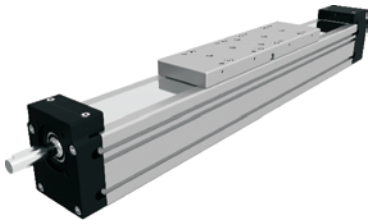
BALL SCREW DRIVEN LINEAR UNITS

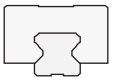
MTV

Page 3.000.0



DRIVE

GUIDE



FEATURES

- High repeatability
- Ball screw support system for higher speeds at the same stroke
- High axial load capabilities
- Large stroke lenghts

Linear Unit	Dynamic load capacity		Max. travel speed	[1] Max. profile length	Max. repeatability	Dimensions	
	Cy [N]	Cz [N]	[m/s]	[mm]	[mm]	[2] Width [mm]	[3] Height [mm]
MTV 65	19800		1,12	2920	± 0,01	65	85
MTV 80	34200		2,5	5480	± 0,01	80	100
MTV 110	49600		1,6	5850	± 0,01	110	129

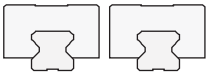
[1] *For lengths over the stated value in the table above please contact us.* [2] *Profile* [3] *Profile + carriage*

CTV

Page 7.000.0

DRIVE

GUIDE



FEATURES

- High repeatability
- High load capabilities
- High flexural rigidity

Linear Unit	Dynamic load capacity		Max. travel speed	[1] Max. profile length	Max. repeatability	Dimensions	
	Cy [N]	Cz [N]	[m/s]	[mm]	[mm]	[2] Width [mm]	[3] Height [mm]
CTV 90 S	4620		0,97	750	± 0,01	90	40
CTV 90 L	9240		0,97	750	± 0,01	90	40
CTV 110 S	19800		1,12	1500	± 0,01	110	50
CTV 110 L	39600		1,12	1500	± 0,01	110	50
CTV 145 S	34200		2,5	1800	± 0,01	145	65
CTV 145 L	68400		2,5	1800	± 0,01	145	65
CTV 200 S	49600		1,6	2200	± 0,01	200	100
CTV 200 L	99200		1,6	2200	± 0,01	200	100

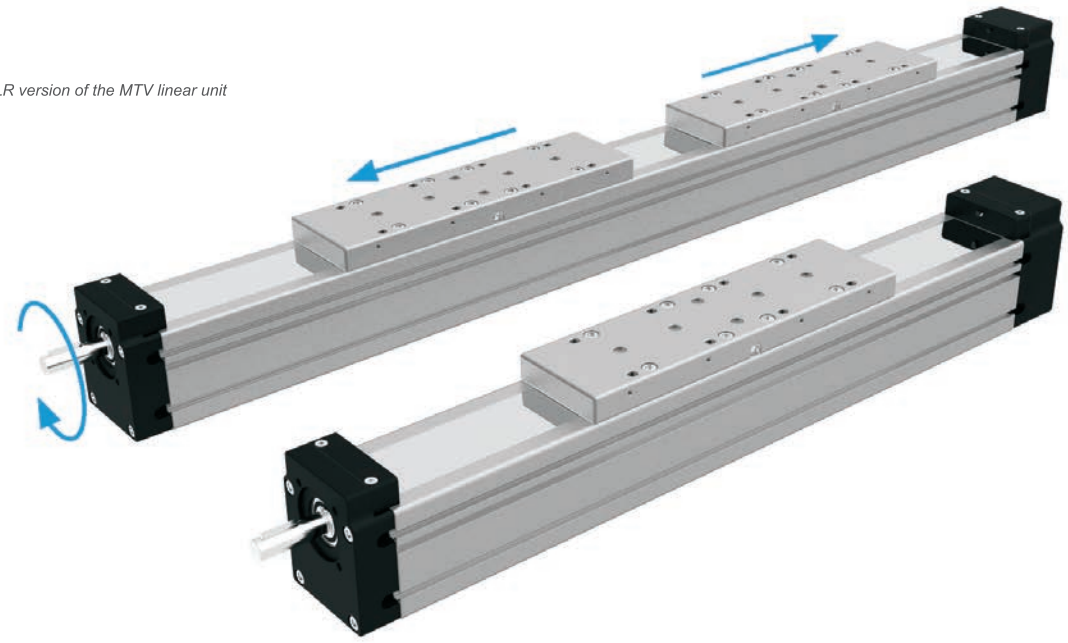
[1] *For lengths over the stated value in the table above please contact us.* [2] *Profile* [3] *Profile + carriage*

CHARACTERISTICS

The **MTV** series describes Linear Units with precision ball screw drive, integrated guide rail and compact dimensions. They provide high performances features, such as high speeds, good accuracy and repeatability.
They can easily be combined to multi-axis systems.
Excellent price-/performance ratio and quick delivery time are ensured.
The compact, precision-extruded aluminum Profile from 6063 AL with integrated Zero-backlash Ball rail guide system, allows high load capacities and optimal cycles for the movement of larger masses at high speed.
In the Linear Units MTV a precision ball screw, with tolerance class ISO7 (ISO5 on request), with reduced backlash of the ball nut is used.
A corrosion-resistant protection strip, protects all the parts in the profile from dust and other contaminants.
The aluminum profile includes T-slots for fixing the Linear Unit and for attaching sensors and switches. Also, a Reed switch can be used here.
The carriage, with central lubrication port, allows easy central re-lubrication of ball screw and Ball rail guide and provides the possibility to attach additional accessories on the side.
For the Linear Units MTV various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.
To achieve higher speeds at the same stroke of the linear unit, the ball screw support system can be integrated. With this feature vibrations and deflections of the ball screw are reduced, therefore longer strokes are possible. The linear unit with integrated support system can have a higher axial load capacity.
Ball screw supports are made out of high quality plastic materials with high wear resistance properties.
Our system enables ball screw support in horizontal or vertical positioning of the linear unit.

A 2LR version of MTV linear unit is available, where two carriages are moving simultaneously in opposite directions. Both right and left handed precision ball screws are used, which are rigidly connected. The ball screw support system can also be integrated.

2LR version of the MTV linear unit

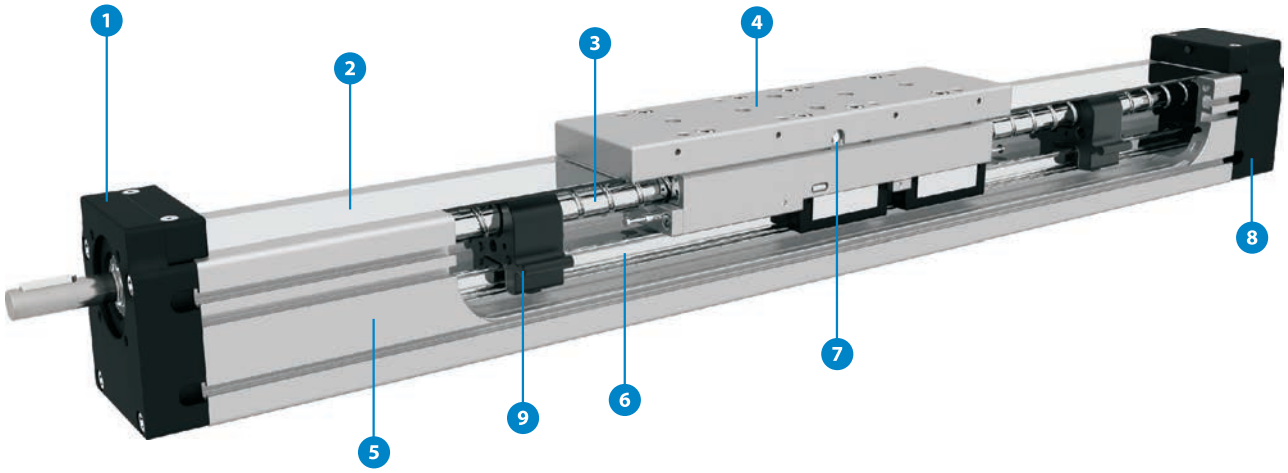


The aluminium profiles are manufactured according to the medium EN 12020-2 standard

Straightness = 0,35 mm/m; Max. torsion = 0,35 mm/m; Angular torsion = 0,2 mm/40 mm; Parallelism = 0,2 mm

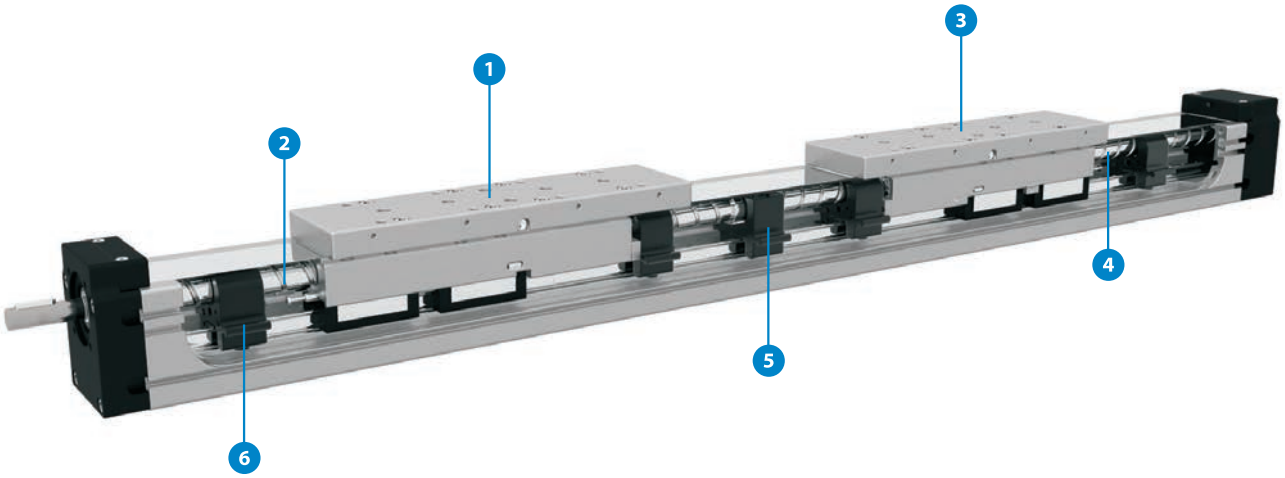
STRUCTURAL DESIGN

Standard version



1 - Drive block with floating bearing (MTV 110 - fixed bearing)
2 - Corrosion-resistant protection strip
3 - Ball screw tolerance ISO7 (ISO5 available on request)
4 - Carriage; with built in Magnets
5 - Aluminium profile-Hard anodized
6 - Integrated Linear Ball Guideway
7 - Central lubrication port; both sides
8 - End block with fixed bearing (MTV 110 - floating bearing)
9 - Screw support - SA

2LR version



1 - Carriage; with build in right hand ball nut
2 - Right hand ball screw
3 - Carriage; with build in left hand ball nut
4 - Left hand ball screw
5 - Central screw support - fixed
6 - Screw support - SA

HOW TO ORDER

MTV - 65 - 1610 - ISO7 - 1 - 1000 - 2SA - 2LR

Series :

MTV

Size :

65

80

110

Ball screw :

MTV 65: Ø16×5, Ø16×10, Ø16×16

MTV 80: Ø20×5, Ø20×10, Ø20×20, Ø20×50

MTV 110: Ø32×5, Ø32×10, Ø32×20, Ø32×32

Ball screw tolerance :

ISO7 (Standard)

ISO5

Ball screw journal :

0 : Without keyway

1 : With keyway

Absolute stroke (mm) :
(Absolute stroke = Effective stroke + 2 x Safety stroke)

2LR version: Absolute stroke of one carriage.

Number of screw supports n_{SA} :
(only even integer number - 2, 4, 6, 8, 10SA) - for MTV 65 max. 4SA is available

Leave blank : Without SA

2LR version :
Both right and left ball screws are used.

Leave blank : Standard version

Available for: MTV65: 16x5, 16x10
MTV80: 20x5

TECHNICAL DATA

General technical data

Linear Unit	Carriage length	Dynamic Load capacity	Dynamic moment			Max. permissible loads					* Max. length	* Max. stroke
						Forces		Moments				
	Lv [mm]	C [N]	Mx [Nm]	My [Nm]	Mz [Nm]	Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]	Lmax [mm]	[mm]
MTV 65	220	19800	158	700	700	6540	10190	94	350	233	2920	2690
MTV 65 2LR	220	19800	158	700	700	6540	10190	94	350	233	5789	2667

*For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valied for screw support SA.
For the case of the SA the equation of defining the linear unit length (for particular size of the linear unit) needs to be used.

Operating conditions	
Operating temp.	0°C ~ +60°C
Duty cycle	100%

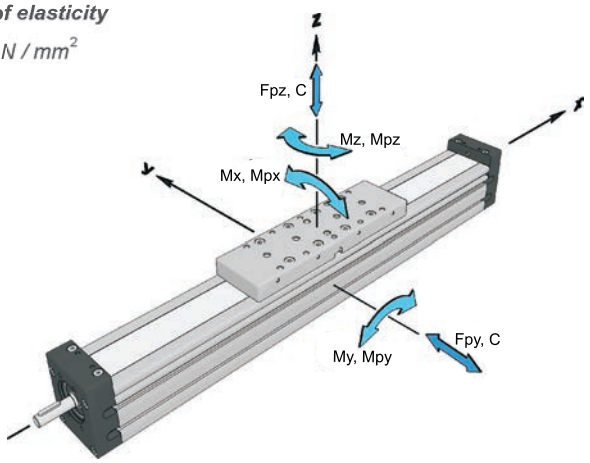
For operating temperature out of the presented range, please contact us.

Recommended values of loads:

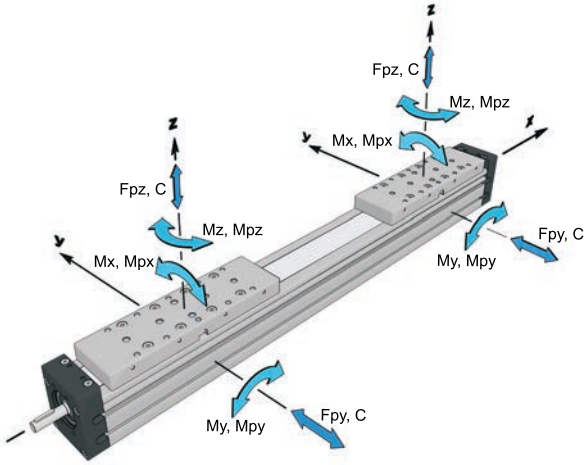
All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0)

Modulus of elasticity

$E = 70000\ N / mm^2$



Standard version



2LR version

Ball Screw Drive data

Linear Unit	Ball screw	3 Max. rotational speed	1 Max. travel speed	Lead constant	2 Max. Repeatability precision [mm]		Dynamic load capacity BS	5 Max. axial load	Max. drive torque	4 Min. stroke	1 Max. acceleration
		(Without SA)	(Without SA)		STANDARD						
	[d × l]	[rev / min]	[m / s]	[mm / rev]	ISO7	ISO5	Ca [N]	Fx [N]	Ma [Nm]	[mm]	[m/s^2]
MTV 65 MTV 65 2LR	16 × 5	4200	0,35	5	± 0,02	± 0,01	13150	8700	5,5 with Keyway 7,7 without Keyway	40	20
	16 × 10		0,70	10	± 0,02	± 0,01	11550	6730	5,5 with Keyway 11,9 without Keyway		
	16 × 16		1,12	16	± 0,02	± 0,01	8170	4200			

[1] *Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.*

[2] *For the ball nut with the preload of 2%, please contact us.*

[3] *With SA or 2LR version the max. rotation speed is limited to 3000 rev / min.*

[4] *For minimum stroke below the stated value in the table above please contact us.*

[5] *In the case of 2RL version the axial load is total axial load of both carriages.*

TECHNICAL DATA

Mass, moved mass, mass moment of inertia and no load torque

Linear Unit	Ball screw [d × l]	Number of SA n_{SA}	Mass of linear unit [kg]	Moved mass [kg]	Mass moment of inertia [10^{-5} kg * m^2]	* No load torque [Nm]
MTV 65	16 × 5	0	4,0 + 0,0073 * Stroke [mm]	1,50	1,6 + 0,0052 * Stroke [mm]	0,11
		2	4,5 + 0,0073 * Stroke [mm]	1,58	1,9 + 0,0052 * Stroke [mm]	0,13
		4	5,0 + 0,0073 * Stroke [mm]	1,66	2,2 + 0,0052 * Stroke [mm]	0,15
	16 × 5 2LR version	0	7,2 + 0,0146 * Stroke [mm]	3,00	2,9 + 0,0104 * Stroke [mm]	0,22
		2	8,2 + 0,0146 * Stroke [mm]	3,16	3,5 + 0,0104 * Stroke [mm]	0,26
		4	9,2 + 0,0146 * Stroke [mm]	3,32	4,1 + 0,0104 * Stroke [mm]	0,29
	16 × 10	0	4,0 + 0,0073 * Stroke [mm]	1,50	1,9 + 0,0052 * Stroke [mm]	0,12
		2	4,5 + 0,0073 * Stroke [mm]	1,58	2,2 + 0,0052 * Stroke [mm]	0,16
		4	5,0 + 0,0073 * Stroke [mm]	1,66	2,5 + 0,0052 * Stroke [mm]	0,19
	16 × 10 2LR version	0	7,2 + 0,0146 * Stroke [mm]	3,00	3,5 + 0,0104 * Stroke [mm]	0,24
		2	8,2 + 0,0146 * Stroke [mm]	3,16	4,1 + 0,0104 * Stroke [mm]	0,28
		4	9,2 + 0,0146 * Stroke [mm]	3,32	4,8 + 0,0104 * Stroke [mm]	0,31
	16 × 16	0	4,0 + 0,0073 * Stroke [mm]	1,50	2,5 + 0,0052 * Stroke [mm]	0,13
		2	4,5 + 0,0073 * Stroke [mm]	1,58	2,8 + 0,0052 * Stroke [mm]	0,19
		4	5,0 + 0,0073 * Stroke [mm]	1,66	3,2 + 0,0052 * Stroke [mm]	0,24

* *The stated values are for strokes up to 500mm.*
No Load Torque value increases with stroke elongation.

Mass calculation doesn´t include mass of motor, reduction gear, switches and clamps.

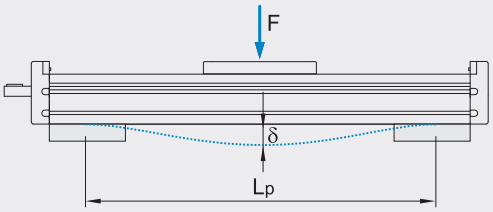
Planar moment of inertia

Linear Unit	Planar moment of inertia	
	I_y [cm^4]	I_z [cm^4]
MTV 65 MTV 65 2LR	71,3	89,4

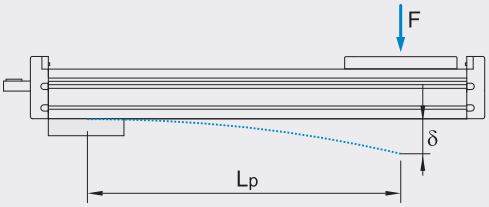
TECHNICAL DATA

Deflection of the linear unit

Fixed - fixed mounting



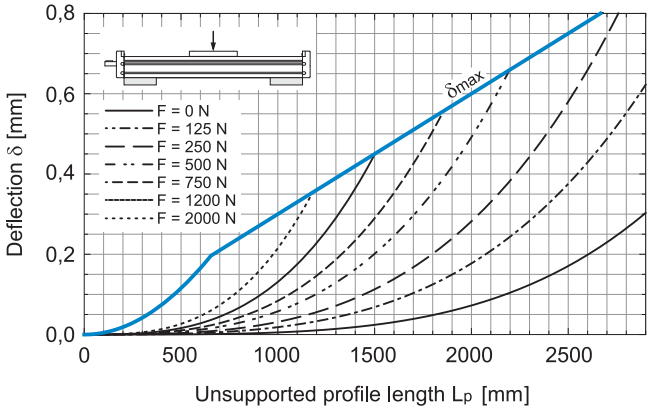
Fixed - free mounting

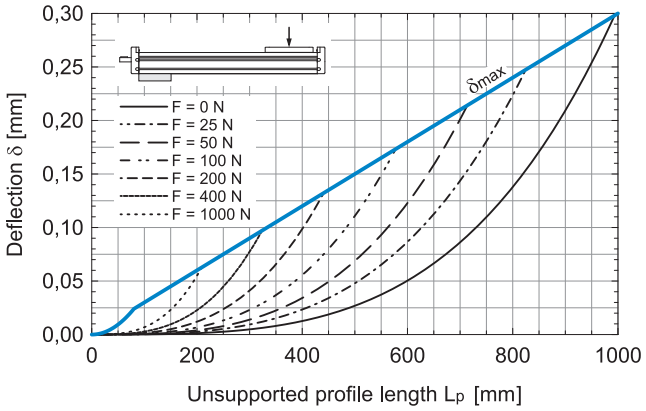


δ	Maximum deflection of the linear unit [mm]
δmax	Maximum permissible deflection of the linear unit [mm]
F	Applied force [N]
Lp	Unsupported profile length [mm]

The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

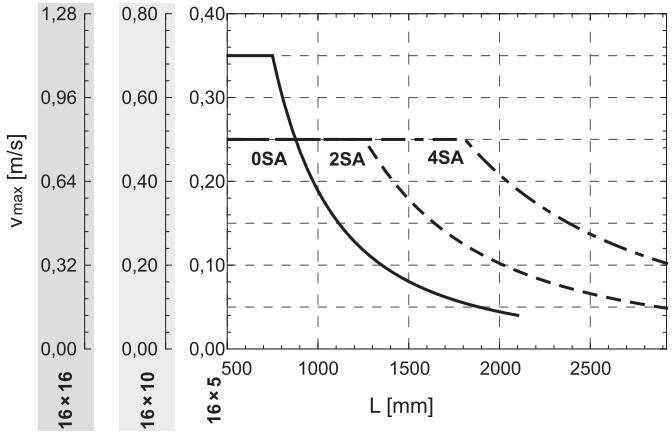
MTV 65





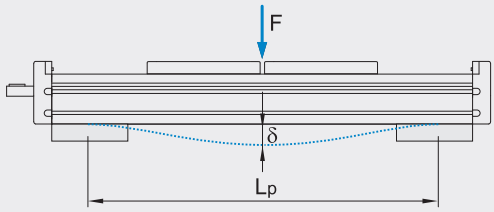
Maximum travel speed as a function of the profile length (Vmax - L curves)

MTV 65



Deflection of the 2LR version

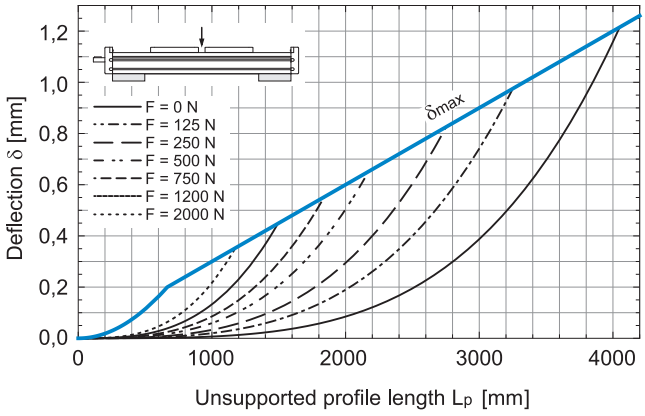
Fixed - fixed mounting



δ	Maximum deflection of the linear unit [mm]
δmax	Maximum permissible deflection of the linear unit [mm]
F	Applied force [N]
Lp	Unsupported profile length [mm]

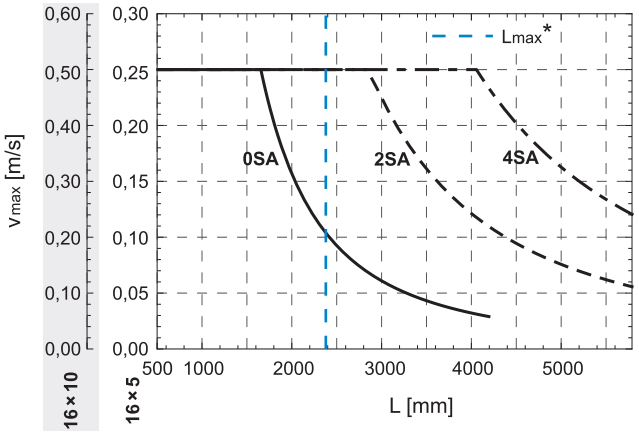
The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

MTV 65 2LR



Maximum travel speed as a function of the profile length (Vmax - L curves)

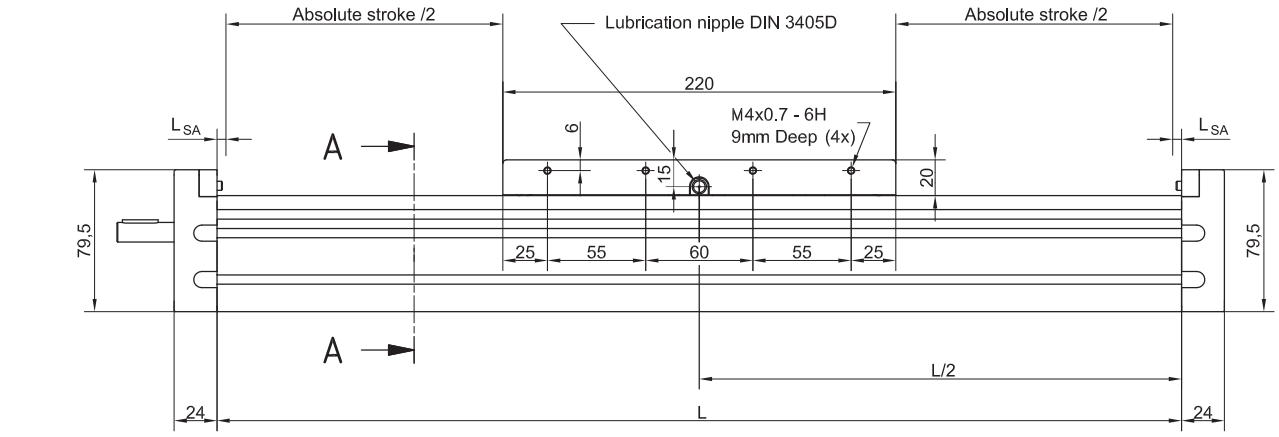
MTV 65 2LR

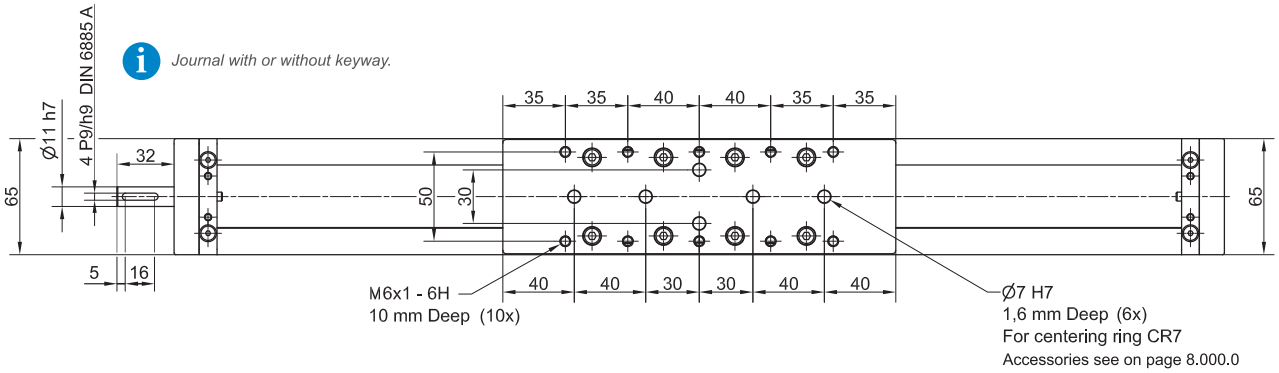


* Max. length Lmax of MTV 65 2LR linear unit with 16x10 ball screw.

DIMENSIONS

Linear Unit doesn't include any safety
Absolute stroke = Effective stroke + 2 x Safety stroke stroke.





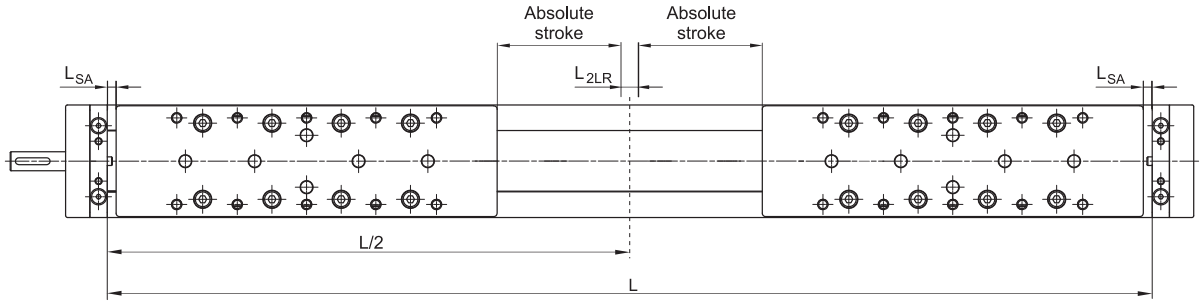
Accessories see on page 8.000.0

n	L_{SA}
0	5,0
2SA	31,0
4SA	62,0

L_{SA} Additional length [mm]

All dimensions in mm;
Drawings scales are not equal.

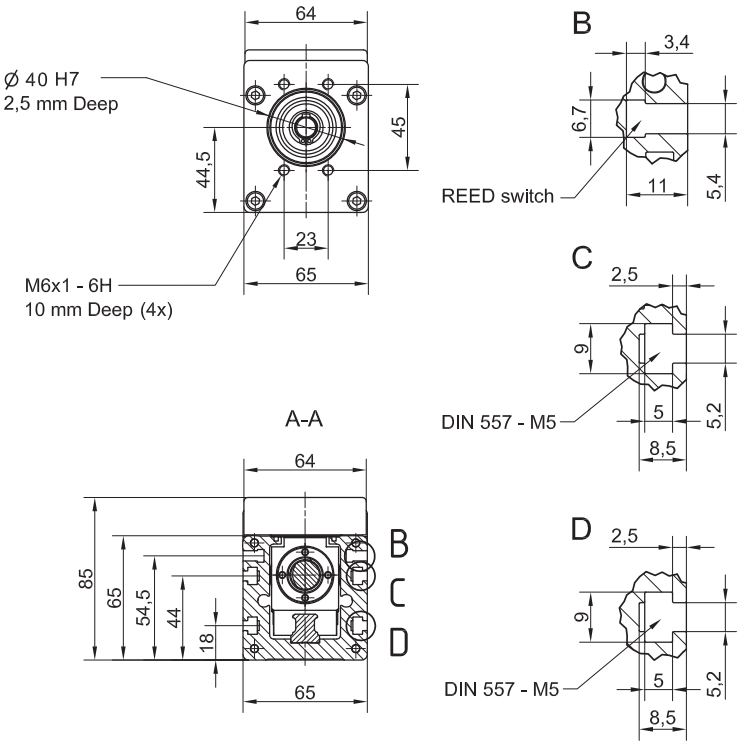
2LR version



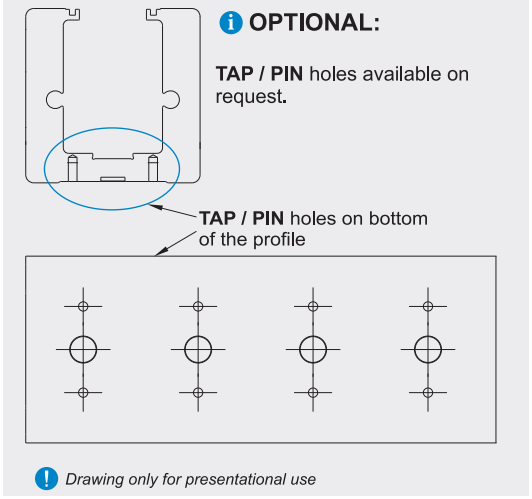
n	L_{SA}	L_{2LR}
0	5,0	5,0
2SA	31,0	67,0
4SA	62,0	129,0

L_{SA} Additional length [mm]
L_{2LR} Min. distance between carriages [mm]

DIMENSIONS



All dimensions in mm.
Drawings scales are not equal.



Drawing only for presentational use

Mounting the drive

- by the **MOTOR SIDE DRIVE - MSD** *(Page 7.095.0)*
- by the **MOTOR ADAPTER WITH COUPLING** *(Page 8.020.0)*

Available on request.

Defining of the linear unit length

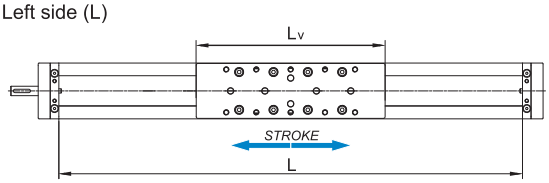
Standard version

L = Effective stroke + 2 × Safety stroke + Lv + 2 × LSA

Ltotal = L + 48 mm

Lv = 220 mm

Left side (L)



Right side (R)

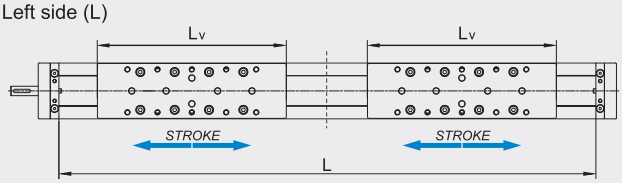
Version 2LR

L = 2 × (Effective stroke + 2 × Safety stroke) + 2 × Lv + 2 × LSA + L2LR

Ltotal = L + 48 mm

Lv = 220 mm

Left side (L)



Right side (R)

TECHNICAL DATA

General technical data

Linear Unit	Carriage length	Dynamic Load capacity	Dynamic moment			Max. permissible loads					* Max. length	* Max. stroke
						Forces		Moments				
	Lv [mm]	C [N]	Mx [Nm]	My [Nm]	Mz [Nm]	Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]	Lmax [mm]	[mm]
MTV 80	290	34200	370	1470	1470	8930	15070	150	500	384	5480	5163
MTV 80 2LR	290	34200	370	1470	1470	8930	15070	150	500	384	11055	5224

*For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valied for screw support SA.
For the case of the SA the equation of defining the linear unit length (for particular size of the linear unit) needs to be used.

Operating conditions	
Operating temp.	0°C ~ +60°C
Duty cycle	100%

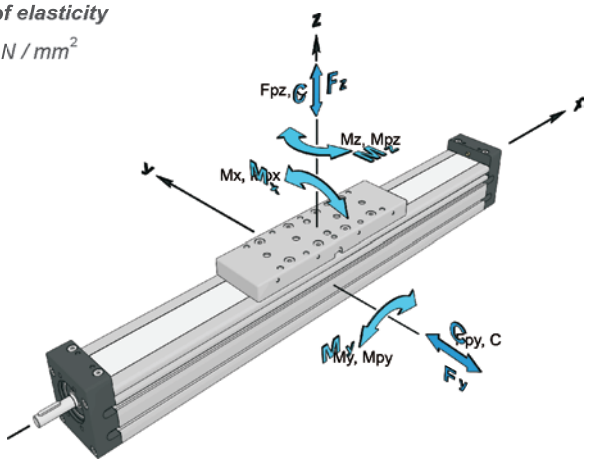
For operating temperature out of the presented range, please contact us.

Recommended values of loads:

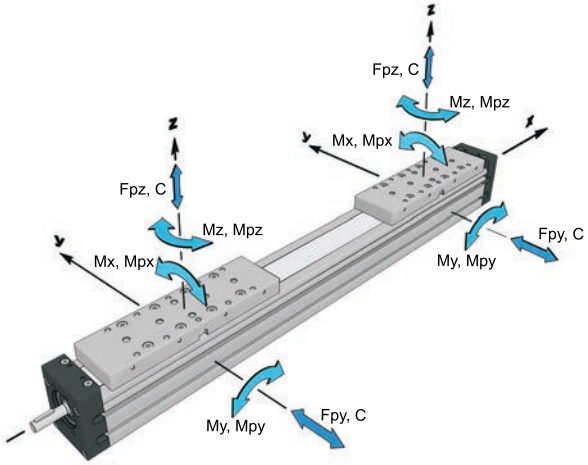
All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0)

Modulus of elasticity

$E = 70000\ N / mm^2$



Standard version



2LR version

Ball Screw Drive data

Linear Unit	Ball screw	3 Max. rotational speed	1 Max. travel speed	Lead constant	2 Max. Repeatability precision [mm]		Dynamic load capacity BS	5 Max. axial load	Max. drive torque	4 Min. stroke	1 Max. acceleration
		(Without SA)	(Without SA)		STANDARD						
	[d × l]	[rev / min]	[m / s]	[mm / rev]	ISO7	ISO5	Ca [N]	Fx [N]	Ma [Nm]	[mm]	[m/s^2]
MTV 80 MTV 80 2LR	20 × 5	3300	0,28	5	± 0,02	± 0,01	14800	14800	11,9 with Keyway 13,0 without Keyway	55	20
	20 × 10		0,55	10	± 0,02	± 0,01	15900	13850	11,9 with Keyway 24,5 without Keyway		
	20 × 20		1,10	20	± 0,02	± 0,01	16250	6930			
	20 × 50	3000	2,50	50	± 0,02	± 0,01	13000	2770			

[1] *Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.*

[2] *For the ball nut with the preload of 2%, please contact us.*

[3] *With SA or 2LR version the max. rotation speed is limited to 3000 rev / min.*

[4] *For minimum stroke below the stated value in the table above please contact us.*

[5] *In the case of 2RL version the axial load is total axial load of both carriages.*

Mass, moved mass, mass moment of inertia and no load torque

Linear Unit	Ball screw [d × l]	Number of SA n_{SA}	Mass of linear unit [kg]	Moved mass [kg]	Mass moment of inertia [10^{-5} kg * m^2]	* No load torque [Nm]
MTV 80	20 × 5	0	8,2 + 0,0114 * Stroke [mm]	3,00	5,6 + 0,0127 * Stroke [mm]	0,16
		2	8,9 + 0,0114 * Stroke [mm]	3,07	6,2 + 0,0127 * Stroke [mm]	0,19
		4 / 6 / 8 / 10	9,7 + 0,4 * (n_{SA} - 4) + 0,0114 * Stroke [mm]	3,21 + 0,035 * (n_{SA} - 4)	7,0 + 0,4 * (n_{SA} - 4) + 0,0127 * Stroke [mm]	0,24 + 0,015 * (n_{SA} - 4)
	20 × 5 2LR Version	0	14,6 + 0,0228 * Stroke [mm]	6,00	9,5 + 0,0254 * Stroke [mm]	0,32
		2	15,9 + 0,0228 * Stroke [mm]	6,14	10,7 + 0,0254 * Stroke [mm]	0,37
		4 / 6 / 8 / 10	17,6 + 0,8 * (n_{SA} - 4) + 0,0228 * Stroke [mm]	6,42 + 0,07 * (n_{SA} - 4)	12,3 + 0,8 * (n_{SA} - 4) + 0,0254 * Stroke [mm]	0,48 + 0,03 * (n_{SA} - 4)
	20 × 10	0	8,2 + 0,0114 * Stroke [mm]	3,00	6,2 + 0,0127 * Stroke [mm]	0,17
		2	8,9 + 0,0114 * Stroke [mm]	3,07	6,8 + 0,0127 * Stroke [mm]	0,22
		4 / 6 / 8 / 10	9,7 + 0,4 * (n_{SA} - 4) + 0,0114 * Stroke [mm]	3,21 + 0,035 * (n_{SA} - 4)	7,6 + 0,4 * (n_{SA} - 4) + 0,0127 * Stroke [mm]	0,33 + 0,025 * (n_{SA} - 4)
	20 × 20	0	8,2 + 0,0114 * Stroke [mm]	3,00	8,5 + 0,0127 * Stroke [mm]	0,18
		2	8,9 + 0,0114 * Stroke [mm]	3,07	9,1 + 0,0127 * Stroke [mm]	0,29
		4 / 6 / 8 / 10	9,7 + 0,4 * (n_{SA} - 4) + 0,0114 * Stroke [mm]	3,21 + 0,035 * (n_{SA} - 4)	10,1 + 0,5 * (n_{SA} - 4) + 0,0127 * Stroke [mm]	0,50 + 0,055 * (n_{SA} - 4)
	20 × 50	0	8,2 + 0,0114 * Stroke [mm]	3,00	24,4 + 0,0127 * Stroke [mm]	0,58
		2	8,9 + 0,0114 * Stroke [mm]	3,07	25,5 + 0,0127 * Stroke [mm]	0,85
		4 / 6 / 8 / 10	9,7 + 0,4 * (n_{SA} - 4) + 0,0114 * Stroke [mm]	3,21 + 0,035 * (n_{SA} - 4)	27,1 + 0,6 * (n_{SA} - 4) + 0,0127 * Stroke [mm]	1,38 + 0,0135 * (n_{SA} - 4)

* *The stated values are for strokes up to 500mm.*
No Load Torque value increases with stroke elongation.

Mass calculation doesn´t include mass of motor, reduction gear, switches and clamps.

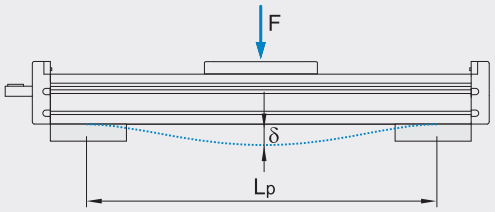
Planar moment of inertia

Linear Unit	Planar moment of inertia	
	I_y [cm^4]	I_z [cm^4]
MTV 80 MTV 80 2LR	144,1	192,3

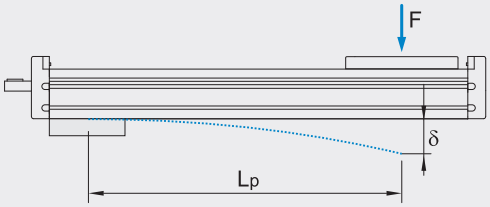
TECHNICAL DATA

Deflection of the linear unit

Fixed - fixed mounting



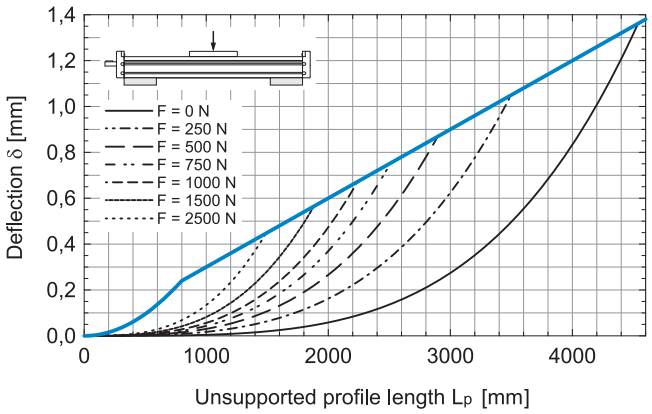
Fixed - free mounting

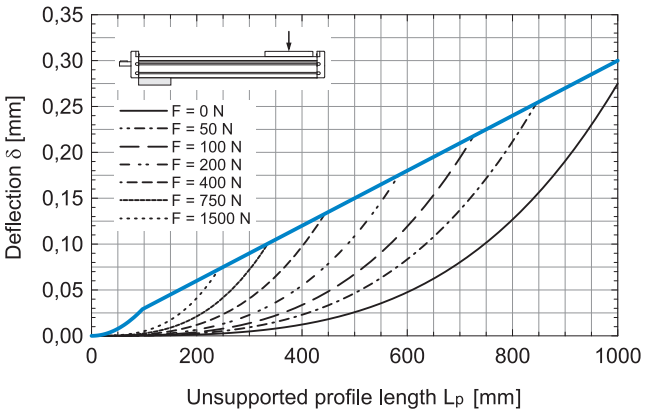


δ Maximum deflection of the linear unit [mm]
δmax Maximum permissible deflection of the linear unit [mm]
F Applied force [N]
Lp Unsupported profile length [mm]

The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

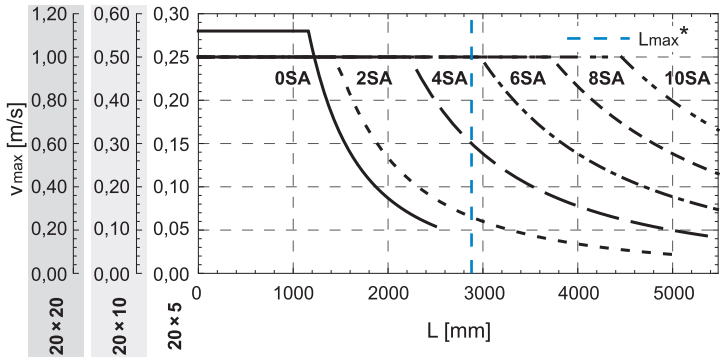
MTV 80

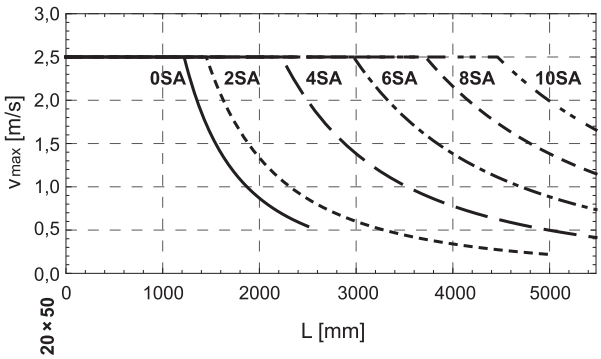




Maximum travel speed as a function of the profile length (Vmax - L curves)

MTV 80

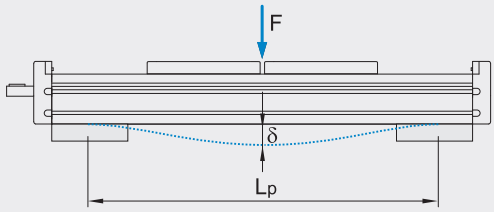




* Max. length Lmax of MTV 80 linear unit with 20x10 ball screw.

Deflection of the 2LR version

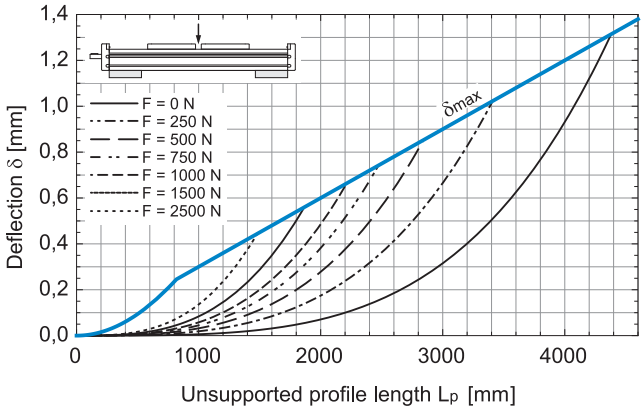
Fixed - fixed mounting



δ	Maximum deflection of the linear unit [mm]
δmax	Maximum permissible deflection of the linear unit [mm]
F	Applied force [N]
Lp	Unsupported profile length [mm]

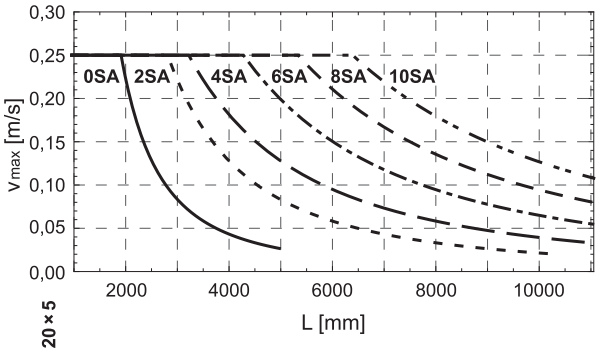
The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

MTV 80 2LR



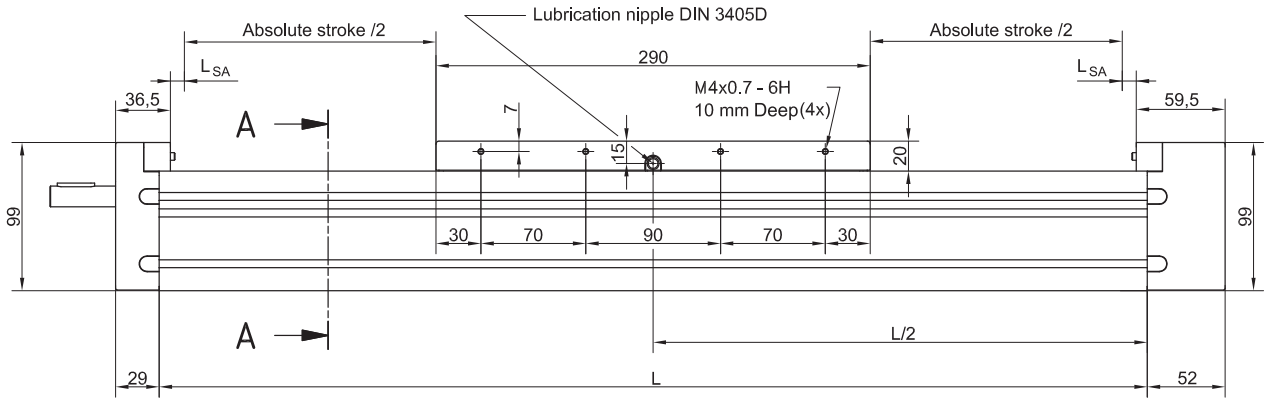
Maximum travel speed as a function of the profile length (Vmax - L curves)

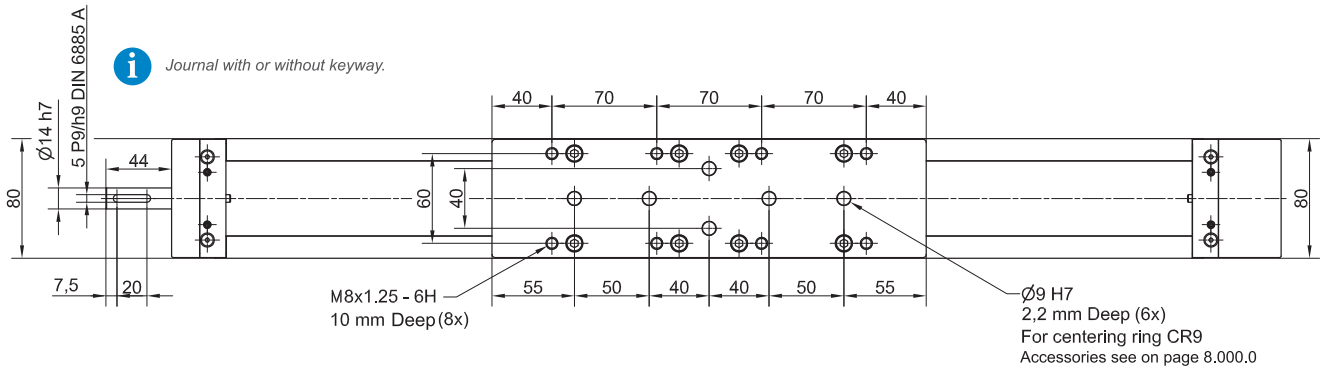
MTV 80 2LR



DIMENSIONS

Linear Unit doesn't include any safety
Absolute stroke = Effective stroke + 2 x Safety stroke stroke.



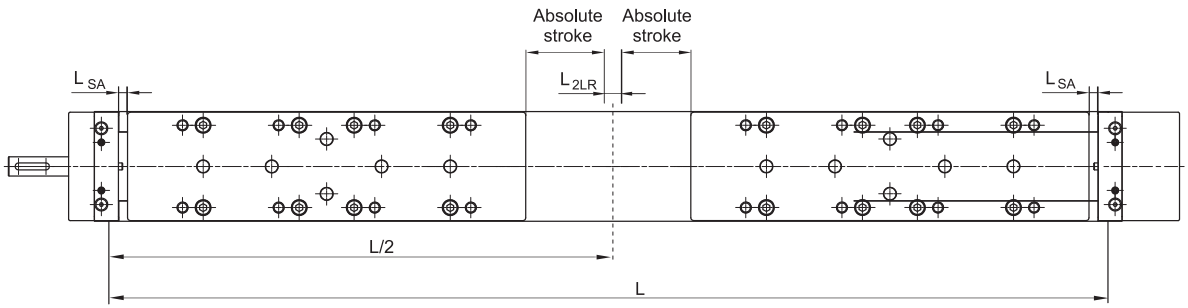


n_{SA}	L_{SA}
0	6,0
2SA	28,5
4SA	59,5
6SA	90,5
8SA	121,5
10SA	152,5

L_{SA} Additional length [mm]

All dimensions in mm;
Drawings scales are not equal.

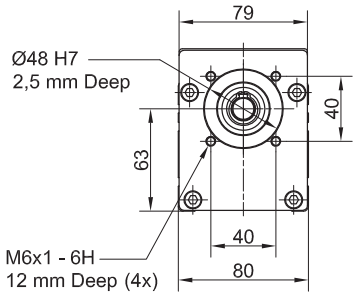
2LR Version

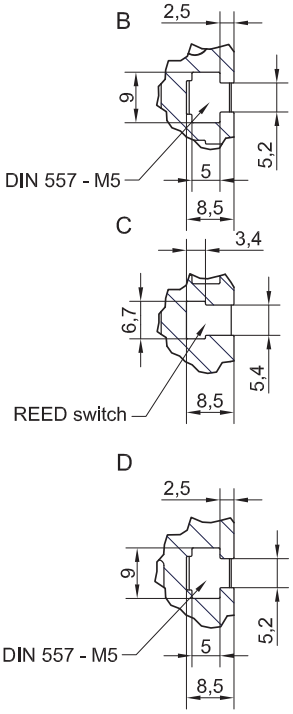


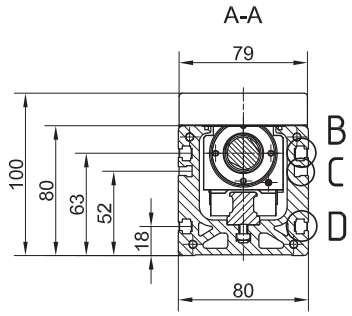
n_{SA}	L_{SA}	L_{2LR}
0	6,0	0,0
2SA	28,5	48,0
4SA	59,5	110,0
6SA	90,5	172,0
8SA	121,5	234,0
10SA	152,5	296,0

L_{SA} Additional length [mm]
L_{2LR} Min. distance between carriages [mm]

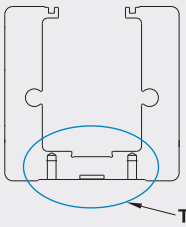
DIMENSIONS





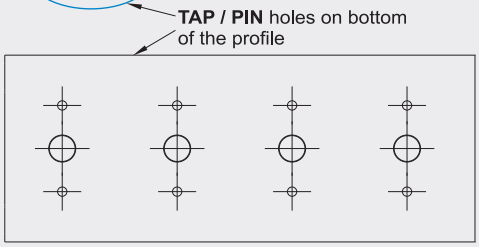


All dimensions in mm.
Drawings scales are not equal.

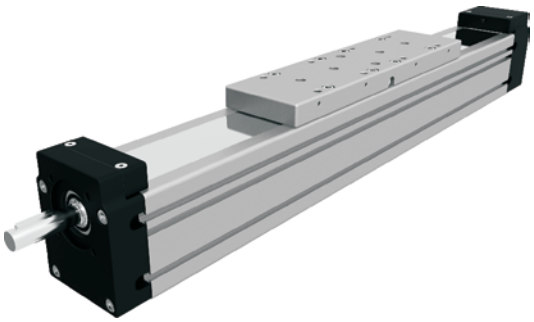


OPTIONAL:

TAP / PIN holes available on request.



Drawing only for presentational use.



Mounting the drive

- by the **MOTOR SIDE DRIVE - MSD** *(Page 7.095.0)*
- by the **MOTOR ADAPTER WITH COUPLING** *(Page 8.020.0)*

Available on request.

Defining of the linear unit length

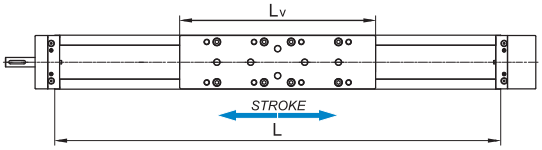
Standard version

L = Effective stroke + 2 × Safety stroke + Lv + 2 × L_{SA} + 15 mm

Ltotal = L + 81 mm

Lv = 290 mm

Left side (L)



Right side (R)

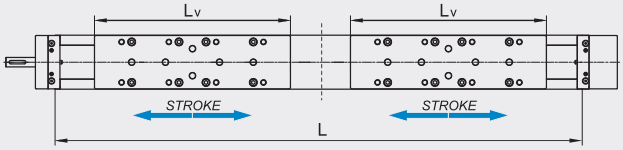
2LR version

L = 2 × (Effective stroke + 2 × Safety stroke) + 2 × Lv + 2 × L_{SA} + L_{2LR} + 15mm

Ltotal = L + 81 mm

Lv = 290 mm

Left side (L)



Right side (R)

TECHNICAL DATA

General technical data

Linear Unit	Carriage length	Dynamic Load capacity	Dynamic moment			Max. permissible loads					* Max. length	* Max. stroke
						Forces		Moments				
	Lv [mm]	C [N]	Mx [Nm]	My [Nm]	Mz [Nm]	Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]	Lmax [mm]	[mm]
MTV 110	330	49600	630	2650	2650	10000	20260	295	670	535	5850	5456

*For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valied for screw support SA.
For the case of the SA the equation of defining the linear unit length (for particular size of the linear unit) needs to be used.

Operating conditions	
Operating temp.	0°C ~ +60°C
Duty cycle	100%

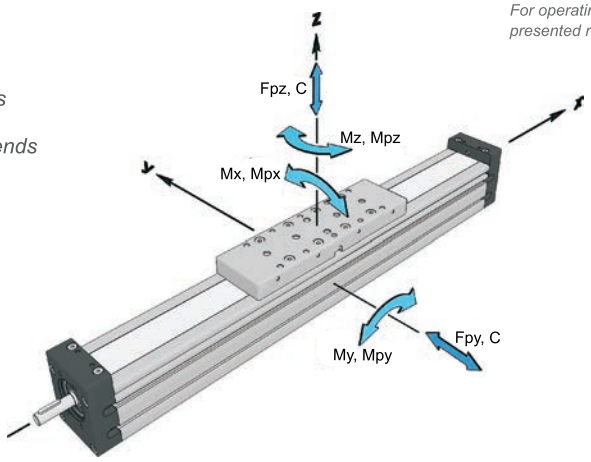
For operating temperature out of the presented range, please contact us.

Recommended values of loads:

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0)

Modulus of elasticity

$E = 70000\ N / mm^2$



Ball Screw Drive data

Linear Unit	Ball screw	3 Max. rotational speed	1 Max. travel speed	Lead constant	2 Max. Repeatability precision [mm]		Dynamic load capacity BS	5 Max. axial load	Max. drive torque	4 Min. stroke	1 Max. acceleration
		(Without SA)	(Without SA)		STANDARD						
	[d × l]	[rev / min]	[m / s]	[mm / rev]	ISO7	ISO5	Ca [N]	Fx [N]	Ma [Nm]	[mm]	[m/s^2]
MTV 110	32 × 5	2150	0,18	5	± 0,02	± 0,01	18850	18850	16,7 with Keyway 16,7 without Keyway	65	20
	32 × 10	3000	0,50	10	± 0,02	± 0,01	33400	29600	27,3 with Keyway 52,3 without Keyway		
	32 × 20		1,00	20	± 0,02	± 0,01	29700	14800			
	32 × 32		1,60	32	± 0,02	± 0,01	35150	9240		70	

[1] *Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.*

[2] *For the ball nut with the preload of 2%, please contact us.*

[3] *With SA or 2LR version the max. rotation speed is limited to 3000 rev / min.*

[4] *For minimum stroke below the stated value in the table above please contact us.*

[5] *In the case of 2RL version the axial load is total axial load of both carriages.*

Planar moment of inertia

Linear Unit	Planar moment of inertia	
	Iy [cm^4]	Iz [cm^4]
MTV 110	562,0	669,0

TECHNICAL DATA

Mass, moved mass, mass moment of inertia and no load torque

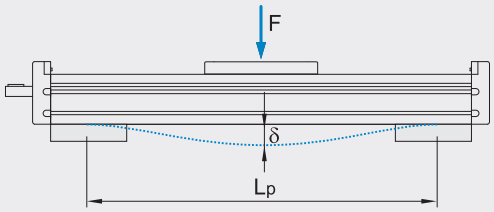
Linear Unit	Ball screw [d × l]	Number of SA n_{SA}	Mass of linear unit [kg]	Moved mass [kg]	Mass moment of inertia [10^{-5} kg * m^2]	* No load torque [Nm]
MTV 110	32 × 5	0	17,3 + 0,0216 * Stroke [mm]	4,90	34,6 + 0,0690 * Stroke [mm]	0,45
		2	17,7 + 0,0216 * Stroke [mm]	5,03	35,1 + 0,0690 * Stroke [mm]	0,52
		4 / 6 / 8 / 10	19,3 + 0,8 * (n_{SA}- 4) + 0,0216 * Stroke [mm]	5,29 + 0,065 * (n_{SA} - 4)	39,4 + 2,2 * (n_{SA}- 4) + 0,0690 * Stroke [mm]	0,66 + 0,035 * (n_{SA} - 4)
	32 × 10	0	17,3 + 0,0216 * Stroke [mm]	4,90	35,5 + 0,0690 * Stroke [mm]	0,50
		2	17,7 + 0,0216 * Stroke [mm]	5,03	36,1 + 0,0690 * Stroke [mm]	0,64
		4 / 6 / 8 / 10	19,3 + 0,8 * (n_{SA}- 4) + 0,0216 * Stroke [mm]	5,29 + 0,065 * (n_{SA} - 4)	40,4 + 2,2 * (n_{SA}- 4) + 0,0690 * Stroke [mm]	0,92 + 0,070 * (n_{SA} - 4)
	32 × 20	0	17,3 + 0,0216 * Stroke [mm]	4,90	39,3 + 0,0690 * Stroke [mm]	0,55
		2	17,7 + 0,0216 * Stroke [mm]	5,03	39,9 + 0,0690 * Stroke [mm]	0,83
		4 / 6 / 8 / 10	19,3 + 0,8 * (n_{SA}- 4) + 0,0216 * Stroke [mm]	5,29 + 0,065 * (n_{SA} - 4)	44,4 + 2,2 * (n_{SA}- 4) + 0,0690 * Stroke [mm]	1,40 + 0,140 * (n_{SA} - 4)
	32 × 32	0	17,3 + 0,0216 * Hub [mm]	4,90	47,0 + 0,0690 * Stroke [mm]	0,60
		2	17,7 + 0,0216 * Hub [mm]	5,03	47,8 + 0,0690 * Stroke [mm]	1,05
		4 / 6 / 8 / 10	19,3 + 0,8 * (n_{SA}- 4) + 0,0216 * Stroke [mm]	5,29 + 0,065 * (n_{SA} - 4)	52,8 + 2,3 * (n_{SA}- 4) + 0,0690 * Stroke [mm]	1,96 + 0,225 * (n_{SA} - 4)

* *The stated values are for strokes up to 500mm.*
No Load Torque value increases with stroke elongation.

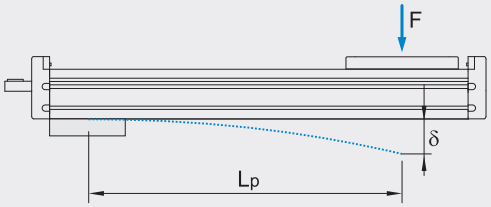
Mass calculation doesn´t include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

Fixed - fixed mounting



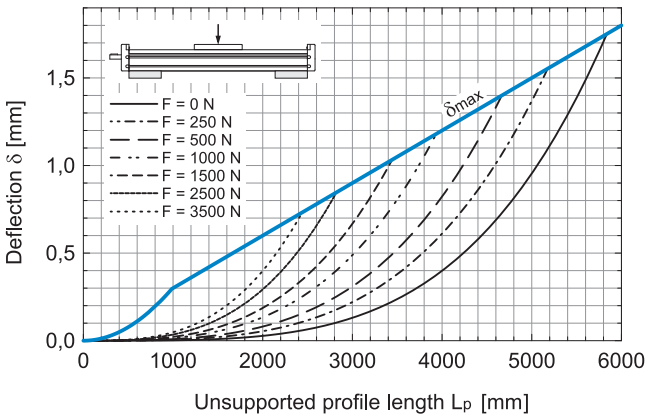
Fixed - free mounting

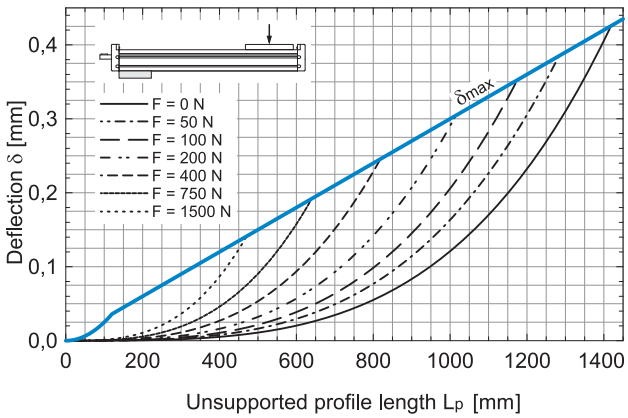


δ Maximum deflection of the linear unit [mm]
δmax Maximum permissible deflection of the linear unit [mm]
F Applied force [N]
Lp Unsupported profile length [mm]

The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

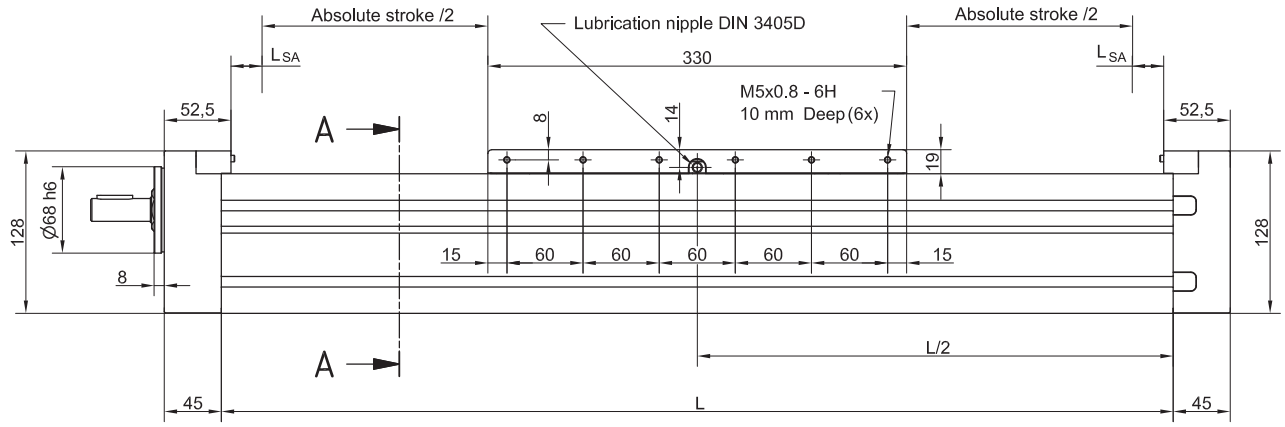
MTV 110



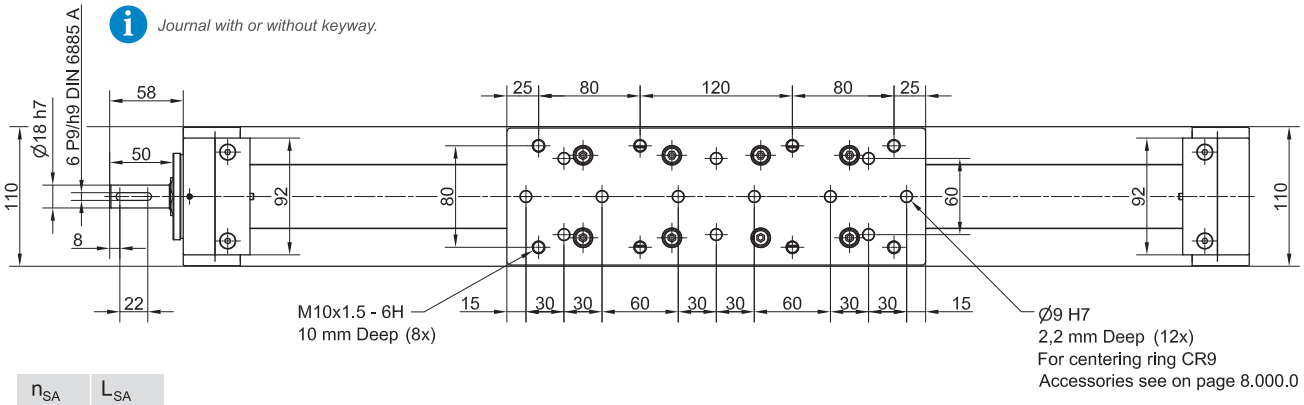


DIMENSIONS

Linear Unit doesn't include any safety
Absolute stroke = Effective stroke + 2 x Safety stroke stroke.



Journal with or without keyway.



n_{SA}	L_{SA}
0	24,5
2SA	28,0
4SA	59,0
6SA	90,0
8SA	121,0
10SA	152,0

All dimensions in mm;
Drawings scales are not equal.

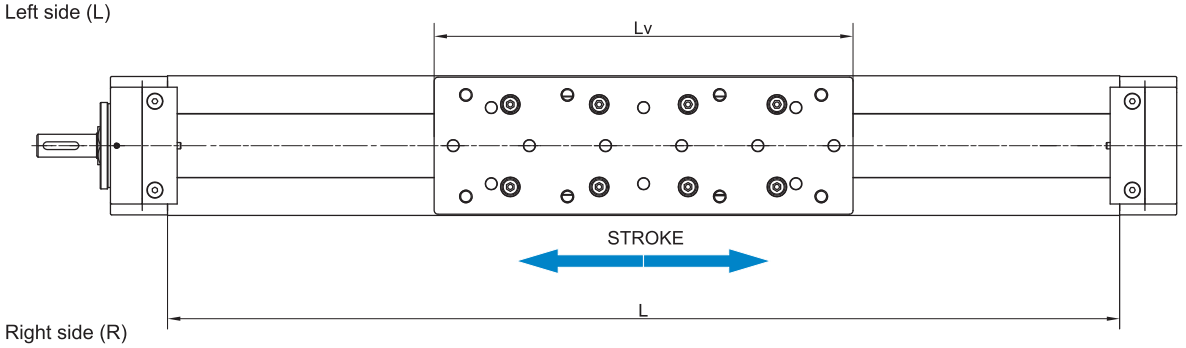
L_{SA} Additional length [mm]

Defining of the linear unit length

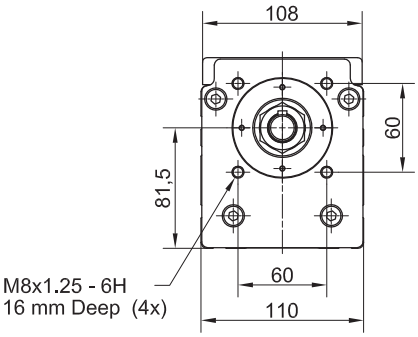
L = Effective stroke + 2 × Safety stroke + Lv + 2 × L_{SA} + 15 mm

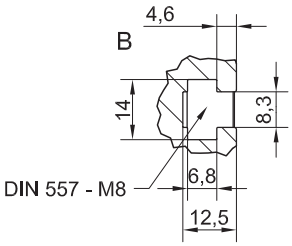
Lv = 330 mm

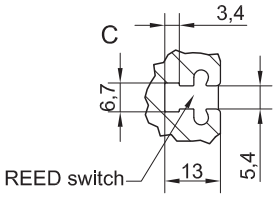
Ltotal = L + 90 mm

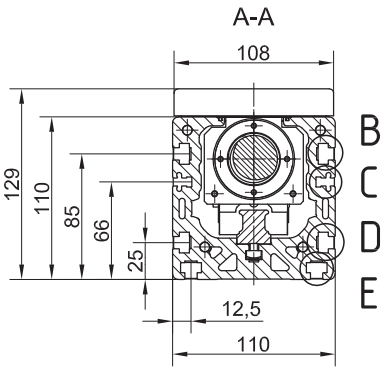


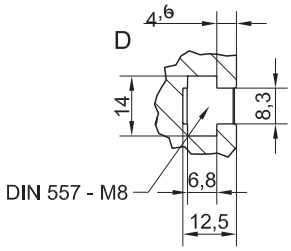
DIMENSIONS

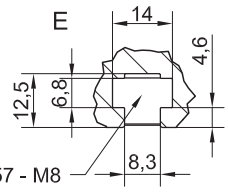








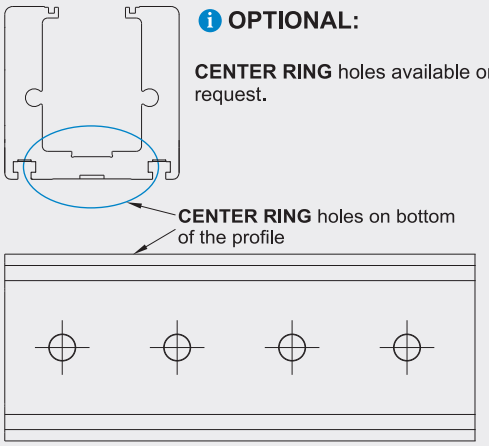




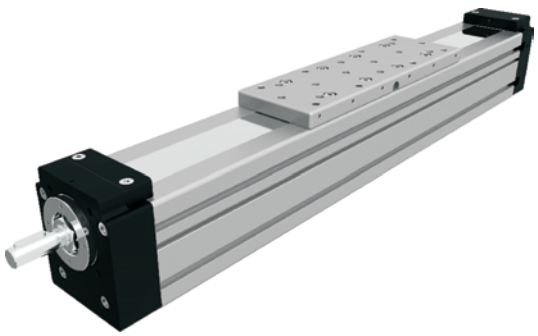
All dimensions in mm.
Drawings scales are not equal.

OPTIONAL:

CENTER RING holes available on request.



Drawing only for presentational use.

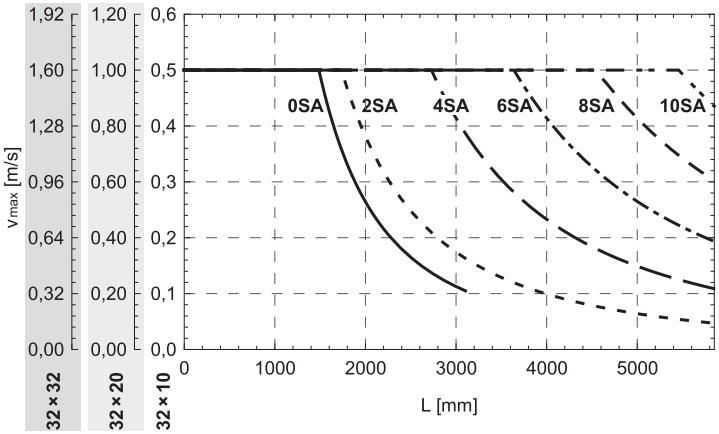


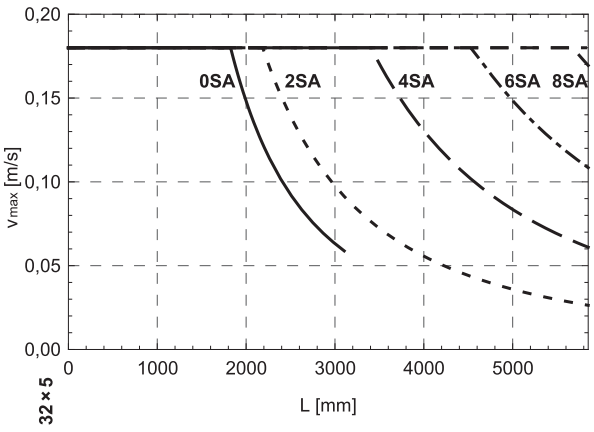
Mounting the drive

- by the **MOTOR SIDE DRIVE - MSD** *(Page 7.095.0)*
- by the **MOTOR ADAPTER WITH COUPLING** *(Page 8.020.0)*

Available on request.

Maximum travel speed as a function of the profile length (V_{max} - L curves)





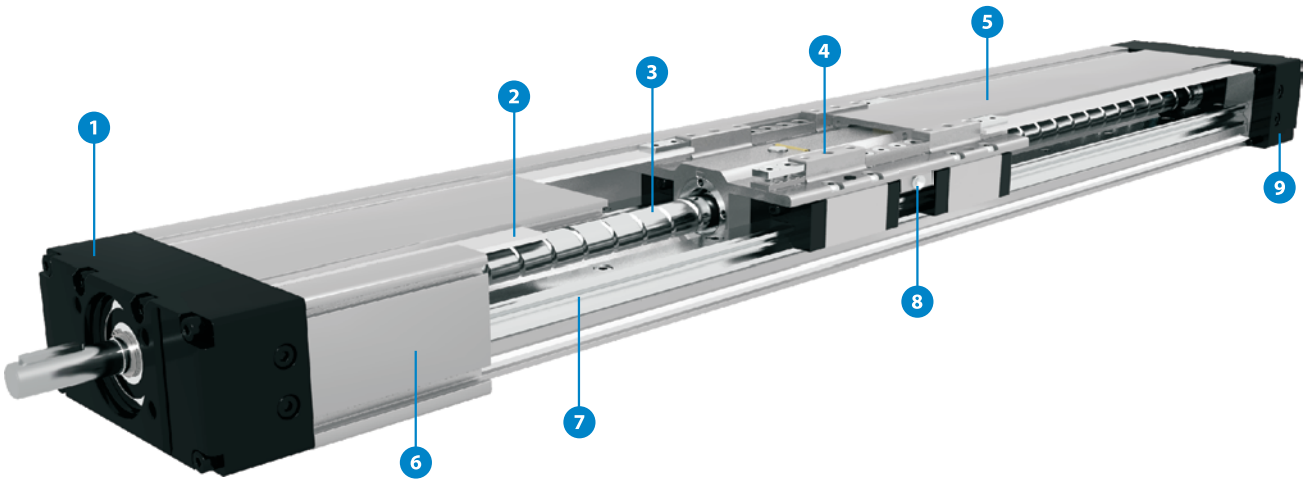
CHARACTERISTICS

The **CTV** series describes Linear Units with a precision ball screw drive and two parallel, integrated, Zero-backlash rail guides. Compact dimensions allow high performance features such as, high speeds, good accuracy and repeatability.
They can easily be combined to multi-axis systems.
Excellent price-/performance ratio and quick delivery time are ensured.
The compact, precision-extruded aluminum Profile from AL 6063, with two parallel, integrated, Zero-backlash rail guide systems, allows high load capacities and optimal cycles for the movement of larger masses at high speed.
In the Linear Units CTV a precision ball screw, with tolerance class ISO7 (ISO5 on request), with reduced backlash of the ball nut is used.
Two parallel circulating antistatic polyurethane sealing strips and an aluminum cover are ensuring to protect all the parts in the profile from dust and other contaminantions.
Different carriage lengths with lubrication port allows for easy re-lubrication of the ball screw and Ball rail guide system and allows the possibility to attach additional accessories. The re-lubrication can also be done through maintenance holes on the side of the Profile.
The aluminum profile includes T-slots for fixing the Linear Unit and for attaching sensors and switches. Also, a Reed switch can be used here.
For the linear units CTV various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.

The aluminium profiles are manufactured according to the medium EN 12020-2 standard

Straightness = 0,35 mm/m; Max. torsion = 0,35 mm/m; Angular torsion = 0,2 mm/40 mm; Parallelism = 0,2 mm

STRUCTURAL DESIGN



1 - Drive block with floating bearing
2 - Gap-type seal of antistatic PU strip (recirculating)
3 - Ball screw tolerance ISO7 (ISO5 available on request)
4 - Carriage; with built in Magnets
5 - Aluminum cover
6 - Aluminium profile-Hard anodized
7 - Two integrated Linear Ball Guideways
8 - Central lubrication port; both sides
9 - End block with fixed bearing

HOW TO ORDER

CTV - 110 - 1610 - ISO7 - 1 - 1000 - L - 1 - 1

Series:
CTV

Size:
90
110
145
200

Ball screw :
CTV 90: Ø12×5, Ø12×10
CTV 110: Ø16×5, Ø16×10, Ø16×16
CTV 145: Ø20×5, Ø20×10, Ø20×20, Ø20×50
CTV 200: Ø32×5, Ø32×10, Ø32×20, Ø32×32

Ball screw tolerance :
ISO7 (Standard)
ISO5

Ball screw journal :
0 : Without keyway
1 : With keyway
*CTV 90 only available without keyway - **0***

Absolute stroke (mm) :
(Absolute stroke = Effective stroke + 2 x Safety stroke)

Carriage Version :
S : Short
L : Long

Connection plate :
0 : Without
1 : With

Protection cover :
0 : Without antistatic PU Gap-type seal strip
1 : With antistatic PU Gap-type seal strip (Standard)
2 : With Corrosion-resistant protection strip

TECHNICAL DATA

General technical data

Linear Unit	Carriage length Lv [mm]	Dynamic load capacity C [N]	Dynamic moment Mx [Nm]	My [Nm]	Mz [Nm]	Max. permissible loads Forces Fpy [N]	Fpz [N]	Moments Mpx [Nm]	Mpy [Nm]	Mpz [Nm]	Moved mass [kg]	* Max. length Lmax [mm]	* Max. stroke [mm]
CTV 90 S	35	4620	125	17	34	2000	4540	125	17	34	0,3	750	665
CTV 90 L	100	9240	250	300	300	3990	9090	250	297	130	0,5		600

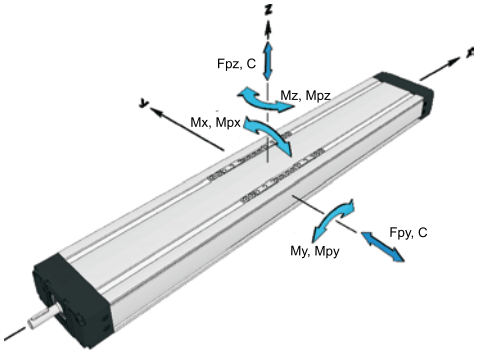
*For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valied for double carriage.
(equation of defining the linear unit length for particular size of the linear unit needs to be used).

Recommended values of loads:

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0)

Modulus of elasticity

E = 70000 N / mm^2



Operating conditions	
Operating temp.	0°C ~ +60°C
Duty cycle	100%

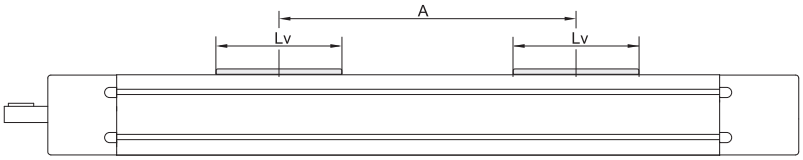
For operating temperature out of the presented range, please contact us.

General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity C [N]	* Dynamic moment Mx [Nm]	My [Nm]	Mz [Nm]	* Max. permissible loads Forces Fpy [N]	Fpz [N]	Moments Mpx [Nm]	Mpy [Nm]	Mpz [Nm]
CTV 90	S2	9240	250	4,6 * A [mm]	4,6 * A [mm]	3990	9090	250	4,5 * A [mm]	2,0 * A [mm]

*A - Distance between carriages. More info on following pages.

*Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.
For grater number of carriages please contact us.*



Ball Screw Drive data

Linear Unit	Ball screw [d × l]	Max. rotational speed [rev / min]	1 Max. travel speed [m / s]	2 No load torque Carriage: S [Nm]	Carriage: L [Nm]	Lead constant [mm / rev]	3 Max. repeteability precision [mm] STANDARD ISO7	ISO5	Dynamic load capacity BS Ca [N]	Max. Axial load Fx [N]	Max. drive torque Ma [Nm]	4 Min. stroke [mm]	1 Max. accele-ration [m/s^2]
CTV 90	12 × 5	5800	0,49	0,07	0,09	5	± 0,02	± 0,01	5000	5000	4,4 without Keyway	30	20
	12 × 10		0,97	0,06	0,08	10	± 0,02	± 0,01	3800	2540	4,5 without Keyway		

1 *Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.*

2 *The stated values are for strokes up to 500mm. No Load Torque value increases with stroke elongation*

3 *For the ball nut with the preload of 2% please contact us*

4 *For minimum stroke below the stated value in the table above please contact us.*

TECHNICAL DATA

Mass moment inertia of Linear unit

Linear unit	Carriage version	Ball screw [d × l]	Mass moment of inertia [10^{-5} kg * m^2]	Planar moment of inertia Iy [cm^4]	Iz [cm^4]
CTV 90	S	12 × 5	0,32 + 0,002 * Stroke [mm]	13,6	102,6
		12 × 10	0,38 + 0,002 * Stroke [mm]		
	L	12 × 5	0,43 + 0,002 * Stroke [mm]		
		12 × 10	0,53 + 0,002 * Stroke [mm]		

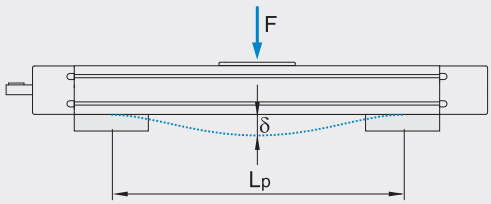
Mass of Linear unit

Linear unit	Carriage Length Lv [mm]	Mass of Linear unit [kg]
CTV 90 S	35	1,6 + 0,006 * Stroke [mm]
CTV 90 L	100	2,2 + 0,006 * Stroke [mm]

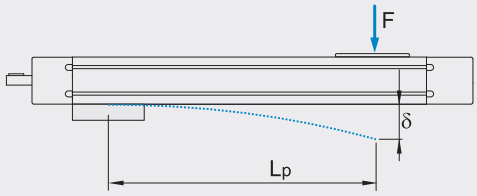
Mass calculation doesn´t include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

Fixed - fixed mounting



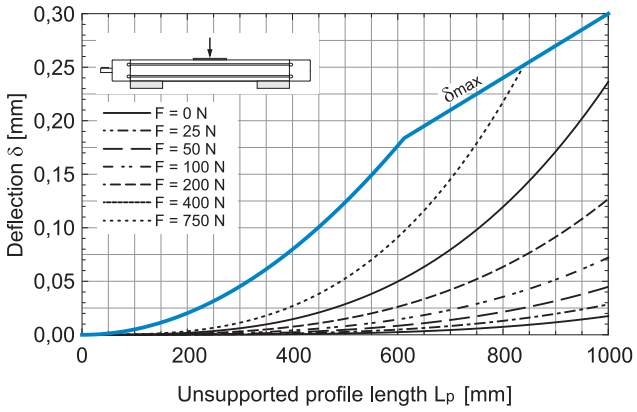
Fixed - free mounting

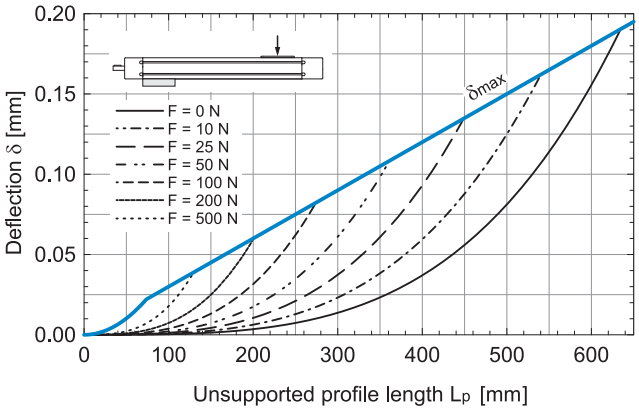


δ Maximum deflection of the linear unit [mm]
δmax Maximum permissible deflection of the linear unit [mm]
F Applied force [N]
Lp Unsupported profile length [mm]

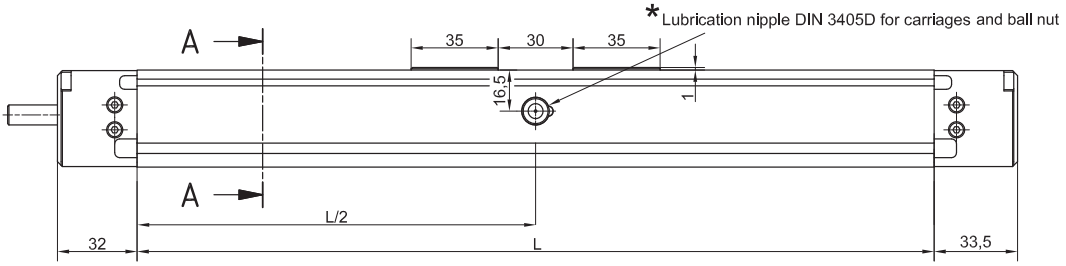
The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

CTV 90



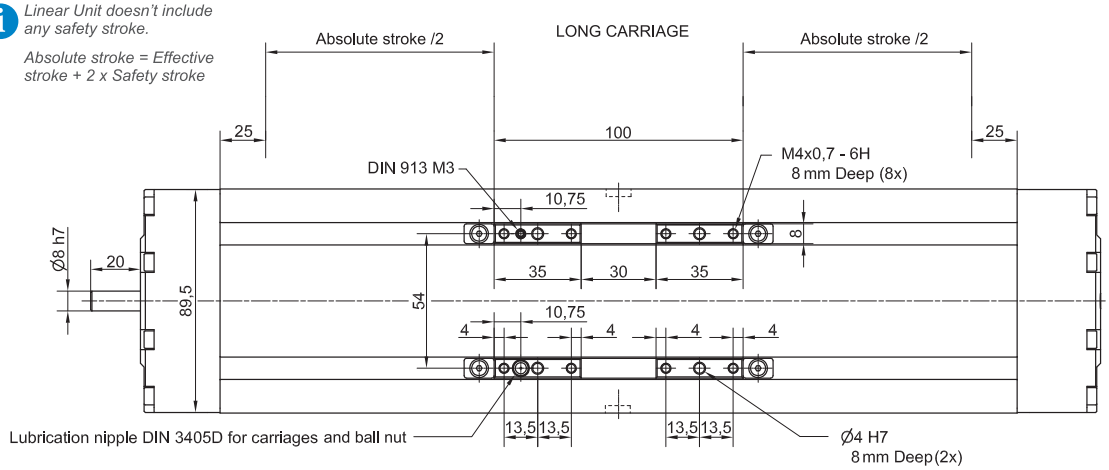


DIMENSIONS



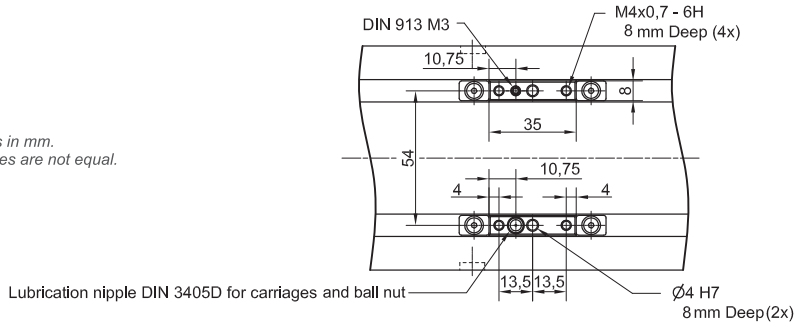
Linear Unit doesn't include any safety stroke.

Absolute stroke = Effective stroke + 2 x Safety stroke



* **Lubrication port position**:
Long carriage: L/2
Short carriage: L/2 - 24,2 mm

SHORT CARRIAGE

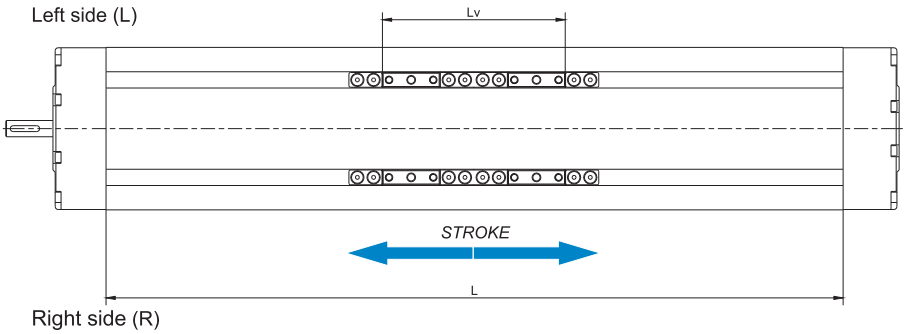


All dimensions in mm.
Drawings scales are not equal.

Defining of the linear unit length

L = Effective stroke + 2 × Safety stroke + Lv + 50 mm

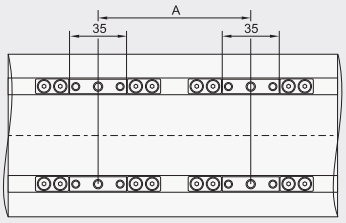
Ltotal = L + 65,5 mm



Lv - Long carriage = 100 mm
Lv - Short carriage = 35 mm

Double-Carriage

*Only with **short** carriage version.*



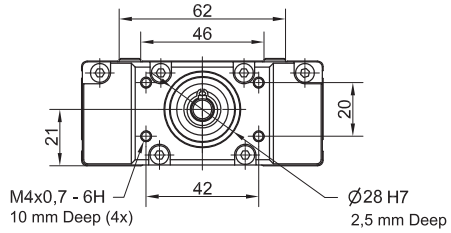
For ordering code please contact us.

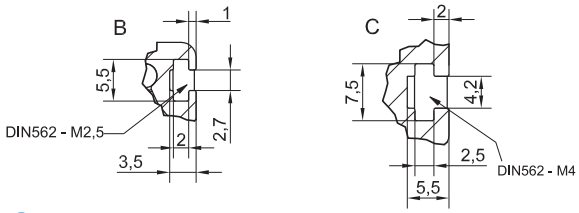
L = Effective stroke + 2 × Safety stroke + A + 85 mm

Ltotal = L + 65,5mm

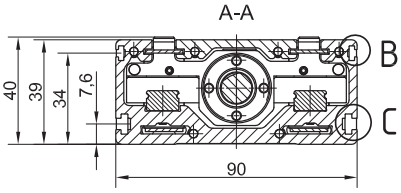
A ≥ 65 mm

DIMENSIONS

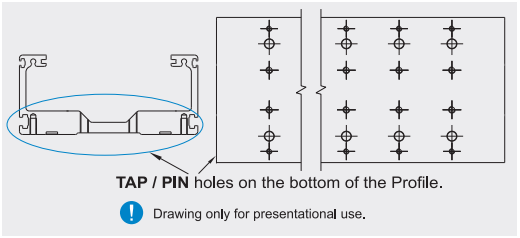




OPTIONAL: TAP / PIN holes available on request.

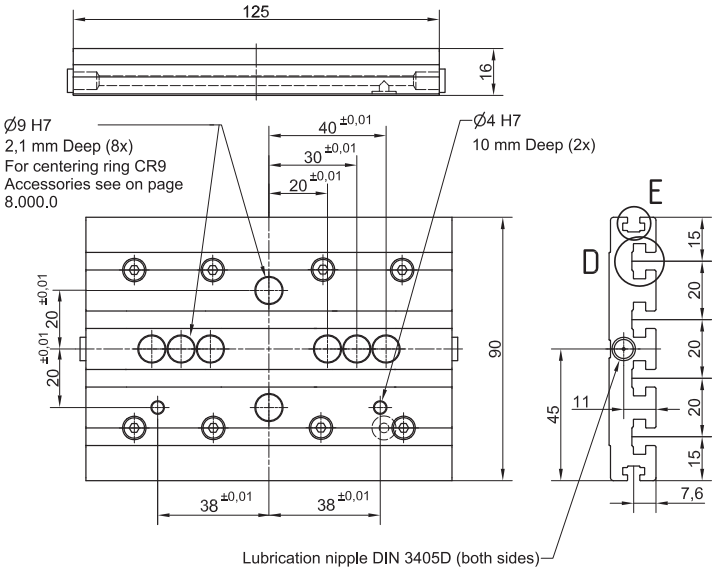


All dimensions in mm; Drawings scales are not equal.

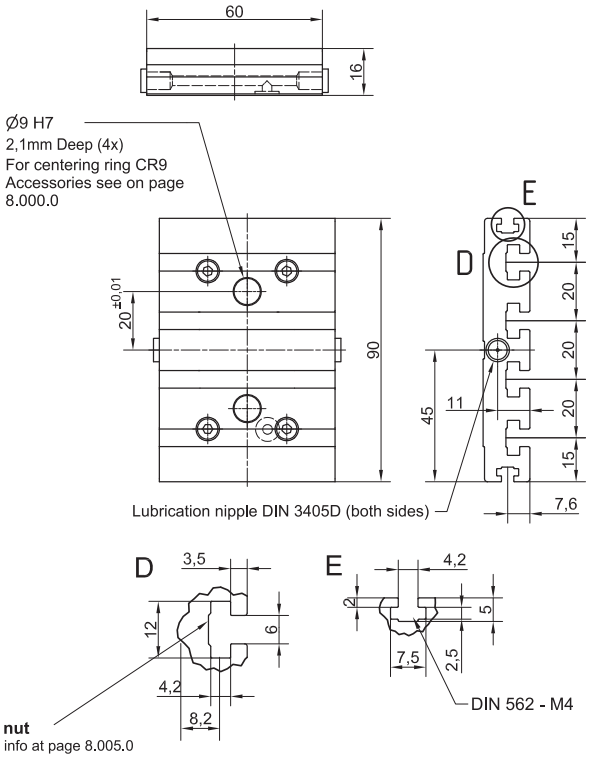


CONNECTION PLATE

CTV 90 L



CTV 90 S



Linear Unit	Plate length [mm]	Weight [kg]	Code
CTV 90 S	60	0,21	46906
CTV 90 L	125	0,44	46907

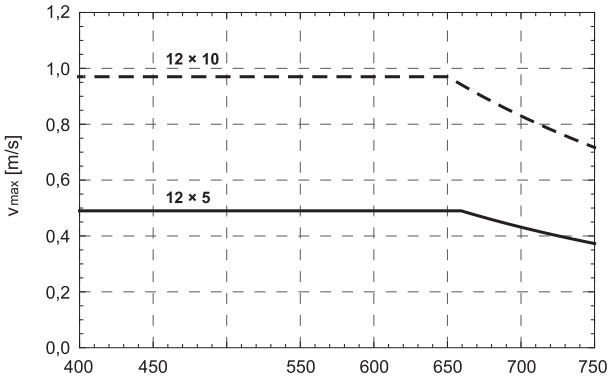
Mounting elements for mounting the connection plate on the Linear unit are inlcuded.

Mounting the drive

- by the **MOTOR SIDE DRIVE - MSD** *(Page 7.095.0)*
- by the **MOTOR ADAPTER WITH COUPLING** *(Page 8.020.0)*

Available on request.

Maximum travel speed as a function of the profile length (Vmax - L curves)



TECHNICAL DATA

General technical data

Linear Unit	Carriage length	Dynamic load capacity	Dynamic moment			Max. permissible loads					Moved mass	* Max. length	* Max. stroke
						Forces		Moments					
	Lv [mm]	C [N]	Mx [Nm]	My [Nm]	Mz [Nm]	Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]	[kg]	Lmax [mm]	[mm]
CTV 110 S	39	19800	650	118	235	4670	9390	310	90	90	0,63	1500	1410
CTV 110 L	124	39600	1305	1680	1680	13080	18800	620	800	550	1,36		1325

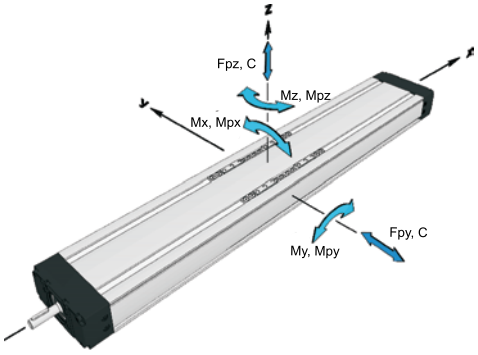
*For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valied for double carriage.
(equation of defining the linear unit length for particular size of the linear unit needs to be used).

Recommended values of loads:

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0)

Modulus of elasticity

E = 70000 N / mm^2



Operating conditions	
Operating temp.	0°C ~ +60°C
Duty cycle	100%

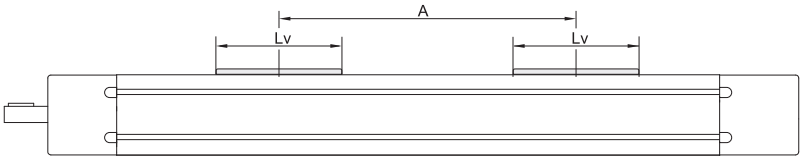
For operating temperature out of the presented range, please contact us.

General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity	* Dynamic moment			* Max. permissible loads				
						Forces		Moments		
		C [N]	Mx [Nm]	My [Nm]	Mz [Nm]	Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]
CTV 110	S2	39600	1300	19,8 * A [mm]	19,8 * A [mm]	12940	18790	620	9,4 * A [mm]	6,5 * A [mm]

*A - Distance between carriages. More info on following pages.

*Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.
For grater number of carriages please contact us.*



Ball Screw Drive data

Linear Unit	Ball screw	Max. rotational speed	[1] Max. travel speed	[2] No load torque		Lead constant	[3] Max. repeteability precision [mm]		Dynamic load capacity BS	Max. Axial load	Max. drive torque	[4] Min. stroke	[1] Max. accele-ration
				Carriage: S	Carriage: L		STANDARD ISO7	ISO5					
	[d × l]	[rev / min]	[m / s]	[Nm]	[Nm]	[mm / rev]			Ca [N]	Fx [N]	Ma [Nm]	[mm]	[m/s^2]
CTV 110	16 × 5	4200	0,35	0,11	0,13	5	± 0,02	± 0,01	13150	8700	5,5 with Keyway 7,7 without Keyway	40	20
	16 × 10		0,70	0,12	0,16	10	± 0,02	± 0,01	11550	6730	5,5 with Keyway		
	16 × 16		1,12	0,14	0,18	16	± 0,02	± 0,01	8170	4200	11,9 without Keyway		

[1] *Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit.
For travel speed and acceleration over the stated value in the table above or diagrams please contact us.*

[2] *The stated values are for strokes up to 500mm.
No Load Torque value increases with stroke elongation*

[3] *For the ball nut with the preload of 2% please contact us*

[4] *For minimum stroke below the stated value in the table above please contact us.*

TECHNICAL DATA

Mass moment inertia of Linear unit

Linear unit	Carriage version	Ball screw [d × l]	Mass moment of inertia [10^{-5} kg * m^2]	Planar moment of inertia Iy [cm^4]	Iz [cm^4]
CTV 110	S	16 × 5	0,70 + 0,005 * Stroke [mm]	29,1	196,0
		16 × 10	0,82 + 0,005 * Stroke [mm]		
		16 × 16	1,07 + 0,005 * Stroke [mm]		
	L	16 × 5	1,19 + 0,005 * Stroke [mm]		
		16 × 10	1,45 + 0,005 * Stroke [mm]		
		16 × 16	1,99 + 0,005 * Stroke [mm]		

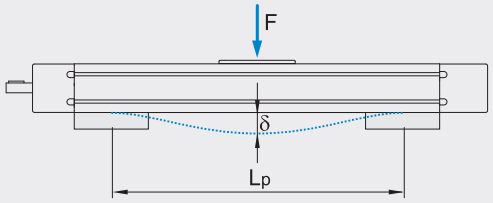
Mass of Linear unit

Linear unit	Carriage Length Lv [mm]	Mass of Linear unit [kg]
CTV 110 S	39	3,3 + 0,008 * Stroke [mm]
CTV 110 L	124	4,6 + 0,008 * Stroke [mm]

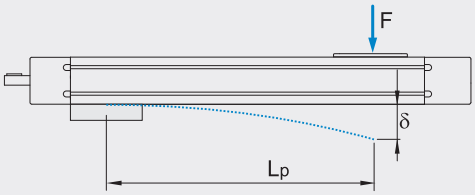
Mass calculation doesn´t include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

Fixed - fixed mounting



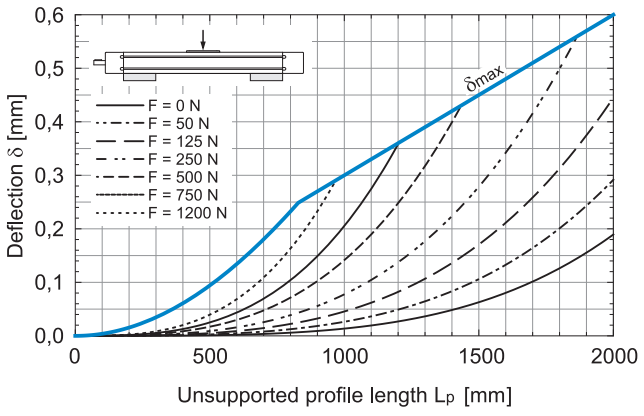
Fixed - free mounting

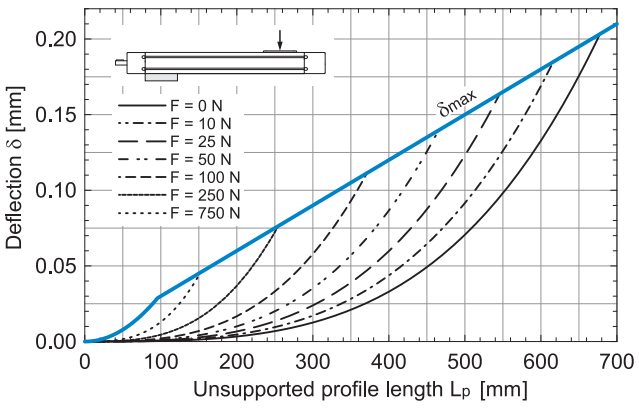


δ Maximum deflection of the linear unit [mm]
δmax Maximum permissible deflection of the linear unit [mm]
F Applied force [N]
Lp Unsupported profile length [mm]

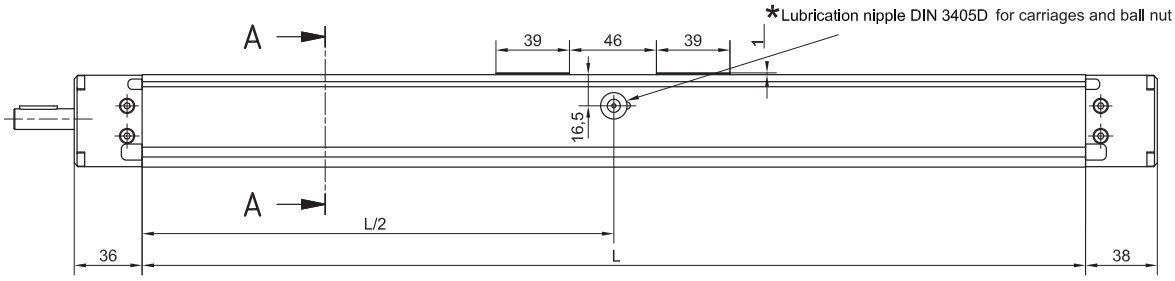
The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

CTV 110





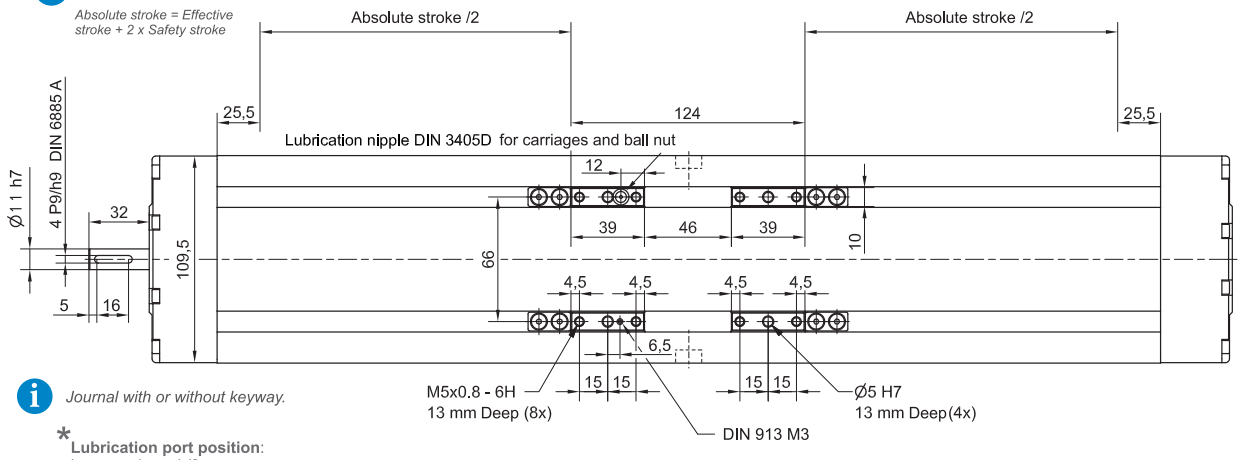
DIMENSIONS



Linear Unit doesn't include any safety stroke.

Absolute stroke = Effective stroke + 2 x Safety stroke

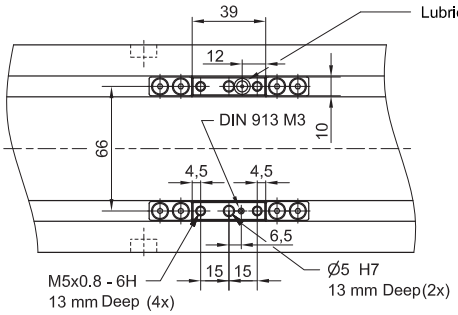
LONG CARRIAGE



Journal with or without keyway.

* **Lubrication port position**:
Long carriage: L/2
Short carriage: L/2 - 39 mm

SHORT CARRIAGE

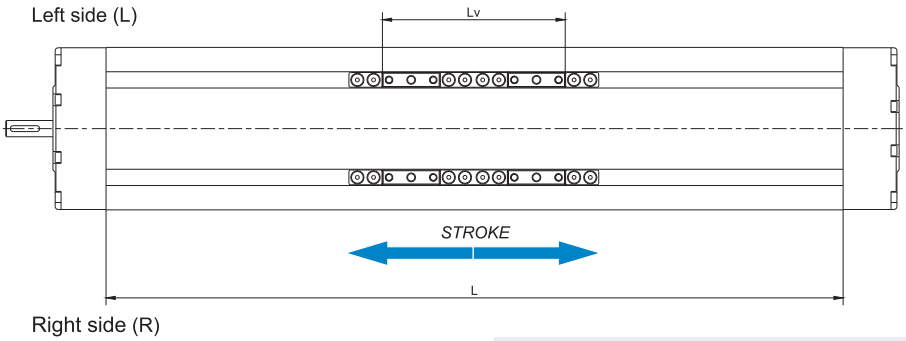


All dimensions in mm.
Drawings scales are not equal.

Defining of the linear unit length

L = Effective stroke + 2 × Safety stroke + Lv + 51 mm

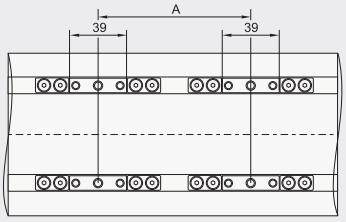
Ltotal = L + 74 mm



Lv - Long carriage = 124 mm
Lv - Short carriage = 39 mm

Double-Carriage

*Only with **short** carriage version.*



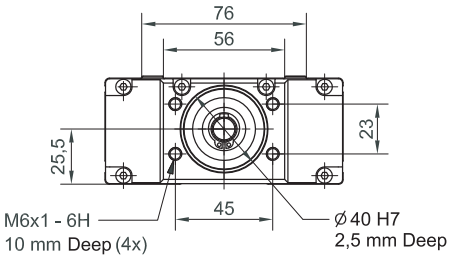
For ordering code please contact us.

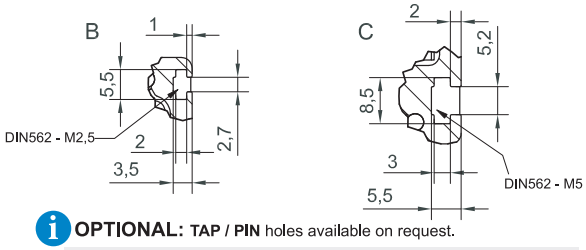
L = Effective stroke + 2 × Safety stroke + A + 90 mm

Ltotal = L + 74 mm

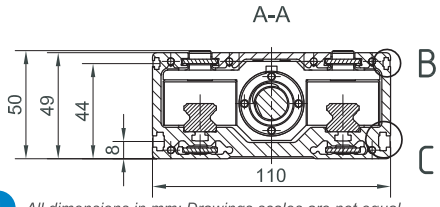
A ≥ 85 mm

DIMENSIONS

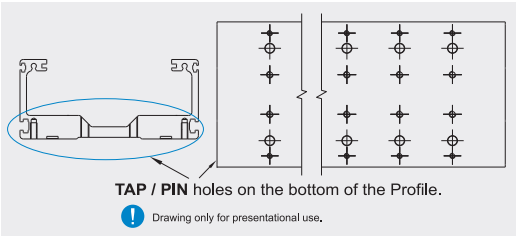




OPTIONAL: TAP / PIN holes available on request.



All dimensions in mm; Drawings scales are not equal.

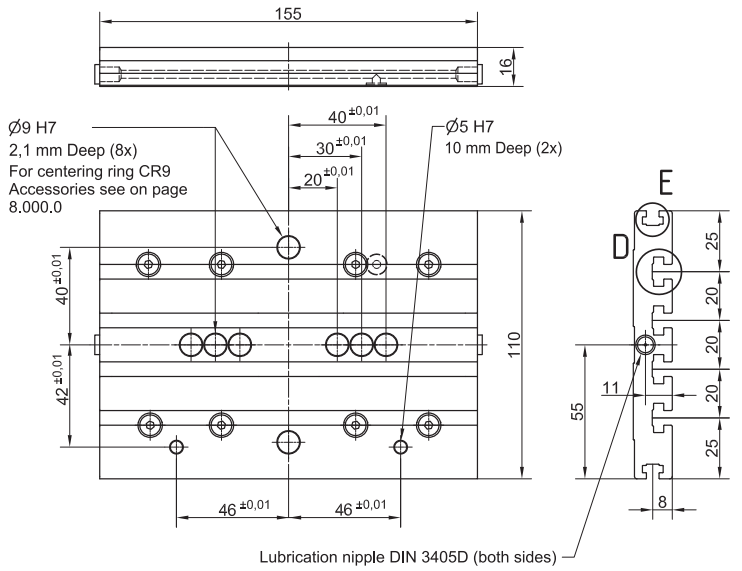


TAP / PIN holes on the bottom of the Profile.

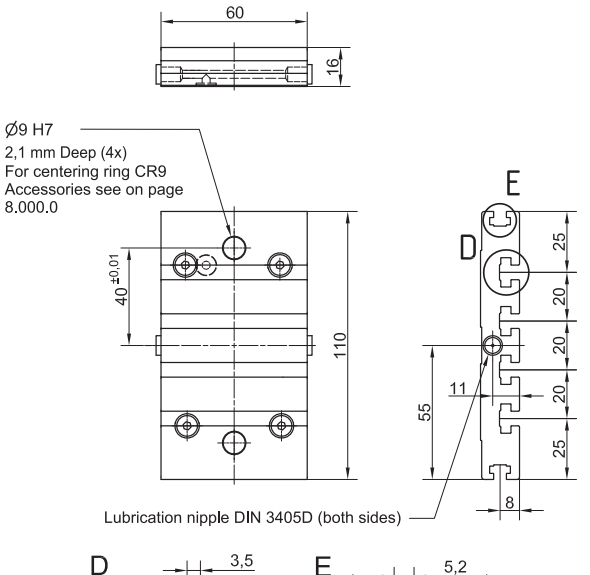
Drawing only for presentational use.

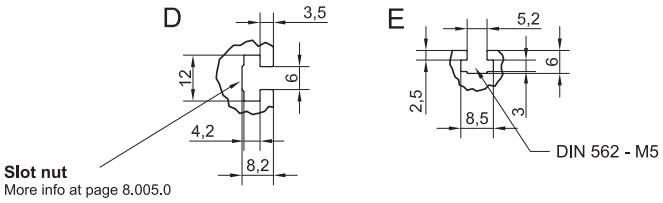
CONNECTION PLATE

CTV 110 L



CTV 110 S



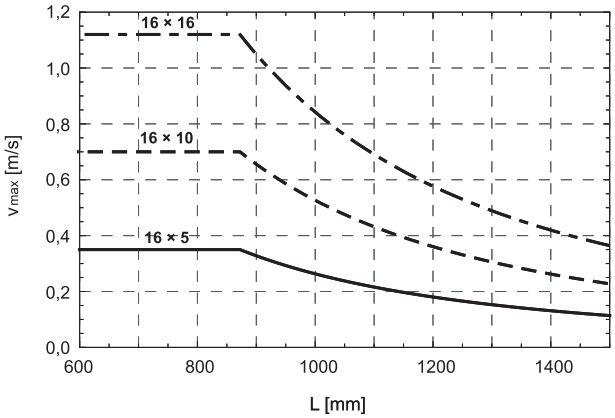


Slot nut
More info at page 8.005.0

Linear Unit	Plate length [mm]	Weight [kg]	Code
CTV 110 S	60	0,37	48348
CTV 110 L	155	0,74	48349

Mounting elements for mounting the connection plate on the Linear unit are inlcuded.

Maximum travel speed as a function of the profile length (Vmax - L curves)



Mounting the drive

- by the **MOTOR SIDE DRIVE - MSD** *(Page 7.095.0)*
- by the **MOTOR ADAPTER WITH COUPLING** *(Page 8.020.0)*

Available on request.

TECHNICAL DATA

General technical data

Linear Unit	Carriage length	Dynamic load capacity	Dynamic moment			Max. permissible loads					Moved mass	* Max. length	* Max. stroke
						Forces		Moments					
	L_V [mm]	C [N]	Mx [Nm]	My [Nm]	Mz [Nm]	Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]	[kg]	L_{max} [mm]	[mm]
CTV 145 S	49	34200	1500	260	520	8930	15320	674	260	180	1,19	1800	1690
CTV 145 L	149	68400	3005	3420	3420	17870	30680	1350	1700	893	2,61		1590

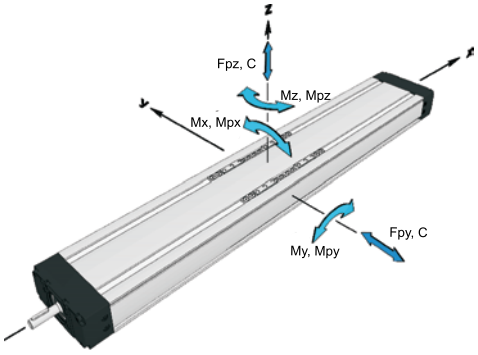
*For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valied for double carriage.
(equation of defining the linear unit length for particular size of the linear unit needs to be used).

Recommended values of loads:

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0)

Modulus of elasticity

E = 70000 N / mm^2



Operating conditions	
Operating temp.	0°C ~ +60°C
Duty cycle	100%

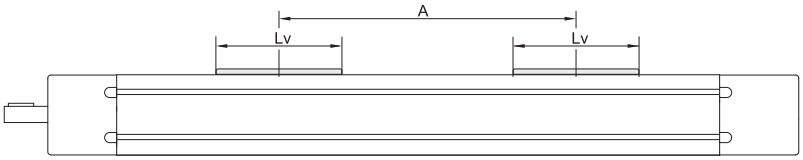
For operating temperature out of the presented range, please contact us.

General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity	* Dynamic moment			* Max. permissible loads				
						Forces		Moments		
		C [N]	Mx [Nm]	My [Nm]	Mz [Nm]	Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]
CTV 145	S2	68400	3000	34,2 * A [mm]	34,2 * A [mm]	17870	30640	1350	15,3 * A [mm]	8,9 * A [mm]

*A - Distance between carriages. More info on following pages.

*Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.
For grater number of carriages please contact us.*



Ball Screw Drive data

Linear Unit	Ball screw	Max. rotational speed	[1] Max. travel speed	[2] No load torque		Lead constant	[3] Max. repeteability precision [mm]		Dynamic load capacity BS	Max. Axial load	Max. drive torque	[4] Min. stroke	[1] Max. acceleration
				Carriage: S	Carriage: L		STANDARD ISO7	ISO5					
	[d × l]	[rev / min]	[m / s]	[Nm]	[Nm]	[mm / rev]			Ca [N]	Fx [N]	Ma [Nm]	[mm]	[m/s^2]
CTV 145	20 × 5	3300	0,28	0,28	0,3	5	± 0,02	± 0,01	14800	14800	11,9 with Keyway 13,0 without Keyway	55	20
	20 × 10		0,55	0,26	0,28	10	± 0,02	± 0,01	15900	13850	11,9 with Keyway 24,5 without Keyway		
	20 × 20		1,10	0,24	0,28	20	± 0,02	± 0,01	16250	6930			
	20 × 50	3000	2,50	0,58	0,6	50	± 0,02	± 0,01	13000	2770			

[1] *Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.*

[2] *The stated values are for strokes up to 500mm. No Load Torque value increases with stroke elongation*

[3] *For the ball nut with the preload of 2% please contact us*

[4] *For minimum stroke below the stated value in the table above please contact us.*

TECHNICAL DATA

Mass moment inertia of Linear unit

Linear unit	Carriage version	Ball screw [d × l]	Mass moment of inertia [10^{-5} kg * m^2]	Planar moment of inertia Iy [cm^4]	Iz [cm^4]
CTV 145	S	20 × 5	3,04 + 0,013 * Stroke [mm]	85,3	682,3
		20 × 10	3,27 + 0,013 * Stroke [mm]		
		20 × 20	4,17 + 0,013 * Stroke [mm]		
		20 × 50	10,50 + 0,013 * Stroke [mm]		
	L	20 × 5	4,43 + 0,013 * Stroke [mm]		
		20 × 10	4,92 + 0,013 * Stroke [mm]		
		20 × 20	6,91 + 0,013 * Stroke [mm]		
		20 × 50	20,79 + 0,013 * Stroke [mm]		

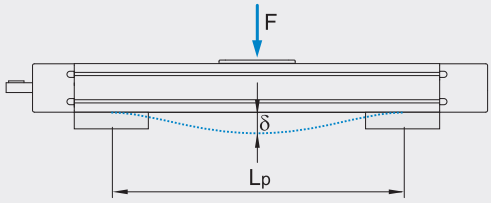
Mass of Linear unit

Linear unit	Carriage Length Lv [mm]	Mass of Linear unit [kg]
CTV 145 S	49	5,7 + 0,015 * Stroke [mm]
CTV 145 L	149	8,4 + 0,015 * Stroke [mm]

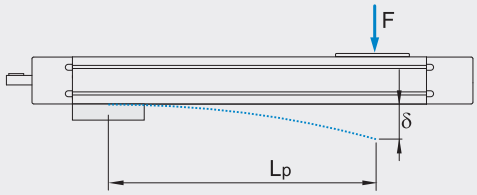
Mass calculation doesn´t include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

Fixed - fixed mounting



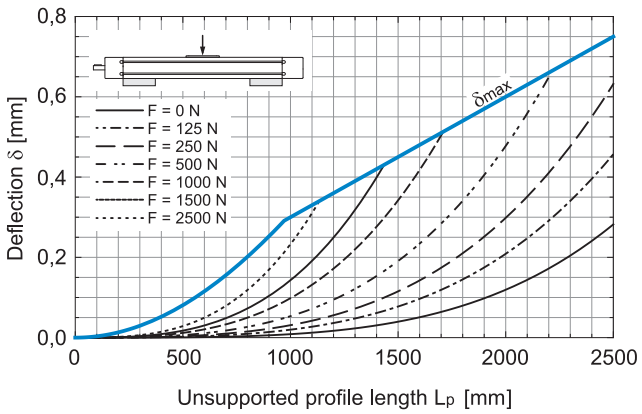
Fixed - free mounting

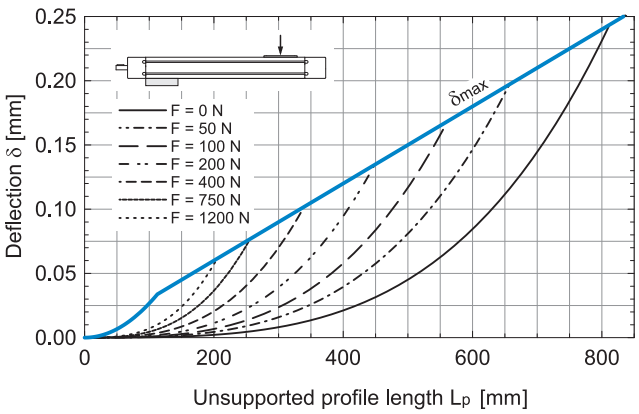


δ Maximum deflection of the linear unit [mm]
δmax Maximum permissible deflection of the linear unit [mm]
F Applied force [N]
Lp Unsupported profile length [mm]

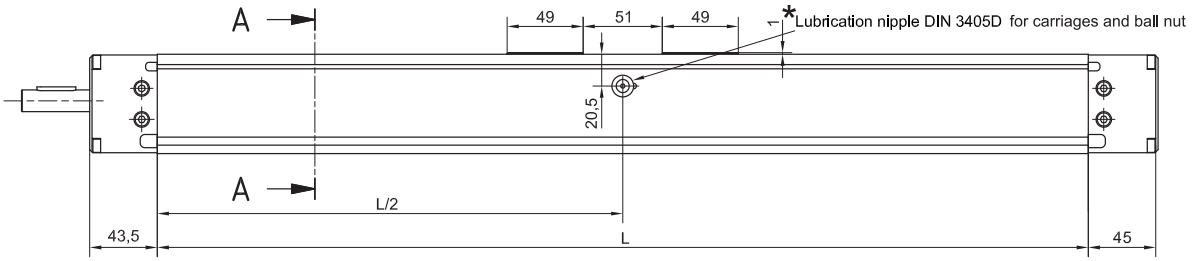
The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

CTV 145





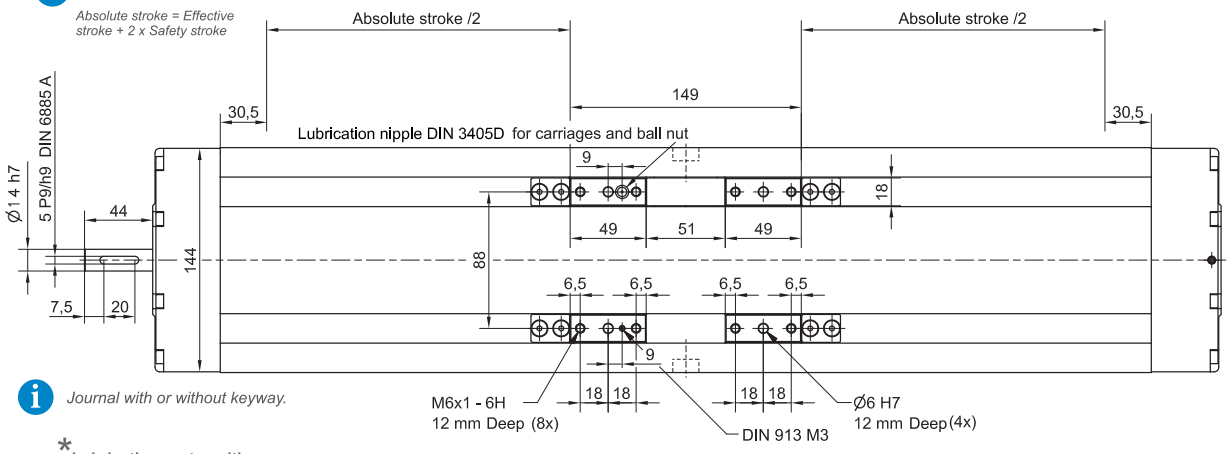
DIMENSIONS



Linear Unit doesn't include any safety stroke.

Absolute stroke = Effective stroke + 2 x Safety stroke

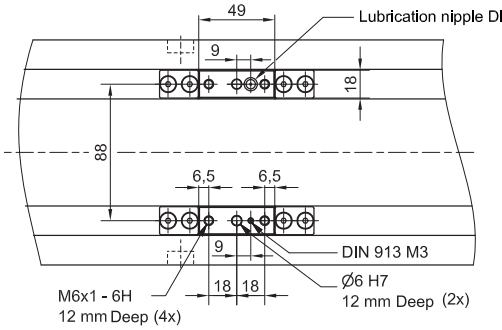
LONG CARRIAGE



Journal with or without keyway.

***Lubrication port position:**
Long carriage: L/2
Short carriage: L/2 - 46 mm

SHORT CARRIAGE



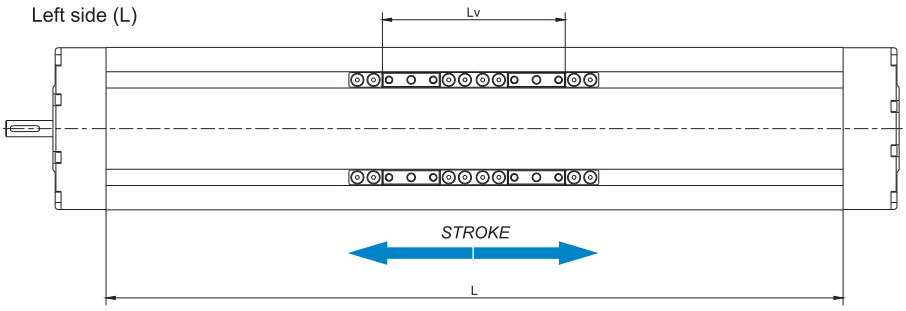
All dimensions in mm.
Drawings scales are not equal.

Defining of the linear unit length

L = Effective stroke + 2 × Safety stroke + Lv + 61 mm

Ltotal = L + 88,5 mm

Left side (L)

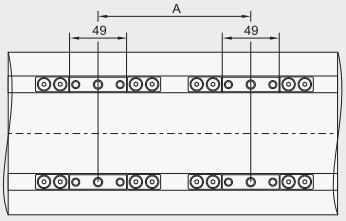


Right side (R)

Lv - Long carriage = 149 mm
Lv - Short carriage = 49 mm

Double-Carriage

*Only with **short** carriage version.*



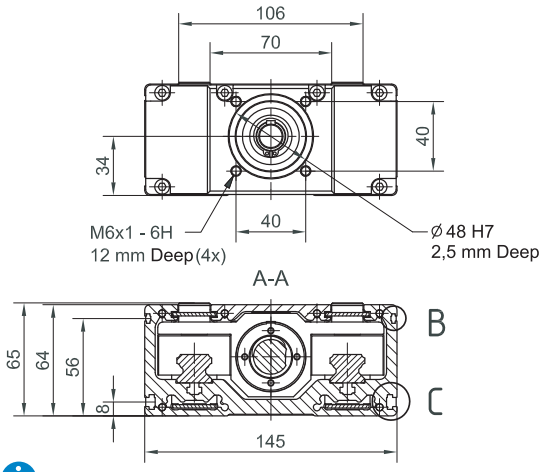
For ordering code please contact us.

L = Effective stroke + 2 × Safety stroke + A + 110 mm

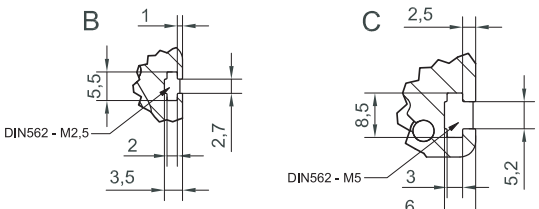
Ltotal = L + 88,5 mm

A ≥ 100 mm

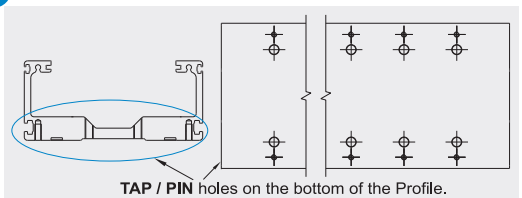
DIMENSIONS



All dimensions in mm; Drawings scales are not equal.



OPTIONAL: **TAP / PIN** holes available on request.

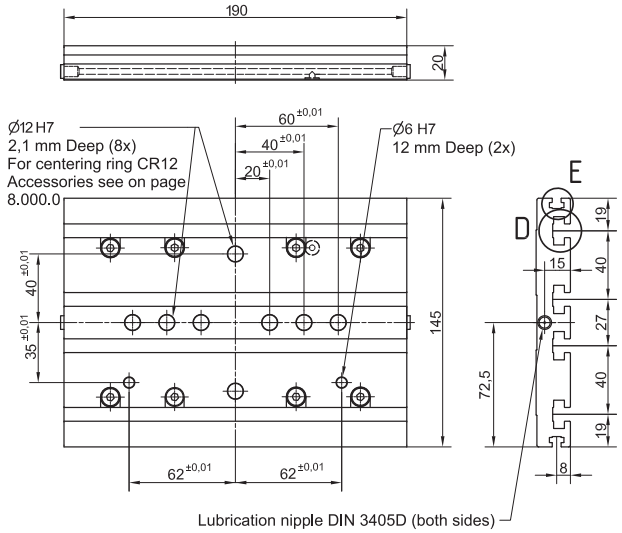


TAP / PIN holes on the bottom of the Profile.

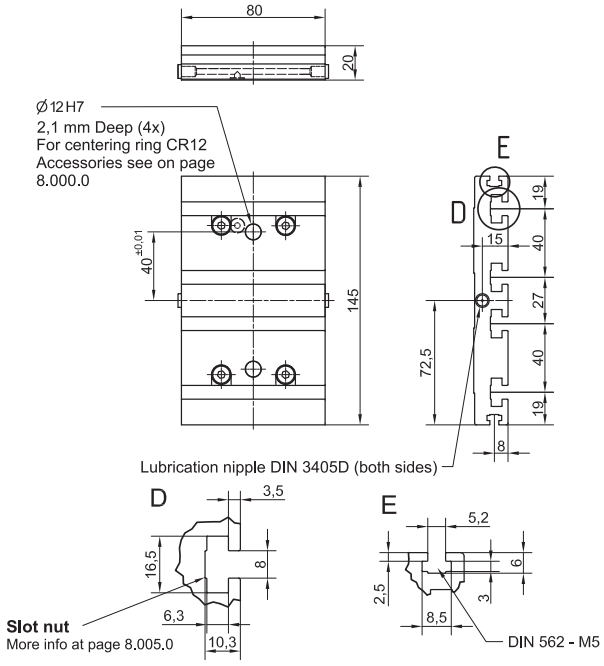
Drawing only for presentational use.

CONNECTION PLATE

CTV 145 L



CTV 145 S



Linear Unit	Plate length [mm]	Weight [kg]	Code
CTV 145 S	80	0,78	48351
CTV 145 L	190	1,54	48350

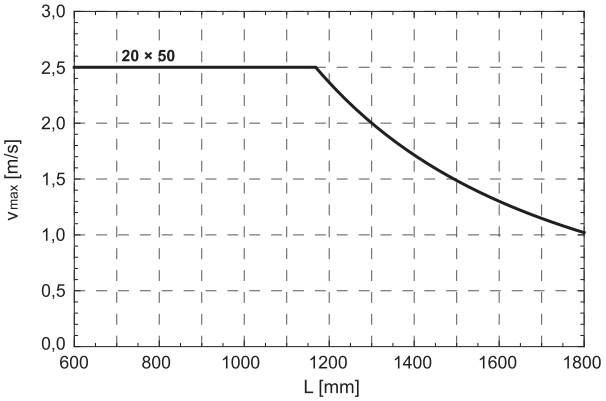
Mounting elements for mounting the connection plate on the Linear unit are inlcuded.

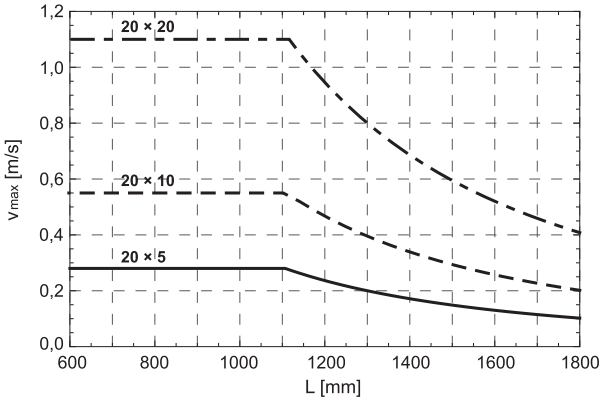
Mounting the drive

- by the **MOTOR SIDE DRIVE - MSD** *(Page 7.095.0)*
- by the **MOTOR ADAPTER WITH COUPLING** *(Page 8.020.0)*

Available on request.

Maximum travel speed as a function of the profile length (Vmax - L curves)





TECHNICAL DATA

General technical data

Linear Unit	Carriage length Lv [mm]	Dynamic load capacity C [N]	Dynamic moment Mx [Nm]	My [Nm]	Mz [Nm]	Max. permissible loads Forces Fpy [N]	Fpz [N]	Moments Mpx [Nm]	Mpy [Nm]	Mpz [Nm]	Moved mass [kg]	* Max. length Lmax [mm]	* Max. stroke [mm]
CTV 200 S	80	49600	3220	450	900	10000	24610	1600	450	308	3,11	2200	2000
CTV 200 L	255	99200	6445	8680	8680	20000	51540	3350	4550	1750	6,21		1825

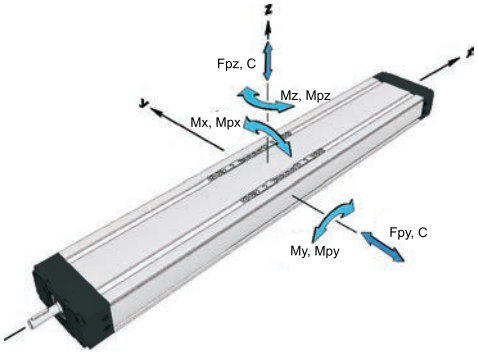
*For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valied for double carriage.
(equation of defining the linear unit length for particular size of the linear unit needs to be used).

Recommended values of loads:

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0)

Modulus of elasticity

E = 70000 N / mm^2



Operating conditions	
Operating temp.	0°C ~ +60°C
Duty cycle	100%

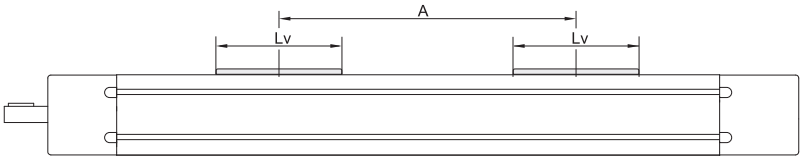
For operating temperature out of the presented range, please contact us.

General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity C [N]	* Dynamic moment Mx [Nm]	My [Nm]	Mz [Nm]	* Max. permissible loads Forces Fpy [N]	Fpz [N]	Moments Mpx [Nm]	Mpy [Nm]	Mpz [Nm]
CTV 200	S2	99200	6440	49,6 * A [mm]	49,6 * A [mm]	20000	49230	3200	24,6 * A [mm]	10,0 * A [mm]

*A - Distance between carriages. More info on following pages.

*Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.
For grater number of carriages please contact us.*



Ball Screw Drive data

Linear Unit	Ball screw [d × l]	Max. rotational speed [rev / min]	1 Max. travel speed [m / s]	2 No load torque Carriage: S [Nm]	Carriage: L [Nm]	Lead constant [mm / rev]	3 Max. repeteability precision [mm] STANDARD ISO7	ISO5	Dynamic load capacity BS Ca [N]	Max. Axial load Fx [N]	Max. drive torque Ma [Nm]	4 Min. stroke [mm]	1 Max. accele-ration [m/s^2]
CTV 200	32 × 5	2150	0,18	0,45	0,55	5	± 0,02	± 0,01	18850	18850	16,7 with Keyway 16,7 without Keyway	65	20
	32 × 10	3000	0,50	0,50	0,60	10	± 0,02	± 0,01	33400	29600	27,3 with Keyway 52,3 without Keyway		
	32 × 20		1,00	0,55	0,65	20	± 0,02	± 0,01	29700	14800			
	32 × 32		1,60	0,60	0,70	32	± 0,02	± 0,01	35150	9240		70	

[1] *Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.*

[2] *The stated values are for strokes up to 500mm. No Load Torque value increases with stroke elongation*

[3] *For the ball nut with the preload of 2% please contact us*

[4] *For minimum stroke below the stated value in the table above please contact us.*

TECHNICAL DATA

Mass moment inertia of Linear unit

Linear unit	Carriage version	Ball screw [d × l]	Mass moment of inertia [10^{-5}kg * m^2]	Planar moment of inertia Iy [cm^4]	Iz [cm^4]
CTV 200	S	32 × 5	21,17 + 0,069 * Stroke [mm]	417,4	3007,3
		32 × 10	21,76 + 0,069 * Stroke [mm]		
		32 × 20	24,12 + 0,069 * Stroke [mm]		
		32 × 32	29,04 + 0,069 * Stroke [mm]		
	L	32 × 5	33,41 + 0,069 * Stroke [mm]		
		32 × 10	34,59 + 0,069 * Stroke [mm]		
		32 × 20	39,31 + 0,069 * Stroke [mm]		
		32 × 32	49,12 + 0,069 * Stroke [mm]		

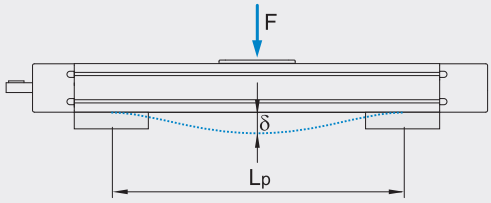
Mass of Linear unit

Linear unit	Carriage Length Lv [mm]	Mass of Linear unit [kg]
CTV 200 S	80	15,4 + 0,031 * Stroke [mm]
CTV 200 L	255	23,8 + 0,031 * Stroke [mm]

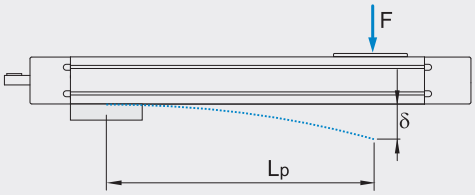
Mass calculation doesn´t include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

Fixed - fixed mounting



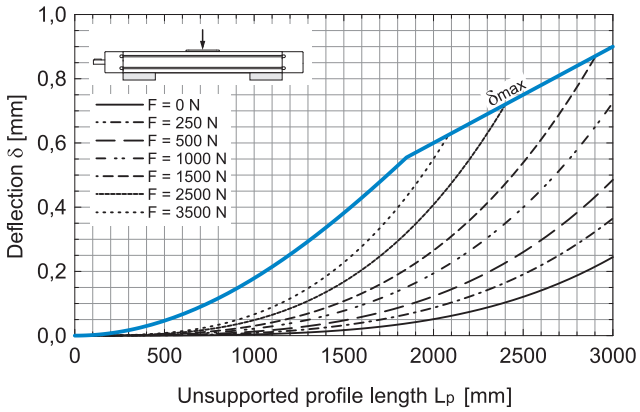
Fixed - free mounting

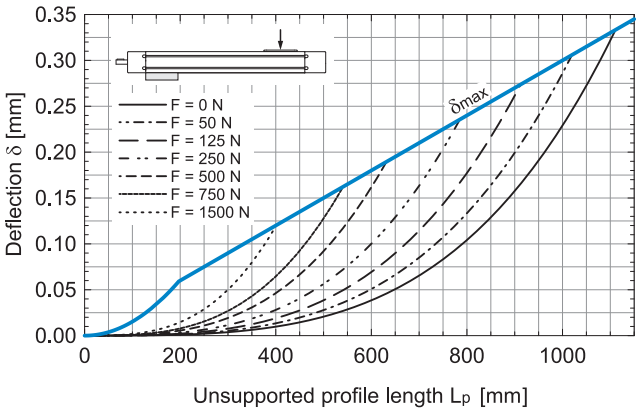


δ Maximum deflection of the linear unit [mm]
δmax Maximum permissible deflection of the linear unit [mm]
F Applied force [N]
Lp Unsupported profile length [mm]

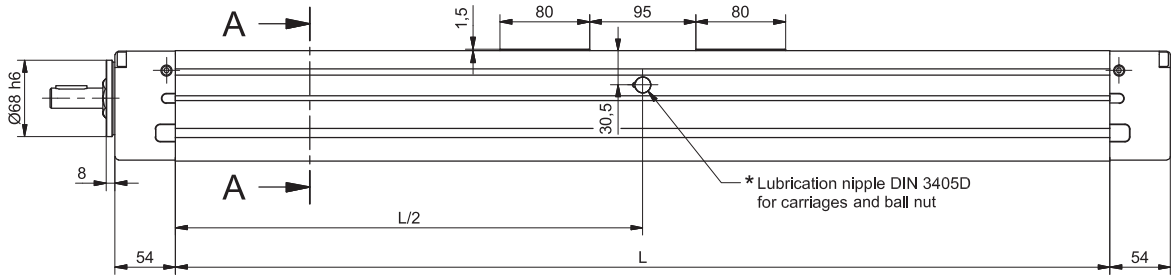
The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

CTV 200



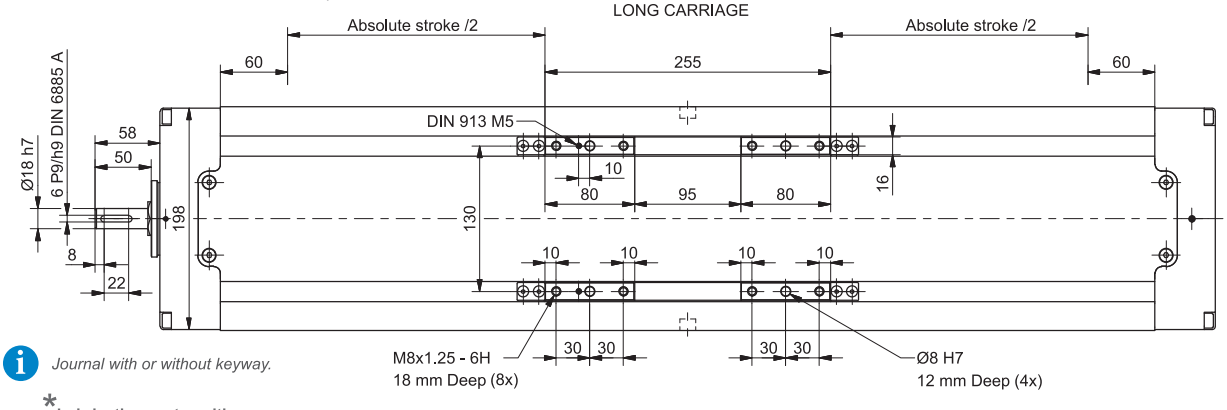


DIMENSIONS



Linear Unit doesn't include any safety stroke.
Absolute stroke = Effective stroke + 2 x Safety stroke

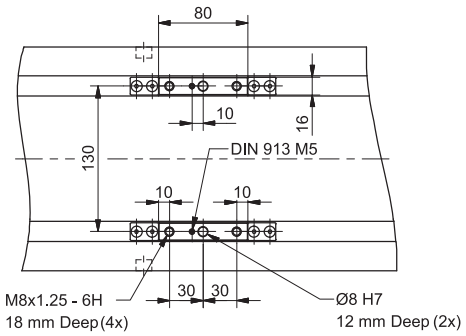
LONG CARRIAGE



Journal with or without keyway.

* **Lubrication port position**:
Long carriage: L/2
Short carriage: L/2 - 53 mm

SHORT CARRIAGE



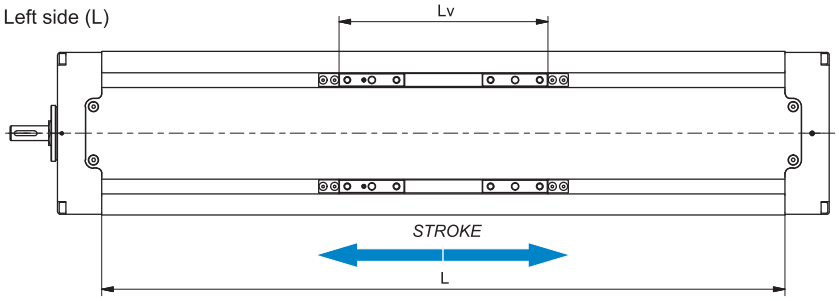
All dimensions in mm.
Drawings scales are not equal.

Defining of the linear unit length

L = Effective stroke + 2 × Safety stroke + Lv + 120 mm

Ltotal = L + 108 mm

Left side (L)

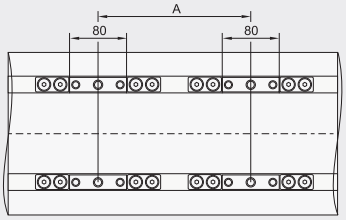


Right side (R)

Lv - Long carriage = 255 mm
Lv - Short carriage = 80 mm

Double-Carriage

*Only with **short** carriage version.*



For ordering code please contact us.

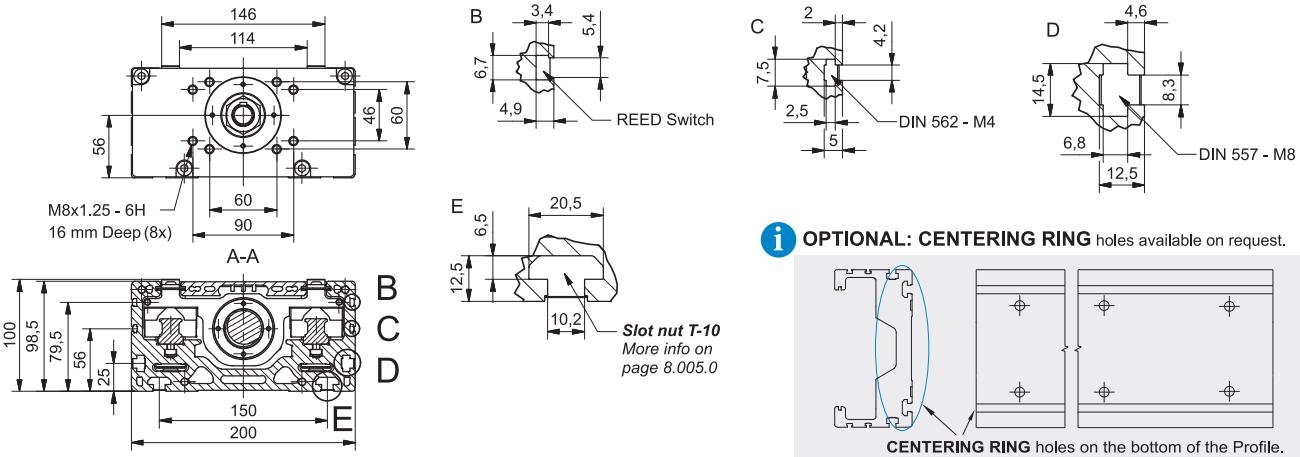
L = Effective stroke + 2 × Safety stroke + A + 200 mm

Ltotal = L + 108 mm

A ≥ 130 mm
***A** ≥ 195 mm

* *In case of using the connection plates.*

DIMENSIONS



All dimensions in mm; Drawings scales are not equal.

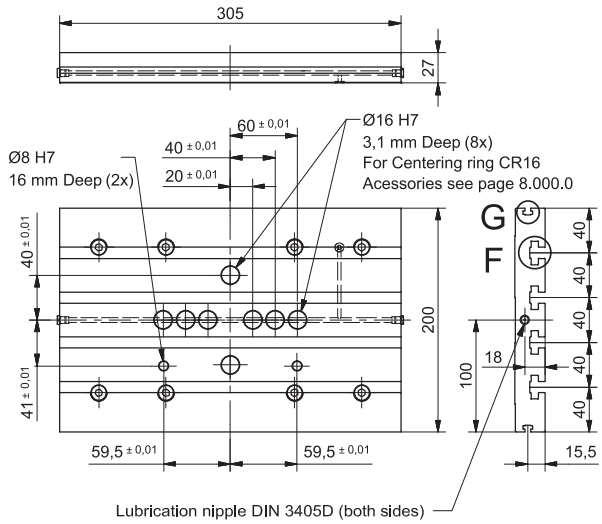
OPTIONAL: CENTERING RING holes available on request.

CENTERING RING holes on the bottom of the Profile.

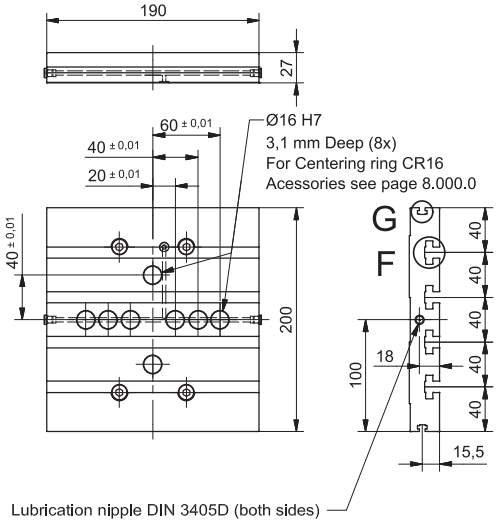
Drawing only for presentational use.

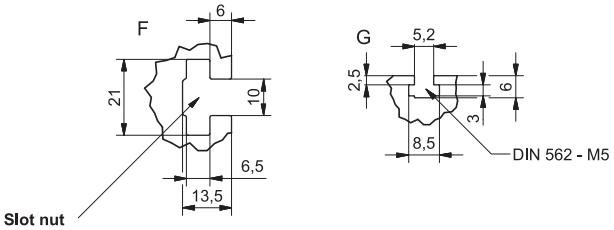
CONNECTION PLATE

CTV 200 L



CTV 200 S





Slot nut
More info on page
8.005.0

Linear Unit	Plate length [mm]	Weight [kg]	Code
CTV 200 S	190	2,32	66669
CTV 200 L	305	3,75	66657

Mounting elements for mounting the connection plate on the Linear unit are inlcuded.

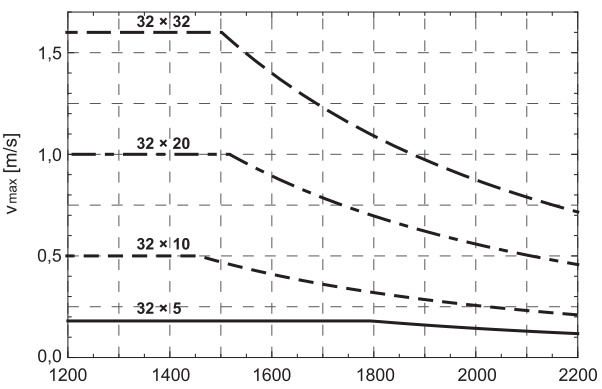
Please consider our advice in our Maintenance- and assembly instructions

Mounting the drive

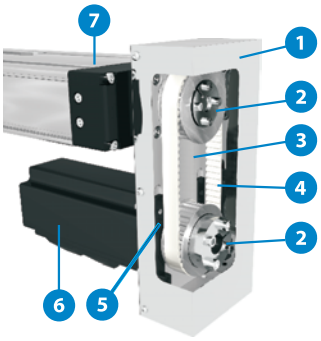
- by the **MOTOR SIDE DRIVE - MSD** *(Page 7.095.0)*
- by the **MOTOR ADAPTER WITH COUPLING** *(Page 8.020.0)*

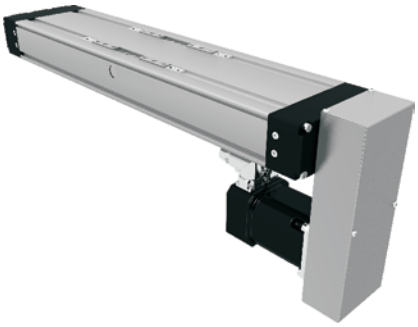
Available on request.

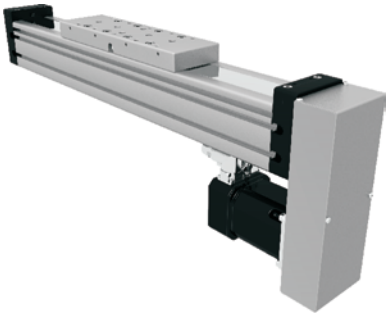
Maximum travel speed as a function of the profile length (Vmax - L curves)



STRUCTURAL DESIGN







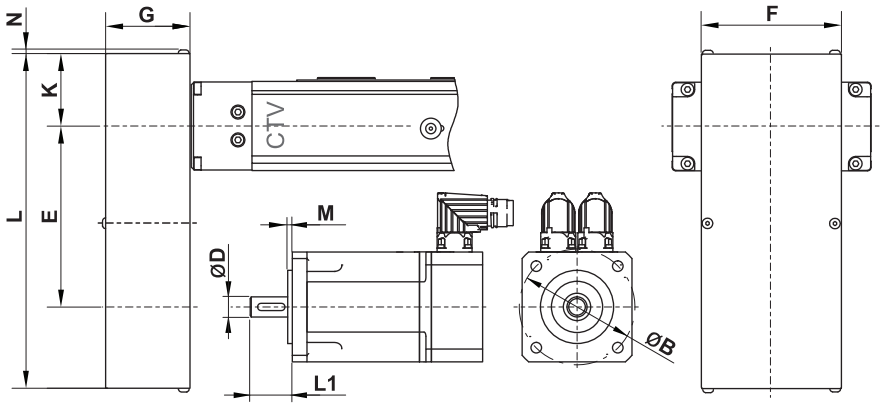
1 - Cover
2 - Attachment of pulley with clamping set
3 - Anodized aluminium housing
4- Toothed belt
5- Belt tensioning system (elongation and frequency of belt span provided with delivery of unit)
6 - Motor
7 - Linear unit - CTV / MTV

The linear unit must be executed with drive journal without keyway, so that the MSD belt drive can be mounted on it.

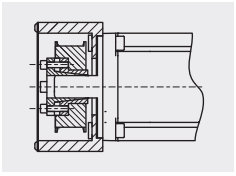
Possible installation positions of MSD

D Down | U Up | R Right | L Left

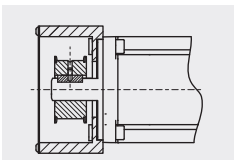
DIMENSIONS AND TECHNICAL DATA



Clamping set



Keyway



Linear Unit	Type	Gear ratio	Max. drive torque (linear unit) [Nm]	** Max. radial load on shaft [N]	Mass moment of inertia [10^{-6} kg * m^2]	Mass [kg]	Motor size limits [mm] ØB max	*M max	L1 min Clamping set	L1 min Keyway	L1 max	ØD max Clamping set	ØD max Keyway	Dimensions [mm] E	F	G	K	L	N
CTV 90	T1	i=1	2,7	90	79	0,88	70	4	22	25	39	14	22	100	70	41	31	179	2
		i=1,5	2,7	90	48	0,74			/			/	14	102					
CTV 110 MTV 65	T1	i=1	5	175	72	0,90	70	4	22	25	39	14	22	100	70	41	31	179	2
		i=1,5	5	175	41	0,80			/			/	14	112				190	
CTV 110 MTV 65	T2	i=1	9	245	206	1,51	100	4	24	30	49	18	30	145	90	51	43	250	2
		i=1,5	11	235	335	1,53			25			14		139					
CTV 145 MTV 80	T1	i=1	13	350	207	1,52	100	4	24	30	49	18	30	145	90	51	43	250	2
		i=1,5	19	410	335	1,64			25			14		180				282	
CTV 145 MTV 80	T2	i=1	19	410	551	3,30	120	4	30	35	59	22	40	160	120	61	56	297	2,5
		i=2	24	375	860	2,93						14	32	158					
CTV 200 MTV 110	ON REQUEST																		

*For a bigger value an additonal adapter plate is used.

(max. drive speed: 3000 1/min; No load torque: approx. 0,5 Nm)

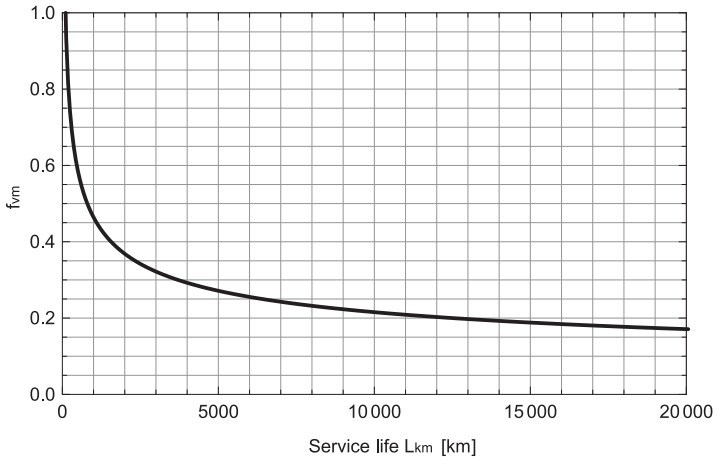
**This is the load which is linearly dependent on the max. drive torque and is generated by the correct pretension of the belt. This load needs to be reduced in accordance with the capabilities of the motor.

HOW TO ORDER

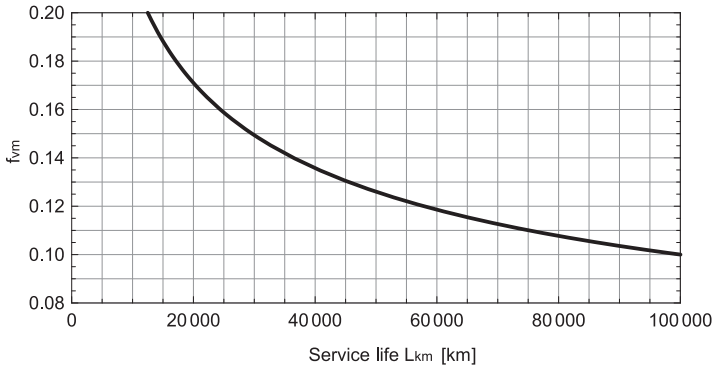
MSD - **CTV 110** - **T2** - **1,5** - **MSM040B**

- **Motor Side Drive:** MSD
- **Linear Unit series :** CTV 110 — CTV / MTV
- **Type :** T2
- **Gear ratio :** 1,5
- **Motor type :** MSM040B — According to customer's drawing

Mean load comparison factor f_{vm} as a function of service life L_{km}



Detailed view:



Diagrams and equations are valid for:

- *MTJ series*
- *MTV series*
- *MTJ ECO series*
- *MTJZ series*
- *CTJ series*
- *CTV series*

Presented diagrams are showing teoretically determined service life of the linear guiding when mean load comparison factor fvm is taken into consideration.

Load comparison factor f_v:

$$f_v = \frac{|Fy|}{Cdyn} + \frac{|Fz|}{Cdyn} + \frac{|Mx|}{Mx\,dyn} + \frac{|My|}{My\,dyn} + \frac{|Mz|}{Mz\,dyn}$$

fv	Load comparison factor	
Cdyn	Dynamic load capacity	N
Mx dyn	Dynamic moment capacity in x-axis	Nm
My dyn	Dynamic moment capacity in y-axis	Nm
Mz dyn	Dynamic moment capacity in z-axis	Nm
Fy	Applied force in y direction	N
Fz	Applied force in z direction	N
Mx	Applied moment in x-axis	Nm
My	Applied moment in y-axis	Nm
Mz	Applied moment in z-axis	Nm

Service life calculation:

$$L_{km} = \left(\frac{1}{f_{vm}}\right)^3 \cdot 10^2$$

Lkm Service life [km]

Safety factor f_s:

$$f_s = \frac{1}{f_{vm}}$$

fs Safety factor

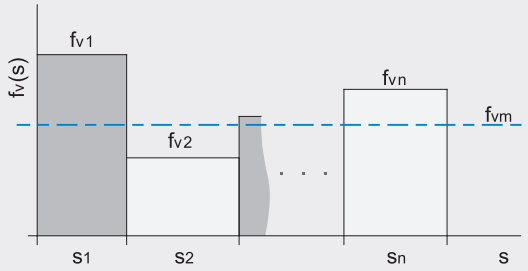
The safety factor depends on the application and its requested safety. We recommended a minimum safety factor fs = 5.0

Mean load comparison factor f_{vm} calculation:

$$f_{vm} = \sqrt[3]{\frac{fv1^3 \times s1 + fv2^3 \times s2 + \ldots + fvn^3 \times sn}{s1 + s2 + \ldots + sn}}$$

fvm	Mean load comparison factor
fv i	i-th load comparison factor of a given loading regime fv (s), i ∈ {1,2,...,n}
si	i-th travel path of a given loading regime fv (s), i ∈ {1,2,...,n}

Loading regime fv (s):

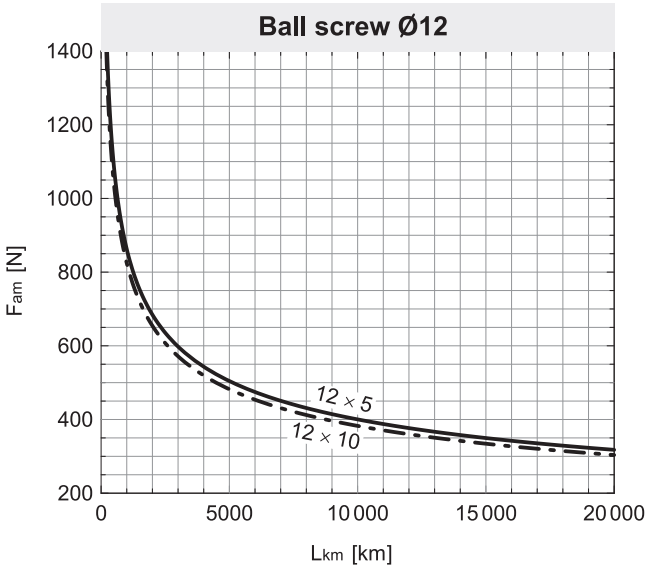


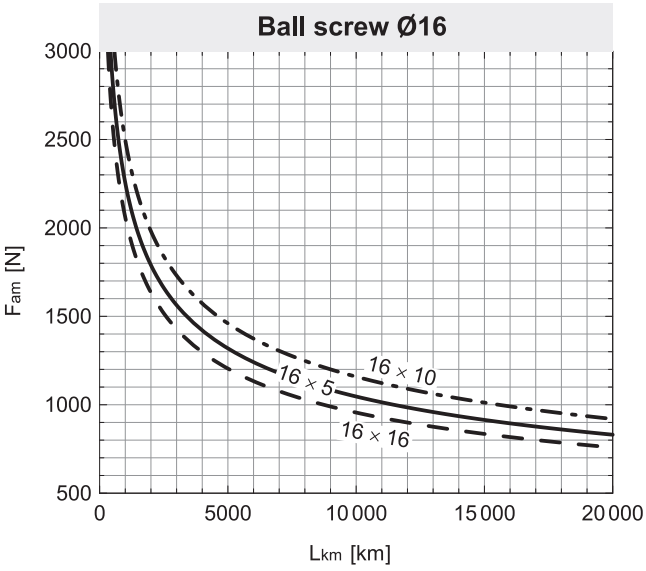
$$f_p = \frac{|Fy|}{Fpy} + \frac{|Fz|}{Fpz} + \frac{|Mx|}{Mpx} + \frac{|My|}{Mpy} + \frac{|Mz|}{Mpz} \leq 1$$

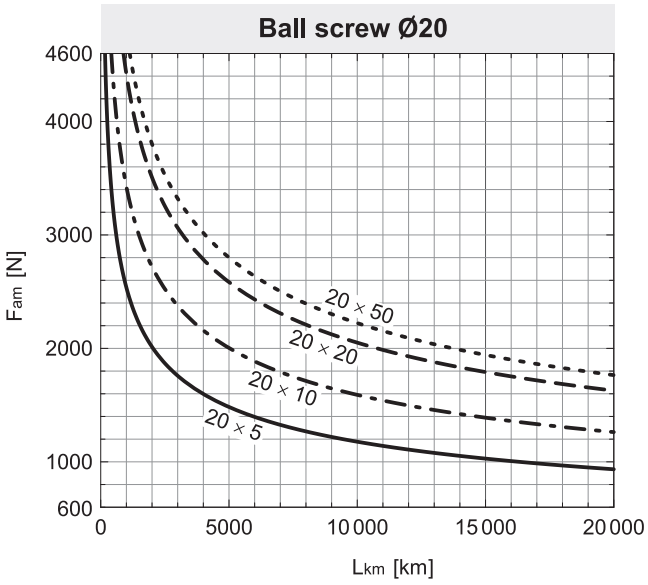
fp	Permissible load factor	
Fpy	Max. permissible force in y-axis	N
Fpz	Max. permissible force in z-axis	N
Mpx	Max. permissible moment in x-axis	Nm
Mpy	Max. permissible moment in y-axis	Nm
Mpz	Max. permissible moment in z-axis	Nm

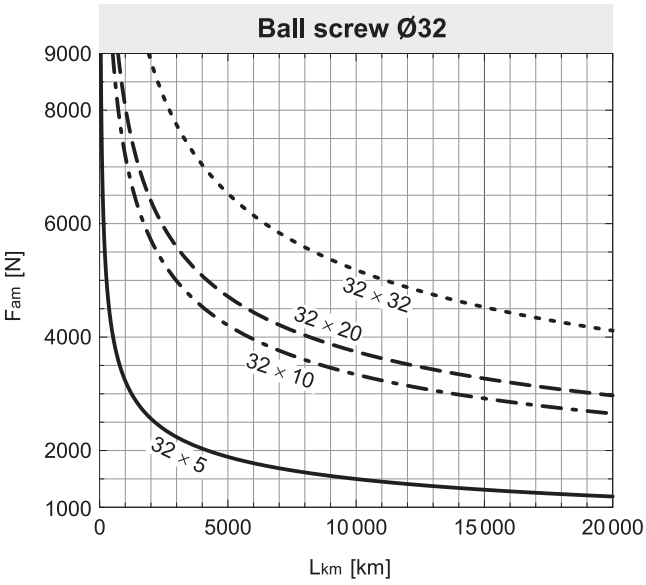
SERVICE LIFE - BALL SCREW

Applied mean axial force Fam as a function of service life Lkm









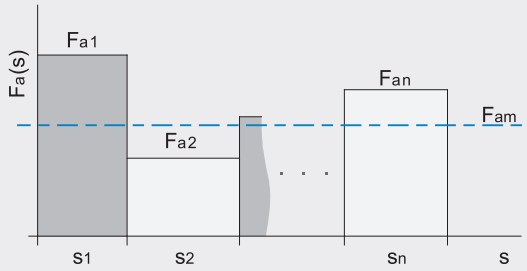
Mean axial force Fam calculation:

$$Fam = \sqrt[3]{\frac{|Fa1|^3 \times s1 + |Fa2|^3 \times s2 + \ldots + |Fan|^\beta \times sn}{s1 + s2 + \ldots + sn}}$$

Fam	Mean axial force
Fa i	i-th axial force of a given loading regime Fa (s), i ∈ {1,2,...,n}
si	i-th travel path of a given loading regime Fa (s), i ∈ {1,2,...,n}

Diagrams presented above are showing teoretically determined service life of the ball screw when mean axial force Fam is taken into consideration.

Loading regime Fa (s):



Diagrams and equations are valid for:

- *MTV series*
- *CTV series*