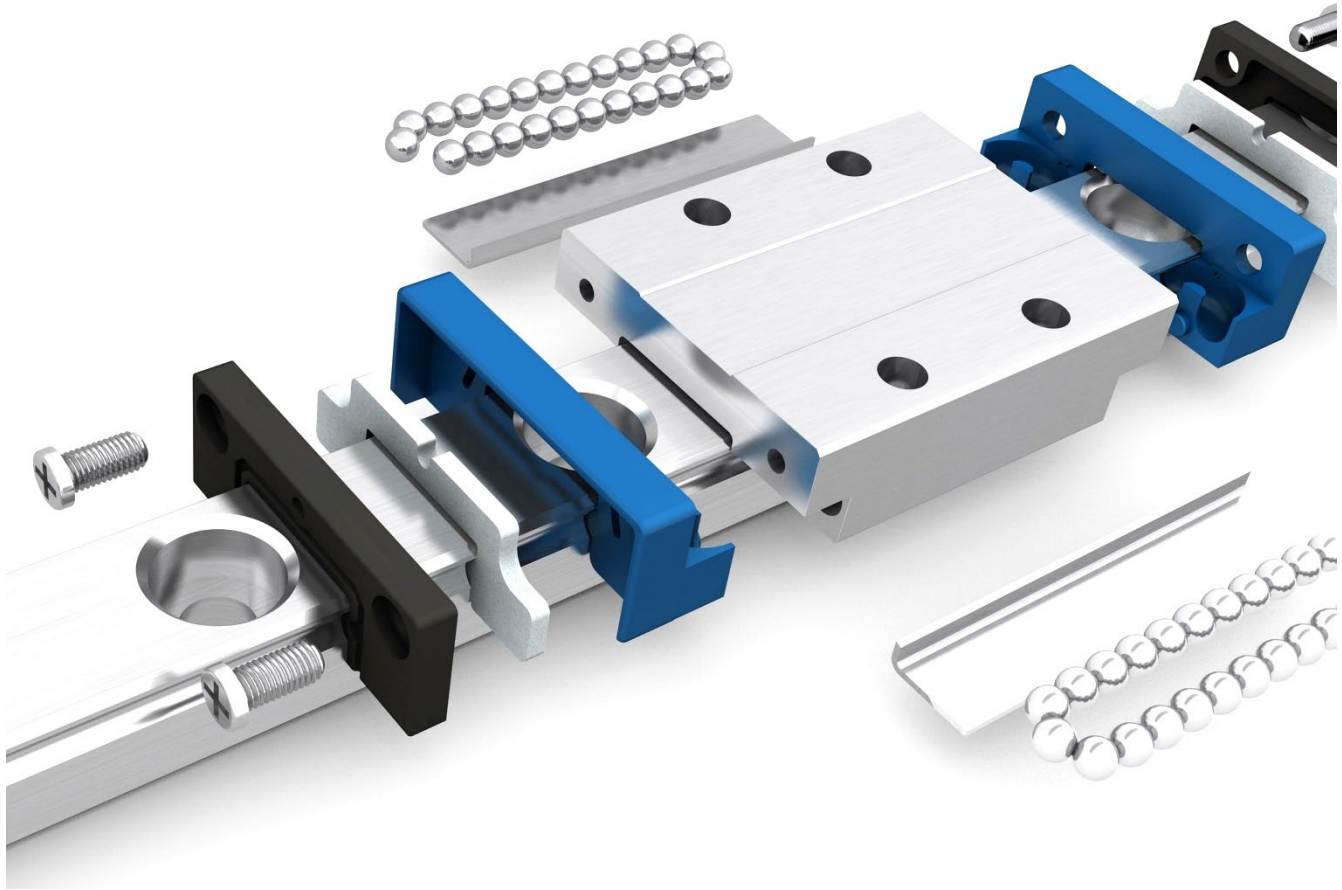
Miniature Profile Rail Guides – Type LLS
Offer presentation

Update: 2019-August

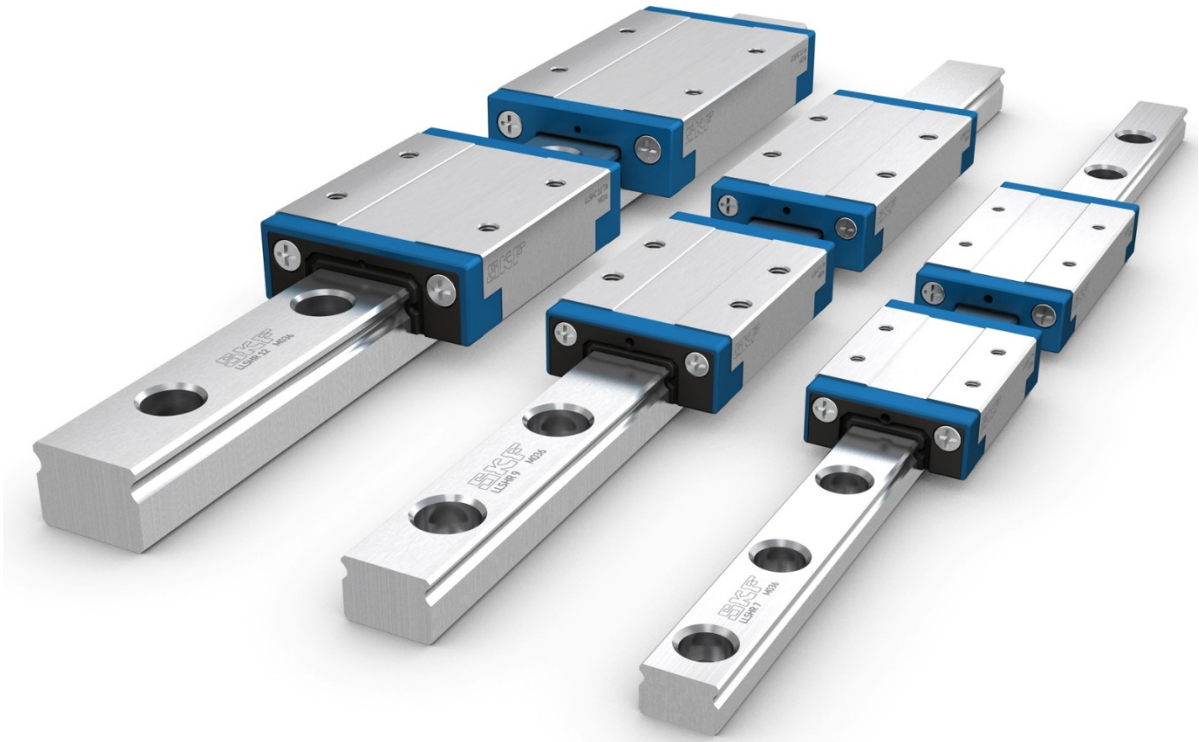
Content



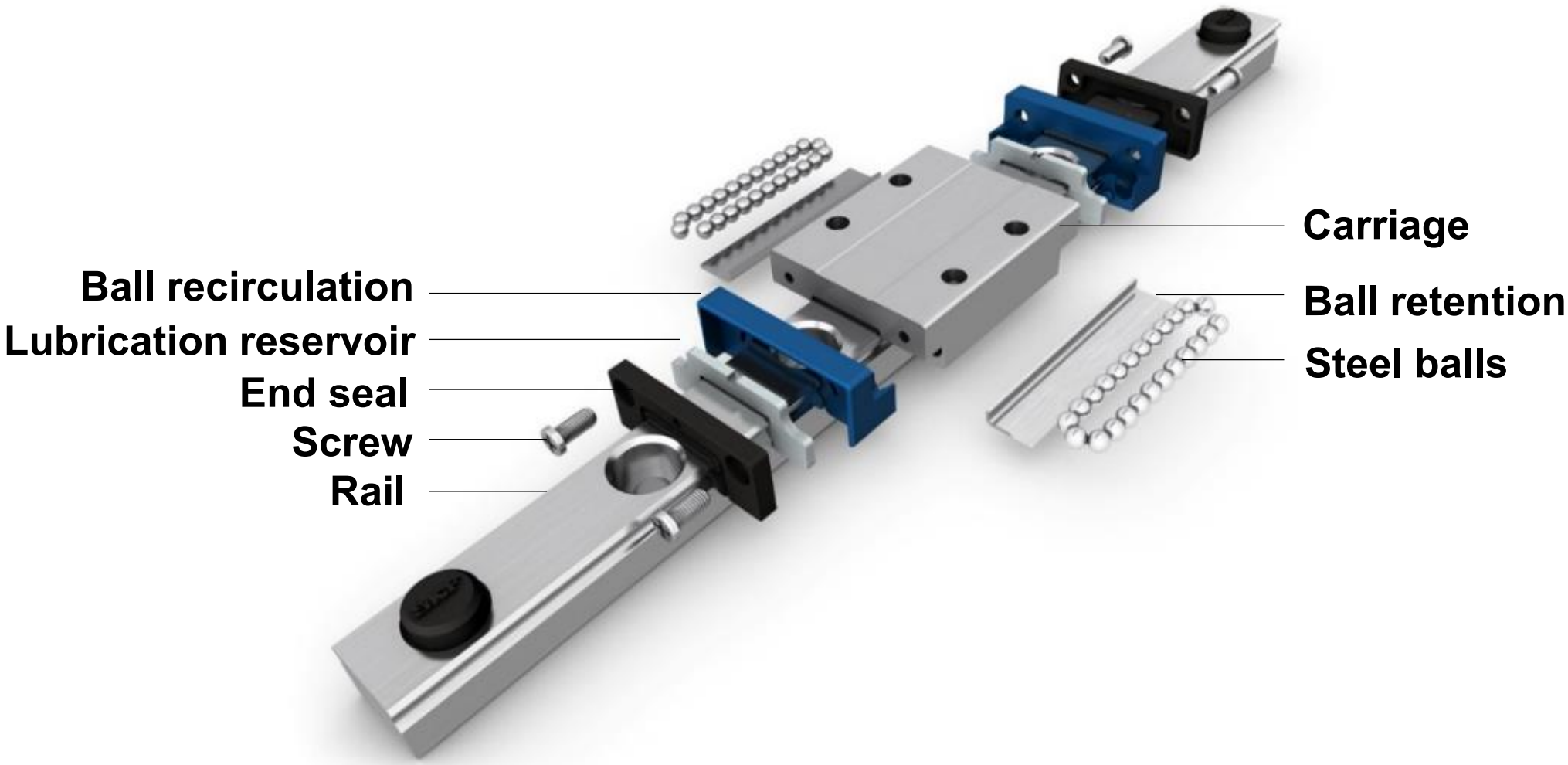
Features & Benefits

1 Features | Introduction

Size	7, 9, 12
Rail Type	Standard width
Carriage Type	Standard and long carriages
Speed	5 m/s
Acceleration	up to 140 m/s^2
Accuracy	up to 7 µm / 1 000 mm
Operating temperature	-20° to +80° C (+100° C without seal)



1 Features | Structure

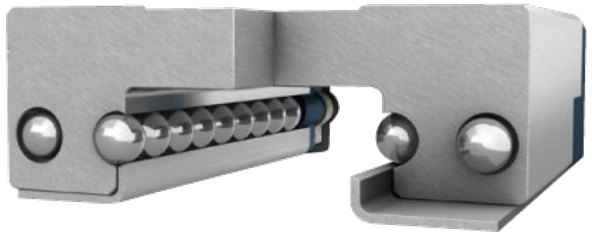


1 Features | Benefits

Optimized design and ball recirculation

- Low noise level, suitable for medical and office environments
- Extremely smooth and constant running behavior
- Higher rigidity due to optimized number of balls

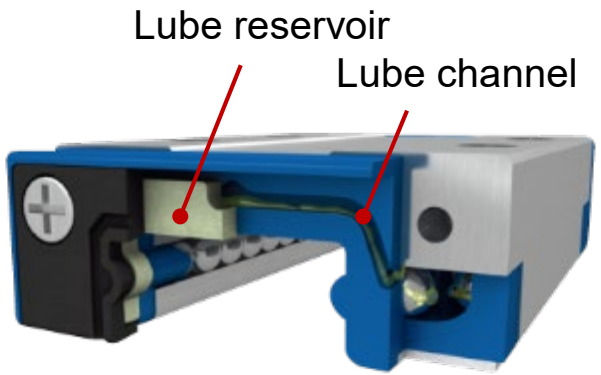
1 Features | Benefits



New robust innovative ball retention system

- Safe and quick mounting
- Improved precision due to anti-drop of steel balls
- Improved smoothness due to innovative design

1 Features | Benefits

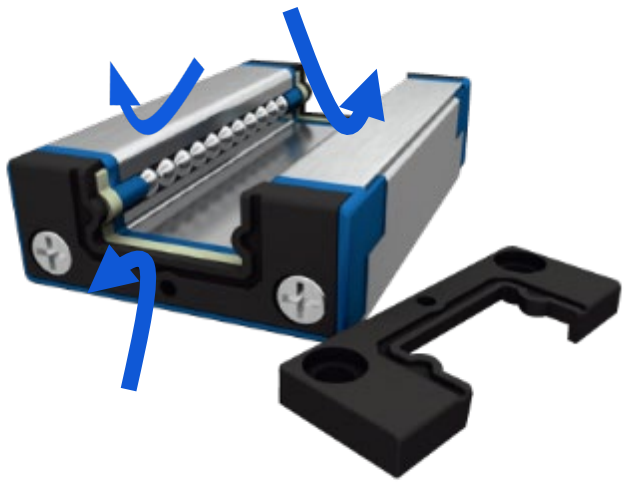


Optimized lubrication design

Up to 20 000 km service life due to innovative lubrication reservoir

Reduced maintenance costs due to factory pre-lubrication with FDA level oil

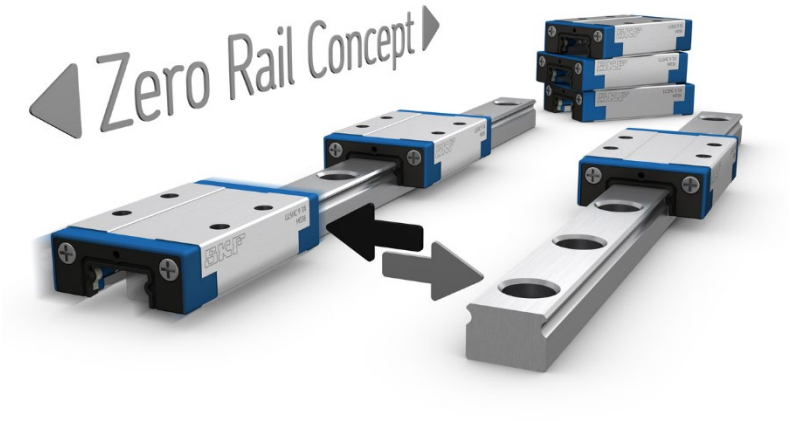
1 Features | Benefits



Optimized seal design

- Longer seal life due to highly abrasion resistant material
- Optimized contamination resistance due to minimal clearance between rail and ball retention plate
- Very low friction due to perfect fit of the sealing on the rail

1 Features | Benefits



ZRC range offers interchangeability of carriages on rails

- **Increase availability with interchangeable ZRC range**
- **High precision with interchangeable product**
- **Reduction of inventory cost with higher flexibility**

1 Features | Benefits

Stainless steel material

- Corrosion resistant material for many applications
- Suitable and clean for medical and food industries

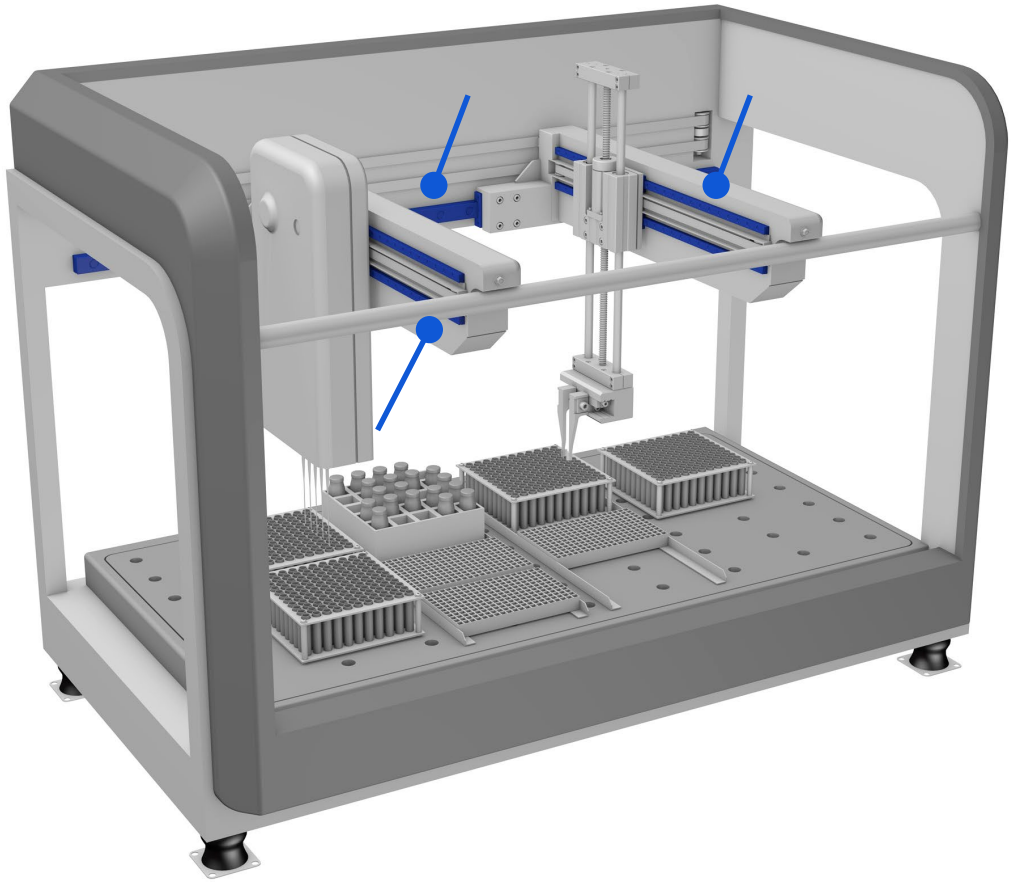
1

Features | Benefits - Summary

Optimized design and ball recirculation	• Low noise level, suitable for medical and office environment • Extremely smooth and constant running behavior • Higher rigidity due to optimized number of balls
Robust innovative ball retention system	• Safe and quick mounting • Improved precision due to anti-drop of steel balls • Improved smoothness due to innovative design
Optimized lubrication design	• Up to 20 000 km service life due to innovative lubrication reservoir • Reduced maintenance cost due to factory pre-lubrication
Optimized seal design	• Long service life due to highly abrasion resistant material • Optimized contamination resistance due to minimal clearance between rail and ball retention plate
ZRC range offers interchangeability of carriages on rails	• Increased availability with interchangeable range • High precision with interchangeable products • Reduction of inventory cost with higher flexibility
Stainless steel material	• Corrosion resistant for many applications • Suitable and clean for medical and food industries

Application examples

2 Application | Laboratory analyzers



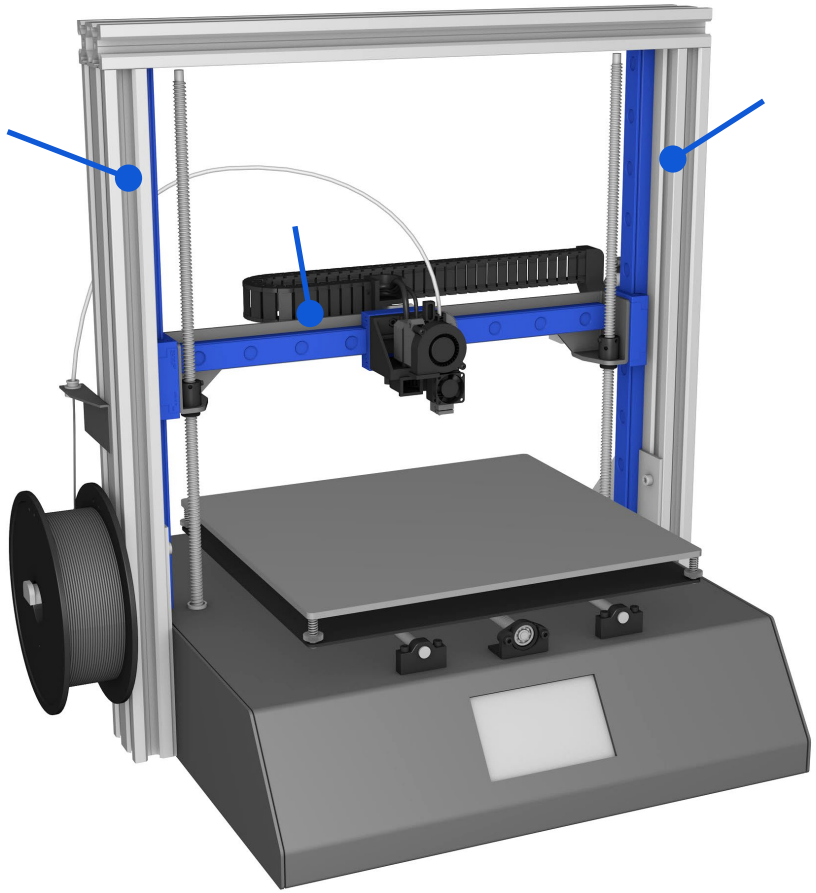
Application function:

- Liquid handling in chemical or biomedical analyzers for testing probes, like: Water, Blood, Urine
- Handling of probes or loading and unloading of racks

Customer benefit:

- Low noise in office environment
- Smooth running for small stepper motors
- Nearly no maintenance
- Up to 20 000 km of service life without maintenance

2 Application | 3D printing machines



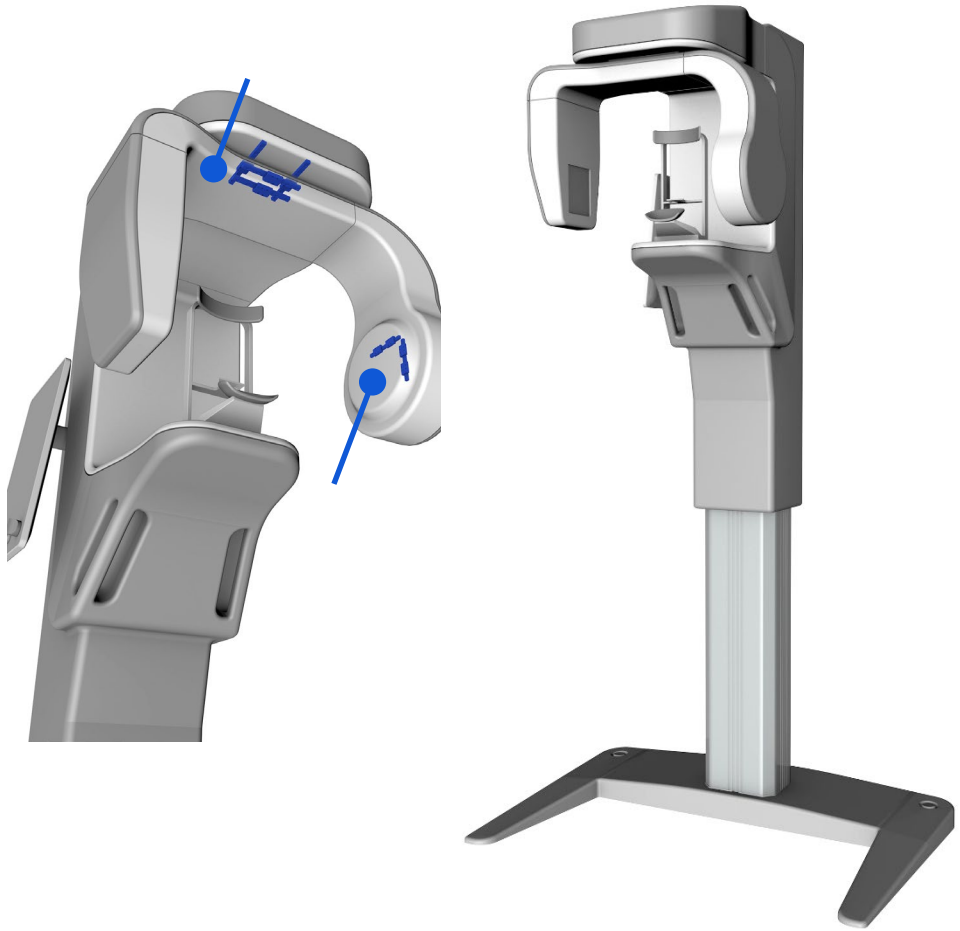
Application function:

- To support added manufacturing machines and processes
- Linear guide for the x-y-z motion and exact positioning of the material onto the printing plate or moving the base around

Customer benefit:

- Up to 20 000 km of service life without relubrication
- Corrosion resistant material to with stain many different environments
- Long seal life due to highly abrasive resistant material

2 Application | Dental 3D x-ray



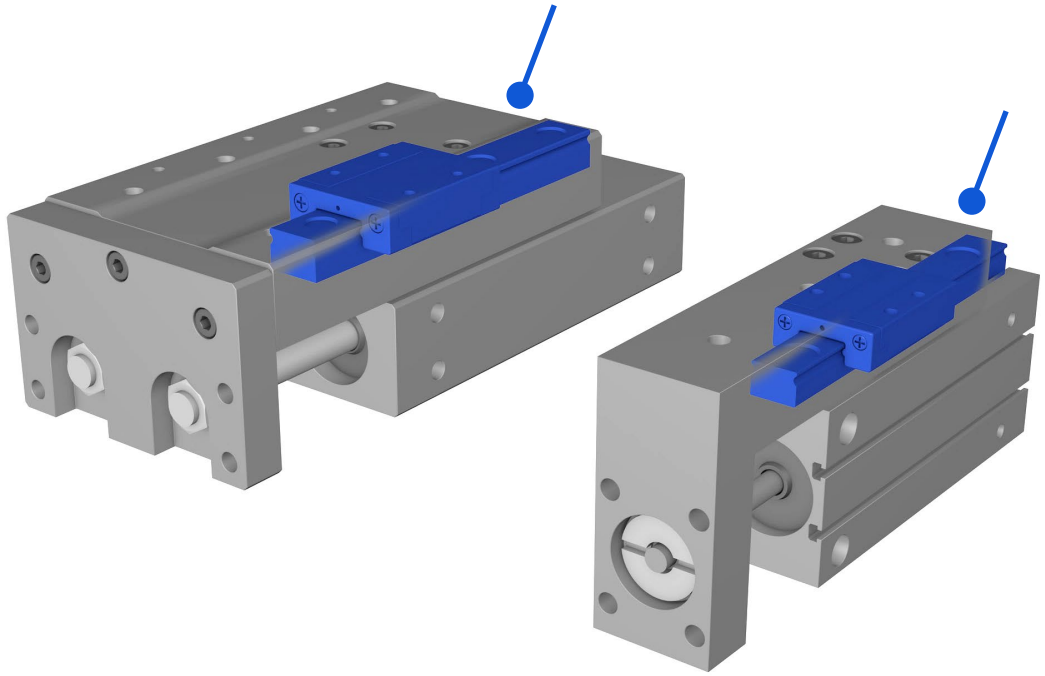
Application function:

- For elliptic turning motion of x-ray equipment around the patient head
- For collimator adjustment in front of x-ray camera equipment

Customer benefit:

- Higher rigidity due to optimized number of balls
- Low noise in office environment
- Smooth running for small stepper motors
- Safe and quick mounting of turning head

2 Application | Mini slides for pick and place



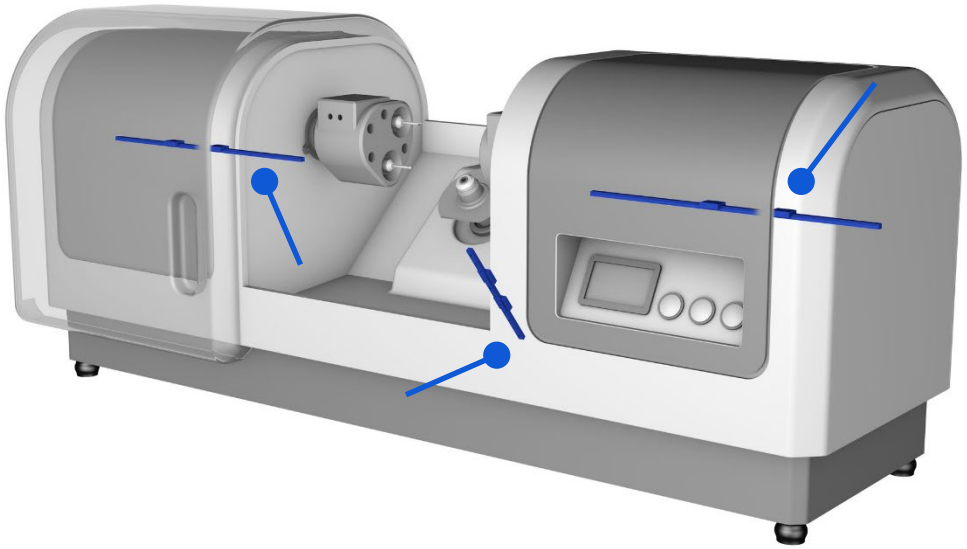
Application function:

- For secure positioning of mini slides in automation applications
- Standard guide element for subsystem mini slides, connect fixed and moved part

Customer benefit:

- Higher rigidity due to optimized number of balls
- Low maintenance due to factory pre-lubrication
- Safe and quick mounting due to innovative ball retention
- Long seal life due to highly abrasive resistant material

2 Application | Dental milling device



Application function:

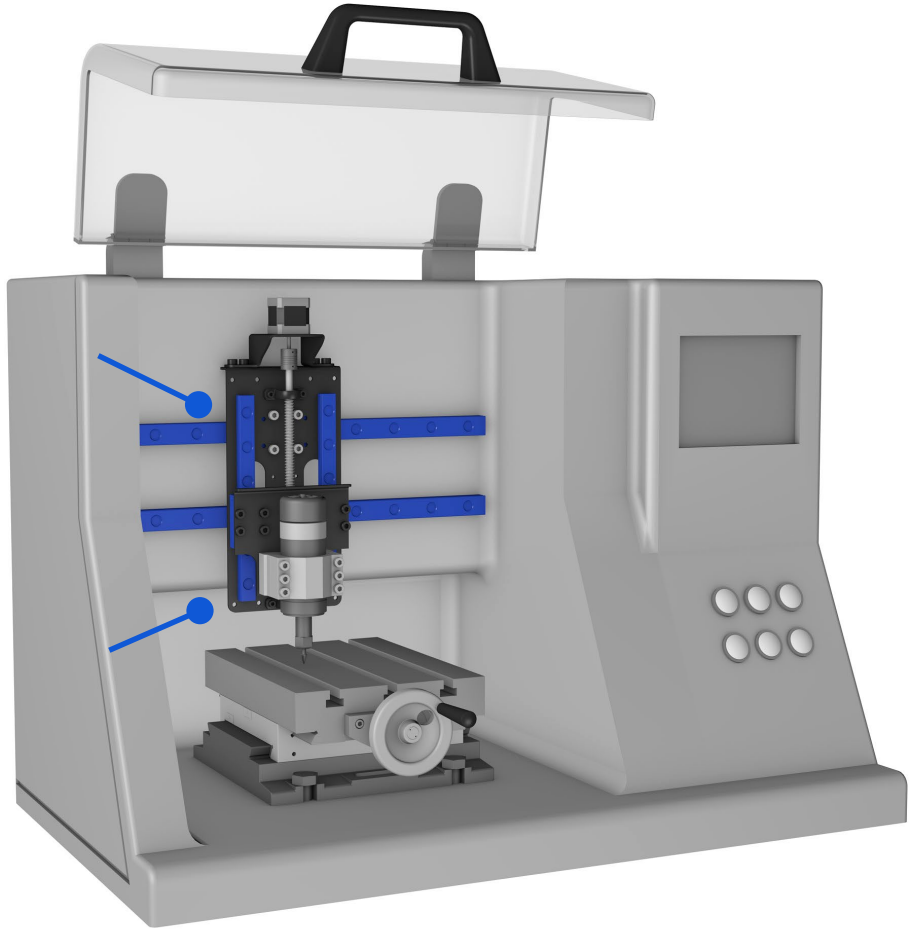
- Supporting the CAD-CAM process during production of teeth prosthesis
- Linear guide for the 3 milling axis inside this mini machine tool equipment

Customer benefit:

- Good sealing function with long seal life due to highly abrasive resistant material with
- Factory pre-lubricated products with long service life up to 20 000 km
- Higher rigidity due to optimized number of balls
- Safe and quick mounting

2

Application | Circuit board production



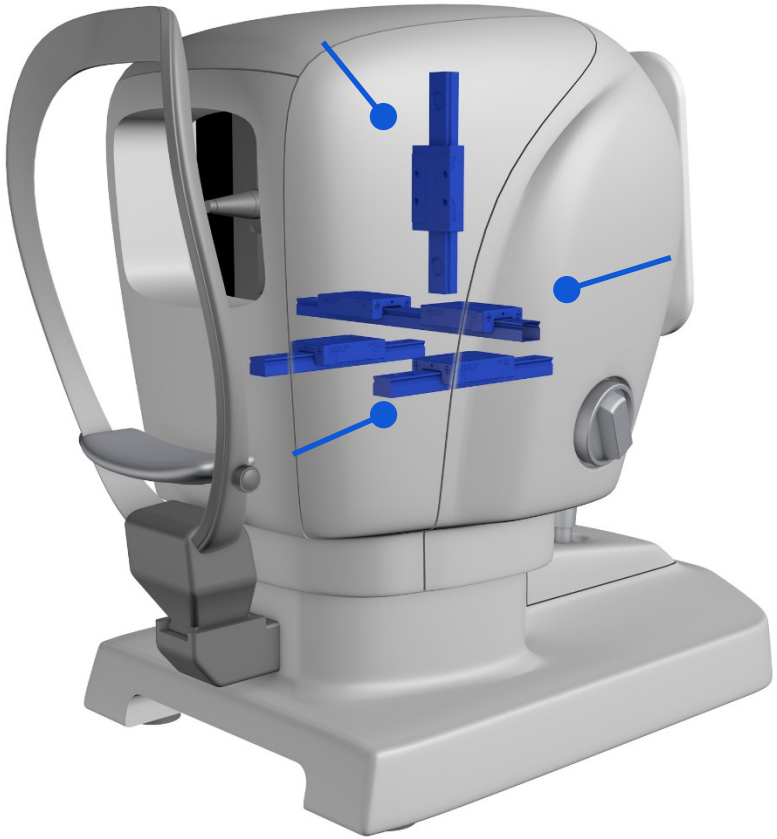
Application function:

- Production machines in electronic industry or surface mounted technologies (SMT)
- Miniature linear guide for the 2-3 axis for exact positioning of the tools or the mounting function inside small to medium machines

Customer benefit:

- Safe and quick mounting, no risk of loosing balls during mounting process
- Factory pre-lubricated products with long service life up to 20 000 km
- Higher rigidity due to optimized number of balls

2 Application | Ophthalmic examination device



Application function:

- Measuring in optical examination, like: Intraocular pressure (IOP) and other devices
- Adjusting the measurement device to the right position of the patients eyes

Customer benefit:

- Smooth running and low friction for using smaller stepper motors.
- Low noise in office environment
- Nearly no maintenance
- Long service life products

2 Applications | Other applications

Automation industry

Medical industry

Robotic industry

Measurement industry

Optical industry

Packaging industry

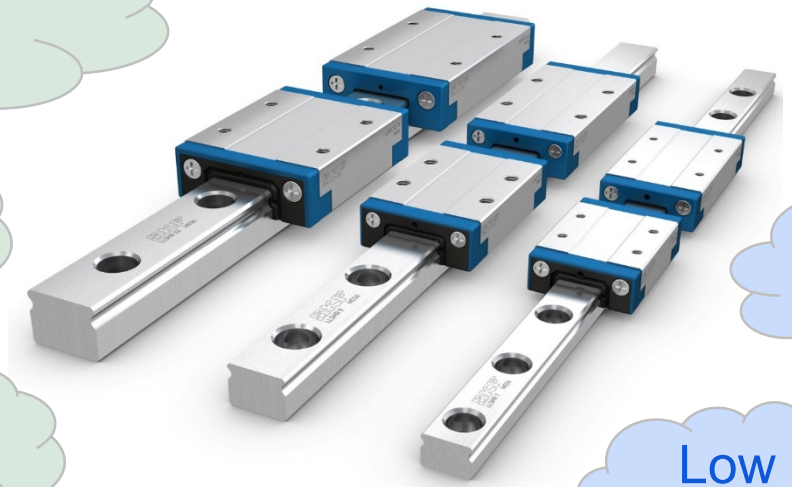
Electronic industry

Aerospace industry

Food & beverage industry

Pick & Place industry

Suitable requirements are:



Precise linear motion

High rigidity

Miniature design

Smooth and soft motion

Long service life

Stainless steel material

High speed

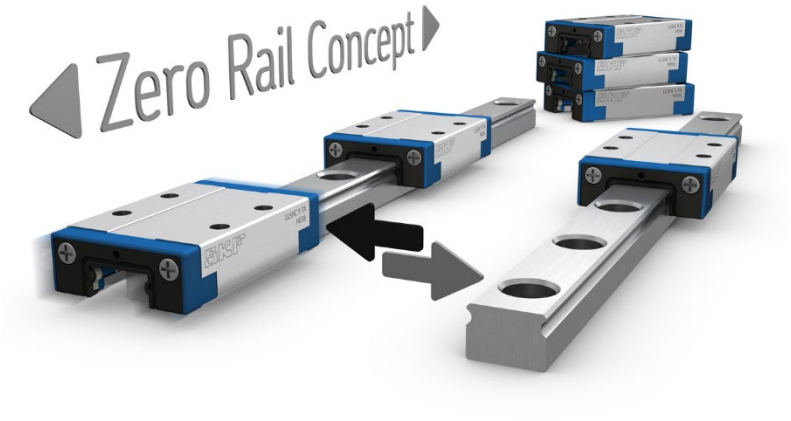
Low weight

High acceleration

Low friction

Ordering key

3 Ordering key | ZRC range



ZRC range offers interchangeability of carriages on rails

- Any carriage can be mounted together with the rail of the same size
- Zero Rail Concept carriages and rails are delivered separately
- The ZRC offer is standardized for precision class P5 (Standard precision) together with preload class T0 (Zero preload) and T1 (Light preload)
- Any carriage or rail from this range must be ordered with the suffix ZRC in the ordering key
- Rail and carriages can be stocked separately as standard items

3 Ordering key | ZRC range - Carriage

LLSHC 7 TAR T0 P5 ZRC

System type
- **H** Standard type

Type code
- **C** Carriage (Carriage only)

Size
- **7, 9, 12**

Carriage type
- **TA** Standard carriage
- **LA** Standard carriage, extended length

Seal options
- **.** Shielded carriage [1)]
- **R** Low friction sealed carriage

Preload Class
- **T0** Zero preload
- **T1** Light preload

Precision Class
- **P5** Standard precision

Zero Rail Concept
- **ZRC** Zero Rail Concept (ZRC) range

[1)] No code for standard

Miniature profile rail guides - Series LLS

3 Ordering key | ZRC range - Rail

LLSHR 7-1000 P5 E11 ZRC

System type
- **H** Standard type

Type code
- **R** Rail (Rail only)

Size
- **7, 9, 12**

Rail Length
- up to 1000 mm length (in 1 mm steps)

Precision Class
- **P5** Standard precision

Distance between end face and the center of the first mounting hole of the rail
- **E0** Standard "E" dimension, even when not selected. The holes at both rails and will be positioned equidistantly from either end of the rails with shortest possible distance
- **Exx** Specified "E" dimension for one rail end with the following options per size: Size 7 from 4.5 to 11 mm, Size 9 from 5 to 15 mm, Size 12 from 5 to 20 mm

Zero Rail Concept
- **ZRC** Zero Rail Concept (ZRC) range

Miniature profile rail guides - Series LLS

3 Ordering key | System range – Part 1 of 2

LLSH S 9 TA R 2 T1 -100 P5 W2 D E0

System type
- **H** Standard type

Type code
- **S** System consisting of carriage and rail

Size
- **7, 9, 12**

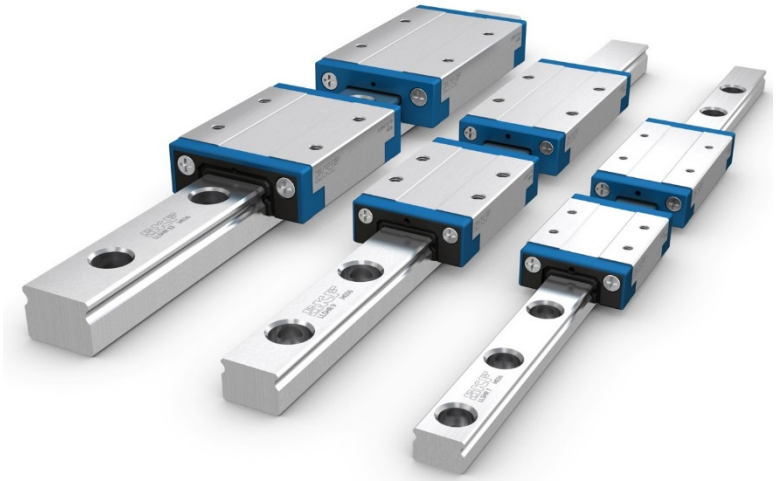
Carriage type
- **TA** Standard carriage
- **LA** Standard carriage, extended length

Seal options
- **.** Shielded carriage [1)]
- **R** Low friction sealed carriage

Number of carriages per rail
- **1, 2, 3, 4, 6**

Preload Class
- **T0** Zero preload
- **T1** Light preload
- **T2** Medium preload(On request)

[1)] No code for standard



3 Ordering key | System range – Part 2 of 2

LLSH S 7 TA R 2 T1 -100 P5 W2 D E0

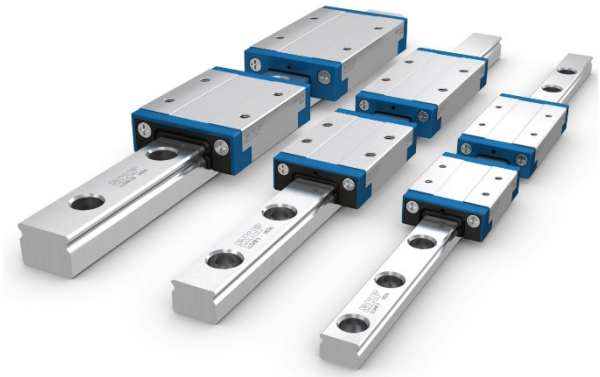
Rail Length
up to 1000 mm length (in 1 mm steps)

Precision Class
P5 Standard precision
P1 High precision (Available as system only)

Rail arrangement (Number of parallel mounted rails)
. Arrangement of single rail as standard [1)]
W2 Arrangement of two parallel mounted rails
Wx Arrangement of x number of parallel mounted rails

Rail type
. Standard rail [1)]
D Customized rail

Distance between end face and the center of the first mounting hole of the rail
E0 Standard "E" dimension, even when not selected. The holes at both rail ends and will be positioned equidistantly from either end of the rail with shortest possible distance
Exx Specified "E" dimension for one rail end with the following options per size: Size 7 from 4.5 mm to 11 mm, Size 9 from 5 mm to 15 mm, Size 12 from 5 mm to 20 mm



[1)] No code for standard

3 Ordering key | Type Code

Carriage-LLSHC

Rail-LLSHR

System-LLSHS

Zero-Rail-Concept
(ZRC) range as standard supplied as components

	T0	T1	WXX
P5	T0 P5	T1 P5	W2
P1	T2 P1	T1 P1	W2

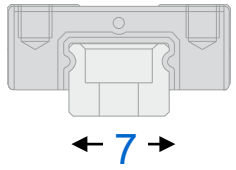
ZRC range

System only

LLSH **S** 7 TA R 2 T1 -100 P5 W2 D E0

3 Ordering key | Size

7



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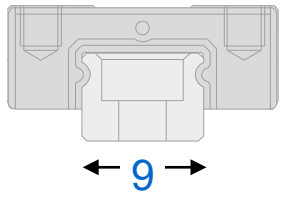

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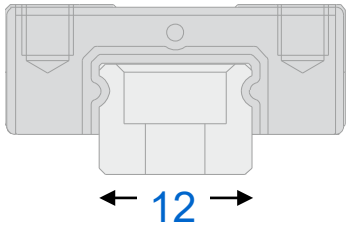
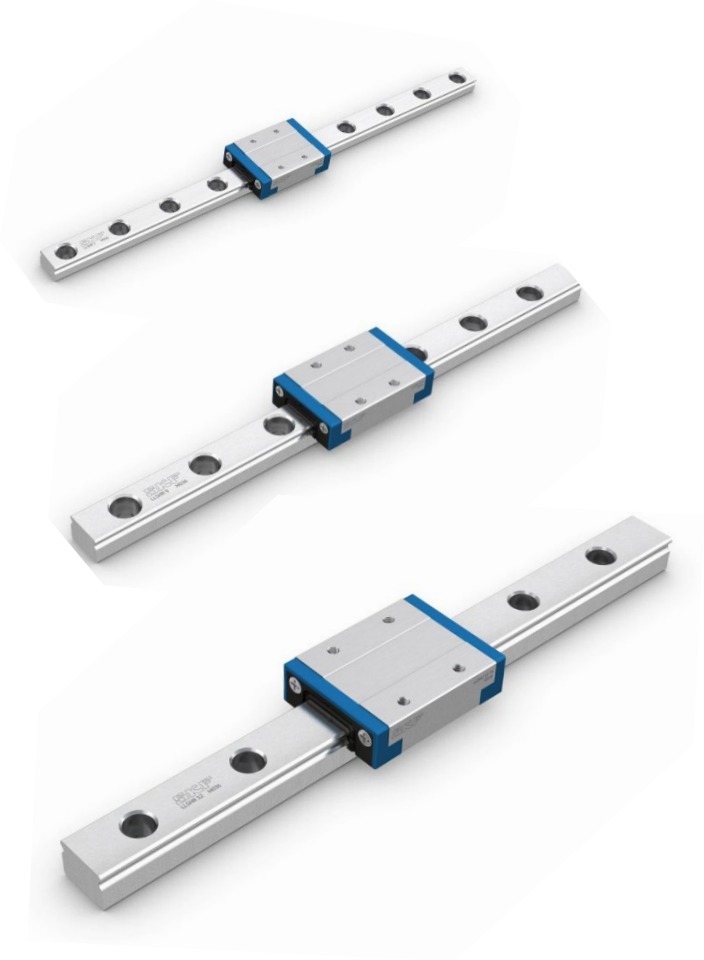


Unit: mm



3 Ordering key | Carriage Type

Standard Length

LLSHC TA

Extended Length

LLSHC LA

3 Ordering key | Sealing

Shielded carriage:

Non-contact part to the rail, applying only rolling friction to the system.

. – Low friction shield [1)]

[1)] No code for standard

Low friction sealed carriage:

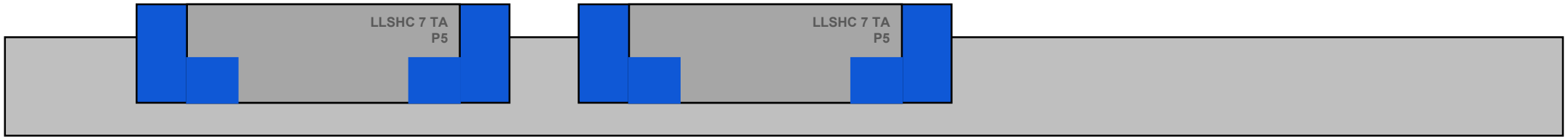
A contact lip seal with very low friction force to protect the carriage against dirt.

Blue line = contact surface

R – Front seal

3 Ordering key | Number of carriages per rail

LLSH S 7 TA R **1** T1 -100 P5 W2 D E0



LLSH S 7 TA R **2** T1 -100 P5 W2 D E0

3 Ordering key | Preload classes

Three different preload classes are available : T0/T1/T2.

The determination of the appropriate preload class depends on the operation conditions. The preload class changes the stiffness and the friction of the overall system.

Preload class	T0	T1	T2
Characteristics	Lowest friction, light clearance	Smooth running, light preload	High stiffness, medium preload

3 Ordering key | Rail length

LLS series rails are datum grinded on both sides, so each side can be used as mounting reference surface. No errors on mounting are possible.

The maximum rail length per piece is shown in the table below.

The rail length tolerance is ±1.5 mm.

Size	LLSHR 7	LLSHR 9 [1)]	LLSHR 12 [1)]
Maximum rail length	1000 mm	1000 mm	1000 mm

[1)] from 2020 onwards we will produce up to 2000mm rails on size 9 and 12

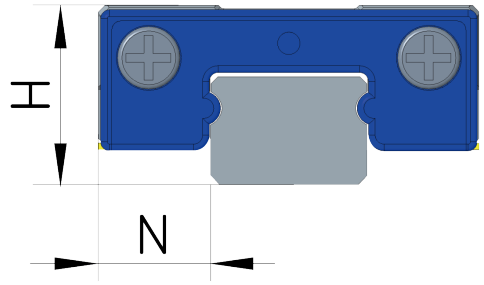
3 Ordering key | Precision Classes

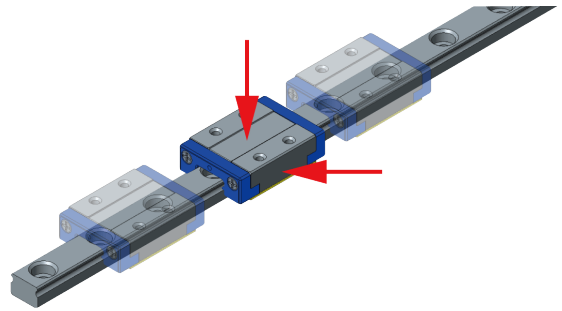
Two different precision classes are available.
P5 = standard precision suitable for most applications
P1 = high precision for high end applications

Unit: mm	Grade P1	Grade P5
Tolerance of height (H)	±0.01	±0.02
Tolerance of width (N)	±0.015	±0.025
Difference of height (△H)	0.007	0.015
Difference of width (△N)	0.007	0.015

Accuracy for one carriage on one rail

Accuracy for two or more carriages on one rail

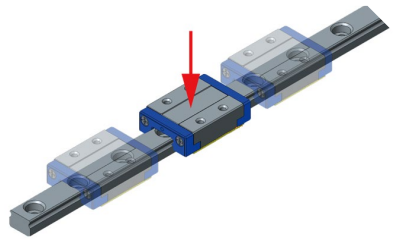




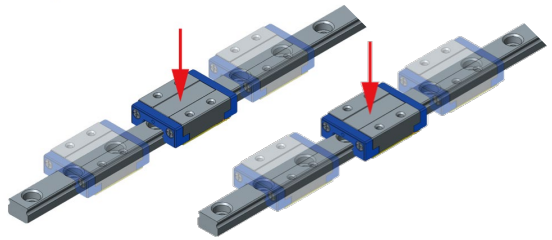
3 Ordering key | Rail arrangement

Arrangement of two or more parallel mounted rails

Item	Grade			
	P1	P5	P1Wx	P5Wx
Tolerance of height (H)	±0.01	±0.02	±0.01	±0.02
Difference of height (△H) on one rail	0.007	0.015	0.007	0.015
Difference of height (△H) on two or more rails	0.02	0.04	0.007	0.015



Difference of height (△H) on one rail



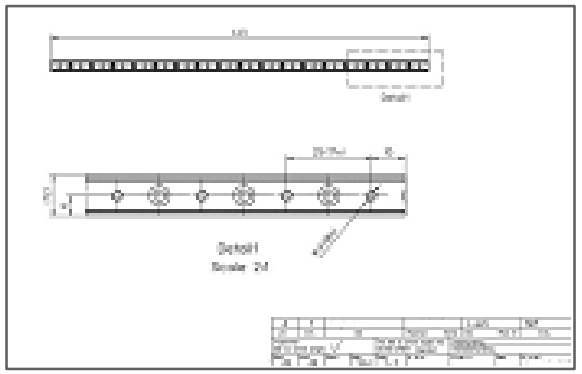
Difference of height (△H) on two or more parallel rails

3 Ordering key | Rail

. – Standard rail [1)]

[1)] No code for standard

D – Customized rail depending on customers drawing



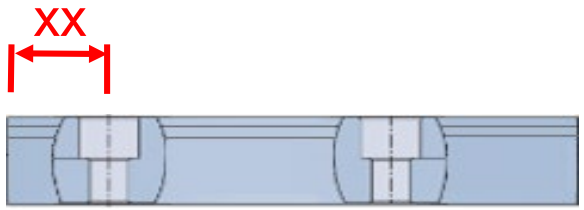
3 Ordering key | Rail mounting hole end distance

Standard on all deliveries, when not mentioned in the ordering key is E0.
The tolerance of the E-dimension is ±0.5 mm

	Shortest symmetrical E-dimension
LLSHR7	4,5 to 11 mm
LLSHR9	5,0 to 15 mm
LLSHR12	5,0 to 20 mm

E0 – Standard

Exx – Customized

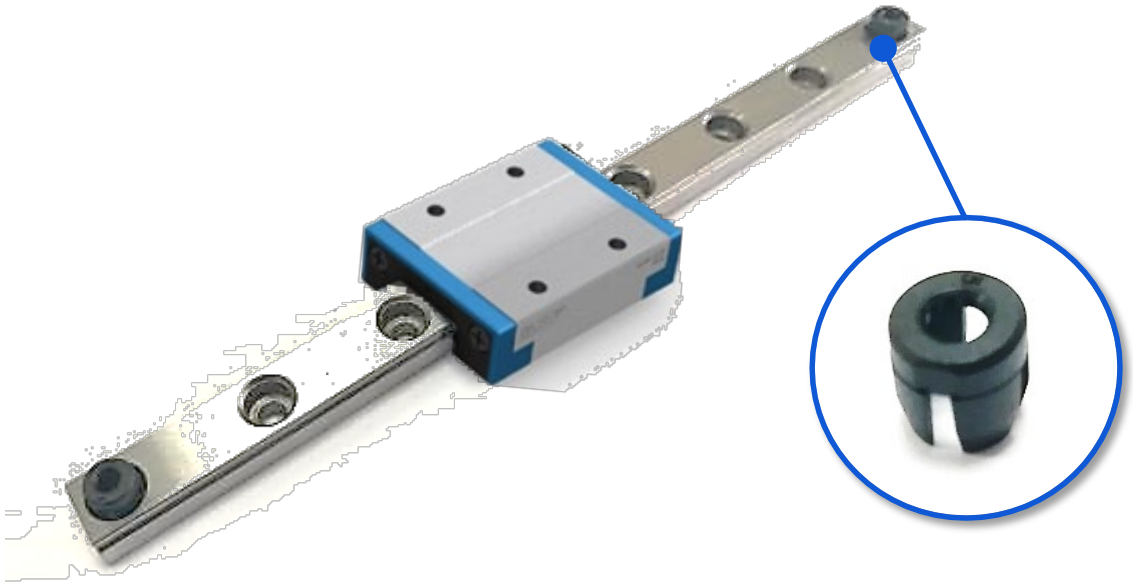


LLSH S 7 TA R 2 T1 -100 P5 W2 D E0

Ordering key | Rail end stops

For a secure supply of systems each one is equipped with plastic end-stops at the end of the rail.

Note: These end-stops are just to secure the carriage on the rail - do not use these end-stops as a mechanical end-stop during the operation process.



Plastic plug

END of part 1 of the presentation