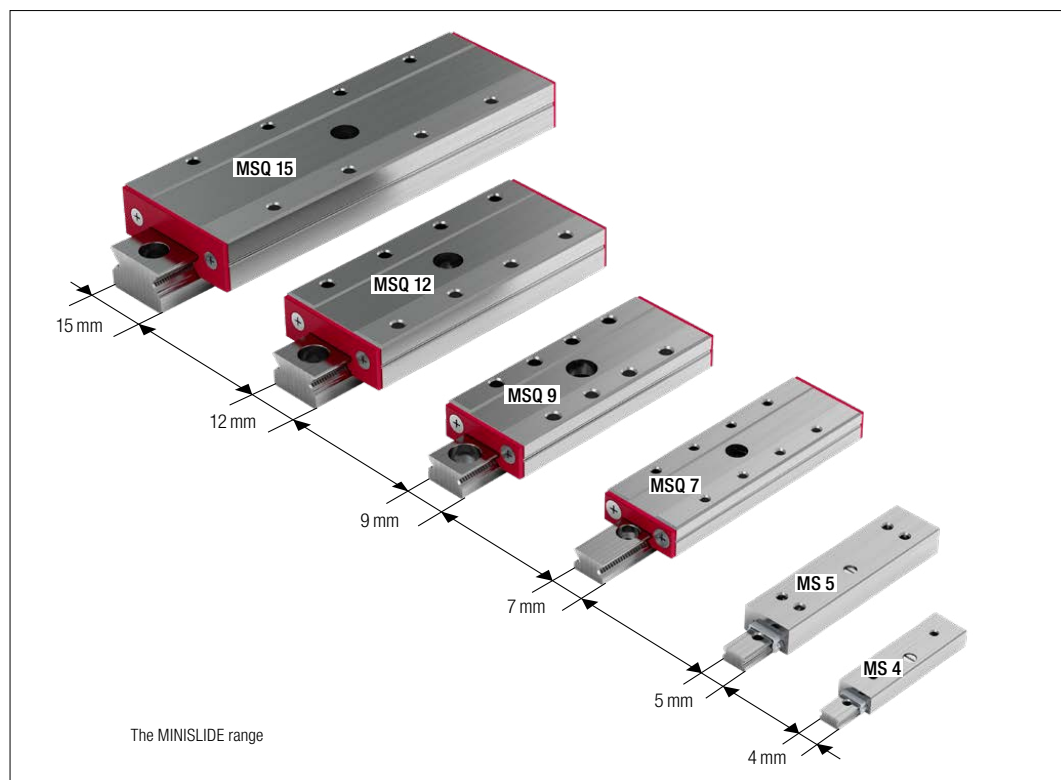


13 MINISLIDE Frictionless Table Product Overview

Demanding applications demand extraordinary guideways. MINISLIDE embodies the new generation of miniature guideways for demanding applications. They are extremely robust and prove themselves in every application with their high level of smoothness, precision and reliability.

The MINISLIDE range includes sizes 4, 5, 7, 9, 12 and 15 with travel distances from 6 to 102 mm.



13 MINISLIDE Frictionless Table Product Overview

13.1 MINISLIDE MS Product Characteristics

13.1.1 Extensive Range

The type MS range includes rail widths of 4 and 5 mm, available, depending on type, in four or five different lengths and strokes.



MINISLIDE MS range

MS 5

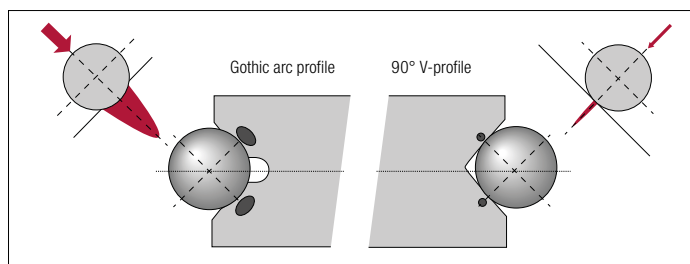
System lengths in mm: 15 – 50
Strokes in mm: 8 – 42

MS 4

System lengths in mm: 10 – 25
Strokes in mm: 6 – 22

13.1.2 Maximum Load Carrying Capacity and Compact Form

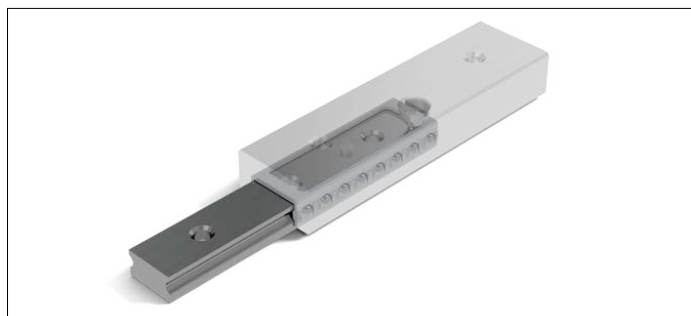
The Gothic arc profile of MINISLIDE MS guideways allows for load capacities up to 15 times higher than those of a 90° V-profile. MINISLIDE MS therefore allows for compact and robust constructions whilst keeping weight to a minimum.



The gothic arc guideway profile compared to the 90° V-profile

13.1.3 Integrated Cage Centering Feature

MINISLIDE MS 4 and MS 5 have a one-piece plastic cage at their disposal to counteract the effects of cage creep. The cage is positioned using the integrated cage centering feature.



MINISLIDE MS

13 MINISLIDE Frictionless Table Product Overview

13.2 MINISLIDE MSQ Product Characteristics

13.2.1 Extensive Range

The type MSQ range includes rail widths of 7, 9, 12 and 15 mm, available, depending on type, in four or five different lengths and strokes.



MINISLIDE MSQ range

MSQ 15

System lengths in mm: 70 – 130
Strokes in mm: 66 – 102

MSQ 12

System lengths in mm: 50 – 100
Strokes in mm: 45 – 70

MSQ 9

System lengths in mm: 40 – 80
Strokes in mm: 34 – 66

MSQ 7

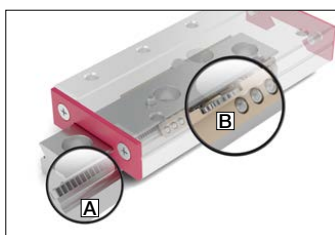
System lengths in mm: 30 – 70
Strokes in mm: 20 – 58



MINISLIDE MSQ allows for speeds of 3 m/s and acceleration of 300 m/s²

13.2.2 High Speed and Acceleration

High-acceleration applications demand well thought-out solutions. With its unique design with integrated cage control, MINISLIDE MSQ fulfills the requirements of the most modern of propulsion technologies and allows for speeds of up to 3 m/s and acceleration of up to 300 m/s².



The robust cage control of MINISLIDE MSQ
A gear rack pinion on carriage and guideway
B cage with pinion

13.2.3 High Process Reliability Thanks to Cage Control

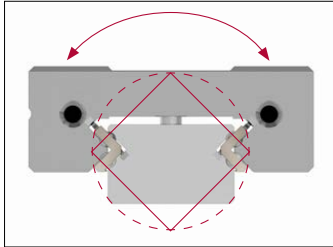
The cage is free to move along the longitudinal axis on every linear guideway. The cage generally moves out of the center position as a result of uneven weight distribution, high acceleration, vertical installation or temperature differences. This so-called cage creep compromises the efficiency of every application, since the cage must be centered regularly using corrective strokes at the expense of energy.

MINISLIDE MSQ products are fitted with a well-engineered, robust cage control system which eliminates cage creep. The gear rack pinion of the control system is directly integrated into the carriages and guideways. The cages and pinions are made from high-quality plastic.

The compact, robust design as well as the minimum of integrated components ensure the highest strength in every commercial situation.

A mechanical limited stroke protects the cage control mechanism and makes installation and maintenance easy (this must not be used during operation as a means to limit stroke).

13 MINISLIDE Frictionless Table Product Overview

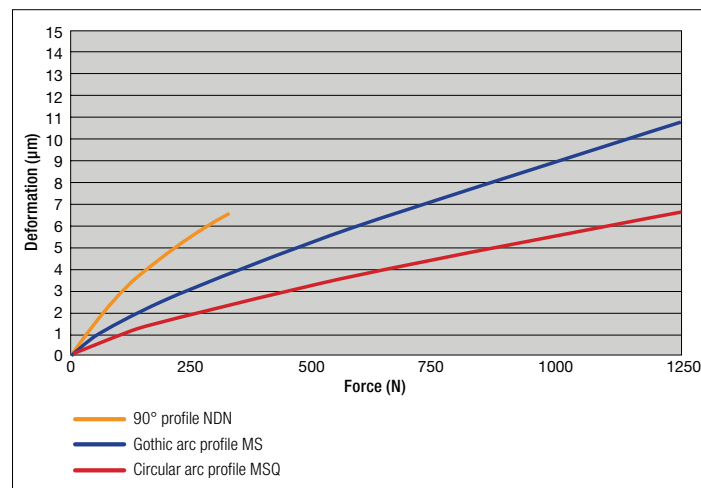


Arrangement of MINISLIDE MSQ with four circular arc profile tracks in an O shape

13.2.4 Maximum Rigidity and Load Capacities

MINISLIDE MSQ products have four tracks with a circular arc profile. Their arrangement in the shape of an O ensures large inner spacings. In combination with the tracks offset by 90 degrees, a high level of evenly distributed force from all directions is achieved, as well as torque rigidity.

MINISLIDE products are preloaded with zero backlash. Combined with the high number of rolling elements, a high level of system rigidity and therefore the highest precision are guaranteed.



Comparison of the rigidity of structurally identical MINISLIDE size 9-80.66 with different contouring of the guideway tracks. The circular arc profile of MSQ results in the lowest deformation and therefore the highest rigidity

13 MINISLIDE Frictionless Table Product Overview**13.3 Technical Information and Alternative Variants****13.3.1 MINISLIDE MS Performance Parameters**

Max. acceleration	50 m/s ²
Max. speed	1 m/s
Preload	Zero backlash
Accuracy	See chapters 13.3.4 and 13.3.5
Materials - guideways, carriages, ball bearings - cage	Stainless, through-hardened steel POM
Areas of application - temperature range ⁽¹⁾ - vacuum ⁽²⁾ - humidity - cleanroom	-40 °C to +80 °C (-40 °F to +176 °F) Vacuum (max. 10 ⁻⁷ mbar) 10 % – 70 % (non-condensing) Cleanroom class ISO 7 or ISO 6 (in accordance with ISO 14644-1)

⁽¹⁾ The standard lubrication covers a temperature range from -20 °C to +80 °C. Lubricants for other temperatures are available on request from SCHNEEBERGER (see chapter 14.2).

⁽²⁾ The suitability for a vacuum depends on the materials used. Use in a vacuum requires a special lubricant which can be requested from SCHNEEBERGER. So that no air remains trapped in the blind holes, the fastening screws must be vented.

13.3.2 MINISLIDE MSQ Performance Parameters

Max. acceleration	300 m/s ²
Max. speed	3 m/s
Preload	Zero backlash
Accuracy	See chapters 13.3.4 and 13.3.5
Materials - guideways, carriages, ball bearings - cage and pinion - end pieces	Stainless, through-hardened steel PEEK PEEK
Areas of application - temperature range ⁽¹⁾ - vacuum ⁽²⁾ - humidity - cleanroom	-40 °C to +150 °C (-40 °F to +302 °F) Vacuum (max. 10 ⁻⁹ mbar) 10 % – 70 % (non-condensing) Cleanroom class ISO 7 or ISO 6 (in accordance with ISO 14644-1)

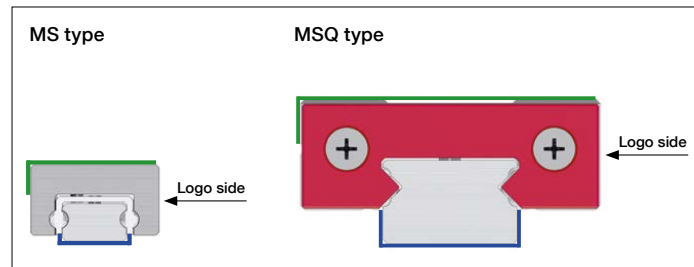
⁽¹⁾ The standard lubrication covers a temperature range from -30 °C to +120 °C. Lubricants for other temperatures are available on request from SCHNEEBERGER (see chapter 14.2).

⁽²⁾ The suitability for a vacuum depends on the materials used. In order to use MSQ in a vacuum, the fastening screws and the front plates must be removed. Use in a vacuum requires a special lubricant which can be requested from SCHNEEBERGER.

13 MINISLIDE Frictionless Table Product Overview

13.3.3 Reference and Supporting Surfaces

The locating and supporting surfaces of carriages and guideways are designated as follows.



— Carriage locating and supporting surfaces
— Guideway locating and supporting surfaces

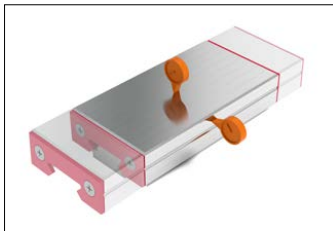
The reference side of the carriage is opposite the carriage side with the company logo / type designation. The guideway can be located on both sides.

13.3.4 Running Accuracy and Parallelism of Supporting Surfaces

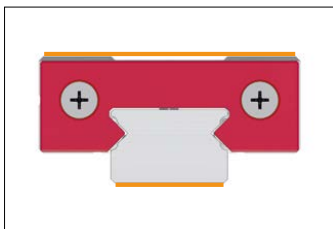
The tolerance for the straightness of the stroke depends on the length of the guideway.

The following table shows the corresponding maximum values.

The measurements are taken in an unloaded state on a flat surface.



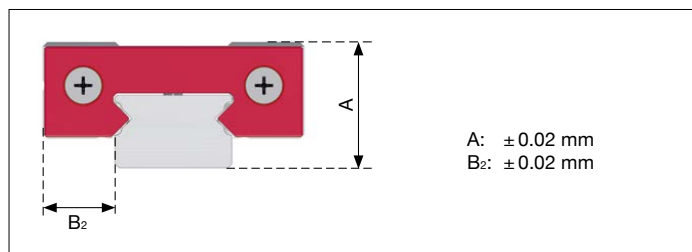
System length L	Straightness of the stroke horizontally and vertically
10 – 30 mm	3 μ m
40 – 80 mm	4 μ m
90 – 130 mm	5 μ m



System length L	Parallelism of the supporting surfaces (frictionless table in the center position)
10 – 30 mm	12 μ m
40 – 80 mm	15 μ m
90 – 130 mm	18 μ m

13 MINISLIDE Frictionless Table Product Overview

13.3.5 Tolerance of the Total Height



13.3.6 Push Force and Preload

The push force is influenced by the preload and the lubricant used. MINISLIDE guideways are delivered with zero backlash and slightly preloaded as standard.

The carriages can be delivered with a defined push force on request (see chapter 14.1).

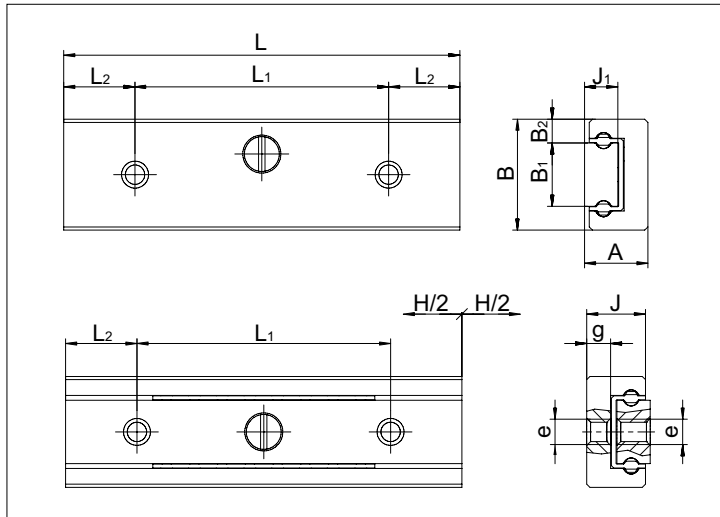
13.3.7 Friction and Smoothness

SCHNEEBERGER places high value on smoothness during manufacturing. The accuracy of the surfaces and materials is of the highest priority. This also applies with respect to the rolling elements used, which must satisfy the most stringent quality demands. Under normal operating conditions a coefficient of friction of 0.003 can be assumed.

13 MINISLIDE Frictionless Table Product Overview

13.3.8 Dimension Tables, Load Capacities, Weights and Moment Loads

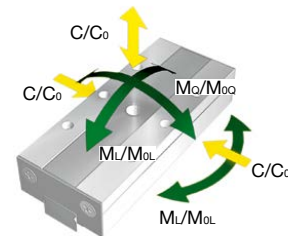
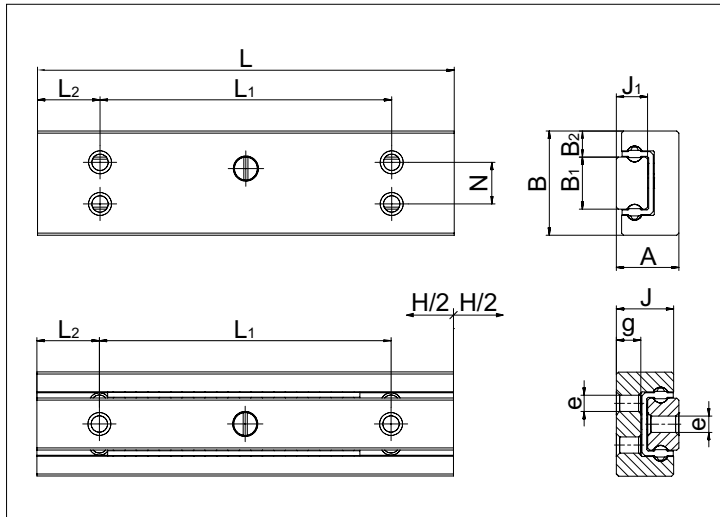
MS 4



Name			Sizes			
			MS 4-10.6	MS 4-15.12	MS 4-20.15	MS 4-25.22
Dimensions (mm)	A	System height	4	4	4	4
	B	System width	7	7	7	7
	B ₁	Rail width	4	4	4	4
	B ₂	Distance between locating surfaces	1.5	1.5	1.5	1.5
	J	Carriage height	3.7	3.7	3.7	3.7
	J ₁	Rail height	2.1	2.1	2.1	2.1
	H	Stroke	6	12	15	22
	L	System length	10	15	20	25
	L ₁	Attachment hole spacing	5	8	12	16
	L ₂	Attachment hole start/end spacing	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
		Ball diameter	1	1	1	1
Load capacity (N)	C ₀	Static load capacity	277	347	485	555
	C	Dynamic load capacity (△ C ₁₀₀)	207	242	307	337
Torque (Nm)	M ₀₀	Permissible lateral static torque	0.60	0.75	1.04	1.19
	M _{0L}	Permissible static torque lengthwise	0.40	0.61	1.13	1.46
	M ₀	Permissible lateral dynamic torque	0.45	0.52	0.66	0.72
	M _L	Permissible dynamic torque lengthwise	0.30	0.42	0.72	0.88
Weight (g)			1.7	2.6	3.4	4.3

13 MINISLIDE Frictionless Table Product Overview

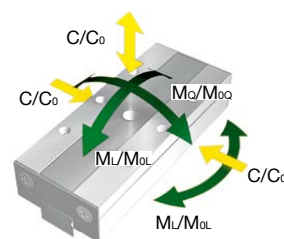
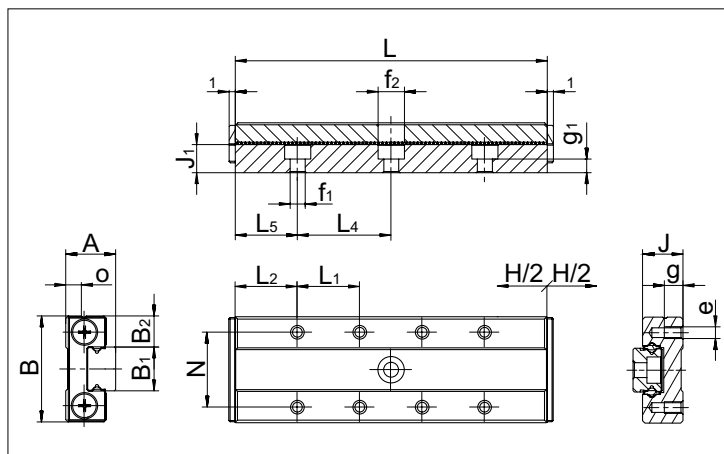
MS 5



Name			Sizes				
			MS 5-15.8	MS 5-20.13	MS 5-30.20	MS 5-40.31	MS 5-50.42
Dimensions (mm)	A	System height	6	6	6	6	6
	B	System width	10	10	10	10	10
	B ₁	Rail width	5	5	5	5	5
	B ₂	Distance between locating surfaces	2.5	2.5	2.5	2.5	2.5
	J	Carriage height	5.5	5.5	5.5	5.5	5.5
	J ₁	Rail height	3	3	3	3	3
	H	Stroke	8	13	20	31	42
	L	System length	15	20	30	40	50
	L ₁	Attachment hole spacing	8	12	20	28	36
	L ₂	Attachment hole start/end spacing	3.5	4	5	6	7
	N	Lateral attachment hole spacing	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
		Ball diameter	1.5	1.5	1.5	1.5	1.5
Load capacity (N)	C ₀	Static load capacity	780	936	1404	1716	2028
	C	Dynamic load capacity (≧ C ₁₀₀)	568	645	857	987	1109
Torque (Nm)	M ₀₀	Permissible lateral static torque	2.18	2.62	3.93	4.80	5.68
	M _{0L}	Permissible static torque lengthwise	1.72	2.4	5.15	7.55	10.4
	M ₀	Permissible lateral dynamic torque	1.59	1.81	2.40	2.76	3.11
	M _L	Permissible dynamic torque lengthwise	1.25	1.66	3.14	4.34	5.69
Weight (g)			5.4	7.3	11	14.8	18.6

13 MINISLIDE Frictionless Table Product Overview

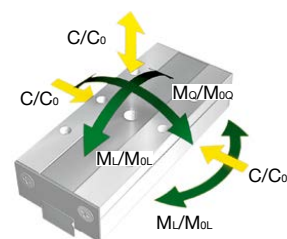
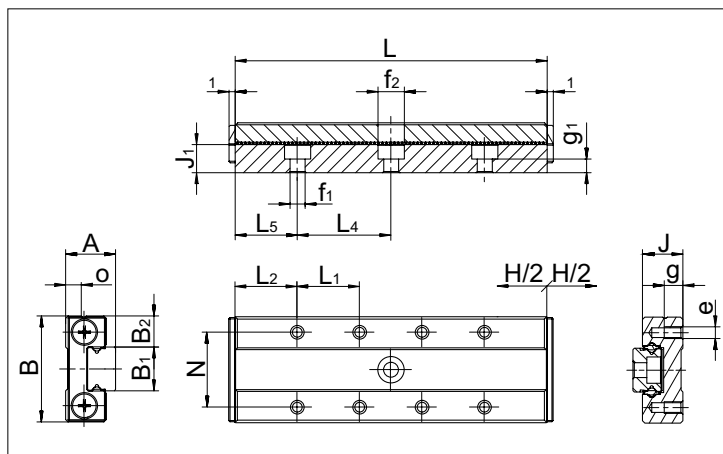
MSQ 7



Name			Sizes				
			MSQ 7-30.20	MSQ 7-40.28	MSQ 7-50.36	MSQ 7-60.50	MSQ 7-70.58
Dimensions (mm)	A	System height	8	8	8	8	8
	B	System width	17	17	17	17	17
	B ₁	Rail width	7	7	7	7	7
	B ₂	Distance between locating surfaces	5	5	5	5	5
	J	Carriage height	6.5	6.5	6.5	6.5	6.5
	J ₁	Rail height	4.5	4.5	4.5	4.5	4.5
	H	Stroke	20	28	36	50	58
	L	System length	30	40	50	60	70
	L ₁	Attachment hole spacing	10	10	10	10	10
	L ₂	Attachment hole start/end spacing	10	10	10	10	10
	L ₄	Attachment hole spacing	15	15	15	15	15
	L ₅	Attachment hole start/end spacing	7.5	5	10	7.5	5
	N	Lateral attachment hole spacing	12	12	12	12	12
	e	Thread	M2	M2	M2	M2	M2
	f ₁	Attachment hole diameter	2.4	2.4	2.4	2.4	2.4
	f ₂	Screw hole diameter	4.2	4.2	4.2	4.2	4.2
	g	Usable thread length	3	3	3	3	3
	g ₁	Clamping length	2.2	2.2	2.2	2.2	2.2
		Ball diameter	1	1	1	1	1
	Load capacity (N)	C ₀	Static load capacity	1193	1670	2148	2386
C		Dynamic load capacity (≅ C ₁₀₀)	609	770	919	989	1124
Torque (Nm)	M ₀₀	Permissible lateral static torque	5.1	7.2	9.2	10.3	12.3
	M _{0L}	Permissible static torque lengthwise	5.0	8.6	13.1	15.8	21.8
	M ₀	Permissible lateral dynamic torque	2.6	3.3	4.0	4.3	4.8
	M _L	Permissible dynamic torque lengthwise	2.5	4.0	5.6	6.5	8.5
Weight (g)			24.5	32.6	40.5	48.5	56.3

13 MINISLIDE Frictionless Table Product Overview

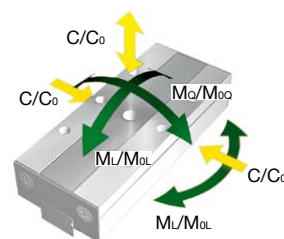
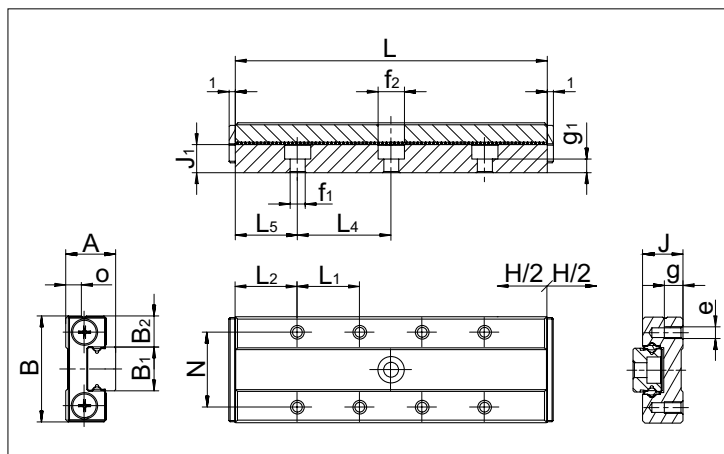
MSQ 9



Name		Sizes				
		MSQ 9-40.34	MSQ 9-50.42	MSQ 9-60.50	MSQ 9-70.58	MSQ 9-80.66
Dimensions (mm)	A	System height	10	10	10	10
	B	System width	20	20	20	20
	B1	Rail width	9	9	9	9
	B2	Distance between locating surfaces	5.5	5.5	5.5	5.5
	J	Carriage height	8	8	8	8
	J1	Rail height	5.5	5.5	5.5	5.5
	H	Stroke	34	42	50	58
	L	System length	40	50	60	70
	L1	Attachment hole spacing	10	10	10	10
	L2	Attachment hole start/end spacing	10	10	10	10
	L4	Attachment hole spacing	20	20	20	20
	L5	Attachment hole start/end spacing	10	5	10	5
	N	Lateral attachment hole spacing	15	15	15	15
	e	Thread	M3	M3	M3	M3
	f1	Attachment hole diameter	3.5	3.5	3.5	3.5
	f2	Screw hole diameter	6	6	6	6
	g	Usable thread length	3	3	3	3
	g1	Clamping length	2	2	2	2
		Ball diameter	1	1	1	1
Load capacity (N)	C0	Static load capacity	1432	1909	2386	2864
	C	Dynamic load capacity (ΔC_{100})	692	846	989	1124
Torque (Nm)	M00	Permissible lateral static torque	7.6	10.1	12.6	15.2
	M0L	Permissible static torque lengthwise	6.7	10.8	15.8	21.8
	M0	Permissible lateral dynamic torque	3.7	4.5	5.2	6.0
	M0L	Permissible dynamic torque lengthwise	3.2	4.8	6.5	8.5
Weight (g)			45.6	56.9	68.1	79.2

13 MINISLIDE Frictionless Table Product Overview

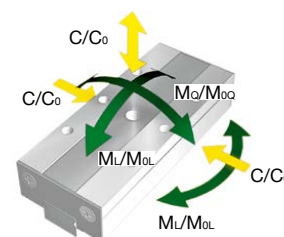
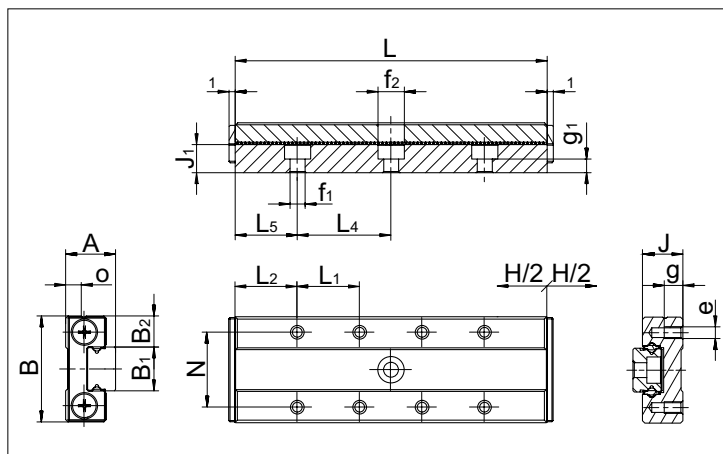
MSQ 12



Name			Sizes			
			MSQ 12-50.45	MSQ 12-60.48	MSQ 12-80.63	MSQ 12-100.70
Dimensions (mm)	A	System height	13	13	13	13
	B	System width	27	27	27	27
	B ₁	Rail width	12	12	12	12
	B ₂	Distance between locating surfaces	7.5	7.5	7.5	7.5
	J	Carriage height	10	10	10	10
	J ₁	Rail height	7.5	7.5	7.5	7.5
	H	Stroke	45	48	63	70
	L	System length	50	60	80	100
	L ₁	Attachment hole spacing	15	15	15	15
	L ₂	Attachment hole start/end spacing	10	7.5	10	12.5
	L ₄	Attachment hole spacing	25	25	25	25
	L ₅	Attachment hole start/end spacing	12.5	5	15	12.5
	N	Lateral attachment hole spacing	20	20	20	20
	e	Thread	M3	M3	M3	M3
	f ₁	Attachment hole diameter	3.5	3.5	3.5	3.5
	f ₂	Screw hole diameter	6	6	6	6
	g	Usable thread length	3.5	3.5	3.5	3.5
	g ₁	Clamping length	3	3	3	3
		Ball diameter	1.5	1.5	1.5	1.5
	Load capacity (N)	C ₀	Static load capacity	2685	3759	5370
C		Dynamic load capacity (≙ C ₁₀₀)	1427	1806	2318	2934
Torque (Nm)	M ₀₀	Permissible lateral static torque	18.9	26.5	37.9	53.0
	M _{0L}	Permissible static torque lengthwise	15.7	27.0	49.5	90.1
	M ₀	Permissible lateral dynamic torque	10.1	12.7	16.3	20.7
	M _L	Permissible dynamic torque lengthwise	8.3	12.9	21.4	35.1
Weight (g)			103.9	124.4	165.5	206.5

13 MINISLIDE Frictionless Table Product Overview

MSQ 15



Name			Sizes			
			MSQ 15-70.66	MSQ 15-90.70	MSQ 15-110.96	MSQ 15-130.102
Dimensions (mm)	A	System height	16	16	16	16
	B	System width	32	32	32	32
	B ₁	Rail width	15	15	15	15
	B ₂	Distance between locating surfaces	8.5	8.5	8.5	8.5
	J	Carriage height	12	12	12	12
	J ₁	Rail height	9.5	9.5	9.5	9.5
	H	Stroke	66	70	96	102
	L	System length	70	90	110	130
	L ₁	Attachment hole spacing	20	20	20	20
	L ₂	Attachment hole start/end spacing	15	15	15	15
	L ₄	Attachment hole spacing	40	40	40	40
	L ₅	Attachment hole start/end spacing	15	5	15	5
	N	Lateral attachment hole spacing	25	25	25	25
	e	Thread	M3	M3	M3	M3
	f ₁	Attachment hole diameter	3.5	3.5	3.5	3.5
	f ₂	Screw hole diameter	6	6	6	6
	g	Usable thread length	4	4	4	4
	g ₁	Clamping length	5	5	5	5
		Ball diameter	2	2	2	2
	Load capacity (N)	C ₀	Static load capacity	4773	7637	8592
C		Dynamic load capacity (≙ C ₁₀₀)	2611	3628	3940	4820
Torque (Nm)	M ₀₀	Permissible lateral static torque	42.5	68	76.5	102.0
	M _{0L}	Permissible static torque lengthwise	36.7	80.9	99.5	166.6
	M ₀	Permissible lateral dynamic torque	23.2	32.3	35.1	42.9
	M _L	Permissible dynamic torque lengthwise	20.1	38.4	45.6	70.1
Weight (g)			216.2	277.5	338.6	399.5

13 MINISLIDE frictionless table product overview**13.3.9 Lubrication**

Lubrication is a design element and must therefore be defined during the development phase of a machine or application. If the lubrication is only selected after design and construction is complete, based on our experience this is likely to lead to considerable performance difficulties. A carefully thought out lubrication concept is therefore a sign of a state-of-the-art and well devised design.

Parameters to be taken into account in selecting the lubricant include:

- Operating conditions (speed, acceleration, stroke, load, installation orientation)
- External influences (temperature, aggressive media or radiation, contamination, humidity, vacuum, cleanroom)
- Subsequent lubrication (Period of time, amount)
- Compatibility (with other lubricants, with corrosion protection and with integrated materials such as plastic)

Technical and economic considerations determine the lubricant used.

MINISLIDE initial lubrication

MINISLIDE products are lubricated with Klübersynth GE 46-1200 at the factory.

MINISLIDE subsequent lubrication intervals

The lubricant should be applied to the guideway. The subsequent lubrication interval depends on different influencing variables, e.g. load, working environment, speed, etc. and can therefore not be calculated. The lubrication area should therefore be monitored over a longer period.

A) Subsequent lubrication with oil

For subsequent lubrication with oil, mineral oil CLP (DIN 51517) or HLP (DIN 51524) with a viscosity range between ISO VG32 and ISO VG150 in accordance with DIN 51519 is recommended. During lubrication, the carriages/guideways should be moved along the entire stroke length so that the lubricant is distributed correctly.

B) Subsequent lubrication with grease

For lubrication with grease, lubricating grease KP2K or KP1K is recommended in accordance with DIN 51825. During lubrication, the carriages/guideways should be moved along the entire stroke length so that the lubricant is distributed correctly.

Custom lubricants

Special lubricants are used for specific purposes. For example lubricants for use in vacuums, cleanrooms, for high or low temperatures, for high speeds or high-frequency strokes. SCHNEEBERGER can deliver the guideways with the appropriate lubricant for any of these areas of application (see chapter 14.2).