

STAR – Linear Motion Slides

STAR – Linear Motion Technology

Ball Rail Systems

Standard Ball Rail Systems
Ball Rail Systems with Aluminum Runner Blocks
Super Ball Rail Systems
Wide Ball Rail Systems
Miniature Ball Rail Systems
Cam Roller Guides
Accessories

Roller Rail Systems

Linear Bushings and Shafts

Linear Bushings
Linear Sets
Shafts
Shaft Support Rails
Shaft Support Blocks
Ball Transfer Units

Screw Drives

Linear Motion Systems

Linear Motion Slides


Linear Modules
Compact Modules
Ball Rail Tables
ALU-STAR Profile System
Controllers, Motors, Electrical Accessories
Linear Actuators

Rexroth Star GmbH
D-97419 Schweinfurt



REG. No.
1617 - 03



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STAR – Linear Motion Slides

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STAR – Linear Motion Slides A Solution to Many Problems

The tasks

- Driving
- Transporting
- Positioning

Total height

Length

Load capacities and moments

Static load

Speed

Precision

System complete
with drive unit

Switch mounting arrangements

Version

Documentation

- 23 mm to 115 mm
- up to 5300 mm
- Load capacity C up to 36380 N
Longitudinal moment M_L up to 3011 Nm
Torsional moment M_t up to 2740 Nm
- up to 1000 kg
- up to 80 m/min
- Repeatability of up to 0.005 mm
Positioning accuracy of up to 0.01 mm
- AC servomotor, MiniDrive or stepping motor
with motor mount, coupling or side drive with
timing belt (plus control unit)
- Switch over total travel range
- without drive unit
with ball screw drive
with toothed belt drive
- Standard report
Moment of friction measurement
Lead deviation

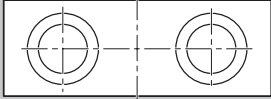
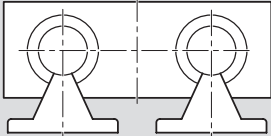
The solution

**STAR Linear
Motion Slides**



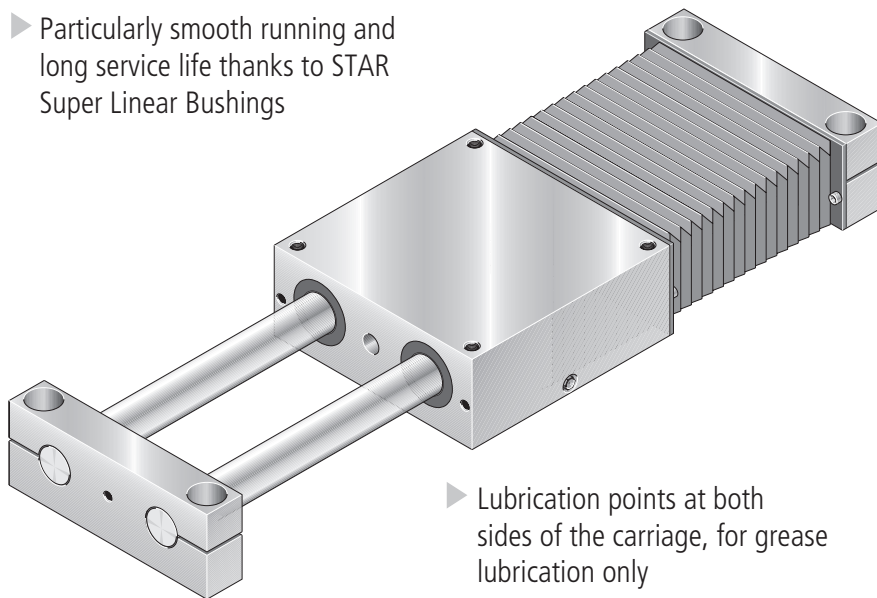
STAR – Linear Motion Slides

Product Overview

STAR Linear Motion Slides:		
	closed type	- for cantilever-type installation
	open type	- for installation with shaft support rails

▶ Particularly smooth running and long service life thanks to STAR Super Linear Bushings

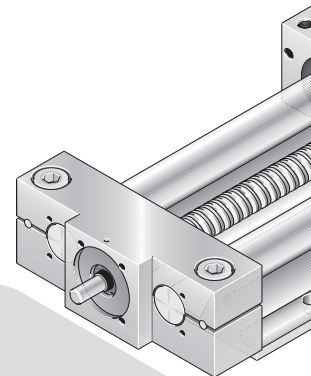
▶ Oil and moisture-proof PU bellows-type protective cover (the last fold is mechanically clamped)



▶ Lubrication points at both sides of the carriage, for grease lubrication only

without drive unit

One-point lubrication

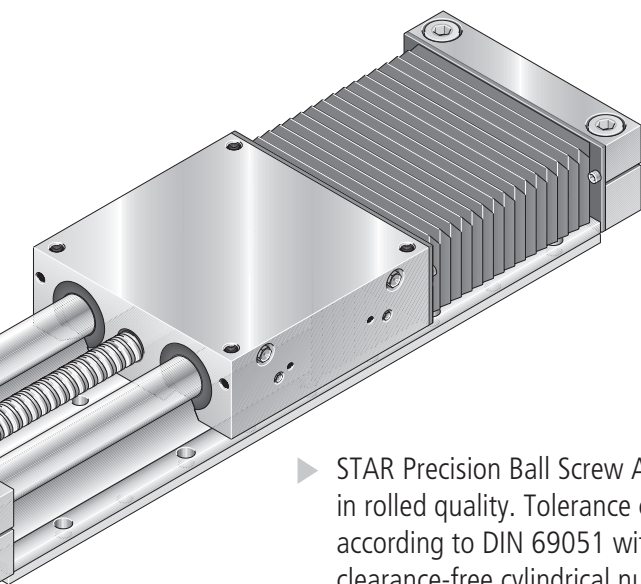


with Precision Ball Screw Assembly

Higher travel speeds possible with larger ball screw drives

Various possibilities for motor attachment

	without drive unit	Screw Drive	with toothed belt drive
Revised design Greater flexibility due to options. Ready for installation with different attachments			

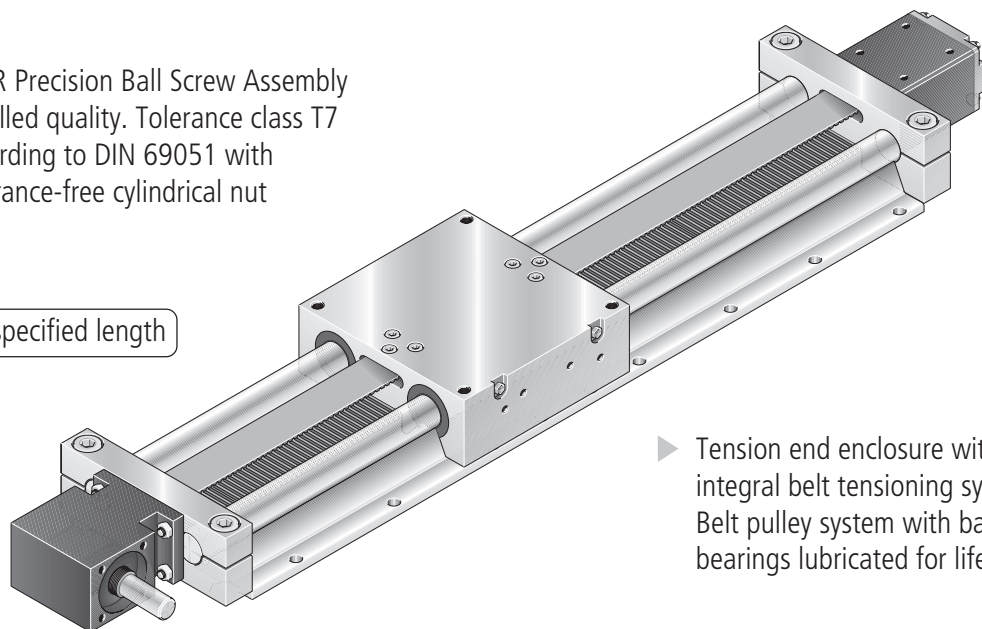


- ▶ STAR Precision Ball Screw Assembly in rolled quality. Tolerance class T7 according to DIN 69051 with clearance-free cylindrical nut

Length as desired

Optimized shaft clamping force

Longer stroke for specified length



- ▶ Tension end enclosure with integral belt tensioning system. Belt pulley system with ball bearings lubricated for life

- ▶ Wide, steel-reinforced toothed polyurethane drive belt for extreme stiffness and positioning accuracy requirements

with toothed belt drive

STAR – Linear Motion Slides

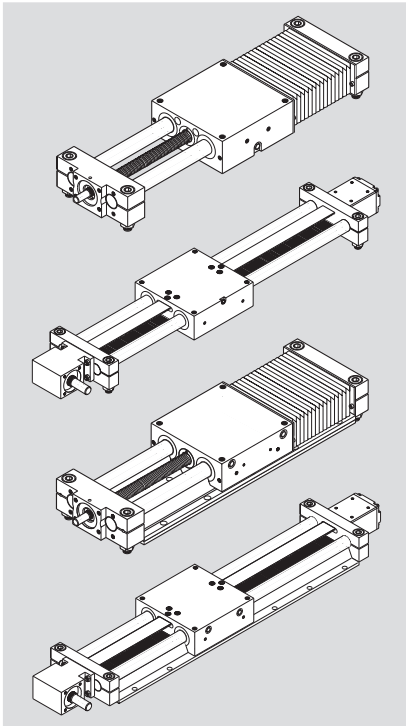
Product Overview

Motor Selection

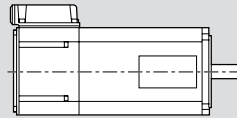
in accordance with controllers and control systems

A choice can be made between several different motor/controller combinations to achieve the most cost-efficient solution for each customer application. The motor/controller combination must always be taken into account when sizing the drive.

For more detailed information on motors and control systems, please refer to catalog RE 82700 "Controllers, Motors, Electrical Accessories".

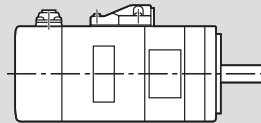


Digital AC servomotor



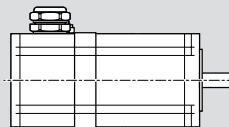
MKD 25B-144-KG1
MKD 41B-144 KG1
MKD 71B-061 KG1
MKD 71B-097 KG1

MiniDrive



MMD 022A
MMD 042A
MMD 082A

3-phase stepping motor



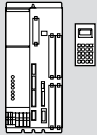
VRDM 368
VRDM 397
VRDM 3910
VRDM 3913



DKC

Digital controller

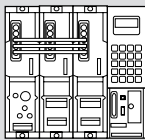
The low-cost solution for single-axis and multi-axis systems



DKS

Digital positioning module and DLC controls

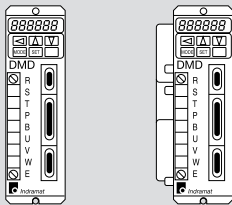
The universal solution for one axis



DDS

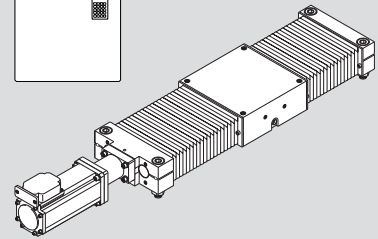
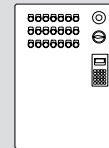
Digital controllers and CLM analog positioning module

The convenient solution for multi-axis systems



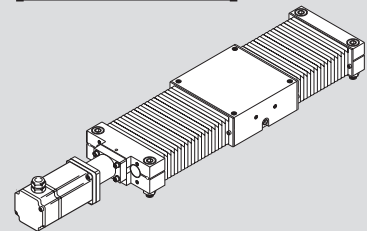
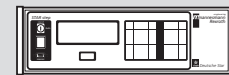
DMD

Digital controller



WD3

Power output section for control cabinet installation



PC

PC controller board Stepping motor controller



STAR step

Single-axis and multiple-axis positioning controls with power output section
The complete solution

Linear Motion Slides can be supplied complete with motor, controller and control system.

STAR – Linear Motion Slides

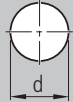
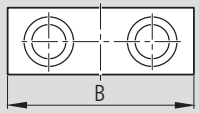
Product Overview

Type designation (size)

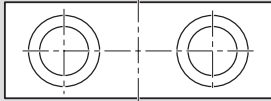
The linear motion slides are designated according to **type** and **size**.

The term **slide** is used to describe a specific combination of type and size.

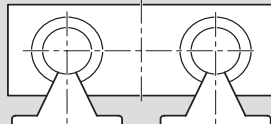
“Linear motion slide” is abbreviated to **slide** in the following tables.

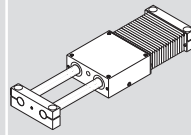
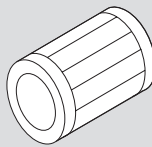

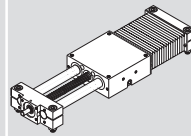

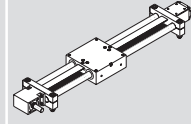
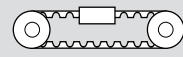
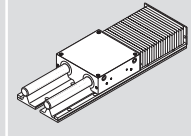
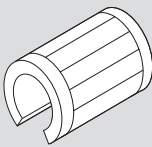

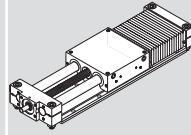
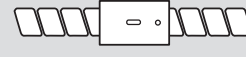
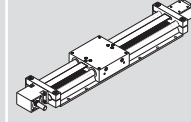
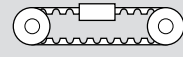
		Type			Size	
		S	G	K	16-	100
Slide (example) =						
System	=	Linear Motion Slide (S)				
Guideway	=	Closed-type linear bushing (G) Open-type linear bushing (O)				
Drive unit	=	Without drive unit (O) Precision Ball Screw Assembly (K) Toothed belt (R)				
Dimensions of guideway	=					
Overall width	=					

Linear Motion Slides Closed type



Linear Motion Slides Open type



Type	Slide	Guideway	Drive unit
SGO			 without drive unit
SGK			 Precision Ball Screw Assembly
SGR			 Toothed belt drive
S00			 without drive unit
SOK			 Precision Ball Screw Assembly
SOR			 Toothed belt drive

¹⁾ Size 8-65 with Standard Linear Bushing

Suitable load
(recommended value on the basis of past experience)

As far as the desired service life is concerned, loads of up to approximately 20% of the dynamic load and moment values (C , M_t , M_L) have proved acceptable.

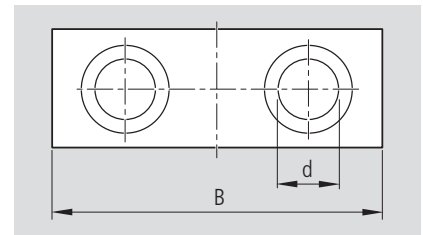
The following values may not be exceeded:

- the maximum permissible deflection
- the maximum permissible drive torque

Note on dynamic load capacities and moments:

The dynamic load capacities and moments are based on 100,000 m travel. However, a travel of just 50,000 m is often taken as a basis. If this is the case, for comparison purposes:

Multiply values C , M_t and M_L by 1.26.



Dynamic load capacity C (N)

	Size: d-B	8-65	12-85	16-100	20-130	25-160	30-180	40-230	50-280
Page 26		1040	2500	3050	6040	11820	14360	24660	36060
Page 30			2500	3050	6040	11820	14360	24660	36060
Page 56						11820			
Page 40			2850	3440	6100	11950	14520	24950	36380
Page 44			2850	3440	6100	11950	14520	24950	36380
Page 56						11950			

STAR – Linear Motion Slides

Structure

Structure

Linear Motion Slides (closed or open type)

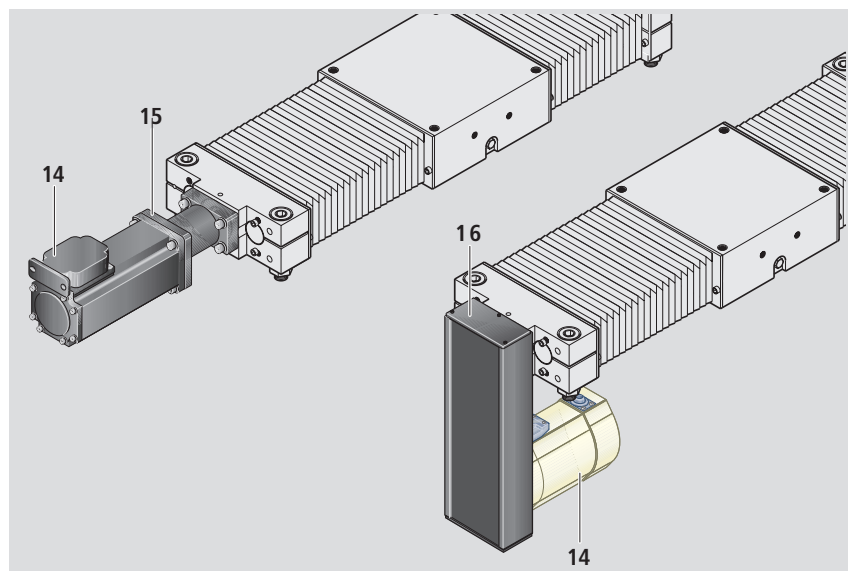
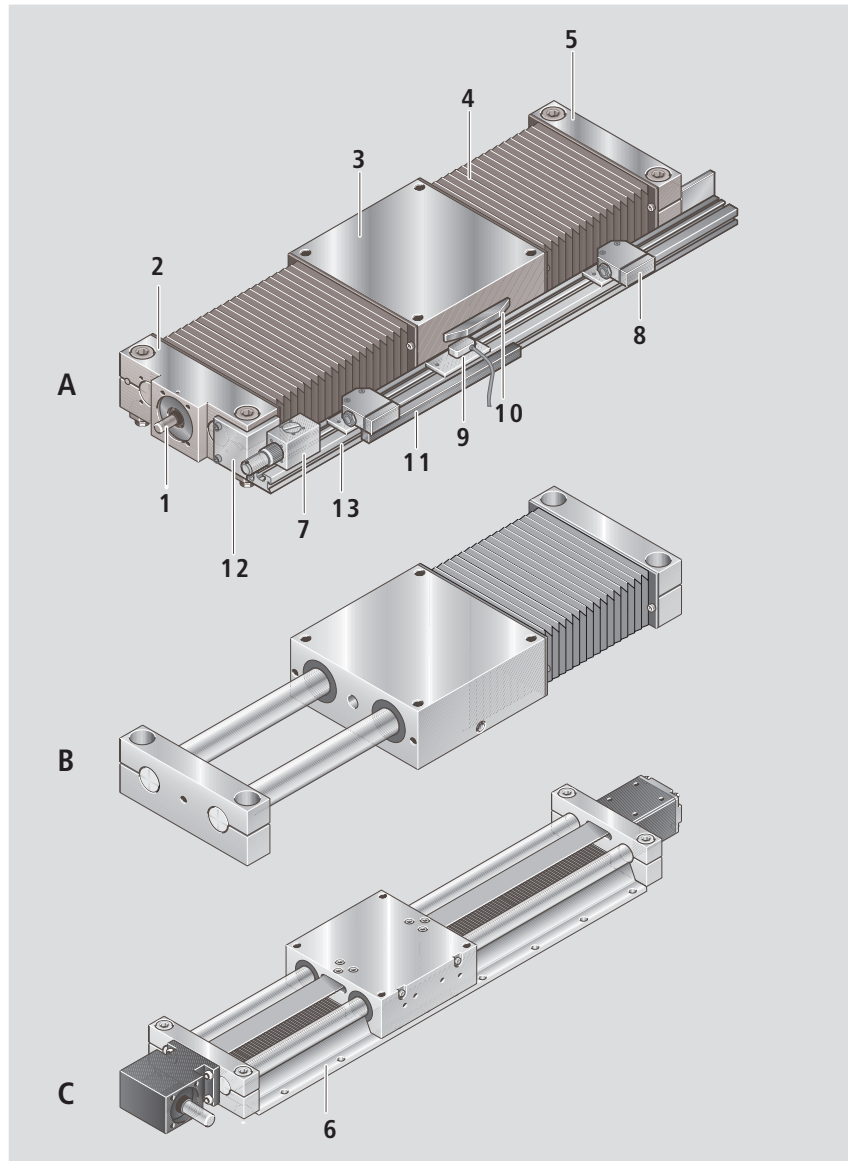
- A with ball screw drive
- B without drive unit
- C with toothed belt drive

- 1 Ball screw drive with clearance-free cylindrical single nut
- 2 End block fixed bearing
- 3 Carriage with four Super Linear Bushings (closed or open type)
- 4 PU bellows-type protective cover
- 5 End block floating bearing
- 6 Shaft support rails (for open version only)

Accessories:

- 7 Socket-plug
- 8 Mechanical switch (with mounting components)
- 9 Proximity switch (with mounting components)
- 10 Switching cam
- 11 Cable duct (aluminum alloy)
- 12 Mounting bracket
- 13 Mounting profile

- 14 Motor
- 15 Motor mount and coupling
- 16 Side drive with timing belt



Motor attachment with mount and coupling

A motor can be attached via a mount and coupling to all Linear Motion Slides equipped with a ball screw drive.

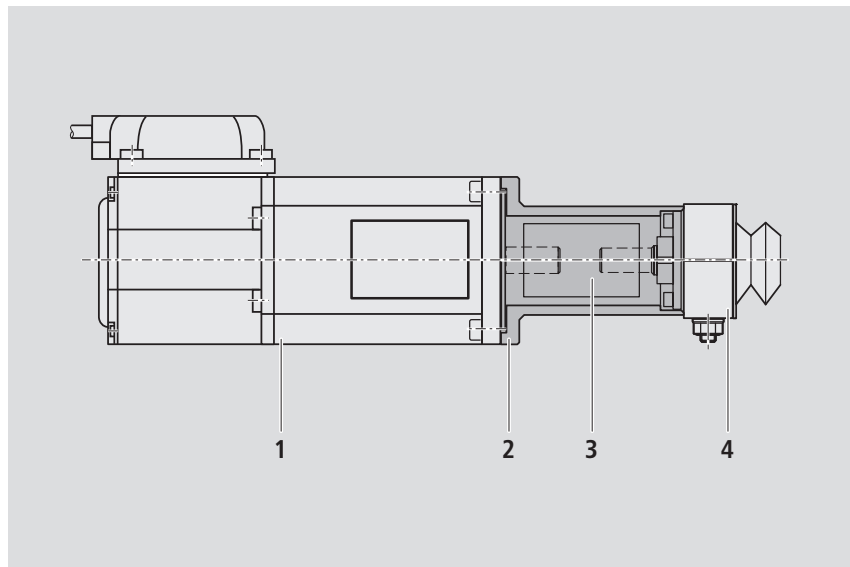
The motor mount serves both to attach the motor to the Linear Motion Slide and as an enclosed housing for the coupling.

The coupling transmits the motor drive torque free of stresses to the Linear Motion Slide drive shaft.

Our standard couplings compensate for the thermal expansion of the system.

If other makes of couplings are used, the thermal expansion must be taken into account.

- 1 Motor
- 2 Motor mount
- 3 Coupling
- 4 Linear Motion Slide



Motor attachment via side drive with timing belt

For Linear Motion Slides from size 25-160 and up, the motor can be attached via a side drive with timing belt. This results in a shorter overall length compared to a motor attachment with motor mount and coupling.

The compact enclosed housing provides belt protection and secures the motor.

In addition, different gear ratios are available:

$$i = 1 : 1$$

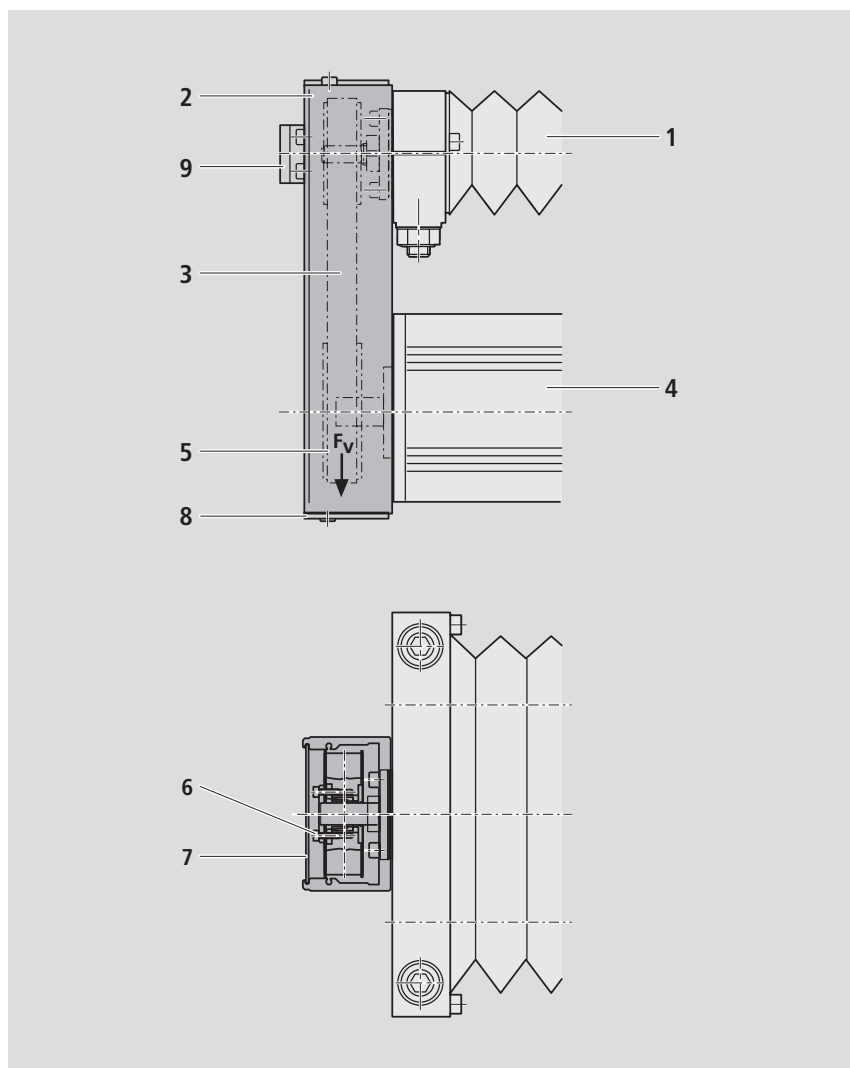
$$i = 1 : 1.5 \quad (\text{size } 25-160, 30-180)$$

$$i = 1 : 2 \quad (\text{size } 40-230, 50-280)$$

The side drive with timing belt can be mounted in four directions:

- bottom, top (RV01 and RV02)
- left, right (RV03 and RV04)

- 1 Linear Motion Slide
- 2 Drawn, anodized aluminum frame
- 3 Toothed belt
- 4 AC servomotor
- 5 Pre-tensioning of the toothed belt:
Apply pre-tensioning force F_v to motor (F_v will be indicated on delivery)
- 6 Attachment of belt pulleys with clamping assemblies
- 7 Cover plate
- 8 End cover
- 9 On sizes 25-160 and 30-180:
Ball screw journal with additional support bearing



STAR – Linear Motion Slides

Technical Data

Drive data for side drive with timing belt, fixed bearing end, for motor attachment via side drive with timing belt

Motor		MKD 41B/MMD 082A					MKD 71B				
Friction moment M_{RRV} (Nm)		0.4					0.45				
		Permissible torque up to length L = ... at ⁽¹⁾			Reduced mass moment of inertia at		Permissible torque up to length L = ... at ⁽¹⁾			Reduced mass moment of inertia at	
Gear ratio i = ...			i = 1	i = 1.5	i = 1	i = 1.5		i = 1	i = 2	i = 1	i = 2
Linear Motion Slide	Ball screw $d_0 \times P$	L (mm)	M_{RV} (Nm)	M_{Rv} (Nm)	J_{RV} ($\cdot 10^{-6} \text{ kgm}^2$)	J_{Rv} ($\cdot 10^{-6} \text{ kgm}^2$)	L (mm)	M_{RV} (Nm)	M_{Rv} (Nm)	J_{RV} ($\cdot 10^{-6} \text{ kgm}^2$)	J_{Rv} ($\cdot 10^{-6} \text{ kgm}^2$)
SOK 25-160	20 x 20	1600	6.9	4.6	250	84					
SOK 30-180	25 x 10	2900	5.0	3.3							
SGK 40-230	32 x 5						2250	11.8	5.9		
SOK 40-230	32 x 10						2250	19.4	10.8	1450	280
SOK 50-280	32 x 20						2750	19.4	12.9		
SOK 50-280	32 x 32						3250	19.4	12.9		

M_{RV} ... Permissible system torque for with timing belt side drive on the motor journal (take max. motor torque M_{Mmax} into account)

M_{RRV} ... Friction moment, timing belt side drive on the motor journal

J_{RV} ... Reduced mass moment of inertia, timing belt side drive

i ... Reduction, timing belt side drive

(1) ... Permissible torque for longer lengths on request

Coupling Data

Couplings with data as shown in the table are used with standard servomotors.

Linear Motion Slide size	Motor type	Rated torque of coupling M_K (Nm)	Mass moment of inertia J_K (10^{-6} kgm^2)	Coupling mass (kg)
12 / 16	MMD 022	3.7	7	0.075
20	MKD 25	19	57	0.26
	MKD 41			
	MMD 042			
	MMD 082			
25 / 30	MKD 41	19	57	0.26
	MMD 082	14.5	63	0.26
	MKD 71B-061	50	200	0.7
MKD 71B-097				

Technical data of AC servomotors and MiniDrive

⚡ See catalog "Controllers, Motors, Electrical Accessories" RE 82 701

Motor	MKD 41B-144 KG1	MKD 71B-061	MMD 082A
Maximum effective speed n_{max} (1/min)	⚡	⚡	3000
Rated torque M_{MN} (Nm)	2.7	8	2.4
Maximum torque M_{max} (Nm)	⚡	⚡	6.9
Mass moment of inertia $J_M + J_{Br}$ (10^{-6} kgm^2)	170 + 16	870 + 38	133 + 8
Brake holding torque M_{Br} (Nm)	2.2	5	2.4
Mass with brake m_{Br} (kg)	4.65	9.17	3.7

Load Capacities and Moments

Size d-B	Dynamic load capacity C (N)	Dynamic moments		Dynamic load capacity C (N)	Dynamic moments	
		M_t (Nm)	M_L (Nm)		M_t (Nm)	M_L (Nm)
8- 65	1040	16	15			
12- 85	2500	52	57	2850	25	27
16-100	3050	82	87	3440	39	41
20-130	6040	217	229	6100	134	141
25-160	11820	520	549	11950	320	339
30-180	14360	689	725	14520	425	447
40-230	24660	1504	1713	24950	928	1057
50-280	36060	2740	3011	36380	1687	1853

Note on dynamic load capacities and moments

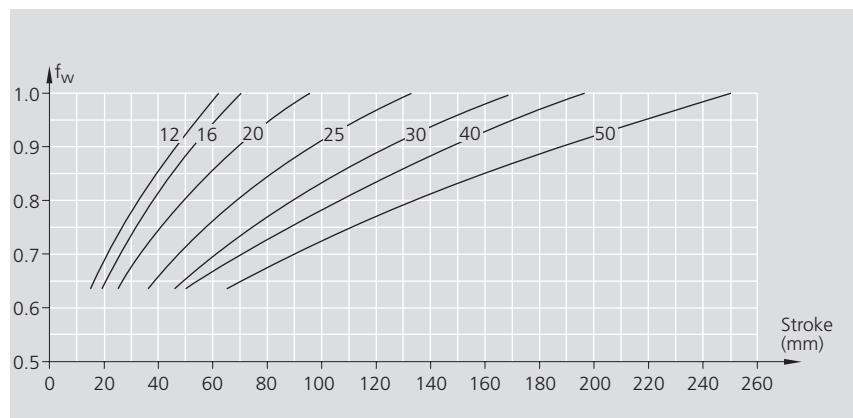
The dynamic load capacities and moments are based on 100,000 m travel. However, a travel of just 50,000 m is often taken as a basis. If this is the case, for comparison purposes:

Multiply values C, M_t and M_L by 1.26.

Reduced load capacity in short-stroke applications

In short-stroke applications, the service life of the shafts is shorter than that of the Super Linear Bushings.

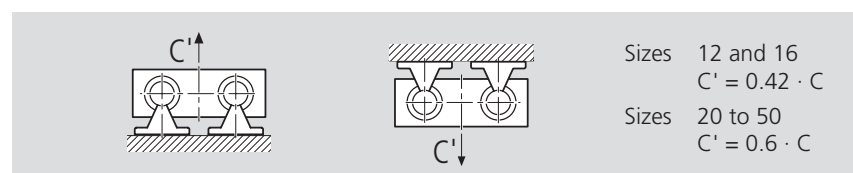
For this reason, the load capacities listed in the tables must be multiplied by the factor f_w .



The load capacities of the open versions are reduced as follows under lift-off loads:

Sizes 12 and 16 to 42%

Sizes 20 to 50 to 60%



Nominal service life

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

$$L_h = \frac{L}{60 \cdot v_m}$$

L	nominal service life	(m)
L_h	nominal service life	(h)
C	dynamic load capacity	(N)
P	equivalent dynamic load	(N)
v_m	average speed	(m)

STAR – Linear Motion Slides

General Information

Delivery condition:

Assemblies without drive unit:

Delivered as separate parts. The carriage is mounted as a sub-assembly. The fixing screws are not included in the package.

Open Type S00:

The Precision Steel Shafts are screwed to the Shaft Support Rails.

Assemblies with drive unit:

The Linear Motion Slides with ball screw drive and toothed belt drive (SGK, SGR, SOR and SOK) are delivered fully assembled and greased.

Length L:

Linear Motion Slides consist of components of varying length and assemblies of fixed length. The length-dependent components are cut to size to suit each particular application. Linear Motion Slides can thus be custom-designed and completed in a variety of lengths (infinitely variable). Lengths exceeding the specified maximum L_{max} are available on request.

Permissible shaft deflection in the Linear Bushing closed type:

Due to the use of STAR Super Linear Bushings (except for Linear Motion Slide size 8-65), higher shaft deflection is permissible than for conventional linear bearings. Selection of the length (L) and the size of slide should take account of the permissible shaft deflection ($\tan \alpha$).

$$\tan \alpha_{max} = 8.72 \cdot 10^{-3} \hat{=} 0.5^\circ$$

$$\tan \alpha \leq \tan \alpha_{max}$$

$$\text{Size 8-65: } \tan \alpha_{max} = 10 \cdot 10^{-4}$$

Maximum permissible drive torque M_{per} :

The values of M_{per} given in the graphs (see Technical Notes) are based on the following assumptions:

- Horizontal operation
- No radial load on the ball screw drive journal
- The torque rating of the coupling is not taken into account

The maximum permissible drive torque (see Technical Notes) is reduced for ball screw drives with keyway. The keyway produces a notch effect and reduces the effective diameter. (Information on side drive with timing belt available on request.)

Weight of the Linear Motion Slide:

Weight calculation does not include motor attachment, switches or side drive with timing belt.

$$\text{Weight (kg/mm)} \cdot \text{Length L (mm)} + \text{Weight of all fixed-length components (kg)}$$

Shafts for Linear Motion Slides without drive unit:

Linear Motion Slides are also available with:

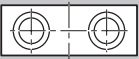
- corrosion resistant steel shafts to DIN 17230 / EN 10088
- STAR Resist steel shafts: zinc/iron coating with yellow chromating

For further details on STAR Resist, please ask for catalog RE 82 050.

For further details on STAR Linear Bushings and Precision Steel Shafts, please ask for catalog RE 83 100.

STAR – Linear Motion Slides

Technical Notes – Size 8-65/12-85

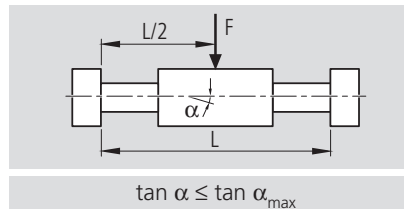
8-65	Slide	Dynamic load capacity C (N)	Dynamic moments		Moved mass (kg)	Slide weight L in mm (kg)	Max. length L_{max} (mm)	Frictional force (N)
			M_t (Nm)	M_L (Nm)				
Closed type 	SGO 8-65	1040	16	15	0.28	$0.0008 \cdot L + 0.39$	700	3

See section on Load Capacities and Moments.

Permissible shaft deflection in the Linear Bushing¹⁾

Linear Motion Slide SGO 8 - 65 incorporates Standard Linear Bushings. The load capacity or service life of the Slide will therefore be reduced with increasing shaft deflection.

For further information refer to catalog RE 83 100 "Linear Bushings and Shafts".


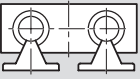


$$\tan \alpha = F \cdot (L - 9) \cdot 4.970 \cdot 10^{-8}$$

$$\tan \alpha_{max} = 10 \cdot 10^{-4}$$

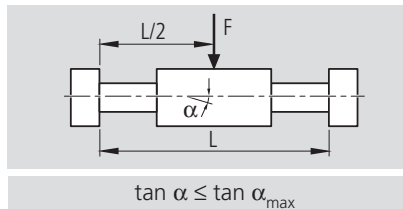
$\tan \alpha$	Shaft deflection	
F	External load	(N)
L	Dimension "L"	(mm)

¹⁾ Also refer to "General Information"

12-85	Slide	Ball screw $d_0 \times P$ (mm)	Dynamic load capacity			Dyn. moments		Moved mass (kg)	Slide weight L in mm (kg)	Maximum length L_{max} (mm)
			Guide-way (N)	Fixed bearing (N)	Ball screw (N)	M_t (Nm)	M_L (Nm)			
	SGO 12-85		2500			52	57	0.55	$0.0018 \cdot L + 0.80$	1000
	SGK 12-85	8 x 2.5	2500	5280	2900	52	57	0.54	$0.0021 \cdot L + 0.92$	1000
	SOO12-85		2850			25	27	0.47	$0.0035 \cdot L + 0.47$	4000
	SOK 12-85	8 x 2.5	2850	5280	2900	25	27	0.47	$0.0040 \cdot L + 0.82$	1000

See section on Load Capacities and Moments.

Permissible shaft deflection in the Linear Bushing closed type¹⁾:



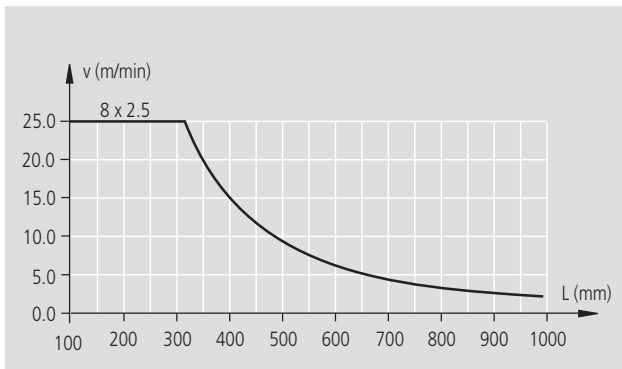
$$\tan \alpha = F \cdot (L - 18) \cdot 1.376 \cdot 10^{-8}$$

$$\tan \alpha_{max} = 8.72 \cdot 10^{-3}$$

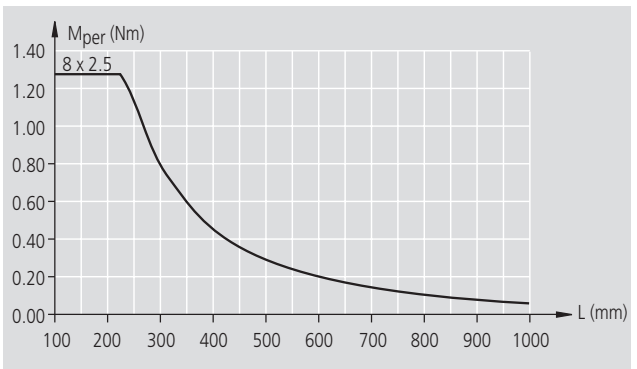
$\tan \alpha$ Shaft deflection
 F External load (N)
 L Dimension "L" (mm)

Linear Motion Slides with Ball Screw Drive:

Maximum speed



Maximum permissible drive torque¹⁾



Mass moment of inertia of linear motion slide:

$$J_s = (0.203 + 0.002 \cdot L + 0.158 \cdot m_{fr}) \cdot 10^{-6}$$

J_s Reduced mass moment of inertia of linear motion slide with additional load on the drive journal (kgm²)
 m_{fr} Additional load (kg)
 L Dimension "L" (mm)

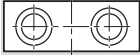

Frictional force, moment of friction:

Slide without drive unit	Frictional force (approx. N)	Slide with drive unit	Moment of friction (approx. Nm) 8 x 2.5
SGO 12-85	7	SGK 12-85	0.06
SOO 12-85		SOK 12-85	

¹⁾ Also refer to "General Information"

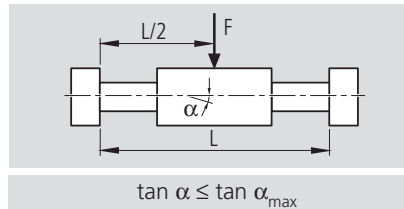
STAR – Linear Motion Slides

Technical Notes – Size 16-100/20-130

16-100	Slide	Ball screw d ₀ x P (mm)	Dynamic load capacity			Dyn. moments		Moved mass (kg)	Slide weight L in mm (kg)	Maximum length L _{max} (mm)
			Guide-way (N)	Fixed bearing (N)	Ball screw (N)	M _t (Nm)	M _L (Nm)			
Closed type 	SGO 16-100		3050			82	87	0.82	0.003 · L + 1.2	1500
		12 x 5 12 x 10			4990 3270					
Open type 	SGO 16-100		3440			39	41	0.75	0.005 · L + 0.75	4000
	SOK 16-100	12 x 5 12 x 10	3440	5280	4990 3270	39	41	0.76	0.006 · L + 1.3	1500

See section on Load Capacities and Moments.

Permissible shaft deflection in the Linear Bushing closed type¹⁾:



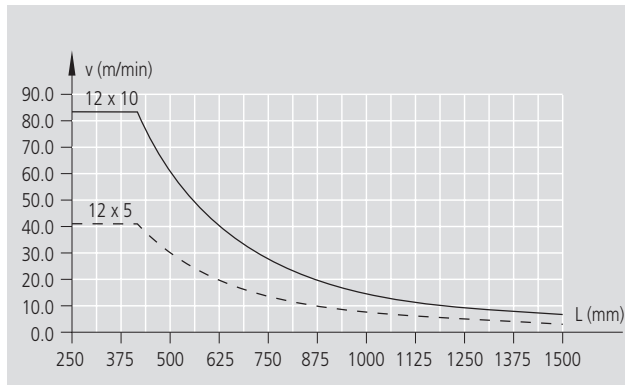
$$\tan \alpha = F \cdot (L - 21) \cdot 5.381 \cdot 10^{-9}$$

$$\tan \alpha_{\max} = 8.72 \cdot 10^{-3}$$

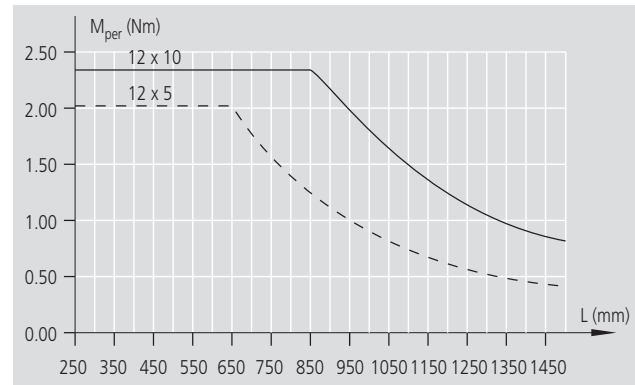
tan α	Shaft deflection	
F	External load	(N)
L	Dimension "L"	(mm)

Linear Motion Slides with Ball Screw Drive:

Maximum speed



Maximum permissible drive torque¹⁾



Mass moment of inertia of linear motion slide:

$J_s = (k_1 + k_2 \cdot L + k_3 \cdot m_{fr}) \cdot 10^{-6}$	
J _s	Reduced mass moment of inertia of linear motion drives with additional load on the drive journal (kgm ²)
k ₁ , k ₂ , k ₃	Constants (see table)
m _{fr}	Additional load (kg)
L	Dimension "L" (mm)

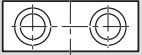

Ball screw: d ₀ x P	Constant		
	k ₁	k ₂	k ₃
12 x 5	1.088	0.013	0.633
12 x 10	2.367	0.013	2.533

Frictional force, moment of friction:

Slide without drive unit	Frictional force (approx. N)
SGO 16-100	9
SOO 16-100	

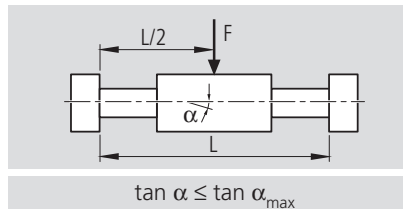
Slide with drive unit	Moment of friction (approx. Nm)	
	12 x 5	12 x 10
SGK 16-100	0.13	0.16
SOK 16-100		

¹⁾ Also refer to "General Information"

20-130	Slide	Ball screw d ₀ x P (mm)	Dynamic load capacity			Dyn. moments		Moved mass (kg)	Slide weight L in mm (kg)	Maximum length L _{max} (mm)	
			Guide-way (N)	Fixed bearing (N)	Ball screw (N)	M _t (Nm)	M _L (Nm)				
Closed type 	SGO 20-130		6040			217	229	1.8	0.005 · L + 2.6	2500	
		16 x 5 16 x 10 16 x 16		6040	13400	12300	217	229	1.8	0.006 · L + 3.0	2500
						6200					
Open type 	SOO 20-130		6100			134	141	1.6	0.008 · L + 1.6	4000	
		16 x 5 16 x 10 16 x 16		6100	13400	12300	134	141	1.6	0.010 · L + 2.7	2500
						6200					

See section on Load Capacities and Moments.

Permissible shaft deflection in the Linear Bushing closed type¹⁾:



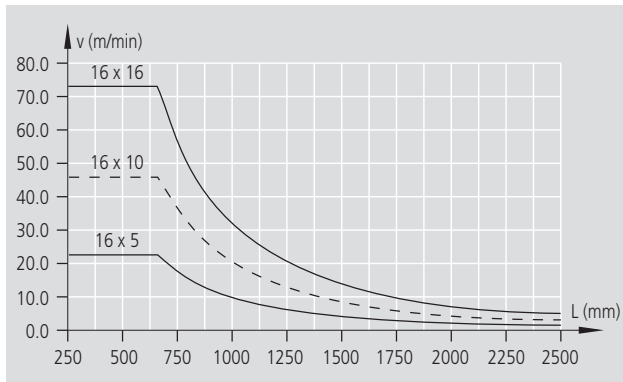
$$\tan \alpha = F \cdot (L - 36) \cdot 2.932 \cdot 10^{-9}$$

$$\tan \alpha_{\max} = 8.72 \cdot 10^{-3}$$

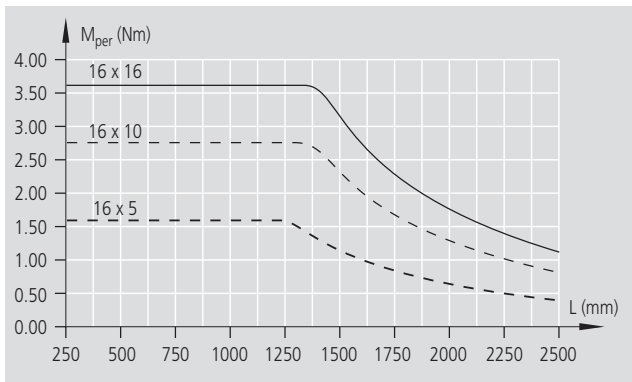
tan α Shaft deflection
 F External load (N)
 L Dimension "L" (mm)

Linear Motion Slides with Ball Screw Drive:

Maximum speed



Maximum permissible drive torque¹⁾



Ball screw drive with keyway: maximum drive torque 3.2 Nm

Mass moment of inertia of linear motion slide:

$J_s = (k_1 + k_2 \cdot L + k_3 \cdot m_{fr}) \cdot 10^{-6}$	
J _s	Reduced mass moment of inertia of linear motion slide with additional load on the drive journal (kgm ²)
k ₁ , k ₂ , k ₃	Constants (see table)
m _{fr}	Additional load (kg)
L	Dimension "L" (mm)

Ball screw: d ₀ x P	Constant		
	k ₁	k ₂	k ₃
16 x 5	3.238	0.039	0.633
16 x 10	6.692	0.039	2.533
16 x 16	13.878	0.039	6.485

Frictional force, moment of friction:

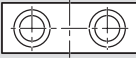
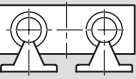
Slide without drive unit	Frictional force (approx. N)
SGO 20-130	11
SOO 20-130	

Slide with drive unit	Moment of friction (approx. Nm)		
	16 x 5	16 x 10	16 x 16
SGK 20-130	0.40	0.43	0.46
SOK 20-130			

¹⁾ Also refer to "General Information"

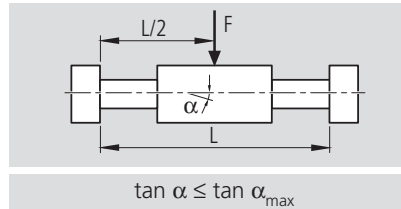
STAR – Linear Motion Slides

Technical Notes – Size 25-160/30-180

25-160	Slide	Ball screw $d_0 \times P$ (mm)	Dynamic load capacity			Dyn. moments		Moved mass (kg)	Slide weight L in mm (kg)	Maximum length L_{max} (mm)
			Guide-way (N)	Fixed bearing (N)	Ball screw (N)	M_t (Nm)	M_L (Nm)			
Closed type 	SGO 25-160		11820			520	549	3.3	$0.008 \cdot L + 4.8$	3000
	SGK 25-160	20 x 5								
		20 x 20	11820	17000	9100	520	549	3.3	$0.011 \cdot L + 5.5$	3000
25 x 10				15800						
Open type 	SOO 25-160		11950			320	339	2.8	$0.011 \cdot L + 2.8$	5300
	SOK 25-160	20 x 5								
		20 x 20	11950	17000	9100	320	339	2.9	$0.015 \cdot L + 5.0$	3000
25 x 10				15800						

See section on Load Capacities and Moments.

Permissible shaft deflection in the Linear Bushing closed type¹⁾:



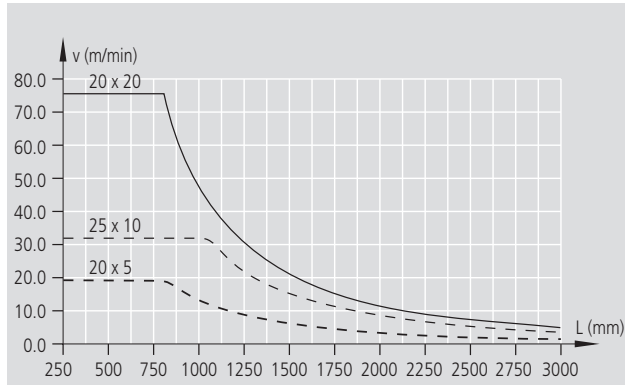
$$\tan \alpha = F \cdot (L - 43) \cdot 1.468 \cdot 10^{-9}$$

$$\tan \alpha_{max} = 8.72 \cdot 10^{-3}$$

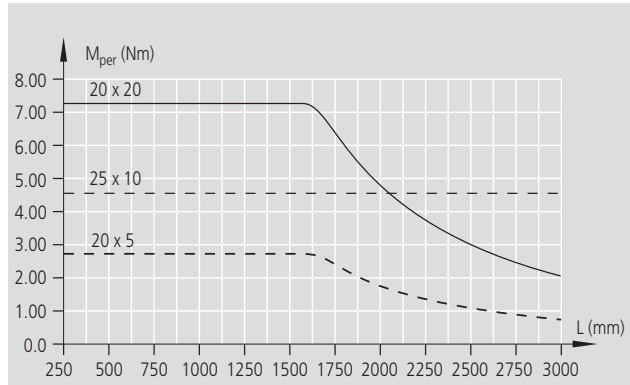
$\tan \alpha$ Shaft deflection
 F External load (N)
 L Dimension "L" (mm)

Linear Motion Slides with Ball Screw Drive:

Maximum speed



Maximum permissible drive torque¹⁾



Mass moment of inertia of linear motion slide:

$J_s = (k_1 + k_2 \cdot L + k_3 \cdot m_{fr}) \cdot 10^{-6}$	
J_s	Reduced mass moment of inertia of linear motion slide with additional load on the drive journal (kgm ²)
k_1, k_2, k_3	Constants (see table)
m_{fr}	Additional load (kg)
L	Dimension "L" (mm)

Ball screw drive with keyway: maximum drive torque 4.5 Nm



Ball screw: $d_0 \times P$	Constant		
	k_1	k_2	k_3
20 x 5	8.216	0.100	0.633
20 x 20	39.990	0.100	10.132
25 x 10	23.575	0.256	2.533

Frictional force, moment of friction:

Slide without drive unit	Frictional force (approx. N)
SGO 25-160	14
SOO 25-160	

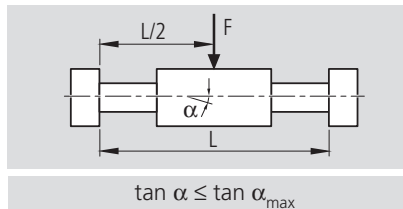
Slide with drive unit	Moment of friction (approx. Nm)		
	20 x 5	20 x 20	25 x 10
SGO 25-160	0.53	0.64	0.66
SOK 25-160			

¹⁾ Also refer to "General Information"

30-180	Slide	Ball screw $d_0 \times P$ (mm)	Dynamic load capacity			Dyn. moments		Moved mass (kg)	Slide weight L in mm (kg)	Maximum length L_{max} (mm)	
			Guide-way (N)	Fixed bearing (N)	Ball screw (N)	M_t (Nm)	M_L (Nm)				
Closed type 	SGO 30-180		14360			689	725	4.7	$0.011 \cdot L + 6,7$	3000	
		SGK 30-180	20 x 5			14300					
			20 x 20	14360	17000	9100	689	725	4.6	$0.014 \cdot L + 7,4$	3000
		25 x 10			15800						
Open type 	SOO 30-180		14520			425	447	4.1	$0.016 \cdot L + 4,1$	5300	
		SOK 30-180	20 x 5			14300					
			20 x 20	14520	17000	9100	425	447	4.2	$0.020 \cdot L + 6,8$	3000
		25 x 10			15800						

See section on Load Capacities and Moments.

Permissible shaft deflection in the Linear Bushing closed type¹⁾:



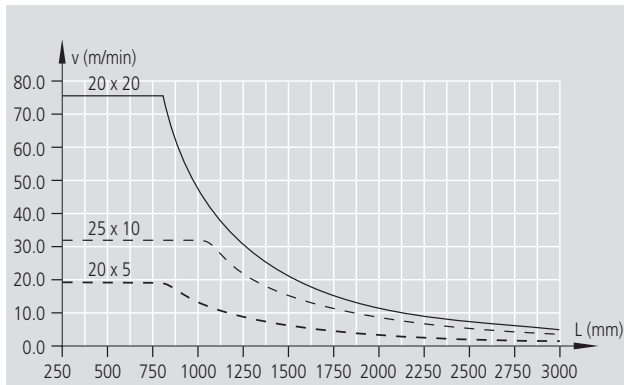
$$\tan \alpha = F \cdot (L - 51) \cdot 7.698 \cdot 10^{-10}$$

$$\tan \alpha_{max} = 8.72 \cdot 10^{-3}$$

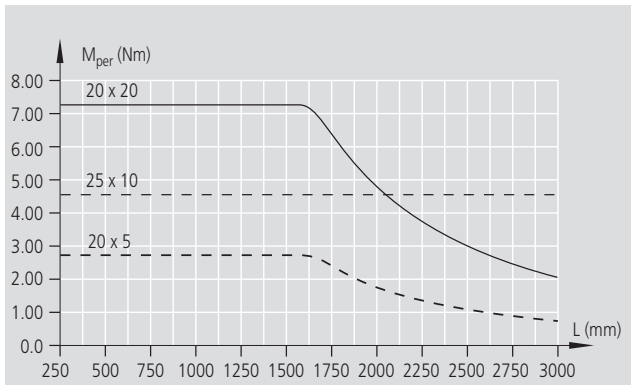
$\tan \alpha$ Shaft deflection
 F External load (N)
 L Dimension "L" (mm)

Linear Motion Slides with Ball Screw Drive:

Maximum speed



Maximum permissible drive torque¹⁾



Ball screw drive with keyway: maximum drive torque 4.5 Nm

Mass moment of inertia of linear motion slide:

$J_s = (k_1 + k_2 \cdot L + k_3 \cdot m_{fr}) \cdot 10^{-6}$	
J_s	Reduced mass moment of inertia of linear motion drives with additional load on the drive journal (kgm ²)
k_1, k_2, k_3	Constants (see table)
m_{fr}	Additional load (kg)
L	Dimension "L" (mm)

Ball screw: $d_0 \times P$	Constant		
	k_1	k_2	k_3
20 x 5	9.103	0.100	0.633
20 x 20	54.169	0.100	10.132
25 x 10	27.12	0.256	2.533

Frictional force, moment of friction:


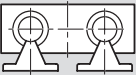
Slide without drive unit	Frictional force (approx. N)
SGO 30-180	18
SOO 30-180	

Slide with drive unit	Moment of friction (approx. Nm)		
	20 x 5	20 x 20	25 x 10
SGO 30-180	0.53	0.64	0.66
SOK 30-180			

¹⁾ Also refer to "General Information"

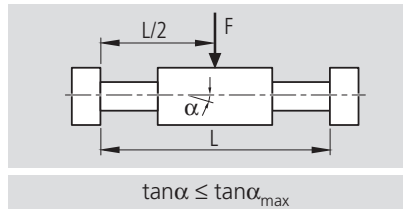
STAR – Linear Motion Slides

Technical Notes – Size 40-230 / 50-280

40-230	Slide	Ball screw $d_0 \times P$ (mm)	Dynamic load capacity			Dyn. moments		Moved mass (kg)	Slide weight L in mm (kg)	Maximum length L_{max} (mm)
			Guide-way (N)	Fixed bearing (N)	Ball screw (N)	M_t (Nm)	M_L (Nm)			
	Closed type	SGO 40-230	24660			1504	1713	9.4	$0.020 \cdot L + 13.3$	4000
		 SGK 40-230	24660	26000	21500	1504	1713	9.3	$0.025 \cdot L + 14.2$	4000
32 x 10										
32 x 20										
32 x 32										
	Open type	SOO 40-230	24950			928	1057	8.3	$0.026 \cdot L + 8.3$	5300
		 SOK 40-230	24950	26000	21500	928	1057	8.5	$0.032 \cdot L + 13.2$	4000
32 x 10										
32 x 20										
32 x 32										

See section on Load Capacities and Moments.

Permissible shaft deflection in the Linear Bushing closed type¹⁾:



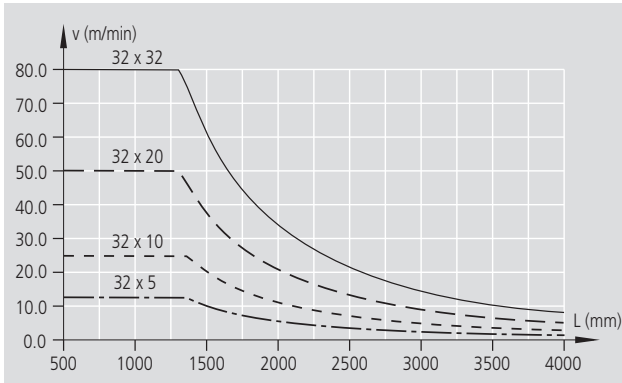
$$\tan \alpha = F \cdot (L - 79) \cdot 3.407 \cdot 10^{-10}$$

$$\tan \alpha_{max} = 8.72 \cdot 10^{-3}$$

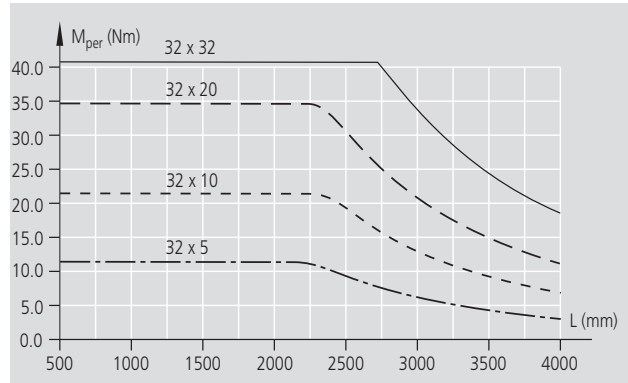
$\tan \alpha$ Shaft deflection
 F External load (N)
 L Dimension "L" (mm)

Linear Motion Slides with Ball Screw Drive:

Maximum speed



Maximum permissible drive torque¹⁾



Mass moment of inertia of linear motion slide:

$J_s = (k_1 + k_2 \cdot L + k_3 \cdot m_{fr}) \cdot 10^{-6}$	
J_s	Reduced mass moment of inertia of linear motion slide with additional load on the drive journal (kgm ²)
k_1, k_2, k_3	Constants (see table)
m_{fr}	Additional load (kg)
L	Dimension "L" (mm)

Ball screw drive with keyway: maximum drive torque 18 Nm

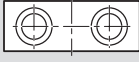
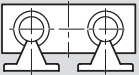
Ball screw: $d_0 \times P$	Constant		
	k1	k2	k3
32 x 5	51.8 53	0.712	0.633
32 x 10	69.446	0.712	2.535
32 x 20	138.21	0.667	10.132
32 x 32	268.83	0.667	25.938

Frictional force, moment of friction:

Slide without drive unit	Frictional force (approx. N)
SGO 40-230	22
SOO 40-230	

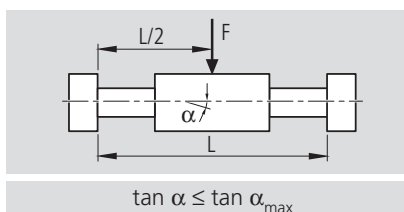
Slide with drive unit	Moment of friction (approx. Nm)			
	32 x 5	32 x 10	32 x 20	32 x 32
SGO 40-230	1.14	1.24	1.23	1.27
SOK 40-230				

¹⁾ Also refer to "General Information"

50-280	Slide	Ball screw $d_o \times P$ (mm)	Dynamic load capacity			Dyn. moments		Moved mass (kg)	Slide weight L in mm (kg)	Maximum length L_{max} (mm)
			Guide-way (N)	Fixed bearing (N)	Ball screw (N)	M_t (Nm)	M_L (Nm)			
	Closed type									
	SGO 50-280		36060			2740	3011	16.4	$0.031 \cdot L + 22.1$	4000
	 SGK 50-280	32 x 5	36060	26000	21500	2740	3011	16.0	$0.036 \cdot L + 22.8$	4000
32 x 10		26200								
32 x 20		17900								
32 x 32		17800								
	Open type									
	SOO 50-280		36380			1687	1853	14.8	$0.039 \cdot L + 14.8$	5300
	 SOK 50-280	32 x 5	36380	26000	21500	1687	1853	14.8	$0.046 \cdot L + 21.3$	4000
32 x 10		26200								
32 x 20		17900								
32 x 32		17800								

See section on Load Capacities and Moments.

Permissible shaft deflection in the Linear Bushing closed type¹⁾:



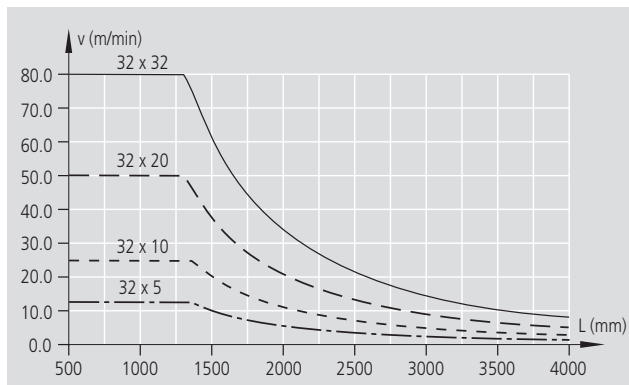
$$\tan \alpha = F \cdot (L - 107) \cdot 1.649 \cdot 10^{-10}$$

$$\tan \alpha_{max} = 8.72 \cdot 10^{-3}$$

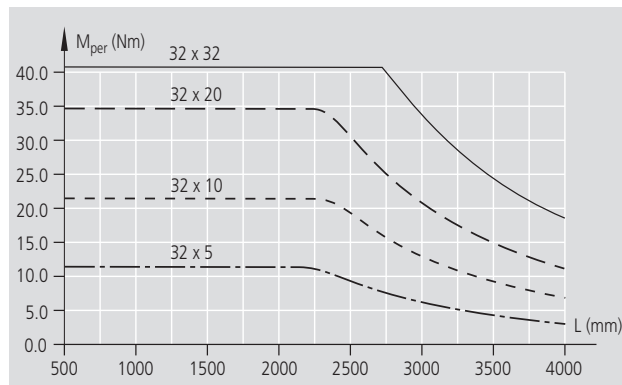
$\tan \alpha$	Shaft deflection	
F	External load	(N)
L	Dimension "L"	(mm)

Linear Motion Slides with Ball Screw Drive:

Maximum speed



Maximum permissible drive torque¹⁾



Mass moment of inertia of linear motion slide:

$J_S = (k_1 + k_2 \cdot L + k_3 \cdot m_{fr}) \cdot 10^{-6}$	
J_S	Reduced mass moment of inertia of linear motion slide with additional load on the drive journal (kgm ²)
k_1, k_2, k_3	Constants (see table)
m_{fr}	Additional load (kg)
L	Dimension "L" (mm)

Ball screw drive with keyway: maximum drive torque 18 Nm

Ball screw: $d_o \times P$	k1	Constant k2	k3
32 x 5	56.025	0.712	0.633
32 x 10	87.214	0.712	2.533
32 x 20	209.28	0.667	10.132
32 x 32	468.78	0.667	25.938

Frictional force, moment of friction:

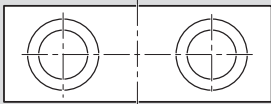
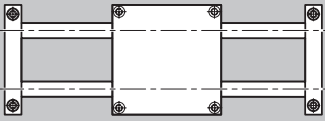
Slide without drive unit	Frictional force (approx. N)
SGO 50-280	27
SOO 50-280	

Slide with drive unit	Moment of friction (approx. Nm)			
	32 x 5	32 x 10	32 x 20	32 x 32
SGO 50-280	1.14	1.25	1.25	1.30
SOK 50-280				

¹⁾ Also refer to "General Information"

STAR – Linear Motion Slides, Closed Type without Drive Unit

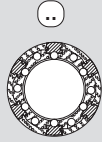



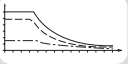
Components and Ordering SGO 8-65 to SGO 50-280

	Slide (do not use for order)	Part number 0260-X00-00, ... mm	Type ...	Old part numbers The part numbers previously applicable are replaced by the number 0260.
				Interchangeable with: 1040-...-... *
	SGO 8 - 65 SGO 12 - 85 SGO 16 - 100 SGO 20 - 130 SGO 25 - 160 SGO 30 - 180 SGO 40 - 230 SGO 50 - 280	0260-900-00 0260-000-00 0260-100-00 0260-200-00 0260-300-00 0260-400-00 0260-500-00 0260-600-00	OA01	1040-708-00 : with end block A 1040-808-00 : with end block B 1040-712-00 : with end block A 1040-812-00 : with end block B 1040-716-00 : with end block A 1040-816-00 : with end block B 1040-720-00 : with end block A 1040-820-00 : with end block B 1040-725-00 : with end block A 1040-825-00 : with end block B 1040-730-00 : with end block A 1040-830-00 : with end block B 1040-740-00 : with end block A 1040-840-00 : with end block B 1040-750-00 : with end block A 1040-850-00 : with end block B

* For the end blocks, heights H_4 , H_5 and H_6 and counterbore H_{13} , S_2 have been modified.

Order example

Ordering data	Description
Linear Motion Slide (Part number): 0260-400-00, 890 mm	Linear Motion Slide SGO 30-180 Length L = 890 mm
Type = OA01	without drive unit
Guideway = 01	with Precision Steel Shafts
Drive unit = 02	with end block B
Carriage = 01	with standard carriage
Cover = 00	without bellows
Documentation = 01	with maintenance instructions

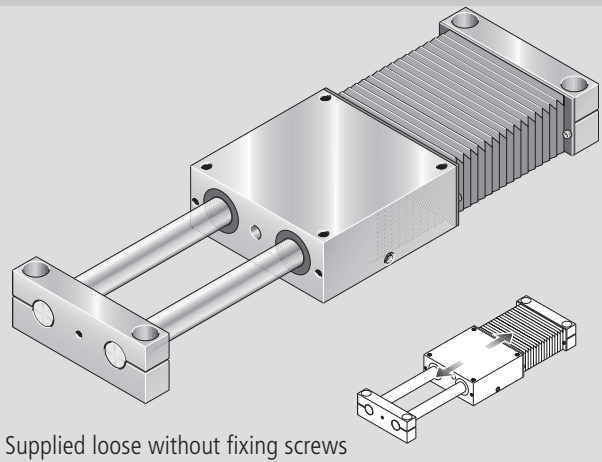
Guideway 			Drive unit (end block) 		Carriage 	Cover 	Documentation 	
Standard shafts	Shafts of corrosion resistant steel to DIN 17230 / EN 10088	Steel shafts with STAR-Resist coating	End block A	End block B	Standard	Polyurethane bellows		Maintenance instructions
						without	with	
01	02	03	01	02	01	00	01	01

STAR – Linear Motion Slides, Closed Type without Drive Unit

Dimension Drawings SGO 8-65 to SGO 50-280

STAR Linear Motion Slides

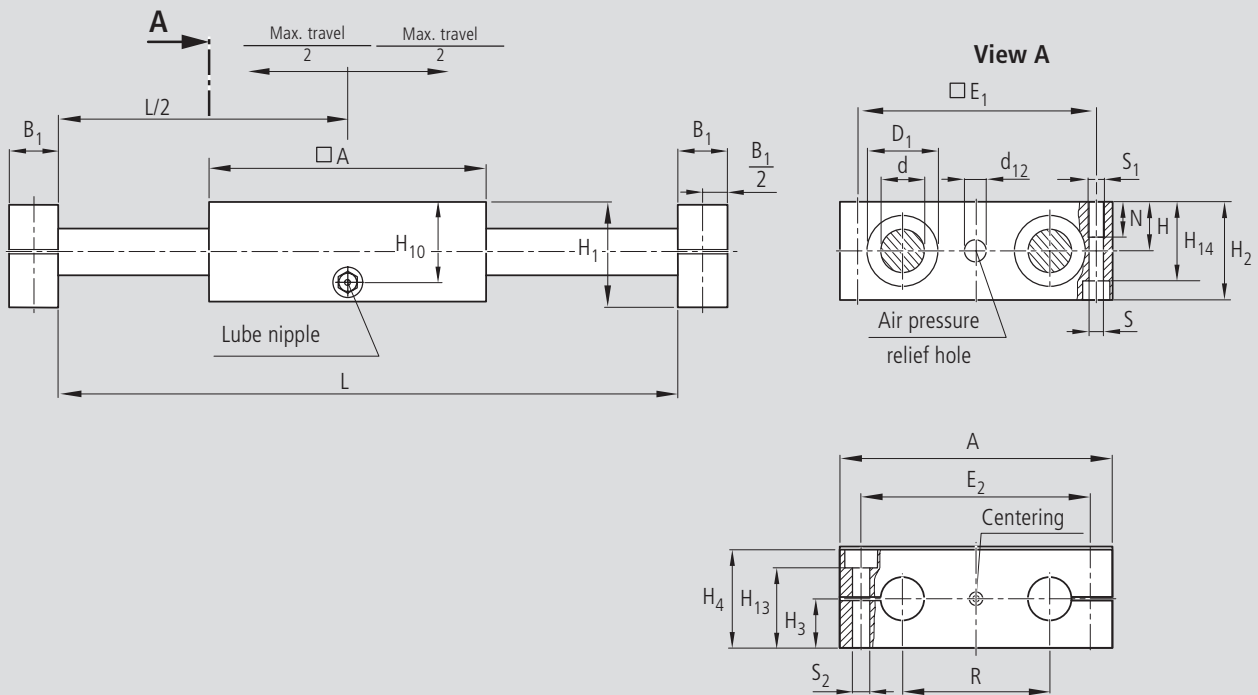
- Carriage (aluminum alloy)
- Four Super Linear Bushings; size 8: Standard Linear Bushings
- Four seals
- Two end blocks (aluminum alloy)
- Two Precision Steel Shafts, tolerance class h6
- With air pressure relief hole for bellows installation



Supplied loose without fixing screws

End block A

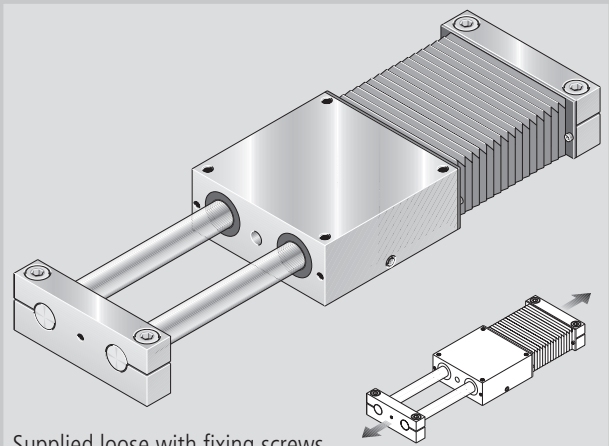
For installations with fixed end blocks and moving carriage.



Slide	Dimensions (mm)												
	d h6	A	R	B ₁	H ± 0.02	H ₁	H ₂	H ₃ ± 0.015	H ₄	H ₁₀	H ₁₃	H ₁₄	D ₁
SGO 8- 65	8	65	32	12	11.5	24	23	12.5	23.5	19.5	18.1	17.5	16
SGO 12- 85	12	85	42	14	16	34	32	18	33	27	26.6	25	22
SGO 16-100	16	100	54	18	18	38	36	20	37	31	28.6	29	26
SGO 20-130	20	130	72	20	23	48	46	25	47	39	36.6	37.5	32
SGO 25-160	25	160	88	25	28	58	56	30	57	48	44.6	45	40
SGO 30-180	30	180	96	25	32	67	64	35	66	55	53.6	50.5	47
SGO 40-230	40	230	122	30	40	84	80	44	83	71	66.6	64	62
SGO 50-280	50	280	152	30	48	100	96	52	99	86	82.6	80	75

For end block A only

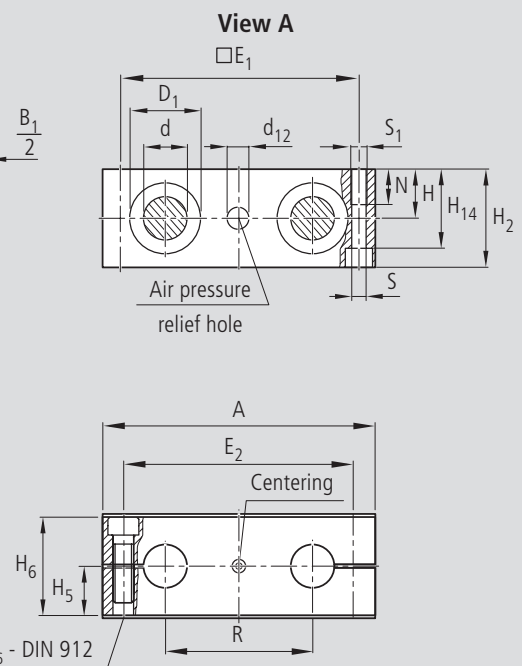
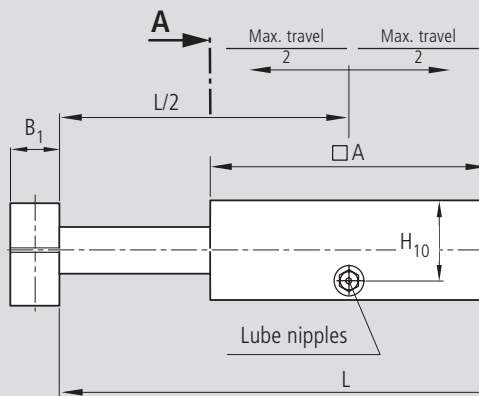




Supplied loose with fixing screws



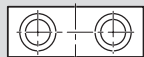
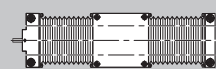
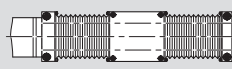
End block B

For installations with fixed carriage and moving end blocks.



							End block B			Lube nipple	For bellows installation	
	E ₁	E ₂	S	S ₁	S ₂	N	S ₆	H ₅	H ₆	DIN 3405	Air pressure relief hole d ₁₂	Length calculation
	55	52	4.3	M 5	5.5	11	M 5 x 15	11	22	D 4	8	L = travel _{max} x 1.4 + 99
	73	70	5.3	M 6	6.6	13	M 6 x 22	15	30	AM 6	10	L = travel _{max} x 1.33 + 122
	88	82	5.3	M 6	9.0	13	M 8 x 25	17	34	AM 6	12	L = travel _{max} x 1.33 + 137
	115	108	6.6	M 8	11.0	18	M10 x 30	22	44	AM 6	14	L = travel _{max} x 1.30 + 168
	140	132	8.4	M 10	13.0	22	M12 x 40	27	54	AM 8 x 1	16	L = travel _{max} x 1.24 + 199
	158	150	10.5	M 12	13.0	26	M12 x 45	31	62	AM 8 x 1	20	L = travel _{max} x 1.20 + 218
	202	190	13.5	M 16	17.0	34	M16 x 60	39	78	AM 8 x 1	22	L = travel _{max} x 1.17 + 273
	250	240	13.5	M 16	17.0	34	M16 x 60	47	94	AM 8 x 1	25	L = travel _{max} x 1.14 + 323

STAR – Linear Motion Slides, Closed Type with Ball Screw Drive Components and Ordering SGK 12-85 to SGK 20-130

Slide	Part number 0261-X00-00, ... mm	Type ...	Guideway .. 	Drive unit .. 								
				Standard shafts	Journal	Ball screw						
						8 x 2.5	12 x 5	12 x 10	16 x 5	16 x 10	16 x 16	
	SGK 12 - 85	0261-000-00	OF01	01	dia. 6	01						
	SGK 16 -100	0261-100-00		01	dia. 6		01	02				
	SGK 20-130	0261-200-00		01	dia. 9 dia. 9 with keyway				01	02	03	04
	SGK 12 - 85	0261-000-00	MF01	01	dia. 6	01						
	SGK 16-100	0261-100-00		01	dia. 6		01	02				
	SGK 20-130	0261-200-00		01	dia. 9				01	02	03	

Order example: see Inquiry/Order Form

Can be supplied with end block B on request.

Determining the switch activation point

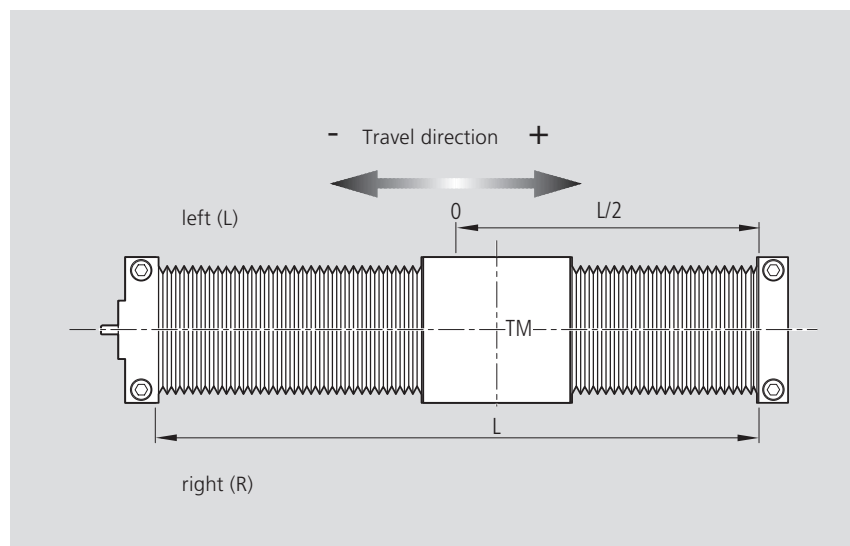
The switch activation point is to be taken from the data given on mounting side, travel direction and switching distance (see table above and order example).

Mounting side: The switches can be fitted on the left (L) or right (R) side of the slide.

Travel direction: The switches can be fitted on the minus (-) or plus (+) side of zero.

Switching distance: The switching distance is the distance between the carriage center (TM) and the zero point (0) when a switch is operated (given in mm).

See "Switch Installation" for more details on fitting switches, types of switch and fitting the cable duct.



Carriage ..		Motor attachment ..		Motor ..	Cover ..	1st switch .. - . ± mm 2nd switch .. - . ± mm 3rd switch .. - . ± mm Cable duct .. - mm Socket-plug .. Switching cam ..	Documentation ..
Standard		*Mount for Motor ¹⁾	Motor Type	Polyurethane bellows without with			
i =							
01	00	00	00				
01	01	00	00				
01	01	00	00				
01	01	03	MMD 022 A (58)	00	01		
		02	VRDM 368 (27)				
01	01	03	MMD 022 A (58)				
		02	VRDM 368 (27)				
01	01	02	MKD 25 B (50)				
		01	MKD 41 B (10)				
		05	MMD 042 A (59)				
		06	MMD 082 A (60)				
		03	VRDM 397 (28)				
		03	VRDM 3910 (29)				

without switch without cable duct (00)	External switching cam (16)	02
External switch		
PNP NC (11 - . ±)		
PNP NO (13 - . ±)		
Mechanical (15 - . ±)		
External socket-plug (loose) (17)		03
Cable duct (loose)		
Cable duct (20 - X....)		
Type		
Length in mm		

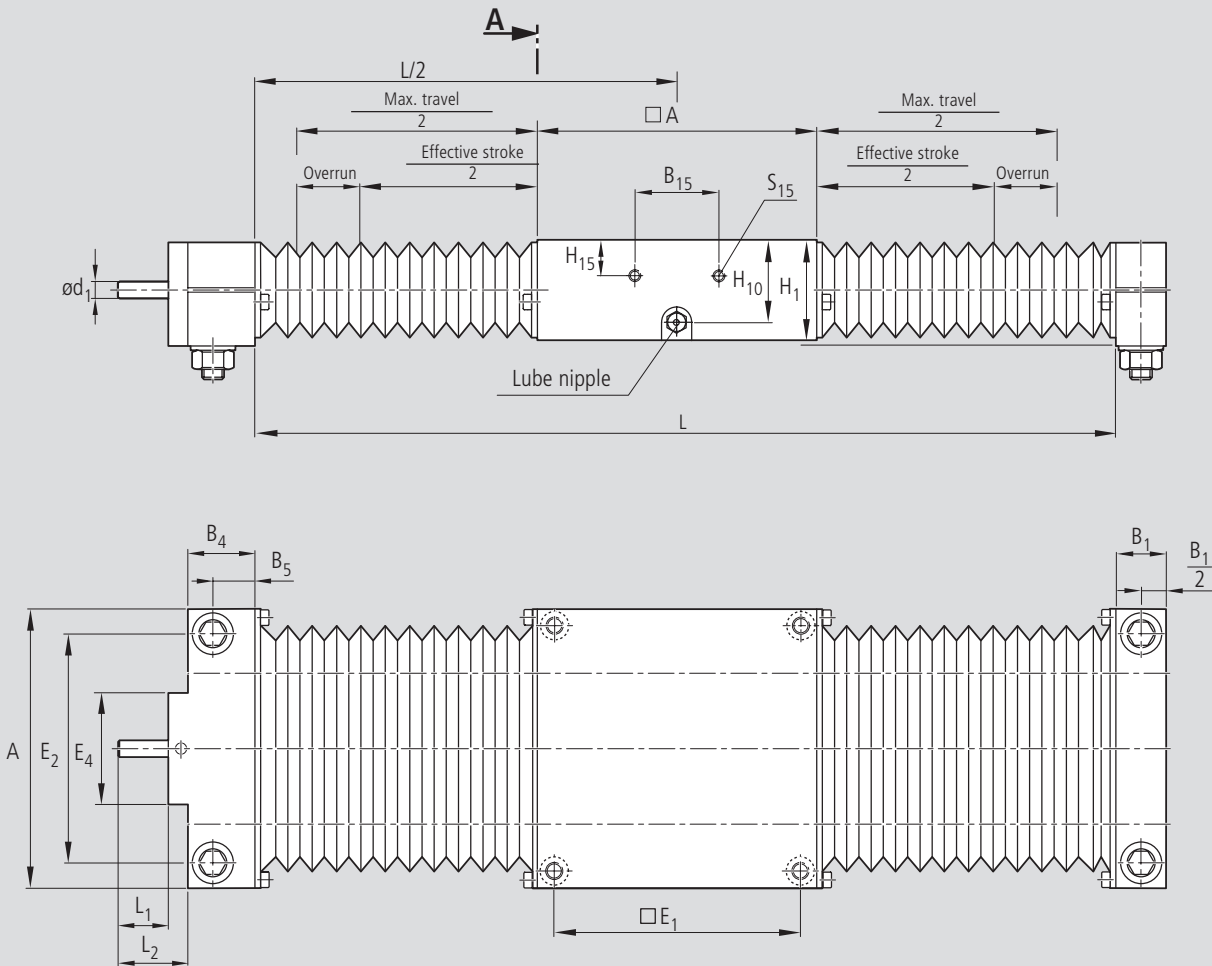
¹⁾ Observe maximum permissible torque.

* Attachment can also be supplied without motor. Please enter "00" for motor on order.

STAR – Linear Motion Slides, Closed Type with Ball Screw Drive

Dimension Drawings SGK 12-85 to SGK 20-130

All dimensions in mm
Diagrams to different scales

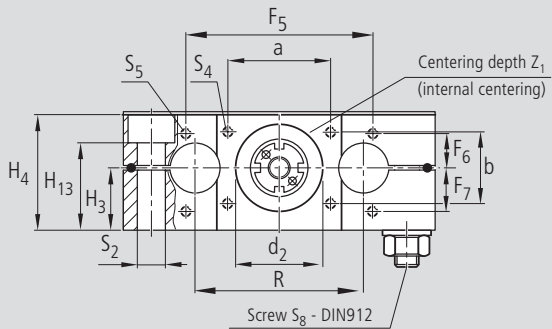


See chapter on motor attachment for the motor attachment drawings.

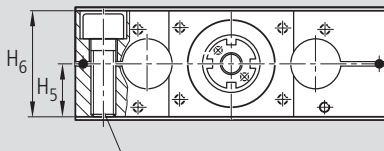
Slide	Drive journal Mounting geometry									Holes for locating bracket in both end blocks			
	d ₁ h7	d ₂ H7	L ₁	L ₂	Z ₁	E ₄	a	b	S ₄	F ₅	F ₆	F ₇	S ₅
SGK 12 - 85	6	28	18	25	2.1	40	33	23	M4 - 8 deep	53	9.5	11.5	M4-8 deep
SGK 16 - 100	6	28	18	25	2.1	40	33	23	M4 - 8 deep	60	11	14	M4-8 deep
SGK 20 - 130	9	40	25	34.5	2.1	52	40	28	M6-12 deep	74	15.5	18.5	M5-12 deep

Slide	Dimensions (mm)															
	d h6	A	R	B ₁	B ₄	B ₅	H ± 0.02	H ₁	H ₂	H ₃ ± 0.015	H ₄	H ₁₀	H ₁₃	H ₁₄	D ₁	
SGK 12 - 85	12	85	42	14	24	17	16	34	32	18	33	27	26.6	25	22	
SGK 16 - 100	16	100	54	18	24	15	18	38	36	20	37	31	28.6	29	26	
SGK 20 - 130	20	130	72	20	29	19	23	48	46	25	47	39	36.6	37.5	32	

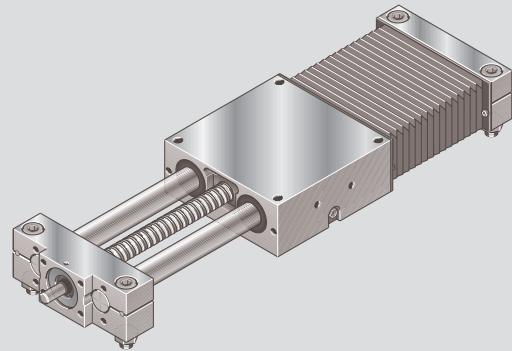
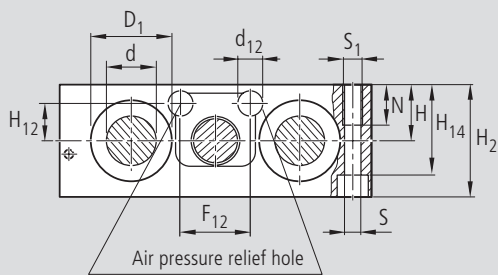




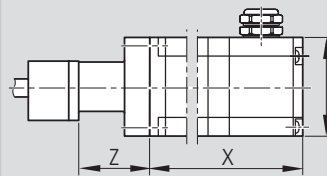
Version with end block B
available on request



View A

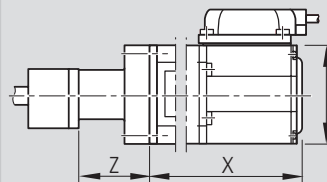


Stepping motors VRDM



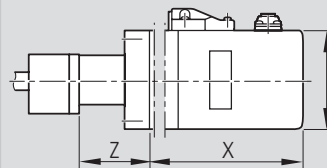
SGK	VRDM	X	Y	Z
12-85	368	116	57.2	50
16-100	397	110	85	77.5
20-130	3910	140		

Servomotors MKD



SGK	MKD	X	Y	Z
20-130	25 B	233	54	75
	41 B	243	82	77.5

MiniDrive MMD



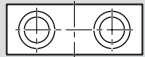

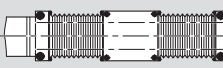
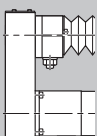
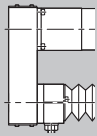
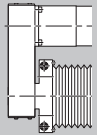
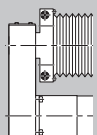


SGK	MMD	X	Y	Z
12-85	022A	128	60	50
16-100	042A	157	60	72
20-130	082A	178	80	83

For switching cam			Air pressure relief holes			For bellows installation Length calculation		For size SGK 20-130 Ball screw journal with keyway	
B ₁₅	H ₁₅	S ₁₅	F ₁₂	H ₁₂	d ₁₂				
30	13.5	M4-7 deep	16	10.4	6.8	L = travel _{max} x 1.33 + 122			
30	13	M4-7 deep	24.4	12	8.5	L = travel _{max} x 1.33 + 137			
64	23	M4-8 deep	37	15.5	10	L = travel _{max} x 1.30 + 168			

							With end block B			Lube nipple	For modifications to the carriage, please ask for one of the following drawings on CD
E ₁	E ₂	S	S ₁	S ₂	S ₈	N	S ₆	H ₅	H ₆	DIN 3405	
73	70	5.3	M 6	6.6	M 6 x 35	13	M 6 x 22	15	30	AM 6	TB02-016-01
88	82	5.3	M 6	9	M 8 x 40	13	M 8 x 25	17	34	AM 6	TB02-016-02
115	108	6.6	M 8	11	M 10 x 55	18	M10 x 30	22	44	AM 6	TB02-016-03

STAR Linear – Motion Slides, Closed Type with Ball Screw Drive Components and Ordering SGK 25-160 to SGK 50-280

	Slide	Part number 0261-X00-00, ... mm	Type ...	Guideway .. 	Drive unit .. 														
				Standard shafts	Journal	Ball screw													
						20 x 5	20 x 20	25 x 10	32 x 5	32 x 10	32 x 20	32 x 32							
	SGK 25-160	0261-300-00	OF01	01	dia. 10	01	02	04											
	SGK 30-180	0261-400-00			dia. 10 with keyway	05	06	08											
	SGK 40-230	0261-500-00			dia. 16				01	02	03	04							
	SGK 50-280	0261-600-00			dia. 16 with keyway				05	06	07	08							
	SGK 25-160	0261-300-00	MF01 02.36.11 02.36.12 02.56.10 02.56.11	01	dia. 10	01	02	04											
	SGK 30-180	0261-400-00																	
	SGK 40-230	0261-500-00			dia. 16				01	02	03	04							
	SGK 50-280	0261-600-00																	
 RV01  RV02  RV03 ¹⁾  RV04 ¹⁾	SGK 25-160	0261-300-00	RV01 RV02 02.36.21	01	dia. 10	11	12	14											
	SGK 30-180	0261-400-00	RV03 RV04 02.36.20	01	dia. 10	11	12	14											
	SGK 40-230	0261-500-00	RV01 RV02 02.56.21	01	dia. 16				01	02	03	04							
	SGK 50-280	0261-600-00	RV03 RV04 02.56.20	01	dia. 16				01	02	03	04							

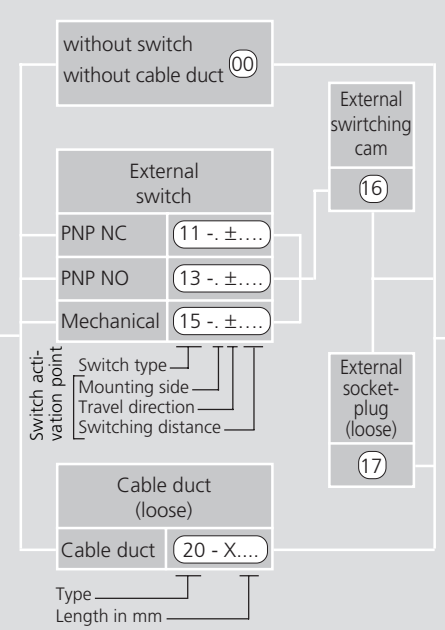
Order example: see Inquiry/Order Form

To determine switch activation point see section "Components and Ordering", e.g. for type SGO.

¹⁾ Switch can only be mounted on the side opposite the side drive.

Can be supplied with end block B on request.

Carriage ⊙		Motor attachment ⊙		Motor ⊙	Cover ⊙	1st switch ⊙ - . ± mm 2nd switch ⊙ - . ± mm 3rd switch ⊙ - . ± mm Cable duct ⊙ - mm Socket-plug ⊙ Switching cam ⊙	Documentation ⊙	
Standard	i =	*Mount	for Motor ¹⁾	Motor Type	Polyurethane bellows without with		Standard report Measurement report	
01		00		00				
01		00		00				
01		03	MKD 41B	10	00	01	02	
		06	MMD 082 A	60				
		04	VRDM 397	28				
			VRDM 3910	29				
			VRDM 3913	30				
05	MKD 71B-061	11						
	MKD 71B-097	12						
01		01			00	01	03	
01	1	10	MKD 41 B	10	00	01	01	
		20	MMD 082A	60				
		1.5	12	MKD 41 B				10
			22	MMD 082A				60
01	1	14	MKD 41 B	10	00	01	01	
		24	MMD 082A	60				
		1.5	16	MKD 41 B				10
			26	MMD 082 A				60
01	1	10	MKD 71B-061	11	00	01	01	
			MKD 71B-097	12				
		2	12	MKD 71B-061				11
			MKD 71B-097	12				
01	1	14	MKD 71B-061	11	00	01	01	
			MKD 71B-097	12				
		2	16	MKD 71B-061				11
			MKD 71B-097	12				



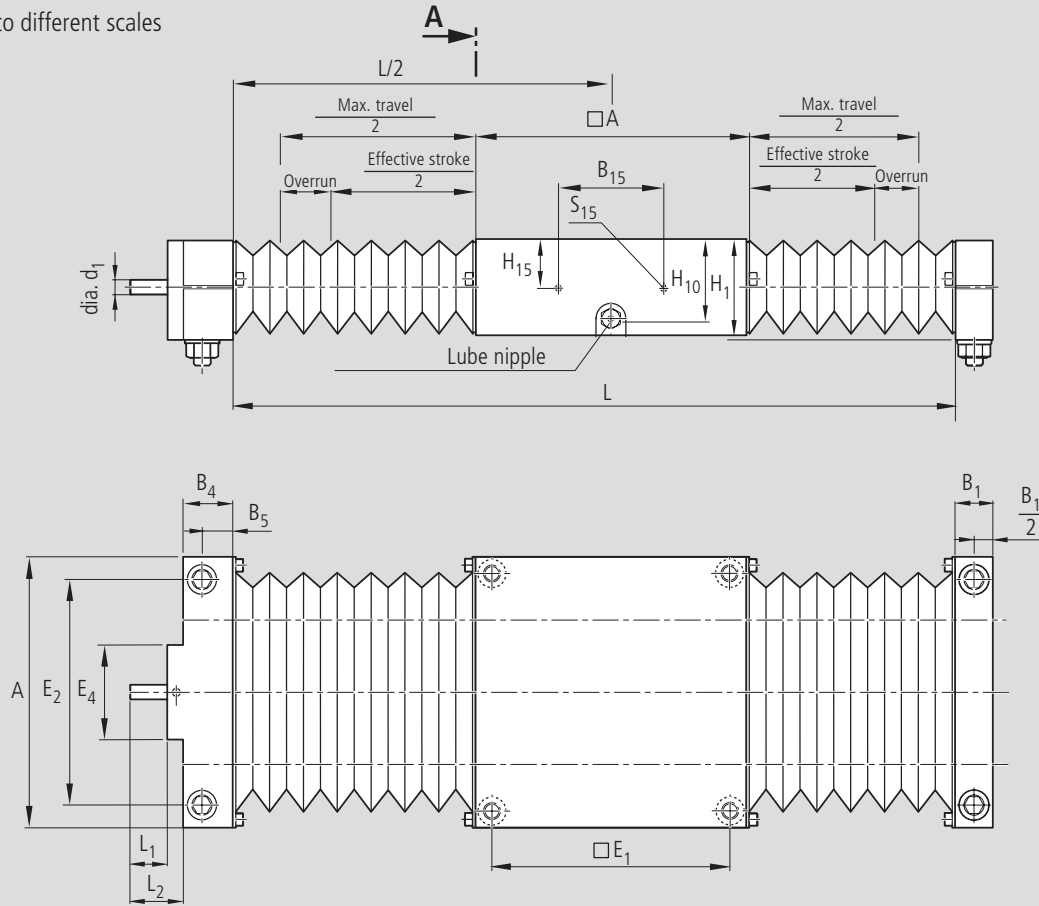
* Attachment can also be supplied without motor. Please enter "00" for motor on order.

¹⁾ Observe maximum permissible torque.

STAR – Linear Motion Slides, Closed Type with Ball Screw Drive

Dimension Drawings SGK 25-160 to SGK 50-280

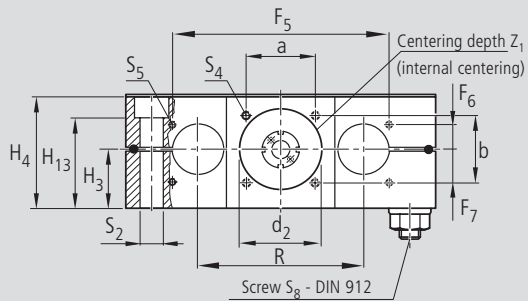
All dimensions in mm
Diagrams to different scales



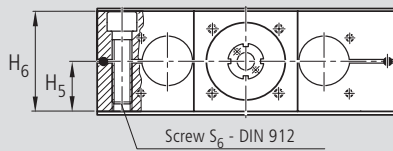
See chapter on motor attachment for the motor attachment drawings.

Slide	Drive journal Mounting geometry									Holes for locating bracket in both end blocks			
	d ₁ h7	d ₂	L ₁	L ₂	Z ₁	E ₄	a	b	S ₄	F ₅	F ₆	F ₇	S ₅
SGK 25-160	10	48 ^{H7}	25	35.5	2.1	63	40	40	M6-12 deep	104	17.5	16.5	M5-12 deep
SGK 30-180	10	48 ^{H7}	25	35.5	2.1	63	40	40	M6-12 deep	126	14.5	19.5	M5-12 deep
SGK 40-230	16	68 _{-0,01}	35	58	8	-	90	46	M8-16 deep	221	14	20	M5-12 deep
SGK 50-280	16	68 _{-0,01}	35	58	8	-	90	46	M8-16 deep	271	22	12	M5-12 deep

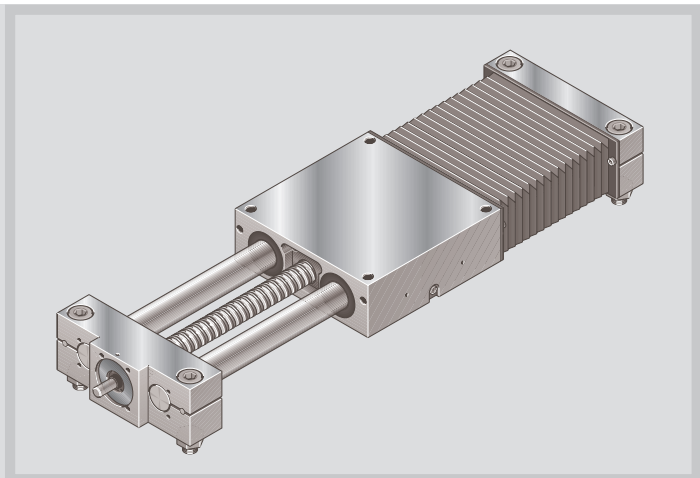
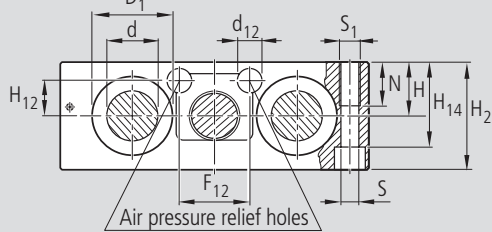
Slide	Dimensions (mm)														
	d h6	A	R	B ₁	B ₄	B ₅	H ± 0.02	H ₁	H ₂	H ₃ ± 0.015	H ₄	H ₁₀	H ₁₃	H ₁₄	D ₁
SGK 25-160	25	160	88	25	33	20.5	28	58	56	30	57	48	44.6	45	40
SGK 30-180	30	180	96	25	33	20.5	32	67	64	35	66	55	53.6	50.5	47
SGK 40-230	40	230	122	30	30	15	40	84	80	44	83	71	66.6	64	62
SGK 50-280	50	280	152	30	30	15	48	100	96	52	99	86	82.6	80	75



Version with end block B
available on request



View A



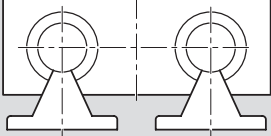
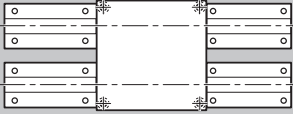
Size	Ball screw journal	
	with keyway	without keyway
SGK 40-230 SGK 50-280		
with centering depth Z ₁ external		
SGK 25-160 SGK 30-180		
with centering depth Z ₁ internal		

For switching cam			Air pressure relief holes			For bellows installation Length calculation	
B ₁₅	H ₁₅	S ₁₅	F ₁₂	H ₁₂	d ₁₂	L = travel _{max}	x
64	26	M4-10deep	40	18.5	12.5		1.24 + 199
64	33	M4-10deep	40	21	15		1.20 + 218
64	21	M4-10deep	54	28	18		1.17 + 273
64	21	M4-10deep	60	30	22		1.14 + 323

							With end block B			Lube nipple	For modifications to the carriage, please ask for one of the following drawings on CD
E ₁	E ₂	S	S ₁	S ₂	S ₈	N	S ₆	H ₅	H ₆	DIN 3405	
140	132	8.4	M 10	13.0	M 12 x 60	22	M 12 x 40	27	54	AM 8 x 1	TB02-016-04
158	150	10.5	M 12	13.0	M 12 x 70	26	M 12 x 45	31	62	AM 8 x 1	TB02-016-05
202	190	13.5	M 16	17.0	M 16 x 90	34	M 16 x 60	39	78	AM 8 x 1	TB02-016-06
250	240	13.5	M 16	17.0	M 16 x 100	34	M 16 x 60	47	94	AM 8 x 1	TB02-016-07

STAR – Linear Motion Slides, Open Type without Drive Unit




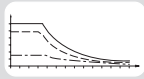
Components and Ordering SOO 12-85 to SOO 50-280

	Slide (do not use for order)	Part number 0265-X00-00, ... mm	Type	Old part numbers The part numbers previously applicable are replaced by the number 02..
				Interchangeable with: 1045-...-..
	SOO 12 - 85	0265-000-00	OA01	1045-112-00
	SOO 16 - 100	0265-100-00*		1045-116-00
	SOO 20 - 130	0265-200-00*		1045-120-00
	SOO 25 - 160	0265-300-00*		1045-125-00
	SOO 30 - 180	0265-400-00		1045-130-00
	SOO 40 - 230	0265-500-00		1045-140-00
	SOO 50 - 280	0265-600-00		1045-150-00

* The new carriages have a shoulder between the shaft supports (B_6 , H_{18}).

Order example

Ordering data	Description
Linear Motion Slide (Part number): 0265-400-00, 890 mm	Linear Motion Slide SOO 30-180 Length L = 890 mm
Type = OA01	without drive unit
Guideway = 01	with Precision Steel Shafts
Carriage = 01	with standard carriage
Cover = 00	without bellows
Documentation = 01	with maintenance instructions

	Guideway ..			Carriage ..	Cover ..	Documentation ..	
							
	Standard shafts	Shafts of corrosion resistant steel to DIN 17230 / EN 10088	Steel shafts with STAR Resist coating	Standard	Polyurethane bellows		Maintenance instructions
					without	with	
	01	02	03	01	00	01	01
	for bellows						
	04	05	06				

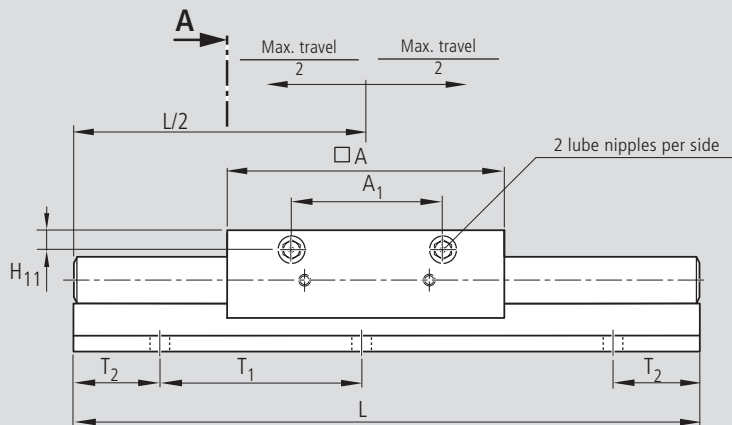
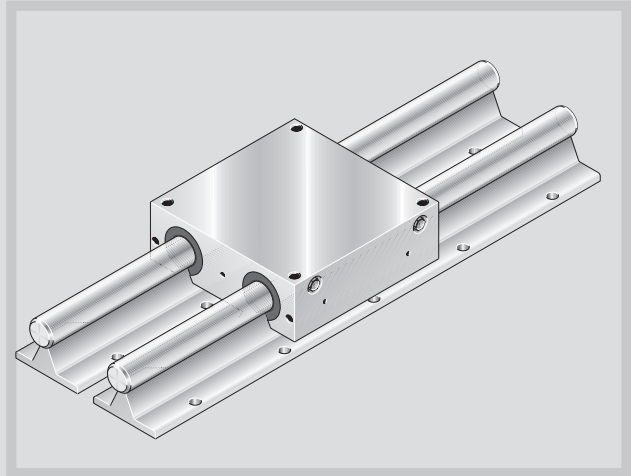
For STAR open-type SOO Linear Motion Slides with bellows, end plates are screwed to both shaft ends (see dimension drawings).

STAR – Linear Motion Slides, Open Type without Drive Unit

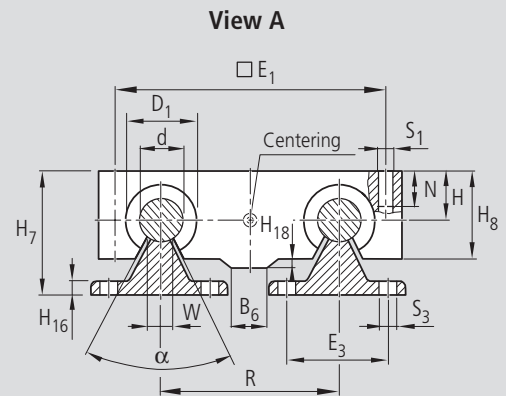
Dimension Drawings S00 12-85 to S00 50-280

STAR Linear Motion Slides

- Carriage (aluminum alloy)
- Four Super Linear Bushings
- Four seals
- Two Precision Steel Shafts, tolerance class h6, with shaft support rails (aluminum alloy)



Hole spacing T_2 is the same at both ends

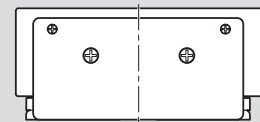
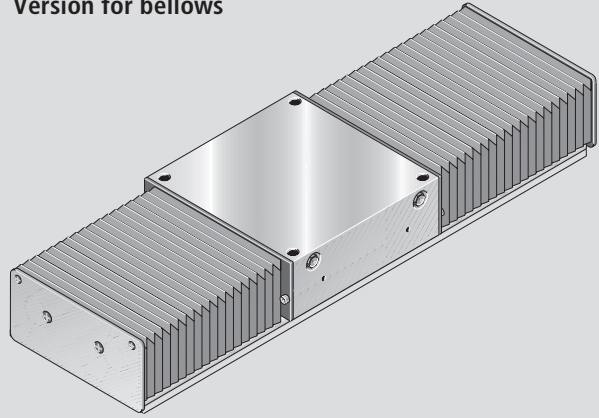


Slide	Dimensions (mm)										
	d h6	A	R	H ± 0.02	H ₇	H ₈	H ₁₈	B ₆	W	Angle α	D ₁
S00 12 - 85	12	85	42	18	40	30	-	-	6.5	66	22
S00 16 - 100	16	100	54	22	48	35	3	15	9.0	68	26
S00 20 - 130	20	130	72	25	57	42	3.5	12	9.0	55	32
S00 25 - 160	25	160	88	30	66	51	2.5	15	11.5	57	40
S00 30 - 180	30	180	96	35	77	60	-	-	14.0	57	47
S00 40 - 230	40	230	122	45	95	77	-	-	19.5	56	62
SGO 50 - 280	50	280	152	55	115	93	-	-	22.5	54	75

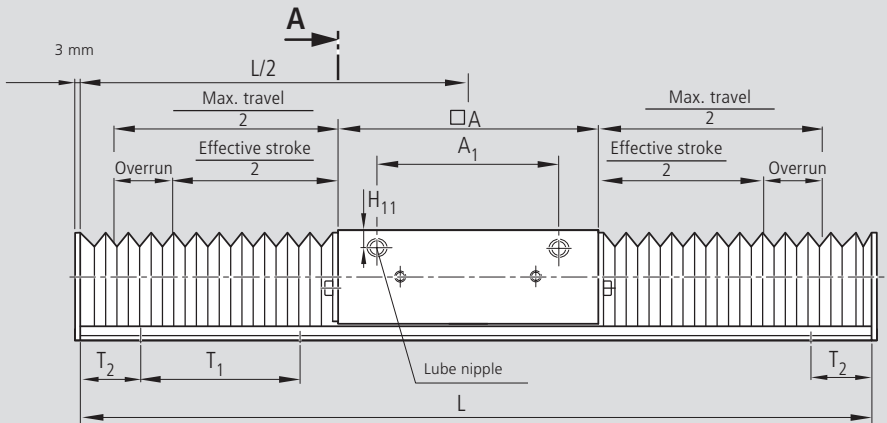
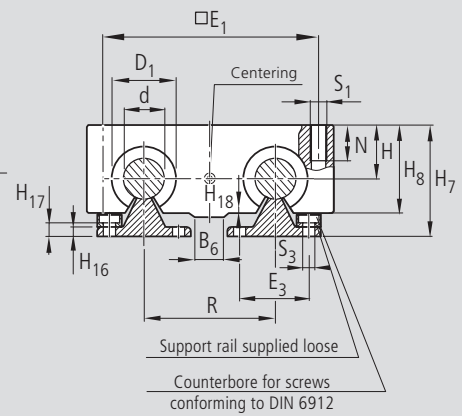


All dimensions in mm
Diagrams to different scales

Version for bellows



View A



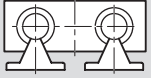
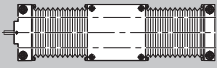
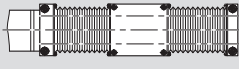


Hole spacing T_2 is the same at both ends

		Shaft support rail								Lube nipple			For bellows Length calculation	
E_1	S_1	N	H_{16}	H_{17}	S_3	E_3	T_1	T_2	A_1	H_{11}	DIN 3405	Please inquire for length $L > 600$ and $L < 660$ for sizes SOO 40-230 and SOO 50-280		
73	M 6	13	5	6.5	4.5	29	75	min.15	57	7	AM 6	$L = \text{travel}_{\text{max}}$	$\times 1.33 + 122$	
88	M 6	13	5	8.3	5.5	33	100	min.20	68	7.2	AM 6	$L = \text{travel}_{\text{max}}$	$\times 1.33 + 137$	
115	M 8	18	6	9.8	6.6	37	100	min.20	94	7.2	AM 6	$L = \text{travel}_{\text{max}}$	$\times 1.30 + 168$	
140	M 10	22	6	9.8	6.6	42	120	min.24	116	9.5	AM 8 x 1	$L = \text{travel}_{\text{max}}$	$\times 1.24 + 199$	
158	M 12	26	7	10.0	9.0	51	150	min.30	130	9.5	AM 8 x 1	$L = \text{travel}_{\text{max}}$	$\times 1.20 + 218$	
202	M 16	34	8	11.8	9.0	55	200	min.30	170	11.5	AM 8 x 1	$L = \text{travel}_{\text{max}}$	$\times 1.14 + 269$	
250	M 16	34	9	14.3	11.0	63	200	min.30	220	15	AM 8 x 1	$L = \text{travel}_{\text{max}}$	$\times 1.112 + 320$	

STAR – Linear Motion Slides, Open Type with Ball Screw Drive

Components and Ordering SOK 12-85 SOK to 20-130

	Slide	Part number 0266-X00-00, ... mm	Type ...	Guideway .. 	Drive unit .. 							
				Standard shafts	Journal	Ball screw						
						8 x 2.5	12 x 5	12 x 10	16 x 5	16 x 10	16 x 16	
	SOK 12 - 85	0266-000-00	OF01	02	dia. 6	01						
	SOK 16 -100	0266-100-00		02	dia. 6		01	02				
	SOK 20 -130	0266-200-00		02	dia. 9 dia. 9 with keyway				01	02	03	04
	SOK 12 - 85	0266-000-00	MF01	02	dia. 6	01						
	SOK 16 -100	0266-100-00		02	dia. 6		01	02				
	SOK 20 -130	0266-200-00		02	dia. 9				01	02	03	

Order example: see Inquiry/Order Form

Can be supplied with end block B on request.

Determining the switch activation point

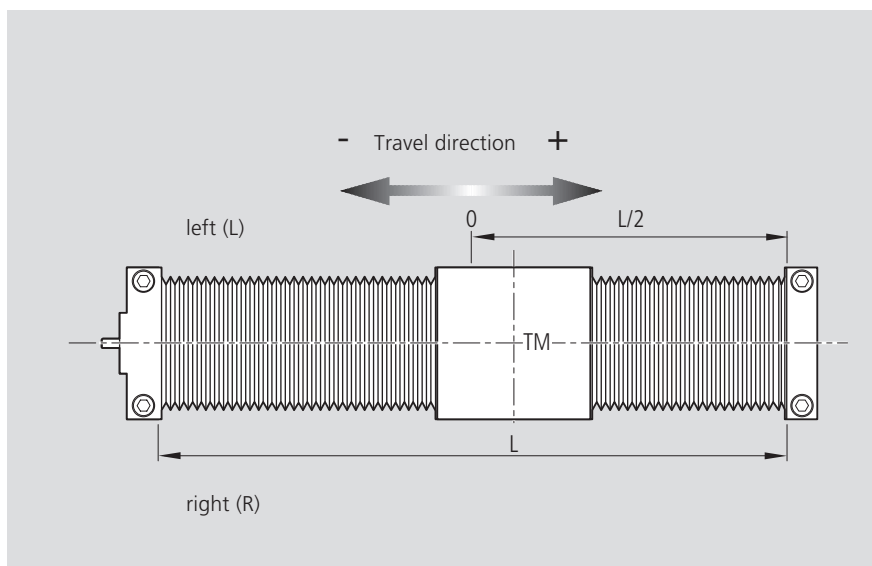
The switch activation point is to be taken from the data given on mounting side, travel direction and switching distance (see table above and order example).





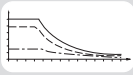
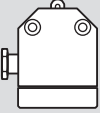
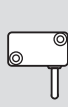
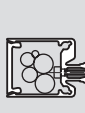
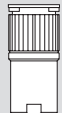
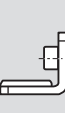
Mounting side: The switches can be fitted on the left (L) or right (R) side of the slide.

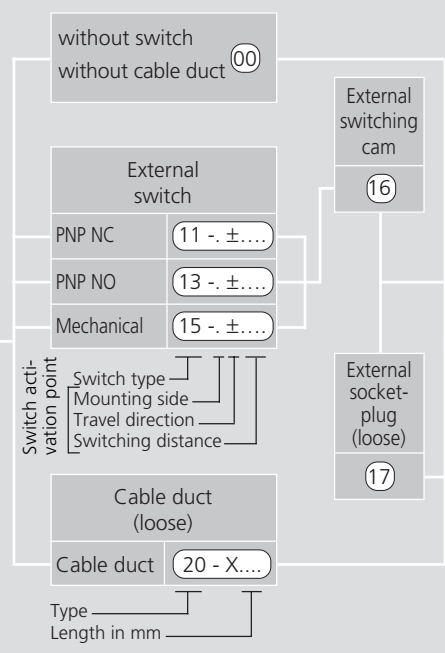
Travel direction: The switches can be fitted on the minus (-) or plus (+) side of zero.

Switching distance: The switching distance is the distance between the carriage center (TM) and the zero point (0) when a switch is operated (given in mm).

See "Switch Installation" for more details on fitting switches, types of switch and fitting the cable duct.



Carriage .. 		Motor attachment .. 		Motor .. 	Cover .. 	1st switch .. - . ± mm 2nd switch .. - . ± mm 3rd switch .. - . ± mm Cable duct .. - mm Socket-plug .. Switching cam ..	Documentation .. 	
Standard	i =	*Mount	for Motor ¹⁾	Motor Type	Polyurethane bellows without with	    	Standard report	Measurement report
01	1	00		00	00	01	01	02
01		00		00				
01		00		00				
01	1	03	MMD 022 A	58	00	01	01	03
		02	VRDM 368	27				
01	1	03	MMD 022 A	58	00	01	01	03
		02	VRDM 368	27				
01	1	02	MKD 25 B	50	00	01	01	03
		01	MKD 41 B	10				
		05	MMD 042 A	59				
		06	MMD 082 A	60				
		03	VRDM 397	28				
		03	VRDM 3910	29				



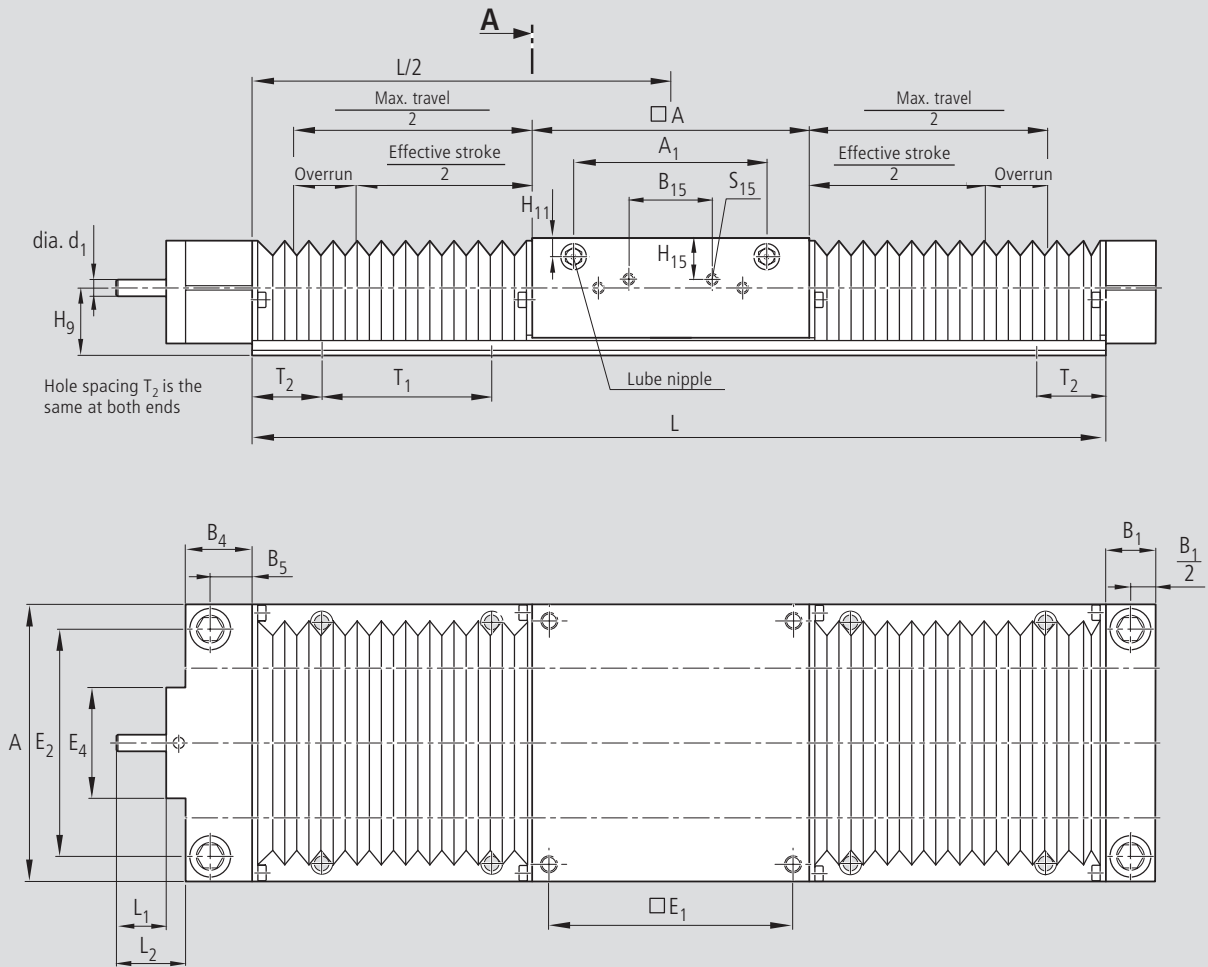
¹⁾ Observe maximum permissible torque.

* Attachment can also be supplied without motor. Please enter "00" for motor on order.

STAR – Linear Motion Slides, Open Type with Ball Screw Drive

Dimension Drawings SOK 12-85 to SOK 20-130

All dimensions in mm
Diagrams to different scales

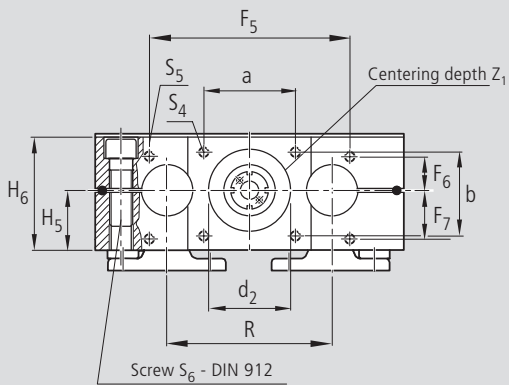


See chapter on motor attachment for the motor attachment drawings.

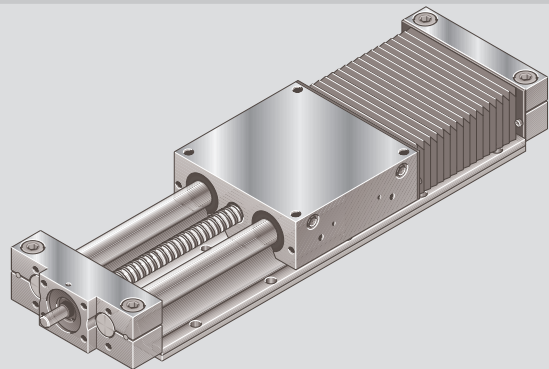
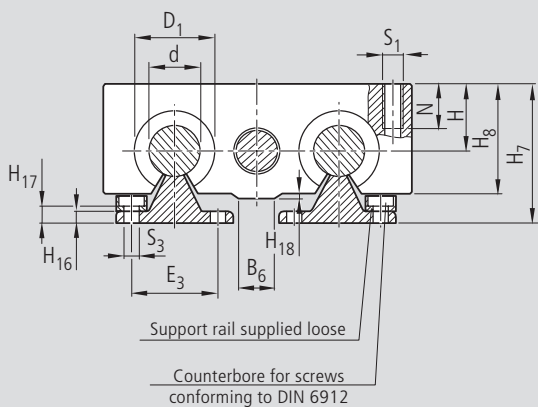
Slide	Drive journal Mounting geometry									Holes for locating bracket in both end blocks			
	d ₁ h7	d ₂ H7	L ₁	L ₂	Z ₁	E ₄	a	b	S ₄	F ₅	F ₆	F ₇	S ₅
SOK 12-85	6	28	18	25	2.1	40	33	23	M4-8 deep	53	9.5	11.5	M4-8 deep
SOK 16-100	6	28	18	25	2.1	40	33	23	M4-8 deep	60	11	14	M4-8 deep
SOK 20-130	9	40	25	34.5	2.1	52	40	28	M6-12 deep	74	15.5	18.5	M5-12 deep

Slide	Dimensions (mm)														
	d h6	A	R	B ₁	B ₄	B ₅	H ± 0.02	H ₅	H ₆	H ₇	H ₈	H ₉	H ₁₈	B ₆	D ₁
SOK 12-85	12	85	42	14	24	17	18	15	30	40	30	22	-	-	22
SOK 16-100	16	100	54	18	24	15	22	17	34	48	35	26	3	15	26
SOK 20-130	20	130	72	20	29	19	25	22	44	57	42	32	3.5	12	32

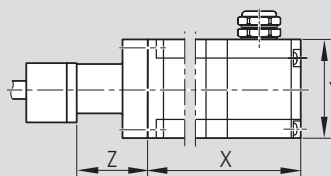




View A

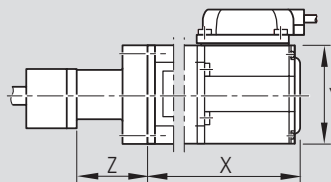


Stepping motors VRDM



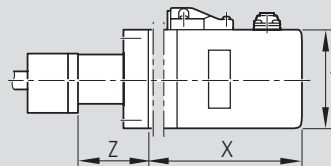
SOK	VRDM	X	Y	Z
12-85	368	116	57.2	50
16-100	397	110	85	77.5
20-130	3910	140		

Servomotors MKD



SOK	MKD	X	Y	Z
20-130	25 B	233	54	75
	41 B	243	82	77.5

MiniDrive MMD



SOK	MMD	X	Y	Z
12-85	022A	128	60	50
16-100	042A	157	60	72
20-130	082A	178	80	83

For switching cam

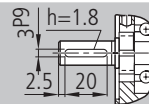
B₁₅ H₁₅ S₁₅

30	13.5	M4-7 deep
30	13	M4-7 deep
64	23	M4-8 deep

For bellows installation
Length calculation

L = travel _{max}	x 1.33	+ 122
L = travel _{max}	x 1.33	+ 137
L = travel _{max}	x 1.30	+ 168

For size SOK 20-130
Ball screw journal with keyway



Shaft support rail

E₁ E₂ S₁ S₆ N

73	70	M 6	M 6 x 22	13
88	82	M 6	M 8 x 25	13
115	108	M 8	M10 x 30	18

H₁₆ H₁₇ E₃ S₃ T₁ T₂

5	6.5	29	4.5	75	min.15
5	8.3	33	5.5	100	min.20
6	9.8	37	6.6	100	min.20

Lube nipple

A₁ H₁₁ DIN 3405


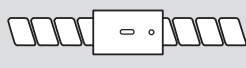
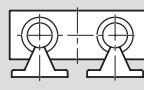
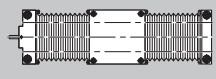
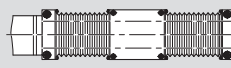
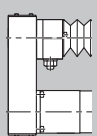
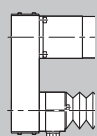
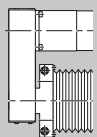
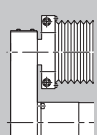
57	7	AM 6
68	7.2	AM 6
94	7.2	AM 6

For modifications to the carriage,
please ask for one of the
following drawings on CD

TB02-016-11
TB02-016-12
TB02-016-13

STAR – Linear Motion Slides, Open Type with Ball Screw Drive

Components and Ordering SOK 25-160 to SOK 50-280

Slide	Part number 0266-X00-00, ... mm	Type ...	Guideway .. 	Drive unit .. 								
				Standard shafts	Journal	Ball screw						
						20 x 5	20 x 20	25 x 10	32 x 5	32 x 10	32 x 20	32 x 32
	SOK 25 -160	0266-300-00	OF01	02	dia. 10	01	02	04				
	SOK 30 -180	0266-400-00			dia. 10 with keyway	05	06	08				
	SOK 40 -230	0266-500-00		02	dia. 16				01	02	03	04
	SOK 50 -280	0266-600-00			dia. 10 with keyway				05	06	07	08
	SOK25 -160	0266-300-00	MF01 02.36.11 02.36.12 02.56.10 02.56.11	02	dia. 10	01	02	04				
	SOK30 -180	0266-400-00										
	SOK40 -230	0266-500-00		02	dia. 16				01	02	03	04
	SOK50 -280	0266-600-00										
 RV01  RV02  RV03 ¹⁾  RV04 ¹⁾	SOK25 -160	0266-300-00	RV01 RV02 02.36.21	02	dia. 10	11	12	14				
		SOK30 -180			0266-400-00	RV03 RV04 02.36.20	02	dia. 10	11	12	14	
	SOK40 -230	0266-500-00	RV01 RV02 02.56.21	02	dia. 16				01	02	03	04
		SOK50 -280			0266-600-00	RV03 RV04 02.56.20	02	dia. 16			01	02

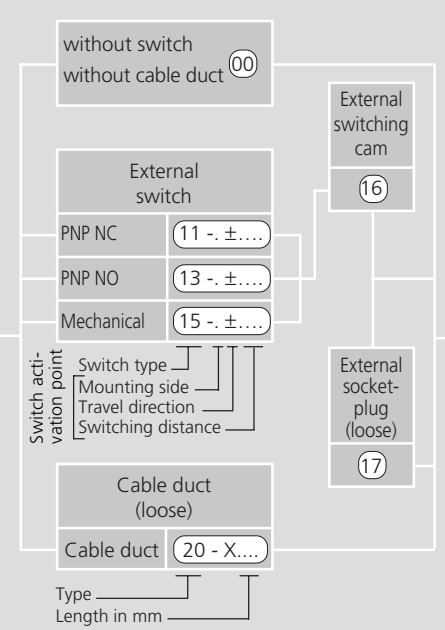
Order example: see Inquiry/Order Form

To determine switch activation point see section "Components and Ordering", e.g. for type SGO.

¹⁾ Switch can only be mounted on the side opposite the side drive.

Can be supplied with end block B on request.

Carriage ⓪		Motor attachment ⓪		Motor ⓪	Cover ⓪	1st switch ⓪ - . ± mm	2nd switch ⓪ - . ± mm	3rd switch ⓪ - . ± mm	Cable duct ⓪ - mm	Socket-plug ⓪	Switching cam ⓪	Documentation ⓪	
Standard	*Mount i =	for Motor ¹⁾	Motor Type	Polyurethane bellows without 95								Standard report	Measurement report
⓪1		⓪0		⓪0									
⓪1		⓪0		⓪0									
⓪1		⓪3	MKD 41B	⓪10	⓪0	⓪1						⓪1	⓪2
		⓪6	MMD 082 A	⓪60									
		⓪4	VRDM 397	⓪28									
			VRDM 3910	⓪29									
			VRDM 3913	⓪30									
⓪1		⓪1	MKD 71B-061	⓪11									
			MKD 71B-097	⓪12									
⓪1	1	⓪10	MKD 41 B	⓪10	⓪0	⓪1						⓪1	⓪3
		⓪20	MMD 082A	⓪60									
		⓪12	MKD 41 B	⓪10									
			MMD 082A	⓪60									
⓪1	1.5	⓪14	MKD 41 B	⓪10									
		⓪24	MMD 082A	⓪60									
		⓪16	MKD 41 B	⓪10									
			MMD 082 A	⓪60									
⓪1	1	⓪10	MKD 71B-061	⓪11									
			MKD 71B-097	⓪12									
	2	⓪12	MKD 71B-061	⓪11									
			MKD 71B-097	⓪12									
⓪1	1	⓪14	MKD 71B-061	⓪11									
			MKD 71B-097	⓪12									
	2	⓪16	MKD 71B-061	⓪11									
			MKD 71B-097	⓪12									

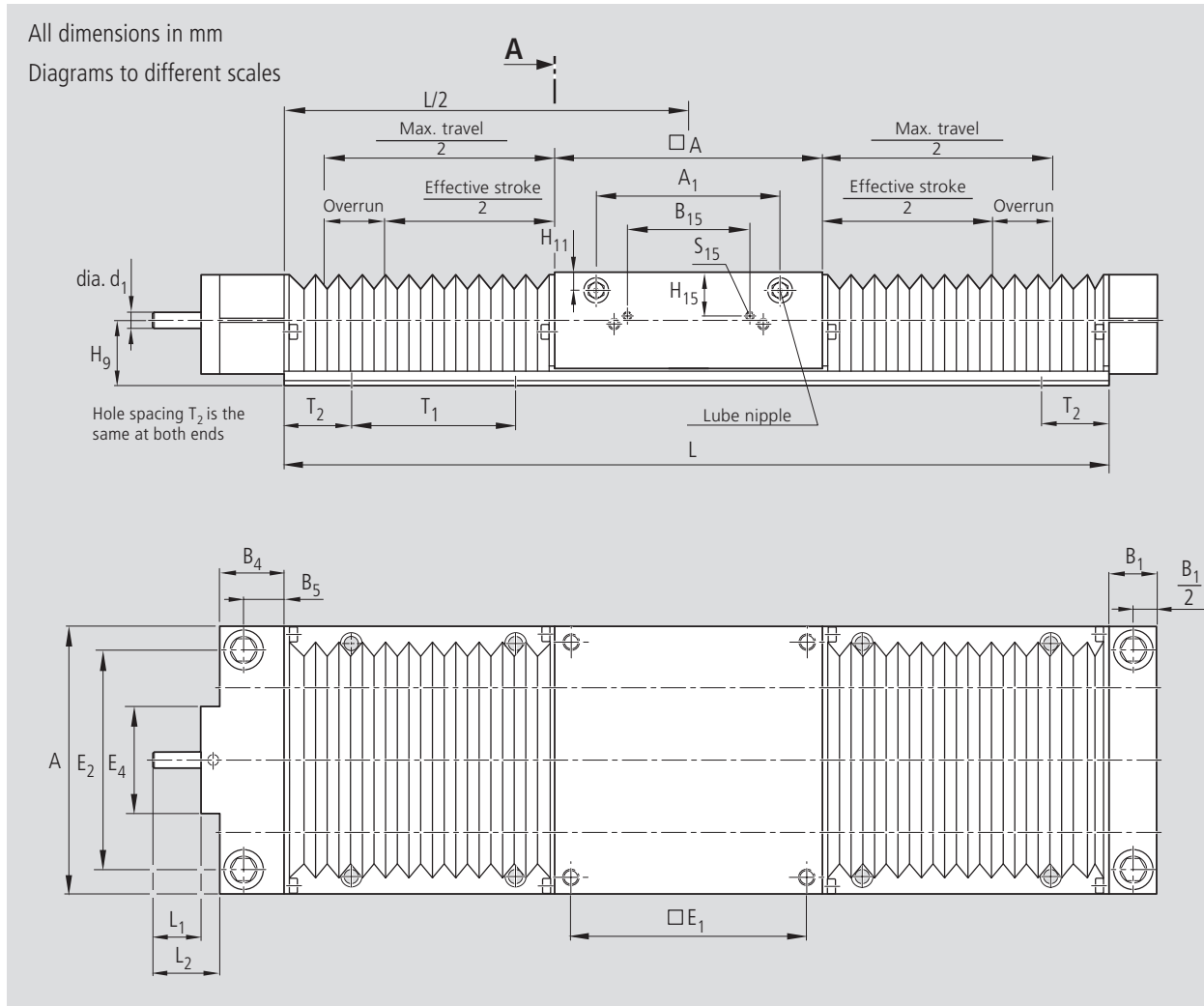


* Attachment can also be supplied without motor. Please enter "00" for motor on order.

¹⁾ Observe maximum permissible torque.

STAR – Linear Motion Slides, Open Type with Ball Screw Drive

Dimension Drawings SOK 25-160 to SOK 50-280

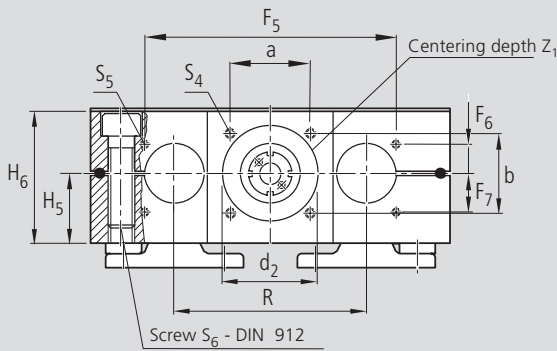


See chapter on motor attachment for the motor attachment drawings.

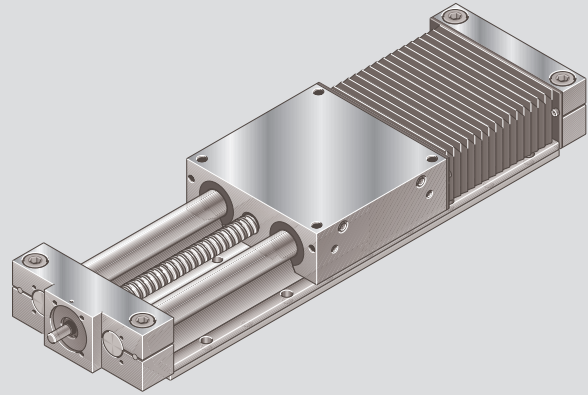
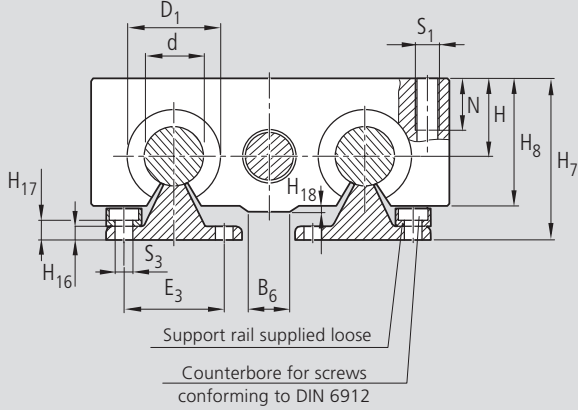
Slide	Drive journal Mounting geometry									Holes for locating bracket in both end blocks			
	d ₁ h7	d ₂	L ₁	L ₂	Z ₁	E ₄	a	b	S ₄	F ₅	F ₆	F ₇	S ₅
SOK 25-160	10	48 ^{H7}	25	35.5	2.1	63	40	40	M6-12deep	104	17.5	16.5	M5-12deep
SOK 30-180	10	48 ^{H7}	25	35.5	2.1	63	40	40	M6-12deep	126	14.5	19.5	M5-12deep
SOK 40-230	16	68 _{-0.01}	35	58	8	-	90	46	M8-16deep	221	14	20	M5-12deep
SOK 50-280	16	68 _{-0.01}	35	58	8	-	90	46	M8-16deep	271	22	12	M5-12deep

Slide	Dimensions (mm)														
	d h6	A	R	B ₁	B ₄	B ₅	H ± 0.02	H ₅	H ₆	H ₇	H ₈	H ₉	H ₁₈	B ₆	D ₁
SOK 25-160	25	160	88	25	33	20.5	30	27	54	66	51	36	2.5	15	40
SOK 30-180	30	180	96	25	33	20.5	35	31	62	77	60	42	-	-	47
SOK 40-230	40	230	122	30	30	15	45	39	78	95	77	50	-	-	62
SOK 50-280	50	280	152	30	30	15	55	47	94	115	93	60	-	-	75





View A



Size	Ball screw journal	
	with keyway	without keyway
SOK 40-230 SOK 50-280 with centering depth Z ₁ external		
SOK 25-160 SOK 30-180 with centering depth Z ₁ internal		

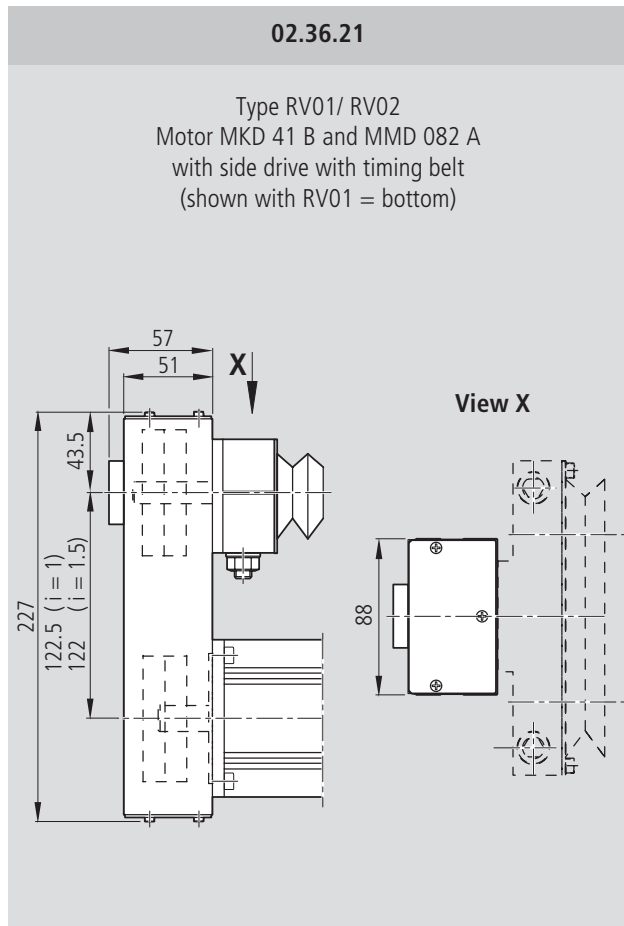
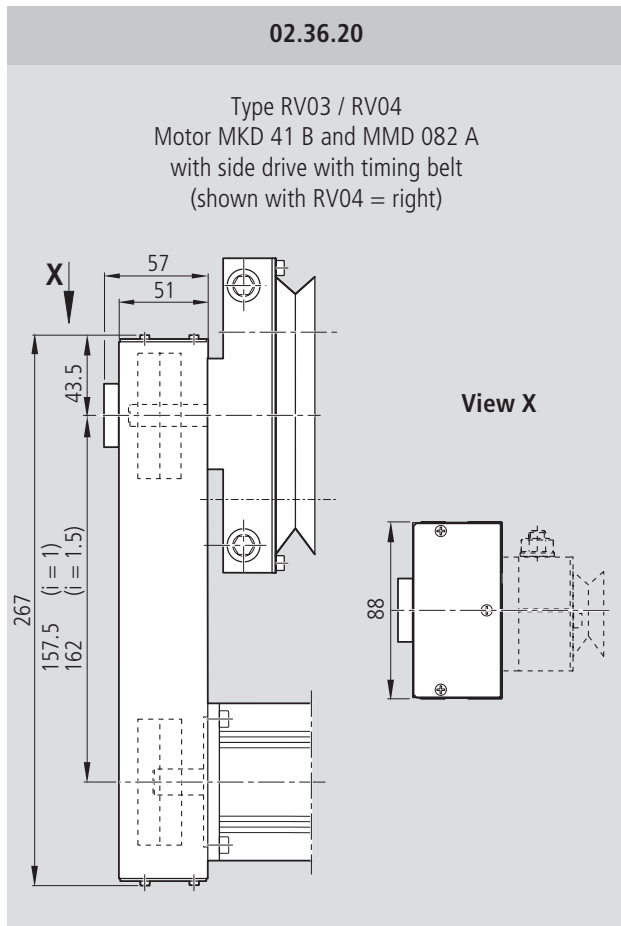
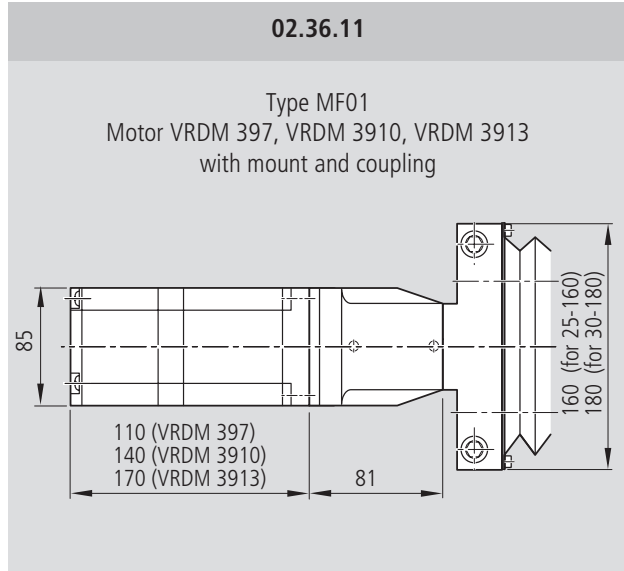
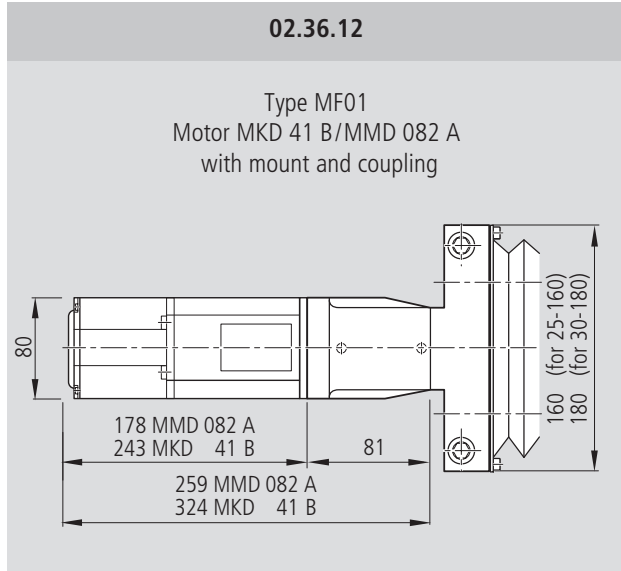
	For switching cam			For bellows installation Length calculation
	B ₁₅	H ₁₅	S ₁₅	
	64	28	M4-10deep	L = travel _{max} x 1.24 + 199
	64	36	M4-10deep	L = travel _{max} x 1.20 + 218
	64	26	M4-10deep	L = travel _{max} x 1.14 + 269
	64	28	M4-10deep	L = travel _{max} x 1.112 + 320

Shaft support rail												Lube nipple			For modifications to the carriage, please ask for one of the following drawings on CD Please inquire for length L > 600 and L < 660 for sizes SOK 40-230 and SOK 50-280
E ₁	E ₂	S ₁	S ₆	N	H ₁₆	H ₁₇	E ₃	S ₃	T ₁	T ₂	A ₁	H ₁₁	DIN 3405		
140	132	M 10	M 12 x 40	22	6	9.8	42	6.6	120	min.24	116	9.5	AM 8 x 1	TB02-016-14	
158	150	M 12	M 12 x 45	26	7	10	51	9.0	150	min.30	130	9.5	AM 8 x 1	TB02-016-15	
202	190	M 16	M 16 x 60	34	8	11.8	55	9.0	200	min.30	170	11.5	AM 8 x 1	TB02-016-16	
250	240	M 16	M 16 x 60	34	9	14.3	63	11	200	min.30	220	15	AM 8 x 1	TB02-016-17	

STAR – Linear Motion Slides, Motor Attachment

Dimension Drawings, Closed/Open Type, Size 25-160 to 50-280

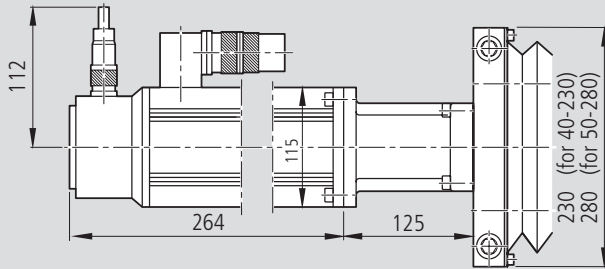
Motor attachment for sizes 25-160 and 30-180



Motor attachment for sizes 40-230 and 50-280

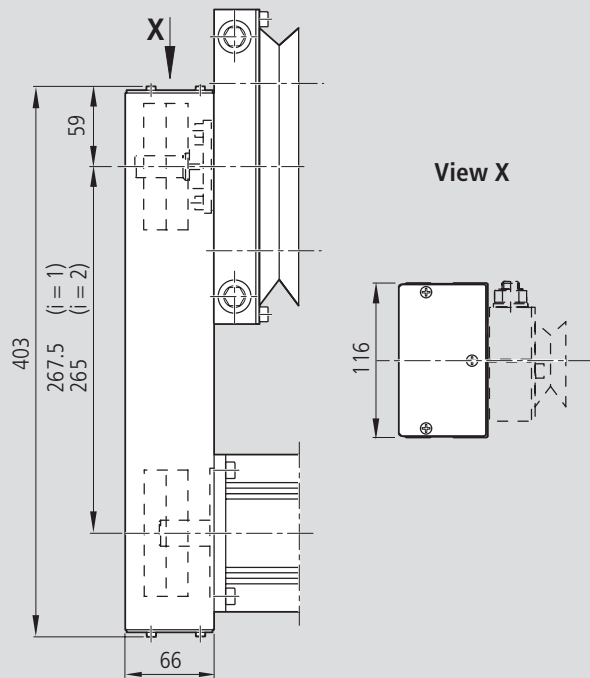
02.56.10

Type MF01
Motor MKD 71B with mount and coupling



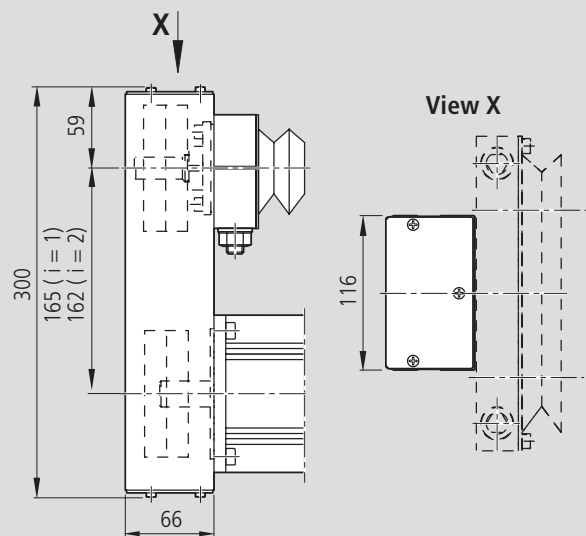
02.56.20

Type RV04 / RV03
Motor MKD 71 B with side drive with timing belt
(shown with RV04 = right)



02.56.21

Type RV01/ RV02
Motor MKD 71B with side drive with timing belt
(shown with RV01 = bottom, closed)

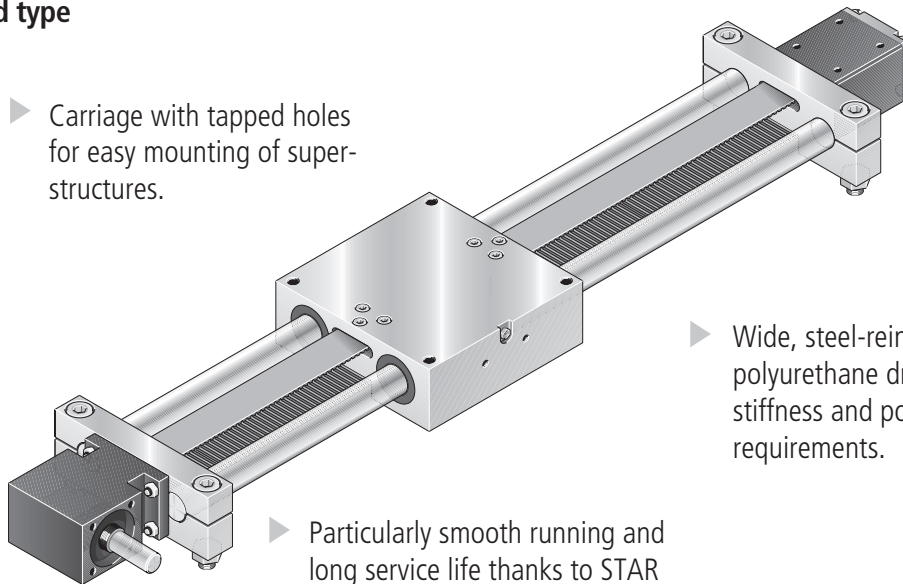


STAR – Linear Motion Slides with Toothed Belt Drive

- Complete Linear Motion Slides in any length up to L_{max}
 - Closed or open type with STAR Shaft Support Rails
 - High positioning accuracy and repeatability
 - One-point lubrication
 - Highly economic solutions
 - Integrated gearing with different ratios
 - AC servo drive or stepping motor with control units
- ▶ Tension end enclosure with integral belt tensioning system. Belt pulley system with ball bearings lubricated for life.

Closed type

- ▶ Carriage with tapped holes for easy mounting of super-structures.

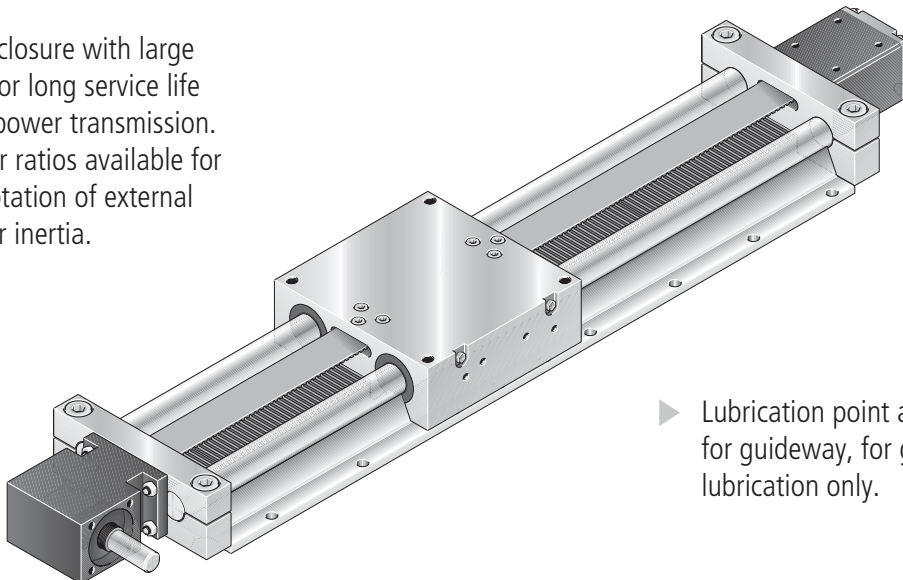


- ▶ Particularly smooth running and long service life thanks to STAR Super Linear Bushings.


- ▶ Wide, steel-reinforced toothed polyurethane drive belt for extreme stiffness and positioning accuracy requirements.

Open type

- ▶ Drive-end enclosure with large drive wheel for long service life and reliable power transmission. Different gear ratios available for optimal adaptation of external load to motor inertia.



- ▶ Lubrication point at both ends for guideway, for grease lubrication only.

25-160	Slide	Dynamic load capacity C (N)	Dynamic moments		Moved mass (kg)	Slide weight L in mm (kg)	Max. length L _{max} (mm)	
			M _t (Nm)	M _L (Nm)				
Closed type		SGR 25-160	11820	520	549	3.2	0.0076 · L + 6.12	3000
Open type								

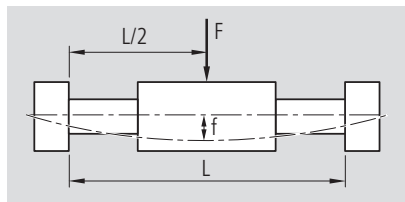
See section on Load Capacities and Moments.

Make allowance for reduced load capacity in short-stroke applications and with lift-off loads.

Permissible shaft deflection in the linear bushing for closed type, refer also to section "Technical Notes"

Shaft deflection

$f_{max} = (65.762 \cdot F + 2.451 \cdot L + 2064.4) \cdot L^3 \cdot 10^{-14}$		
$f_{max} = 3 \text{ mm}$		
f_{max}	Shaft deflection	(mm)
F	External load	(N)
L	Dimension "L"	(mm)



$$f \leq f_{max}$$

Depending on the choice of length (L), shaft deflection must be taken into account at the specified load. Shaft deflection must not exceed 3 mm (f_{max}), since otherwise the toothed belt rubs against the carriage.

If the linear motion slide with toothed belt drive is installed for lift-off loads (i.e. upside down) and shafts longer than 2000 mm are envisaged, please contact us.

Drive data:

Slide	Gearing reduction i	Maximum drive torque M _a (Nm)	Lead constant (mm/rev.)	Motor attachment		Maximum speed v (m/s)
SGR 25-160	1	9.1	110	-	-	up to 3*
	3	2.6	36.67	VRDM 3910	MKD 41 B	3.06
SOR 25-160	7	1.1	15.72	VRDM 397	MKD 41 B	1.31

*Speeds of up to 5 m/s are possible. The service life is limited by the increased wear of the plastic material. Tests have shown that a travel of 50 to 100 x 10⁵ m is possible without failure.

Drive data without motor (i = 1) :

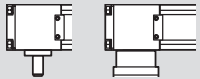
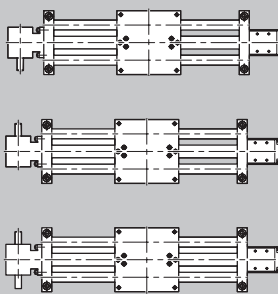
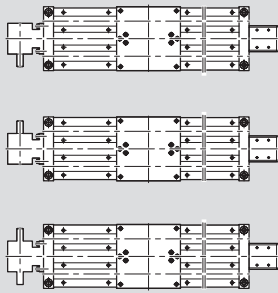
Drive diameter: 35.02 mm
 Max belt operating force: 520 N
 Belt type: AT 5, width 32 mm
 Belt strain: 0.001786 mm/m·N

Mass moment of inertia of linear motion slide with additional load:

$J_S = (k_1 + k_2 \cdot L + k_3 \cdot m_{fr}) \cdot 10^{-6}$	
J _S	Reduced mass moment of inertia of linear motion slide with additional load on the drive journal (kgm ²)
k ₁ , k ₂ , k ₃	Constants (see table)
m _{fr}	Additional load (kg)
L	Dimension "L" (mm)

Constant	Reduction i		
	1	3	7
k1	1050	152	56.5
k2	0.075	0.083	0.0015
k3	307	34	6.3

STAR – Linear Motion Slides with Toothed Belt Drive Components and Ordering SGR and SOR 25-160

	Slide	Part number	Type ...	Guideway ..	Drive unit ..			
								
				Standard shafts	Drive unit without key-way i = 1 with key-way i = 1 i = 3 i = 7			
	SGR 25-160	0263-300-00, mm	MA01 Journal at right end Dim. drawing 02.34.10	01	01	03		
			MA02 Journal at left end Dim. drawing 02.34.10		01	03		
			MA03 Journal at both ends Dim. drawing 02.34.60		02	04		
			MG01 Gear unit MG02 with push-on sleeve Dim. drawing 02.34.20 Dim. drawing 02.34.30 Dim. drawing 02.34.40 Dim. drawing 02.34.50				10	11
	SOR 25-160	0267-300-00 mm	MA01 Journal at right end Dim. drawing 02.34.11	01	01	03		
			MA02 Journal at left end Dim. drawing 02.34.11		01	03		
			MA03 Journal at both ends Dim. drawing 02.34.61		02	04		
			MG01 Gear unit MG02 with push-on sleeve Dim. drawing 02.34.21 Dim. drawing 02.34.31 Dim. drawing 02.34.41 Dim. drawing 02.34.51				10	11

Order example: see Inquiry/Order Form

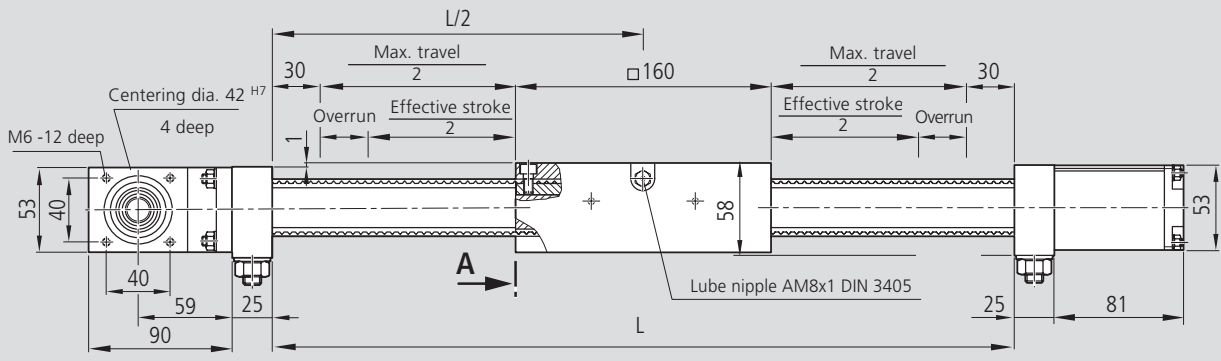
To determine switch activation point see Components and Ordering, e.g. for type SGO.

Carriage		Motor attachment			Motor	1st switch .. - . ± mm	2nd switch .. - . ± mm	3rd switch .. - . ± mm	Cable duct .. - mm	Socket-plug ..	Switching cam ..	Documentation ..
Standard	i =	*Mount	for Motor ¹⁾	Motor Type	without switch without cable duct 00		External switch		External switching cam 16		Standard report	Measurement report
01							PNP NC 11 - . ±				01	02
01		00		00			PNP NO 13 - . ±		External socket-plug (loose) 17			
01							Mechanical 15 - . ±				01	02
01		00		00			Cable duct (loose)					
01							Cable duct 20 - X....				01	02
01		00		00			Type _____ Length in mm _____					
01	i = 3	01	MKD 41 B	10							01	02
		03	VRDM 3910	29								
		04	MMD 082A	60								
	i = 7	01	MKD 41 B	10								
		03	VRDM 397	28								
		05	MMD 042A	59								

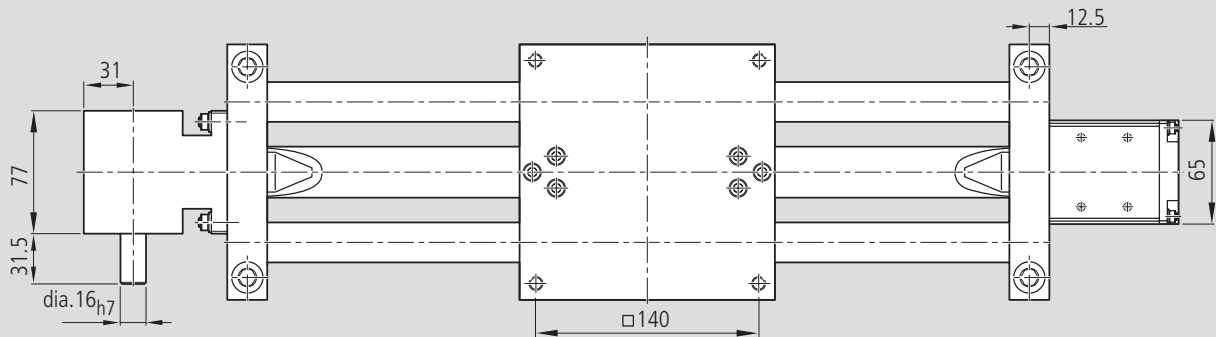
* Attachment can also be supplied without motor. Please enter "00" for motor on order.

¹⁾ Observe maximum permissible torque.

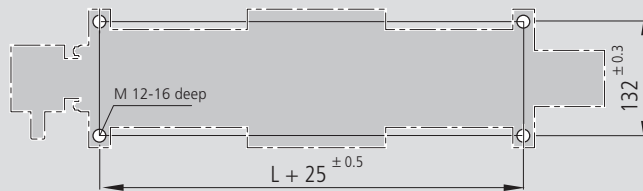
STAR – Linear Motion Slides, Closed Type with Toothed Belt Drive Dimension Drawings SGR 25-160



Calculating the length: $L = \text{max. travel} + 220 \text{ mm}$

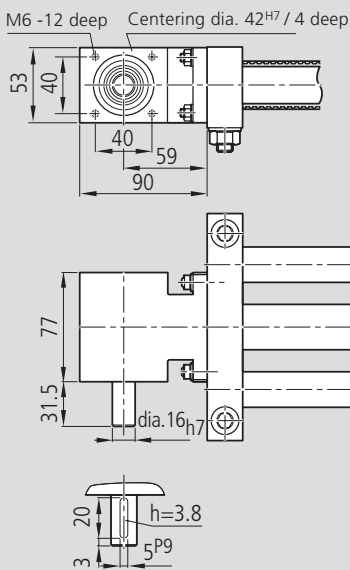


Mounting hole pattern

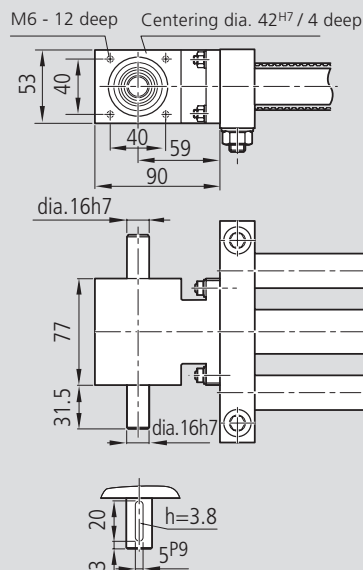


All dimensions in mm
Diagrams to different scales

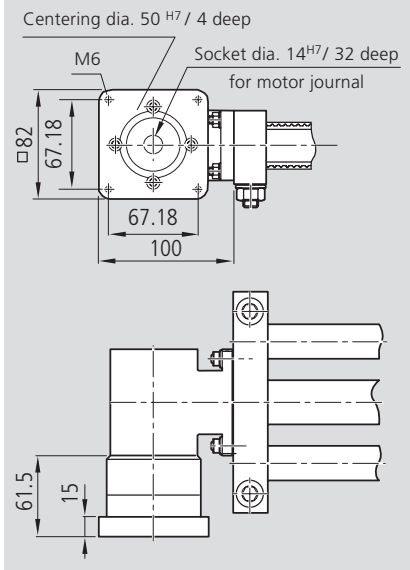
02.34.10

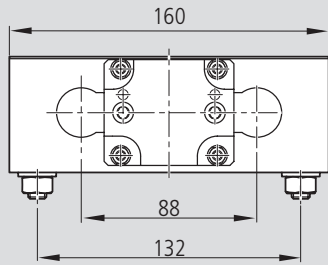


02.34.60

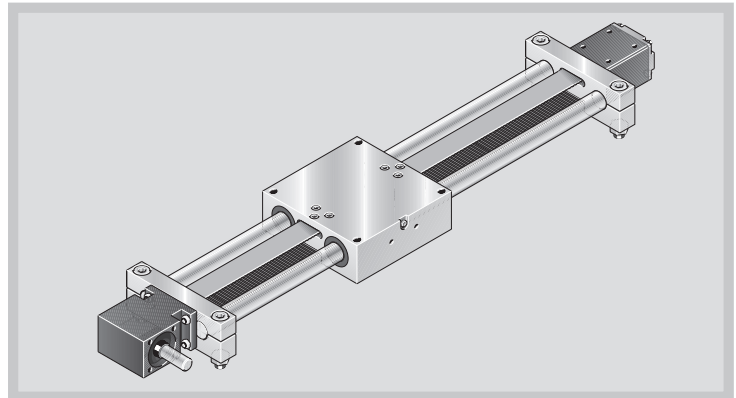
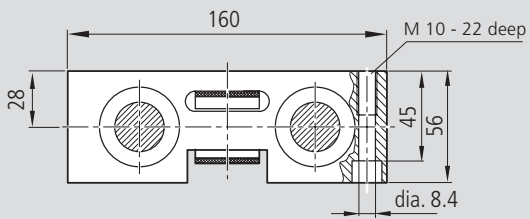


02.34.20

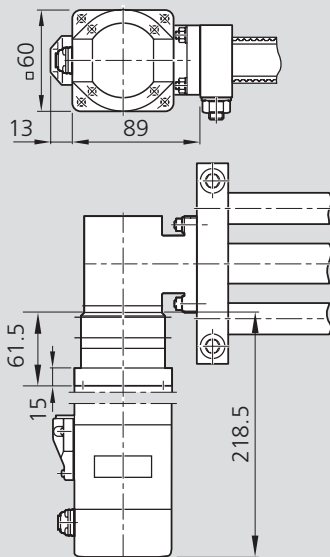




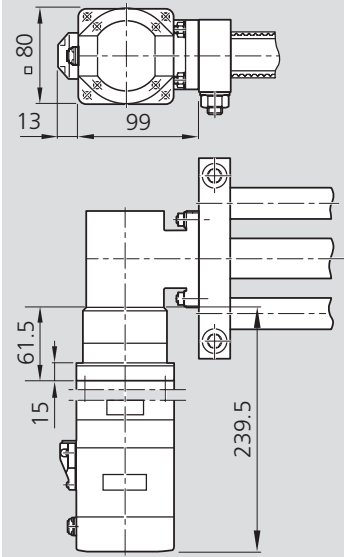
View A



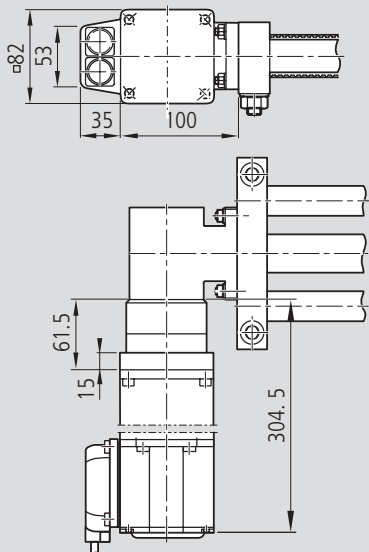
02.34.70 / MMD 042A



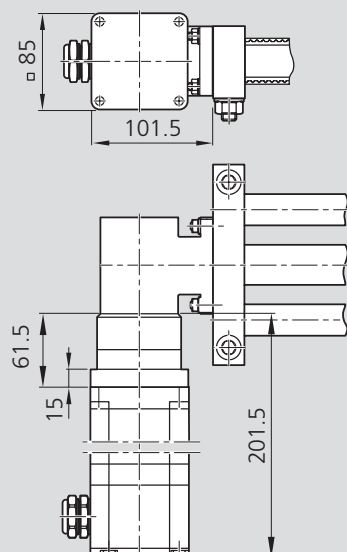
02.34.75 / MMD 082A



02.34.30 / MKD 41B

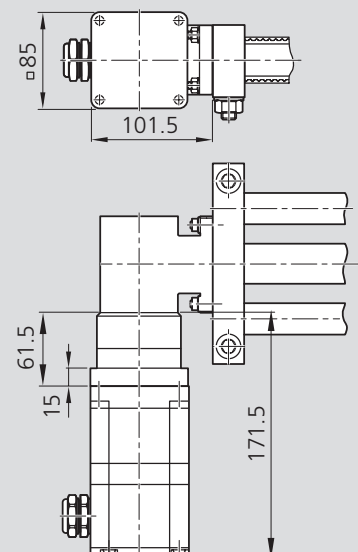


02.34.40 / VRDM 3910



Cable gland P_G 16

02.34.50 / VRDM 397

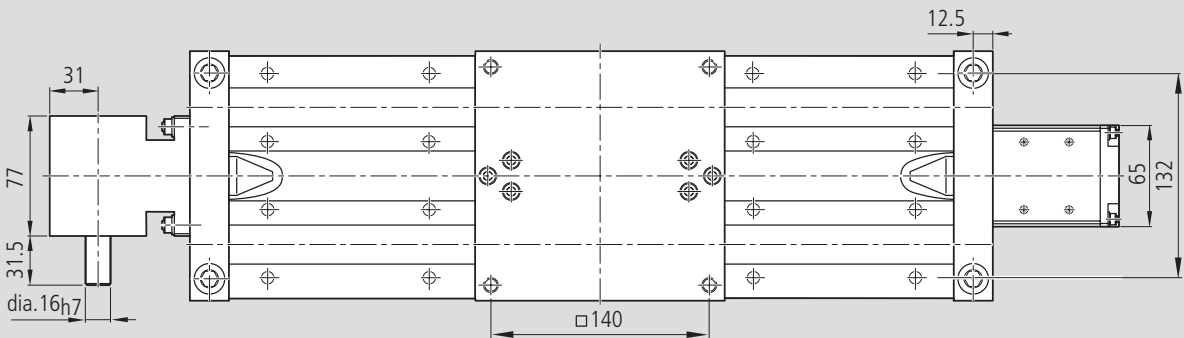
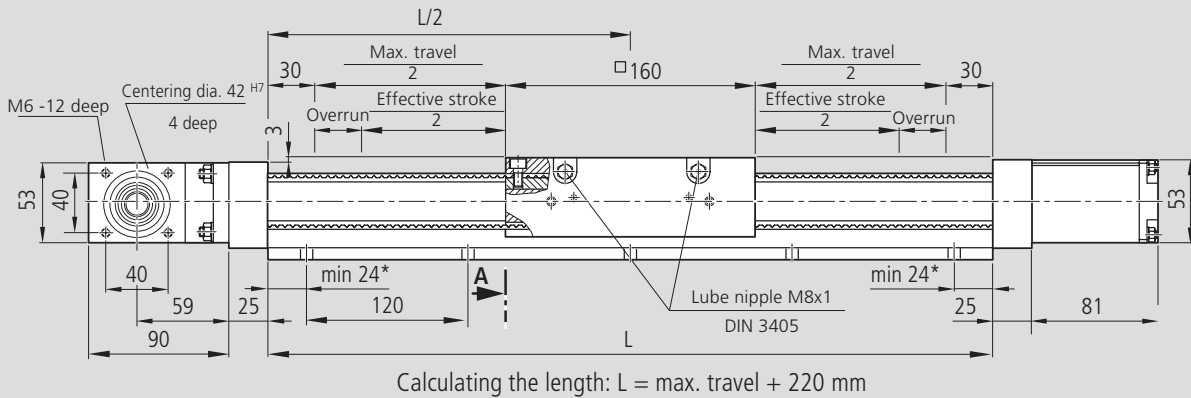


Cable gland P_G 16

STAR – Linear Motion Slides, Open Type with Toothed Belt Drive

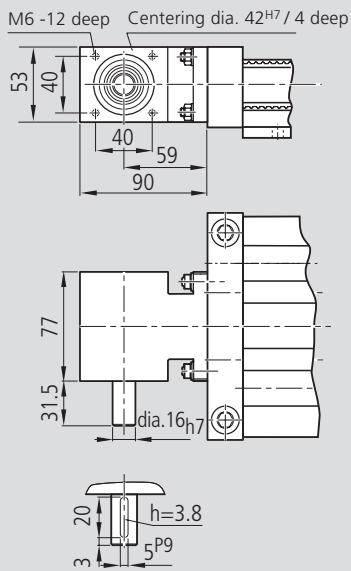
Dimension Drawings SOR 25-160

All dimensions in mm
Diagrams to different scales

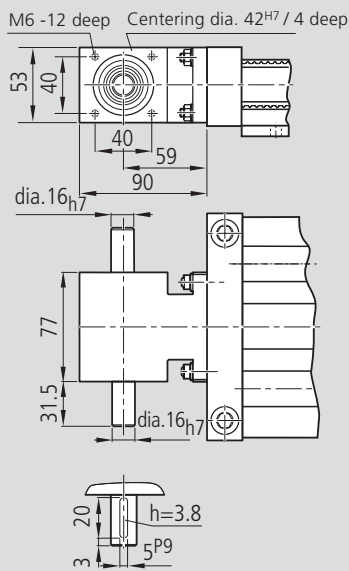


* Same hole spacing at both ends

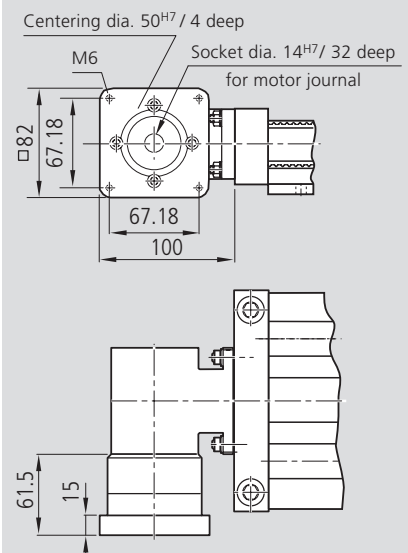
02.34.11

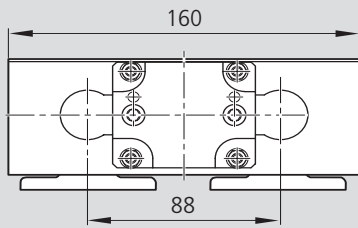


02.34.61

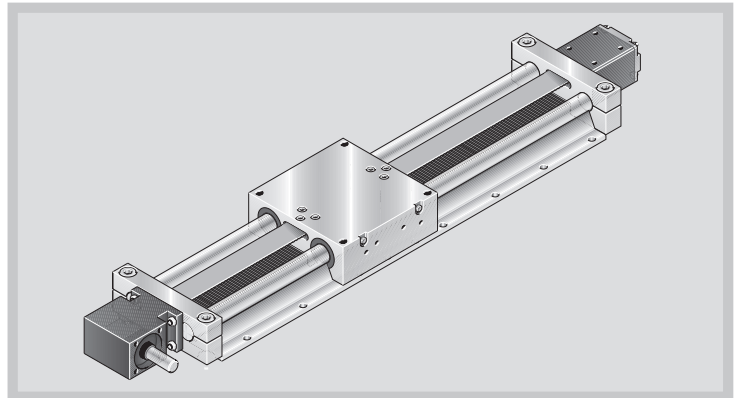
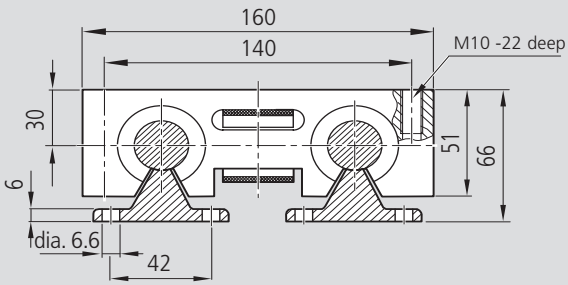


02.34.21

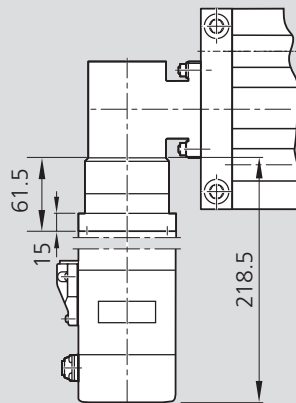
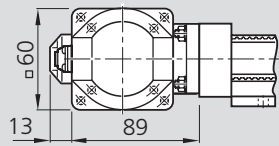




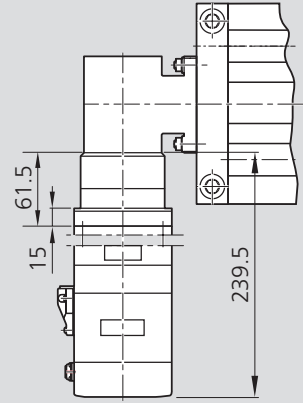
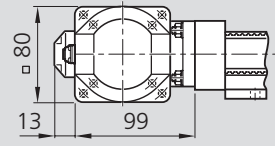
View A



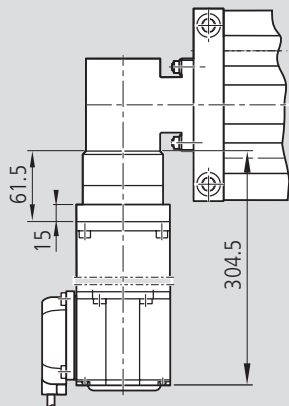
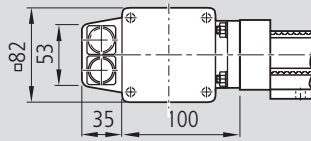
02.34.71 / MMD 042A



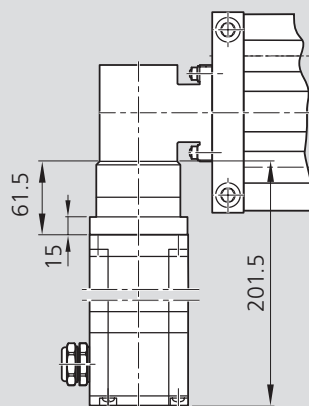
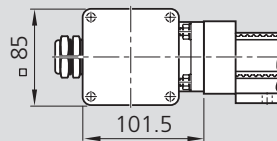
02.34.76 / MMD 082A



02.34.31 / MKD 41B

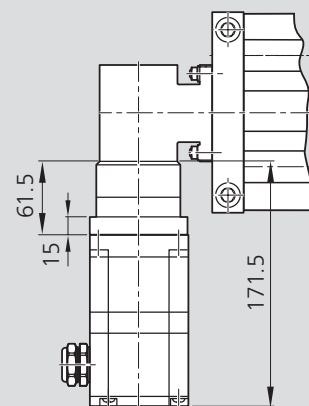
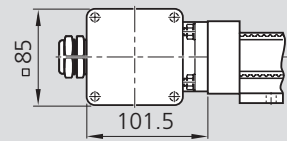


02.34.41 / VRDM 3910



Cable gland P_G 16

02.34.51 / VRDM 397

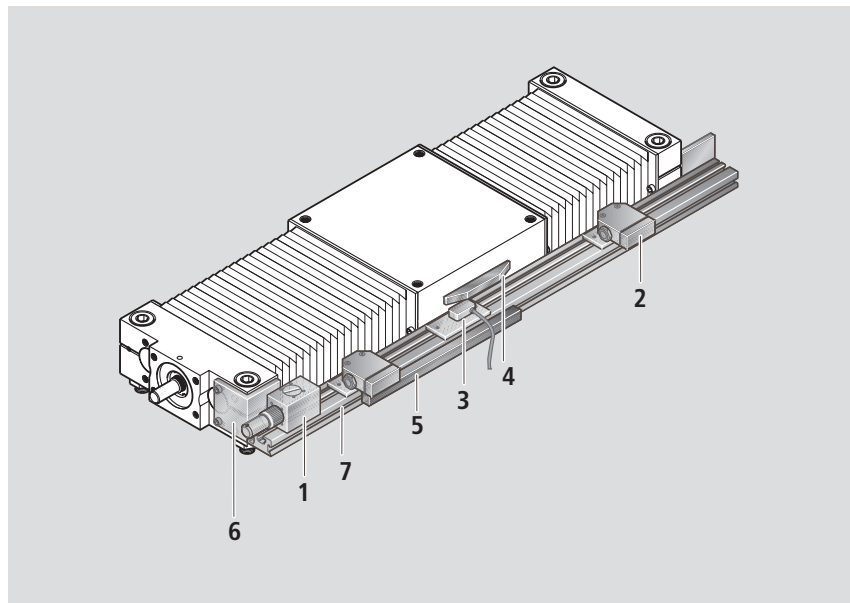


Cable gland P_G 16

STAR – Linear Motion Slides Switch Mounting Arrangements

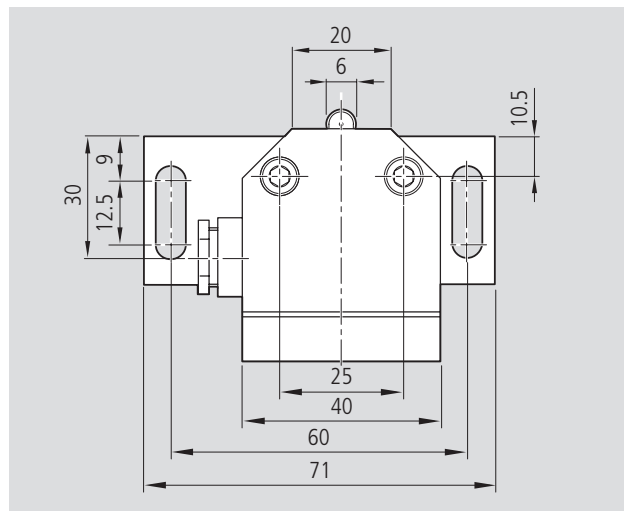
Overview of the switching system

- 1 Socket and plug
- 2 Mechanical switch (with mounting components)
- 3 Proximity switch (with mounting components)
- 4 Switching cam
- 5 Cable duct (aluminum alloy)
- 6 Mounting bracket
- 7 Mounting profile



Mechanical switch (with mounting components)

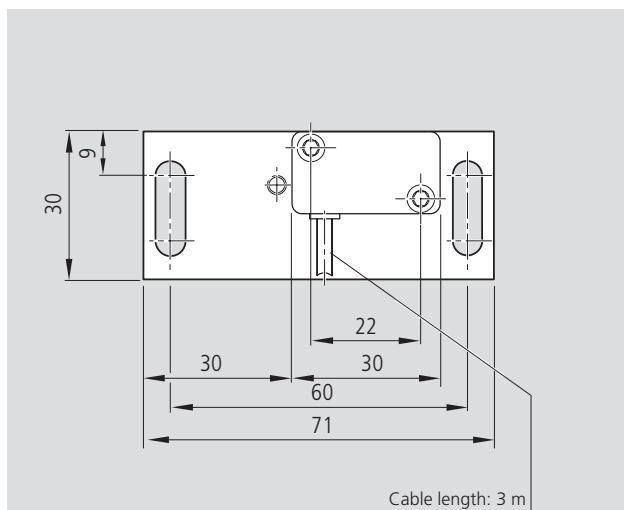
Reproducibility	= ± 0.05 mm
Permissible ambient temperature	= -5°C to $+80^{\circ}\text{C}$
Enclosure	= DIN 40050 IP 67
Contact time	= < 2 ms
Insulation	= group C to VDE 0110
Rated voltage	= 250 V AC
Continuous current	= 5 A
Switching capacity at 220 V, 40-60 Hz	= $\cos\phi = 0.8$ at 2 A
Contact resistance when new	= < 240 m Ω
Connection	= screw connection
Contact system	= single-pole changeover
Changeover system	= snap-action response



Proximity switch (with mounting components)

Miniature circuit breakers with potted cable (3 x 0.14 mm² Unitronic),

Housing form	= NO
Minisensor	= Form A DIN 41635
Voltage	= 10...30 V DC
Residual ripple	= ≤ 10 %
Load	= 200 mA
No-load current	= ≤ 20 mA
Switching frequency	= max. 1500 Hz
Temperature-related shift in make point	= ≤ 4 $\mu\text{m}/^{\circ}\text{C}$
Output signal steepness	= $\geq 1\text{V}/\mu\text{s}$
Reproducibility of make point to EN 5008	= ≤ 0.1 mm

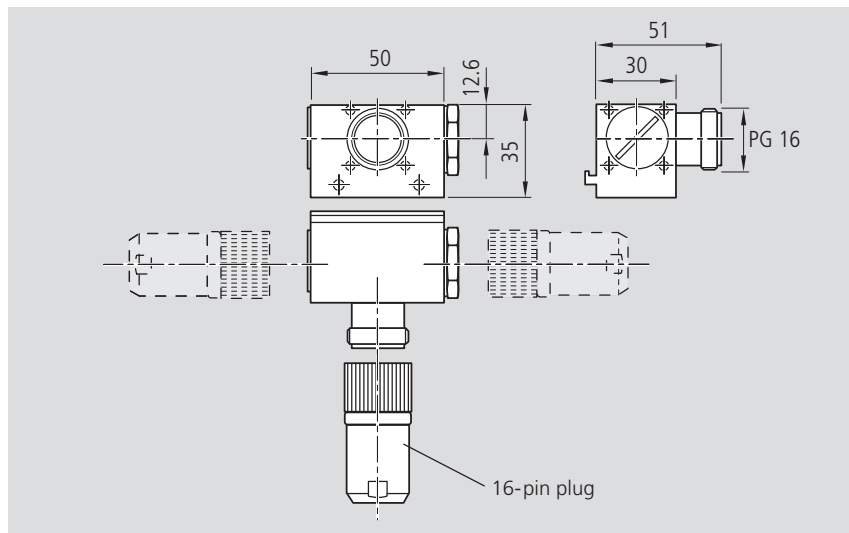


Socket and plug

- Fit the socket to the side with the most switches (see example on next page).

Socket and switch are not wired. The switch activation points can thus be optimized during start-up. A plug is provided.

The plug can be mounted in three directions (see figure).



Ordering the switches and mounting components

The part numbers are listed in the table below.

Mounting components can also be ordered individually.

Item		Size		
		12-85	16-100	20-130 / 25-160 30-180 / 40-230 / 50-280
1	Socket-plug		1414-000-61	
2	Mech. switch with mounting components		0236-203-01	
	Mech. switch without mounting components		8453-040-16	
3	Proximity switch			
	- Mounting components without switch		0236-203-02	
	- PNP NC		8453-040-01	
	- NPN NC		8453-040-02	
	- PNP NO		8453-040-03	
	- NPN NO		8453-040-04	
4/6	Switching cam + mount. bracket + mount. comp.	0236-003-03	0236-103-03	0236-203-03
5	Cable duct		0396-620-07	
7	Mounting profile		0396-620-08	

STAR – Linear Motion Slides Switch Mounting Arrangements

Fitting example

The switch position indicates the position of the carriage center (TM) after displacement. The zero point is in the center (L/2).

$$\text{Maximum switching distance} = 0.5 \cdot (\text{travel max.}) - \text{overrun}$$

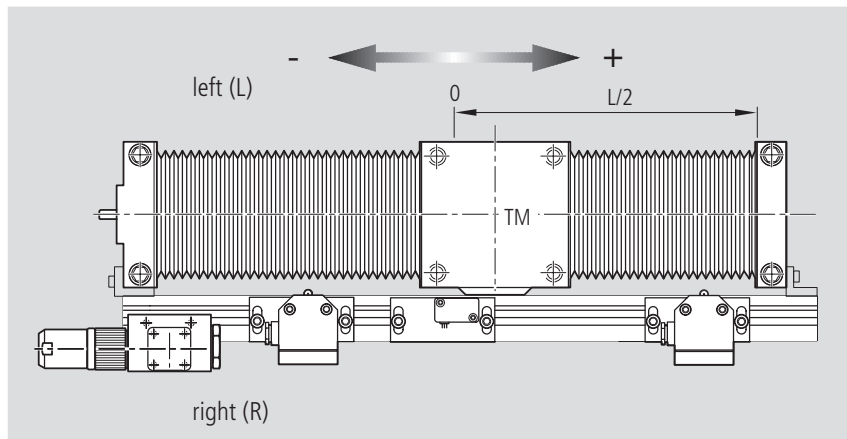
For safe operation of the linear motion slide the overrun must be longer than the braking distance.

The acceleration distance may be taken as a guideline for the braking distance.

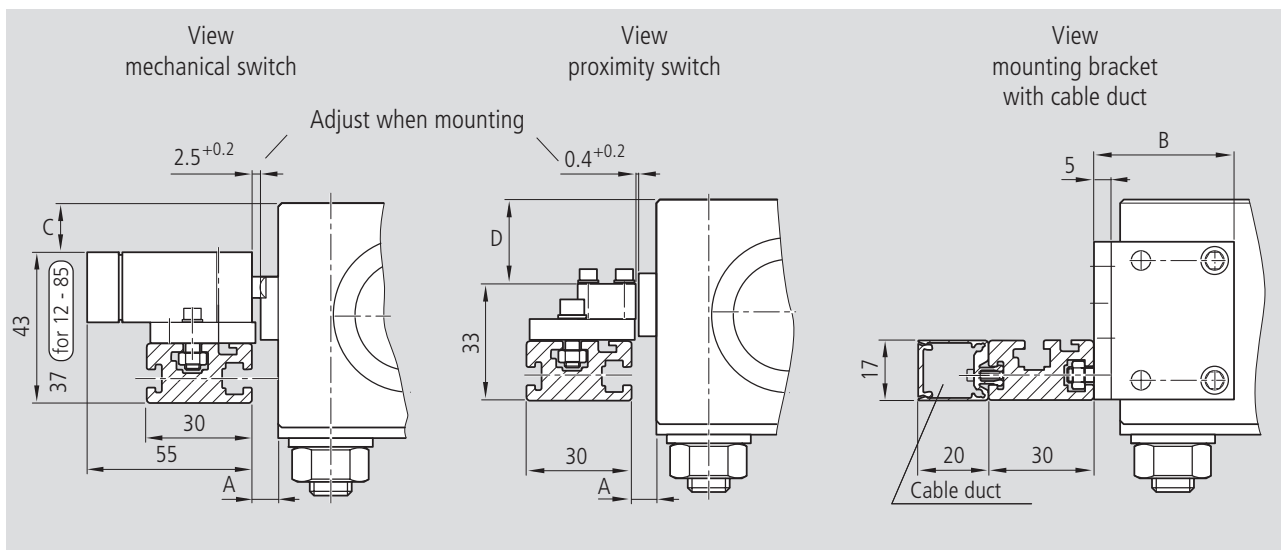
Recommended standard switch fittings:

- 2 mechanical switches
- 1 proximity switch

Slide mounting plates with switches into the groove and fix with the screws and square nuts.



Observe the minimum possible distance between switches:
 mechanical-mechanical = 62 mm
 mechanical-proximity = 49 mm
 proximity-proximity = 35 mm
 Here, the mounting plates must be mounted in mirror image.



The switch is mounted in the same way for all sizes:

The spacing for the mechanical and proximity switches must be adjusted when mounting the switch.

Depending on the relevant operating conditions (vibrations, center of switch stroke), the switch mounting profile may have to be supported.

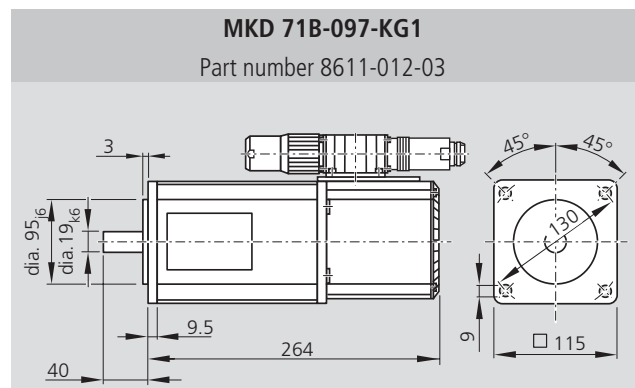
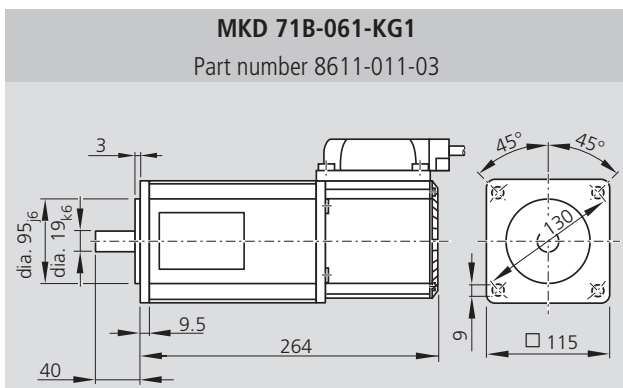
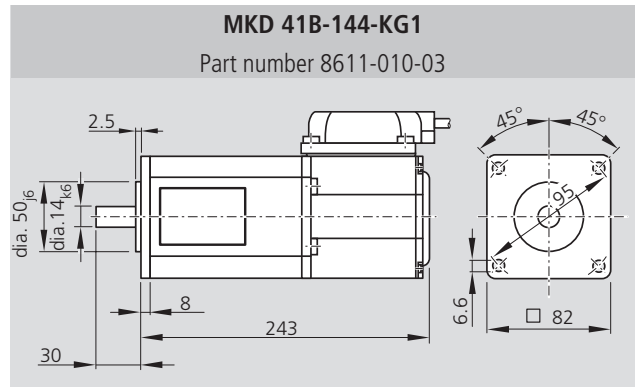
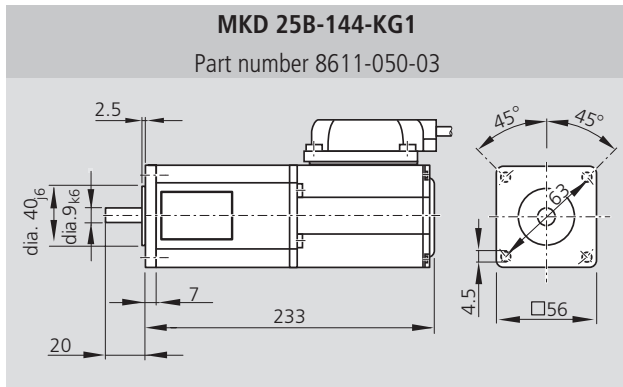
Slide	Dim. A	Dim. B	Dim. C	Dim. D
SGK 12-85	5.5	27	+4	+0.5
SGK 16-100	5.5	30	+6	3.5
SGK 20-130	6.5	40	4	13.5
SGK 25-160	6.5	40	7	16.5
SGK 30-180	7.5	40	14	23.5
SGK 40-230	9.0	40	2	11.5
SGK 50-280	9.0	40	2	11.5

Slide	Dim. A	Dim. B	Dim. C	Dim. D
SOK 12-85	5.5	27	+2	1.5
SOK 16-100	5.5	30	+2	7.5
SOK 20-130	6.5	40	6	15.5
SOK 25-160	6.5	40	9	18.5
SOK 30-180	7.5	40	17	26.5
SOK 40-230	9.0	40	7	16.5
SOK 50-280	9.0	40	9	18.5

Negative values mean that the switch projects above the top edge of the carriage.

Motors

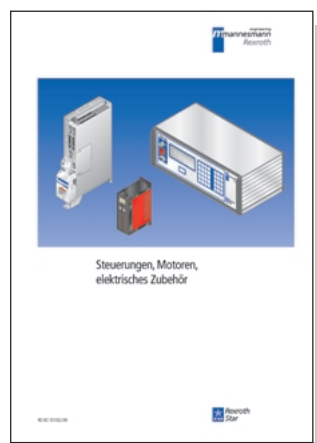
AC servomotors



AC servomotor data

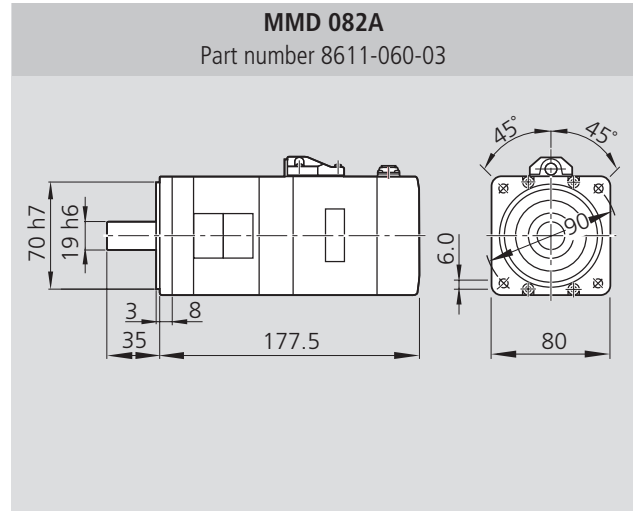
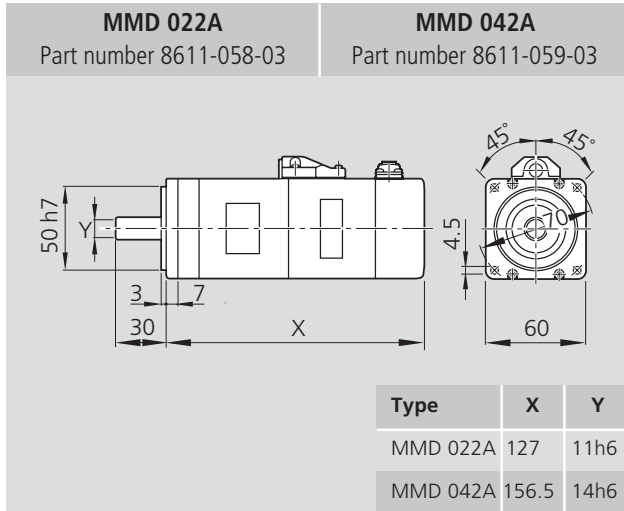
Motor	MKD 25B	MKD 41B	MDD 71B
Max. effective speed n_m (1/min)	⚡	⚡	⚡
Rated torque M_{MN} (Nm)	0.9	2.7	8
Maximum torque M_{Mmax} (Nm)	⚡	⚡	⚡
Mass moment of inertia $J_M + J_{Br}$ (10^{-6} kgm ²)	30+8	170+16	870+38
Brake holding torque M_{Br} (Nm)	1.0	2.2	5.0
Mass with brake m_{Br} (kg)	2.25	4.65	9.17

⚡ See catalog
"Controllers, Motors,
Electrical Accessories"
RE 82 701



STAR – Linear Motion Slides Motors

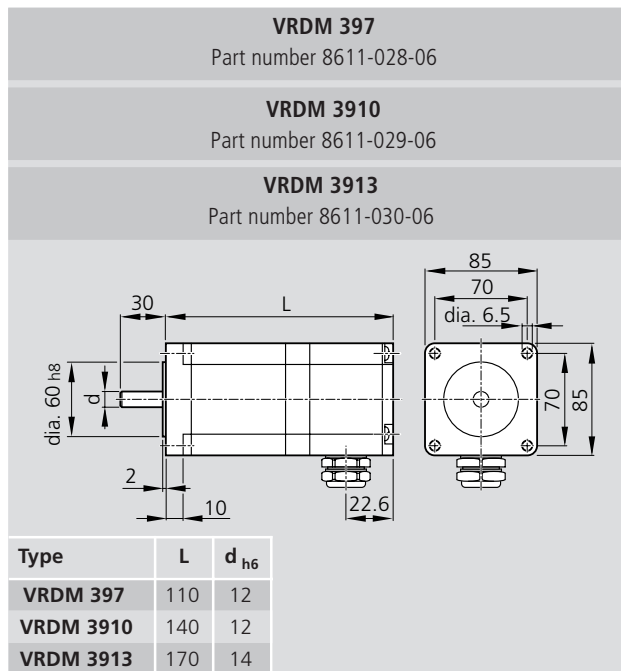
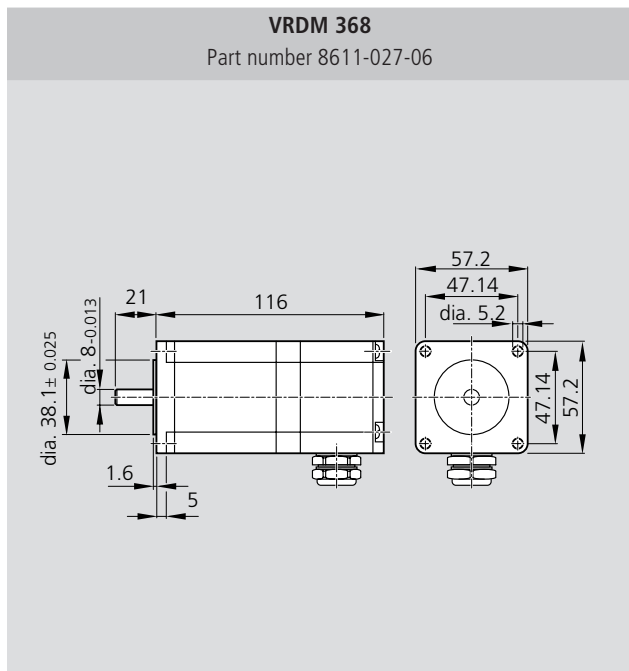
MiniDrive



MiniDrive motor data

Motor		MMD 022A	MMD 042A	MMD 082A
Rated speed n_{max}	(1/min)	3000	3000	3000
Rated torque M_{MN}	(Nm)	0.64	1.3	2.4
Maximum torque M_{max}	(Nm)	1.91	3.36	6.9
Mass moment of inertia $J_M + J_{Br}$	(10^{-6} kgm ²)	17 + 3	37 + 3	133 + 8
Brake holding torque M_{Br}	(Nm)	1.3	1.3	2.4
Mass with brake m_{Br}	(kg)	1.4	2.0	3.7

3-phase stepping motor dimensions



3-phase stepping motor data

Motor	VRDM 368 50 LWB	VRDM 397 50 LWB	VRDM 3910/ 50 LWB	VRDM 3913/ 50 LWB
Number of steps	200 / 400 / 500 / 1000			
Step angle (°)	1.8 / 0.9 / 0.72 / 0.36			
Maximum torque (Nm)	1.5	2.0	4.0	6
Mass moment of inertia (kgcm ²)	0.38	1.1	2.2	3.3
Holding torque (Nm)	1.74	2.26	4.52	6.78
Mass (kg)	1.1	2.05	3.1	4.2

STAR – Linear Motion Slides

Documentation

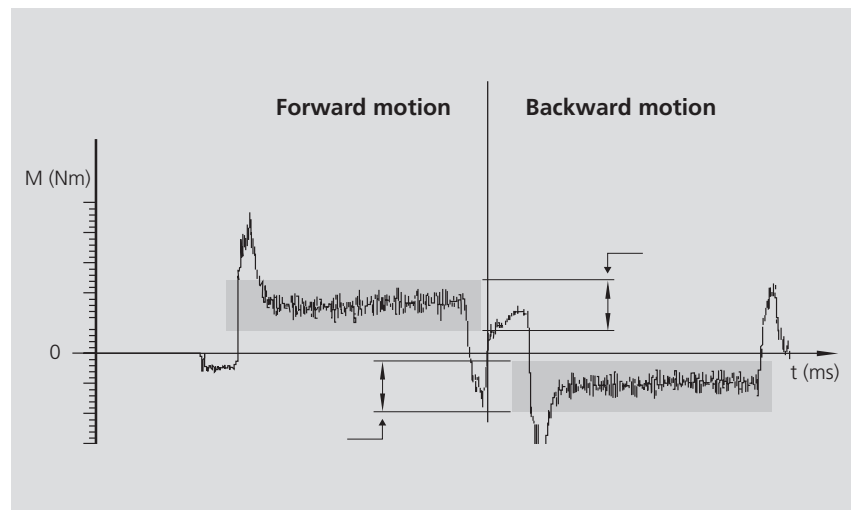
Standard report Option 01

The standard report serves to confirm that the checks listed in the report have been carried out and that the measured values lie within the permissible tolerances.

- Checks listed in the standard report:
- functional checks of mechanical components
 - functional checks of electrical components
 - design is in accordance with confirmation of order

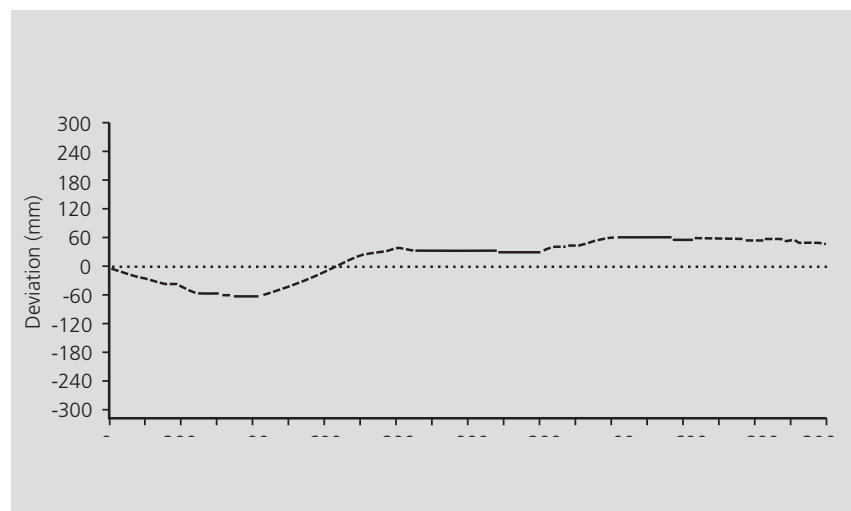
Moment of friction measurement of the complete system Option 02

The moment of friction is measured along the entire travel.



Lead deviation of ball screw for SGK and SOK Option 03

In addition to the graph (see diagram), a measurement report in table form is provided.



Inquiry/Order Form

Rexroth Star GmbH

Telephone + 49-9721-937-0

D-97419 Schweinfurt

Telefax + 49-9721-937-350
(direct)

STAR Linear Motion Slides

Order example: Linear motion slide with linear bushings and shafts

Ordering data	Description
Linear motion slide SKG 25-160 (Part number): 1160-260-00, 1310 mm	Slide designation SKG, length = 1310 mm
Type = MF01	with mount and motor, mounted as in diagram MF01
Guideway = 01	Linear Bushings and Shafts
Drive unit = 03	ball screw 20 x 20
Carriage = 01	carriage
Motor attachment = 01	with mount for motor
Motor = 08	motor MKD 41 B
Cover = 01	polyurethane bellows
1st switch = 15-R+ 390 mm	mechanical switch, switch activation point: right + 390 mm
2nd switch = 11-R- 290 mm	PNP NC, switch activation point: right - 290 mm
3rd switch = 15-R- 390 mm	mechanical switch, switch activation point: right - 390 mm
Cable duct = 20, 1200 mm	cable duct 1200 mm long (loose)
Socket-plug = 17	socket-plug on switch side
Switching cam = 16	for switch activation
Documentation = 03	lead deviation chart for ball screw

To be completed by customer: Inquiry / Order

Linear Motion Slide _____

(Part number): _____ - _____ - _____, length _____ mm

Type =
Guideway =
Drive unit =
Carriage =
Motor attachment =
Motor =
Cover =
1st switch = - + mm
2nd switch = - ± mm
3rd switch = - - mm
Cable duct = , mm
Socket-plug =
Switching cam =
Documentation =

Components:

Motor mount

(Part number): _____ - _____ - _____

Number of units Quantity: _____ pcs., _____ per month, _____ per year, per order, or _____


Comments: _____

From	OEM	User	Distributor
Company: _____			Contact: _____
Address: _____			Position: _____
_____			Telephone: _____
_____			Fax: _____

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Rexroth Star GmbH

D-97419 Schweinfurt
Germany

Telephone +49-9721-937-0

Telefax +49-9721-937-275
(general)

Telefax +49-9721-937-350
(direct)

www.rexroth-star.com

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