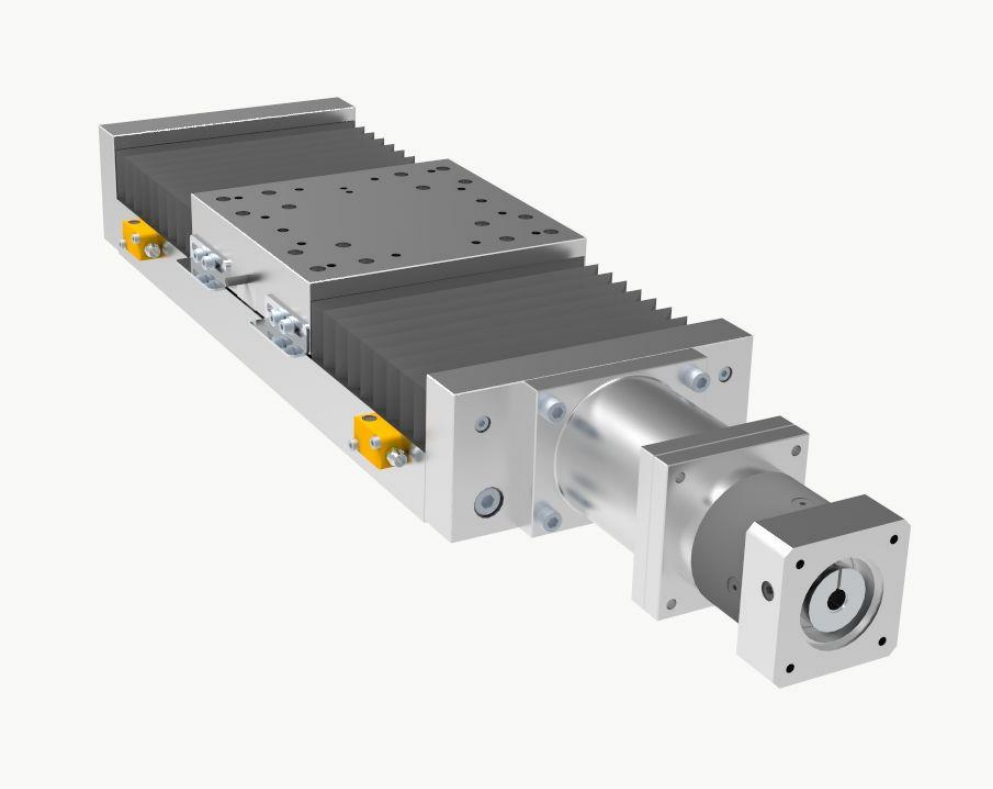
Gesellschaft für innovative Automationstechnik mbH

Positioning tables



Preface

To realise automation solutions in a technically and economically efficient way, it is essential to trust in the competence and experience of specialists.
We consequently follow the idea of systems to offer a comprehensive range of standardised automation solutions with which line and gantry robots, palletisers and manipulators can be realised in an economically efficient way.

Use our experience and our specialist's know-how! Benefit from our innovative technologies for economical, user-oriented solutions. Wherever custom-tailored and individual automation solutions are required – we are your competent partner!

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Linear positioning table LPT

Linear positioning tables are ready-to-use subsystems that can be supplied completely with motor and controller as desired. They offer a nearly unlimited range of solutions for various guiding and positioning tasks. Linear positioning tables are progressive engineering systems with high load-bearing capacity and precision in lightweight or compact construction. The table modules can be combined to compound tables.
The modular construction consists of a carriage made of an aluminium alloy and featuring four sealed linear slides, two hardened and precision grinded idlers and to shaft supports. The linear slides are aligned in a way to absorb loads from all directions. The result is an extremely stiff guiding system with high load-bearing capacity, running optimally and quiet.
Construction and ability of combination make it possible to adapt the positioning tables to almost every application.

Fields of application

Linear positioning tables provide cost-effective, precise and reliable constructions. That is why they can be used for a broad variety of industrial automation measures.
Tried and tested fields of application:

- Machine tools (drilling, metal lathes, milling)
- Machining centers and special machines
- Handling systems
- Pick-and-place machines and appliances
- Plants for measuring, testing and mounting

Drives

As a standard, the linear positioning tables are equipped with ball screws of the tolerance class G9 (V_{300p}=50 μm). Higher tolerance classes on demand. The ball screws are available with low or no backlash and thus fulfil the respective requirements. The ball screws feature precision ball bearings or if necessary tapered roller bearings at both ends.

As desired the linear positioning tables are available with trapezoidal screws, preferably for tasks with medium requirements of force, precision and velocity.
The duty cycle must not exceed 20 % per hour.

Cover

As desired the linear positioning tables are available with a bellow cover against dirt.
Mind the loss of stroke length when unsing bellow covers (contact us).

Linear positioning table LPT

Safety instructions

All sizes are not or only partly self-locking and therefore require motors with holding brake especially for vertical application. Screw drives are preferable for vertical application. Make sure, the application poses no danger to people or material or clearly indicate remaining risks.

Installation

Normally the linear positioning tables are positioned on shaft bearing blocks that at the same time fixate the guide shafts. In order to achieve the guide precision required it is necessary to install the blocks on a properly machined surface (flatness <0,2 mm per 1 m).

The goods to be transported can be safely screwed to the slide plate. Excessive dust or dirt should be removed regularly from the linear positioning tables.

Commissioning

During commissioning make sure the permissible loads are not exceeded and the permissible distances are kept (don't drive against mechanicla stop). The end positions should feature limit switches and external dampers as emergency stoppers.

Lubrication and maintenance

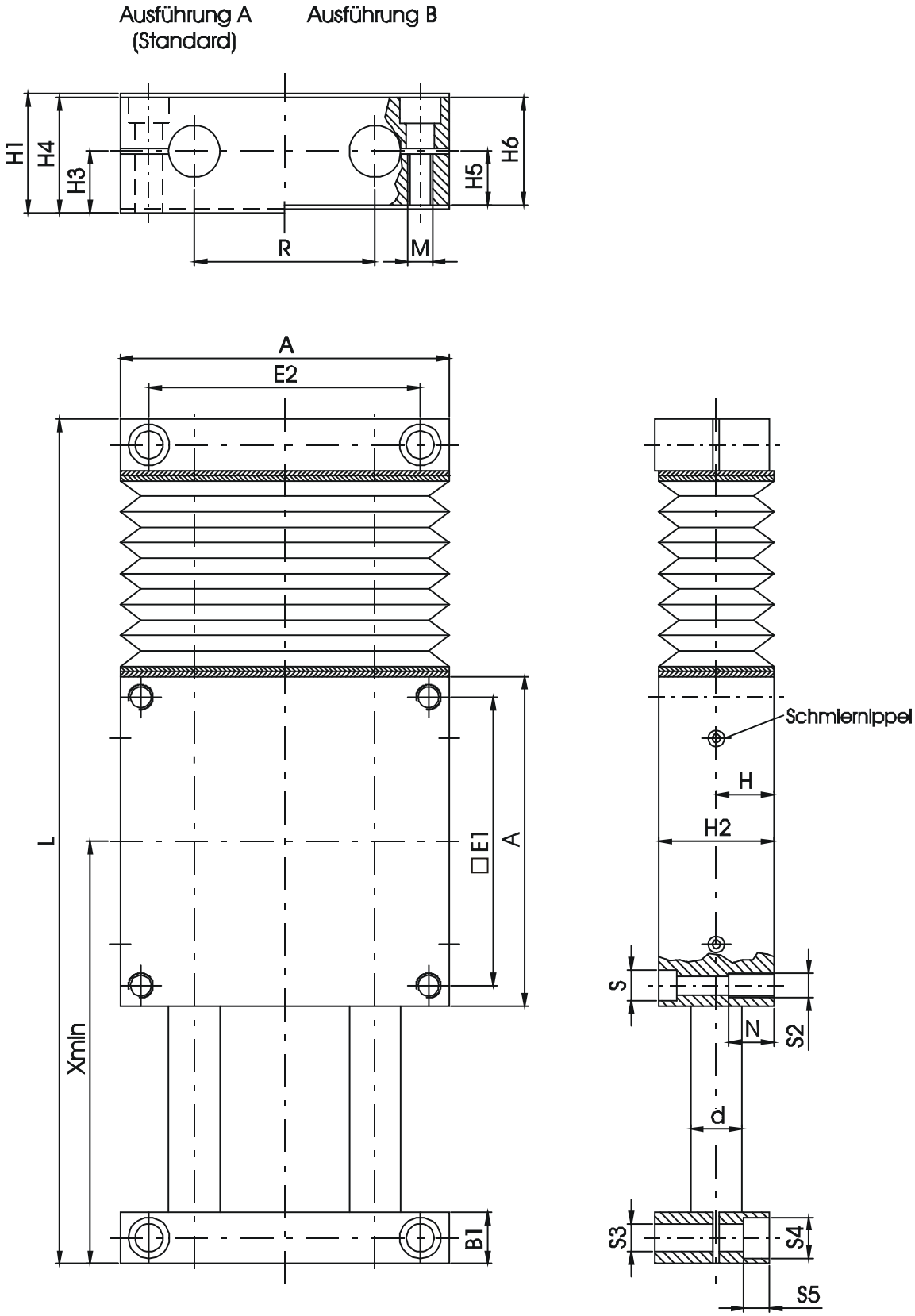
The linear positioning tables are delivered ready-to-mount and lubricated with lithium complex soap thickened grease. Lubrication nipples mounted on the sides allow central relubrication for maintenance. All bearings are sealed and maintenance-free. Every 400 operating hours at the latest or every six months the linear recirculating ball bearings and the screw shoudld be relubricated by means of a suitable grease. If other greases are used check the miscibility. It is recommended to rather grease several times with small amounts than to grease once when the maintenance interval expires.

The maintenance intervals depend on the ambient conditions and the application.

Amounts for lubrication

	Size 8 - 12	Size 16 - 20	Size 25 - 30	Size 40 - 50
LPT without drive	10 - 12 g	16 - 18 g	20 - 24 g	26 - 30 g
LPT with screw KGT (Tr)	15 - 17 g	22 - 24 g	28 - 34 g	35 - 40 g

LPT – Linear positioning table without drive



LPT – Linear positioning table without drive

	LPT-08	LPT-12	LPT-16	LPT-20	LPT-25	LPT-30	LPT-40	LPT-50
Ød	8	12	16	20	25	30	40	50
A	65	85	100	130	160	180	230	280
B1	12	14	18	20	25	25	30	30
H±0.015	11,5	16	18	23	28	32	40	48
H1	24	34	38	48	58	67	84	100
H2	23	32	36	46	56	64	80	96
H3±0.015	12	18	20	25	30	35	44	52
H4	23	32	36	46	56	64	80	96
H5	11	14	16	21	26	29	36	44
H6	22	28	32	42	52	58	72	88
R	32	42	54	72	88	96	122	152
ØS	8	10	10	11	15	18	20	20
S2	M5	M6	M6	M10	M12	M12	M16	M16
ØS3	5.5	6.6	9.0	11.0	13.5	13.5	17.5	17.5
ØS4	10	11	15	18	20	20	26	26
S5	6	7	9	11	13	13	17.5	17.5
M	M4	M5	M5	M6	M8	M10	M12	M12
N	11	13	13	18	22	26	34	34
E1	55	73	88	115	140	158	202	250
E2	52	70	82	108	132	150	190	240
L[1)]	-	-	strokex1.50 +156	strokex1.33 +190	strokex1.34 +231	strokex1.27 +251	strokex1.28 +312	strokex1.24 +362
Xmin[1)]	-	-	strokex0.250+78	strokex0.167+95	strokex0.172+116	strokex0.135+126	strokex0.142+156	strokex0.120+181

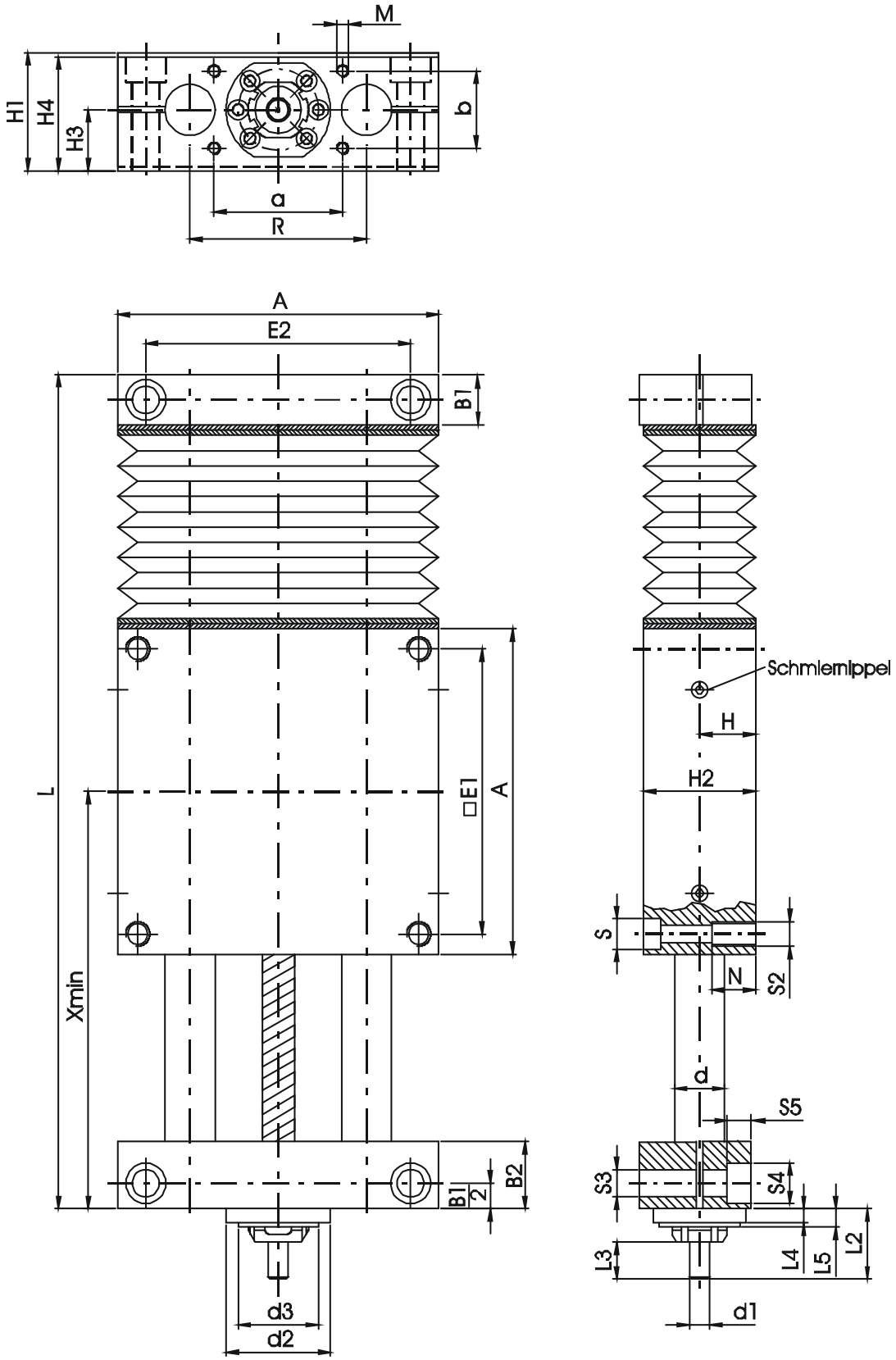
1) Approximate calculation for use of bellow covers [mm]

Static load rating of the linear slides

$C_{dynamic}$	0.72	3.2	3.8	7.5	13.4	16.4	30.0	43.6
C_{static}	1.2	2.0	2.4	4.9	18.8	11.4	19.6	28.8

Static load rating with same load on all linear slides [kN]

LPT KGT (Tr) – Linear positioning table with ball screw or trapezoidel screw



LPT KGT (Tr) – Linear positioning table with ball screw

	LPT-16	LPT-20	LPT-25	LPT-30	LPT-40	LPT-50
Ød	16	20	25	30	40	50
KGT	12x4	16x5/10	16x5/10	20x5/20/50	25x5/10/20/25/50 32x5/10/20/40 40x5/10/20/40	25x5/10/20/25/50 32x5/10/20/40 40x5/10/20/40
Tr	on demand					
A	100	130	160	180	230	280
a ±0,2	44	62	64	68	68	62
b ±0,2	22	30	38	44	56	62
B1	18	20	25	25	30	30
B2	24	29	33	38	39 (KGT 25) 42 (KGT 32/40)	39 (KGT 25) 42 (KGT 32/40)
Ød1 h6	5	10	10	10	16	16
Ød2 g7	38	50	52	60	66 (KGT 25) 72 (KGT 32/40)	66 (KGT 25) 72 (KGT 32/40)
Ød3 g7	24	-	-	-	-	-
H±0.015	18	23	28	32	40	48
H1	38	48	58	67	84	100
H2	36	46	56	64	80	96
H3±0.015	20	25	30	35	44	52
H4	36	46	56	64	80	96
R	54	72	88	96	122	152
ØS	10	11	15	18	20	20
S2	M6	M10	M12	M12	M16	M16
ØS3	9.0	11.0	13.5	13.5	17.5	17.5
ØS4	15	18	20	20	26	26
S5	9	11	13	13	17.5	17.5
L2	28.5	37	34.5	36.5	46	46
L3	12	18	18	18	23	23
L4	5	8	7	9	9	9
L5	6.5	-	-	-	-	-
M	M5	M6	M8	M10	M12	M12
N	13	18	22	26	34	34
E1	88	115	140	158	202	250
E2	82	108	132	150	190	240
L[1)]	strokex1.50+162	strokex1.33-199	strokex1.34+239	strokex1.27+264	strokex1.28+321	strokex1.24+374
Xmin[1)]	strokex0.250+84	strokex0.167+104	strokex0.172+124	strokex0.135+139	strokex0.142+165	strokex0.120+193

1) Approximate calculation when using bellow cover

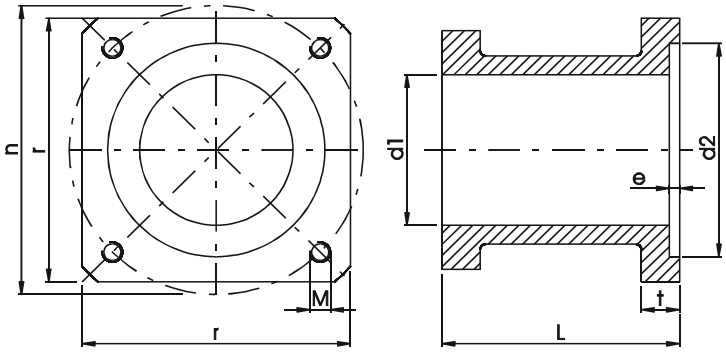
[mm]

Static load rating of linear slides cf. chapt. 2/4

Static load rating of ball screws cf. chapt.3/6

Accessory for LPT

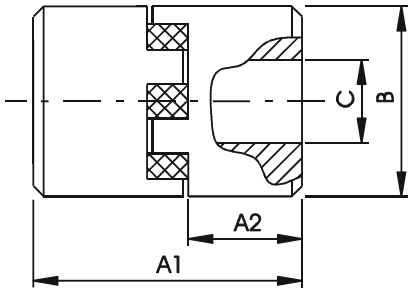
Motor flange - MG



	Servo motor	Ød1	Ød2	r	Øn	e	M	t	L
MG 60	6SM37	60	60	75	90	3	M5	10	80
MG 80	6SM47	60	80	88	100	4	M6	15	85
MG 95	6SM57	60	95	105	115	4	M8	15	95
MG 130	6SM77	60	130	142	165	5	M10	15	105
MG 180	6SM107	60	180	190	215	5	M12	15	115

[mm]

Coupling - KUP



The couplings are torsionally elastic, transmit the torque positively and are puncture-proof.
Vibrations or bumps occurring during operation are effectively dampened and reduced.

	M_{rated} [Nm]	M_{max} [Nm]	A1	A2	ØB	ØC_{min}	ØC_{max}
GS 14	12.5	25	35 (50)[1)]	11 (18,5)[1)]	30	6	14
GS 19	17	34	66	25	40	6	24
GS 24	60	120	78	30	55	8	28
GS 28	160	320	90	35	65	10	38

1) only with clamping ring hub type

[mm]

Types of mounting holes: key groove/clamping collar/clamping ring hub/slip clutch

Accessory für LPT

Further accessory:

- Cam switch
- Inductive proximity sensor
- Mechanical limit switch
- Bevel gear
- Planetary gear
- Shock absorbers
- Encoder
- Servo motor (cf. chapt. 4/1)
- Stepper motor
- Three-phase asynchronous motor
- Three-phase asynchronous motor with worm or spur gear

Order code

LPT 40	–	KGT 32x10	–	400	–	800	–	FB	–	KUP	–	Stainless steel guide shafts

LPT 40	-	Product name	Linear positioning table size 40
KGT 32x10	-	Kind of drive	Ball screw 32 x 10 (diameter x pitch)
400	-	Length of stroke [mm]	400 mm stroke
800	-	Total length [mm]	Total length L = 800 mm
FB	-	Accessory	Bellow cover
KUP	-	Accessory	coupling
Stainless steel guide shaft	-	Special design	Guide shafts made of 1.4112 (corrosion-proof)

Precision positioning table PPT

Linear positioning tables are ready-to-use subsystems that can be supplied completely with motor and controller as desired. They offer a nearly unlimited range of solutions for various guiding and positioning tasks. Linear positioning tables are progressive engineering systems with high load-bearing capacity and precision in lightweight or compact construction. The table modules can be combined to compound tables.
The modular construction consists of a carriage made of an aluminium alloy and featuring four sealed linear slides, two hardened and precision grinded idlers and to shaft supports. The linear slides are aligned in a way to absorb loads from all directions. The result is an extremely stiff guiding system with high load-bearing capacity, running optimally and quiet.
Construction and ability of combination make it possible to adapt the positioning tables to almost every application.

Series PPT AL

Suitable for positioning small and medium loads. The linear table is made of a high-tensile aluminium alloy.

Series PPT St

These positioning tables are made of steel or cast iron and designed for medium to high loads. The series is distinguished for precision and good vibration behaviour.

Structural characteristics

All seatings for the guides, the underside of the base plate and the top side of the slide are machined parallely.
The block bearings feature tapered roller bearings. This results in high static load ratings and thus in the capacity to absorb high axial loads.

As a standard, the precision positioning tables are equipped with ball screws of the tolerance class G9 (V_{300p}=50 μm). Higher tolerance classes on demand. The ball screws are available with low or no backlash and thus fulfil the respective requirements. The ball screws feature precision ball bearings or if necessary tapered roller bearings at both ends.

As desired the precision positioning tables are available with trapezoidal screws, preferably for tasks with medium requirements of force, precision and velocity.
The duty cycle must not exceed 20 % per hour.

Cover

The precision positioning tables are available with two bellow covers as a protection. All liniar guide carriages are sealed on all sides.

Precision poitioning table PPT

Safety instructions

All sizes are not or only partly self-locking and therefore require motors with holding brake especially for vertical application. Screw drives are preferable for vertical application. Make sure, the application poses no danger to people or material or clearly indicate remaining risks.

Mounting

Normally the precision positioning tables are mounted to the base plate from above (through holes). In order to achieve the guide precision required it is necessary to position the base plate on an adequately machined seating (flatness <0.2 mm per 1 m).

The goods to be transported can be mounted safely to the slide plates by means of screws. Excessive depeosits of dust or dirt should be removed regularly.

Commissioning

During commissioning make sure the permissible loads are not exceeded and the permissible distances are kept (don't drive against mechanical stop). The end positions should be equipped with limit switches and external dampers as emergency stoppers.

Lubrication and maintenance

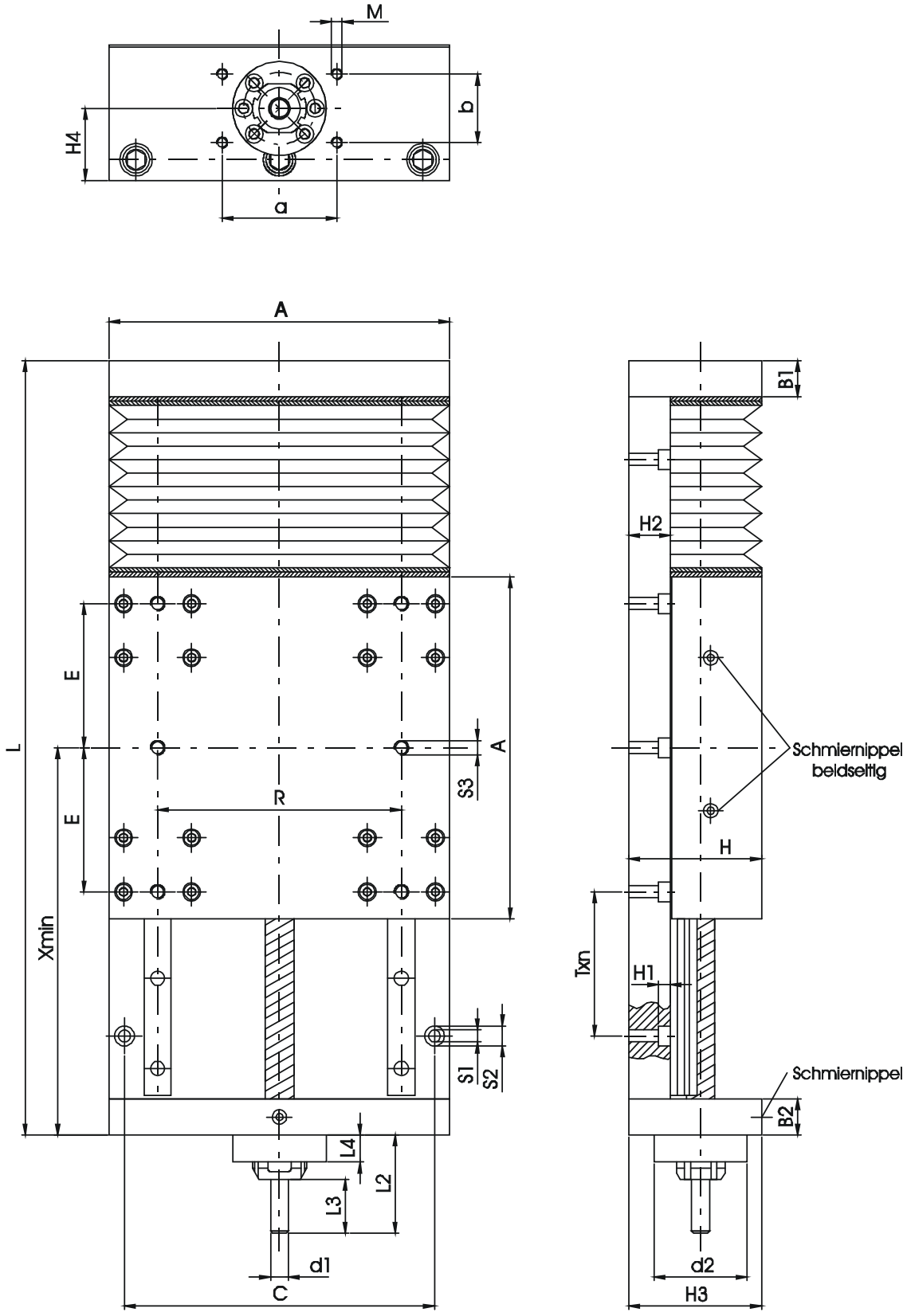
The linear positioning tables are delivered ready-to-mount and lubricated with lithium complex soap thickened grease. Lubrication nipples mounted on the sides allow central relubrication for maintenance. All bearings are sealed and maintenance-free. Every 400 operating hours at the latest or every six months the linear recirculating ball bearings and the screw shoudld be relubricated by means of a suitable grease. If other greases are used check the miscibility. It is recommended to rather grease several times with small amounts than to grease once when the maintenance interval expires.

The maintenance intervals depend on the ambient conditions and the application.

Amounts for relubrication

	PPT 15	PPT 20	PPT 25
Amount	10 - 12 g	12 - 14 g	16 - 18 g

PPT KGT (Tr) – Precision positioning table with ball screw



PPT KGT (Tr) – Precision positioning table with ball screw

	PPT-15	PPT-20	PPT-25
KGT	16x5/10 20x5/20/50	20x5/20/50 25x5/10/20/25/50	25x5/10/20/25/50 32x5/10/20/40
Tr	on demand		
A	190	250	300
a±0,2	80	80	100
b±0,2	47	60	70
B1	20	25	30
B2	20	25	35
C	173	229	279
∅d1h6	14	20	22
∅d2f6	60	75	90
E	80	105	130
H	75	82	100
H1	10	10	10
H2	23	28	33
H3	74	81	99
H4	40	41	51.5
L2	60	65	80
L3	30	33.5	41
L4	15	16	22
R	136	188	235
∅S1	9	9	11
∅S2	15	15	18
S3	M8	M8	M10
M	M6	M6	M8
T	80	80	60
L[1)]	strokex1.40+270	strokex1.35+330	strokex1.35+425
Xmin[1)]	strokex0.200+140	strokex0.176+176	strokex0.176+211

1) Approximate calculation for use of bellow covers [mm]

Static load rating of the linear guides cf. chapt. 3/5

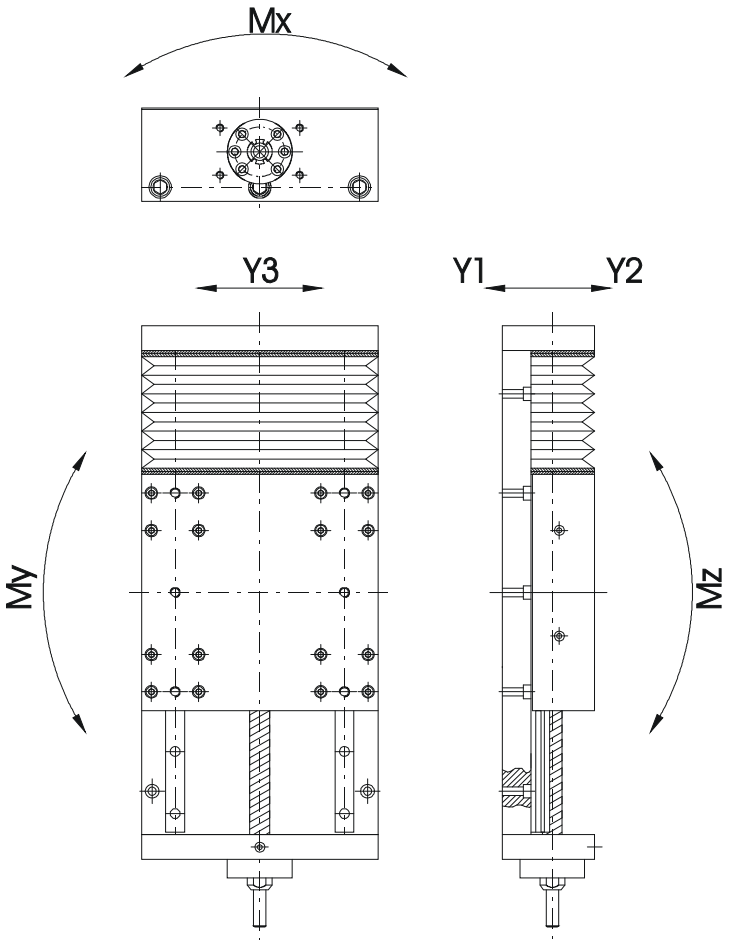
Static load rating of the ball screws cf. chapt. Kapitel 3/6

Precision positioning table PPT

Static load rating of guide

Load direction	Static load rating	PPT-15		PPT-20		PPT-25	
		KU2-15	KU4-15	KU2-20	KU6-20	KU4-25	KU6-25
Y1	C_{dyn} [kN]	17.1	18.8	35.0	57.9	47.1	73.7
	C_{stat} [kN]	37.0	40.0	47.4	136.0	97.3	176.3
Y2	C_{dyn} [kN]	17.1	18.8	35.0	46.0	47.1	60.3
	C_{stat} [kN]	37.0	40.0	47.4	94.7	97.3	121.0
Y3	C_{dyn} [kN]	17.1	18.8	35.0	42.9	47.1	56.0
	C_{stat} [kN]	37.0	40.0	47.4	88.1	97.3	121.0
Mx	Mx_{stat} [Nm]	2130	2340	5538	9161	10160	19021
My	My_{stat} [Nm]	2170	2385	5642	9333	9344	18744
Mz	Mz_{stat} [Nm]	2170	2385	5642	9333	9344	17451

The values of the static load ratings of the guides are valid for loads evenly distributed on the four carriages.



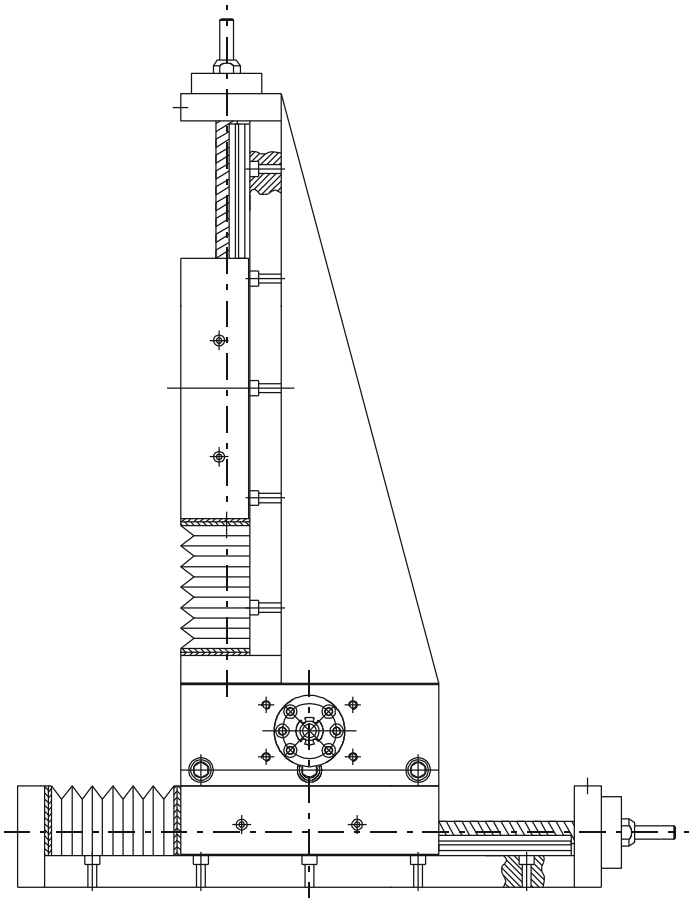
Precision positioning table PPT

Static load rating of the ball screw

Ball screw	Static load rating	
	$C_{dynamic}$ [kN]	C_{static} [kN]
KGT 12x4	3.4	6.5
KGT 16x5	7.0	12.7
KGT 16x10	12.0	26.0
KGT 20x5	8.0	17.0
KGT 20x20	9.0	19.2
KGT 20x50	11.0	22.0
KGT 25x5	9.5	22.4
KGT 25x10	10.0	25.0
KGT 25x20	10.5	23.5
KGT 25x25	12.5	31.0
KGT 25x50	13.0	29.0

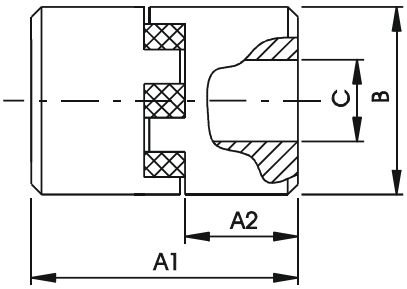
Ball screw	Static load rating	
	$C_{dynamic}$ [kN]	C_{static} [kN]
KGT 32x5	17.0	49.0
KGT 32x10	26.5	53.0
KGT 32x20	24.0	61.0
KGT 32x40	11.5	32.0
KGT 40x5	19.0	63.5
KGT 40x10	30.0	70.0
KGT 40x20	27.0	77.0
KGT 40x40	26.5	93.0

Project example X-Y table



Accessory for PPT

Coupling - KUP



The couplings are torsionally elastic, transmit the torque positively and are puncture-proof.
Vibrations or bumps occurring during operation are effectively dampened and reduced.

	M_{rated} [Nm]	M_{max} [Nm]	A1	A2	∅B	$∅C_{min}$	$∅C_{max}$
GS 14	12.5	25	35 (50)[1)]	11 (18,5)[1)]	30	6	14
GS 19	17	34	66	25	40	6	24
GS 24	60	120	78	30	55	8	28
GS 28	160	320	90	35	65	10	38

1) only with clamping ring hub type [mm]

Types of mounting holes: key groove/clamping collar/clamping ring hub/slip clutch

Further accessories for PPT

Further accessories:

- Cam switch
- Inductive proximity sensor (integrated as desired)
- Mechanical position switch (integrated as desired)
- Bevel gear
- Planetary gear
- Shock absorber
- Cable carrier
- Linear encoder (magnetic or optical)
- Encoder
- Servo motor (cf. chapt. 4/1)
- Stepper motor
- Three-phase asynchronous motor
- Three-phase asynchronous motor with worm gear
- Three-phase asynchronous motor with spur gear

Order code

PPT 20	–	KGT 20x20	–	250	–	800	–	MG	–	KUP	–	Length of slide 450 mm

PPT 20	-	Product name	Precision positioning table size 20
KGT 20x20	-	Kind of drive	Ball screw 20 x 20 (diameter x pitch)
250	-	Length of stroke [mm]	250 mm stroke
800	-	Total length [mm]	Total length L = 800 mm
MG	-	Accessory	Motor flange
KUP	-	Accessory	Coupling
Length of slide 450 mm	-	Special design	Length of slide 450 mm

Range of products

Drives and stages

- Linear stages
- Linear positioning tables with/without drive
- Precision positioning tables
- Ball screws and roller screws
- Trapezoidal screws
- Screw jacks
- Electromechanical cylinders
- Bevel gears
- Planeatry gears

Drives and accessory

- Three-phase asynchronous motors
- Worm geared motors
- Spur gear motors
- Servo drives
- Stepper drives
- DC motors
- Frequency changers
- Controllers
- Switches, proximity sensors

Linear guides

- Linear ball or roller guides
- Precision shafts
- Linear ball bearings
- Glide bushings

Links

- Couplings
- Universal shafts
- Cardan shafts
- Clamps

Roller bearings

Custom-tailored solutions

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