



Stainless Steel Modular Linear Actuators QLZE, QSZE, QST/KE

Modular Linear Actuators ELBZ Curve

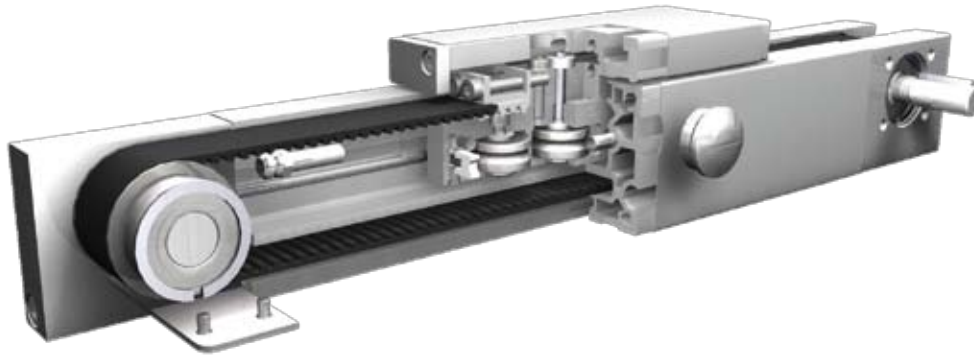


Modular Linear Actuator QLZE 60, 80, 100



Belt Drive

Specifications



Function:

This unit consists of a square aluminium profile with an integrated roller guide and is covered by a stainless steel sheet (thickness 0.37mm, material 1.4301). The carriage is driven by a timing belt. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel. This linear unit is based on the QLZ and is suitable for application in clean rooms of clean-room classification 1000 (corresponding to US Fed. Standard 209 E).

Fitting position: As required. Max. length 3.000 mm without joints.

Carriage mounting: By T-nuts and bores through the cover.

Unit mounting: By T-nuts and bores through the cover.

Belt performance: HTD with kevlar reinforcement, no backlash when changing direction, repeatability $\pm 0,1$ mm.

Carriage support: In the standard version, the carriage runs on 4 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased.

Forces and torques	Size	60		80		100		
	Forces/Torques	static	dynamic	static	dynamic	static	dynamic	
	F_x (N)	894	800	1900	1800	4000	3800	
	F_y (N)	399	333	1065	825	1267	1000	
	F_z (N)	599	433	999	799	1400	1133	
	M_x (Nm)	10	7	33	26	128	40	
	M_y (Nm)	40	33	66	53	93	73	
	M_z (Nm)	26	20	50	40	73	60	
	All forces and torques related to the following:							
	existing values $\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$ table values							
No-load torque								
Nm	0,8		1,0		1,5			
Speed								
(m/sec) max	4		6		7			
Tensile force								
permanent (N)	900		1900		4000			
0,2 sec (N)	1000		2090		4300			
Geometrical moments of inertia of aluminium profile								
I_x mm ⁴	4,3x10 ⁵		16,5x10 ⁵		43,0x10 ⁵			
I_y mm ⁴	4,8x10 ⁵		18,7x10 ⁵		48,8x10 ⁵			
Elastic modulus N/mm ²	70000		70000		70000			

11.1

Formula: QLZE

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2000 \cdot \pi} + M_{leer}$$

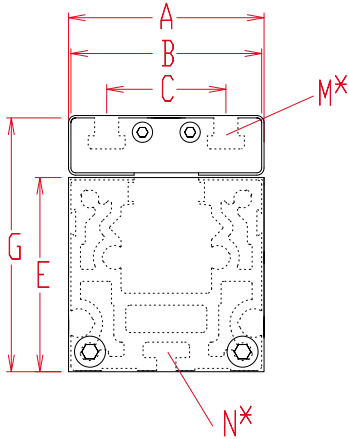
$$P_a = \frac{M_a \cdot n}{9550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1,2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

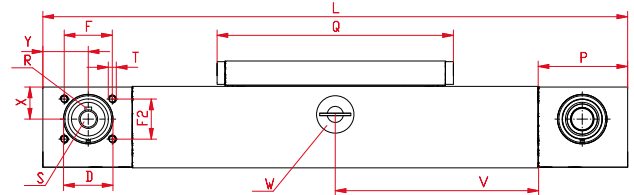
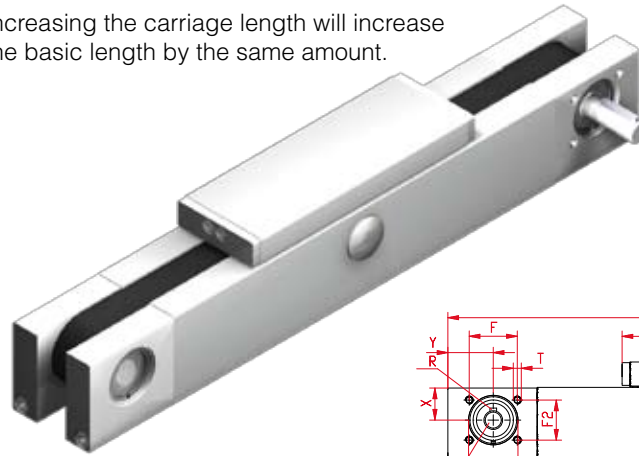
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70000 (N/mm²)
- I = second moment of area (mm⁴)

Dimensions (mm)



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



*For slide nuts refer to the accessory section

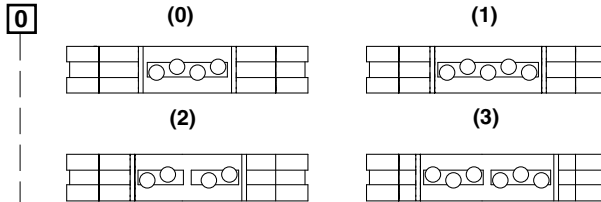
$$V = Q + 100 \text{ mm} \quad W = \text{servicing position}$$

Size	Basic length L	A	B	C	D	E	F/F2	G	N for	M for	P	Q	T	X	Y	Basic weight	Weight per 100 mm
QLZE 60	296	61	60	36	37	61	36/30	80	M 5	M 6	67	152	M 6	24,5	34	4,2 Kg	0,40 kg
QLZE 80	400	81	80	50	55	81	50/50	107	M 6	M 8	95	196	M 8	32,5	47	10,6 Kg	0,80 Kg
QLZE 100	484	101	100	66	62	101	62/58	130	M 10	M 10	107	260	M 10	40	54		

Choice of guide body profile:

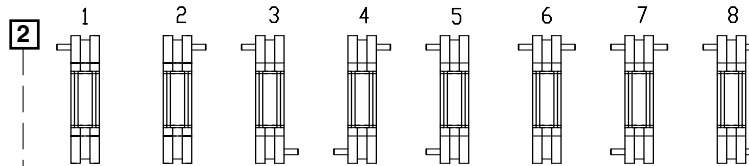
- 0** (0) Standard (1) stainless guide rods (2) stainless guide rods and screws (3) stainless guide rods, rollers and screws

Choice of carriages:



Size	Version 0		Version 1		Version 2		Version 3	
	Q	L	Q	L	Q	L	Q	L
60	152	296	192	336	232	376	232	376
80	196	400	246	450	296	500	296	500
100	260	484	320	544	388	604	388	604

Selection of shaft mounting:



The standard version is supplied shaft pos. 2

Size	Shaft	
	R Key	S \varnothing h6 x length
60	5x5x28	14 x 35
80	6x6x40	18 x 45
100	6x6x40	22 x 45

Belt table

Code No.	Size	Belt	Pulley	
			mm/rev.	Number of teeth
0 3	60	5M25	130	26
0 4	80	8M30	176	22
0 7	100	8M50	224	28

Basic Length + Stroke + Overtravel** = total length For additional accessories refer to the accessory section

**Minimum 25mm on each end

QLZE 80 1 0 0 2 0 4 1 01500
Pos. 1 2 3 4 5 6 7

Sample ordering code:

QLZE80, standard body profile, standard carriage, shaft pos.2, 1100 mm stroke

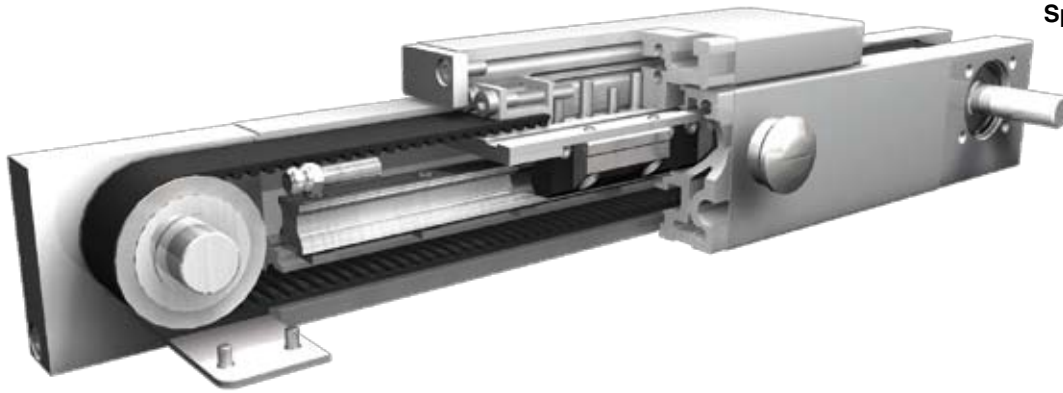


Modular Linear Actuator QSIZE 60, 80, 100



Belt Drive

Specifications



Function:

This unit consists of a square aluminium profile with an integrated ball rail guide and is covered by a stainless steel sheet (thickness 0.37mm, material 1.4301). The carriage is moved by a belt drive. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

Fitting position:

As required. Max. length 3.000 mm without joints.

Carriage mounting:

By T-nuts and bores through the cover.

Unit mounting:

By T-nuts and bores through the cover.

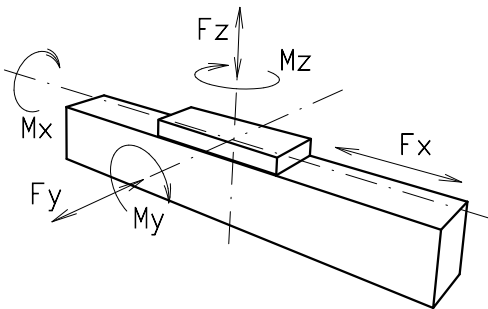
Belt performance:

HTD with kevlar reinforcement, no backlash when changing direction, repeatability ± 0,1 mm.

Carriage support:

In the standard version, the carriage runs on two runner blocks which can be adjusted and serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

Forces and torques



Size	60		80		100	
permitted dyn. Forces*	5000 km	10000 km	5000 km	10000 km	5000 km	10000 km
F _x (N)	894	800	1900	1800	4000	3800
F _y (N)	1410	990	3570	2550	4080	2900
F _z (N)	3520	2500	8500	6050	10300	7270
M _x (Nm)	33	23	107	75	142	101
M _y (Nm)	104	73	310	222	439	311
M _z (Nm)	100	70	296	210	412	292
C (N)	7800		18800		22800	
All forces and torques related to the following:						
existing values $\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$						
table values $\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$						
No-load torque						
Nm	1,0		1,4		1,8	
Speed						
(m/sec) max	5		5		5	
Tensile force						
permanent (N)	900		1900		4000	
0,2 sec (N)	1000		2090		4300	
Geometrical moments of inertia of aluminium profile						
I _x mm ⁴	4,3x10 ⁵		16,5x10 ⁵		43,0x10 ⁵	
I _y mm ⁴	4,8x10 ⁵		18,7x10 ⁵		48,8x10 ⁵	
Elastic modulus N/mm ²	70000		70000		70000	

* referred to life-time

11.1



Formula: QSIZE

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2000 \cdot \pi} + M_{leer}$$

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

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1,2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

Deflection:

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

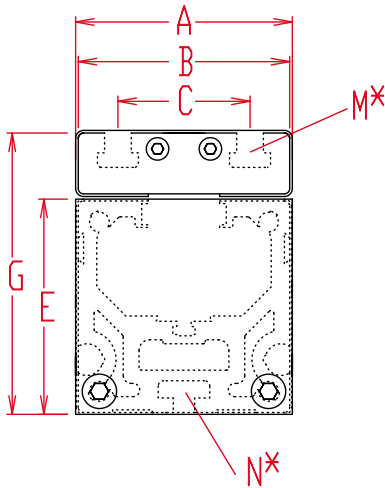
- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70000 (N/mm²)
- I = second moment of area (mm⁴)

Nominal lifetime:

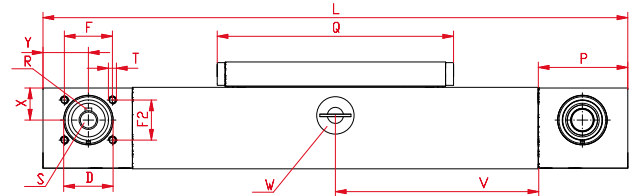
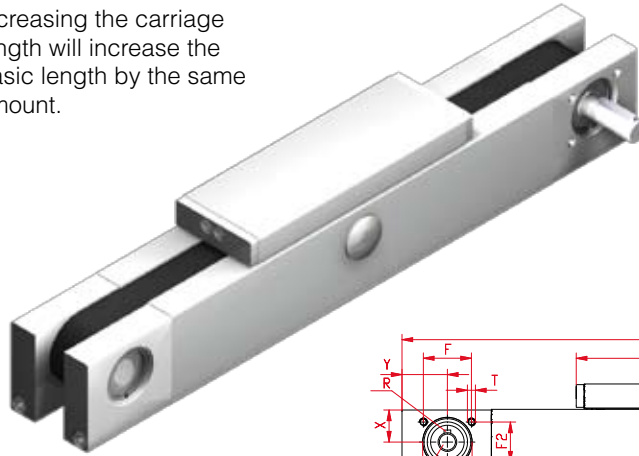
$$L = \left(\frac{C}{F}\right)^3 \times 10^5$$

- L = Lifetime in meter
- C = Dynamic load factor (N)
- F = Middle load (N)

Dimensions (mm)



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

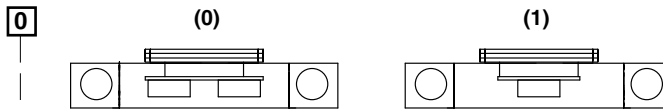


*For side nuts refer to the accessory section $V = Q + 100 \text{ mm}$ $W = \text{servicing position}$

Size	Basic length L	A	B	C	D	E	F/F2	G	N for	M for	P	Q	T	X	Y	Basic weight	Weight per 100 mm
QSIZE 60	316	61	60	36	37	61	36/30	80	M 5	M 6	67	177	M 6	24,5	34	4,2 Kg	0,40 kg
QSIZE 80	440	81	80	50	55	81	50/50	107	M 6	M 8	95	232	M 8	32,5	47	10,6 Kg	0,80 Kg
QSIZE 100	504	101	100	66	62	101	62/58	130	M 10	M 10	107	268	M 10	40	54		

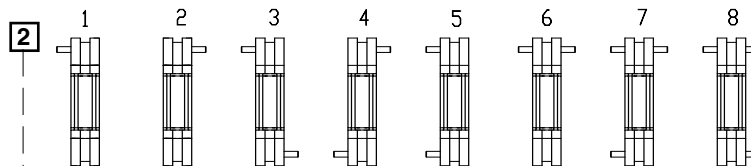
Choice of guide body profile:
 (0) Standard

Choice of carriages:



Size	Version 0		Version 1	
	Q	L	Q	L
60	177	316	152	296
80	232	440	196	400
100	268	504	260	494

Selection of shaft mounting:



The standard version is supplied shaft pos. 2

Size	Shaft	
	R Key	S $\varnothing h6 \times$ length
60	5x5x28	14 x 35
80	6x6x40	18 x 45
100	6x6x40	22 x 45

Belt table

Code No.	Size	Belt	Pulley	
			mm/rev.	Number of teeth
0 3	60	5M25	130	26
0 4	80	8M30	176	22
0 7	100	8M50	224	28

Basic Length + Stroke + Overtravel** = total length
 **Minimum 25mm on each end

For additional accessories refer to the accessory section

QSIZE 80 1 0 0 2 0 4 1 01500
 Pos. 1 2 3 4 5 6 7

Sample ordering code:
 QSIZE80, standard body profile, standard carriage, shaft pos2, 1060 mm stroke

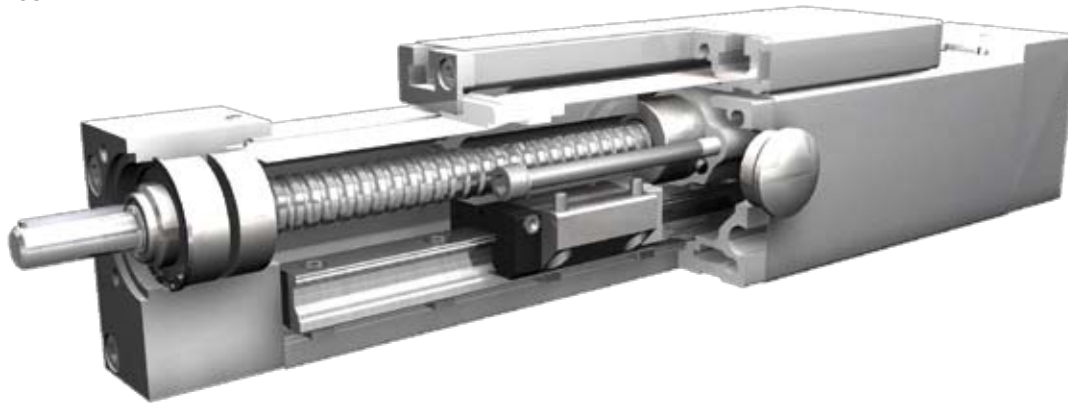


Modular Linear Actuator QST/KE 60, 80, 100



Screw Drives

Specifications



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 screw 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 $\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$ table values						
No-load torque							
Acme	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		14,0x10 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	

* referred to life-time

11.1



Formula: QST/KE

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2000 \cdot \pi \cdot \mu} + M_{leer}$$

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

- F = force (N)
- P = thread pitch (mm)
- S_i = safety factor 1,2 ... 2
- M_{leer} = 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:

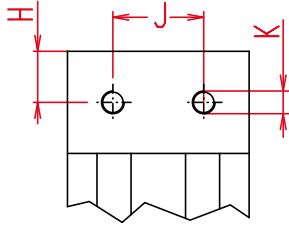
All ballscrew 0.900

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

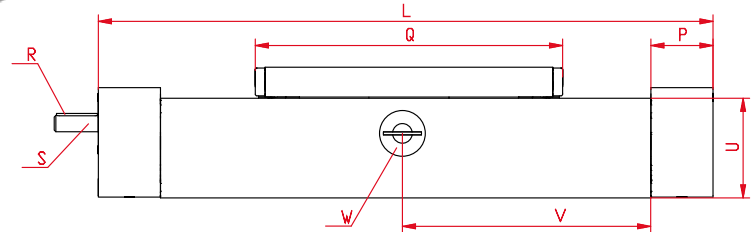
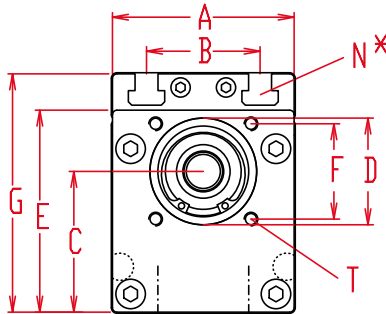
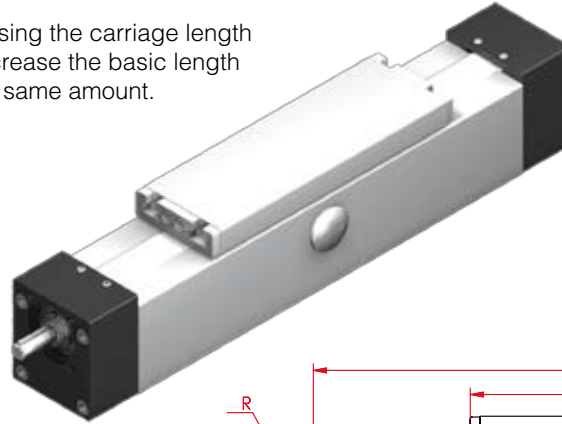
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70000 (N/mm²)
- I = second moment of area (mm⁴)

Dimensions (mm)



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



*For slide nuts refer to the accessory section

$$V = Q + 100 \text{ mm}$$

W = servicing position

Size	Basic length L	A	B	C	D	E	F \square	G	H	J	K for	N for	P	Q	Shaft		T for	U	Basic weight	Weight per 100 mm
															R Key	S \varnothing h6 x length				
QST/KE 60	270	61	36	45,5	37	67,5	32	80	19	18	M6	M6	38	188	3x3x25	10h6x27	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	14h6x35	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	22h6x45	M8	101	14,8 kg	1,3 kg

K

Spindle:

(T) Acme thread (K) Ballscrew

1

Selection of screw:

(1) right hand (Standard) (2) left hand (Ballscrew by inquiry)

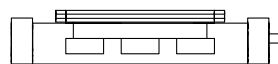
Choice of carriage

0

(0)



(1)



Size	Carriage version 1	
	Q	Basic length L
60	255	350
80	336	436
100	383	510

0

Choice of journal:

(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	
	acme thread		acme thread		ballscrew		ballscrew	
60	(0) Tr 18x4	(1) Tr 18x8	(0) Kg 16x5	(1) Kg 16x10	(2) Kg 16x16	(0) Kg 25x5	(1) Kg 20x20	(2) Kg 25x10
80	(0) Tr 24x5	(1) Tr 24x10	(0) Kg 32x5	(1) Kg 32x10	(2) Kg 32x32 *			
100	(0) Tr 32x6	(1) Tr 32x12						

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

0

Ballscrew pitch accuracy:

(0) 0,1 mm / 300 mm (Standard) (1) 0,05 mm / 300 mm (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
* only in combination with pitch accuracy (1) or (2)

1500

Basic Length + Stroke + Overtravel** = total length

**Minimum 25mm on each end

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

Sample ordering code:

QSKE80, ballscrew right hand thread, standard carriage, one shaft (locating bearing side), spindle 25x5, 1150 mm stroke.





Function:

This linear unit consists of a curved aluminium square profile with hardened steel guide rods. The smallest radius amounts to 800 mm. The carriage which has internal linear ball bearings that can be adjusted free of play is driven along the guide rods by a timing belt. The pulley has maintenance-free ball bearings. Belt tension can be readjusted by a simple tensioning device in one of the end blocks. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

Fitting position:

As required.

Carriage mounting:

Drilled and Topped holes

Unit mounting:

By T-slots or tapped holes in the profile nut, or mounting sets.

Belt type:

HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0,1 mm.

11.1



Formula: ELBZ

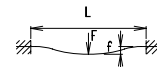
Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2000 \cdot \pi} + M_{leer}$$

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

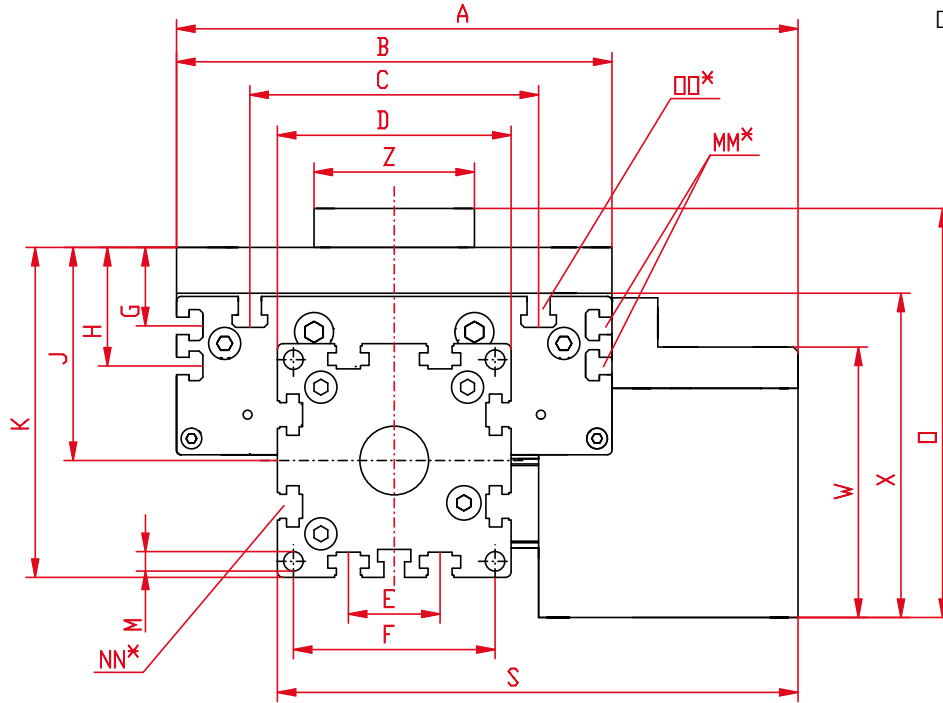
- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1,2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

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



- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70000 (N/mm²)
- I = second moment of area (mm⁴)

Dimensions (mm)

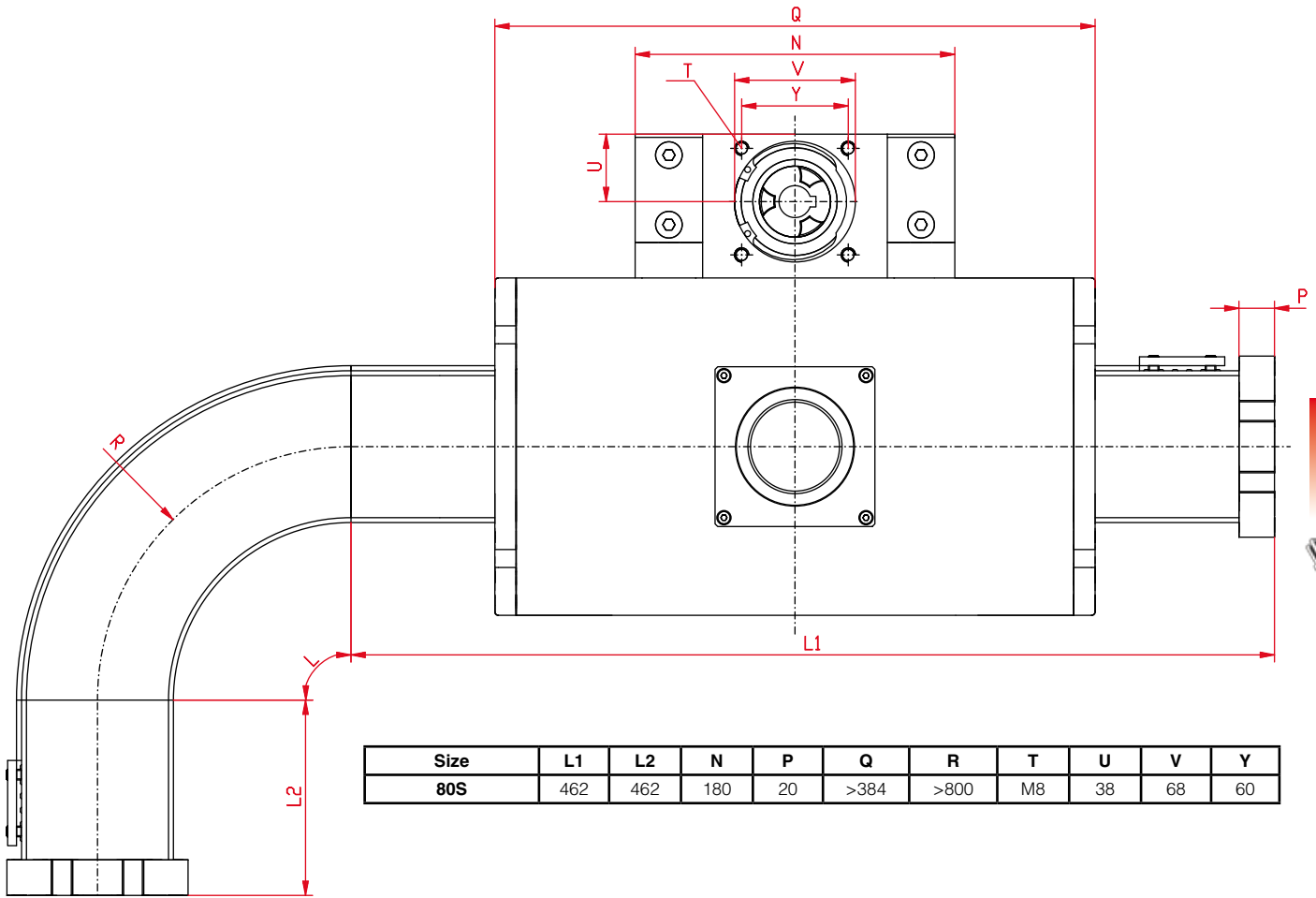


*For slide nuts refer to the accessory section

$V = Q + 100 \text{ mm}$

W = servicing position

Size	A	B	C	D	E	F	G	H	J	K	M	O	S	MM for	NN for	OO for	W	X	Z
80S	271	190	126	102	40	88	34,5	52	94	145	8,5	183	228	M6	M10	M10	118	137,5	74



Size	L1	L2	N	P	Q	R	T	U	V	Y
80S	462	462	180	20	>384	>800	M8	38	68	60

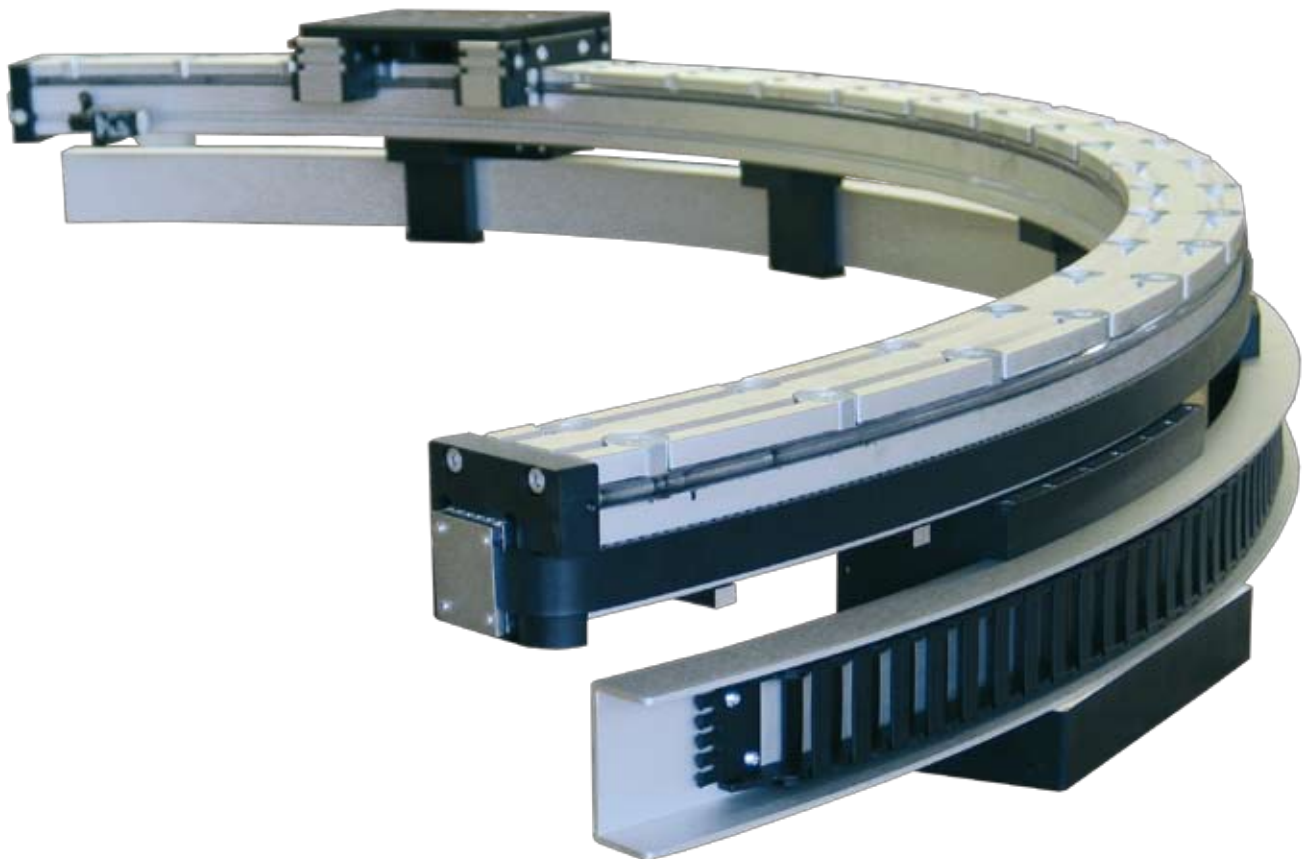
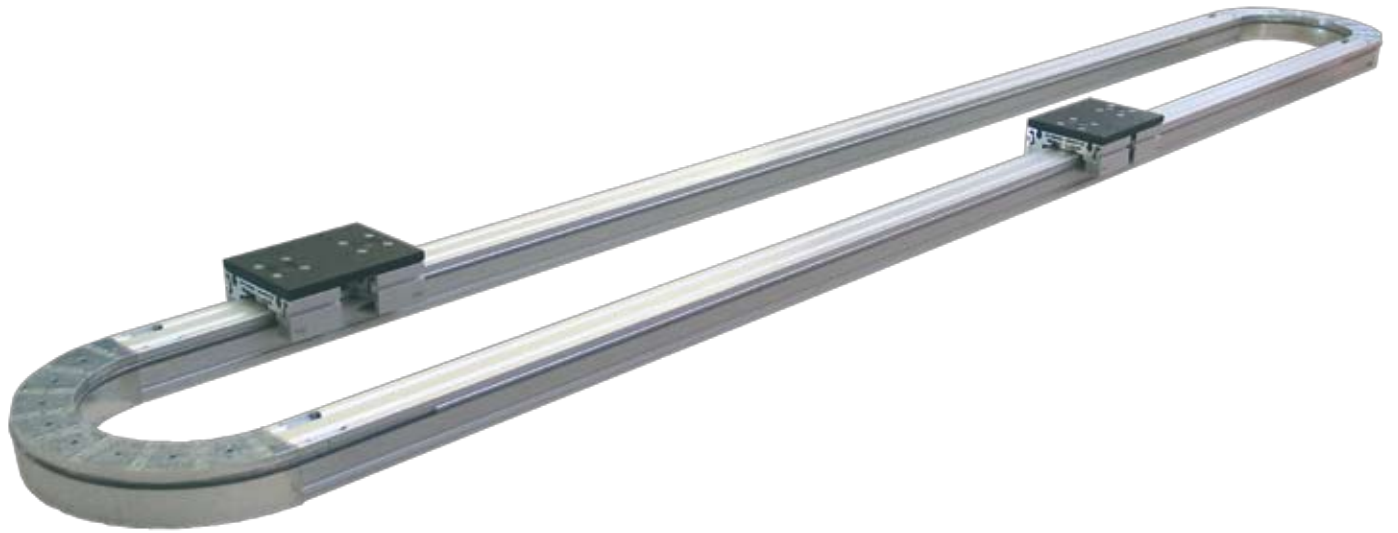


Modular Linear Actuators QLZE and QSKE-Lift



11.1







11.1

