Positioning system QST/KE 60, 80, 100

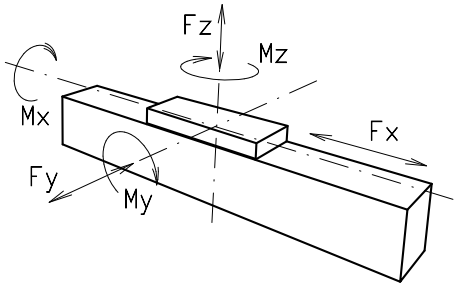
Spindle drives

product design award 2011

Function:
This unit consists of a square aluminium profile with an integrated ball rail and is covered by a stainless steel sheet (thickness 0.37mm, material 1.4301). 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.

Fitting position: As required, max. length 3000mm
Carriage connection: By T-nuts and bores through the cover.
Unit mounting: By the bearing blocks

Forces and torques



Size	QST/KE 60		QST/KE 80		QST/KE 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	0,8/0,9		0,8/1,0		2,0/2,2	
Ballscrew	16x5/16x10		25x5/20x20/25x10		32x5/32x10	
Nm	0,5/0,8		0,5/0,9/0,8		1,7/2,1	
Geometrical moments of inertia of aluminium profile						
I_x mm^4	$4,3x10^5$		$14,0x10^5$		$43,0x10^5$	
I_y mm^4	$4,8x10^5$		$16,6x10^5$		$48,8x10^5$	
E-Modulus N/mm^2	70000		70000		70000	

For life-time calculation use our homepage.

** referred to life-time*

15.1

Driving torque:

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

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

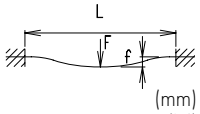
F = force (N)
P = thread pitch (mm)
Si = safety factor 1,2 ... 2
M_n = no-load torque (Nm)
n = rpm of screw (min^{-1})
M_a = driving torque (Nm)
μ = screw efficiency
P_a = motor power (KW)

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:

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

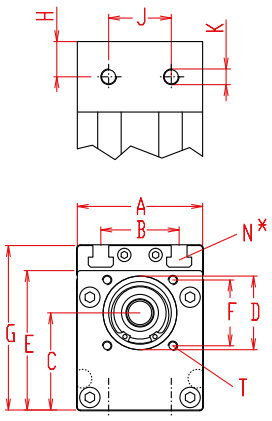


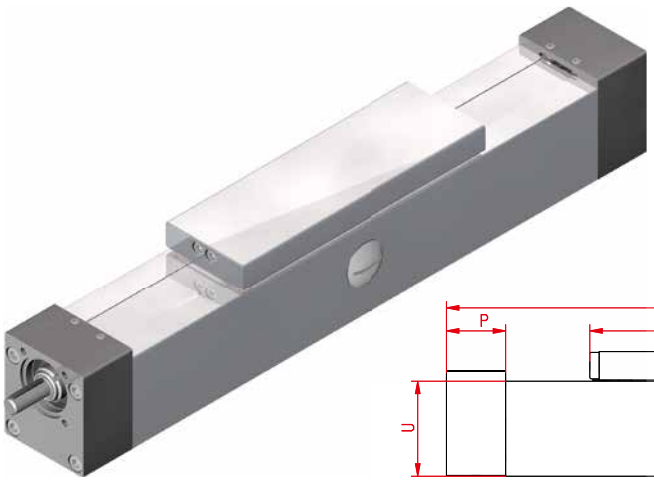
f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm^2)
I = second moment of area (mm^4)

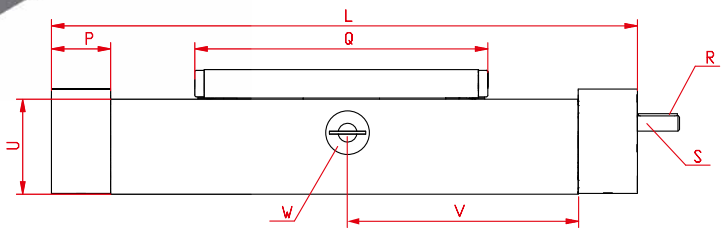
For the diagram for critical speeds of lead screws refer to the main catalog chapter 4.2

Positioning system QST/KE 60, 80, 100

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.

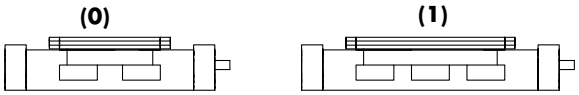
Size ❒	Basic length L	A	B	C	D -0,05	E	F ❒	G	H	J	K for	N for	P	Q	Shaft R Key	Shaft S Ø h6 x length	T for	U	Basic weight	Weight per 100 mm
QST/KE 60	270	61	36	45,5	37	67,5	32	80	19	18	M6	M6	38	188	3x3x25	10 x 27	M5	61	4,1 kg	0,5 kg
QST/KE 80	350	81	50	62,5	47	89,5	42	107	22,5	40	M10	M8	45	250	5x5x28	14 x 35	M6	81	7,5 kg	0,9 kg
QST/KE 100	410	101	66	75,5	68	112,5	60	130	28,5	50	M10	M10	57	288	6x6x40	22 x 45	M8	101	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 guide body profile:**
(0) Version with corrosion-protected components
(1) Version 0 but with not corrosion-protected guidings

0 **Choice of carriage:**



Size	Carriage version 1	
	Q	Basic length 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 standard		ballscrew standard			
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**
	trapezoidal thread stainless		ballscrew stainless by inquiry			
60	**(4)** Tr 18x4	**(5)** Tr 18x8				
80	**(4)** Tr 24x5	**(5)** Tr 24x10				
100	**(4)** Tr 32x6	**(5)** Tr 32x12				

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

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

1500 Basic length + stroke = total length

QS	K	E	80	1	0	0	0	0	0	01500
			Pos. 1	2	3	4	5	6	7	

Sample ordering code:
QSKE80, ballscrew right hand thread, full stainless version, standard carriage, one shaft (locating bearing side), spindle 25x5, 1150 mm stroke.

15.1