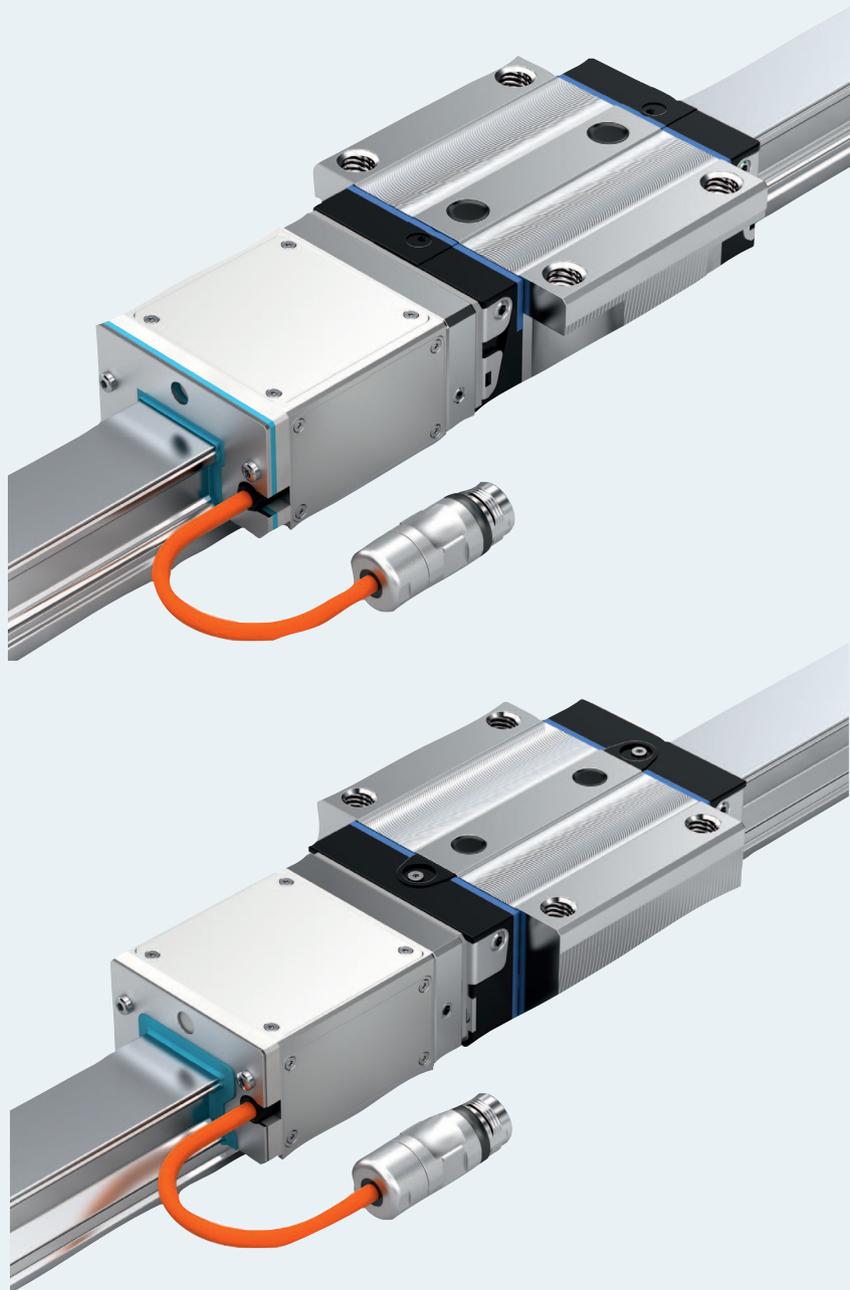


Integrated Measuring System IMS-I

for Ball and Roller Rail Systems



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Katalog " Integrated Measuring System IMS-I R310EN2350 (2015-05)

Sehr geehrte Damen und Herren,
die Druckversion des englischen Katalogs ist ab ca. Ende Juni 2014 verfügbar.

Catalog " Integrated Measuring System IMS-I R310EN2350 (2015-05)

Dear Ladies and Gentlemen,
the print version of the english catalog is from around the end of June 2014 available.

Mit freundlichen Grüßen/ best regards
Bosch Rexroth AG
12.05.2014 / DC-IA / MKT31

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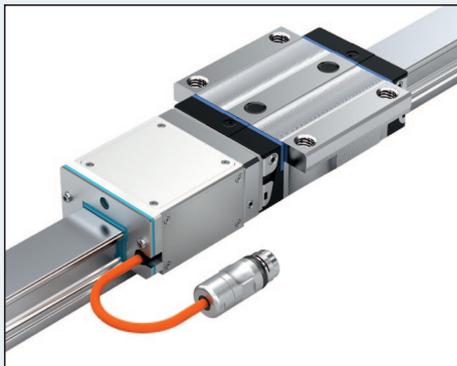
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New Features at a Glance

- ▶ Improvement of interpolation accuracy to $\pm 0.75 \mu\text{m}$
- ▶ Improvement of repeatability to $\pm 0.25 \mu\text{m}$
- ▶ Signal period ($40 \mu\text{m} / 1 V_{pp}$)
- ▶ Guide rail length up to 4500 mm
- ▶ Up to 5 single reference marks, e.g. for applications with several independent linear motor primary parts
- ▶ Supply voltage from 4.75 V ... 12.6 V
- ▶ New 17-pin connector M 17 as a round connector and in a flanged version

Product Description

The Integrated Measuring System (IMS-I) from Rexroth consists of:



Rexroth Ball or Roller Runner Block

- ▶ with mounted adapter plate

available in:

- ▶ different sizes
- ▶ various accuracy classes
- ▶ various preload classes

Rexroth Scanner

- ▶ including sensors, electronics, connecting cable and connector
- ▶ already mounted on the Ball or Roller Runner Block

Rexroth Guide Rail

- ▶ with integrated scale
- ▶ with integrated reference marks
- ▶ with cover strip or plastic mounting hole plugs

IMS-I from Rexroth:

Integrated **M**easuring **S**ystem Incremental

Integrating the measuring technology into the linear guide results in a mechatronic system which combines the ability to guide mechanical loads and to measure length into one product.

No external measuring systems are needed.

Product Description

Runner Blocks

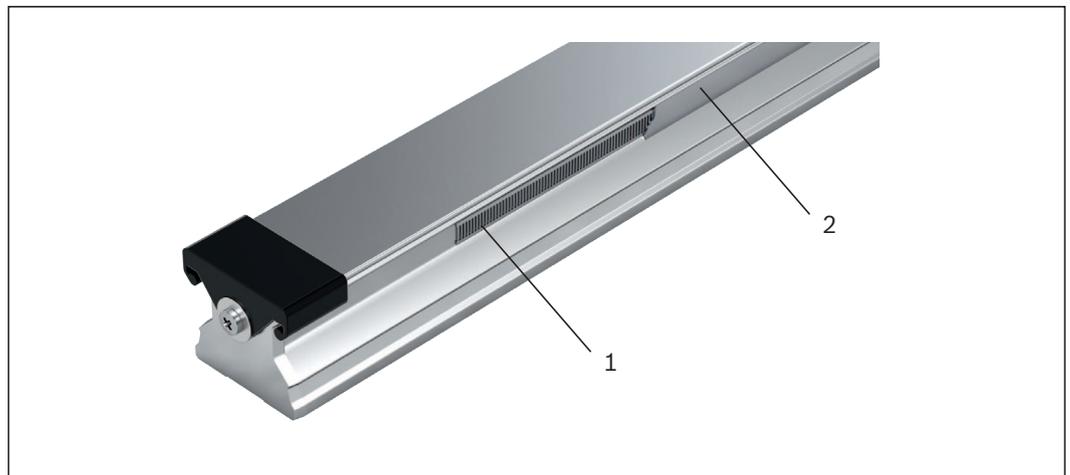


Runner block with mounted adapter plate and mounted scanner

- ▶ Same mounting hole pattern as standard runner blocks
- ▶ Adapter plate allows scanner* to be replaced during servicing without removing the runner block.

* Scanner fastening screws must be accessible and there must sufficient clearance at the end of the rail for pulling the scanner off.

Guide Rail



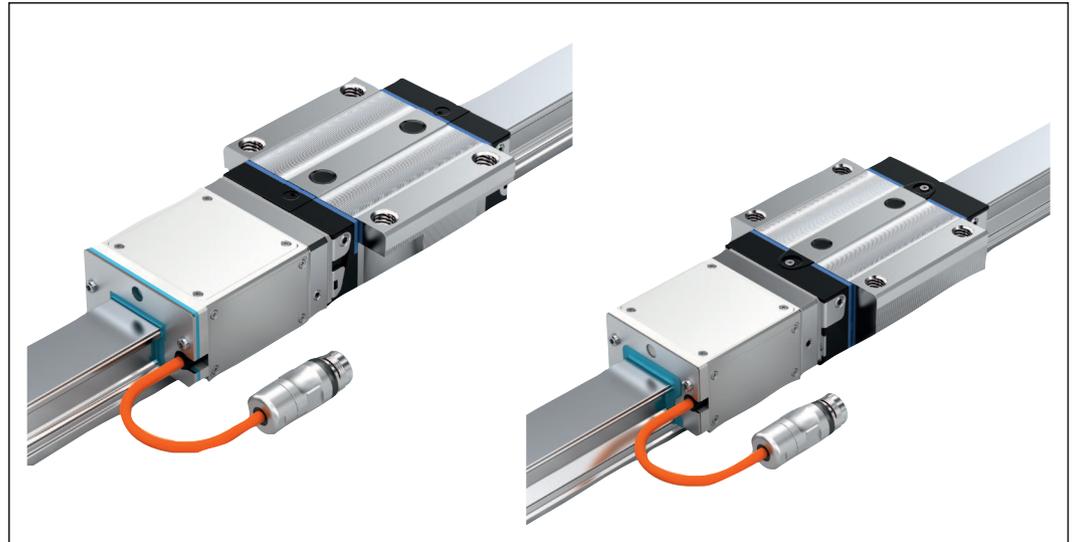
Guide rail with integrated scale

- ▶ Same mounting hole pattern as standard guide rails
- ▶ Choice of single reference mark or distance coded reference marks over the entire rail length, covered by a laser-welded stainless steel strip

1 Steel scale integrated

2 Scale protected by a laser-welded stainless steel strip

Integrated Measuring System for Ball and Roller Rail Systems



Rexroth Ball Rail and Roller Rail Systems can be supplied with a completely integrated, inductive linear measuring system. The linear measuring system consists of a scanner, a scale and reference marks integrated in a ball or roller rail system. The scanner with sensors is mounted on the runner block. As it travels over them, it evaluates the scale and the reference marks integrated in the rail. This mechatronic system combines the functions of guidance and measurement into one unit and opens up new, ideal opportunities in machine design.

Highlights: Integrated Measuring System

- ▶ The guide system and the measuring system form one unit, building on standard guide elements.
- ▶ No additional space is required, except possibly in the longitudinal direction to accommodate the scanner
- ▶ No external mounting surfaces required for measuring systems
- ▶ No measuring inaccuracies due to deviations in parallelism between the measuring system and the guideway
- ▶ Easy retrofitting and replacement
- ▶ Position measurement directly at the workpiece/tool
- ▶ Protection class IP67 with no additional measures required
- ▶ Thanks to full integration of the measuring system components into the guide no complex installation or tuning work is needed.
- ▶ The runner block, scanner and guide rail can be replaced individually if servicing is required.

Inductive Measuring System

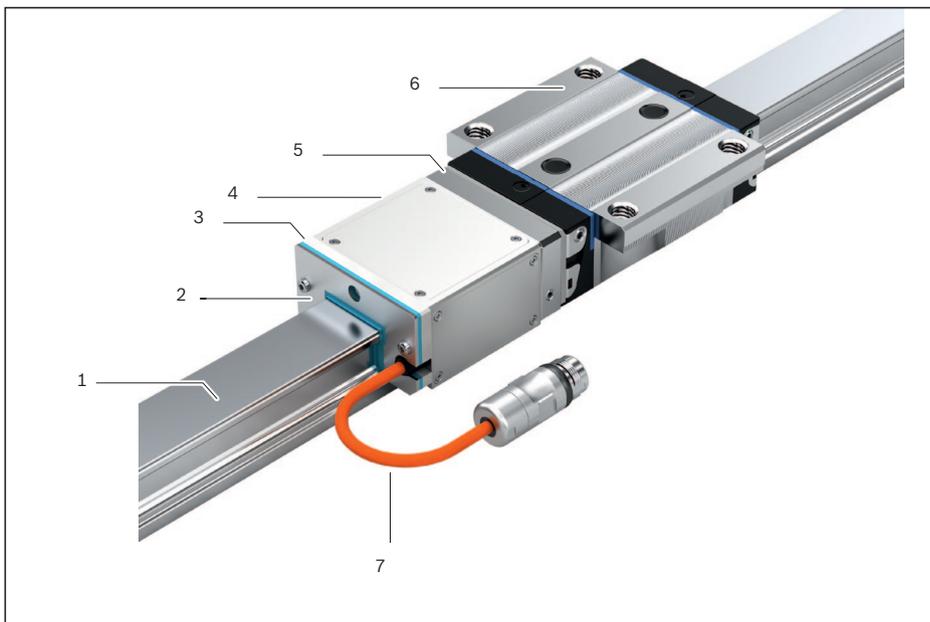
- ▶ Contact-free scanning ensures zero maintenance
- ▶ Resistant to water, oil, dust, shavings, etc.
- ▶ Insensitive to magnetic fields
- ▶ One-piece guide rails: Standard length up to 4500 mm
- ▶ Several scanners can be mounted on one rail
- ▶ No magnetic components

Incremental Measuring Principle

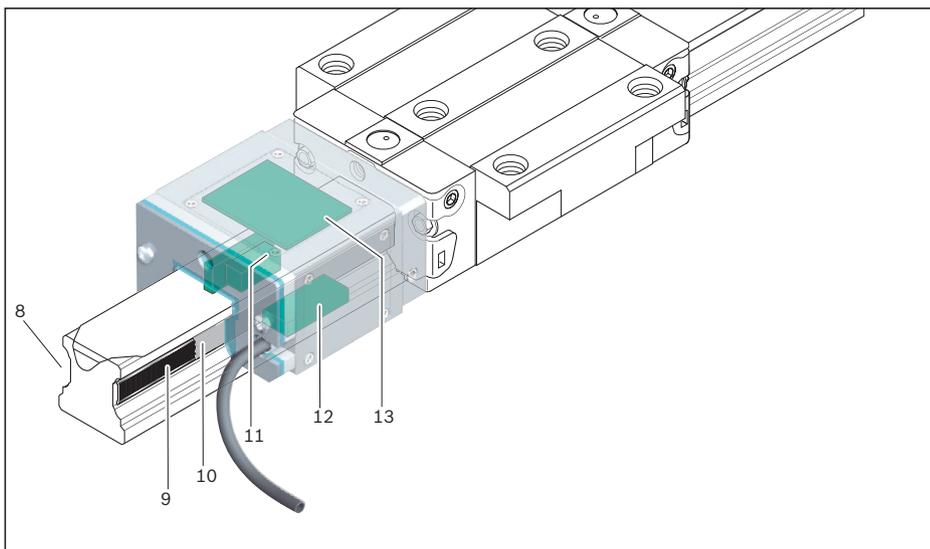
- ▶ Precise position detection through a high-precision scale paired with distance coded reference marks or with a single reference mark.
- ▶ High resolution thanks to 40 my signal period

Structural Design

- 1** Guide rail with scale and reference marks
- 2** End seal
- 3** Support plate
- 4** Scanner
- 5** Adapter plate (fixed to the runner block)
- 6** Runner block
- 7** Cable and Connector



- 8** Reference marks (on the side opposite the scale)
- 9** Scale
- 10** Scale protection: laser-welded stainless steel strip
- 11** Reference sensor
- 12** Measuring sensor
- 13** Evaluation electronics



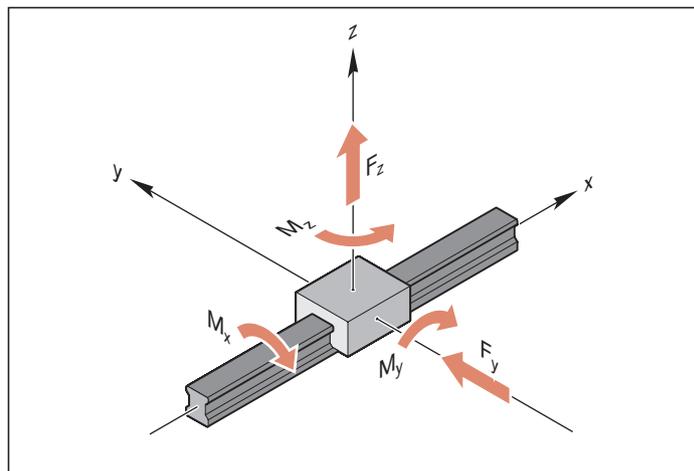
General Technical Data and Calculations of Runner Blocks

Loads due to forces and moments on the runner block

The forces acting on the system are distributed among the runner blocks according to the layout of the system. The loads due to forces and moments resulting from the forces acting on the system have to be calculated for each runner block when performing the nominal life calculation.

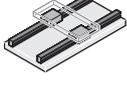
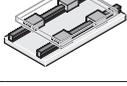
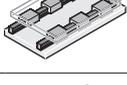
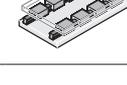
All load calculations assume an infinitely rigid mounting base and an infinitely rigid attachment.

The service life calculation for the IMS-I is performed in a similar way to the service life calculation for profiled rail systems without measuring system. Please refer to the appropriate catalog for Ball/Roller Rail Systems.



Load on a single runner block due to forces and moments

The following table shows the scenarios that are most commonly found in practice. Whichever scenario is selected, the relevant values for $F_{y \max}$ and $M_{z \max}$ must be complied with in the application. The respective values are given in the sections on Ball / Roller Runner Blocks.

Scenario	Layout	Forces		Moments		
		in z-direction Lift-off/down force	in y-direction Side load	about the X-axis Torsional moment	about the Y-axis Longitudinal moment	about the Z-axis Longitudinal moment
1	1 rail 1 runner block 	F_z	F_y	M_x	M_y	M_z
2	1 rail 2 runner blocks 	F_z	F_y	M_x	-	-
3	2 rails 2 runner blocks 	F_z	F_y	-	M_y	M_z
4	2 rails 4 runner blocks 	F_z	F_y	-	-	-
5	2 rails 6 runner blocks 	F_z	F_y	-	-	-
6	2 rails 8 runner blocks 	F_z	F_y	-	-	-

Description and Technical Data of Scanner

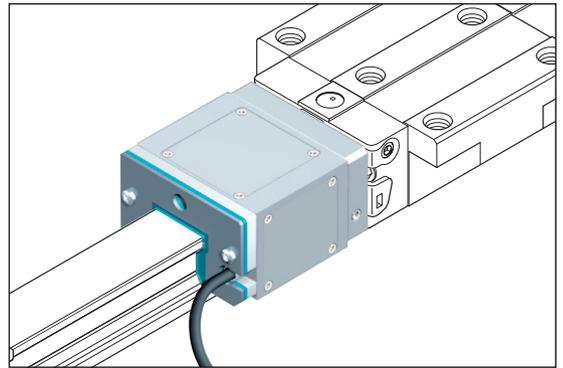
Scanner on the runner block

The basic design of the scanner is explained here, using a ball runner block as an example. The scanner for roller runner blocks differs only in minor details.

The scanner is mounted to the adapter plate of the runner block and has the same width and height as the adapter plate. The mounting hole pattern of the runner block remains unchanged. The advantage of this is that the runner block can be mounted to the adjoining structure in the same way as a runner block without measuring system. The scanner contains the non-contacting sensor system and the unit for recognizing the reference marks. It also contains the required electronics. The scanner can deliver either analog or digital signals, as required.

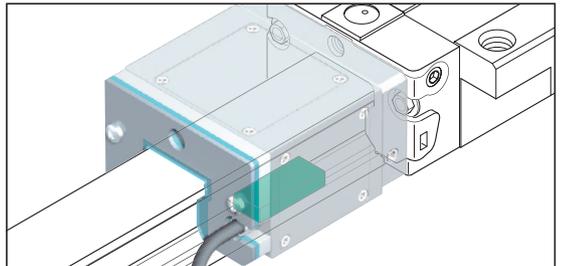
Scanner

The aluminum scanner housing accommodates all of the other scanner components. It is fastened via an adapter plate pre-mounted to the runner block, and thus forms one unit with it. The adapter plate allows the scanner to be replaced without having to remove the runner block itself from the rail. The housing protects the electronic and mechanical components from dirt and impacts.



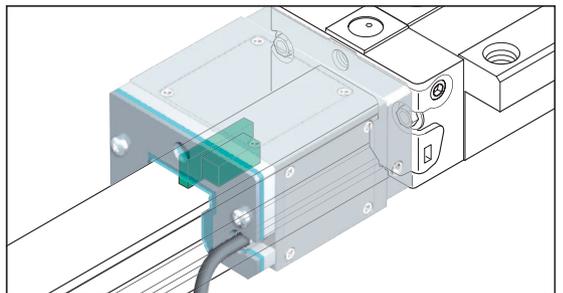
Measuring sensor

The non-contacting measuring sensor which scans the scale in the guide rail is located on one side of the scanner. It consists of a large number of transmitter and receiver coils. The measuring sensor is always located on the same side as the cable.



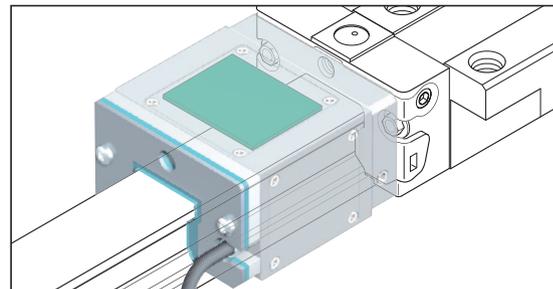
Reference sensor

The reference sensor is located on the opposite side of the scanner. This sensor scans the reference marks on the guide rail, thus allowing the absolute position of the runner block on the rail to be detected.

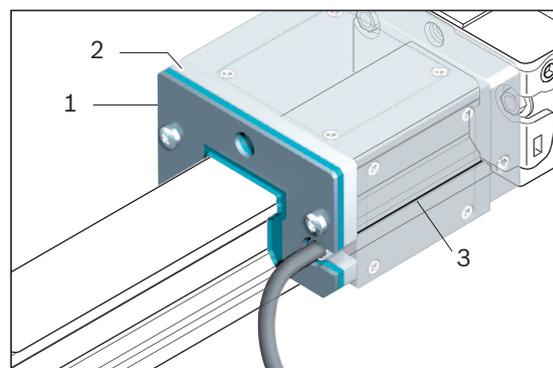


Evaluation electronics

The evaluation electronics (a printed circuit board) includes all the necessary electronic circuits to generate, process, calibrate and transmit the signal. The interpolation function is already integrated in the digital version.


End seal

To provide added protection, an end seal (1) is fastened to the scanner with screws. This prevents water, oil, metalworking fluids, shavings and dust from working their way into the scanner from the end face. Side seals protect the underside of the scanner.


Support plate

The support plate (2) is mounted between the end seal and the scanner. It has a clearance of 0.1 mm to the guide rail and prevents the sensor from touching the rail in the event of strong vibrations and impact loads.

Connector/Cable

The connector and cable connect the scanner to an evaluation electronics unit.

Technical Data

Max. travel speed	5 m/s at resolution 5 μm ; 10 μm , 1 V_{pp} 2 m/s at resolution 1 μm
Vibration (55 – 2000 Hz)	$\leq 100 \text{ m/s}^2$
Shock (11 ms)	$\leq 500 \text{ m/s}^2$
Enclosure protection class (EN 60529)	IP 67
Operating temperature	0 to 50°C
Storage-/ transport temperature	-10 to 70°C
Relative humidity during storage	max. 95%
Relative humidity in service	max. 80% at 20°C
Power supply	4.75 V to 12.6 V (at connector) Overvoltage protection: max. 18 V DC
Current consumption	1 V_{pp} /5V: 300 mA; 1 V_{pp} /12V: 170 mA; TTL/5V: 350 mA; TTL/12V: 190 mA
MTTF	100 years

Description and Technical Data of Scanner

Interfaces

Analog output signals

Sinusoidal signals 1 V_{pp} (Option I1)

Incremental signals

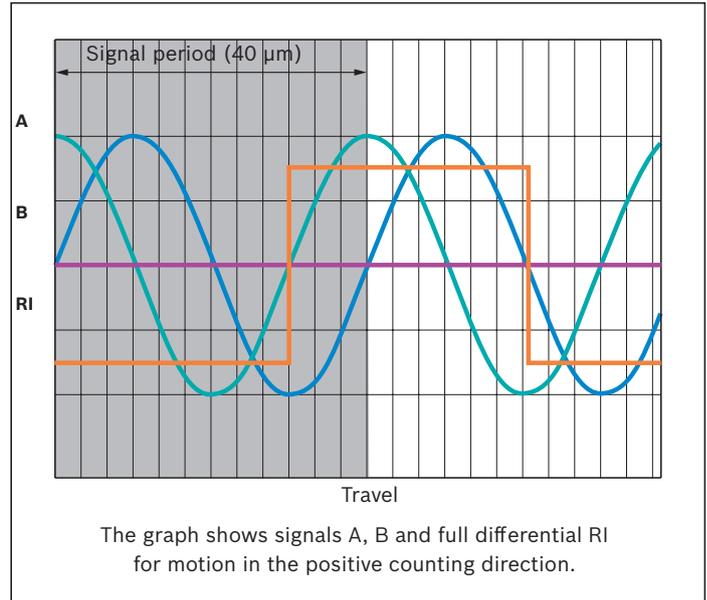
The sinusoidal incremental signals A and B are phase-shifted 90° relative to each other and have a typical signal amplitude of 1 V_{pp}.

Signal amplitude: A, B = 1 V_{pp} (±0.1 V)

The illustrated output signal sequence (B phase-lagged to A) relates to motion of the scanner in the positive counting direction (see graph).

Reference mark signal

The differential reference mark signal RI has an amplitude of approx. -0,7 V when inactive (low). In the active state (high), the amplitude is +0,7 V.



Digital output signals

Square-wave TTL output signals through an integrated interpolation unit (Option I2, I3, I4)

Incremental signals

The digital incremental signals A and B comply with the EIA/TIA-422-A standard. They are 90° phase shifted and have the following signal levels:

$$U_{\text{high}} > 2 \text{ V}$$

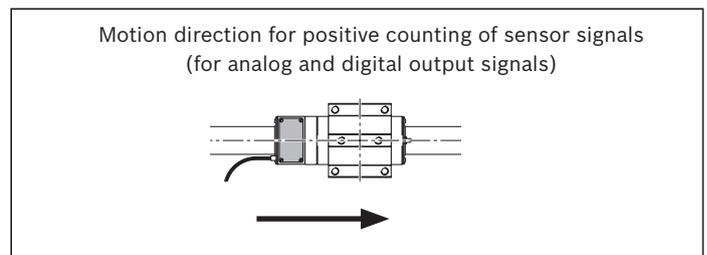
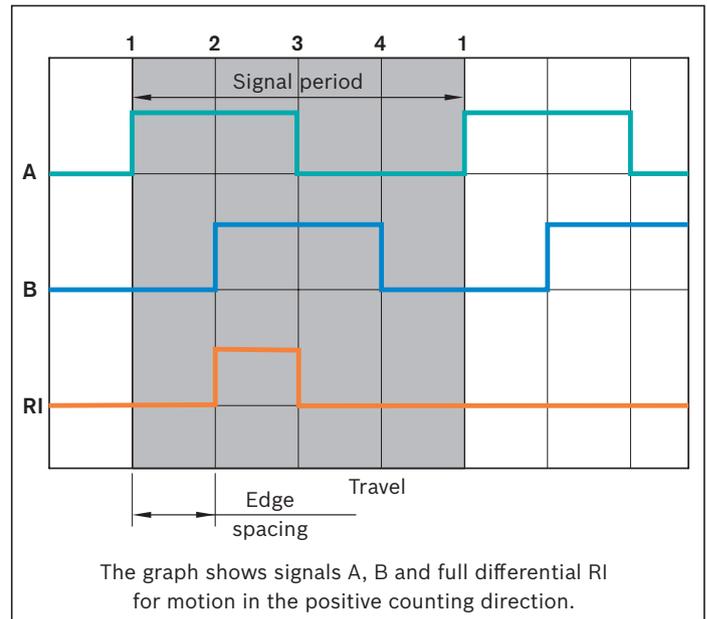
$$U_{\text{low}} < -2 \text{ V}$$

The switching response times are ≤ 100 ns at a capacitive load of ≤ 1000 pF.

Reference mark signal

The differential reference mark signal RI has the same electrical characteristics as the incremental signals.

The stated amplitudes apply for operation with a terminating resistor $Z_0 = 120 \Omega$. (See interface circuitry)



Resolution

Measuring systems with digital output signals are available with resolution rates of 1 μm, 5 μm, 10 μm.

Option	Resolution (edge spacing) (μm)	Signal period (μm)	Max. scanner travel speed (m/s)
I2	1	4	2.0
I3	5	20	5.0
I4	10	40	5.0

Interface circuitry for analog and digital output signals

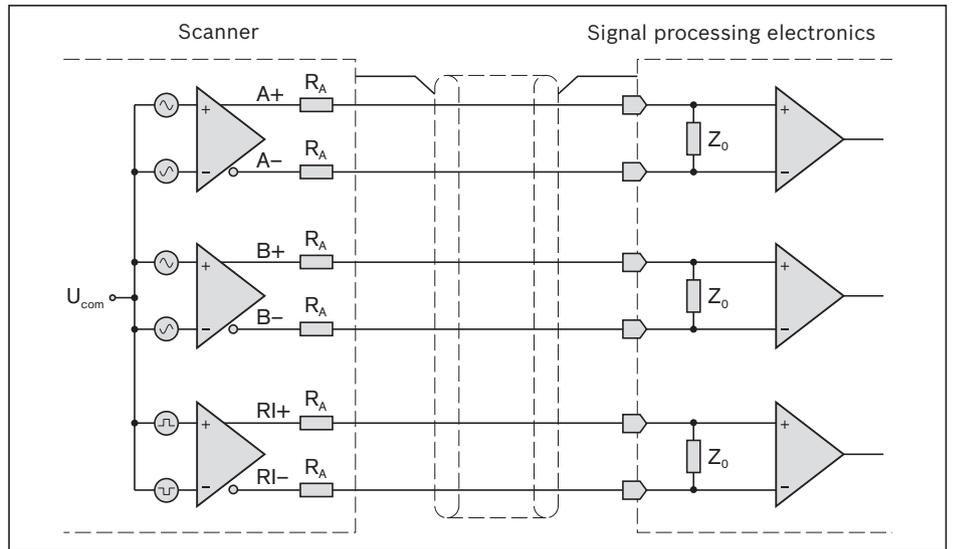
The stated amplitudes apply for operation with a terminating resistor

$Z_0 = 120 \Omega$.

$R_A = 27.40 \Omega$

$Z_0 = 120.00 \Omega$

$U_{com} = 1.65 \text{ V}$

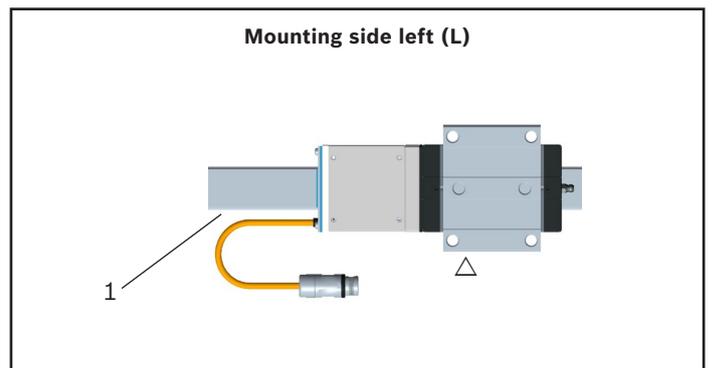
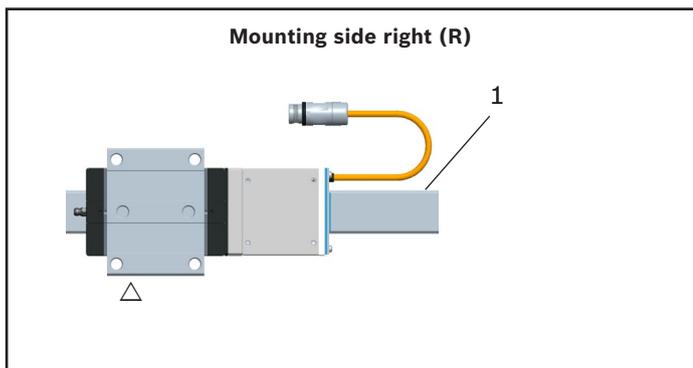


Safe-Motion

None of the output signals (I1, I2, I3, I4) may be used for drive-integrated safety functions for the controller. Exceptions: Safety functions which do not poll encoder signals.

Scanner mounting side

The scanner mounting side defines the side upon which the reference edge (Δ) of the runner block is located in relation to the scale (1) on the guide rail when the scanner is mounted.



Design notes:

The direction for sliding on the IMS-I runner block must be defined at the design stage.

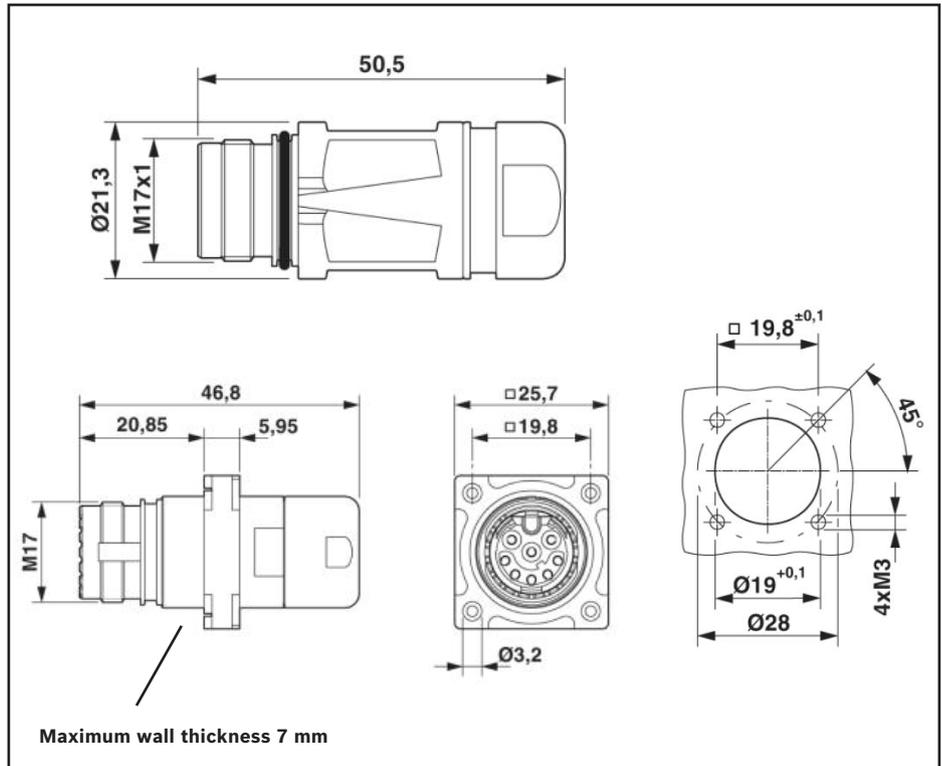
IMS-I runner blocks must be slid onto the rail so that the cable outlet is always on the same side of the IMS-I guide rail as the scale is.

Description and Technical Data of Connectors and Cable

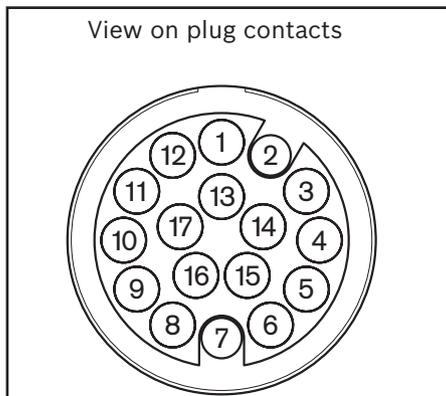
Connector types

Protection class: IP67 (when locked)

Option A: RGS1722 (round connector)



Option B: RGS1714 (flanged housing for mounting in front or rear walls)



M17, 17 pin Connei Pin no.	Signal assignment	Color	Function
1	Inner shield		Inner cable shield
2	A +	green	Analog/digital distance information
3	A -	yellow	
4	GND	blue-white / blue-gray	Power supply GND
5	B +	brown	Analog/digital displacement information
6	B -	white	
7	Data +	gray	Data lines (not usable by customer)
8	Data -	pink	
9	Rl+	orange	Referencing information (zero position or distance coded)
10	Rl-	purple	
11	VDD	red-white / red-gray	Power supply VDD
12	n.c.	-	
13	n.c.	-	
14	n.c.	-	
15	0V_Sense	Blau-Schwarz	Sense line* GND
16	5V_Sense	Rot-Schwarz	Sense line* VDD
17	n.c.	-	
Housing	Outer shield		Outer shield contacted via connector housing

* If there is no voltage adjustment via sense lines available, the sense lines can be switched parallel to the power supply lines.

Cable

Structure

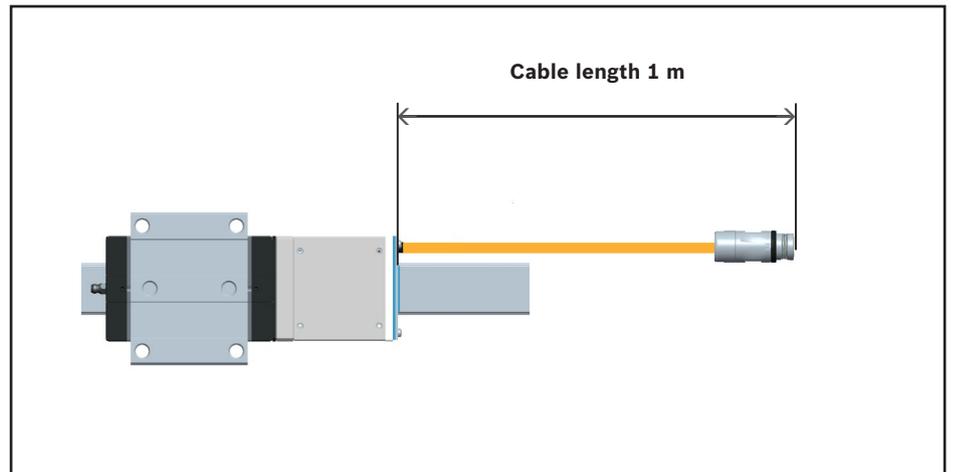
- Sheath: polyurethane (PUR)
- Color: RAL 2003 orange
- Outside diameter: 5.0 ± 0.30 mm
- Oil resistant
- RoHS compliant
- UL-Type 20963

Mechanical properties (standard cable)

Bending radius for one-time bending (stationary): 20 mm

Bending radius for repeated bending (flexing installation): 40 mm

Cable length



Description and Technical Data of Guide Rail

Guide Rail

The scale and the reference marks for the measuring system are integrated in the guide rail.

All tuning work has therefore been completed at the factory prior to shipment. The user does not incur any extra installation costs. Moreover, the system does not take up any additional space.

Mounting

The guide rail is mounted from above. The mounting holes can be sealed by a cover strip or with plugs.

Scale

The scale (1) is integrated in the side of the guide rail. It is a non-magnetic, high-precision, graduated steel strip with a pitch of 1,000 μm , which is joined to the rail by welding. When scanned, the scale itself delivers only ascending or descending numerical values (incremental signals): incremental measuring principle.

Scale protection

A rust-proof laser-welded stainless steel strip (2) protects the scale from contamination.

Reference marks

Reference sensor – reference marks

When scanned, the scale itself delivers only ascending or descending numerical values (incremental signals). This incremental measuring method does not allow the absolute position of the measuring system to be detected.

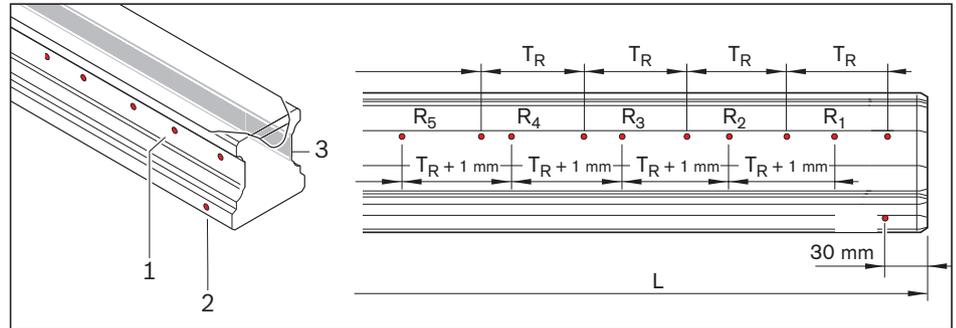
An additional reference is needed to determine the absolute position of the runner block on the rail. This can be provided in different ways:

- ▶ Distance-coded reference marks
- ▶ Single reference mark
- ▶ External mechanical stop or switch



Distance-coded reference marks

This reference marks are holes that are machined into the guide rail on the side opposite the scale and sealed to protect them from contamination. The distance coded reference marks supply a reference mark signal and are also protected by a tightly welded stainless steel strip. The side with reference marks is designated by a hole drilled into the reference edge of the guide rail. The coding ensures that an absolute positioning signal is available as soon as the sensor on the runner block has passed two reference marks.



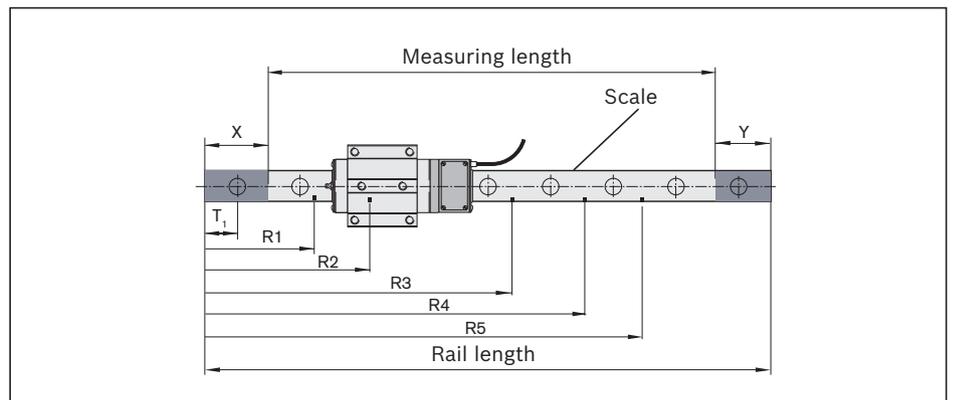
- 1) Distance-coded reference marks ($R_1 \dots R_n$)
 - 2) Hole identifying the reference mark side
 - 3) Scale on the opposite side
- T_R = Distance between reference marks
 L = Rail length

Reference mark spacing depending on rail length (mm)

L_{max}	T_R
800	40
2 400	70
4 000	90
4 500	100

Single, absolute reference mark

A single, absolute reference mark is a hole that is machined into the guide rail on the side opposite the scale. It is closed with a brass pin to protect it from contamination and damage. This sensor must travel past this reference mark to detect the position. Up to 5 single reference marks ($R_1 \dots R_5$) can be machined into the guide rail (please state the required positions when ordering). The minimum distance between 2 reference marks is 10 mm. The permitted positions for references marks can be found in the section “ Ball/Roller Guide Rails”.



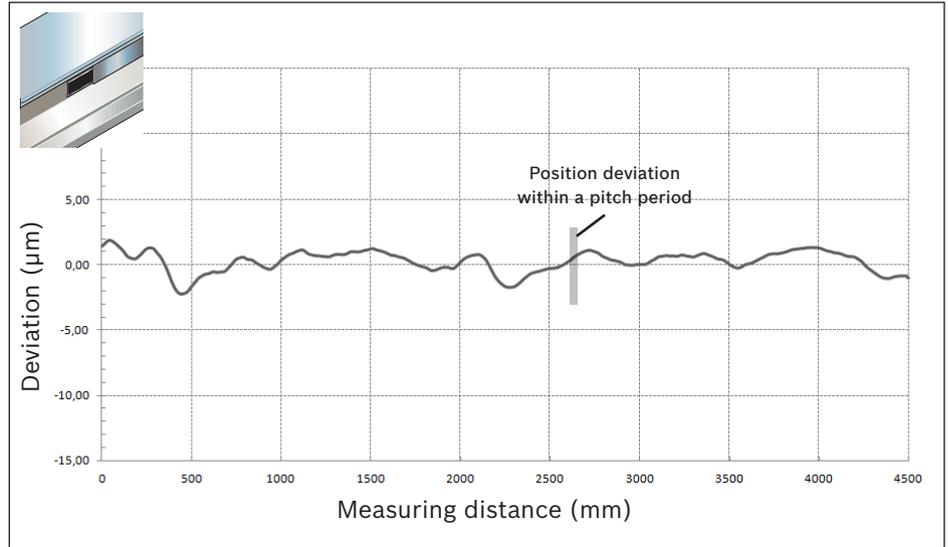
Description and Technical Data of Overall System

Accuracy of the measuring system

The accuracy of the measuring system is composed of the scale accuracy and the interpolation accuracy (scanning accuracy) of the scanner.

Scale accuracy

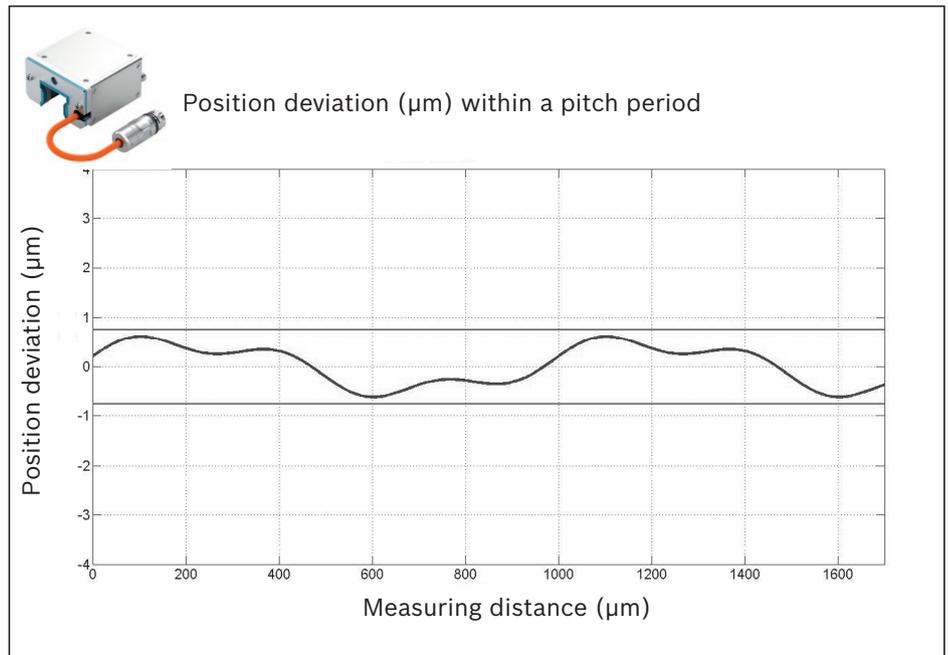
The scale accuracy is the maximum deviation from the mean of any position over a measuring distance of 1 m, expressed in $\pm a$ (μm), (long wave deviation over the measured length). A detailed accuracy report is provided.

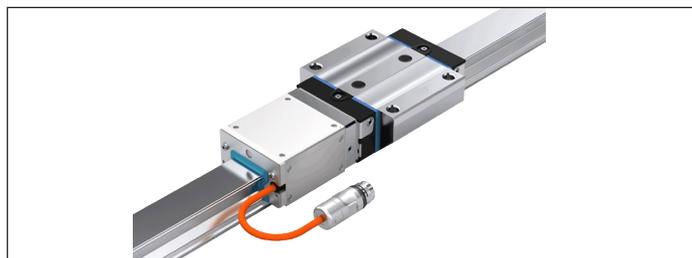


Interpolation accuracy

Scanning accuracy of the scanner:

The position deviations within one pitch period of the scale (1000 μm) are determined by the signal period of the IMS-I and by the accuracy of the scale and the accuracy with which it is scanned by the scanner. The position deviation is less than $\pm 0.75 \mu\text{m}$ over any chosen measuring distance of 1 mm in length.



System accuracy

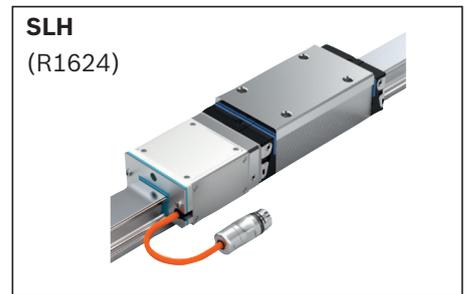
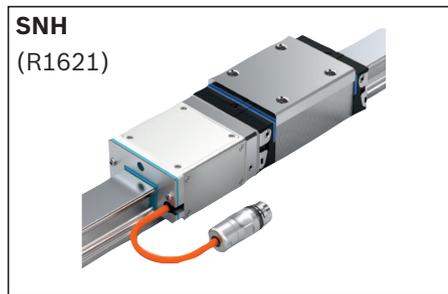
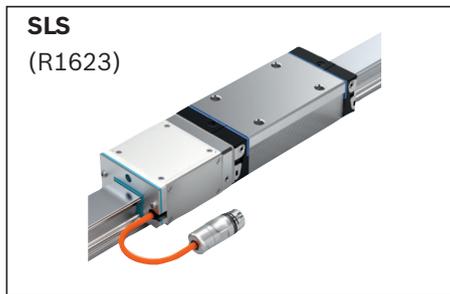
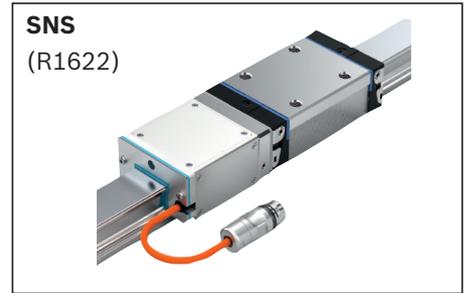
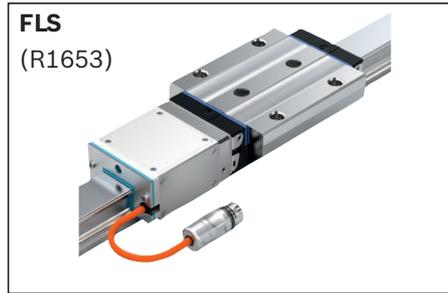
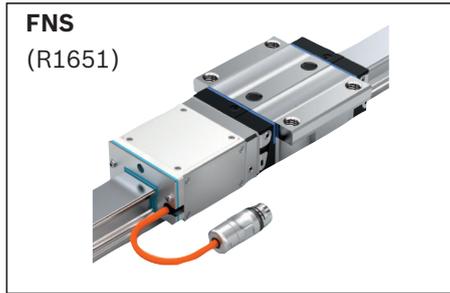
Scale accuracy ($\mu\text{m}/\text{m}$)	Interpolation accuracy (μm)	Repeatability (μm)
± 3	± 0.75	± 0.25
± 5	± 0.75	± 0.25

Interface (signal)	I1 (1V _{PP})	I2 (TTL 1 μm)	I3 (TTL 5 μm)	I4 (TTL 10 μm)
Recommended measuring increment (μm)	0.125	1	5	10

Technical data of overall system

	Ball Rail System	Roller Rail System	Comment
Type of signal	I1, I2, I3, I4	I1, I2, I3, I4	
Velocity v_{max} Homing cycle velocity v_{ref}	5 m/s at I1, I3, I4 2 m/s at I2	4 m/s at I1, I3, I4 2 m/s at I2	
Acceleration a_{max}	500 m/s ²	150 m/s ²	
Shock	500 m/s ² / 11 ms		according to EN 60068-2-27: 1993 / IEC 68-2-6:1995
Vibration	100 m/s ²		55-2000Hz, according to EN 60068-2-6: 1996 / IEC 68-2-6:1995
Protection class	IP67		tested with metalworking fluids Curtis S90
EMC	Immunity: EN 61326-1: 2006 Emissions: EN 61000-6-2, Class B		CE-marking
RoHS compliant			
UL compliant			

Product Overview and Type Designation, Ball Runner Blocks



Available versions

Ball runner blocks	Ball chain	Seal	Size																								
			20					25					30					35					45				
			P		S			P		S			P		S			P		S			P		S		
			C1	C2	C1	C2	C3	C1	C2	C1	C2	C3	C1	C2	C1	C2	C3	C1	C2	C1	C2	C3	C1	C2	C1	C2	C3
FNS	0/R	SS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	0/R	LS	✓					✓					✓					✓									
FLS	0/R	SS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	0/R	LS	✓		✓			✓		✓			✓		✓			✓		✓							
SNS	0/R	SS	✓	✓				✓	✓				✓	✓				✓	✓				✓	✓			
	0/R	LS	✓					✓					✓					✓									
SLS	0/R	SS	✓	✓				✓	✓				✓	✓				✓	✓				✓	✓			
	0/R	LS	✓					✓					✓					✓									
SNH	0/R	SS						✓	✓				✓	✓				✓	✓				✓	✓			
	0/R	LS						✓					✓					✓									
SLH	0/R	SS						✓	✓				✓	✓				✓	✓				✓	✓			
	0/R	LS						✓					✓					✓									

✓ = Available versions

Type designation Ball Runner Block with IMS-I (example)

I	M	S	2	I	-	K	W	D	-	0	2	0	-	F	N	S	-	C	2	-	P	-	S	S	-	R	-	R	-	I	1	-	A	-	1	0	0	-	D			
										1				2				3				4		5		6		7				8		9				10				11

1 Size

Feature	Description
020	Size 20
025	Size 25
030	Size 30
035	Size 35
045	Size 45

2 Design style

Feature	Description
FNS	Flanged, normal, standard height
FLS	Flanged, long, standard height
SNS	Slimline, normal, standard height
SLS	Slimline, long, standard height
SNH	Slimline, normal, high
SLH	Slimline, long, high

3 Preload class

Feature	Description
C1	Preload class C1
C2	Preload class C2
C3	Preload class C3

4 Accuracy class

Feature	Description
P	Precision
S	Super precision (SP)

5 Seal

Feature	Description
SS	Standard seal
LS	Low-friction seal

6 Ball chain

Feature	Description
0	Without ball chain
R	With ball chain

7 Scanner mounting side

Feature	Description
R	Right
L	Left

8 Interface

Feature	Description
I 1	1 V _{pp} 40 μm
I 2	TTL 1 μm
I 3	TTL 5 μm
I 4	TTL 10 μm

9 Connector type

Feature	Description
A	RGS 1722
B	RGS 1714

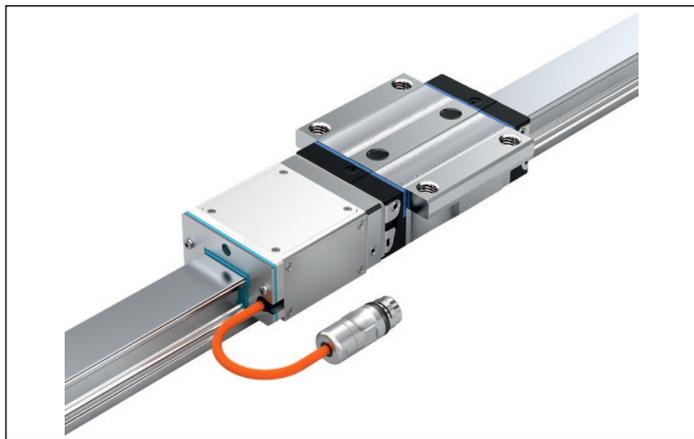
10 Cable length

Feature	Description
100	1.0 meter

11 Documentation

Feature	Description
D	Standard documentation

Ball Runner Blocks FNS



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With initial greasing (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Ball runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

FNS	Ball Chain	Seal	Size																													
			20						25						30						35						45					
			P		S				P		S				P		S				P		S				P		S			
			C1	C2	C1	C2	C3	C1	C2	C1	C2	C3	C1	C2	C1	C2	C3	C1	C2	C1	C2	C3	C1	C2	C1	C2	C3					
	0/R	SS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	0/R	LS	✓		✓			✓		✓			✓		✓			✓		✓												

✓ = Available versions

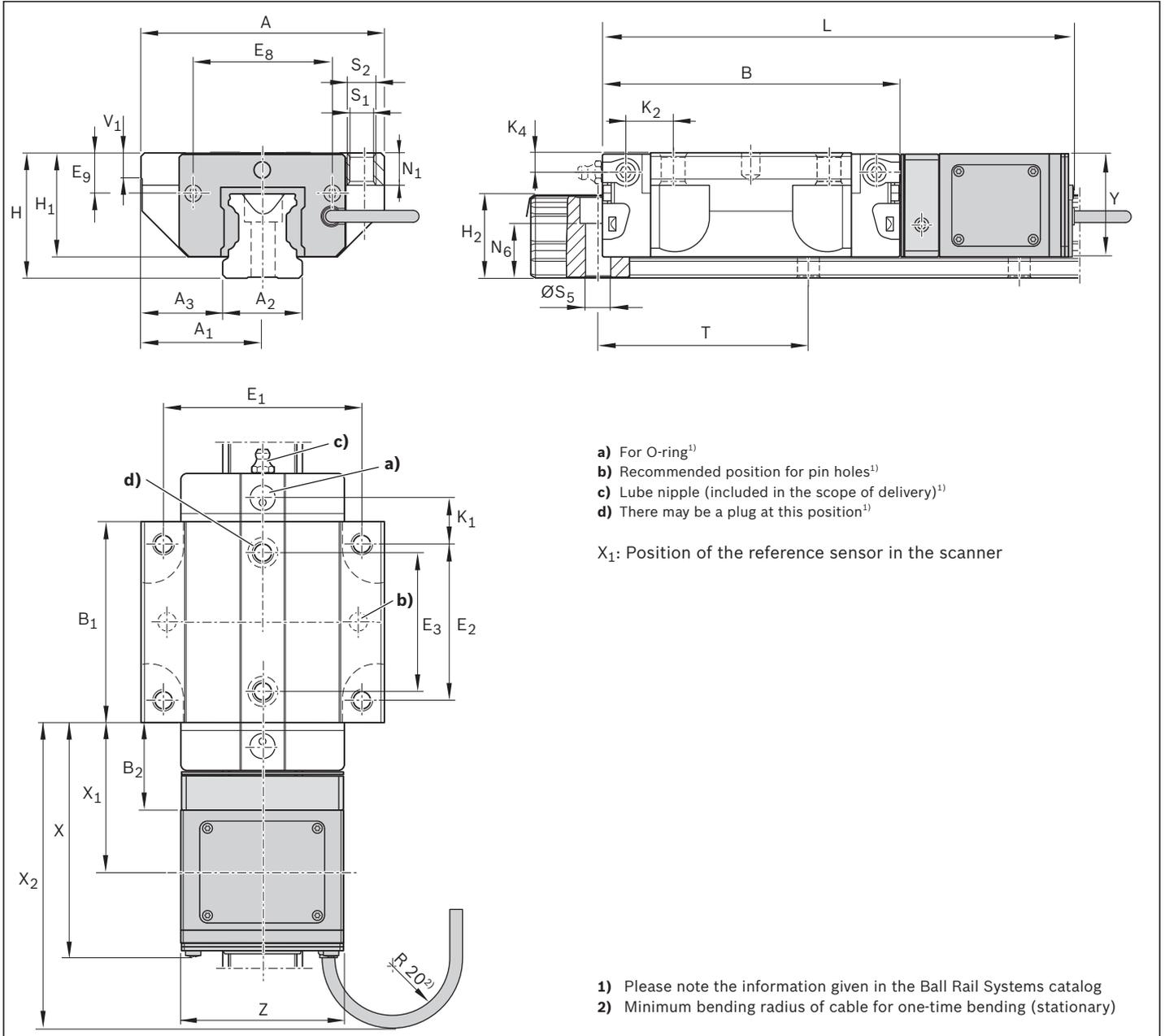
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₃	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₄
20	63	31.5	20	21.5	75.0	49.6	23.45	53	40	35	32.5	7.30	30	25.35	20.75	20.55	11.80	11.8	3.35
25	70	35.0	23	23.5	86.2	57.8	24.95	57	45	40	38.3	11.50	36	29.90	24.45	24.25	12.45	13.6	5.50
30	90	45.0	28	31.0	97.7	67.4	27.40	72	52	44	48.4	14.60	42	35.35	28.55	28.35	14.00	15.7	6.05
35	100	50.0	34	33.0	110.5	77.0	29.00	82	62	52	58.0	17.35	48	40.40	32.15	31.85	14.50	16.0	6.90
45	120	60.0	45	37.5	137.6	97.0	32.55	100	80	60	69.80	20.90	60	50.30	40.15	39.85	17.30	19.3	8.20

Size	L	N ₁	N ₆ ^{±0.5}	S ₁	S ₂	S ₅	T	V ₁	X	X ₁	X ₂	Y	Z
20	155.9	7.7	13.2	5.3	M6	6.0	60	6.0	93.10	53.45	118.10	24.93	43
25	167.1	9.3	15.2	6.7	M8	7.0	60	7.5	94.60	54.95	119.60	29.43	47
30	180.6	11.0	17.0	8.5	M10	9.0	80	7.0	97.55	57.40	122.55	34.50	59
35	193.7	12.0	20.5	8.5	M10	9.0	80	8.0	99.45	59.00	124.45	39.50	69
45	222.0	15.0	23.5	10.4	M12	14.0	105	10.0	104.2	62.55	129.20	49.50	85

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

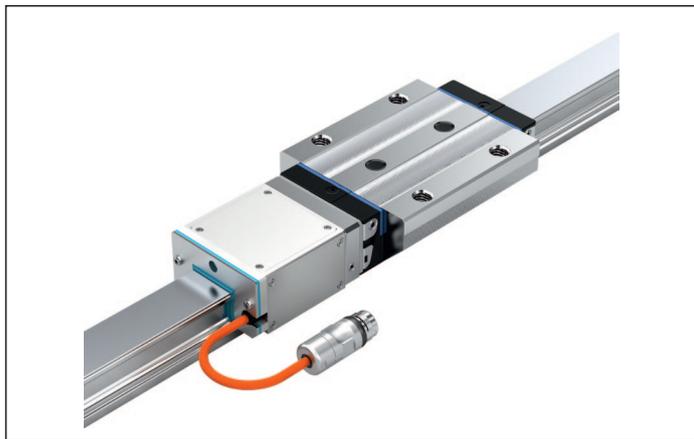


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class	
			$F_{y \max}$ → ← $F_{y \max}$	$M_{L \max}$
	m	C1/C2	C1	C2
20	0.67	9 400	52	65
25	0.91	11 400	81	90
30	1.42	15 850	131	145
35	2.00	20 950	154	220
45	3.58	34 050	267	445

3) Values for runner block without ball chain with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the “Ball Rail Systems” catalog must be used. Values for ball runner block with ball chain available on request.

Ball Runner Blocks FLS



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With initial greasing (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Ball runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

FLS	Ball Chain	Seal	Size																													
			20						25						30						35						45					
			P		S				P		S				P		S				P		S				P		S			
			C1	C2	C1	C2	C3	C1	C2	C1	C2	C3	C1	C2	C1	C2	C3	C1	C2	C1	C2	C3	C1	C2	C1	C2	C3					
0/R	SS		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
0/R	LS		✓		✓			✓		✓				✓		✓																

✓ = Available versions

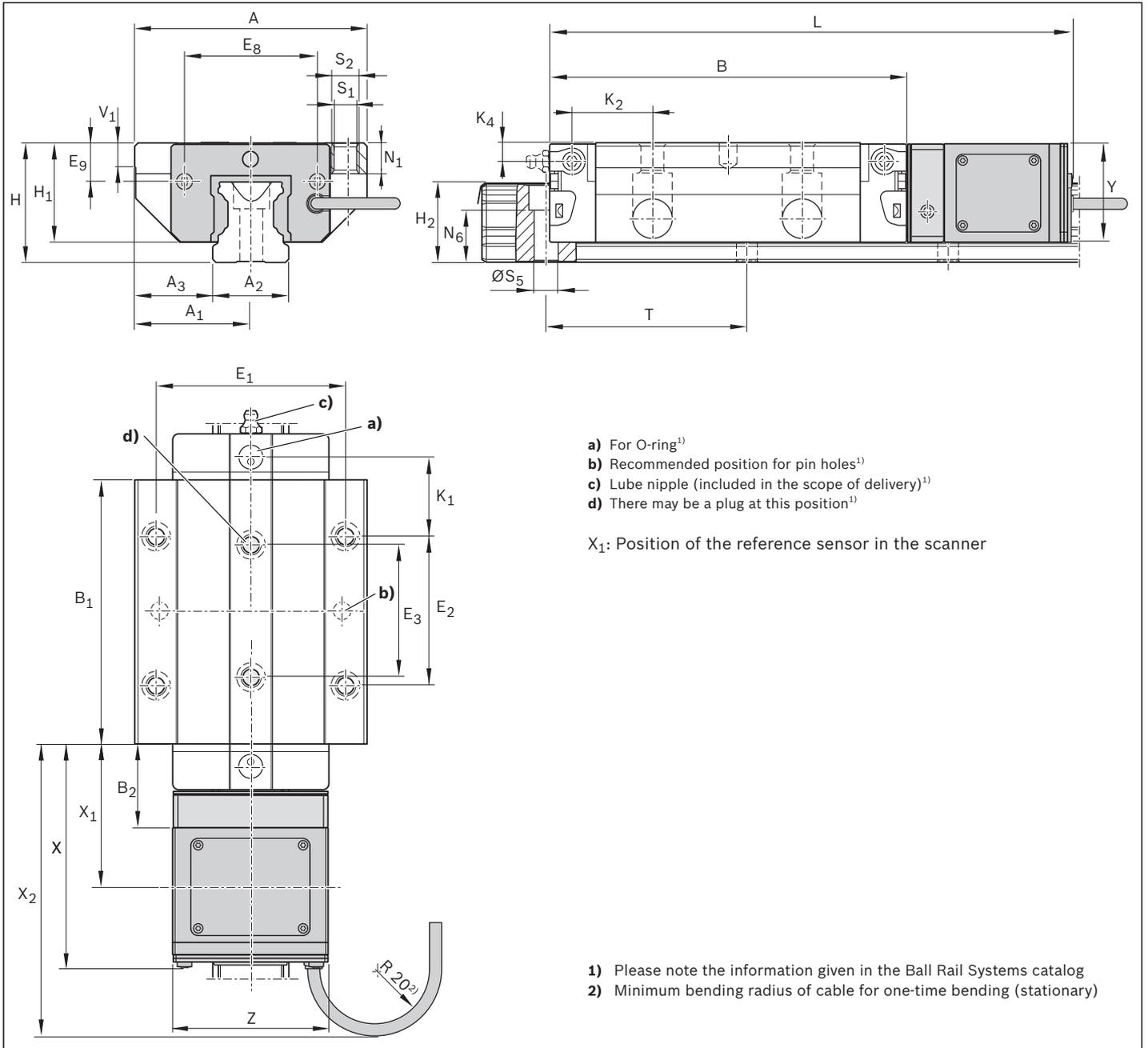
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₃	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₄
20	63	31.5	20	21.5	91.0	65.6	23.45	53	40	35	32.5	7.30	30	25.35	20.75	20.55	19.80	19.80	3.35
25	70	35.0	23	23.5	107.9	79.5	24.95	57	45	40	38.3	11.50	36	29.90	24.45	24.25	23.30	24.45	5.50
30	90	45.0	28	31.0	119.7	89.4	27.40	72	52	44	48.4	14.60	42	35.35	28.55	28.35	25.00	26.70	6.05
35	100	50.0	34	33.0	139.0	105.5	29.00	82	62	52	58.0	17.35	48	40.40	32.15	31.85	28.75	30.25	6.90
45	120	60.0	45	37.5	174.1	133.5	32.55	100	80	60	69.8	20.90	60	50.30	40.15	39.85	35.50	37.50	8.20

Size	L	N1	N ₆ ^{±0.5}	S ₁	S ₂	S ₅	T	V ₁	X	X ₁	X ₂	Y	Z
20	171.9	7.7	13.2	5.3	M6	6.0	60	6.0	93.10	53.45	118.10	24.93	43
25	188.8	9.3	15.2	6.7	M8	7.0	60	7.5	94.60	54.95	119.60	29.43	47
30	202.6	11.0	17.0	8.5	M10	9.0	80	7.0	97.55	57.40	122.55	34.50	59
35	222.2	12.0	20.5	8.5	M10	9.0	80	8.0	99.45	59.00	124.45	39.50	69
45	258.5	15.0	23.5	10.4	M12	14.0	105	10.0	104.2	62.55	129.20	49.50	85

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

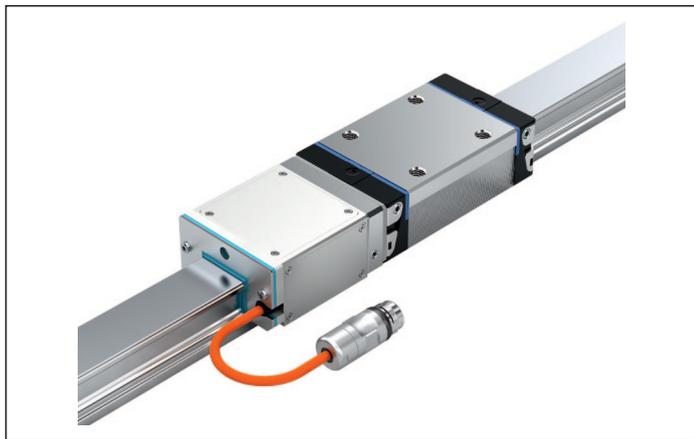


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class	
			C1/C2	C1 C2
	m			
20	0.77	12 200	140	155
25	1.16	15 200	215	215
30	1.82	20 000	345	345
35	2.65	27 800	600	600
45	4.88	45 200	1 098	1 220

3) Values for runner block without ball chain with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the "Ball Rail Systems" catalog must be used. Values for ball runner block with ball chain available on request.

Ball Runner Blocks SNS



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With initial greasing (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Ball runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SNS	Ball Chain	Seal	Size																		
			20		25		30		35		45										
			P		P		P		P		P										
			C1	C2	C1	C2	C1	C2	C1	C2	C1	C2									
	O/R	SS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	O/R	LS	✓		✓		✓		✓		✓		✓								

✓ = Available versions

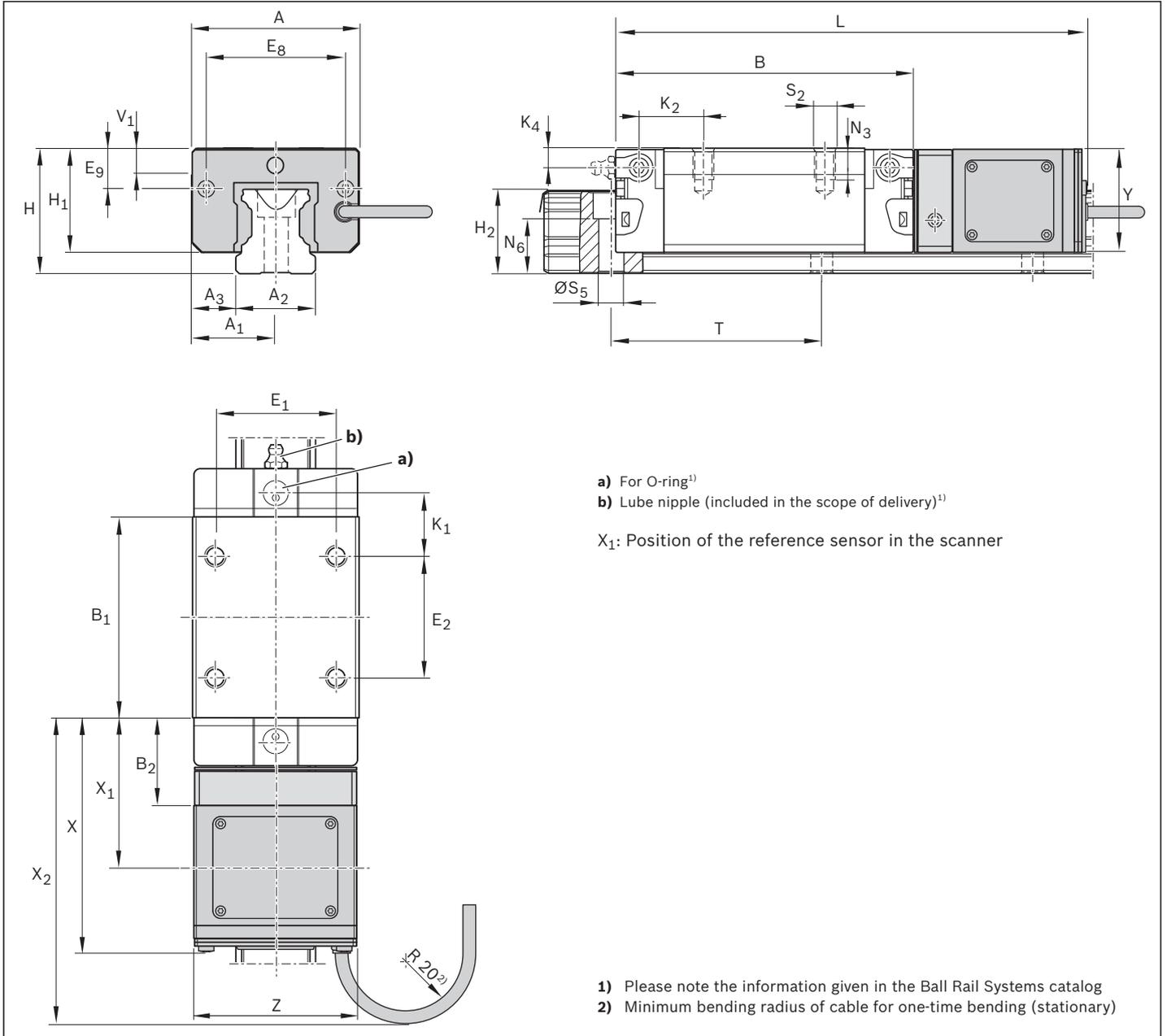
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₄
20	44	22	20	12.0	75.0	49.6	23.45	32	36	32.5	7.30	30	25.35	20.75	20.55	13.80	13.80	3.35
25	48	24	23	12.5	86.2	57.8	24.95	35	35	38.3	11.50	36	29.90	24.45	24.25	17.45	18.60	5.50
30	60	30	28	16.0	97.7	67.4	27.40	40	40	48.4	14.60	42	35.35	28.55	28.35	20.00	21.70	6.05
35	70	35	34	18.0	110.5	77.0	29.00	50	50	58.0	17.35	48	40.40	32.15	31.85	20.50	22.00	6.90
45	86	43	45	20.5	137.6	97.0	32.55	60	60	69.80	20.90	60	50.30	40.15	39.85	27.30	29.30	8.20

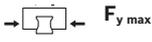
Size	L	N ₃	N ₆ ^{±0.5}	S ₂	S ₅	T	V ₁	X	X ₁	X ₂	Y	Z
20	155.9	7.5	13.2	M5	6.0	60	6.0	93.10	53.45	118.10	24.93	43
25	167.1	9.0	15.2	M6	7.0	60	7.5	94.60	54.95	119.60	29.43	47
30	180.6	12.0	17.0	M8	9.0	80	7.0	97.55	57.40	122.55	34.50	59
35	193.7	13.0	20.5	M8	9.0	80	8.0	99.45	59.00	124.45	39.50	69
45	222.0	18.0	23.5	M10	14.0	105	10.0	104.2	62.55	129.20	49.50	85

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

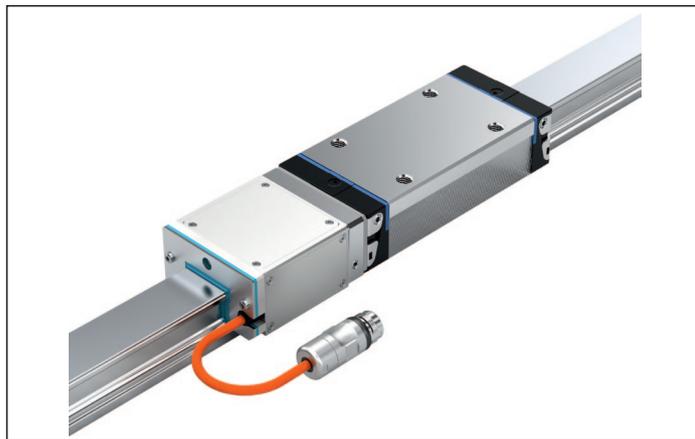


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class	
			C1	C2
	m			
		$F_{y \max}$ →  ← $F_{y \max}$		
			$M_{L \max}$ 	
		C1/C2	C1	C2
20	0.57	9 400	52	65
25	0.76	11 400	63	90
30	1.17	15 850	116	145
35	1.65	20 950	154	220
45	2.98	34 050	223	356

3) Values for runner block without ball chain with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the “Ball Rail Systems” catalog must be used. Values for ball runner block with ball chain available on request.

Ball Runner Blocks SLS



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With initial greasing (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Ball runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SLS	Ball Chain	Seal	Size																		
			20		25		30		35		45										
			P		P		P		P		P										
			C1	C2	C1	C2	C1	C2	C1	C2	C1	C2									
0/R		SS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
0/R		LS	✓		✓		✓		✓		✓		✓								

✓ = Available versions

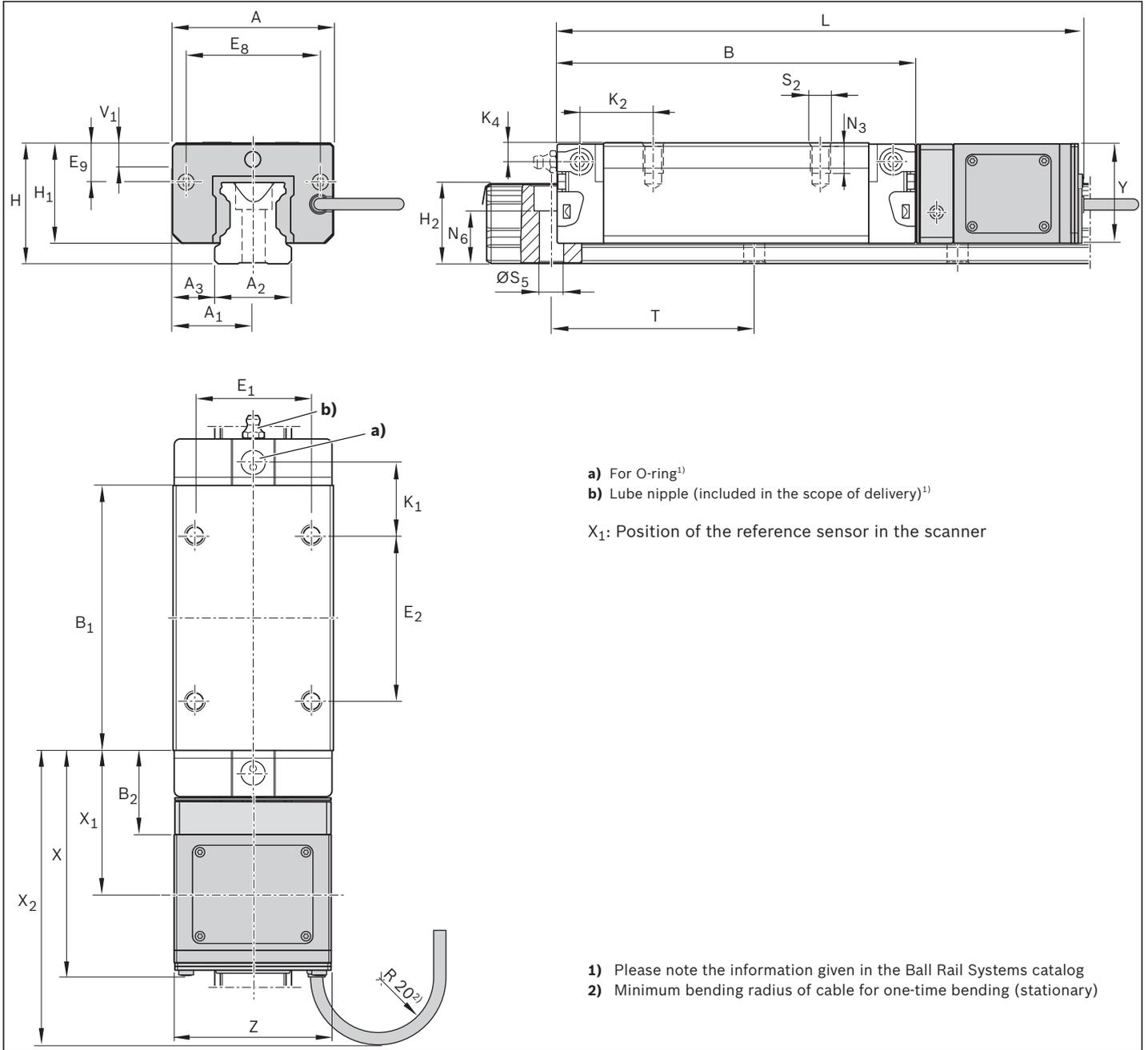
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₄
20	44	22	20	12.0	91.0	65.6	23.45	32	50	32.50	7.30	30	25.35	20.75	20.55	14.80	14.80	3.35
25	48	24	23	12.5	107.9	79.5	24.95	35	50	38.30	11.50	36	29.90	24.45	24.25	20.80	21.95	5.50
30	60	30	28	16.0	119.7	89.4	27.40	40	60	48.40	14.60	42	35.35	28.55	28.35	21.00	22.70	6.05
35	70	35	34	18.0	139.0	105.5	29.00	50	72	58.00	17.35	48	40.40	32.15	31.85	23.75	25.25	6.90
45	86	43	45	20.5	174.1	133.5	32.55	60	80	69.80	20.90	60	50.30	40.15	39.85	35.50	37.50	8.20

Size	L	N ₃	N ₆ ^{±0.5}	S ₂	S ₅	T	V ₁	X	X ₁	X ₂	Y	Z
20	171.9	7.5	13.2	M5	6.0	60	6.0	93.10	53.45	118.10	24.93	43
25	188.8	9.0	15.2	M6	7.0	60	7.5	94.60	54.95	119.60	29.43	47
30	202.6	12.0	17.0	M8	9.0	80	7.0	97.55	57.40	122.55	34.50	59
35	222.2	13.0	20.5	M8	9.0	80	8.0	99.45	59.00	124.45	39.50	69
45	258.5	18.0	23.5	M10	14.0	105	10.0	104.2	62.55	129.20	49.50	85

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

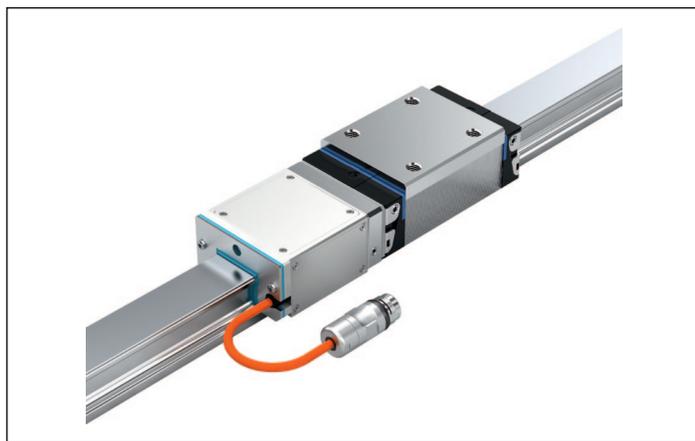


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class		
	m	C1/C2	C1	C2	
20	0.67	12 200	140	155	
25	0.91	15 200	215	215	
30	1.42	20 000	345	345	
35	2.10	27 800	540	600	
45	3.78	45 200	854	1 220	

3) Values for runner block without ball chain with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the “Ball Rail Systems” catalog must be used. Values for ball runner block with ball chain available on request.

Ball Runner Blocks SNH



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With initial greasing (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Ball runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SNH	Ball Chain	Seal	Size																		
			25		30		35		45												
			P		P		P		P												
			C1	C2	C1	C2	C1	C2	C1	C2											
	0/R	SS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	0/R	LS	✓		✓		✓														

✓ = Available versions

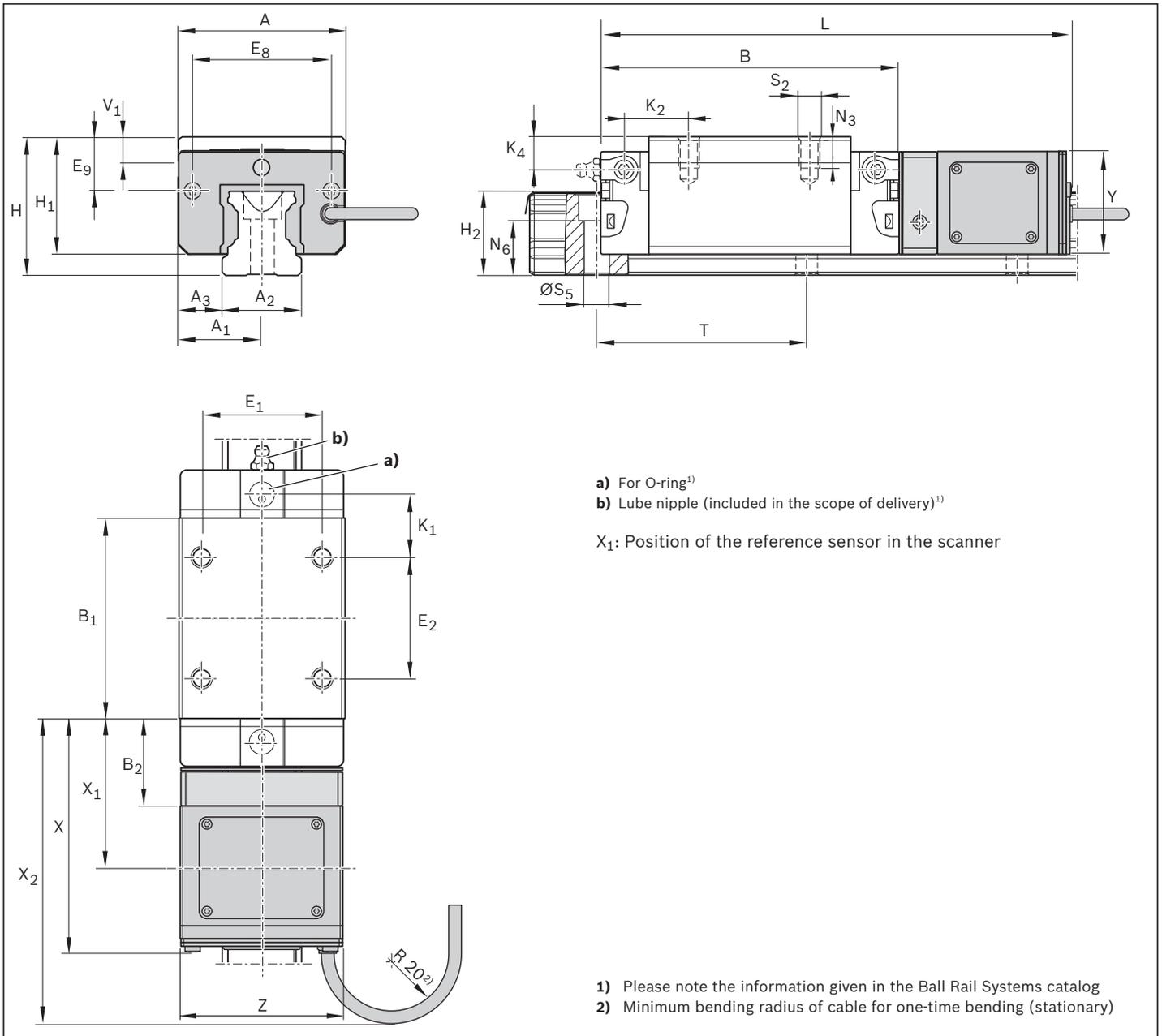
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₃	K ₄
25	48	24	23	12.5	86.2	57.8	24.95	35	35	38.30	15.50	40	33.90	24.45	24.25	17.45	18.6	9.50	9.50
30	60	30	28	16.0	97.7	67.4	27.40	40	40	48.40	17.60	45	38.35	28.55	28.35	20.00	21.7	9.05	9.05
35	70	35	34	18.0	110.5	77.0	29.00	50	50	58.00	24.35	55	47.40	32.15	31.85	20.50	22.0	13.90	13.90
45	86	43	45	20.5	137.6	97.0	32.55	60	60	69.80	30.90	70	60.30	40.15	39.85	27.30	29.3	18.20	18.20

Size	L	N ₃	N ₆ ^{±0.5}	S ₂	S ₅	T	V ₁	X	X ₁	X ₂	Y	Z
25	167.1	9.0	15.2	M6	7.0	60	7.5	94.60	54.95	119.60	29.43	47
30	180.6	12.0	17.0	M8	9.0	80	7.0	97.55	57.40	122.55	34.50	59
35	193.7	13.0	20.5	M8	9.0	80	8.0	99.45	59.00	124.45	39.50	69
45	222.0	18.0	23.5	M10	14.0	105	10.0	104.2	62.55	129.20	49.50	85

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

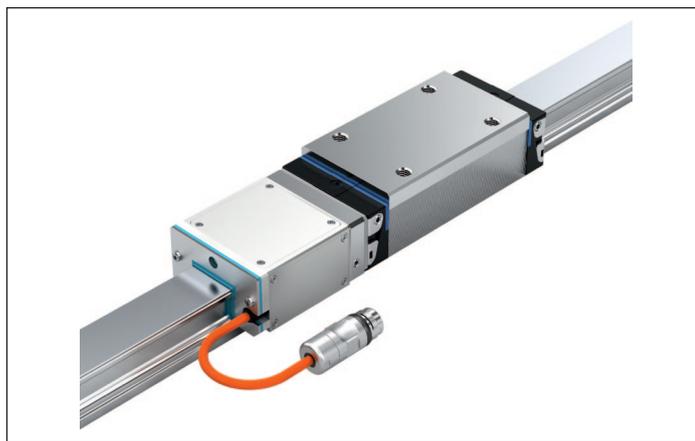


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class	
	m	C1/C2	C1	C2
25	0.86	11 400	81	90
30	1.27	15 850	131	145
35	1.95	20 950	176	220
45	3.58	34 050	401	312

3) Values for runner block without ball chain with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the “Ball Rail Systems” catalog must be used. Values for ball runner block with ball chain available on request.

Ball Runner Blocks SLH



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With initial greasing (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Ball runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SLH	Ball Chain	Seal	Size									
			25		30		35		45			
			P		P		P		P			
				C1	C2	C1	C2	C1	C2	C1	C2	
	0/R	SS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	0/R	LS	✓		✓		✓					

✓ = Available versions

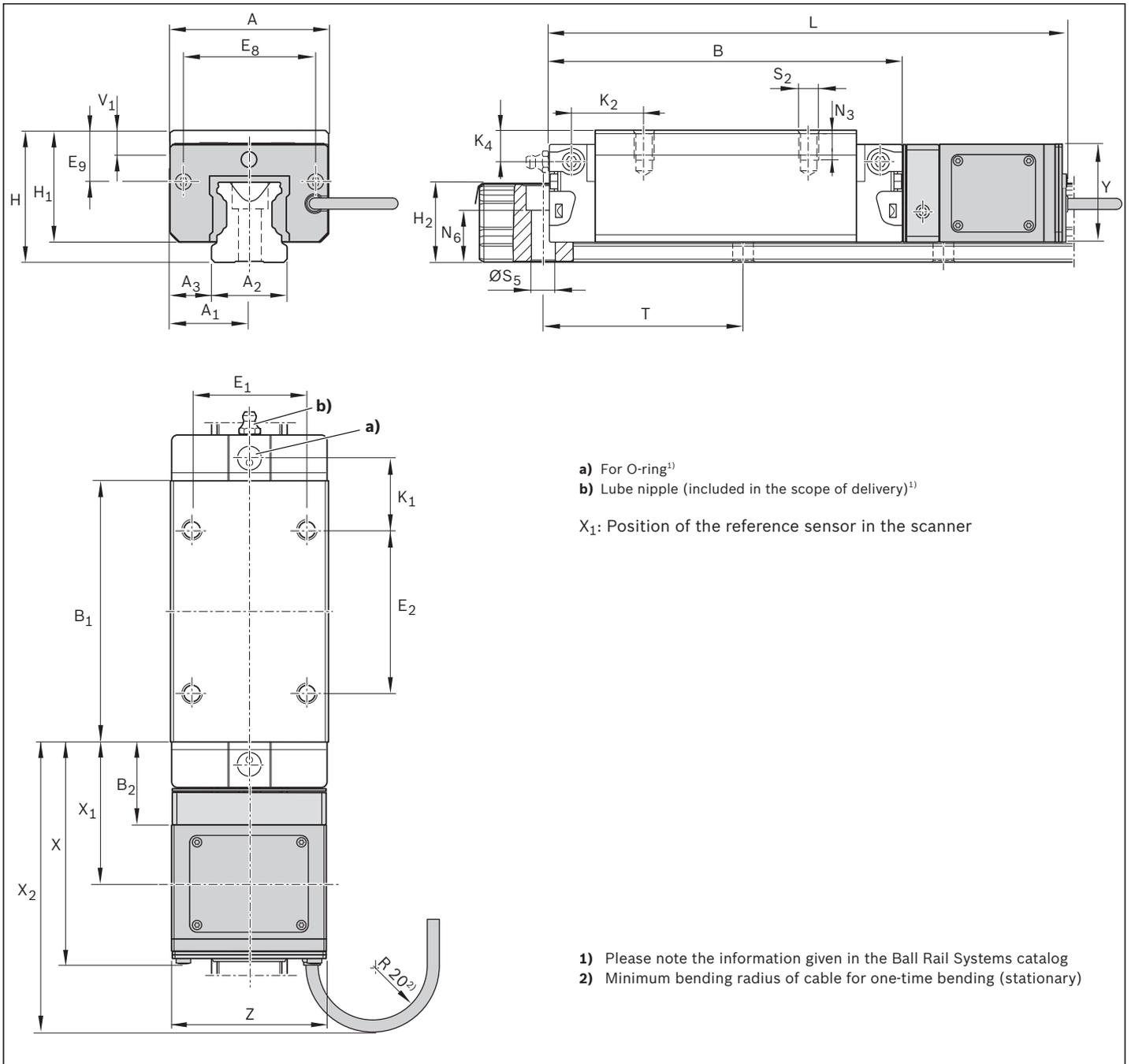
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₄
25	48	24	23	12.5	107.9	79.5	24.95	35	50	38.3	15.50	40	33.90	24.45	24.25	20.80	21.95	9.50
30	60	30	28	16.0	119.7	89.4	27.40	40	60	48.4	17.60	45	38.35	28.55	28.35	21.00	22.70	9.05
35	70	35	34	18.0	139.0	105.5	29.00	50	72	58.0	24.35	55	47.40	32.15	31.85	23.75	25.25	13.90
45	86	43	45	20.5	174.1	133.5	32.55	60	80	69.8	30.90	70	60.30	40.15	39.85	35.50	37.50	18.20

Size	L	N ₃	N ₆ ^{20.5}	S ₂	S ₅	T	V ₁	X	X ₁	X ₂	Y	Z
25	188.8	9.0	15.2	M6	7.0	60	7.5	94.60	54.95	119.60	29.43	47
30	202.6	12.0	17.0	M8	9.0	80	7.0	97.55	57.40	122.55	34.50	59
35	222.2	13.0	20.5	M8	9.0	80	8.0	99.45	59.00	124.45	39.50	69
45	258.5	18.0	23.5	M10	14.0	105	10.0	104.2	62.55	129.20	49.50	85

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip



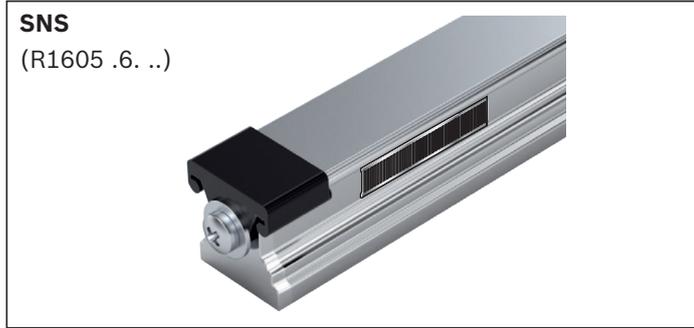
Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class		
					
	m		C1	C2	
25	1.06		15 200	215	215
30	1.52		20 000	345	345
35	2.50		27 800	600	600
45	4.68		45 200	1 220	1 220

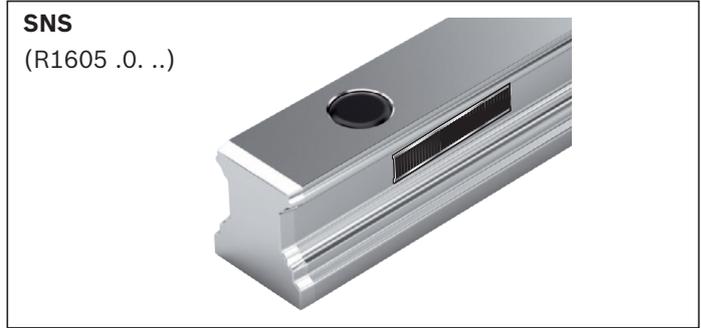
3) Values for runner block without ball chain with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the "Ball Rail Systems" catalog must be used. Values for ball runner block with ball chain available on request.

Product Overview and Type Designation, Ball Guide Rails

Ball Guide Rails with Cover Strip and Protective End Caps and integrated scale



Ball Guide Rails with plastic mounting hole plugs and integrated scale



Available versions

Ball Guide Rails SNS	Size									
	20		25		30		35		45	
	P	S	P	S	P	S	P	S	P	S
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions

Type designation Ball Guide Rails with scale (example)

I	M	S	2	I	-	K	S	A	-	0	2	0	-	S	N	S	-	P	-	M	A	-	A	B	-	1	-	R	2	-	A	3	-	D						
										1				2				3				4				5				6				7			8			9

1 Size

Feature	Description
020	Size 20
025	Size 25
030	Size 30
035	Size 35
045	Size 45

2 Design style

Feature	Description
SNS	Slimline, normal, standard height
SNO	SNS without groove (on request)

3 Accuracy class

Feature	Description
P	Precision
S	Super precision (SP)

4 Mounting

Feature	Description
MA	Mounting from above

5 Cover

Feature	Description
AB	With cover strip and protective end caps
AK	With plastic mounting hole plugs

7 Coding

Feature	Description
R0	Without reference marks
R1	With 1 reference mark
R2	With 2 reference marks
R3	With 3 reference marks
R4	With 4 reference marks
R5	With 5 reference marks
RD	With distance-coded reference marks

6 Number of sections

Feature	Description
1	Number of sections

8 Scale pitch accuracy

Feature	Description
A3	$\pm 3 \mu\text{m} / \text{m}$ (max. rail length: 1 000 mm)
A5	$\pm 5 \mu\text{m} / \text{m}$ (max. rail length: $L_{\text{max.}}$)

9 Dokumentation

Feature	Description
D	Standard Documentation

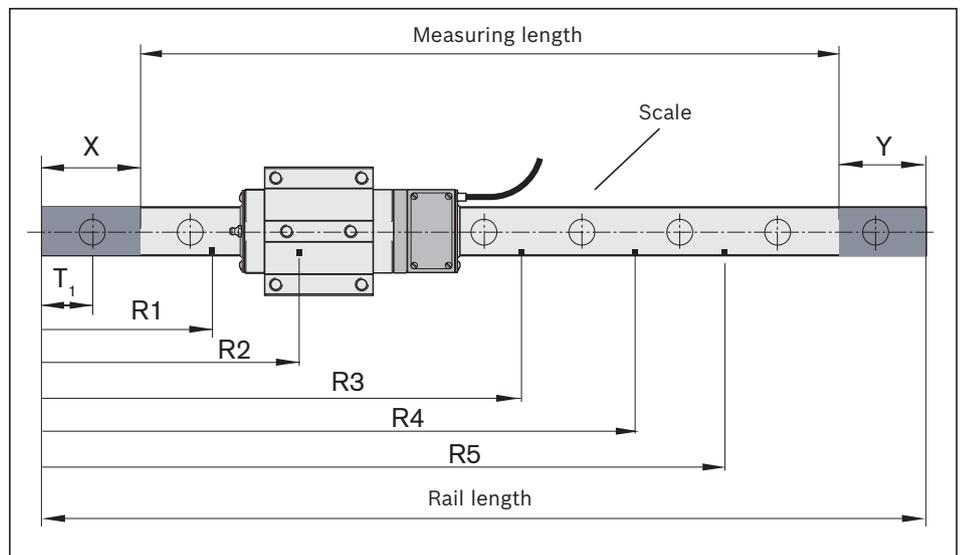
Permitted positions of single reference marks (7 Coding, feature: R1 ... R5)

Due to mechanical boundary conditions, the reference mark positions must be chosen as specified in the drawing below. No reference marks may be positioned in the areas X and Y. In other words, define the positions for R1 ... R5 so that these are $>X$ and $>Y$. Specify the positions in increments of 1 mm.

Example: Size 20: $R_1 = 155 \text{ mm}$, $R_n = \text{rail length} - 63 \text{ mm}$, with cover strip and protective end caps (AB).

Between the single reference marks there must be a minimum space of 10 mm.

Size	Dimensions (mm)			
	Feature AB (R1605 .6. ...)		Feature AK (R1605 .0. ...)	
	X	Y	X	Y
20	154	62	134	42
25	170	62	150	42
30	184	62	164	42
35	203	62	183	42
45	238	62	218	42



R1 ... R5 Positions of the reference marks

Ball Guide Rails SNS with Cover Strip and Protective End Caps



- ▶ For mounting from above, with cover strip made of corrosion-resistant spring steel per EN 10088 and screw-down plastic protective end caps (with threaded mounting holes on end faces).
- ▶ With integrated scale

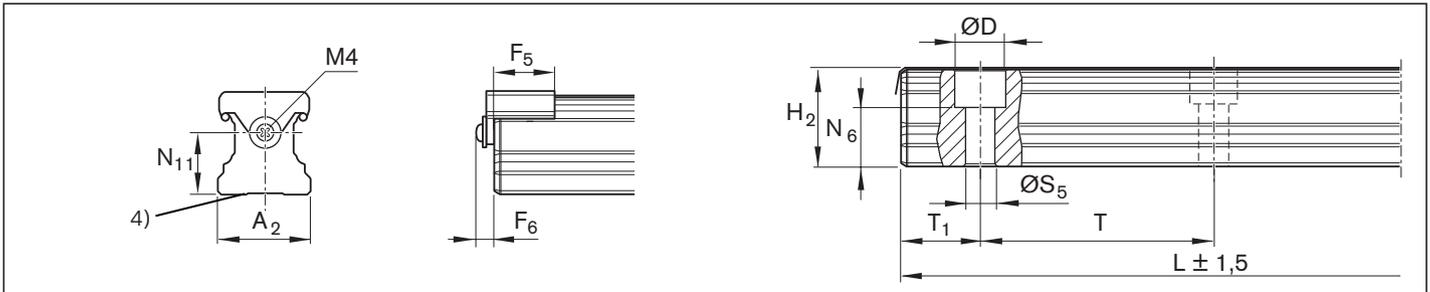
Notes

- ▶ Secure the cover strip!
- ▶ As an alternative, the cover strip can be secured with screws and washers.
- ▶ Protective caps with screws and washers included in scope of supply.
- ▶ Follow the mounting instructions!
Send for the publications “Mounting Instructions for Ball Rail Systems” and “Mounting Instructions for the Cover Strip”.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SNS	Size									
	20		25		30		35		45	
	P	S	P	S	P	S	P	S	P	S
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions



Dimensions (mm)

Size	A_2	D	F_5	F_6	$H_2^{1)}$	$H_2^{5)}$	L_{min}	L_{max}	$N_6^{20,5}$	N_{11}	S_5	T	$T_{1 min}^{2)}$	$T_{1S}^{3)}$	$T_{1 max}$	Mass m (kg/m)
20	20	9.4	14.0	6.5	20.75	20.55	260	4 500	13.2	13.0	6.0	60	13	28.0	50	2.4
25	23	11.0	15.2	6.5	24.45	24.25	280	4 500	15.2	15.0	7.0	60	13	28.0	50	3.2
30	28	15.0	15.2	7.0	28.55	28.35	290	4 500	17.0	18.0	9.0	80	16	38.0	68	5.0
35	34	15.0	18.0	7.0	32.15	31.85	310	4 500	20.5	22.0	9.0	80	16	38.0	68	6.8
45	45	20.0	20.0	7.0	40.15	39.85	350	4 500	23.5	30.0	14.0	105	18	50.5	89	10.5

- 1) Dimension H_2 with cover strip
Size 20 - 30 with 0.2 mm cover strip
Size 35 - 45 with 0.3 mm cover strip
- 2) For end spaces below T_{1min} , no threaded holes in end faces possible. Secure the cover strip.
- 3) Recommended: preferred dimension T_{1S} with tolerances ± 0.75 .
- 4) For manufacturing reasons, rails may have a flat underside (without groove).
- 5) Dimension H_2 without cover strip

Ball Guide Rails SNS with Plastic Mounting Hole Plugs



- ▶ For mounting from above, with plastic mounting hole plugs
- ▶ With integrated scale

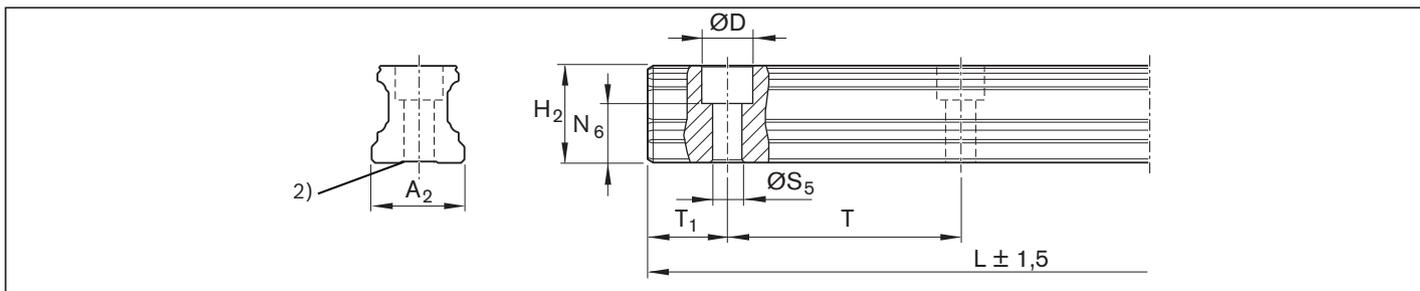
Notes:

- ▶ Plastic mounting hole plugs included in scope of supply.
- ▶ Follow the mounting instructions!
Send for the “Mounting Instructions for Ball Rail Systems”.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SNS	Size										
	20		25		30		35		45		
	P	S	P	S	P	S	P	S	P	S	
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions



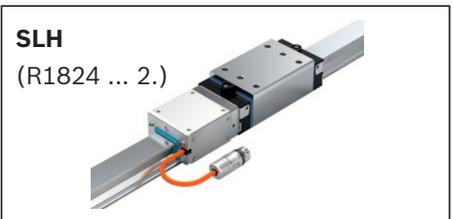
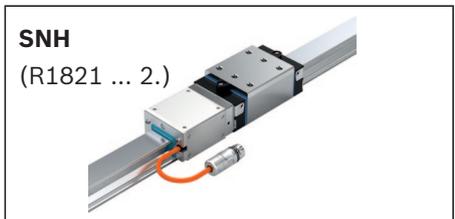
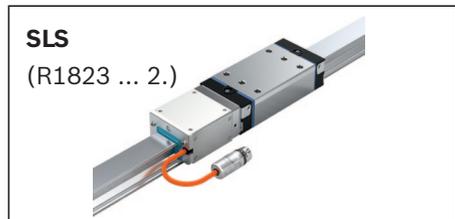
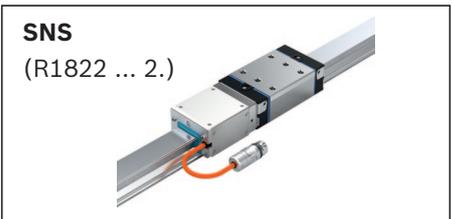
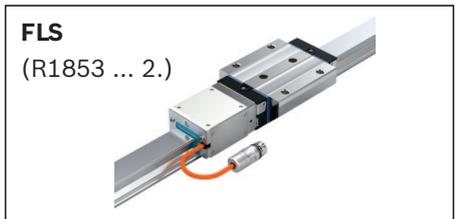
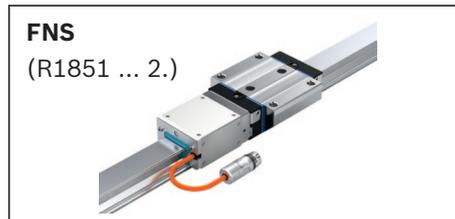
Dimensions (mm)

Size	A ₂	D	H ₂	L _{min}	L _{max}	N ₆ ^{±0.5}	S ₅	T	T _{1 min}	T _{1S} ¹⁾	T _{1 max}	Mass m (kg/m)
20	20	9.4	20.55	220	4 500	13.2	6.0	60	10	28.0	50	2.4
25	23	11.0	24.25	240	4 500	15.2	7.0	60	10	28.0	50	3.2
30	28	15.0	28.35	250	4 500	17.0	9.0	80	12	38.0	68	5.0
35	34	15.0	31.85	270	4 500	20.5	9.0	80	12	38.0	68	6.8
45	45	20.0	39.85	310	4 500	23.5	14.0	105	16	50.5	89	10.5

1) Recommended: preferred dimension T_{1S} with tolerances ± 0.75.

2) For manufacturing reasons, rails may have a flat underside (without groove).

Product Overview and Type Designation, Roller Runner Blocks



Available versions

Roller Runner Blocks	Size											
	35				45				55 ^{*)}			
	P		S		P		S		P		S	
	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3
FNS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FLS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SNS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SLS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SNH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SLH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions

*) in preparation

Type designation Roller Runner Block with IMS-I (example)

I	M	S	2	I	-	R	W	D	-	0	3	5	-	F	N	S	-	C	2	-	S	-	D	S	-	0	-	R	-	I	1	-	A	-	1	0	0	-	D
										1				2				3				4		5		6		7		8		9				10		11	

1 Size

Feature	Description
035	Size 35
045	Size 45
055	Size 55

3 Preload class

Feature	Description
C2	Preload class C2
C3	Preload class C3

5 Seal

Feature	Description
DS	Double-lipped seal

7 Scanner mounting side

Feature	Description
R	Right
L	Left

9 Connector type

Feature	Description
A	RGS 1722
B	RGS 1714

11 Documentation

Feature	Description
D	Standard documentation

2 Design style

Feature	Description
FNS	Flanged, normal, standard height
FLS	Flanged, long, standard height
SNS	Slimline, normal, standard height
SLS	Slimline, long, standard height
SNH	Slimline, normal, high
SLH	Slimline, long, high

4 Accuracy class

Feature	Description
P	Precision
S	Super precision (SP)

6 Roller chain

Feature	Description
0	Without roller chain

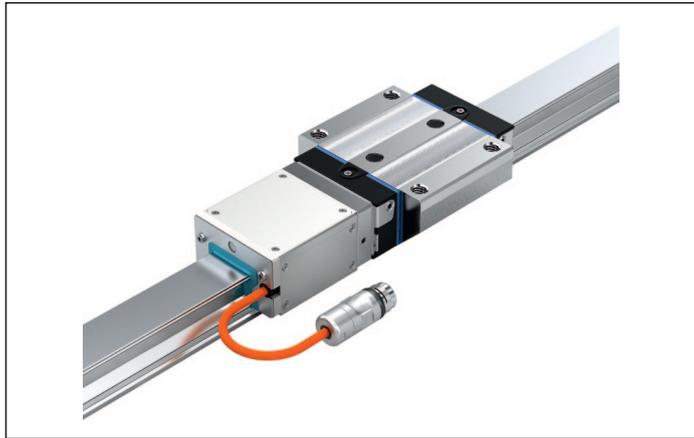
8 Interface

Feature	Description
I 1	1 V _{PP} 40 µm
I 2	TTL 1 µm
I 3	TTL 5 µm
I 4	TTL 10 µm

10 Cable length

Feature	Description
100	1.0 meter

Roller Runner Blocks FNS



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With anti-corrosion agent (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Roller runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

FNS	Size											
	35				45				55*)			
	P		S		P		S		P		S	
	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions

*) in preparation

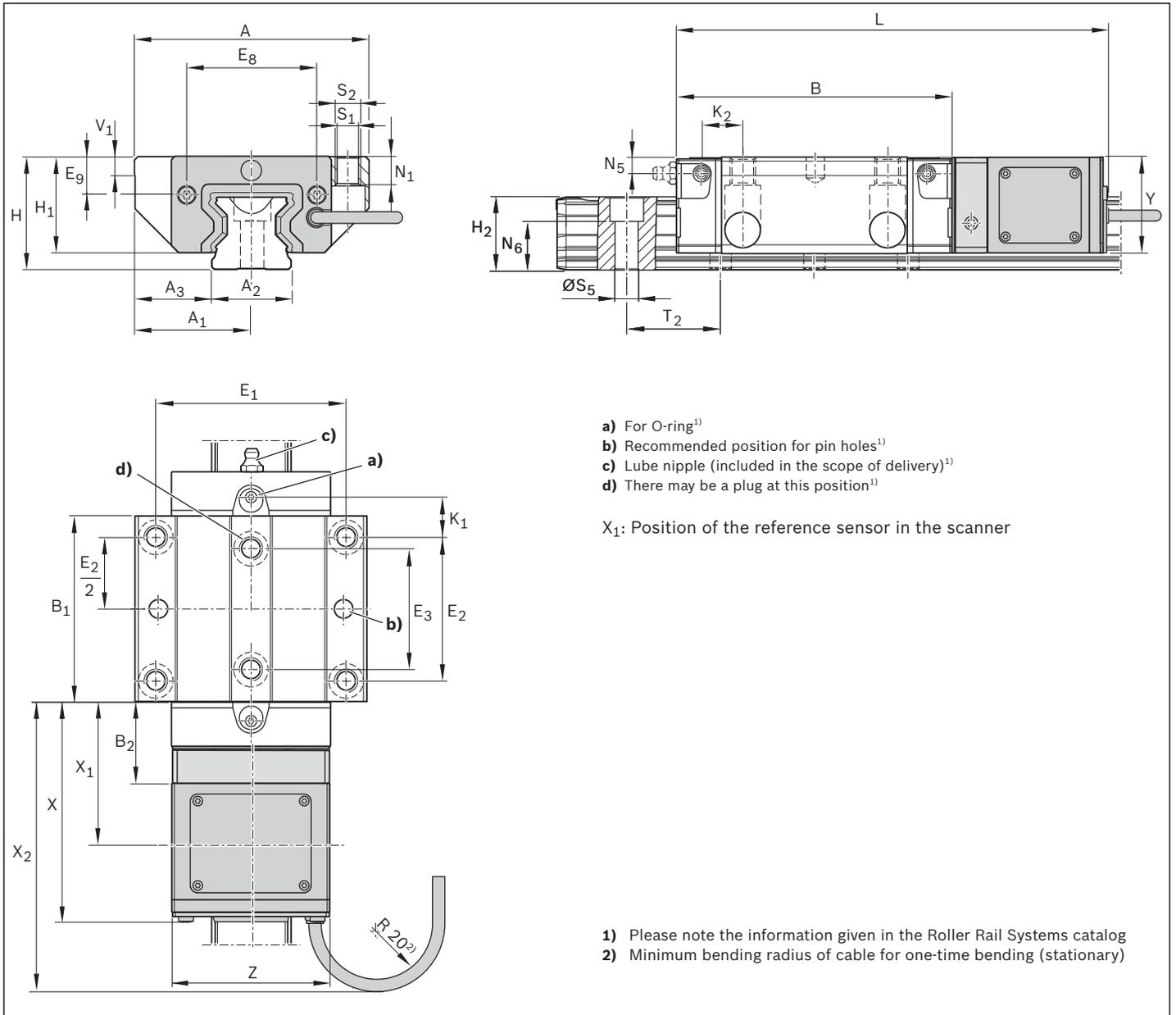
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₃	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁
35	100	50	34	33.00	118.00	79.60	31.45	82	62	52	50.30	13.10	48	41	31.10	30.80	15.55
45	120	60	45	37.50	147.00	101.50	35.00	100	80	60	62.90	16.70	60	51	39.10	38.80	17.45
55	140	70	53	43.50	170.65	123.10	38.03	116	95	70	74.20	18.85	70	58	47.85	47.55	21.75

Size	K ₂	L	N ₁	N ₅	N ₆ ^{±0.5}	Ø S ₁	S ₂	Ø S ₅	T ₂	V ₁	X	X ₁	X ₂	Y	Z
35	17.40	198.9	12	7	19.8	8.5	M10	9.00	40.0	8	99.60	61.45	124.60	40.00	63.8
45	20.35	229.6	15	8	22.8	10.4	M12	14.00	52.5	10	104.85	65.00	129.85	50.00	78.0
55	24.90	256.4	18	9	28.7	12.4	M14	16.00	60.0	12	109.03	68.03	134.03	56.35	91.4

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

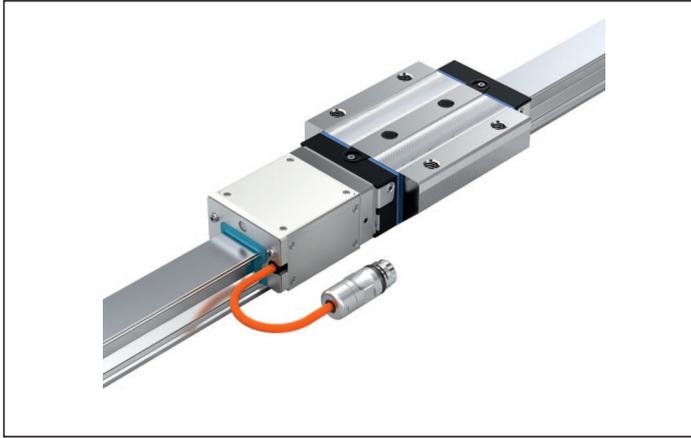


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class
	m		
		C1/C2	C1/C2
35	2.52	30 500	380
45	4.57	53 300	825
55	6.13	70 200	1 305

3) Values for runner block with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the “Roller Rail Systems” catalog must be used.

Roller Runner Blocks FLS



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With anti-corrosion agent (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Roller runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

FLS	Size											
	35				45				55 ¹⁾			
	P		S		P		S		P		S	
	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions

*¹⁾ in preparation

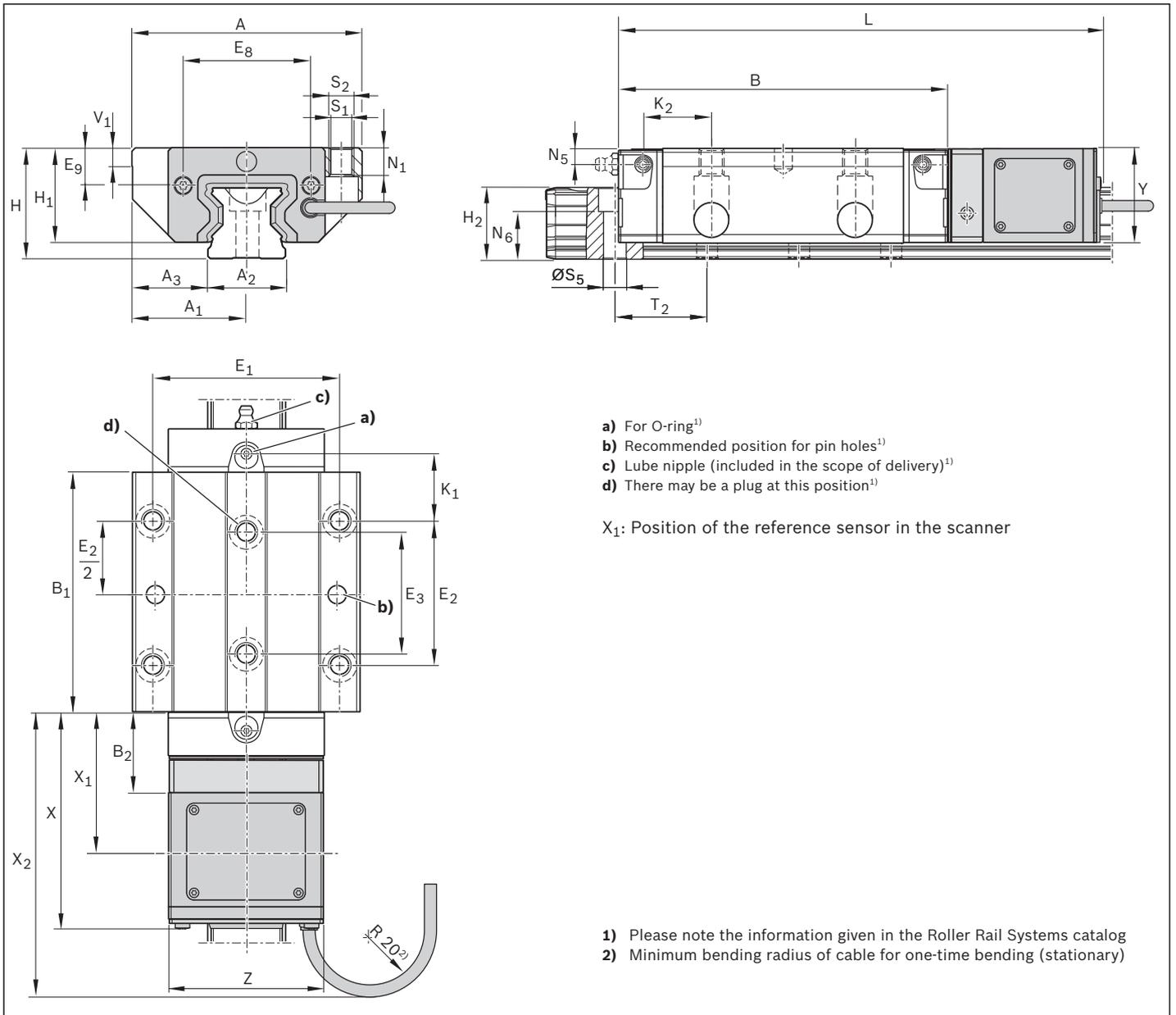
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₃	E ₄	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁
35	100	50	34	33.0	142.00	103.6	31.45	82	62	52	80	50.30	13.10	48	41	31.10	30.80	27.55
45	120	60	45	37.5	179.50	134.0	35.00	100	80	60	98	62.90	16.70	60	51	39.10	38.80	33.70
55	140	70	53	43.5	209.65	162.1	38.03	116	95	70	114	74.20	18.85	70	58	47.85	47.55	41.25

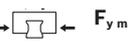
Size	K ₂	L	N ₁	N ₅	N ₆ ^{±0.5}	Ø S ₁	S ₂	Ø S ₅	T ₂	V ₁	X	X ₁	X ₂	Y	Z
35	29.4	222.6	12	7	19.80	8.5	M10	9	40.0	8	99.60	61.45	124.60	40.00	63.8
45	36.6	262.1	15	8	22.80	10.4	M12	14	52.5	10	104.85	65.00	129.85	50.00	78.0
55	44.4	295.4	18	9	28.70	12.4	M14	16	60.0	12	109.03	68.03	134.03	56.35	91.4

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

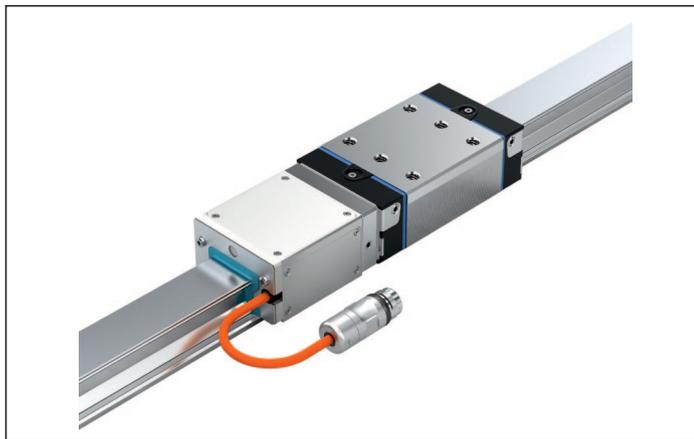


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class	
			$F_{y \max}$ →  ← $F_{y \max}$	$M_{L \max}$ 
	m		C1/C2	C1/C2
35	3.07		37 450	610
45	5.67		66 150	1 345
55	7.84		87 000	2 210

- 3)** Values for runner block with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the "Roller Rail Systems" catalog must be used.

Roller Runner Blocks SNS



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With anti-corrosion agent (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Roller runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SNS	Size														
	35				45				55*)						
	P		S		P		S		P		S				
	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3			
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions

*) in preparation

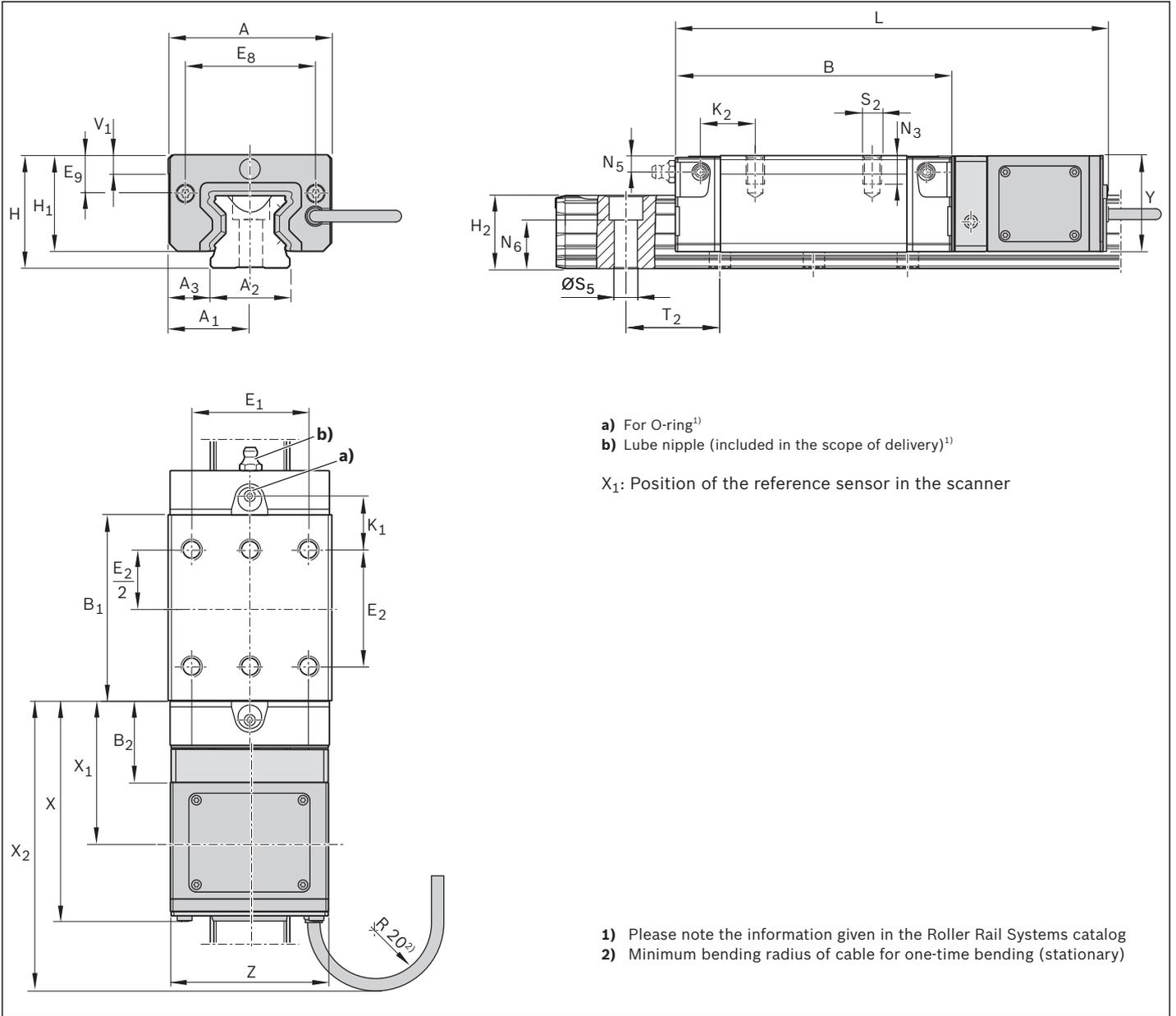
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁
35	70	35	34	18.0	118.00	79.6	31.45	50	50	50.3	13.10	48	41	31.10	30.80	21.55
45	86	43	45	20.5	147.00	101.5	35.00	60	60	62.9	16.70	60	51	39.10	38.80	27.45
55	100	50	53	23.5	170.65	123.1	38.03	75	75	74.2	18.85	70	58	47.85	47.55	31.75

Size	K ₂	L	N ₃	N ₅	N ₆ ^{±0.5}	S ₂	∅ S ₅	T ₂	V ₁	X	X ₁	X ₂	Y	Z
35	23.40	198.9	12	7	19.8	M8	9	40.0	8	99.60	61.45	124.60	40.00	63.8
45	30.35	229.6	18	8	22.8	M10	14	52.5	10	104.85	65.00	129.85	50.00	78.0
55	34.90	256.4	17	9	28.7	M12	16	60.0	12	109.03	68.03	134.03	56.35	91.4

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

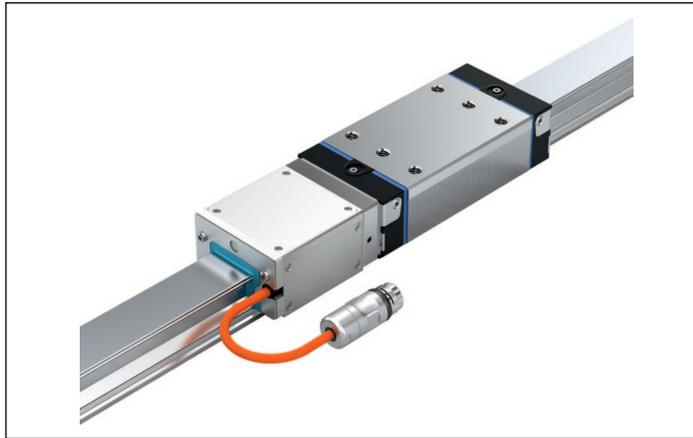


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class 	Max. permissible moment load ³⁾ (Nm) for preload class 
	m	C1/C2	C1/C2
35	1.92	30 500	380
45	3.42	53 300	825
55	4.83	70 200	1 305

3) Values for runner block with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the “Roller Rail Systems” catalog must be used.

Roller Runner Blocks SLS



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With anti-corrosion agent (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Roller runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SLS	Size											
	35				45				55*)			
	P		S		P		S		P		S	
	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions

*) in preparation

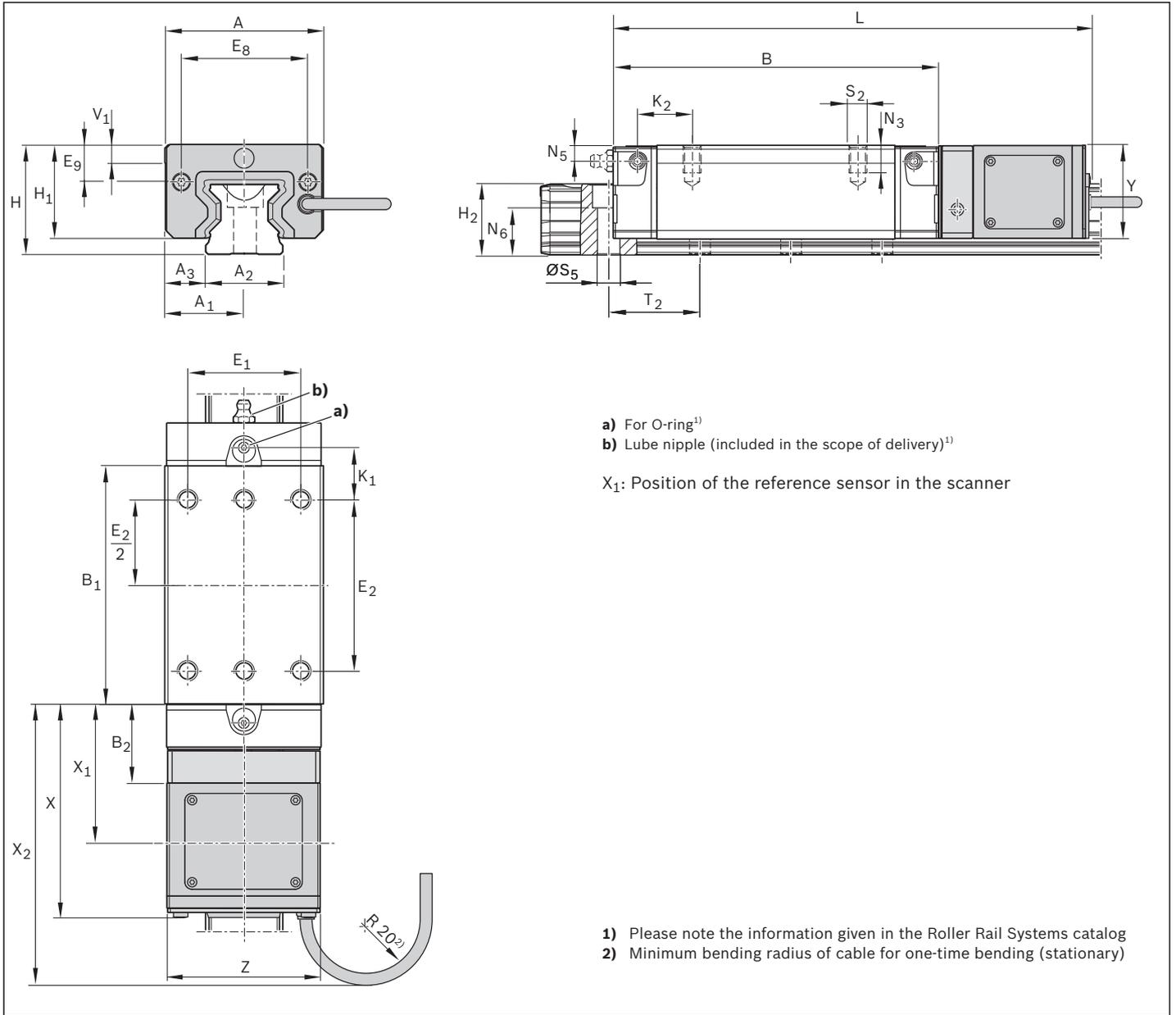
Dimensions (mm)

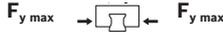
Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁
35	70	35	34	18.0	142.00	103.60	31.45	50	72	50.3	13.10	48	41	31.10	30.80	22.55
45	86	43	45	20.5	179.50	134.00	35.00	60	80	62.9	16.70	60	51	39.10	38.80	33.70
55	100	50	53	23.5	209.65	162.10	38.03	75	95	74.2	18.85	70	58	47.85	47.55	41.25

Size	K ₂	L	N ₃	N ₅	N ₆ ^{+0.5}	S ₂	∅ S ₅	T ₂	V ₁	X	X ₁	X ₂	Y	Z
35	24.40	222.6	12	7	19.8	M8	9	40.0	8	99.60	61.45	124.60	40.00	63.8
45	36.60	262.1	18	8	22.8	M10	14	52.5	10	104.85	65.00	129.85	50.00	78.0
55	44.40	295.4	17	9	28.7	M12	16	60.0	12	109.03	68.03	134.03	56.35	91.4

1) Dimension H₂ with cover strip

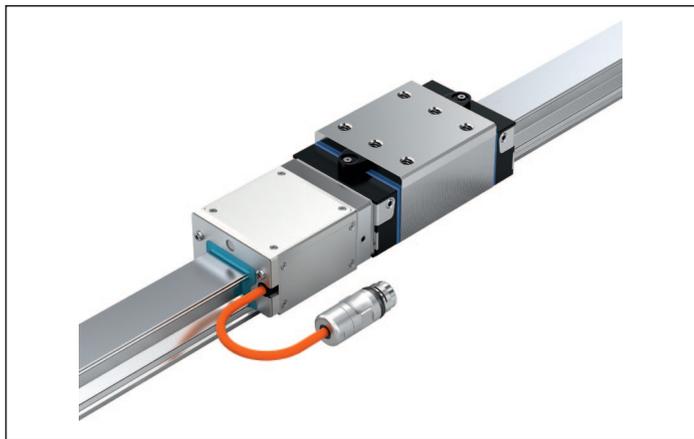
2) Dimension H₂ without cover strip


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class 	Max. permissible moment load ³⁾ (Nm) for preload class 	
				m
35	2.32		37 450	610
45	4.17		66 150	1 345
55	5.99		87 000	2 210

- 3) Values for runner block with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the “Roller Rail Systems” catalog must be used.

Roller Runner Blocks SNH



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With anti-corrosion agent (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Roller runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SNH	Size											
	35				45				55 ¹⁾			
	P		S		P		S		P		S	
	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions

*¹⁾ in preparation

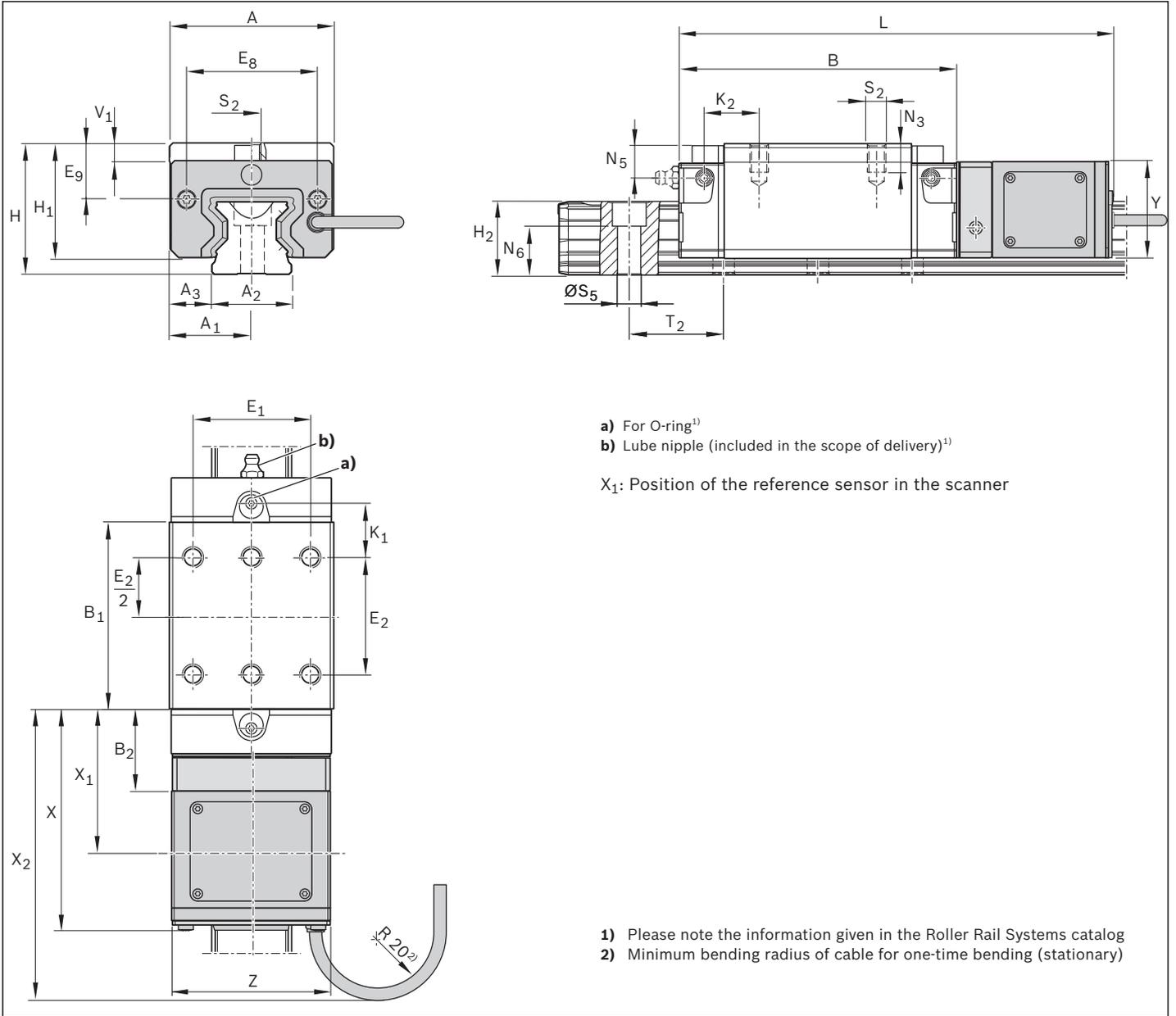
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁
35	70	35	34	18.0	118.00	79.6	31.45	50	50	50.3	20.10	55	48	31.10	30.80	21.55
45	86	43	45	20.5	147.00	101.5	35.00	60	60	62.9	26.70	70	61	39.10	38.80	27.45
55	100	50	53	23.5	170.65	123.1	38.03	75	75	74.2	28.85	80	68	47.85	47.55	31.75

Size	K ₂	L	N ₃	N ₅	N ₆ ^{±0.5}	S ₂	S ₅	T ₂	V ₁	X	X ₁	X ₂	Y	Z
35	23.40	198.9	13	14	19.8	M8	∅ 9	40.0	8	99.60	61.45	124.60	40.00	63.8
45	30.35	229.6	18	18	22.8	M10	∅ 14	52.5	10	104.85	65.00	129.85	50.00	78.0
55	34.90	256.4	19	19	28.7	M12	∅ 16	60.0	12	109.03	68.03	134.03	56.35	91.4

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

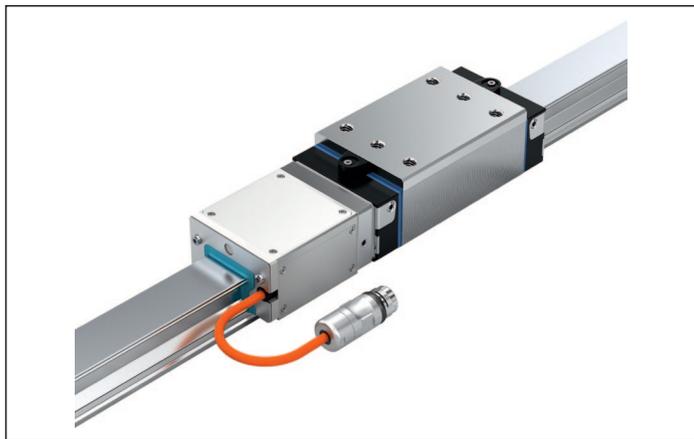


Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class	
			$M_{L \max}$	
	m	$F_{y \max}$ → ← $F_{y \max}$	$M_{L \max}$	
		C1/C2		C1/C2
35	2.22			380
45	3.87			825
55	5.73			1 305

3) Values for runner block with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the “Roller Rail Systems” catalog must be used.

Roller Runner Blocks SLH



Dynamic characteristics

See the section “Description and Technical Data of Overall System”.

Notes:

- ▶ With anti-corrosion agent (sufficient for mounting and start-up). For more details on lubrication, please refer to the “Maintenance Instructions” section.
- ▶ Delivery: Roller runner block with pre-assembled adapter plate and pre-assembled scanner. A lube nipple is included in the delivery.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

SLH	Size											
	35				45				55 ¹⁾			
	P		S		P		S		P		S	
	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3	C2	C3
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Available versions

*¹⁾ in preparation

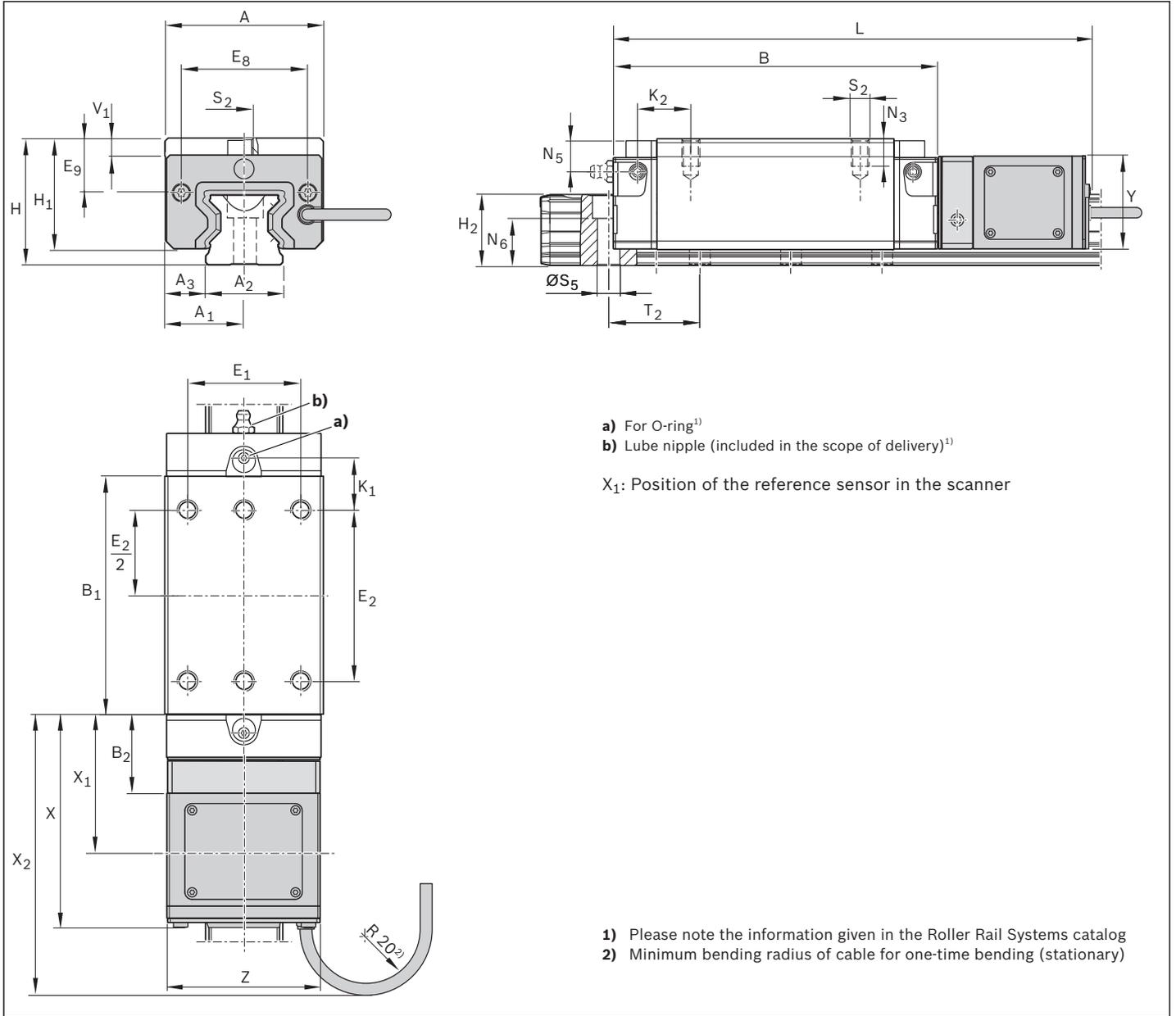
Dimensions (mm)

Size	A	A ₁	A ₂	A ₃	B	B ₁	B ₂	E ₁	E ₂	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁
35	70	35	34	18.0	142.00	103.6	31.45	50	72	50.3	20.10	55	48	31.10	30.80	22.55
45	86	43	45	20.5	179.50	134.0	35.00	60	80	62.9	26.70	70	61	39.10	38.80	33.70
55	100	50	53	23.5	209.65	162.1	38.03	75	95	74.2	28.85	80	68	47.85	47.55	41.25

Size	L	K ₂	N ₃	N ₅	N ₆ ^{30.5}	S ₂	S ₅	T ₂	V ₁	X	X ₁	X ₂	Y	Z
35	222.6	24.4	13	14	19.8	M8	∅ 9	40.0	8	99.60	61.45	124.60	40.00	63.8
45	262.1	36.6	18	18	22.8	M10	∅ 14	52.5	10	104.85	65.00	129.85	50.00	78.0
55	295.4	44.4	19	19	28.7	M12	∅ 16	60.0	12	109.03	68.03	134.03	56.35	91.4

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip



Technical data

Size	Mass (kg)	Max. permissible load ³⁾ (N) for preload class	Max. permissible moment load ³⁾ (Nm) for preload class
	m	$F_{y \max} \rightarrow \left[\text{Scanner} \right] \leftarrow F_{y \max}$	$M_{L \max}$
		C1/C2	C1/C2
35	2.72	37 450	610
45	4.97	66 150	1 345
55	7.24	87 000	2 210

3) Values for runner block with assembled scanner. Compliance with these values will ensure safe functioning of the application. Exceeding these values can lead to destruction of the equipment. For the nominal life calculation, the values from the “Roller Rail Systems” catalog must be used.

Product Overview and Type Designation, Roller Guide Rails

Roller Guide Rails with Cover Strip and Protective End Caps and integrated scale



Roller Guide Rails with plastic mounting hole plugs and integrated scale



Available versions

Roller Guide Rails SNS	Size					
	35		45		55	
	P	S	P	S	P	S
	✓	✓	✓	✓	✓	✓

✓ = Available versions

Type designation for Roller Guide Rails with scale (example)

I	M	S	2	I	-	R	S	A	-	0	3	5	-	S	N	S	-	S	-	M	A	-	A	B	-	1	-	R	D	-	A	3	-	D			
										1				2				3				4				5		6				7			8		9

1 Size	
Feature	Description
035	Size 35
045	Size 45
055	Size 55

2 Design style	
Feature	Description
SNS	Slimline, normal, standard height
SNO	SNS without groove (on request)

3 Accuracy class	
Feature	Description
P	Precision
S	Super precision (SP)

4 Mounting	
Feature	Description
MA	Mounting from above

5 Cover

Feature	Description
AB	With cover strip and protective end caps
AK	With with plastic mounting hole plugs

7 Coding

Feature	Description
R0	Without reference marks
R1	With 1 reference mark
R2	With 2 reference marks
R3	With 3 reference marks
R4	With 4 reference marks
R5	With 5 reference marks
RD	With distance-coded reference marks

6 Number of sections

Feature	Description
1	Number of sections

8 Scale pitch accuracy

Feature	Description
A3	$\pm 3 \mu\text{m} / \text{m}$ (max. rail length: 1 000 mm)
A5	$\pm 5 \mu\text{m} / \text{m}$ (max. rail length: $L_{\text{max.}}$)

9 Documentation

Feature	Description
D	Standard documentation

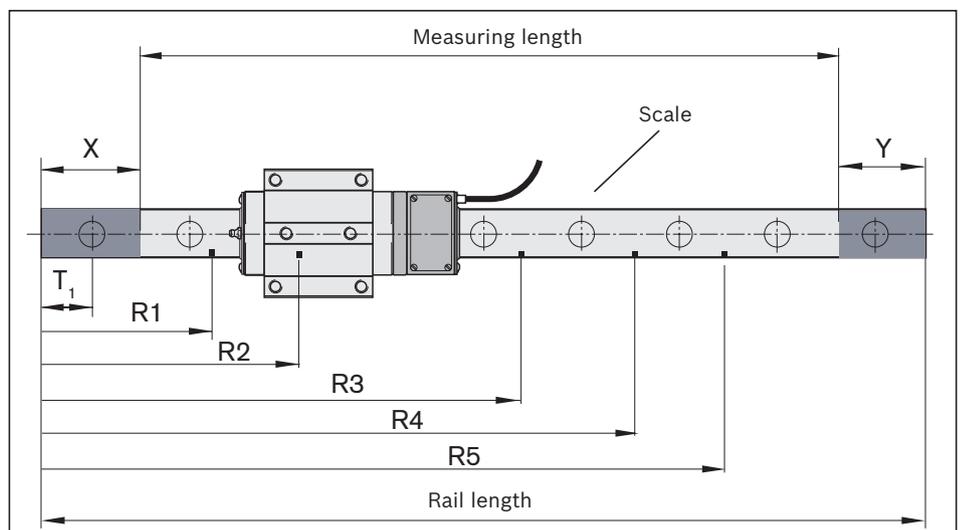
Permitted positions of single reference marks (7 Coding, feature: R1 ... R5)

Due to mechanical boundary conditions, the reference mark positions should be chosen as specified in the drawing below. No reference marks may be positioned in the areas X and Y. In other words, define the positions for R1 ... R5 so that these are $>X$ and $>Y$. Specify the positions in increments of 1 mm.

Example: Size 45: $R_1 = 223 \text{ mm}$, $R_n = \text{rail length} - 43 \text{ mm}$, with plastic mounting hole plugs (AK).

Between the single reference marks there must be a minimum space of 10 mm.

Size	Dimensions (mm)			
	Feature AB (R1805 .6. ..)		Feature AK (R1605 .5. ..)	
	X	Y	X	Y
35	205	62	185	42
45	242	62	222	42
55	279	62	258	42



R1 ... R5 Positions of the reference marks

Roller Guide Rails SNS with Cover Strip and Protective End Caps



- ▶ For mounting from above, with cover strip made of corrosion-resistant spring steel per EN 10088 and screw-down plastic protective end caps (with threaded mounting holes on end faces).
- ▶ With integrated scale

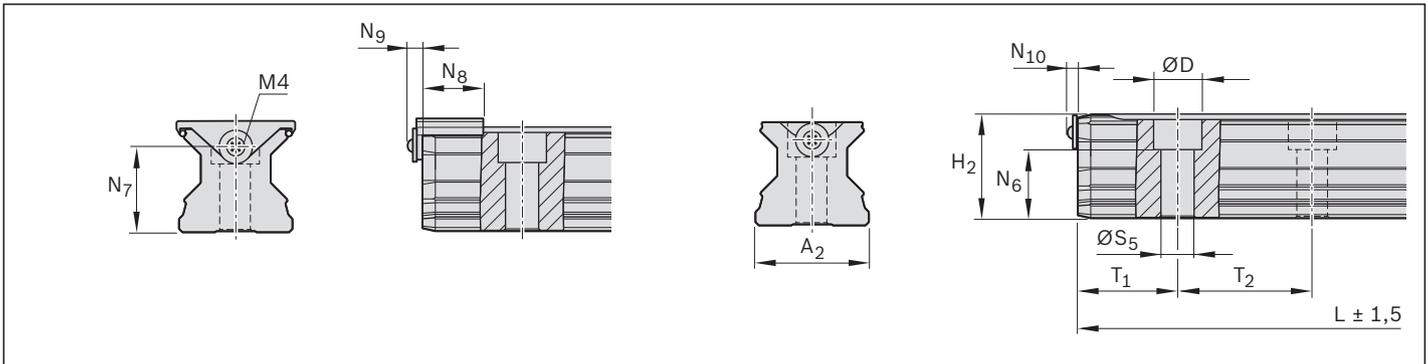
Notes

- ▶ Secure the cover strip!
- ▶ As an alternative, the cover strip can be secured with screws and washers.
- ▶ Protective caps with screws and washers included in scope of supply.
- ▶ Follow the mounting instructions!
Send for the publications “Mounting Instructions for Roller Rail Systems” and “Mounting Instructions for the Cover Strip”.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

Roller guide rails SNS	Size					
	35		45		55	
	P	S	P	S	P	S
	✓	✓	✓	✓	✓	✓

✓ = Available versions



Dimensions (mm)

Size	A ₂	D	H ₂ ¹⁾	L _{min}	L _{max} ²⁾	N ₆	N ₇	N ₈	N ₉	N ₁₀	S ₅	T _{1 min}	T _{1 s} ³⁾	T _{1 max}	T ₂	Mass m (kg/m)
35	34	15	31.10	312	3 996	19.4	22	18	7	4.10	9	16	18.00	28.0	40.0	6.3
45	45	20	39.10	351	3 986	22.4	30	20	7	4.10	14	18	24.25	36.5	52.5	10.3
55	53	24	47.85	400	3 956	28.7	30	20	7	4.35	16	20	28.00	42.0	60.0	13.1

1) Dimension H₂ with cover strip

2) For sizes 35 to 55 in accuracy class P, one-piece guide rails up to approx. 4 500 mm in length can be supplied in special cases.

3) Preferred dimension T_{1S} with tolerances +0.5/-1.0

Roller Guide Rails SNS with Plastic Mounting Hole Plugs



- ▶ For mounting from above, with plastic mounting hole plugs
- ▶ With integrated scale

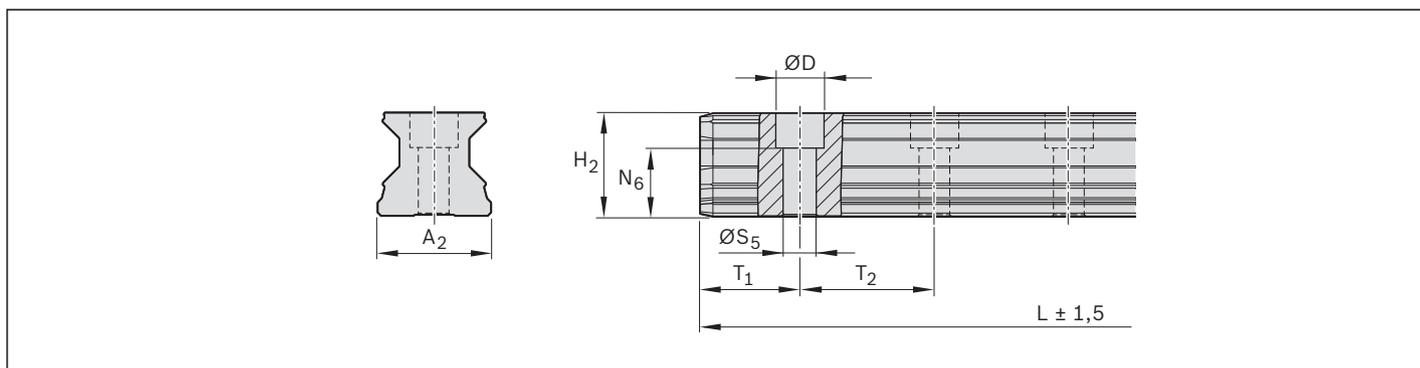
Notes:

- ▶ Plastic mounting hole plugs included in scope of supply.
- ▶ Follow the mounting instructions!
Send for the “Mounting Instructions for Roller Rail Systems”.
- ▶ For ordering examples, see the sections entitled “Ordering System” and “Ordering Examples”.

Available versions

Roller guide rails SNS	Size 35		45		55	
	P	S	P	S	P	S
	✓	✓	✓	✓	✓	✓

✓ = Available versions



Dimensions (mm)

Size	A ₂	D	H ₂	L _{min}	L _{max} ¹⁾	N ₆	S ₅	T _{1 min}	T _{1 S} ²⁾	T _{1 max}	T ₂	Mass m (kg/m)
35	34	15	30.80	270	3 996	19.4	9	16	18.00	28.0	40.0	6.3
45	45	20	38.80	310	3 986	22.4	14	18	24.25	36.5	52.5	10.3
55	53	24	47.55	350	3 956	28.7	16	20	28.00	42.0	60.0	13.1

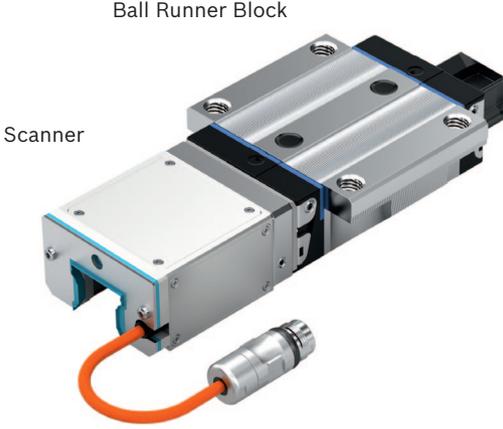
1) For sizes 35 to 55 in accuracy class P, one-piece guide rails up to approx. 4 500 mm in length can be supplied in special cases.

2) Preferred dimension T_{1S} with tolerances +0.5/-1.0

Ordering System IMS-I for Ball Rail System

Type Designation, Ball Runner Block with scanner (KWD)

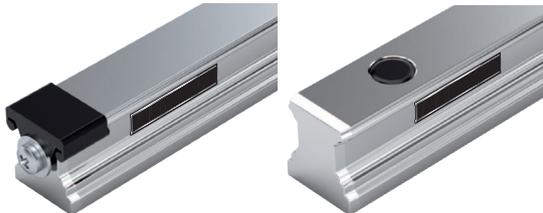
I	M	S	2	I	-	K	W	D	-	0	2	0	-	F	N	S	-	C	2	-	P	-	S	S	-	R	-	R	-	I	1	-	A	-	1	0	0	-	D				
										1				2				3				4			5		6		7				8				9			10			11

KWD		 <p>Ball Runner Block</p> <p>Scanner</p>
1	For an explanation of the type designation, see the section "Product Overview, Ball Runner Blocks"	
2		
3		
4		
5		
6		
7		
Scanner		
8		
9		
10		
11		

+

Type designation, Ball Guide Rail (KSA) with scale

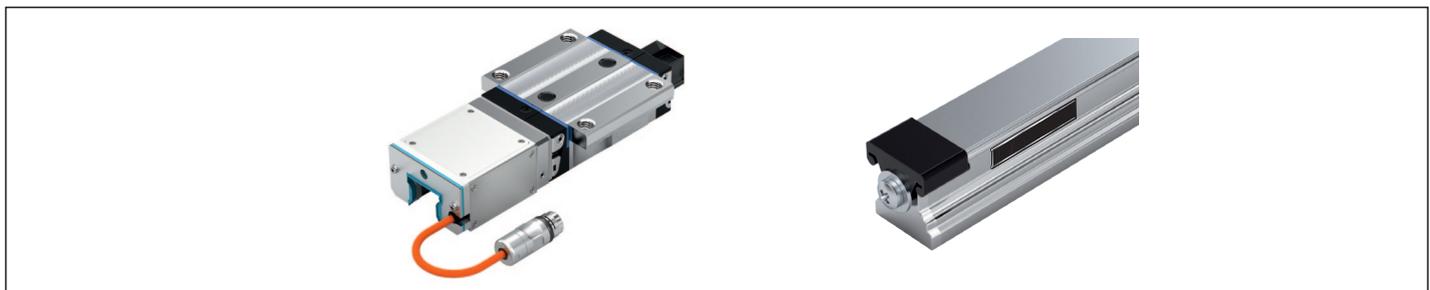
I	M	S	2	I	-	K	S	A	-	0	2	0	-	S	N	S	-	P	-	M	A	-	A	B	-	1	-	R	2	-	A	3	-	D			
										1				2				3				4			5		6		7				8				9

KSA		 <p>Required dimensions for type designation:</p> <p>Rail length : mm</p> <p>T1 : mm</p> <p>R1....R5 : mm</p>
1	For an explanation of the type designation, see the section "Product Overview, Ball Rail"	
2		
3		
4		
5		
6		
7		
8		
9		

=

Ball Rail System, complete

To order a complete system, please state the type designations for the ball runner block and the ball guide rail (including the required dimensions). For ordering examples, see the "Ordering Examples" section.



Ordering System IMS-I for Roller Rail System

Type Designation, Roller Runner Block with scanner (RWD)

I	M	S	2	I	-	R	W	D	-	0	3	5	-	F	N	S	-	C	2	-	S	-	D	S	-	0	-	R	-	I	1	-	A	-	1	0	0	-	D
										1					2				3			4			5	6		7			8			9			10		11

RWD		<p>For an explanation of the type designation, see the section "Product Overview, Roller Runner Blocks"</p>	
1			
2			
3			
4			
5			
6			
7			
Scanner			
8			
9			
10			
11			



Type designation, Roller Guide Rail (RSA) with scale

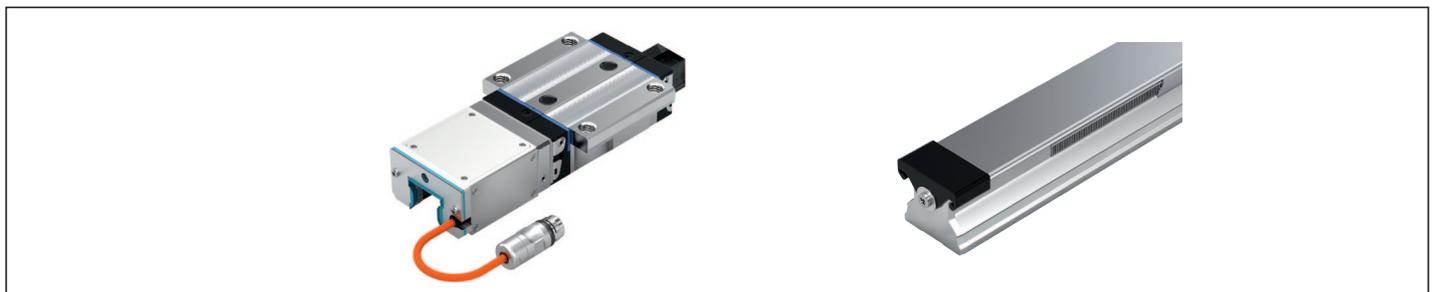
I	M	S	2	I	-	R	S	A	-	0	3	5	-	S	N	S	-	S	-	M	A	-	A	B	-	1	-	R	D	-	A	3	-	D
										1					2				3			4			5	6		7			8			9

RSA		<p>For an explanation of the type designation, see the section "Product Overview, Roller Guide Rail"</p>		<p>Required dimensions for type designation:</p> <p>Rail length : mm</p> <p>T1 : mm</p> <p>R1....R5 : mm</p>
1				
2				
3				
4				
5				
6				
7				
8				
9				



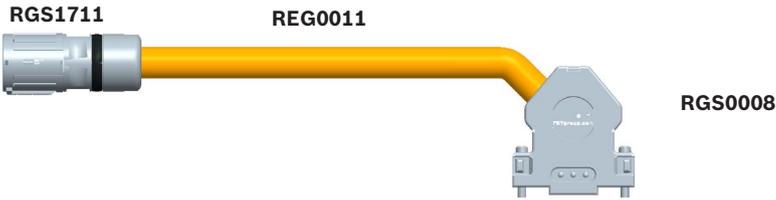
Roller Rail System, complete

To order a complete system, please state the type designations for the roller runner block and the roller guide rail (including the required dimensions). For ordering examples, see the "Ordering Examples" section.



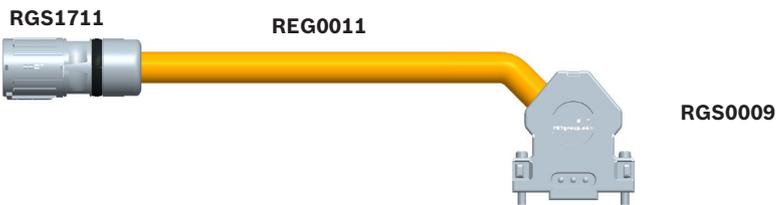
Cables

RGK0055 Extension cable (M17 → EC/ENS Interface (12 V DC))



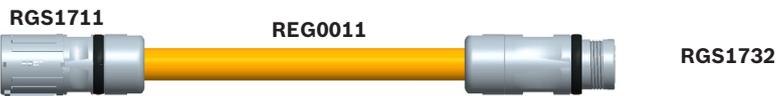
L _c (m)	Nr.
2	R911341075
5	R911342688
8	R911342689

RGK0056 Extension cable (M17 → EN2 Interface (5 V DC))



L _c (m)	Nr.
2	R911342690
5	R911342691
8	R911341071

RKG 0057 Extension cable (M17 → M17)



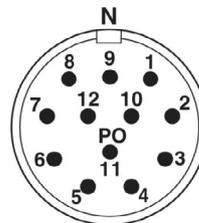
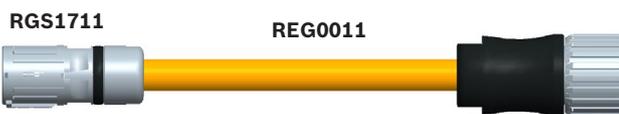
L _c (m)	Nr.
2	R911342692
5	R911342693
8	R911342694

RKG 0058 Extension cable (open cable ends)



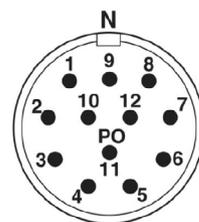
L _c (m)	Nr.
2	R911342695
5	R911342696
8	R911342684

RKG 0060 Extension cable (M17 → M23, 12 pin, male)



L _c (m)	Nr.
0,5	R911341555
2,0	R911343305

RKG 0061 Extension cable (M17 → M23, 12 pin, male)



L _c (m)	Nr.
0,5	R911341146
2,0	R911343303

RGS1711 single connector M17

Nr.

R911342383

L_c = cable length

Nr. = part number

Data for encoder cable REG0011

RoHS	compliant with EU directive 2002/95/EC
AWM Style (UL)	20233
Diameter	10.0 ± 0.3 mm
Cable sheath material	PUR
Cable sheath color	RAL2003 (orange)
Spec. cable weight	0,027 kg/m
Oil resistance	EN 60811-2-1 and EN 50363-10-2
Flame properties	UL 758, section 40, Cable Flame Test Section 1061 as per UL 1581 and CSA C22.2 No. 210-05 Sec. 8.8.2. Test according to DIN EN 60332-1-2
Flexing cycles	5 million
Bending radius for flexing installation	75 mm
Bending radius for one-time bending (stationary)	40 mm

Maximum cable length**For connection to Rexroth drive controller IndraDrive:**

Encoder interface EC (12 VDC supply): maximum length is 75 m.

Encoder interface EN2 interface (5 VDC supply): maximum length is 50 m.

For connection to other makes of evaluation electronics:Signal type I1 (1 V_{pp}, current consumption 300 mA):

Voltage drop over 75 m cable length is 2.05 V, i.e., the encoder supply voltage for the evaluation electronics must be settable to at least 6.8 V.

Signal type I2, I3, I4 (TTL, current consumption 350 mA):

Voltage drop over 75 m cable length is 2.30 V, i.e., the encoder supply voltage for the evaluation electronics must be settable to at least 7.05 V.

Please note that the cable length can additionally be limited by:

- ▶ Plug connections (> 2 pcs.)
- ▶ EMC behavior

Be sure to take note of the information in the project planning manuals for IndraDrive controllers and EMC project planning.

The total length of pre-assembled cables is measured inclusive of the connectors.

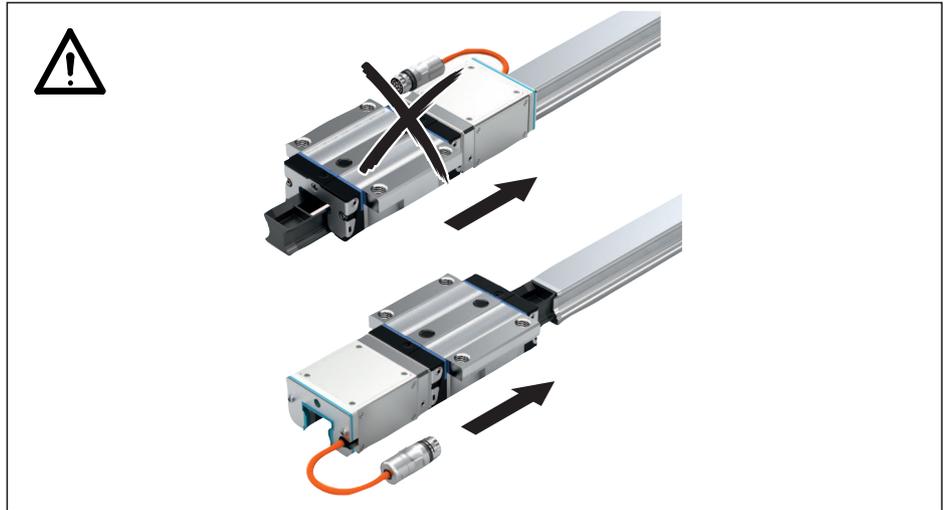
Mounting Instructions / Maintenance Instructions

⚠ Always handle the measuring system with great care!

Mounting the Runner Blocks

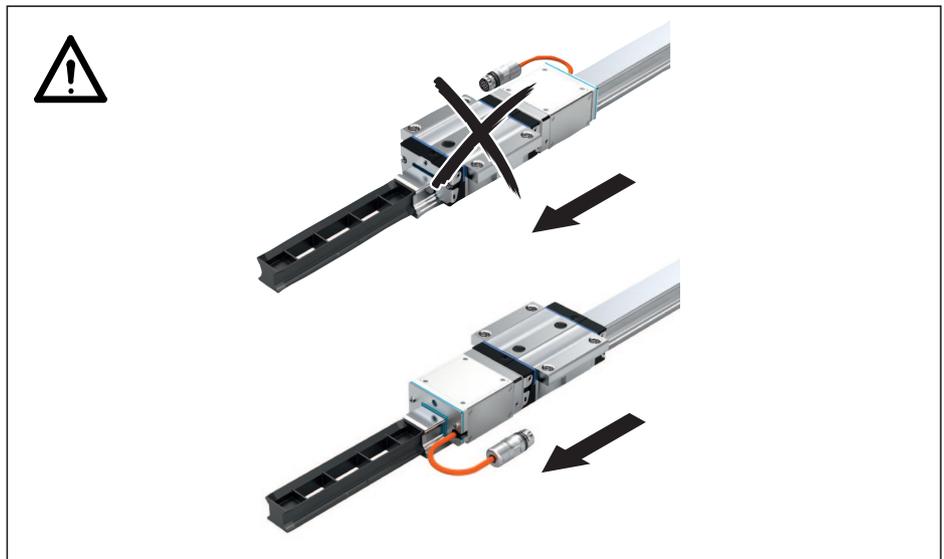
⚠ Do not remove the mounting arbor, otherwise the rolling elements may be lost! Position the runner block on its mounting arbor against the end of the guide rail and carefully push the runner block off the mounting arbor and onto the guide rail.

⚠ Do not discard the mounting arbor. It will be needed again when removing the runner block.



Removal the Runner Blocks

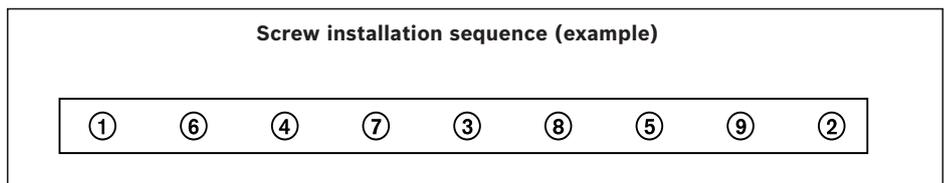
⚠ Position the mounting arbor against the end of the guide rail. Always slide the runner block directly onto the mounting arbor, otherwise the rolling elements may be lost! The removed runner block must remain on the mounting arbor!



Mounting the guide rails

⚠ Always handle the measuring system with great care!

To ensure that the repeatable accuracy of the measuring system is achieved upon assembly, the guide rails must be screwed down in sequence from the ends toward the center. Partial sections should be screwed down in the same way.



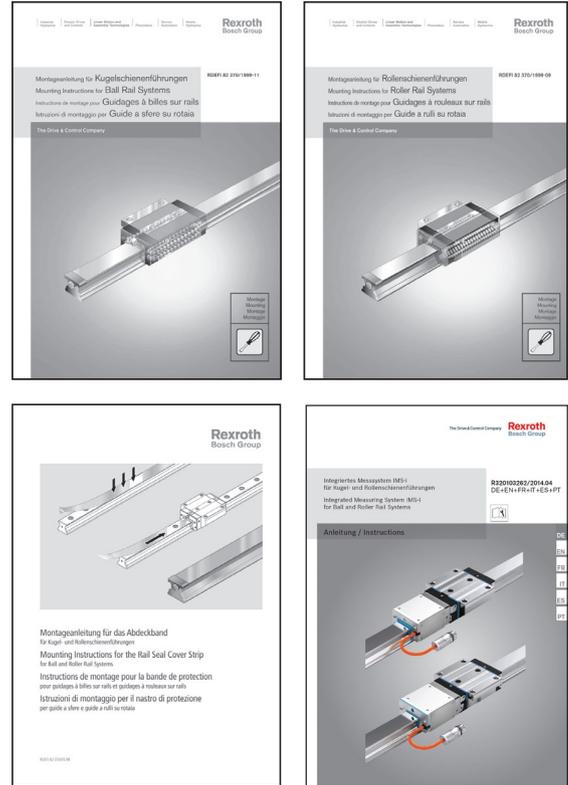
Note:

For guide rails with distance coded reference marks, the side with the reference marks is indicated by a hole in the reference edge of the guide rail. The scale is located on the opposite side.

For more detailed information on mounting Ball Rail and Roller Rail Systems, as well as cover strips, see the following mounting instructions:

- ▶ Mounting Instructions for Ball Rail Systems R320103095
- ▶ Mounting Instructions for Roller Rail Systems R320103096
- ▶ Mounting Instructions for the Cover Strip R320103110
- ▶ Instructions: Integrated Measuring System for Ball and Roller Rail Systems IMS-I R320103262

This documentation is available for download at „www.boschrexroth.com/mediadirectory“.



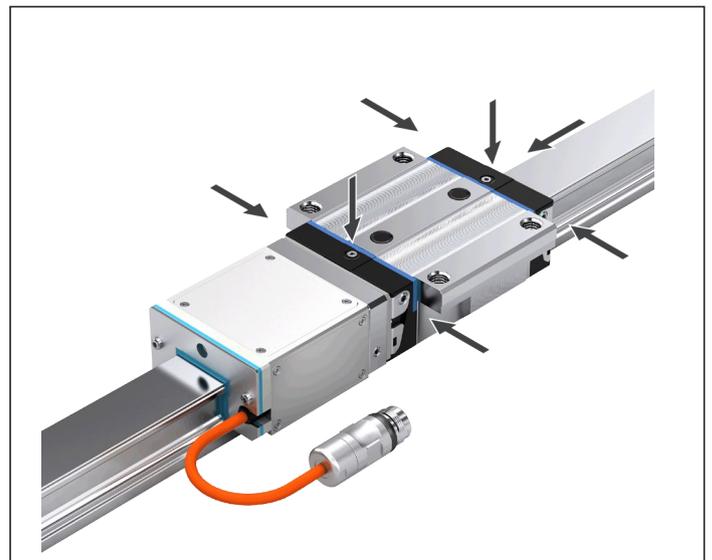
Lubrication

Rexroth Ball Rail Systems are delivered coated with anti-corrosion oil and with initial greasing.

Rexroth Roller Rail Systems are delivered filled with an anti-corrosion agent (sufficient for mounting and start-up). Immediately after mounting the runner blocks (before start-up), make sure the system has sufficient initial lubrication (basic lubrication). All runner blocks have been designed so that they can be lubricated either with grease or with oil.

Ball Rail and Roller Rail Systems with Measuring System cannot be lubricated through the scanner.

The runner blocks can be easily lubricated using the free lube ports, as indicated by the arrows. For more information on maintenance and lubrication, see the respective sections in the Ball Rail Systems catalog or the Roller Rail Systems catalog.



Safety Instructions

General Notes

- ▶ Combinations of different accuracy classes

Combining guide rails and runner blocks of different accuracy classes results in different tolerances for dimensions H and A₃. See relevant main catalog.

Intended use

Rail Systems are linear guides capable of absorbing forces from all transverse directions and moments about all axes. Rail Systems are intended exclusively for guiding and positioning tasks when installed in a machine.

The Integrated Measuring System (IMS for short) is an assembly. The IMS consists of components for precise linear movements and incremental measurements of linear displacement. The product may be used in accordance with the technical documentation (product catalog) for the following purposes:

- ▶ as a direct linear position sensing system in industrial environments (woodworking, laser welding, laser cutting, metal cutting and metal forming machine tools.
- ▶ as a linear encoder in applications with a linear motor.
- ▶ in interpolating axes in machine tools.
- ▶ in measuring machines within the scope of the achievable accuracy.
- ▶ for connection to display units, evaluation electronics for PCs and drive controllers

The product is exclusively intended for professional use and not for private use.

Use for the intended purpose also includes the requirement that you must have read and understood the product documentation completely, in particular these "Safety instructions".

The product is exclusively intended for incorporation into a final machine or a system or for assembly to other components for the purpose of building a final machine or a system.



The permitted operating conditions are determined by the individual components.

Misuse

Use of the product in any other way than as described under "Intended use" is considered to be misuse and is therefore not permitted. The product may only be used in applications or environments constituting a danger to the health and life of persons if this use – for example, in potentially explosive atmospheres covered by ATEX regulations – has been expressly specified and permitted in the product documentation. Bosch Rexroth AG will not accept any liability for injury or damage caused by misuse of the product. The risks associated with any misuse of the product shall be borne by the user alone.

Misuse of the product includes:

- ▶ the transport of persons
- ▶ use in potentially explosive atmospheres
- ▶ use in the food industry in direct contact with unpacked foods
- ▶ use in liquids
- ▶ use as a safety component, either mechanical or electrical
- ▶ use in environments with increased radioactivity

General Safety Instructions

- ▶ The safety rules and regulations of the country in which the product is used must be complied with.
- ▶ All current and applicable accident prevention and environmental regulations must be adhered to.
- ▶ The product may only be used when it is in technically perfect condition.
- ▶ The technical data and environmental conditions stated in the product documentation must be complied with.

- ▶ The product must not be put into service until it has been verified that the final product (for example a machine or system) into which the product has been installed complies with the country-specific requirements, safety regulations and standards for the application.
- ▶ Rexroth Rail Systems may not be used in zones with potentially explosive atmospheres as defined in the ATEX directive 94/9/EC.
- ▶ Rexroth Rail Systems must never be altered or modified. The user may only perform the work described in the “Quick User Guide” or the “Mounting Instructions for Ball- or Roller Rail Systems.”
- ▶ The product must never be dismantled.
- ▶ At high travel speeds a certain amount of noise is caused by the product. If necessary, appropriate measures should be taken to protect the hearing.
- ▶ Special safety requirements for specific sectors (e.g. cranes, theaters, foodstuffs) as provided for in laws, directives and standards must be complied with.
- ▶ In all cases, the provisions of the following standard should be noted and followed. DIN 637, Safety regulations for dimensioning and operation of profiled rail guides with recirculating rolling elements.

Directives and Standards

Rexroth Rail Systems are suitable for dynamic linear applications requiring reliability and high precision. The machine tool industry and other sectors must comply with a series of standards and guidelines. The standards can vary significantly worldwide. It is therefore essential to understand the legislation and standards that apply in each particular region.

EN ISO 12100

This standard is entitled Safety of machinery – General principles for design – Risk assessment and risk reduction. It gives a general overview and contains a guide to the major developments governing machines and their intended use.

Directive 2006/42/EC

The Machinery Directive describes the basic safety and health requirements for the design and manufacture of machinery. The manufacturer of a machine or his authorized representative has a duty to ensure that a risk assessment has been performed in order to determine the health and safety requirements which have to be fulfilled for that machine. The machine must be designed and built with the results of the risk assessment in mind.

Directive 2001/95/EC

This directive covers general safety requirements for any product placed on the market and intended for consumers, or likely to be used by consumers under reasonably foreseeable conditions, including products that are made available to consumers in the context of service provision for use by them.

Directive 85/374/EEC

This directive concerns liability for defective products and applies to industrially manufactured movables, irrespective of whether they have been incorporated into another movable or into an immovable or not.

Directive 76/769/EEC

This directive relates to restrictions on the marketing and use of certain dangerous substances and preparations. “Substances” means chemical elements and their compounds as they occur in the natural state or as produced by industry. „Preparations“ means mixtures or solutions composed of two or more substances.

Ordering Example for Ball Rail System

Ball Runner Block (KWD)

I	M	S	2	I	-	K	W	D	-	0	2	0	-	F	N	S	-	C	2	-	P	-	S	S	-	R	-	R	-	I	1	-	A	-	1	0	0	-	D
										1				2				3			4		5		6		7		8		9				10				11

Ordering data			
Feature	Description		Explanation
	IMS2I-KWD	Ball runner block with scanner	Ball runner block with mounted scanner
1	020	Size	Size 20
2	FNS	Design style	Flanged, normal, standard height
3	C2	Preload class	Preload class C2
4	P	Accuracy class	Precision
5	SS	Seal	Standard seal
6	R	Ball chain	with ball chain
7	R	Scanner mounting side	Scanner mounted on the right side
8	I1	Interface	1 V _{pp} 40 µm
9	A	Connector type	RGS 1722
10	100	Cable length	Cable length 1 m
11	D	Documentation	Standard documentation

Ball Guide Rail (KSA)

I	M	S	2	I	-	K	S	A	-	0	2	0	-	S	N	S	-	P	-	M	A	-	A	B	-	1	-	R	2	-	A	3	-	D
										1				2				3			4		5		6		7		8				9	

Ordering data			
Feature	Description		Explanation
	IMS2I-KSA	Ball guide rail with scale	Ball guide rail with scale
1	020	Size	Size 20
2	SNS	Design style	Slimline, normal, standard height
3	P	Accuracy class	Precision
4	MA	Mounting	Mounting from above
5	AB	Cover	With cover strip and protective end caps
6	1	Number of sections	One-piece guide rail
7	R2	Coding	2 reference marks
8	A3	Scale pitch accuracy	± 3 µ /m at 20 °C
9	D	Documentation	Standard documentation

Rail length 1750 mm

T1 = 35

R1 = 500 mm

R2 = 1500 mm

R3 = -

R4 = -

R5 = -

Necessary ordering data:

IMS2I-KWD-020-FNS-C2-P-SS-R-R-I1-A-100-D

IMS2I-KSA-020-SNS-P-MA-AB-1-R2-A3-D

Rail length : 1750 mm

T1 : 35 mm

R1 : 500 mm

R2 : 1500 mm

R3 : -

R4 : -

R5 : -

Ordering Example for Roller Rail System

Roller Runner Block (RWD)

I	M	S	2	I	-	R	W	D	-	0	3	5	-	F	N	S	-	C	2	-	S	-	D	S	-	0	-	R	-	I	1	-	A	-	1	0	0	-	D	
										1				2				3			4			5		6		7			8			9			10			11

Ordering data			Explanation
Feature	Description		
	IMS2I-RWD	Roller runner block with scanner	Roller runner block with mounted scanner
1	035	Size	Size 35
2	FNS	Design style	Flanged, normal, standard height
3	C2	Preload class	Preload class C2
4	S	Accuracy class	Super precision
5	DS	Seal	Double-lipped seal
6	0	Roller chain	Without roller chain
7	R	Scanner mounting side	Scanner mounted on the right side
8	I1	Interface	1 V _{PP} 40 µm
9	A	Connector type	RGS 1722
10	100	Cable length	Cable length 1 m
11	D	Documentation	Standard documentation

Roller Guide Rail (RSA)

I	M	S	2	I	-	R	S	A	-	0	3	5	-	S	N	S	-	S	-	M	A	-	A	B	-	1	-	R	D	-	A	3	-	D
										1				2				3			4			5		6		7			8			9

Ordering data			Explanation
Feature	Description		
	IMS2I-RSA	Roller guide rail with scale	Roller guide rail with scale
1	035	Size	Size 35
2	SNS	Design style	Slimline, normal, standard height
3	S	Accuracy class	Super precision
4	MA	Mounting	Mounting from above
5	AB	Cover	With cover strip and protective end caps
6	1	Number of sections	One-piece guide rail
7	RD	Coding	With distance-coded reference marks
8	A3	Scale pitch accuracy	± 3 µ /m at 20 °C
9	D	Documentation	Standard documentation

Rail length	1640 mm
T1	= 20
R1	= -
R2	= -
R3	= -
R4	= -
R5	= -

Necessary ordering data:

IMS2I-RWD-035-FNS-C2-S-DS-0-R-I1-A-100-D

IMS2I-RSA-035-SNS-S-MA-AB-1-RD-A3-D

Rail length : 1640 mm

T1 : 20 mm

R1 :-

R2 :-

R3 :-

R4 :-

R5 :-

Notes

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