

**MTJ ECO**

## CHARACTERISTICS

The **MTJ ECO** series Linear Unit is a powerful and cost-effective Linear Unit with toothed belt drive and a Zero-backlash Ball rail guide system for easy and accurate linear movements.

It can easily be combined to multi-axis systems.

Excellent price-/performance ratio and quick delivery time are ensured.

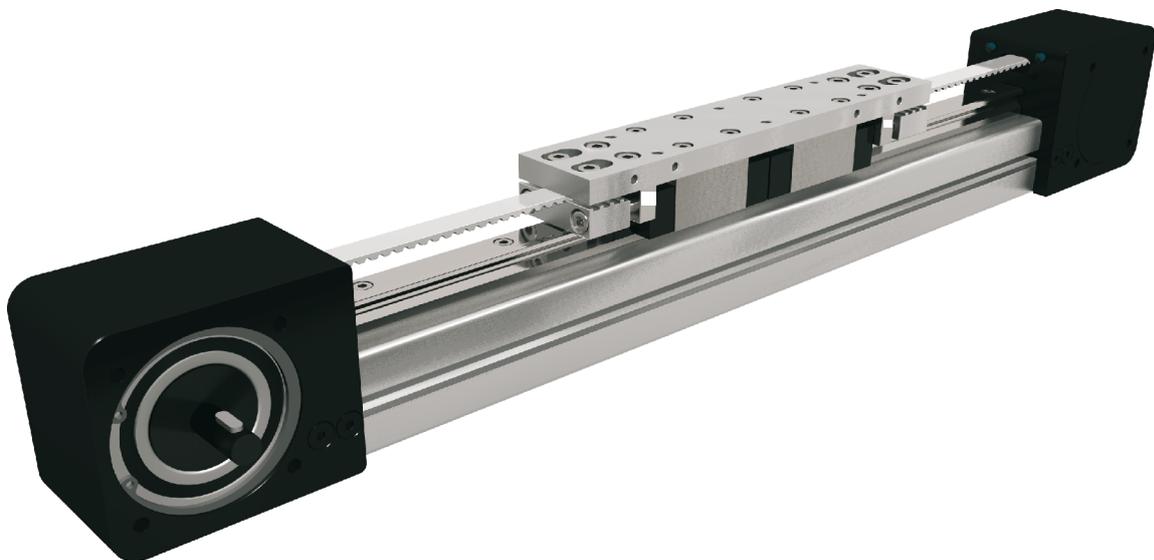
An extruded aluminum Profile from 6063 AL with on it mounted Zero-backlash Ball rail guide system, allows high load capacities and optimal cycles for the movement of larger masses at high speed.

The linear unit MTJ ECO uses 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 aluminum Profile includes T-slots for fixing the Linear Unit and for attaching sensors and switches . Different carriage lengths of the Linear Unit allow the possibility to attach additional accessories on the side.

Lubrication holes on the carriage allow easy re-lubrication of the Ball rail guide .

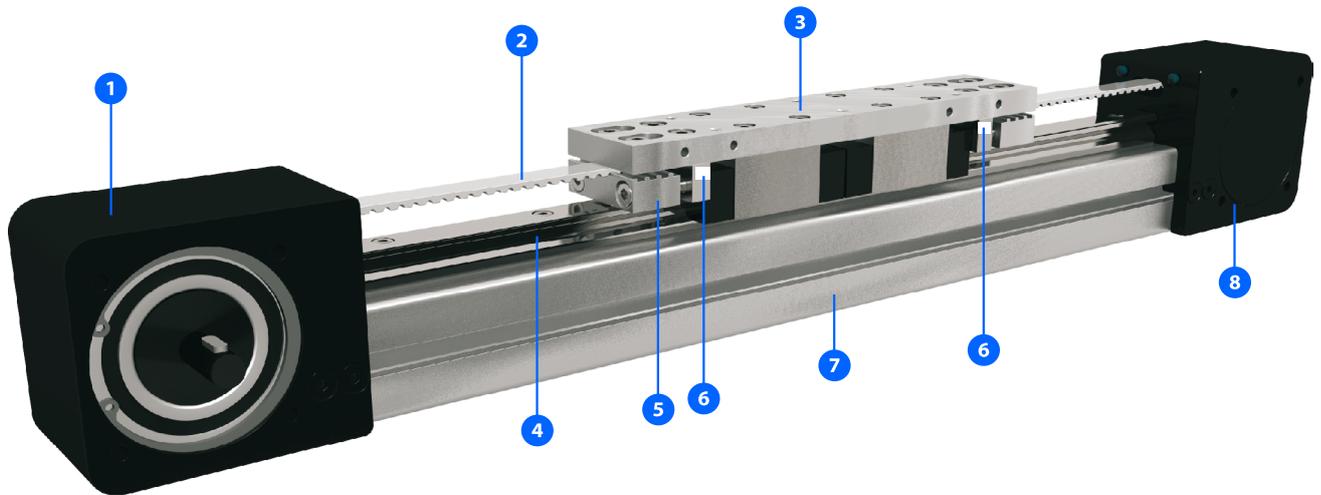
For the linear unit MTJ ECO various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.



**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 pulley
- 2 - AT polyurethane toothed belt with steel tension cords
- 3 - Carriage
- 4 - Linear Ball Guideway
- 5 - Belt Tensioning system
- 6 - Lubrication port
- 7 - Aluminium profile-Hard anodized
- 8 - End block

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HOW TO ORDER

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**MTJ** - **40** - **ECO** - **700** - **L2** - **300** - **10R**

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

**MTJ**

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

**40**

Type : \_\_\_\_\_

**ECO**

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

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

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

**2** : Pulley with journal on both sides

**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

## TECHNICAL DATA

### General technical data

Linear Unit	Carriage length Lv [ mm ]	i Dynamic load capacity C [ N ]	i Dynamic moment			Max. permissible loads					Moved mass [ kg ]	Max. Repeatability [ mm ]	* Max. length Lmax [ mm ]	* Max. stroke [ mm ]	** Min. stroke [ mm ]	
			Mx [ Nm ]	My [ Nm ]	Mz [ Nm ]	Forces		Moments								
						Fpy [ N ]	Fpz [ N ]	Mpx [ Nm ]	Mpy [ Nm ]	Mpz [ Nm ]						
MTJ 40 ECO S	132	9900	79	59	59	3270	5100	34	34	34	0,45	± 0,1	5960	5813	40	
MTJ 40 ECO L	200	19800	158	660	660	6540	10190	60	341	219	0,72	± 0,1				

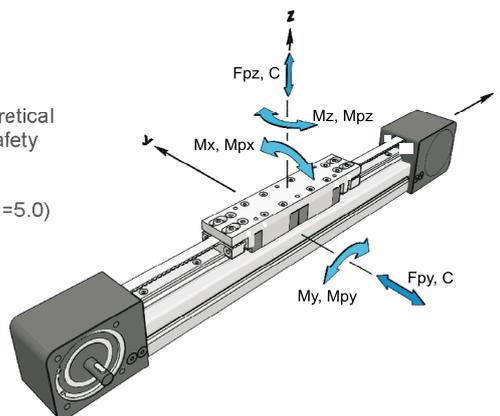
\*For lengths / stroke over the stated value in the table above please contact us.  
Values for max. stroke are not valid for multiple carriages  
(equation of defining the linear unit length for particular size of the linear unit needs to be used).  
\*\*For minimum stroke below the stated value in 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 ( $f_s = 5.0$ )

#### Modulus of elasticity

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



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

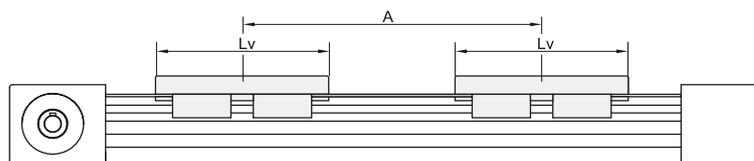
For operating temperature out of the presented range, please contact us.

### 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 ]
MTJ 40 ECO	S2	19800	158	9,9 × A	9,9 × A	6540	10190	68	5,1 × A	3,3 × A
	L2	39600	317	19,8 × A	19,8 × A	13080	20380	120	10,2 × A	6,5 × A

\*A - Distance between carriages [mm]. More on page 4.030.0

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 [ Nm ]	* No load torque [ Nm ]	Pulley 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> ]
MTJ 40 ECO S	3	7,5	1,0 × nc	180	57,31	AT5	12	262	235000	70
MTJ 40 ECO L			1,1 × nc							

\*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

\*\*For travel speed and acceleration over 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 ]	Mass moment of inertia [ 10 <sup>-5</sup> kg m <sup>2</sup> ]	Planar moment of inertia	
			Iy [ cm <sup>4</sup> ]	Iz [ cm <sup>4</sup> ]
MTJ 40 ECO S	$3,1 + 0,003 \times (\text{Abs. stroke} + (nc - 1) \times A) + 0,45 \times (nc - 1)$	$70,1 + 0,007 \times (\text{Abs. stroke} + (nc - 1) \times A) + 36,9 \times (nc - 1)$	9,53	9,21
MTJ 40 ECO L	$3,55 + 0,003 \times (\text{Abs. stroke} + (nc - 1) \times A) + 0,72 \times (nc - 1)$	$92,3 + 0,007 \times (\text{Abs. stroke} + (nc - 1) \times A) + 59,1 \times (nc - 1)$		

\* 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

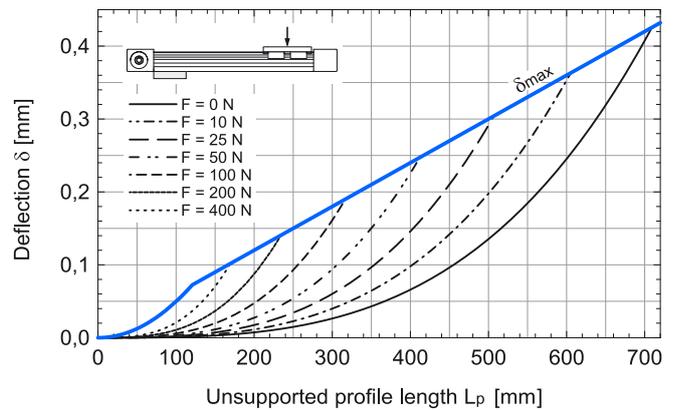
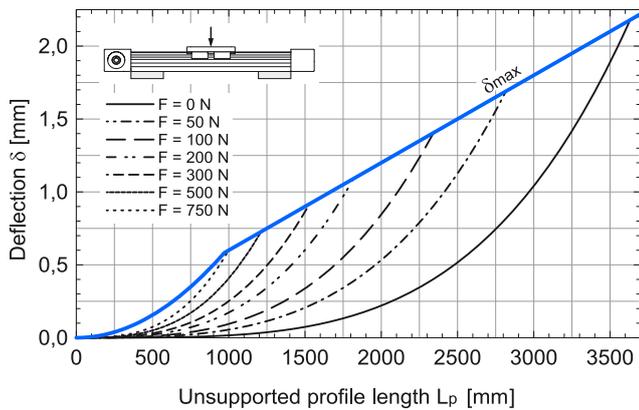
**Fixed - fixed mounting**

**Fixed - free mounting**

$\delta$  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.

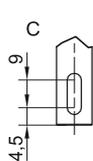
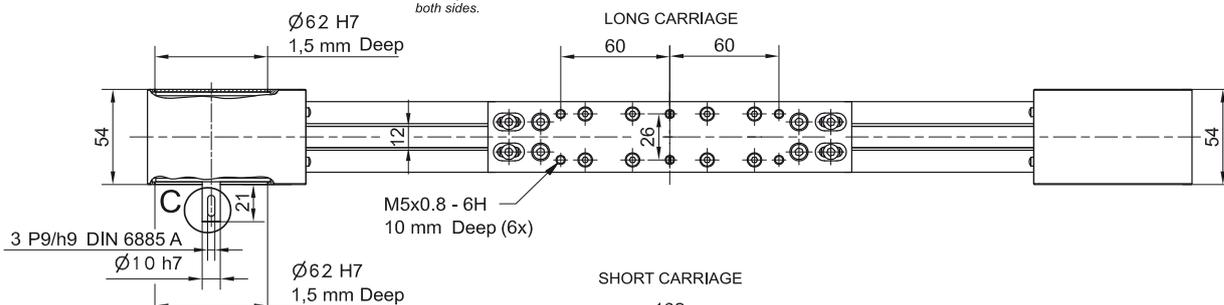
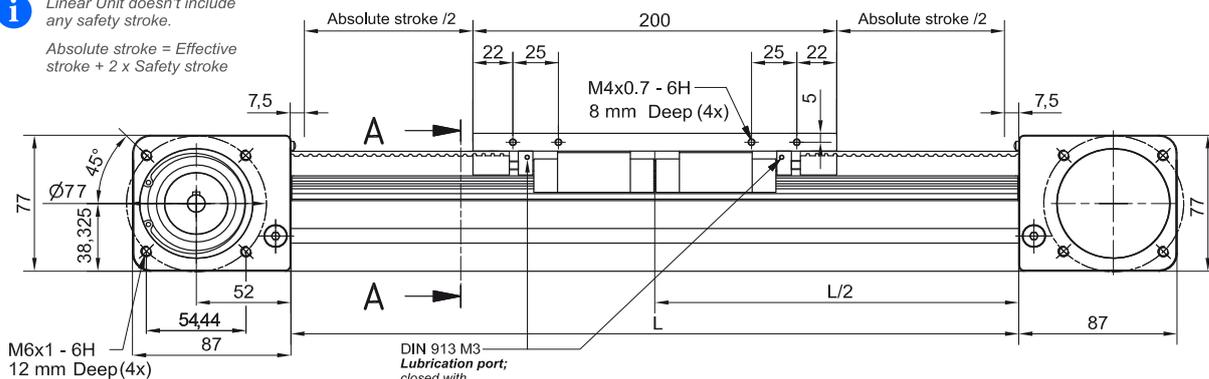
MTJ 40 ECO



DIMENSIONS

**i** Linear Unit doesn't include any safety stroke.

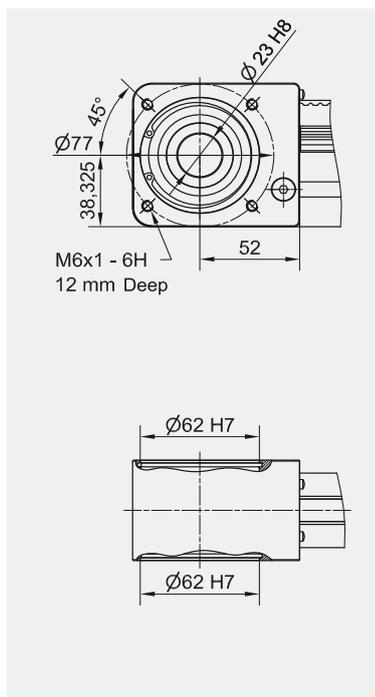
Absolute stroke = Effective stroke + 2 x Safety stroke



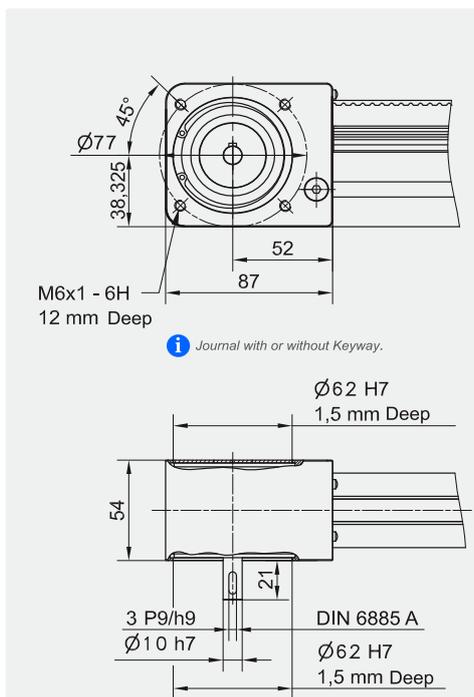
**i** Journal with or without Keyway.

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

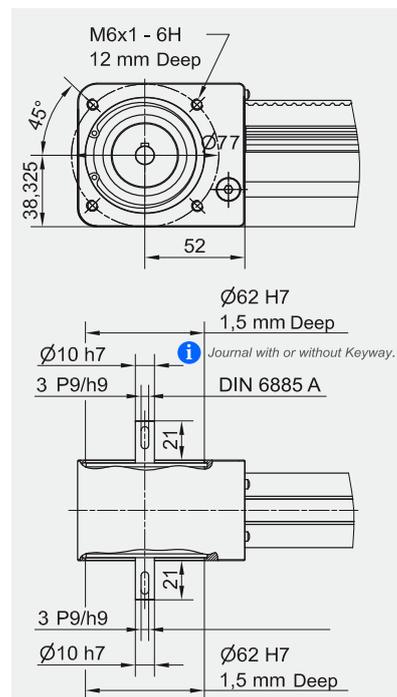
**TYPE 0**



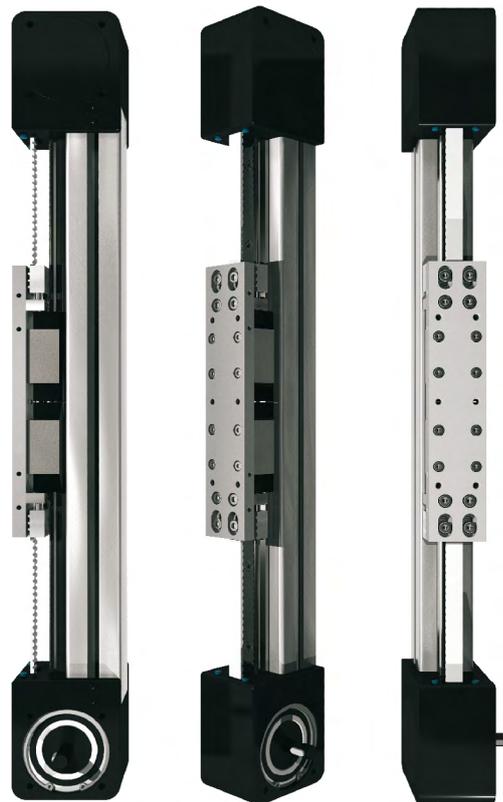
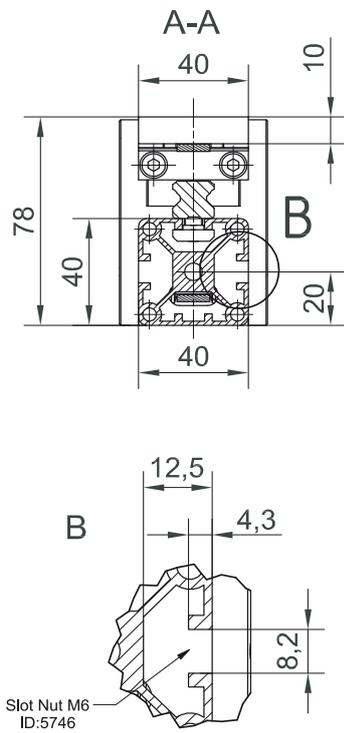
**TYPE 1 L and 1 R**



**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

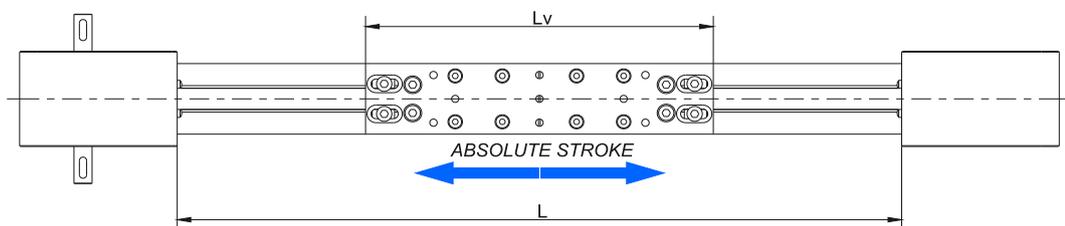
$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + 15 \text{ mm}$

$L_{\text{total}} = L + 174 \text{ mm}$

$L_v - \text{Long carriage} = 200 \text{ mm}$

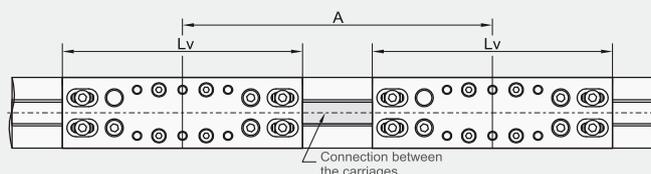
$L_v - \text{Short carriage} = 132 \text{ mm}$

Left side (L)



Right side (R)

**Multiple Carriages**



$L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + A \times (n_c - 1) + 15 \text{ mm}$

$L_{\text{total}} = L + 174 \text{ mm}$

$A \geq L_v$  **i**

For the case of  $A \text{ [mm]} \geq A_{\text{lim}}$  **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 40 ECO S	MTJ 40 ECO L
<b>A<sub>lim</sub> [mm]</b>	132	200