

CTV

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 contaminations.

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.

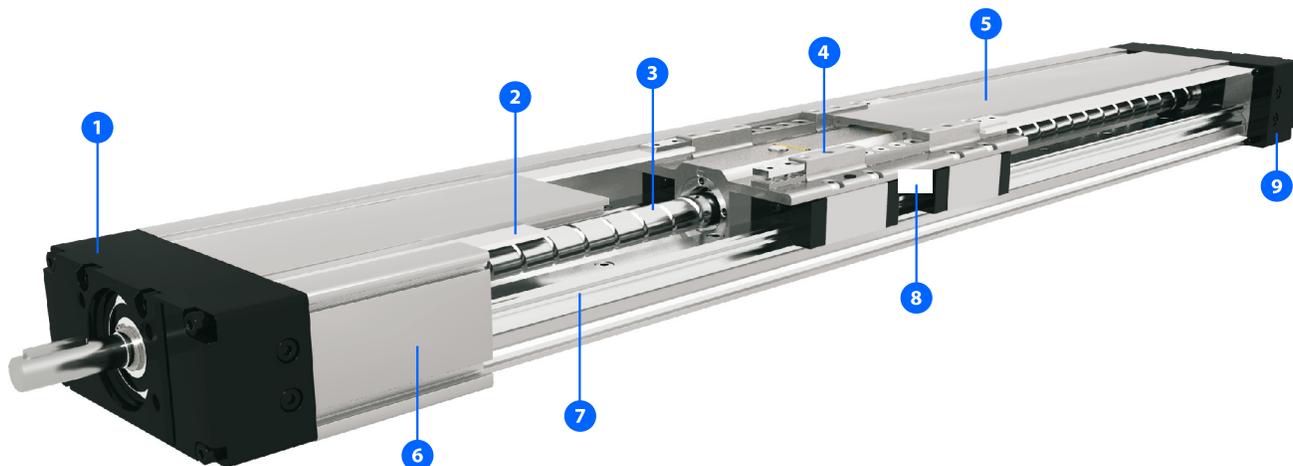
For the linear units CTV various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.



i 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



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

Number of carriages : _____
The stated number specifies the number of carriages on one Linear unit (up to 5 carriages available)

Leave blank : For the case of one carriage
! Connection between the carriages is not rigid

Distance between two carriages [mm] : _____
Leave blank : For the case of one carriage

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			Max. permissible loads					Moved mass [kg]	* Max. length Lmax [mm]	* Max. stroke [mm]
			Mx [Nm]	My [Nm]	Mz [Nm]	Forces		Moments					
						Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]			
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

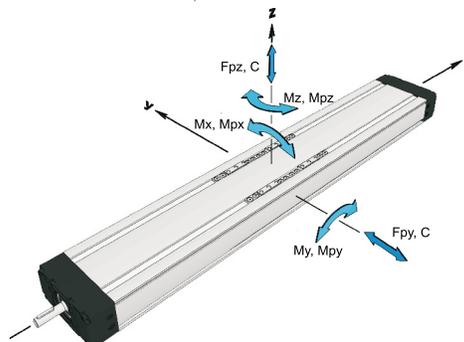
* For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valid for multiple carriages (equation of defining the linear unit length for particular size of the linear unit needs to be used).

i 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 / mm²



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

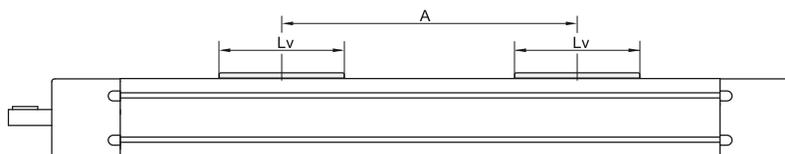
For operating temperature out of the presented range, please contact us.

General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity C [N]	Dynamic moment			Max. permissible loads				
			Mx [Nm]	My [Nm]	Mz [Nm]	Forces		Moments		
						Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]
CTV 90	S2	9240	250	4,6 × A	4,6 × A	3990	9090	250	4,5 × A	2,0 × A
	L2	18480	500	9,2 × A	9,2 × A	7980	18170	500	9,0 × A	4,0 × A

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

i Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.



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		Lead constant [mm / rev]	3 Max. repeatability precision [mm]		Dynamic load capacity BS Ca [N]	Max. Axial load Fx [N]	Max. drive torque Ma [Nm]	4 Min. stroke [mm]	1 Max. acceleration [m/s ²]
				Carriage: S [Nm]	Carriage: L [Nm]		STANDARD ISO7	ISO5					
CTV 90	12 × 5	5800	0,49	0,08 × nc	0,10 × nc	5	± 0,02	± 0,01	5000	5000	4,4 without Keyway	30	20
	12 × 10			0,09 × nc	0,11 × nc		10	± 0,02					

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 (and distances between the carriages A) up to 500mm.

No Load Torque value increases with stroke (and with A) elongation.

nc - Number of carriages

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 and mass moment of inertia

Linear unit	Mass of linear unit [kg]	Planar moment of inertia	
		ly [cm ⁴]	lz [cm ⁴]
CTV 90 S	$1,6 + 0,006 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,30 \times (\text{nc} - 1)$	13,6	102,6
CTV 90 L	$2,2 + 0,006 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,50 \times (\text{nc} - 1)$		

Linear unit	Ball screw [d × l]	Mass moment of inertia [10 ⁻⁵ kg m ²]
	12 × 10	$0,38 + 0,002 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,08 \times (\text{nc} - 1)$
CTV 90 L	12 × 5	$0,43 + 0,002 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,03 \times (\text{nc} - 1)$
	12 × 10	$0,53 + 0,002 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,13 \times (\text{nc} - 1)$

*Absolute stroke [mm]

A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages



Mass calculation doesn't include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

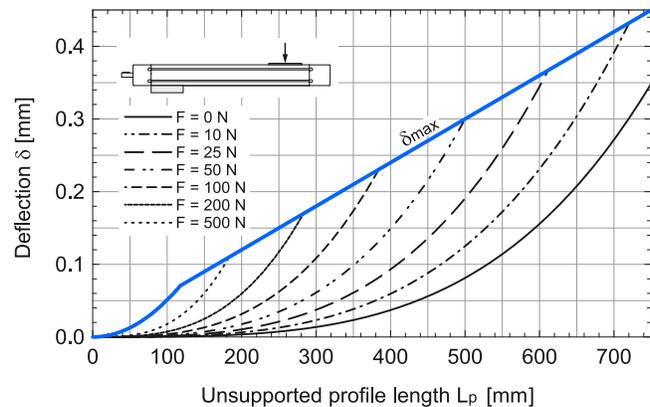
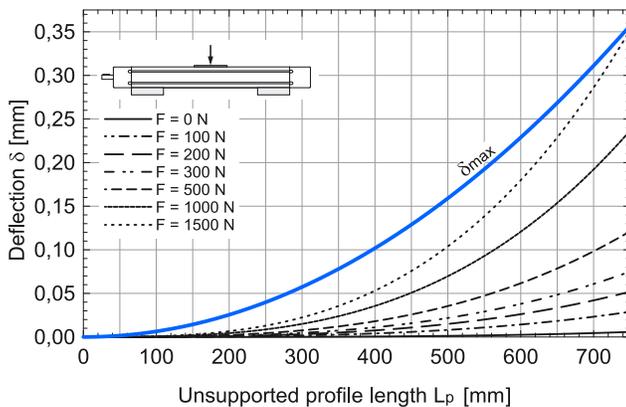
Fixed - fixed mounting

Fixed - free mounting

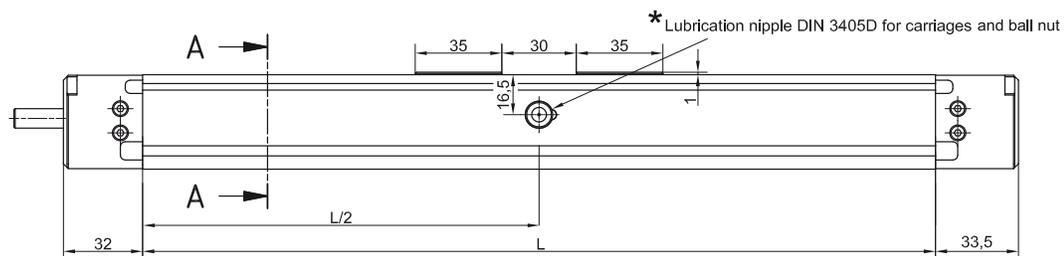
δ Maximum deflection of the linear unit [mm]
 δ_{max} Maximum permissible deflection of the linear unit [mm]
 F Applied force [N]
 Lp Unsupported profile length [mm]

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

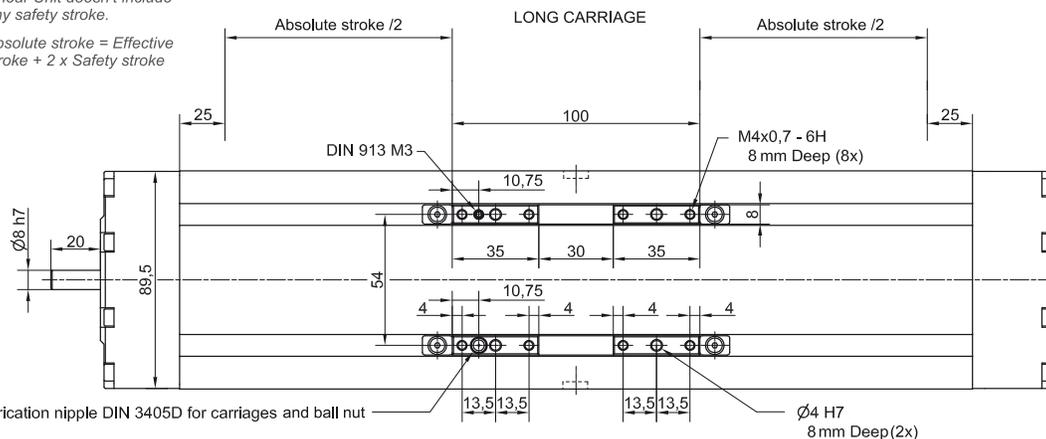
CTV 90



DIMENSIONS



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

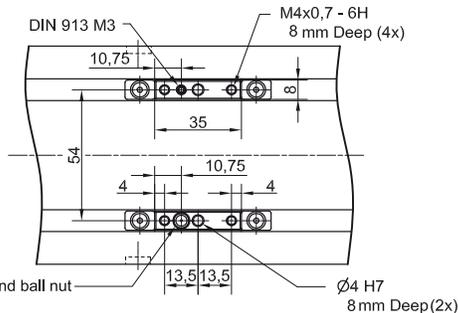


* Lubrication port position:
Long carriage: L/2
Short carriage: L/2 - 24,2 mm

i For lubrication port positions in the case of multiple carriages please contact us.

i All dimensions in mm.
Drawings scales are not equal.

SHORT CARRIAGE

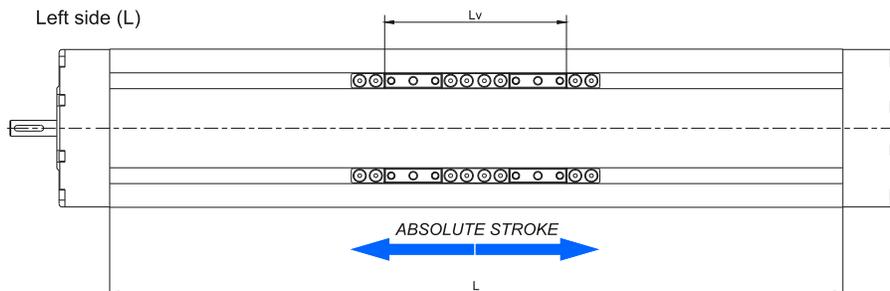


Defining of the linear unit length

L = Effective stroke + 2 x Safety stroke + Lv + A x (nc - 1) + 50 mm **i**

Ltotal = L + 65,5 mm *nc - Number of carriages*

Left side (L)

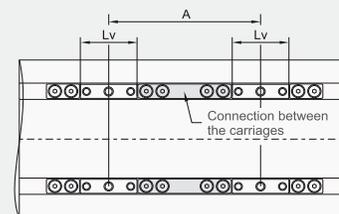


Right side (R)

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

Multiple carriages

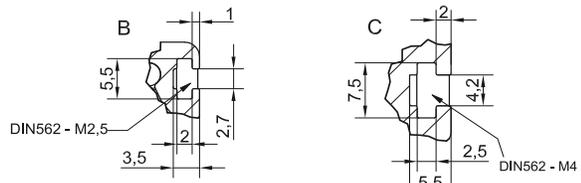
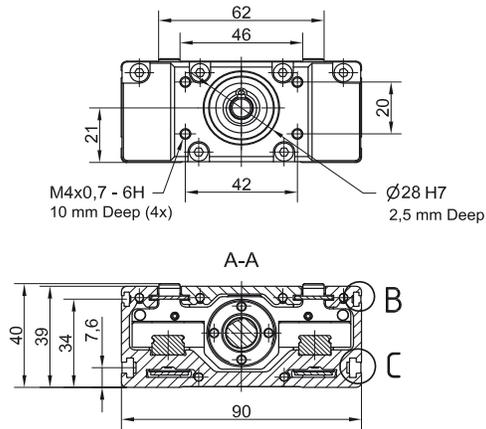
Amin ≤ A ≤ Alim **i**



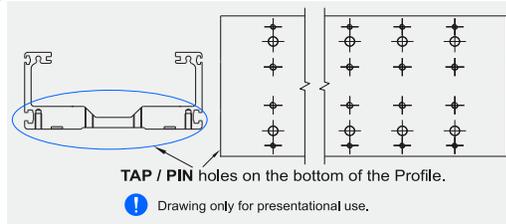
i Carriages are connected with non-rigid galvanized steel plates.

	CTV 90 S	CTV 90 L
Amin [mm]	65	130
Alim [mm]	600	665

DIMENSIONS



i OPTIONAL: TAP / PIN holes available on request.

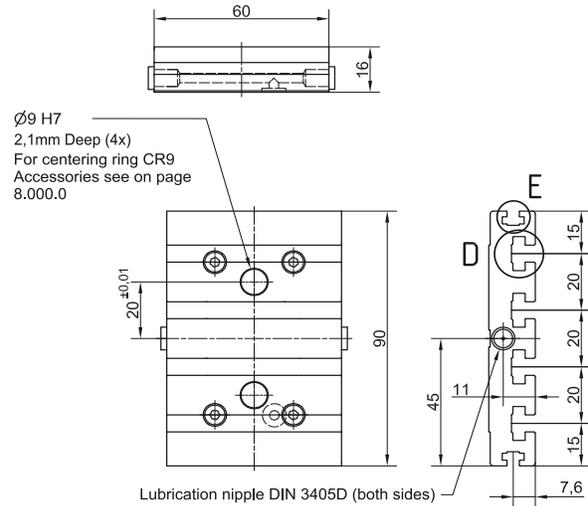
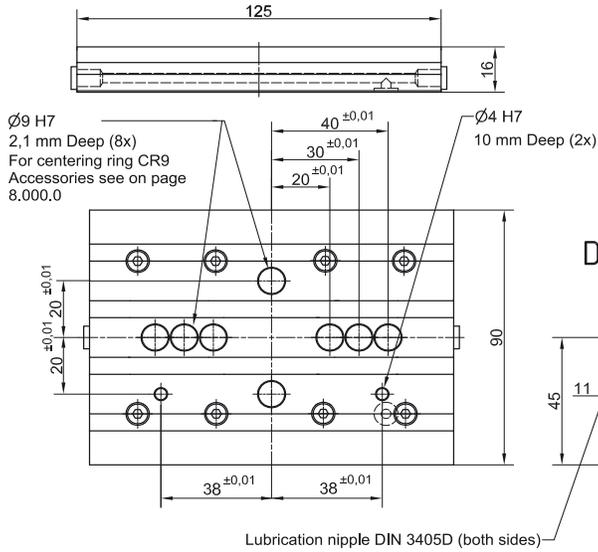


i All dimensions in mm; Drawings scales are not equal.

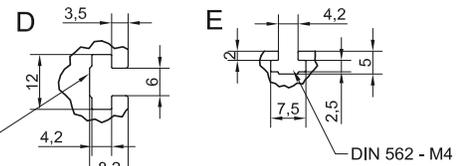
CONNECTION PLATE

CTV 90 L

CTV 90 S



Lubrication nipple DIN 3405D (both sides)



Slot nut
More info at page 8.005.0

Linear Unit	Plate length [mm]	Weight [kg]	Code
CTV 90 S	60	0,21	103669
CTV 90 L	125	0,44	103668

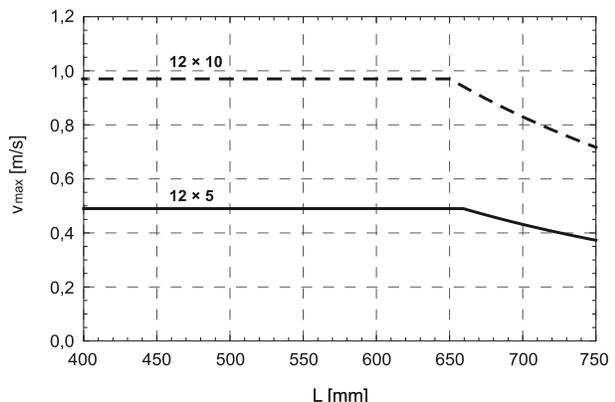
i Mounting elements for mounting the connection plate on the Linear unit are included.

Mounting the drive

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

i Available on request.

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



TECHNICAL DATA

General technical data

Linear Unit	Carriage length Lv [mm]	Dynamic load capacity C [N]	Dynamic moment			Max. permissible loads					Moved mass [kg]	* Max. length Lmax [mm]	* Max. stroke [mm]
			Mx [Nm]	My [Nm]	Mz [Nm]	Forces		Moments					
						Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]			
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

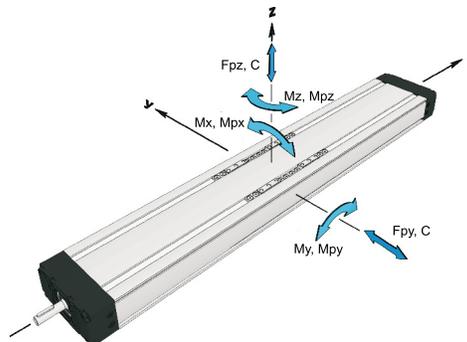
* For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valid for multiple carriages
(equation of defining the linear unit length for particular size of the linear unit needs to be used).

i 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

$$E = 70000 \text{ N / mm}^2$$



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

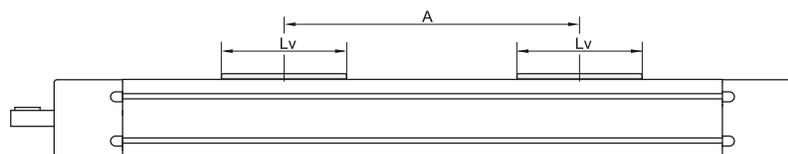
For operating temperature out of the presented range, please contact us.

General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity C [N]	Dynamic moment			Forces		Max. permissible loads		
			Mx [Nm]	My [Nm]	Mz [Nm]	Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]
CTV 110	S2	39600	1300	19,8 × A	19,8 × A	12940	18790	620	9,4 × A	6,5 × A
	L2	79200	2600	39,6 × A	39,6 × A	26100	37600	1240	18,8 × A	13,0 × A

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

i Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.



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		Lead constant [mm / rev]	3 Max. repeatability precision [mm]		Dynamic load capacity BS Ca [N]	Max. Axial load Fx [N]	Max. drive torque Ma [Nm]	4 Min. stroke [mm]	1 Max. acceleration [m/s ²]		
				Carriage: S [Nm]	Carriage: L [Nm]		STANDARD ISO7	ISO5							
CTV 110	16 × 5	4200	0,35	0,17 × nc	0,20 × nc	5	± 0,02	± 0,01	13150	8700	5,5 with Keyway 7,7 without Keyway	40	20		
	16 × 10			0,18 × nc	0,21 × nc		± 0,02	± 0,01						11550	6730
	16 × 16			1,12	0,23 × nc		0,26 × nc	± 0,02						± 0,01	8170

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 (and distances between the carriages A) up to 500mm.

No Load Torque value increases with stroke (and with A) elongation.

nc - Number of carriages

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 and mass moment of inertia

Linear unit	Mass of linear unit [kg]	Planar moment of inertia	
		ly [cm ⁴]	lz [cm ⁴]
CTV 110 S	$3,3 + 0,008 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,63 \times (\text{nc} - 1)$	29,1	196,0
CTV 110 L	$4,6 + 0,008 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1,36 \times (\text{nc} - 1)$		

Linear unit	Ball screw [d × l]	Mass moment of inertia [10 ⁻⁵ kg m ²]
	16 × 10	$0,82 + 0,005 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,16 \times (\text{nc} - 1)$
	16 × 16	$1,07 + 0,005 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,41 \times (\text{nc} - 1)$
CTV 110 L	16 × 5	$1,19 + 0,005 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,09 \times (\text{nc} - 1)$
	16 × 10	$1,45 + 0,005 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,34 \times (\text{nc} - 1)$
	16 × 16	$1,99 + 0,005 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,88 \times (\text{nc} - 1)$

*Absolute stroke [mm]

A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages



Mass calculation doesn't include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

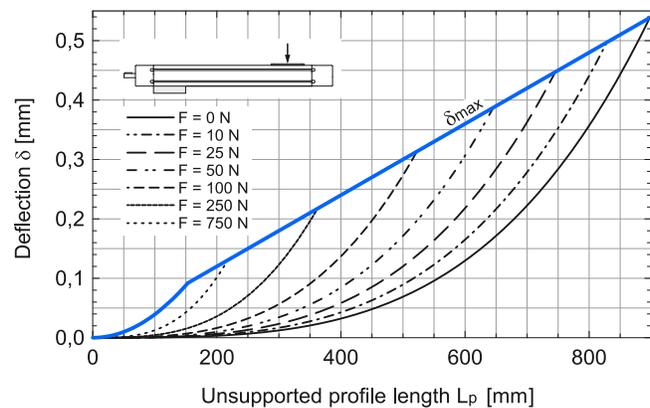
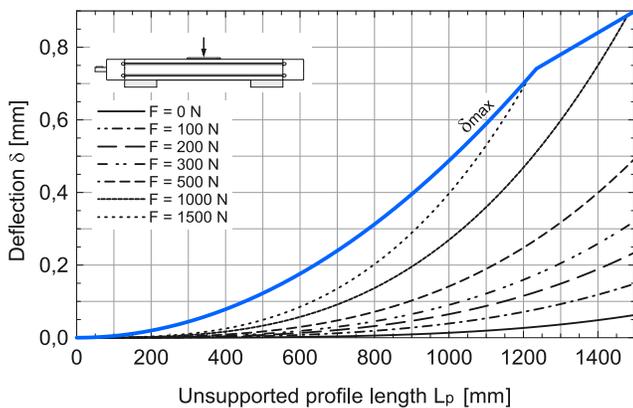
Fixed - fixed mounting

Fixed - free mounting

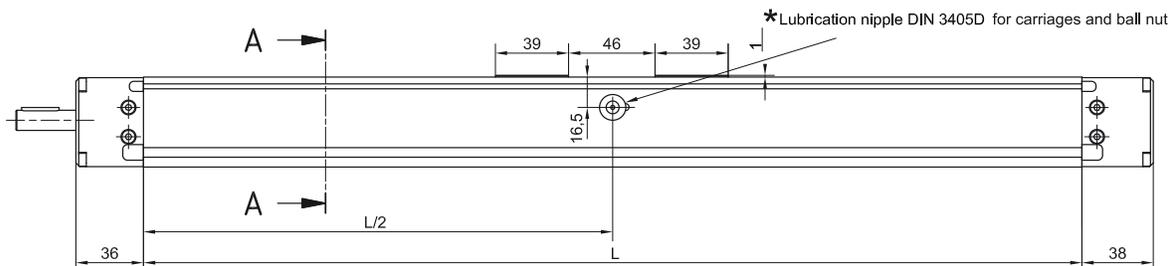
δ Maximum deflection of the linear unit [mm]
 δ_{max} Maximum permissible deflection of the linear unit [mm]
 F Applied force [N]
 Lp Unsupported profile length [mm]

i The maximum permissible deflection δ_{max} must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δ_{max} additional profile supports are needed.

CTV 110

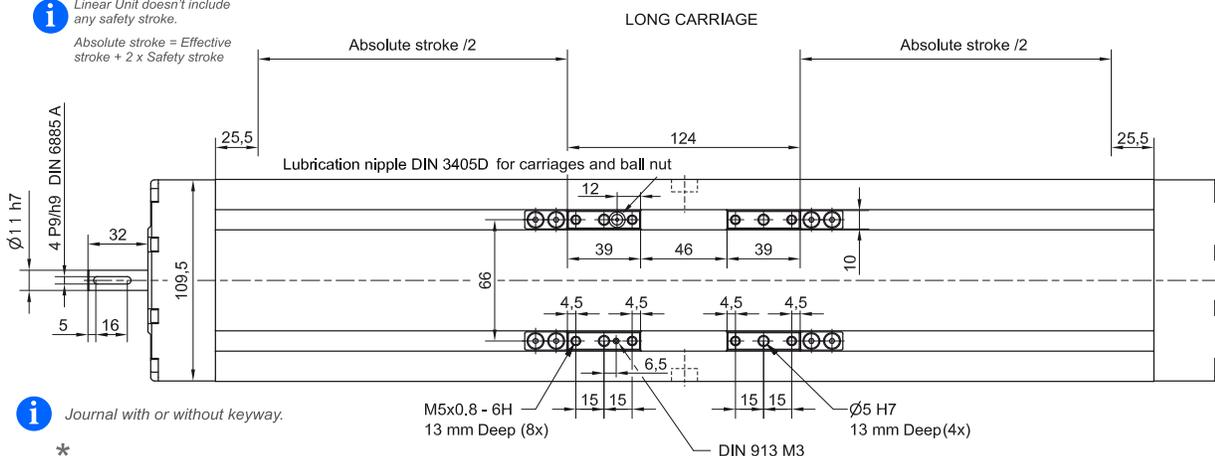


DIMENSIONS



i Linear Unit doesn't include any safety stroke.

Absolute stroke = Effective stroke + 2 x Safety stroke

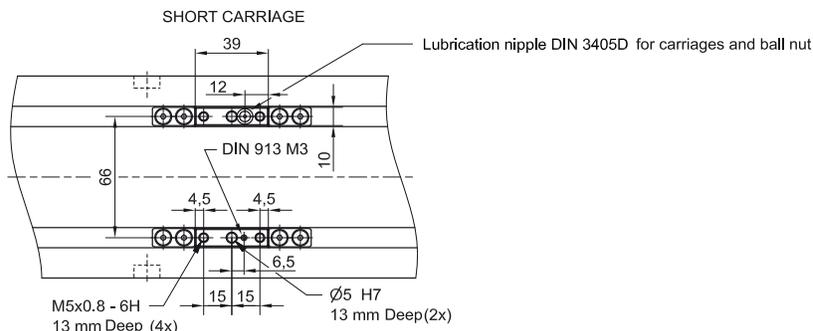


i Journal with or without keyway.

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

i For lubrication port positions in the case of multiple carriages please contact us.

i All dimensions in mm.
Drawings scales are not equal.

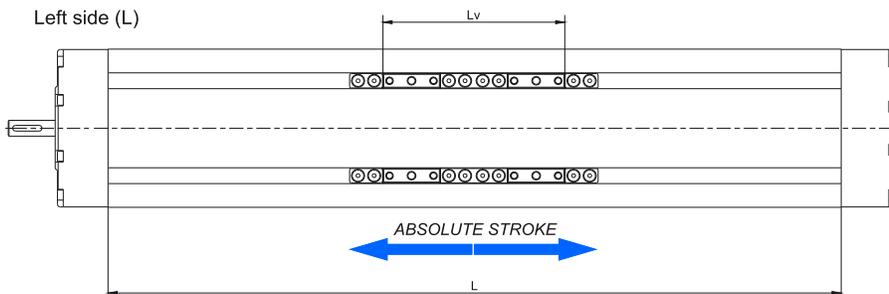


Defining of the linear unit length

$$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + A \times (n_c - 1) + 51 \text{ mm} \quad \text{!}$$

$$L_{\text{total}} = L + 74 \text{ mm} \quad n_c - \text{Number of carriages}$$

Left side (L)

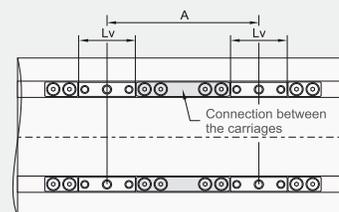


Right side (R)

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

Multiple carriages

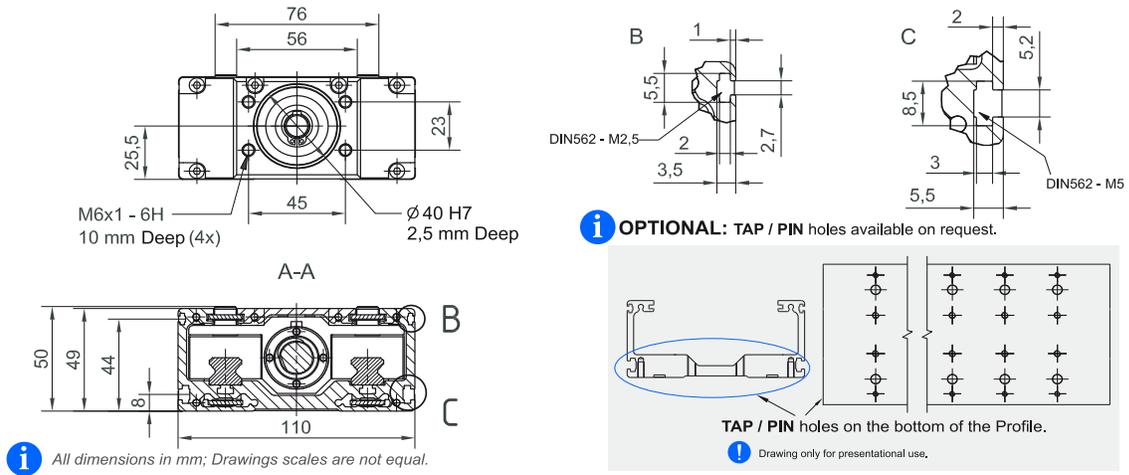
$$A_{\text{min}} \leq A \leq A_{\text{lim}} \quad \text{!}$$



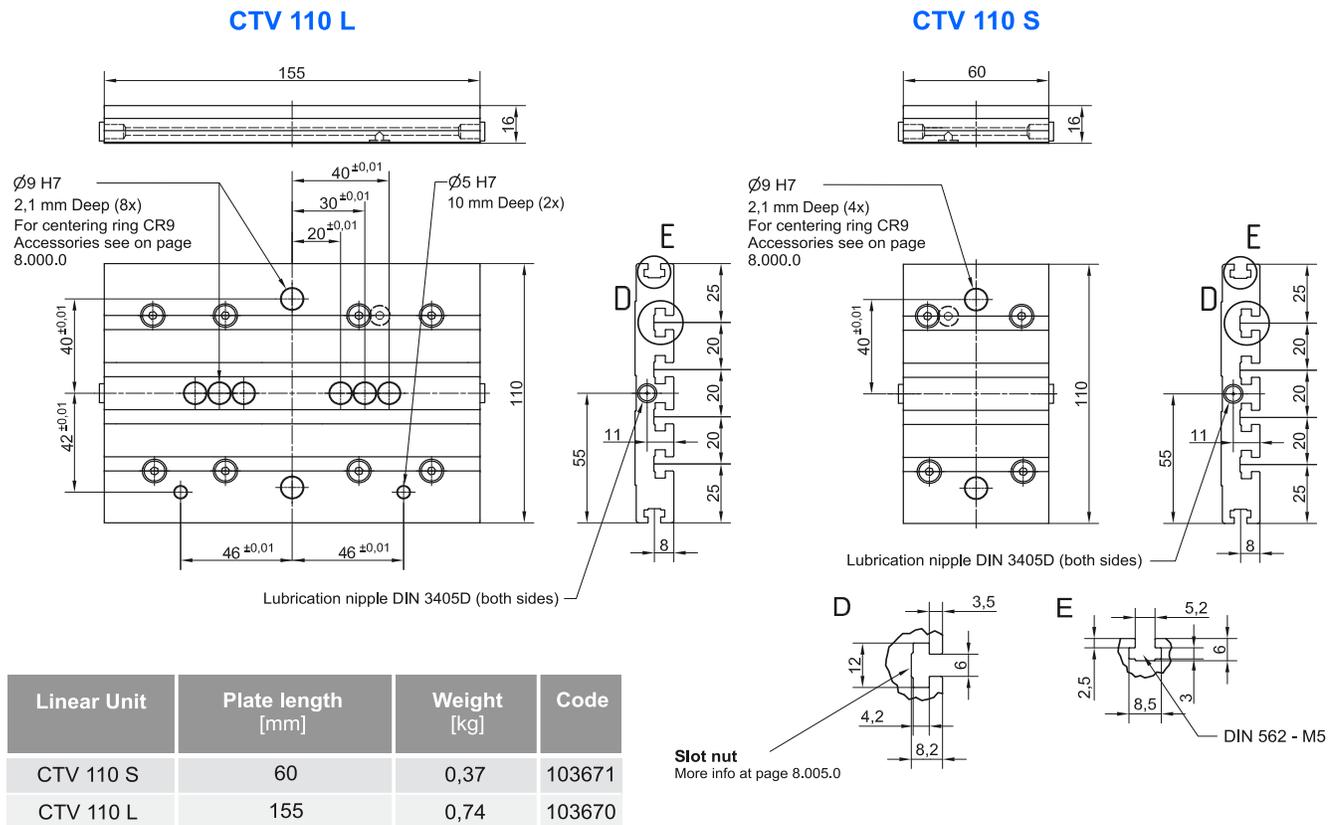
i Carriages are connected with non-rigid galvanized steel plates.

	CTV 110 S	CTV 110 L
A _{min} [mm]	85	175
A _{lim} [mm]	800	885

DIMENSIONS



CONNECTION PLATE



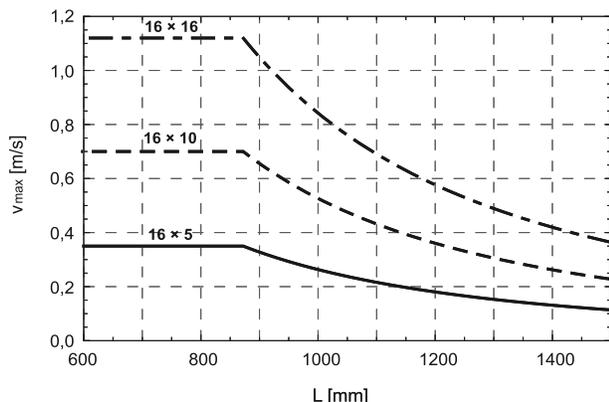
i Mounting elements for mounting the connection plate on the Linear unit are included.

Mounting the drive

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

i Available on request.

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



TECHNICAL DATA

General technical data

Linear Unit	Carriage length Lv [mm]	Dynamic load capacity C [N]	Dynamic moment			Max. permissible loads					Moved mass [kg]	* Max. length Lmax [mm]	* Max. stroke [mm]
			Mx [Nm]	My [Nm]	Mz [Nm]	Forces		Moments					
						Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]			
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

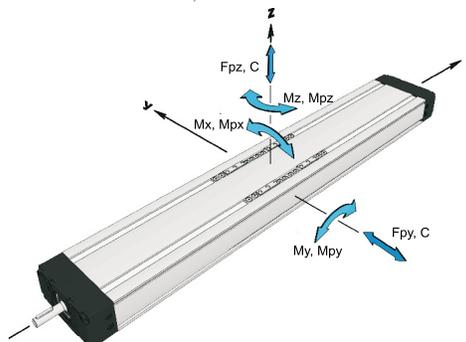
* For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valid for multiple carriages
(equation of defining the linear unit length for particular size of the linear unit needs to be used).

i 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

$E = 70000 \text{ N / mm}^2$



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

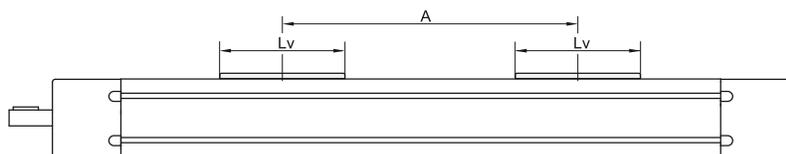
For operating temperature out of the presented range, please contact us.

General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity C [N]	Dynamic moment			Max. permissible loads				
			* Mx [Nm]	My [Nm]	Mz [Nm]	Forces		Moments		
						Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]
CTV 145	S2	68400	3000	34,2 × A	34,2 × A	17870	30640	1350	15,3 × A	8,9 × A
	L2	136800	6000	68,4 × A	68,4 × A	35700	61300	2700	30,6 × A	17,8 × A

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

i Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.



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		Lead constant [mm / rev]	3 Max. repeatability precision [mm]		Dynamic load capacity BS Ca [N]	Max. Axial load Fx [N]	Max. drive torque Ma [Nm]	4 Min. stroke [mm]	1 Max. acceleration [m/s ²]
				Carriage: S [Nm]	Carriage: L [Nm]		STANDARD ISO7	ISO5					
CTV 145	20 × 5	3300	0,28	0,30 × nc	0,35 × nc	5	± 0,02	± 0,01	14800	14800	11,9 with Keyway 13,0 without Keyway	55	20
	20 × 10			0,55	0,32 × nc	0,37 × nc	10	± 0,02	± 0,01	15900	13850		
	20 × 20			1,10	0,45 × nc	0,50 × nc	20	± 0,02	± 0,01	16250	6930		
	20 × 50	3000	2,50	0,80 × nc	0,85 × nc	50	± 0,02	± 0,01	13000	2770	11,9 with Keyway 24,5 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 (and distances between the carriages A) up to 500mm.
No Load Torque value increases with stroke (and with A) elongation.
nc - Number of carriages

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 and mass moment of inertia

Linear unit	Mass of linear unit [kg]	Planar moment of inertia	
		ly [cm ⁴]	lz [cm ⁴]
CTV 145 S	$5,7 + 0,015 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1,19 \times (\text{nc} - 1)$	85,3	682,3
CTV 145 L	$8,4 + 0,015 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 2,61 \times (\text{nc} - 1)$		

Linear unit	Ball screw [d × l]	Mass moment of inertia [10 ⁻⁵ kg m ²]
CTV 145 S	20 × 5	$3,04 + 0,013 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,08 \times (\text{nc} - 1)$
	20 × 10	$3,27 + 0,013 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,30 \times (\text{nc} - 1)$
	20 × 20	$4,17 + 0,013 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1,21 \times (\text{nc} - 1)$
	20 × 50	$10,50 + 0,013 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 7,54 \times (\text{nc} - 1)$
CTV 145 L	20 × 5	$4,43 + 0,013 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,17 \times (\text{nc} - 1)$
	20 × 10	$4,92 + 0,013 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 0,66 \times (\text{nc} - 1)$
	20 × 20	$6,91 + 0,013 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 2,64 \times (\text{nc} - 1)$
	20 × 50	$20,79 + 0,013 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 16,53 \times (\text{nc} - 1)$

*Absolute stroke [mm]

A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages



Mass calculation doesn't include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

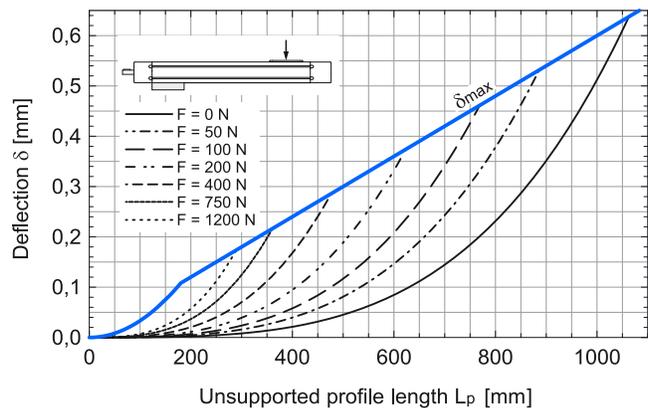
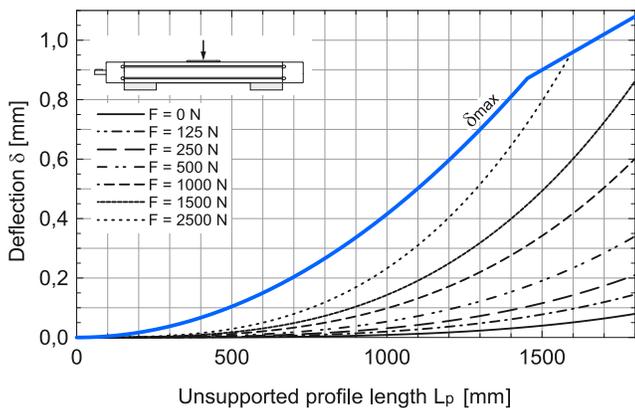
Fixed - fixed mounting

Fixed - free mounting

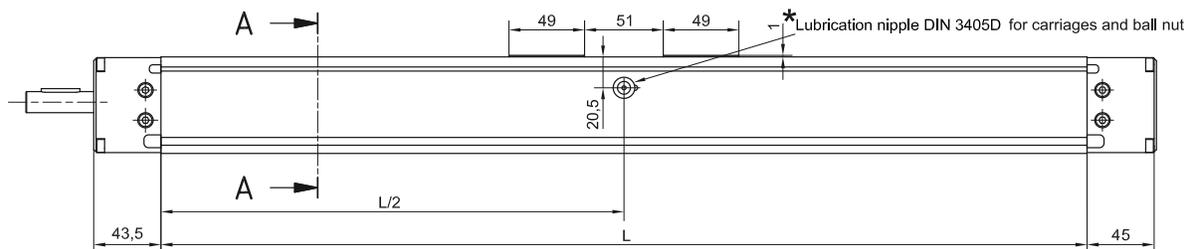
δ Maximum deflection of the linear unit [mm]
 δmax Maximum permissible deflection of the linear unit [mm]
 F Applied force [N]
 Lp Unsupported profile length [mm]

i 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



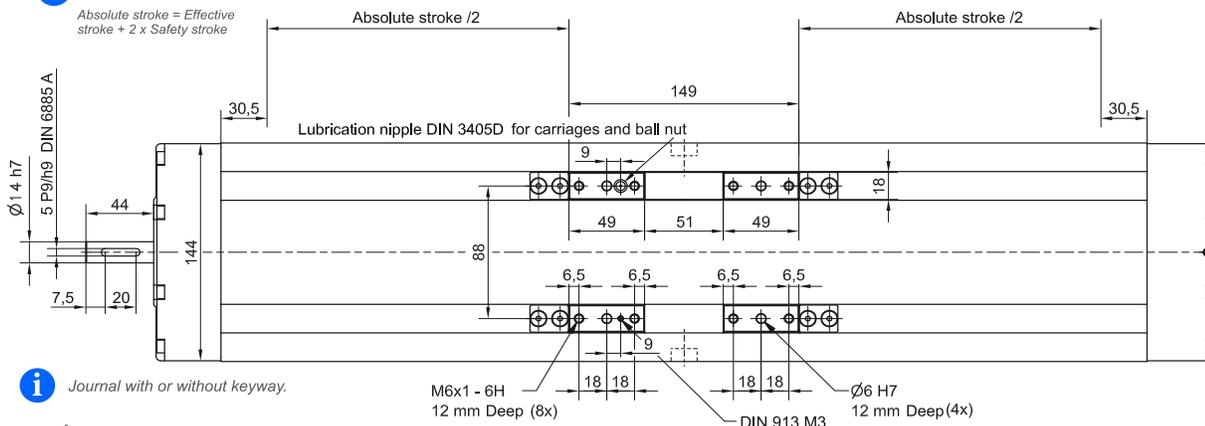
DIMENSIONS



i Linear Unit doesn't include any safety stroke.

Absolute stroke = Effective stroke + 2 x Safety stroke

LONG CARRIAGE



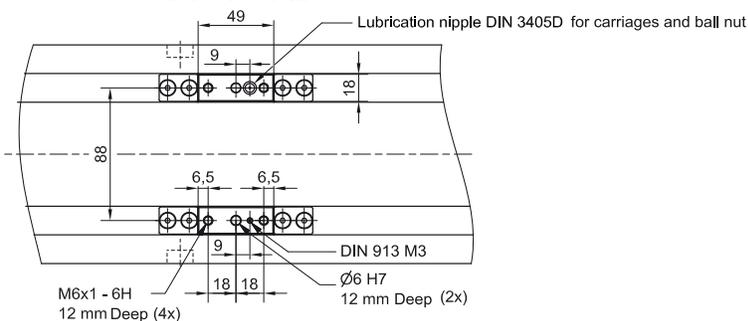
i Journal with or without keyway.

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

i For lubrication port positions in the case of multiple carriages please contact us.

i All dimensions in mm.
Drawings scales are not equal.

SHORT CARRIAGE

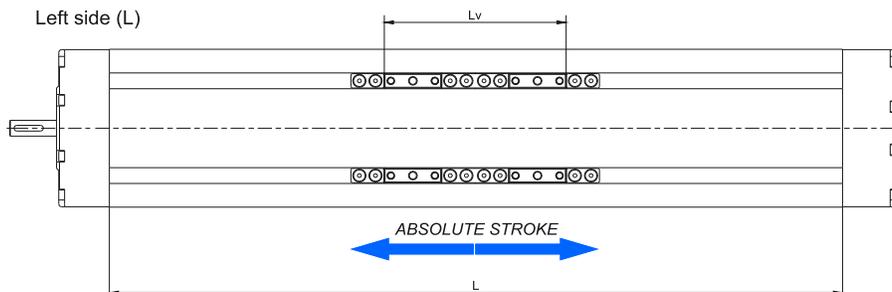


Defining of the linear unit length

L = Effective stroke + 2 × Safety stroke + Lv + A × (nc - 1) + 61 mm **!**

Ltotal = L + 88,5 mm *nc - Number of carriages*

Left side (L)

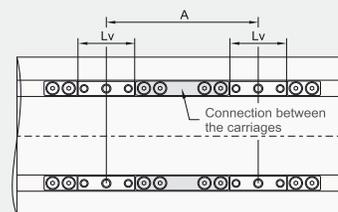


Right side (R)

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

Multiple carriages

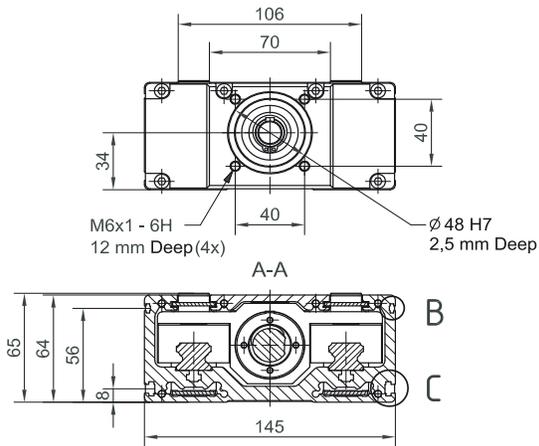
Amin ≤ A ≤ Alim **!**



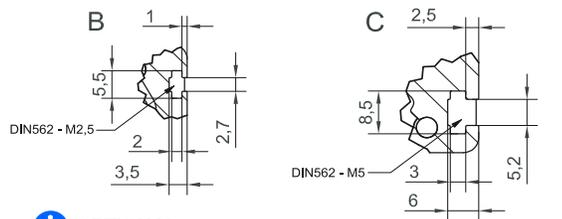
! Carriages are connected with non-rigid galvanized steel plates.

	CTV 145 S	CTV 145 L
Amin [mm]	100	200
Alim [mm]	800	900

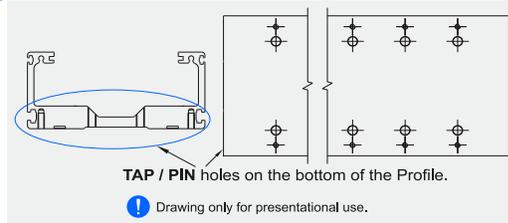
DIMENSIONS



i All dimensions in mm; Drawings scales are not equal.



i OPTIONAL: TAP / PIN holes available on request.

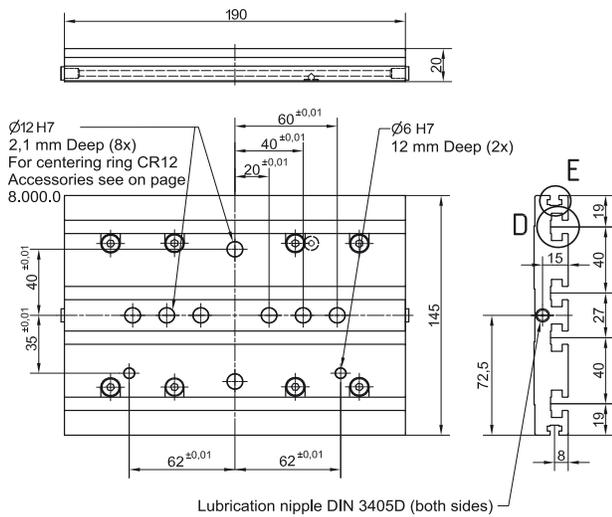


TAP / PIN holes on the bottom of the Profile.

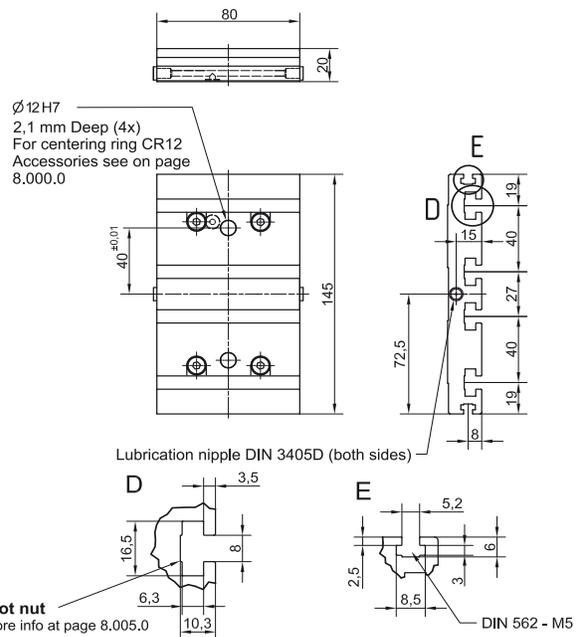
i Drawing only for presentational use.

CONNECTION PLATE

CTV 145 L



CTV 145 S



Linear Unit	Plate length [mm]	Weight [kg]	Code
CTV 145 S	80	0,78	103673
CTV 145 L	190	1,54	103672

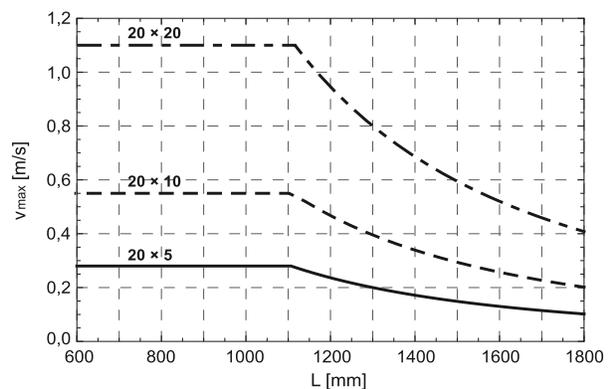
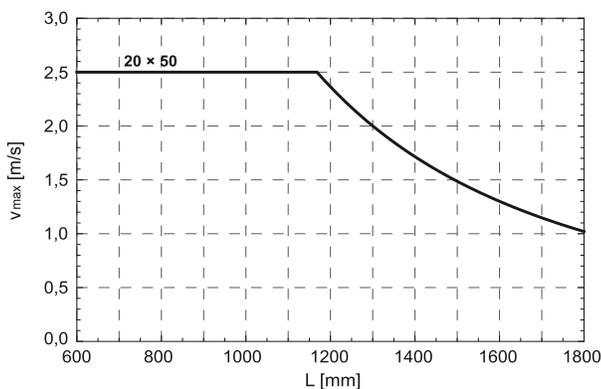
i Mounting elements for mounting the connection plate on the Linear unit are included.

Mounting the drive

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

i Available on request.

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



TECHNICAL DATA

General technical data

Linear Unit	Carriage length Lv [mm]	Dynamic load capacity C [N]	Dynamic moment			Max. permissible loads					Moved mass [kg]	* Max. length Lmax [mm]	* Max. stroke [mm]
			Mx [Nm]	My [Nm]	Mz [Nm]	Forces		Moments					
						Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]			
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

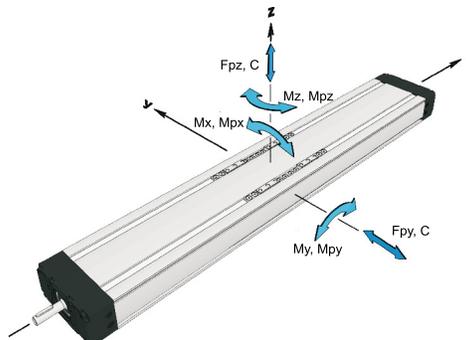
* For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valid for multiple carriages
(equation of defining the linear unit length for particular size of the linear unit needs to be used).

i 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

$E = 70000 \text{ N / mm}^2$



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

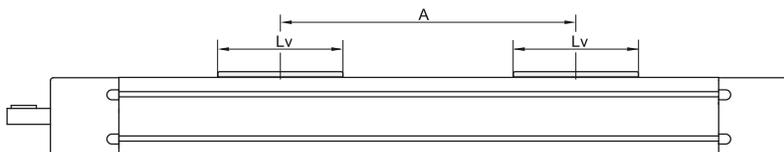
For operating temperature out of the presented range, please contact us.

General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity C [N]	Dynamic moment			Max. permissible loads				
			* Mx [Nm]	My [Nm]	Mz [Nm]	Forces		Moments		
						Fpy [N]	Fpz [N]	Mpx [Nm]	Mpy [Nm]	Mpz [Nm]
CTV 200	S2	99200	6440	49,6 × A	49,6 × A	20000	49230	3200	24,6 × A	10,0 × A
	L2	198400	12890	99,2 × A	99,2 × A	40000	103000	6700	51,5 × A	20,0 × A

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

i Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.



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		Lead constant [mm / rev]	3 Max. repeatability precision [mm]		Dynamic load capacity BS Ca [N]	Max. Axial load Fx [N]	Max. drive torque Ma [Nm]	4 Min. stroke [mm]	1 Max. acceleration [m/s ²]
				Carriage: S [Nm]	Carriage: L [Nm]		STANDARD ISO7	ISO5					
CTV 200	32 × 5	2150	0,18	0,60 × nc	0,70 × nc	5	± 0,02	± 0,01	18850	18850	16,7 with Keyway 16,7 without Keyway	65	20
	32 × 10			0,50	0,70 × nc		0,80 × nc	± 0,02					
	32 × 20	3000	1,00	0,75 × nc	0,85 × nc	± 0,02	± 0,01	22950	14800				
	32 × 32			1,60	0,80 × nc	0,90 × nc	± 0,02			± 0,01	15550		

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 (and distances between the carriages A) up to 500mm.
No Load Torque value increases with stroke (and with A) elongation.
nc - Number of carriages

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 and mass moment of inertia

Linear unit	Mass of linear unit [kg]	Planar moment of inertia	
		ly [cm ⁴]	lz [cm ⁴]
CTV 200 S	$15,4 + 0,031 \times (\text{Abs. stroke} + (nc - 1) \times A) + 3,11 \times (nc - 1)$	417,4	3007,3
CTV 200 L	$23,8 + 0,031 \times (\text{Abs. stroke} + (nc - 1) \times A) + 6,21 \times (nc - 1)$		

Linear unit	Ball screw [d × l]	Mass moment of inertia [10 ⁻⁵ kg m ²]
CTV 200 S	32 × 5	$21,17 + 0,069 \times (\text{Abs. stroke} + (nc - 1) \times A) + 0,20 \times (nc - 1)$
	32 × 10	$21,76 + 0,069 \times (\text{Abs. stroke} + (nc - 1) \times A) + 0,79 \times (nc - 1)$
	32 × 20	$24,12 + 0,069 \times (\text{Abs. stroke} + (nc - 1) \times A) + 3,15 \times (nc - 1)$
	32 × 32	$29,04 + 0,069 \times (\text{Abs. stroke} + (nc - 1) \times A) + 8,07 \times (nc - 1)$
CTV 200 L	32 × 5	$33,41 + 0,069 \times (\text{Abs. stroke} + (nc - 1) \times A) + 0,39 \times (nc - 1)$
	32 × 10	$34,59 + 0,069 \times (\text{Abs. stroke} + (nc - 1) \times A) + 1,57 \times (nc - 1)$
	32 × 20	$39,31 + 0,069 \times (\text{Abs. stroke} + (nc - 1) \times A) + 6,29 \times (nc - 1)$
	32 × 32	$49,12 + 0,069 \times (\text{Abs. stroke} + (nc - 1) \times A) + 16,11 \times (nc - 1)$

* Absolute stroke [mm]

A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages



Mass calculation doesn't include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

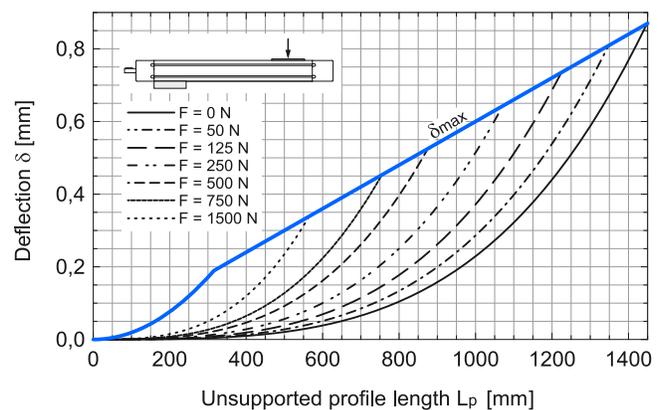
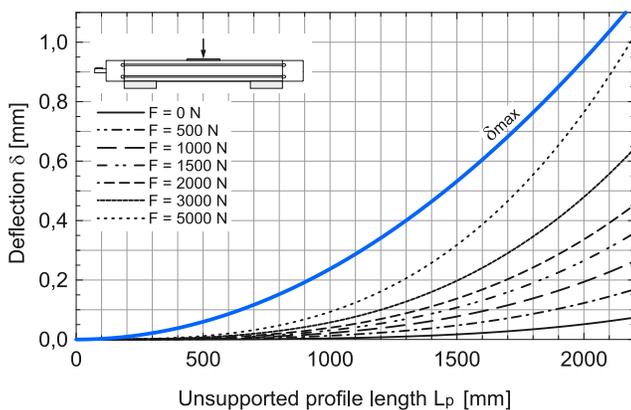
Fixed - fixed mounting

Fixed - free mounting

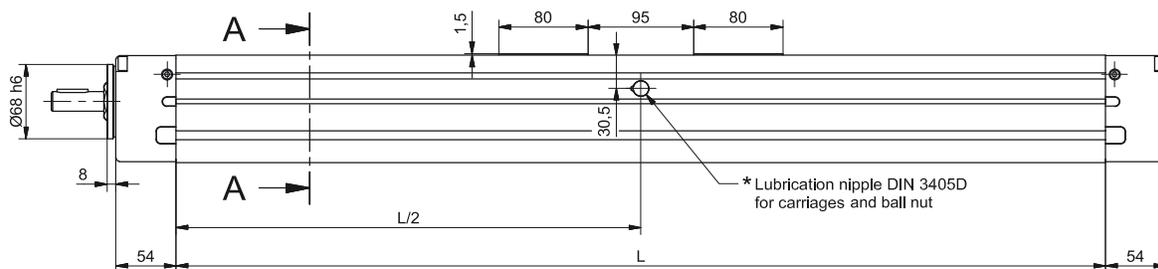
δ Maximum deflection of the linear unit [mm]
 δmax Maximum permissible deflection of the linear unit [mm]
 F Applied force [N]
 Lp Unsupported profile length [mm]

i 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.

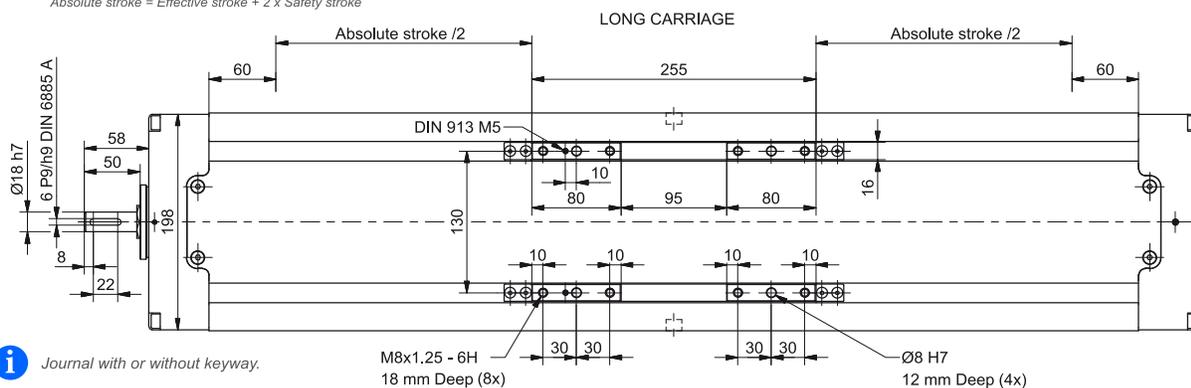
CTV 200



DIMENSIONS



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

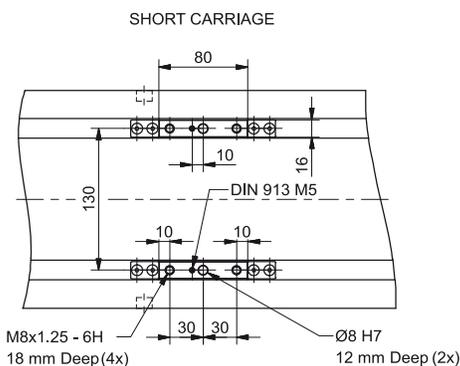


i Journal with or without keyway.

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

i For lubrication port positions in the case of multiple carriages please contact us.

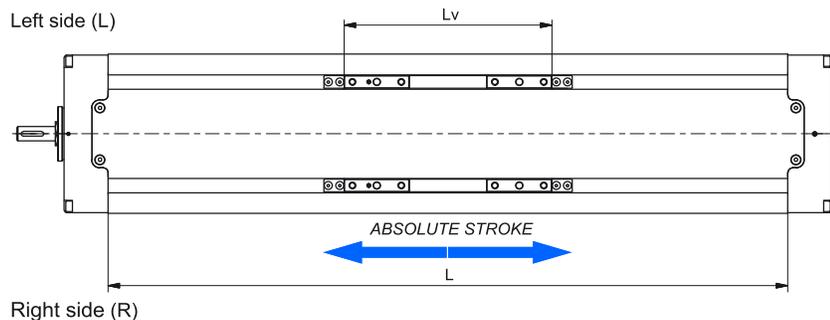
i All dimensions in mm.
Drawings scales are not equal.



Defining of the linear unit length

$$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + A \times (n_c - 1) + 120 \text{ mm} \quad \text{!}$$

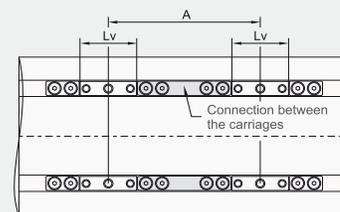
$$L_{\text{total}} = L + 108 \text{ mm} \quad n_c - \text{Number of carriages}$$



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

Multiple carriages

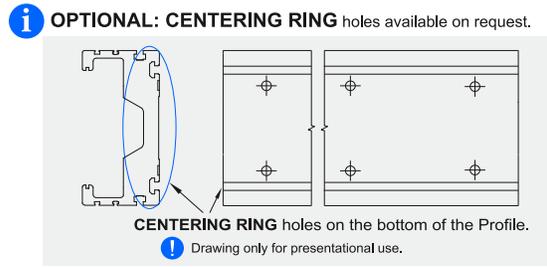
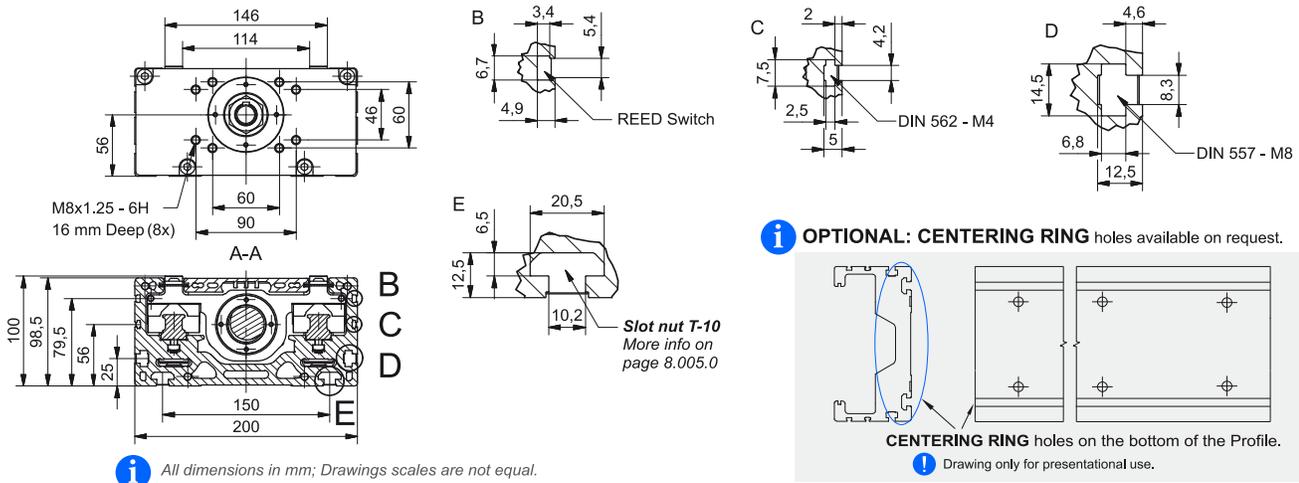
$$A_{\text{min}} \leq A \leq A_{\text{lim}} \quad \text{!}$$



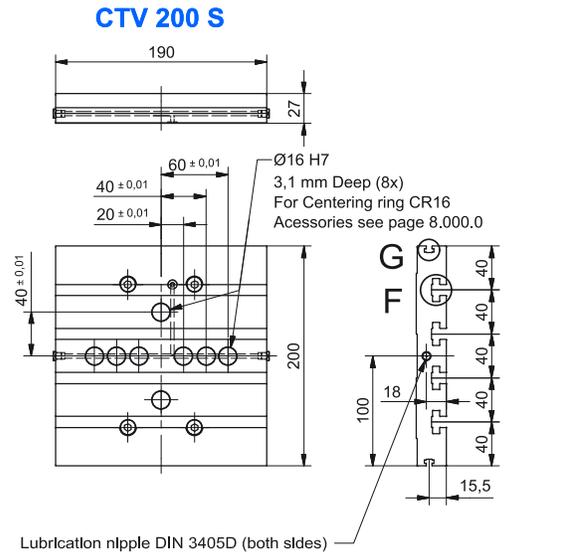
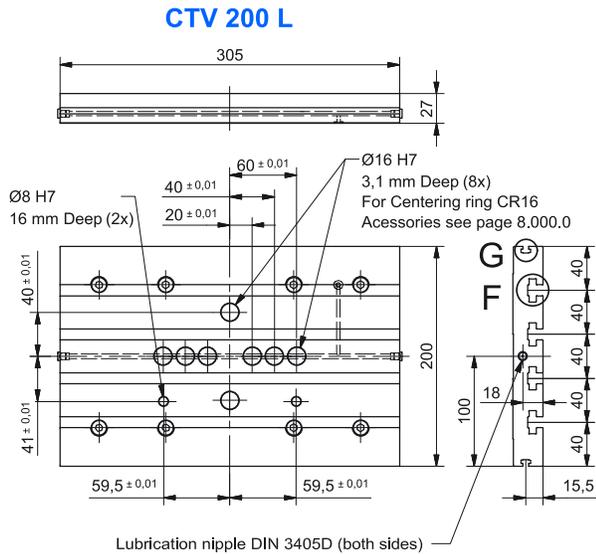
i Carriages are connected with non-rigid galvanized steel plates.

	CTV 200 S	CTV 200 L
A _{min} [mm]	130	305
A _{lim} [mm]	* 195	* 310
A _{lim} [mm]	900	1075

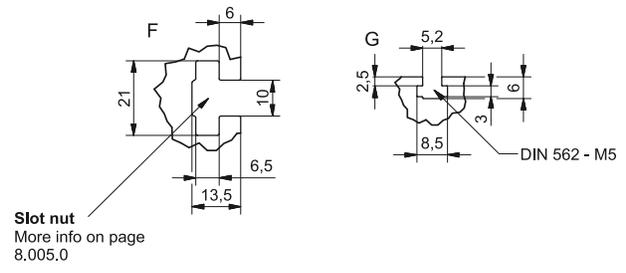
DIMENSIONS



CONNECTION PLATE



Linear Unit	Plate length [mm]	Weight [kg]	Code
CTV 200 S	190	2,32	103675
CTV 200 L	305	3,75	103674



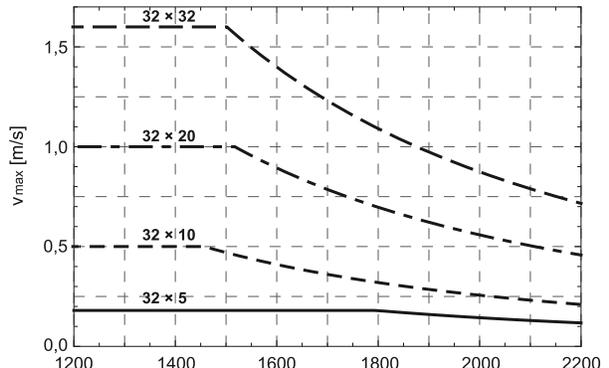
i Mounting elements for mounting the connection plate on the Linear unit are included.
Please consider our advice in our Maintenance- and assembly instructions

Mounting the drive

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

i Available on request.

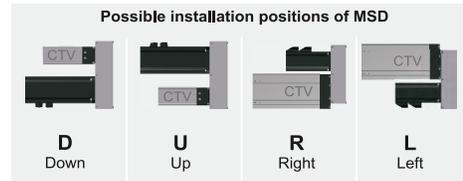
Maximum travel speed as a function of the profile length (V_{max} - L curves)



STRUCTURAL DESIGN

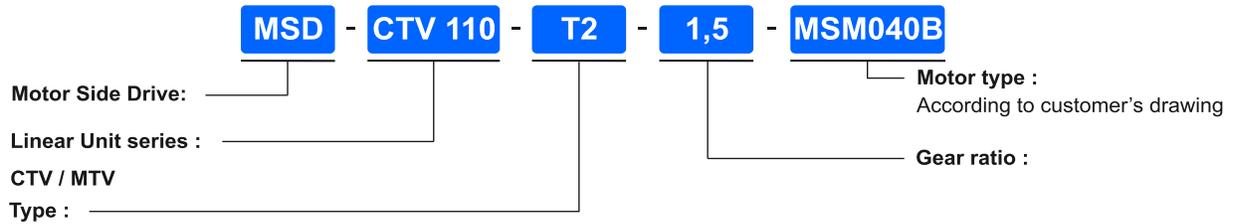


- 1 - Cover
- 2 - Attachment of pulley with clamping set
- 3 - Anodized aluminium housing
- 4- Toothed belt
- 5- Belt tensioning system (elongation and frequency of belt span provided with delivery of unit)
- 6 - Motor
- 7 - Linear unit - CTV / MTV

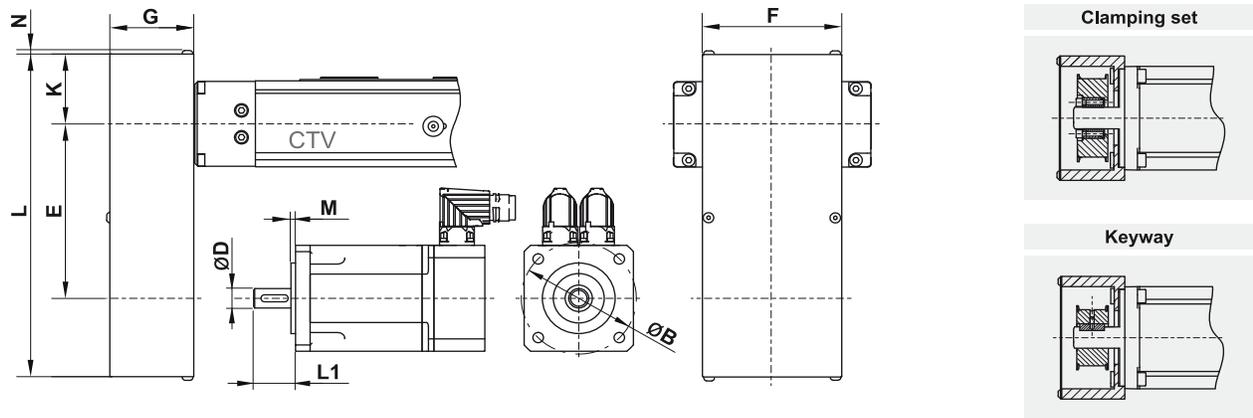


i The linear unit must be executed with drive journal without keyway, so that the MSD belt drive can be mounted on it.

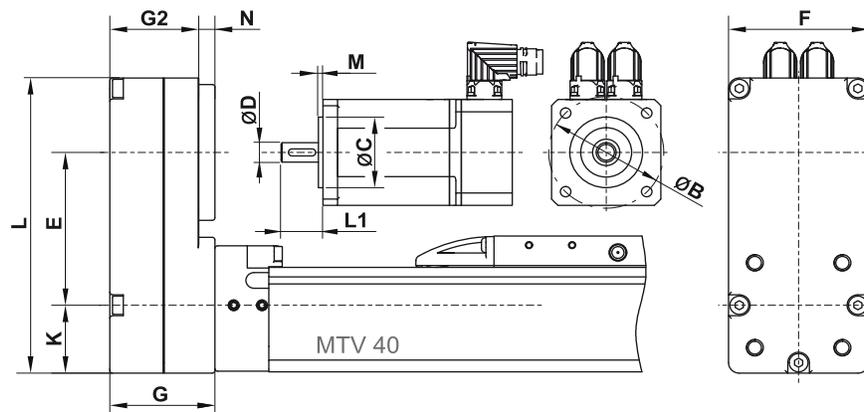
HOW TO ORDER



TECHNICAL DATA AND DIMENSIONS



MTV 40



TECHNICAL DATA AND DIMENSIONS

Technical data

Linear Unit	Type	Gear ratio i	Max. drive torque (linear unit) [Nm]	** Max. radial load on shaft [N]	Mass moment of inertia [10 ⁻⁶ kg m ²]	Mass *** [kg]	ØB max	ØC max	*M max	Motor size limits [mm]					
										L1			ØD		
										Clamping set	min	max	Clamping set	min	max
MTV 40	T1	1	1,3	60	4,6	0,5	60	36	4	****	20	32	8	>8	12
		1,5	1,3	60	5,4	0,5							8	-	-
MTV 40	T2	1	3	80	45	0,8	80	52	4		25	39	19	-	-
		1,5	3	80	31	0,7							10	>10	14
CTV 90	T1	1	2,7	90	75	0,8	70	-	4		25	39	19	-	-
		1,5	2,7	90	45	0,7							10	>10	14
CTV 110 MTV 65	T1	1	5	175	70	0,8	70	-	4		25	39	19	-	-
		1,5	5	175	45	0,8							10	>10	14
CTV 110 MTV 65	T2	1	9	245	210	1,5	100	-	4		30	49	22	-	-
		1,5	11	235	330	1,5							19	>19	28
CTV 145 MTV 80	T1	1	13	350	210	1,5	100	-	4		30	49	22	-	-
		1,5	19	410	330	1,6							19	>19	28
CTV 145 MTV 80	T2	1	19	410	550	3,0	130	-	4	35	59	35	-	-	
		2	24	375	860	2,9						19	>19	28	
CTV 200 MTV 110	T1	1	25	500	640	3,8	130	-	4	35	59	35	-	-	
		2	25	400	960	3,6						19	>19	28	

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

*For a bigger value an additional adapter plate is used. For the case of MTV 40 a thicker plate may be used.

**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.

***This is an average value. It could differ depending to the motor dimensions.

****Minimum dimension L1 depends on the size of particular clamping set. Values can be found in the table on page 7.105.0.

Dimensions

Linear Unit	Type	Gear ratio i	Dimensions [mm]						
			E (± 0,5)	L	F	G	G2	K	N
MTV 40	T1	1	58,5	113	52	39	33	26	6 *
		1,5	59						
MTV 40	T2	1	65	135	68	42	36	31	8 *
		1,5	64,5						
CTV 90	T1	1	100	179	70	41	-	31	2
		1,5	102						
CTV 110 MTV 65	T1	1	100	179	70	41	-	31	2
		1,5	112						
CTV 110 MTV 65	T2	1	145	250	90	51	-	43	2
		1,5	139						
CTV 145 MTV 80	T1	1	145	250	90	51	-	43	2
		1,5	180						
CTV 145 MTV 80	T2	1	160	297	120	61	-	56	2,5
		2	158						
CTV 200 MTV 110	T1	1	268	403	120	61	-	56	2,5
		2	267						

*This is a standard value. It could differ depending to the motor dimensions M and L1.

TECHNICAL DATA AND DIMENSIONS

Minimum dimension L1 [mm] depends on the motor shafts diameter ØD

Linear Unit	Type	Gear ratio i	ØD [mm]																											
			4	5	6	6,35	7	8	9	9,53	10	11	12	14	15	16	17	18	19	20	22	24	25	25,4	28	30	32	35		
MTV 40	T1	1	17	17	17	17	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		1,5	17	17	17	17	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MTV 40	T2	1	-	-	17	17	17	17	18	18	18	18	18	22	22	22	25	25	25	-	-	-	-	-	-	-	-	-	-	
		1,5	-	-	17	17	17	17	18	18	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CTV 90	T1	1	-	-	23	23	23	23	24	24	24	24	24	28	28	28	31	31	31	-	-	-	-	-	-	-	-	-	-	
		1,5	-	-	23	23	23	23	24	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CTV 110 MTV 65	T1	1	-	-	23	23	23	23	24	24	24	24	24	28	28	28	31	31	31	-	-	-	-	-	-	-	-	-	-	
		1,5	-	-	23	23	23	23	24	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CTV 110 MTV 65	T2	1	-	-	-	-	-	23	24	24	24	24	24	28	28	28	31	31	31	31	31	-	-	-	-	-	-	-	-	
		1,5	-	-	-	-	23	23	24	24	24	24	24	28	28	28	31	31	31	-	-	-	-	-	-	-	-	-	-	
CTV 145 MTV 80	T1	1	-	-	-	-	-	-	24	24	24	24	24	28	28	28	31	31	31	31	31	-	-	-	-	-	-	-	-	
		1,5	-	-	-	-	-	-	24	24	24	24	24	28	28	28	31	31	31	31	31	-	-	-	-	-	-	-	-	
CTV 145 MTV 80	T2	1	-	-	-	-	-	-	-	-	-	-	29	33	33	33	36	36	36	36	36	36	40	40	40	40	40	40	43	
		2	-	-	-	-	-	-	29	29	29	29	29	29	33	33	33	36	36	36	-	-	-	-	-	-	-	-	-	
CTV 200 MTV 110	T1	1	-	-	-	-	-	-	-	-	-	-	29	33	33	33	36	36	36	36	36	36	40	40	40	40	40	40	43	
		2	-	-	-	-	-	-	29	29	29	29	29	29	33	33	33	36	36	36	-	-	-	-	-	-	-	-	-	

