The Drive & Control Company

Rexroth
Bosch Group

Precision Modules PSK

Identification system for short product names

Short product name		Example::	P	S	K	-	050	-	N N	-	1
System	=	Precision Module **(P)**									
Guideway	=	Integrated Ball Rail System **(S)**									
Drive unit	=	Precision Ball Screw Assembly **(K)**									
Size	=	040 / **050** / 060 / 090									
Version	=	**N**ormal version									
Generation	=	Product generation **1**									

Precision Modules PSK

Product overview

Product Description

Outstanding features

Rexroth Precision Modules are precise, ready-to-install linear motion systems that combine high performance with compact dimensions.
Rexroth offers favorable price/performance ratios and fast delivery.

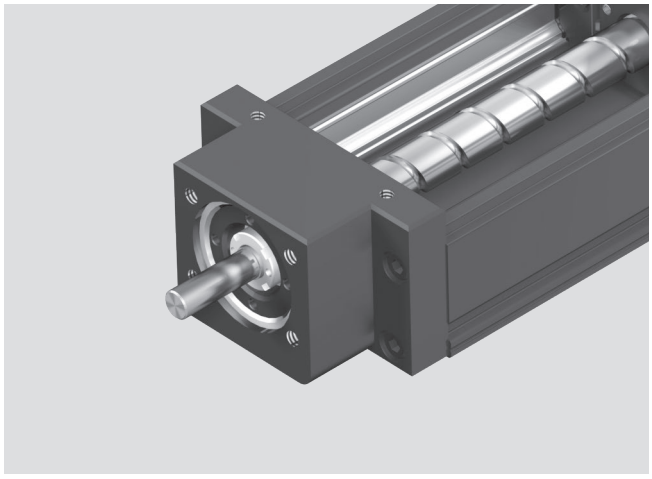
Structural design
- Extremely compact and rigid precision steel profile (frame) with reference edge and integrated Rexroth guideway geometry
- Precision ball screw drive in tolerance grade 7 with zero-backlash nut system
- Aluminum fixed bearing end block with preloaded ball bearings and ball screw journal
- Floating bearing end block with double ball bearings
- One or two steel carriages, standard length or long, for PSK without cover or with cover plate
- One aluminum carriage, standard length or long, for PSK with sealing strip

Attachments
- Maintenance-free digital AC servo drives with integrated brake and attached feedback, or stepping motors
- Motor mount and coupling or timing belt side drive for motor attachment
- Adjustable switches over the entire travel range
- Aluminum profile mounting duct

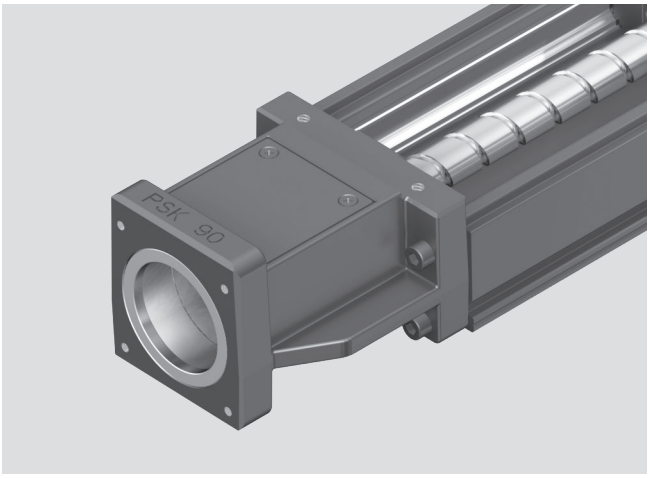
Drive controllers and control systems

Further highlights

- Extremely stiff and precise miniature drive unit
- Optimal travel performance, high load capacities, high precision and high rigidity due to integrated Rexroth Ball Rail System
- High positioning accuracy and repeatability due to Precision Ball Screw Assembly with zero-backlash nut system
- Repeatability up to 0.005 mm
  Positioning accuracy up to 0.01 mm
  Guidance accuracy up to 0.005 mm
- High travel speeds combined with high precision due to Ball Rail Systems, large screw diameters and leads, and double floating bearing
- Rapid mounting and easy axis alignment thanks to machined reference edge on the frame
- Precise alignment and secure mounting of attachments thanks to tapped bores and pin holes in the carriage
- Easy motor attachment via locating feature and fastening threads
- Low-cost maintenance provided by one-point lubrication (grease) for Ball Rail System and Precision Ball Screw Assembly
- Precision Modules in standard lengths for fast delivery



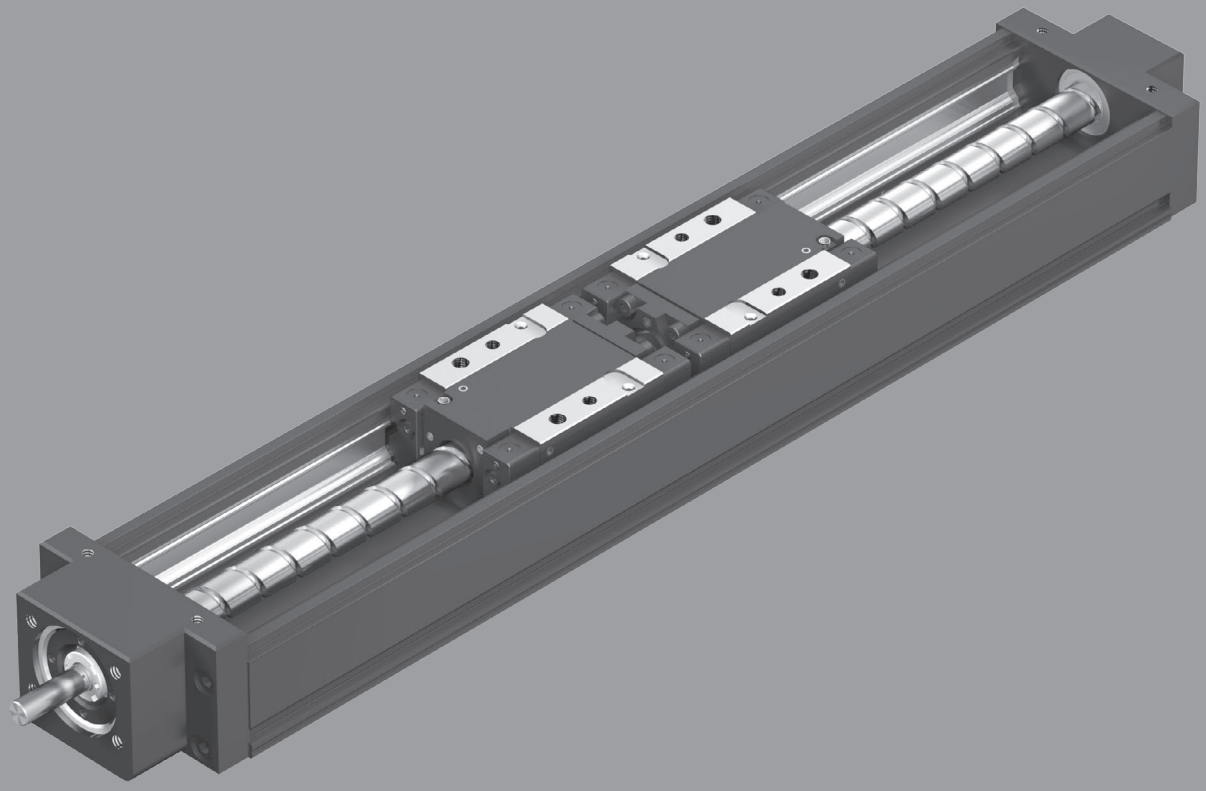
Fixed bearing end block with ball screw journal

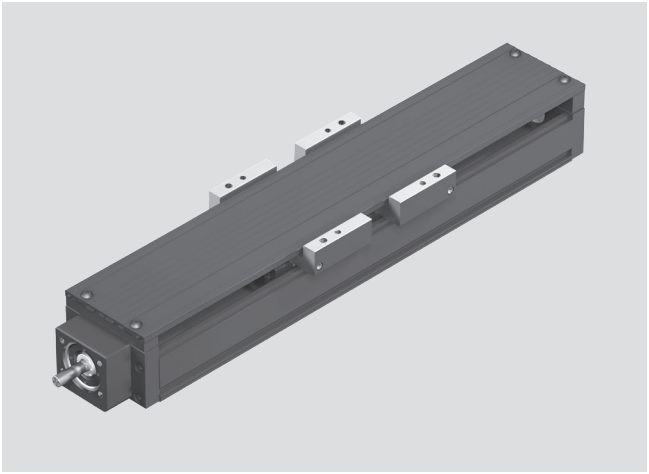


Fixed bearing end block with integrated motor mount

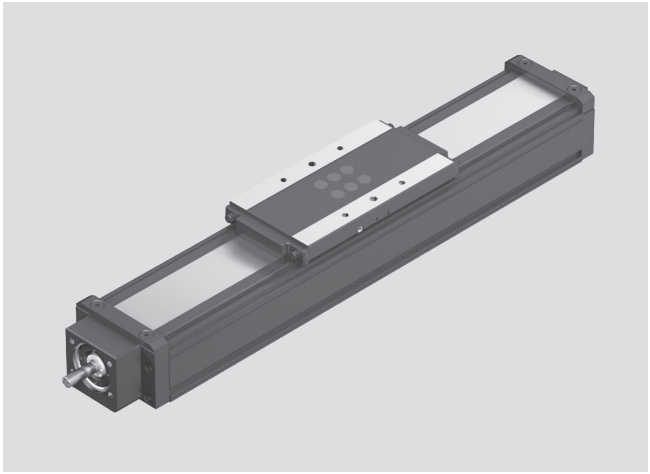
For mounting, maintenance and start-up, see
“Instructions for Precision Modules PSK.”

PSK without cover





Internal elements protected by cover plate
One or two steel carriages, standard length or long



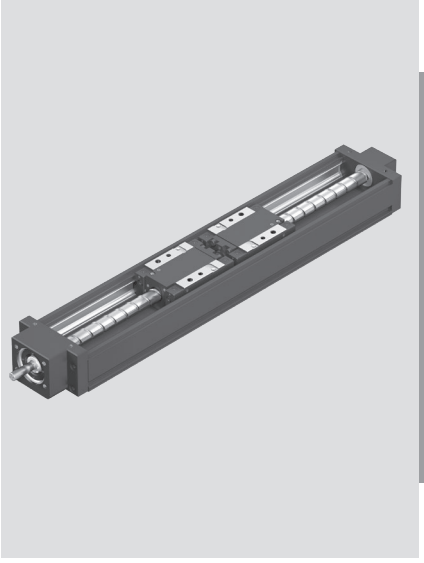
Internal elements protected by stainless steel sealing strip
Aluminum carriage, standard length or long

Product overview

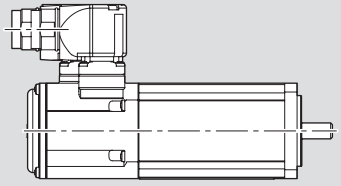
Motor selection

Based on drive controllers and control system

A choice can be made between several different motor/controller combinations to achieve the most cost-efficient solution for each customer application. When sizing the drive, always consider the motor-controller combination.
For more information about motors and control systems, see the following Rexroth catalog:
– IndraDrive for Linear Motion Systems

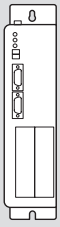


Digital AC servo motors MSK

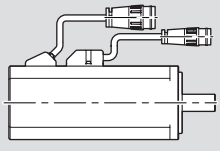


Digital controllers IndraDrive

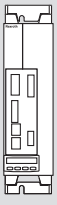
SAFETY ON BOARD

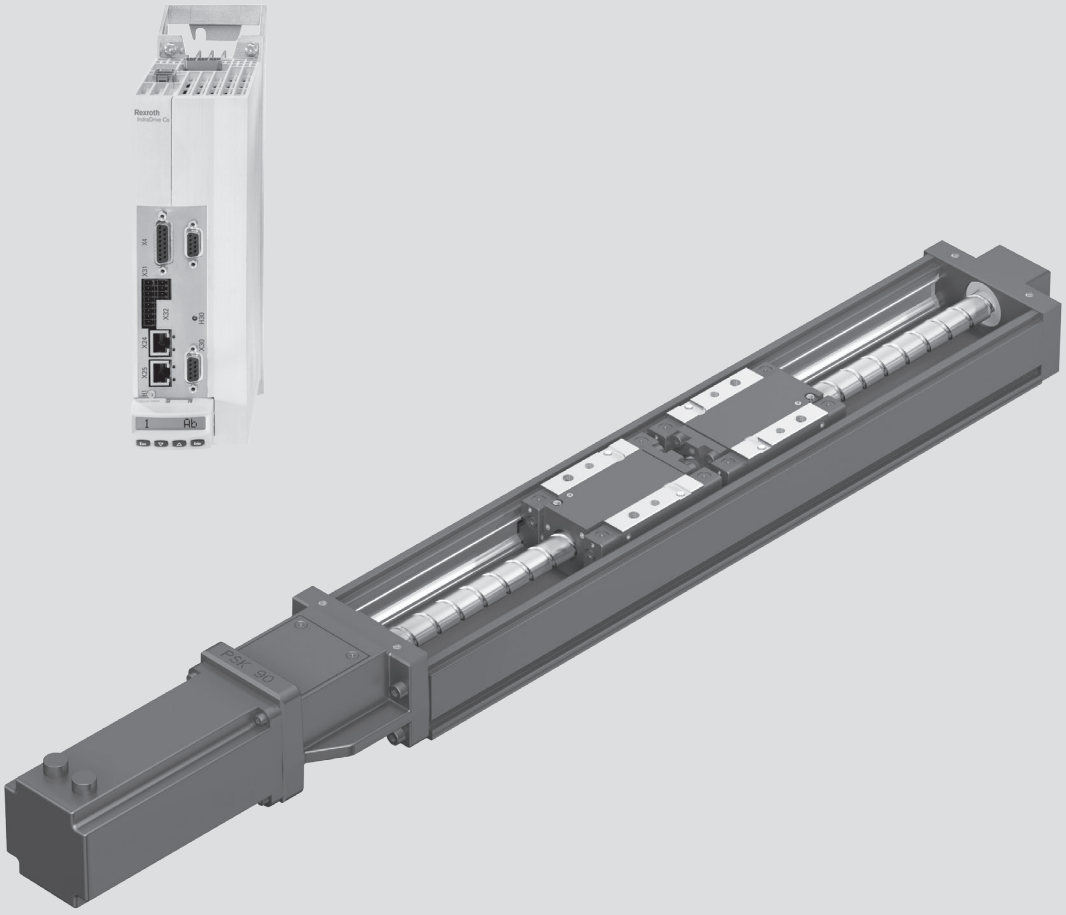


Digital AC servo motors MSM



Digital controllers IndraDrive Cs



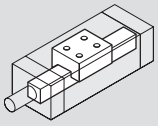
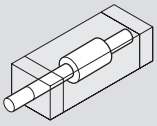
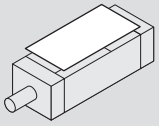
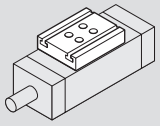
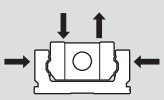


Precision Modules PSK can be supplied complete with motor, controller and control unit.

Product overview

Load capacities and sizes

Overview of types with load capacities

Type	System	Guideway 	Drive unit [1] 	Size	Cover 	Carriage (carr.) 		Load capacities 
							Number	C (N)
PSK	Precision Module	Rail System	Precision Ball Screw Assembly	**PSK-040**	Without / cover plate	Standard	1 carr.	3 065
							2 carr.	4 980
				PSK-050	Without / cover plate	Standard	1 carr.	7 300
							2 carr.	11 850
					Sealing strip	Standard	1 carr.	7 300
						Long	1 carr.	11 850
				PSK-060	Without / cover plate	Standard	1 carr.	7 300
							2 carr.	11 850
						Long	1 carr.	9 000
							2 carr.	14 620
					Sealing strip	Standard	1 carr.	9 000
						Long	1 carr.	14 620
				PSK-090	Without / cover plate	Standard	1 carr.	21 300
							2 carr.	34 600
						Long	1 carr.	27 500
							2 carr.	44 670
					Sealing strip	Standard	1 carr.	21 300
						Long	1 carr.	34 600

1) All Precision Modules can also be supplied without drive unit.

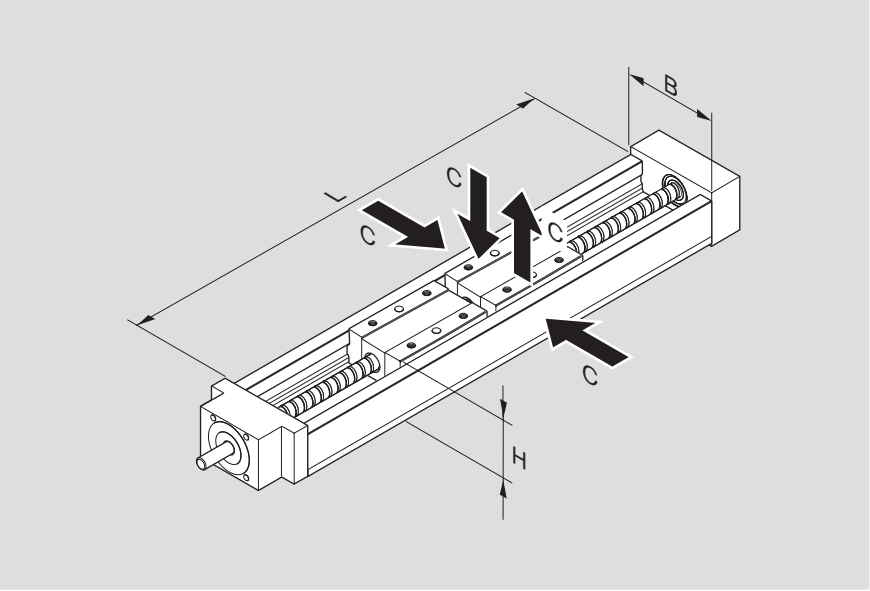
Permissible loads

Suitable loads (recommended values)
With respect to the desired service life, loads up to about 20% of the characteristic dynamic values (**C, M_t, M_L**) have proved acceptable.

At the same time, the following may not be exceeded:
- maximum permissible loads
- permissible drive torque
- permissible travel speed

For permissible values, see the “Technical Data” section.

Dimensions



Standard lengths L

Precision Module		PSK-040	PSK-050	PSK-060	PSK-090
B	(mm)	40	50	60	86
H	(mm)	20	26	33	46
L	(mm)	100	100	150	340
		150	150	200	440
		200	200	250	540
		250	250	300	640
		300	300	400	740
		350	350	500	840
			400	600	940
			450	700	
			500	800	
			550	900	
			600	940	

Product overview

Structural Design

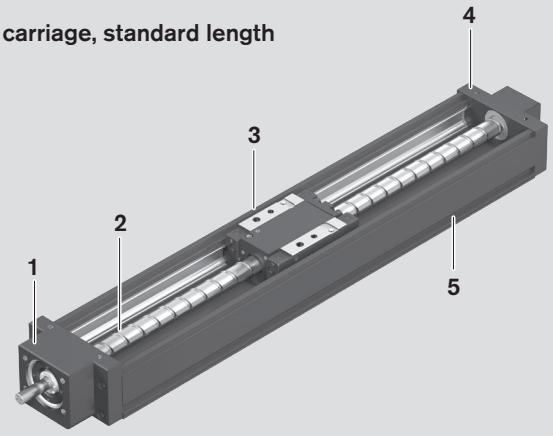
PSK without cover

1 Fixed bearing end block
2 Ball screw with zero-backlash cylindrical single nut
3 One or two steel carriages, standard length or long
4 Floating bearing end block
5 Frame with reference edge and integrated guideway geometry

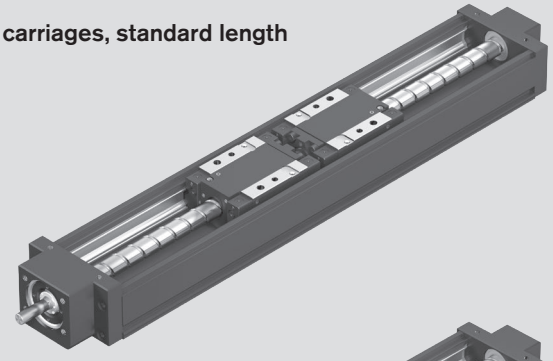
PSK with cover plate

6 Cover plate
7 One or two carriages, standard length or long
8 Carriage plate, aluminum
9 Carriage plate guide unit, steel

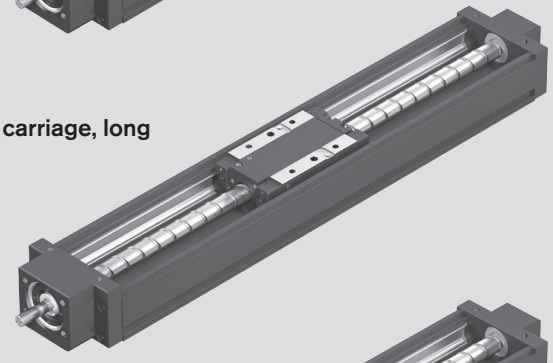
1 carriage, standard length



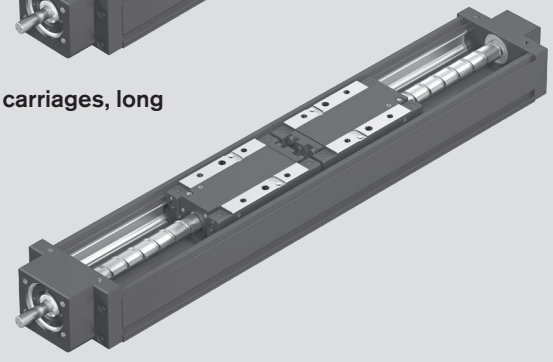
2 carriages, standard length



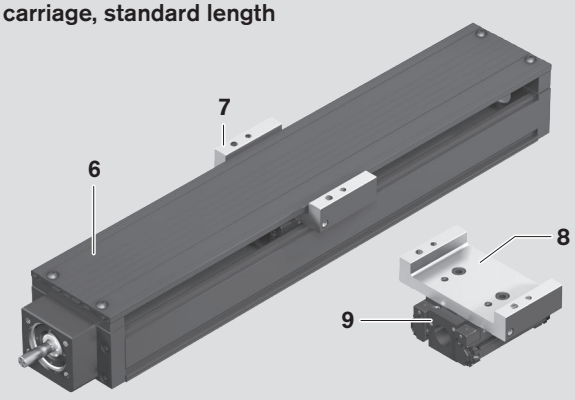
1 carriage, long



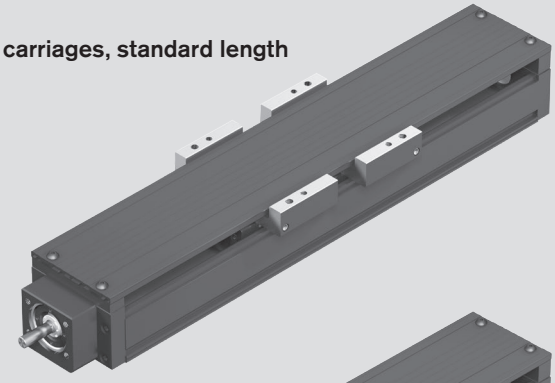
2 carriages, long



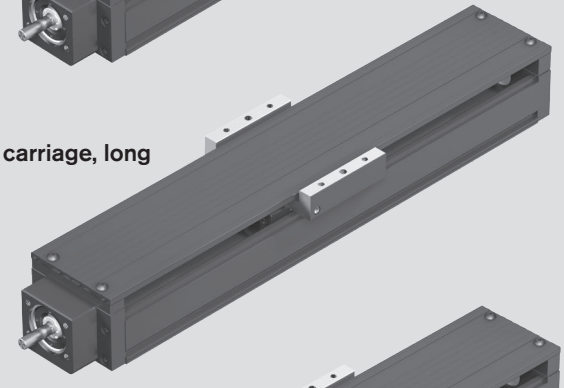
1 carriage, standard length



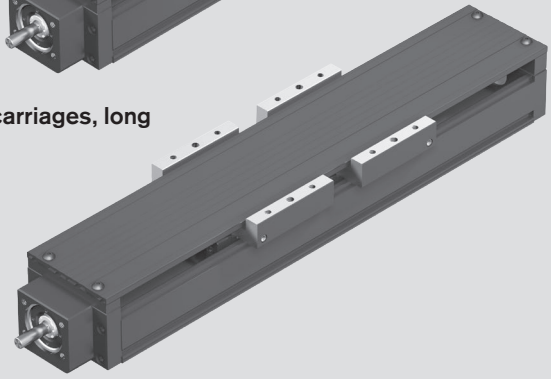
2 carriages, standard length



1 carriage, long



2 carriages, long



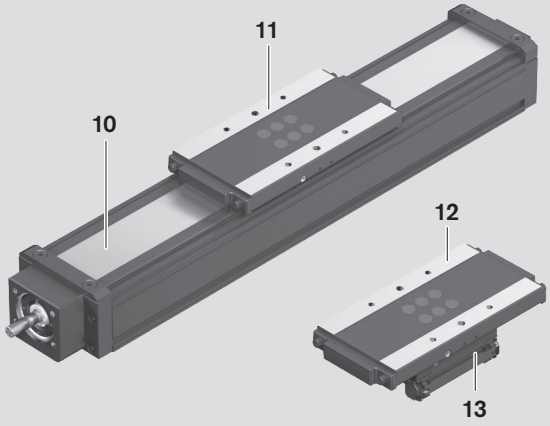
PSK with sealing strip

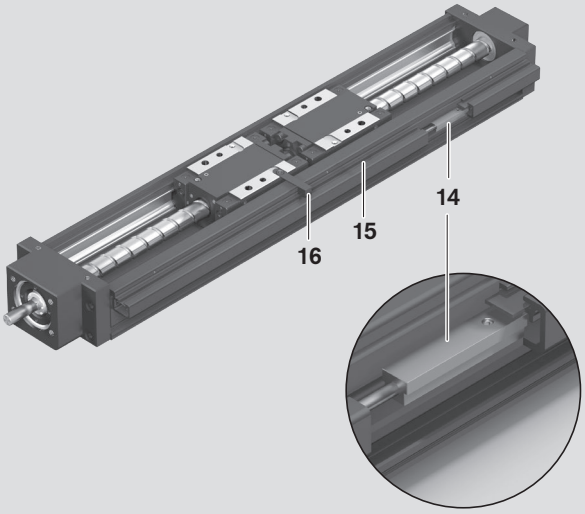
10 Sealing strip, stainless steel
11 One carriage, standard length or long
12 Carriage plate, aluminum
13 Carriage plate guide unit, aluminum

Attachments for all PSK modules

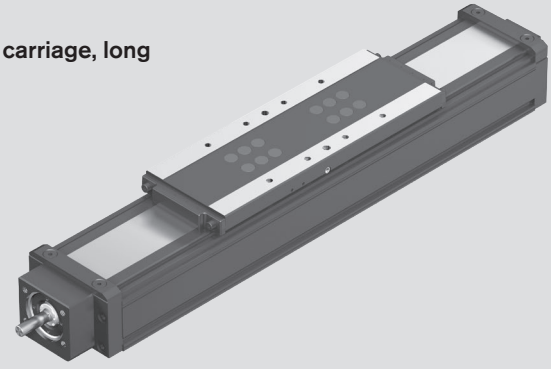
14 Switches
15 Mounting duct
16 Switching cam

1 carriage, standard length





1 carriage, long



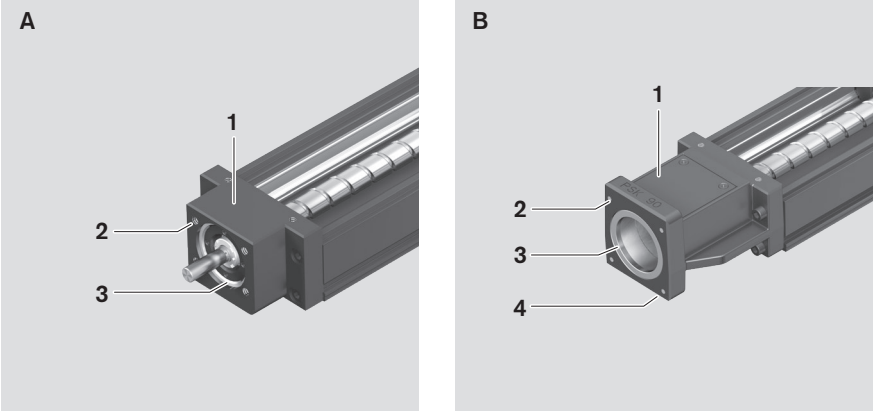
Product overview

Structural Design

Fixed bearing end block

Version with ball screw journal (A)
1 End block with preloaded bearing
2 Tapped mounting hole
3 Centering feature

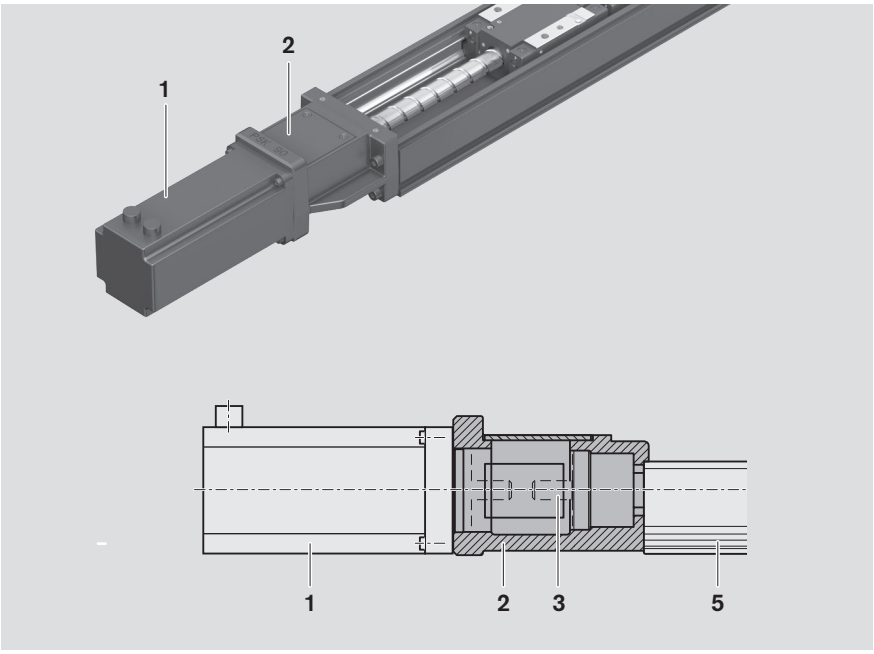
Version with integrated motor mount (B)
1 End block with integrated motor mount and preloaded bearing
2 Tapped mounting hole
3 Centering feature
4 Flange form suitable for motor attachment



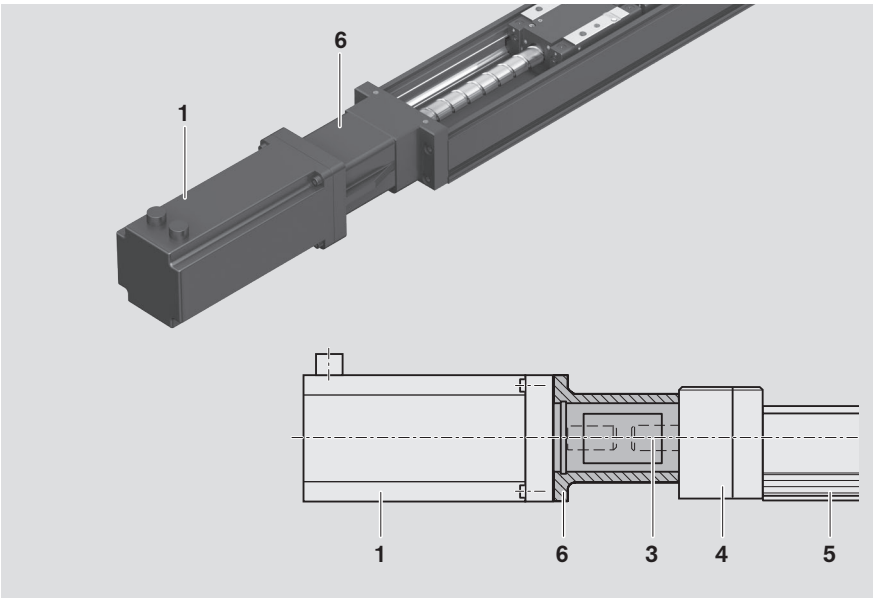
Motor attachment

Motor attachment with motor mount and coupling
A motor can be attached to all Precision Modules by means of a motor mount and coupling.
The motor mount serves to fasten the motor to the Precision Module and acts as a closed housing for the coupling.
The coupling transmits the motor drive torque free of distortive stresses to the Precision Module's ball screw journal.

Fixed bearing end block with integrated motor mount and coupling
1 Motor
2 Fixed bearing end block with integrated motor mount
3 Coupling
5 Precision module



Fixed bearing end block with attached motor mount and coupling
1 Motor
3 Coupling
4 Fixed bearing end block
5 Precision module
6 Motor mount

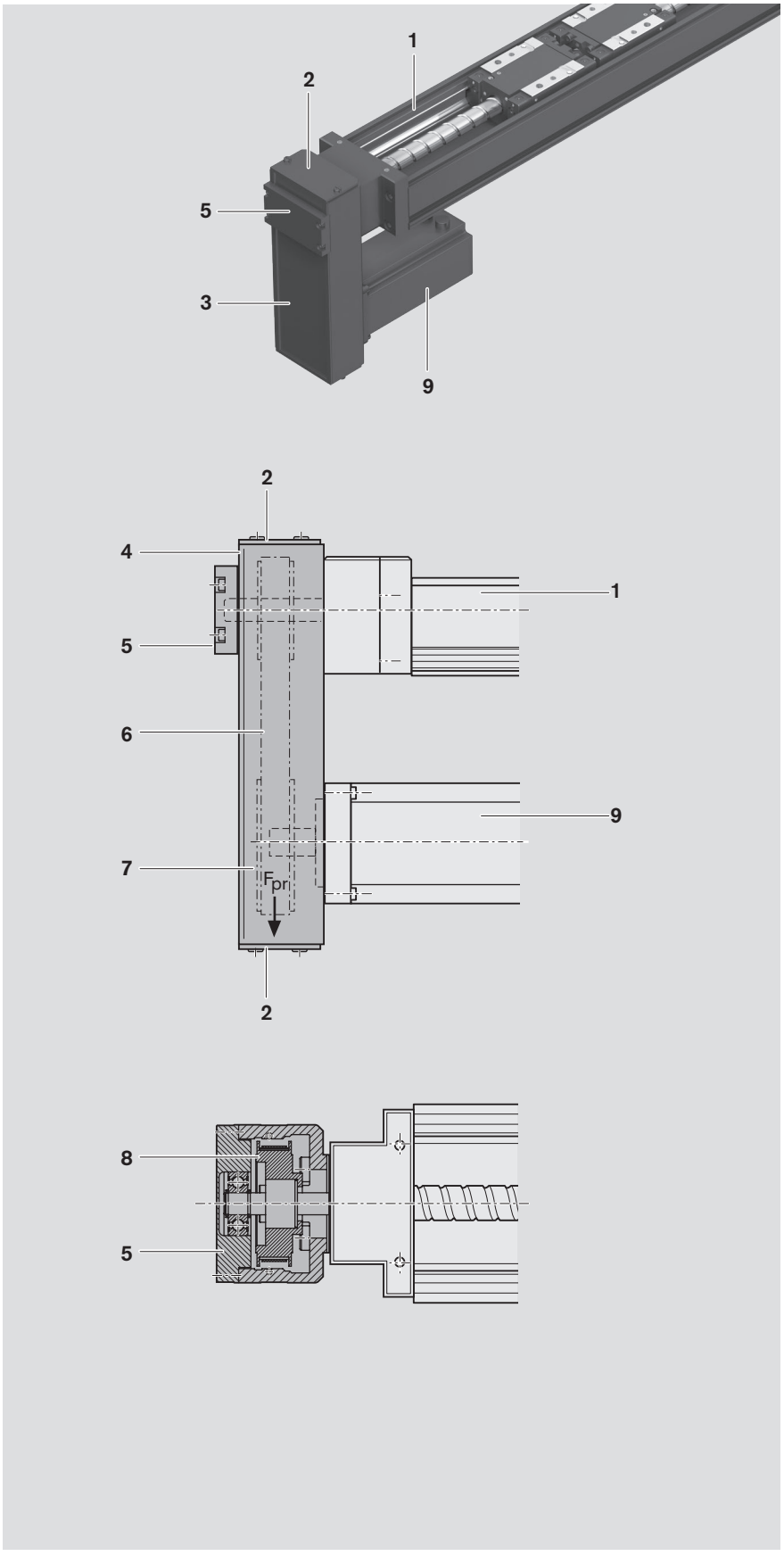


Motor attachment with timing belt side drive
On Precision Modules PSK-050 and PSK-090 the motor (9) can be attached via a side drive with timing belt.
This makes the overall length shorter than when attaching the motor with a motor mount and coupling.
The compact, closed housing protects the belt and secures the motor.

The following gear ratios are available:
i = 1 : 1
i = 1 : 1.5

The timing belt side drive can be mounted in four different directions:
– top, bottom
– left, right

1 Precision module
2 End cover
3 Cover plate
4 Drawn, anodized aluminum profile
5 Ball screw journal with support bearing
6 Toothed belt
7 Pre-tensioning of the toothed belt: Apply pretensioning force F_{pr} to motor (F_{pr} will be indicated on delivery)
8 Belt pulleys
9 AC servo motor



Technical Data

General technical data

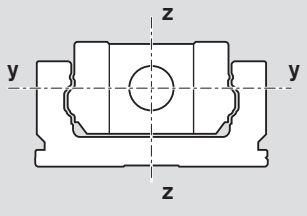
Precision Module	Planar moment of inertia		Minimum center-to-center distance $l_{m\,min}$		Mass of the linear motion system m_s (kg)			
	I_y (cm^4)	I_z (cm^4)	Standard carr. (mm)	Long carr. (mm)	Without cover, without drive	Without cover, with drive	With cover plate	With sealing strip
PSK-040	0.892	6.65	50	–	$0.0026 \cdot L + m_{ca}$	$0.0028 \cdot L + 0.075 + m_{ca}$	$0.0030 \cdot L + 0.089 + m_{ca}$	–
PSK-050	1.690	13.50	60	–	$0.0035 \cdot L + m_{ca}$	$0.0038 \cdot L + 0.179 + m_{ca}$	$0.0041 \cdot L + 0.204 + m_{ca}$	$0.0042 \cdot L + 0.208 + m_{ca}$
PSK-060	5.380	34.48	60	75	$0.0062 \cdot L + m_{ca}$	$0.0069 \cdot L + 0.254 + m_{ca}$	$0.0072 \cdot L + 0.281 + m_{ca}$	$0.0073 \cdot L + 0.272 + m_{ca}$
PSK-090	22.340	145.80	90	110	$0.0125 \cdot L + m_{ca}$	$0.0138 \cdot L + 0.638 + m_{ca}$	$0.0146 \cdot L + 0.726 + m_{ca}$	$0.0147 \cdot L + 0.736 + m_{ca}$

Dynamic characteristics

Precision Module	Type of cover	Carriage (carr.)		Guideway			Ball screw		Fixed bearing
			Number	Dynamic load capacity	Dynamic load moments		Size	Dynamic load capacity	Dynamic load capacity
				C (N)	M_t (Nm)	M_L (Nm)	d_0 x P	C (N)	C (N)
PSK-040	W/o and w/plate	Standard	1 carr.	3 065	43.1	14.8	6 x 1	900	820
			2 carr.	4 980	70.0	2.49 x l_m	6 x 2	890	820
PSK-050	W/o and w/plate	Standard	1 carr.	7 300	150.0	35	8 x 2.5	2 200	1 600
			2 carr.	11 850	244.0	5.93 x l_m	8 x 2.5	2 200	1 600
	Strip	Standard	1 carr.	7 300	150.0	35	8 x 2.5	2 200	1 600
		Long	1 carr.	11 850	244.0	356	8 x 2.5	2 200	1 600
PSK-060	W/o and w/plate	Standard	1 carr.	7 300	170.0	35	12 x 2	2 240	4 000
			2 carr.	11 850	276.0	5.93 x l_m	12 x 2	2 240	4 000
		Long	1 carr.	9 000	210.0	60	12 x 5	3 800	4 000
			2 carr.	14 620	341.0	7.31 x l_m	12 x 5	3 800	4 000
	Strip	Standard	1 carr.	9 000	210.0	60	12 x 10	2 500	4 000
		Long	1 carr.	14 620	341.0	541	12 x 10	2 500	4 000
PSK-090	W/o and w/plate	Standard	1 carr.	21 300	710.0	150	16 x 5	12 300	13 400
			2 carr.	34 600	1153.0	17.3 x l_m	16 x 5	12 300	13 400
		Long	1 carr.	27 500	910.0	270	16 x 10	9 600	13 400
			2 carr.	44 670	1478.0	22.34 x l_m	16 x 10	9 600	13 400
	Strip	Standard	1 carr.	21 300	710.0	150	16 x 16	6 300	13 400
		Long	1 carr.	34 600	1153.0	1557	16 x 16	6 300	13 400

Maximum acceleration: $a_{max} = 27\ m/s^2$

l_m = center-to-center distance between carriages (mm)
d_0 = screw diameter (mm)
P = screw lead (mm)
carr. = carriage(s) (mm)
m_{ca} = moved mass of system (kg)



Mass
Mass calculation without motor and switches.
Mass formula:
Mass factor (kg/mm) · length L (mm) + mass of all parts of fixed length (kg) + moved mass of system m_{ca} (kg)

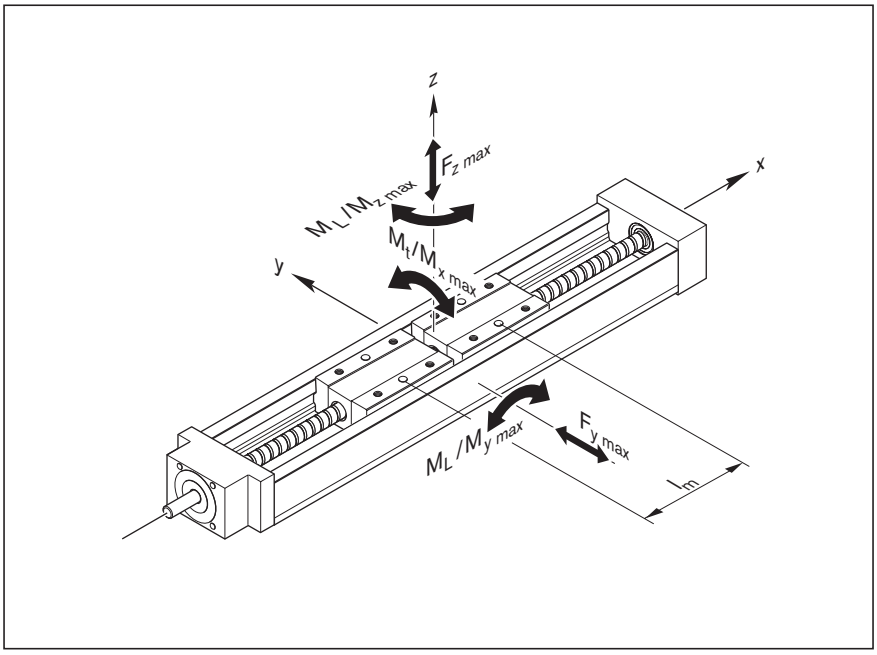
Modulus of elasticity E $E = 210{,}000\ N/mm^2$

Ambient temperature 0 °C ... 40 °C

Note on dynamic load capacities and moments
Determination of the dynamic load capacities and moments is based on a travel life of 100,000 m.
Often only 50,000 m are actually stipulated.
For comparison: Multiply values **C**, $\mathbf{M_t}$ and $\mathbf{M_L}$ from the table by 1.26.

Maximum permissible loads
The maximum permissible forces ($F_{y\,max}$, $F_{z\,max}$) and moments ($M_{x\,max}$, $M_{y\,max}$, $M_{z\,max}$) are equal to half the dynamic characteristics (**C**, $\mathbf{M_t}$, $\mathbf{M_L}$).

Suitable loads (recommended values)
With respect to the desired service life, loads up to about 20% of the characteristic dynamic values (**C**, $\mathbf{M_t}$, $\mathbf{M_L}$) have proved acceptable.
At the same time, the following may not be exceeded:
– maximum permissible loads
– permissible drive torque
– permissible travel speed
– maximum permissible acceleration



l_m = center-to-center distance between carriages (mm)

Moved mass of system m_{ca}

Precision Module	Carriage	Moved mass of system m_{ca} (kg)						
		Without cover, without drive		Without cover, with drive		With cover plate		With sealing strip
		1 carr.	2 carr.	1 carr.	2 carr.	1 carr.	2 carr.	1 carr.
PSK-040	Standard	0.08	0.17	0.09	0.18	0.14	0.28	–
PSK-050	Standard	0.20	0.40	0.22	0.42	0.29	0.56	0.20
	Long	–	–	–	–	–	–	0.37
PSK-060	Standard	0.25	0.49	0.27	0.52	0.38	0.73	0.33
	Long	0.34	0.69	0.37	0.71	0.51	1.00	0.58
PSK-090	Standard	0.77	1.54	0.85	1.62	1.09	2.10	0.80
	Long	1.04	2.08	1.11	2.15	1.43	2.79	1.40

carr. = carriage(s) (mm)

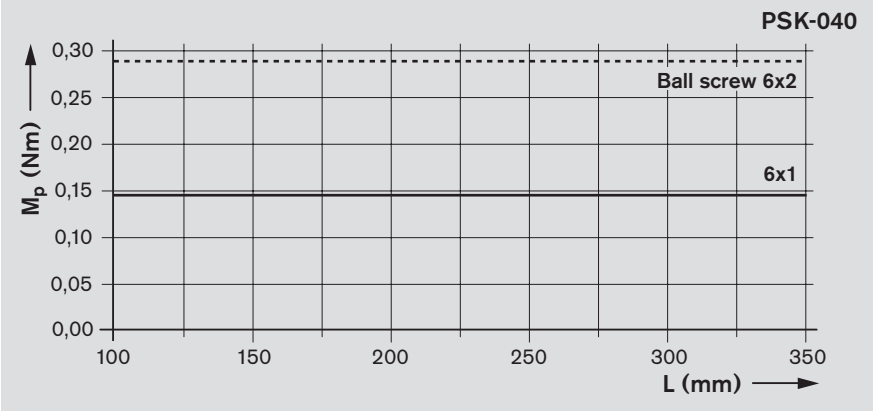
Technical Data

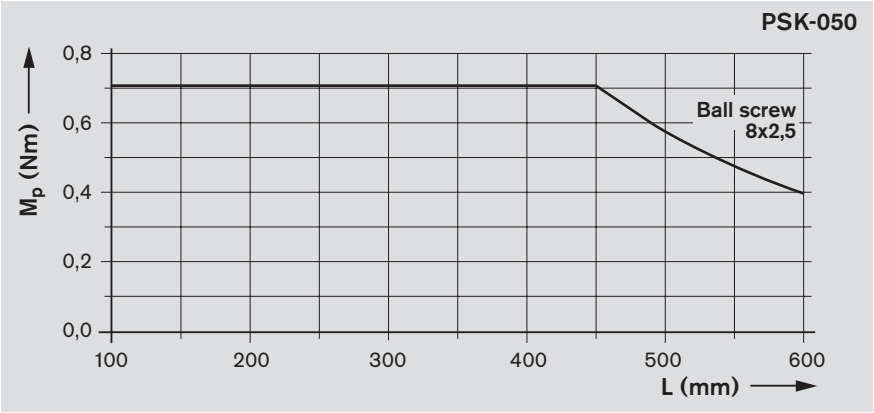
General technical data

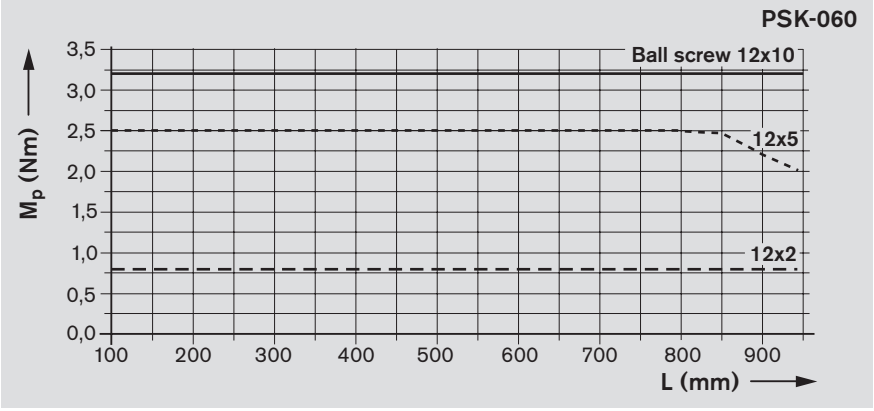
Maximum permissible drive torque at the screw journal M_p

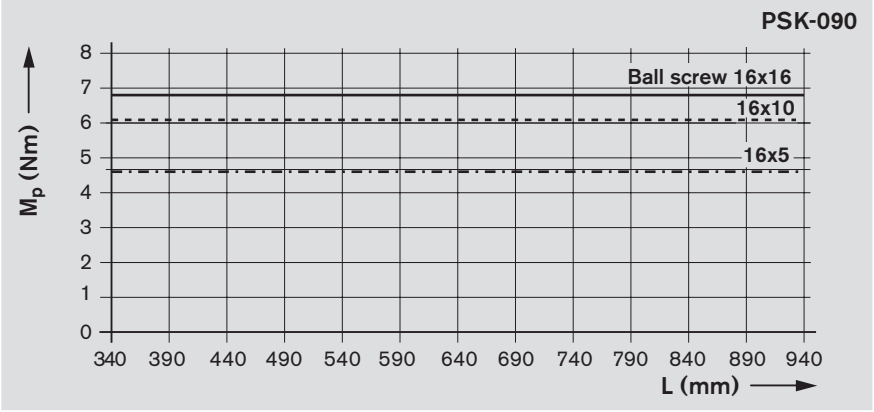
The values shown for M_p are applicable under the following conditions:
- Horizontal operation
- Ball screw journal without keyway
- No radial load on ball screw shaft

Consider the rated torque of the coupling used!





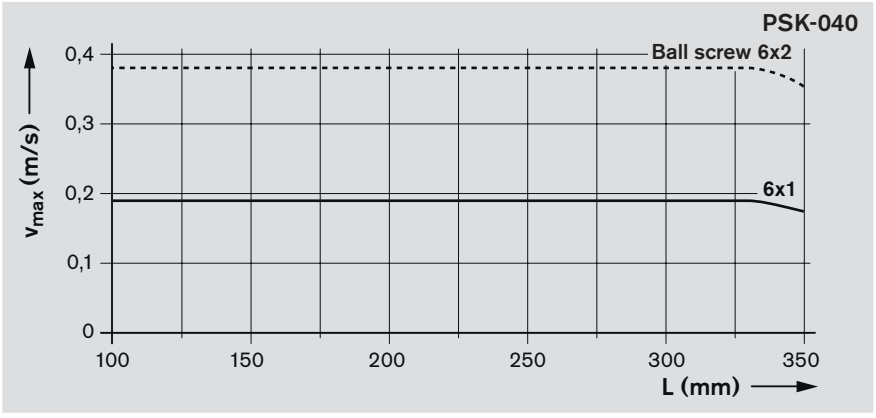


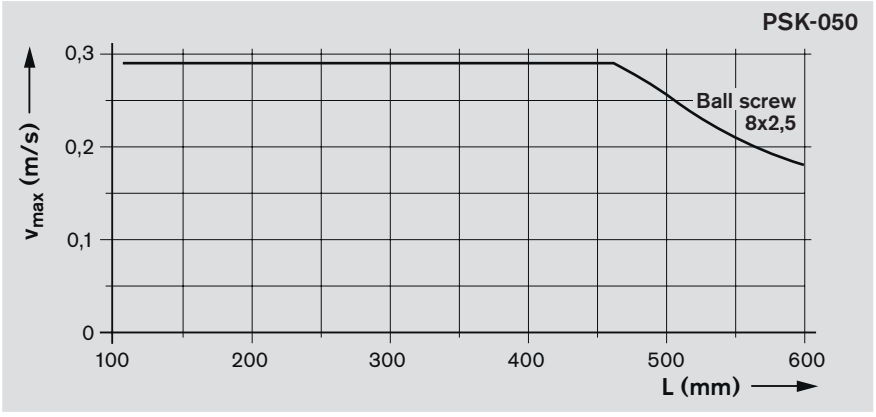


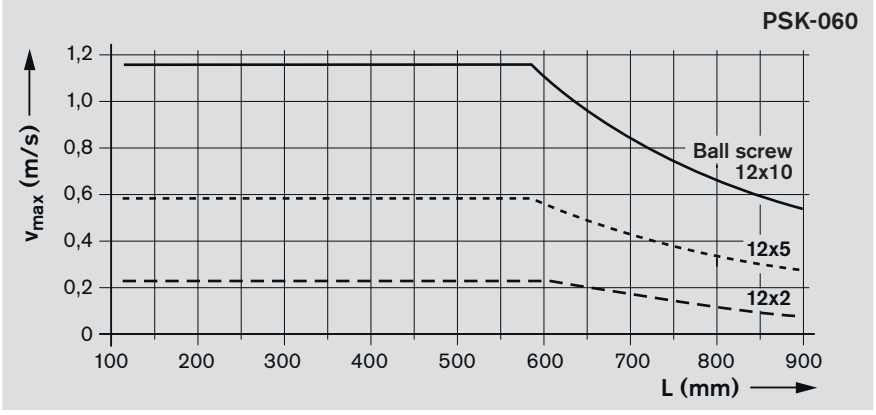
L	=	PSK length	(mm)
Ball screw	=	ball screw size: d_0 x P	
d_0	=	screw diameter	(mm)
P	=	lead	(mm)

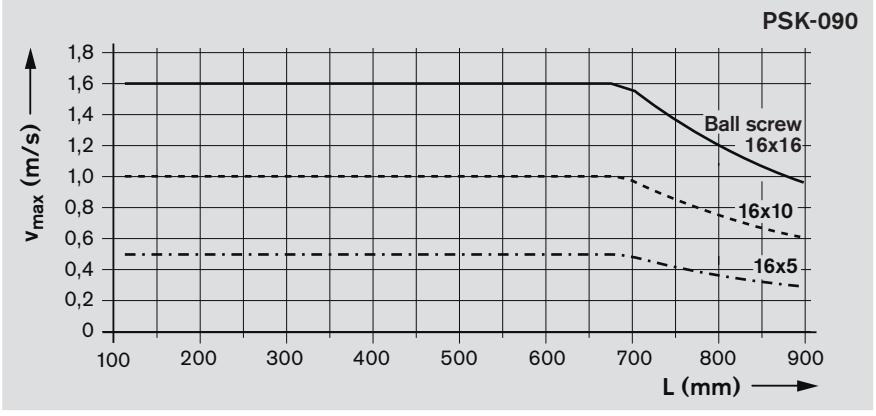
Maximum permissible linear speed v_{max}

Consider the motor speed!









L	=	PSK length	(mm)
Ball screw	=	ball screw size: d_0 x P	
d_0	=	screw diameter	(mm)
P	=	lead	(mm)

Technical Data

General technical data

Motor attachment via timing belt side drive

Motor type		MSM 019B					MSM 031B / MSM 031C / MSK 030				
F	(mm)	48					64.5				
M_{Rsd}	(Nm)	0.10					0.15				
m_{sd}	(kg)	0.28					0.65				
			M_{sd} [2]		J_{sd}			M_{sd} [2]		J_{sd}	
Gear ratio i			i = 1	i = 1.5	i = 1	i = 1.5		i = 1	i = 1.5	i = 1	i = 1.5
Belt type			6 AT3	6 AT3	6 AT3	6 AT3		10 AT3	10 AT3	10 AT3	10 AT3
Size	BS	up to L[1]					up to L[1]				
	d_0 x P	(mm)	(Nm)	(Nm)	(10^{-6} kgm²)	(10^{-6} kgm²)	(mm)	(Nm)	(Nm)	(10^{-6} kgm²)	(10^{-6} kgm²)
PSK-050	8 x 2.5	450	0.61	0.41	10.7	4.1	–	–	–	–	–
PSK-060	12 x 2	940	0.79	0.53	10.7	4.1	940	0.79	0.53	34.8	13.1
	12 x 5	940	1.31	0.87			800	2.48	1.65		
	12 x 10	940	1.31	0.87			940	2.70	1.80		
PSK-090	16 x 5	–	–	–	–	–	940	2.87	1.91	41.5	13.4
	16 x 10	–	–	–			940	2.87	1.91		
	16 x 16	–	–	–			940	2.87	1.91		

Motor type		MSM 041B / MSK 040				
F	(mm)	88				
M_{Rsd}	(Nm)	0.40				
m_{sd}	(kg)	1.45				
			M_{sd} [2]		J_{sd}	
Gear ratio i			i = 1	i = 1.5	i = 1	i = 1.5
Belt type			16 AT5	16 AT5	16 AT5	16 AT5
Size	BS	up to L[1]				
	d_0 x P	(mm)	(Nm)	(Nm)	(10^{-6} kgm²)	(10^{-6} kgm²)
PSK-090	16 x 5	940	4.31	2.87	234.4	83.6
	16 x 10	940	5.85	3.90		
	16 x 16	940	6.42	4.28		

1) For longer lengths, the permitted drive torque is determined by the length-dependent value M_p of the linear system as given in the graphs ➠ section “Technical Data”
2) Values for M_{sd} do not take motor torque into account.

i = timing belt side drive reduction
BS = ball Screw Assembly
d_0 = screw diameter (mm)
P = screw lead (mm)
J_{sd} = mass moment of inertia of timing belt side drive
M_{Rsd} = frictional torque of timing belt side drive at motor journal
M_{sd} = maximum permissible drive torque of the timing belt side drive
m_{sd} = mass of timing belt side drive

Frictional torque of the linear motion system M_{Rs}

Precision Module	Ball screw size	Frictional torque of the linear motion system M_{Rs} (Nm) for carriage version			
		Without cover or with cover plate		With sealing strip	
	d_0 x P	Standard carr.	Long carr.	Standard carr.	Long carr.
PSK-040	6 x 1	0.033	–	–	–
	6 x 2	0.034	–	–	–
PSK-050	8 x 2.5	0.06	–	0.06	0.07
PSK-060	12 x 2	0.10	0.10	0.10	0.11
	12 x 5	0.11	0.11	0.11	0.12
	12 x 10	0.12	0.13	0.13	0.15
PSK-090	16 x 5	0.30	0.30	0.29	0.31
	16 x 10	0.32	0.32	0.30	0.34
	16 x 16	0.34	0.36	0.32	0.37

carr. = carriage(s) (mm)
d_0 = screw diameter (mm)
P = screw lead (mm)

Mass moment of inertia of the linear motion system J_s referred to the drive journal

$$J_s = (k_{J\,fix} + k_{J\,var} \cdot L) \cdot 10^{-6}$$

J_s = mass moment of inertia of linear motion system (without external load) (kgm^2)
$k_{J\,fix}$ = constant for fixed-length portion of mass moment of inertia ($10^6\ kgm^2$)
$k_{J\,m}$ = constant for mass-specific portion of mass moment of inertia ($10^6\ kgm^2$)
$k_{J\,var}$ = constant for variable-length portion of mass moment of inertia (10^9 kgm)
L = length (mm)

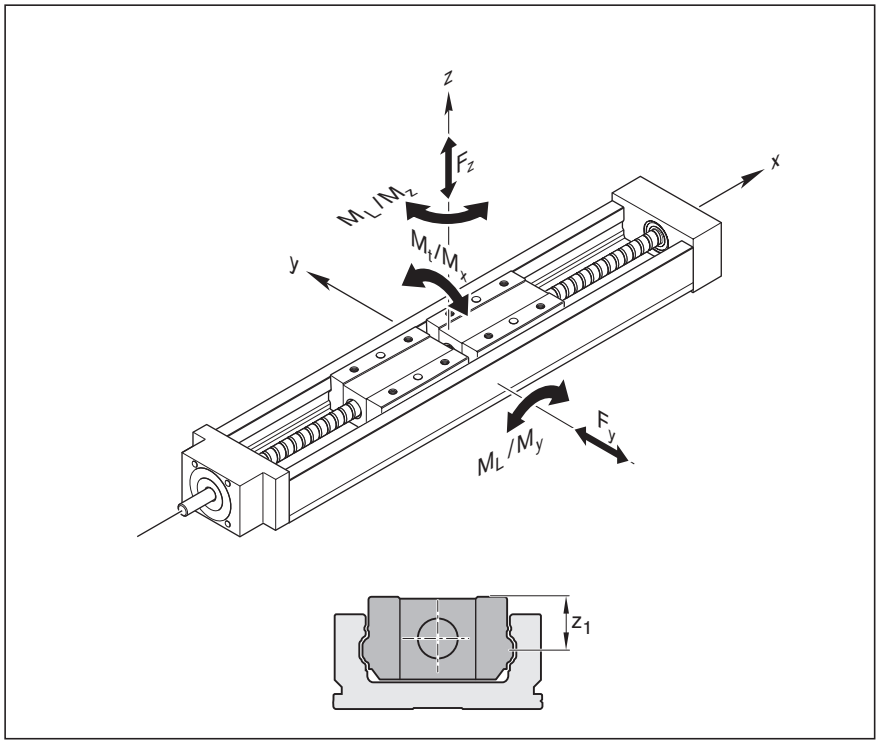
Precision Module	Ball screw size d_0 x P	Carriage	$k_{J\,fix}$ Without cover 1 carr.	Without cover 2 carr.	Cover plate 1 carr.	Cover plate 2 carr.	Sealing strip 1 carr.	$k_{J\,var}$	$k_{J\,m}$
PSK-040	6 x 1	Standard	0.115	0.117	0.116	0.120	–	0.002	0.025
	6 x 2	Standard	0.122	0.131	0.127	0.141	–	0.002	0.101
PSK-050	8 x 2,5	Standard	0.533	0.565	0.544	0.587	0.530	0.004	0.158
		Long	–	–	–	–	0.557		
PSK-060	12 x 2	Standard	0.999	1.024	1.010	1.045	1.005	0.013	0.101
		Long	1.009	1.043	1.023	1.073	1.030		
	12 x 5	Standard	1.130	1.289	1.200	1.422	1.168	0.011	0.633
		Long	1.194	1.409	1.282	1.593	1.327		
	12 x 10	Standard	1.643	2.277	1.922	2.808	1.795	0.011	2.533
		Long	1.897	2.758	2.251	3.492	2.492		
PSK-090	16 x 5	Standard	4.216	4.703	4.368	5.007	4.184	0.031	0.633
		Long	4.380	5.039	4.583	5.444	4.564		
	16 x 10	Standard	5.831	7.781	6.439	8.997	5.704	0.031	2.533
		Long	6.489	9.124	7.300	10.745	7.224		
	16 x 16	Standard	9.213	14.207	10.770	17.319	8.889	0.034	6.485
		Long	10.899	17.643	12.974	21.793	12.780		

Motor attachment via motor mount and coupling

Precision Module	for motor attachment	Coupling data Rated torque M_{cN} (Nm)	Mass moment of inertia J_c ($10^{-6}\ kgm^2$)	Mass Assembly kit Motor mount m_c (kg)
PSK-040	MSM 019B	0.70	0.12	0.09
PSK-050	MSM 019B	1.90	2.10	0.09
	MSM 031B	3.70	7.00	0.28
	MSK 030C	3.70	7.00	0.25
PSK-060	MSM 031B	3.70	7.00	0.30
	MSK 030C	1.90	2.10	0.15
PSK-090	MSM 031C	10.00	35.00	0.41
	MSM 041B	9.00	60.00	0.77
	MSK 030C	10.00	35.00	0.43
	MSK 040C	9.00	60.00	0.73

Calculations

Calculation principles



Combined equivalent load on bearing of the linear guide

$$(1) \qquad F_{comb} = |F_y| + |F_z| + C \cdot \frac{|M_x|}{M_t} + C \cdot \frac{|M_y|}{M_L} + C \cdot \frac{|M_z|}{M_L}$$

F_{comb}	=	combined equivalent load on bearing	(N)
F_y	=	force in y-direction	(N)
F_z	=	force in z-direction	(N)
M_x	=	torsional moment (about the x-axis)	(Nm)
M_y	=	torsional moment (about the y-axis)	(Nm)
M_z	=	torsional moment (about the z-axis)	(Nm)
C	=	dynamic load capacity	(N)
M_t	=	dynamic torsional moment load capacity	(Nm)
M_L	=	dynamic longitudinal moment load capacity	(Nm)

	z_1 (mm)		
	Without cover	Cover plate	Sealing strip
PSK-040	11	23	–
PSK-050	13	27	27
PSK-060	17	32	32
PSK-090	22	44	44

z_1 = distance between guideway centerline and top edge of carriage (mm)

Nominal life

Nominal life of the guideway in meters:

(2) $$L = \left(\frac{C}{F_{comb}}\right)^3 \cdot 10^5 \text{ m}$$

Nominal life of the guideway in hours:

(3) $$L_h = \frac{L}{3600 \cdot v_m}$$

Frictional torque

Frictional torque for motor attachment via motor mount and coupling:

(4) $$M_R = M_{Rs}$$

Frictional torque for motor attachment via timing belt side drive:

(5) $$M_R = \frac{M_{Rs}}{i} + M_{R\,sd}$$

Mass moment of inertia

for motor attachment via motor mount and coupling:

(6) $$J_{ex} = J_s + J_t + J_c$$

for motor attachment via timing belt side drive:

(7) $$J_{ex} = \frac{J_s + J_t}{i^2} + J_{sd}$$

Determination of mass moment of inertia of Linear Motion System components:

(8) $$J_s = (k_{J\,fix} + k_{J\,var} \cdot L) \cdot 10^{-6}$$

Translatory mass moment of inertia of external load referred to the drive journal:

(9) $$J_t = m_{ex} \cdot k_{Jm} \cdot 10^{-6}$$

C	=	dynamic load capacity	(N)
F_{comb}	=	combined equivalent load on bearing	(N)
i	=	timing belt side drive reduction	(–)
J_c	=	mass moment of inertia, coupling	(kgm^2)
J_{ex}	=	mass moment of inertia of mechanical system	(kgm^2)
J_s	=	mass moment of inertia of linear motion system (without external load)	(kgm^2)
J_{sd}	=	mass moment of inertia of belt timing belt side drive at the motor journal	(kgm^2)
J_t	=	translatory mass moment of inertia of external load referred to the drive journal	(kgm^2)
k_{Jm}	=	constant for mass-specific portion of mass moment of inertia	($10^6\ m^2$)
L	=	nominal life	(m)
L_h	=	nominal life	(h)
m_{ex}	=	moved external load	(kg)
M_R	=	frictional torque at motor journal	(Nm)
$M_{R\,sd}$	=	frictional torque of timing belt side drive	(Nm)
M_{Rs}	=	frictional torque of linear motion system	(Nm)
v_m	=	average speed	(m/s)

Calculations

Calculation principles

Mass moment of inertia of the drive train referred to the motor journal

$$V = \frac{J_{ex}}{J_m + J_{br}} \quad (10)$$

Mass moment of inertia ratio

$$n_{mech} = \frac{v_{max} \cdot i \cdot 1\,000 \cdot 60}{P} \quad (11)$$

Application area	V
Handling	≤ 6.0
Machining	≤ 1.5

Condition:

$n_{mech} < n_{m\,max}$

i = timing belt side drive reduction (–)

J_{br} = mass moment of inertia, motor brake (kgm^2)

J_{ex} = mass moment of inertia of mechanical system (kgm^2)

J_m = mass moment of inertia, motor (kgm^2)

$n_{m\,max}$ = maximum permissible rotary speed of motor with controller (min^{-1})

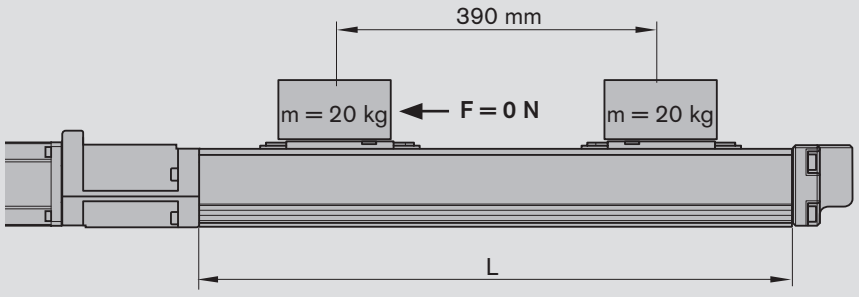
n_{mech} = maximum permissible rotary speed of mechanical system (min^{-1})

P = screw lead (mm)

V = ratio of mass moments of inertia of drive train and motor (–)

v_{max} = maximum permissible linear speed of mechanical system (m/s)

Calculation example



Given data

A mass of 20 kg is to be moved 390 mm at a maximum travel speed of 0.6 m/s.

Module selected based on the technical data and the connection dimensions:

- PSK-090 without cover and with a standard length steel carriage; motor attachment via integrated motor mount and coupling
- Motor type MSK 030C

When sizing the drive, the motor-controller combination must always be considered, as the motor type and performance data (e.g. maximum useful speed and maximum torque) will depend on the controller or control system used.

Estimation of the PSK module length L

Excess travel	=	2 · P = 2 · 16 mm = 32 mm (in accordance with the formula given in "PSK-090 Components and Ordering Data")

Selection of ball screw:
As a general rule:
Always choose the lowest lead (resolution, braking distance, length).

Permissible ball screws according to the "Permissible travel speed" chart at v_{max} = 0.6 m/s: Ball screw 16x10 and 16x16;
Ball screw selected:
Ball screw 16x10 with v_{max} = 1 m/s
M_p = 4.1 Nm with ball screw 16x10
(according to the chart "Maximum permissible drive torque")

Calculation of PSK length L

Excess travel	=	2 · P = 2 · 10 mm = 20 mm
Length L	=	(effective stroke + 2 · excess travel) + 100 mm = (390 mm + 2 · 20 mm) + 100 mm = 530 mm
Selected:		Standard length L = 540 mm; hole spacing in frame: 70 mm / 4 · 100 mm / 70 mm

Frictional torque M_R

M_R	=	M_{Rs}
M_R	=	0.30 Nm (see "Technical Data")

Calculations

Calculation example (continued)

Mass moment of inertia of mechanical system:

$$J_{ex} = J_s + J_t + J_c$$

$$J_s = (k_{J\,fix} + k_{J\,var} \cdot L)$$
$$= (5.831 + 0.031 \cdot 540\ mm) \cdot 10^{-6}$$
$$= 22.57 \cdot 10^{-6}\ kgm^2 \text{ (see “Technical Data”)}$$

$$J_t = m_{ex} \cdot k_{J\,m} \cdot 10^{-6}$$
$$= 20\ kg \cdot 2.533 \cdot 10^{-6}\ kgm^2$$
$$= 50.66 \cdot 10^{-6}\ kgm^2 \text{ (see “Technical Data”)}$$

$$J_c = 60 \cdot 10^{-6}\ kgm^2 \text{ (see “Technical Data”)}$$

$$J_{ex} = (22.57 + 50.66 + 60) \cdot 10^{-6}\ kgm^2$$
$$= 133.23 \cdot 10^{-6}\ kgm^2$$

Mass moment of inertia for handling ($V \leq 6$):

$$V = \frac{J_{ex}}{J_m + J_{br}} \leq 6$$

$$J_m = 30 \cdot 10^{-6}\ kgm^2$$

$$J_{br} = 7.0 \cdot 10^{-6}\ kgm^2 \text{ (see „motors“)}$$

$$V = \frac{133{,}23 \cdot 10^{-6}\ kgm^2}{(30 + 7{,}0) \cdot 10^{-6}\ kgm^2} = 3.6 < 6$$

Rotary speed n:

$$n_{mech} = \frac{v \cdot i \cdot 1\,000 \cdot 60}{10} = \frac{0.6\ m/s \cdot 1 \cdot 1\,000 \cdot 60}{10\ mm} = 3\,600\ min^{-1}$$

Result

Precision Module PSK-090 without cover and with one standard-length steel carriage; Motor MSK 030C, attached via integrated mount and coupling:

Standard length	L	=	540 mm;
Hole spacing in frame:			70 mm / 40 · 100 mm / 70 mm
Ball screw 16 x 10 with	v_{max}	=	1 m/s > 0.6 m/s
	M_p	=	4.1 Nm
Frictional torque	M_R	=	0.30 Nm
Mass moment of inertia	J_{ex}	=	$133.23 \cdot 10^{-6}\ kgm^2$
Rotary speed	$n_{m\,max}$	=	$9\,000\ min^{-1} > 3\,600\ min^{-1}$
Torque	M_{max}	=	4.0 Nm < 4.1 Nm

For final motor selection, the drive and performance data must be recalculated as specified in the Rexroth catalog “Control Systems, Electrical Accessories, ...”

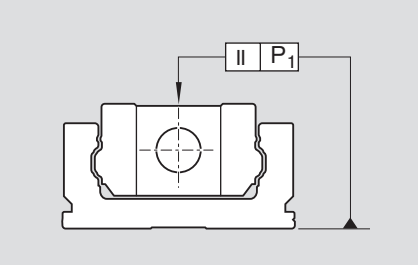
Accuracy

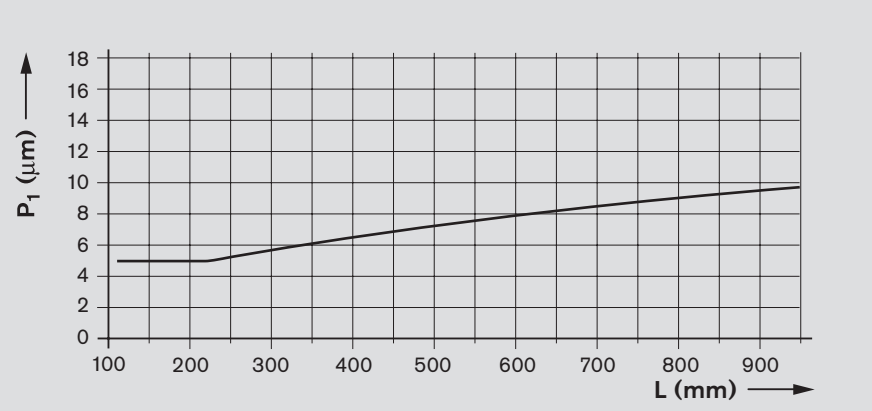
General note

All accuracy figures apply to the module when screwed down and assume an ideally flat mounting base. The values given do not take account of any shape deviations in the mounting base surface.

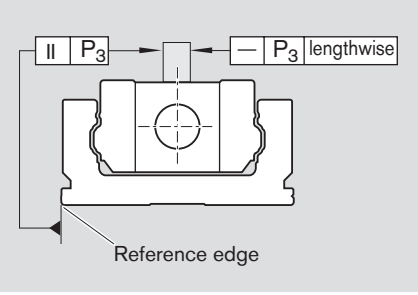
Accuracy P_1

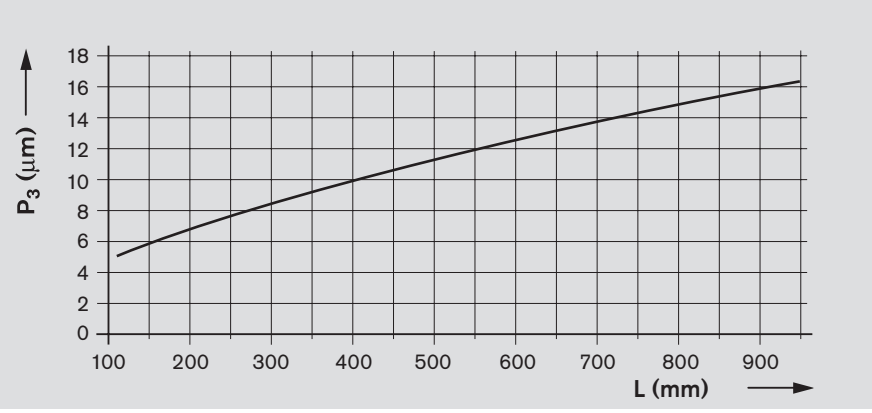
Measured at the carriage center





Accuracy P_3

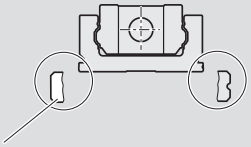
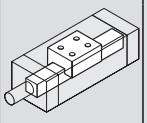
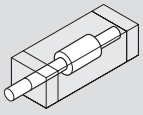
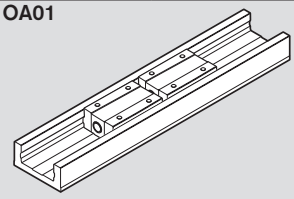
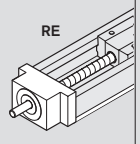
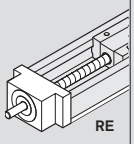
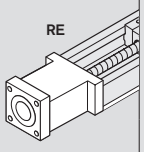
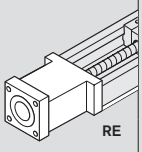




Configuration and ordering, Dimension Drawings

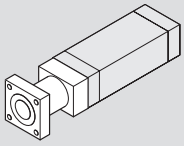
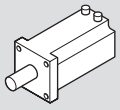
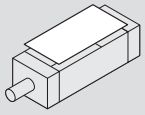
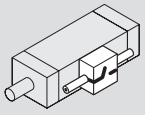
Precision Module PSK-040

Configuration and ordering

Short product name, length PSK-040-NN-1, ... mm				Guideway	Drive unit			Carriage version Steel				
 Reference edge (RE)												
Version					Screw journal	Ball screw size d_0 x P		Without cover Standard		Cover plate Standard		
	RE left	RE right				6 x 1	6 x 2	1 carr.	2 carr.	1 carr.	2 carr.	
Without drive	OA01 		OA01	L = 100 mm 10 L = 150 mm 12 L = 200 mm 14 L = 250 mm 16 L = 300 mm 18 L = 350 mm 20	without	50		01	02	–	–	
With ball screw, w/o motor mount	OF01 	OF02 	OF01 OF02		Ø4	01	02	01	02	21	22	
With ball screw and integrated mount	MF10 	MF11 	MF10 MF11		Ø4	30	31	01	02	21	22	

Ordering example: See “Inquiry/Order” form

d_0 = screw diameter (mm)
P = screw lead (mm)
carr. = carriage(s)
L = length

Motor attachment		Motor		Type of cover		Switches / Mounting duct / Socket-plug		Documentation	
									
Attachment kit [1]	for motor	with brake	without brake	without	cover plate			Standard report	Measure-ment report
00	–	00		00	–	**Without switch and Mounting duct**	00	01	02 Friction moment
00	–	00		00	01	**Switches:** – Reed sensor – Hall sensor	 21 22		03 Lead deviation
						Mounting duct	27		04 Travel accuracy
30	**NEMA 14-C** [2]	00				**Switching cam for PSK:** – Without cover or with cover plate	35		05 Positioning accuracy
31	**NEMA 17-C** [2]	00							
32	**NEMA 17-D** [2]	00							
35	**MSM 019A**	133	132						
	MSM 019B	135	134						

1) Attachment kit also available without motor (when ordering: enter “00” for motor). For motor mounting kit for customer motor see “Motor mounting” section

2) Use motors complying with the appropriate NEMA specification. Because of the varying shaft dimensions for NEMA-specification motors, the attachment kit does not include a coupling.

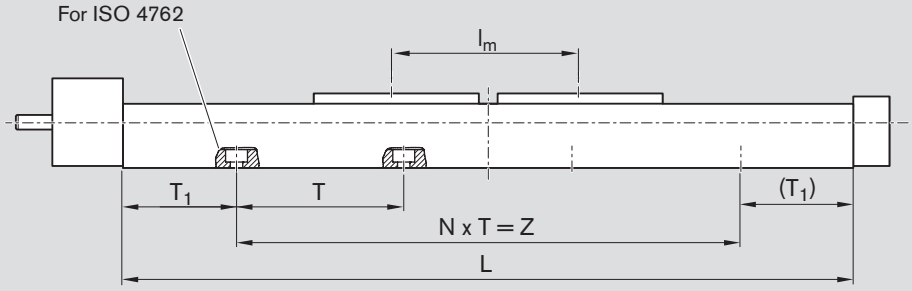
Switch mounting arrangements

Refer to “Switch mounting arrangements” for more information on switch types and switch mounting.

Configuration and ordering, Dimension Drawings

Precision Module PSK-040

Lengths and Hole Spacing



Length L

Type of cover	Number of carriages (carr.)	Carriage version Standard length
Without cover or with cover plate	1 carr.	L = (stroke + 2 · excess travel) + 55 mm
	2 carr.	L = (stroke + 2 · excess travel) + l_m + 55 mm $l_{m\ min}$ = 50 mm

l_m = center-to-center distance between carriages (consider $l_{m\ min}$)

Stroke = maximum travel of carriage center between the outermost switch activation points

In most cases the recommended limit for excess travel (braking path) is:
Excess travel = 2 · screw lead P

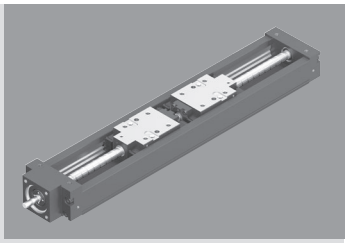
Example
Ball screw 6 x 2
(Ball screw size = d_0 x P):
Excess travel = 2 · 2 = 4 mm

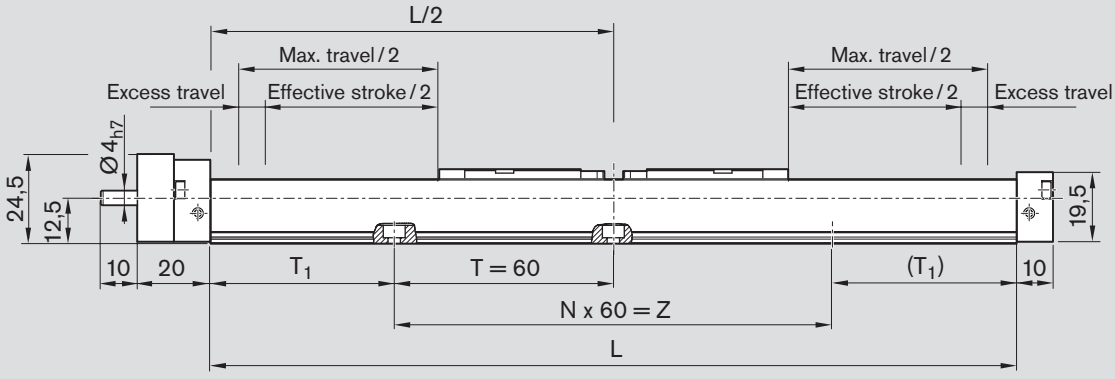
Standard lengths of frame

Length L (mm)	T (mm)	T_1 (mm)	N	Z (mm)	Mounting holes for ISO 4762 screws
100	60	20	1	60	M3
150	60	15	2	120	
200	60	40	2	120	
250	60	35	3	180	
300	60	30	4	240	
350	60	25	5	300	

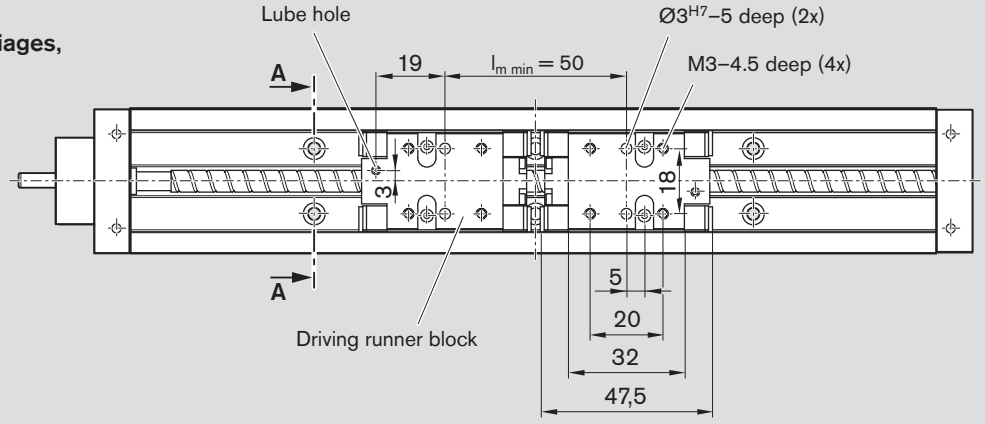
Dimension Drawings without Cover

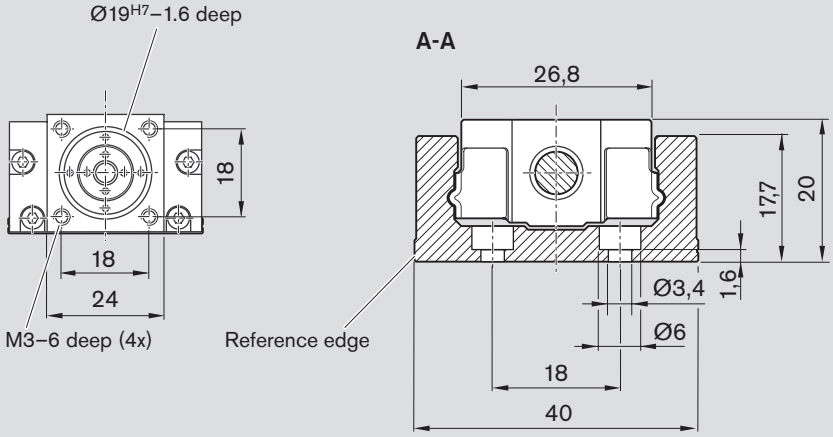
All dimensions in mm
Drawings not to scale





Version:
One or two carriages, standard length



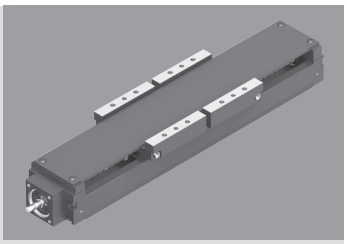


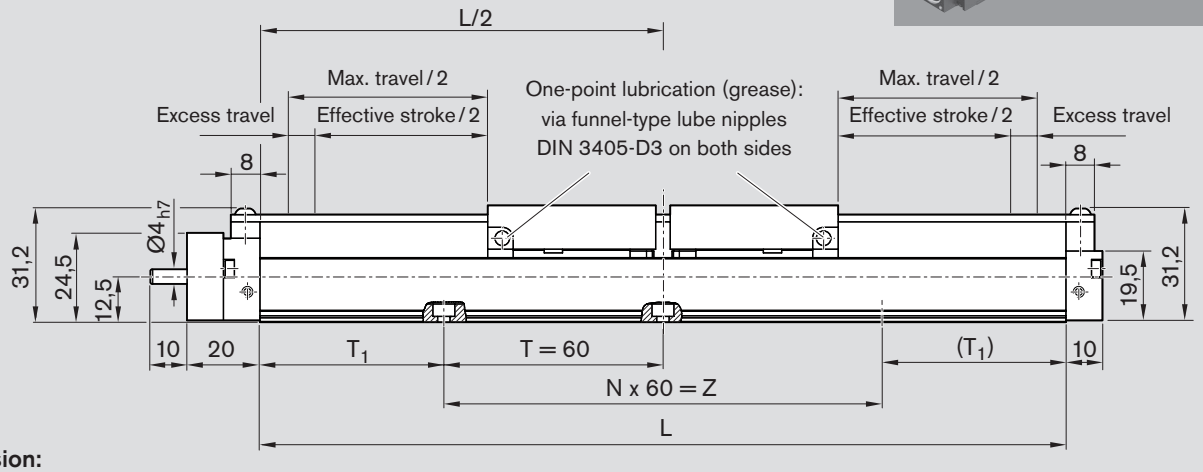
Configuration and ordering, Dimension Drawings

Precision Module PSK-040

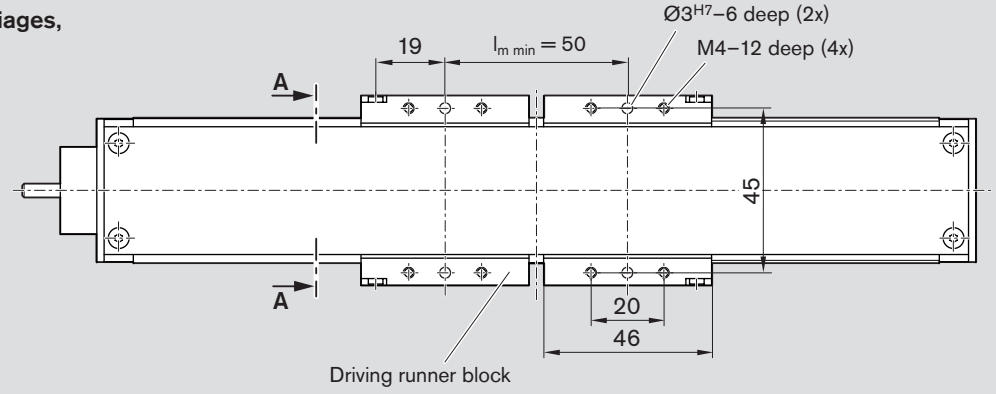
Dimension Drawings with Cover Plate

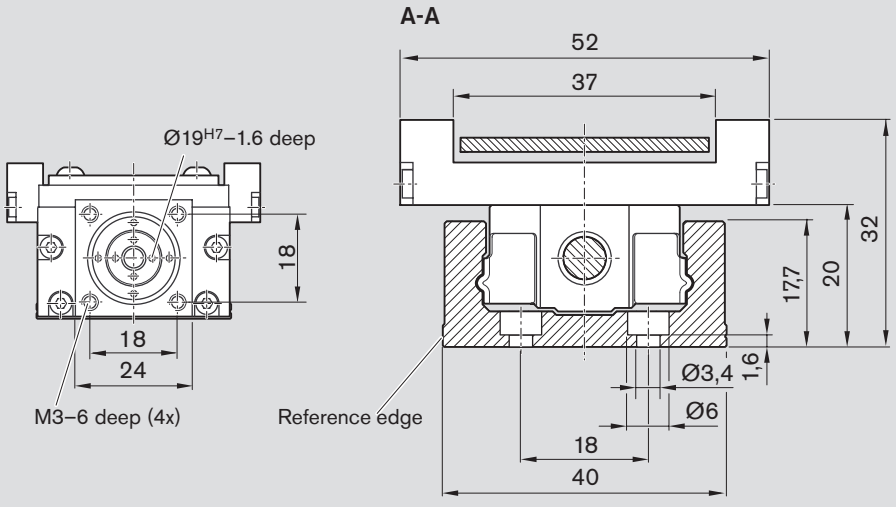
All dimensions in mm
Drawings not to scale





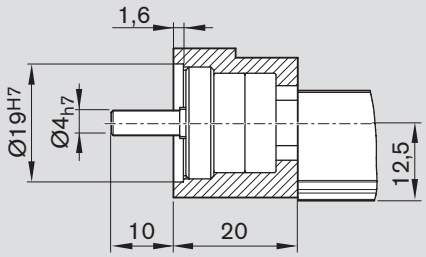
Version:
One or two carriages, standard length





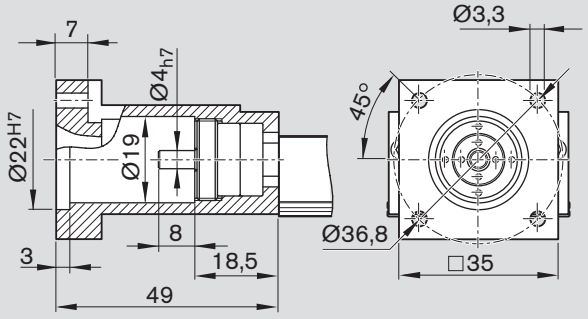
Dimension Drawings, Motor Attachment

OF01, OF02



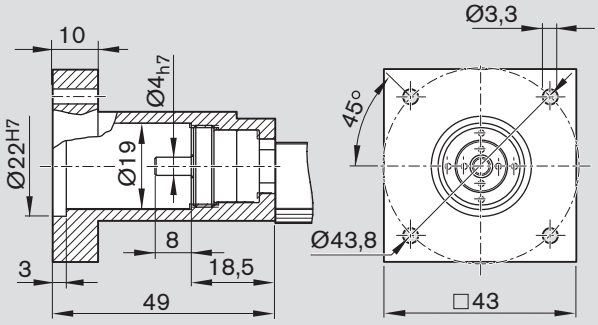
MF10, MF11

Integrated motor mount (NEMA 14 – Form C)



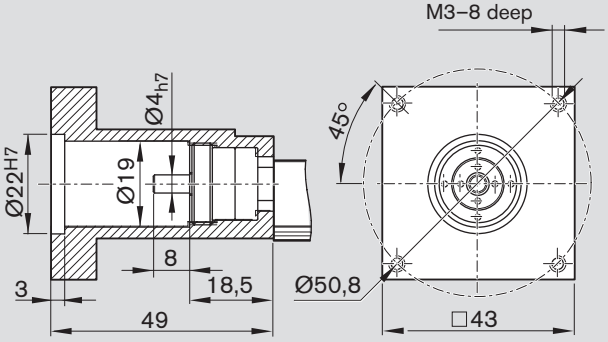
MF10, MF11

Integrated motor mount (NEMA 17 – Form C)



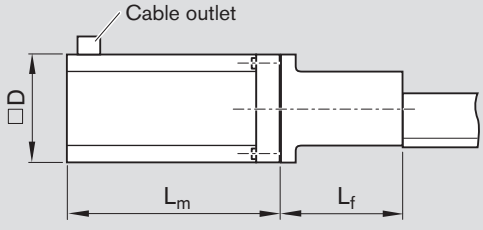
MF10, MF11

Integrated motor mount (NEMA 17 – Form D)



MF10, MF11

Motor with integrated motor mount and coupling



Motor type	Dimensions (mm)			
	D	L_f	L_m without brake	L_m with brake
MSM 019A	38	54	72	102
MSM 019B	38	54	92	122

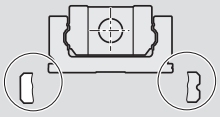
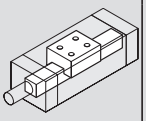
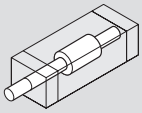
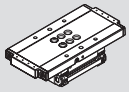
Drawings not to scale!

For further information and dimensions, see “Motors.”

Configuration and ordering, Dimension Drawings

Precision Module PSK-050

Configuration and ordering

Short product name, length PSK-050-NN-1, ... mm				Guideway	Drive unit		Carriage version Steel				Aluminum	
												
Reference edge (RE)					Screw journal	Ball screw size d_0 x P	Without cover		Cover plate		Sealing strip	
Version							Standard		Standard		Stan-dard	Long
	RE left	RE right				8 x 2.5	1 carr.	2 carr.	1 carr.	2 carr.	1 carr.	1 carr.
Without drive	OA01		OA01	L = 100 mm 09	Ohne	50	01	02	–	–	–	–
With ball screw, w/o motor mount	OF01	OF02	OF01 OF02	L = 150 mm 10	Ø5	01	01	02	21	22	40	41
With ball screw and motor mount	MF01	MF02	MF01 MF02	L = 200 mm 11	Ø5	01	01	02	21	22	40	41
With ball screw and integrated mount	MF10	MF1	MF10 MF11	L = 250 mm 12	Ø5	30	01	02	21	22	40	41
With ball screw and timing belt side drive	RV01	RV02	RV01 to RV08	L = 300 mm 13	for MSM 019B	01	01	02	21	22	40	41
	RV03	RV04		L = 400 mm 15								
	RV05	RV06		L = 450 mm 16								
	RV07	RV08		L = 500 mm 17								
				L = 550 mm 18								
				L = 600 mm 19								

Ordering example: See “Inquiry/Order” form

⚠ **Please check whether the selected combination is a permissible one (load capacities, moments, maximum speeds, motor data, etc.)!**

d_0 = screw diameter (mm)
P = screw lead (mm)
carr. = carriage(s)
L = length

Motor attachment			Motor		Type of cover			Switches / Mounting duct / Socket-plug	Documentation	
Gear ratio i =	Attachment kit [1]	for motor	with brake	without brake	without	cover plate	strip		Standard report	Measurement report
–	00	–	00		00	–	–			02 Friction moment
–	00	–	00							
–	01	**MSM 031B**	137	136				**Without switch and Mounting duct** 00		03 Lead deviation
–	03	**MSK 030C**	85	84						
–	31	**NEMA 17-D** [2]	00					**Switches:**		
–	35	**NEMA 17-C** [2]	00					– Reed sensor 21 – Hall sensor 22		
–	36	**MSM 019B**	135	134	00	01	02	**Mounting duct** 26	01	
1	13	**MSM 019B**	135	134				**Switching cam for PSK:** – Without cover or with cover plate 32 – With sealing strip 34		04 Travel accuracy
1,5	14									05 Positioning accuracy

1) Attachment kit also available without motor (when ordering: enter “00” for motor).
For motor mounting kit for customer motor see “Motor mounting” section

2) Use motors complying with the appropriate NEMA specification.
Because of the varying shaft dimensions for NEMA-specification motors, the attachment kit does not include a coupling.

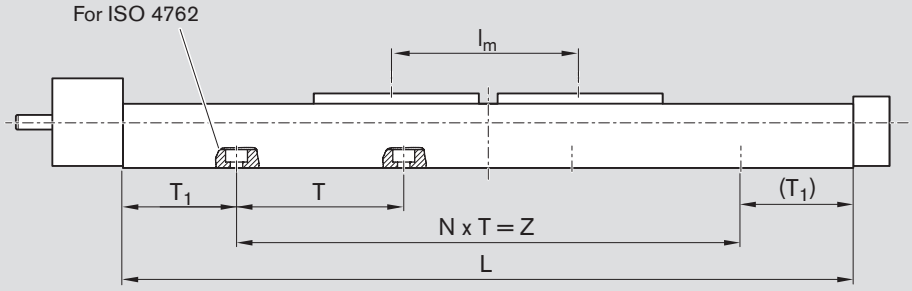
Switch mounting arrangements

Refer to “Switch mounting arrangements” for more information on switch types and switch mounting.

Configuration and ordering, Dimension Drawings

Precision Module PSK-050

Lengths and Hole Spacing



Length L

Type of cover	Number of carriages (carr.)	Carriage version	
		Standard length	Long
Without cover or with cover plate	1 carr.	L = (stroke + 2 · excess travel) + 70 mm	–
	2 carr.	L = (stroke + 2 · excess travel) + l_m + 70 mm $l_{m\,min}$ = 60 mm	–
With sealing strip	1 carr.	L = (stroke + 2 · excess travel) + 127 mm	L = (stroke + 2 · excess travel) + 187 mm

l_m = center-to-center distance between carriages (consider $l_{m\,min}$)

Stroke = maximum travel of carriage center between the outermost switch activation points

In most cases the recommended limit for excess travel (braking path) is:
Excess travel = 2 · screw lead P

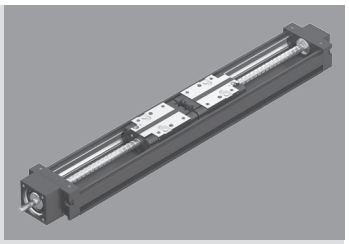
Example
Ball screw 8 x 2.5
(Ball screw size = d_0 x P):
Excess travel = 2 · 2.5 = 5 mm

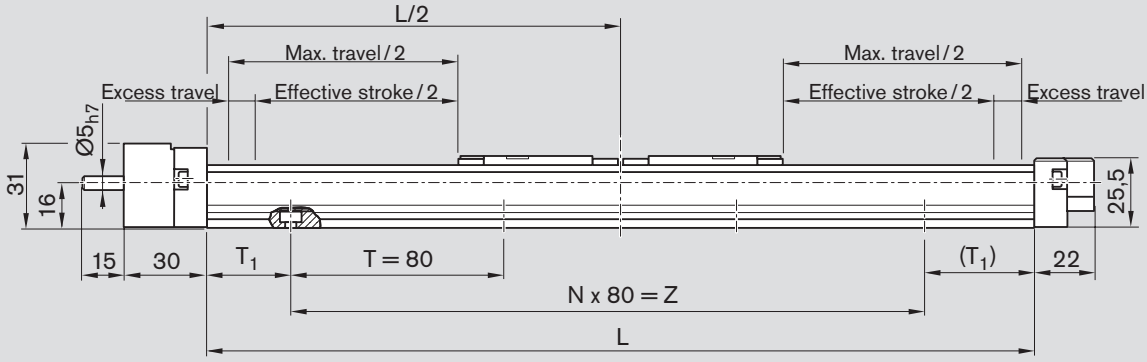
Standard lengths of frame

Length L (mm)	T (mm)	T_1 (mm)	N	Z (mm)	Mounting holes for ISO 4762 screws
100	80	10	1	80	M4
150	80	35	1	80	
200	80	20	2	160	
250	80	45	2	160	
300	80	30	3	240	
350	80	15	4	320	
400	80	40	4	320	
450	80	25	5	400	
500	80	50	5	400	
550	80	35	6	480	
600	80	20	7	560	

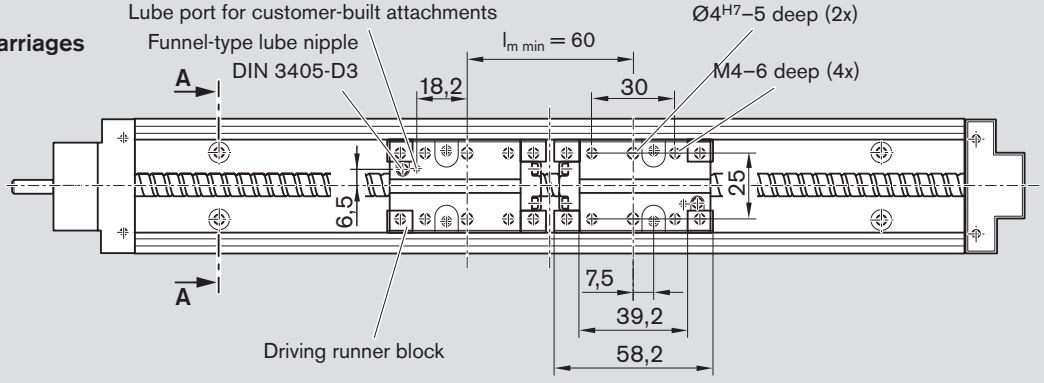
Dimension Drawings without Cover

All dimensions in mm
Drawings not to scale

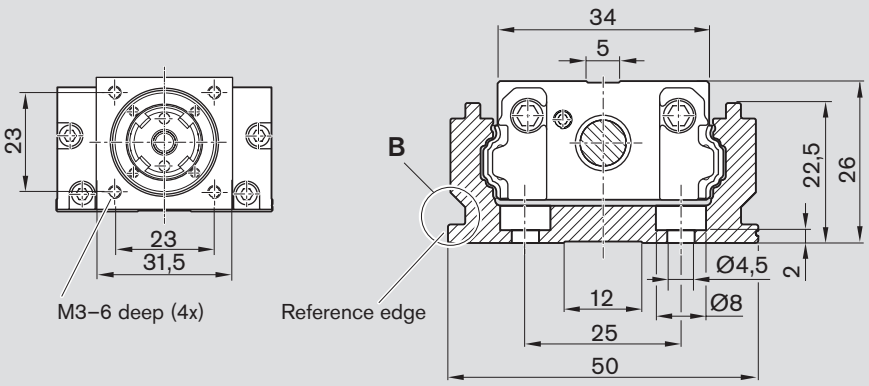


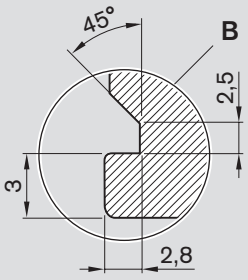


Version:
One or two carriages



A-A





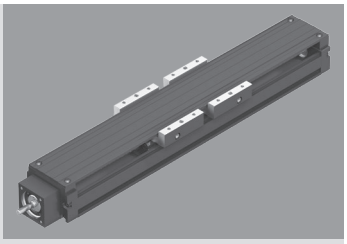
For fastening with
clamping fixtures

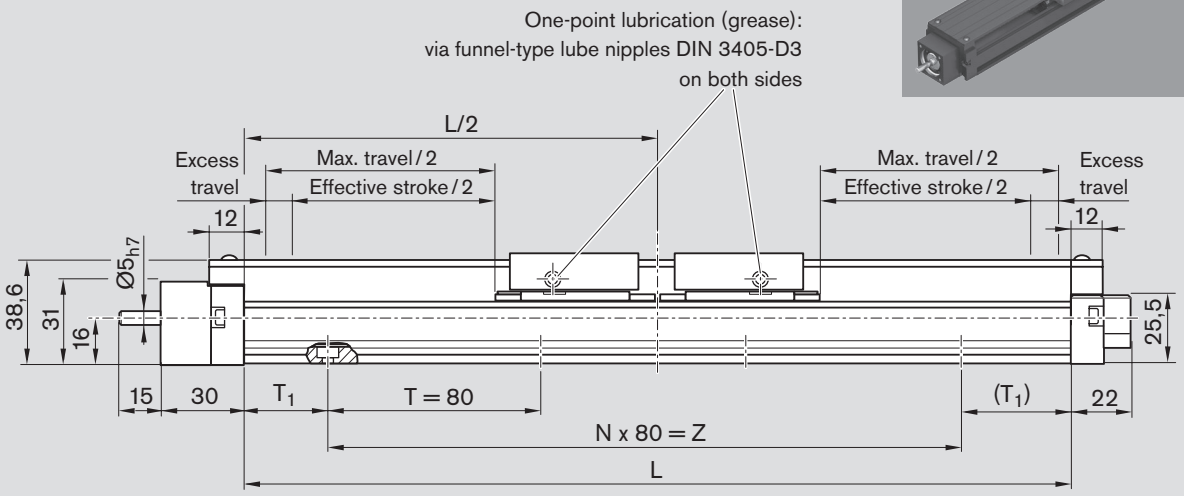
Configuration and ordering, Dimension Drawings

Precision Module PSK-050

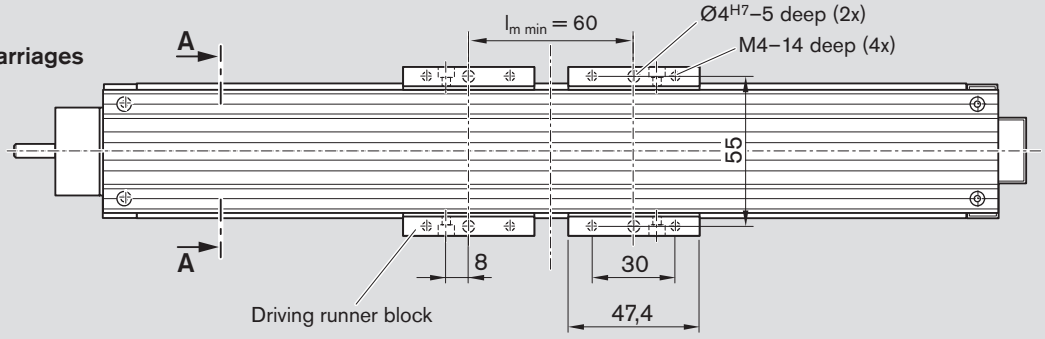
Dimension Drawings with Cover Plate

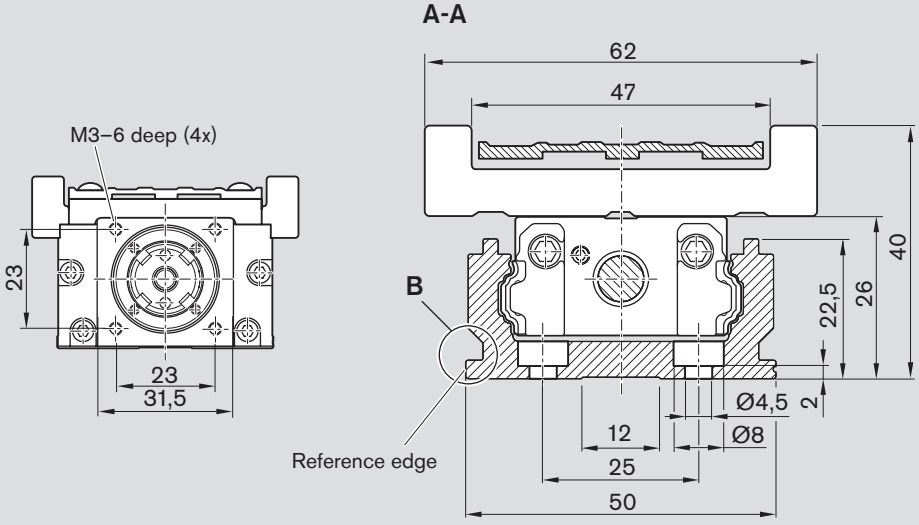
All dimensions in mm
Drawings not to scale

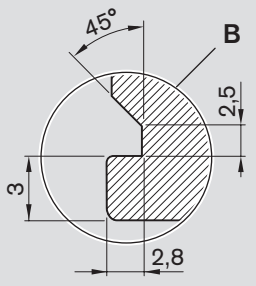




Version:
One or two carriages



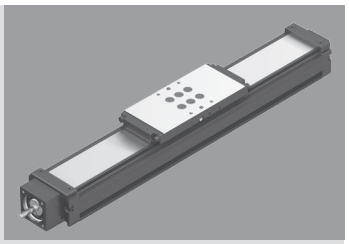


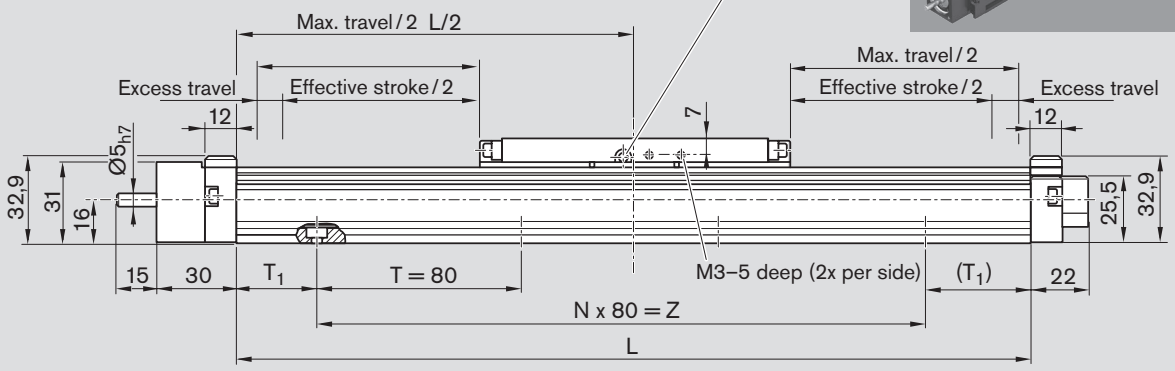


For fastening with clamping fixtures

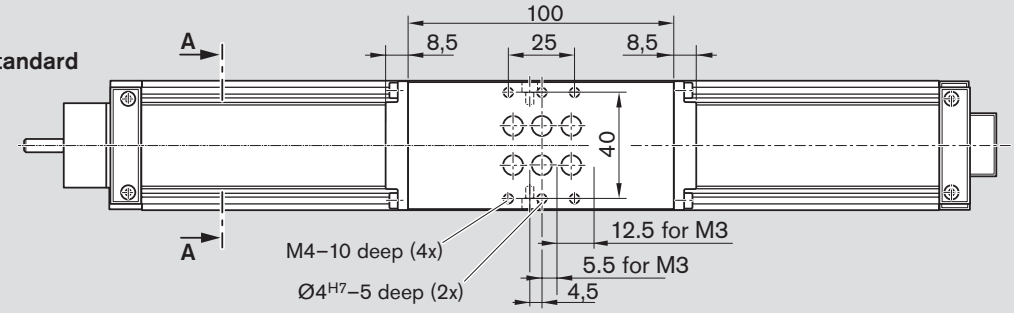
Dimension Drawings with Sealing Strip

All dimensions in mm
Drawings not to scale

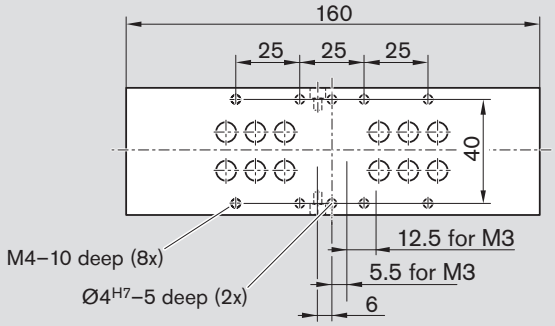


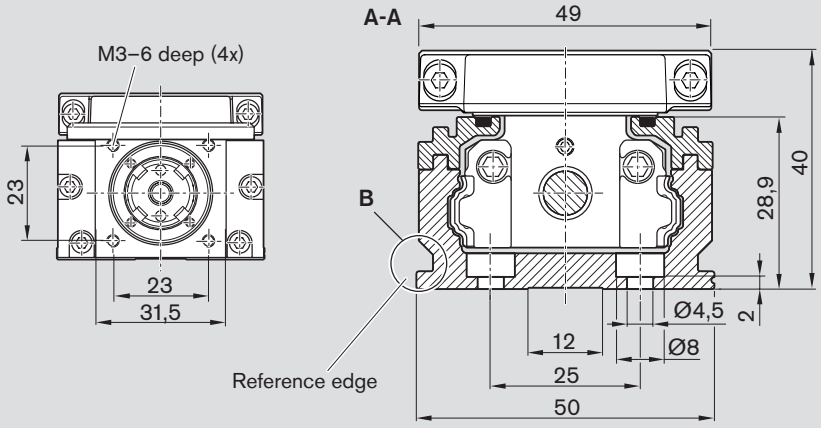


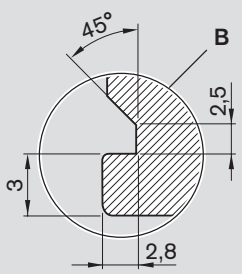
Version:
Carriage, standard length



Version:
Carriage, long







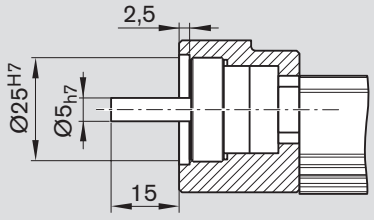
For fastening with clamping fixtures

Configuration and ordering, Dimension Drawings

Precision Module PSK-050

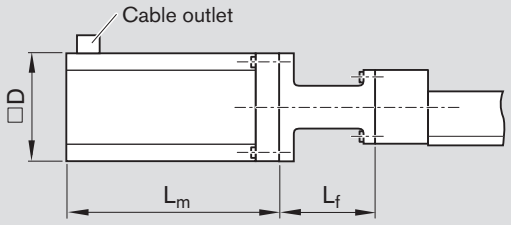
Dimension Drawings, Motor Attachment

OF01, OF02



MF01, MF02

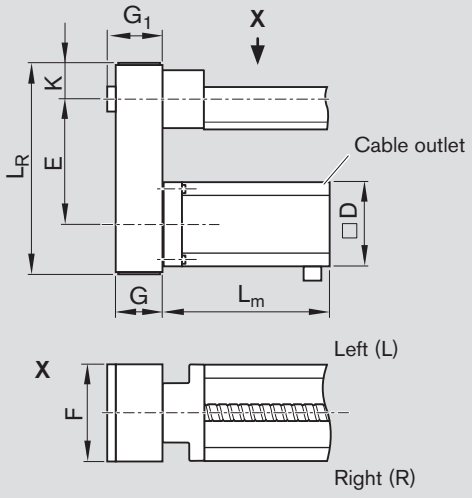
Motor with motor mount and coupling



Motor type	Dimensions (mm)			
	D	L_f	L_m without brake	L_m with brake
MSM 031B	60,0	53,0	79	115.5
MSK 030C	54,0	53,0	188	213.0

RV01 – RV08

Motor with timing belt side drive

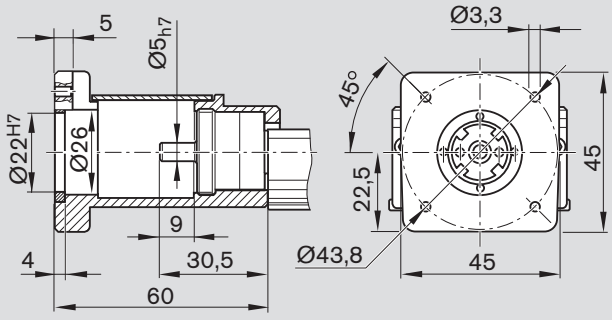


View **X** shown without motor

Version	Motor type	Dimensions (mm)									
		D	E		F	G	G_1	K	L_m		L_R
			i = 1	i = 1.5					without brake	with brake	
RV01 to RV08	**MSM 019B**	38	76.5	76.5	48	27.5	29	27.5	92	122	139

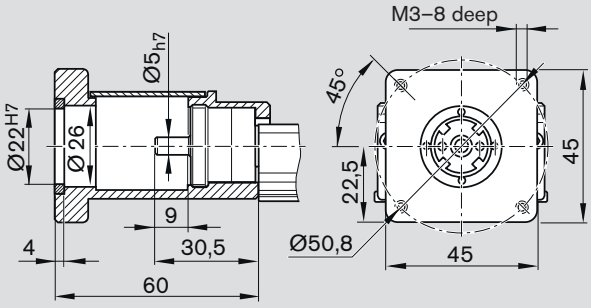
MF10, MF11

Integrated motor mount (NEMA 17 – Form C)



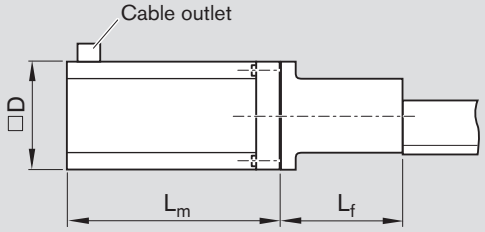
MF10, MF11

Integrated motor mount (NEMA 17 – Form D)



MF10, MF11

Motor with integrated motor mount and coupling



Motor type	Dimensions (mm)			
	D	L_f	without brake	L_m with brake
MSM 019B	38	60	92	122

Drawings not to scale!
For further information and dimensions, see “Motors.”

Configuration and ordering, Dimension Drawings

Precision Module PSK-060

Configuration and ordering

Short product name, length PSK-060-NN-1, ... mm				Guideway	Drive unit				Carriage version Steel								Aluminum	
Reference edge (RE)																		
Version					Screw journal	Ball screw size d_0 x P			Without cover				Cover plate				Sealing strip	
									Standard		Long		Standard		Long		Standard	Long
	RE left	RE right				12x2	12x5	12x10	1carr.	2carr.	1carr.	2carr.	1carr.	2carr.	1carr.	2carr.	1carr.	1carr.
Without drive	OA01		OA01	L = 150 mm 10 L = 200 mm 11 L = 250 mm 12 L = 300 mm 13 L = 400 mm 15 L = 500 mm 17 L = 600 mm 19 L = 700 mm 21 L = 800 mm 23 L = 900 mm 25 L = 940 mm 26	without	50			01	02	03	04	–	–	–	–	–	–
With ball screw, w/o motor mount	OF01	OF02	OF01 OF02		Ø6	03	01	02	01	02	03	04	21	22	23	24	40	41
With ball screw and motor mount	MF01	MF02	MF01 MF02		Ø6	03	01	02	01	02	03	04	21	22	23	24	40	41
W/ball screw and integrated mount	MF10	MF11	MF10 MF11		Ø6	30	31	32	01	02	03	04	21	22	23	24	40	41
With ball screw and timing belt side drive	RV01 RV03 RV05 RV07	RV02 RV04 RV06 RV08	RV01 to RV08		for MSK 030C MSM 031B MSM 019B	03	01	02	01	02	03	04	21	22	23	24	40	41

Ordering example: See “Inquiry/Order” form

d_0 = screw diameter (mm)
P = screw lead (mm)
carr. = carriage(s)
L = length

Motor attachment			Motor		Type of cover			Switches / Mounting duct / Socket-plug	Documentation	
Gear ratio i =	Attachment kit[1]	for motor	with brake	without brake	without	cover plate	strip		Standard report	Measurement report
–	00	–	00		00	–	–			
–	00	–	00							02 Friction moment
–	03	**MSM 031B**	137	136				**Without switch and Mounting duct** 00		
	05	**MSM 019B**	135	134				**Switches:**		03 Lead deviation
–	31	**NEMA 23-D**[2]	00					– Reed sensor 21 – Hall sensor 22		
	34	**NEMA 23-C**[2]	00						01	
	32	**MSK 030C**	85	84	00	01	02	**Mounting duct** 25		
i = 1	11	**MSK 030C**	85	84				**Switching cam for PSK:** – Without cover or with cover plate 30 – With sealing strip 31		04 Travel accuracy
	13	**MSM 031B**	137	136						
	17	**MSM 019B**	135	134						
i = 1,5	12	**MSK 030C**	85	84						05 Positioning accuracy
	14	**MSM 031B**	137	136						
	18	**MSM 019B**	135	134						

1) Attachment kit also available without motor (when ordering: enter “00” for motor).
For motor mounting kit for customer motor see “Motor mounting” section.

2) Use motors complying with the appropriate NEMA specification.
Because of the varying shaft dimensions for NEMA-specification motors, the attachment kit does not include a coupling.

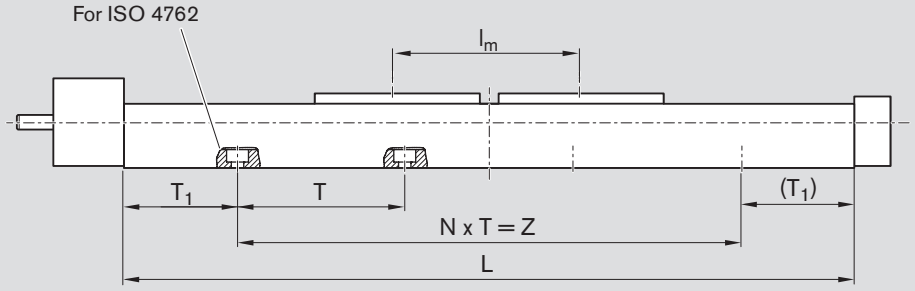
Switch mounting arrangements

Refer to “Switch mounting arrangements” for more information on switch types and switch mounting.

Configuration and ordering, Dimension Drawings

Precision Module PSK-060

Lengths and Hole Spacing



Length L

Type of cover	Number of carriages (carr.)	Carriage version	
		Standard length	Long
Without cover or with cover plate	1 carr.	L = (stroke + 2 · excess travel) + 70 mm	L = (stroke + 2 · excess travel) + 85 mm
	2 carr.	L = (stroke + 2 · excess travel) + l_m + 70 mm $l_{m\ min}$ = 60 mm	L = (stroke + 2 · excess travel) + l_m + 85 mm $l_{m\ min}$ = 75 mm
With sealing strip	1 carr.	L = (stroke + 2 · excess travel) + 160 mm	L = (stroke + 2 · excess travel) + 215 mm

l_m = center-to-center distance between carriages (consider $l_{m\ min}$)

Stroke = maximum travel of carriage center between the outermost switch activation points

In most cases the recommended limit for excess travel (braking path) is:
Excess travel = 2 · screw lead P

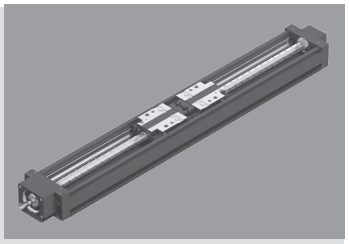
Example
Ball screw 12 x 10
(Ball screw size = d_0 x P):
Excess travel = 2 · 10 = 20 mm

Standard lengths of frame

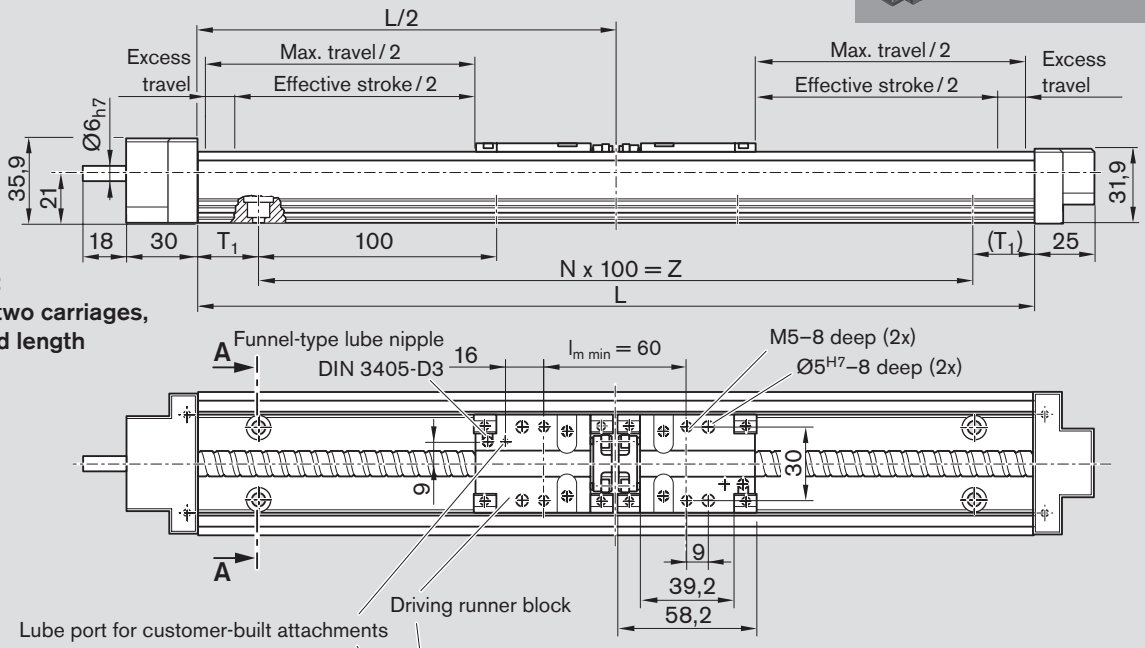
Length L (mm)	T (mm)	T_1 (mm)	N	Z (mm)	Mounting holes for ISO 4762 screws
150	100	25	1	100	M5
200	100	50	1	100	
250	100	25	2	200	
300	100	50	2	200	
400	100	50	3	300	
500	100	50	4	400	
600	100	50	5	500	
700	100	50	6	600	
800	100	50	7	700	
900	100	50	8	800	
940	100	20	9	900	

Dimension Drawings without Cover

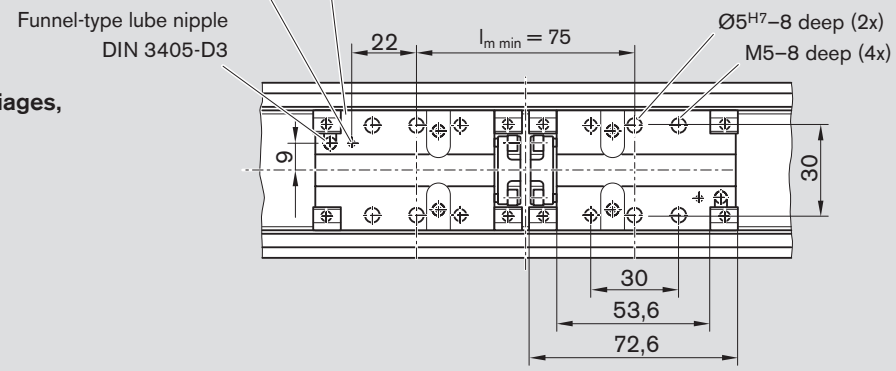
All dimensions in mm
Drawings not to scale

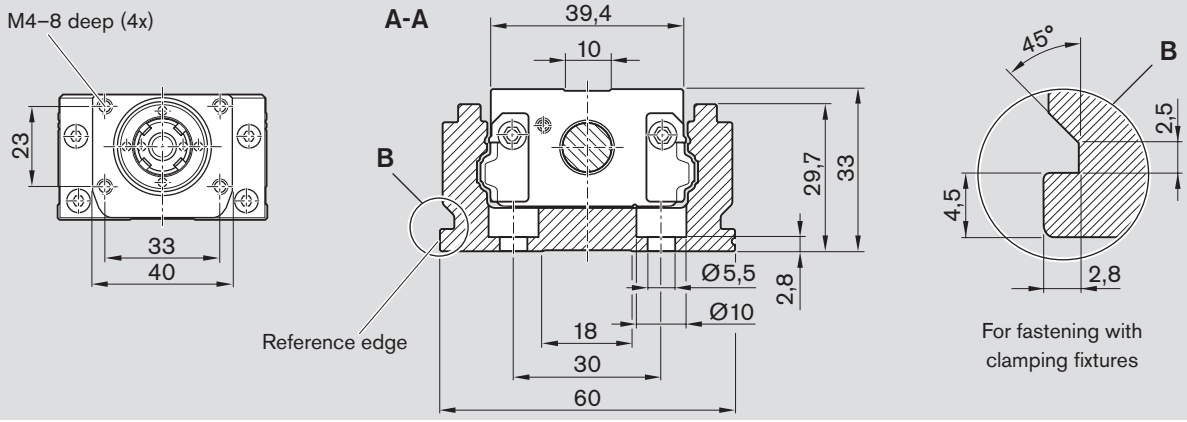


Version:
One or two carriages, standard length



Version:
One or two carriages, long



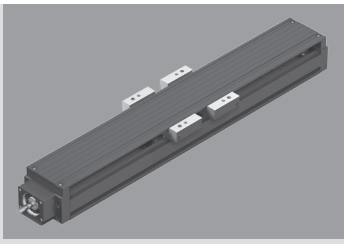


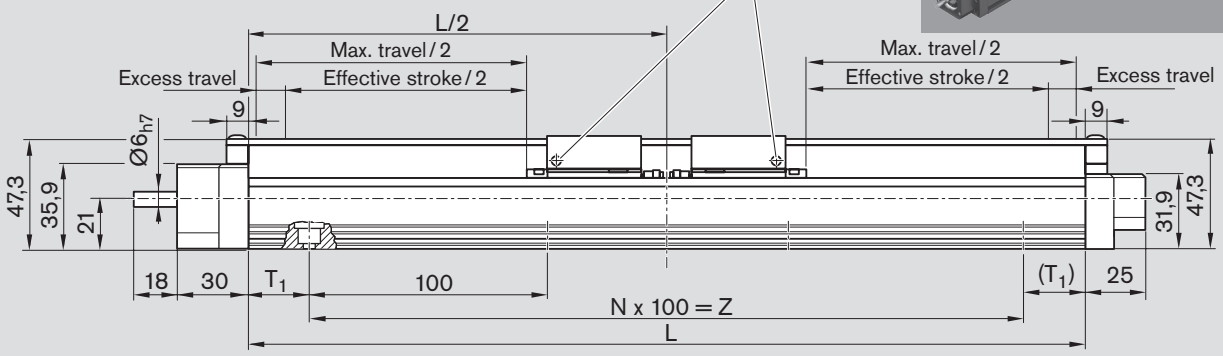
Configuration and ordering, Dimension Drawings

Precision Module PSK-060

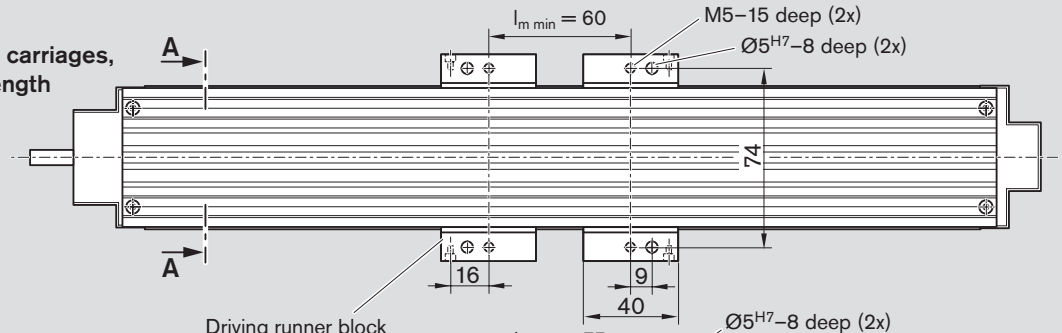
Dimension Drawings with Cover Plate

All dimensions in mm
Drawings not to scale



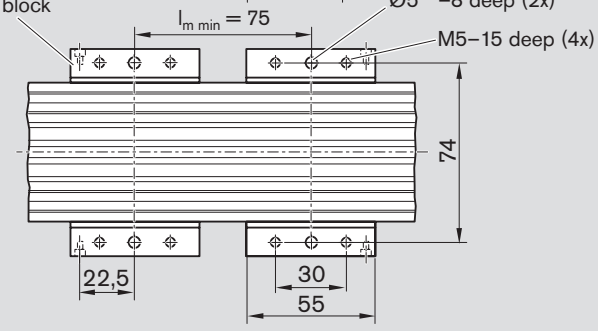


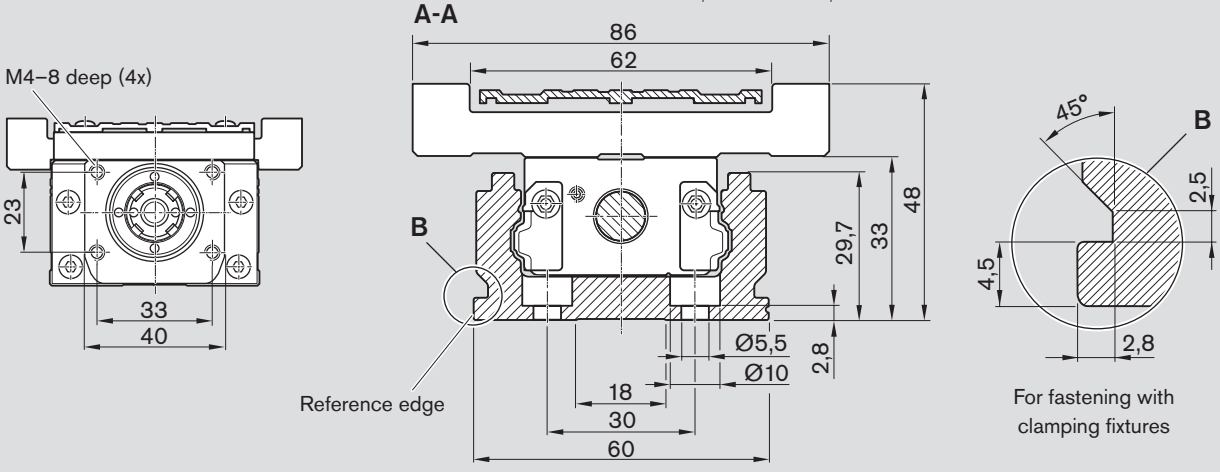
Version:
One or two carriages, standard length



Driving runner block

Version:
One or two carriages, long

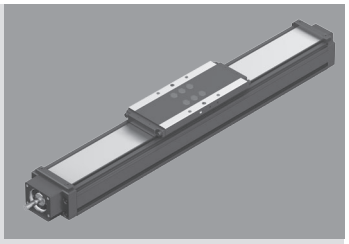


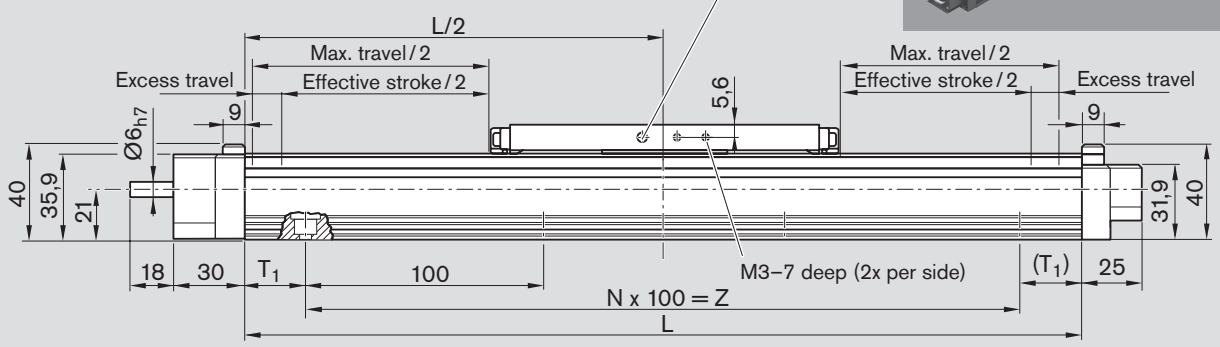


For fastening with clamping fixtures

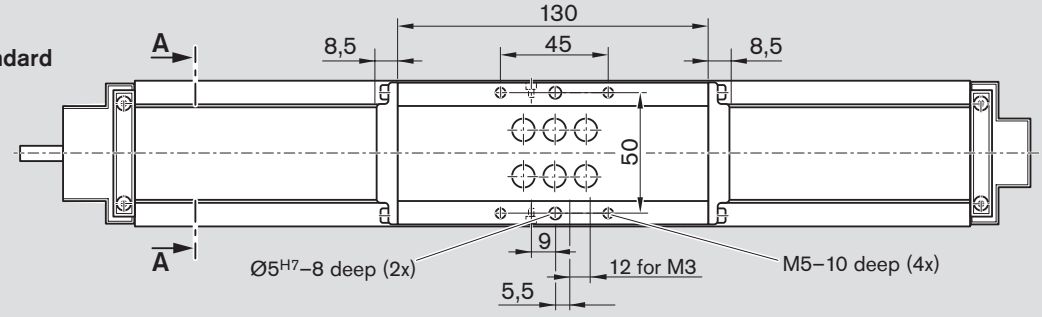
Dimension Drawings with Sealing Strip

All dimensions in mm
Drawings not to scale

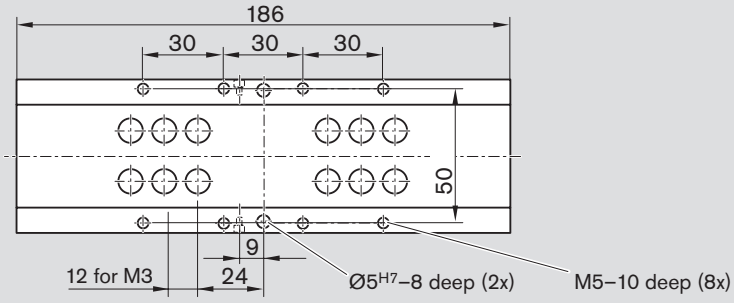


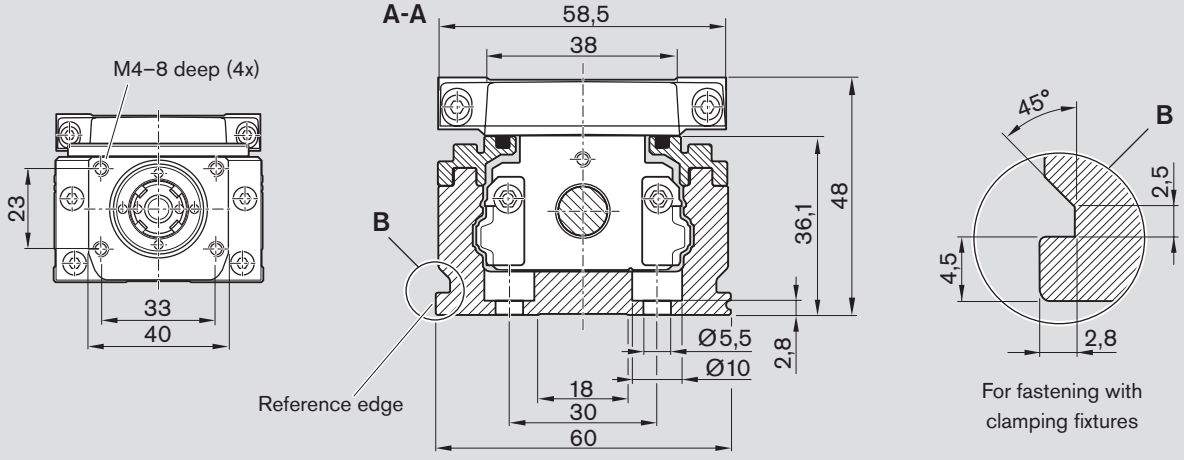


Version:
Carriage, standard length



Version:
Carriage, long



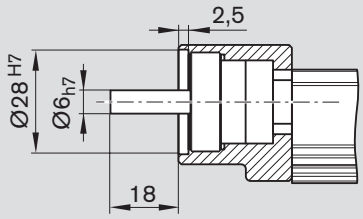


Configuration and ordering, Dimension Drawings

Precision Module PSK-060

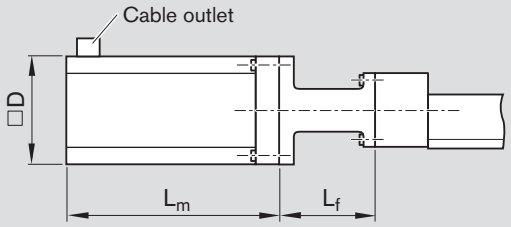
Dimension Drawings, Motor Attachment

OF01, OF02



MF01, MF02

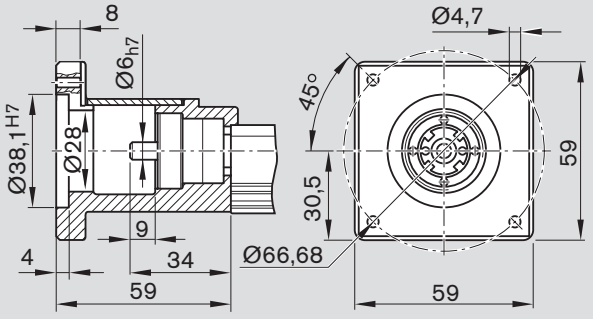
Motor with motor mount and coupling



Motor type	Dimensions (mm)			
	D	L_f	L_m without brake	L_m with brake
MSM 019B	38	45	92	122.0
MSK 030C	54	50	188	213.0
MSM 031B	60	50	79	115.5

MF10, MF11

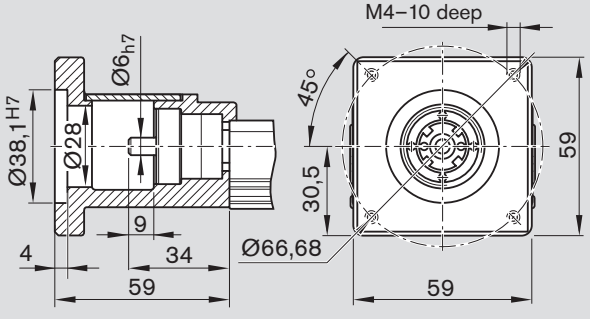
Integrated motor mount (NEMA 23 – Form C)



Drawings not to scale!
For further information and dimensions, see “Motors.”

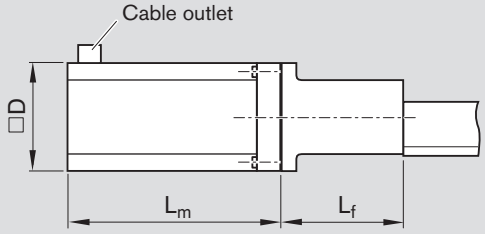
MF10, MF11

Integrated motor mount (NEMA 23 – Form D)



MF10, MF11

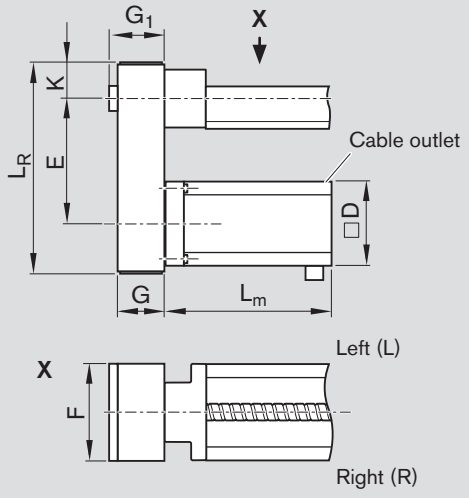
Motor with integrated motor mount and coupling



Motor type	Dimensions (mm)			
	D	L_f	L_m without brake	L_m with brake
MSK 030C	54	59	188	213

RV01 – RV08

Motor with timing belt side drive



View **X** shown without motor

Version	Motor type	Dimensions (mm)									
		D	E		F	G	G_1	K	L_m without brake	L_m with brake	L_R
			i = 1	i = 1.5							
RV01 to RV08	**MSM 019B**	38	76,5	76,5	48,0	27,5	29,0	27,5	92	122,0	139
	MSK 030C	54	78,0	75,0	64,5	37,0	43,5	33,5	188	213,0	154
	MSM 031B	60	78,0	75,0	64,5	37,0	43,5	33,5	79	115,5	157

Configuration and ordering, Dimension Drawings

Precision Module PSK-090

Components and Ordering Data

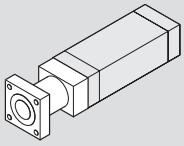
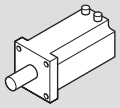
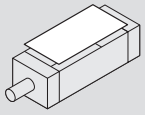
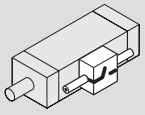
Short product name, length PSK-090-NN-1, ... mm			Guideway	Drive unit				Carriage version Steel								Aluminum	
Reference edge (RE)								Without cover				Cover plate				Sealing strip	
Version				Screw journal	Ball screw size d_0 x P			Standard		Long		Standard		Long		Standard	Long
	RE left	RE right			16x5	16x10	16x16	1carr.	2carr.	1carr.	2carr.	1carr.	2carr.	1carr.	2carr.	1carr.	1carr.
Without drive	OA01		OA01	without	50			01	02	03	04	–	–	–	–	–	–
With ball screw, w/o motor mount	OF01	OF02	OF01 OF02	Ø9	01	02	03	01	02	03	04	21	22	23	24	40	41
				Ø9 with keyway	11	12	13										
With ball screw and motor mount	MF01	MF02	MF01 MF02	Ø9	01	02	03	01	02	03	04	21	22	23	24	40	41
W/ball screw and integrated mount	MF10	MF11	MF10 MF11	Ø9	30	31	32	01	02	03	04	21	22	23	24	40	41
With ball screw and timing belt side drive	RV01	RV02	RV01 to RV08	for MSK 030C MSM 031C	01	02	03	01	02	03	04	21	22	23	24	40	41
	RV03	RV04															
	RV05	RV06		for MSK 040C MSM 041B	01	02	03	01	02	03	04	21	22	23	24	40	41
	RV07	RV08															

L = 340 mm 10
L = 440 mm 12
L = 540 mm 14
L = 640 mm 16
L = 740 mm 18
L = 840 mm 20
L = 940 mm 22

Ordering example: See “Inquiry/Order” form

⚠ **Please check whether the selected combination is a permissible one (load capacities, moments, maximum speeds, motor data, etc.)!**

d_0 = screw diameter (mm)
P = screw lead (mm)
carr. = carriage(s)
L = length

Motor attachment			Motor		Type of cover			Switches / Mounting duct / Socket-plug	Documentation	
										
Gear ratio i =	Attachment kit[1]	for motor	with brake	without brake	without	cover plate	strip		Standard report	Measurement report
–	00	–	00		00	–	–			
–	00	–	00							02 Friction moment
–	03	**MSK 040C**	87	86				**Without switch and Mounting duct** 00		
–	06	**MSM 041B**	141	140				**Switches:**		03 Lead deviation
–	31	**NEMA 23-D[2]**	00					– Reed sensor 21 – Hall sensor 22		
–	32	**MSK 030C**	85	84				**Mounting duct** 25	01	
–	33	**MSM 031C**	139	138	00	01	02			
i = 1	40	**MSK 030C**	85	84				**Switching cam for PSK:** – Without cover or with cover plate 30 – With sealing strip 31		04 Travel accuracy
i = 1,5	41									
i = 1	42	**MSM 031C**	139	138						
i = 1,5	43									
i = 1	44	**MSK 040C**	87	86						05 Positioning accuracy
i = 1,5	45									
i = 1	46	**MSM 041B**	141	140						
i = 1,5	47									

1) Attachment kit also available without motor (when ordering: enter “00” for motor).
For motor mounting kit for customer motor see “Motor mounting” section.

2) Use motors complying with the appropriate NEMA specification.
Because of the varying shaft dimensions for NEMA-specification motors, the attachment kit does not include a coupling.

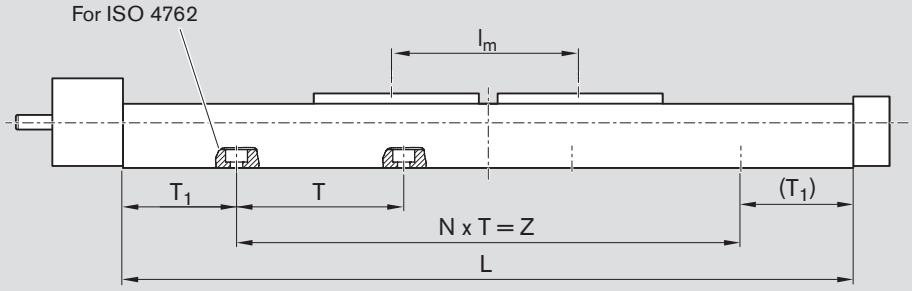
Switch mounting arrangements

Refer to “Switch mounting arrangements” for more information on switch types and switch mounting.

Configuration and ordering, Dimension Drawings

Precision Module PSK-090

Lengths and Hole Spacing



Length L

Type of cover	Number of carriages (carr.)	Carriage version Standard length	Long
Without cover or with cover plate	1 carr.	L = (stroke + 2 · excess travel) + 100 mm	L = (stroke + 2 · excess travel) + 120 mm
	2 carr.	L = (stroke + 2 · excess travel) + l_m + 100 mm $l_{m\,min}$ = 90 mm	L = (stroke + 2 · excess travel) + l_m + 120 mm $l_{m\,min}$ = 110 mm
With sealing strip	1 carr.	L = (stroke + 2 · excess travel) + 190 mm	L = (stroke + 2 · excess travel) + 265 mm

l_m = center-to-center distance between carriages (consider $l_{m\,min}$)
Stroke = maximum travel of carriage center between the outermost switch activation points

In most cases the recommended limit for excess travel (braking path) is:
Excess travel = 2 · screw lead P

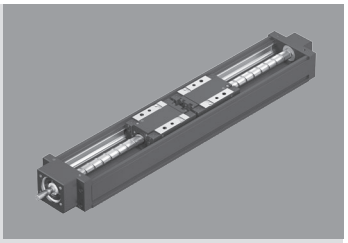
Example
Ball screw 16 x 10
(Ball screw size = d_0 x P):
Excess travel = 2 · 10 = 20 mm

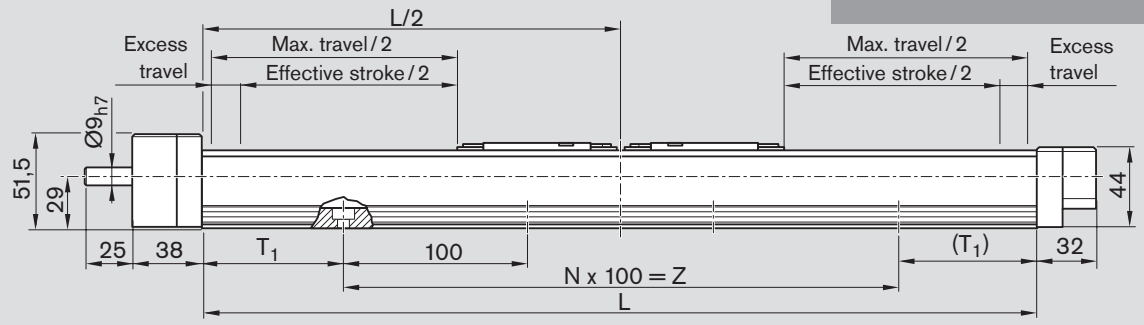
Standard lengths of frame

Length L (mm)	T (mm)	T_1 (mm)	N	Z (mm)	Mounting holes for ISO 4762 screws
340	100	70	2	200	M6
440	100	70	3	300	
540	100	70	4	400	
640	100	70	5	500	
740	100	70	6	600	
840	100	70	7	700	
940	100	70	8	800	

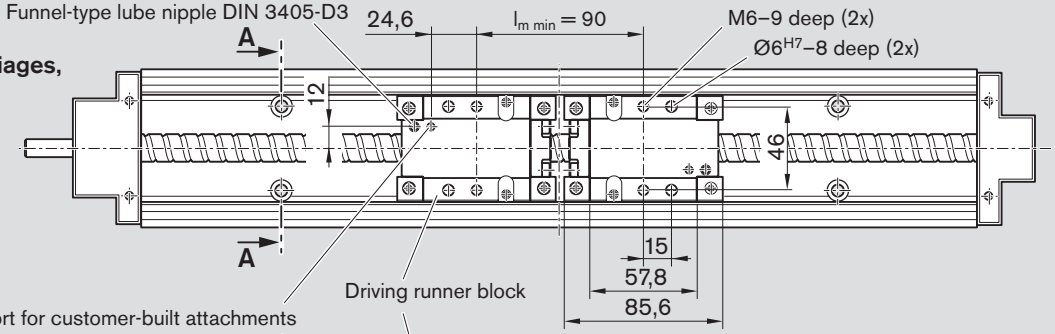
Dimension Drawings without Cover

All dimensions in mm
Drawings not to scale

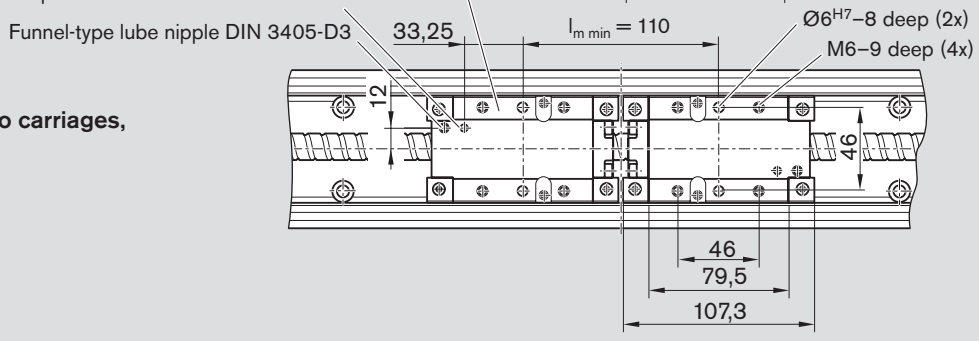


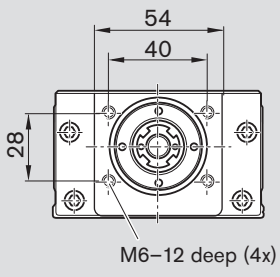


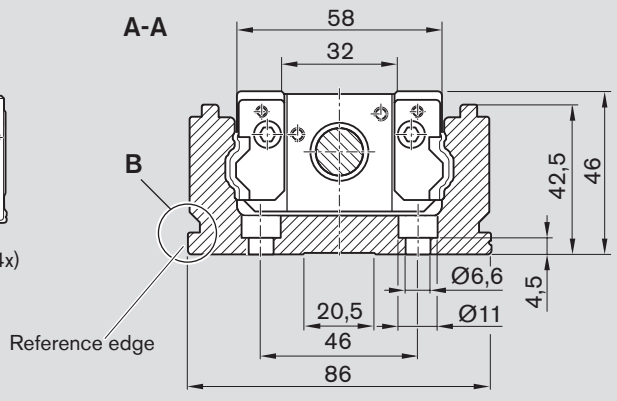
Version:
One or two carriages, standard length

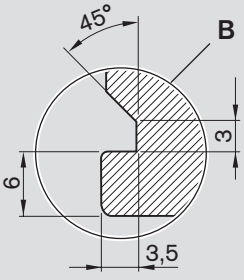


Version:
One or two carriages, long









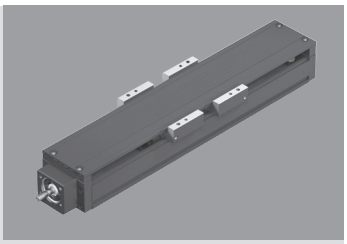
For fastening with clamping fixtures

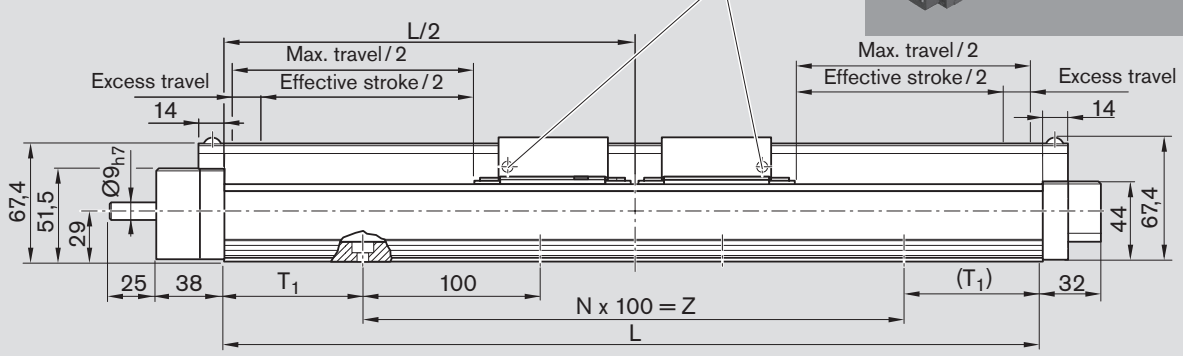
Configuration and ordering, Dimension Drawings

Precision Module PSK-090

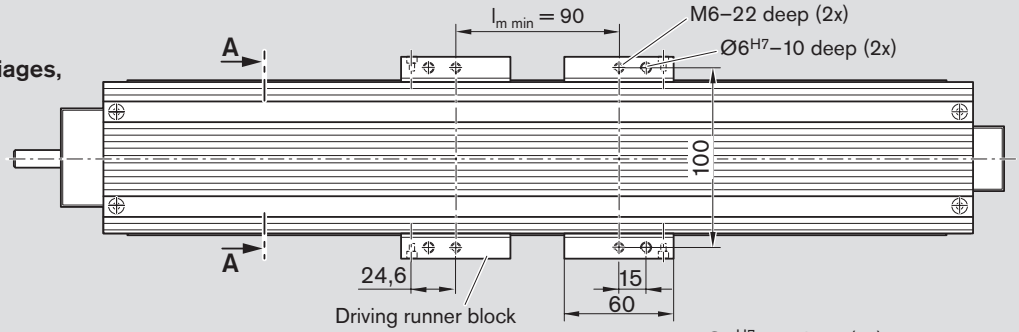
Dimension Drawings with Cover Plate

All dimensions in mm
Drawings not to scale

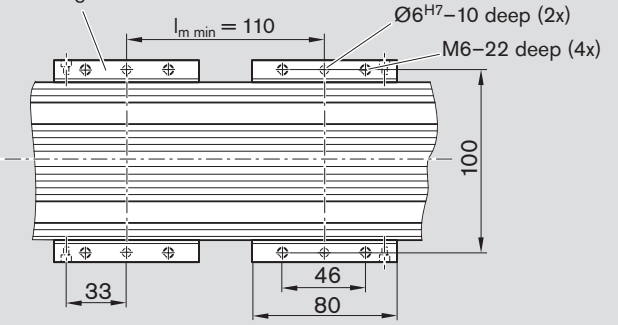


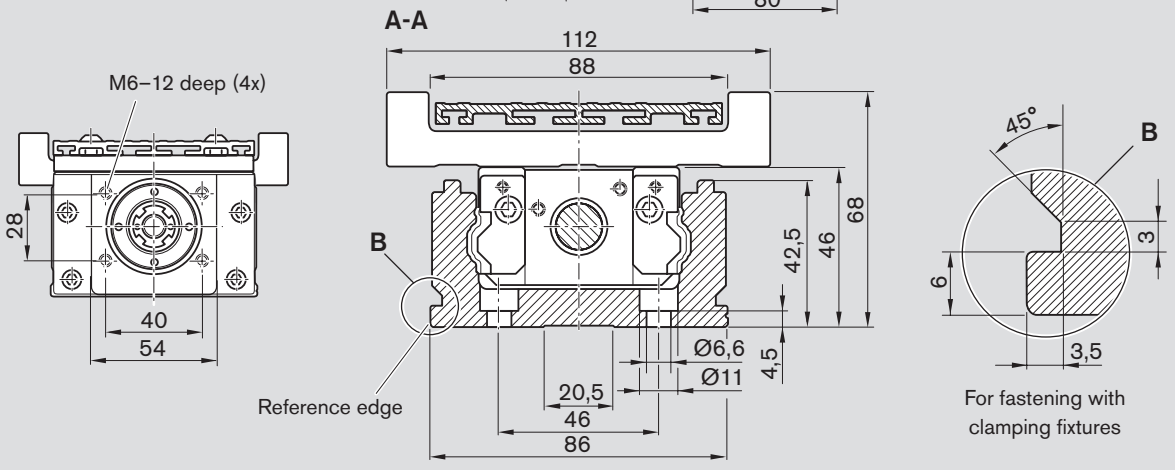


Version:
One or two carriages, standard length



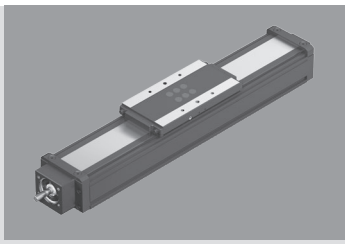
Version:
One or two carriages, long

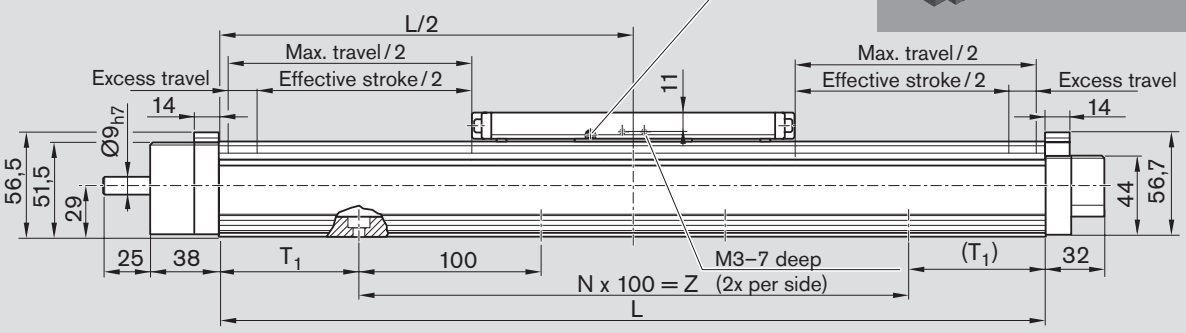




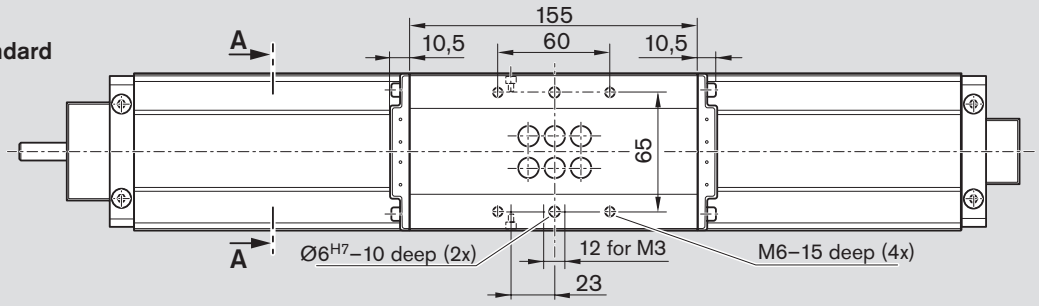
Dimension Drawings with Sealing Strip

All dimensions in mm
Drawings not to scale

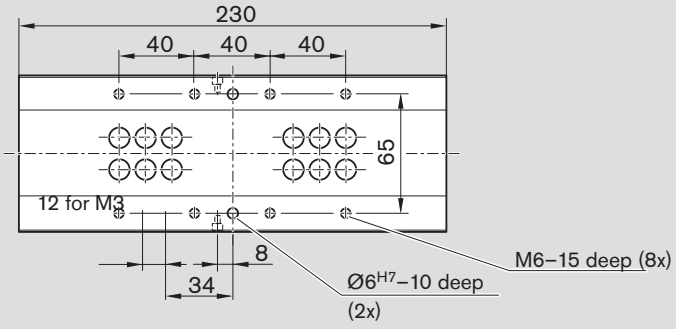


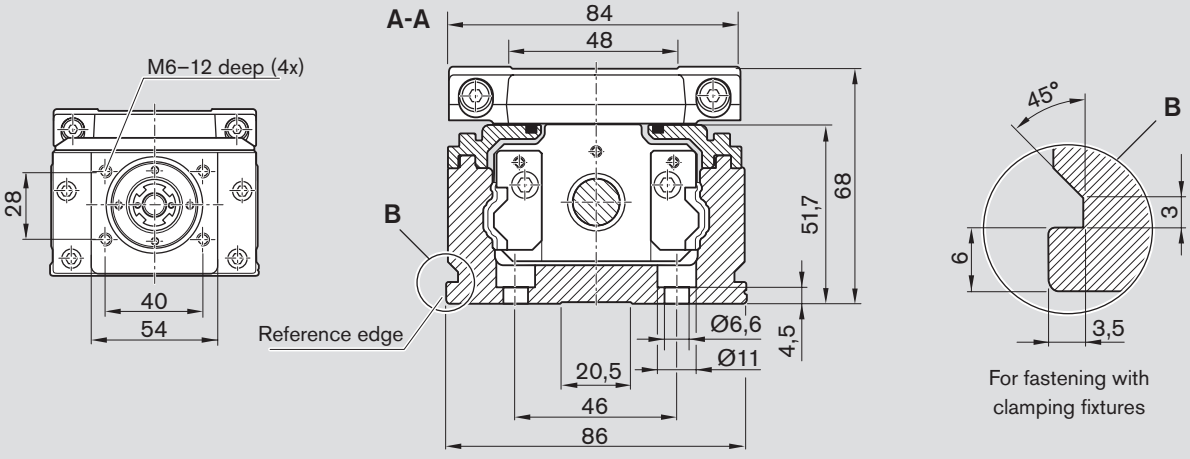


Version:
Carriage, standard length



Version:
Carriage, long





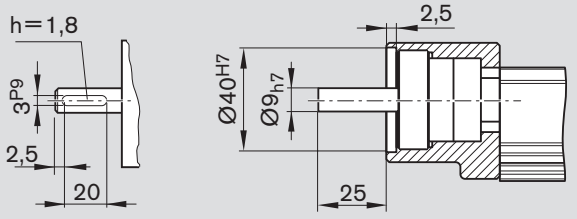
For fastening with clamping fixtures

Configuration and ordering, Dimension Drawings

Precision Module PSK-090

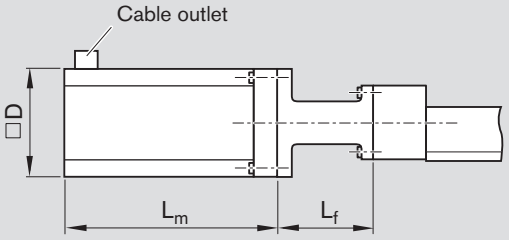
Dimension Drawings, Motor Attachment

OF01, OF02



MF01, MF02

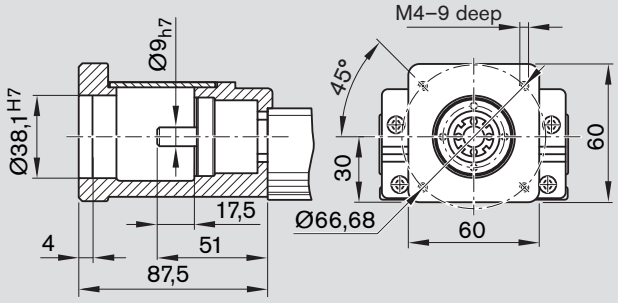
Motor with motor mount and coupling



Motor type	Dimensions (mm)			
	D	L_f	L_m without brake	L_m with brake
MSM 031C	60.0	72.0	98.5	135.0
MSM 041B	80.0	81.0	112.0	149.0
MSK 030C	54.0	75.0	188.0	213.0
MSK 040C	82.0	77.5	185.5	215.5

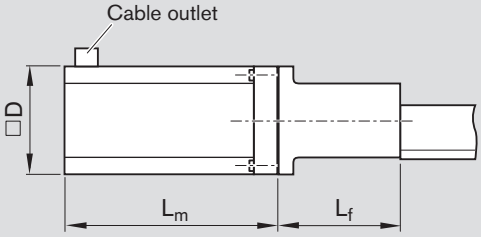
MF10, MF11

Integrated motor mount (NEMA 23 – Form D)



MF10, MF11

Motor with integrated motor mount and coupling

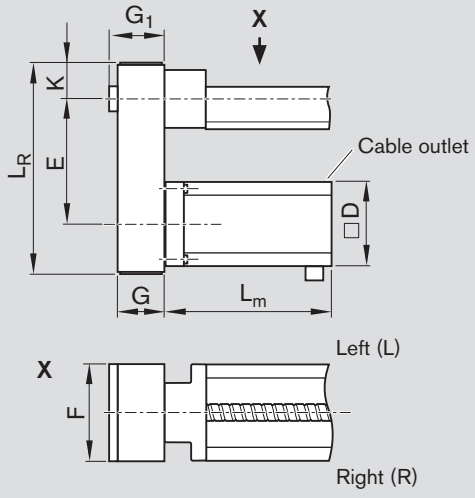


Motor type	Dimensions (mm)			
	D	L_f	L_m without brake	L_m with brake
MSM 031C	60	87.5	98.5	135.0
MSK 030C	54	87.5	188.0	213.0

Drawings not to scale!
For further information and dimensions, see “Motors.”

RV01–RV08

Motor with timing belt side drive



View **X** shown without motor

Version	Motor type	Dimensions (mm)									
		D	E		F	G	G_1	K	L_m		L_R
			i = 1	i = 1.5					without brake	with brake	i = 1	i = 1.5
RV01 to RV08	**MSM 031C**	60	103.5	115.0	64.5	37	43.5	33.5	98.5	135.0	180.0	191.5
	MSM 041B	80	122.0	122.0	88.0	51	57.0	45.5	112.0	149.0	231.0	231.0
	MSK 030C	54	103.5	115.0	64.5	37	43.5	33.5	188.0	213.0	180.0	191.5
	MSK 040C	80	122.0	122.0	88.0	51	57.0	45.5	185.5	215.5	231.0	231.0

Attachments and Accessories

Switch Mounting Arrangements

Overview of switching system

1 Switch
2 Switching cam
3 Mounting duct (aluminum alloy, black anodized)
4 Socket head cap screw with washer

Notes for mounting
A mounting duct is required for installation of the switches.

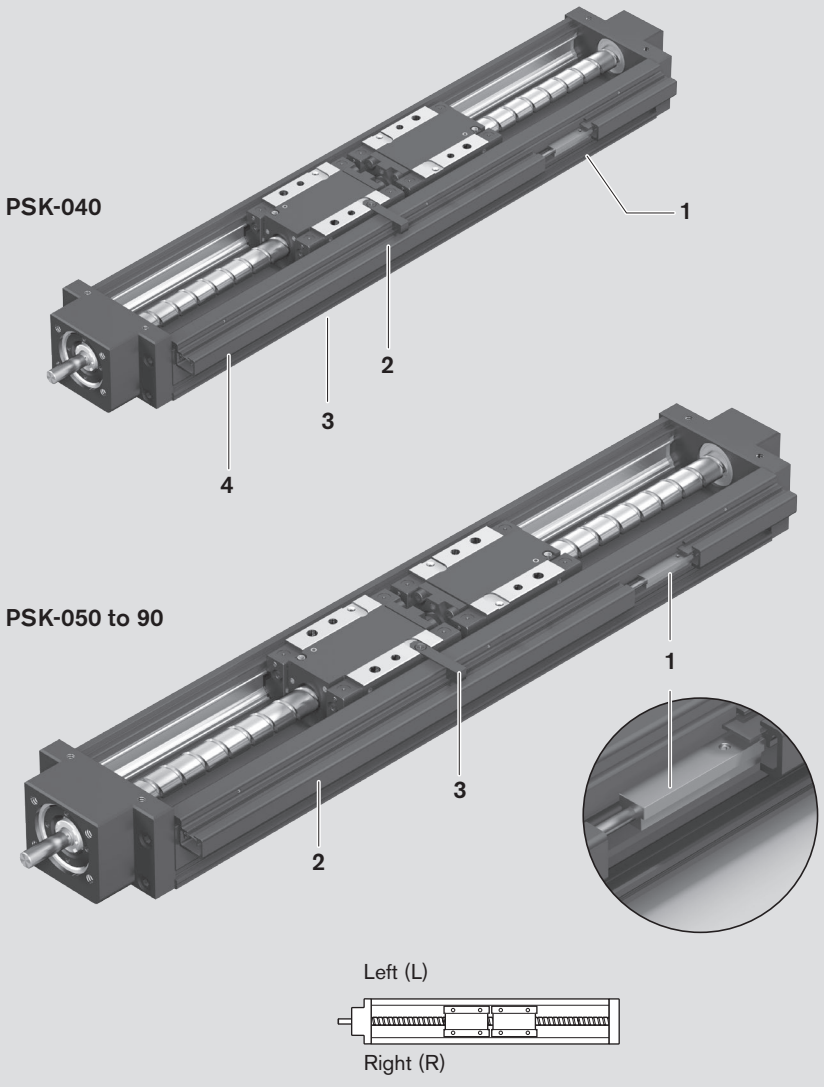
⚠ **Short stroke:**
Consider the length of the switch!

Mounting side:
Switches may be mounted on the left (L) or right (R) side of the module.

For two-carriage versions:
Switch actuation by the driving runner block (on the motor side).

The switching system (switch, switching cam, mounting duct, standard parts) is supplied loose.

Switching system



Ordering the switches and accessories

Refer to the following table for part numbers.
Accessories can also be ordered separately.

Item		Part numbers		
		PSK-040	PSK-050	PSK-060 and PSK-090
1	**Switches**			
	– Reed sensor	R3476 018 03	R3476 018 03	R3476 018 03
	– Hall sensor	R3476 019 03	R3476 019 03	R3476 019 03
2	**Mounting duct**	R0399 800 97	R0396 620 20	R0396 620 19
3	**Switching cam**			
	– For PSK without cover or with cover plate	R1419 000 12	R1419 000 10	R1419 000 04
	– For PSK with sealing strip	–	R1419 000 11	R1419 000 05

Length calculation mounting duct : PSK40: L + 15 mm
PSK-050 to PSK-090: L – 2 mm

Mounting duct

Function

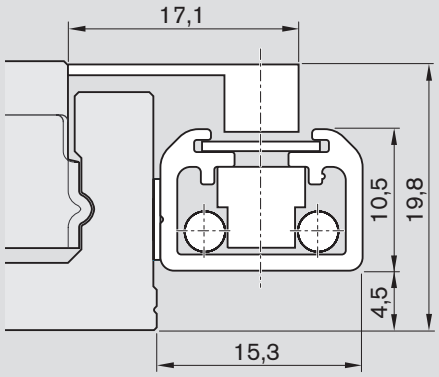
– To accommodate and secure switches
– To house cables

Mounting instructions for PSK-040

The mounting duct is fastened to the same side as the switches and fixed to the end blocks of the Precision Module with socket head cap screws and washers (included in delivery).

Mounting duct PSK-040

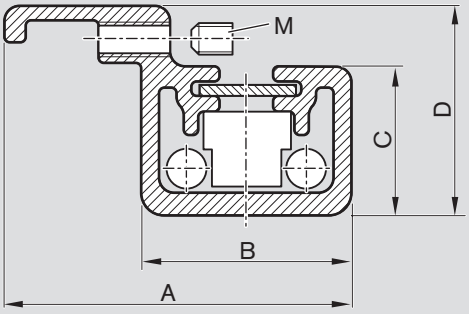
Arrangement of switching cam and mounting duct



Mounting instructions for PSK-050 to PSK-090

The Mounting duct is mounted to the same side as the switches by snapping it into the T-slots on the frame of the Precision Module and securing it with set screws. The set screws (M) are supplied along with the duct.

Mounting duct PSK 50 to PSK 90



Dimensions for mounting duct

Dimensions		PSK-050	PSK-060	PSK-090
A	(mm)	21.7	25.2	25.2
B	(mm)	15.0	15.0	15.0
C	(mm)	11.5	11.5	11.5
D	(mm)	16.5	16.5	16.5
M	(mm)	M2.0	M2.5	M2.5

Installation dimensions for versions without cover or with cover plate

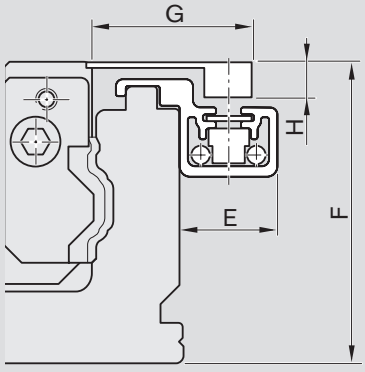
Dimensions		PSK-050	PSK-060	PSK-090
E	(mm)	15.2	15.8	15.4
F	(mm)	25.8	32.8	45.8
G	(mm)	19.7	22.6	25.8
H	(mm)	6.0	6.0	6.0

Installation dimensions for version with sealing strip

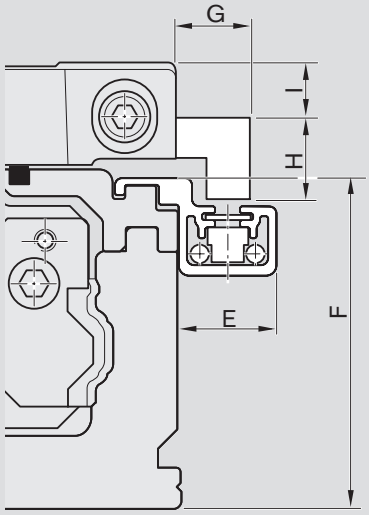
Dimensions		PSK-050	PSK-060	PSK-090
E	(mm)	15.2	15.8	15.2
F	(mm)	28.2	35.7	50.2
G	(mm)	12.2	13.0	13.0
H	(mm)	12.5	14.0	14.0
I	(mm)	3.3	1.9	7.4

Arrangement of switching cam and mounting duct

– PSK without cover or with cover plate



– PSK with sealing strip



Attachments and Accessories

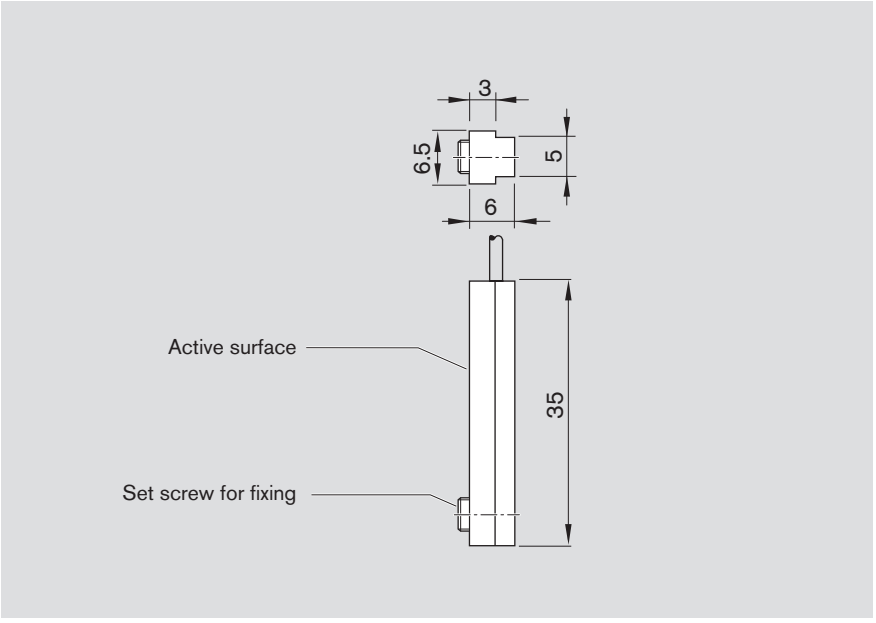
Switch Mounting Arrangements

Switches

The switches for Precision Modules PSK are magnetic field sensors with potted cable.

Versions
- Hall sensor, PNP NC
- Reed sensor (changeover)

Notes for mounting
Switches may only be mounted to one side of the Precision Module (left or right).
A mounting duct is required for installation of the switches.
The switches are pushed into the slots of the mounting duct and fixed with set screws.

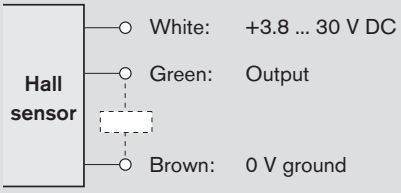


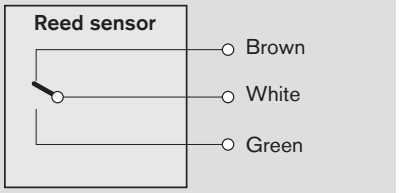
Technical data

Hall sensor	
Contact type	PNP NC
Operating voltage	3.8–30 V DC
Current consumption	max. 10 mA
Output current	max. 20 mA
Cable length	2000 mm
Protection class	IP 66
Short-circuit protection	No

Reed sensor	
Contact type	Changeover
Switching voltage	max. 100 V DC
Switching current	max. 500 mA
Cable length	2000 mm
Protection class	IP 66
Caution: 2 switching points	

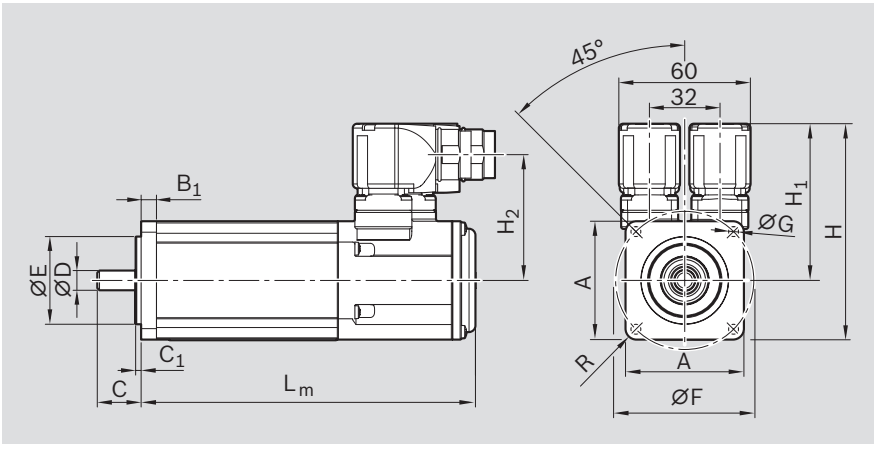
Pin assignment





Attachments and Accessories

IndraDyn S Servo Motor MSK



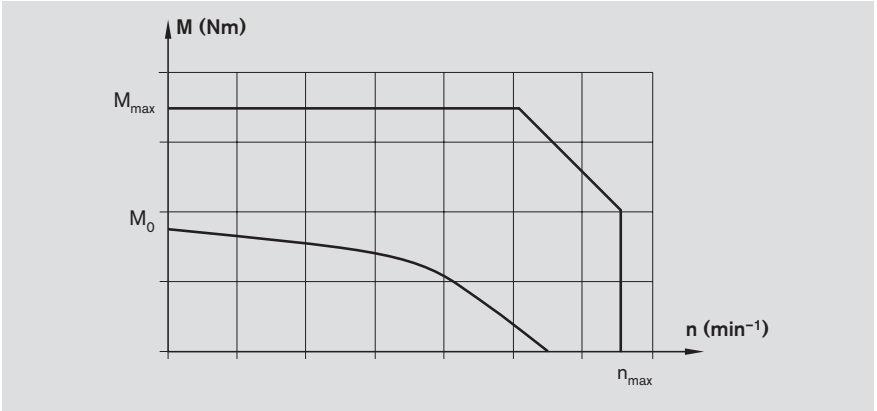
Motor type	Dimensions (mm)										
	A	B_1	C	C_1	ØD k6	ØE j6	ØF	ØG	H	L_m without brake	L_m with brake
MSK 030C-0900	54	7	20	2,5	9	40	63	4,5	98,5	180,0	213,0
MSK 040C-0600	82	8	30	2,5	14	50	95	6,6	124,5	185,5	215,5

Motor data

Motor type	n_{max} (min^{-1})	M_0 (Nm)	M_{max} (Nm)	M_{br} (Nm)	J_m (kgm^2)	J_{br} (kgm^2)	m_m (kg)	m_{br} (kg)
MSK 030C-0900	9 000	0,8	4,0	1	0,000030	0,000007	1,9	0,2
MSK 040C-0600	7 500	2,7	8,1	4	0,000140	0,000023	3,6	0,3

J_{br} = mass moment of inertia of the holding brake
J_m = mass moment of inertia, motor
L_m = length of the motor
M_0 = standstill torque
M_{br} = holding torque of holding brake when switched off
M_{max} = maximum possible motor torque
n_{max} = maximum motor speed

Motor torque speed curve (schematic)



Option number[1)]	Motor	Part number	Version Holding brake		Type designation
			without	with	
84	**MSK 030C-0900**	R911308683	X		MSK030C-0900-NN-M1-UG0-NNNN
85		R911308684		X	MSK030C-0900-NN-M1-UG1-NNNN
86	**MSK 040C-0600**	R911306060	X		MSK040C-0600-NN-M1-UG0-NNNN
87		R911306061		X	MSK040C-0600-NN-M1-UG1-NNNN

[1)] From the “Configuration and Ordering” table“

Specification:
- Plain shaft with shaft seal ring
- Multiturn absolute encoder M1 (Hiperface)
- Cooling system: natural convection
- Protection class IP65 (casing)
- With or without holding brake

Note
The motors can be supplied complete with controllers and control units. For further motor types and more information on motors, controllers and control systems, please refer to the Rexroth catalogs on drive technology.

Rexroth Media Directory

Categories

- Electric Drives and Controls
- Industrial Hydraulics
- Mobile Hydraulics
- Linear Motion and Assembly Technologies
- Systems
- Training
- Company
- Industries
- Cast
- Service
- Countries

- General
- Drive Technology
- Automation Systems
- Press-fit systems
- Engineering
- Tightening Systems
- Control units
- Resistance Welding

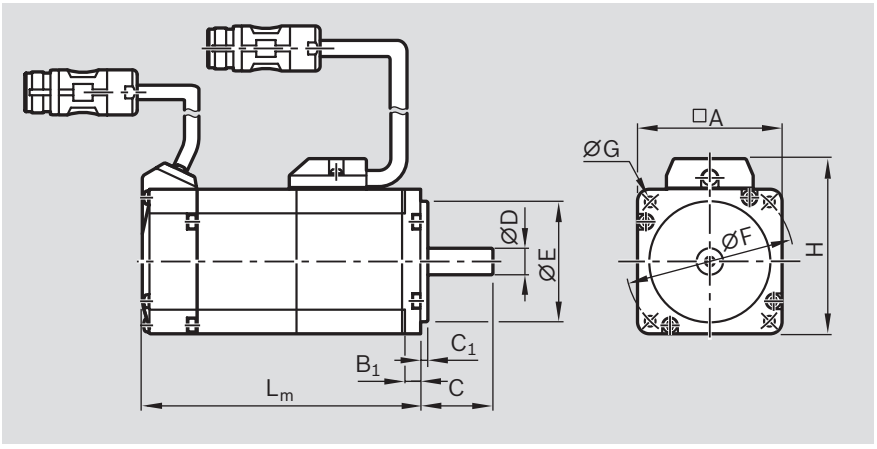
- IndraDrive
- IndraDrive Cs
- IndraDrive Mi
- IndraDrive ML
- IndraDrive Fc
- Frequency Converter EFC 3600
- Frequency Converter EFC 3610/5610
- Frequency Converter VFC 3610/5610
- Frequency Converter Fe
- Frequency Converter Fv

Recommended motor controller combinations

Motor	Controller
MSK 030C-0900	HCS 01.1E-W0005
MSK 030C-0900	HCS 01.1E-W0008
MSK 040C-0600	
MSK 040C-0600	HCS 01.1E-W0018

Attachments and Accessories

IndraDyn S Servo Motor MSM



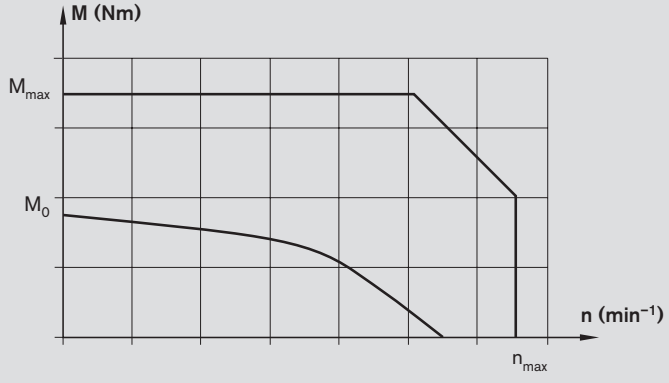
Motor type	Dimensions (mm)										
	A	B_1	C	C_1	ØD h6	ØE h7	ØF	ØG	H	L_m without brake	L_m with brake
MSM 019A-0300	38	6,0	25	3	8	30	45	3,4	51	72,0	102,0
MSM 019B-0300	38	6,0	25	3	8	30	45	3,4	51	92,0	122,0
MSM 031B-0300	60	6,5	30	3	11	50	70	4,5	73	79,0	115,5
MSM 031C-0300	60	6,5	30	3	14	50	70	4,5	73	98,5	135,0
MSM 041B-0300	80	6,0	35	3	19	70	90	6,0	93	112,0	149,0

Motor data

Motor type	n_{max} (min^{-1})	M_0 (Nm)	M_{max} (Nm)	M_{br} (Nm)	J_m (kgm^2)	J_{br} (kgm^2)	m_m (kg)	m_{br} (kg)
MSM 019A-0300	5 000	0.16	0.48	0.29	0.0000025	0.0000002	0.32	0.21
MSM 019B-0300	5 000	0.32	0.95	0.29	0.0000051	0.0000002	0.47	0.21
MSM 031B-0300	5 000	0.64	1.91	1.27	0.0000140	0.0000018	0.82	0.48
MSM 031C-0300	5 000	1.30	3.80	1.27	0.0000260	0.0000018	1.20	0.50
MSM 041B-0300	4 500	2.40	7.10	2.45	0.0000870	0.0000075	2.30	0.80

J_{br} = mass moment of inertia of the holding brake
J_m = mass moment of inertia, motor
L_m = length of the motor
M_0 = standstill torque
M_{br} = holding torque of holding brake when switched off
M_{max} = maximum possible motor torque
n_{max} = maximum motor speed

Motor torque speed curve (schematic)



Option number[1)]	Motor	Part number	Version Holding brake without	with	Type designation
132	**MSM 019A-0300**	R911344209	X		MSM 019A-0300-NN-M5-MH0
133		R911344210		X	MSM 019A-0300-NN-M5-MH1
134	**MSM019B-0300**	R911344211	X		MSM 019B-0300-NN-M5-MH0
135		R911344212		X	MSM 019B-0300-NN-M5-MH1
136	**MSM 031B-0300**	R911344213	X		MSM 031B-0300-NN-M5-MH0
137		R911344214		X	MSM 031B-0300-NN-M5-MH1
138	**MSM 031C-0300**	R911344215	X		MSM 031C-0300-NN-M5-MH0
139		R911344216		X	MSM 031C-0300-NN-M5-MH1
140	**MSM 041B-0300**	R911344217	X		MSM 041B-0300-NN-M5-MH0
141		R911344218		X	MSM 041B-0300-NN-M5-MH1

[1)] From the “Configuration and Ordering” table“

Specification:
- Plain shaft without shaft seal ring
- Multiturn absolute encoder M5 (20 Bit, absolute encoder functionality only possible with back-up battery)
- Cooling system: natural convection
- Protection class IP54 (shaft IP40)
- With or without holding brake
- Metal round plug M17

Note
The motors can be supplied complete with controllers and control units. For further motor types and more information on motors, controllers and control systems, please refer to the Rexroth catalogs on drive technology.

Rexroth Media Directory

Categories

- Electric Drives and Controls
  - General
  - Drive Technology
    - IndraDrive
    - IndraDrive Cs
    - IndraDrive Mi
    - IndraDrive ML
    - IndraDrive Fc
    - Frequency Converter EFC 3600
    - Frequency Converter EFC 3610/5610
    - Frequency Converter VFC 3610/5610
    - Frequency Converter Fe
    - Frequency Converter Fv
  - Automation Systems
  - Press-fit systems
  - Engineering
  - Tightening Systems
  - Control units
  - Resistance Welding
- Industrial Hydraulics
- Mobile Hydraulics
- Linear Motion and Assembly Technologies
- Systems
- Training
- Company
- Industries
- Cast
- Service
- Countries

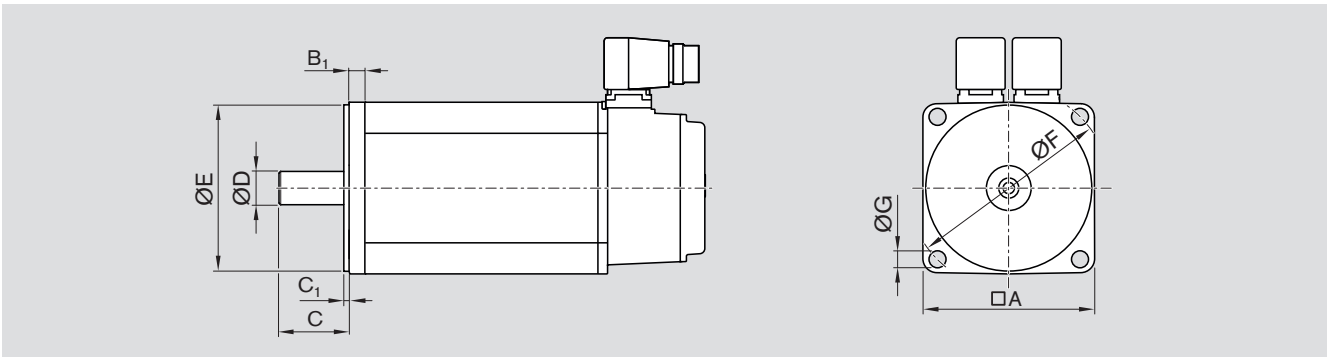
Recommended motor controller combinations

Motor	Controller
MSM 019A-0300	HCS 01.1E-W0003
MSM 019B-0300	
MSM 031B-0300	HCS 01.1E-W0006
MSM 031C-0300	HCS 01.1E-W0009
MSM 041B-0300	HCS 01.1E-W0013

Attachments and Accessories

Motor mounting kits according to customer specification

The motor mounting for linear systems with ball screw drive consists of either a mounting kit with flange and coupling (MF) or a timing belt side drive (SD). The available combinations are shown in the “Components and ordering” selection tables for the respective size.
In addition to motor options for Rexroth motors, kits for motors can also be ordered according to customer specifications. In order to establish the appropriate mounting set, the connection geometry of the motor is crucial.
Characteristics required to uniquely determine the motor geometry are shown below.

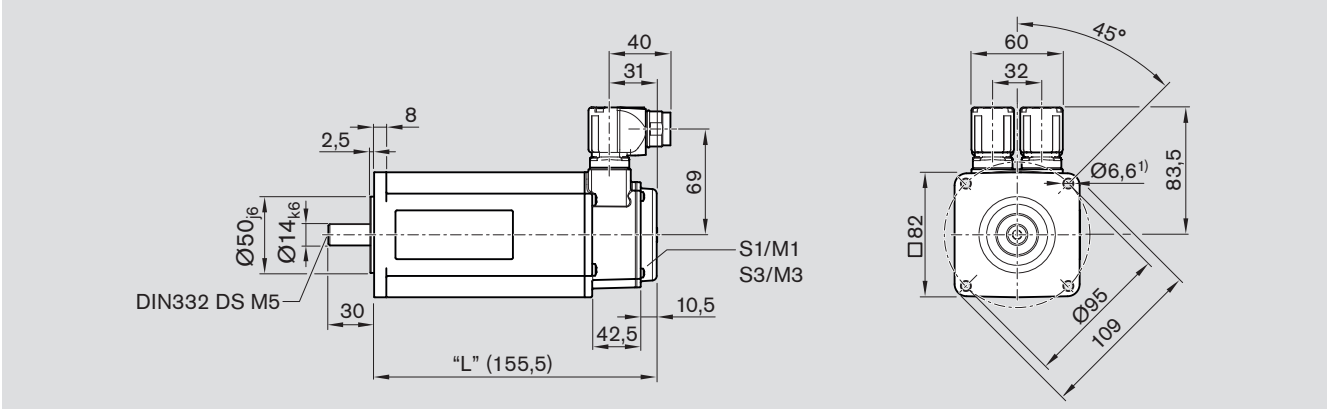


The dimensions queried result in a unique “motor geometry code”:

□□–□□–□□□–□□□–□□□–M□□–□□□–□□□

ØD	=	Shaft diameter
C	=	Shaft length
ØE	=	Centering diameter
C_1	=	Centering depth
ØF	=	Pitch diameter
ØG	=	Through hole for mounting screw (specify thread diameter)
B_1	=	Flange thickness
A	=	Flange edge dimension

Example representation of servo motor IndraDyn S Type MSK040C

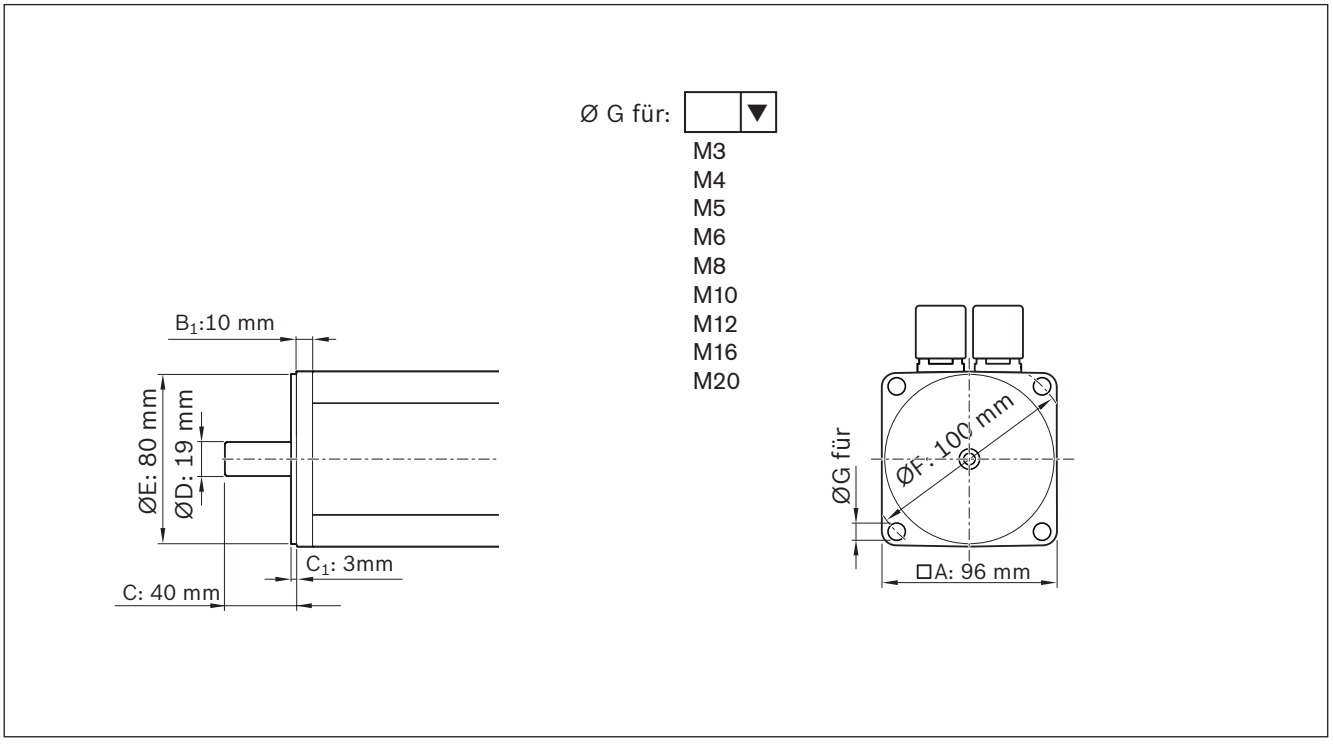


1 4 – 3 0 – 0 5 0 – 2 . 5 – 0 9 5 – M 0 6 – 0 0 8 – 0 8 2

1) The through hole Ø 6.6 mm results in the type designation M06 for the geometry motor code (nominal thread diameter mounting screw M6).

Motor mounting kits for motors according to customer specification can be configured using the online configurator in the eShop. The option “Motor mounting kits according to customer specification” needs to be selected for this.

The motor geometry is entered via the input dialog box. The dimensions can either be entered by being input directly or via a drop-down menu.



Attachments and Accessories

Mounting

General notes

⚠ **Do not mount or support the Precision Module by the end blocks! The frame is the main load-bearing part!**

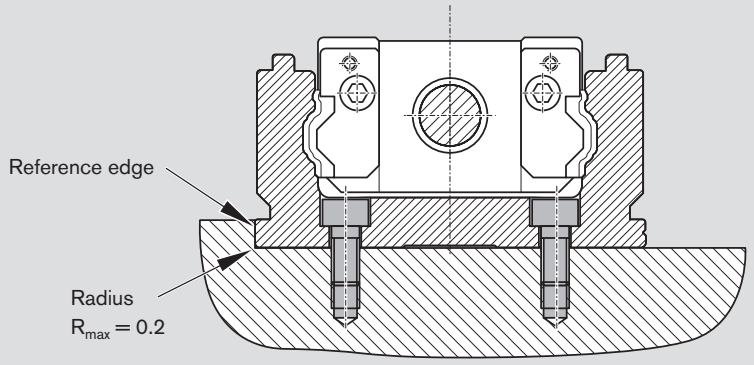
Precision Modules can be mounted either with screw-fasteners in the frame itself or with external clamping fixtures. When mounting Precision Modules, please note the maximum tightening torques listed in the table.

Mounting with screws in the frame

The reference edge on the frame facilitates alignment of the Precision Module. Suitable for cover options:

– Without cover
– With cover plate (remove cover plate before mounting the module). For installation dimensions, see the relevant dimension drawings.

Mounting with screws in the frame



Mounting with clamping fixtures, PSK 50 to PSK 90

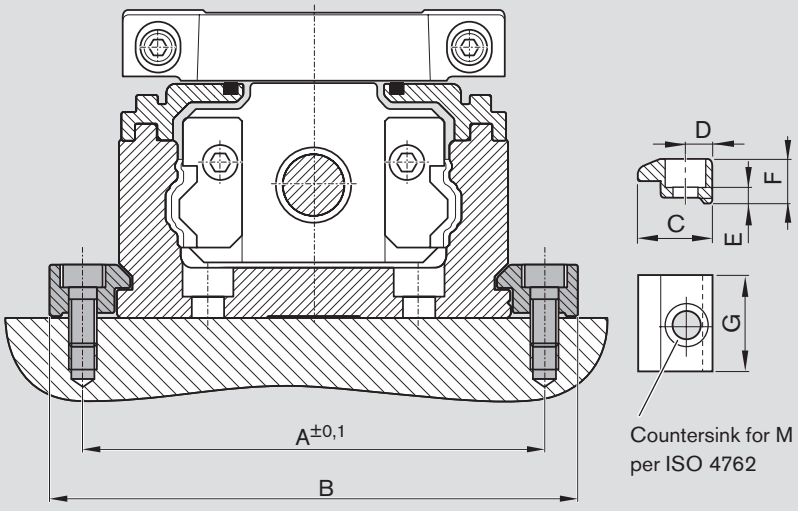
The reference edge cannot be used in the region of the clamping fixtures. Suitable for all cover options.

Clamping fixtures

Recommended number:

– 3 per 500 mm and side

Mounting with clamping fixtures, PSK 50 to PSK 90



Precision Module	Part numbers Clamping fixtures	Dimensions (mm) A	B	C	D	E	F	G	M
PSK-050	R1419 010 02	60	70	12.5	5.0	4.0	8.5	20	M4
PSK-060	R1419 010 01	72	85	15.0	6.5	4.8	10.0	22	M5
PSK-090	R1419 010 00	100	115	17.5	7.5	5.8	12.0	25	M6

Tightening torques for the mounting screws

– At friction factor 0.125
– Strength class 8.8

			M3	M4	M5	M6
8.8		(Nm) max.	1.3	2.7	5.5	9.5

Services and Information

Lube Ports

General notes

The lubrication system on Precision Modules has been designed for grease lubricants (grease gun). The lube port supplies lubricant to both the Rail System guideway and the Precision Ball Screw Assembly. If the module has two carriages, **both** of these must be lubricated.

Lubricant

Lithium soap grease	PSK-040	PSK-050 to PSK-090
	Consistency class NGLI 00 as per DIN 51818	Consistency class NLGI 2 as per DIN 51818
Recommended	Dynalub 520	Dynalub 510
Part numbers	R3416 043 00	R3416 037 00
May also be used		
	Elkalub GLS 135 / N00	Elkalub GLS 135 / N2
	Castrol Longtime PD 00, (Castrol)	Castrol Longtime PD 2, (Castrol)

PSK without cover

- PSK-040: One-point lubrication is possible via the lube port for grease gun on each carriage. Remove the set screw from the lube hole, apply lubricant, then drive the set screw in again.
- PSK-050 to PSK-090: One-point lubrication at either of the two funnel-type lube nipples DIN 3405-D3 per carriage.
- One-point lubrication through customer-built attachment: This can be achieved in all PSK types by using the lube port in the carriage. The lube ports are closed with set screws for shipment. Before using the lube ports, the set screws must be removed and O-rings inserted to seal off the customer-built attachment.

Precision Module	O-ring DIN 3771	Part numbers
PSK-040 to PSK-060	3 x 1	R3411 118 01
PSK-090	5 x 1.5	R3411 108 01

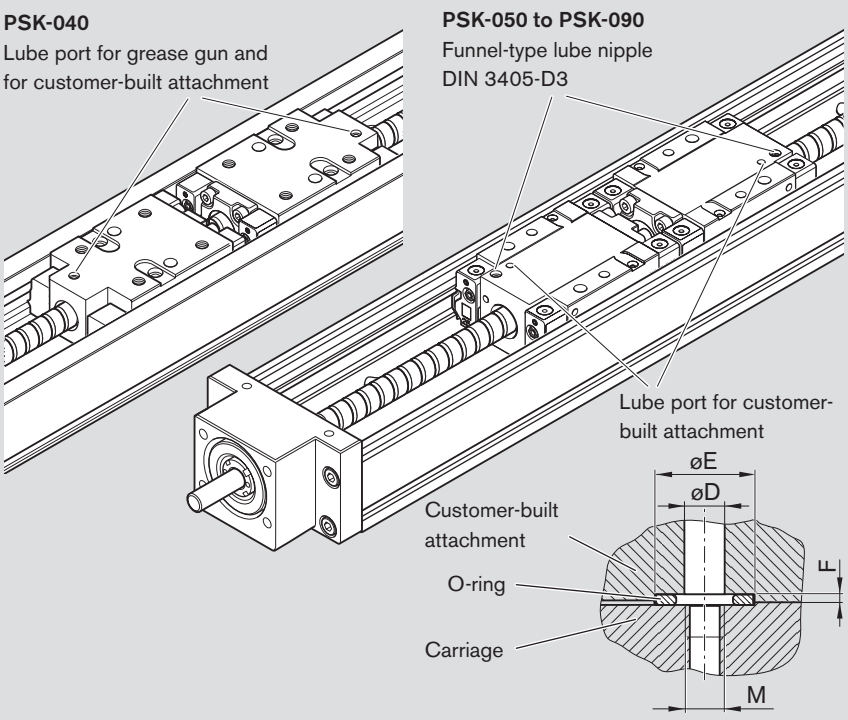
PSK with cover plate or sealing strip

One-point lubrication at either of the two funnel-type lube nipples (1) DIN 3405-D3 per carriage.

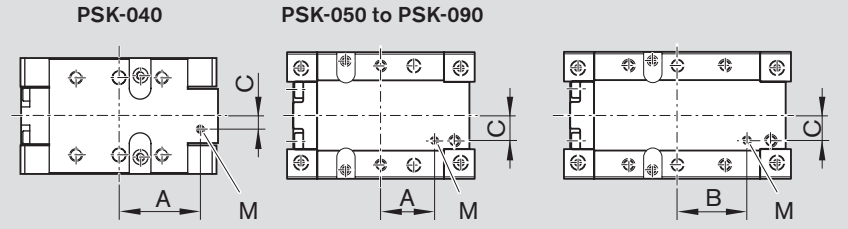
For short-stroke applications, please contact us regarding the lubrication arrangements:

PSK-040: stroke < 50 mm
PSK-050: stroke < 70 mm
PSK-060: stroke < 95 mm
PSK-090: stroke < 135 mm

Without cover

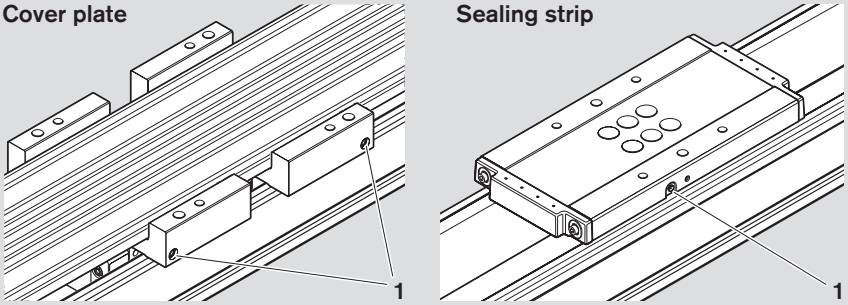


Carriage: standard length **Carriage: long**



Precision Module		PSK-040	PSK-050	PSK-060	PSK-090
A	(mm)	19.0	18.2	16.0	24.6
B	(mm)	–	–	22.0	33.3
C	(mm)	3.0	6.5	9.0	12.0
D	(mm)	2.5	2.5	2.5	4.0
E	(mm)	5.0	5.0	5.0	8.0
F	(mm)	0.6 +0.1	0.6 +0.1	0.7 +0.1	0.5 +0.1
M	(mm)	M2	M2.5	M3	M4

Cover plate **Sealing strip**



Services and Information

Documentation

Standard report

Option no. 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 order confirmation

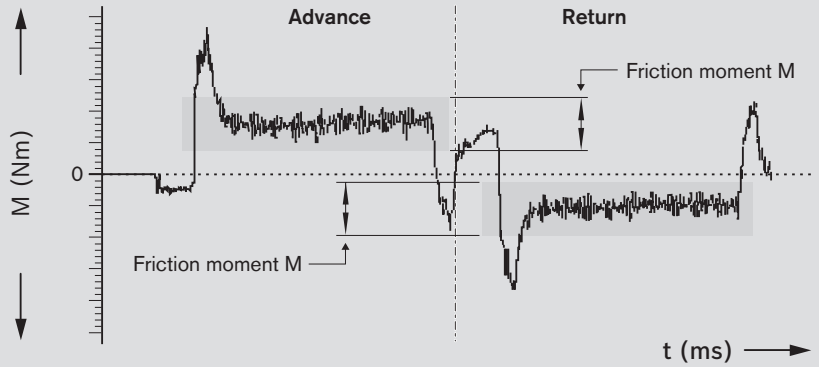
Frictional moment of complete system

Option no. 02

The moment of friction M is measured over the entire travel range.

M = friction moment (N)
t = travel time (ms)

Example



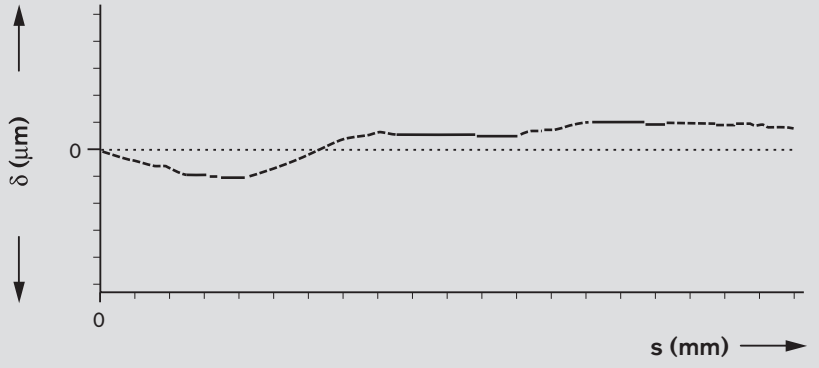
Lead deviation of ball screw

Option no. 03

A measurement report of the lead deviation δ over the measured travel s (see illustration) is provided in table form in addition to the graph.

δ = deviation (µm)
s = measured travel (mm)

Example



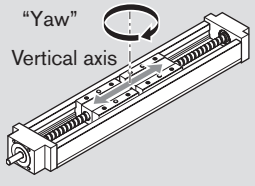
Travel accuracy

Option no. 04

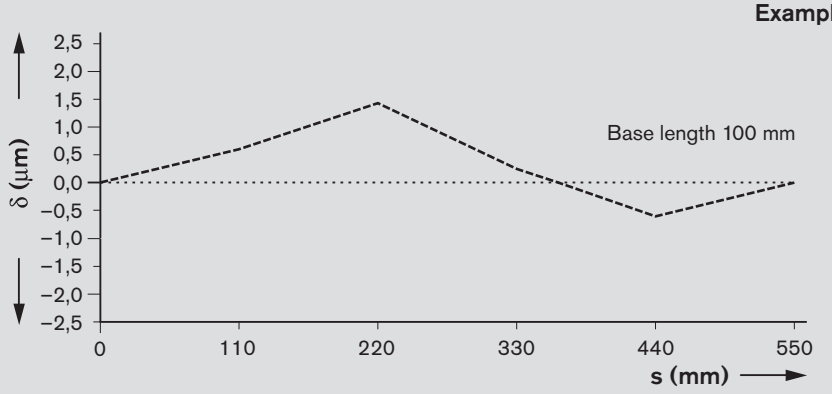
Several measuring points are passed during the total travel. The yawing and pitching deviations are measured at these points.

Note
The measurements are taken with the module screwed down and assuming an ideally flat mounting base surface.

Yawing
Yawing is angular deviation about the vertical axis. This angular deviation is converted to a linear deviation δ in µm on the basis of a standard length and is plotted on the graph. The base length is given in the graph.

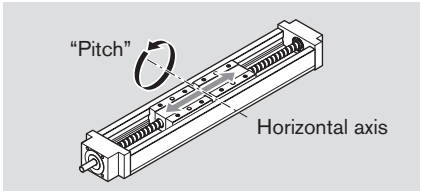


Example

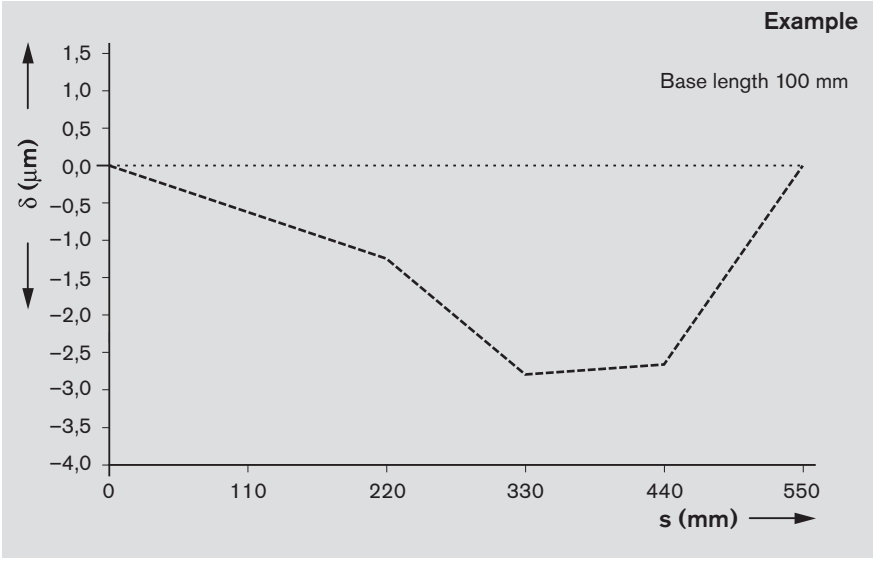


Pitching

Pitching means angular deviation about the horizontal axis. This angular deviation is converted to a linear deviation δ in µm on the basis of a standard length and is plotted on the graph. The base length is given in the graph.
In addition to graphical representation (see illustrations), a measurement report is supplied in table form.



Example

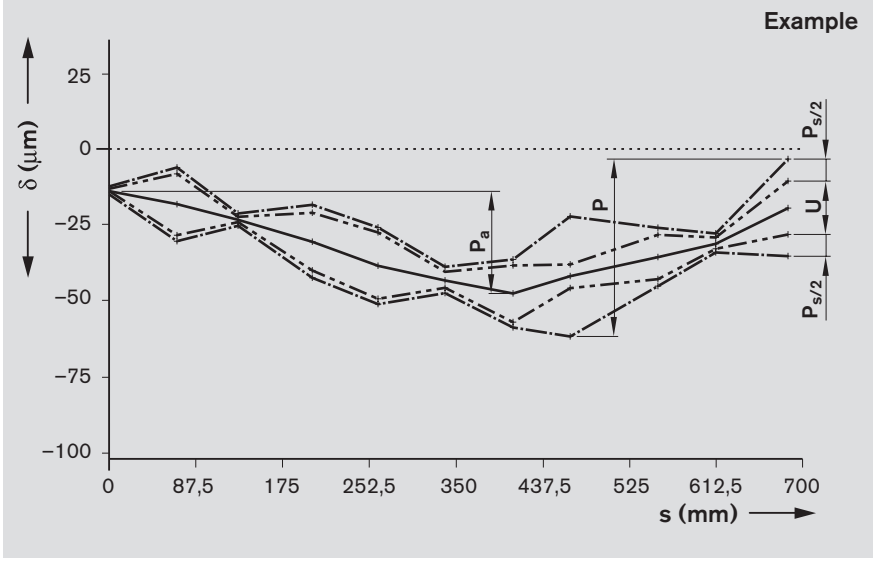


Positioning accuracy per VDI/DGQ 3441

Option no. 05

Measurement points are selected at irregular intervals along the travel range. This allows even periodical deviations δ in µm to be detected during positioning. Each measurement point is approached several times from both sides.
This gives the following parameters.

Example



δ = deviation (µm)
s = measured travel (mm)

Positioning accuracy P

The positioning accuracy corresponds to the total deviation. It encompasses all the systematic and random deviations during positioning. The positioning accuracy takes the following characteristic values into consideration:
- Position deviation
- Reversal range
- Position variation range

Position deviation P_a

The position deviation corresponds to the maximum difference arising in the mean values of all the measurement points. It describes systematic deviations.

Reversal range U

The reversal range corresponds to the difference in mean values of the two approach directions.

The reversal range is determined at every measurement point. It describes systematic deviations.

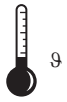
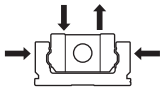
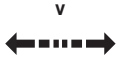
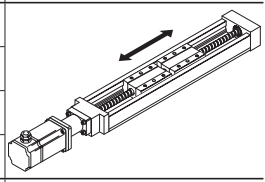
Position variation range P_s

The position variation range describes the effects of random deviations. It is determined at every measurement point.

Services and Information

Operating conditions and usage

Normal operating conditions

Ambient temperature (Temperature must not fall below dew point)		0 °C ... 40 °C	
Load		≤ 0,2 C	
Travel speed		≤ 1,0 m/s	
Travel distance s_{min}	PSK-040	> 65 mm	
	PSK-050	> 70 mm	
	PSK-060	> 95 mm	
	PSK-090	> 135 mm	
Contamination		Not permitted	

Required and supplementary documentation

For more information about Intended use and safety, see “Safety Instructions for Linear Motion Systems R320103152”.

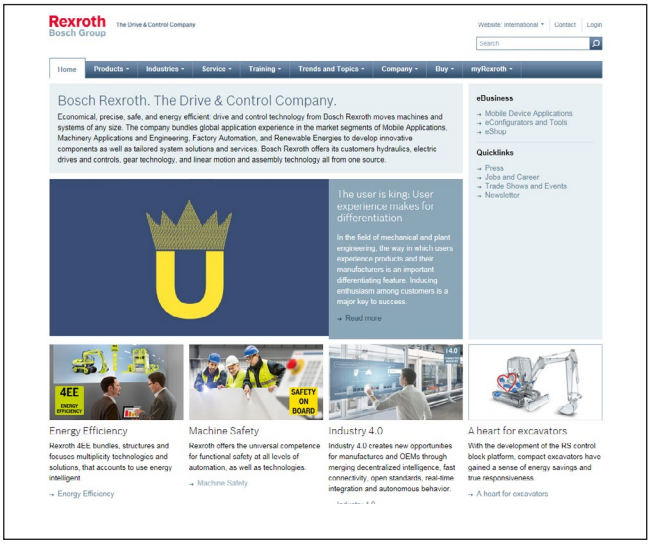
For more information on installation / initial operation see “Instructions PSK R320103187”.

PDF files of these documents can be found on the Internet at: www.boschrexroth.com/mediadirectory

Further Information

Homepage Bosch Rexroth:

http://www.boschrexroth.com



Productinformations
Precision Modules:

http://www.boschrexroth.com/en/xc/products/product-groups/linear-motion-technology/linear-motion-systems/precision-modules/index

Services and Information

Inquiry/Order Form

Bosch Rexroth AG
Linear Motion and Assembly Technologies
D-97419 Schweinfurt
Germany

Telephone +49 9721 937-0
Telefax +49 9721 937-350 (direct)

Ordering example
Rexroth Precision Module PSK

Ordering data			Description
Precision Module PSK-090			Designation
Part number: PSK-090-NN-1, 740 mm			PSK-090, length = 740 mm
Version	=	MF01	With motor mount and motor, as shown in diagram MF01
Guideway	=	18	Rail system, 740 mm long
Drive unit	=	03	Ball screw 16 x 16
Carriage	=	24	Two carriages, long, steel version for cover plate
Motor attachment	=	03	With motor mount for motor MSK 040C
Motor	=	87	Motor MSK 040C with brake
Cover	=	01	With cover plate
1st switch	=	21	Reed sensor supplied loose
2nd switch	=	22	Hall sensor supplied loose
3rd switch	=	21	Reed sensor supplied loose
Mounting duct	=	25	Mounting duct supplied loose
Switching cam	=	30	Switching cam for version without cover or with cover plate
Documentation	=	01	Standard report

To be completed by customer: Inquiry ☐ / Order ☐

Precision Module

Part number: PSK-_____ -NN-1, length _____mm

Version = ☐☐☐☐
Guideway = ☐☐
Drive unit = ☐☐
Carriage = ☐☐
└ Carriage with center-to-center distance └ ☐☐☐
Motor attachment = ☐☐
└ Motor geometry code[1] └ ☐☐-☐☐-☐☐☐-☐☐☐-☐☐☐-M☐☐-☐☐☐-☐☐☐
Motor = ☐☐☐
Cover = ☐☐
1st switch = ☐☐
2nd switch = ☐☐
3rd switch = ☐☐
Mounting duct = ☐☐
Switching cam = ☐☐
Documentation = ☐☐

1) Only required for „kits for motors according to customer specifications“.

Quantity **Order of: ____ pcs, _____ per month, _____ per year, per order, or _____**
Comments:

From
Company: _____ **Name:** _____

Address: _____ **Department:** _____

_____ **Telephone:** _____

_____ **Telefax:** _____

The Drive & Control Company

Rexroth
Bosch Group

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www.boschrexroth.com

Find your local contact person here:
www.boschrexroth.com/contact

R999000500 (2015-12)