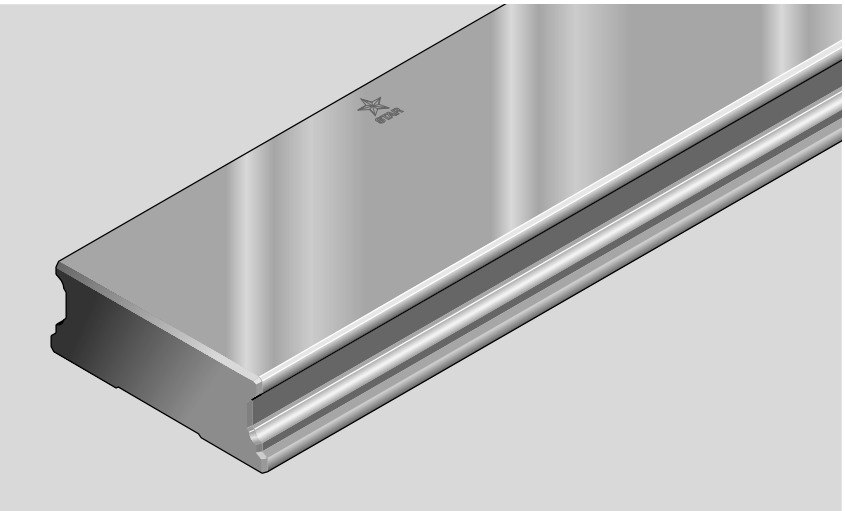
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STAR – Ball Rail® Systems
Wide Ball Rail® Systems

Guide rail 1677-

Wide, for mounting from below

Special version:
Zinc-iron coating with yellow chromating in accuracy class N available on request.



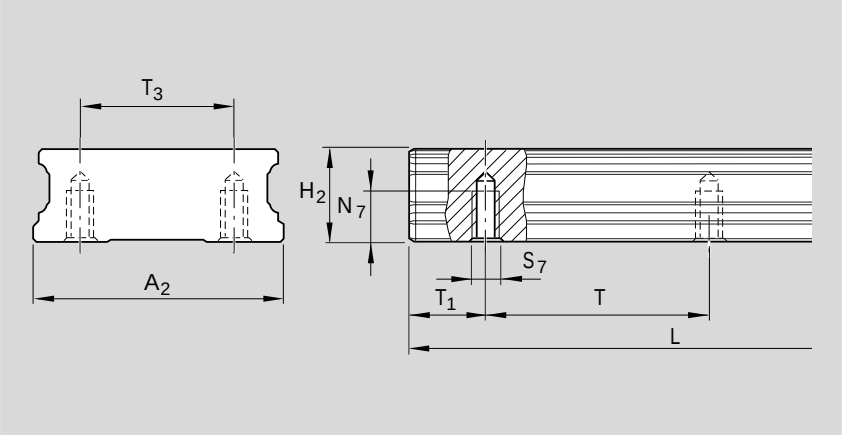
Part numbers

Size	Accuracy class	Guide Rail		Hole spacing T (mm)
		One-piece	Composite	
		Part number, Rail length L (mm)	Part number, Number of sections Rail length L (mm)	
20/40	P	1677-802-31,....	1677-852-3.,....	60
	H	1677-803-31,....	1677-853-3.,....	
	N	1677-804-31,....	1677-854-3.,....	
25/70	P	1677-202-31,....	1677-202-3.,....	80
	H	1677-203-31,....	1677-203-3.,....	
	N	1677-204-31,....	1677-204-3.,....	
35/90	P	1677-302-31,....	1677-302-3.,....	
	H	1677-303-31,....	1677-303-3.,....	
	N	1677-304-31,....	1677-304-3.,....	

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Dimensions and masses

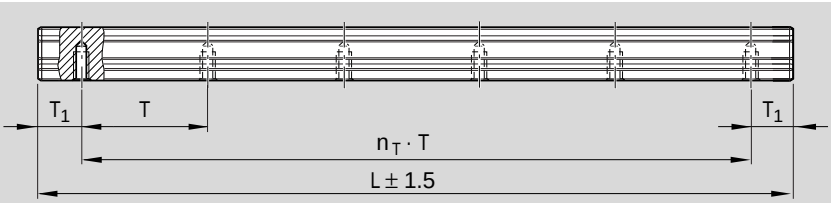


Size	Dimensions (mm)									Mass
	A_2	H_2	N_7	S_7	$T_{1S}{}^{\pm 0.5}$	T_{1min}	T	T_3	L_{max}	kg/m
20/40	42	19.05	7.5	M5	28	10	60	24	4 000	5.3
25/70	69	23.40	12.0	M6	38	10	80	40	4 000	11.6
35/90	90	32.00	15.0	M8	38	12	80	60	4 000	21.0

Ordering a guide rail

Ordering example 1:

Guide rail size 35/90,
accuracy class H,
rail length 1756 mm,
(21 · T, number of holes $n_B = 22$
giving 44 holes in 2 rows)
Ordering data: **1677-303-31, 1756 mm**



$$L = n_B \cdot T - 4$$

or

$$L = n_T \cdot T + 2 \cdot T_{1S}$$

L	= rail length	(mm)
T	= hole spacing*)	(mm)
T_{1S}	= preferred dimension*)	(mm)
n_B	= number of holes per row	
n_T	= number of spaces	

*) see table for values

Intermediate lengths

Calculation of rail length L and ordering examples:

- The preferred dimension is T_{1S}
- If T_{1S} cannot be used, then
  - Select an end space T_1 between T_{1S} and $T_{1\ min}$
  - Do not go below the minimum spacing $T_{1\ min}$!

Note

– T_1, $T_{1\ min}$, T_{1S} are the same at either end of the rail.

Ordering example 2 (up to L_{max}):

Guide rail size 35/90,
accuracy class P,
rail length 1676 mm,
(20 · T, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 21$ giving 42 holes in 2 rows)

Ordering data:

Part number, length (mm)
T_{1S} / $n_T \cdot T$ / T_{1S} (mm)

1677-302-31, 1676 mm
38 / 20 · 80 / 38 mm

Rail lengths above L_{max} are made up of fitted rail sections mounted end to end.

Ordering example 3 (over L_{max}):

Guide rail size 35/90,
accuracy class P,
rail length 5036 mm, 2 sections
(62 · T, preferred dimension $T_{1S} = 38$ mm;
number of holes $n_B = 63$
giving 126 holes in 2 rows)

Ordering data:

Part number and number of sections, length (mm)
T_{1S} / $n_T \cdot T$ / T_{1S} (mm)

1677-302-32, 5036 mm
38 / 62 · 80 / 38 mm

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Lubrication plate

– Material: aluminum

Versions:

– Standard (for standard lube nipple)
– G 1/8 connection

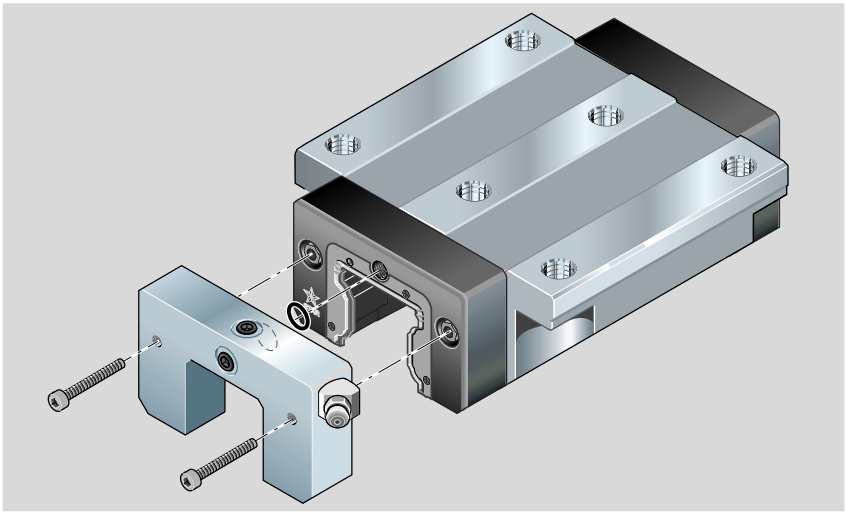
Mounting:

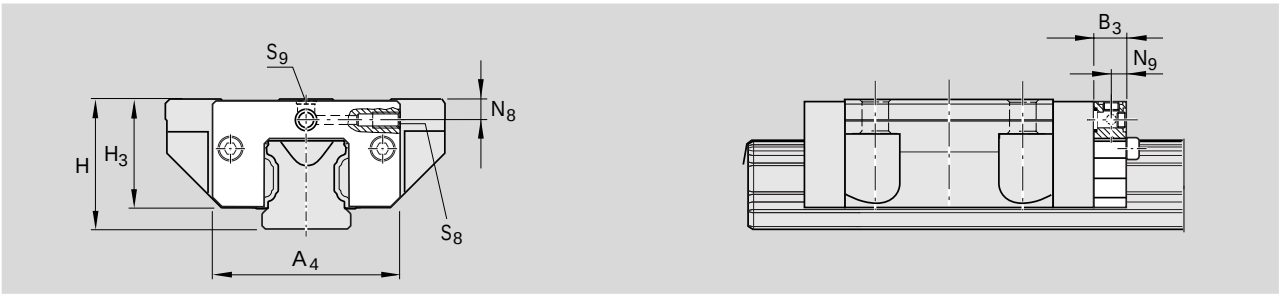
The parts required for mounting on the runner block are supplied along with the optional attachments.

Size 25 - 65:
The runner block lube nipple can be used.

Size 15 and 20:
A funnel-type lube nipple with a knock-in spigot is supplied ready for insertion.

For mounting details, see "Mounting Instructions for Ball Rail® Systems".

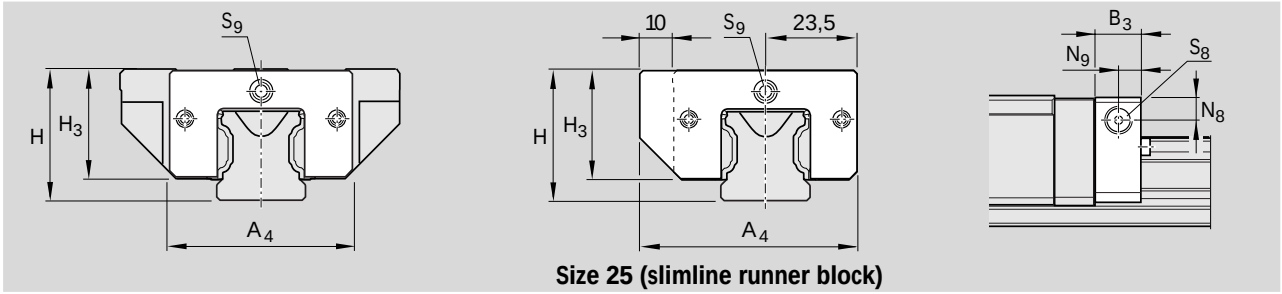




Standard lubrication plate

Part numbers, dimensions and masses.

Size	Part numbers	Dimensions (mm)								Mass
		A_4	B_3	H	H_3	N_8	N_9	S_8	S_9	(g)
15	1620-111-20	32	11	24	19.0	3.4	5.5	ø3	M3	15
20	1620-811-20	42	12	30	24.8	3.5	6.0	ø3	M3	25
25	1620-211-20	47	12	36	28.3	6.0	6.0	M6	M3	30
30	1620-711-20	59	12	42	33.8	8.0	6.0	M6	M6	45
35	1620-311-20	69	12	48	39.1	8.0	6.0	M6	M6	60
45	1620-411-20	85	12	60	48.5	8.0	6.0	M6	M6	85
55	1620-511-20	98	12	70	56.0	9.0	6.0	M6	M6	115
65	1620-611-20	124	14	90	75.7	18.0	7.0	M8x1	M8x1	250



Size 25 (slimline runner block)

Lubrication plate G 1/8

Part numbers, dimensions and masses.

With slimline runner block size 25, remember that the lubrication plate will project at the side.

Size	Part numbers	Dimensions (mm)							Mass
		A_4	B_3	H	H_3	N_8	N_9	S_8	(g)
25	1620-211-30	57	16	36	28.3	7.0	8	G 1/8 - 8 tief	40
30	1620-711-30	59	16	42	33.8	7.0	8	G 1/8 - 8 tief	59
35	1620-311-30	69	16	48	39.1	8.0	8	G 1/8 - 8 tief	79
45	1620-411-30	85	16	60	48.5	8.0	8	G 1/8 - 8 tief	112
55	1620-511-30	98	16	70	56.0	9.0	8	G 1/8 - 8 tief	152
65	1620-611-30	124	16	90	75.7	18.0	8	G 1/8 - 8 tief	285

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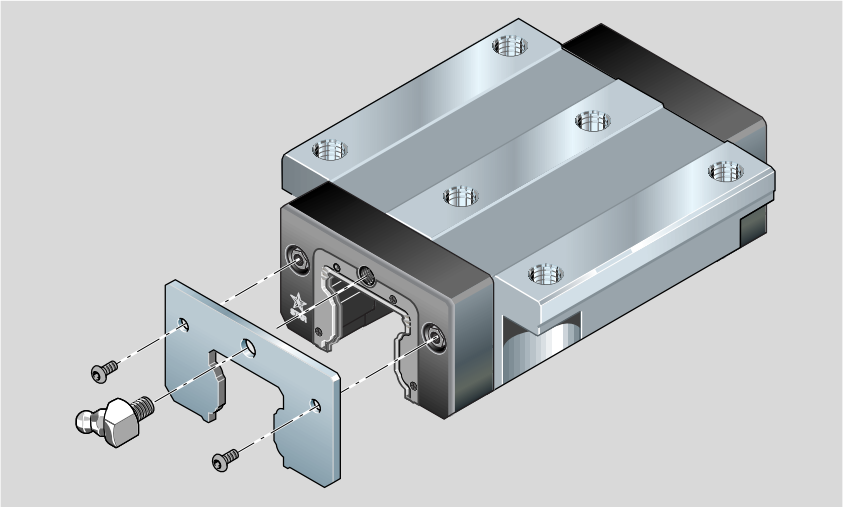
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Scraper plate

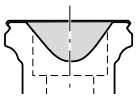
– Material: corrosion resistant spring steel to DIN 17230 / EN 10088
– Finish: bright

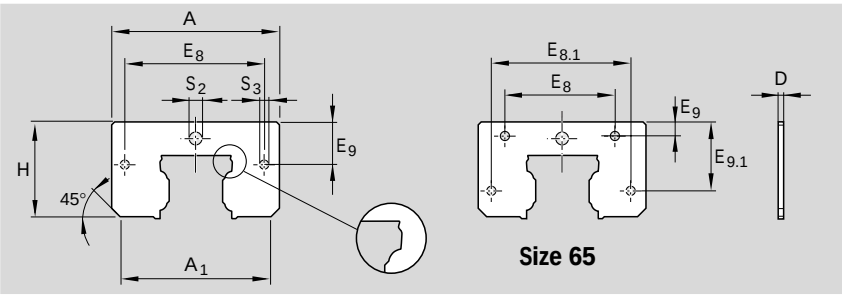
Mounting:

The mounting screws are supplied with the scraper plate.
When mounting, ensure that there is a uniform gap between runner block and scraper plate.



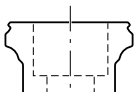
Scraper plates for guide rails with Rail Seal® cover strips.



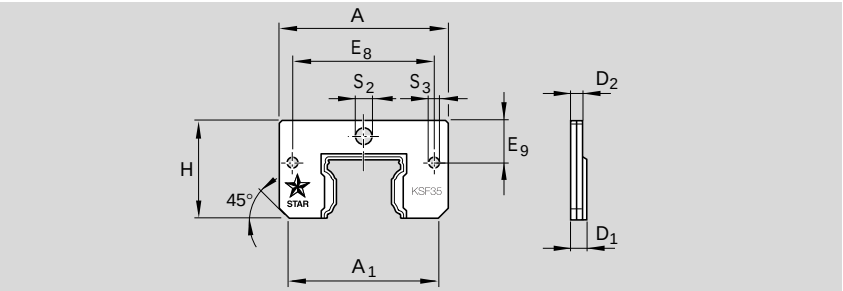


Size	Part numbers	Dimensions (mm)										Mass
		A	A_1	H	E_8	$E_{8.1}$	E_9	$E_{9.1}$	S_2	S_3	D	(g)
15	1620-110-**30**	33	26.4	19.2	24.55	–	6.3	–	ø4	ø3.5	1.0	4
20	1620-810-**30**	42	40.0	24.8	32.4	–	6.8	–	ø4	ø4	1.0	6
25	1620-210-**30**	47	41.6	29.5	38.3	–	11.0	–	ø7	ø4	1.0	8
30	1620-710-**30**	59	52.8	34.7	48.4	–	14.1	–	ø7	ø4	1.0	12
35*	1620-310-**40**	69	60.9	40.1	58.0	–	17.0	–	ø7	ø4	1.0	16
45*	1620-410-**40**	85	76.7	50.0	70.0	–	20.5	–	ø7	ø5	2.0	50
55*	1620-510-**40**	98	89.8	56.4	80.0	–	21.8	–	ø7	ø6	2.0	65
65*	1620-610-**40**	124	113.2	74.7	76.0	100	10.0	52.5	ø9	ø5	2.5	140

*) Scraper plates for guide rails without Rail Seal
from size 35, Part numbers: 1620-.10-**30**



Two-piece front seal



Size	Part numbers	Dimensions (mm)									Mass
		A	A_1	H	E_8	E_9	S_2	S_3	D_1	D_2	(g)
15	1619-121-20	32	27	19.0	24.55	6.3	ø3.5	ø3.5	3.0	2.2	6
20	1619-821-20	42	39	24.3	32.4	6.8	ø4	ø4	3.3	2.5	8
25	1619-221-30	47	42	29.0	38.3	11.0	ø7	ø4	3.3	2.5	10
30	1619-721-30	59	53	34.5	48.4	14.1	ø7	ø4	4.5	3.3	18
35	1619-321-30	69	61	39.5	58.0	17.0	ø7	ø4	4.5	3.3	25
45	1619-421-30	85	77	49.5	70.0	20.5	ø7	ø5	5.5	4.0	55

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Protective bellows

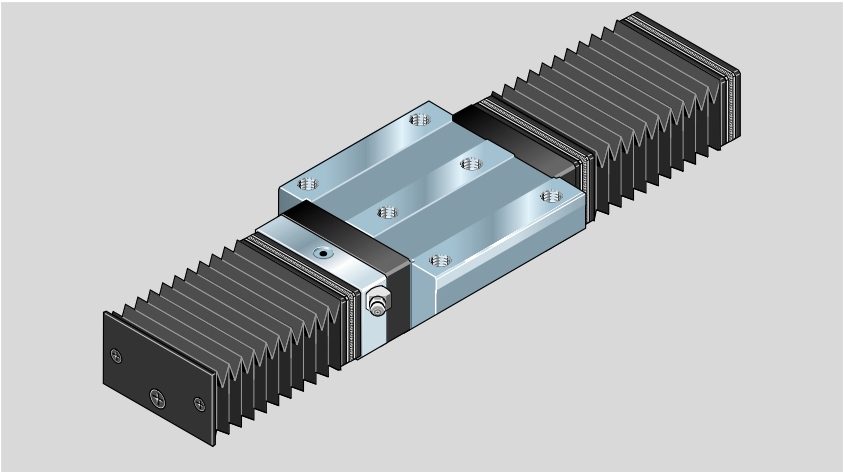
– Material: Bellows-type protective cover of polyurethane-coated polyester fabric
– Aluminum lubrication plates

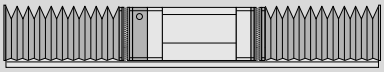
The runner block lube nipple can be used.

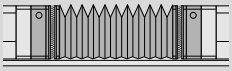
Heat resistant bellows

– Material: Nomex fabric, metallized on both sides.
– Non combustible, non flammable
– Resistant to sparks, welding splashes and hot chips
– Temperature resistance: Temperatures of up to 200°C near the protective metal coat possible. Operating temperature for the entire bellows: 100°C.

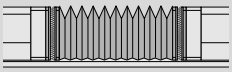
Available in sizes 25-55.
The runner block lube nipple can be used.

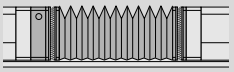


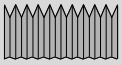




Size	Typ 1 with lubrication plate and end plate Typ 6 with FLU* and end plate	Number of folds	Typ 2 with mounting frame and end plate	Number of folds	Typ 3 with 2 lubrication plates Typ 7 with 2 FLU*	Number of folds
15	1620-10.-00	...	1620-102-00	...	1620-10.-00	...
20	1620-80.-00	...	1620-802-00	...	1620-80.-00	...
25	1620-20.-00	...	1620-202-00	...	1620-20.-00	...
30	1620-70.-00	...	1620-702-00	...	1620-70.-00	...
35	1620-30.-00	...	1620-302-00	...	1620-30.-00	...
45	1620-40.-00	...	1620-402-00	...	1620-40.-00	...
55	1620-50.-00	...	1620-502-00	...	1620-50.-00	...
65	1620-60.-00	...	1620-602-00	...	1620-60.-00	..
25	1620-25.-00	...	1620-252-00	...	1620-25.-00	...
30	1620-75.-00	...	1620-752-00	...	1620-75.-00	
35	1620-35.-00	...	1620-352-00	...	1620-35.-00	...
45	1620-45.-00	...	1620-452-00	...	1620-45.-00	...
55	1620-55.-00	...	1620-552-00	...	1620-55.-00	...







Size	Typ 4 with 2 mounting frames	Number of folds	Typ 5 with lubrication plate and mounting frame (MF) Typ 8 with FLU* and MF	Number of folds	Typ 9 Bellows, loose supply (spare part)	Number of folds
15	1620-104-00	...	1620-10.-00	...	1600-109-00	...
20	1620-804-00	...	1620-80.-00	...	1600-809-00	...
25	1620-204-00	...	1620-20.-00	...	1600-209-00	...
30	1620-704-00	...	1620-70.-00	...	1600-709-00	...
35	1620-304-00	...	1620-30.-00	...	1600-309-00	...
45	1620-404-00	...	1620-40.-00	...	1600-409-00	...
55	1620-504-00	...	1620-50.-00	...	1600-509-00	...
65	1620-604-00	...	1620-60.-00	...	1600-609-00	...
25	1620-254-00	...	1620-25.-00	...	1600-259-00	...
30	1620-754-00	...	1620-75.-00	...	1600-759-00	...
35	1620-354-00	...	1620-35.-00	...	1600-359-00	...
45	1620-454-00	...	1620-45.-00	...	1600-459-00	...
55	1620-554-00	...	1620-55.-00	...	1600-559-00	...

Part numbers, Bellows

Example: 1620-306-00, 36 folds

Standard	= 0
Fire resistant	= 5
Type 1 to 9	

Bellows size 35, standard version, type 6 (with FLU* and end plate), number of folds: 36

* FLU = front lube unit

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Mounting instructions

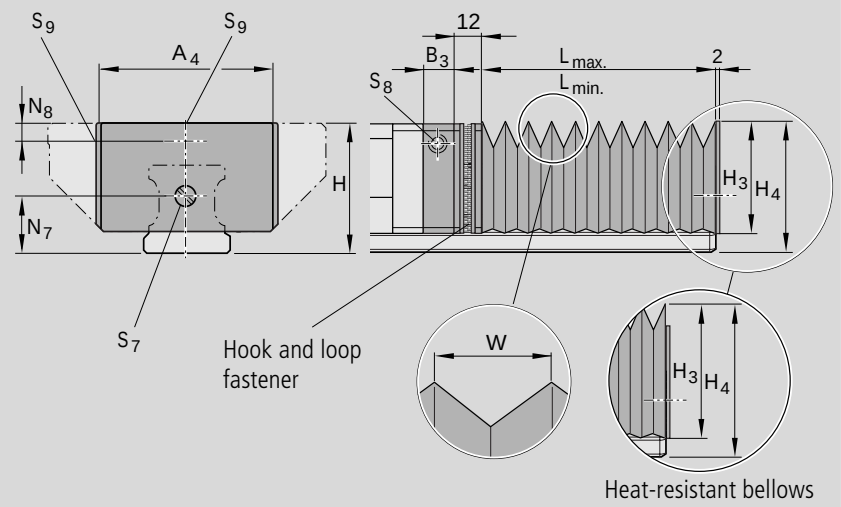
The bellows are delivered preassembled ready for installation, complete with the screws required for attachment to the guide rail.

In types 1 and 2, thread size M4 10 mm deep and countersunk 2 x 45° must be tapped in each end face of the rail.

Size 25 - 65:
The runner block lube nipple can be used.

Size 15 and 20:
A funnel-type lube nipple with knock-in spigot is supplied.

For mounting details, see "Mounting Instructions for Lubrication Plates and Bellows".



Dimensions: Bellows

Size	A4	B3	H	H3	H4	N7	N8	S7	S8	S9	W	Factor U
15	45	11	24	26.5	31.5	11	3.4	M4	ø3	M3	19.9	1.18
20	42	12	30	24.0	29.2	13	3.5	M4	ø3	M3	10.3	1.33
25	45	12	36	28.5	35.0	15	6.0	M4	M6	M3	12.9	1.32
30	55	12	42	34.0	41.0	18	8.0	M4	M6	M6	15.4	1.25
35	64	12	48	39.0	47.0	22	8.0	M4	M6	M6	19.9	1.18
45	83	12	60	49.0	59.0	30	8.0	M4	M6	M6	26.9	1.13
55	96	12	70	56.0	69.0	30	9.0	M4	M6	M6	29.9	1.12
65	120	14	90	75.0	89.0	40	18.0	M4	M8x1	M8x1	40.4	1.08

Dimensions: Heat-resistant bellows

Size	A4	B3	H	H3	H4	N7	N8	S7	S8	S9	W	Factor U
25	62	12	36	39.0	44.5	15	6.0	M4	M6	M3	25.9	1.25
30	67	12	42	42.0	47.5	18	8.0	M4	M6	M6	25.9	1.25
35	76	12	48	47.0	54.0	22	8.0	M4	M6	M6	29.9	1.21
45	90	12	60	55.0	64.0	30	8.0	M4	M6	M6	32.9	1.18
55	104	12	70	63.0	75.0	30	9.0	M4	M6	M6	37.9	1.16

Bellows design formulas

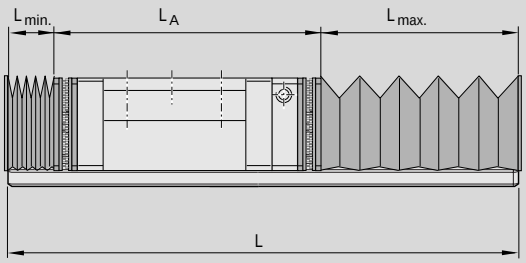
$$L_{max} = (\text{Stroke} + 30) \cdot U$$

$$L_{min} = L_{max} - \text{Stroke}$$

$$\text{No. of folds} = \frac{L_{max}}{W} + 2$$

L_{max} = Bellows extended
L_{min} = Bellows compressed
Stroke in mm
U = Calculation factor
W = Maximum extension (mm)

Rail length formula



$$L = L_{min} + L_{max} + L_A$$

L = Rail length (mm)

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Wide lubrication plate, G 1/8

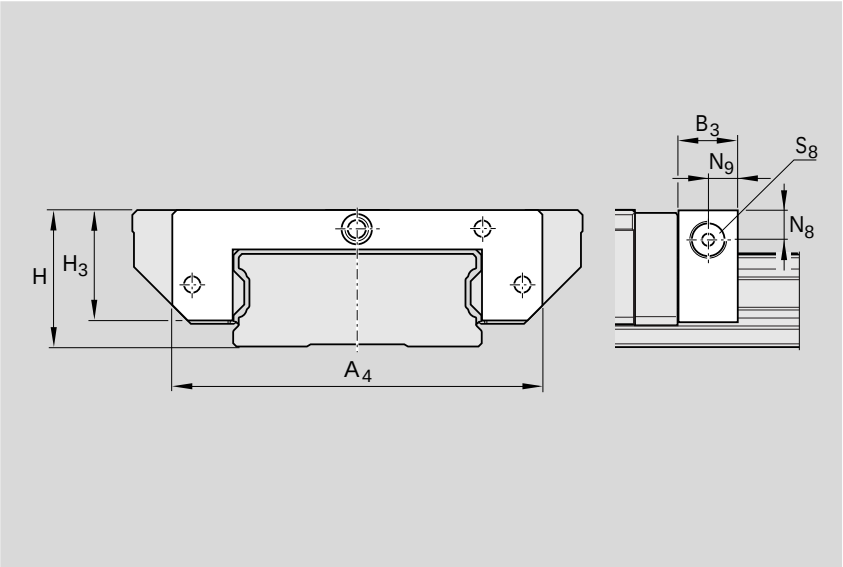
– Material: aluminum

Mounting:

The parts required for mounting on the runner block are supplied along with the optional attachments.

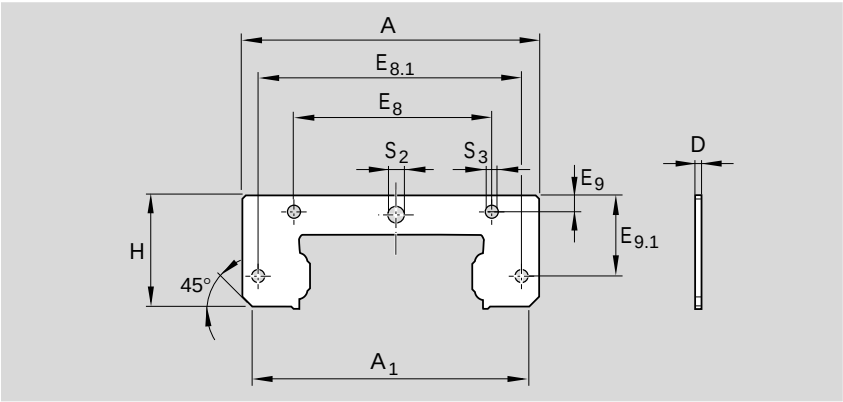
The runner block lube nipple can be used.

For mounting details, see "Mounting Instructions for Ball Rail® Systems".



Size	Part numbers	Dimensions (mm)							Mass (g)
		A_4	B_3	H	H_3	N_8	N_9	S_8	
25/70	1670-211-30	101	16	36	29	7.7	8	G 1/8 - 8 tief	65
35/90	1670-311-30	129	16	42	41	8.3	8	G 1/8 - 8 tief	120

Wide scraper plate



Size	Part numbers	Dimensions (mm)										Mass (g)
		A	A_1	H	E_8	$E_{8.1}$	E_9	$E_{9.1}$	S_2	S_3	D	
25/70	1670-210-00	101	92.7	28.6	70.2	90.7	5.1	19.7	ø7	ø4	1.0	14
35/90	1670-310-00	129	124.2	40.8	79.0	116	5.6	28.7	ø7	ø4	1.0	25

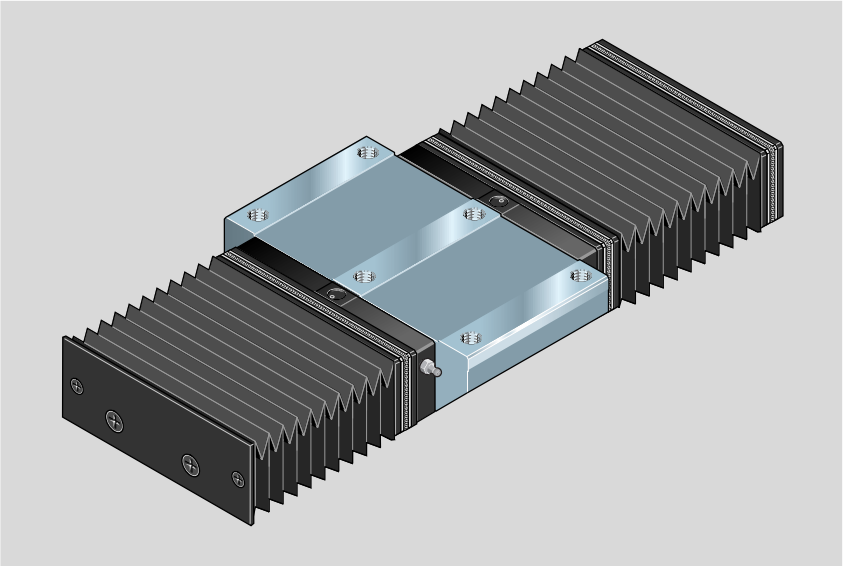
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Wide bellows

– Material: Bellows-type protective cover of polyurethane-coated polyester fabric

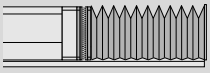
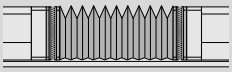
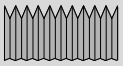
The runner block lube nipple can be used.



Part numbers, Bellows

Ordering example for bellows

Size 35/90, Type 2,
Number of folds: 36
1670-302-00, 36 folds

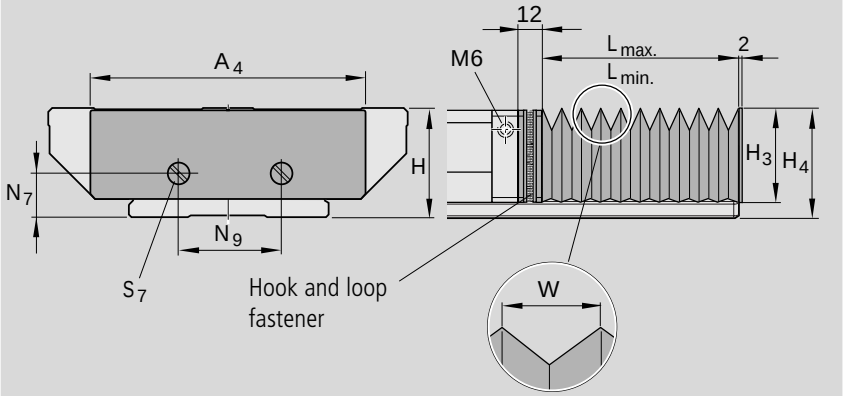
Size	 Typ 2 with mounting frame and end plate	Number of folds	 Typ 4 with 2 mounting frames	Number of folds	 Typ 9 Bellows, loose supply (spare part)	Number of folds
25/70	1670-202-00	...	1670-204-00	...	1670-209-00	...
35/90	1670-302-00	...	1670-304-00	...	1670-309-00	...

Mounting instructions

The bellows are delivered preassembled ready for installation, complete with the screws required for attachment to the guide rail.

In types 2 and 4, two threads size M4 10 mm deep and countersunk 2 x 45° must be tapped in each end face of the rail.

The runner block lube nipple can be used.



Dimensions: Bellows

Size	Dimensions (mm) A_4	H	H_3	H_4	N_7	N_9	S_7	W	Factor U
25/70	101	35	29	35	14.0	26	M4	12.9	1.25
35/90	128	50	42	49	21.5	40	M4	19.9	1.18

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Bellows design formulas

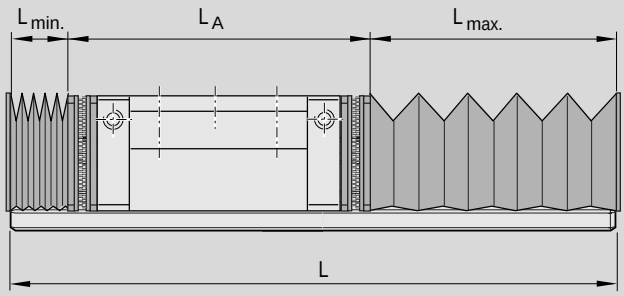
$L_{max} = (Stroke + 30) \cdot U$

$L_{min} = L_{max} - Stroke$

$No.\ of\ folds = \frac{L_{max}}{W} + 2$

L_{max} = Bellows extended
L_{min} = Bellows compressed
Stroke in mm
U = Calculation factor
W = Maximum extension (mm)

Rail length formula

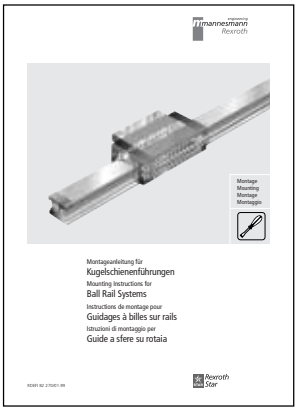


$L = L_{min} + L_{max} + L_A$

L = Rail length (mm)

Mounting Instructions for Accessories

For details of how to mount accessories such as the lubrication plate, bellows etc, see Mounting Instructions for Ball Rail® Systems RDEFI 82 270.

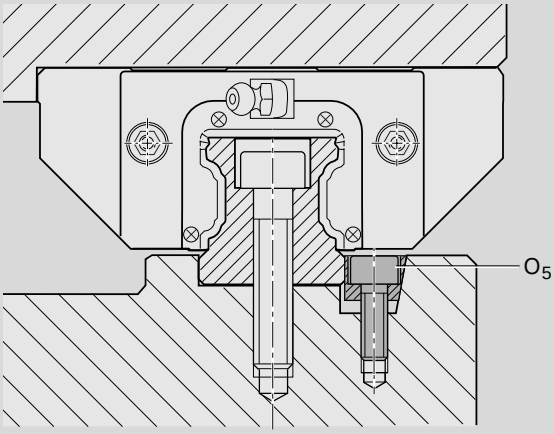


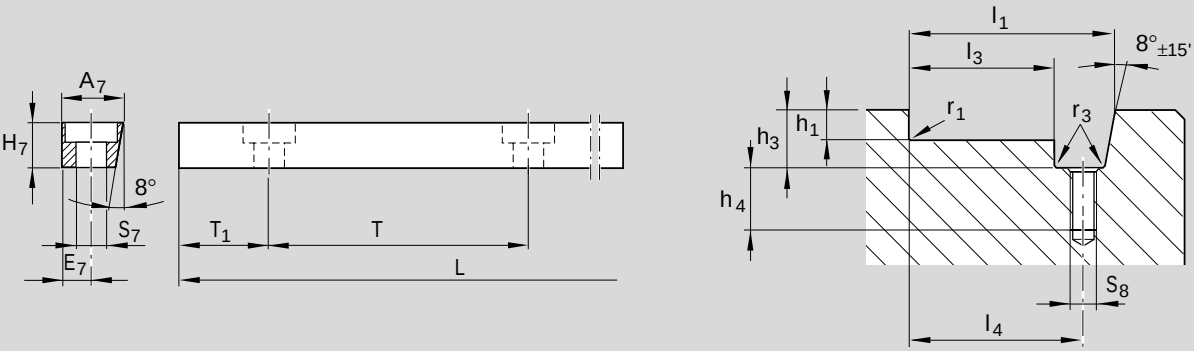
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Accessories, General

Wedge profile for Ball Rail® Systems
-
Lateral retention

– Material: steel
– Finish: black





Part numbers and dimensions

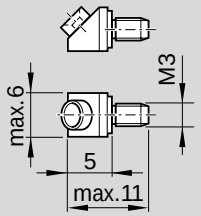
Size	Wedge profile									Wedge profile groove								
	Part numbers	Dimensions (mm)								Dimensions (mm)								
		A_7	E_7	H_7	S_7	T	T_1	L	O_5 DIN 6912	h_1 -0.2	h_3 +1	h_4 +2	l_1 ±0.05	l_3 -0.1 -0.2	l_4 ±0.1	S_8	r_1 max.	r_3 max.
15	1619-200-01	12	6	10	5.5	60	28.5	957	M5x20	3.5	12.5	15	27	15	21	M5	0.4	0.5
20										4	12.5	15	32	20	26	M5	0.5	0.5
25										5	12.5	15	35	23	29	M5	0.8	0.5
30										5	12.5	15	40	28	34	M5	0.8	0.5
35										6	12.5	15	46	34	40	M5	0.8	0.5
45	1619-400-01	19	9	16	9.0	105	51.0	942	M8x25	8	19.0	16	64	45	54	M8	0.8	0.5
55										10	19.0	16	72	53	62	M8	1.2	0.5
65										10	19.0	16	82	63	72	M8	1.2	0.5

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STAR – Ball Rail® Systems
Accessories, General

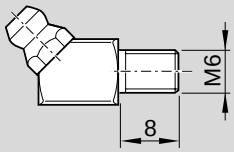
Funnel-type lube nipple



(Supplied as standard)

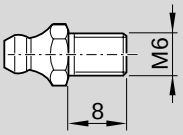
Part number
8417-004-09

Hydraulic-type lube nipple



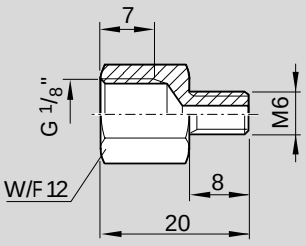
(Supplied as standard)

Part number
8417-007-02

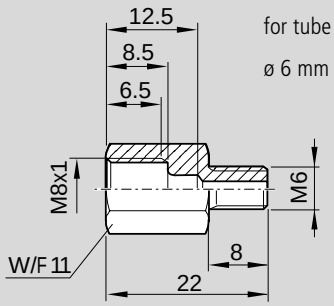


Part number
8417-008-02

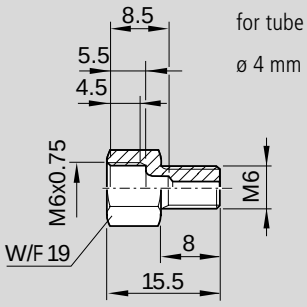
Reducing adapters



Part number
8455-030-34

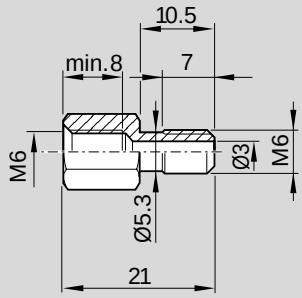


Part number
8455-030-37



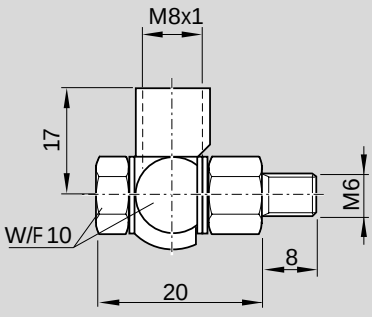
Part number
8455-030-38

Extension



Part number
8455-030-69

Swiveling screw fitting



Part number
8417-018-09

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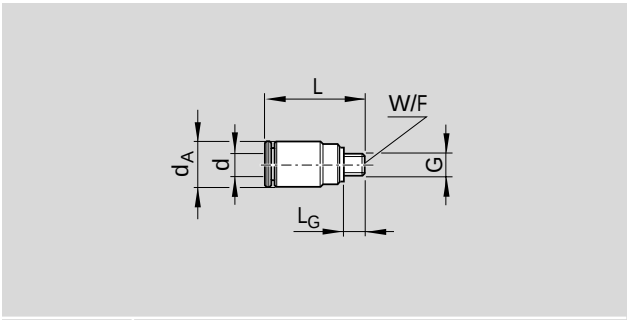
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Accessories, General

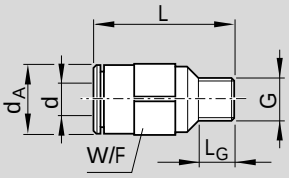
Fittings for plastic hoses

For runner blocks without scraper plates

Straight fitting

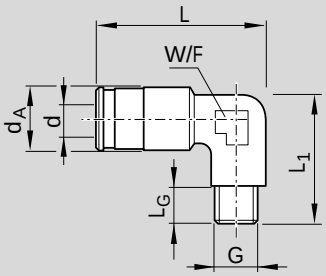


Part numbers	Dimensions (mm)					
	d_A	d	L	W/F	G	L_G
8417-010-09	5.8	3	12.5	1.5	M3	3
8417-011-09	7.8	3	13.5	2.0	M5	4



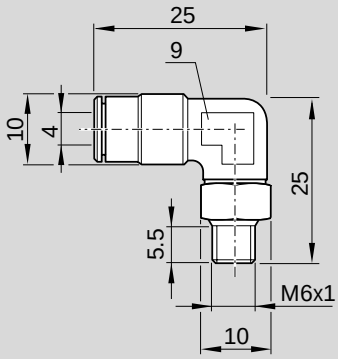
Part numbers	Dimensions (mm)					
	d_A	d	L	W/F	G	L_G
8417-013-09	11.0	4	21	10	M6x1	5.5
8417-014-09	13.5	6	21	12	M6x1	5.5

Elbow fitting



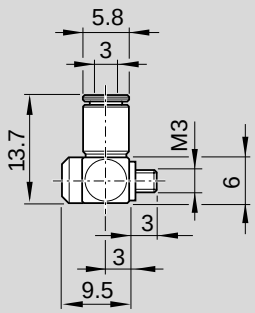
Part numbers	Dimensions (mm)						
	d_A	d	L	L_1	W/F	G	L_G
8417-016-09	11.0	4	24	19	9	M6x1	5.5
8417-017-09	13.5	6	27	21	10	M6x1	5.5

Rotary elbow fitting



Part number
8417-015-09

Swiveling elbow fitting



Part number
8417-012-09

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STAR – Ball Rail® Systems
Maintenance and Lubrication

Maintenance

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

It is advisable to run the machine through a full "cleaning cycle" over the entire installed rail length at least twice a day, but no later than the end of every 8-hour shift. Always run a cleaning cycle before shutting down the machine.

Lubrication

Star Ball Rail® Systems are delivered filled with an anti-corrosion agent. Either oil or grease can be used as a lubricant.

Before start-up, make sure the system has sufficient initial lubrication.

Grease Lubricants

We recommend a grease lubricant to DIN 51825:

– K2K

For higher loads:

– KP2K
  Consistency class NLGI 2 to DIN 51818

Observe the manufacturer's instructions.

Short stroke.

Stroke < 2 runner block lengths:

– Provide 2 lube ports per runner block and lubricate these!

Stroke < 0.5 runner block length:

– Provide 2 lube ports per runner block and lubricate these!

– Move the runner block 2x runner block length per lubricating cycle. If this is not possible, please consult Star.

Lubricant quantities as per Table 1.

Apply the specified lubricant quantity per lube port.

Size	Grease lubricants	
	Initial lubrication partial quantity (cm^3)	In-service lubrication (cm^3)
15	0.4 (x 3)	0.4
20	0.7 (x 3)	0.7
25	1.4 (x 3)	1.4
30	2.2 (x 3)	2.2
35	2.2 (x 3)	2.2
45	4.7 (x 3)	4.7
55	9.4 (x 3)	9.4
65	15.4 (x 3)	15.4
20/40	1.0 (x 3)	1.0
25/70	1.4 (x 3)	1.4
35/90	2.7 (x 3)	2.7

Table 1

Size	In-service lubrication intervals under normal operating conditions Travel (km)
	Load ≤ 0,15 C
15	1000
20	1000
25	1000
30	1000
35	500
45	250
55	150
65	100

Table 2

Oil lubricants

⚠ Add the entire oil quantity at one time!

Lubrication interval ≤ 40000 m

Size	Oil Lubrication Initial and in-service lubrication (cm^3)
15	0.4
20	0.7
25	0.8
30	1.1
35	1.2
45	2.2
55	3.6
65	6.0
20/40	0.7
25/70	1.1
35/90	1.8

Table 3

Always lubricate runner blocks before start up (initial lubrication)

Initial lubrication requires a total of three times the partial quantity given in Table 1:

1. Apply the first partial quantity of lubricant as per Table 1 to runner block.
2. Slide runner blocks back and forth over at least three times the block length 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.

In-service lubrication of runner blocks

- Once the in-service lubrication interval as given in Table 2 is reached, apply the lubricant quantity as stated in Table 1.

If the equipment is to operate in an environment subject to dirt or vibration and shock loads, etc., we recommend shortening the in-service lubrication interval.

The smaller the load, the longer the intervals between in-service lubrication will be.

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One-point oil lubrication

Notes

Recommended interval between two pulses: 10 seconds.

Example for size 45:
4 pulses of 0.6 cm^3 each in 50 seconds.

The quantities listed in the table are valid for:

$F \leq 0.3\ C$
$v \leq 1$ m/s
Lubrication interval ≤ 40,000 m

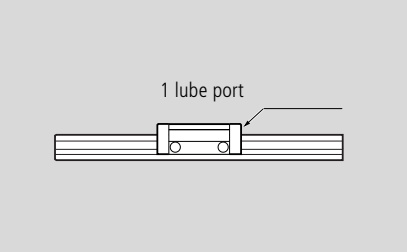
If the equipment is to operate in an environment subject to dirt or vibration and shock loads, etc., we recommend shortening the in-service lubrication interval.

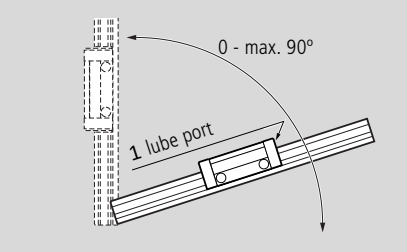
Size	Lubricant quantities for one-point oil lubrication	
	Oil lubricant quantity / pulse (cm^3)	Pulses per lube cycle
15	0.6	1
20	0.6	2
25	0.6	2
30	0.6	2
35	0.6	2
45	0.6	4
55	1.5	3
65	1.5	4
20/40	0.6	2
25/70	0.6	2
35/90	0.6	3

Table 4

Stroke > 2 runner block lengths:

– Provide 1 lube port per runner block.
Oil lubricant to ISO VG 220.
Lubricant quantities to Table 4.



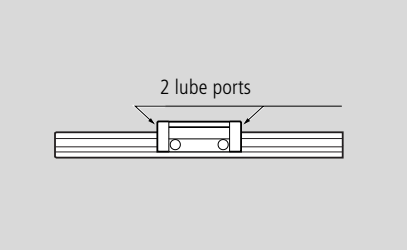


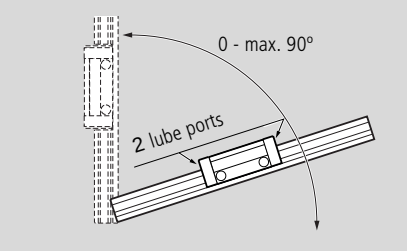
Stroke < 2 runner block lengths:

- Provide 2 lube ports per runner block.

Oil lubricant to ISO VG 220.
Lubricant quantities to Table 4.

Apply the specified lubricant quantity per lube port.



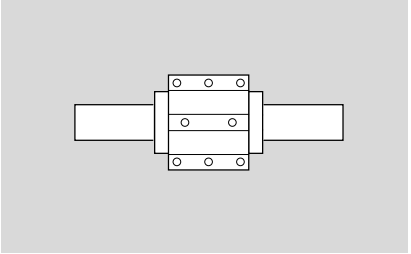


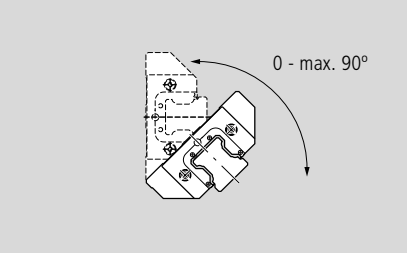
Installation at an angle about the centerline

Stroke < 2 runner block lengths:

– Provide 2 lube ports per runner block.
Add the lubricant quantity as specified in Table 4 in one pulse.

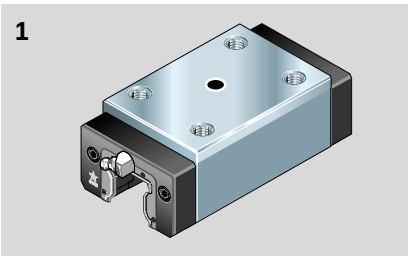
If this is not possible, please consult STAR.

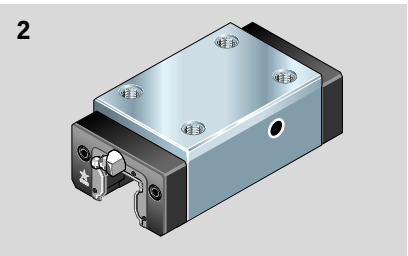




Special Lube Ports

Lube ports mounted on the top (1) or on the sides (2) are available on request.





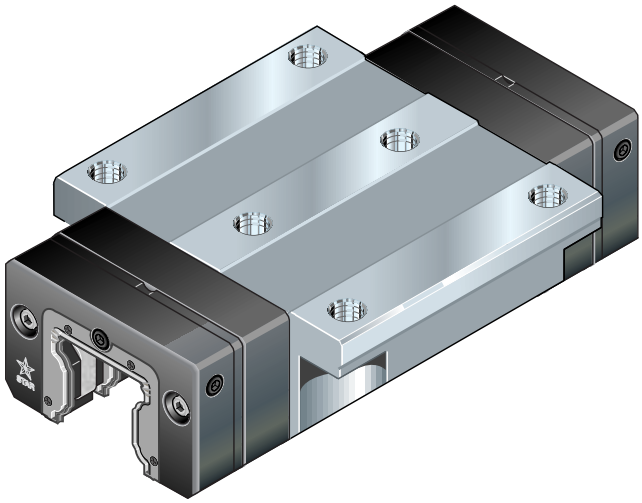
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STAR – Ball Rail® Systems
Front Lube Unit

Advantages during mounting and in service:

- Up to 10,000 km travel
- Only initial lubrication of the runner block necessary
- Front Lube Units at both runner block ends
- Minimal lubricant loss
- Reduced oil consumption
- No lubrication lines
- Max. operating temperature 60C°

▶ Ports provided at end and side for convenient refilling using lube nipple

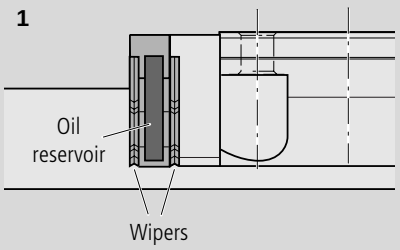


▶ Lube port on end face also suitable for lubricating runner block with grease

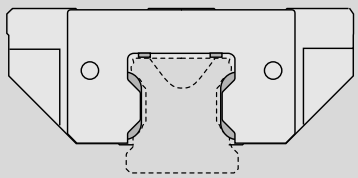
Size	Travel under normal operating conditions Travel (km)
	Load ≤ 0,15 C
15	10000
20	10000
25	10000
30	10000
35	4000
45	2500
55	1500
65	1000

▶ STAR – Ball Rail® Systems
Runner block with two front lubrication units

1



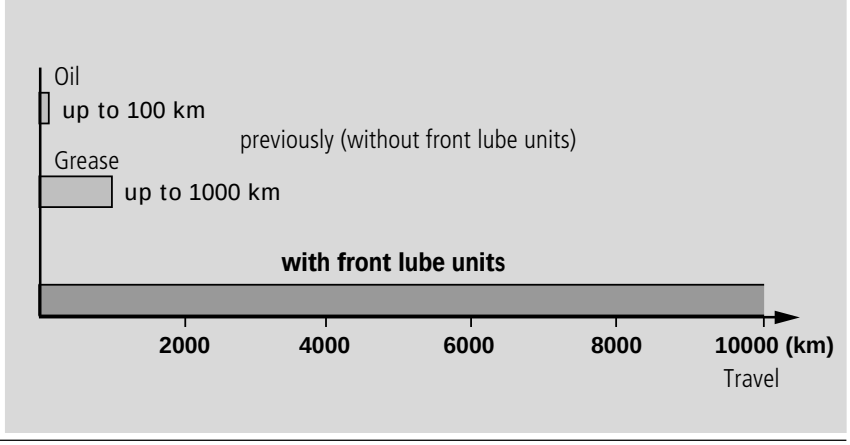
2



Specially designed oil distribution channels ensure that lubricant is applied only where needed: directly to the ball tracks and the guide rail surfaces (2).

Oil consumption comparison (Ball Rail® System size 25)

Front lubrication units	Lubricant quantity per lubrication cycle (cm^3)	Travel (m)	Consumption (cm^3/km)
without	1.2	20 000	0.06 ! 100 %
with	**5.2**	**5 000 000**	**0.00104 ! 1.73 %**



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Front Lube Units for Ball Rail® Systems

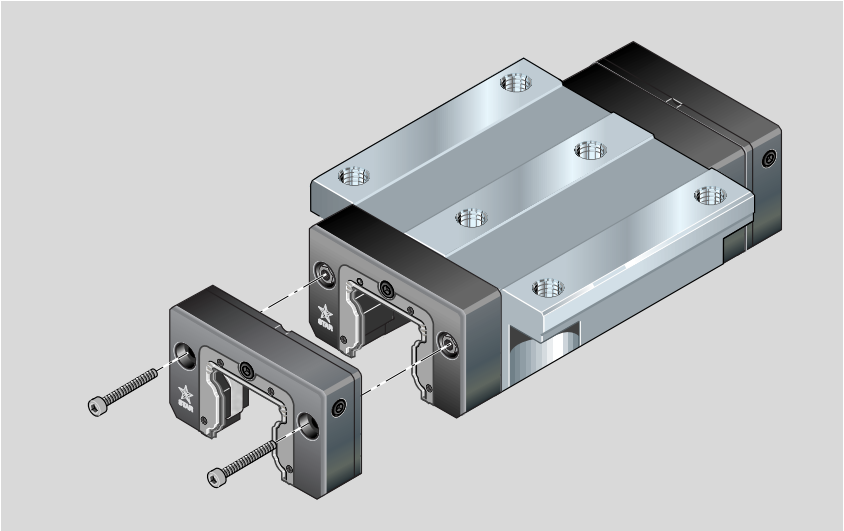
- Material: special plastic.

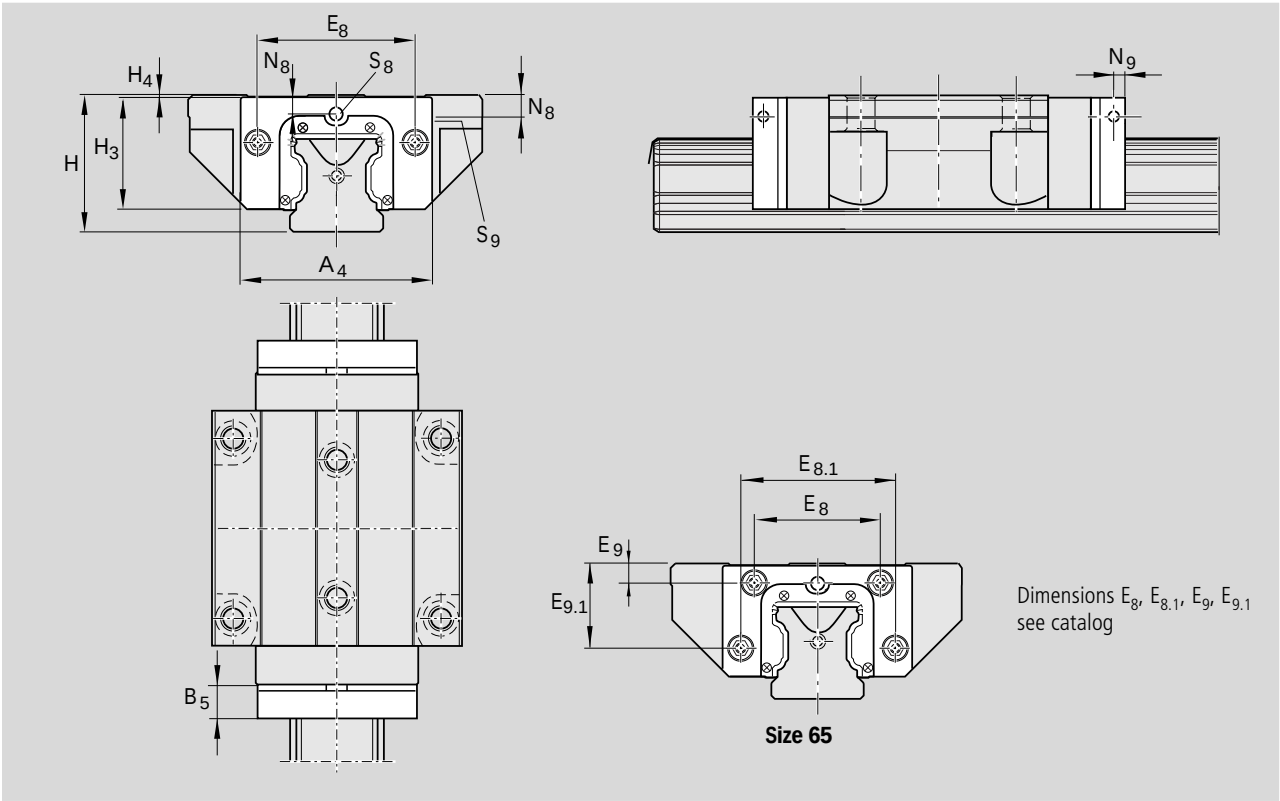
Mounting instructions:

Comes complete with coated mounting screws and lubricating nipple.

Front Lube Units with the part numbers stated below: ...-**00** are supplied ready-filled with oil and can be mounted immediately.

*Also available with dry reservoir for special lubricants.





Dimensions E_8, $E_{8.1}$, E_9, $E_{9.1}$ see catalog

Part numbers, dimensions.

Size	Part numbers	Dimensions (mm)									Oil
		A_4	B_5	H	H_3	H_4	N_8	N_9	S_8	S_9	(cm^3)
15	1619-125-00	31.8	11.5	24	19.2	0.20	3.4	5	M3	M3	1.00
20	1619-825-00	43.0	12.5	30	24.8	0.50	3.4	5	M3	M3	2.20
25	1619-225-00	47.0	13.0	36	29.3	0.50	5.2	5	M6	M6	2.60
30	1619-725-00	58.8	14.5	42	34.8	0.75	5.5	6	M6	M6	3.85
35	1619-325-00	69.0	16.0	48	39.8	0.55	6.6	6	M6	M6	5.70
45	1619-425-00	84.0	17.0	60	49.8	0.50	8.0	7	M6	M6	9.60
55	1619-525-00	99.0	18.0	70	56.8	0.75	8.5	8	M6	M6	14.50
65	1619-625-00	124.2	19.0	90	75.8	1.00	15.2	8	M8	M8	30.00
20	1619-826-00	41.0	12.5	28	22.8	0.50	2.4	–	M3	–	1.8
25	1619-226-00	47.0	13.0	33	26.3	0.50	3.8	5	M6	M3	2.5

Ball Rail® Systems, low profile: Sizes 20 and 25 in preparation.

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