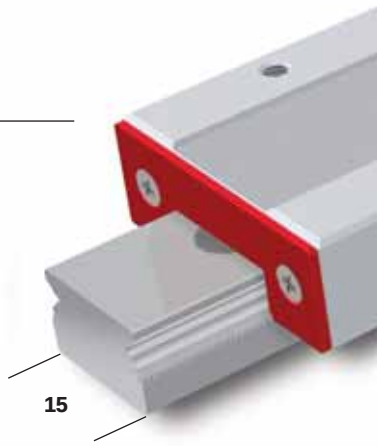
SCHNEEBERGER
LINEAR TECHNOLOGY

MINISLIDE

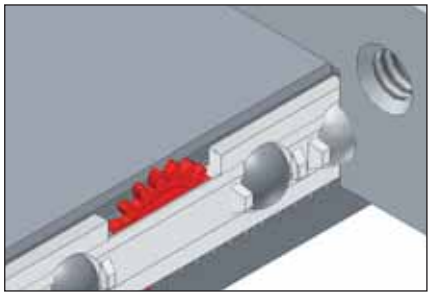
The last word in productivity

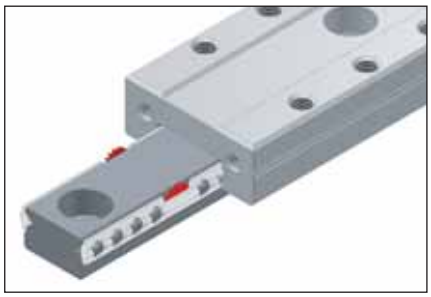


MINISLIDE – The last word in productivity

MINISLIDE is the latest generation of miniature slides for high-tech applications. Preloaded with zero play, a MINISLIDE is exceptionally smooth running. High rigidity and a low push force of less than 1 N will satisfy even the highest demands.

Integral positive cage control system





Process stability due to the elimination of cage creeping

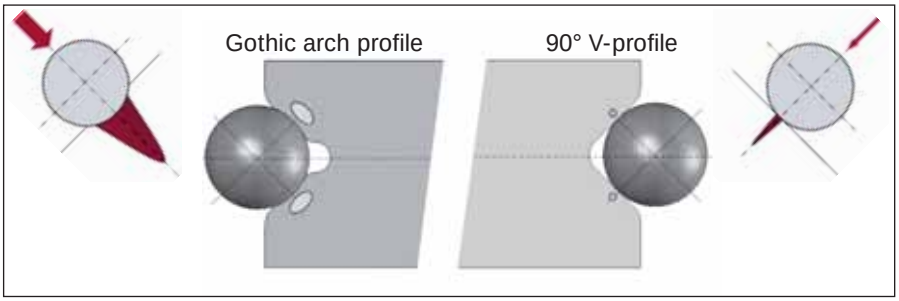
No more cage creeping with a MINISLIDE. Sizes 4 and 5 contain a centring mechanism and sizes 7, 9, 12 and 15 incorporate a sophisticated SCHNEEBERGER cage control system. SCHNEEBERGER is thus the first company to put miniature slides onto the market that meet the demands of modern high-tech applications: maximum dynamics matched by a consistently high level of reliability.

The individual benefits you gain from the integral cage control system are as follows:

- Trouble-free operation which means more productive time
- High speeds and rates of acceleration allow faster motion and thus reduce cycle times
- No readjustment of the cage, not even when installed vertically
- The design and tolerances of the surrounding structure or differences in temperature do not result in cage creeping
- Long service life

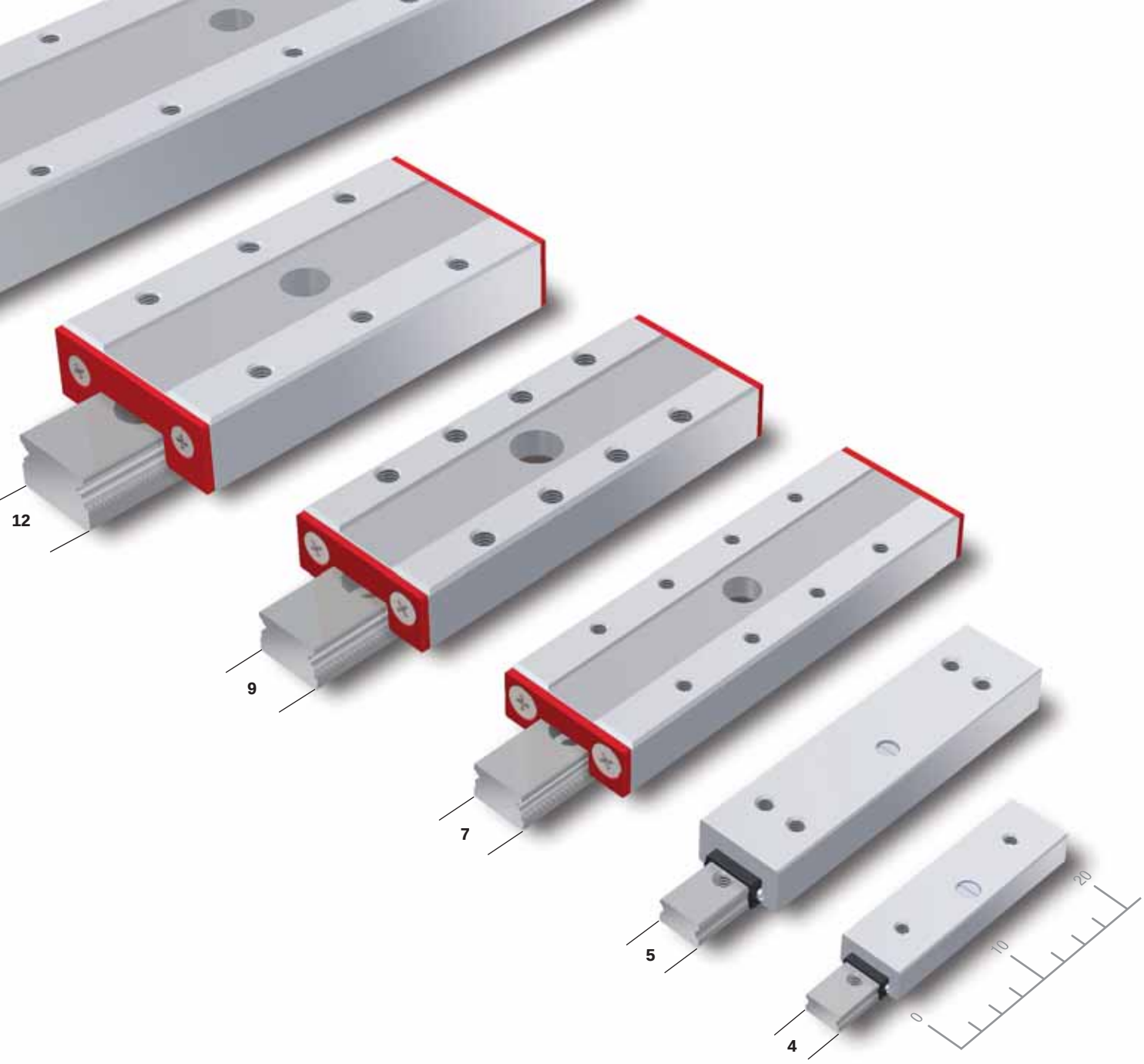
Maximum effect with minimum space requirements due to the Gothic arch profile of the tracks

MINISLIDES will allow you to implement space-saving designs capable of high loads. Gothic arch tracks permit substantially higher loads than traditional 90° V-profile tracks of comparable dimensions.



The benefits of the Gothic arch profile

- High load carrying capacity in a compact design
- Robust and less sensitive to impacts
- Low weight
- High rigidity
- Excellent damping behaviour



High load ratings… low space requirements

In order to achieve comparable load ratings, slides with traditional tracks have space requirements that are significantly greater.

	MINISLIDE	Slide with a 90° V-profile
Load rating	**337 N**	**310 N**
Width	7	15
Length	22	70
Height	4	8
Space requirements	**616 mm³**	**8’400 mm³**

Robust and hard-wearing

Optimized materials to meet the highest demands

MINISLIDES are manufactured to the very best quality along with SCHNEEBERGER's well-known expertise. All steel components are manufactured from through hardened, corrosion-resistant steel. The plastic components are made from extremely hard-wearing material.

MINISLIDES are impressive for their uniquely compact design with a minimum of integral components. This is what makes MINISLIDES extremely reliable.

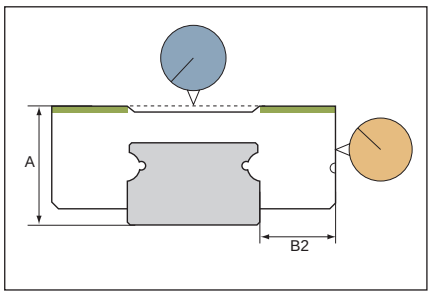
Speed and acceleration

30 g (300 m/s²)... is there anything better?

High rates of acceleration as demanded in today's manufacturing processes require new solutions in linear technology. Thanks to its unique design, a MINISLIDE satisfies the demands of the very latest drive technology – high speeds, extreme rates of acceleration, oscillation at high frequencies.

Acceleration: max. 300 m/s²
Speed: max. 3 m/s

Accuracy



SCHNEEBERGER precision

The tolerance for the straightness of travel is dependent on the length of the MINISLIDE. The corresponding values are given in the table below. Measurements are made in free state on a surface table.

	Straightness of Travel over Stroke; Laterally	Flatness of Travel over Stroke; at Top	Parallelism of Table Surfaces in Middle Position
Length			
10 - 30 mm	3 µm	3 µm	12 µm
40 - 80 mm	4 µm	4 µm	15 µm
90 - 130 mm	5 µm	5 µm	18 µm

Height tolerance
A: ± 0.02 mm
B2: ± 0.02 mm

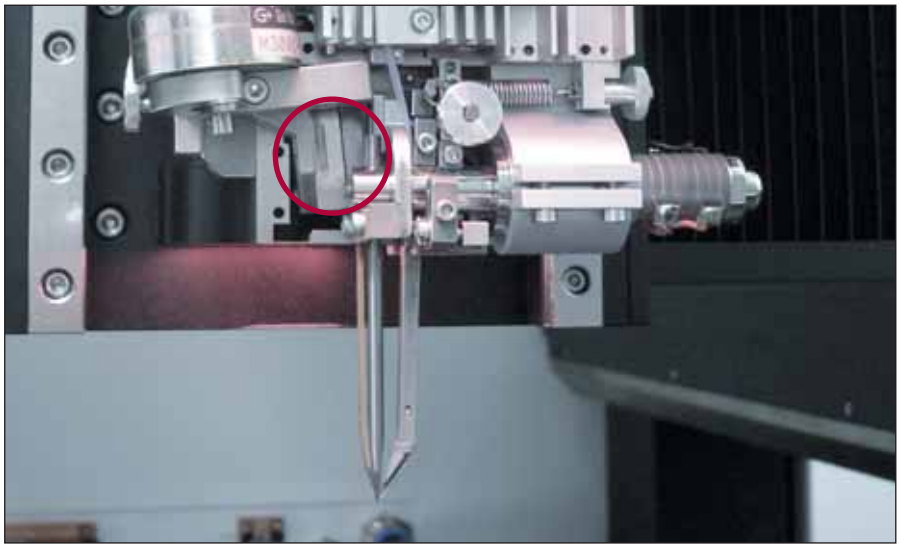
MINISLIDE at a glance

The MINISLIDE range includes 6 sizes, which are available as standard in different lengths. For you, this means a wide selection of products with high load capacity for your dynamic applications.

Sizes and strokes	MS 4	MS 5	MS 7	MS 9	MS 12	MS 15
System height	4	6	8	10	13	16
System width	7	10	17	20	27	32
Lengths	10 to 25	15 to 50	30 to 70	40 to 80	50 to 100	70 to 130
Strokes	6 to 22	8 to 42	25 to 61	34 to 66	47 to 77	63 to 103
Technical details						
Cage centring	•	•	-	-	-	-
Cage control system	-	-	•	•	•	•
Materials						
Rail, upper part, balls, screws	**	**	**	**	**	**
Cage	POM	POM	PEEK	PEEK	PEEK	PEEK
Pinion	-	-	PEEK	PEEK	PEEK	PEEK
End parts	-	-	PEEK	PEEK	PEEK	PEEK
Areas of application						
High vacuum*	10^{-7} mbar	10^{-7} mbar	10^{-9} mbar	10^{-9} mbar	10^{-9} mbar	10^{-9} mbar
Operating temperature	-40°C /+80°C	-40°C /+80°C	-40°C /+150°C	-40°C /+150°C	-40°C /+150°C	-40°C /+150°C
Short-term maximum temperature	+120°C	+120°C	+200°C	+200°C	+200°C	+200°C

* Please note design modifications which ensure that air is not trapped in drilled and tapped holes

** Corrosion-resistant steel

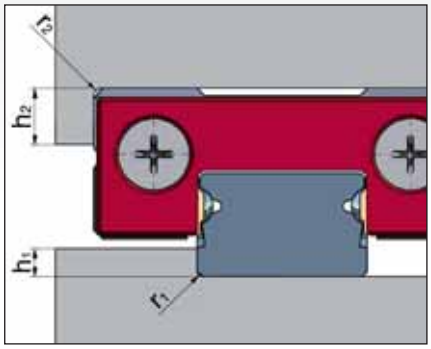


MINISLIDE applications

MINISLIDE is used wherever high precision, high loads and maximum process stability are required within severely limited space requirements. This is why a MINISLIDE's unique advantages make it ideal, particularly in the following areas of application:

- Semiconductor industry
- Medical technology
- Laboratory automation
- Biotechnology
- Nanotechnology
- Metrology
- Micro-automation
- Optical industry
- Robotics, Pick & Place
- Surface finishing
- Machine tools for use in the micro-sector

Design and installation



Preloading

MINISLIDES have preloaded ball guides with zero play and can therefore be installed directly without any additional set up.

Design of the supporting structure

The benefits offered by MINISLIDE are best realised on a rigid, low-deformation structure of high dimensional accuracy. To prevent the performance of linear guide systems from being negatively affected, the flatness of the supporting surface in the transverse direction must be 3 µm. In order to attain the tolerances in terms of flatness and parallelism that are required, we recommend an average surface finish of Ra 0.4 to 1.6 µm for the support surface and datum edge.

The shoulder heights stated are recommended for installation surfaces. The corners should be in accordance with the maximum radii given in the table below.

	MS 4	MS 5	MS 7	MS 9	MS 12	MS 15
h_1	0.2	0.4	1.2	1.5	2.5	3.5
$r_{1max.}$	0.1	0.2	0.2	0.3	0.4	0.5
$r_{2\ max.}$	0.1	0.1	0.3	0.4	0.4	0.5
h_2	1.2	1.8	2.5	3	4	5

Tightening torque

For DIN 912, µ 0.125 (12.9) and DIN 912, µ 0.2 (A2-70) fixing screws

	Maximum tightening torque		
	M1.6	M2	M3
Strength category			
12.9	0.28 Nm	0.6 Nm	2.1 Nm
A2-70	0.2 Nm	0.3 Nm	1.1 Nm

Load Carrying Capacity and Operational Life

In applying MINISLIDE, the primary consideration is the relationship of the applied load to the load carrying capacity. The elastic deformation (rigidity) must also be evaluated.

The load carrying capacities of the individual MINISLIDE are based on the fundamentals established by ISO and DIN for the calculation of roller bearings (DIN 636, part 3). The load carrying capacity C is the load with which a nominal operation-al life of 100000 m travel is achieved, given that the size and direction of the load remain unchanged and the line of application is vertical onto the MINISLIDE surface.

By definition, the static load should not be greater than the dynamic load. The reason for this lies in the fatigue behavior which is always initiated at the highest loaded point. In the case of an absolutely constant load during standstill and in operation, the fatigue process will start at that point where the static load is present longest. The C-values given are used in the operational life equation to calculate the operational life resulting with a given load.

The operational life is the travel in metres which is made by a MINISLIDE before the first signs of metal fatigue appear on any of the guideway components.
The operational life is achieved when 90% of a statistical sample of MINISLIDE meet or exceed the prescribed amount of travel.

Dynamic loading capacity C

As previously mentioned, the load carrying capacity C is based on an operational life of 100000 m. Some manufacturers use, for various reasons, a larger load carrying capacity with 50000 metres operational life. The C_{50} values for SCHNEEBERGER MINISLIDE are calculated as follows:

$$\mathbf{C_{50} = C \cdot 1.26}$$

Life Expectancy

According to the DIN and ISO standards, the load carrying capacities for roller bearings are given in such a manner that from the operational life equation a value results which, with 90% probability, will be exceeded. Should this probability not suffice, then the operational life must be shortened with the a_1 factor per the following table:

	Life Expectancy in %					
	90	**95**	**96**	**97**	**98**	**99**
a_1	1	0.62	0.53	0.44	0.33	0.21

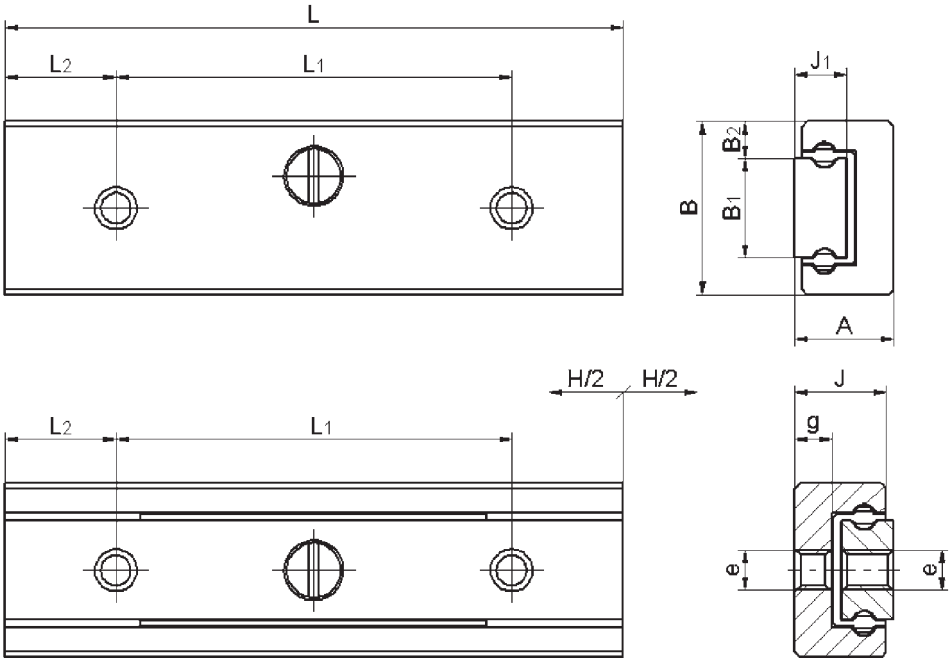
Operational life calculation

The operational life L, the dynamic load carrying capacity C (N) and the loading P (N) have the following relationship:

$$\mathbf{L = a_1 \left(\frac{C}{P}\right)^3 \cdot 10^5\ m}$$

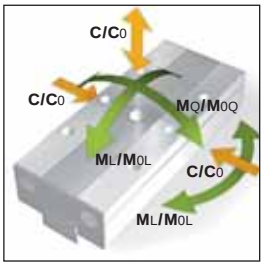
Whereby a is the probable life expectancy factor. The operational life in hours can be calculated when the single stroke H (m) and the time needed for it t (s) are known:

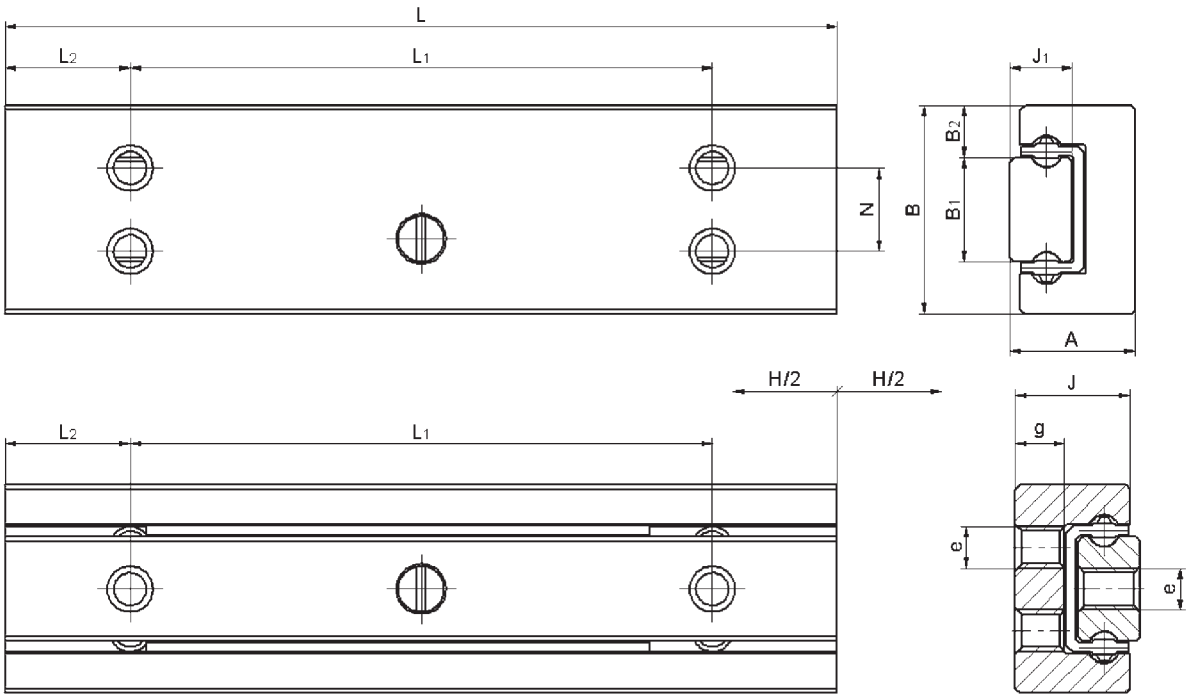
$$\mathbf{L_h = \frac{L \cdot t}{H \cdot 3600}\ in\ h}$$



MS 4 Dimensions and load ratings

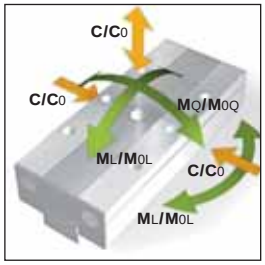
		MS 4-10.6	MS 4-15.12	MS 4-20.15	MS 4-25.22
A:	System height	4	4	4	4
B:	System width	7	7	7	7
B1:	Rail width	4	4	4	4
B2:	Distance to the stop surfaces	1.5	1.5	1.5	1.5
J:	Carriage height	3.7	3.7	3.7	3.7
J1:	Rail height	2.1	2.1	2.1	2.1
H:	Stroke	6	12	15	22
L:	System length excluding end parts	10	15	20	25
L1:	Hole spacing	5	8	12	16
L2:	Start/finish spacing of holes	2.5	3.5	4	4.5
e:	Thread	M1.6	M1.6	M1.6	M1.6
g:	Usable thread length	1.5	1.5	1.5	1.5
Weight in grams		1.7	2.6	3.4	4.3
Load ratings and forces:					
C [N]	Dynamic load rating	207	242	307	337
C0[N]	Static load rating	277	347	485	555
MQ[Nm]	Transverse dynamic moment	0.45	0.52	0.66	0.72
M0Q[Nm]	Transverse static moment	0.60	0.75	1.04	1.19
ML[Nm]	Longitudinal dynamic moment	0.30	0.42	0.72	0.88
M0L[Nm]	Longitudinal static moment	0.40	0.61	1.13	1.46

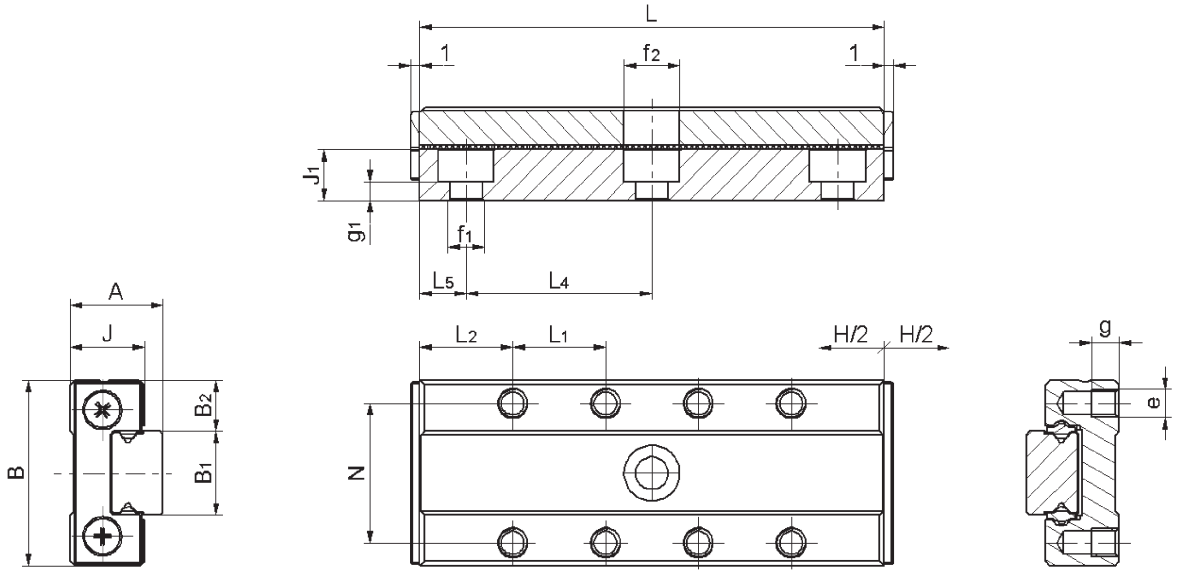




MS 5 Dimensions and load ratings

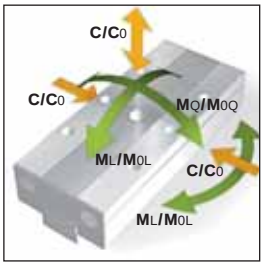
		MS 5-15.8	MS 5-20.13	MS 5-30.20	MS 5-40.31	MS 5-50.42
A:	System height	6	6	6	6	6
B:	System width	10	10	10	10	10
B1:	Rail width	5	5	5	5	5
B2:	Distance to the stop surfaces	2.5	2.5	2.5	2.5	2.5
J:	Carriage height	5.5	5.5	5.5	5.5	5.5
J1:	Rail height	3	3	3	3	3
H:	Stroke	8	13	20	31	42
L:	System length excluding end parts	15	20	30	40	50
L1:	Hole spacing	8	12	20	28	36
L2:	Start/finish spacing of holes	3.5	4	5	6	7
N:	Hole spacing across carriage	4	4	4	4	4
e:	Thread	M2	M2	M2	M2	M2
g:	Usable thread length	2.35	2.35	2.35	2.35	2.35
Weight in grams		5.4	7.3	11	14.8	18.6
Load ratings and forces:						
C [N]	Dynamic load rating	568	645	857	987	1109
C0[N]	Static load rating	780	936	1404	1716	2028
MQ[Nm]	Transverse dynamic moment	1.59	1.81	2.40	2.76	3.11
M0Q[Nm]	Transverse static moment	2.18	2.62	3.93	4.80	5.68
ML[Nm]	Longitudinal dynamic moment	1.25	1.66	3.14	4.34	5.69
M0L[Nm]	Longitudinal static moment	1.72	2.4	5.15	7.55	10.4

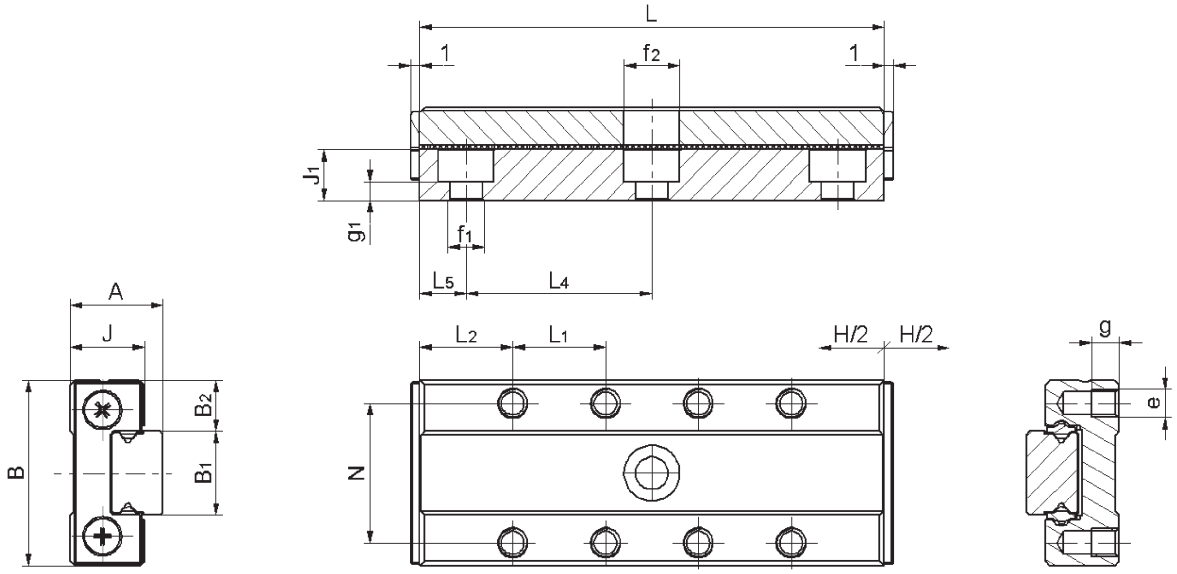




MS 7 Dimensions and load ratings

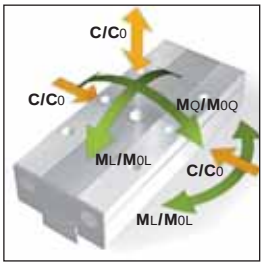
	MS 7-30.25	MS 7-40.32	MS 7-50.39	MS 7-60.50	MS 7-70.61
A: System height	8	8	8	8	8
B: System width	17	17	17	17	17
B1: Rail width	7	7	7	7	7
B2: Distance to the stop surfaces	5	5	5	5	5
J: Carriage height	6.5	6.5	6.5	6.5	6.5
J1: Rail height	4.5	4.5	4.5	4.5	4.5
H: Stroke	25	32	39	50	61
L: System length excluding end parts	30	40	50	60	70
L1: Hole spacing	10	10	10	10	10
L2: Start/finish spacing of holes	10	10	10	10	10
L4: Rail-hole spacing	15	15	15	15	15
L5: Start/finish spacing of rail holes	7.5	5	10	7.5	5
N: Hole spacing across carriage	12	12	12	12	12
e: Thread	M2	M2	M2	M2	M2
f1: Diameter of through-hole	2.4	2.4	2.4	2.4	2.4
f2: Countersunk hole diameter	4.2	4.2	4.2	4.2	4.2
g: Usable thread lengthe	3	3	3	3	3
g1: Clamping length	2.2	2.2	2.2	2.2	2.2
Weight in grams	24.5	32.6	40.5	48.5	56.3
Load ratings and forces:					
C [N] Dynamic load rating	645	857	1049	1168	1282
C0[N] Static load rating	936	1404	1872	2184	2496
MQ[Nm] Transverse dynamic moment	2.3	3.1	3.8	4.2	4.6
M0Q[Nm] dynamisches Moment Querrichtung	3.4	5.1	6.7	7.9	9
ML[Nm] Longitudinal dynamic moment	2.6	4.4	5.8	8	9.8
M0L[Nm] Longitudinal static moment	3.8	7.2	11.6	15	19

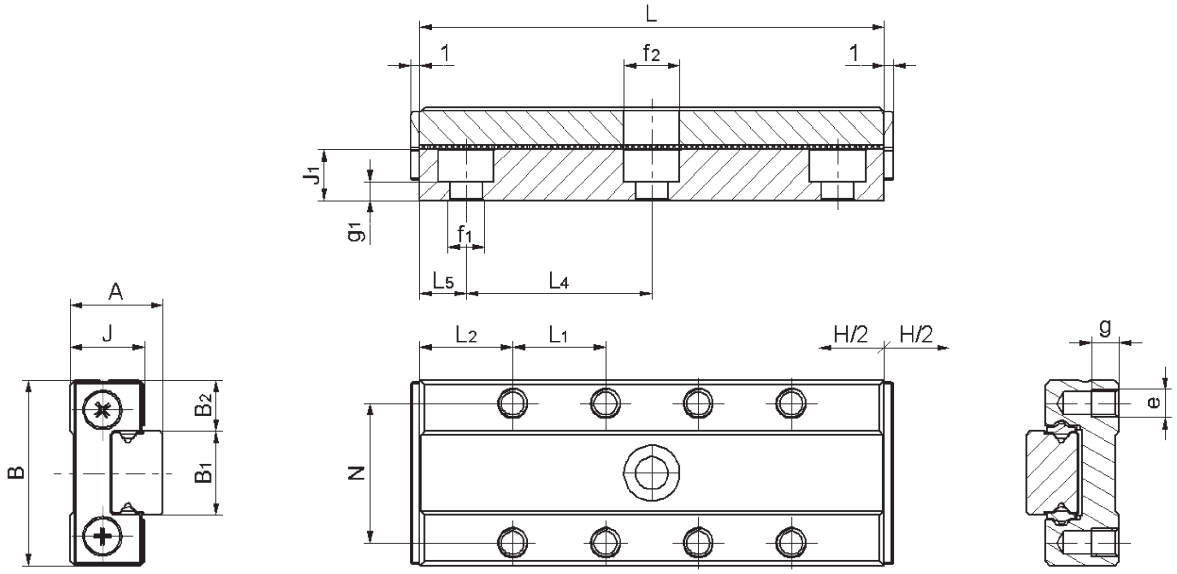




MS 9 Dimensions and load ratings

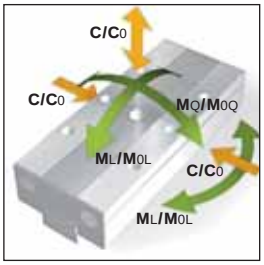
	MS 9-40.34	MS 9-50.42	MS 9-60.50	MS 9-70.58	MS 9-80.66
A: System height	10	10	10	10	10
B: System width	20	20	20	20	20
B1: Rail width	9	9	9	9	9
B2: Distance to the stop surfaces	5.5	5.5	5.5	5.5	5.5
J: Carriage height	8	8	8	8	8
J1: Rail height	5.5	5.5	5.5	5.5	5.5
H: Stroke	34	42	50	58	66
L: System length excluding end parts	40	50	60	70	80
L1: Hole spacing	10	10	10	10	10
L2: Start/finish spacing of holes	10	10	10	10	10
L4: Rail-hole spacing	20	20	20	20	20
L5: Start/finish spacing of rail holes	10	5	10	5	10
N: Hole spacing across carriage	15	15	15	15	15
e: Thread	M3	M3	M3	M3	M3
f1: Diameter of through-hole	3.5	3.5	3.5	3.5	3.5
f2: Countersunk hole diameter	6	6	6	6	6
g: Usable thread length	3	3	3	3	3
g1: Clamping length	2	2	2	2	2
Weight in grams	45.6	56.9	68.1	79.2	90.3
Load ratings and forces:					
C [N] Dynamic load rating	1181	1444	1689	1918	2137
C0[N] Static load rating	1664	2219	2774	3328	3883
MQ[Nm] Transverse dynamic moment	5.5	6.7	7.9	8.9	9.9
M0Q[Nm] Transverse static moment	7.7	10.3	12.9	15.5	18.1
ML[Nm] Longitudinal dynamic moment	6.2	8.9	12.1	15.6	19.4
M0L[Nm] Longitudinal static moment	8.7	13.7	19.8	27	35.3

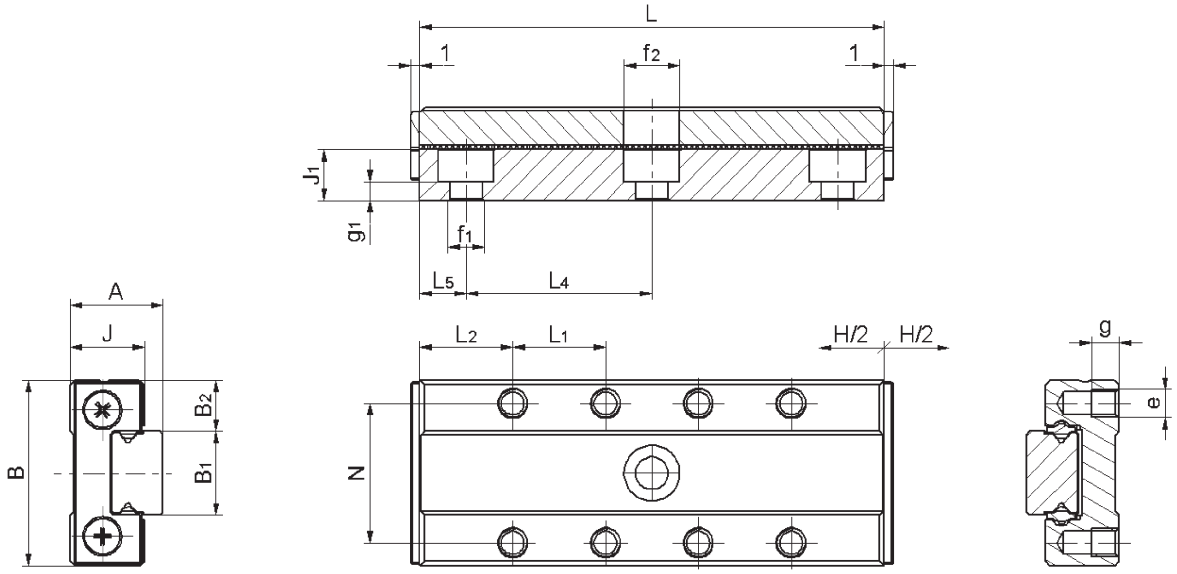




MS 12 Dimensions and load ratings

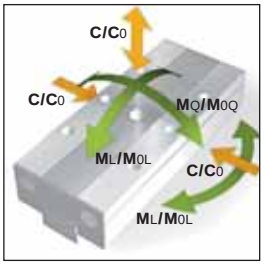
		MS 12-50.47	MS 12-60.53	MS 12-80.65	MS 12-100.77
A:	System height	13	13	13	13
B:	System width	27	27	27	27
B1:	Rail width	12	12	12	12
B2:	Distance to the stop surfaces	7.5	7.5	7.5	7.5
J:	Carriage height	10	10	10	10
J1:	Rail height	7.5	7.5	7.5	7.5
H:	Stroke	47	53	65	77
L:	System length excluding end parts	50	60	80	100
L1:	Hole spacing	15	15	15	15
L2:	Start/finish spacing of holes	10	7.5	10	12.5
L4:	Rail-hole spacing	25	25	25	25
L5:	Start/finish spacing of rail holes	12.5	5	15	12.5
N:	Hole spacing across carriage	20	20	20	20
e:	Thread	M3	M3	M3	M3
f1:	Diameter of through-hole	3.5	3.5	3.5	3.5
f2:	Countersunk hole diameter	6	6	6	6
g:	Usable thread length	3.5	3.5	3.5	3.5
g1:	Clamping length	3	3	3	3
Weight in grams		103.9	124.4	165.5	206.5
Load ratings and forces:					
C [N]	Dynamic load rating	1887	2308	3065	3749
C0[N]	Static load rating	2600	3467	5200	6934
MQ[Nm]	Transverse dynamic moment	11.5	14.1	18.7	22.9
M0Q[Nm]	Transverse static moment	15.9	21.1	31.7	42.3
ML[Nm]	Longitudinal dynamic moment	11.6	16.7	29.1	44.2
M0L[Nm]	Longitudinal static moment	16	25.1	49.3	81.7



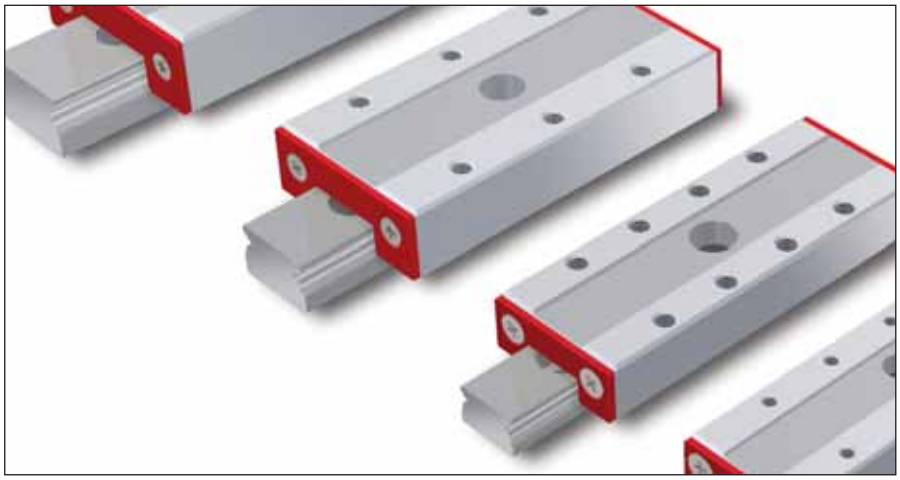


MS 15 Dimensions and load ratings

		MS 15-70.63	MS 15-90.71	MS 15-110.95	MS 15-130.103
A:	System height	16	16	16	16
B:	System width	32	32	32	32
B1:	Rail width	15	15	15	15
B2:	Distance to the stop surfaces	8.5	8.5	8.5	8.5
J:	Carriage height	12	12	12	12
J1:	Rail height	9.5	9.5	9.5	9.5
H:	Stroke	63	71	95	103
L:	System length excluding end parts	70	90	110	130
L1:	Hole spacing	20	20	20	20
L2:	Start/finish spacing of holes	15	15	15	15
L4:	Rail-hole spacing	40	40	40	40
L5:	Start/finish spacing of rail holes	15	5	15	5
N:	Hole spacing across carriage	25	25	25	25
e:	Thread	M3	M3	M3	M3
f1:	Diameter of through-hole	3.5	3.5	3.5	3.5
f2:	Countersunk hole diameter	6	6	6	6
g:	Usable thread length	4	4	4	4
g1:	Clamping length	5	5	5	5
Weight in grams		216.2	277.5	338.6	399.5
Load ratings and forces:					
C [N]	Dynamic load rating	3384	4495	5007	5970
C0[N]	Static load rating	4992	7489	8737	11233
MQ[Nm]	Transverse dynamic moment	25.7	34.2	38.1	45.4
M0Q[Nm]	Transverse static moment	37.9	56.9	66.4	85.4
ML[Nm]	Longitudinal dynamic moment	27.8	48.5	60.6	87.9
M0L[Nm]	Longitudinal static moment	41.0	80.8	105.7	165.4



Handling and servicing



Transportation and storage

MINISLIDES are high-precision components, which must be treated with care at all times. The following instructions must be observed to avoid damage:

- MINISLIDES should always be transported in their original packaging and stored at room temperature
- MINISLIDES must be protected from impact and humidity

Lubrication

Status when supplied:

MINISLIDES are initially lubricated with grease before they leave the factory. Oil lubrication is possible if specified by the customer.

Initial and subsequent lubrication:

For the purpose of initial and subsequent lubrication with grease, we recommend KP2K or KP1K grease to DIN 51825.

For the purpose of initial and subsequent lubrication with oil, we recommend CLP mineral oil to DIN 51517 or HLP to DIN 51524 in the viscosity range of ISO 68 to 150.

Subsequent lubrication:

Subsequent lubrication is dependent on environmental influences, the load and the type of load. Guarantees regarding subsequent lubrication intervals can thus only be provided by users' own tests or observations. Please note the recommendations issued by the manufacturer of the lubricant!

Installation

To avoid damage, installation of the parts may only be carried out by specialist staff. Careless handling leads to hidden damage and thus to premature failure when used in continuous operation.

End parts

Please note that the end parts are not designed as mechanical stroke stops.

Ordering information

The order designation for MINISLIDES consists of the product group (MS), the rail width (B1), the system length (L) and the stroke (H). The following example illustrates the main configuration of the designation:

MS 5-40.31

- H: Stroke = **31** mm
- L: System length = **40** mm
- B1: Rail width = **5** mm
- MINISLIDE product group = **MS**

Free downloads of 2D drawings and 3D models

In order to facilitate your design work, you will find 2D drawings and 3D models for all formats required for your design on the Cadenas part server. You can access the download area directly from SCHNEEBERGER's Webpage www.schneeberger.com

Further product information can also be found at www.schneeberger.com

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