

**MTJ / MRJ**

## CHARACTERISTICS

**MTJ** and **MRJ** Linear Units with toothed belt drive and compact dimensions provide high performance features such as, high speed, 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.

For very high speeds, up to 10m/s, the Track Rollers ( journal Bearings) of the type MRJ are particularly suitable.

In the Linear Units MTJ and MRJ is used a pre-tensioned steel reinforced AT polyurethane timing toothed belt. In conjunction with a Zero-backlash drive pulley high moments with alternating loads with good positioning accuracy, low wear and low noise can be realized.

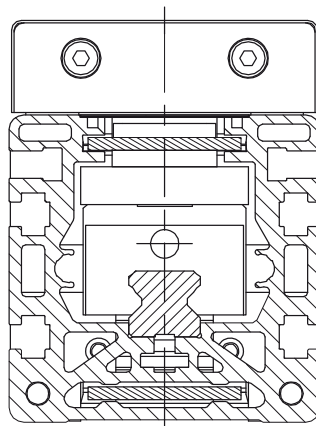
The in the Profile slot driving Polyurethane timing belt protects all the parts in the Profile from dust and other contaminations. As optional, a corrosion-resistant protection strip is available.

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.

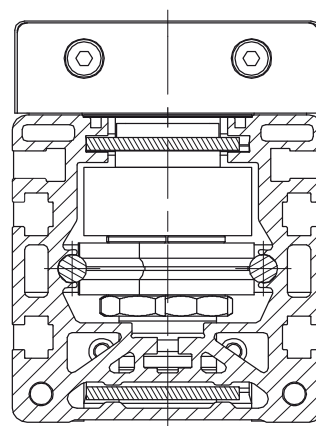
Different carriage lengths with central lubrication port, allow easy re-lubrication of the Linear Unit and allow the possibility to attach additional accessories on the side.

For the Linear Units MTJ and MRJ various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.

**MTJ**



**MRJ**

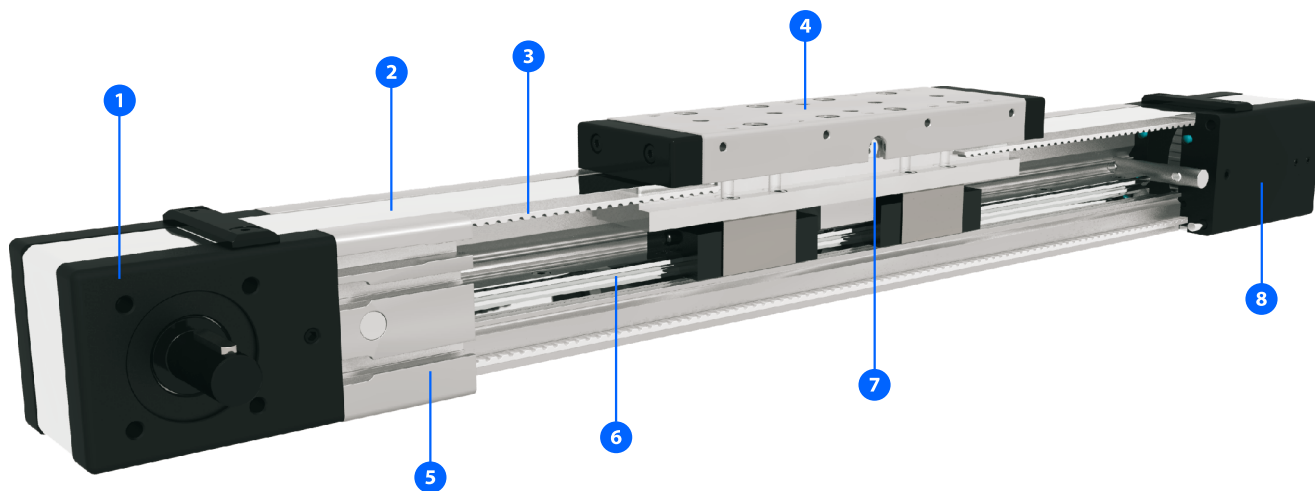


**i** The aluminium profiles are manufactured according to the medium EN 12020-2 standard

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

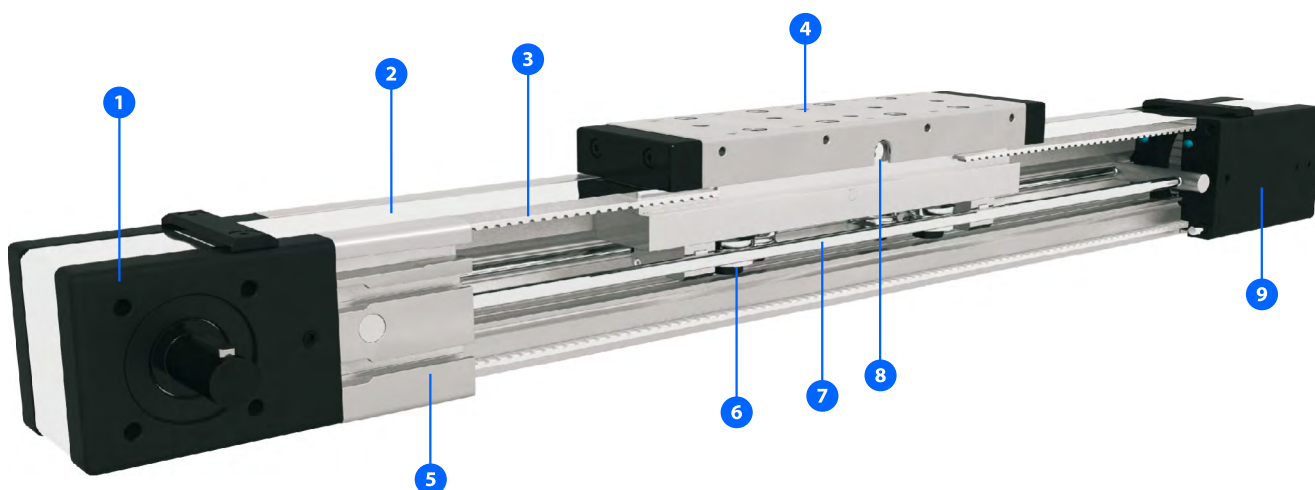
STRUCTURAL DESIGN

MTJ Series



- 1 - Drive block with pulley
- 2 - Corrosion-resistant protection strip (available also without protection strip)
- 3 - AT polyurethane toothed belt with steel tension cords
- 4 - Carriage; with built in Magnets
- 5 - Aluminium profile-Hard anodized
- 6 - Linear Ball Guideway
- 7 - Central lubrication port; both sides
- 8 - Tension End with integrated belt tensioning system

MRJ Series



- 1 - Drive block with pulley
- 2 - Corrosion-resistant protection strip (available also without protection strip)
- 3 - AT polyurethane toothed belt with steel tension cords
- 4 - Carriage; with build in Magnets
- 5 - Aluminium profile-Hard anodized
- 6 - Track Roller (journal Bearing)
- 7 - Two hardened steel Round guide (58/60 HRC)
- 8 - Central lubrication port; both sides
- 9 - Tension End with integrated belt tensioning system

HOW TO ORDER

**MTJ** - **65** - **700** - **L2** - **250** - **10R** - **1**

**Series :** \_\_\_\_\_

**MRJ**

**MTJ**

**Size :** \_\_\_\_\_

**40**

**65**

**80**

**110**

**Absolute stroke [mm] :** \_\_\_\_\_

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

**Carriage Version :** \_\_\_\_\_

**S** : Short (only for MTJ series)

**L** : Long

**Leave blank** : For MRJ 40, MTJ 40

**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

**Distance between two carriages [mm] :** \_\_\_\_\_

**Leave blank** : For the case of one carriage

**Type of drive pulley :** \_\_\_\_\_

**0** : Pulley with through hole

**1** : Pulley with journal (with Keyway)

**10** : Pulley with journal (without Keyway)

**2** : Pulley with journal on both sides (with Keyway)

**20** : Pulley with journal on both sides (without Keyway)

**3** : Without drive unit

**Drive journal position :** \_\_\_\_\_

**L** : Journal on left side

**R** : Journal on right side

**Leave blank** : For type of drive pulley 0, 2, 20 and 3

**Protection cover :** \_\_\_\_\_

**0** : In profile groove guided Polyurethane toothed belt

**1** : Corrosion-resistant protection strip

## TECHNICAL DATA

### General technical data

Linear Unit	Carriage length Lv [ mm ]	Dynamic load capacity			Dynamic moment			Max. permissible loads					Moved mass [ kg ]	Max. Repeatability [ mm ]	* Max. length Lmax [ mm ]	* Max. stroke [ mm ]	** Min. stroke [ mm ]
		C [ N ]	Cy [ N ]	Cz [ N ]	Mx [ Nm ]	My [ Nm ]	Mz [ Nm ]	Forces		Moments							
								Fpy [ N ]	Fpz [ N ]	Mpx [ Nm ]	Mpy [ Nm ]	Mpz [ Nm ]					
MTJ 40	92	4610	/	/	28	90	90	3850	3850	14	75	75	0,28	± 0,08	3000	2876	25
MRJ 40	92	/	3400	1700	20	21	25	1015	1090	13	14	7,6	0,26	± 0,08	6000	5876	0

\* 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).

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

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

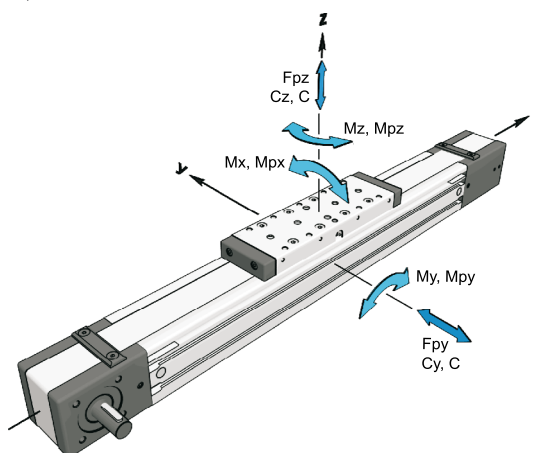
For operating temperature out of the presented range, please contact us.

### **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 ( $f_s = 5.0$ )

#### Modulus of elasticity :

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

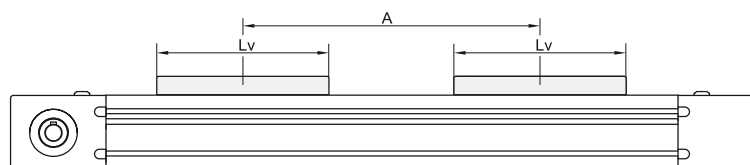


### General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity			* Dynamic moment			* Max. permissible loads				
		C [ N ]	Cy [ N ]	Cz [ N ]	Mx [ Nm ]	My [ Nm ]	Mz [ Nm ]	Forces		Moments		
								Fpy [ N ]	Fpz [ N ]	Mpx [ Nm ]	Mpy [ Nm ]	Mpz [ Nm ]
MTJ 40	2	9220	/	/	57	4,6 × A	4,6 × A	7690	7690	28	3,8 × A	3,8 × A
MRJ 40	2	/	6800	3400	40	1,7 × A	3,4 × A	2030	2180	26	1,1 × A	1,0 × 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.



### Drive and belt data

Linear Unit	* Max. travel speed [ m / s ]	Max. drive torque Ma [ Nm ]	** No load torque		Puley drive ratio	Pulley diameter [ mm ]	Belt type	Belt width [ mm ]	Max. force transmitted by belt [ N ]	Specific spring constant Cspec [ N ]	* Max. acceleration [ m/s <sup>2</sup> ]
			With strip [ Nm ]	Without strip [ Nm ]							
MTJ 40	6	3,7	0,4 × nc	0,2 × nc	99	31,51	AT 3	20	235	225000	70
MRJ 40	10		0,4 × nc	0,2 × nc							

\* Max. travel speed and max. acceleration of Linear unit with the Corrosion-resistant protection strip is 1,5 m/s and 50 m/s<sup>2</sup>, respectively.  
For travel speed and acceleration over the stated value in the table above please contact us.

\*\* The stated values are for strokes (and for distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.

TECHNICAL DATA

Mass and mass moment of inertia

Linear Unit	* Mass of linear unit [ kg ]	* Mass moment of inertia [ 10 <sup>-5</sup> kg m <sup>2</sup> ]	Planar moment of inertia	
			ly [ cm <sup>4</sup> ]	lz [ cm <sup>4</sup> ]
MTJ 40	$1,3 + 0,0024 \times (\text{Abs. stroke} + (nc - 1) \times A) + 0,28 \times (nc - 1)$	$9,7 + 0,0035 \times (\text{Abs. stroke} + (nc - 1) \times A) + 7,0 \times (nc - 1)$	9,8	11,6
MRJ 40	$1,25 + 0,0022 \times (\text{Abs. stroke} + (nc - 1) \times A) + 0,26 \times (nc - 1)$	$9,3 + 0,0035 \times (\text{Abs. stroke} + (nc - 1) \times A) + 6,5 \times (nc - 1)$		

\*Absolute stroke [mm]

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

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

Deflection of the linear unit

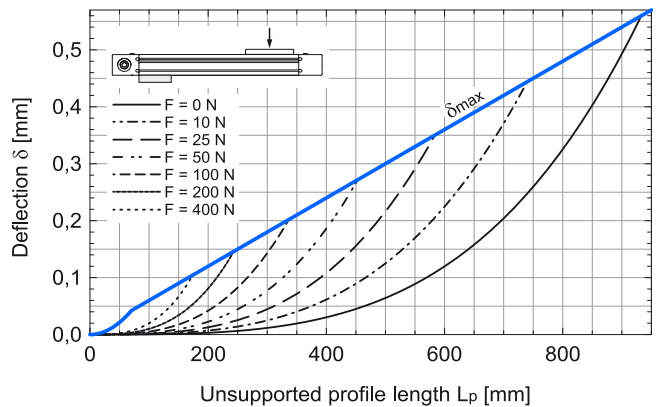
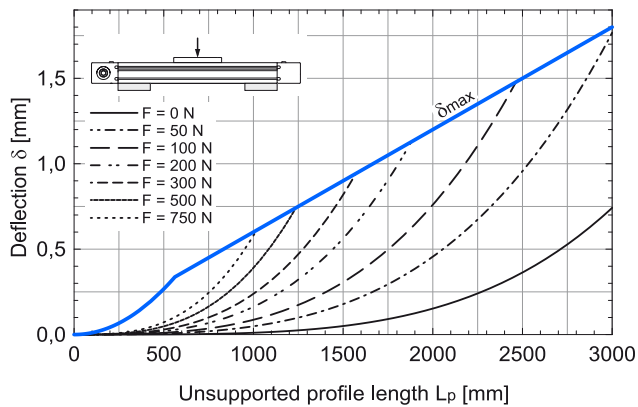
**Fixed - fixed mounting**

**Fixed - free mounting**

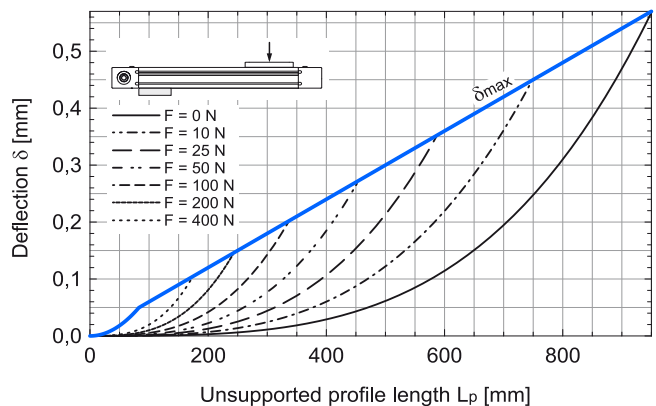
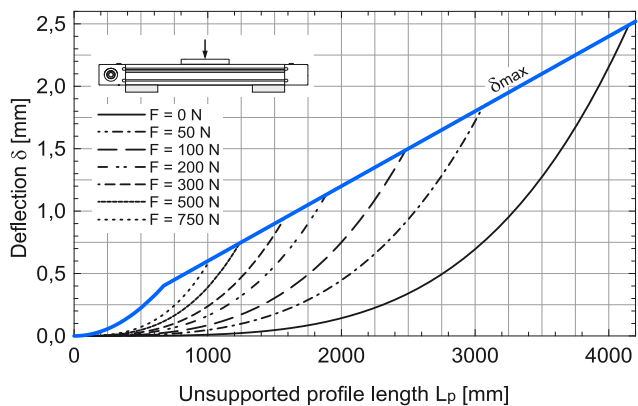
$\delta$  Maximum deflection of the linear unit [mm]  
 $\delta_{max}$  Maximum permissible deflection of the linear unit [mm]  
 F Applied force [N]  
 Lp Unsupported profile length [mm]

**i** The maximum permissible deflection  $\delta_{max}$  must not be exceeded. In the case that maximum deflection  $\delta$  exceeds the maximum permissible deflection  $\delta_{max}$  additional profile supports are needed.

MTJ 40

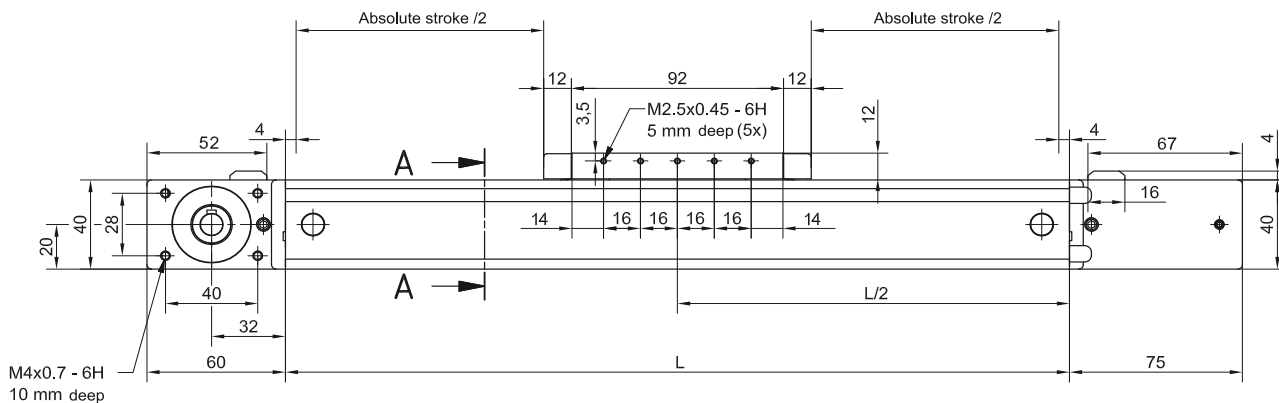


MRJ 40

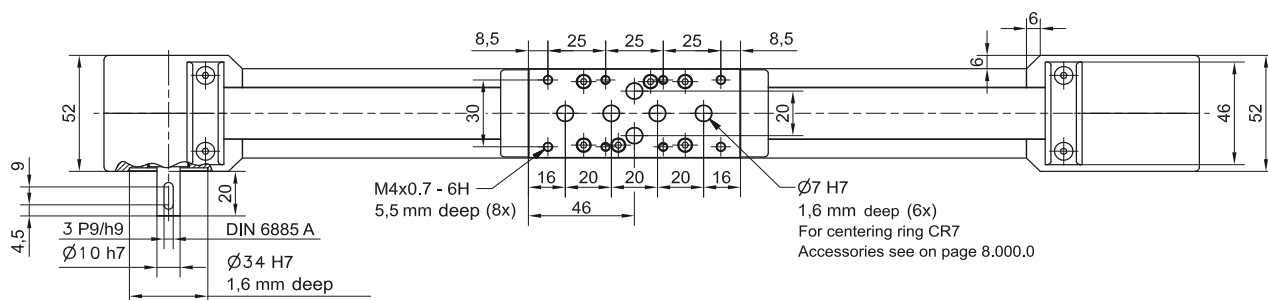


## DIMENSIONS

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



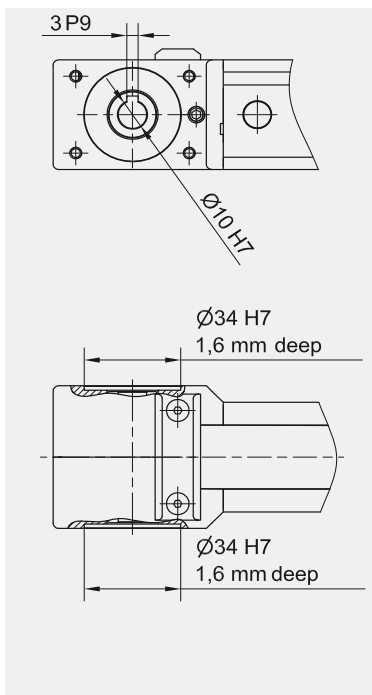
**i** Lifetime lubricated!



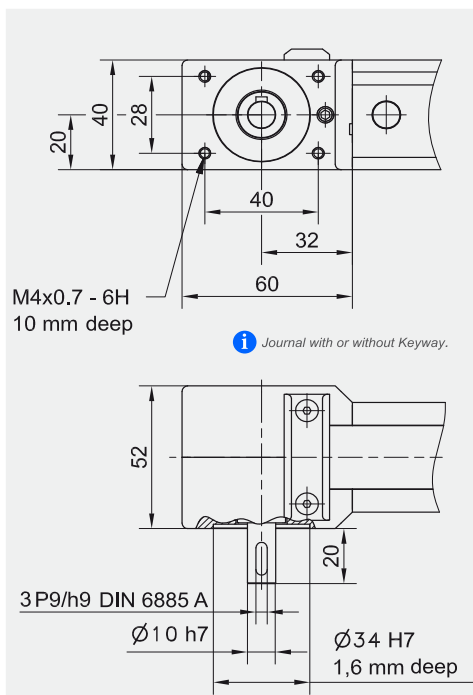
**i** Journal with or without Keyway.

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

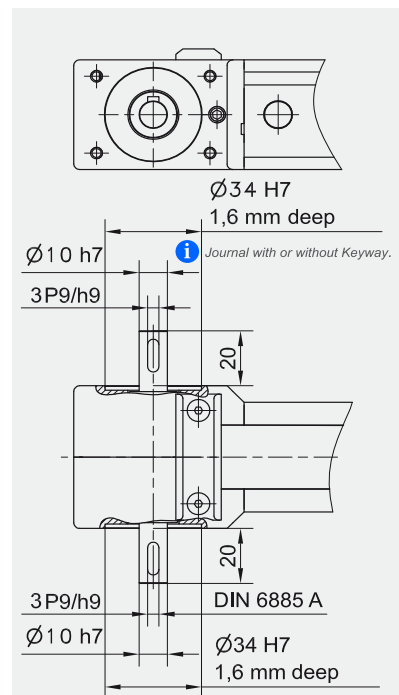
### TYPE 0



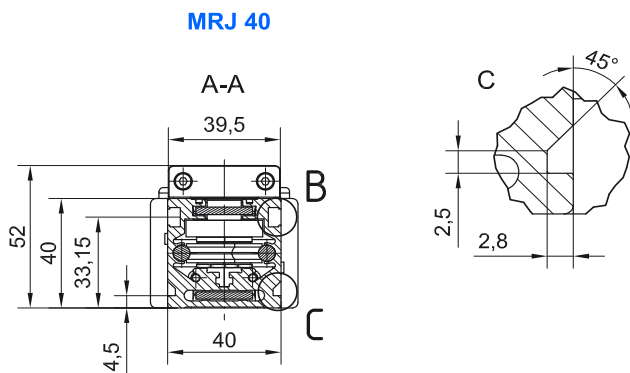
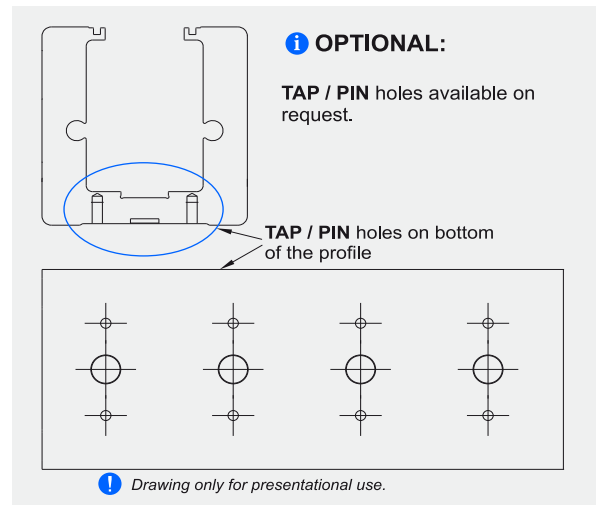
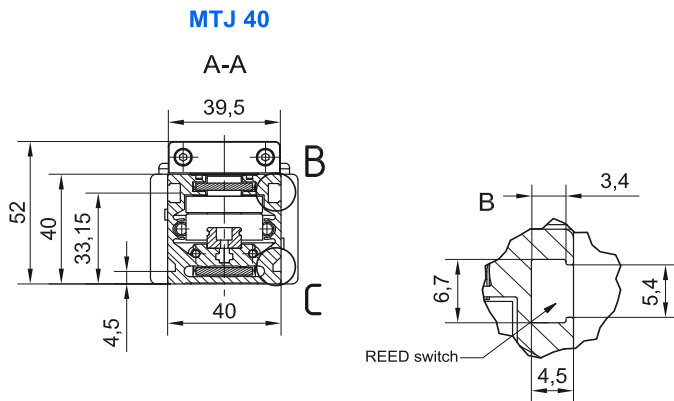
### TYPE 1 L and 1 R



### TYPE 2



DIMENSIONS



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

Mounting the drive

- by the **MOTOR ADAPTER WITH COUPLING** (Page 8.020.0)

**i** Available on request.

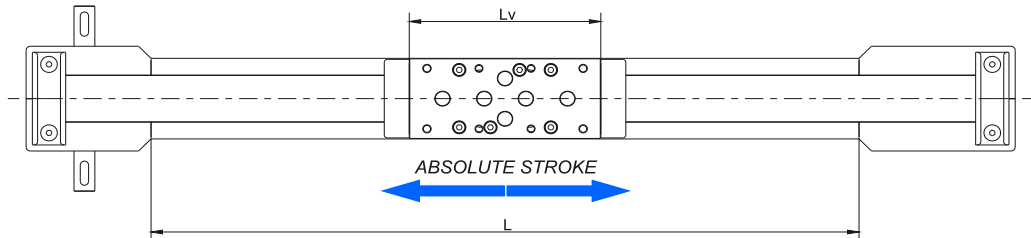
Defining of the linear unit length

**L = Effective stroke + 2 × Safety stroke + Lv + 32 mm**

**Lv = 92 mm**

**Ltotal = L + 135 mm**

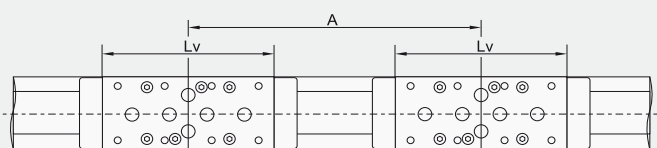
Left side (L)



Right side (R)

Multiple carriages

**i** Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)



**L = Effective stroke + 2 × Safety stroke + Lv + A × (nc - 1) + 32 mm**

**Ltotal = L + 135 mm**

**A ≥ Lv + 24 mm** **i**

**For the case of A [mm] > A<sub>lim</sub> :** **i**  
 - a toothed belt for the connection of the carriages will be used,  
 - the following condition must be met:  
 $A [mm] = A_{lim} + 3 \times i$ ,  
 where  $i \in \{1, 2, 3, \dots\}$ .

	<b>MTJ / MRJ 40</b>
<b>A<sub>lim</sub> [mm]</b>	<b>401,5</b>

nc - Number of carriages



## TECHNICAL DATA

### General technical data

Linear Unit	Carriage length Lv [ mm ]	Dynamic load capacity			Dynamic moment			Max. permissible loads					Moved mass [ kg ]	Max. Repeatability [ mm ]	* Max. length Lmax [ mm ]	* Max. stroke [ mm ]	** Min. stroke [ mm ]
		C [ N ]	Cy [ N ]	Cz [ N ]	Mx [ Nm ]	My [ Nm ]	Mz [ Nm ]	Forces		Moments							
								Fpy [ N ]	Fpz [ N ]	Mpx [ Nm ]	Mpy [ Nm ]	Mpz [ Nm ]					
MTJ 65 S	140	9900	/	/	79	59	59	3270	5100	34	34	34	1,00	± 0,08		5820	40
MTJ 65 L	190	19800	/	/	158	1025	1025	6540	10190	60	530	340	1,45	± 0,08	6000	5770	40
MRJ 65 L	190	/	8600	4400	74	186	425	1920	1470	25	62	95	1,31	± 0,08		5770	0

\* 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).

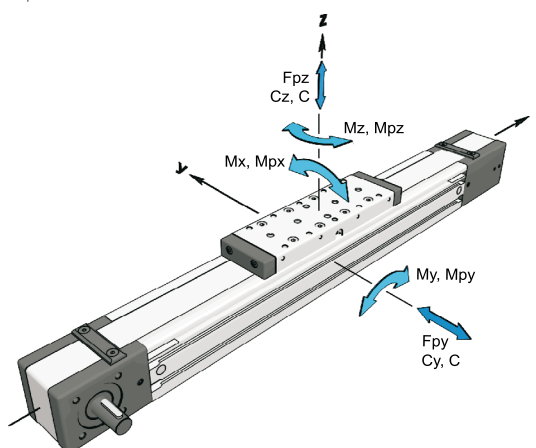
\*\* For minimum stroke below the stated value in the table above please contact us.

#### **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%

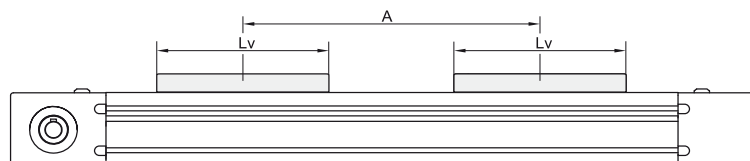
For operating temperature out of the presented range, please contact us.

### General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity			* Dynamic moment			* Max. permissible loads				
		C [ N ]	Cy [ N ]	Cz [ N ]	Mx [ Nm ]	My [ Nm ]	Mz [ Nm ]	Forces		Moments		
								Fpy [ N ]	Fpz [ N ]	Mpx [ Nm ]	Mpy [ Nm ]	Mpz [ Nm ]
MTJ 65	S2	19800	/	/	158	9,9 × A	9,9 × A	6540	10190	68	5,1 × A	3,3 × A
MTJ 65	L2	39600	/	/	316	19,8 × A	19,8 × A	13080	20380	120	10,2 × A	6,5 × A
MRJ 65	L2	/	17200	8800	148	4,4 × A	8,6 × A	3850	2940	50	1,5 × A	1,9 × 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.



### Drive and belt data

Linear Unit	* Max. travel speed [ m / s ]	Max. drive torque Ma [ Nm ]	** No load torque		Puley drive ratio [ mm / rev ]	Pulley diameter [ mm ]	Belt type	Belt width [ mm ]	Max. force transmitted by belt [ N ]	Specific spring constant Cspec [ N ]	* Max. acceleration [ m/s <sup>2</sup> ]
			With strip [ Nm ]	Without strip [ Nm ]							
MTJ 65 S	6	13,1	1,1 × nc	0,8 × nc	165	52,52	AT 5	32	500	600000	70
MTJ 65 L			1,2 × nc	0,9 × nc							
MRJ 65 L	10		1,0 × nc	0,7 × nc							

\* Max. travel speed and max. acceleration of Linear unit with the Corrosion-resistant protection strip is 1,5 m/s and 50 m/s<sup>2</sup>, respectively.  
For travel speed and acceleration over the stated value in the table above please contact us.

\*\* The stated values are for strokes (and for distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.  
nc - Number of carriages

TECHNICAL DATA

Mass and mass moment of inertia

Linear Unit	*	Mass of linear unit [ kg ]	*	Mass moment of inertia [ 10 <sup>-5</sup> kg m <sup>2</sup> ]	Planar moment of inertia	
					ly [ cm <sup>4</sup> ]	lz [ cm <sup>4</sup> ]
MTJ 65 S		$4,0 + 0,0055 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1,00 \times (\text{nc} - 1)$		$98,4 + 0,0154 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 69,0 \times (\text{nc} - 1)$	59,7	74,4
MTJ 65 L		$4,6 + 0,0055 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1,45 \times (\text{nc} - 1)$		$130,1 + 0,0154 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 100,0 \times (\text{nc} - 1)$		
MRJ 65 L		$4,3 + 0,0047 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1,31 \times (\text{nc} - 1)$		$120,4 + 0,0154 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 90,3 \times (\text{nc} - 1)$		

\* Absolute stroke [mm]

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

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

Deflection of the linear unit

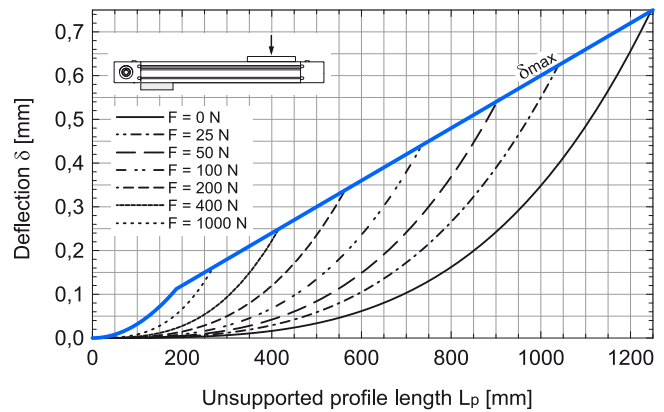
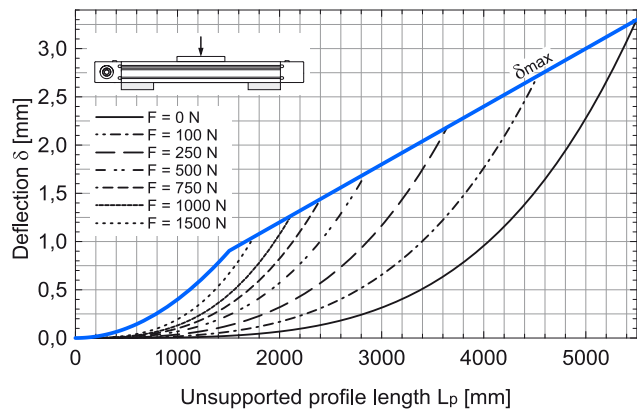
**Fixed - fixed mounting**

**Fixed - free mounting**

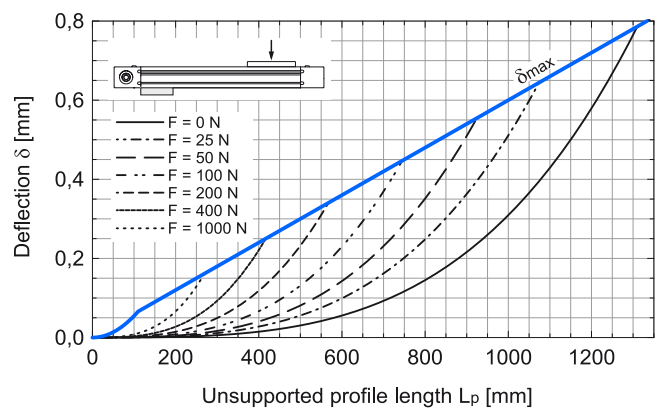
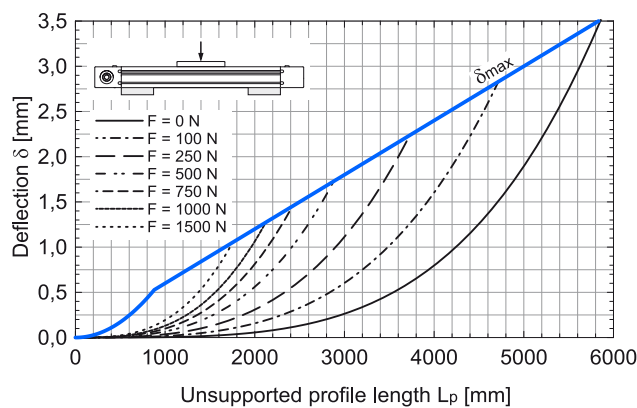
$\delta$  Maximum deflection of the linear unit [mm]  
 $\delta_{max}$  Maximum permissible deflection of the linear unit [mm]  
 F Applied force [N]  
 Lp Unsupported profile length [mm]

**i** The maximum permissible deflection  $\delta_{max}$  must not be exceeded. In the case that maximum deflection  $\delta$  exceeds the maximum permissible deflection  $\delta_{max}$  additional profile supports are needed.

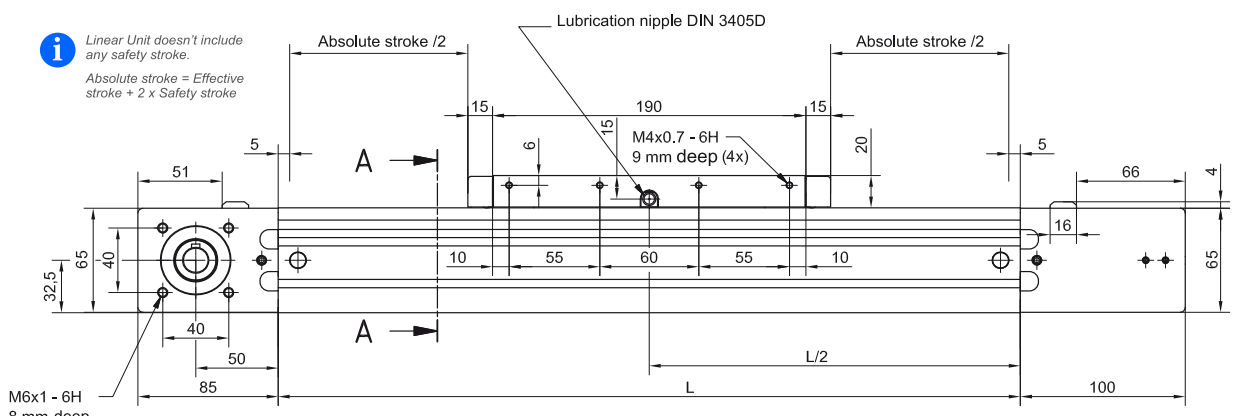
MTJ 65



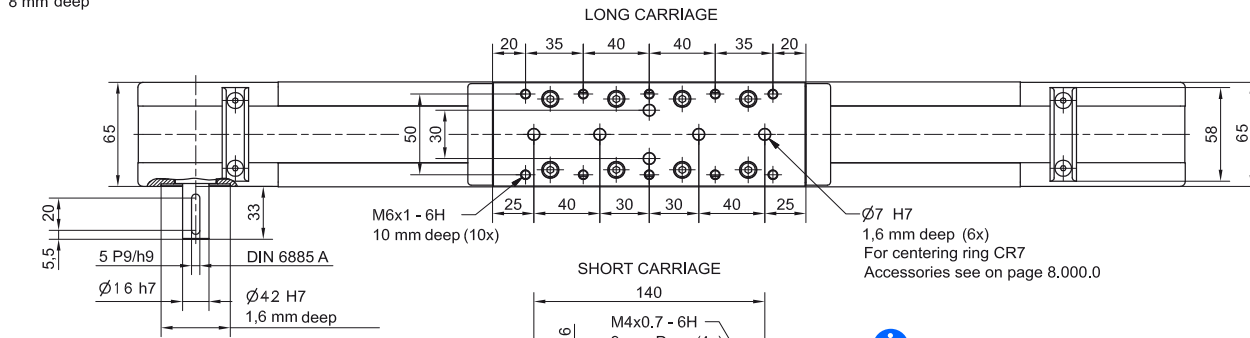
MRJ 65



DIMENSIONS



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

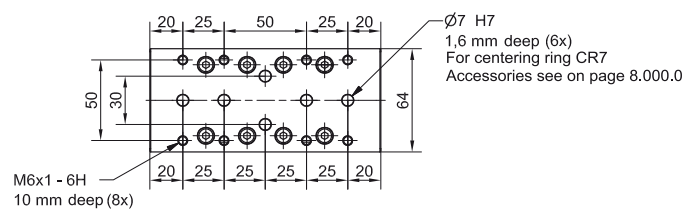
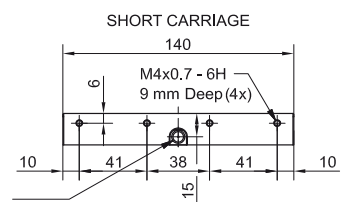


**i** Journal with or without Keyway.

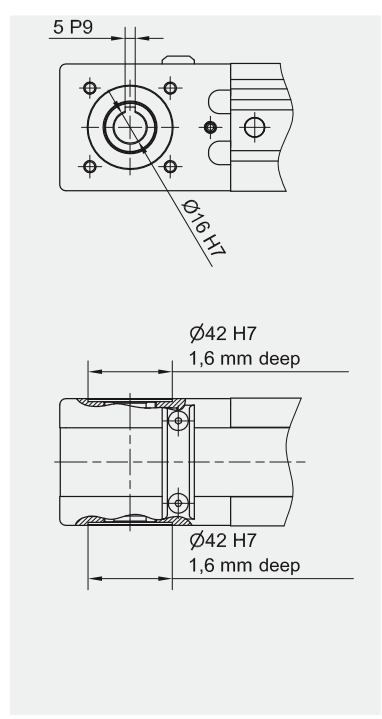
**i** Short carriage only for MTJ series!

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

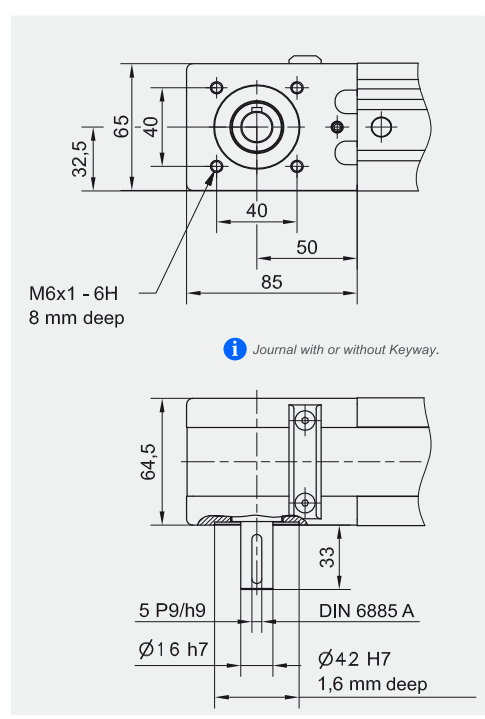
Lubrication nipple DIN 3405D



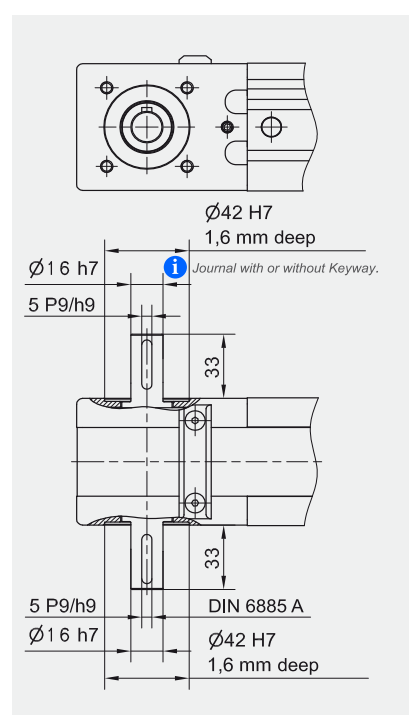
TYPE 0



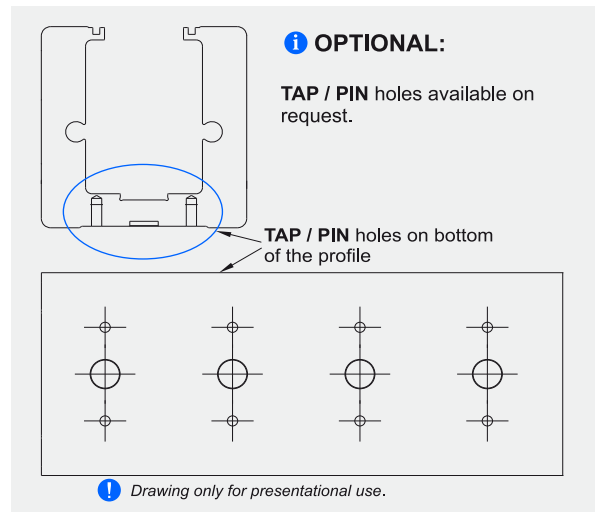
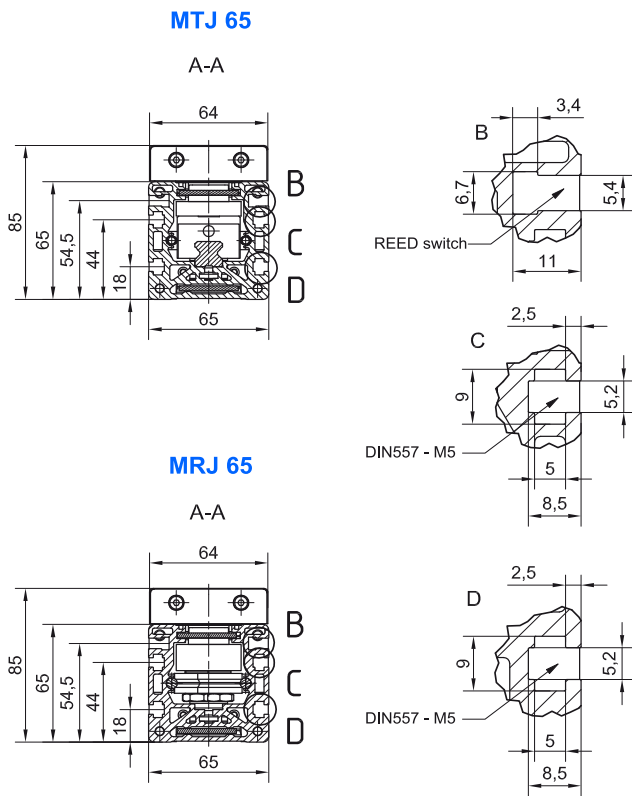
TYPE 1 L and 1 R



TYPE 2



DIMENSIONS



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

Mounting the drive

- by the **MOTOR ADAPTER WITH COUPLING** (Page 8.020.0)

**i** Available on request.

Defining of the linear unit length

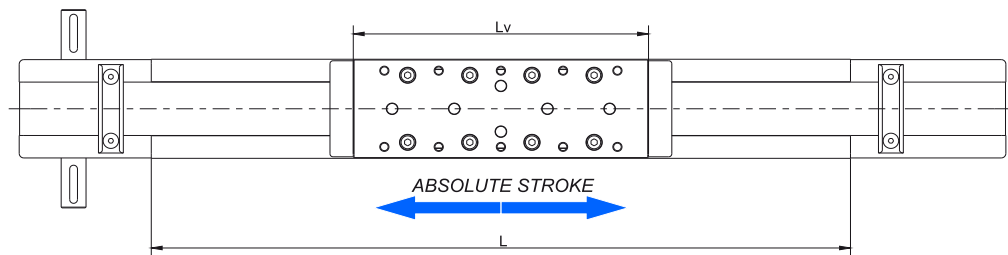
$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + 40 \text{ mm}$

$L_v - \text{Long carriage} = 190 \text{ mm}$

$L_{\text{total}} = L + 185 \text{ mm}$

$L_v - \text{Short carriage} = 140 \text{ mm}$

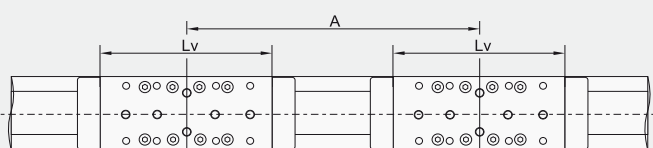
Left side (L)



Right side (R)

Multiple carriages

**i** Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)



For the case of  $A \text{ [mm]} > A_{\text{lim}}$  : **i**

- a toothed belt for the connection of the carriages will be used,

- the following condition must be met:

$A \text{ [mm]} = A_{\text{lim}} + 5 \times i$ ,  
where  $i \in \{1,2,3,\dots\}$ .

$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + A \times (n_c - 1) + 40 \text{ mm}$

$L_{\text{total}} = L + 185 \text{ mm}$

$A \geq L_v + 30 \text{ mm}$  **i**

	MTJ 65 S	MTJ / MRJ 65 L
<b>A<sub>lim</sub> [mm]</b>	550	600

## TECHNICAL DATA

### General technical data

Linear Unit	Carriage length Lv [ mm ]	Dynamic load capacity			Dynamic moment			Max. permissible loads					Moved mass [ kg ]	Max. Repeatability [ mm ]	* Max. length Lmax [ mm ]	* Max. stroke [ mm ]	** Min. stroke [ mm ]
		C [ N ]	Cy [ N ]	Cz [ N ]	Mx [ Nm ]	My [ Nm ]	Mz [ Nm ]	Forces		Moments							
								Fpy [ N ]	Fpz [ N ]	Mpx [ Nm ]	Mpy [ Nm ]	Mpz [ Nm ]					
MTJ 80 S	170	17100	/	/	185	130	130	4470	7530	110	122	100	1,72	± 0,08		5788	55
MTJ 80 L	260	34200	/	/	370	2565	2565	8930	15060	150	1130	670	2,72	± 0,08	6000	5698	55
MRJ 80 L	260	/	17100	9000	198	511	1145	3400	1760	39	101	228	2,73	± 0,08		5698	0

\* 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).

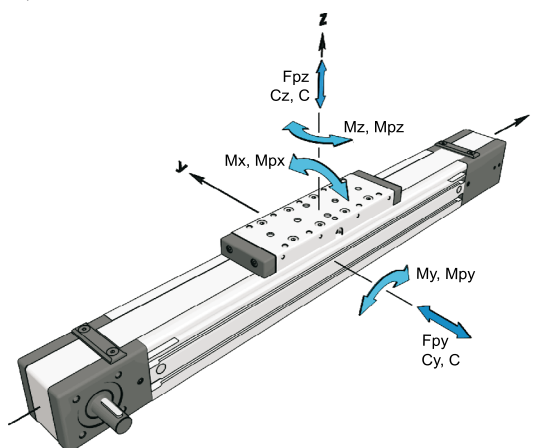
\*\* For minimum stroke below the stated value in the table above please contact us.

#### **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%

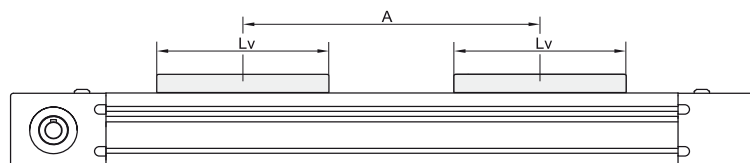
For operating temperature out of the presented range, please contact us.

### General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity			* Dynamic moment			* Max. permissible loads				
		C [ N ]	Cy [ N ]	Cz [ N ]	Mx [ Nm ]	My [ Nm ]	Mz [ Nm ]	Forces		Moments		
								Fpy [ N ]	Fpz [ N ]	Mpx [ Nm ]	Mpy [ Nm ]	Mpz [ Nm ]
MTJ 80	S2	34200	/	/	370	17,1 × A	17,1 × A	8930	15060	220	7,5 × A	4,5 × A
MTJ 80	L2	68400	/	/	740	34,2 × A	34,2 × A	17860	30130	300	15,1 × A	8,9 × A
MRJ 80	L2	/	34200	18000	396	9,0 × A	17,1 × A	6800	3530	78	1,8 × A	3,4 × 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.



### Drive and belt data

Linear Unit	* Max. travel speed [ m / s ]	Max. drive torque Ma [ Nm ]	** No load torque		Puley drive ratio [ mm / rev ]	Pulley diameter [ mm ]	Belt type	Belt width [ mm ]	Max. force transmitted by belt [ N ]	Specific spring constant Cspec [ N ]	* Max. acceleration [ m/s <sup>2</sup> ]
			With strip [ Nm ]	Without strip [ Nm ]							
MTJ 80 S	6	29,4	1,5 × nc	1,2 × nc	210	66,84	AT 5	50	880	960000	70
MTJ 80 L			1,7 × nc	1,4 × nc							
MRJ 80 L	10		1,4 × nc	1,1 × nc							

\* Max. travel speed and max. acceleration of Linear unit with the Corrosion-resistant protection strip is 1,5 m/s and 50 m/s<sup>2</sup>, respectively.  
For travel speed and acceleration over the stated value in the table above please contact us.

\*\* The stated values are for strokes (and for distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.  
nc - Number of carriages

TECHNICAL DATA

Mass and mass moment of inertia

Linear Unit	*	Mass of linear unit [ kg ]	*	Mass moment of inertia [ 10 <sup>-5</sup> kg m <sup>2</sup> ]	Planar moment of inertia	
					ly [ cm <sup>4</sup> ]	lz [ cm <sup>4</sup> ]
MTJ 80 S		$6,8 + 0,0085 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1,72 \times (\text{nc} - 1)$		$310,6 + 0,0391 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 192,1 \times (\text{nc} - 1)$	129,1	173,4
MTJ 80 L		$8,4 + 0,0085 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 2,72 \times (\text{nc} - 1)$		$423,3 + 0,0391 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 303,8 \times (\text{nc} - 1)$		
MRJ 80 L		$8,2 + 0,0075 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 2,73 \times (\text{nc} - 1)$		$424,4 + 0,0391 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 304,9 \times (\text{nc} - 1)$		

\*Absolute stroke [mm]

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

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

Deflection of the linear unit

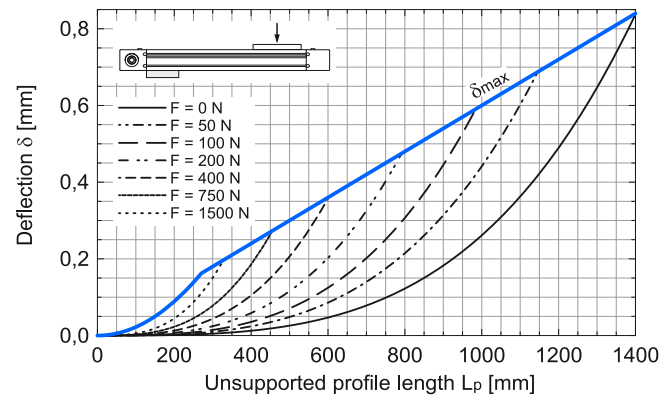
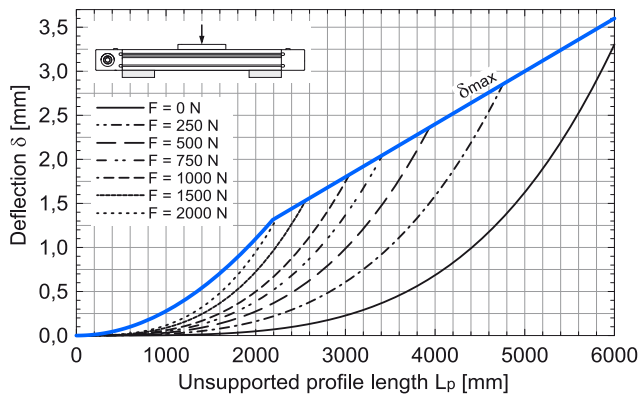
**Fixed - fixed mounting**

**Fixed - free mounting**

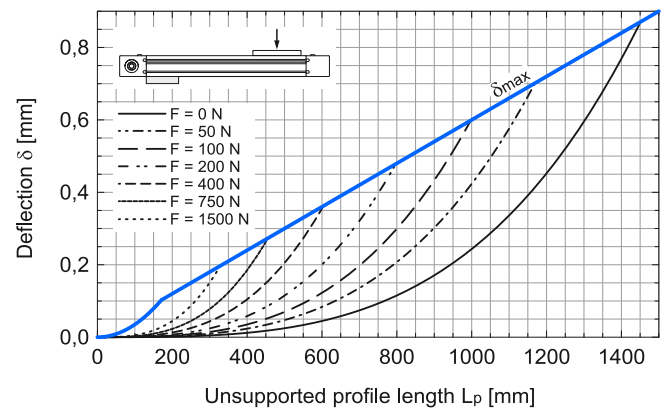
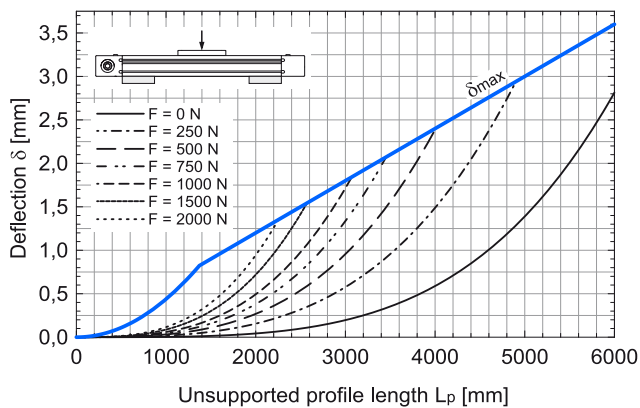
$\delta$  Maximum deflection of the linear unit [mm]  
 $\delta_{max}$  Maximum permissible deflection of the linear unit [mm]  
 F Applied force [N]  
 Lp Unsupported profile length [mm]

**i** The maximum permissible deflection  $\delta_{max}$  must not be exceeded. In the case that maximum deflection  $\delta$  exceeds the maximum permissible deflection  $\delta_{max}$  additional profile supports are needed.

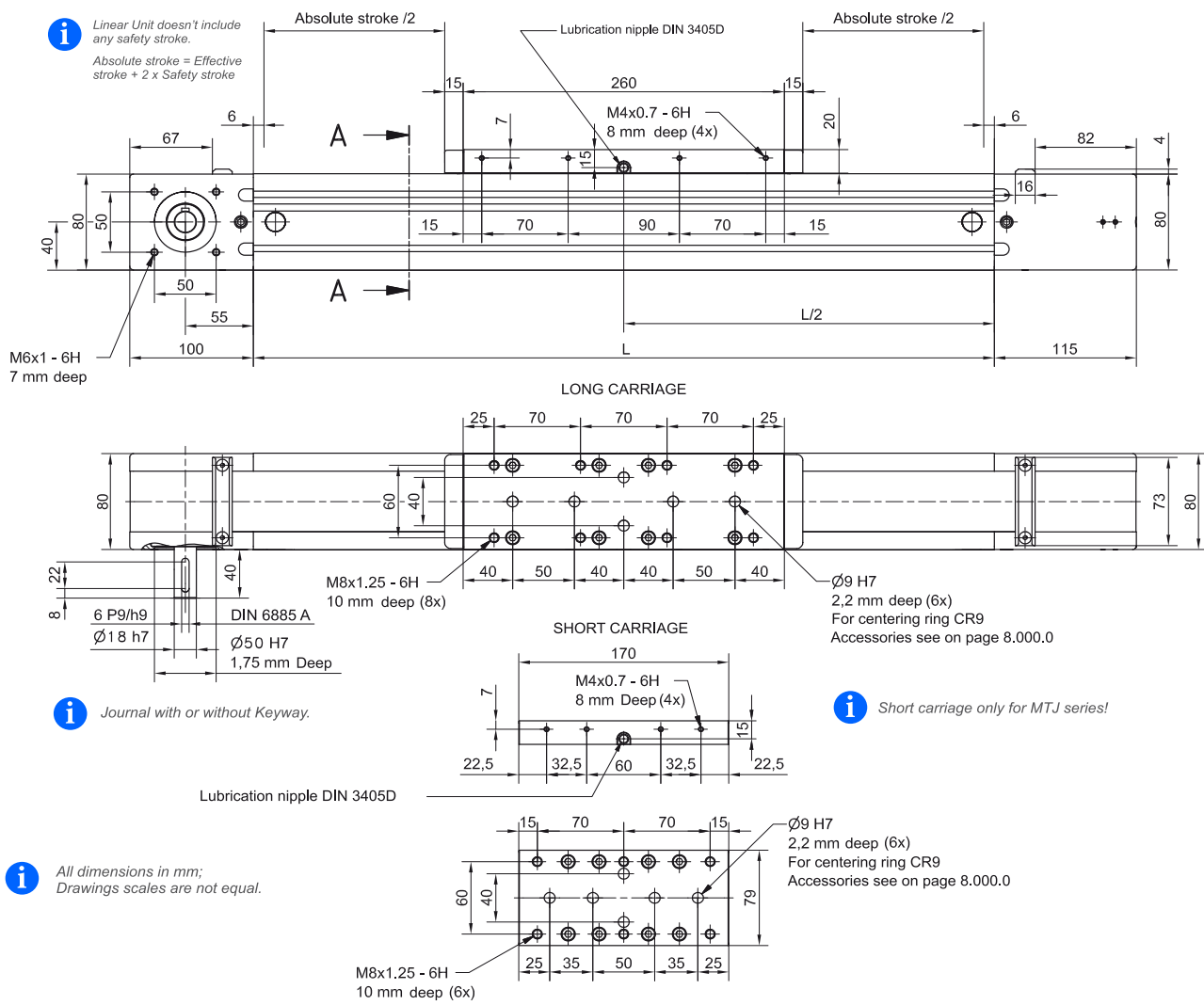
MTJ 80



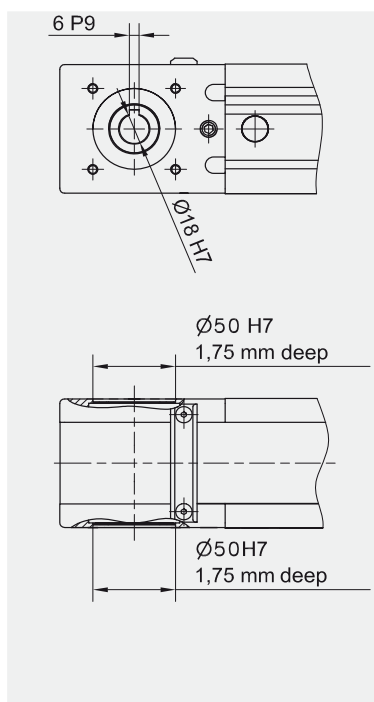
MRJ 80



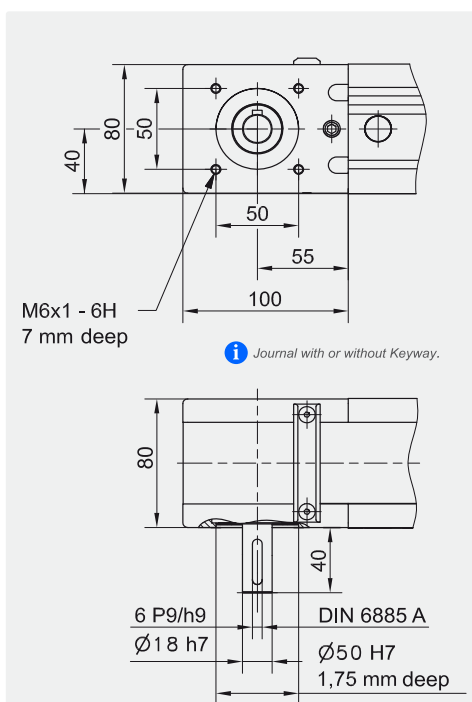
DIMENSIONS



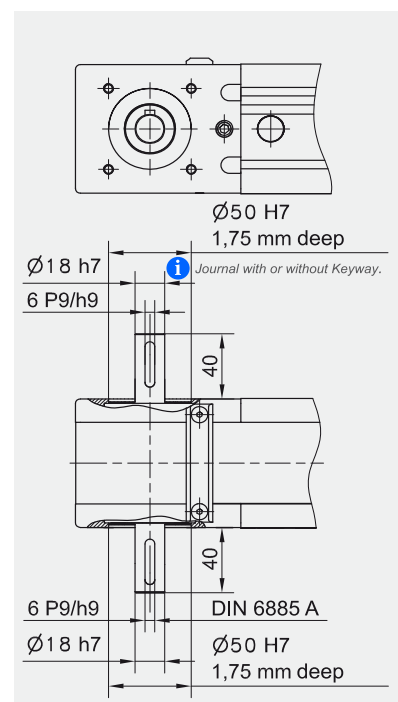
**TYPE 0**



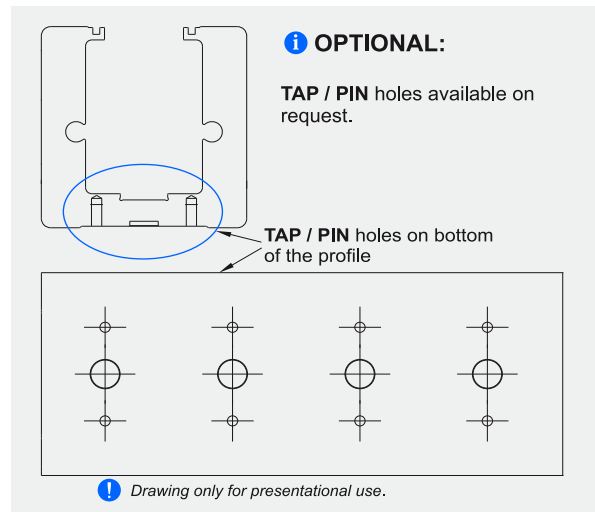
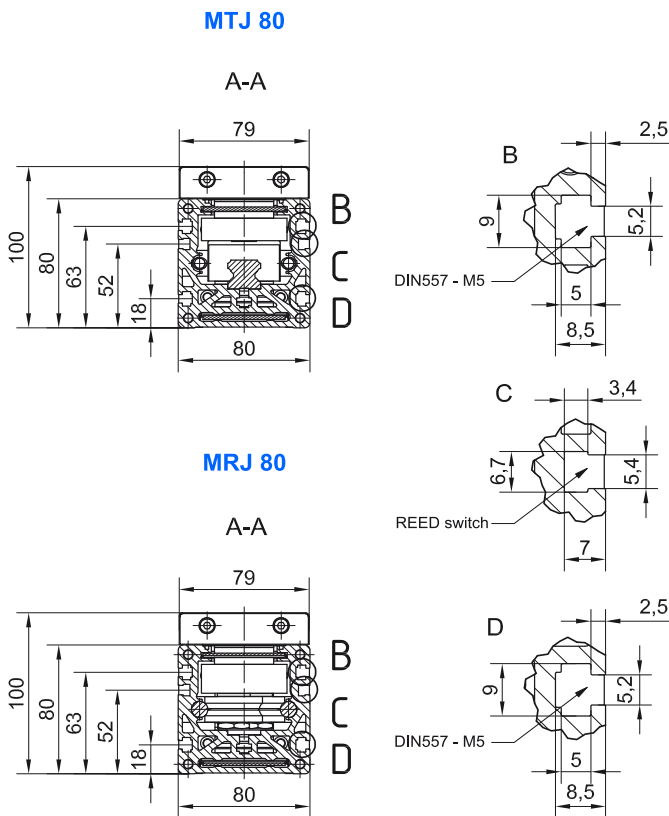
**TYPE 1 L and 1 R**



**TYPE 2**



DIMENSIONS



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

Mounting the drive

- by the **MOTOR ADAPTER WITH COUPLING** (Page 8.020.0)

**i** Available on request.

Defining of the linear unit length

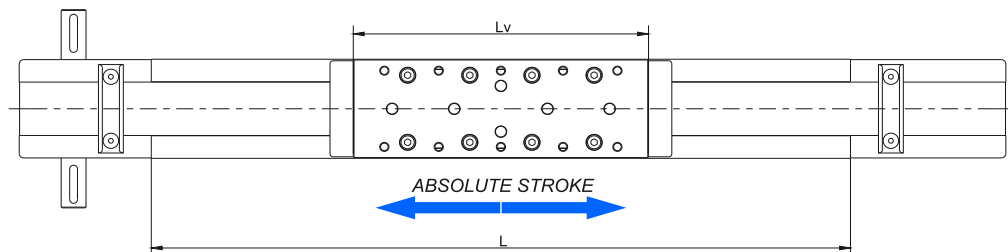
$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + 42 \text{ mm}$

$L_{\text{total}} = L + 215 \text{ mm}$

$L_v - \text{Long carriage} = 260 \text{ mm}$

$L_v - \text{Short carriage} = 170 \text{ mm}$

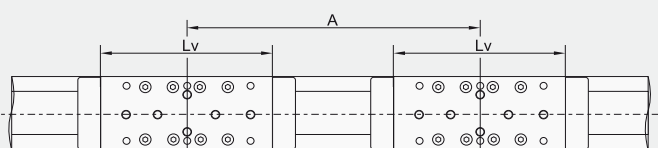
Left side (L)



Right side (R)

Multiple carriages

**i** Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)



$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + A \times (n_c - 1) + 42 \text{ mm}$

$L_{\text{total}} = L + 215 \text{ mm}$

$A \geq L_v + 30 \text{ mm}$  **i**

For the case of  $A \text{ [mm]} > A_{\text{lim}}$  : **i**

- a toothed belt for the connection of the carriages will be used,

- the following condition must be met:

$A \text{ [mm]} = A_{\text{lim}} + 5 \times i$ ,  
where  $i \in \{1,2,3,\dots\}$ .

	MTJ 80 S	MTJ / MRJ 80 L
<b>A<sub>lim</sub> [mm]</b>	711,5	801,5



TECHNICAL DATA

General technical data

Linear Unit	Carriage length Lv [ mm ]	Dynamic load capacity			Dynamic moment			Max. permissible loads					Moved mass [ kg ]	Max. Repeatability [ mm ]	* Max. length Lmax [ mm ]	* Max. stroke [ mm ]	** Min. stroke [ mm ]
		C [ N ]	Cy [ N ]	Cz [ N ]	Mx [ Nm ]	My [ Nm ]	Mz [ Nm ]	Forces		Moments							
								Fpy [ N ]	Fpz [ N ]	Mpx [ Nm ]	Mpy [ Nm ]	Mpz [ Nm ]					
MTJ 110 S	240	24800	/	/	315	220	220	5000	10130	135	180	100	3,25	± 0,08		5748	65
MTJ 110 L	330	49600	/	/	630	3840	3840	10000	20260	295	1570	775	4,61	± 0,08	6000	5658	65
MRJ 110 L	330	/	31000	14000	406	877	2325	6200	3410	99	214	465	4,78	± 0,08		5658	0

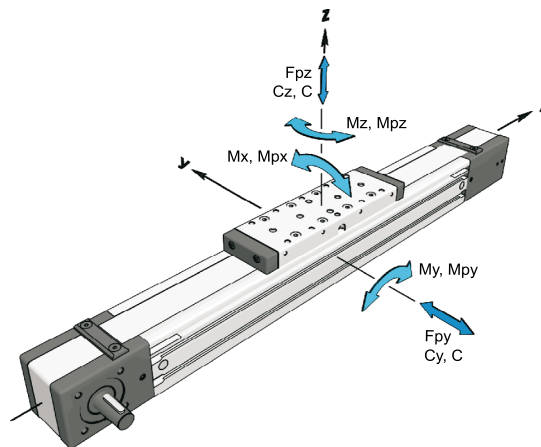
\*For lengths / stroke over the stated value in the table above please contact us.  
Values for max. stroke are not valid for multiple carriages  
(equation of defining the linear unit length for particular size of the linear unit needs to be used).  
\*\*For minimum stroke below the stated value in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

**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%

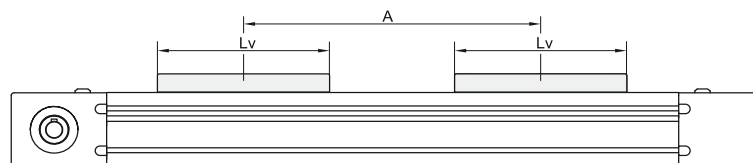
For operating temperature out of the presented range, please contact us.

General technical data for double carriage

Linear Unit	Carriage version	Dynamic load capacity			* Dynamic moment			* Max. permissible loads				
		C [ N ]	Cy [ N ]	Cz [ N ]	Mx [ Nm ]	My [ Nm ]	Mz [ Nm ]	Forces		Moments		
								Fpy [ N ]	Fpz [ N ]	Mpx [ Nm ]	Mpy [ Nm ]	Mpz [ Nm ]
MTJ 110	S2	49600	/	/	630	24,8 × A	24,8 × A	10000	20260	270	10,1 × A	5,0 × A
MTJ 110	L2	99200	/	/	1260	49,6 × A	49,6 × A	20000	40520	590	20,3 × A	10,0 × A
MRJ 110	L2	/	62000	28000	812	14,0 × A	31,0 × A	12400	6830	198	3,4 × A	6,2 × 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.



Drive and belt data

Linear Unit	* Max. travel speed [ m / s ]	Max. drive torque Ma [ Nm ]	** No load torque		Puley drive ratio [ mm / rev ]	Puley diameter [ mm ]	Belt type	Belt width [ mm ]	Max. force transmitted by belt [ N ]	Specific spring constant Cspec [ N ]	* Max. acceleration [ m/s <sup>2</sup> ]
			With strip [ Nm ]	Without strip [ Nm ]							
MRJ 110 L	10	68,5 with Keyway 82,6 without Keyway	2,2 × nc	2,0 × nc	300	95,49	AT 10	50	1730	2145000	70
MTJ 110 S	6		2,2 × nc	2,0 × nc							
MTJ 110 L			2,7 × nc	2,3 × nc							

\* Max. travel speed and max. acceleration of Linear unit with the Corrosion-resistant protection strip is 1,5 m/s and 50 m/s<sup>2</sup>, respectively.  
For travel speed and acceleration over the stated value in the table above please contact us.

\*\*The stated values are for strokes (and for distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.  
nc - Number of carriages

TECHNICAL DATA

Mass and mass moment of inertia

Linear Unit	* Mass of linear unit [ kg ]	* Mass moment of inertia [ 10 <sup>-5</sup> kg m <sup>2</sup> ]	Planar moment of inertia	
			ly [ cm <sup>4</sup> ]	lz [ cm <sup>4</sup> ]
MTJ 110 S	$15,0 + 0,015 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3,25 \times (\text{nc} - 1)$	$1065,0 + 0,137 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 741,9 \times (\text{nc} - 1)$	513,0	620,0
MTJ 110 L	$17,7 + 0,015 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 4,61 \times (\text{nc} - 1)$	$1381,0 + 0,137 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1050,9 \times (\text{nc} - 1)$		
MRJ 110 L	$16,3 + 0,0133 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 4,78 \times (\text{nc} - 1)$	$1420,0 + 0,137 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1089,6 \times (\text{nc} - 1)$		

\*Absolute stroke [mm]

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

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

Deflection of the linear unit

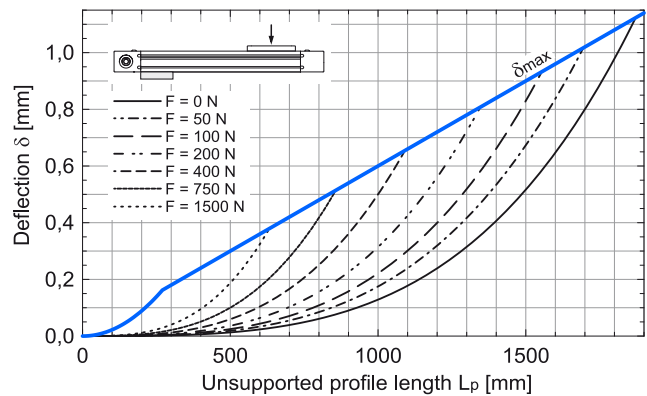
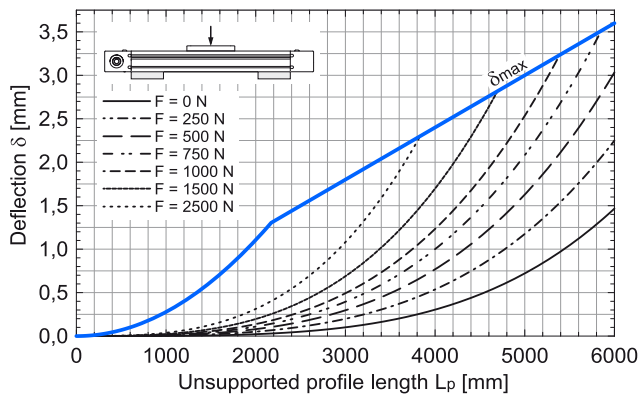
**Fixed - fixed mounting**

**Fixed - free mounting**

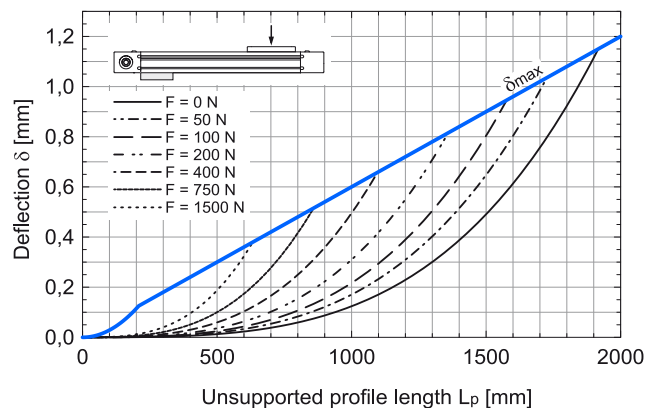
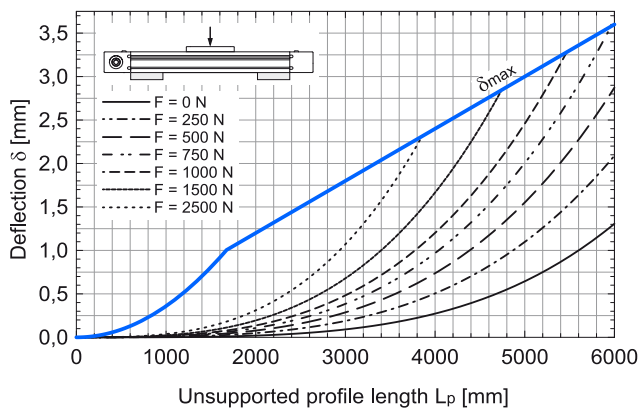
$\delta$  Maximum deflection of the linear unit [mm]  
 $\delta_{max}$  Maximum permissible deflection of the linear unit [mm]  
 F Applied force [N]  
 Lp Unsupported profile length [mm]

**i** The maximum permissible deflection  $\delta_{max}$  must not be exceeded. In the case that maximum deflection  $\delta$  exceeds the maximum permissible deflection  $\delta_{max}$  additional profile supports are needed.

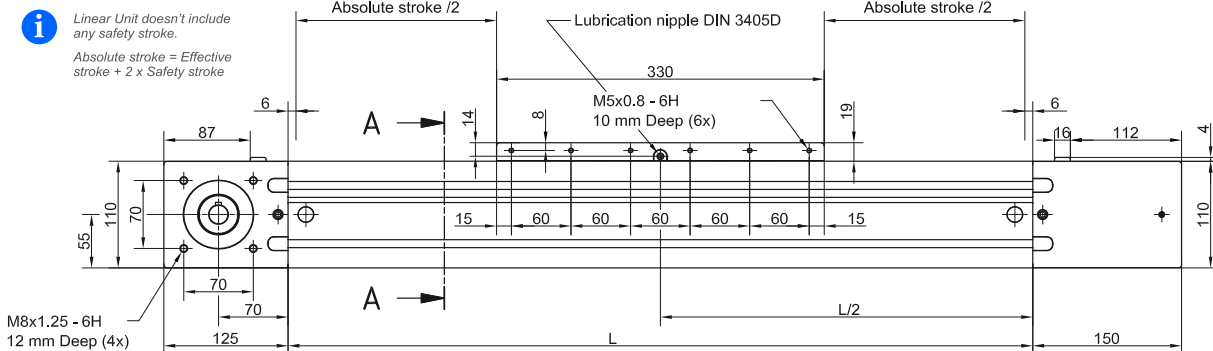
MTJ 110



MRJ 110

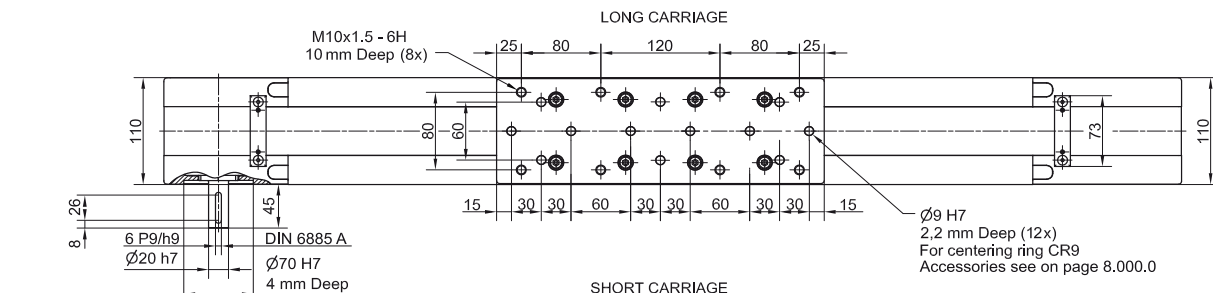


DIMENSIONS



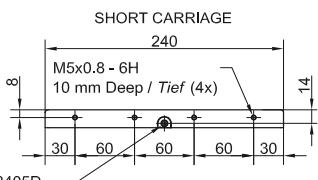
**i** Linear Unit doesn't include any safety stroke.  
Absolute stroke = Effective stroke + 2 x Safety stroke

Absolute stroke = Effective stroke + 2 x Safety stroke



**i** Journal with or without Keyway.

Journal with or without Keyway.

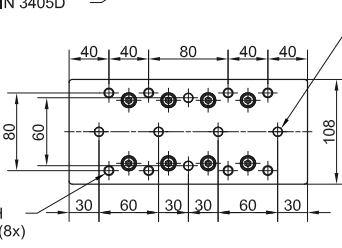


**i** Short carriage only for MTJ series!

Short carriage only for MTJ series!

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

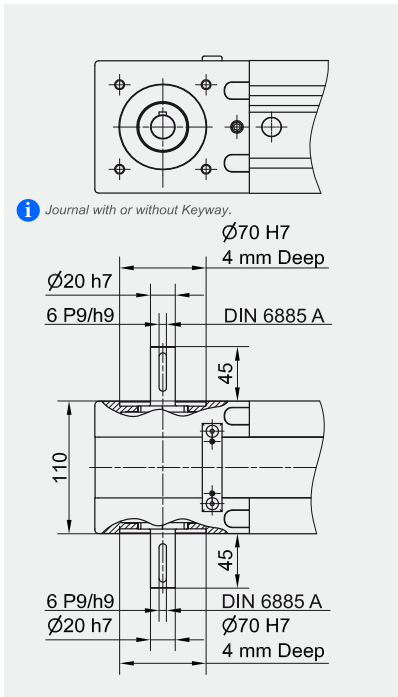
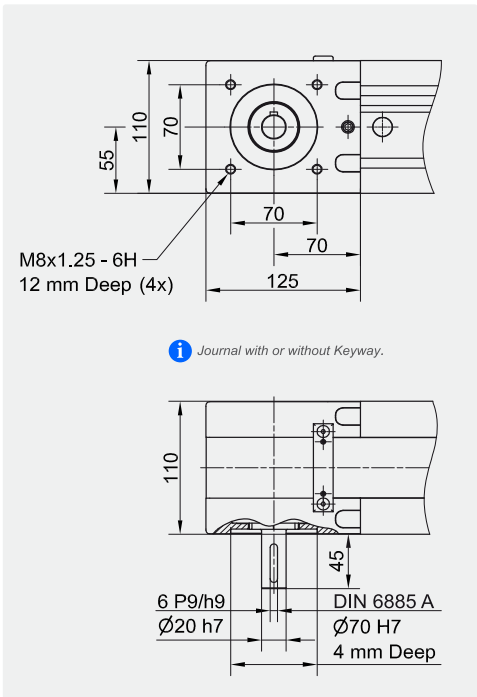
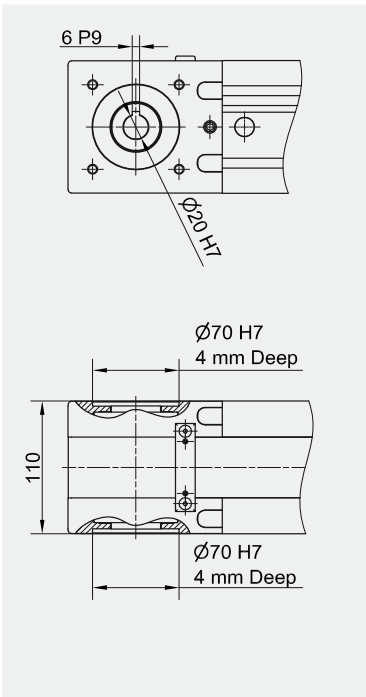
All dimensions in mm; Drawings scales are not equal.



TYPE 0

TYPE 1 L and 1 R

TYPE 2



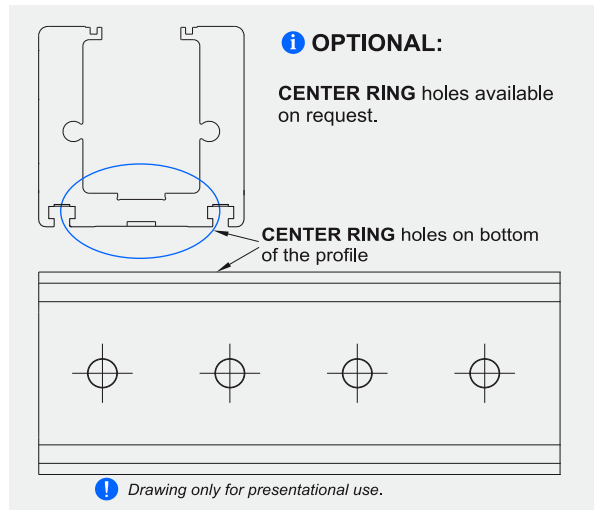
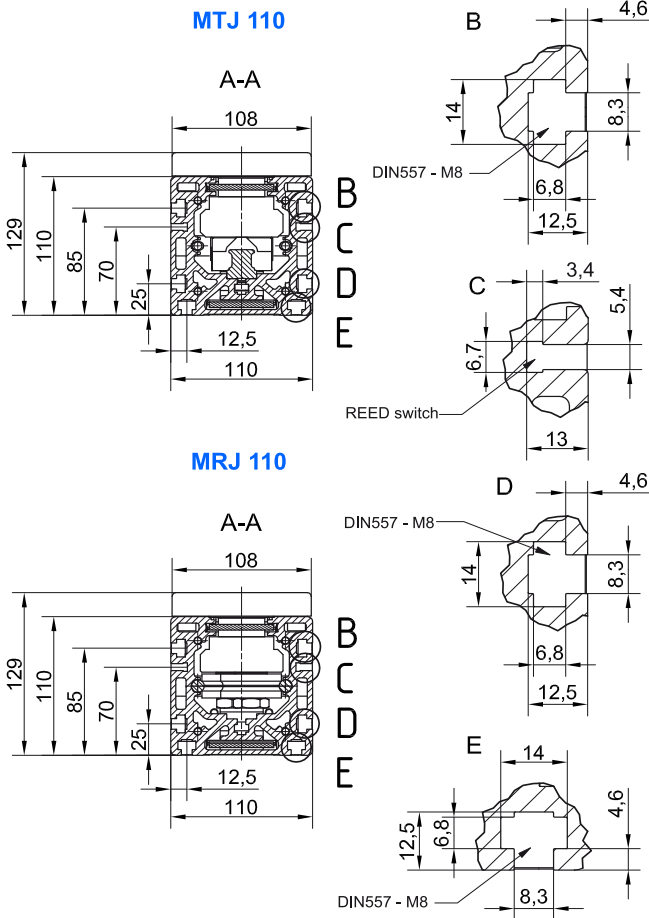
**i** Journal with or without Keyway.

Journal with or without Keyway.

**i** Journal with or without Keyway.

Journal with or without Keyway.

DIMENSIONS



Mounting the drive

- by the **MOTOR ADAPTER WITH COUPLING** (Page 8.020.0)

Available on request.

All dimensions in mm; Drawings scales are not equal.

Defining of the linear unit length

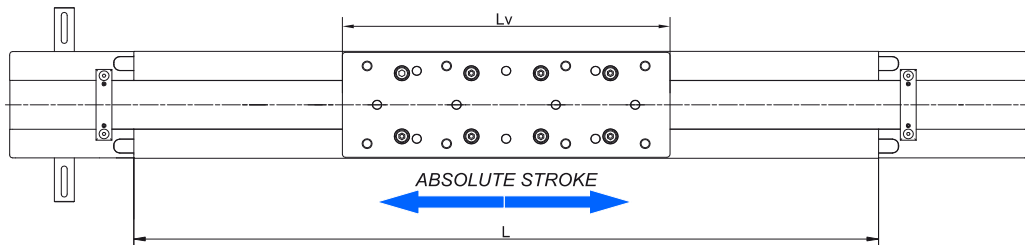
$$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + 12 \text{ mm}$$

$$L_{\text{total}} = L + 275 \text{ mm}$$

$L_v$  - Long carriage = 330 mm

$L_v$  - Short carriage = 240 mm

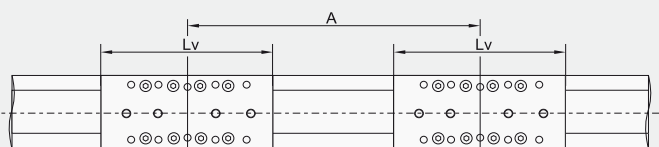
Left side (L)



Right side (R)

Multiple carriages

Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)



For the case of  $A$  [mm]  $> A_{lim}$  :  
- a toothed belt for the connection of the carriages will be used,  
- the following condition must be met:  
 $A$  [mm] =  $A_{lim} + 10 \times i$ ,  
where  $i \in \{1,2,3,\dots\}$ .

$$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + A \times (n_c - 1) + 12 \text{ mm}$$

$$L_{\text{total}} = L + 275 \text{ mm}$$

$A \geq L_v$

	MTJ 110 S	MTJ / MRJ 110 L
$A_{lim}$ [mm]	716	806