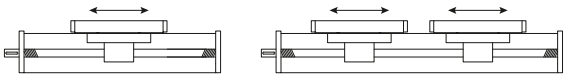
Linear system **DST/DSK 120, 160, 200**

SPINDLE DRIVES

- INDEPENDENT INSTALLATION POSITION
- PRECISION
- UNIVERSAL SYSTEM
- HIGH TORQUE ABSORPTION

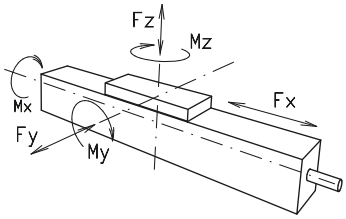


Function:
This unit consists of a rectangular aluminium profile with 2 integrated rail guides. The carriage is driven by means of a rotating spindle with leading nut. Where two parallel linear units are used or where two carriages are mounted on one unit, the leading-nut receiver can be used to adjust the symmetry of the carriages. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the drive from splash water and dust.

Fitting position: As required. Max. length 3.000 mm without joints.
Carriage mounting: By T-slots.
Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
Carriage support: In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.
Repeatability: Ballscrew ± 0,025 mm, trapezoidal thread ± 0,2 mm.

9.1

Forces and torques



Size	120		160		200			
permitted dyn. Forces*	5000 km	10000 km	5000 km	10000 km	5000 km	10000 km		
F_x (N)	900	800	5000	4000	10000	8000		
F_y (N)	1776	1405	5570	3900	15600	11080		
F_z (N)	2090	1650	7050	5020	20600	14600		
M_x (Nm)	81	64	358	255	1285	915		
M_y (Nm)	97	77	369	262	1375	980		
M_z (Nm)	96	76	364	258	1345	960		
All forces and torques related to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$								
No-load torque								
Trapezoidal thread	18 x 4	18 x 8	24 x5	24 x 10	32 x 6	32 x 12		
(Nm)	0,8	1,1	1,0	1,3	1,5	1,7		
Ballscrew	16 x 5	16 x 10	25 x 5	20 x 20	32 x 5	32 x 10	32 x 20	32 x 32
(Nm)	0,7	1,0	1,0	1,2	1,3	1,6	1,7	1,7
Geometrical moments of inertia of aluminium profile								
I_x mm^4	5,61x10^5		2,13x10^6		4,81 x10^6			
I_y mm^4	34,19x10^5		12,33x10^6		26,0 x10^6			
Elastic modulus N/mm^2	70000		70000		70000			

For life-time calculation use our homepage.

** referred to life-time*

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

F = force (N)
P = thread pitch (mm)
Si = safety factor 1,2 … 2
M_n = no-load torque (Nm)
n = rpm of screw (min^{-1})
M_a = driving torque (Nm)
μ = screw efficiency
P_a = motor power (KW)

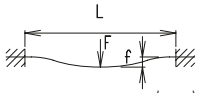
Efficiency of lead screws:

All ballscrew 0,900

Tr 24x5 0,384
Tr 24x10 0,550
Tr 32x6 0,360
Tr 32x12 0,524

Deflection:

$$f = \frac{F * L^3}{E * I * 192}$$

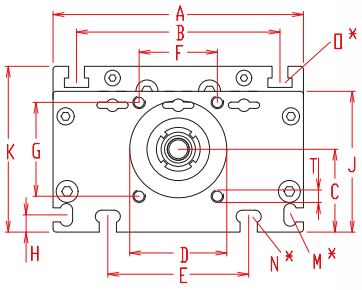


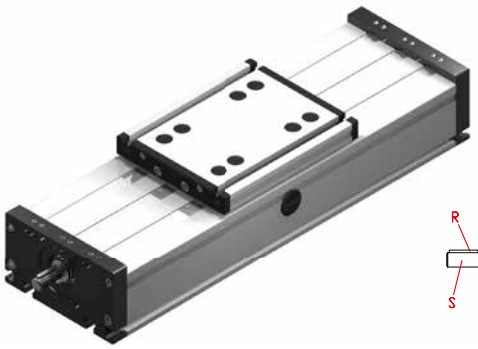
f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm^2)
I = second moment of area (mm^4)

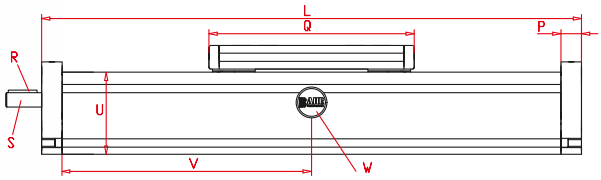
For the diagram for critical speeds of lead screws refer to chapter 4.2

Linear system **DST/DSK 120, 160, 200**

Dimensions (mm)







V = Q + 100 mm
W = servicing position

*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

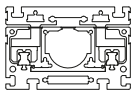
Size	Basic length L	A	B	C	D +0,1 +0,05	E	F	G	H	J	K	M for	N for	O for	P	Q	Shaft R Key	Shaft S Ø h6 x length	T	U	Basic weight	Weight per 100 mm
DS 120	200	120	96	39	47	78	42	42	10	68	79	M 5	M 6	M 6	15	156	3x3x25	10 x 27	M 6	60	3,9 kg	0,92 kg
DS 160	260	160	130	53	62	90	50	60	11	90	106	M 6	M 8	M 8	20	200	5x5x28	14 x 35	M 8	80	7,2 kg	2,1 kg
DS 200	320	200	160	66	68	140	60	60	15	110	129	M 8	M 10	M 10	20	270	6x6x40	22 x 45	M 8	100	19,4 kg	3,5 kg

T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

1 **Selection of screw:**
(1) right hand **(2)** left hand (Ballscrew by inquiry)

0 **Choice of guide body profile:** Stainless versions upon request.

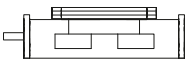
(0)



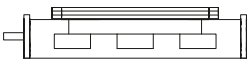
internal profile
with cover bands

0 **Choice of carriages:**

(0)



(1)



Size	Version 0 Q	Version 0 L	Version 1 Q	Version 1 L
120	156	200	156	200
160	200	260	>230	>290
200	270	320	>310	>360

0 **Drive version:**
(0) one shaft (locating bearing side) **(1)** one shaft (non-locating bearing side) **(2)** shaft on both sides

0

Selection of screw:	Size	Standard	Multistart screw			
Ballscrew right hand	120	**(0)** 16x5	**(1)** 16x10	**(2)** 16x16	**(3)** 20x20	**(4)** 25x5	**(5)** 25x10
	160	**(0)** 25x5	**(1)** 20x20	**(2)** 25x10	**(3)** 25x25		
	200	**(0)** 32x5	**(1)** 32x10	**(2)** 32x20	**(3)** 32x32		
Ballscrew left hand	upon request						
Trapezoidal right hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12				
Trapezoidal left hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12				

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard) **(1)** < 0,02 mm **(2)** 2% apply prestress

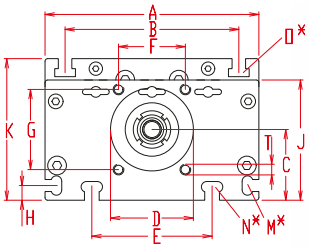
DS	T	160	1	0	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7	

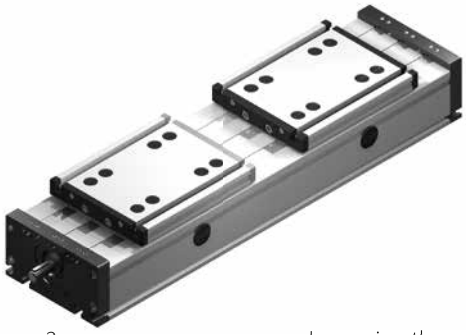
Basic length + stroke = total length

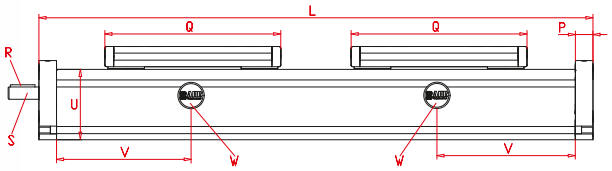
Sample ordering code:
DST160, trapezoidal right hand thread, with internal profile and cover bands, standard carriage, one shaft (locating bearing side), spindle 24x5, 1240 mm stroke.

Linear system **DST/DSK 120, 160, 200**

RIGHT-HAND AND LEFT-HAND THREAD OR DIVIDED SPINDLES







V = Q + 100 mm
W = servicing position

*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

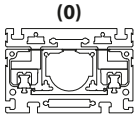
Size	Basic length L	A	B	C	D +0,1 +0,05	E	F	G	H	J	K	M for	N for	O for	P	Q	Shaft R Key	Shaft S Ø h6 x length	T	U	Basic weight	Weight per 100 mm
DS 120	360	120	96	39	47	78	42	42	10	68	79	M 5	M 6	M 6	15	156	3x3x25	10 x 27	M 6	60	5,1 kg	0,92 kg
DS 160	470	160	130	53	62	90	50	60	11	90	106	M 6	M 8	M 8	20	200	5x5x28	14 x 35	M 8	80	10,1 kg	2,1 kg
DS 200	590	200	160	66	68	140	60	60	15	110	129	M 8	M 10	M 10	20	270	6x6x40	22 x 45	M 8	100	35,9 kg	3,5 kg

T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

3 **Selection of screw:**
(3) right - left hand (ballscrew by inquiry) **(4)** divided spindle

0 **Choice of guide body profile:** Stainless versions upon request.

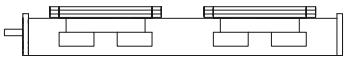
(0)



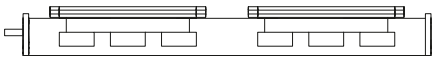
internal profile
with cover bands

0 **Choice of carriages:**

(0)



(1)



Size	Version 0 Q	Version 0 L	Version 1 Q	Version 1 L
120	156	360	156	360
160	200	470	>230	>530
200	270	590	>310	>680

0 **Drive version:**
(0) shaft right hand thread **(1)** shaft left hand thread **(2)** shaft on both sides

0

Selection of screw:	Size	Standard	Multistart screw			
Ballscrew right hand	120	**(0)** 16x5	**(1)** 16x10*	**(2)** 16x16*	**(3)** 20x20*	**(4)** 25x5	**(5)** 25x10*
	160	**(0)** 25x5	**(1)** 20x20*	**(2)** 25x10*	**(3)** 25x25*		
	200	**(0)** 32x5	**(1)** 32x10*	**(2)** 32x20*	**(3)** 32x32*		
Ballscrew left hand	upon request					
Trapezoidal right hand thread	120	**(0)** 18x4	**(1)** 18x8			
	160	**(0)** 24x5	**(1)** 24x10			
	200	**(0)** 32x6	**(1)** 32x12			
Trapezoidal left hand thread	120	**(0)** 18x4	**(1)** 18x8			
	160	**(0)** 24x5	**(1)** 24x10			
	200	**(0)** 32x6	**(1)** 32x12			

** = only for selection of divided spindle*

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard) **(1)** < 0,02 mm **(2)** 2% apply prestress

DS	T	160	3	0	0	0	0	0	0	01500
		Pos.	1	2	3	4	5	6	7	

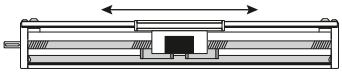
Basic length + stroke = total length

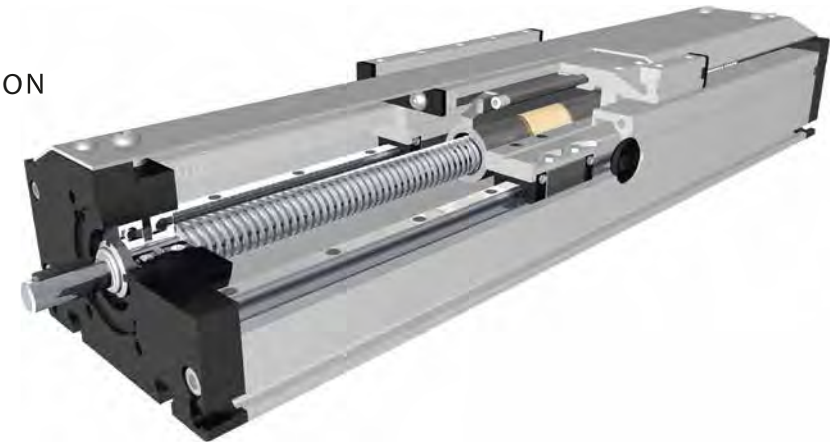
Sample ordering code:
DST160, trapezoidal right - left hand thread, with internal profile and cover bands, standard carriage, shaft on right hand thread, spindle 24x5,1030 mm stroke.

Linear system **DST/DSK 120 P, 160 P, 200 P**

SPINDLE DRIVES

- INDEPENDENT INSTALLATION POSITION
- PRECISION
- UNIVERSAL SYSTEM
- COVER PROFILE



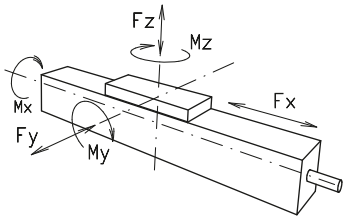


Function:
This unit consists of a rectangular aluminium profile with 2 integrated rail guides. The carriage is driven by means of a rotating spindle with leading nut. Where two parallel linear units are used or where two carriages are mounted on one unit, the leading-nut receiver can be used to adjust the symmetry of the carriages. A special curved aluminium sheet is covering the carriage side. There is only a small gap between carriage and aluminium sheet. The cover profile can be adjusted according to the mounting position.

Fitting position: As required, max. length **DST/K 120P** / 1600mm, **DST/K 160P** / 1800mm, **DST/K 200P** / 2000mm
Carriage mounting: By tapped holes.
Unit mounting: T-slots
Carriage support: In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased. Repeatability: Ballscrew ± 0,025 mm, trapezoidal thread ± 0,2 mm.

9.1

Forces and torques



Size	120		160		200			
permitted dyn. Forces*	5000 km	10000 km	5000 km	10000 km	5000 km		10000 km	
F_x (N)	900	800	5000	4000	10000		8000	
F_y (N)	1776	1405	5570	3900	15600		11080	
F_z (N)	2090	1650	7050	5020	20600		14600	
M_x (Nm)	81	64	358	255	1285		915	
M_y (Nm)	97	77	369	262	1375		980	
M_z (Nm)	96	76	364	258	1345		960	
All forces and torques related to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$								
No-load torque								
Trapezoidal thread	18 x 4	18 x 8	24 x5	24 x 10	32 x 6	32 x 12	--	--
(Nm)	0,8	1,1	1,0	1,3	1,5	1,7	--	--
Ballscrew	16 x 5	16 x 10	25 x 5	20 x 20	32 x 5	32 x 10	32 x 20	32 x 32
(Nm)	0,7	1,0	1,0	1,2	1,3	1,6	1,7	1,7
Geometrical moments of inertia of aluminium profile								
I_x mm^4	5,61x10^5		2,13x10^6		4,81 x10^6			
I_y mm^4	34,19x10^5		12,33x10^6		26,0 x10^6			
Elastic modulus N/mm^2	70000		70000		70000			

For life-time calculation use our homepage.

** referred to life-time*

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

F = force (N)
P = thread pitch (mm)
Si = safety factor 1,2 … 2
M_n = no-load torque (Nm)
n = rpm of screw (min^{-1})
M_a = driving torque (Nm)
μ = screw efficiency
P_a = motor power (KW)

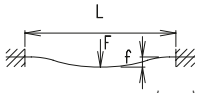
Efficiency of lead screws:

All ballscrew 0,900

Tr 24x5 0,384
Tr 24x10 0,550
Tr 32x6 0,360
Tr 32x12 0,524

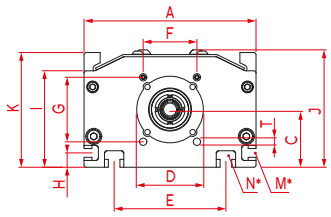
Deflection:

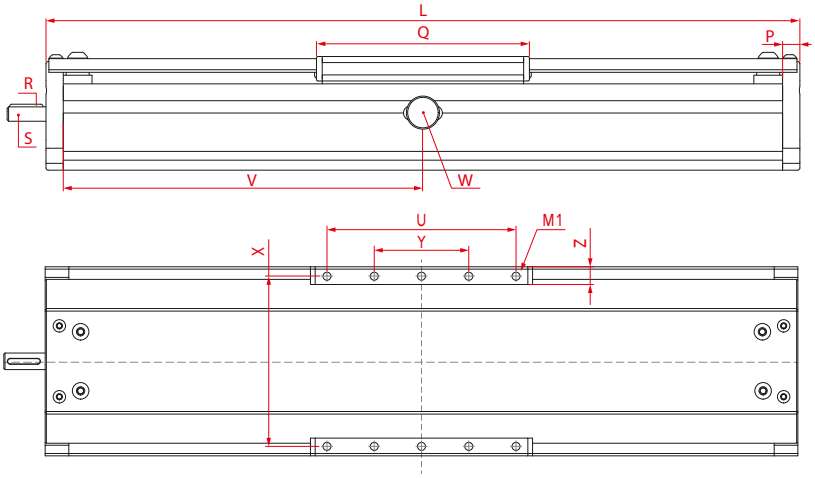
$$f = \frac{F * L^3}{E * I * 192}$$



f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm^2)
I = second moment of area (mm^4)

For the diagram for critical speeds of lead screws refer to catalog - chapter 4.2





*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

DS 120 M1 = M6 x 8 only 8 threaded holes in the carriage

DS 160 M1 = M8 x 12 **DS 200** M1 = M10 x 12

V = Q + 100 mm W = servicing position

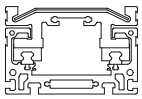
Size	Basic length L	A	C	D +0,1 +0,05	E	F	G	H	I	J	K	M for	N for	P	Q	Shaft R Key	Shaft S Ø h6 x length	T	U	X	Y	Z	Basic weight	Weight per 100 mm
DS 120	225	120	39	47	78	42	42	10	67	82	79	M5	M6	12	152	3x3x25	10 x 27	M6	120	106	40	11,5	3,67 kg	1,05 kg
DS 160	285	160	53	62	90	50	60	11	89	109	106	M6	M8	20	196	5x5x28	14 x 35	M8	160	144	80	15	9,45 kg	2,71 kg
DS 200	340	200	66	68	140	60	60	15	100	133	129	M8	M10	20	256	6x6x40	22 x 45	M8	200	180	100	17	17,43 kg	3,43 kg

T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

1 **Selection of screw:**
(1) right hand (Standard) **(2)** left hand (Ballscrew by inquiry)

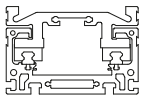
0 **Choice of guide body profile:** Stainless versions upon request.

(0)



with cover profile

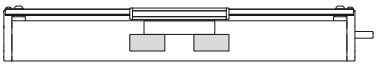
(1)



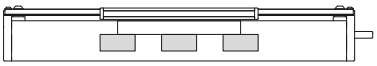
without cover profile

0 **Choice of carriages:**

(0)



(1)



Size	Version 1 Q	Version 1 L
120	>152	>225
160	>228	>315
200	>296	>384

0 **Drive version:**
(0) one shaft (locating bearing side) **(1)** one shaft (non-locating bearing side) **(2)** shaft on both sides

0

Selection of screw:	Size	Standard	Multistart screw				
Ballscrew right hand	120	**(0)** 16x5	**(1)** 16x10	**(2)** 16x16	**(3)** 20x20*	**(4)** 25x5*	**(5)** 25x10*
	160	**(0)** 25x5	**(1)** 20x20	**(2)** 25x10	**(3)** 25x25		
	200	**(0)** 32x5	**(1)** 32x10	**(2)** 32x20	**(3)** 32x32		
Ballscrew left hand		upon request					
Trapezoidal right hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12				
Trapezoidal left hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12		* by inquiry		

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard) **(1)** < 0,02 mm **(2)** 2% apply prestress

DS	T	160 P	1	0	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7	

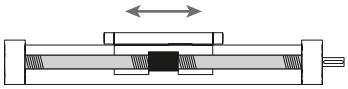
Basic length + stroke = total length

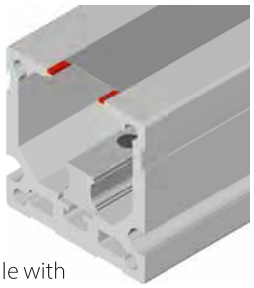
Sample ordering code:
DST 160 P, trapezoidal right hand thread, with cover profile, standard carriage, one shaft (locating bearing side), spindle 24x5, 1215 mm stroke.

Linear system **QST/K 60, 80, 100**

SPINDLE DRIVES

CLEAN ROOM
PRECISION





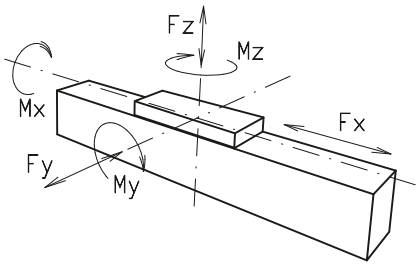
Fraunhofer TESTED DEVICE IPA
Bahr Modultechnik GmbH Positioningsystem QSK 80 Report No. BA 0610-367

Function:
This unit consists of a square aluminium profile with an integrated ball rail. The carriage is driven by means of a rotating spindle with leading nut. The openings of the guide body are sealed by a stainless steel cover band to protect the drive from splash water and dust. In size 80, the cover tape is additionally secured with magnetic tapes (see detail picture, marked in red). High positioning and repeat accuracy. Inrestricted installation position, flexible use as a vertical axis in a gantry system with short lifting movements and higher loads. This linear unit is suitable for application in clean rooms of clean-room classification ISO class 1 (according to DIN EN ISO 14644-1).

7.1

Fitting position: As required, max. length 3000mm
Carriage connection: By T-slots
Unit mounting: By half round slots and tapped holes in the bearing blocks, mounting sets.

Forces and torques



Size	QST/K 60		QST/K 80		QST/K 100	
permitted dyn. forces*	5000 km	10000 km	5000 km	10000 km	5000 km	10000 km
F_x (N)	900	800	2500	2000	5000	4000
F_y (N)	1415	1010	3570	2542	4082	2910
F_z (N)	3525	2510	8500	6050	10300	7360
M_x (Nm)	33	23	107	76	142	101
M_y (Nm)	190	143	604	430	838	597
M_z (Nm)	176	125	550	392	745	532
All forces and torques related to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$						
No-load torque						
Trapezoidal	18x4/18x8		24x5/24x10		32x6/32x12	
Nm	0,6/0,7		0,6/0,8		1,5/1,7	
Ballscrew	16x5/16x10		25x5/20x20/25x10		32x5/32x10	
Nm	0,4/0,6		0,4/0,7/0,6		1,3/1,6	
Geometrical moments of inertia of aluminium profile						
I_x mm^4	$4,3x10^5$		$14,3x10^5$		$31,8x10^5$	
I_y mm^4	$5,8x10^5$		$18,7x10^5$		$46,5x10^5$	
E-Modulus N/mm^2	70000		70000		70000	

For life-time calculation use our homepage.

** referred to life-time*

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

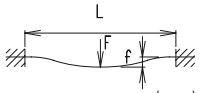
F = force (N)
P = thread pitch (mm)
Si = safety factor 1,2 ... 2
M_n = no-load torque (Nm)
n = rpm of screw (min^{-1})
M_a = driving torque (Nm)
μ = screw efficiency
P_a = motor power (KW)

Efficiency of lead screws:

All ballscrew		0,900
Tr	18x4	0,399
Tr	18x8	0,565
Tr	24x5	0,384
Tr	24x10	0,550
Tr	32x6	0,360
Tr	32x12	0,524

Deflection:

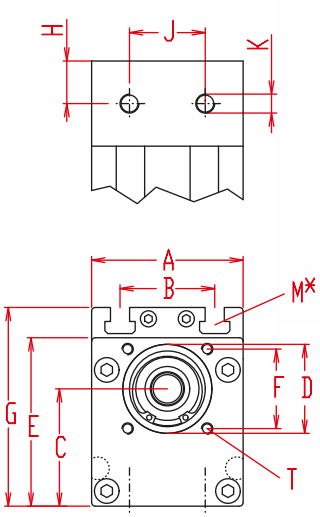
$$f = \frac{F * L^3}{E * I * 192}$$

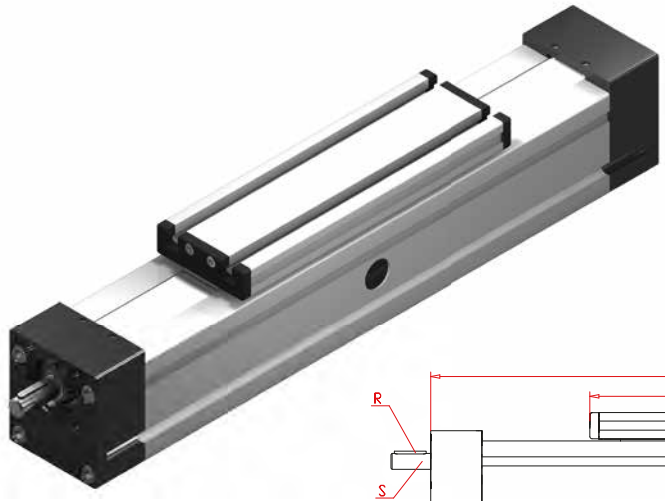


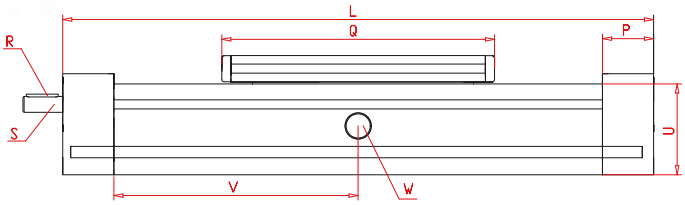
f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm^2)
I = second moment of area (mm^4)

For the diagram for critical speeds of lead screws refer to chapter 4.2

Linear system **QST/K 60, 80, 100**







V = Q + 100 mm
W = servicing position

*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

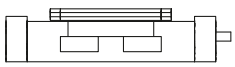
Size ❐	Basic length L	A	B	C	D -0,05	E	F ❐	G	H	J	K	M for	P	Q	Shaft R Key	Shaft S Ø h6 x length	T for	U	Basic weight	Weight per 100 mm
QST/K 60	270	60	36	45	37	67	32	79	19	18	M6	M6	38	188	3x3x25	10 x 27	M5	60	4,1 kg	0,5 kg
QST/K 80	350	80	50	62	47	89	42	106	22,5	40	M10	M8	45	250	5x5x28	14 x 35	M6	80	7,5 kg	0,9 kg
QST/K 100	410	100	66	75	68	112	60	129	28,5	50	M10	M10	57	288	6x6x40	22 x 45	M8	100	14,8 kg	1,3 kg

K **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

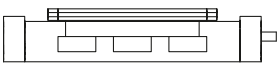
1 **Selection of screw:**
(1) right hand (Standard) **(2)** left hand (Ballscrew by inquiry)

0 **Choice of carriage:**

(0)



(1)



Size	Version 1	
	Q	L
60	255	350
80	336	436
100	383	510

0 **Drive version:**
(0) one shaft (locating bearing side) **(1)** one shaft (non-locating bearing side) **(2)** shaft on both sides

0

Selection of screw:

Size	Standard	Multistart screw	Standard	Multistart screw		
	Trapezoidal thread		Ballscrew			
60	**(0)** Tr 18x4	**(1)** Tr 18x8	**(0)** Kg 16x5	**(1)** Kg 16x10	**(2)** Kg 16x16	
80	**(0)** Tr 24x5	**(1)** Tr 24x10	**(0)** Kg 25x5	**(1)** Kg 20x20	**(2)** Kg 25x10	**(3)** Kg 25x25***
100	**(0)** Tr 32x6	**(1)** Tr 32x12	**(0)** Kg 32x5	**(1)** Kg 32x10	**(2)** Kg 32x32 *	**(3)** Kg 32x20**

** = Basic and carriage length (L and Q) increase over 47 mm*
***= Basic and carriage length (L and Q) increase over 11 mm*
**** = Basic and carriage length (L and Q) increase over 42 mm*

0 **Choice of guide body profile:**
(0) Standard **(1)** corrosion-protected screws

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard) **(1)** < 0,02 mm **(2)** 2% apply prestress

QS	K	80	1	0	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7	

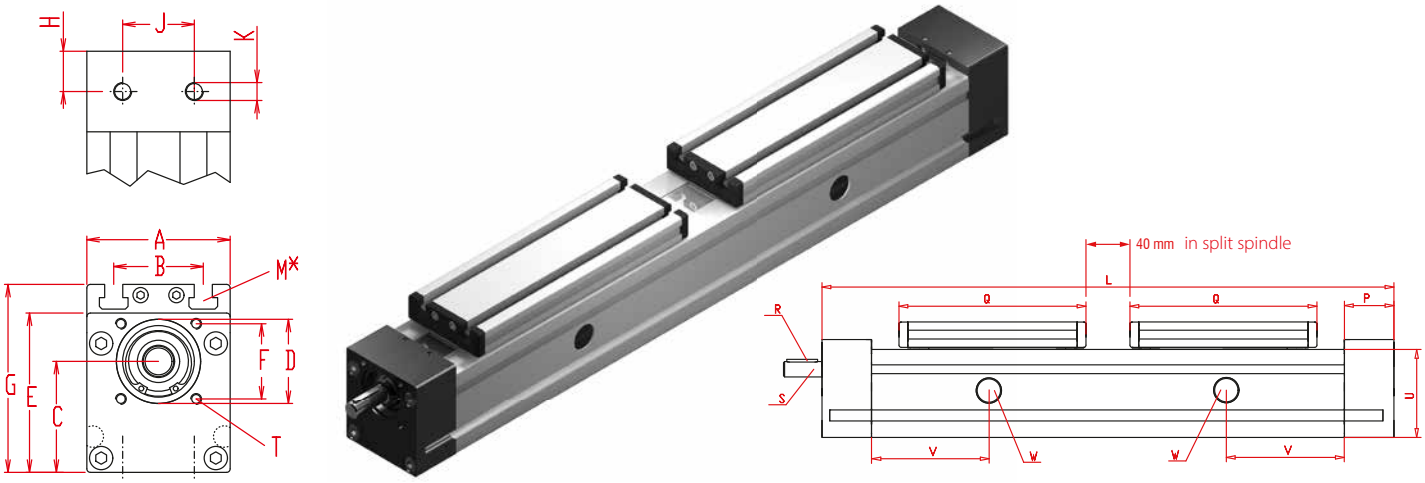
Basic length + stroke = total length

For additional accessories refer to chapter 2.2

Sample ordering code:
QSK80, ballscrew right hand thread, standard carriage, one shaft (locating bearing side), spindle 25x5, 1150 mm stroke.

Linear system **QST/K 60, 80, 100**

SPINDLE DRIVEN RIGHT-HAND | LEFT-HAND | DIVIDED SPINDLE



*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

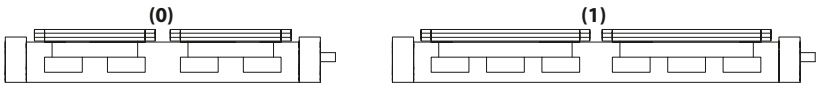
Size ❒	Basic length L selection of screw		A	B	C	D -0,05	E	F ❒	G	H	J	K	M for	P	Q	Shaft		T for	U	Basic weight	Weight per 100 mm
	3	4														R Key	S Ø h6 x length				
QST/K 60	460	500	60	36	45	37	67	32	79	19	18	M6	M6	38	188	3x3x25	10 x 27	M5	60	5,4 kg	0,5 kg
QST/K 80	600	640	80	50	62	47	89	42	106	22,5	40	M10	M8	45	250	5x5x28	14 x 35	M6	80	9,8 kg	0,9 kg
QST/K 100	700	740	100	66	75	68	112	60	129	28,5	50	M10	M10	57	288	6x6x40	22 x 45	M8	100	18,6 kg	1,3 kg

V = Q + 100 mm
W = servicing position

K **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

3 **Selection of screw:**
(3) right - left hand **(4)** divided spindle

0 **Choice of carriage:**



Size	Carriage version 1		
	Q	Basic length L selection of spindle	
		3	4
60	255	590	630
80	336	770	810
100	383	890	930

0 **Drive version:**
(0) shaft right hand thread **(1)** shaft left hand thread **(2)** shaft on both sides

0

Selection of screw:	Size	Standard	Multistart screw	
Ballscrew right hand	60	**(0)** 16x5	**(1)** 16x10*	**(2)** 16x16*
	80	**(0)** 25x5	**(1)** 20x20*	**(2)** 25x10*
	100	**(0)** 32x5	**(1)** 32x10*	**(2)** 32x32**
Ballscrew left hand	auf Anfrage			
Trapezoidal right hand thread	60	**(0)** 18x4	**(1)** 18x8	
	80	**(0)** 24x5	**(1)** 24x10	
	100	**(0)** 32x6	**(1)** 32x12	
Trapezoidal left hand thread	60	**(0)** 18x4	**(1)** 18x8	
	80	**(0)** 24x5	**(1)** 24x10	
	100	**(0)** 32x6	**(1)** 32x12	* = only for selection of divided spindle

** = only for selection of divided spindle, Basic and carriage length (L and Q) increase over 94 mm

0 **Choice of guide body profile:**
(0) Standard **(1)** corrosion-protected screws
(4) expanded corrosion-protected version (depending on the availability of components)

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard) **(1)** < 0,02 mm **(2)** 2% apply prestress

QS	K	80	3	0	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7	

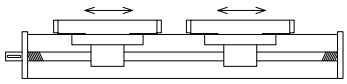
Basic length + stroke = total length

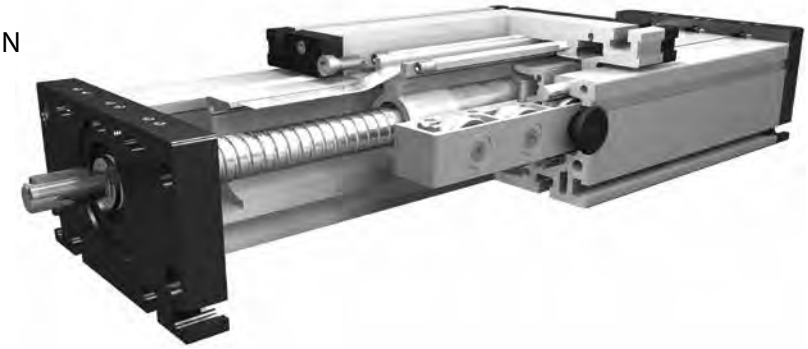
Sample ordering code:
QSK80, ballscrew right - left hand thread, standard carriage, shaft on right hand thread, spindle 25x5, 860 mm stroke.

Linear system **DLT/DLK 120, 160, 200**

SPINDLE DRIVE

- INDEPENDENT INSTALLATION POSITION
- PRECISION
- UNIVERSAL SYSTEM



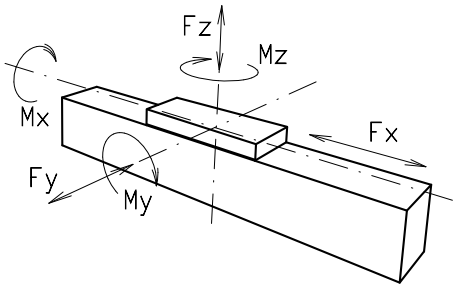


Function:
This unit consists of a rectangular aluminium profile with 2 integrated roller guides. The carriage is driven by means of a rotating spindle with leading nut. Where two parallel linear units are used or where two carriages are mounted on one unit, the leading-nut receiver can be used to adjust the symmetry of the carriages. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the drive from splash water and dust.

Fitting position: As required. Max. length 3.000 mm without joints.
Carriage mounting: By T-slots.
Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
Carriage support: In the standard version, the carriage runs on 8 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased. Repeatability ballscrew ± 0,025 mm, trapezoidal thread ± 0,2 mm.

8.1

Forces and torques



Size	120		160		200	
Forces/Torques	static	dynamic	static	dynamic	static	dynamic
F_x (N)	900	800	5000	4000	10000	8000
F_y (N)	1100	900	3000	2000	4400	3100
F_z (N)	1250	1000	3500	2800	4900	4400
M_x (Nm)	150	125	400	320	600	510
M_y (Nm)	140	120	360	300	560	480
M_z (Nm)	100	90	180	150	310	275
All forces and torques related to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$						
No-load torque						
Trapezoidal thread	18 x 4	18 x 8	24 x 5	24 x 10	32 x 6	32 x 12
(Nm)	0,6	0,9	0,6	0,9	0,9	1,1
Ballscrew	16 x 5	16 x 10	25 x 5	20 x 20	32 x 5	32 x 10
(Nm)	0,5	0,8	0,5	0,8	0,7	0,9
Geometrical moments of inertia of aluminium profile						
I_x mm^4	$6{,}6\times10^5$		$22{,}2\times10^5$		$63{,}8\times10^5$	
I_y mm^4	$38{,}6\times10^5$		$122{,}0\times10^5$		$335{,}0\times10^5$	
Elastic modulus N/mm^2	70000		70000		70000	

For life-time calculation of rollers use our homepage.

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

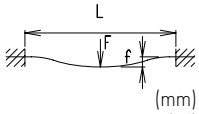
F	= force	(N)
P	= thread pitch	(mm)
Si	= safety factor 1,2 … 2	
M_n	= no-load torque	(Nm)
n	= rpm of screw	(min^{-1})
M_a	= driving torque	(Nm)
μ	= screw efficiency	
P_a	= motor power	(KW)

Efficiency of lead screws:

All ballscrew		0,900
Tr	18x4	0,399
Tr	18x8	0,565
Tr	24x5	0,384
Tr	24x10	0,550
Tr	32x6	0,360
Tr	32x12	0,524

Deflection:

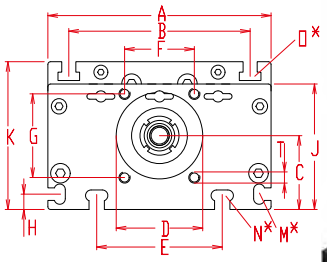
$$f = \frac{F * L^3}{E * I * 192}$$

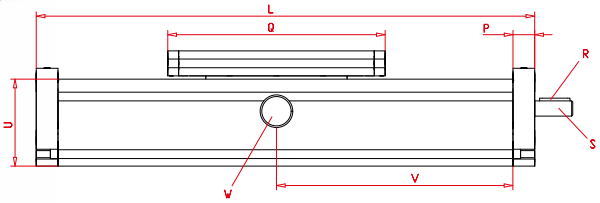


f = deflection	(mm)
F = load	(N)
L = free length	(mm)
E = elastic modulus 70000	(N/mm^2)
I = second moment of area	(mm^4)

For the diagram for critical speeds of lead screws refer to chapter 4.2

Linear system **DLT/DLK 120, 160, 200**





V = Q + 100 mm
W = servicing position

*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

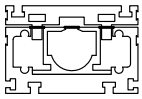
Size	Basic length L	A	B	C	D +0,1 +0,05	E	F	G	H	J	K	M for	N for	O for	P	Q	Shaft R Key	Shaft S Ø h6 x length	T	U	Basic weight	Weight per 100 mm
DL 120	200	120	96	39	47	78	42	42	10	68	79	M 5	M 6	M 6	15	156	3x3x25	10 x 27	M 6	60	3,9 kg	0,92 kg
DL 160	260	160	130	53	62	90	50	60	11	90	106	M 6	M 8	M 8	20	200	5x5x28	14 x 35	M 8	80	8,2 kg	1,96 kg
DL 200	320	200	160	66	68	140	60	60	15	110	129	M 8	M10	M10	20	270	6x6x40	22 x 45	M 8	100	19,6 kg	2,82 kg

T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

1 **Selection of screw:**
(1) right hand **(2)** left hand (Ballscrew by inquiry)

0 **Choice of guide body profile:** Stainless versions upon request.

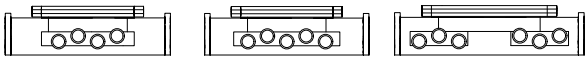
(0)



internal profile
with cover bands

0 **Choice of carriages:**

(0) **(2)** **(3)**



Size	Version 0 Q	Version 0 L	Version 2 Q	Version 2 L	Version 3 Q	Version 3 L
120	156	200	196	240	>236	>280
160	200	260	250	310	>300	>360
200	270	320	330	380	>410	>460

0 **Drive version:**
(0) one shaft (locating bearing side) **(1)** one shaft (non-locating bearing side) **(2)** shaft on both sides

0

Selection of screw:	Size	Standard	Multistart screw			
Ballscrew right hand	120	**(0)** 16x5	**(1)** 16x10	**(2)** 16x16	**(3)** 20x20	**(4)** 25x5	**(5)** 25x10
	160	**(0)** 25x5	**(1)** 20x20	**(2)** 25x10	**(3)** 25x25		
	200	**(0)** 32x5	**(1)** 32x10	**(2)** 32x20	**(3)** 32x32		
Ballscrew left hand	upon request						
Trapezoidal right hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12				
Trapezoidal left hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12				

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

Repeatability:
± 0,2 mm Trapezoidal
± 0,025 mm Ballscrew

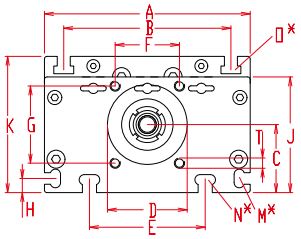
DL	T	160	1	0	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7	

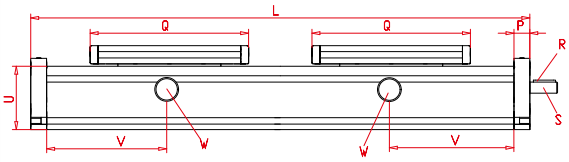
Basic length + stroke = total length

Sample ordering code:
DLT160, trapezoidal right hand thread, with internal profile and cover bands, standard carriage, one shaft (locating bearing side), spindle 24x5, 1240 mm stroke.

Linear system **DLT/DLK 120, 160, 200**

SPINDLE DRIVE, RIGHT-HAND / LEFT-HAND THREAD OR DIVIDED SPINDLES





V = Q + 100 mm
W = servicing position
*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

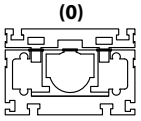
Size	Basic length L	A	B	C	D +0,1 +0,05	E	F	G	H	J	K	M for	N for	O for	P	Q	Shaft R Key	Shaft S Ø h6 x length	T	U	Basic weight	Weight per 100 mm
DL 120	360	120	96	39	47	78	42	42	10	68	79	M 5	M 6	M 6	15	156	3x3x25	10 x 27	M 6	60	5,1 kg	0,92 kg
DL 160	470	160	130	53	62	90	50	60	11	90	106	M 6	M 8	M 8	20	200	5x5x28	14 x 35	M 8	80	12,0 kg	1,96 kg
DL 200	590	200	160	66	68	140	60	60	15	110	129	M 8	M10	M10	20	270	6x6x40	22 x 45	M 8	100	27,1 kg	2,82 kg

T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

3 **Selection of screw:**
(3) right - left hand **(4)** divided spindle

0 **Choice of guide body profile:** Stainless versions upon request.

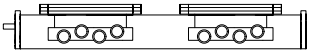
(0)



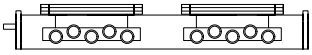
internal profile
with cover bands

0 **Choice of carriages:**

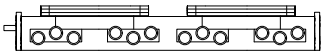
(0)



(2)



(3)



Size	Version 0 Q	Version 0 L	Version 2 Q	Version 2 L	Version 3 Q	Version 3 L
120	156	360	196	440	>236	>530
160	200	470	250	570	>300	>670
200	270	600	330	720	>410	>880

0 **Drive version:**
(0) shaft right hand thread **(1)** shaft left hand thread **(2)** shaft on both sides

0

Selection of screw:	Size	Standard	Multistart screw				
Ballscrew right hand	120	**(0)** 16x5	**(1)** 16x10*	**(2)** 16x16*	**(3)** 20x20*	**(4)** 25x5*	**(5)** 25x10*
	160	**(0)** 25x5	**(1)** 20x20*	**(2)** 25x10*	**(3)** 25x25*		
	200	**(0)** 32x5	**(1)** 32x10*	**(2)** 32x20*	**(3)** 32x32*		
Ballscrew left hand	upon request						
Trapezoidal right hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12				
Trapezoidal left hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12				

* = only for selection of divided spindle

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

Repeatability:
± 0,2 mm Trapezoidal
± 0,025 mm Ballscrew

DL	T	160	3	0	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7	

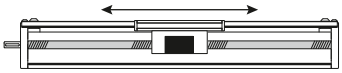
Basic length + stroke = total length

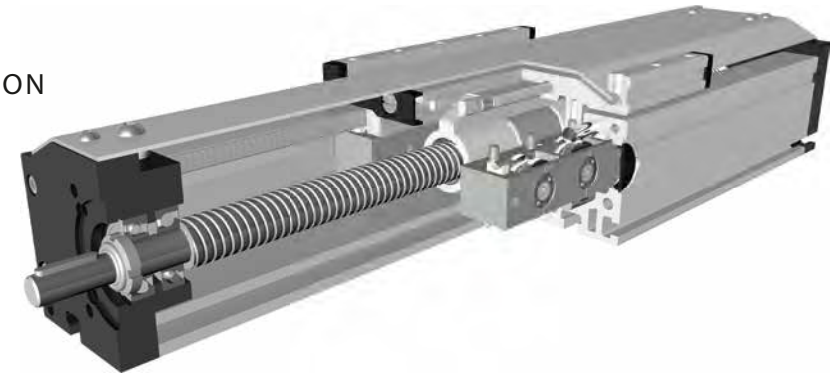
Sample ordering code:
DLT160, trapezoidal right - left hand thread, with internal profile and cover bands, standard carriage, shaft on the right hand side, spindle 24x5, 1030 mm stroke

Linear system **DLT/DLK 120 P, 160 P, 200 P**

SPINDLE DRIVE

- INDEPENDENT INSTALLATION POSITION
- PRECISION
- COVER PROFILE

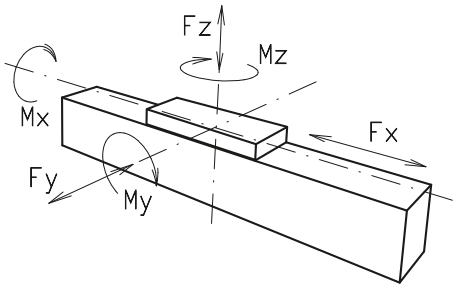




Function:
This unit consists of a rectangular aluminium profile with 2 integrated roller guides. The carriage is driven by means of a rotating spindle with leading nut. Where two parallel linear units are used or where two carriages are mounted on one unit, the leading-nut receiver can be used to adjust the symmetry of the carriages. A special curved aluminium sheet is covering the carriage side. There is only a small gap between carriage and aluminium sheet.

Fitting position: As required. Max. length DLT/K 120P / 1600mm, DLT/K 160P / 1800mm, DLT/K 200P / 2000mm
Carriage mounting: By tapped holes in the carriage.
Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
Carriage support: In the standard version, the carriage runs on 8 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased. Repeatability ballscrew ± 0,025 mm, trapezoidal thread ± 0,2 mm.

Forces and torques



Size	120		160		200	
Forces/Torques	static	dynamic	static	dynamic	static	dynamic
F_x (N)	900	800	5000	4000	10000	8000
F_y (N)	1100	900	3000	2000	4400	3100
F_z (N)	1250	1000	3500	2800	4900	4400
M_x (Nm)	150	125	400	320	600	510
M_y (Nm)	140	120	360	300	560	480
M_z (Nm)	100	90	180	150	310	275
All forces and torques related to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$						
No-load torque						
Trapezoidal thread	18 x 4	18 x 8	24 x 5	24 x 10	32 x 6	32 x 12
(Nm)	0,6	0,9	0,6	0,9	0,9	1,1
Ballscrew	16 x 5	16 x 10	25 x 5	20 x 20	32 x 5	32 x 10
(Nm)	0,5	0,8	0,5	0,8	0,7	0,9
Geometrical moments of inertia of aluminium profile						
I_x mm^4	$6{,}6 \times 10^5$		$22{,}2 \times 10^5$		$63{,}8 \times 10^5$	
I_y mm^4	$38{,}6 \times 10^5$		$122{,}0 \times 10^5$		$335{,}0 \times 10^5$	
Elastic modulus N/mm^2	70000		70000		70000	

For life-time calculation of rollers use our homepage.

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

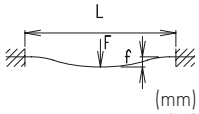
F = force (N)
P = thread pitch (mm)
Si = safety factor 1,2 … 2
M_n = no-load torque (Nm)
n = rpm of screw (min^{-1})
M_a = driving torque (Nm)
μ = screw efficiency
P_a = motor power (KW)

Efficiency of lead screws:

All ballscrew		0,900
Tr	18x4	0,399
Tr	18x8	0,565
Tr	24x5	0,384
Tr	24x10	0,550
Tr	32x6	0,360
Tr	32x12	0,524

Deflection:

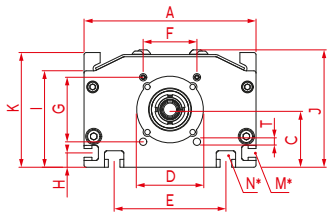
$$f = \frac{F * L^3}{E * I * 192}$$

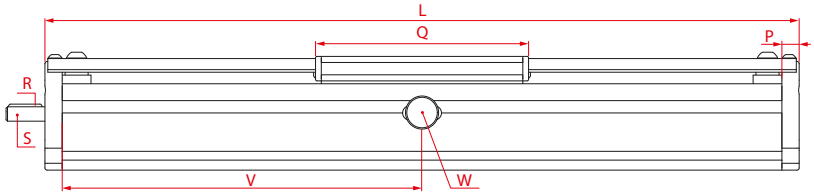


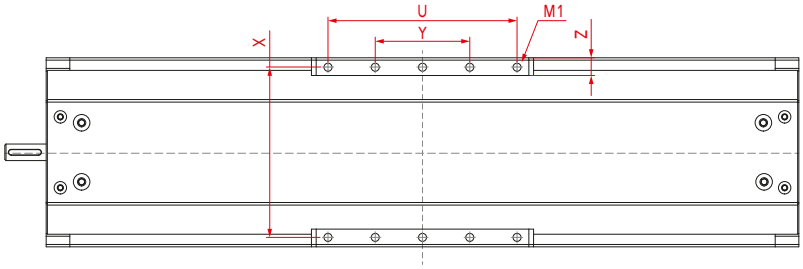
f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm^2)
I = second moment of area (mm^4)

For the diagram for critical speeds of lead screws refer to chapter 4.2

Linear system **DLT/DLK 120 P, 160 P, 200 P**







*For slide nuts refer to chapter 2.2 page 2
Increasing the carriage length will increase the basic length by the same amount.

DL 120 M1 = M6 x 8 only 8 threaded holes in the carriage
DL 160 M1 = M8 x 12 **DL 200** M1 = M10 x 12

V = Q + 100 mm W = servicing position

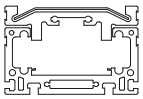
Size	Basic length L	A	C	D +0,1 +0,05	E	F	G	H	I	J	K	M for	N for	P	Q	Shaft R Key	Shaft S Ø h6 x length	T	U	X	Y	Z	Basic weight	Weight per 100 mm
DL 120	220	120	39	47	78	42	42	10	67	82	79	M5	M6	12	152	3x3x25	10 x 27	M6	120	106	40	11,5	4,20 kg	1,16 kg
DL 160	277	160	53	62	90	50	60	11	89	109	106	M6	M8	20	196	5x5x28	14 x 35	M8	160	144	80	15	9,70 kg	1,98 kg
DL 200	340	200	66	68	140	60	60	15	110	133	129	M8	M10	20	256	6x6x40	22 x 45	M8	200	180	100	17	18,70 kg	3,16 kg

T **Spindle:** **(T)** Trapezoidal thread **(K)** Ballscrew

1 **Selection of screw:** **(1)** right hand *(Standard)* **(2)** left hand *(Ballscrew by inquiry)*

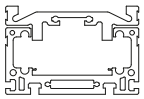
0 **Choice of guide body profile:** Stainless versions upon request.

(0)



with cover profile

(1)

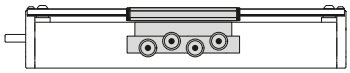


without cover profile

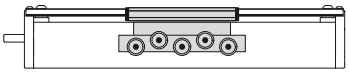
Size	Version 0 Q	Version 0 L	Version 2 Q	Version 2 L	Version 3 Q	Version 3 L
120	152	220	192	260	>240	>308
160	196	277	250	331	>300	>381
200	256	340	330	414	>410	>494

0 **Choice of carriages:**:

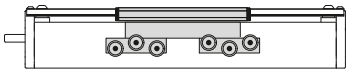
(0)



(2)



(3)



0 **Drive version:**
(0) right (locating bearing side) **(1)** left (non-locating bearing side) **(2)** shaft on both sides

0

Selection of screw:	Size	Standard	Multistart screw				
Ballscrew right hand	120	**(0)** 16x5	**(1)** 16x10	**(2)** 16x16	**(3)** 20x20*	**(4)** 25x5*	**(5)** 25x10*
	160	**(0)** 25x5	**(1)** 20x20	**(2)** 25x10	**(3)** 25x25		
	200	**(0)** 32x5	**(1)** 32x10	**(2)** 32x20	**(3)** 32x32		
Ballscrew left hand			upon request				
Trapezoidal right hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12				
Trapezoidal left hand thread	120	**(0)** 18x4	**(1)** 18x8				
	160	**(0)** 24x5	**(1)** 24x10				
	200	**(0)** 32x6	**(1)** 32x12		* by inquiry		

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

DL	T	160 P	1	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7

Basic length + stroke = total length

Sample ordering code:
DLT 160 P, trapezoidal right hand thread, with cover profile, standard carriage (0), right (locating bearing side), spindle (standard), 1220 mm stroke.

8.1

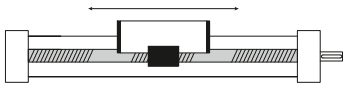
Linear system **ELT/ELK 30, 40, 60, 60S, 80, 80S, 100, 125**

1.1

SPINDLE DRIVEN

LIFTING SYSTEM

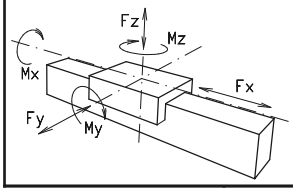
PRECISION



Function:
This linear unit consists of an aluminium hollow section with integral, parallel ground and hardened steel guide rods. The carriage has play-adjustable ball-bearing rollers which engage with the guide rods. The rotating trapezoidal/ballscrew causes linear motion of the ballnut, which is connected to the carriage. The slot necessary for this is covered by a stainless steel strip, making the unit dust- and splash-proof. Lateral adjustment of movement for parallel units, or when two carriages are mounted on one unit, is provided by the ballnut mounting.

Fitting position: As required, max. length 3.000 mm (**EL 30** / max. 1500 mm, **EL 40** / max. 2000 mm)
Carriage mounting: By T-slots and tapped holes
Unit mounting: By T-slots and tapped holes in the mounting surfaces.

Forces and torques



Size	EL 30		EL 40		EL 60		EL 60 S		EL 80		EL 80S		EL 100		EL 125	
Forces/Torques	static	dyna.	static	dyna.	static	dyna.	static	dyna.	static	dyna.	static	dyna.	static	dyna.	static	dyna.
F_x (N)	750	600	1500	1200	2500	2000	2500	2000	5000	4000	5000	4000	10000	8000	15000	12000
F_y (N)	90	60	1200	700	3000	2000	4100	3100	3000	2000	4600	3600	8000	6500	12000	9000
F_z (N)	90	60	900	650	1700	1100	2160	1600	1700	1100	3000	1800	3600	2200	6000	4500
M_x (Nm)	12	10	25	20	67	43	88	65	90	55	170	140	300	230	600	450
M_y (Nm)	12	10	32	18	90	70	190	140	110	80	270	230	400	270	750	600
M_z (Nm)	15	12	35	25	120	100	230	170	150	120	300	220	750	500	1350	1150
All forces and torques relate to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$																
No-load torque																
Trapezoidal thread	10x3		18x4/18x8		24x5/24x10		24x5/24x10		28x5/28x10		28x5/28x10		32x6/32x12		40x7/40x14	
(Nm)	0,3		0,4/0,5		0,6/0,8		0,6/0,8		0,8/1,0		0,8/1,0		0,9/1,1		1,2/1,4	
Ballscrew	8x2,5		16x5/16x10		25x5/25x10		25x5/25x10		32x5/32x10		32x5/32x10		32x5/32x10		40x10/40x20	
(Nm)	0,15		0,2/0,4		0,4/0,6		0,4/0,6		0,6/0,8		0,6/0,8		0,7/0,9		1,0/1,2	
Geometrical moments of inertia of aluminium profile																
I_x mm^4	4,09x10^4		1,32x10^5		6,79x10^5		6,79x10^5		18,99x10^5		18,99x10^5		44,4x10^5		101,5x10^5	
I_y mm^4	4,00x10^4		1,34x10^5		6,97x10^5		6,97x10^5		18,97x10^5		18,97x10^5		44,8x10^5		101,5x10^5	
E-Modulus N/mm^2	70000		70000		70000		70000		70000		70000		70000		70000	

For life-time calculation of rollers use our homepage.

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

F = force (N)
P = thread pitch (mm)
Si = safety factor 1,2 ... 2
M_n = no-load torque (Nm)
n = rpm of screw (min^{-1})
M_a = driving torque (Nm)
μ = screw efficiency
P_a = motor power (KW)

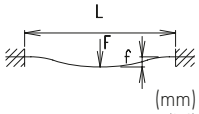
Efficiency of lead screws:

All ballscrew 0,900

Tr	10x3	0,375	Tr	32x6	0,360
Tr	18x4	0,399	Tr	32x12	0,524
Tr	18x8	0,565	Tr	40x7	0,344
Tr	24x5	0,384	Tr	40x14	0,509
Tr	24x10	0,550			
Tr	28x5	0,349			
Tr	28x10	0,513			

Deflection:

$$f = \frac{F * L^3}{E * I * 192}$$

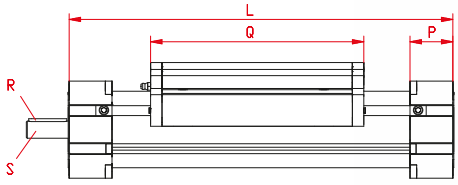


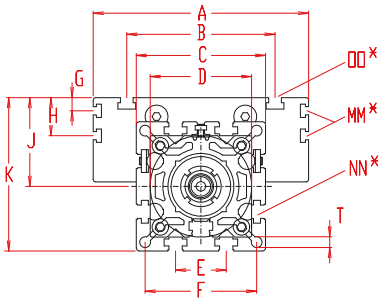
f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm^2)
I = second moment of area (mm^4)

For the diagram for critical speeds of lead screws refer to chapter 4.2

Linear system **ELT/ELK 30, 40, 60, 60S, 80, 80S, 100, 125**

Dimensions (mm)





*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

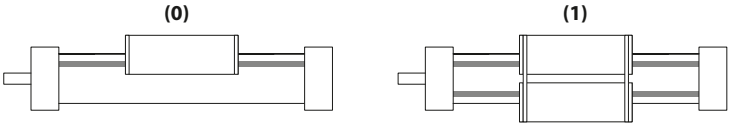
Size ❒	Basic length L	A	B	C	D ± 0,05	E	F	G	H	J	K	MM for	NN for	OO for	P	Q	R	S Ø h6 x length	T	Basic weight	Weight per 100 mm
EL 30	120	70	56	42	40x1	13	35	-	-	26	47	-	M 6	M 6	18	82	-	5x15	4,2	0,7 kg	0,16 kg
EL 40	175	100	66	58	48x1	18	47	--	-	35	64	-	M 6	M 6	25	122	3x3x25	10x27	6,5	1,7 kg	0,37 kg
EL 60	245	144	96	82	62x1	30	69	-	-	49	90	-	M 8	M 8	35	168	5x5x28	14x35	8,5	5,1 kg	0,89 kg
EL 60S	270	170	108	82	62x1	30	69	-	-	53	94	-	M 8	M 8	35	194	5x5x28	14x35	8,5	5,1 kg	0,89 kg
EL 80	285	170	117	102	80x1	40	88	10,5	30,5	70	121	M 6	M 10	M 10	45	194	6x6x40	18x45	8,5	10,0 kg	1,48 kg
EL 80S	305	190	126	102	80x1	40	88	12,5	30	71	122	M 6	M 10	M 8	45	214	6x6x40	18x45	8,5	11,0 kg	1,48 kg
EL 100	410	230	155	130	110x1	50	112	-	29	89	154	M 10	M 10	M 10	55	300	6x6x40	22x45	10,5	19,0 kg	2,00 kg
EL 125	510	295	200	165	130x1	60	142	-	30	107,5	190	M 10	M 12	M 12	65	365	8x7x50	25x55	13,0	33,0 kg	2,89 kg

T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

1 **Selection of screw:**
(1) right hand **(2)** left hand (Ballscrew by inquiry)

0 **Choice of guide body profile:**
(0) Standard **(2)** corrosion-protected guide rods and screws
(4) expanded corrosion-protected version, only for trapezoidal thread (on request)

0 **Choice of carriages:**



Size	Version 1	
	Q	L
30	94	132
40	138	191
60	184	261
60S	214	290
80	210	301
80S	234	325
100	316	426
125	389	534

0 **Drive version:**
(0) one shaft (locating bearing side) **(1)** one shaft (non-locating bearing side)
(2) shaft on both sides

0 **Selection of screw:**

Size	Standard	Multistart screw	Standard	Multistart screw		
30	**(0)** Tr 10x3		**(0)** Kg 8x2,5	Tr = trapezoidal thread / Kg = ballscrew		
40	**(0)** Tr 18x4	**(1)** Tr 18x8	**(0)** Kg 16x5	**(1)** Kg 16x10	**(2)** Kg 16x16	
60	**(0)** Tr 24x5	**(1)** Tr 24x10	**(0)** Kg 25x5	**(1)** Kg 20x20	**(2)** Kg 25x10	**(3)** Kg 20x50
80	**(0)** Tr 28x5	**(1)** Tr 28x10	**(0)** Kg 32x5	**(1)** Kg 25x25	**(2)** Kg 32x10	
100	**(0)** Tr 32x6	**(1)** Tr 32x12	**(0)** Kg 32x5	**(1)** Kg 32x10	**(2)** Kg 32x20	**(3)** Kg 32x32
125	**(0)** Tr 40x7	**(1)** Tr 40x14	**(0)** Kg 40x10	**(1)** Kg 40x20	**(2)** Kg 40x40	

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

Repeatability:
± 0,2 mm Trapezoidal
± 0,025 mm Ballscrew

EL	T	40	1	0	0	0	0	0	0	1500
	Pos.		1	2	3	4	5	6	7	

Basic length + stroke = total length

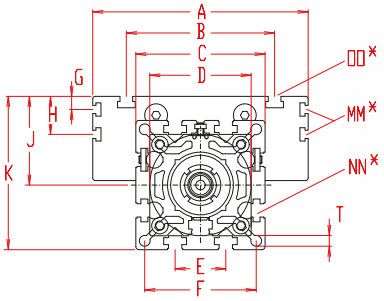
For combination kits and connecting elements refer to chapter 2.2

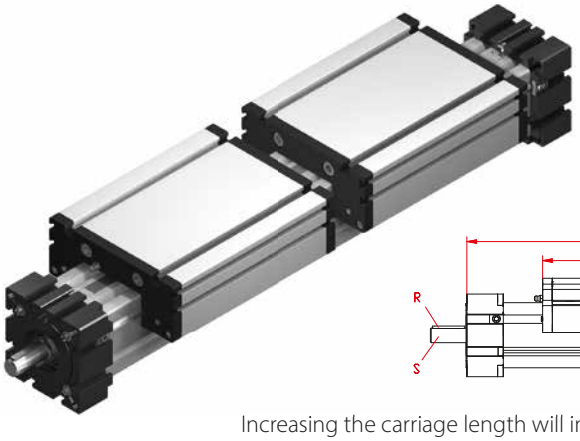
Sample ordering code:
ELT40, trapezoidal right hand thread, standard body profile, top carriage, one shaft (locating bearing side), spindle 18x4, 1325 mm stroke

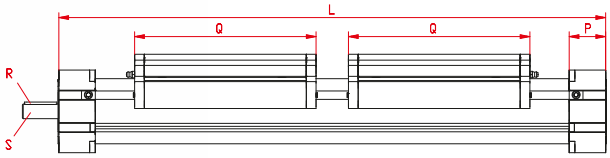
Linear system **ELT/ELK 30, 40, 60, 60S, 80, 80S, 100, 125**

1.1

SPINDLE DRIVEN - RIGHT-HAND AND LEFT-HAND







*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

Size ❒	Basic length L	A	B	C	D ± 0,05	E	F	G	H	J	K	MM for	NN for	OO for	P	Q	R	S Ø h6 x length	T	Basic weight	Weight per 100 mm
EL 30	202	70	56	42	40x1	13	35	-	-	26	47	-	M 6	M 6	18	82	-	5 x 15	4,2	1,1 kg	0,16 kg
EL 40	300	100	66	58	48x1	18	47	-	-	35	64	-	M 6	M 6	25	122	3x3x25	10 x 27	6,5	2,5 kg	0,37 kg
EL 60	410	144	96	82	62x1	30	69	-	-	49	90	-	M 8	M 8	35	168	5x5x28	14 x 35	8,5	8,1 kg	0,89 kg
EL 60S	460	170	108	82	62x1	30	69	-	-	53	94	-	M 8	M 8	35	194	5x5x28	14 x 35	8,5	10,1 kg	0,89 kg
EL 80	480	170	117	102	80x1	40	88	10,5	30,5	70	121	M 6	M10	M10	45	194	6x6x40	18 x 45	8,5	15,0 kg	1,48 kg
EL 80S	520	190	126	102	80x1	40	88	12,5	30	71	122	M 6	M10	M 8	45	214	6x6x40	18 x 45	8,5	17,0 kg	1,48 kg
EL 100	720	230	155	130	110x1	50	112	-	29	89	154	M10	M10	M10	55	300	6x6x40	22 x 45	10,5	32,0 kg	2,00 kg
EL 125	880	295	200	165	130x1	60	142	-	30	107,5	190	M10	M12	M12	65	365	8x7x50	25 x 55	13	48,0 kg	2,89 kg

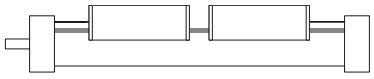
T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

3 **Selection of screw:**
(3) right - left hand **(4)** divided spindle

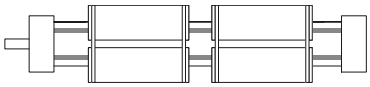
0 **Choice of guide body profile:**
(0) Standard **(2)** corrosion-protected guide rods and screws
(4) expanded corrosion-protected version, only for trapezoidal thread (on request)

0 **Choice of carriages:**

(0)



(1)



Size	Version 1	
	Q	L
30	94	226
40	138	332
60	184	442
60S	214	502
80	210	512
80S	234	560
100	316	752
125	389	928

0 **Drive version:**
(0) shaft right hand thread **(1)** shaft left hand thread **(2)** shaft on both sides

0 **Selection of screw:**

Size	Standard	Multistart screw	Standard	Multistart screw		
30	**(0)** Tr 10x3		**(0)** Kg 8x2,5*	Tr = trapezoidal thread / Kg = ballscrew		
40	**(0)** Tr 18x4	**(1)** Tr 18x8	**(0)** Kg 16x5	**(1)** Kg 16x10*	**(2)** Kg 16x16*	
60	**(0)** Tr 24x5	**(1)** Tr 24x10	**(0)** Kg 25x5	**(1)** Kg 20x20*	**(2)** Kg 25x10*	
80	**(0)** Tr 28x5	**(1)** Tr 28x10	**(0)** Kg 32x5	**(1)** Kg 25x25*	**(2)** Kg 32x10*	
100	**(0)** Tr 32x6	**(1)** Tr 32x12	**(0)** Kg 32x5	**(1)** Kg 32x10*	**(2)** Kg 32x20*	**(3)** Kg 32x32*
125	**(0)** Tr 40x7	**(1)** Tr 40x14	**(0)** Kg 40x10	**(1)** Kg 40x20*	**(2)** Kg 40x40*	

* = only for selection of devided spindle

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

Repeatability:
± 0,2 mm Trapezoidal
± 0,025 mm Ballscrew

	EL	T	40	3	0	0	0	0	0	2200
Pos.			1	2	3	4	5	6	7	

Basic length + stroke = total length

For combination kits and connecting elements refer to chapter 2.2

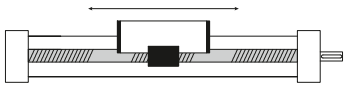
Sample ordering code:
ELT40, trapezoidal right - left hand thread, standard body profile, 2 top carriage, shaft on right hand side, spindle 18x4, 1900 mm stroke

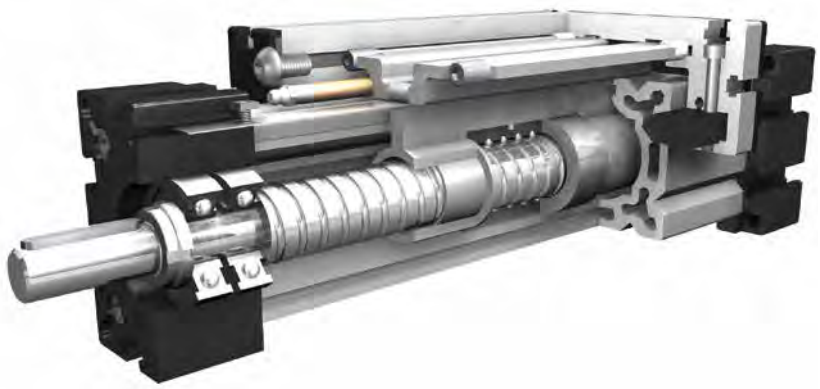
Linear system **EGT/EGK 30, 40, 60, 80**

1.1

SPINDLE DRIVEN

- SLIDE UNIT
- PRECISION
- ROBUST

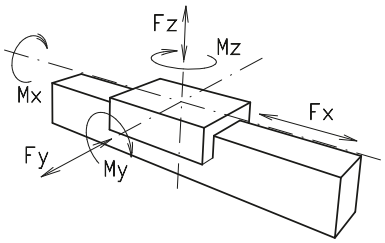




Function:
This unit consists of an aluminium square profile with lateral V-guides. The carriage, which is driven by means of a trapezoidal/ballscrew threaded spindle with lead screw, moves along the unit guided by V-slides that are adjustable free of play. Where two linear units are used in parallel or where two carriages are mounted on one unit, the leading-nut receiver can be used to adjust the symmetry of the carriages. The linear opening of the unit is sealed with a stainless steel cover band to make the unit splash-proof and dust-tight.

Fitting position: As required. Max. length 3.000 mm (**EG 30** / max. 1500 mm, **EG 40** / max. 2000 mm)
Carriage mounting: T-slots, tapped holes (size 40)
Unit mounting: By T-slots or tapped holes in the bearing block, mounting sets.

Forces and torques



Size	EG 30		EG 40		EG 60		EG 80	
Forces / Torques	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F_x (N)	750	600	1500	1200	2500	2000	4200	3500
F_y (N)	90	60	350	315	500	450	1000	900
F_z (N)	90	60	500	450	750	675	1125	1000
M_x (Nm)	10	5	20	18	33	30	82	75
M_y (Nm)	13	6	44	40	77	70	220	200
M_z (Nm)	14	7	33	30	55	50	165	150
All forces and torques relate to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$								
No-load torque								
Trapezoidal thread	10x3	-	18x4	18x8	24x5	24x10	28x5	28x10
(Nm)	0,4	-	0,70	0,70	0,50	0,80	0,80	1,0
Ballscrew	8x2,5	-	16x5	16x10	25x5	25x10	32x5	32x10
(Nm)	0,25	-	0,40	0,60	0,40	0,70	0,80	1,0
Geometrical moments of inertia of aluminium profile								
I_x mm^4	$4{,}09\times10^4$		$1{,}35\times10^5$		$5{,}65\times10^5$		$19{,}14\times10^5$	
I_y mm^4	$4{,}00\times10^4$		$1{,}48\times10^5$		$6{,}12\times10^5$		$20{,}12\times10^5$	
Elastic-modulus N/mm^2	70000		70000		70000		70000	

Driving torque:

$$M_a = \frac{F*P*S_i*w}{2000*\pi*\mu} + M_n$$

$$P_a = \frac{M_a*n}{9550}$$

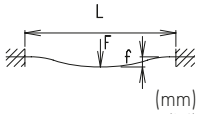
F	= force	(N)
P	= thread pitch	(mm)
Si	= safety factor 1,2 … 2	
M_n	= no-load torque	(Nm)
n	= rpm of screw	(min^{-1})
M_a	= driving torque	(Nm)
μ	= screw efficiency	
w	= friction coefficient	~1,22
P_a	= motor power	(KW)

Efficiency of lead screws:

All ballscrew		0,900
Tr	10x3	0,375
Tr	18x4	0,399
Tr	18x8	0,565
Tr	24x5	0,384
Tr	24x10	0,550
Tr	28x5	0,349
Tr	28x10	0,513

Deflection:

$$f = \frac{F*L^3}{E*I*192}$$

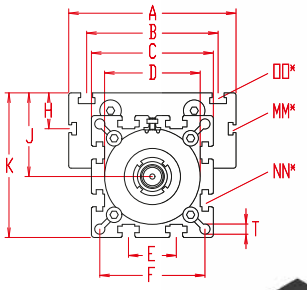


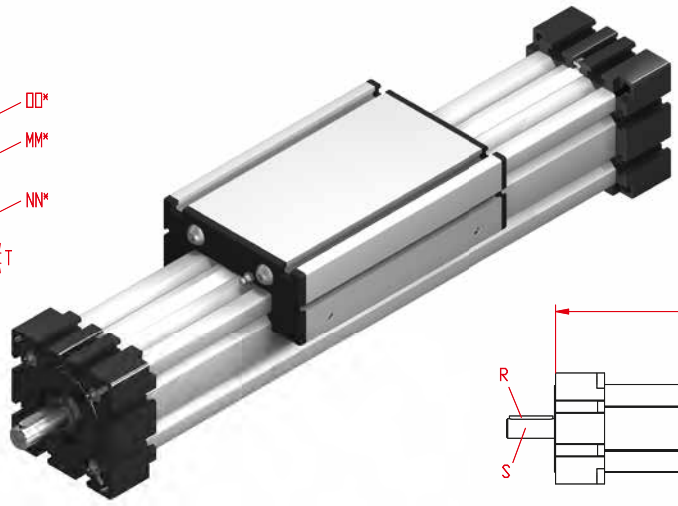
f = deflection	(mm)
F = load	(N)
L = free length	(mm)
E = elastic modulus 70000	(N/mm^2)
I = second moment of area	(mm^4)

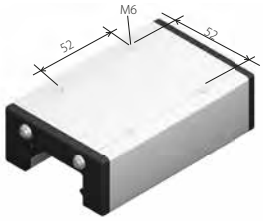
For the diagram for critical speeds of lead screws refer to chapter 4.2

Linear system **EGT/EGK 30, 40, 60, 80**

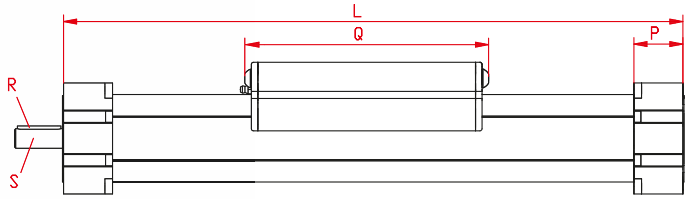
Dimensions (mm)







Size 40 without T-slots



*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

Size ❒	Basic length L	A	B	C	D ± 0,05	E	F	H	J	K	MM for	NN for	OO for	P	Q	R	S Ø h6 x length	T	Basic weight	Weight per 100 mm
EG 30	120	70	56	42	40x1	13	35	-	26	47	-	M 6	M 6	18	82	-	5x15	4,2	0,6 kg	0,16 kg
EG 40	170	70	-	58	48x1	18	47	-	35	64	-	M 6	M 6	25	117	3x3x25	10x27	6,5	1,3 kg	0,36 kg
EG 60	235	100	80	82	62x1	30	69	-	49	90	-	M 8	M 8	35	165	5x5x28	14x35	8,5	4,0 kg	0,67 kg
EG 80	286	140	110	102	80x1	40	88	30	70	121	M 6	M 10	M 10	45	193	6x6x40	18x45	8,5	6,7 kg	1,14 kg

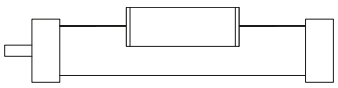
T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

1 **Selection of screw:**
(1) right hand **(2)** left hand (Ballscrew by inquiry)

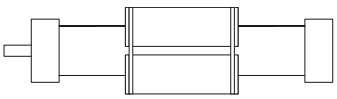
0 **Choice of guide body profile:**
(0) Standard **(2)** corrosion-protected guide rods (only size 30) and screws

0 **Choice of carriages:**

(0)



(1)



Size	Version 1	
	Q	L
30	94	132
40	133	186
60	181	251
80	209	302

0 **Drive version:**
(0) one shaft (locating bearing side) **(1)** one shaft (non-locating bearing side) **(2)** shaft on both sides

0 **Selection of screw:** Tr = trapezoidal thread / Kg = ballscrew

Size	Standard	Multistart screw	Standard	Multistart screw		
30	**(0)** Tr 10x3		**(0)** Kg 8x2,5			
40	**(0)** Tr 18x4	**(1)** Tr 18x8	**(0)** Kg 16x5	**(1)** Kg 16x10	**(2)** Kg 16x16	
60	**(0)** Tr 24x5	**(1)** Tr 24x10	**(0)** Kg 25x5	**(1)** Kg 20x20	**(2)** Kg 25x10	**(3)** Kg 20x50
80	**(0)** Tr 28x5	**(1)** Tr 28x10	**(0)** Kg 32x5	**(1)** Kg 25x25	**(2)** Kg 32x10	

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

Repeatability:
± 0,2 mm Trapezoidal
± 0,025 mm Ballscrew

	EG	T	40	1	0	0	0	0	0	0	1500
Pos.				1	2	3	4	5	6	7	

Basic length + stroke = total length

For combination kits and connecting elements refer to chapter 2.2

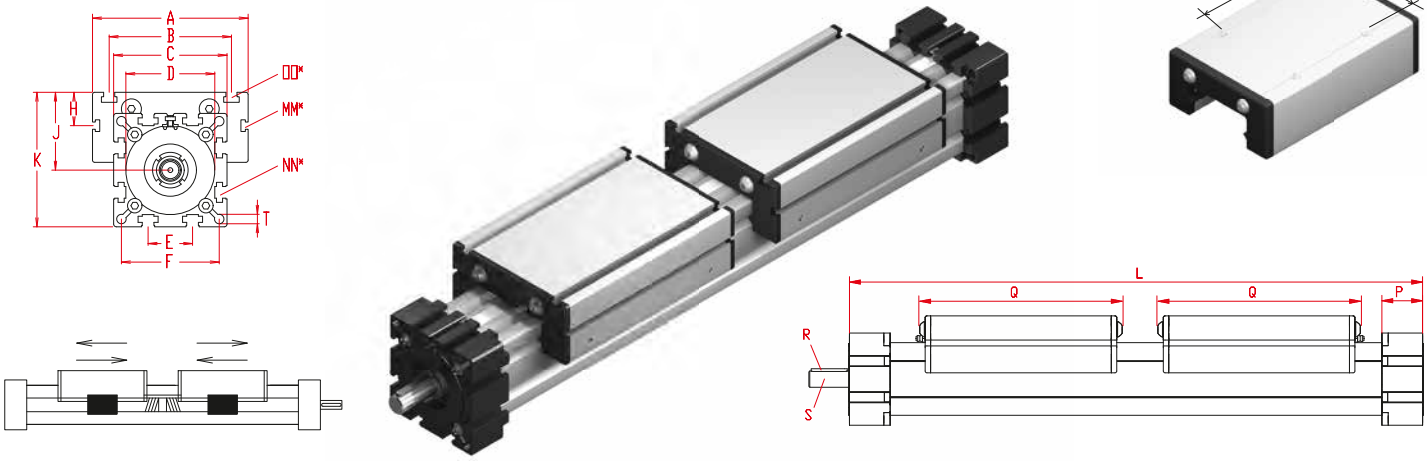
Sample ordering code:
EGT40, trapezoidal right hand thread, standard body profile, top carriage, one shaft (locating bearing side), spindle 18x4, 1331 mm stroke

Linear system **EGT/EGK 30, 40, 60, 80**

1.1

SPINDLE DRIVEN RIGHT-HAND AND LEFT-HAND

Size 40 without T-slots



*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

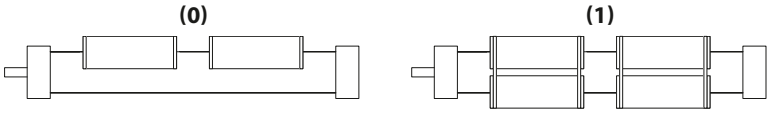
Size ❒	Basic length L	A	B	C	D ± 0,05	E	F	H	J	K	MM for	NN for	OO for	P	Q	R	S Ø h6 x length	T	Basic weight	Weight per 100 mm
EG 30	202	70	56	42	40x1	13	35	-	26	47	-	M 6	M 6	18	82	-	5x15	4,2	1,0 kg	0,16 kg
EG 40	287	70	-	58	48x1	18	47	-	35	64	-	M 6	M 6	25	117	3x3x25	10x27	6,5	2,5 kg	0,36 kg
EG 60	400	100	80	82	62x1	30	69	-	49	90	-	M 8	M 8	35	165	5x5x28	14x35	8,5	6,2 kg	0,67 kg
EG 80	479	140	110	102	80x1	40	88	30	70	121	M6	M 10	M 10	45	193	6x6x40	18x46	8,5	12,0 kg	1,14 kg

T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

3 **Selection of screw:**
(3) right - left hand **(4)** divided spindle

0 **Choice of guide body profile:**
(0) Standard **(2)** corrosion-protected guide rods (only size 30) and screws

0 **Choice of carriages:**



Size	Version 1	
	Q	L
30	94	226
40	133	319
60	181	432
80	209	511

0 **Drive version:**
(0) shaft right hand thread **(1)** shaft left hand thread **(2)** shaft on both sides

0 **Selection of screw:**

Size	Standard	Multistart screw	Standard	Multistart screw	
30	**(0)** Tr 10x3		**(0)** Kg 8x2,5*	Tr = trapezoidal thread / Kg = ballscrew	
40	**(0)** Tr 18x4	**(1)** Tr 18x8	**(0)** Kg 16x5	**(1)** Kg 16x10*	**(1)** Kg 16x16*
60	**(0)** Tr 24x5	**(1)** Tr 24x10	**(0)** Kg 25x5	**(1)** Kg 20x20*	**(2)** Kg 25x10*
80	**(0)** Tr 28x5	**(1)** Tr 28x10	**(0)** Kg 32x5	**(1)** Kg 25x25*	**(2)** Kg 32x10*

* = only for selection of divided spindle

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm (Standard) **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

Repeatability:
± 0,2 mm Trapezoidal
± 0,025 mm Ballscrew

EG	T	40	3	0	0	0	0	0	0	2200
Pos.			1	2	3	4	5	6	7	

Basic length + stroke = total length

For combination kits and connecting elements refer to chapter 2.2

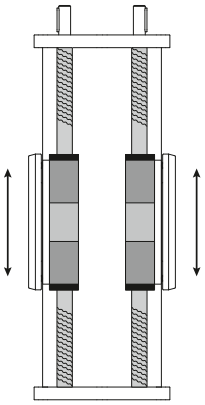
Sample ordering code:
EGT40, trapezoidal right - left hand thread, standard body profile, 2 top carriage, one shaft on right hand side, spindle 18x4, 1914 mm stroke

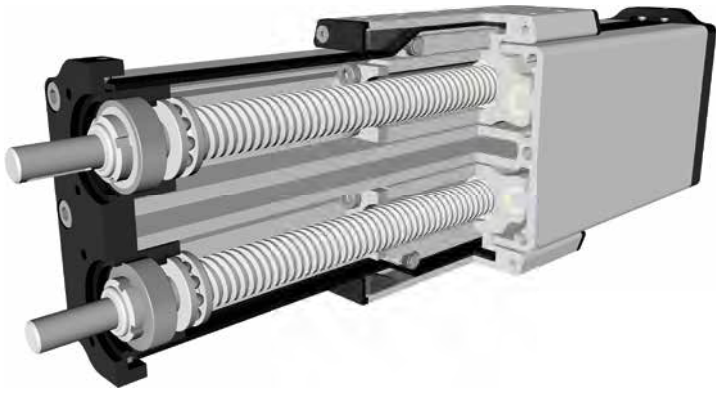
Linear system **GDGT/K 90**

1.1

SPINDLE DRIVEN

- SLIDE UNIT
- LIFTING SYSTEM
- HIGH RIGIDITY
- EASY CLEANING
- SMOOTH SURFACES

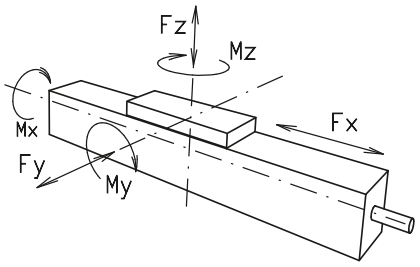




Function:
Optimized spindle axis for lift systems, bicycle assembly stands, lifting platforms and other lifting applications. The guide body consists of an aluminium profile with an integrated sliding guide. The plastic slide bushes integrated in the carriage ensure a very low friction resistance on anodized aluminium. The so-called double G profile ensures a very high stability. The carriage is moved by a rotating threaded spindle provided with a follower nut. The opening in the guide body is closed by a cover band made of plastic material. This plastic cover band is abrasion-free and is pressed into the profile by means of ball bearings.

Fitting position: As required. Max. length 3.000 mm
Carriage mounting: By tapped holes in the carriage.
Unit mounting: By T-slots or tapped holes in the bearing block.

Forces and torques



Size	90	
Forces / Torques	statisch	dynamisch
F_x (N)	4200	3500
F_y (N)	1000	900
F_z (N)	1125	1000
M_x (Nm)	82	75
M_y (Nm)	220	200
M_z (Nm)	165	150
All forces and torques relate to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$		
No-load torque		
Trapezoidal thread	24x5	24x10
(Nm)	0,50	0,80
Ballscrew	25x5	25x10
Nm	0,40	0,60
Geometrical moments of inertia of aluminium profile		
I_x mm^4	4,1x10^6	
I_y mm^4	4,0x10^6	
Elastic-modulus N/mm^2	70000	

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

F	= force	(N)
P	= thread pitch	(mm)
Si	= safety factor 1,2 … 2	
M_n	= no-load torque	(Nm)
n	= rpm of screw	(min^{-1})
M_a	= driving torque	(Nm)
μ	= screw efficiency	
P_a	= motor power	(KW)

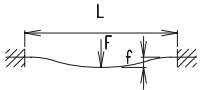
Efficiency of lead screws:

All ballscrew 0,900

Tr 24x5 0,384
Tr 24x10 0,550

Deflection:

$$f = \frac{F * L^3}{E * I * 192}$$

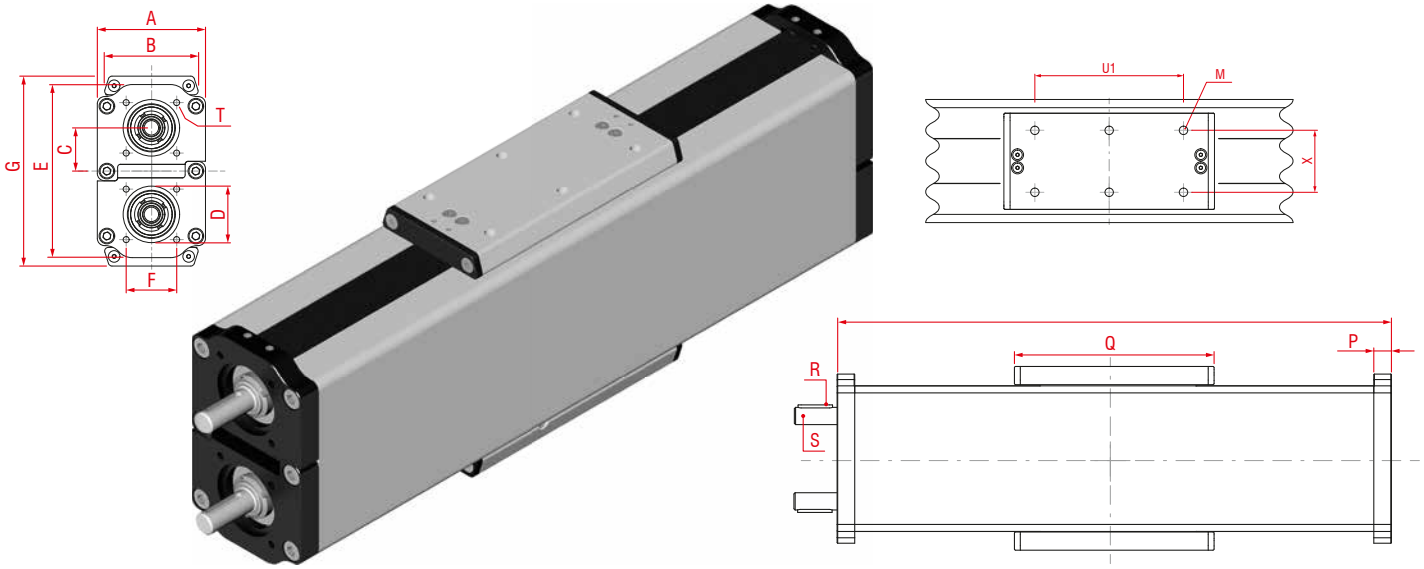


f = deflection	(mm)
F = load	(N)
L = free length	(mm)
E = elastic modulus 70000	(N/mm^2)
I = second moment of area	(mm^4)

For the diagram for critical speeds of lead screws refer to chapter 4.2

Linear system **GDGT/K 90**

Dimensions (mm)



*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

Size	Basic length L	A	B	C	D -0,05	E	F ❒	G	M for	P	Q	Shaft R key	Shaft S Ø h6 x length	T for	U1	X	Basic weight	Weight per 100 mm
GDGT/K 90	242	90	78	36	47	144	42	158	M8	15	170	5x5x28	14x35	M6	120	50	7,8 kg	1,5 kg

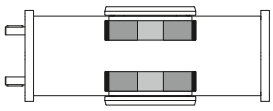
T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

1 **Selection of screw:**
(1) right hand (Standard) **(2)** left hand (Ballscrew by inquiry)

0 **Choice of guide body profile:**
(0) Standard **(1)** corrosion-protected screws
(4) expanded corrosion-protected version, only for trapezoidal thread (on request)

0 **Choice of carriages:**

(0)



0 **Drive version:**
(0) right (locating bearing side) **(1)** left (non-locating bearing side) **(2)** shaft on both sides

0

Selection of screw:				
Size	Standard	Multistart screw	Standard	Multistart screw
				Tr = trapezoidal thread / Kg = ballscrew
90	**(0)** Tr 24x5	**(1)** Tr 24x10	**(0)** Kg 25x5	**(1)** Kg 25x10 **(2)** Kg 20x20

0 **Ballscrew pitch accuracy:** (only ballscrew)
(0) 0,05 mm / 300 mm **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:** (only ballscrew)
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

GDG	T	90	1	0	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7	

Basic length + stroke = total length

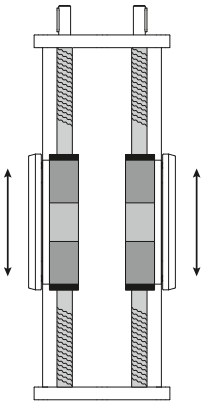
Sample ordering code:
GDGT 90, trapezoidal thread right hand thread, carriage version 0, drive version 0, spindle Tr 24x5, 1258 mm stroke

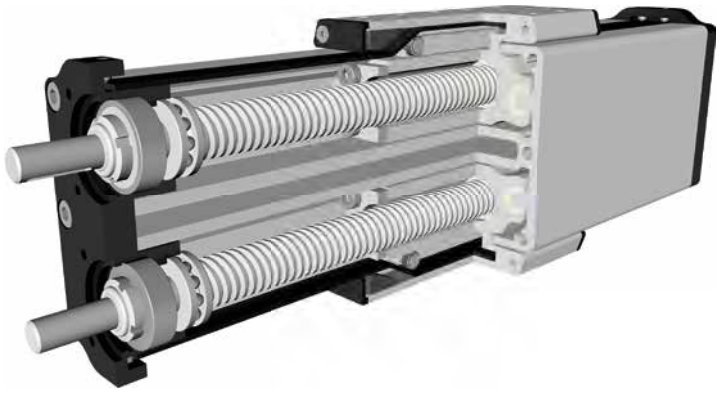
Linear system **GDGT/K 90**

1.1

SPINDLE DRIVEN

- SLIDE UNIT
- LIFTING SYSTEM
- HIGH RIGIDITY
- EASY CLEANING
- SMOOTH SURFACES

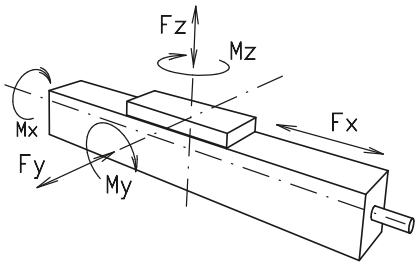




Function:
Optimized spindle axis for lift systems, bicycle assembly stands, lifting platforms and other lifting applications. The guide body consists of an aluminium profile with an integrated sliding guide. The plastic slide bushes integrated in the carriage ensure a very low friction resistance on anodized aluminium. The so-called double G profile ensures a very high stability. The carriage is moved by a rotating threaded spindle provided with a follower nut. The opening in the guide body is closed by a cover band made of plastic material. This plastic cover band is abrasion-free and is pressed into the profile by means of ball bearings.

Fitting position: As required. Max. length 3.000 mm
Carriage mounting: By tapped holes in the carriage.
Unit mounting: By T-slots or tapped holes in the bearing block.

Forces and torques



Size	90	
Forces / Torques	statisch	dynamisch
F_x (N)	4200	3500
F_y (N)	1000	900
F_z (N)	1125	1000
M_x (Nm)	82	75
M_y (Nm)	220	200
M_z (Nm)	165	150
All forces and torques relate to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$		
No-load torque		
Trapezoidal thread	24x5	24x10
(Nm)	0,50	0,80
Ballscrew	25x5	25x10
Nm	0,40	0,60
Geometrical moments of inertia of aluminium profile		
I_x mm^4	4,1x10^6	
I_y mm^4	4,0x10^6	
Elastic-modulus N/mm^2	70000	

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

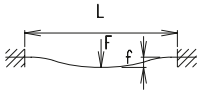
F	= force	(N)
P	= thread pitch	(mm)
Si	= safety factor 1,2 … 2	
M_n	= no-load torque	(Nm)
n	= rpm of screw	(min^{-1})
M_a	= driving torque	(Nm)
μ	= screw efficiency	
P_a	= motor power	(KW)

Efficiency of lead screws:

All ballscrew	0,900
Tr 24x5	0,384
Tr 24x10	0,550

Deflection:

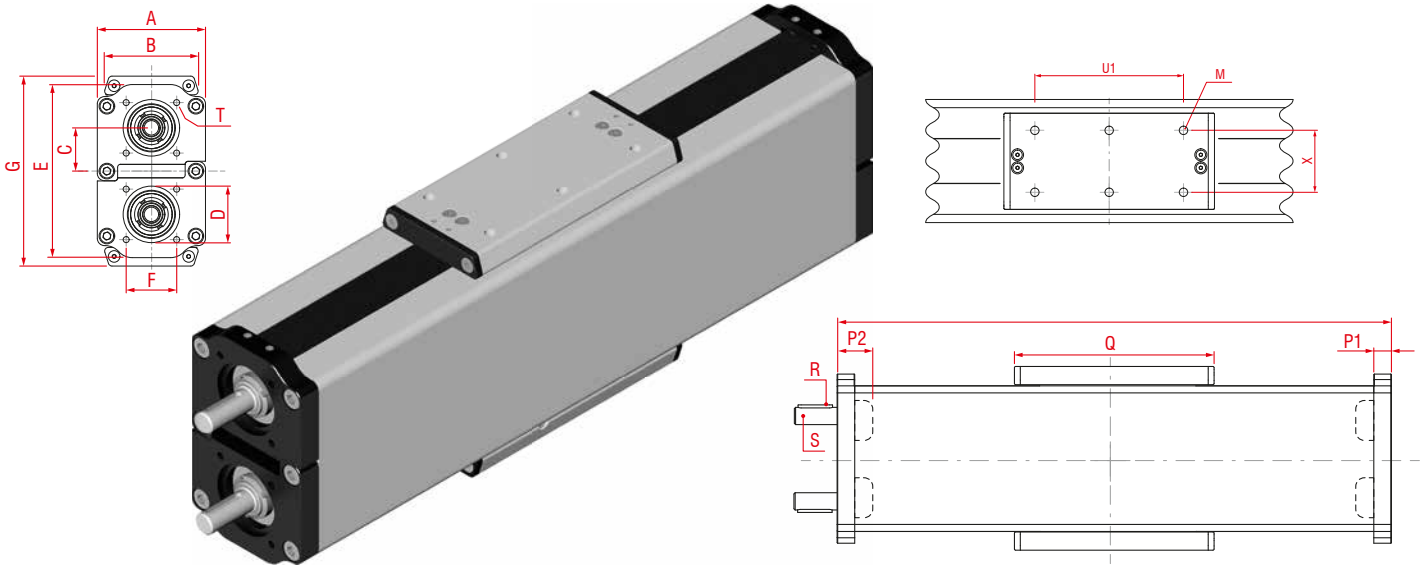
$$f = \frac{F * L^3}{E * I * 192}$$



f = deflection	(mm)
F = load	(N)
L = free length	(mm)
E = elastic modulus 70000	(N/mm^2)
I = second moment of area	(mm^4)

For the diagram for critical speeds of lead screws refer to chapter 4.2

Linear system **GDGT/K 90**



*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

Size	Basic length L	A	B	C	D -0,05	E	F ❐	G	M for	P1	P2	Q	Shaft R key	Shaft S Ø h6 x length	T for	U1	X	Basic weight	Weight per 100 mm
GDGT/K 90	242	90	78	36	47	144	42	158	M8	15	36	170	5x5x28	14x35	M6	120	50	7,8 kg	1,5 kg

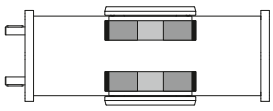
T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

1 **Selection of screw:**
(1) right hand (Standard) **(2)** left hand (Ballscrew by inquiry)

0 **Choice of guide body profile:**
(0) Standard **(1)** corrosion-protected screws
(4) expanded corrosion-protected version, only for trapezoidal thread (on request)

0 **Choice of carriages:**

(0)



0 **Drive version:**
(0) right (locating bearing side) **(1)** left (non-locating bearing side) **(2)** shaft on both sides

0

Selection of screw:				
Size	Standard	Multistart screw	Standard	Multistart screw
				Tr = trapezoidal thread / Kg = ballscrew
90	**(0)** Tr 24x5	**(1)** Tr 24x10	**(0)** Kg 25x5	**(1)** Kg 25x10 **(2)** Kg 20x20

0 **Ballscrew pitch accuracy:** (only ballscrew)
(0) 0,05 mm / 300 mm **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:** (only ballscrew)
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

GDG	T	90	1	0	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7	

Basic length + stroke = total length

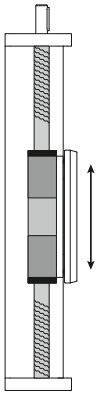
Sample ordering code:
GDGT 90, trapezoidal thread right hand thread, carriage version 0, drive version 0, spindle Tr 24x5, 1258 mm stroke

Linear system **GGT/K 90**

1.1

SPINDLE DRIVEN

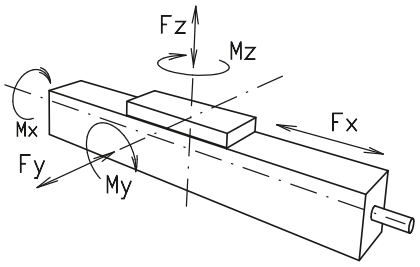
- SLIDE UNIT
- LIFTING SYSTEM
- IF DESIGN AWARD 2017
- EASY CLEANING



Function:
Optimized spindle axis for wheelchair lifting systems, lifting platforms and other lifting applications. The guide body consists of an aluminium square profile with an integrated sliding guide. The plastic slide bushes integrated in the carriage ensure a very low friction resistance on anodized aluminium. The carriage is moved by means of a rotating thread spindle with an assigned follower nut. The opening in the guide body is closed by a plastic cover band. This plastic cover band is abrasion-free and is pressed into the profile by means of ball bearings.

Fitting position: As required. Max. length 3.000 mm
Carriage mounting: By tapped holes in the carriage.
Unit mounting: By T-slots or tapped holes in the bearing block and mounting sets.

Forces and torques



Size	GGT/K 90	
Forces / Torques	static	dynamic
F_x (N)	4200	3500
F_y (N)	1000	900
F_z (N)	1125	1000
M_x (Nm)	82	75
M_y (Nm)	220	200
M_z (Nm)	165	150
All forces and torques relate to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$		
No-load torque		
Trapezoidal thread	24x5	24x10
(Nm)	0,50	0,80
Ballscrew	25x5	25x10
(Nm)	0,40	0,60
Geometrical moments of inertia of aluminium profile		
I_x mm^4	11,05x10^5	
I_y mm^4	23,60x10^5	
Elastic-modulus N/mm^2	70000	

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

F	= force	(N)
P	= thread pitch	(mm)
Si	= safety factor 1,2 … 2	
M_n	= no-load torque	(Nm)
n	= rpm of screw	(min^{-1})
M_a	= driving torque	(Nm)
μ	= screw efficiency	
P_a	= motor power	(KW)

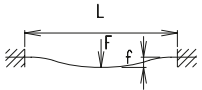
Efficiency of lead screws:

All ballscrew 0,900

Tr 24x5 0,384
Tr 24x10 0,550

Deflection:

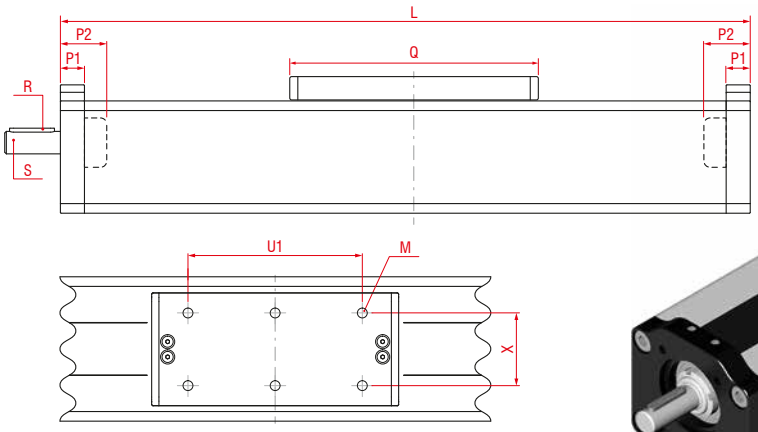
$$f = \frac{F * L^3}{E * I * 192}$$

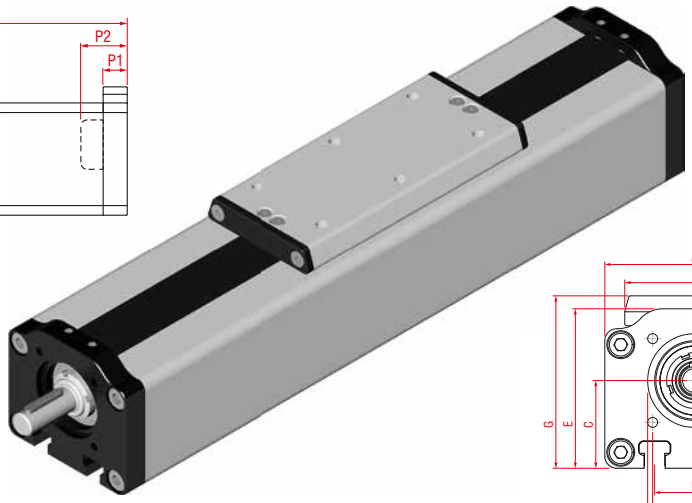


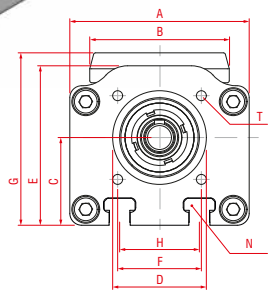
f	= deflection	(mm)
F	= load	(N)
L	= free length	(mm)
E	= elastic modulus 70000	(N/mm^2)
I	= second moment of area	(mm^4)

For the diagram for critical speeds of lead screws refer to chapter 4.2

Linear system **GGT/K 90**







*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

Size	Basic length L	A	B	C	D -0,05	E	F ❐	G	H	M	N for	P1	P2	Q	Shaft R key	Shaft S Ø h6 x length	T for	U1	X	Basic weight	Weight per 100 mm
GGT/K 90	242	90	78	44	47	80	42	87	40	M8	M8	15	36	170	5x5x28	14x35	M6	120	50	4,5 kg	1,134 kg

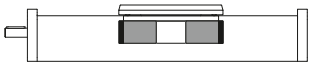
T **Spindle:**
(T) Trapezoidal thread **(K)** Ballscrew

1 **Selection of screw:**
(1) right hand (Standard) **(2)** left hand (Ballscrew by inquiry)

0 **Choice of guide body profile:**
(0) Standard **(1)** corrosion-protected screws
(4) expanded corrosion-protected version (depending on the availability of components)

0 **Choice of carriages:**

(0)



0 **Drive version:**
(0) right (locating bearing side) **(1)** left (non-locating bearing side) **(2)** shaft on both sides

0

Selection of screw:

Size	Standard	Multistart screw	Standard	Multistart screw	
				Tr = trapezoidal thread / Kg = ballscrew	
90	**(0)** Tr 24x5	**(1)** Tr 24x10	**(0)** Kg 25x5	**(1)** Kg 25x10	**(2)** Kg 20x20

0 **Ballscrew pitch accuracy:** (only ballscrew)
(0) 0,05 mm / 300 mm **(2)** 0,025 mm / 300 mm

0 **End play of ball nut:** (only ballscrew)
(0) 0,04 mm (Standard), **(1)** < 0,02 mm, **(2)** 2% apply prestress

GG	T	90	1	0	0	0	0	0	0	1500
		Pos.	1	2	3	4	5	6	7	

Basic length + stroke = total length

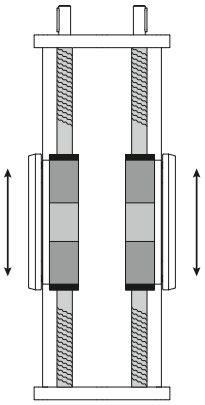
Sample ordering code:
GGT 90, trapezoidal thread right hand thread, standard body profile, carriage version 0, drive version 0, spindle Tr 24x5, 1258 mm stroke

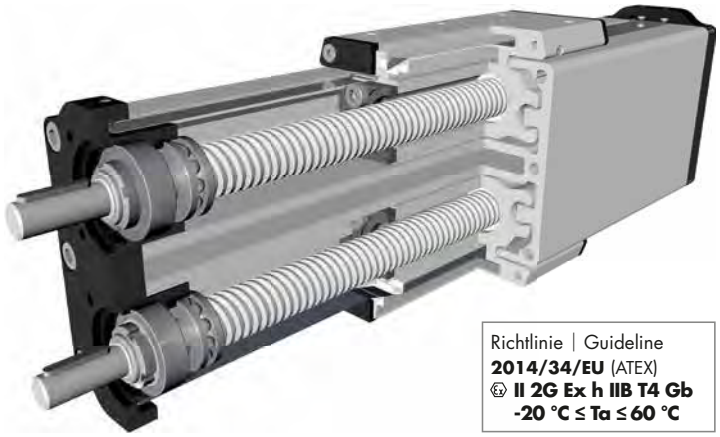
Linear system **GDGK 90**

1.1

SPINDLE DRIVEN

- EX-GUIDE
- LIFTING SYSTEM
- HIGH RIGIDITY
- EASY CLEANING
- SMOOTH SURFACES





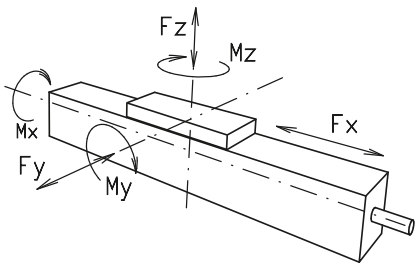
Richtlinie | Guideline
2014/34/EU (ATEX)
II 2G Ex h IIB T4 Gb
-20 °C ≤ Ta ≤ 60 °C

Function:
Optimized spindle axis for lift systems, bicycle assembly stands, lifting platforms and other lifting applications. The guide body consists of an aluminium profile with an integrated sliding guide. The plastic slide bushes integrated in the carriage ensure a very low friction resistance on anodized aluminium. The so-called double G profile ensures a very high stability. The carriage is moved by a rotating threaded spindle provided with a follower nut. The opening in the guide body is closed by a cover band. This cover band prevents dust and dirt from getting inside, it also offers a high level of safety and protects against hand injuries.

The products can be used as follows, according to the marking:
a) In Zone 2 (Gas, Category 3G, EPL Gc) in explosion groups IIA and IIB
b) In Zone 1 (Gas, Category 2G, EPL Gb) in explosion groups IIA and IIB
The qualification with regard to the surface temperature is T4; for all gases, vapours and mists with an ignition temperature > 125 °C the product is not an ignition source.

Fitting position: As required. Max. length 1.500 mm
Carriage mounting: By tapped holes in the carriage.
Unit mounting: By T-slots or tapped holes in the bearing block and mounting sets.

Forces and torques



Size	**90**	
Forces / Torques	static	dynamic
F_x (N)	1000	1500
F_y (N)	1000	900
F_z (N)	1125	1000
M_x (Nm)	67	62
M_y (Nm)	180	165
M_z (Nm)	135	124
All forces and torques relate to the following:		
existing values / table values	$\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$	
No-load torque		
Ballscrew	25x10	
(Nm)	0,60	
Geometrical moments of inertia of aluminium profile		
I_x mm^4	4,1x10^6	
I_y mm^4	4,0x10^6	
Elastic-modulus N/mm^2	70000	

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

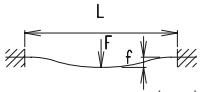
F	= force	(N)
P	= thread pitch	(mm)
Si	= safety factor 1,2 … 2	
M_n	= no-load torque	(Nm)
n	= rpm of screw	(min^{-1})
M_a	= driving torque	(Nm)
μ	= screw efficiency	
P_a	= motor power	(KW)

Efficiency of lead screws:

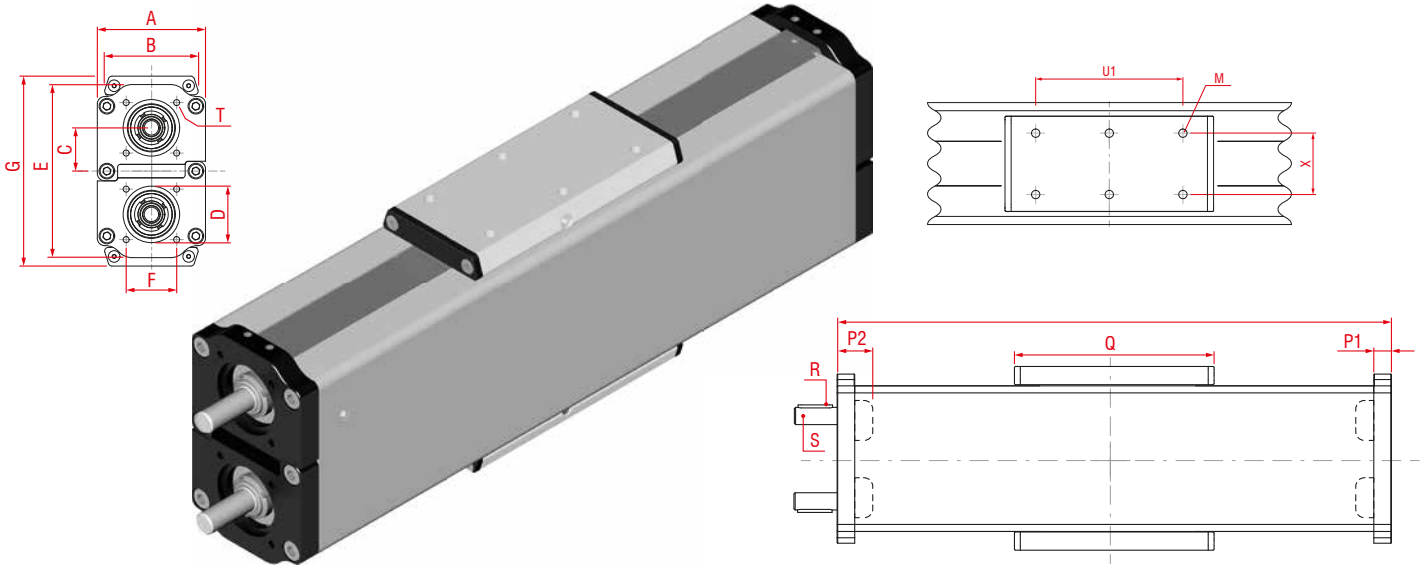
All ballscrew 0,900

Deflection:

$$f = \frac{F * L^3}{E * I * 192}$$



f	= deflection	(mm)
F	= load	(N)
L	= free length	(mm)
E	= elastic modulus 70000	(N/mm^2)
I	= second moment of area	(mm^4)



*For slide nuts refer to chapter 2.2 page 2

Increasing the carriage length will increase the basic length by the same amount.

Size	Basic length L	A	B	C	D -0,05	E	F ❒	G	M for	P1	P2	Q	Shaft R key	Shaft S Ø h6 x length	T for	U1	X	Basic weight	Weight per 100 mm
GDGKex 90	242	90	78	36	47	144	42	158	M8	15	36	170	5x5x28	14x35	M6	120	50	7,8 kg	1,5 kg

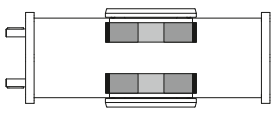
K **Spindle:**
(K) Ballscrew

1 **Selection of screw:**
(1) right hand (Standard) **(2)** left hand (by inquiry)

0 **Choice of guide body profile:**
(0) Standard **(1)** corrosion-protected screws

0 **Choice of carriages:**

(0)



0 **Drive version:**
(0) right (locating bearing side)
(1) left (non-locating bearing side) **(2)** shaft on both sides

0 **Selection of screw:**
(0) Kg 25x10

0 **Ballscrew pitch accuracy:**
(0) 0,05 mm / 300 mm

0 **End play of ball nut:**
(0) 0,04 mm

GDG	K	EX	90	1	0	0	0	0	0	0	1500
			Pos.	1	2	3	4	5	6	7	

Basic length + stroke = total length

Sample ordering code:
GDGKex 90, ballscrew right hand, carriage version 0, drive version 0, spindle Kg 25x10, 1258 mm stroke

Safety-related limits:

• max. input speed	1500 min-1
• min. input speed	20 min-1
• nom. input torque	4 Nm
• max. starting torque	12.5 Nm
• max. static lifting power	1000 N
• max. dynamic lifting power	1500 N
• Operating modes	S1
• up to 120 full strokes per hour, evenly distributed	
• stroke length	250 mm ..1500 mm
• Velocity	0.005 ms-1 .. 0.5 ms-1
• ambient temperature range	-20 °C < Ta < 60 °C

Safety-related notes regarding lubrication:
In potentially explosive atmospheres, you may only use lubrication systems that comply with the applicable regulations and are authorised by us. The maintenance intervals for the lubricators have to be observed (e. g. operating and mounting instructions for perma FLEX, if these are used).

Note that the system is not lubricated during the lubricator activation time! Before starting operation, ensure that the lubrication system is working flawlessly and check the activation documentation.

The lubrication line of the lubricator must not exceed 0.5 m in length. The lubricator and the lubrication line are pressurized. When performing maintenance work ensure that no air bubbles can form within the lubrication system, that the lubrication lines are not kinked and that the lubricator is not exposed to mechanical loads.

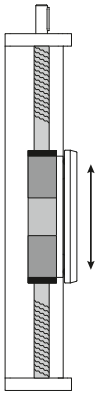
Preset dispensing time	Activation time
1 month	1 day
3 months	5 days
6 months	14 days
12 months	28 days

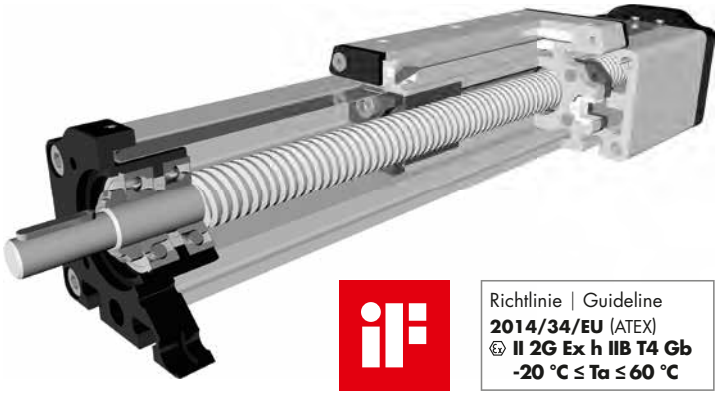
Linear system **GGK 90**

1.1

SPINDLE DRIVEN

- EX-GUIDE
- LIFTING SYSTEM
- IF DESIGN AWARD 2017
- EASY CLEANING
- SMOOTH SURFACES





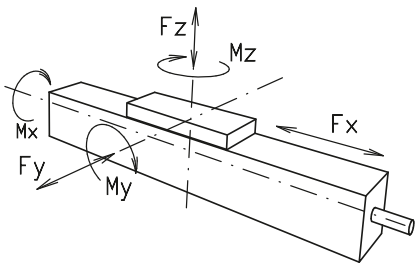
Richtlinie | Guideline
2014/34/EU (ATEX)
II 2G Ex h IIB T4 Gb
-20 °C ≤ Ta ≤ 60 °C

Function:
Optimized spindle axis for wheelchair lifting systems, lifting platforms and other lifting applications. The guide body consists of an aluminium square profile with an integrated sliding guide. The plastic slide bushes integrated in the carriage ensure a very low friction resistance on anodized aluminium. The carriage is moved by means of a rotating thread spindle with an assigned follower nut. The opening in the guide body is closed by a cover band. This cover band prevents dust and dirt from getting inside, it also offers a high level of safety and protects against hand injuries.

The products can be used as follows, according to the marking:
a) In Zone 2 (Gas, Category 3G, EPL Gc) in explosion groups IIA and IIB
b) In Zone 1 (Gas, Category 2G, EPL Gb) in explosion groups IIA and IIB
The qualification with regard to the surface temperature is T4; for all gases, vapours and mists with an ignition temperature > 125 °C the product is not an ignition source.

Fitting position: As required. Max. length 1.500 mm
Carriage mounting: By tapped holes in the carriage.
Unit mounting: By T-slots or tapped holes in the bearing block and mounting sets.

Forces and torques



Size	90	
Forces / Torques	static	dynamic
F_x (N)	1000	1500
F_y (N)	1000	900
F_z (N)	1125	1000
M_x (Nm)	67	62
M_y (Nm)	180	165
M_z (Nm)	135	124
All forces and torques relate to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fz}{Fz_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1$		
No-load torque		
Ballscrew	25x10	
(Nm)	0,60	
Geometrical moments of inertia of aluminium profile		
I_x mm^4	11,05x10^5	
I_y mm^4	23,60x10^5	
Elastic-modulus N/mm^2	70000	

Driving torque:

$$M_a = \frac{F * P * S_i}{2000 * \pi * \mu} + M_n$$

$$P_a = \frac{M_a * n}{9550}$$

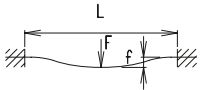
F	= force	(N)
P	= thread pitch	(mm)
Si	= safety factor 1,2 … 2	
M_n	= no-load torque	(Nm)
n	= rpm of screw	(min^{-1})
M_a	= driving torque	(Nm)
μ	= screw efficiency	
P_a	= motor power	(KW)

Efficiency of lead screws:

All ballscrew 0,900

Deflection:

$$f = \frac{F * L^3}{E * I * 192}$$



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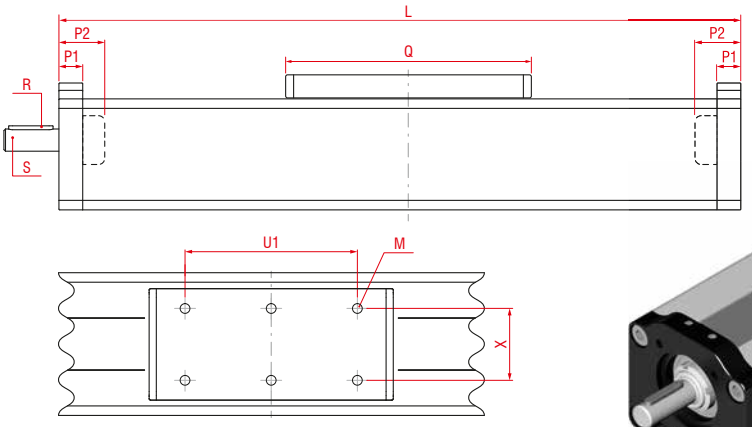

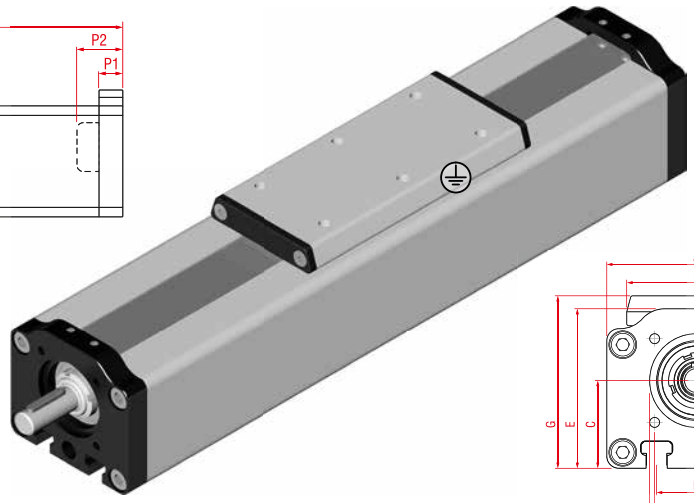

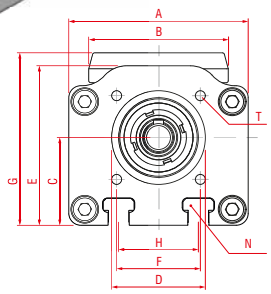

Richtlinie | Guideline
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Ex II 2G Ex h IIB T4 Gb
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GG	K	EX	90	1	0	0	0	0	0	0	1500
			Pos.	1	2	3	4	5	6	7	

Basic length + stroke = total length

Sample ordering code:
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