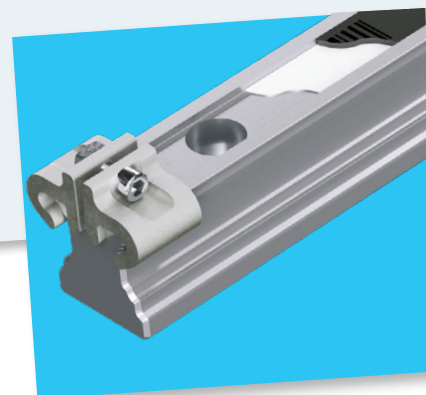
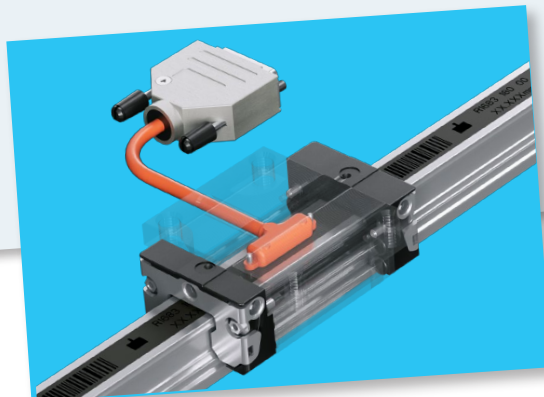
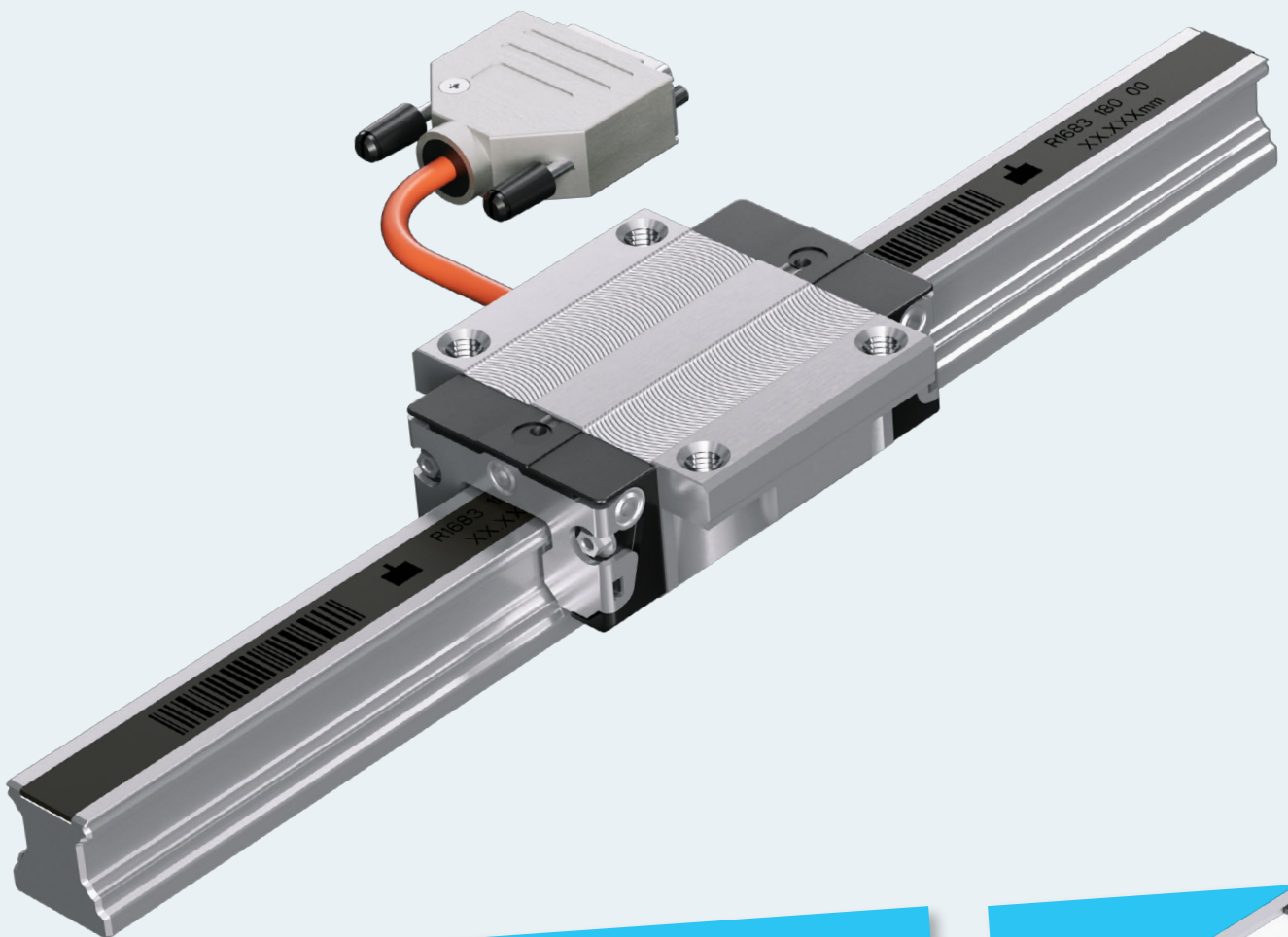


Integrated measuring system IMScompact

for BSHP ball rail systems



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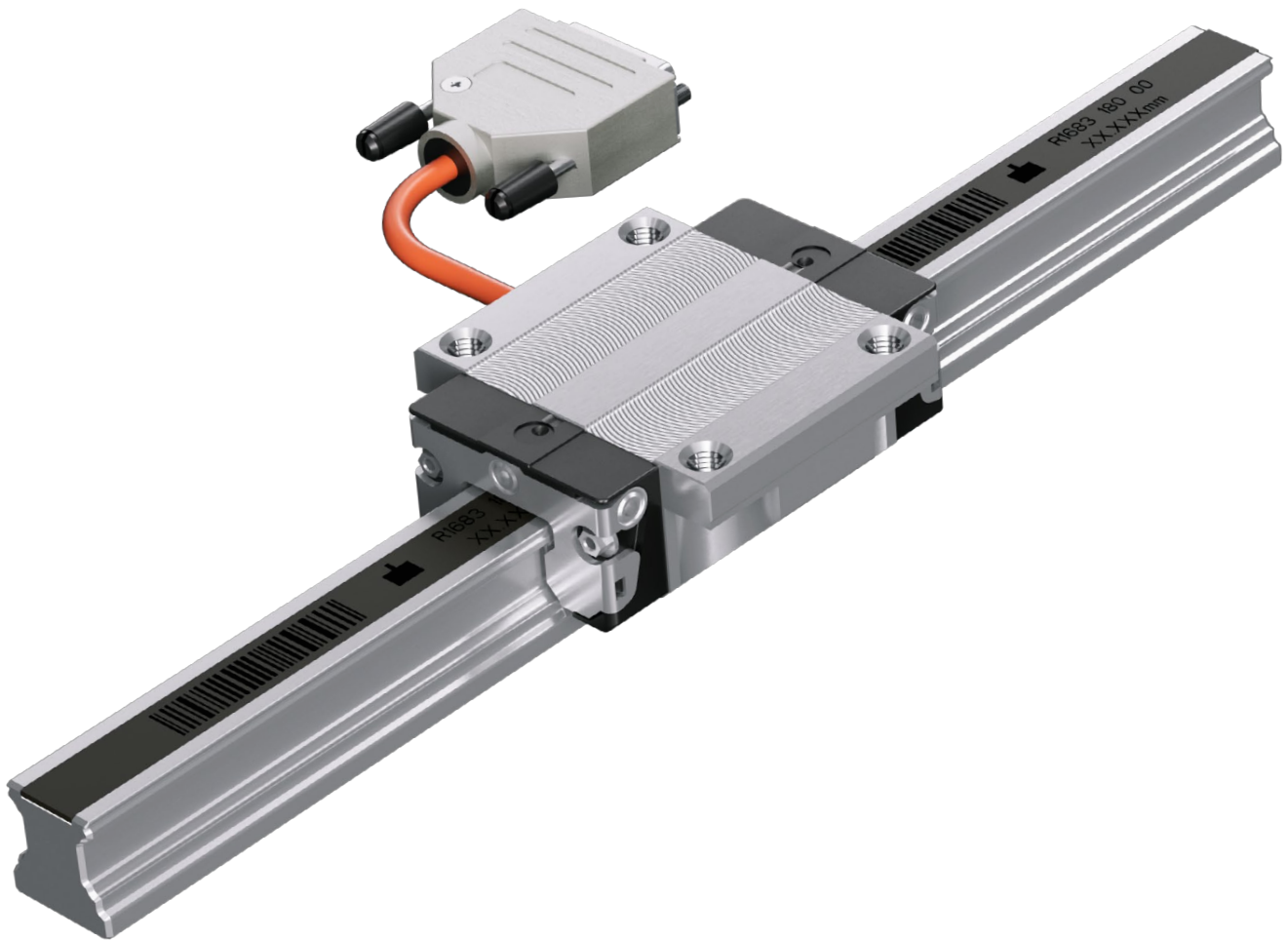
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Product overview

With the new integrated, magnetic measuring system "IMScompact", Rexroth expands their product range of integrated measuring systems and thus opens up an extended area of application for linear position measurement systems. With minimal spatial requirements, i.e. the new construction size 15, a maximum measuring length of up to 17.8 meters across rail joints, with absolute versions which are suited for the drive-integrated safety technology (in preparation) as well as with a simplified assembly, the new IMScompact series supplements the highly precise IMS inductive measuring system in many areas of automation technology, wood and plastic processing, processing of metal sheets, linear direct drive technology and general machinery.

The proven Rexroth quality characteristics of interchangeable design, modularity, robustness and easy assembly were consistently continued here. In connection with superior logistics, the global distribution and service, the customer will benefit from simplified work across the entire value adding chain – from design, purchasing and logistics to assembly and maintenance.



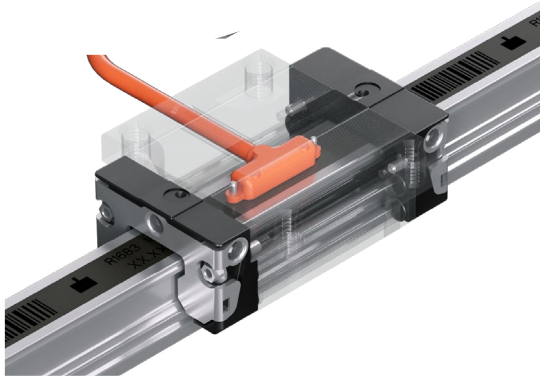
At a glance

Compact	Construction-space neutral, integrated measuring head electronics Sizes 15, 20, and 25 in six runner block designs Runner block accessible from all sides (lubrication, cleaning)	
Flexible	Magnetic strip can be installed across rail joints Length finishing with manual tools Compatible with the full BSHP product range Compatible with the braking and clamping elements, bellows, front seals and front lube units Lateral cable output in all directions	
Robust	Protection type IP67 without buffer air and encapsulation Dirt-resistant magnetic measuring principle Circumferential gaskets for protection against dirt and media Sensors shielded by steel bodies Measurement close to and stiff at the tool center point	
Cost-effective	Mount & Guide & Measure: fully adjusted Plug & Play complete system Favorable component price No additional assembly or disposition required	
Future-proof	Global service and spare parts from the BSHP modular system Compatible with all established drive controllers and measuring displays Easy replacement	
Powerful	Repeatability:	$\pm 1 \mu\text{m}$
	System accuracy:	$\pm 20 \mu\text{m/m}$
	Voltage supply:	10 ... 30 V
	Incremental:	1Vpp (1 mm) and TTL (10 μm) with reference track, pitch-coded
	Highly dynamic:	up to 5 m/s
	Measuring length:	up to 17.8 m
	Several scanners on one rail possible	

Encoders and other interfaces which are suitable for drive-integrated safety technology are currently being prepared.

Product description

Ball runner block with integrated measuring sensor



- ▶ The runner block and the measuring sensor form a compact, completely assembled unit.
- ▶ The runner block is fully loadable up to F_{max} and compatible with the Rexroth interchangeable design. With the integrated gaskets and the massive steel shield, the electronics are optimally protected.

Ball guide rail with slot for magnetic strip



- ▶ Secured with screws from above, with BSHP interchangeable design and a slot for the intake of the magnetic strip - also available as joint version for measuring lengths of > 6 meters.

Rexroth magnetic strip



- ▶ Remove protective paper - attach - done. The magnetic strips are attached to a thermally stable stainless-steel frame and equipped with transfer adhesive tape.
- ▶ At the same time, it serves as closure for the fastening bore holes.

Wide range of accessory products



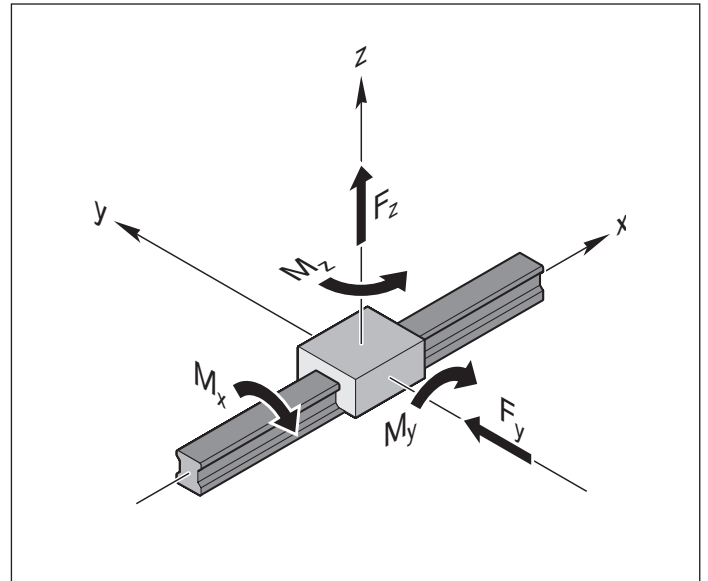
- ▶ From the second runner block / carriage to clamping elements, additional gaskets for lubrication elements and bellows
- ▶ The entire BSHP product range is compatible. Additionally, drives, controllers and control systems as well as position indicators by Rexroth are available.

Technical data

Dimensioning and calculations

The IMScompact measuring system runner block is based on the proven BSHP ball runner block in CS design. The dimensioning and calculation including the nominal life expectancy calculation is implemented analogously to the calculation for the profiled rail system without measuring system according to the catalog information in "BSHP ball rail systems".

The external loads acting on the system are distributed among the runner blocks depending on the arrangement. The loads caused by forces and torques resulting from the effective forces need to be calculated for each runner block when performing the life expectancy calculation. For the IMScompact runner blocks, whichever scenario is selected, the relevant values for $F_{\max}$ and $M_{\max}$ must be complied with in the application. The respective values can be obtained from the corresponding dimension tables.

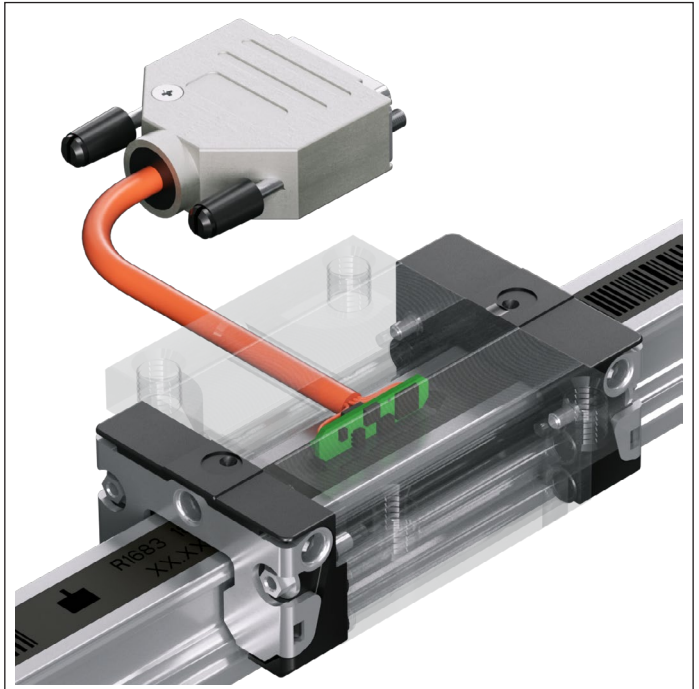


In common applications, the measuring runner block is used as full replacement for a loaded standard runner block; the dynamic load capacity C as well as the calculation of the nominal life expectancy are identical with the standard runner block.

IMScompact runner block

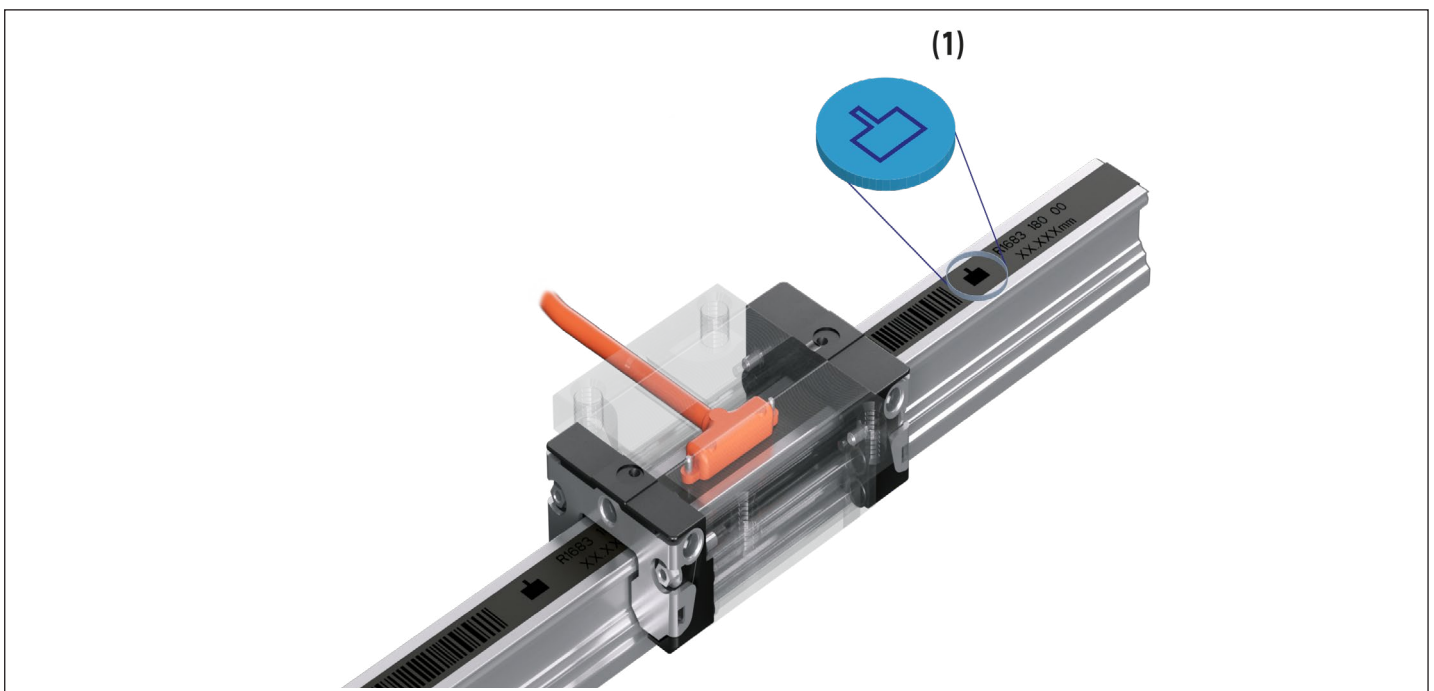
Assembly

In an internal pouch of the runner block, the measuring sensor is assembled as compact unit with plastic enclosure. It comprises the incremental and reference sensor as well as the signal processing and the cable outlet. The cable is guided through a bore hole located opposite the side with the reference edge to the outside and mechanically strain-relieved at the runner block. The measuring sensor is already fully adjusted to the ideal measuring distance. The other characteristics of the runner block correspond to the BSHP ball rail system. Due to the sensors integrated into the steel body, an excellent EMC protection is achieved.

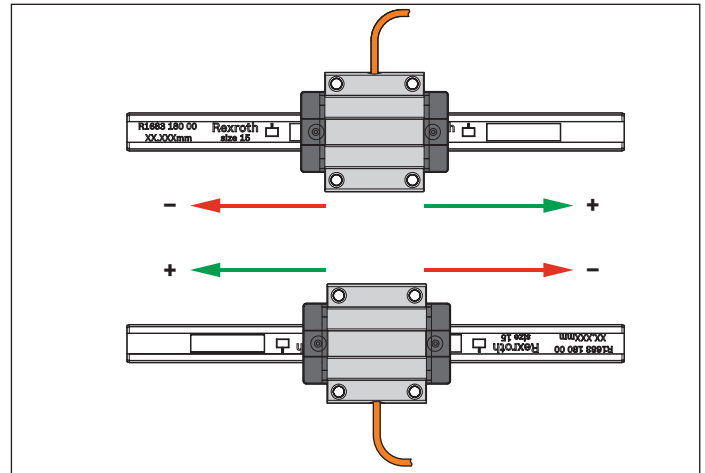


Installation direction of the magnetic strip relative to the IMScompact runner block

The installation direction of the magnetic strip must correspond to the installation direction of the IMScompact runner block. On the magnetic strip, there is a pictogram (1) showing an IMScompact runner block with cable outlet. It must be ensured that the cable outlet of the IMScompact runner block is on the same side as shown on the pictogram (1) of the magnetic strip.



Definition of the motion direction

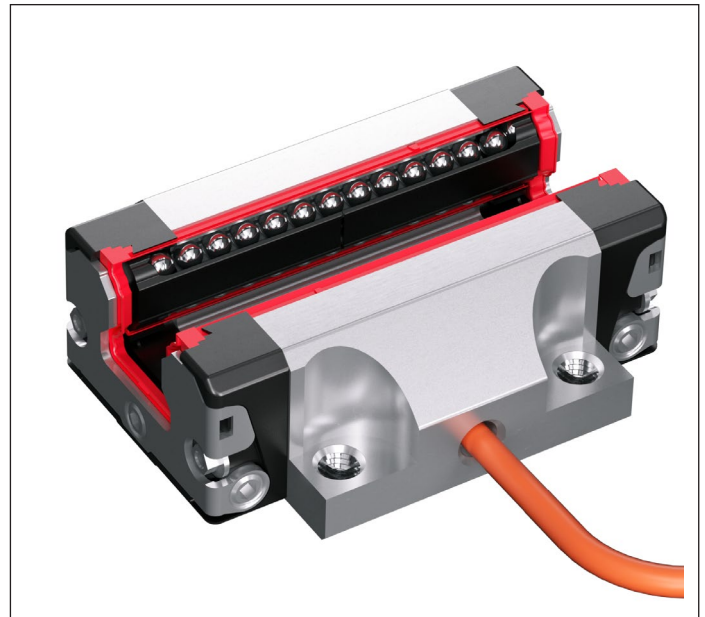


Sealing

As is the case with all BSHP runner blocks, the interior of the runner block and the measuring sensor are protected by two end seals and four longitudinal seals.

For rough ambient conditions such as chips, dusts and fluids, additional front seals and wipers from the BSHP range of accessory products are available.

The magnetic strip consists of a tribologically optimized mix of materials and offers a good running surface for the seals in a common industrial environment. Ferromagnetic substances in the sensor air gap may interfere with the measuring signal and must be kept outside by means of corresponding wipers (cover plate wipers, front seals). Cover plate wipers and front seals in combination with the optional cover strip offer the best protection (see accessories).



Operating conditions

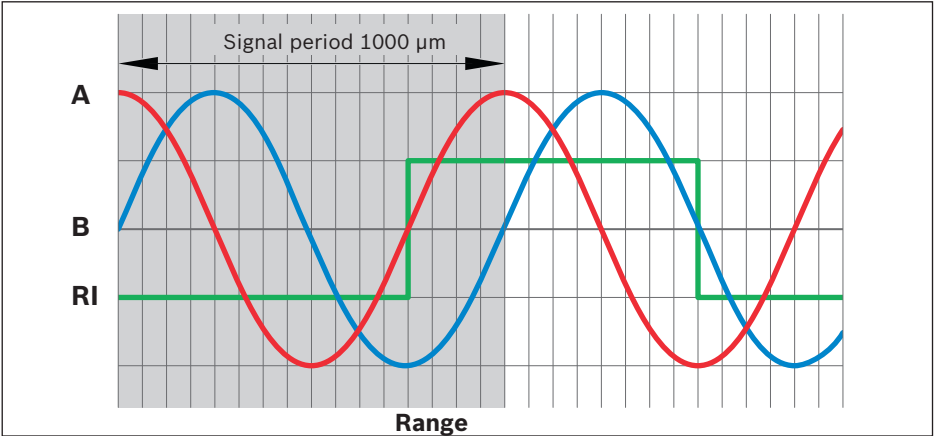
Travel speed $v_{\max}$	5 m/s
Acceleration $a_{\max}$	500 m/s ²
Shock (EN 60068-2-27)	500 m/s ² / 11 ms
Vibration (EN 60068-2-6)	100 m/s ² (57 Hz - 2000 Hz) 1.5 mm _{p-p} (10 Hz - 57 Hz)
Operating temperature	0 ... 80 °C
Storage/transport temperature	-10 ... 80 °C
Relative air humidity during storage	max. 95%
Relative air humidity in operation	max. 80% at 20°C
MTTF	(in preparation)
Protection type (EN 60529)	IP67
EMC	EN 61326-1 EN 61000-6-3 / EN 61000-6-4
RoHS compliant	yes
UL compliant	Cable UL AWM STYLE 20549 Casting compound UL 94VO

Functional safety - Safe Motion

The suitability of the IMScompact for functional safety in the overall system (electrical signal path and mechanical integration) is currently in preparation. For this reason, the mechanical connection of the IMScompact is to be evaluated by the respective designer and/or machinery engineer taking into consideration the safety-related aspects, and the results are to be used in the hazard analysis. For applications with functional safety, the magnetic strip must be glued-in at all times. Corresponding IMScompact versions are currently prepared.

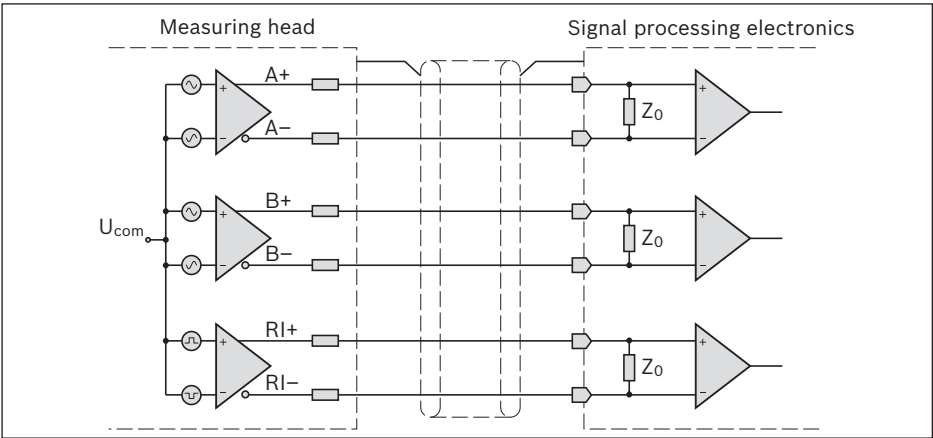
Electrical interface, incremental: analog sinusoidal signals 1 Vpp (option I9)

The 1 Vpp analog interface (option I9) is predestined for the highly dynamic position control of linear motors, belt drives or screw drives. The sinusoidal incremental signals A and B are phase-offset by 90° to each other and have a typical signal amplitude of 1 Vpp.



Option	Signal period	Max. measuring head speed	Max. homing cycle speed
	(μm)	(m/s)	(m/s)
I9	1000	5.0	≤ 0.5

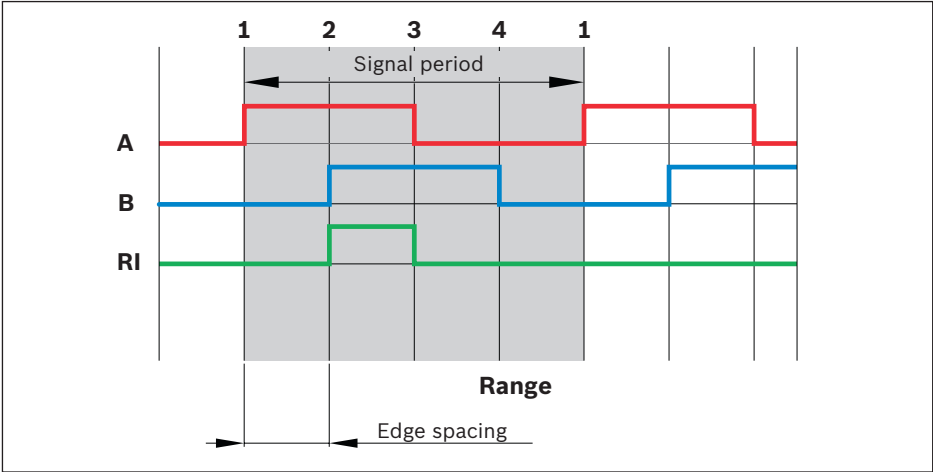
The illustrated output signal sequence (**B** phase-lagged to **A**) applies to measuring head motions in the positive counting direction. The differential reference mark signal **RI** has an amplitude of approx. -0.7 V when inactive (low). In the active state (high), the amplitude amounts to +0.7 V. The indicated amplitude values apply to an operation with terminating resistor $Z_0 = 120\ \Omega$.



- $Z_0 = 120.00\ \Omega$
 $U_{com} = 2.5\ V$

Electrical interface, incremental: digital square-wave output signal TTL, 10 µm resolution (option I4)

The digital TTL interface (option I4) is used for the position display or the position transmission to programmable logic controllers or measuring value displays. The digital incremental signals A and B comply with the EIA/TIA-422-A standard. They are phase-offset by 90° and have the following signal levels: $U_{\text{high}} > 2 \text{ V}$; $U_{\text{low}} < -2 \text{ V}$. The differential reference mark signal RI has the same electrical characteristics as the incremental signals. The amplitudes apply to the operation with a terminating resistor $Z_0 = 120 \text{ }\Omega$.



Option	Resolution (edge spacing) (µm)	Signal period (µm)	Max. measuring head speed (m/s)	Max. homing cycle speed (m/s)
I4	10	40	0.8	≤ 0.5

Voltage supply	10 ... 30 V DC
Current consumption	1 Vpp at 12 V: 19.5 mA 1 Vpp at 24 V: 11.3 mA TTL at 12 V: 51 mA TTL at 24 V: 28.5 mA

Electrical interface, absolute:

in preparation

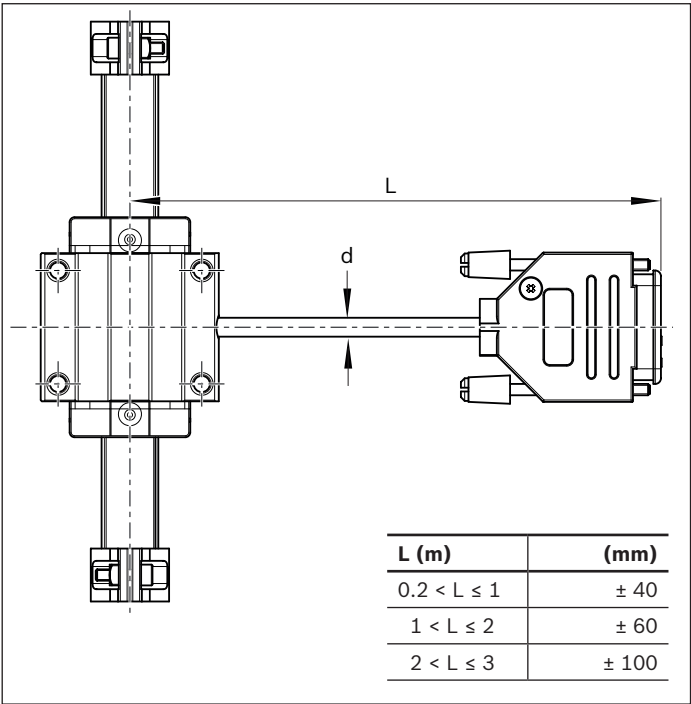
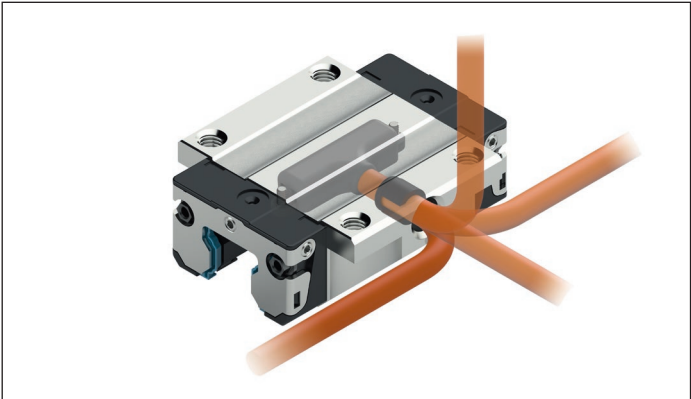
Cables and connectors

Cables

The length of the connection cable at the IMScompact runner block can be selected in steps of 0.5 m up to a maximum length of 3.0 m. The cable outlet at the runner block can be implemented flexibly in all directions. Due to the high supply voltage in connection with the analog, differential signal transmission, in practice, cable lengths of up to a maximum of 75 meters can be realized without any restrictions. With the digital absolute interface (SSI), the indicated maximum cable lengths are to be taken into consideration depending on the frequency. This cable type can be ordered as extension cable (see accessories).

Specification

- ▶ Lif9YC11Y 5x2x0.09 mm² (AWG28), suitable for drag chains
- ▶ Minimum length 0.2 m
- ▶ Outer diameter 5.0^{±0.2} mm
- ▶ Wires stranded in pairs, pairs stranded
- ▶ Wire insulation PP
- ▶ Wire colors DIN47100
- ▶ Shield: tin-coated CU mesh with non-woven banding and polyester foil
- ▶ Sheath: PUR color: orange RAL2003
- ▶ UL 20549/10954
- ▶ Recommended bending radius for one-time bending (stationary): 5 x d (external line diameter)
- ▶ Recommended bending radius for alternating bends (drag chain): 10 x d

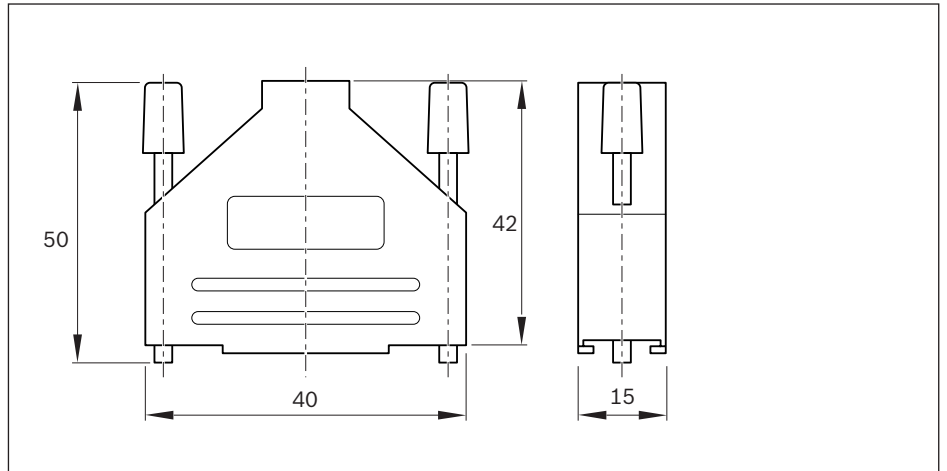
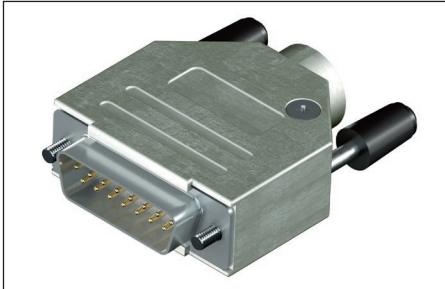


[IMScompact instructions](#)

Connectors and assignment

Connectors

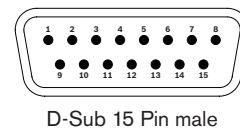
Type E and F:
DSUB 15-pin male, protection
type / protection IP40



Option I9

Type E: Signal, incremental 1Vpp

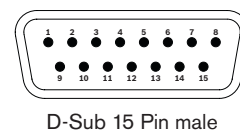
Pin	Cable color	Signal, incremental 1Vpp
1		
2	Green	A+
3	Yellow	A-
4	Blue	0V / GND
5	Brown	B+
6	White	B
7		
8		
9	Pink	R+
10	Gray	R-
11	Red	10 ... 30VDC
12		
13		
14		
15		
Housing	Shield	0V / GND



Option I4

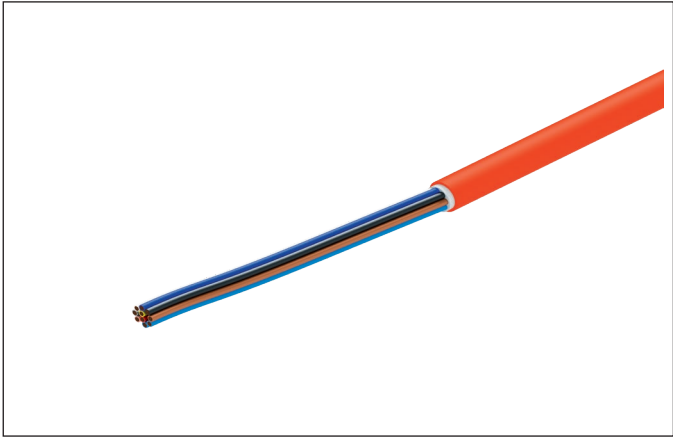
Type F: Signal, incremental TTL

Pin	Cable color	Signal, incremental TTL
1		
2		
3		
4	Blue	0V / GND
5		
6		
7	Green	A+TTL
8	Yellow	A-TTL
9	Pink	R+TTL
10	Gray	R-TTL
11	Red	10 ... 30VDC
12		
13	Brown	B+TTL
14	White	B-TTL
15		
Housing	Shield	0V / GND



Type 0: Open cable end (only for options I9 and I4, incremental measuring system)

- ▶ Stripping length 20 mm
- ▶ Insulation stripping length 5 mm
- ▶ Drilled strands



R-

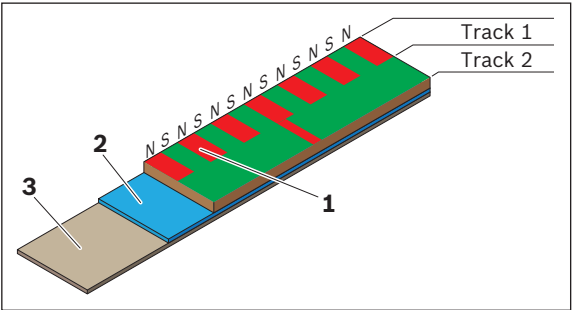
Cable color	1Vpp (option I9)	TTL (option I4)
Green	A+	A+ TTL
Yellow	A-	A- TTL
Blue	0V / GND	0V / GND
Brown	B+	B+ TTL
White	B-	B- TTL
Red	10 ... 30VDC	10 ... 30VDC
Pink	R+	R+ TTL
Gray	R-	R- TTL
Shield	0V / GND	0V / GND

Magnetic strip

Structure and specification

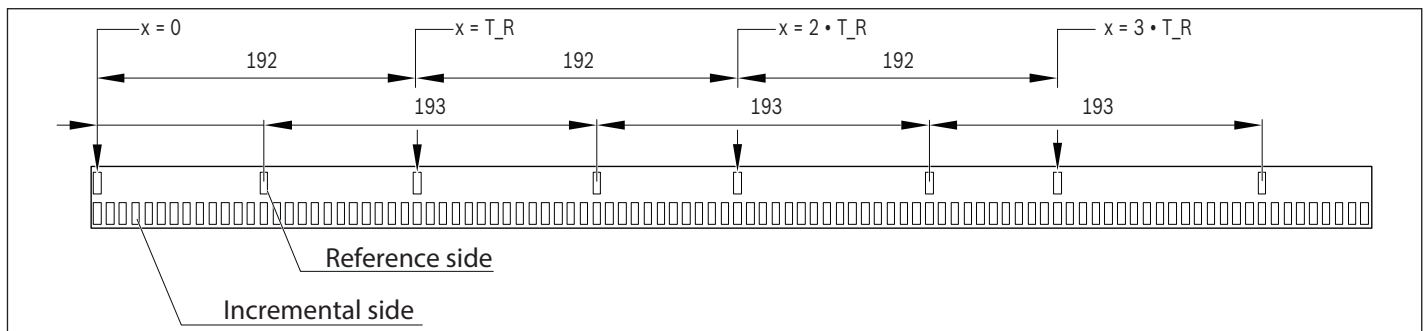
The magnetic strip consists of three firmly glued components:

- 1 Two-track magnetic strip made of plastic which holds the position information, 1 mm pole width, distance-coded
- 2 Stainless steel flexible conductive strip
- 3 Transfer adhesive tape with protective foil



The magnetic strip has two tracks, with an incremental and a reference side. The incremental track comprises 1 mm increments. On the reference side, distance-coded reference marks are provided. The clear arrangement of the reference marks ensures that an absolute position is already available when two marks have been passed. For the battery-buffered absolute variant of IMScompact, the distance-coding is the absolute reference to the rail. Thus, measuring lengths of up to 17.8 m are possible. The necessary minimum length ¹⁾ of the magnetic strip for evaluating the distance-coded reference marks is 400 mm. If the length of the magnetic strip is shorter than 400 mm, the measuring system may only be used as incremental measuring system without evaluation of reference marks.

1) the minimum length can also be shorter depending on the mechanical design.



The following specifications apply:

Material	CPE with 90% strontium ferrite (magnet carrier)
Coding	Incremental, two-track system (reference track)
Pole pitch	1 mm
Reference track	Distance-coded, $T_R = 192$ mm
Minimum length for the evaluation of the distance coding	± 400 mm
Operating temperature, processed	$-20 \dots +65$ °C
Optimum storage temperature, unprocessed	$+18$ °C
Adhesion temperature	$+18 \dots +30$ °C
Humidity	Max. 95%, non-condensing
Accuracy	± 20 $\mu\text{m}/\text{m}$
Carrier strip material	Precision steel strip, 1.4310
Adhesive tape	3M-9088
Dimensions	Width: 8 / 10 / 12 mm ± 0.1 mm Thickness of exclusive carrier 1.55 ± 0.09 mm
Thermal expansion coefficient	$\alpha = 16 \times 10^{-6}$ 1/K
Thermal longitudinal expansion	In the glued-on condition, the longitudinal expansion of the magnetic strip corresponds to the one of the rail. With a massive substructure, the latter is in turn determined by the longitudinal expansion of the substructure.
Weight	Approx. 60 g/m
Impact of external magnets	External magnetic fields at the surface of the magnetic strip max. 64 mT (640 Oe; 52 kA/m) to prevent damage.
Bending radius	Min. 150 mm

Handling

To avoid tensions in the magnetic strip, it must not be stretched, twisted or stored/handled with the magnetized plastic strip directed to the inside. If the magnetic strip is reeled up, inserting a partition layer for avoiding damage is recommended. When being stored in a non-glued condition, the recommended storage temperature is to be complied with to avoid a weakening of the transfer adhesive layer.

Mounting

The system is mounted by adhesion of the rail slot. Before mounting, the correct mounting orientation is to be ensured since, with the mounted magnetic strip, the push-on direction and thus the position of the reference edge of the runner block are determined. A magnetic strip which has already been glued on is destroyed after its removal and cannot be re-used. Before the adhesion of the magnetic strip, the latter is to be stored near the rail (ideally in the slot) for approx. 30 minutes so that the temperature corresponds to the rail temperature and any tensions due to thermal expansion can be excluded. After mounting, the strip ends are to be secured with strip clamps.

Mounting steps:

- 1 Thoroughly clean the surface
- 2 Acclimatize the magnetic strip
- 3 Remove the protective foil and attach the magnetic strip with a great pressure force (4-5 kg/cm²)
- 4 Cover it with lubricant (if no cover strip is used), push-on the runner block, secure it with strip clamps

The following preparation instructions are to be observed:

Preparing the surface

To guarantee an ideal adhesion, any anti-adhesive contamination in the rail slot (e.g. oil, grease, dust, separating agents) must be removed with solvents with residue-free evaporation. Suitable agents are ketones or alcohols. When using solvents, the manufacturer's instructions are to be observed at all times!

Pressure force

The rigidity of the adhesion directly depends on the contact developed by the adhesive with the surfaces to be glued. The ideal pressure force is 4 to 5 kg/cm² (use press-on aids if applicable).

Adhesion temperature

The most favorable adhesion temperature is between +18°C and +30°C. Adhesions in which the surfaces to be glued are colder than +10°C are to be avoided since, in such case, the adhesive becomes too hard and, therefore, a sufficient instant adhesion cannot be achieved. After proper adhesion, the rigidity of the connection is also guaranteed with temperatures in the minus range. According to our experience, the final adhesion force of an adhesion is reached after approx. 72 hours (at +21°C). For adhesion, only the transfer adhesive tape which is included in the scope of delivery and already attached to the magnetic strip is to be used.



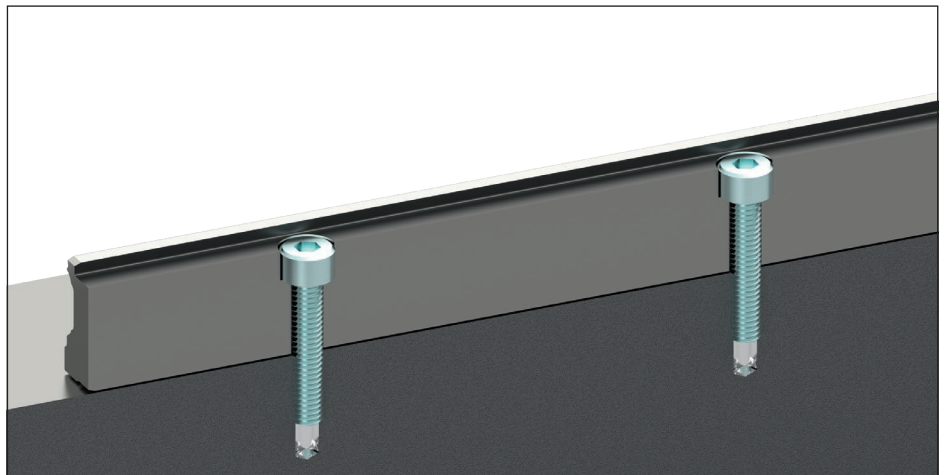
[IMScmpact instructions](#)

IMScompact guide rail

The IMScompact guide rail corresponds to a modified standard rail with slot which is secured with screws from above. Due to the magnetic strip, the use of plastic mounting hole plugs for protection against contamination and of gaskets can be omitted.



The thermal expansion coefficient of the rail amounts to $\alpha_{\text{therm}} = 11 \cdot 10^{-6} \text{ K}^{-1}$. Generally, the thermal expansion coefficient of the overall system secured with screws with the magnetic strip being affixed corresponds to the one of the substructure provided that it is sufficiently rigid towards the rail.



Accuracy

Repeatability

The repeatability is the maximum position deviation that can occur with the repeated run-up of the same position. In any measurement point, this is less than $\pm 1 \mu\text{m}$.

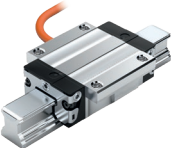
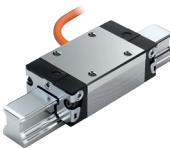
System accuracy

The system accuracy of the measuring system, consisting of measuring head and magnetic strip, corresponds to $\pm 20 \mu\text{m/m}$. This is the maximum linearity deviation for any measured travel of maximally 1 m across the length of the magnetic strip.

Ball runner block for IMScompact

Product overview and type key

Ball runner blocks are delivered with standard seals (SS) or low-friction seals (LS) in an initially greased/preserved version without Ball Chain. Generally, they comply with accuracy class P. The following versions are available. Special versions are possible upon request.

	FNS	FLS	SNS	SLS	SNH	SLH
	(R1651)	(R1653)	(R1622)	(R1623)	(R1621)	(R1624)
						
Size	Size 15		Size 20		Size 25	
Preload	C1	C2	C1	C2	C1	C2
FNS	✓	✓	✓	✓	✓	✓
FLS	✓	✓	✓	✓	✓	✓
SNS	✓	✓	✓	✓	✓	✓
SLS	✓	✓	✓	✓	✓	✓
SNH	✓	✓			✓	✓
SLH					✓	✓

Short type designation / ordering code for IMScompact ball runner block:

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

1 Size

Characteristic	Name
015	Size 15
020	Size 20
025	Size 25

3 Preload class

Characteristic	Name
C1	Preload 2% C
C2	Preload 8% C

5 Gasket

Characteristic	Name
SS	Standard
LS	Low-friction

7 Lubrication

Characteristic	Name
01	With initial lubrication, preserved
02	Preserved

9 Connector type

Characteristic	Name
F	15-pin sub-D. pins, TTL/EC
E	15-pin sub-D. pins, 1Vpp/EC
0	Open cable end

11 Documentation

Characteristic	Name
D	Standard

2 Format

Characteristic	Name
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

Characteristic	Name
P	Precision

6 Ball Chain

Characteristic	Name
0	Without Ball Chain

8 Interface

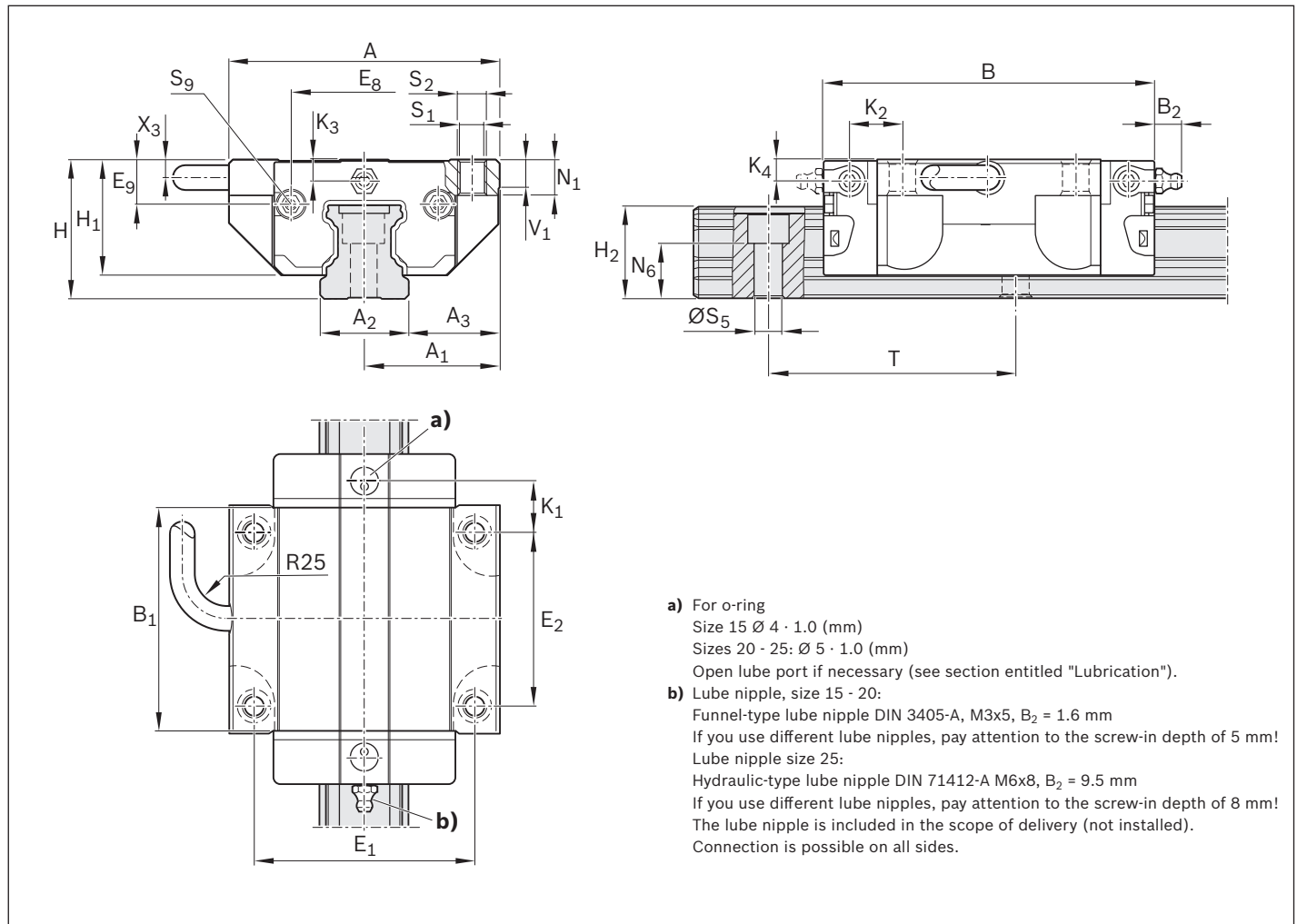
Characteristic	Name
I9	1Vpp / 1000 µm
I4	TTL 10 µm

10 Cable length

Characteristic	Name
300	3.00 m
250	2.50 m
200	2.00 m
150	1.50 m
100	1.00 m
050	0.50 m
020	0.20 m

In the type key, it is impossible to combine different signal forms with characteristics 8 and 9.
E.g.: The combination of interface I9 (1Vpp) with connector type F (TTL) is impossible.

FNS (Flanged, normal, standard height)

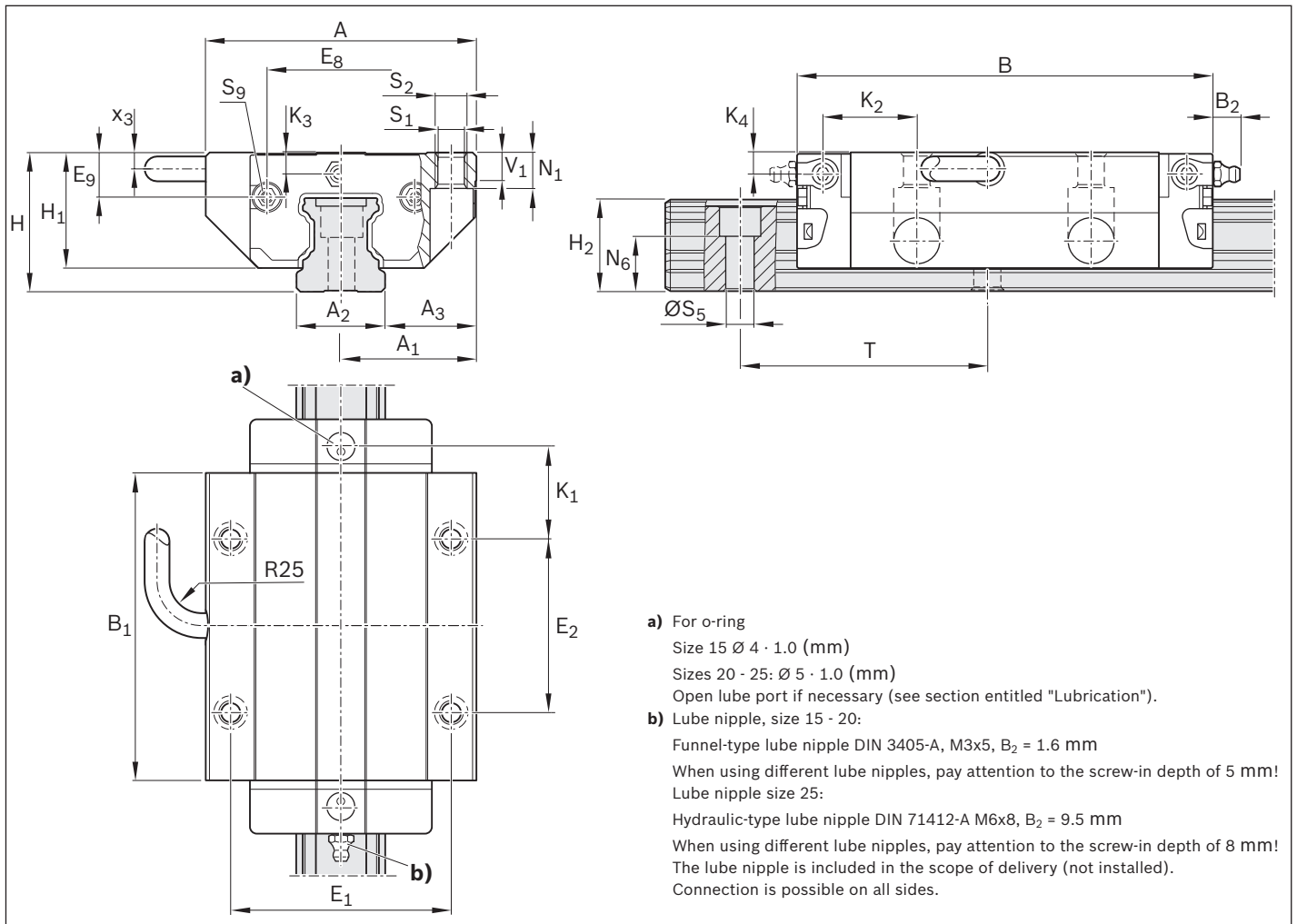


Size	Dimensions (mm)																			
	A	A ₁	A ₂	A ₃	B ^{+0.5}	B ₁	E ₁	E ₂	E ₃	X ₃	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₃	K ₄
15	47	23.5	15	16.0	58.2	39.2	38	30	26	4.25	24.55	6.70	24	19.90	16.30	16.20	8.00	9.6	3.20	3.20
20	63	31.5	20	21.5	75.0	49.6	53	40	35	5.90	32.50	7.30	30	25.35	20.75	20.55	11.80	11.8	3.35	3.35
25	70	35.0	23	23.5	86.2	57.8	57	45	40	8.25	38.30	11.50	36	29.90	24.45	24.25	12.45	13.6	5.50	5.50

Size	Dimensions (mm)										Mass (kg)	Load capacities (N)		Load moments (Nm)			
	N ₁	N ₂	N ₆ ^{±0,5}	S ₁	S ₂	S ₅	S ₉	T	V ₁	m		C	F _{max}	M _t	M _{t,max}	M _L	M _{L,max}
15	5.2	4.40	10.3	4.3	M5	4.5	M2,5x3,5	60	5.0	0.20	9 860	3 290	95	30	68	20	
20	7.7	5.20	13.2	5.3	M6	6.0	M3x5	60	6.0	0.45	23 400	7 800	300	100	200	70	
25	9.3	7.00	15.2	6.7	M8	7.0	M3x5	60	7.5	0.65	28 600	9 530	410	140	290	100	

¹⁾ Dimension H₂ with cover strip
²⁾ Dimension H₂ without cover strip

FLS (Flanged, long, standard height)

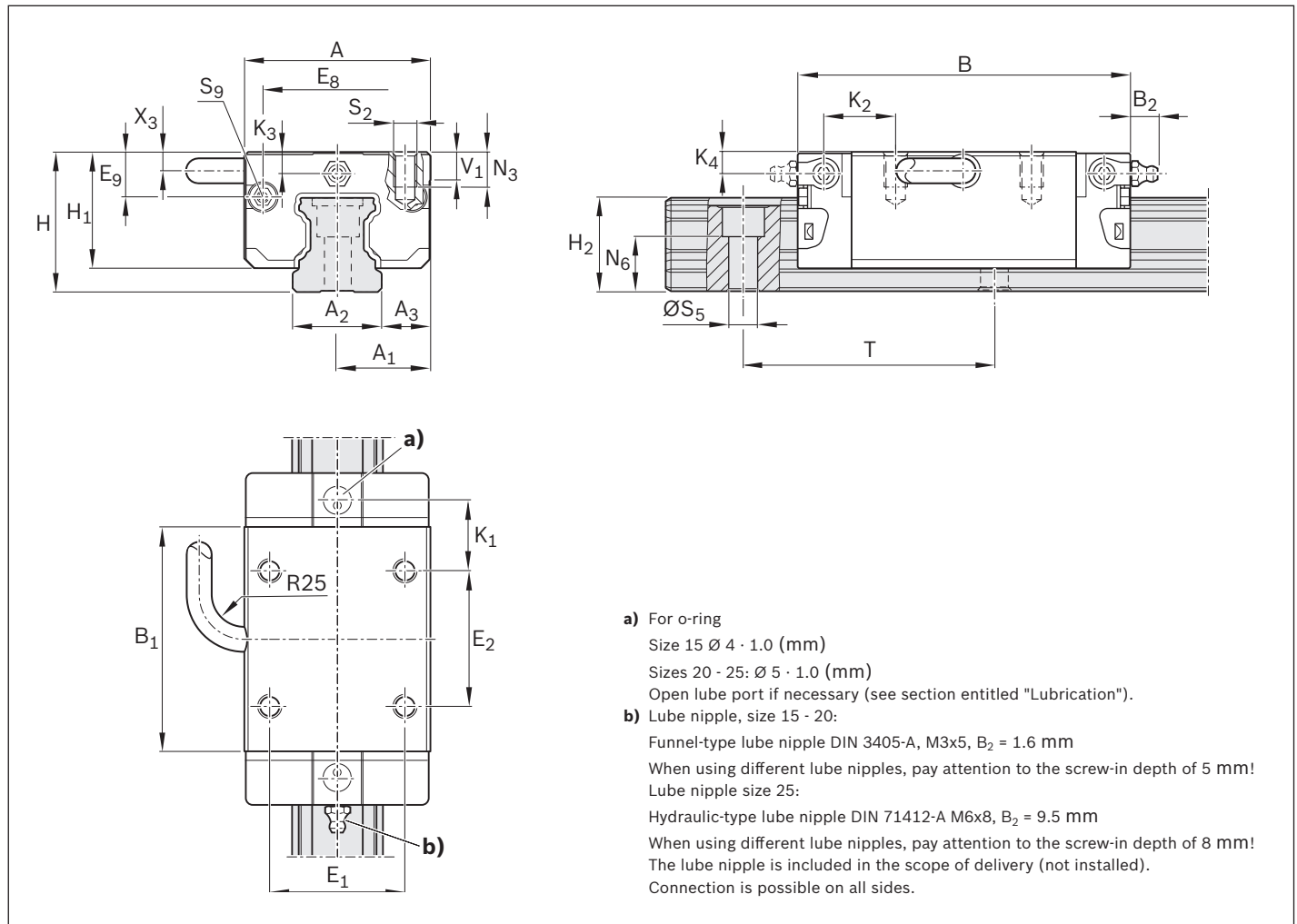


Size	Dimensions (mm)																			
	A	A ₁	A ₂	A ₃	B ^{+0.5}	B ₁	E ₁	E ₂	X ₃	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₃	K ₄	
15	47	23.5	15	16.0	72.6	53.6	38	30	4.25	24.55	6.70	24	19.90	16.30	16.20	15.20	16.80	3.20	3.20	
20	63	31.5	20	21.5	91.0	65.6	53	40	5.90	32.50	7.30	30	25.35	20.75	20.55	19.80	19.80	3.35	3.35	
25	70	35.0	23	23.5	107.9	79.5	57	45	8.25	38.30	11.50	36	29.90	24.45	24.25	23.30	24.45	5.50	5.50	

Size	Dimensions (mm)										Mass (kg)	Load capacities (N)		Load moments (Nm)					
	N ₁	N ₂	N ₆ ^{±0,5}	S ₁	S ₂	S ₅	S ₉	T	V ₁	m		C	F _{max}	M _t	M _{t,max}	M _L	M _{L,max}		
15	5.2	4.40	10.3	4.3	M5	4.5	M2,5x3,5	60	5.0	0.30		12 800	4 270		120	40		120	40
20	7.7	5.20	13.2	5.3	M6	6.0	M3x5	60	6.0	0.55		29 600	9 870		380	130		340	110
25	9.3	7.00	15.2	6.7	M8	7.0	M3x5	60	7.5	0.90		37 300	12 430		530	180		530	180

¹⁾ Dimension H₂ with cover strip
²⁾ Dimension H₂ without cover strip

SNS (Slimline, normal, standard height)



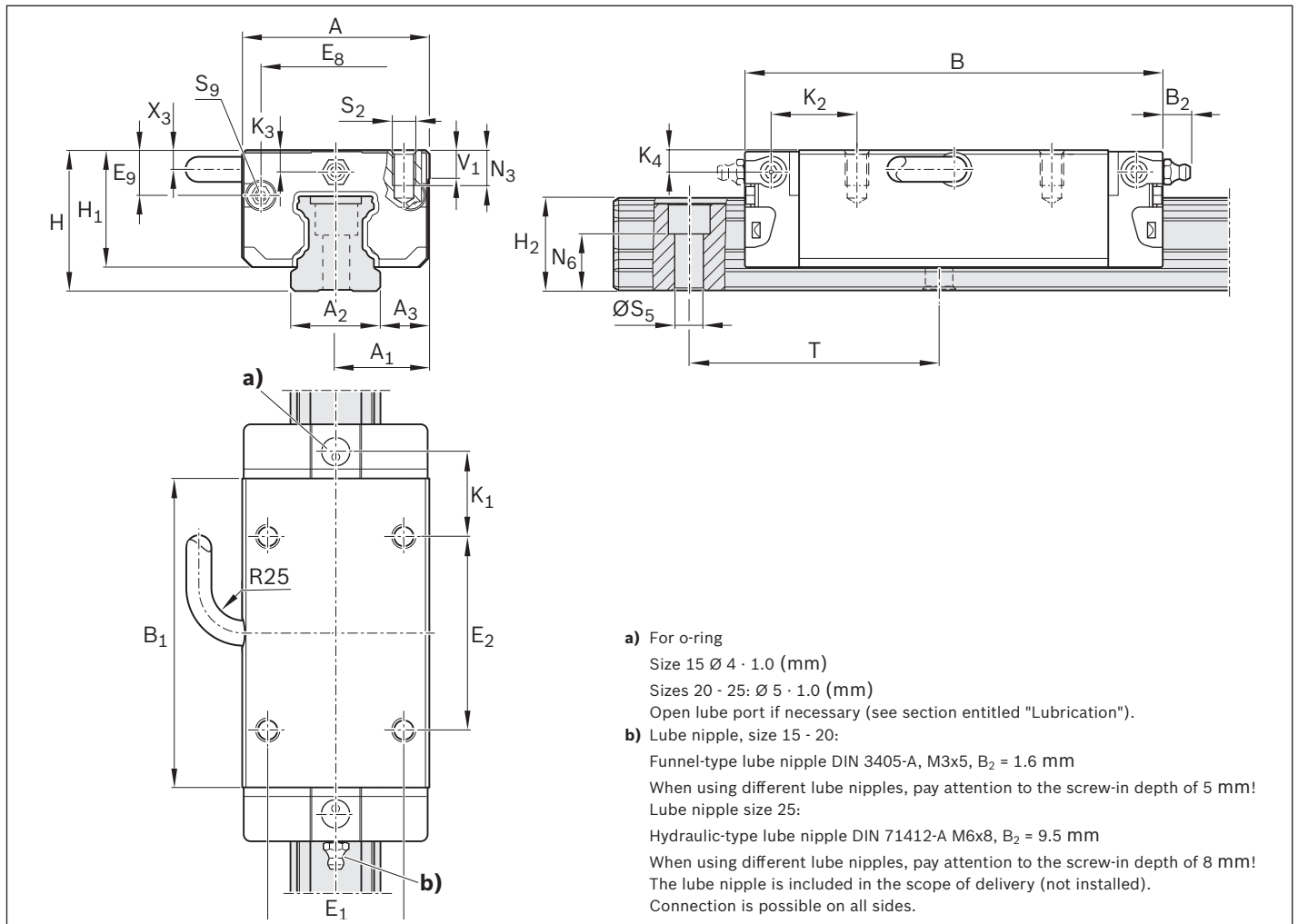
Size	Dimensions (mm)																			
	A	A ₁	A ₂	A ₃	B ^{+0.5}	B ₁	E ₁	E ₂	X ₃	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₃	K ₄	
15	34	17	15	9.5	58.2	39.2	26	26	4.25	24.55	6.70	24	19.90	16.30	16.20	10.00	11.60	3.20	3.20	
20	44	22	20	12.0	75.0	49.6	32	36	5.90	32.50	7.30	30	25.35	20.75	20.55	13.80	13.80	3.35	3.35	
25	48	24	23	12.5	86.2	57.8	35	35	8.25	38.30	11.50	36	29.90	24.45	24.25	17.45	18.60	5.50	5.50	

Size	Dimensions (mm)							Mass (kg)	Load capacities (N)		Load moments (Nm)			
	N ₃	N ₆ ^{±0,5}	S ₂	S ₅	S ₉	T	V ₁		m	C	F _{max}	M _t	M _{t,max}	M _L
15	6.0	10.3	M4	4.5	M2,5x3,5	60	5.0	0.15	9 860	3 290	95	30	68	20
20	7.5	13.2	M5	6.0	M3x5	60	6.0	0.35	23 400	7 800	300	100	200	70
25	9.0	15.2	M6	7.0	M3x5	60	7.5	0.50	28 600	9 530	410	140	290	100

¹⁾ Dimension H₂ with cover strip

²⁾ Dimension H₂ without cover strip

SLS (Slimline, long, standard height)

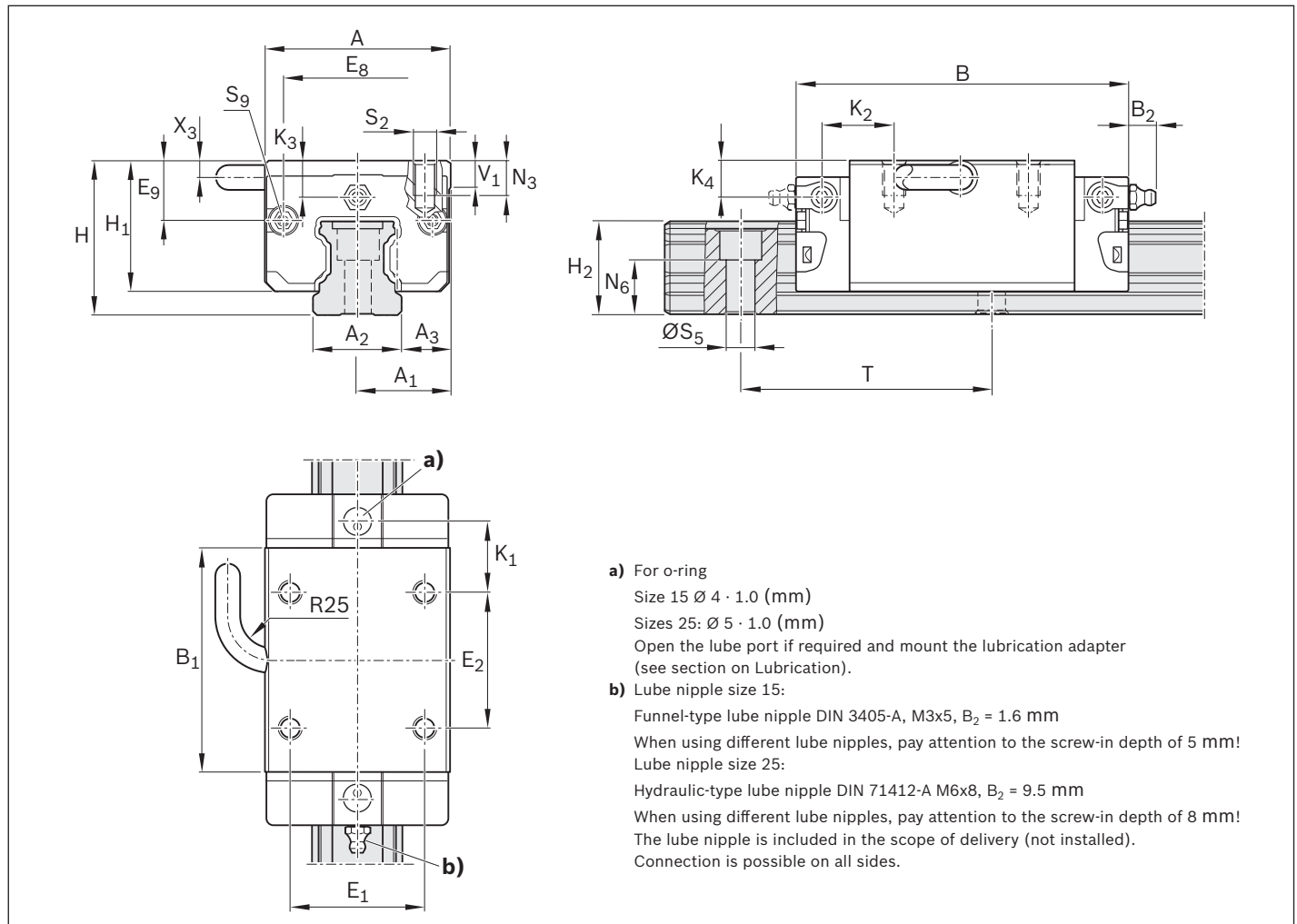


Size	Dimensions (mm)																		
	A	A ₁	A ₂	A ₃	B ^{+0.5}	B ₁	E ₁	E ₂	X ₃	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₃	K ₄
15	34	17	15	9.5	72.6	53.6	26	26	4.25	24.55	6.70	24	19.90	16.30	16.20	17.20	18.80	3.20	3.20
20	44	22	20	12.0	91.0	65.6	32	50	5.90	32.50	7.30	30	25.35	20.75	20.55	14.80	14.80	3.35	3.35
25	48	24	23	12.5	107.9	79.5	35	50	8.25	38.30	11.50	36	29.90	24.45	24.25	20.80	21.95	5.50	5.50

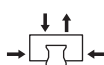
Size	Dimensions (mm)							Mass (kg)	Load capacities (N)		Load moments (Nm)			
	N ₃	N ₆ ^{±0,5}	S ₂	S ₅	S ₉	T	V ₁		m	C	F _{max}	M _t	M _{t,max}	M _L
15	6.0	10.3	M4	4.5	M2,5x3,5	60	5.0	0.20	12 800	4 270	120	40	120	40
20	7.5	13.2	M5	6.0	M3x5	60	6.0	0.45	29 600	9 870	380	130	340	110
25	9.0	15.2	M6	7.0	M3x5	60	7.5	0.65	37 300	12 430	530	180	530	180

¹⁾ Dimension H₂ with cover strip
²⁾ Dimension H₂ without cover strip

SNH (Slimline, normal, high)



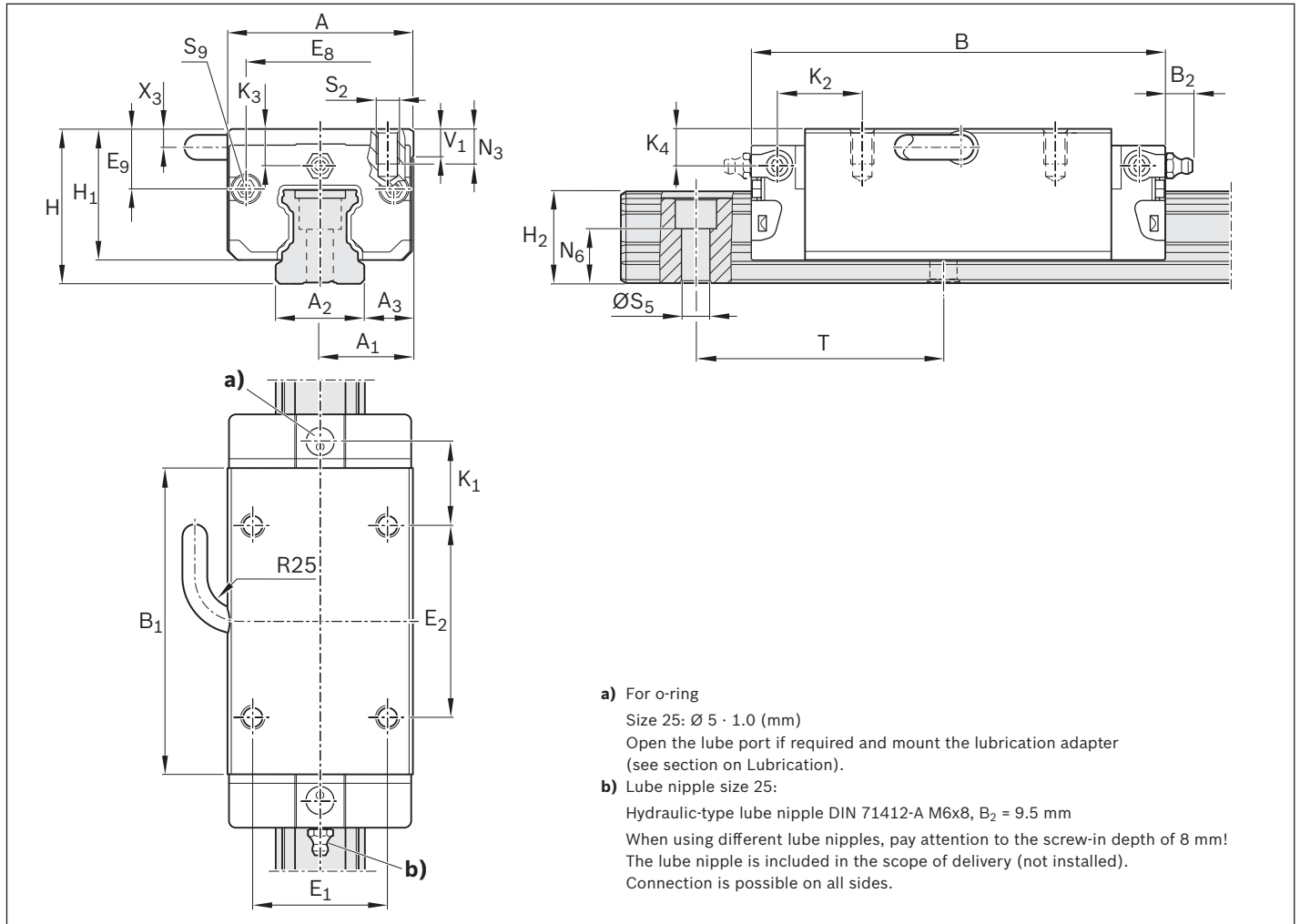
Size	Dimensions (mm)																		
	A	A ₁	A ₂	A ₃	B ^{+0.5}	B ₁	E ₁	E ₂	X ₃	E ₈	E ₉	H	H ₁	H ₂ ¹⁾	H ₂ ²⁾	K ₁	K ₂	K ₃	K ₄
15	34	17	15	9.5	58.2	39.2	26	26	8.3	24.55	10.70	28	23.90	16.30	16.20	10.00	11.60	7.20	7.20
25	48	24	23	12.5	86.2	57.8	35	35	12.5	38.30	15.50	40	33.90	24.45	24.25	17.45	18.60	9.50	9.50

Size	Dimensions (mm)							Mass (kg)	Load capacities (N)		Load moments (Nm)				
	N ₃	N ₆ ^{±0,5}	S ₂	S ₅	S ₉	T	V ₁		m		F _{max}		M _t	M _{t,max}	
15	6.0	10.3	M4	4.5	M2,5x3,5	60	5.0	0.20	9 860	3 290	95	30	68	20	
25	9.0	15.2	M6	7.0	M3x5	60	7.5	0.60	28 600	9 530	410	140	290	100	

¹⁾ Dimension H₂ with cover strip

²⁾ Dimension H₂ without cover strip

SLH (Slimline, long, high)



Size	Dimensions (mm)																		
	A	A ₁	A ₂	A ₃	B ^{+0.5}	B ₁	E ₁	E ₂	X ₃	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	107.9	79.5	35	50	12.2	38.30	15.50	40	33.90	24.45	24.25	20.80	21.95	9.50	9.50

Size	Dimensions (mm)							Mass (kg)	Load capacities (N)		Load moments (Nm)			
	N ₃	N ₆ ^{±0.5}	S ₂	S ₅	S ₉	T	V ₁	m	C	F _{max}	M _t	M _{t,max}	M _L	M _{L,max}
25	9.0	15.2	M6	7.0	M3x5	60	7.5	0.80	37 300	12 430	530	180	530	180

- ¹⁾ Dimension H₂ with cover strip
²⁾ Dimension H₂ without cover strip

Ball guide rail for IMScompact

Product overview and type key, ball guide rails

Measuring ball guide rails are available as one-piece (up to 6.000 mm) and multi-piece (joint) version (up to 17.800 mm).

Short type designation / ordering code for IMScompact ball rail:

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

1 Size

Characteristic	Name
015	Size 15
020	Size 20
025	Size 25

3 Accuracy class

Characteristic	Name
P	Precision
H	High

5 Cover

Characteristic	Name
MT	Magnetic strip, strip clamp
00	Without ^{*1)}

7 Coding

Characteristic	Name
RD	Distance-coded reference marks

9 Documentation

Characteristic	Name
D	Standard

2 Format

Characteristic	Name
SNS	Slimline, normal, standard height

4 Fastening

Characteristic	Name
MA	Bolting from above

6 Number of sections

Characteristic	Name
1	1-piece
2	2-piece
...	...
8	8-piece

8 Accuracy scale

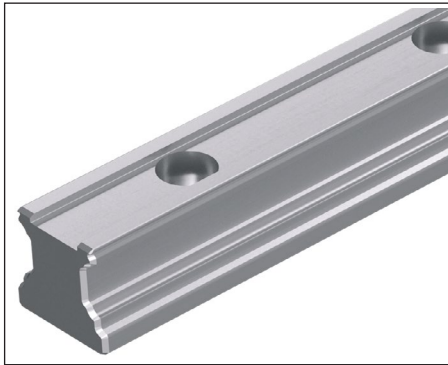
Characteristic	Name
10	±20 µm/m

10 Total length

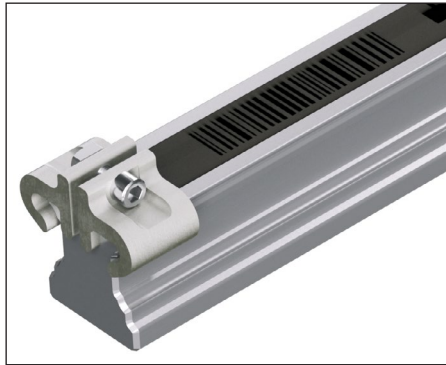
Characteristic	Name
$L_{\min} \leq L \leq 17.800$	mm

*1) The magnetic strip may also be ordered separately - see accessories

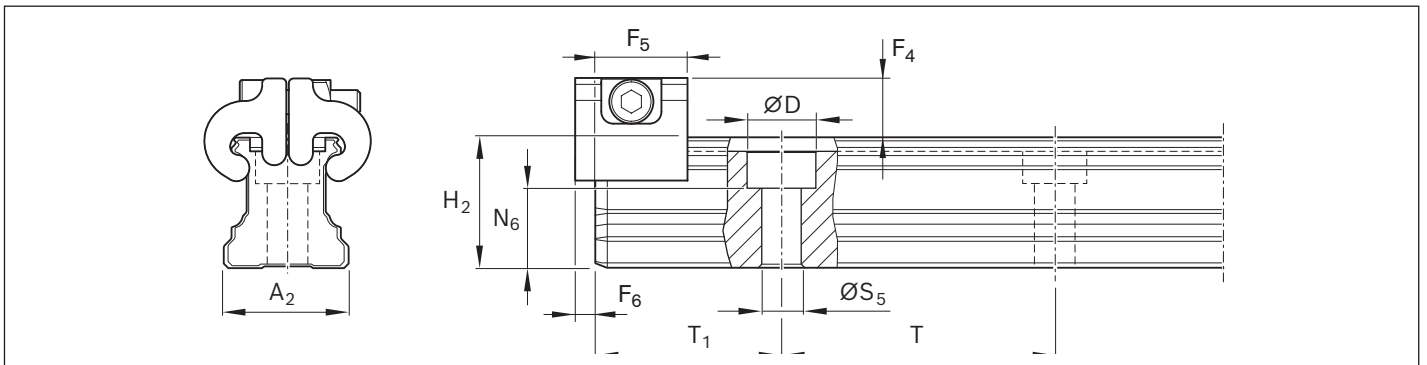
Ball guide rail for IMScompact



Without magnetic strip: Option 00



With magnetic strip and strip clamp Option MT



Size	Dimensions (mm)													Mass m (kg/m)
	A ₂	D	H ₂ ¹⁾	L _{max} ²⁾	N ₆ ^{±0,5}	S ₅	T	T _{1 min}	T _{1S} ³⁾	T _{1 max}	F ₄	F ₅	F ₆	
15	15	7.4	16.20	3 836	10.3	4.5	60	12	28.0	50	7.3	12.0	2.0	1.4
20	20	9.4	20.55	3 836	13.2	6.0	60	13	28.0	50	7.1	12.0	2.0	2.4
25	23	11.0	24.25	3 836	15.2	7.0	60	13	28.0	50	8.2	13.0	2.0	3.2

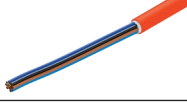
¹⁾ Dimension H₂ without cover strip

²⁾ For size 20 - 25, ball guide rails up to 5816 mm are available upon request.

³⁾ Preferred dimension T_{1S} with tolerances ± 0.75 recommended.

Accessories

Cables and electrical accessories

	for EC interfaces	3 m	5 m	10 m	20 m	100 m
	1 Vpp	R051704308	R051704309	R051704310	R051704311	
	TTL	R051704312	R051704313	R051704314	R051704315	
	Raw cable PUR orange, 5x2x0.09 mm					R168395000
	INS0760, Encoder connector (pin)	R911297361				
	INS0761, Encoder connector (bush)	R911297341				

Additionally, freely selectable cable manufactures are available.

Short type designation / ordering code for ready-made IMScompact extension cable:

I	M	S	C	-	V	L	-	I	9	-	E	-	5	0	,	0
									1		2			3		

2 Cable end 1 (interface)

Characteristic	Name
I9	1Vpp/15-pin sub-D, female connector
I4	TTL/15-pin sub-D, female connector
00	Without, open cable end

3 Cable end 2 (connector type)

Characteristic	Name
E	15-pin sub-D, pins, 1Vpp/EC
F	15-pin sub-D, pins, TTL/EC
O	Without, open cable end

4 Cable length

Characteristic	Name
1 ≤ L ≤ 75	m

In the type key, it is impossible to combine different signal forms with characteristics 3 and 4.
E.g.: Combinations of cable end 1 = I9 and cable end 2 = F impossible.

As leading manufacturer of electric drives, controllers and control units, Rexroth offers a great selection of accessories, available under www.boschrexroth.com.

Magnetic strips



Magnetic strips can be ordered cut-to-length or in a package with a length of 17.8 m.

Size	Part number	Length (m)
15	R168318000	17.8
20	R168388000	17.8
25	R168328000	17.8

Short type designation / ordering code for IMScompact magnetic strip:

I	M	S	C	-	M	T	-	0	2	0	-	R	D	-	2	0	-	1	7	8	0	0
								1				2			3			4				

1 Size

Characteristic	Name
015	Size 15
020	Size 20
025	Size 25

3 Accuracy scale

Characteristic	Name
10	±20 µm/m

2 Coding

Characteristic	Name
RD	Distance-coded reference marks

4 Total length

Characteristic	Name
$L_{\min} \leq L \leq 17\,800$	mm

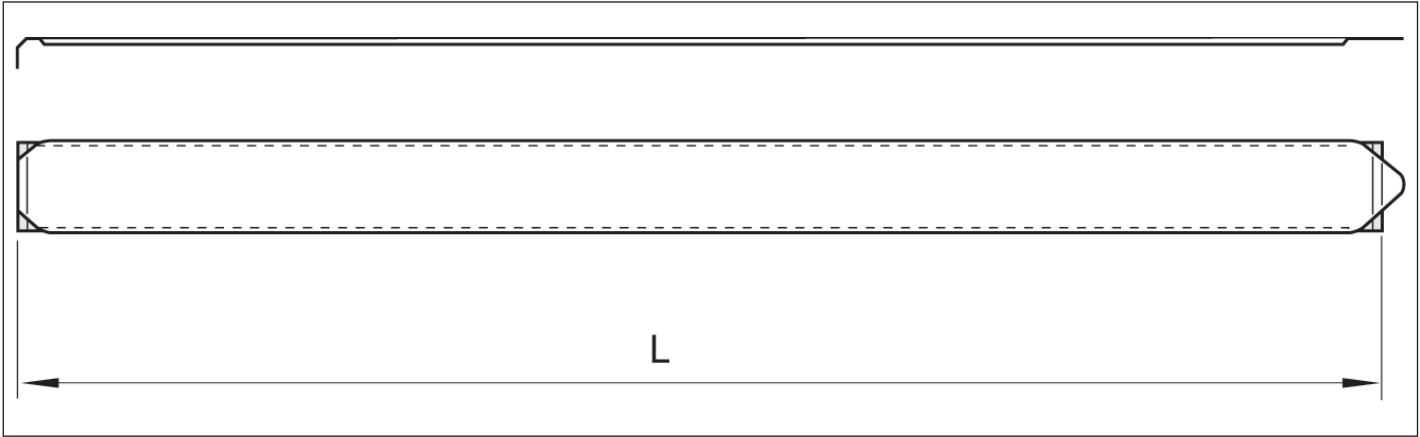
Pole search film



Name	Part number
Pole search film	R168399000

With the pole search film, the magnetization of the magnetic strip can be checked.

Cover strip



Short type designation / ordering code for cover strip with snap fit:

I	M	S	C	-	F	S	T	-	0	2	0	-	1	7	8	0	0
										1		2					

1	Size
Characteristic	Name
015	Size 15
020	Size 20
025	Size 25

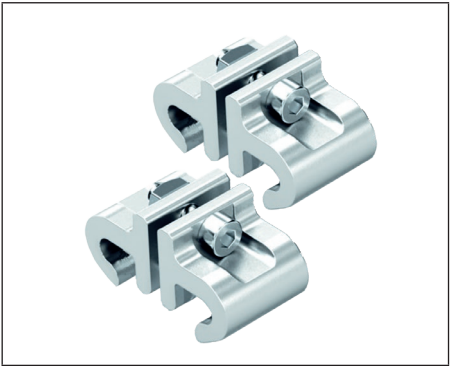
2	Total length
Characteristic	Name
$L_{min} \leq L \leq 17.800$	mm

The cover strip may not be used in the US, in Japan and in Taiwan.

Strip clamps

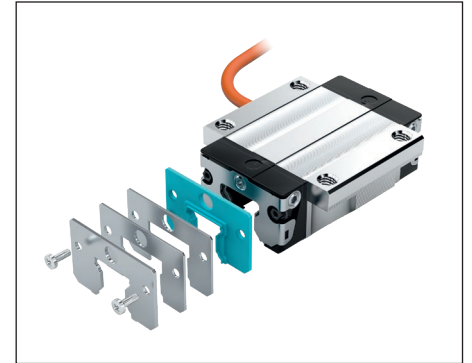
Associated aluminum strip clamps are attached to the magnetic strips and can be reordered under the following material numbers. The pieces are packed as set (2 strip clamps with related screw connection).

Size	Part number	Mass (g)
15	R161913950	11
20	R161983950	13
25	R161923950	14



Mechanical accessories

From the standard guide rail to the full product range of runner blocks including comprehensive accessories - the proven Rexroth BSHP program is compatible with MPP-IMS and described in a separate catalog. Special feature: Braking and clamping elements as well as the runner blocks of all versions and accuracy classes can also be operated on the measuring system rail.



Position display

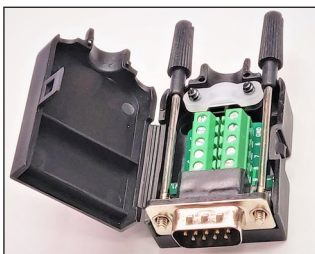
For simple applications, e.g. stop adjustment and length measurement, for the direct display of the position value, a compact display unit is available. This unit can be connected to the TTL version (option I4) of the IMScompact.

Characteristics of the position display R168393000:

- ▶ 7-digit LCD display, color: blue, character height: 10 mm, including sign and measuring unit
- ▶ Easy snap-in mounting in panel cut-out 68x45 mm
- ▶ Offset function
- ▶ Switching between relative and absolute dimension
- ▶ Actual value storage
- ▶ Protection type IP 54 (front), IP40 (rear)
- ▶ Connection of the IMScompact to the position display by means of
 - a.) an adapter cable R348112705 (DSUB 15-pin to DSUB 9-pin)
 - b.) DSUB Breakout Box
- ▶ Travel speed of the IMScompact to 0.8 m/s restricted in the event of an operation at the position display
- ▶ Voltage supply 24VDC (power supply unit not included in the scope of delivery)



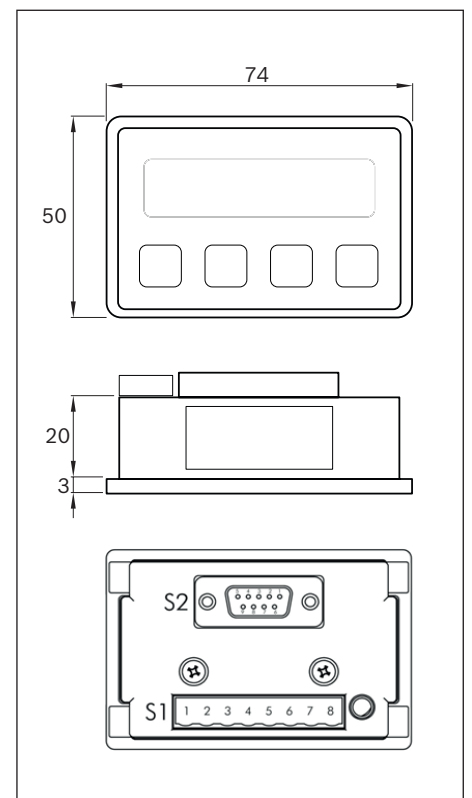
	Part number	Length (m)
Position display	R168393000	-
Adapter cable	R348112705	0.55
DSUB Breakout Box	R348112905	-



DSUB Breakout Box



[Position display instructions](#)



Further information

Safety instructions

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 position measurement 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 measurement 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 intended exclusively for professional use and not for private use. The intended use also includes having read and understood the product documentation completely, in particular these "Safety instructions". The product is exclusively intended for incorporation into a machine or system or for assembling with other components to build a final machine or system.

Misuse

Using 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 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 direct contact with unpacked foodstuffs
- ▶ 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 observed.
- ▶ All current and applicable accident prevention and environmental regulations must be adhered to.
- ▶ The product may only be used when it is in a technically perfect condition.
- ▶ The technical data and ambient 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/ roller rail systems".

- ▶ The product is never allowed to be disassembled.
- ▶ At high travel speeds a certain amount of noise is caused by the product. If necessary, appropriate measures should be taken to protect hearing.
- ▶ The special safety requirements for specific industries (e.g. crane construction, theaters, food technology) set forth 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 systems with recirculating rolling elements.
- ▶ The runner block and guide rail shall be generally and sufficiently grounded. Danger to life in the event of energized components!

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 observe a series of standards and directives. These requirements can vary significantly worldwide. It is therefore essential that you read and understand the regionally applicable standards and directives.

DIN EN ISO 12100

This standard describes the 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 European 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 taking into account the results of the risk assessment.

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 the liability for defective products and applies to industrially manufactured movable objects, irrespective of whether or not they have been incorporated into another movable or immovable object.

REGULATION (EC) No. 1907/2006 (REACH)

This regulation 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.

DIN 637

Ball bearings – safety regulations for dimensioning and operation of profiled rail systems with roller element circuit (see Ball rail systems catalog).

EMC Directive 2014/30/EU

This directive refers to the electromagnetic compatibility of electrical and electronic products.

ROHS Directive 2011/65/EU

This directive concerns the restriction of the use of certain hazardous substances in electrical and electronic equipment. It regulates the use and the placing on the market of hazardous substances in electrical appliances and electronic construction elements.

- Always handle the measuring system with great care!

See detailed instruction for mounting:

R320103196 IMScompact instructions

R320103195 IMScompact package insert

R320103179 IMScompact position display

R320103885 Instructions for profiled rail systems

For more information on maintenance and lubrication, see the respective sections in the BSHP ball rail systems catalog.

Configurators, calculation tools, eShop, CAD models

All order information, comfortable configuration and calculation tools as well as an e-shop for direct orders are provided under:



[Online catalog](#)

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