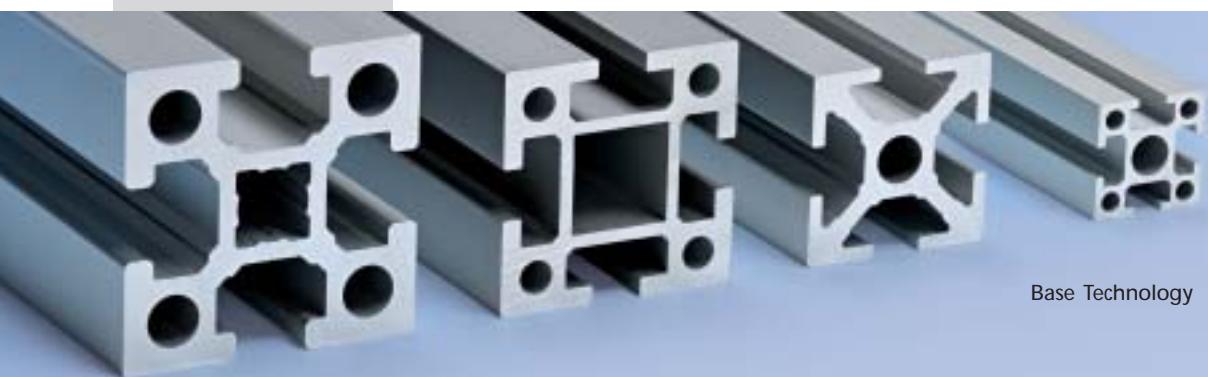




mk Linear Motion

# One construction kit – many options



Base Technology



Profile Technology

Conveyor Technology

Factory Equipment

Linear Motion

## *Advantages of the mk modular system*

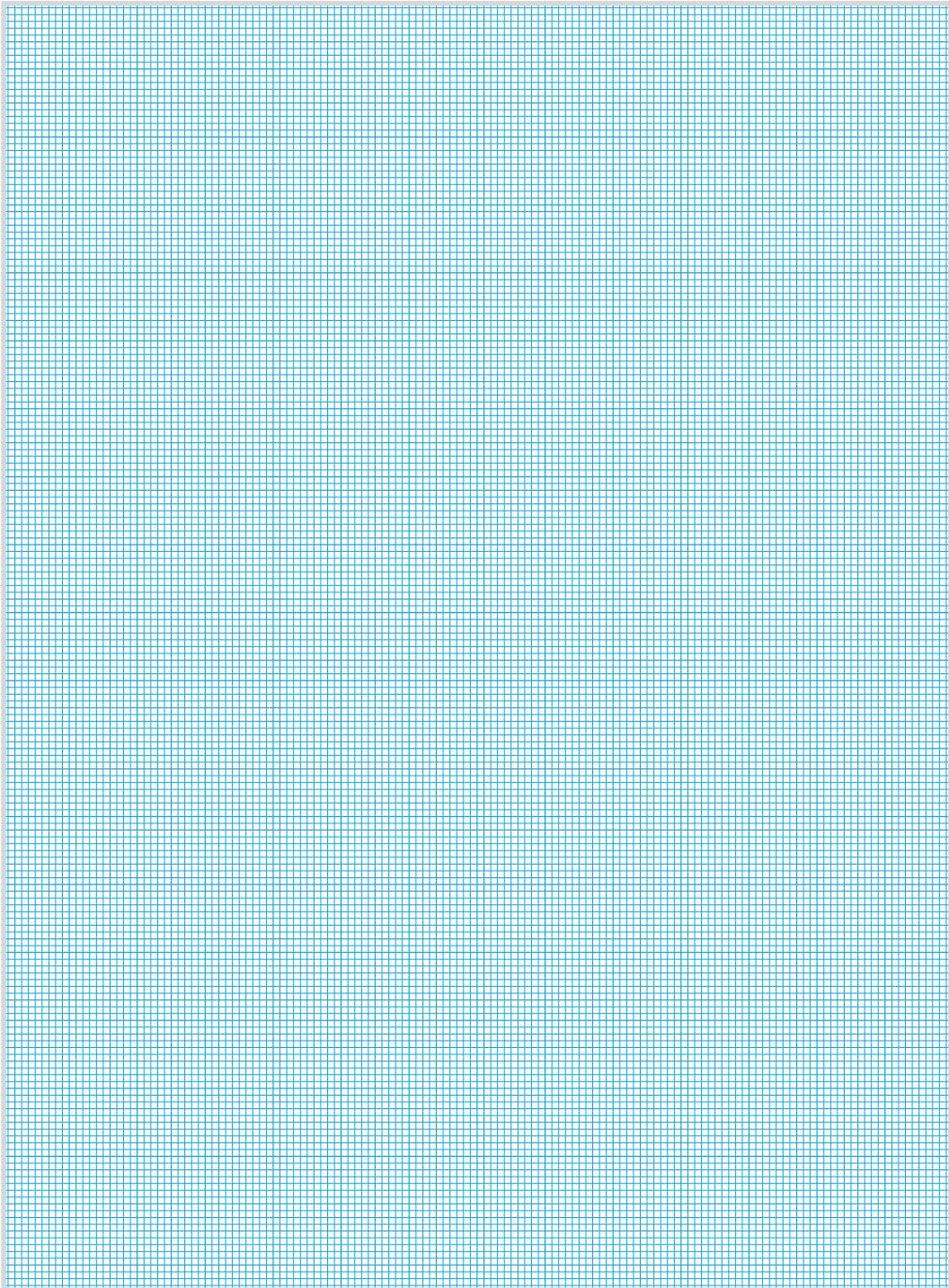
- Everything comes from one source: interchangeable modules and components for profile, conveyor and linear technology, as well as factory equipment
- Outsourcing of various project functions at a fixed price helps integrators to minimize their project costs and risks
- Coverage of all basic mechanical functions for modern factory automation
- The widest profile range on the market reduces the need for specialized design and therefore provides a cost benefit due to standardization
- High material quality, solid connecting technology and high-quality accessories guarantee high loading capacity and long service life
- The highest flexibility for system extensions or alterations due to the reusability of individual components and modules
- The degree of assembly of our products can be freely selected, guaranteeing optimum adaptation to the existing utilization of resources at all times
- The modular construction is subject to constant optimization and extension because mk itself uses it daily for the preparation of customer-specific solutions

## Table of contents

	Selection Guidelines	4
	Introducing mk	6
	Information about Linear Motion	8
	mk Gliding Assemblies	10
	mk Track Roller Assemblies	28
	mk Recirculating Ball Bearing Guides	94
	Application Examples	102
	Our service	110
	Index	114

# Selection Guidelines

Requirement	Gliding Assemblies	Track Roller Assemblies	Recirculating Ball Bearing Guides
Durability			
high		•	•
short	•		
Precision			
very high			•
high		•	
medium	•		
low			
Speed			
very high		•	
high			•
medium			
low	•		
Load Capacity			
very high			•
high		•	
medium	•		
low			
Stiffness			
very high			
high			•
medium	•	•	
low			
Maintenance			
limited	•		
regularly		•	•
often			



# Introducing mk



*„We live our passion for technology –  
that shapes us for over 40 years“*



Maschinenbau Kitz GmbH, was founded in 1966 and is headquartered in Troisdorf, Germany, and also operates internationally; together with its subsidiaries and sales partners as the "mk Technology Group". Backed by over 40 years of experience, mk sells mechanical modules, components for profile, conveyor and



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linear technology, as well as factory equipment. These products are based on more than 250 different aluminum profiles and extensive stainless steel sheet metal work. The modular construction principle these products offer ensures full compatibility between all products. The resulting benefits include considerable

cost savings during installation of the system, as well as a high degree of flexibility for future extensions and re-configurations. Our most important target markets include original machine constructions, as well as work in the automotive, electrical, packaging, pharmaceutical and food industries.

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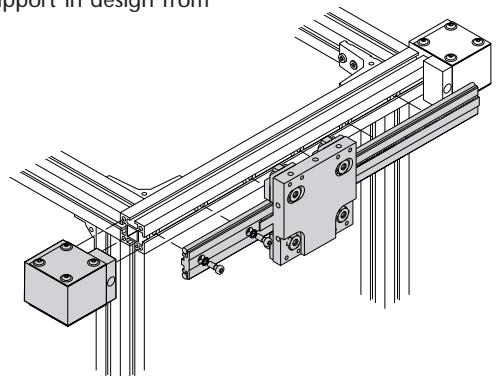
# Information about Linear Motion



## *Advantages of mk Linear Motion*

- Optimal functionality thanks to the wide range of tracks designed to meet customer needs
- Material, cost and space savings due to compatibility with mk profile series: Tracks can be mounted to the existing supporting structure directly
- Fast and easy installation of linear tracks due to add-on principle
- Precision running with mk clamping profile ensures maximum parallelism of the guide rods
- High reliability due to high-quality materials and tested manufactured parts
- Competent advice and support in design from mk sales engineers

Application Example  
Structural Profile Series 50  
and LZR 2000-38.41-15.



# Our Guidelines

## *Criteria for the selection of the right guide*

### Criteria for Gliding Assemblies

- High static load capacity
- Low maintenance, good wear resistance
- Good damping
- Compact construction
- Quiet

### Criteria for Track Roller Assemblies

- Compensate for relatively large misalignments
- Well suited for dirty environments (dust, chips, etc.)

- Suitable for high accelerations (to  $a = 50 \text{ m/s}^2$ ) and high speeds (to  $v = 10 \text{ m/s}$ )
- Low rolling resistance
- Light to medium loads
- Economically practical solution over longer lengths through simple mounting of track
- Can be loaded in all directions (forces and moments)
- Varying preload setting using eccentric bushings

### Criteria for Recirculating Ball Bearing Guides

- 4-row recirculating ball bearings can be loaded in all directions (forces and moments)
- High load capacity, high stiffness
- Compact construction
- One track accommodates various carriage types
- Lightly preloaded (standard), available with play and higher preloads
- Medium to high accelerations (to  $a = 30 \text{ m/s}^2$ ) and speeds (to  $v = 5 \text{ m/s}$ )
- High precision of carriages



Gliding Assemblies

### Gliding Assemblies

- High static loading capacity due to large contact surfaces ensures low maintenance operation
- Good wear compensation
- Good damping
- Compact design
- Quiet
- For applications with need for manual adjustment



Track Roller Assemblies

### Track Roller Assemblies

- Compensate for relatively large misalignment
- Well-suited to dirty environments
- High accelerations
- Low rolling resistance
- Simple and cost-effective mounting of the track
- Can be loaded in all directions



Recirculating Ball Bearing Guides

### Recirculating Ball Bearing Guides

- Can be loaded in all directions
- High load capacity
- High rigidity
- Compact design
- One track for different carriage types
- High accelerations
- High speeds
- High precision

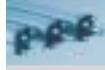
# mk Gliding Assemblies



*Contents mk Gliding Assemblies*



Linear Modules 12



Glide Bushings 23



Glide Assembly System 2000 24



Pneumatic Glide System 2000 26

# mk Gliding Assemblies

## Informationen Linear Modules

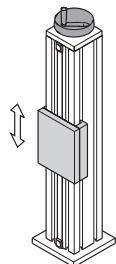
### Technical Informations

The structural beams which distinguish the two basic sizes of our Linear Modules are our standard Profile mk 2015 (50 x 50 mm) and Profile mk 2011 (100 x 100 mm). The profiles are reworked and feature a high-quality surface coating

which provides a low friction surface while enhancing the profile with added wear resistance. Standard features of the linear modules include trapezoidal spindles with POM-nuts which are protected from contaminants by a stainless steel cover strip.

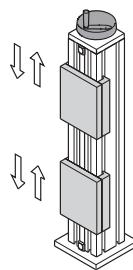
These linear modules are maintenance-free. On request special configurations are possible including stainless steel spindles, trapezoidal bronze nuts, ball screws, as well as motor driven modules.

#### Styles

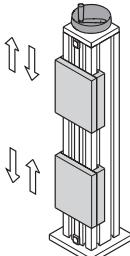


Linear Module  
with  
one carriage

Linear Module  
with two  
carriages,  
synchronous  
travel (see  
directional  
arrows)



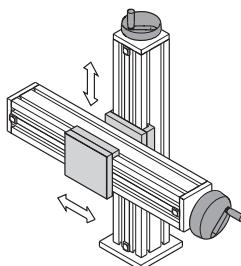
optionally  
available with  
adjustable  
lower skid



Linear Module  
with two  
carriages,  
opposing  
travel (see  
directional  
arrows)

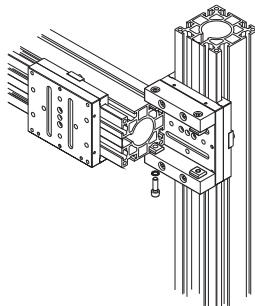
#### Combinations

A connection kit enables two adjusting units to be combined to form one biaxial system.



Combination kit  
for cross-VST 2015 B46.07.020

Combination kit  
for cross-VST 2011 B46.07.021



#### Clamps and Wipers

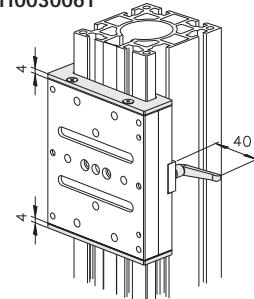
The felt wipers prevent material contaminants from lodging between the carriage and track. The wipers are an accessory which can be added to the carriage at any time.

The carriage can be fixed in position using a clamp plate, which is tightened using with a socket screw. As an option, this screw can be replaced with an adjustable handle.

Felt Wiper System 2015  
B03.00.011

Felt Wiper System 2011  
B03.00.012

Felt wiper  
K110030061



## Choice of operating options

The linear modules are available in 3 basic, manually operated configurations.



**Linear Module with Handwheel.** The handwheel is operated manually with no travel information.



**Linear Module with Handwheel and Scale.** With this option, carriage travel can be read.



**Linear Module with Handwheel and mechanical display.** Carriage travel and relative position is indicated by the display.

## Motor Driven

On request, carriage modules can be motor driven. The maximum carriage speed is limited to  $v = 1$  m/min. We can assist you in the selection process.

Example of a motor driven linear module

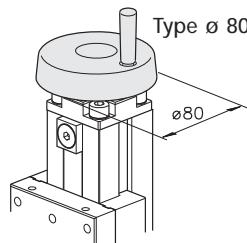


## Order Example

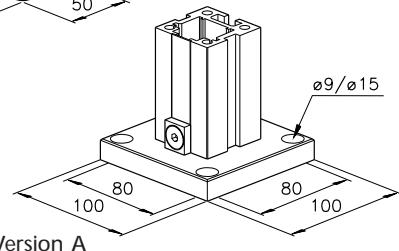
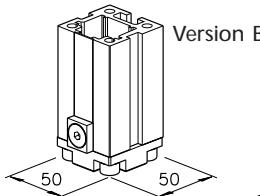
Linear Module		VST 2011-H
Ident-No.		B85.00.020
Length		L = ..... mm
Stroke		H = ..... mm
Drive Option	Handwheel	Scale
Base Plate	Version A	Version B
Felt Wiper	yes	no
Clamp Handle	yes	no
For Linear Module with two carriages, synchronous travel, please indicate choice of one or two trapezoidal nuts**.		
With 2nd trapezoidal nut Lx = ..... mm ( $\pm 2$ mm)		
*For display, please indicate desired orientation and direction.		
**Use of one trapezoidal nut indicates that only one carriage is to be driven.		



Handwheel



Base plates



Version A

# Linear Modules

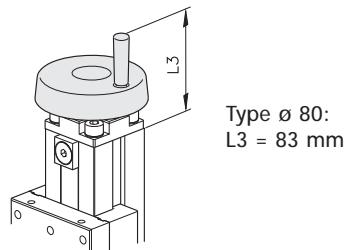
## System 2015

Structural profile: mk 2015 (50 x 50 mm)  
Trapezoidal Spindle: Tr 16 x 4  
Axial Spindle Load: 500 N  
Standard Lengths, L: 250 mm, 500 mm,  
750 mm and 1000 mm

Linear travel per revolution is 4 mm,  
minimum stroke length is 10 mm,  
maximum length L = 1400 mm.

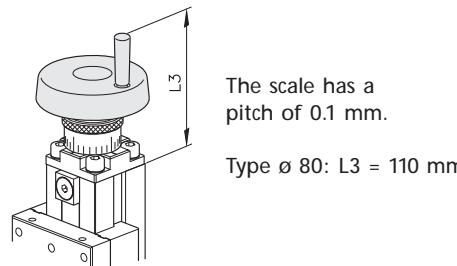
Scale

### System 2015 without Scale



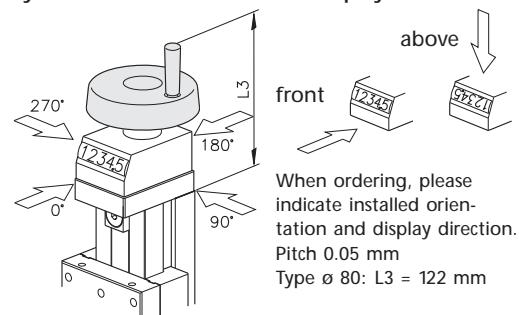
Type ø 80:  
L3 = 83 mm

### System 2015 with Scale



Type ø 80: L3 = 110 mm

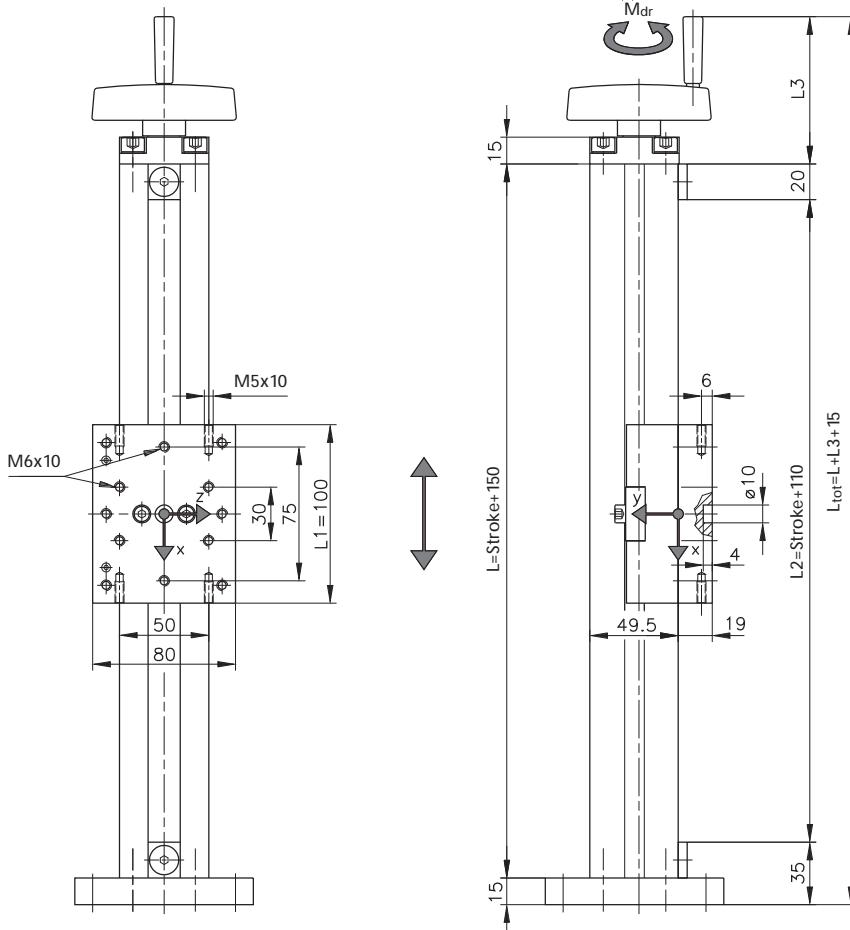
### System 2015 with mechanical display



# VST 2015

with one carriage

## System 2015



### Versions

Version	without Scale	Scale	Display
Description	VST 2015-H	VST 2015-S	VST 2015-D
Type	ø 80	ø 80	ø 80
Ident-No.	B85.00.015	B85.00.016	B85.00.017

### maximum loads VST 2015

F <sub>y</sub> [N]	F <sub>z</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]	M <sub>dr</sub> [Nm]	n [min <sup>-1</sup> ]	v [m/min]
750	750	25	25	25	2.5	250	1

Confirm maximum load specifications with intended application

# VST 2015

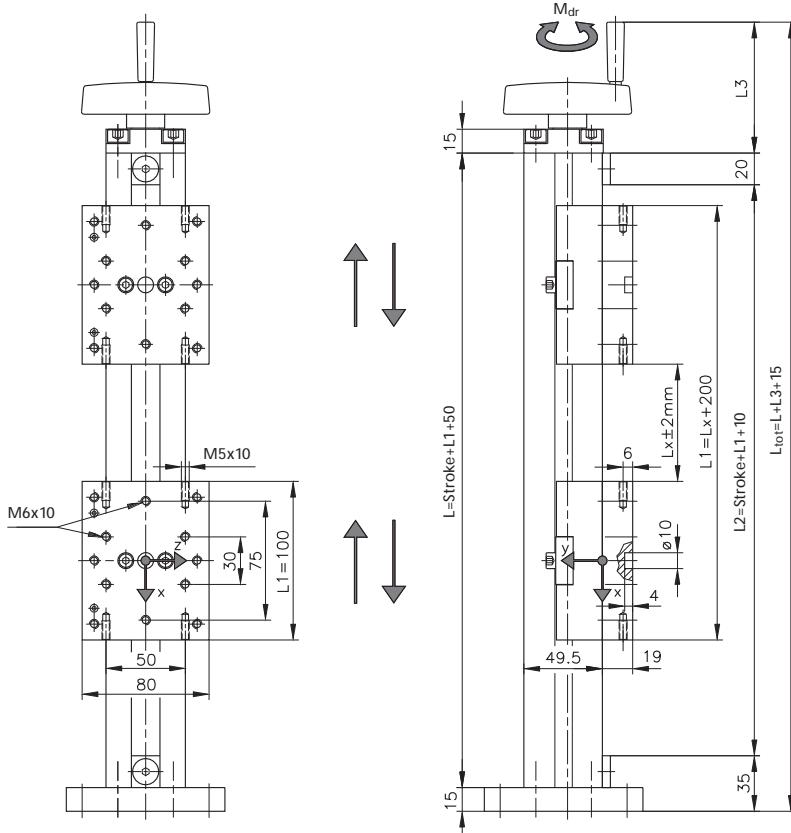
with two carriages synchronous travel or independent

## System 2015

### Options:

VST with two trapezoidal nuts: both carriages synchronous travel (see directional arrows)

VST with one trapezoidal nut: lower carriage manually adjustable



### Versions

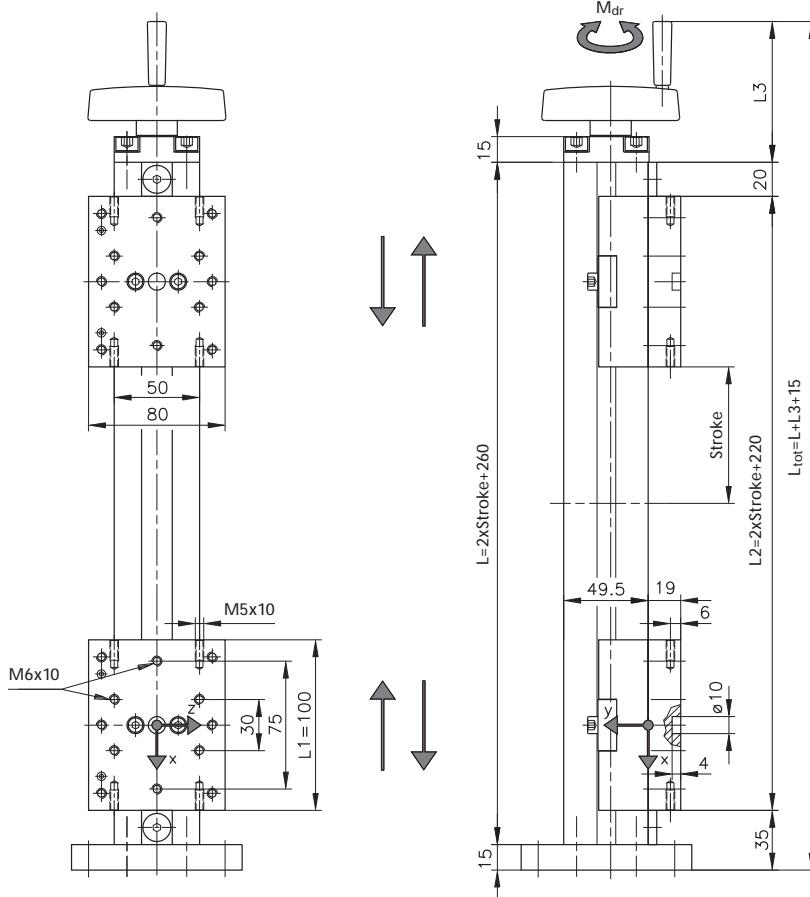
Version	without Scale	Scale	Display
Description	VST 2015-H-2	VST 2015-S-2	VST 2015-D-2
Type	ø 80	ø 80	ø 80
Ident-No.	B85.00.115	B85.00.116	B85.00.117

### maximum loads VST 2015

F <sub>y</sub> * [N]	F <sub>z</sub> * [N]	M <sub>x</sub> * [Nm]	M <sub>y</sub> * [Nm]	M <sub>z</sub> * [Nm]	M <sub>dr</sub> [Nm]	n [min <sup>-1</sup> ]	v [m/min]
750	750	25	25	25	2.5	250	1

Confirm maximum load specifications with intended application \*Maximum loads per carriage

## System 2015



### Versions

Version	without Scale	Scale	Display
Description	VST 2015-H-G	VST 2015-S-G	VST 2015-D-G
Type	ø 80	ø 80	ø 80
Ident-No.	B85.00.215	B85.00.216	B85.00.217

maximum loads VST 2015

F <sub>y</sub> * [N]	F <sub>z</sub> * [N]	M <sub>x</sub> * [Nm]	M <sub>y</sub> * [Nm]	M <sub>z</sub> * [Nm]	M <sub>dr</sub> [Nm]	n [min <sup>-1</sup> ]	v [m/min]
750	750	25	25	25	2.5	250	1

Confirm maximum load specifications with intended application \*Maximum loads per carriage



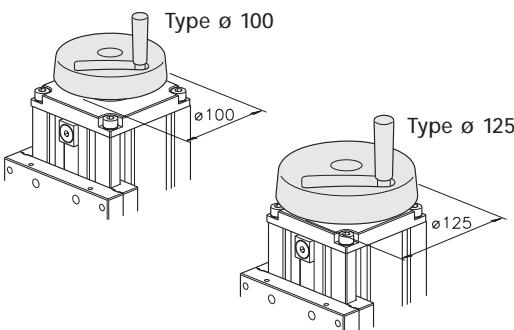
# Linear Modules

## System 2011

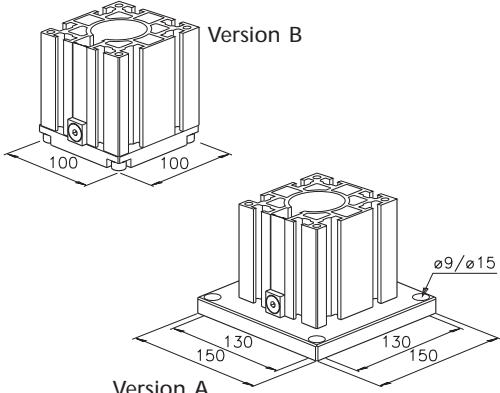
Structural profile: mk 2011 (100 x 100 mm)  
Trapezoidal Spindle: Tr 20 x 4  
Axial Spindle Load: 1000 N  
Standard Lengths, L: 250 mm, 500 mm,  
750 mm and 1000 mm

Linear Travel per revolution is 4 mm,  
minimum stroke length is 10 mm,  
maximum length L = 1400 mm.

### Handwheels

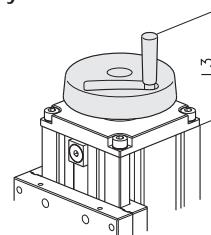


### Base plates



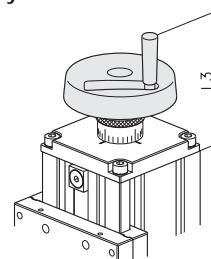
### Scale

#### System 2011 without Scale



Type ø 100: L3=97 mm  
Type ø 125: L3=110 mm

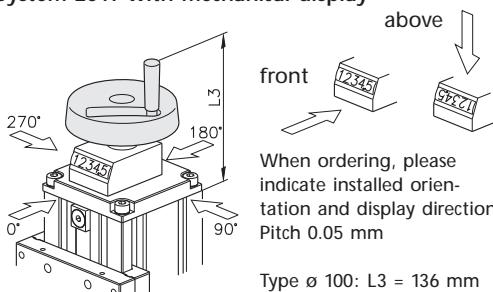
#### System 2011 with Scale



The scale has a pitch of 0.1 mm

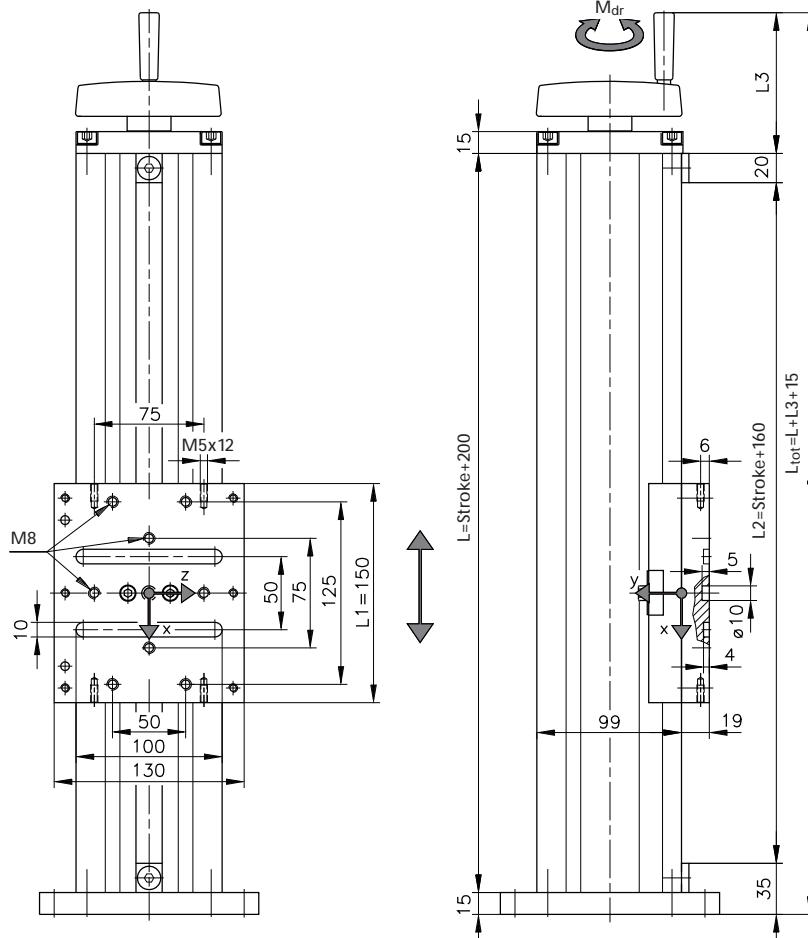
Type ø 100: L3=123 mm  
Type ø 125: L3=136 mm

#### System 2011 with mechanical display



When ordering, please indicate installed orientation and display direction.  
Pitch 0.05 mm

Type ø 100: L3 = 136 mm  
Type ø 125: L3 = 149 mm

*System 2011**Versions*

Version	without Scale		Scale		Display	
Description	VST 2011-H	VST 2011-H	VST 2011-S	VST 2011-S	VST 2011-D	VST 2011-D
Type	Ø 100	Ø 125	Ø 100	Ø 125	Ø 100	Ø 125
Ident-No.	B85.00.020	B85.00.025	B85.00.021	B85.00.026	B85.00.022	B85.00.027

maximum loads VST 2011

F <sub>y</sub> [N]	F <sub>z</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]	M <sub>dr</sub> [Nm]	n [min <sup>-1</sup> ]	v [m/min]
2000	2000	75	100	100	6	250	1

Confirm maximum load specifications with intended application

# VST 2011

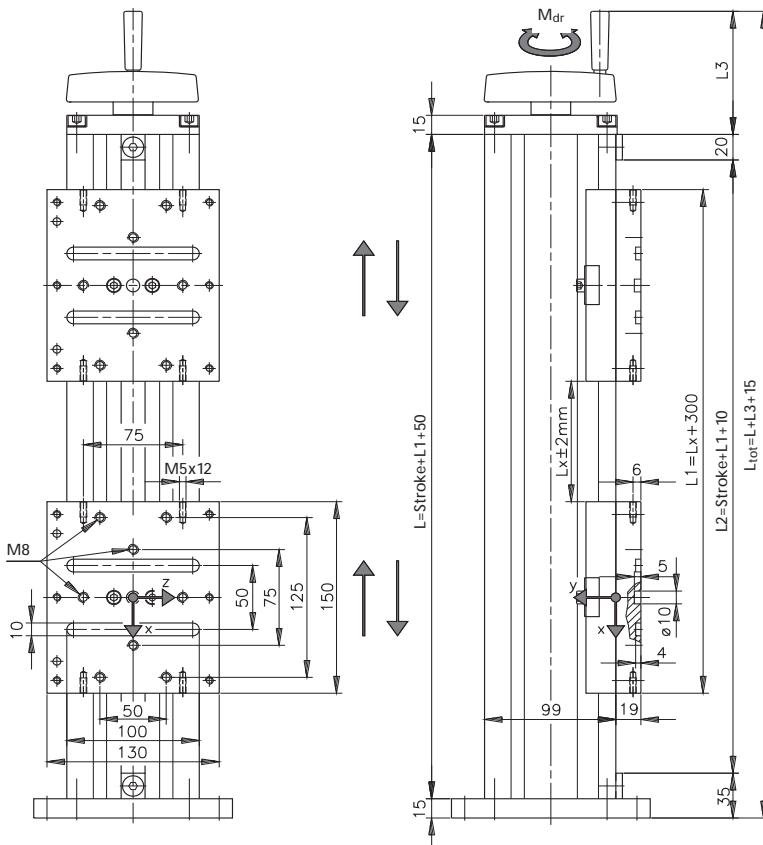
with two carriages synchronous travel

## System 2011

### Options:

VST with two trapezoidal nuts: both carriages synchronous travel (see directional arrows)

VST with one trapezoidal nut: lower carriage manually adjustable



*Versions* (Version with or without 2<sup>nd</sup> trapezoidal nut available)

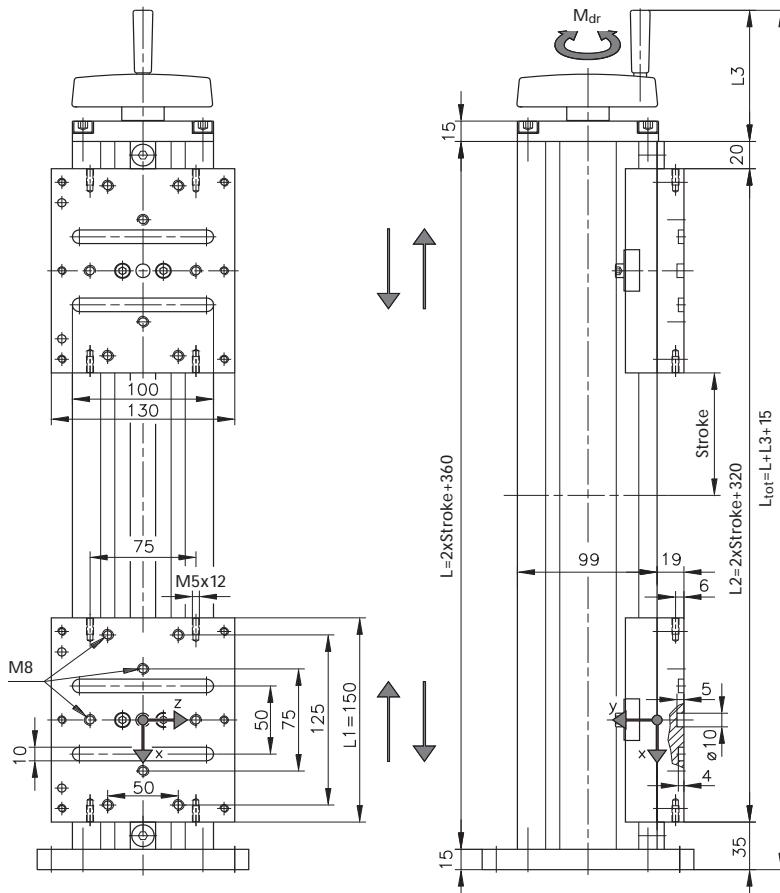
Version	without Scale		Scale		Display	
Description	VST 2011-H-2	VST 2011-H-2	VST 2011-S-2	VST 2011-S-2	VST 2011-D-2	VST 2011-D-2
Type	ø 100	ø 125	ø 100	ø 125	ø 100	ø 125
Ident-No.	B85.00.120	B85.00.125	B85.00.121	B85.00.126	B85.00.122	B85.00.127

### maximum loads VST 2011

F <sub>y</sub> * [N]	F <sub>z</sub> * [N]	M <sub>x</sub> * [Nm]	M <sub>y</sub> * [Nm]	M <sub>z</sub> * [Nm]	M <sub>dr</sub> [Nm]	n [min <sup>-1</sup> ]	v [m/min]
2000	2000	75	100	100	6	250	1

Confirm maximum load specifications with intended application \*Maximum loads per carriage

## System 2011



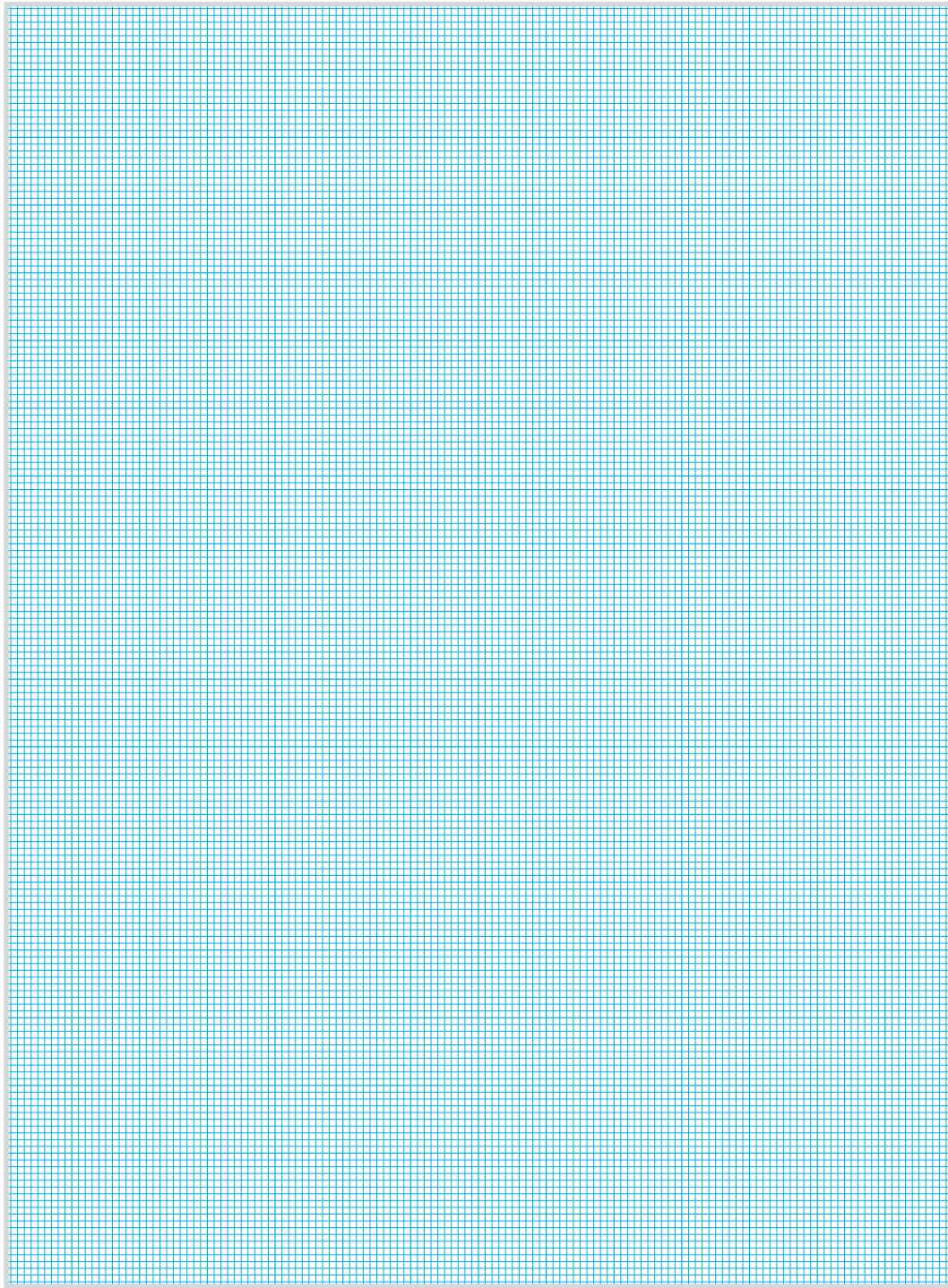
## Versions

Version	without Scale		Scale		Display	
Description	VST 2011-H-G	VST 2011-H-G	VST 2011-S-G	VST 2011-S-G	VST 2011-D-G	VST 2011-D-G
Type	ø 100	ø 125	ø 100	ø 125	ø 100	ø 125
Ident-No.	B85.00.220	B85.00.225	B85.00.221	B85.00.226	B85.00.222	B85.00.227

maximum loads VST 2011

Fy* [N]	Fz* [N]	Mx* [Nm]	My* [Nm]	Mz* [Nm]	Mdr [Nm]	n [min <sup>-1</sup> ]	v [m/min]
2000	2000	75	100	100	6	250	1

Confirm maximum load specifications with intended application \*Maximum loads per carriage

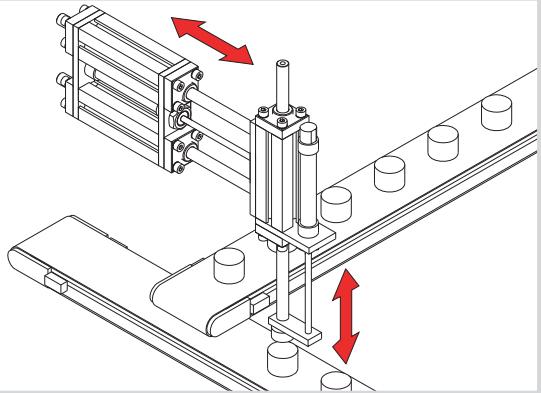


# Examples Glide Bushings

## System 2000

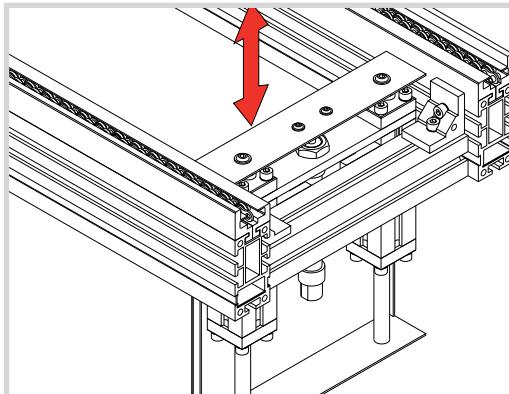
### Pick and Place with Suction Cup

Combination using Pneumatic Glide System 2000.  
2-axis system, part handling with vacuum.



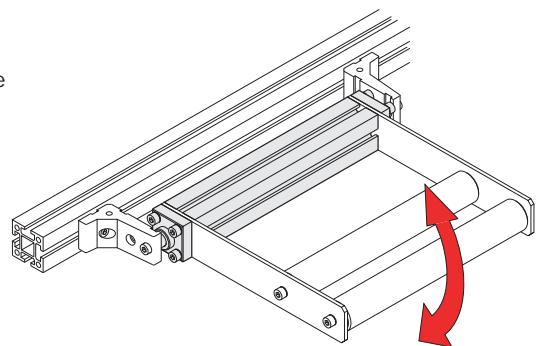
### Pallet Stop

Pneumatic Glide System 2000 integrated within a dual-lane conveyor for use as a pallet stop.



### Swing Gate

Swing gate manufactured using Glide Assembly System 2000 used as a damping assembly above product transport.

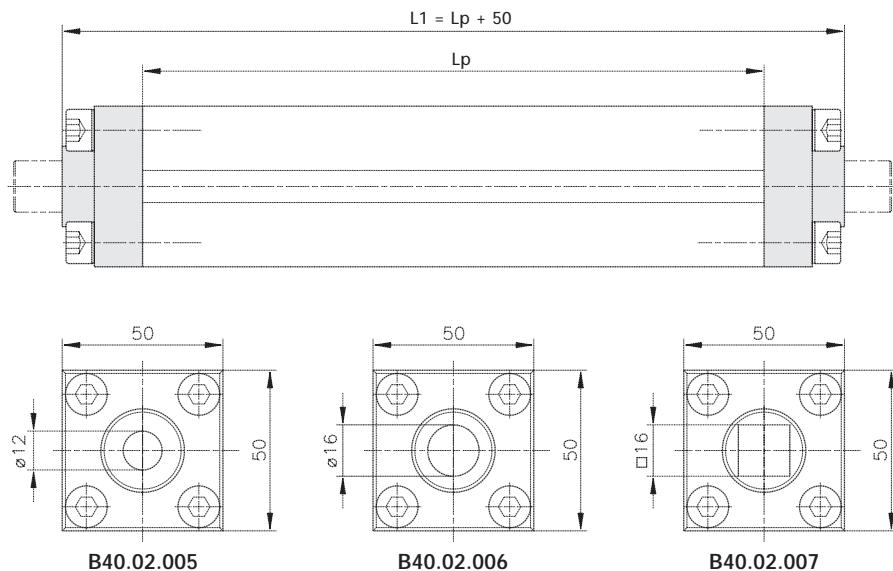


# Glide Bushings

## Glide Assembly

### System 2000

Glide Assembly System 2000 consists of glide bushings mounted to structural profile mk 2000 (50 x 50 mm), as well as an appropriate guide shaft (rod). Standard lengths: 150 mm, 200 mm, 250 mm and 300 mm. The minimum Profile L<sub>p</sub> is 50 mm, the maximum Profile L<sub>p</sub> is 750 mm. The Glide Assembly requires no maintenance. When ordering, please note that the various shaft options are ordered separately (see page 25).



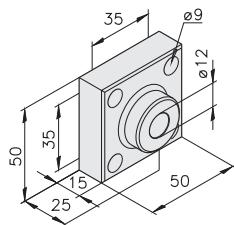
### Versions

Ident-No.	Description	for Shaft*
B40.02.005	WF 2000-12	ø 12 h 6
B40.02.006	WF 2000-16	ø 16 h 6
B40.02.007	WF 2000-16.16	□ 16 h 9

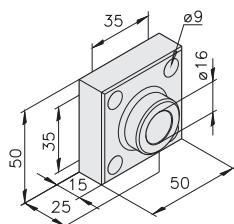
\*Order shaft separately

# Accessories

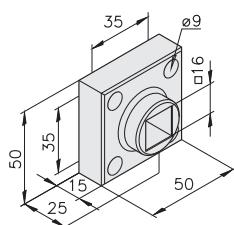
## System 2000



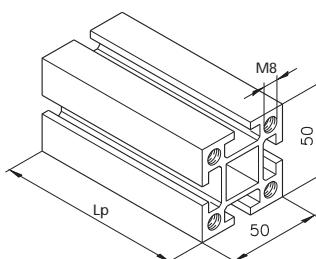
Bushing ø 12  
35.00.0007  
D=12 mm,  
POM



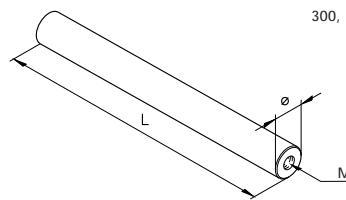
Bushing ø 16  
35.00.0006  
D=16 mm,  
POM



Bushing □ 16  
35.00.0008  
POM

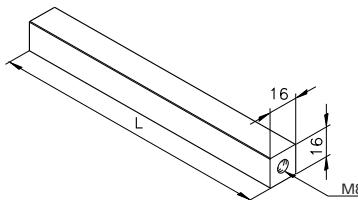


Profile mk 2000  
5100AD....\*  
2.85 kg/m  
Al



Shaft ø 12, M6  
0100AF. ....\*  
St50K h6

Shaft ø 16, M8  
0100AA. ....\*  
St50K h6  
Stock length 150, 200, 250,  
300, 350 and 400 mm



Shaft ø 12, M6  
0100AE. ....\*  
CF53

Shaft ø 16, M8  
0100AB. ....\*  
CF53  
hardened shaft h6  
Stock length 150, 200, 250,  
300, 350 and 400 mm

Shaft □ 16, M8  
0101AA. ....\*  
Steel C45 polished h9  
Stock length 150, 200, 250,  
300, 350 and 400 mm

....\* Length in mm

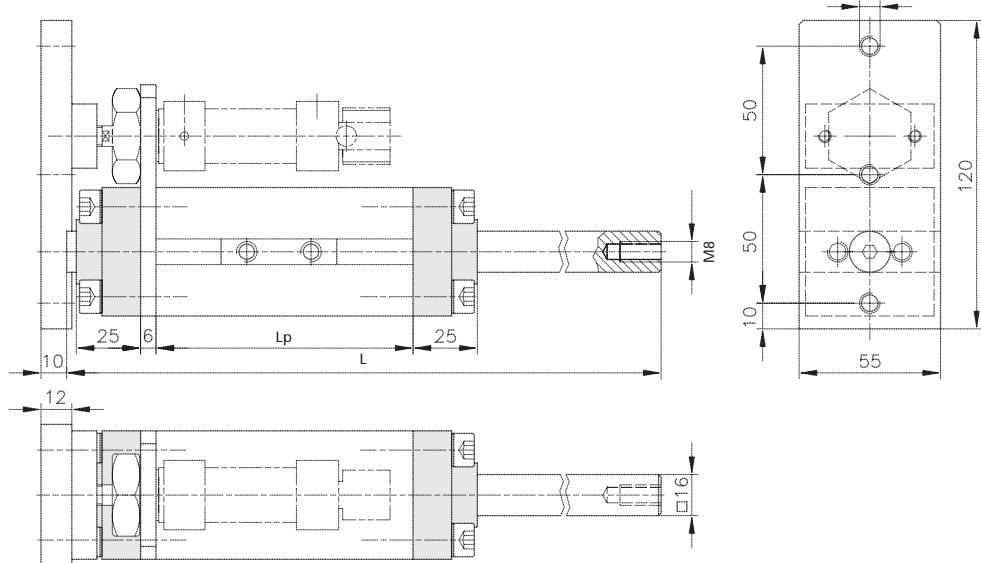


# Glide Bushings

## Pneumatic Glide

### System 2000

The standard pneumatic unit is delivered with one cylinder with  $\varnothing$  20 mm piston. A handful of components are all that is required to modify Pneumatic Glide System 2000. Various manufacturers pneumatic cylinders with 20 or 25 mm bores and strokes to 300 mm can be used. Customer standards can be accommodated as the system is based on the air cylinder. The mechanics and connection remain the same. The cylinder and connection must be ordered separately.



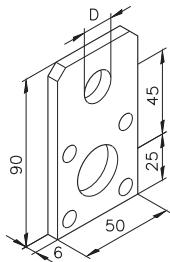
### Versions

Ident-No.	Description	D Bore $\varnothing$ [mm]	$F_x^*$ [N]	Stroke [mm]	D Bore [mm]	Lp [mm]	L [mm]	Cylinder Ident-No.
B38.01.003	LPZ 2000-16.20	20	150	25	20	75	200	K501000655
				50	20	75	200	K501000657
				80	20	75	250	K501000658
				100	20	75	250	K501000659
				200	20	100	350	K501000662

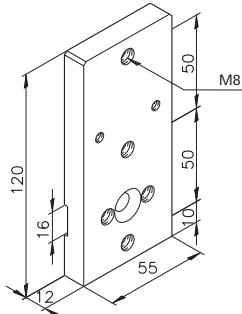
If ordering with cylinder, please append with appropriate Cylinder Ident-No.

\* Cylinder extension force at 6 bar (87 psi)

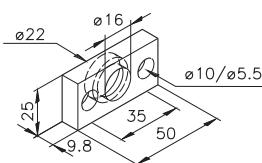
## System 2000



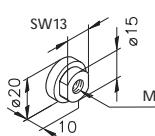
Cylinder Plate  
**50.05.0036**  
 Al, D = 22.5 mm  
 Cylinder ø 20 and ø 25



Cylinder Plate  
**50.09.0017**  
 Al



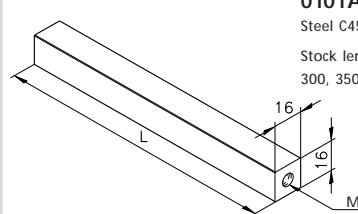
Cylinder Plate  
**50.09.0018**  
 Al



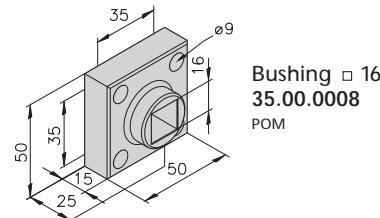
Washer M8  
**63.03.0001**  
 Steel, Cylinder ø 20  
 Washer M10 x 125  
**63.03.0003**  
 Steel, Cylinder ø 25



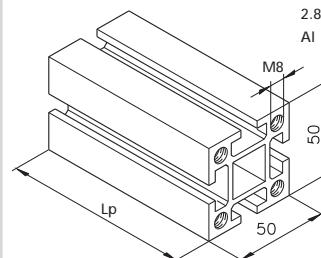
Nut M8  
**D09348**  
 Cylinder ø 20  
 Nut M10 x 125  
**41.00.0014**  
 Cylinder ø 25



Shaft □ 16, M8  
**0101AA. ....\***  
 Steel C45 polished h9  
 Stock length 150, 200, 250,  
 300, 350 and 400 mm



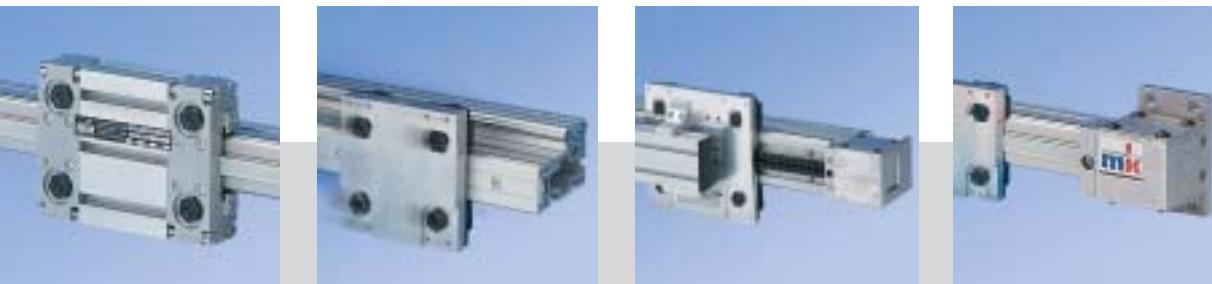
Bushing □ 16  
**35.00.0008**  
 POM



Profile mk 2000  
**5100AD....\***  
 2.85 kg/m  
 Al

.... \* Length in mm

# mk Track Roller Assemblies



## Contents *mk Track Roller Assemblies*

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# Track Roller Assemblies

## General Information

### Roller Assemblies

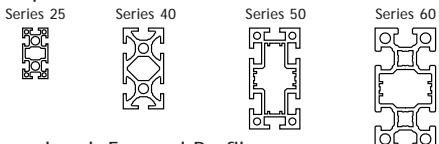
#### Basic Construction

The basic elements used to construct mk Linear Systems consist of a track and a carriage. The linear track consists of a clamping profile which is mounted directly to the support profile. Attention must be paid to the series and the dimensions of the supporting profile. The carriage consists of grooved rollers mounted to the carriage plate. The available selection of the linear assemblies and modules is a function of the support profile and the guide rods. For the support profile, application suitability (with respect to deflection) and strength of the material is paramount. For proper operation of our linear systems, a maximum deflection of 1 mm/m is allowable. Deflection and strength calculations are based upon standard mechanical formulas.

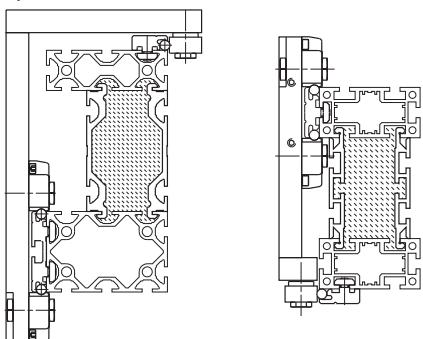
### Support Profiles

All linear assemblies and modules shown in this catalog are based on the structural profiles of the Profile Technology System mk 2000. When used in combination with foamed profiles, gantries can be manufactured in lengths of up to 10 meters.

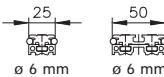
#### Example mk Structural Profiles



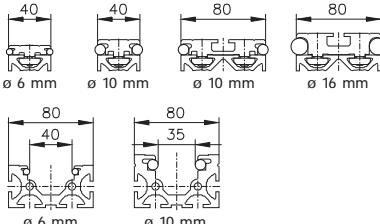
#### Example mk Foamed Profiles



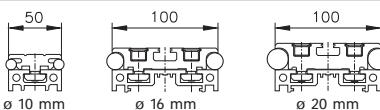
#### Profiles Track Series 25



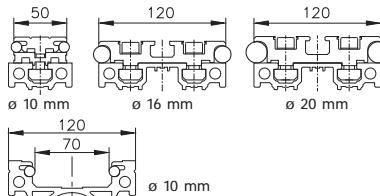
#### Profiles Track Series 40



#### Profiles Track Series 50

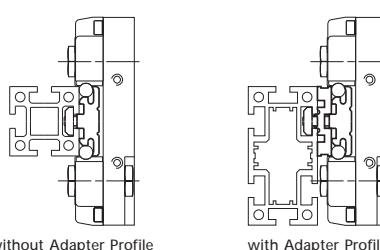


#### Profiles Track Series 60



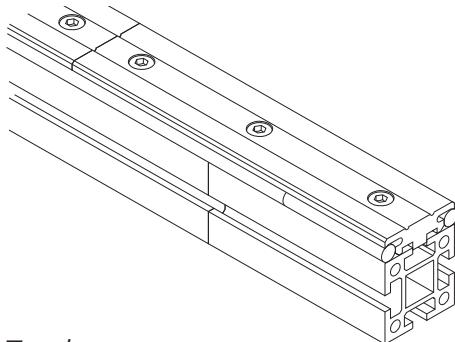
### Adapter Profiles

Adapter Profiles are used in instances where a larger supporting profile is desired (or required) and the standard carriage interferes with such an arrangement. In addition, adapter profiles can be used to combine linear components of different profile series.



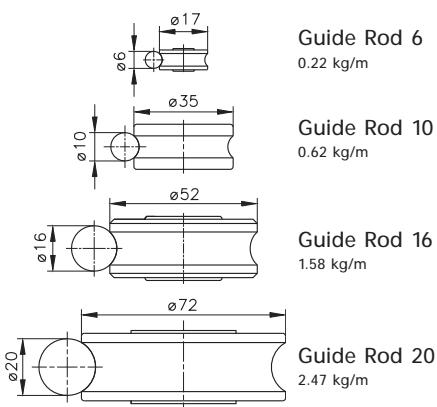
## Stock Lengths

The maximum length of linear assemblies is 6000 mm. This may be extended using multiple support profiles, rods and clamping profiles.

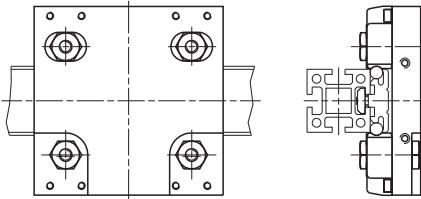


## Tracks

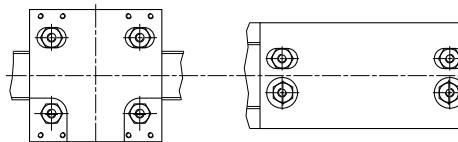
The load capacity of the track is based primarily on the desired guide rod diameter and appropriate roller. mk offers guide rods in four diameters. The standard guide rods (polished to h6) are precision steel shafting Cf 53 (1.1213). Optionally, X46 Cr13 (1.4034, stainless martensitic steel, corrosion resistant) or corrosion resistant galvanized Cf 53 rods are also available.



## Carriages



The mk carriage comes standard with four rollers, although optional two and three roller versions are available on request.

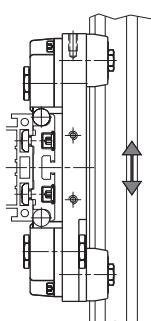


Standard carriage,  
(exterior rollers)

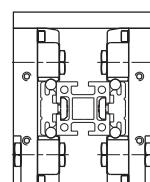
Standard carriage,  
(interior rollers)

## Construction

mk Carriages are available in two additional optional configurations.



Cross-carriages



Dual-carriages

# Track Roller Assemblies

## Calculations and System Selection

### Selecting Series 25 Support Profiles

#### Calculations for maximum Stress and Deflection

Load at Center:

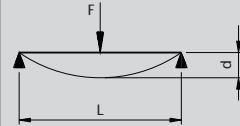
Maximum Stress

$$M_{b\max} = \frac{F \cdot L}{4} \quad \sigma_b = \frac{M_{b\max}}{W_{x,y}} \quad S = \frac{R_{p0.2}}{\sigma_b}$$

Maximum Deflection

$$d = \frac{F \cdot L^3}{48 \cdot E \cdot I_{x,y}}$$

$$R_{p0.2} = 195 \text{ N/mm}^2 \\ (\text{AlMgSi 0.5 F25})$$



Uniform Load:

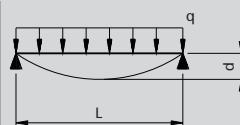
Maximum Stress

$$M_{b\max} = \frac{q \cdot L^2}{8} \quad \sigma_b = \frac{M_{b\max}}{W_{x,y}} \quad S = \frac{R_{p0.2}}{\sigma_b}$$

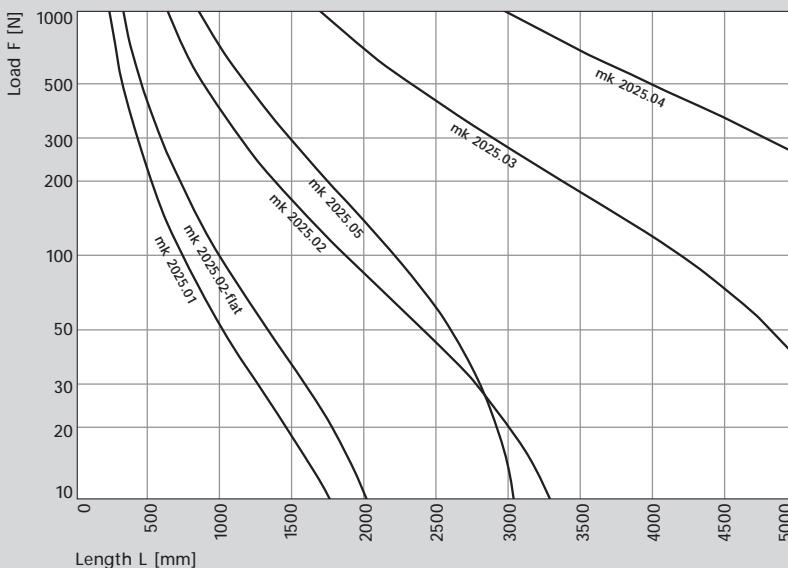
Maximum Deflection

$$d = \frac{5}{384} \cdot \frac{q \cdot L^4}{E \cdot I_{x,y}}$$

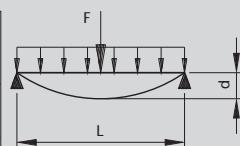
$$R_{p0.2} = 195 \text{ N/mm}^2 \\ (\text{AlMgSi 0.5 F25})$$



#### Graphical Selection



#### Application Diagram



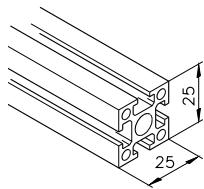
With point load at center and profile weight for the case:

$$\frac{d}{L} = \frac{1}{1000}$$

Example:  
F = 100 N  
L = 1000 mm  
=> mk 2025.02-flat

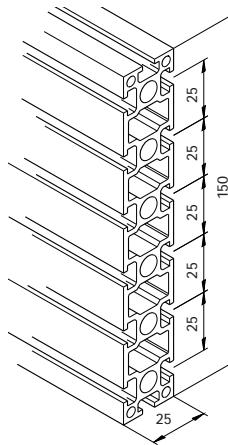
with  $\frac{d}{L} \leq \frac{1}{1000}$   
is suitable

## Support Profiles Series 25



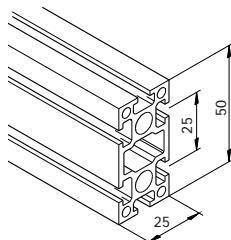
**Profile mk 2025.01**  
**25.01. ....\***

0.75 kg/m  
 AlMgSi 0.5 F25  
 A 279.10 mm<sup>2</sup>  
 I<sub>x</sub> 1.70 cm<sup>4</sup>  
 I<sub>y</sub> 1.70 cm<sup>4</sup>  
 W<sub>x</sub> 1.40 cm<sup>3</sup>  
 W<sub>y</sub> 1.40 cm<sup>3</sup>



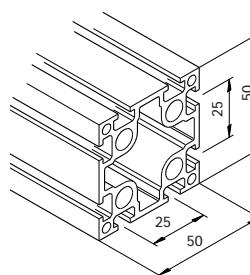
**Profile mk 2025.04**  
**25.04. ....\***

3.75 kg/m  
 AlMgSi 0.5 F25  
 A 1389.10 mm<sup>2</sup>  
 I<sub>x</sub> 280.00 cm<sup>4</sup>  
 I<sub>y</sub> 9.60 cm<sup>4</sup>  
 W<sub>x</sub> 37.30 cm<sup>3</sup>  
 W<sub>y</sub> 7.70 cm<sup>3</sup>



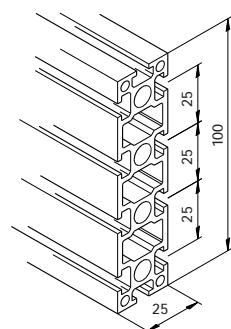
**Profile mk 2025.02**  
**25.02. ....\***

1.35 kg/m  
 AlMgSi 0.5 F25  
 A 501.10 mm<sup>2</sup>  
 I<sub>x</sub> 12.20 cm<sup>4</sup>  
 I<sub>y</sub> 3.30 cm<sup>4</sup>  
 W<sub>x</sub> 4.90 cm<sup>3</sup>  
 W<sub>y</sub> 2.60 cm<sup>3</sup>



**Profile mk 2025.05**  
**25.05. ....\***

2.20 kg/m  
 AlMgSi 0.5 F25  
 A 816.00 mm<sup>2</sup>  
 I<sub>x</sub> 22.30 cm<sup>4</sup>  
 I<sub>y</sub> 22.30 cm<sup>4</sup>  
 W<sub>x</sub> 8.90 cm<sup>3</sup>  
 W<sub>y</sub> 8.90 cm<sup>3</sup>



**Profile mk 2025.03**  
**25.03. ....\***

2.55 kg/m  
 AlMgSi 0.5 F25  
 A 945.10 mm<sup>2</sup>  
 I<sub>x</sub> 87.00 cm<sup>4</sup>  
 I<sub>y</sub> 6.40 cm<sup>4</sup>  
 W<sub>x</sub> 17.40 cm<sup>3</sup>  
 W<sub>y</sub> 5.20 cm<sup>3</sup>

.... \* Profile length in mm

# Track Roller Assemblies

## Calculations and System Selection

### Selecting Series 40 Support Profiles

#### Calculations for maximum Stress and Deflection

Load at Center:

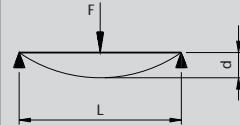
Maximum Stress

$$M_{b\max} = \frac{F \cdot L}{4} \quad \sigma_b = \frac{M_{b\max}}{W_{x,y}} \quad S = \frac{R_{p0.2}}{\sigma_b}$$

$$R_{p0.2} = 195 \text{ N/mm}^2 \\ (\text{AlMgSi 0.5 F25})$$

Maximum Deflection

$$d = \frac{F \cdot L^3}{48 \cdot E \cdot I_{x,y}}$$



Uniform Load:

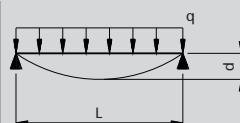
Maximum Stress

$$M_{b\max} = \frac{q \cdot L^2}{8} \quad \sigma_b = \frac{M_{b\max}}{W_{x,y}} \quad S = \frac{R_{p0.2}}{\sigma_b}$$

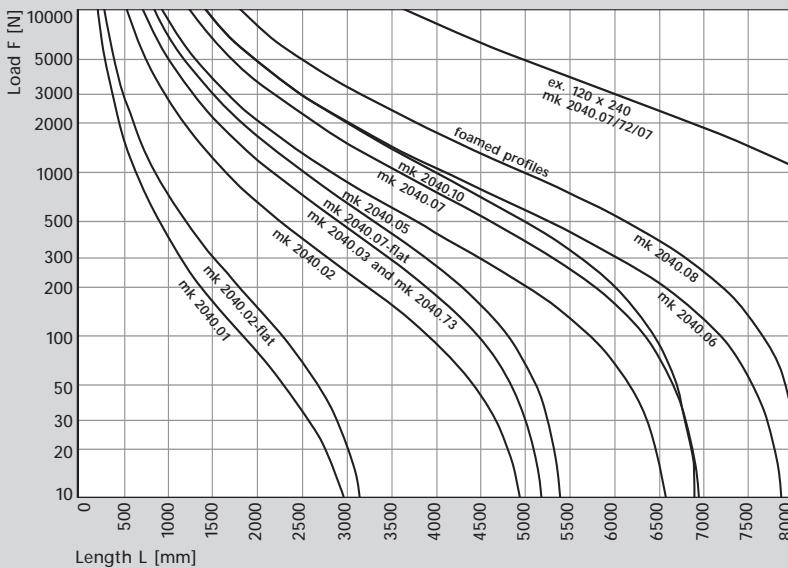
$$R_{p0.2} = 195 \text{ N/mm}^2 \\ (\text{AlMgSi 0.5 F25})$$

Maximum Deflection

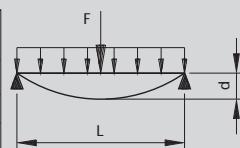
$$d = \frac{5}{384} \cdot \frac{q \cdot L^4}{E \cdot I_{x,y}}$$



#### Graphical Selection



#### Application Diagram



With point load at center and profile weight for the case:

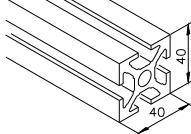
$$\frac{d}{L} = \frac{1}{1000}$$

Example:  
F = 300 N  
L = 1500 mm  
=> mk 2040.02-flat

with  $\frac{d}{L} \leq \frac{1}{1000}$

is suitable

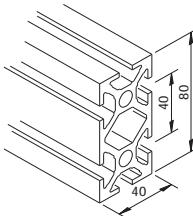
## Support Profiles Series 40



**Profile mk 2040.01**

**54.01. ....\***

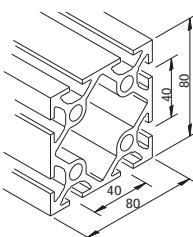
2.00 kg/m  
AlMgSi 0.5 F25  
A 742.20 mm<sup>2</sup>  
Ix 12.10 cm<sup>4</sup>  
Ly 12.10 cm<sup>4</sup>  
Wx 6.10 cm<sup>3</sup>  
Wy 6.10 cm<sup>3</sup>



**Profile mk 2040.02**

**54.02. ....\***

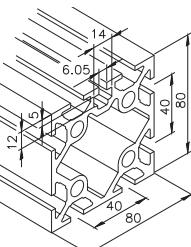
3.60 kg/m  
AlMgSi 0.5 F25  
A 1340.90 mm<sup>2</sup>  
Ix 83.30 cm<sup>4</sup>  
Ly 22.60 cm<sup>4</sup>  
Wx 20.80 cm<sup>3</sup>  
Wy 11.30 cm<sup>3</sup>



**Profile mk 2040.03**

**54.03. ....\***

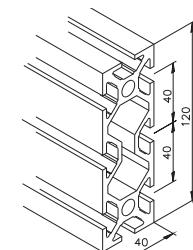
5.60 kg/m  
AlMgSi 0.5 F25  
A 2062.20 mm<sup>2</sup>  
Ix 149.60 cm<sup>4</sup>  
Ly 149.60 cm<sup>4</sup>  
Wx 37.40 cm<sup>3</sup>  
Wy 37.40 cm<sup>3</sup>



**Profile mk 2040.73**

**54.73. ....\***

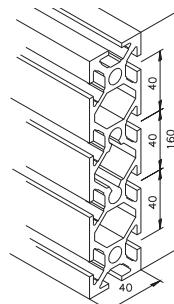
5.70 kg/m  
AlMgSi 0.5 F25  
A 2110.00 mm<sup>2</sup>  
Ix 150.00 cm<sup>4</sup>  
Ly 150.00 cm<sup>4</sup>  
Wx 37.10 cm<sup>3</sup>  
Wy 37.10 cm<sup>3</sup>



**Profile mk 2040.05**

**54.05. ....\***

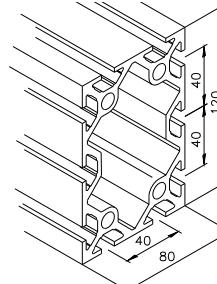
4.70 kg/m  
AlMgSi 0.5 F25  
A 1738.60 mm<sup>2</sup>  
Ix 256.60 cm<sup>4</sup>  
Ly 31.60 cm<sup>4</sup>  
Wx 43.80 cm<sup>3</sup>  
Wy 15.80 cm<sup>3</sup>



**Profile mk 2040.06**

**54.06. ....\***

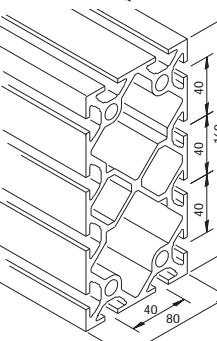
6.30 kg/m  
AlMgSi 0.5 F25  
A 2318.90 mm<sup>2</sup>  
Ix 576.10 cm<sup>4</sup>  
Ly 41.40 cm<sup>4</sup>  
Wx 72.00 cm<sup>3</sup>  
Wy 20.70 cm<sup>3</sup>



**Profile mk 2040.07**

**54.07. ....\***

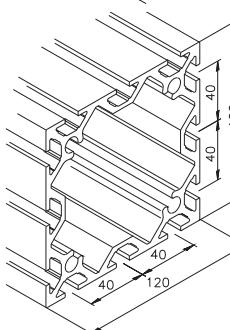
7.00 kg/m  
AlMgSi 0.5 F25  
A 2579.30 mm<sup>2</sup>  
Ix 440.70 cm<sup>4</sup>  
Ly 208.50 cm<sup>4</sup>  
Wx 73.40 cm<sup>3</sup>  
Wy 52.10 cm<sup>3</sup>



**Profile mk 2040.08**

**54.08. ....\***

9.50 kg/m  
AlMgSi 0.5 F25  
A 3504.90 mm<sup>2</sup>  
Ix 948.90 cm<sup>4</sup>  
Ly 272.10 cm<sup>4</sup>  
Wx 118.60 cm<sup>3</sup>  
Wy 68.00 cm<sup>3</sup>



**Profile mk 2040.10**

**54.10. ....\***

8.30 kg/m  
AlMgSi 0.5 F25  
A 3058.60 mm<sup>2</sup>  
Ix 585.20 cm<sup>4</sup>  
Ly 585.20 cm<sup>4</sup>  
Wx 97.50 cm<sup>3</sup>  
Wy 97.50 cm<sup>3</sup>

.... \* Profile length in mm

# Track Roller Assemblies

## Calculations and System Selection

### Selecting Series 50 Support Profiles

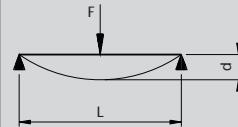
#### Calculations for maximum Stress and Deflection

Load at Center:

Maximum Stress

$$M_{b\max} = \frac{F \cdot L}{4} \quad \sigma_b = \frac{M_{b\max}}{W_{x,y}} \quad S = \frac{R_{p0.2}}{\sigma_b}$$

225 N/mm<sup>2</sup>  
(AlMgSi 0.7 F28)



Maximum Deflection

$$d = \frac{F \cdot L^3}{48 \cdot E \cdot I_{x,y}}$$

Uniform Load:

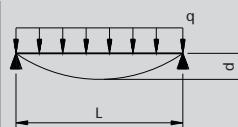
Maximum Stress

$$M_{b\max} = \frac{q \cdot L^2}{8} \quad \sigma_b = \frac{M_{b\max}}{W_{x,y}} \quad S = \frac{R_{p0.2}}{\sigma_b}$$

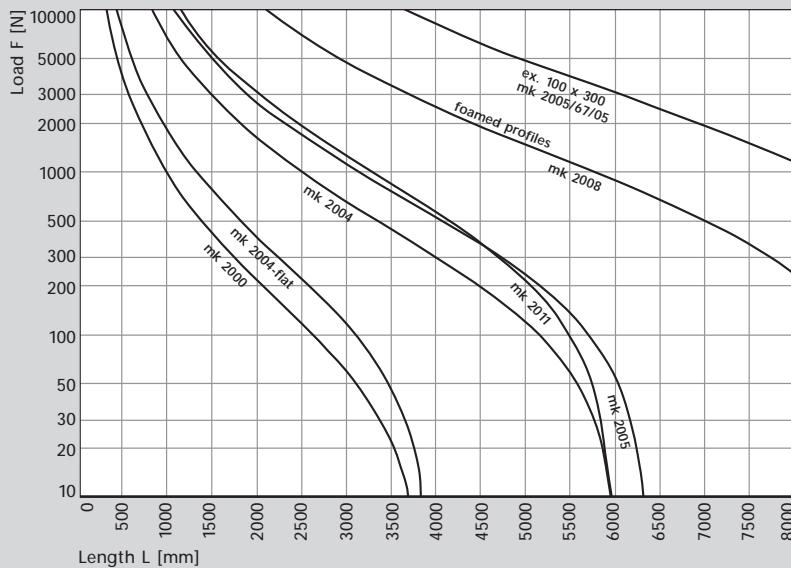
225 N/mm<sup>2</sup>  
(AlMgSi 0.7 F28)

Maximum Deflection

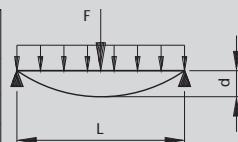
$$d = \frac{5}{384} \cdot \frac{q \cdot L^4}{E \cdot I_{x,y}}$$



#### Graphical Selection



#### Application Diagram



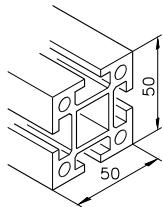
With point load at center and profile weight for the case:

$$\frac{d}{L} = \frac{1}{1000}$$

Example:  
F = 400 N  
L = 2000 mm  
=> mk 2004-flat

with  $\frac{d}{L} \leq \frac{1}{1000}$   
is suitable

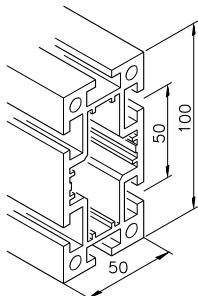
## Support Profiles Series 50



**Profile mk 2000**

**51.00. ....\***

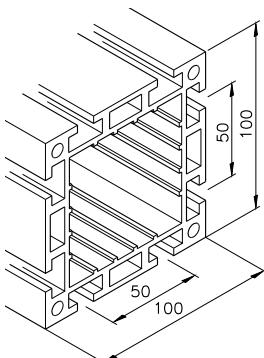
2.85 kg/m  
AlMgSi 0.7 F28  
 $A = 1084.20 \text{ mm}^2$   
 $I_x = 29.90 \text{ cm}^4$   
 $I_y = 29.90 \text{ cm}^4$   
 $W_x = 12.00 \text{ cm}^3$   
 $W_y = 12.00 \text{ cm}^3$



**Profile mk 2004**

**51.04. ....\***

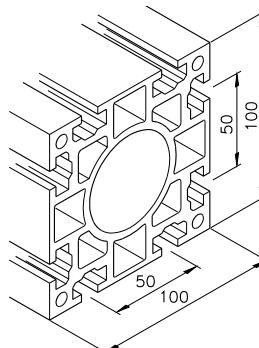
4.90 kg/m  
AlMgSi 0.7 F28  
 $A = 1805.50 \text{ mm}^2$   
 $I_x = 200.00 \text{ cm}^4$   
 $I_y = 55.40 \text{ cm}^4$   
 $W_x = 40.00 \text{ cm}^3$   
 $W_y = 22.20 \text{ cm}^3$



**Profile mk 2005**

**51.05. ....\***

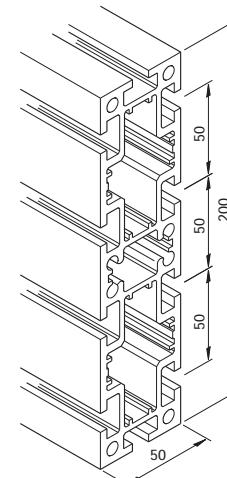
7.00 kg/m  
AlMgSi 0.7 F28  
 $A = 2655.50 \text{ mm}^2$   
 $I_x = 334.80 \text{ cm}^4$   
 $I_y = 334.80 \text{ cm}^4$   
 $W_x = 67.00 \text{ cm}^3$   
 $W_y = 67.00 \text{ cm}^3$



**Profile mk 2011**

**51.11. ....\***

9.70 kg/m  
AlMgSi 0.7 F28  
 $A = 3671.30 \text{ mm}^2$   
 $I_x = 383.40 \text{ cm}^4$   
 $I_y = 383.40 \text{ cm}^4$   
 $W_x = 76.70 \text{ cm}^3$   
 $W_y = 76.70 \text{ cm}^3$



**Profile mk 2008**

**51.08. ....\***

9.00 kg/m  
AlMgSi 0.7 F28  
 $A = 3366.40 \text{ mm}^2$   
 $I_x = 1302.50 \text{ cm}^4$   
 $I_y = 106.80 \text{ cm}^4$   
 $W_x = 130.20 \text{ cm}^3$   
 $W_y = 42.70 \text{ cm}^3$

.... \* Profile length in mm

# Track Roller Assemblies

## Calculations and System Selection

### Selecting Series 60 Support Profiles

#### Calculations for maximum Stress and Deflection

Load at Center:

Maximum Stress

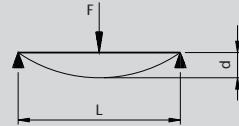
$$M_{b\max} = \frac{F \cdot L}{4} \quad \sigma_b = \frac{M_{b\max}}{W_{x,y}} \quad S = \frac{R_{p0.2}}{\sigma_b}$$

$$R_{p0.2} = 195 \text{ N/mm}^2 \\ (\text{AlMgSi 0.5 F25})$$

Maximum Deflection

$$d = \frac{F \cdot L^3}{48 \cdot E \cdot I_{x,y}}$$

$$225 \text{ N/mm}^2 \\ (\text{AlMgSi 0.7 F28})$$



Uniform Load:

Maximum Stress

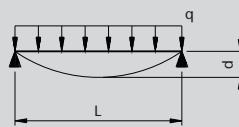
$$M_{b\max} = \frac{q \cdot L^2}{8} \quad \sigma_b = \frac{M_{b\max}}{W_{x,y}} \quad S = \frac{R_{p0.2}}{\sigma_b}$$

$$R_{p0.2} = 195 \text{ N/mm}^2 \\ (\text{AlMgSi 0.5 F25})$$

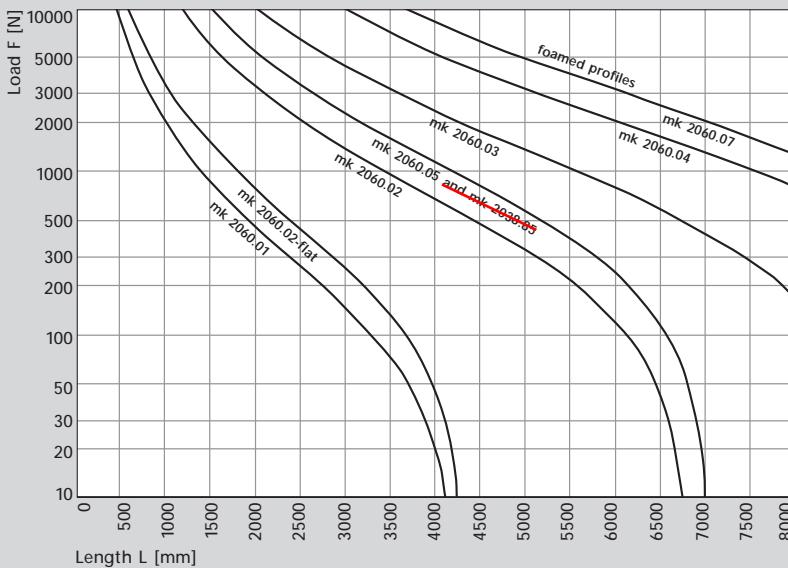
Maximum Deflection

$$d = \frac{5}{384} \cdot \frac{q \cdot L^4}{E \cdot I_{x,y}}$$

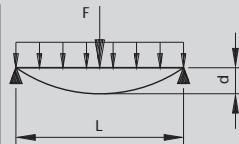
$$225 \text{ N/mm}^2 \\ (\text{AlMgSi 0.7 F28})$$



#### Graphical Selection



#### Application Diagram



With point load at center and profile weight for the case:

$$\frac{d}{L} = \frac{1}{1000}$$

Example:

$$F = 800 \text{ N}$$

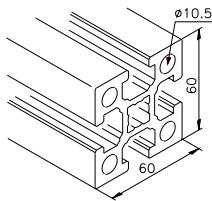
$$L = 4500 \text{ mm}$$

$$\Rightarrow \text{mk 2060.05}$$

$$\text{with } \frac{d}{L} \leq \frac{1}{1000}$$

is suitable

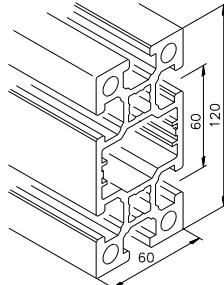
## Support Profiles Series 60



Profile mk 2060.01

60.01. ....\*

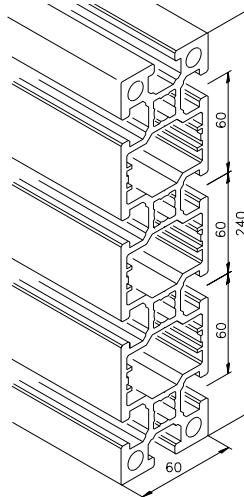
4.30 kg/m  
 AlMgSi 0.7 F28  
 A 1596.60 mm<sup>2</sup>  
 Ix 60.20 cm<sup>4</sup>  
 ly 60.20 cm<sup>4</sup>  
 Wx 20.10 cm<sup>3</sup>  
 Wy 20.10 cm<sup>3</sup>



Profile mk 2060.02

60.02. ....\*

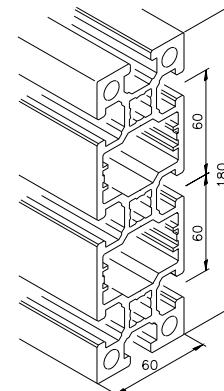
6.95 kg/m  
 AlMgSi 0.7 F28  
 A 2574.30 mm<sup>2</sup>  
 Ix 404.40 cm<sup>4</sup>  
 ly 103.50 cm<sup>4</sup>  
 Wx 67.30 cm<sup>3</sup>  
 Wy 34.50 cm<sup>3</sup>



Profile mk 2060.04

60.04. ....\*

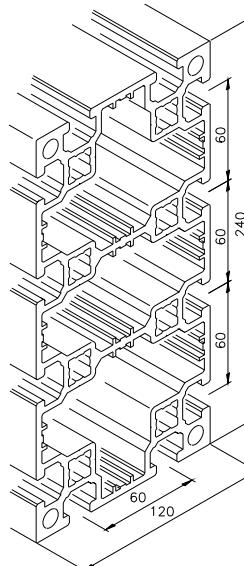
12.20 kg/m  
 AlMgSi 0.7 F28  
 A 4515.90 mm<sup>2</sup>  
 Ix 2657.20 cm<sup>4</sup>  
 ly 189.90 cm<sup>4</sup>  
 Wx 221.20 cm<sup>3</sup>  
 Wy 63.30 cm<sup>3</sup>



Profile mk 2060.03

60.03. ....\*

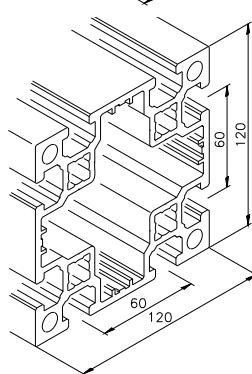
9.60 kg/m  
 AlMgSi 0.7 F28  
 A 3544.40 mm<sup>2</sup>  
 Ix 1210.50 cm<sup>4</sup>  
 ly 146.70 cm<sup>4</sup>  
 Wx 134.50 cm<sup>3</sup>  
 Wy 48.90 cm<sup>3</sup>



Profile mk 2060.07

60.07. ....\*

18.00 kg/m  
 AlMgSi 0.5 F25  
 A 6700.20 mm<sup>2</sup>  
 Ix 4086.10 cm<sup>4</sup>  
 ly 1177.40 cm<sup>4</sup>  
 Wx 340.50 cm<sup>3</sup>  
 Wy 169.20 cm<sup>3</sup>



Profile mk 2060.05

60.05. ....\*

10.30 kg/m  
 AlMgSi 0.7 F28  
 A 3800.70 mm<sup>2</sup>  
 Ix 659.90 cm<sup>4</sup>  
 ly 659.90 cm<sup>4</sup>  
 Wx 109.90 cm<sup>3</sup>  
 Wy 109.90 cm<sup>3</sup>

.... \* Profile length in mm

# Track Roller Assemblies

## Linear Assemblies

### Selection Track Rollers

#### Selection

The indicated static load carrying capacities may be used as a guideline for the preliminary selection of track rollers and carriages. These values are the maximum allowable unit loads and contain a static safety factor  $s_0 = 4$  against plastic deformation of the raceways and rolling elements. For stainless steel rollers, these values must be reduced by 30%.

The load values shown for axial load ( $F_y$ ) and radial load ( $F_z$ ) are for moment-free loads. The allowable moments are the result of opposing offset loads.

Combined loads must be verified separately. A combined load is a single point load which, with a 50 mm offset for example, also introduces a moment. Careful consideration must be given to combined loads which cause torsion.

When arranging track rollers, it is important that the track rollers only transfer compressive loads in the radial direction. The centric track rollers are especially suited for handling compressive loads in the  $F_z$  direction. The centric track rollers are prevented from twisting by use of a steel bushing.

#### Application notes

Care must be taken that the track rollers are installed in an unloaded condition. In most cases, re-adjustment of the eccentric rollers under load causes premature abrasion. For "normal" applications (to  $a = 3 \text{ m/s}^2$ ) the track rollers should be installed so that they rotate as they travel along the track, yet that you can still prevent this rotation by placing your thumb and index finger on the perimeter of the roller. For applications requiring a speed of over  $a = 3 \text{ m/s}^2$  the track rollers require further preloading, so that one can no longer manually prevent the rollers from rotating.

As an additional safety measure we recommend securing the eccentric bushings with adhesive in order to prevent them from slipping. Sufficient lubrication, to prevent corrosion and increased abrasion, must also be used.

#### Calculations

When confirming the suitability of particular track rollers a distinction must be made between the static and the dynamic loading. Static loads are loads which are transferred at the contact point between the rod and the track roller while the roller is not rotating. That is to say that dynamic loads, or loads along other axes, must also be considered.

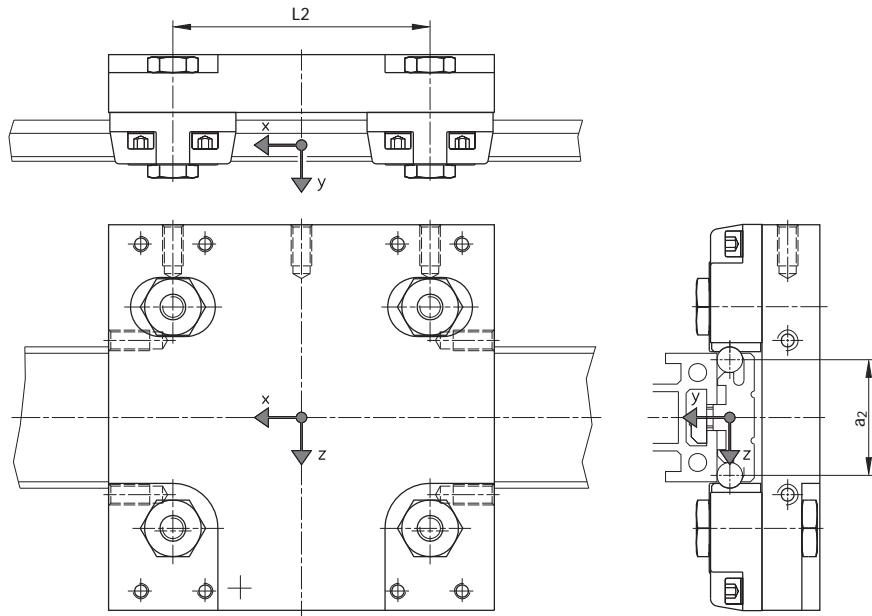
It makes sense to confirm first the static, then the dynamic load calculations. The allowable static axial and radial roller loads, as well as the static and dynamic safety factors of the highest loaded rollers, must be confirmed. The maximum track roller loads are technically considered mechanical contact loads (supported loads).

The static and the dynamic safety factor is derived from the relationship between the allowable load capacity  $C_w$  and the available equivalent load  $P$ .

#### As Guidelines we recommend

To  $v = 3 \text{ m/s}$  and  $a = 3 \text{ m/s}^2$  full load capacity of the track rollers with  $s_0 \geq 4$  and  $2 < s_D \leq 5$ .  
For high dynamic loads with  $a > 10 \text{ m/s}^2$  and speeds to  $v = 10 \text{ m/s}$  the load values must be reduced.

## Technical details for Track Roller Assemblies



Static Safety Factor:	Equivalent Loads	Track Roller Loads
$s_0 = \frac{C_{ow}}{P_0} \geq 4 = s_0 \text{ recomm.}$	<ul style="list-style-type: none"> <li>– static:  <math>P_0 = x_0 \cdot F_{ro} + y_0 \cdot F_{ao} [\text{N}]</math> </li> <li>– dynamic:  <math>P = x \cdot F_r + y \cdot F_a [\text{N}]</math> </li> </ul>	<ul style="list-style-type: none"> <li>– radial:  <math>F_{r(o)} = \pm \frac{F_{z(o)}}{2} \pm \frac{M_{y(o)}}{L_2} [\text{N}]</math> </li> <li>– axial:  <math>F_{a(o)} = \pm \frac{F_{y(o)}}{4} \pm \frac{M_{x(o)}}{2 \cdot a_2} \pm \frac{M_{z(o)}}{2 \cdot L_2} [\text{N}]</math> </li> </ul>
Dynamic Safety Factor: $s_D = \frac{C_w}{P} \geq 5 = s_D \text{ recomm.}$	Factors from the Table	Highest loaded roller, i.e. respectively largest value
Nominal Life Expectancy: $L_h = \left(\frac{C_w}{P}\right)^3 [10^5 \text{ m}]$	<ul style="list-style-type: none"> <li>– static: roller at rest</li> <li>– dynamic: roller rotating</li> </ul>	

### Load data

Ident-No.	Description Track with	Rod $\phi$	$F_{ro\text{-max}}$ [N]	$F_{ao\text{-max}}$ [N]	$x_0$	$F_{r(o)} \geq F_{a(o)}$ $y_0$	$x$	$y$	$F_{r(o)} < F_{a(o)}$ $x_0$	$y_0$	$x$	$y$	$C_{ow}$ [N]	$C_w$ [N] limited to $10^5$ m
K101100003	LR 6	6	175	60	1.2	3.6	1.0	3.1	0.9	3.6	0.5	3.9	890	1270
K101100001	LR 10	10	1000	300	1.2	4.0	1.0	3.4	0.9	4.0	0.5	4.3	5100	8500
K101100002	LR 16	16	2000	500	1.2	4.8	1.0	3.9	1.0	5.0	0.5	4.8	9500	16800
K101100006	LR 20	20	3250	825	1.2	4.9	1.0	4.0	1.1	5.0	0.5	4.9	16600	29500

# Track Roller Assemblies

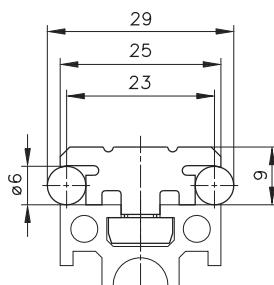
## Linear Assemblies

### Profile Track Series 25

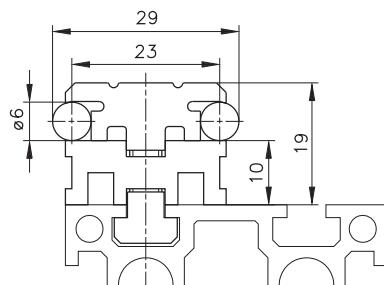
#### Profile Track PF 6-38.20/50

The Profile Track PF 6-38.20 with or without adapter profile, can be combined with Series 25 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.025	B51.04.029
Description	PF 6-38.20	PF 6-38.20/50
L1 [mm]	to 6000	to 6000
m <sub>Track</sub> [kg/m]	1.5	2.0



Profile Track  
PF 6-38.20



Profile Track  
PF 6-38.20/50  
with Adapter Profile

#### Hole Spacing

Range:  $75 \leq L1 \leq 6000$

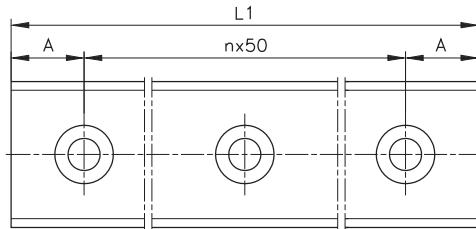
$12.5 \leq A < 37.5$

$$N = \frac{L1 - (2 \times A)}{50} + 1$$

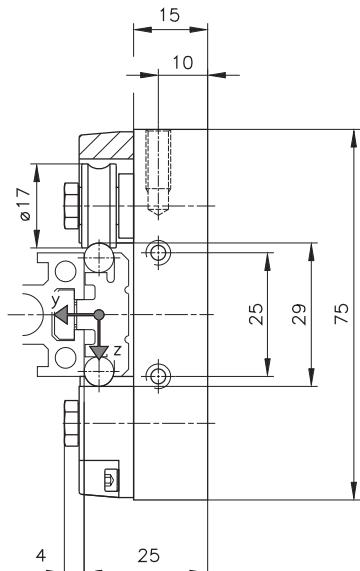
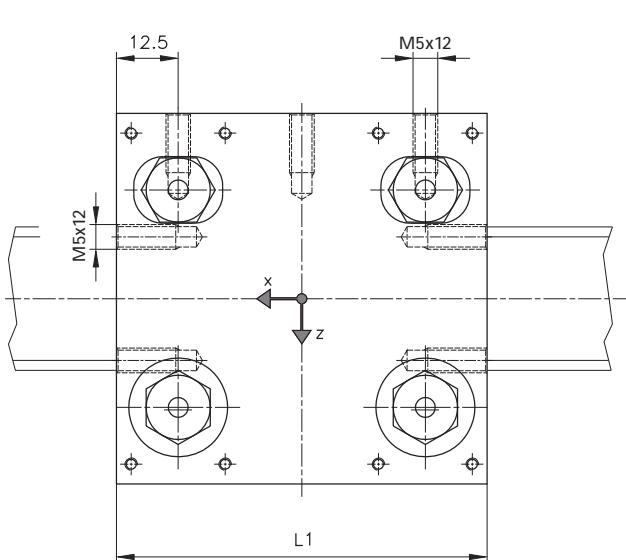
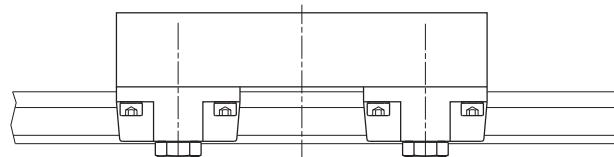
L1 = Length of Profile Track

A = Distance to first hole

N = Number of screws



## Carriages LW 38.20-04 for Profile Track PF 6-38.20/50



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.25.041	LW 38.20-04	75	200	350	2.5	8.5	5	0.35	5009CA0075
B90.25.041	LW 38.20-04	100	200	350	2.5	13	8.0	0.43	5009CA0100

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 15 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

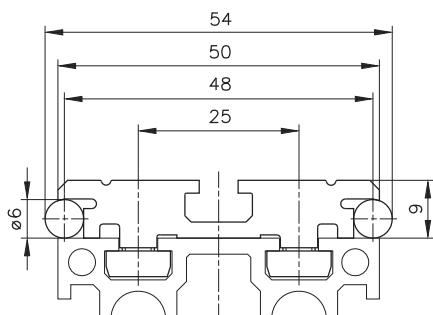
## Linear Assemblies

### Profile Track Series 25

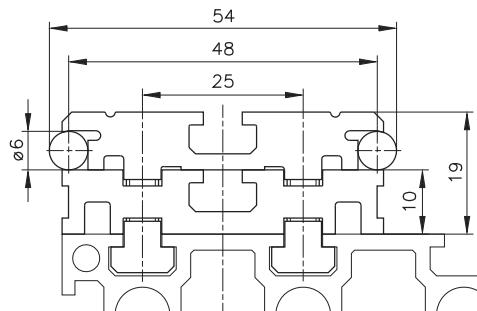
#### Profile Track PF 6-38.21/51

The Profile Track PF 6-38.21 with or without adapter profile, can be combined with Series 25 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.030	B51.04.031
Description	PF 6-38.21	PF 6-38.21/51
L1 [mm]	to 6000	to 6000
m <sub>Track</sub> [kg/m]	2.0	3.0



Profile Track  
PF 6-38.21



Profile Track  
PF 6-38.21/51  
with Adapter Profile

#### Hole Spacing

Range:  $100 \leq L1 \leq 6000$

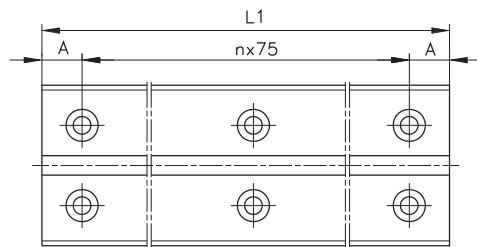
$12.5 \leq A < 50$

$$N = \left( \frac{L1 - (2 \times A)}{75} + 1 \right) \times 2$$

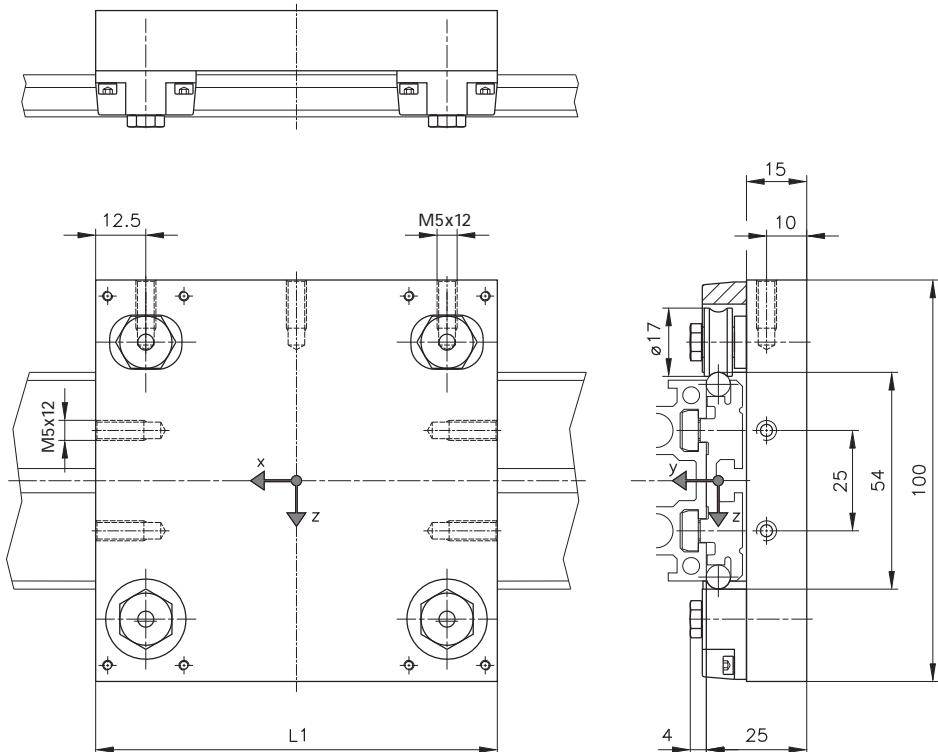
L1 = Length of Profile Track

A = Distance to first hole

N = Number of screws



## Carriages LW 38.21-04 for Profile Track PF 6-38.21/51



### Technical Data

Ident-No.	Description	L1 [mm]	Fy0 [N]	Fz0 [N]	Mx0 [Nm]	My0 [Nm]	Mz0 [Nm]	mCarriage [kg]	Plate only
B90.25.042	LW 38.21-04	100	200	350	5.0	13	8.0	0.55	5009CB0100
B90.25.042	LW 38.21-04	150	200	350	5.0	21	13	0.75	5009CB0150

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 15 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

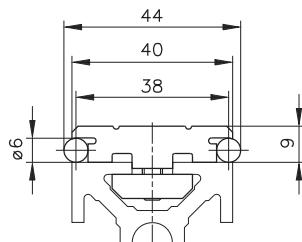
## Linear Assemblies

### Profile Track Series 40

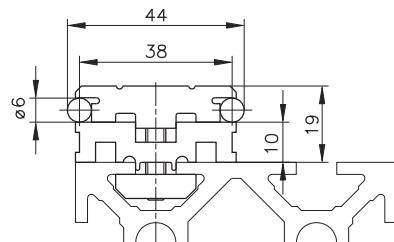
#### Profile Track PF 6-38.30/55

The Profile Track PF 6-38.30 with or without adapter profile, can be combined with Series 40 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.042	B51.04.043
Description	PF 6-38.30	PF 6-38.30/55
L1 [mm]	to 6000	to 6000
m <sub>Track</sub> [kg/m]	1.8	2.6



Profile Track  
PF 6-38.30



Profile Track  
PF 6-38.30/55  
with Adapter Profile

#### Hole Spacing

Range:  $75 \leq L1 \leq 6000$

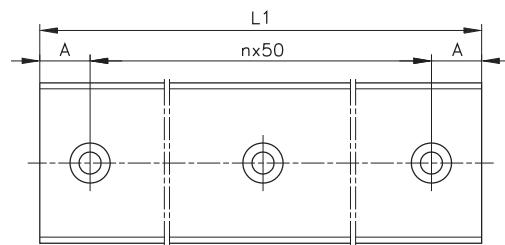
$12.5 \leq A < 37.5$

$$N = \frac{L1 - (2 \times A)}{50} + 1$$

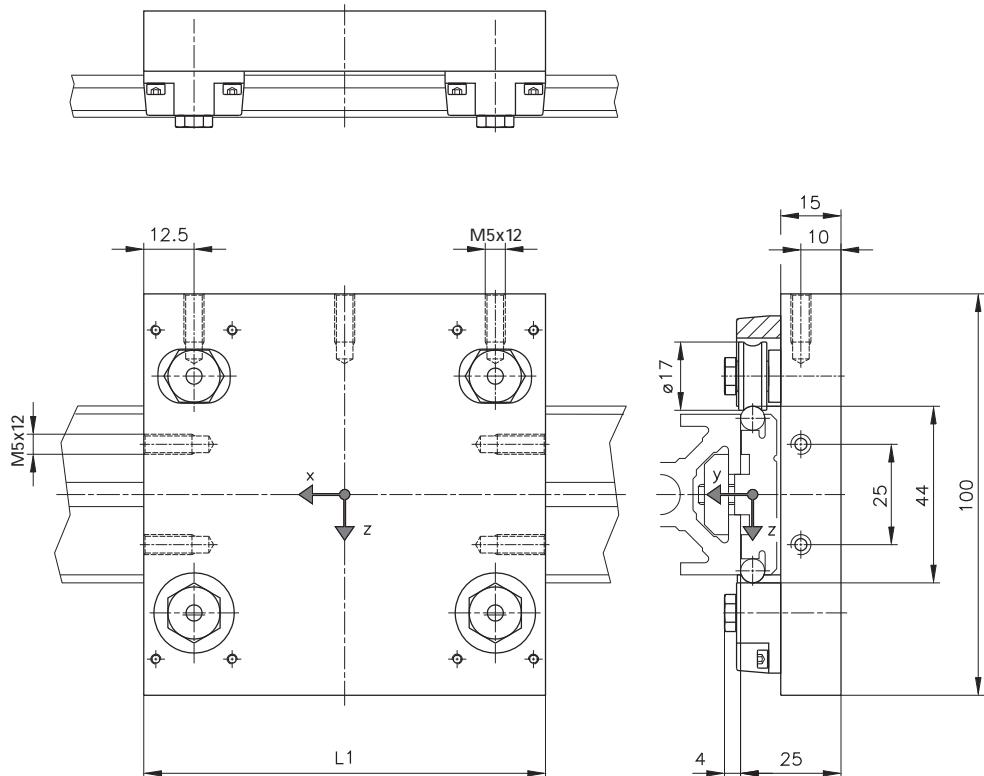
$L1$  = Length of Profile Track

$A$  = Distance to first hole

$N$  = Number of screws



## Carriages LW 38.30-04 for Profile Track PF 6-38.30/55



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.40.041	LW 38.30-04	100	200	350	4.0	13	8.0	0.55	5009CC0100
B90.40.041	LW 38.30-04	160	200	350	4.0	23	14	0.80	5009CC0160

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 15 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

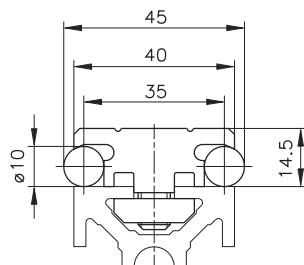
## Linear Assemblies

### Profile Track Series 40

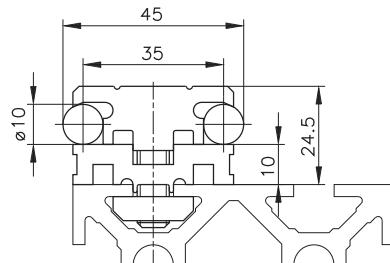
#### Profile Track PF 10-38.31/55

The Profile Track PF 10-38.31 with or without adapter profile, can be combined with Series 40 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.046	B51.04.047
Description	PF 10-38.31	PF 10-38.31/55
L1 [mm]	to 6000	to 6000
m <sub>Track</sub> [kg/m]	2.8	3.6



Profile Track  
PF 10-38.31



Profile Track  
PF 10-38.31/55  
with Adapter Profile

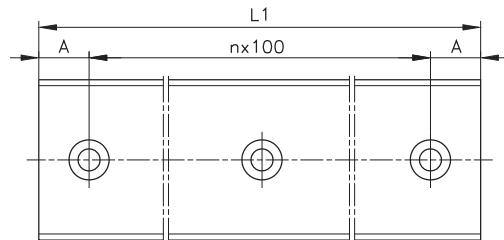
#### Hole Spacing

Range:  $150 \leq L1 \leq 6000$

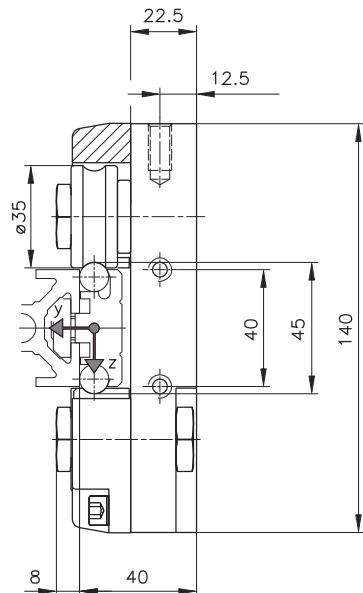
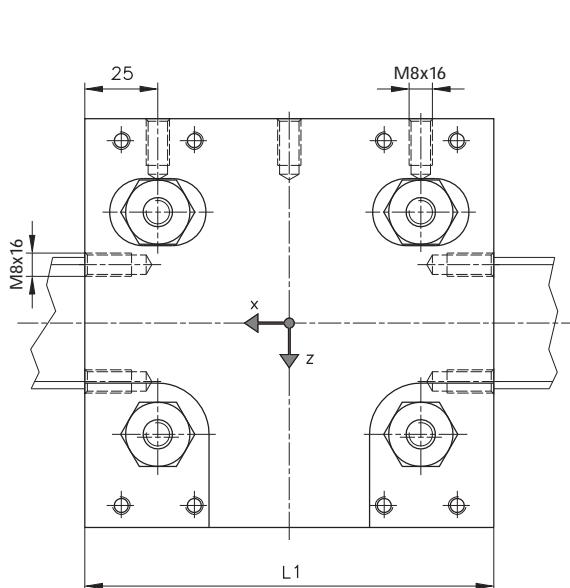
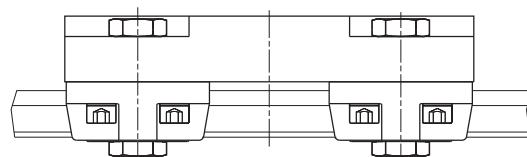
$25 \leq A < 75$

$$N = \frac{L1 - (2 \times A)}{100} + 1$$

L1 = Length of Profile Track  
A = Distance to first hole  
N = Number of screws



## Carriages LW 38.31-04 for Profile Track PF 10-38.31/55



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.40.042	LW 38.31-04	140	1000	2000	18	90	45	2.0	5009CD0140
B90.40.042	LW 38.31-04	240	1000	2000	18	190	95	2.8	5009CD0240

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 25 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

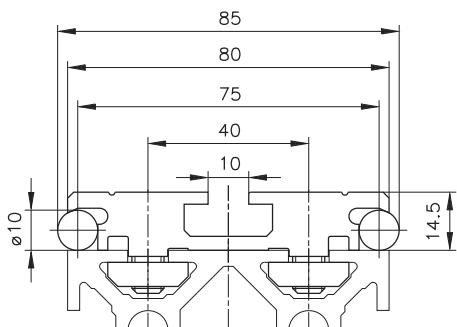
## Linear Assemblies

### Profile Track Series 40

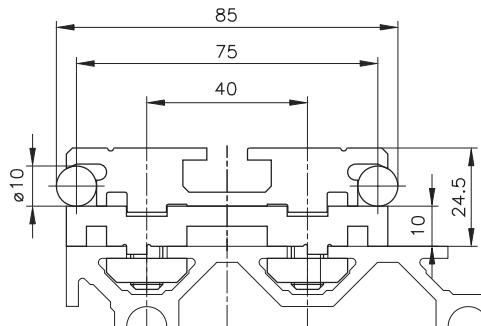
#### Profile Track PF 10-38.32/56

The Profile Track PF 10-38.32 with or without adapter profile, can be combined with Series 40 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.048	B51.04.049
Description	PF 10-38.32	PF 10-38.32/56
L1 [mm]	to 6000	to 6000
m <sub>Track</sub> [kg/m]	4.0	5.8



Profile Track  
PF 10-38.32



Profile Track  
PF 10-38.32/56  
with Adapter Profile

#### Hole Spacing

Range:  $200 \leq L1 \leq 6000$

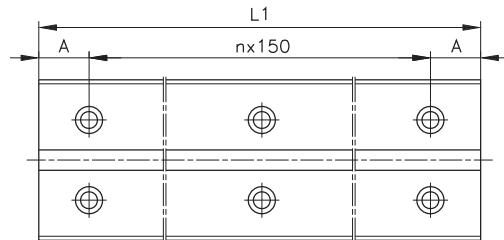
$25 \leq A < 100$

$$N = \left( \frac{L1 - (2 \times A)}{150} + 1 \right) \times 2$$

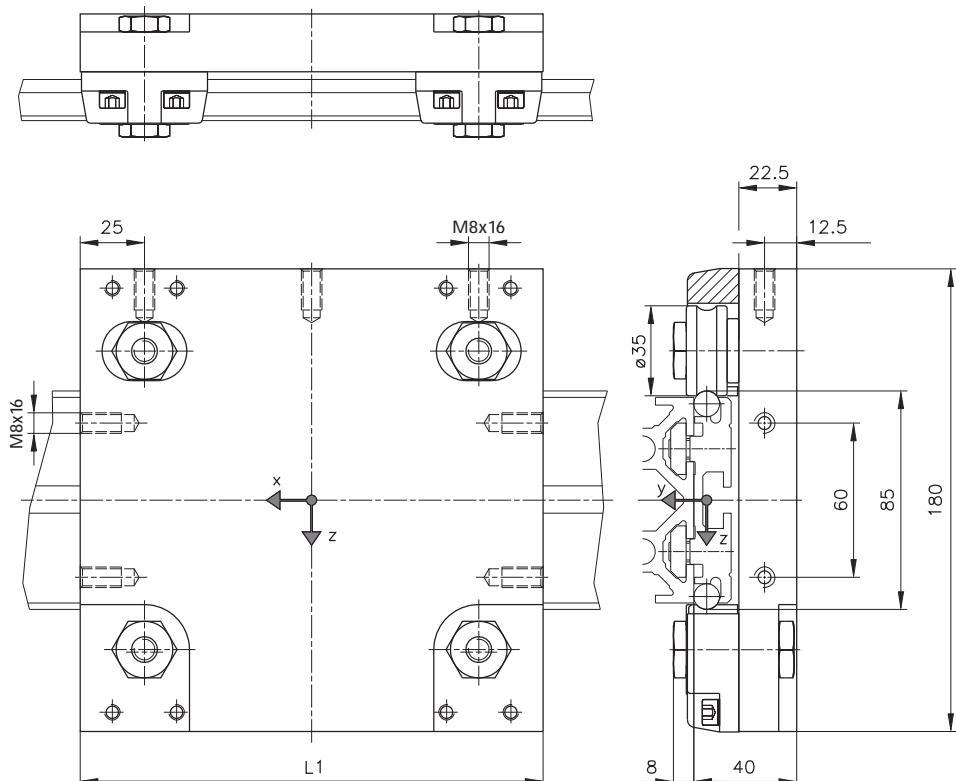
L1 = Length of Profile Track

A = Distance to first hole

N = Number of screws



## Carriages LW 38.32-04 for Profile Track PF 10-38.32/56



### Technical Data

Ident-No.	Description	L1 [mm]	Fy0 [N]	Fz0 [N]	Mx0 [Nm]	My0 [Nm]	Mz0 [Nm]	mCarriage [kg]	Plate only
B90.40.043	LW 38.32-04	180	1000	2000	40	130	65	2.8	5009CE0180
B90.40.043	LW 38.32-04	280	1000	2000	40	230	115	3.8	5009CE0280

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 25 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

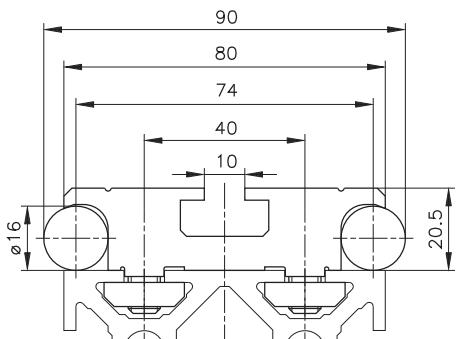
## Linear Assemblies

### Profile Track Series 40

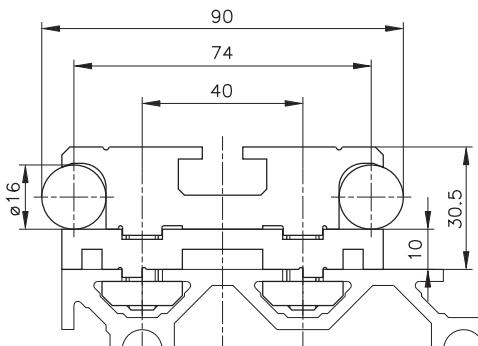
#### Profile Track PF 16-38.33/56

The Profile Track PF 16-38.33 with or without adapter profile, can be combined with Series 40 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.052	B51.04.053
Description	PF 16-38.33	PF 16-38.33/56
L1 [mm]	to 6000	to 6000
m <sub>Track</sub> [kg/m]	7.0	8.8



Profile Track  
PF 16-38.33



Profile Track  
PF 16-38.33/56  
with Adapter Profile

#### Hole Spacing

Range:  $150 \leq L1 < 450$

$25 \leq A < 75$

$$N = \left( \frac{L1 - (2 \times A)}{100} + 1 \right) \times 2$$

$L1$  = Length of Profile Track

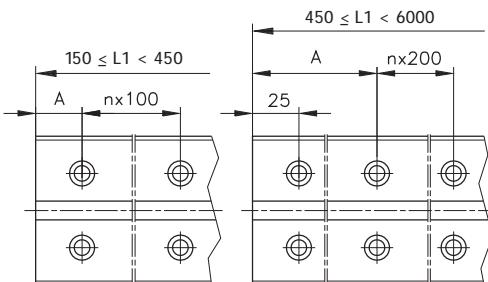
$A$  = Distance to first hole

$N$  = Number of screws

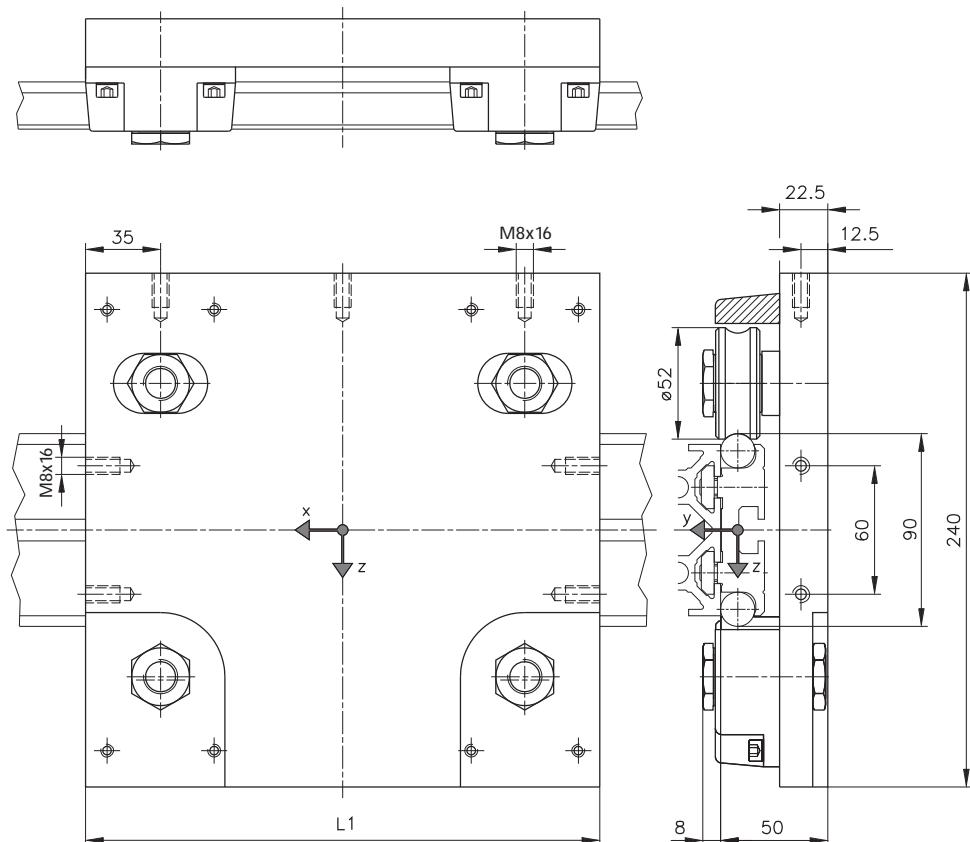
Range:  $450 \leq L1 < 6000$

$125 \leq A < 225$

$$N = \left( \frac{L1 - (2 \times A)}{200} + 3 \right) \times 2$$



## Carriages LW 38.33-04 for Profile Track PF 16-38.33/56



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.40.044	LW 38.33-04	240	1600	4000	60	340	140	5.5	5009CF0240
B90.40.044	LW 38.33-04	400	1600	4000	60	660	260	8.0	5009CF0400

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 30 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

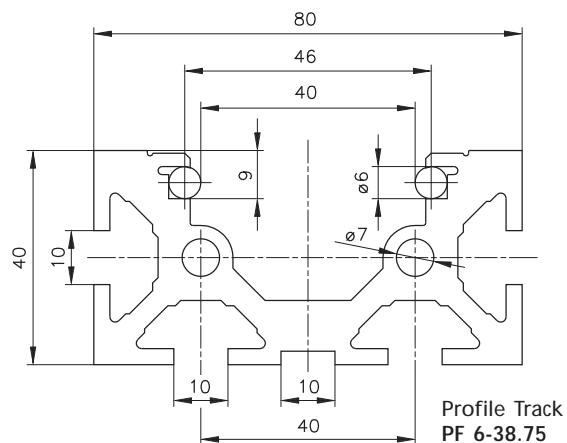
## Linear Assemblies

### Profile Track Series 40

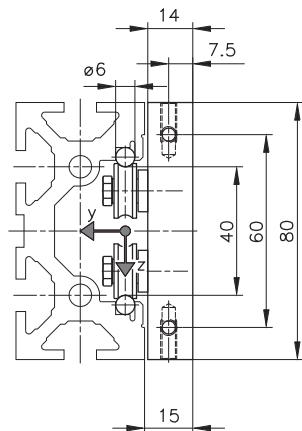
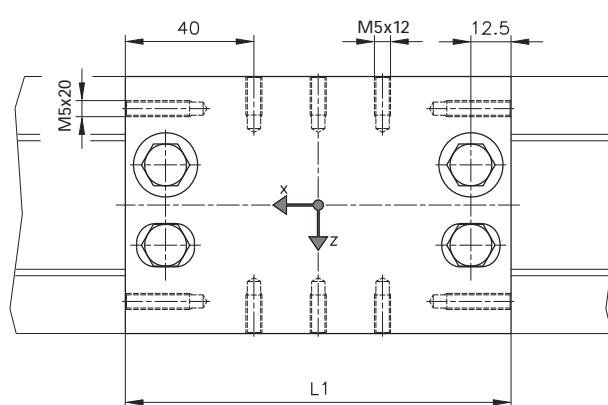
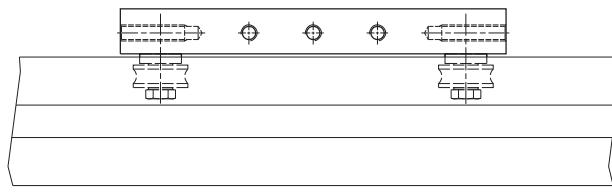
#### Interior Profile Track PF 6-38.75

The Profile Track PF 6-38.75, can be combined with the carriage shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.140
Description	PF 6-38.75
L1 [mm]	to 6000
$m_{\text{Track}}$ [kg/m]	3.9



## Carriages LW 38.75-44 for Profile Track PF 6-38.75



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.40.441	LW 38.75-44	120	200	350	5.0	15	10	0.50	5009CN0120

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 15 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

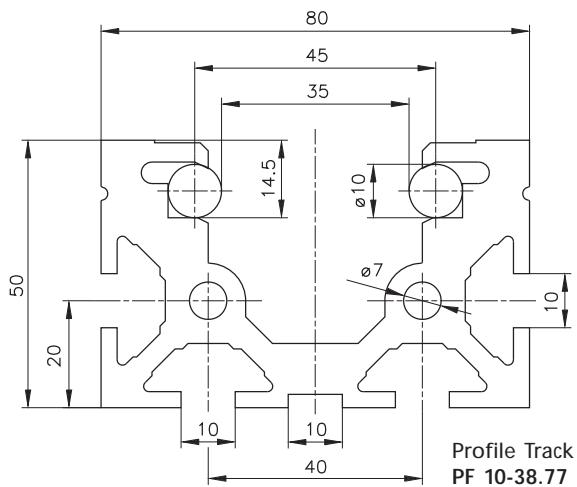
## Linear Assemblies

### Profile Track Series 40

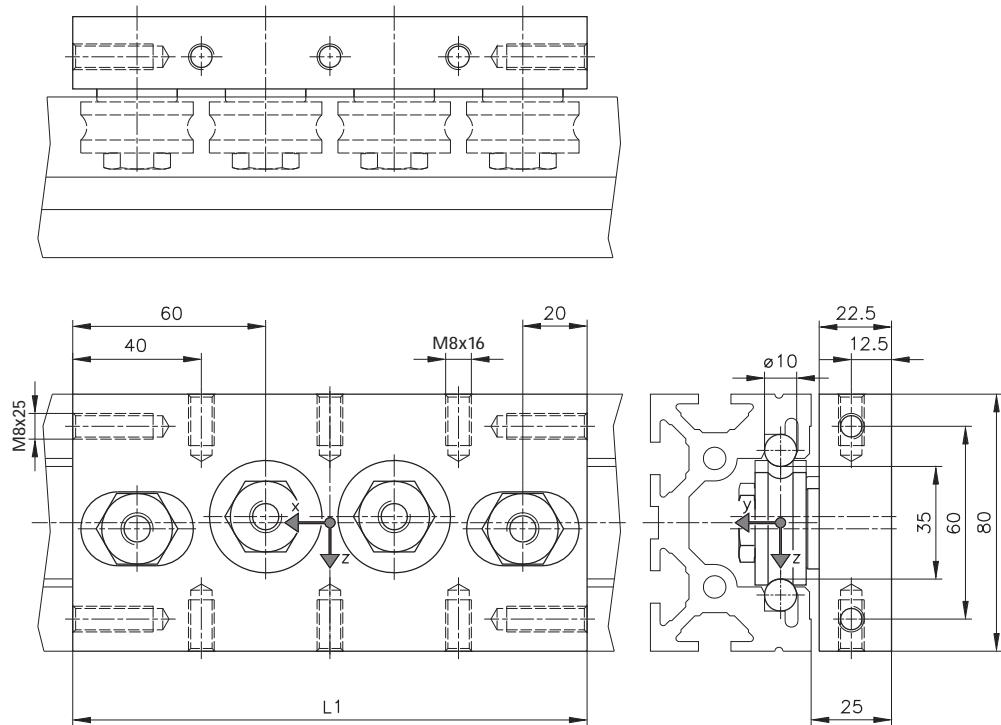
#### Interior Profile Track PF 10-38.77

The Profile Track PF 10-38.77, can be combined with the carriage shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.142
Description	PF 10-38.77
L1 [mm]	to 6000
$m_{\text{Track}}$ [kg/m]	5.6



## Carriages LW 38.77-44 for Profile Track PF 10-38.77



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.40.443	LW 38.77-44	160	1000	1500	20	60	40	1.5	5009CO0160

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 25 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

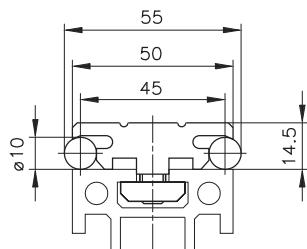
## Linear Assemblies

### Profile Track Series 50

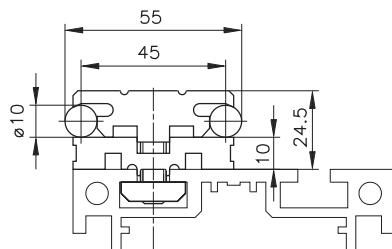
#### Profile Track PF 10-38.41/60

The Profile Track PF 10-38.41 with or without adapter profile, can be combined with Series 50 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.020	B51.04.015
Description	PF 10-38.41	PF 10-38.41/60
L1 [mm]	to 6000	to 6000
m <sub>Track</sub> [kg/m]	3.0	4.2



Profile Track  
PF 10-38.41



Profile Track  
PF 10-38.41/60  
with Adapter Profile

#### Hole Spacing

Range:  $150 \leq L1 \leq 6000$

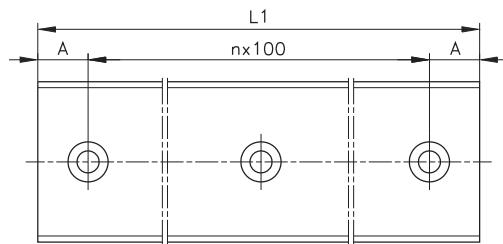
$25 \leq A < 75$

$$N = \frac{L1 - (2 \times A)}{100} + 1$$

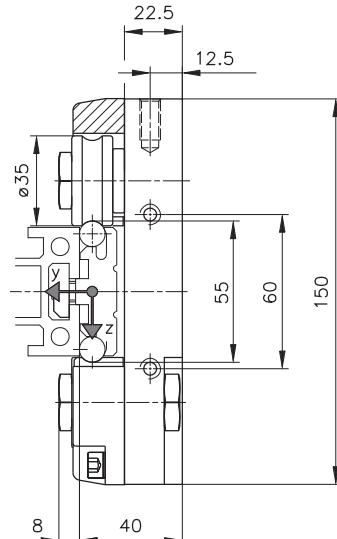
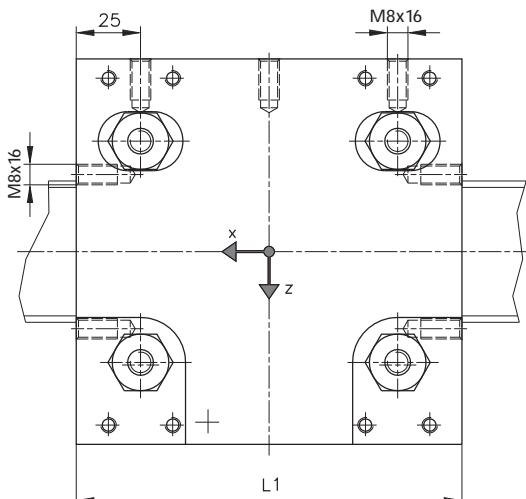
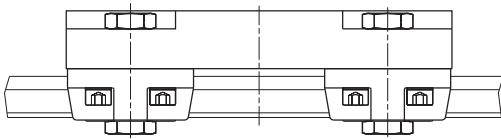
L1 = Length of Profile Track

A = Distance to first hole

N = Number of screws



## Carriages LW 38.41-04 for Profile Track PF 10-38.41/60



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.50.042	LW 38.41-04	150	1000	2000	25	100	50	2.2	5009CG0150
B90.50.042	LW 38.41-04	250	1000	2000	25	200	100	3.0	5009CG0250

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 25 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

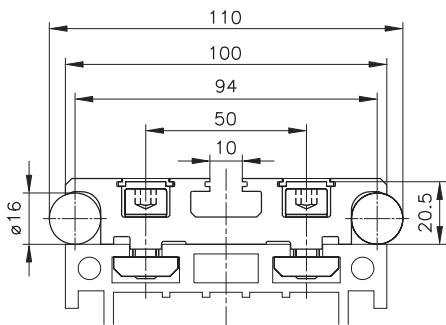
## Linear Assemblies

### Profile Track Series 50

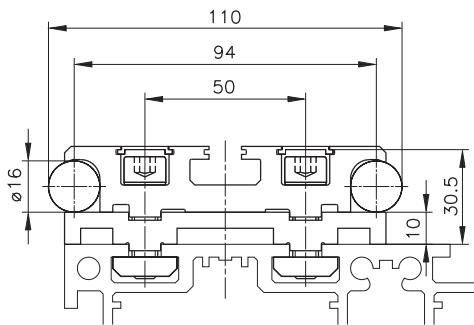
#### Profile Track PF 16-38.44/61

The Profile Track PF 16-38.44 with or without adapter profile, can be combined with Series 50 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.004	B51.04.016
Description	PF 16-38.44	PF 16-38.44/61
L1 [mm]	to 6000	to 6000
m <sub>Track</sub> [kg/m]	6.8	8.8



Profile Track  
PF 16-38.44



Profile Track  
PF 16-38.44/61  
with Adapter Profile

#### Hole Spacing

Range:  $150 \leq L1 < 450$

$25 \leq A < 75$

$$N = \left( \frac{L1 - (2 \times A)}{100} + 1 \right) \times 2$$

$L1$  = Length of Profile Track

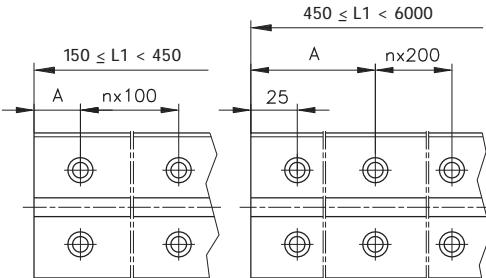
$A$  = Distance to first hole

$N$  = Number of screws

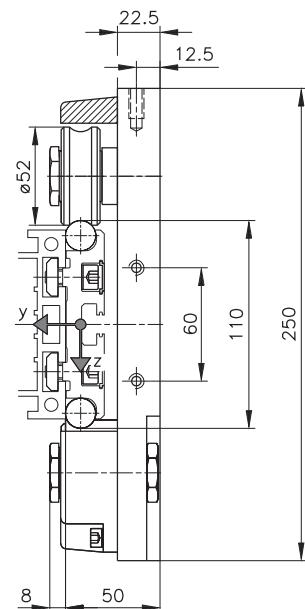
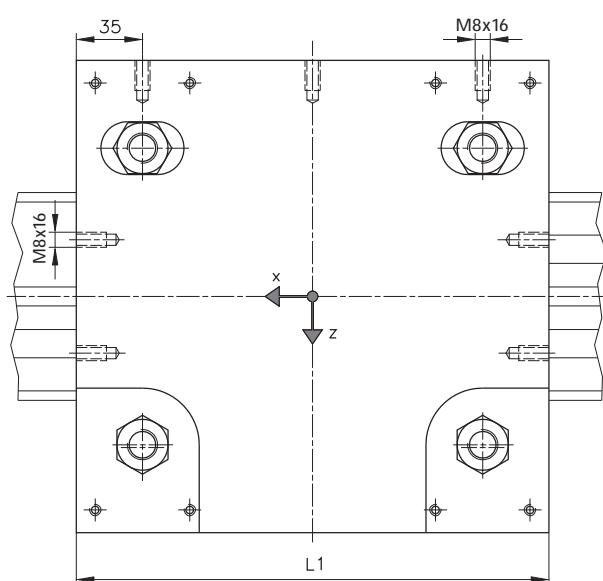
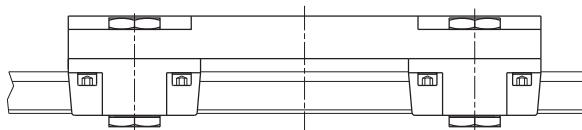
Range:  $450 \leq L1 < 6000$

$125 \leq A < 225$

$$N = \left( \frac{L1 - (2 \times A)}{200} + 3 \right) \times 2$$



## Carriages LW 38.44-04 for Profile Track PF 16-38.44/61



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.50.044	LW 38.44-04	250	1600	4000	80	360	150	5.5	5009CI0250
B90.50.044	LW 38.44-04	450	1600	4000	80	760	300	8.5	5009CI0450

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 30 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

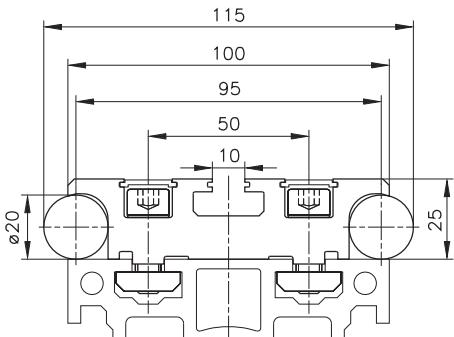
## Linear Assemblies

### Profile Track Series 50

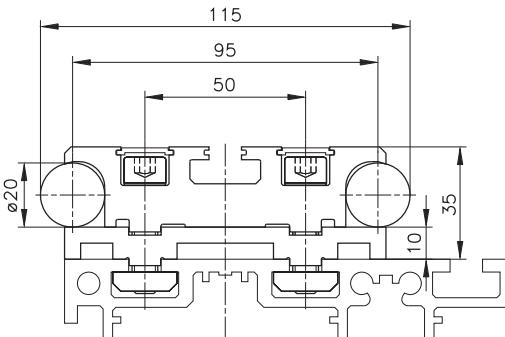
#### Profile Track PF 20-38.46/61

The Profile Track PF 20-38.46 with or without adapter profile, can be combined with Series 50 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.082	B51.04.083
Description	PF 20-38.46	PF 20-38.46/61
L1 [mm]	to 6000	to 6000
m <sub>Track</sub> [kg/m]	9.5	11.5



Profile Track  
PF 20-38.46



Profile Track  
PF 20-38.46/61  
with Adapter Profile

#### Hole Spacing

Range:  $150 \leq L1 < 450$

$25 \leq A < 75$

$$N = \left( \frac{L1 - (2 \times A)}{100} + 1 \right) \times 2$$

$450 \leq L1 < 6000$

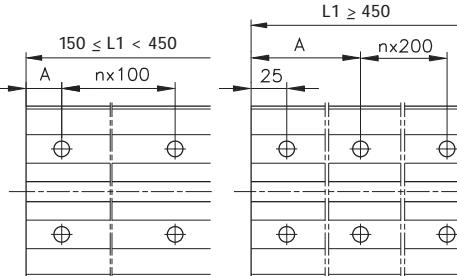
$125 \leq A < 225$

$$N = \left( \frac{L1 - (2 \times A)}{200} + 3 \right) \times 2$$

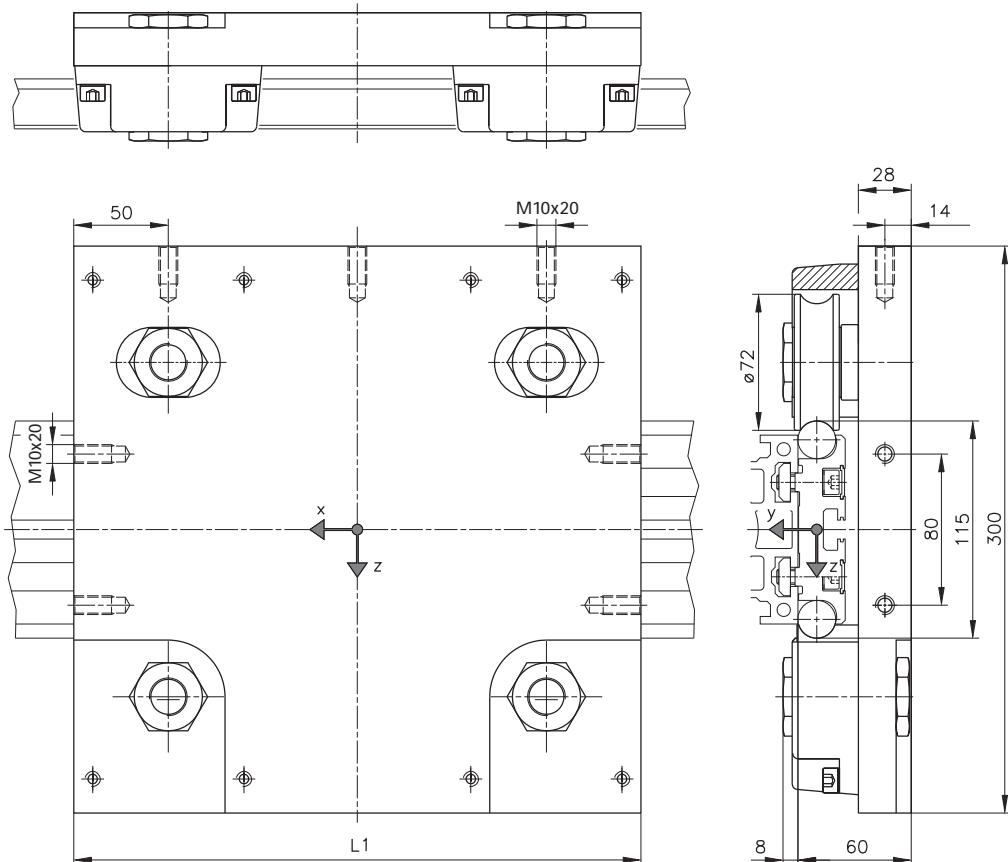
L1 = Length of Profile Track

A = Distance to first hole

N = Number of screws



## Carriages LW 38.46-04 for Profile Track PF 20-38.46/61



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.50.046	LW 38.46-04	300	3000	6000	150	600	300	11	5009CK0300
B90.50.046	LW 38.46-04	450	3000	6000	150	1000	500	14	5009CK0450

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 40 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

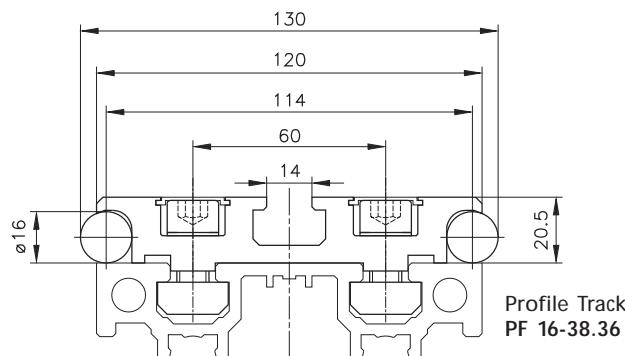
## Linear Assemblies

### Profile Track Series 60

#### Profile Track PF 16-38.36

The Profile Track PF 16-38.36, can be combined with Series 60 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.109
Description	PF 16-38.36
L1 [mm]	to 6000
m <sub>Track</sub> [kg/m]	9.5



#### Hole Spacing

Range:  $150 \leq L1 < 450$

$25 \leq A < 75$

$$N = \left( \frac{L1 - (2 \times A)}{100} + 1 \right) \times 2$$

$450 \leq L1 < 6000$

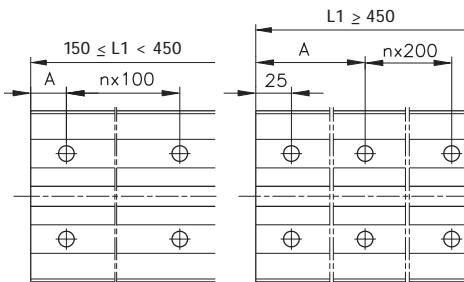
$125 \leq A < 225$

$$N = \left( \frac{L1 - (2 \times A)}{200} + 3 \right) \times 2$$

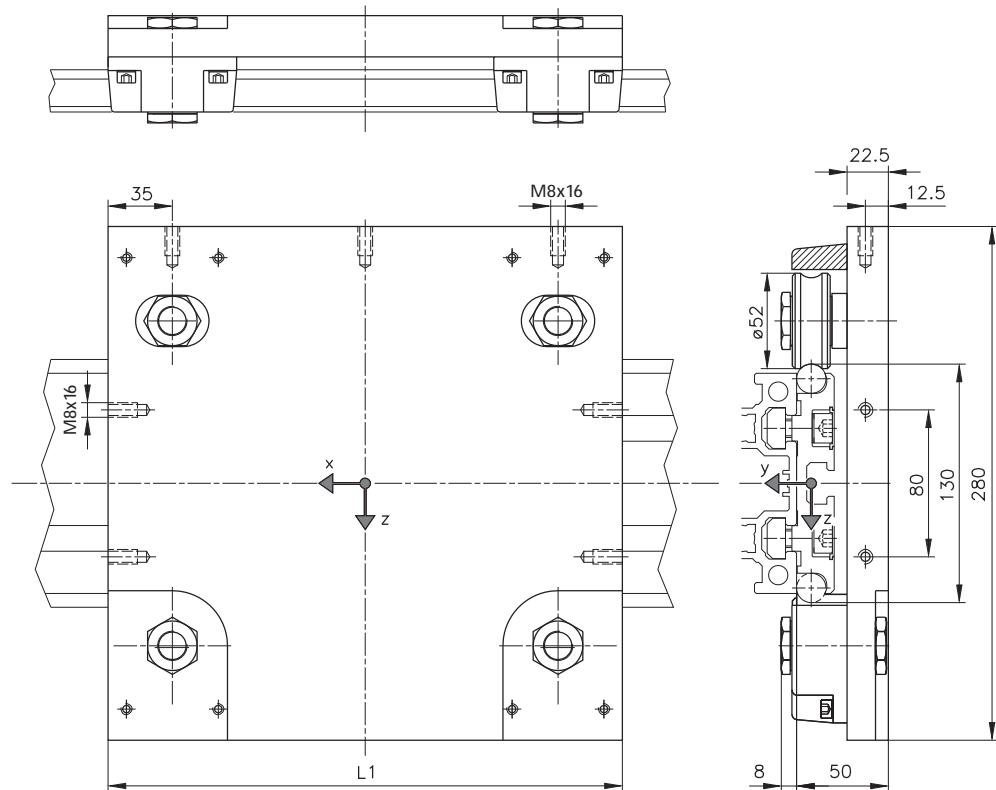
L1 = Length of Profile Track

A = Distance to first hole

N = Number of screws



## Carriages LW 38.36-04 for Profile Track PF 16-38.36



### Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.60.042	LW 38.36-04	280	1600	4000	100	420	170	6.5	5009CL0280
B90.60.042	LW 38.36-04	480	1600	4000	100	820	330	10.0	5009CL0480

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 30 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

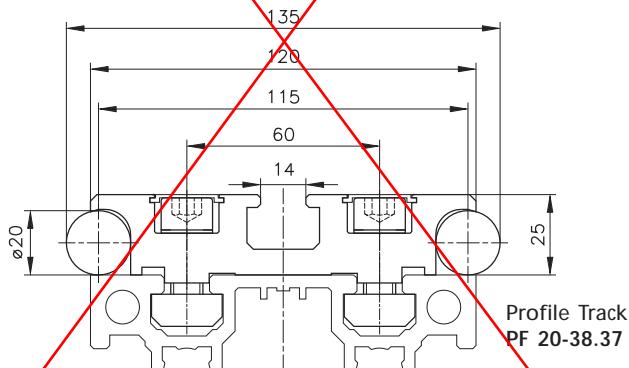
## Linear Assemblies

### Profile Track Series 60

#### Profile Track PF 20-38.37

The Profile Track PF 20-38.37, can be combined with Series 60 profiles and the carriages shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.113
Description	PF 20-38.37
L1 [mm]	to 6000
m <sub>Track</sub> [kg/m]	10.5



#### Hole Spacing

Range:  $150 \leq L1 < 450$

$25 \leq A < 75$

$$N = \left( \frac{L1 - (2 \times A)}{100} + 1 \right) \times 2$$

$450 \leq L1 < 6000$

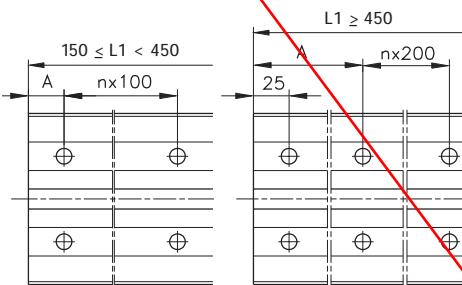
$125 \leq A < 225$

$$N = \left( \frac{L1 - (2 \times A)}{200} + 3 \right) \times 2$$

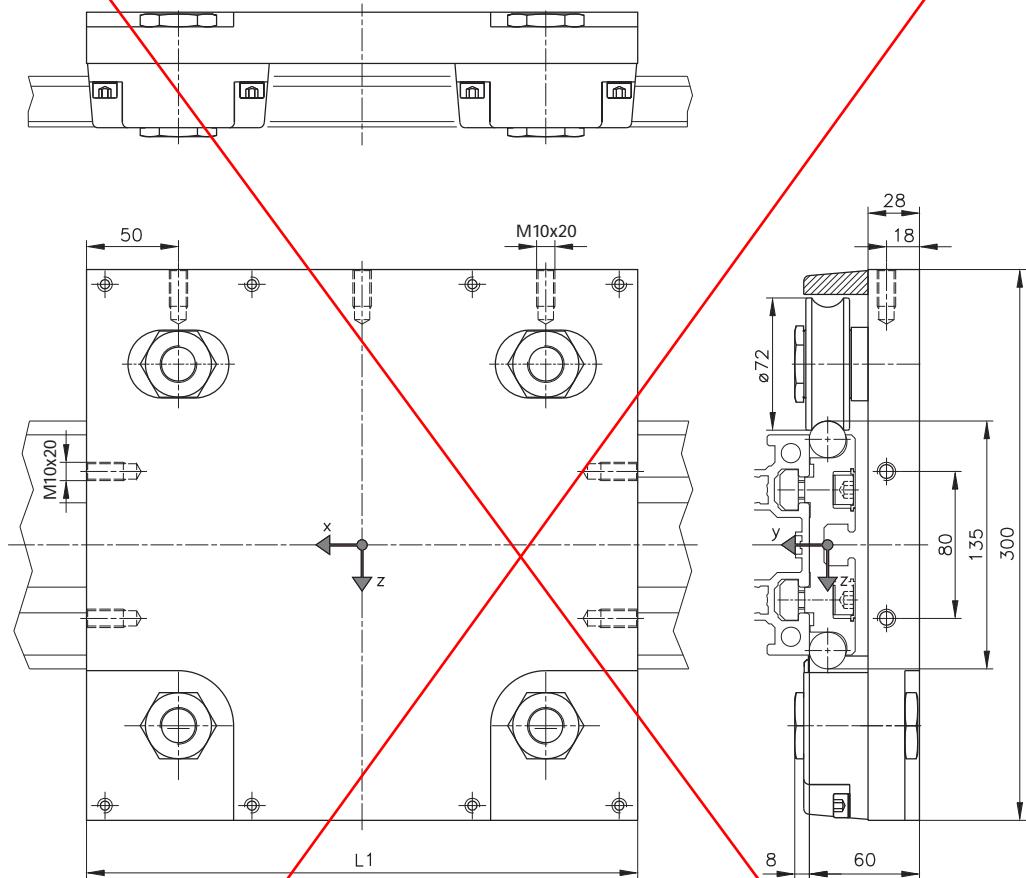
$L1$  = Length of Profile Track

$A$  = Distance to first hole

$N$  = Number of screws



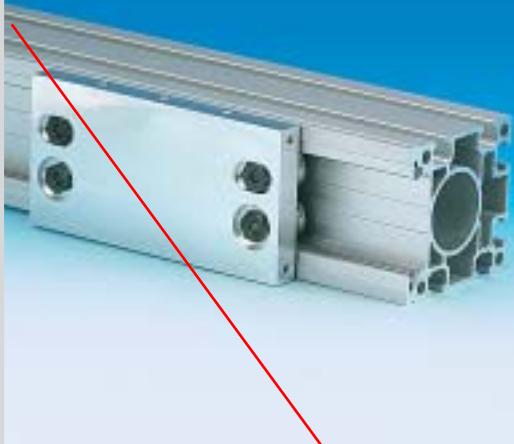
Carriages LW 38.37-04 for Profile Track PF 20-38.37



Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.60.044	LW 38.37-04	300	3000	6000	180	600	300	11	5009CM0300
B90.60.044	LW 38.37-04	480	3000	6000	180	1100	550	15	5009CM0480

- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 40 mm
- For X46 Cr13 rods and track rollers load capacities reduced by 30%



# Track Roller Assemblies

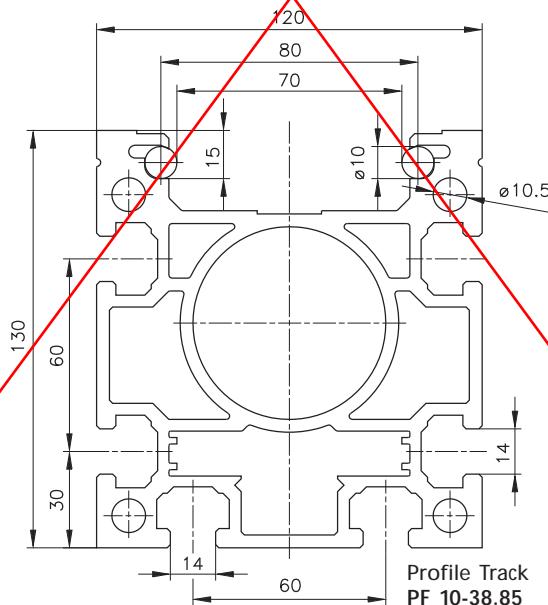
## *Linear Assemblies*

## *Profile Track Series 60*

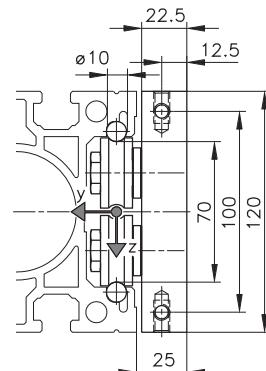
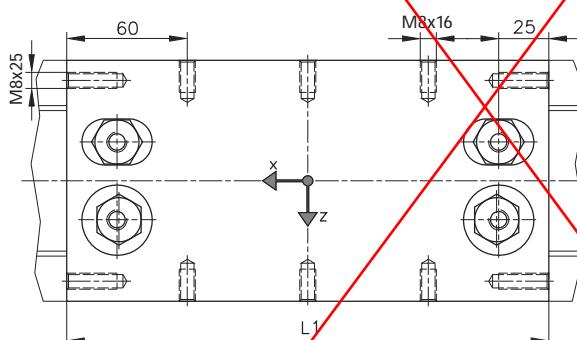
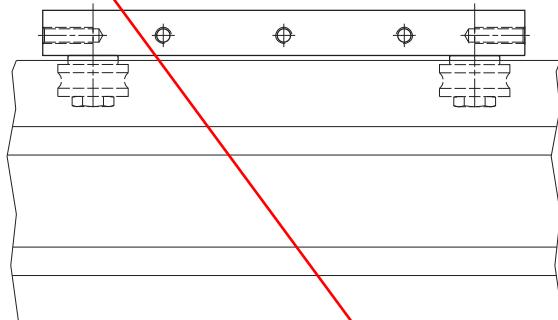
Interior Profile Track PF 10-38.85

The Profile Track PF 10-38.85, can be combined with the carriage shown on the next page. Together they result in a linear assembly.

Ident-No.	B51.04.160
Description	PF 10-38.85
L1 [mm]	to 6000
$m_{\text{Track}}$ [kg/m]	13.2



Carriages LW 38.85-44 for Profile Track PF 10-38.85



Technical Data

Ident-No.	Description	L1 [mm]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	m <sub>Carriage</sub> [kg]	Plate only
B90.60.441	LW 38.85-44	240	1000	1500	40	190	95	2.5	5009CP0240

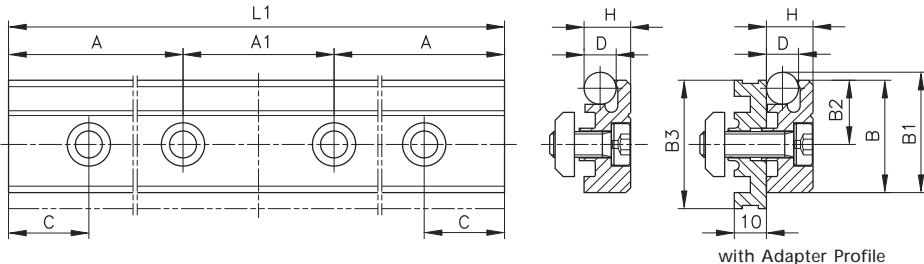
- max. loads for  $v \leq 10 \text{ m/s}$  and  $a \leq 10 \text{ m/s}^2$ ; with  $s_0 = 4$
- max. acceleration  $a = 50 \text{ m/s}^2$  with reduced load
- max. load offset from center 25 mm
- for X46 Cr13 rods and track rollers load capacities reduced by 30%

# Track Roller Assemblies

## Linear Assemblies

### Components

#### Profile Track with Guide Rod one side



#### Technical Data

Ident-No.	Description	consisting of		Rod	Screw	Nut
		Profile	Adapter profile			
B51.04.027	PF 6-38.01	3801BA ....*	-	ø 6**	D6912512	25.50.0500
B51.04.028	PF 6-38.01/50	3801BA ....*	3850BB ....*	ø 6**	D6912520	D05085
B51.04.040	PF 6-38.05	3805BA ....*	-	ø 6**	D6912516	34.12.0001
B51.04.041	PF 6-38.05/55	3805BA ....*	3855BB ....*	ø 6**	D6912525	34.12.0001
B51.04.044	PF 10-38.06	3806BA ....*	-	ø 10**	D6912820	34.01.0001
B51.04.045	PF 10-38.06/55	3806BA ....*	3855BD ....*	ø 10**	D6912830	34.01.0001
B51.04.050	PF 16-38.07	3807BA ....*	-	ø 16**	D6912825	34.01.0001
B51.04.051	PF 16-38.07/55	3807BA ....*	3855BE ....*	ø 16**	D6912835	34.01.0001
B51.04.070	PF 10-38.11	3811BA ....*	-	ø 10**	D6912820	34.01.0001
B51.04.071	PF 10-38.11/60	3811BA ....*	3860BB ....*	ø 10**	D6912830	34.01.0001
B51.04.076	PF 16-38.12	3812BA ....*	-	ø 16**	D0912820	34.01.0001
B51.04.077	PF 16-38.12/60	3812BA ....*	3860BC ....*	ø 16**	D0912830	34.01.0001
B51.04.100	PF 10-38.11/65	3811BA ....*	3865BB ....*	ø 10**	D6912835	34.60.0101
B51.04.102	PF 16-38.12/65	3812BA ....*	3865BA ....*	ø 16**	D0912835	34.60.0101

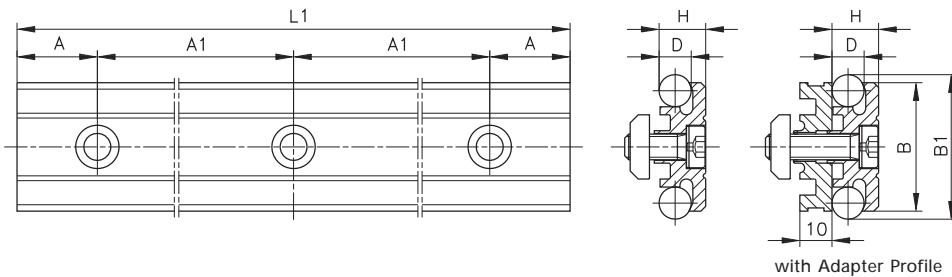
....\* Length in mm, \*\*Ident-No. see Page 77

Ident-No.	D [mm]	B [mm]	B1 [mm]	B2 [mm]	B3** [mm]	H [mm]	A [mm]	A1 [mm]	C [mm]
B51.04.027/028	6	21	23	12.5	25	9	12.5 ≤ A < 50	75	-
B51.04.040/041	6	35	37	20	40	9	12.5 ≤ A < 50	75	-
B51.04.044/045	10	35	37.5	20	40	14.5	25 ≤ A < 100	150	-
B51.04.050/051	16	35	40	20	40	20.5	125 ≤ A < 225*	200	25
B51.04.070/071	10	40	42.5	25	50	14.5	25 ≤ A < 100	150	-
B51.04.076/077	16	40	45	25	50	20.5	125 ≤ A < 225*	200	25
B51.04.100	10	40	42.5	25	50	14.5	25 ≤ A < 100	150	-
B51.04.102	16	40	45	25	50	20.5	125 ≤ A < 225*	200	25

\*Applies only for the range  $L1 \geq 450$ , \*\*Values for Adapter Profile

## Components

### Profile Track with Guide Rod both sides



### Technical Data

Ident-No.	Description	consisting of Profile	Adapter Profile	Rod	Screw	Nut
B51.04.025	PF 6-38.20	3820BA ....*	-	ø 6**	D6912512	25.50.0500
B51.04.029	PF 6-38.20/50	3820BA ....*	3850BA ....*	ø 6**	D6912520	D05085
B51.04.042	PF 6-38.30	3830BA ....*	-	ø 6**	D6912516	34.12.0001
B51.04.043	PF 6-38.30/55	3830BA ....*	3855BA ....*	ø 6**	D6912525	34.12.0001
B51.04.046	PF 10-38.31	3831BA ....*	-	ø 10**	D6912820	34.01.0001
B51.04.047	PF 10-38.31/55	3831BA ....*	3855BC ....*	ø 10**	D6912830	34.01.0001
B51.04.020	PF 10-38.41	3841BA ....*	-	ø 10**	D6912820	34.01.0001
B51.04.015	PF 10-38.41/60	3841BA ....*	3860BA ....*	ø 10**	D6912830	34.01.0001
B51.04.101	PF 10-38.41/65	3841BA ....*	3865BC ....*	ø 10**	D6912835	34.60.0101

....\* Length in mm, \*\*Ident-No. see Page 77

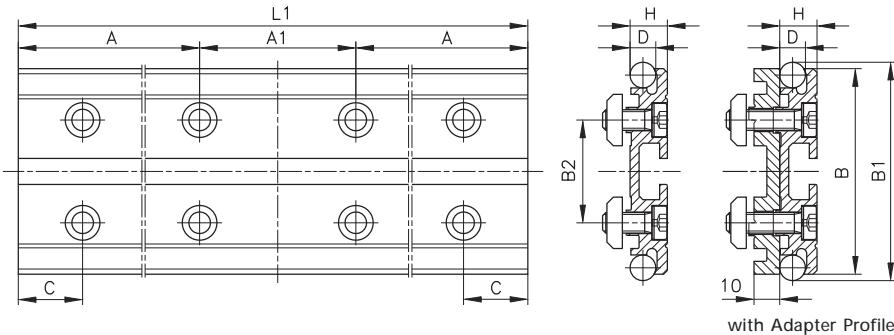
Ident-No.	D [mm]	B [mm]	B1 [mm]	H [mm]	A [mm]	A1 [mm]
B51.04.025/029	6	25	29	9	12.5 ≤ A < 37.5	50
B51.04.042/043	6	40	44	9	12.5 ≤ A < 37.5	50
B51.04.046/047	10	40	45	14.5	25 ≤ A < 75	100
B51.04.020/015	10	50	55	14.5	25 ≤ A < 75	100
B51.04.101	10	50	55	14.5	25 ≤ A < 75	100

# Track Roller Assemblies

## Linear Assemblies

### Components

#### Profile Track with Guide Rod both sides



#### Technical Data

Ident-No.	Description	consisting of		Adapter Profile	Rod	Screw	Nut
		Profile	Profile				
B51.04.030	PF 6-38.21	3821BA .... *	-	ø 6**	D6912512	25.50.0500	
B51.04.031	PF 6-38.21/51	3821BA .... *	3851BA .... *	ø 6**	D6912520	D05085	
B51.04.048	PF 10-38.32	3832BA .... *	-	ø 10**	D6912820	34.01.0001	
B51.04.049	PF 10-38.32/56	3832BA .... *	3856BB .... *	ø 10**	D6912830	34.01.0001	
B51.04.052	PF 16-38.33	3833BA .... *	-	ø 16**	D6912825	34.01.0001	
B51.04.053	PF 16-38.33/56	3833BA .... *	3856BA .... *	ø 16**	D6912835	34.01.0001	

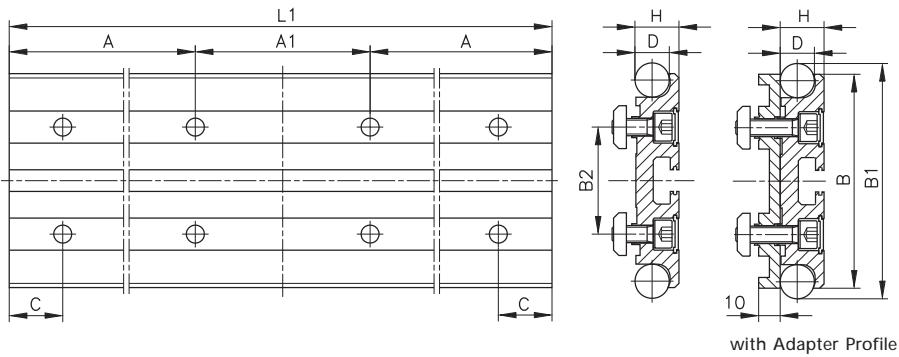
....\* Length in mm, \*\*Ident-No. see Page 77

Ident-No.	D [mm]	B [mm]	B1 [mm]	B2 [mm]	H [mm]	A [mm]	A1 [mm]	C [mm]
B51.04.030/031	6	50	54	25	9	125 ≤ A < 50	75	-
B51.04.048/049	10	80	85	40	14.5	25 ≤ A < 100	150	-
B51.04.052/053	16	80	90	40	20.5	125 ≤ A < 225*	200	25

\*Applies only for the range  $L1 \geq 450$

## Components

### Profile Track with Guide Rod both sides



### Technical Data

Ident-No.	Description	consisting of		Rod	Screw	Nut	Closure Strip
		Profile	Adapter Profile				
B51.04.004	PF 16-38.44	3844BA ....*	-	ø 16**	D0912820	34.01.0001	mk 3018
B51.04.016	PF 16-38.44/61	3844BA ....*	3861BA ....*	ø 16**	D0912830	34.01.0001	mk 3018
B51.04.082	PF 20-38.46	3846BA ....*	-	ø 20**	D0912825	34.01.0001	mk 3018
B51.04.083	PF 20-38.46/61	3846BA ....*	3861BA ....*	ø 20**	D0912835	34.01.0001	mk 3018
B51.04.109	PF 16-38.36	3836BA ....*	-	ø 16**	D69121025	34.60.0201	mk 3028
<b>B51.04.113</b>	<b>PF 20-38.37</b>	<b>3837BA ....*</b>	<b>-</b>	<b>ø 20**</b>	<b>D69121030</b>	<b>34.60.0201</b>	<b>mk 3028</b>

....\* Length in mm, \*\*Ident-No. see Page 77

Ident-No.	D [mm]	B [mm]	B1 [mm]	B2 [mm]	H [mm]	A [mm]	A1 [mm]	C [mm]
B51.04.004/016	16	100	110	50	20.5	125 ≤ A < 225*	200	25
B51.04.082/083	20	100	115	50	25	125 ≤ A < 225*	200	25
B51.04.109	16	120	130	60	20.5	125 ≤ A < 225*	200	25
B51.04.113	20	120	135	60	25	125 ≤ A < 225*	200	25

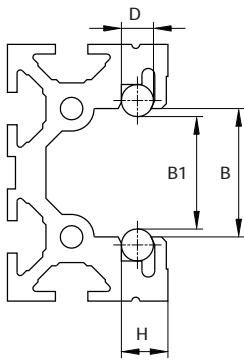
\*Applies only for the range L1 ≥ 450

# Track Roller Assemblies

## Linear Assemblies

### Components

*Internal Profile Track* with Guide Rod both sides



### Technical Data

Ident-No.	Description	consisting of					Nut	Closure Strip
		Profile	Adapter Profile	Rod	Screw	-		
B51.04.140	PF 6-38.75	38.75. ....*	-	Ø 6**	-	-	-	-
B51.04.142	PF 10-38.77	38.77. ....*	-	Ø 10**	-	-	-	-
<del>B51.04.160</del>	<del>PF 10-38.85</del>	<del>38.85. ....*</del>	<del>-</del>	<del>Ø 10**</del>	<del>-</del>	<del>-</del>	<del>-</del>	<del>-</del>

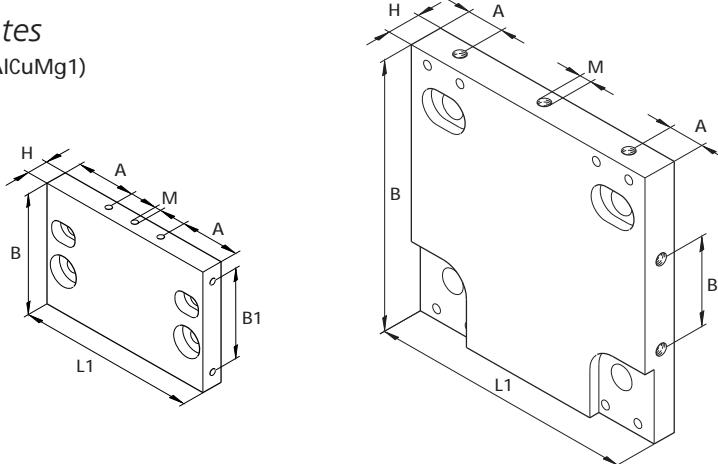
....\* Length in mm, \*\*Ident-No. see Page 77

Ident-No.	D [mm]	B [mm]	B1 [mm]	B2 [mm]	H [mm]	A [mm]	A1 [mm]	C [mm]
B51.04.140	6	44	40	-	9	-	-	-
B51.04.142	10	40	35	-	14.5	-	-	-
B51.04.160	10	75	70	-	15	-	-	-

## Components

### Carriage Plates

EN AW-2017A (AlCuMg1)



### Technical Data

Description	L1 [mm]	B [mm]	H [mm]	A [mm]	B1 [mm]	M [mm]	for Carriage Ident-No.	Description	for Profile Tracks* Ident-No.	Description
5009CA0075	75	75	15	12.5	25	5x12	B90.25.041	LW 38.20-04	B51.04.025	PF 6-38.20
5009CA0100	100	75	15	12.5	25	5x12	B90.25.041	LW 38.20-04	B51.04.025	PF 6-38.20
5009CB0100	100	100	15	12.5	25	5x12	B90.25.042	LW 38.21-04	B51.04.030	PF 6-38.21
5009CB0150	150	100	15	12.5	25	5x12	B90.25.042	LW 38.21-04	B51.04.030	PF 6-38.21
5009CC0100	100	100	15	12.5	25	5x12	B90.40.041	LW 38.30-04	B51.04.042	PF 6-38.30
5009CC0160	160	100	15	12.5	25	5x12	B90.40.041	LW 38.30-04	B51.04.042	PF 6-38.30
5009CD0140	140	140	22.5	25	40	8x16	B90.40.042	LW 38.31-04	B51.04.046	PF 10-38.31
5009CD0240	240	140	22.5	25	40	8x16	B90.40.042	LW 38.31-04	B51.04.046	PF 10-38.31
5009CE0180	180	180	22.5	25	60	8x16	B90.40.043	LW 38.32-04	B51.04.048	PF 10-38.32
5009CE0280	280	180	22.5	25	60	8x16	B90.40.043	LW 38.32-04	B51.04.048	PF 10-38.32
5009CF0240	240	240	22.5	35	60	8x16	B90.40.044	LW 38.33-04	B51.04.052	PF 16-38.33
5009CF0400	400	240	22.5	35	60	8x16	B90.40.044	LW 38.33-04	B51.04.052	PF 16-38.33
5009CG0150	150	150	22.5	25	60	8x16	B90.50.042	LW 38.41-04	B51.04.020	PF 10-38.41
5009CG0250	250	150	22.5	25	60	8x16	B90.50.042	LW 38.41-04	B51.04.020	PF 10-38.41
5009CI0250	250	250	22.5	35	60	8x16	B90.50.044	LW 38.44-04	B51.04.004	PF 16-38.44
5009CI0450	450	350	22.5	35	60	8x16	B90.50.044	LW 38.44-04	B51.04.004	PF 16-38.44
5009CK0300	300	300	28	50	80	10x20	B90.50.046	LW 38.46-04	B51.04.082	PF 20-38.46
5009CK0450	450	300	28	50	80	10x20	B90.50.046	LW 38.46-04	B51.04.082	PF 20-38.46
5009CL0280	280	280	22.5	35	80	8x16	B90.60.042	LW 38.36-04	B51.04.109	PF 16-38.36
5009CL0480	480	280	22.5	35	80	8x16	B90.60.042	LW 38.36-04	B51.04.109	PF 16-38.36
5009CM0300	300	300	28	50	80	10x20	B90.60.044	LW 38.37-04	B51.04.113	PF 20-38.37
5009CM0480	480	300	28	50	80	10x20	B90.60.044	LW 38.37-04	B51.04.113	PF 20-38.37
5009CN0120	120	80	14	40	60	5x12	B90.40.441	LW 38.75-44	B51.04.140	PF 6-38.75
5009CO0160	160	80	22.5	40	60	8x16	B90.44.442	LW 38.77-44	B51.04.142	PF 10-38.77
5009CP0240	190	120	22.5	60	100	8x16	B90.60.441	LW 38.85-44	B51.04.160	PF 10-38.85

\*Ident-No. and description only for track without adapter profile

The carriage plates may be used with tracks which include adapter profiles.

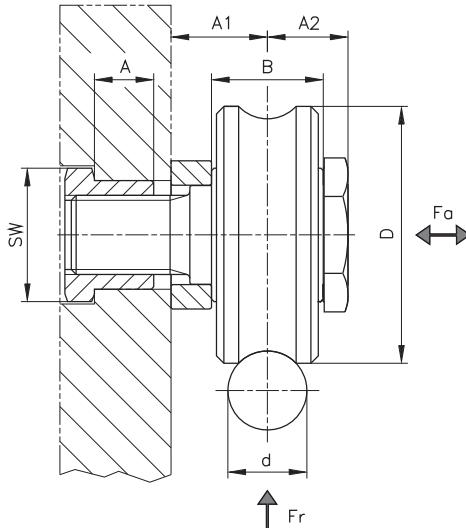
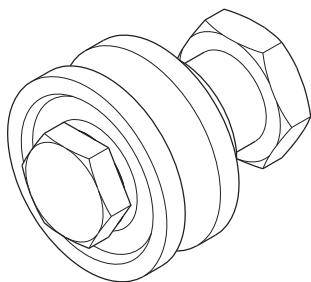
# Track Roller Assemblies

## Linear Assemblies

### Components

#### Track Rollers

for Guide Rods ø 6, ø 10, ø 16, ø 20



#### Technical Data

Ident-No.	D [mm]	B [mm]	A [mm]	A1 [mm]	A2 [mm]	SW [mm]	d for Rod	consisting of	Track Roller	Bolt	Spacer	Bushing
B60.02.017 centric	17	8	5	7	7	13	ø 6*	K101100003	25.51.3201	25.51.3301	25.51.3101	
B60.02.018 excentric	17	8	5	7	7	13	ø 6*	K101100003	25.51.3201	25.51.3301	25.51.3102	
B60.02.015 centric	35	15.9	12	12.5	13	22	ø 10*	K101100001	05.06.0003	14.04.0003	06.01.0013	
B60.02.016 excentric	35	15.9	12	12.5	13	22	ø 10*	K101100001	05.06.0003	14.04.0003	06.01.0014	
B60.02.013 centric	52	22.6	12	19.5	16.3	27	ø 16*	K101100002	05.06.0007	14.04.0004	06.01.0018	
B60.02.014 excentric	52	22.6	12	19.5	16.3	27	ø 16*	K101100002	05.06.0007	14.04.0004	06.01.0017	
B60.02.011 centric	72	25.8	18	22	18	36	ø 20*	K101100006	05.06.0009	14.04.0020	06.01.0021	
B60.02.012 excentric	72	25.8	18	22	18	36	ø 20*	K101100006	05.06.0009	14.04.0020	06.01.0022	

\*Ident-No. see page 77

Track Rollers for all diameters also available in stainless steel.

#### Load Capacities per Roller

Value	Roller for Rod ø 6 mm	Roller for Rod ø 10 mm	Roller for Rod ø 16 mm	Roller for Rod ø 20 mm
so*	4	4	4	4
Fr	175N	1000N	2000N	3250N
Fa	60N	300N	500N	825N
static load cap. Cow	890N	5100N	9500N	16600N
dynamic load cap. Cw	1270N	8500N	16800N	29500N

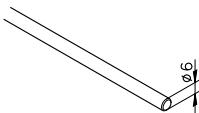
\* static load capacity against plastic deformation of the raceways and rolling elements.

These values to be reduced by 30% for stainless steel rollers.

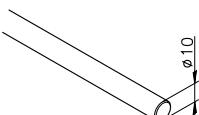
## Components

### Guide Rods

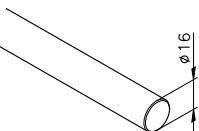
The stock lengths of Cf 53 and X46 Cr13 (corrosion resistant) rods is 4000 mm, for Cf 53 galvanized rods 3000 mm.



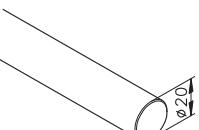
Guide Rod 6  
0.22 kg/m



Guide Rod 10  
0.62 kg/m



Guide Rod 16  
1.58 kg/m



Guide Rod 20  
2.47 kg/m

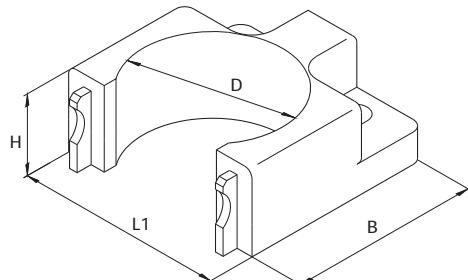
### Wipers

Polyamide

The wiper housings act as a safeguard (housing covers pinch points at the track rollers) as well as serve to remove dirt and other contaminants from the guide rods.

The rubber wipers for 10 and 16 mm rod diameters conform to the shape of the rod and can wipe off finer particulates.

On request, wipers for the 10 and 16 mm diameter rods are available with felt strips and fittings for oil lubrication.



### Ident-Numbers

	Cf 53 1.1213	Cf 53 1.1213 (galva- nized)	X46 Cr13 1.4034
Ø 6 mm	7003AK....*	7003DC....*	7003EC....*
Ø 10 mm	7003AA....*	7003DH....*	7003EH....*
Ø 16 mm	7003AM....*	7003DP....*	7003EP....*
Ø 20 mm	7003CM....*	7003DT....*	7003ET....*

\* Rod length in mm

### Technical Data

Ident-No.	d for Rod	L1 [mm]	B [mm]	H [mm]	D [mm]
B03.00.014	ø 6**	25	22.5	11	19
B03.00.003	ø 10	50	46	20	37
B03.00.004	ø 16	70	64	30	56
B03.00.013	ø 20**	100	80	35	76

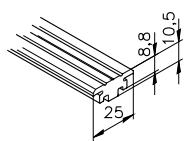
\*\*wiper without rubber seal

# Track Roller Assemblies

## Linear Assemblies

### Components

#### Clamping Profiles



[25|40|50|60]

mk 2038.20

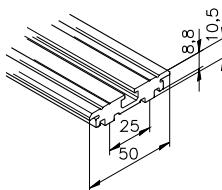
0.44 kg/m

AlMgSi 0.7 F28

Stock length 38.20.6100

Cut 38.20. ....\*

Used with  
Guide Rod ø 6 mm



[25|40|50|60]

mk 2038.21

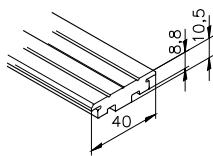
0.88 kg/m

AlMgSi 0.7 F28

Stock length 38.21.6100

Cut 38.21. ....\*

Used with  
Guide Rod ø 6 mm



[25|40|50|60]

mk 2038.30

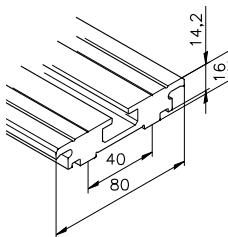
0.79 kg/m

AlMgSi 0.7 F28

Stock length 38.30.6100

Cut 38.30. ....\*

Used with  
Guide Rod ø 6 mm



[25|40|50|60]

mk 2038.32

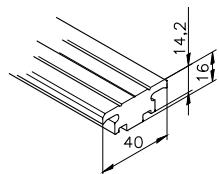
0.44 kg/m

AlMgSi 0.7 F28

Stock length 38.32.6100

Cut 38.32. ....\*

Used with  
Guide Rod ø 10 mm



[25|40|50|60]

mk 2038.31

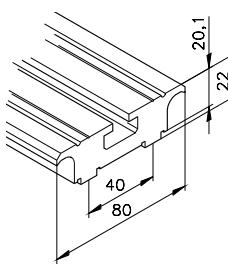
1.07 kg/m

AlMgSi 0.7 F28

Stock length 38.31.6100

Cut 38.31. ....\*

Used with  
Guide Rod ø 10 mm



[25|40|50|60]

mk 2038.33

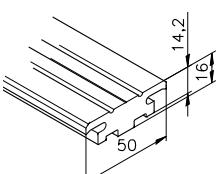
2.96 kg/m

AlMgSi 0.7 F28

Stock length 38.33.6100

Cut 38.33. ....\*

Used with  
Guide Rod ø 16 mm



[25|40|50|60]

mk 2038.41

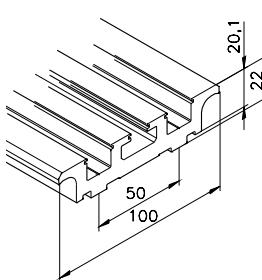
1.36 kg/m

AlMgSi 0.7 F28

Stock length 38.41.6100

Cut 38.41. ....\*

Used with  
Guide Rod ø 10 mm



[25|40|50|60]

mk 2038.44

3.09 kg/m

AlMgSi 0.7 F28

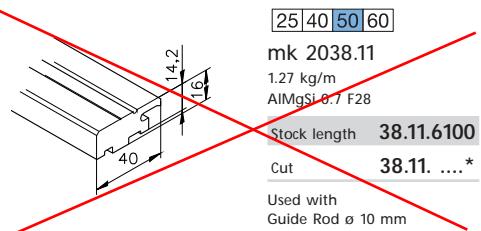
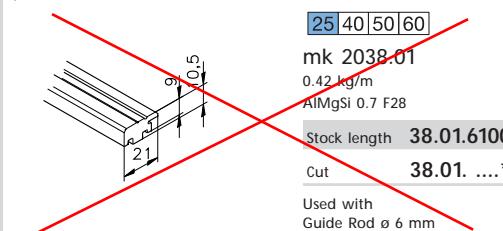
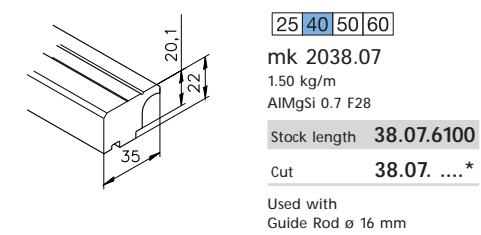
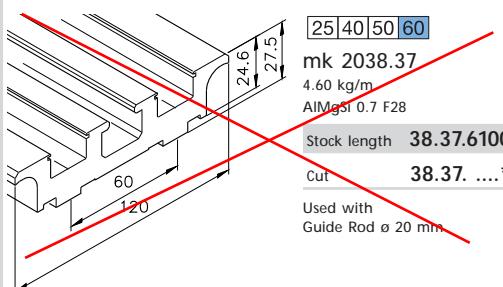
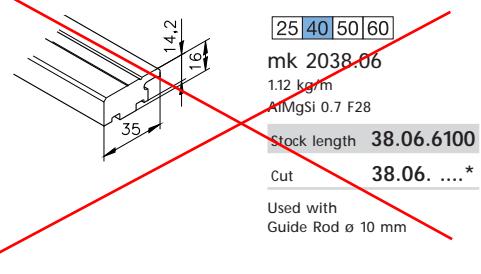
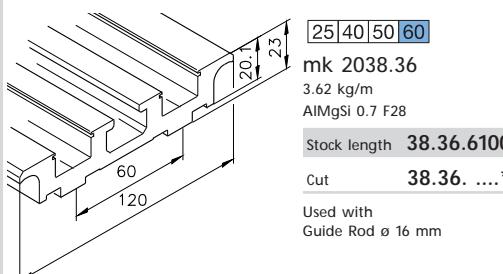
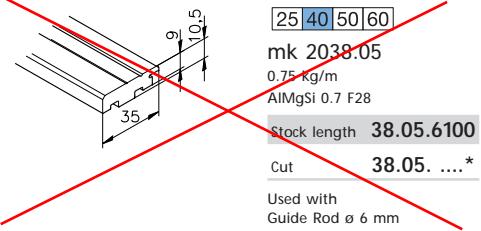
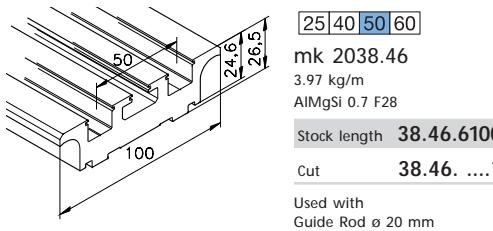
Stock length 38.44.6100

Cut 38.44. ....\*

Used with  
Guide Rod ø 16 mm

## Components

### Clamping Profiles

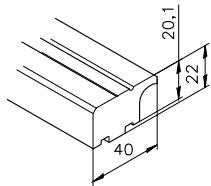


# Track Roller Assemblies

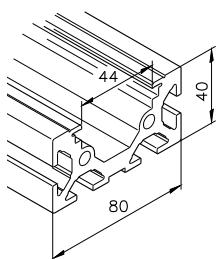
## Linear Assemblies

### Components

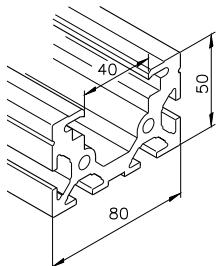
#### Clamping Profiles



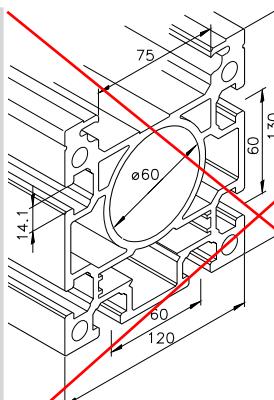
**[25 40 50 60]**  
mk 2038.12  
1.77 kg/m  
AlMgSi 0.7 F28  
Stock length **38.12.6100**  
Cut **38.12. ....\***  
Used with  
Guide Rod ø 16 mm



**[25 40 50 60]**  
mk 2038.75  
3.41 kg/m  
AlMgSi 0.7 F28  
Stock length **38.75.6100**  
Cut **38.75. ....\***  
Used with Guide Rod  
ø 6 mm, Guided inside



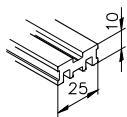
**[25 40 50 60]**  
mk 2038.77  
4.34 kg/m  
AlMgSi 0.7 F28  
Stock length **38.77.6100**  
Cut **38.77. ....\***  
Used with  
Guide Rod ø 10 mm,  
Guided inside



**[25 40 50 60]**  
mk 2038.85  
11.85 kg/m  
AlMgSi 0.7 F28  
Stock length **38.85.6100**  
Cut **38.85. ....\***  
Used with Guide Rod  
ø 10 mm, Guided inside

## Components

### Adapter Profiles



**[25|40|50|60]**

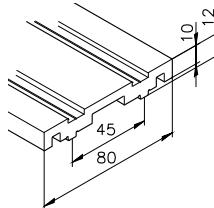
**mk 2038.50**

0.46 kg/m

AlMgSi 0.7 F28

Stock length **38.50.6100**

Cut **38.50. ....\***



**[25|40|50|60]**

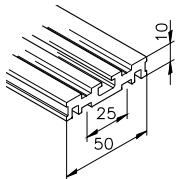
**mk 2038.56**

1.67 kg/m

AlMgSi 0.7 F28

Stock length **38.56.6100**

Cut **38.56. ....\***



**[25|40|50|60]**

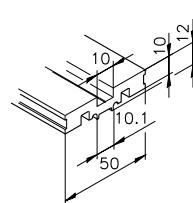
**mk 2038.51**

0.89 kg/m

AlMgSi 0.7 F28

Stock length **38.51.6100**

Cut **38.51. ....\***



**[25|40|50|60]**

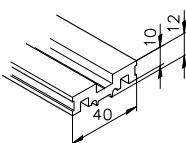
**mk 2038.60**

1.04 kg/m

AlMgSi 0.7 F28

Stock length **38.60.6100**

Cut **38.60. ....\***



**[25|40|50|60]**

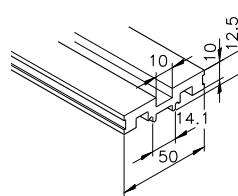
**mk 2038.55**

0.77 kg/m

AlMgSi 0.7 F28

Stock length **38.55.6100**

Cut **38.55. ....\***



**[25|40|50|60]**

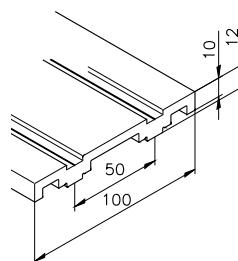
**mk 2038.65**

1.00 kg/m

AlMgSi 0.7 F28

Stock length **38.65.6100**

Cut **38.65. ....\***



**[25|40|50|60]**

**mk 2038.61**

1.90 kg/m

AlMgSi 0.7 F28

Stock length **38.61.6100**

Cut **38.61. ....\***



# Track Roller Assemblies

## Linear Module

### General Information

#### LZR Linear Modules with Timing Belts

The linear modules take the track roller carriages to another level, creating a fully modular assembly. Basic elements include the supporting and track profiles, the carriage wagon, as well as the required timing belt drive components including tails and profile connections.

As a standard, the LZRs are designed to be motor driven. With the appropriate hollow shaft, the tail housings enable motors to be installed directly on any side of the LZR. Available options include output shafts for the direct mounting of hollow shaft motors, adapters for gearboxes and couplings, as well as components for indirect drives.

For electromechanical drives using stepper or servo motors we recommend using one-piece drive shafts, available as options.

Combinations of linear modules to manufacture 2- and 3-axis systems, as well as gantries and other customer-specific applications are available.

#### Achievable Precision of Linear Modules with Timing Belts

For LZRs using a type 8M-30 timing belt, the following no-load values are achievable:

Repeatability: 0.1 mm

Positional Accuracy:  $\pm$  0.2 mm

Hysteresis: 0.2 mm

These values will vary depending on stroke length and application.

### How to Order

System Designation	LZR	2025	-38.20-16
Support Profile			
Clamping Profile			
Timing Belt Width			

### Order Example

Linear Module	LZR 2025-38.20-16
Ident-No.	B38.25.001
Stroke	= .....mm
Overall Length	L = .....mm
Carriage Length	L <sub>1</sub> = .....mm
Hollow Drive Shaft	$\varnothing$ = .....mm
Linear Speed	v = .....m/s
Acceleration	a = .....m/s <sup>2</sup>

## General Information

### Remarks to the Load Data

For information regarding the track roller guides, refer to the information beginning on page 42.

#### Remarks to the Load Data for Timing Belts

Standard timing belts used are PU (Polyurethane) with steel cord tension members. Other types, including conductive belts, are available.

The maximum speed of  $v = 10 \text{ m/s}$  of linear assemblies can be achieved using timing belts with no reduction of the load capacities.

As of  $a > 10 \text{ m/s}^2$  the values for the standard load factors must be reduced (due to the physical limitations of the timing belts).

The allowable tension loads are based on a 0.4 % stretch of the timing belt.

The breaking strength of the belts is significantly higher. The normally usable belt pull strength ( $F_u$ ) and required pretension ( $F_v$ ) is approximately:

$$\text{Fallowable} = F_v + F_u \text{ with } F_v = F_u$$

Timing Belt	AT 5-16	5M-15	8M-30
$F_{\text{breaking}}$	3900 N	3600 N	14900 N
$F_{\text{allowable}}$	1200 N	1150 N	4000 N
$F_v = F_u$	600 N	575 N	2000 N

The usable starting torque results from the maximum usable belt pull strength, of the engaged teeth and the pitch diameter of the drive pulley.

#### Values for the mk LZR Modules:

Timing Belt	AT 5-16	5M-15	8M-30
$D_{\text{Pitch}}$	41.4 mm	50.9 mm	71.3 mm
Z	26	32	28
$M_{\text{Drive}}$	12 Nm	15 Nm	70 Nm

### Motor Selection/Drive Design

For the motor selection several factors must be considered, including the timing belt (especially the allowable belt pull strength and required stiffness), as well as the motor - especially the starting torque, the revolutions per minute and the resulting performance.

The most important consideration is the required driving force. As a simple starting point for the calculations, the transition point from acceleration to constant speed can be used.

#### Constant acceleration ( $a = \text{constant}$ ):

$$v = a \cdot t = \sqrt{2 \cdot a \cdot s}$$

#### Constant speed ( $v = \text{constant}$ ):

$$v = \frac{s}{t}$$

#### Max. drive force:

$$F_{\text{Drive}} = F_a + F_{\text{Roll}} + F_{\text{Empty}} + F_{\text{Additional}}$$

$$F_a = m \cdot (a + g)$$

with  $m$  = moving masses in kg

$a$  = constant acceleration in  $\text{m/s}^2$

$g = 10 \text{ m/s}^2$ , for vertical travel

$g = 0 \text{ m/s}^2$ , for horizontal travel

$$F_{\text{Roll}} = F_N \cdot \mu_{\text{Roll}}$$

with  $F_N = F_G$  for horizontal travel

$\mu_{\text{Roll}} = 0.05$  for lightly preloaded track roller

$F_{\text{Empty}} = 50$  to  $100 \text{ N}$  depending on Linear Module and pretension of timing belt

$F_{\text{Additional}} = \text{Additional customer load}$

$$F_{\text{Drive}} = m \cdot (a + g) + F_N \cdot 0.05 + 100 \text{ N} + F_{\text{Additional}}$$

#### Timing Belt Selection:

Indicated  $F_{\text{Drive}} < F_u$

#### For Motor Selection:

$$M_{\text{req}} = \frac{F_{\text{Drive}} \cdot D_{\text{pitch}} [\text{m}]}{2 \cdot \eta}$$

$$n_{\text{req}} = \frac{v \cdot 60}{D_{\text{pitch}} [\text{m}] \cdot \pi}$$

$$P_{\text{req}} = \frac{F_{\text{Drive}} \cdot v}{\eta}$$

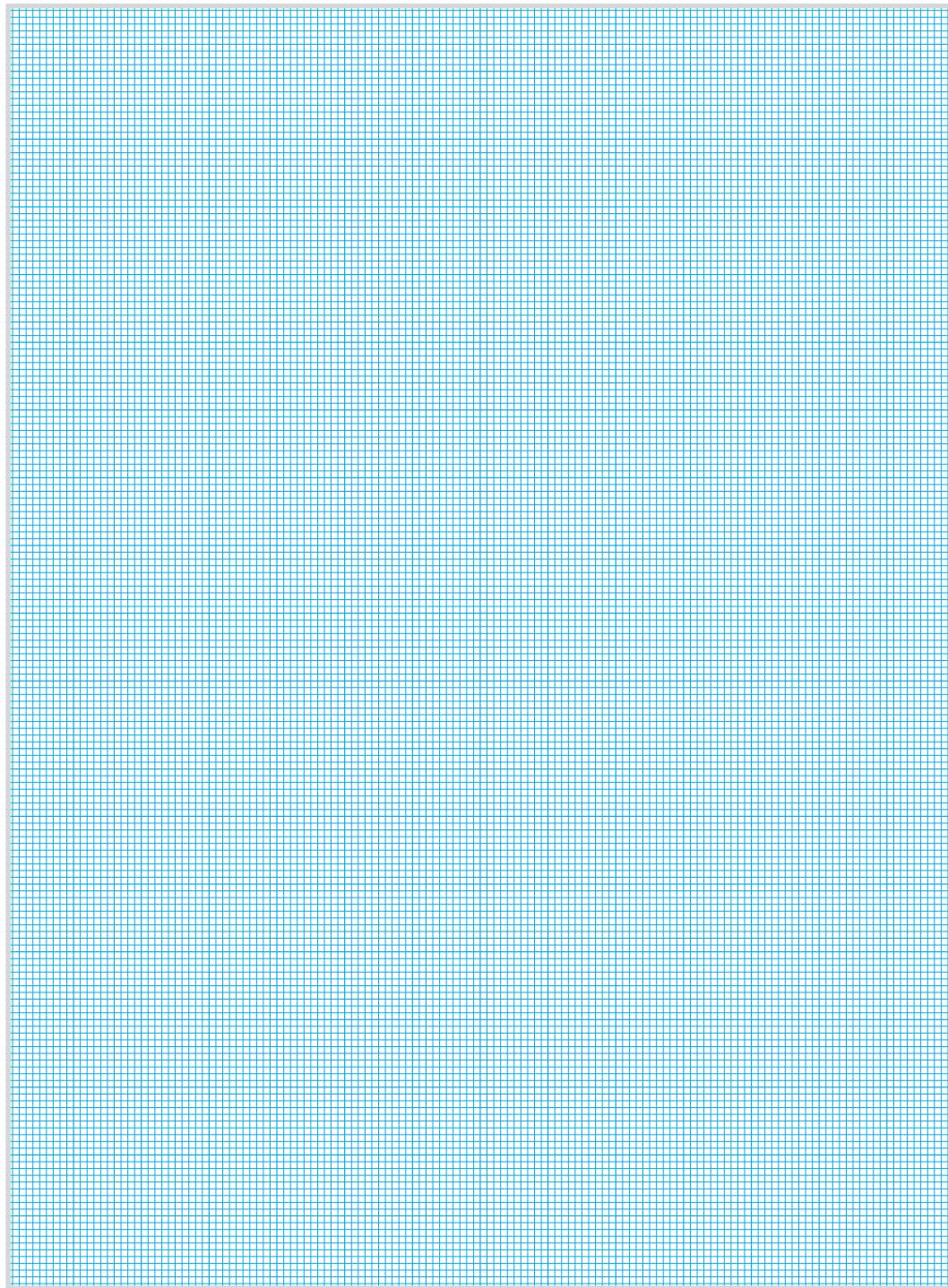
with  $D_{\text{pitch}}$  in m of Pulley

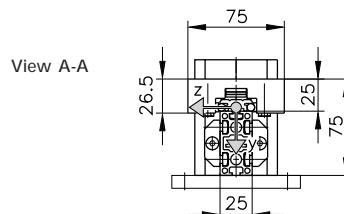
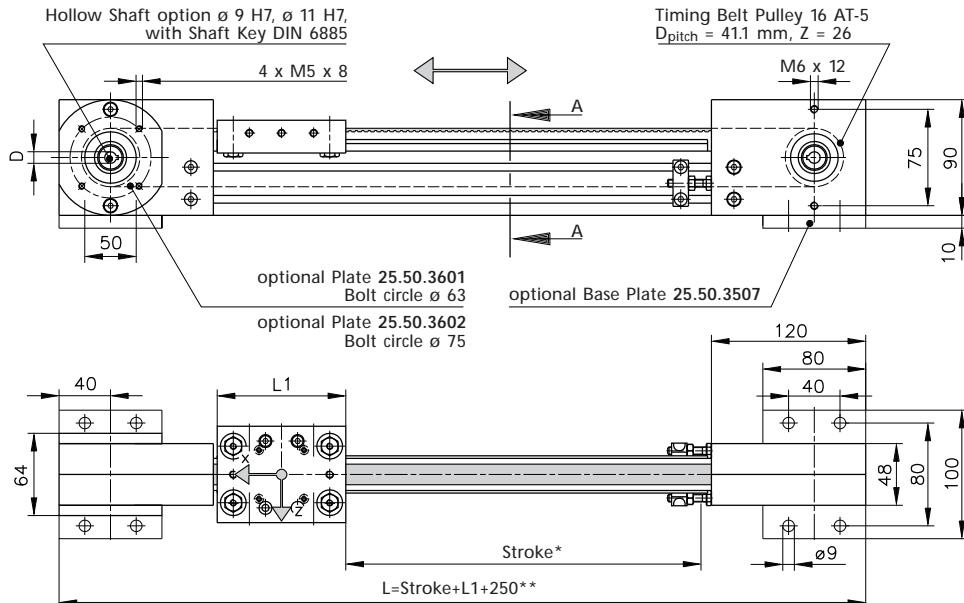
$\eta = 50$  to  $75\%$  depending on selected drive (gear reducer, motor, etc.)

$v$  in  $\text{m/s}$

# Track Roller Assemblies

## *Linear Module*



*Type LZR 2025-38.20-16 with Carriage Wagon***Load Data LZR 2025-38.20-16 with Carriage Wagon**

Ident-No.	L1 [mm]	F <sub>x</sub> *** [N]	F <sub>y0</sub> [N]	F <sub>z0</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]
B38.25.001	100	1200	200	350	2.5	13	8
B38.25.001	150	1200	200	350	2.5	21	13
B38.25.001	200	1200	200	350	2.5	30	18

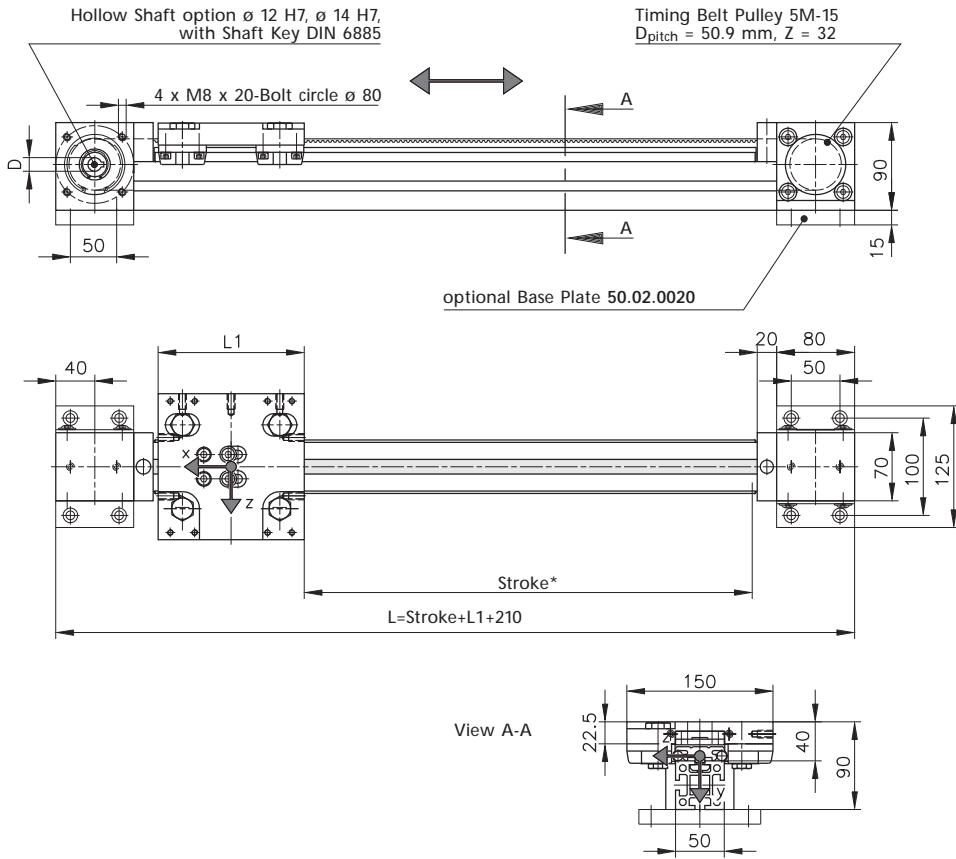
\* Maximum stroke between fixed stops.

\*\* Variable length, depends on pre-tension of timing belt (achieved by moving tail stock).

\*\*\* F<sub>x</sub> = Fallowable; F<sub>u</sub> = 600 N = F<sub>y</sub>

# Series 50

Type LZR 2000-38.41-15 with Carriage Wagon

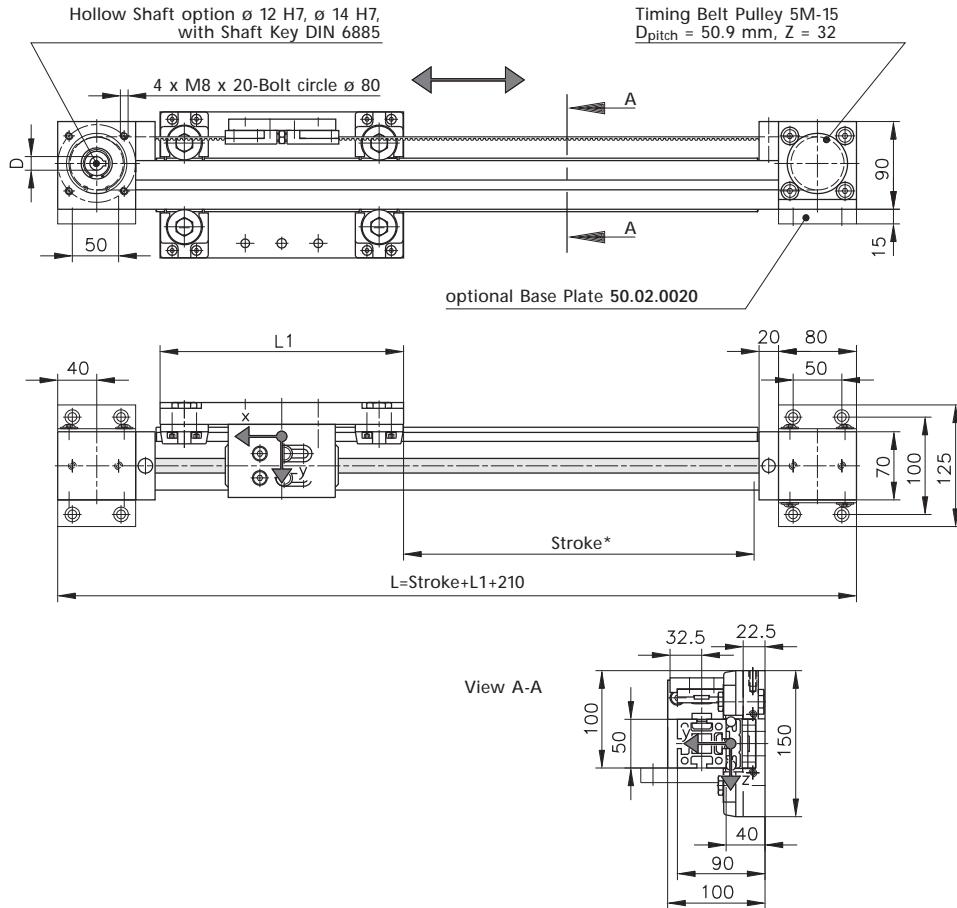


## Load Data LZR 2000-38.41-15 with Carriage Wagon

Ident-No.	L1 [mm]	$F_x^{**}$ [N]	$F_{yo}$ [N]	$F_{zo}$ [N]	$M_{x0}$ [Nm]	$M_{yo}$ [Nm]	$M_{zo}$ [Nm]
B38.02.003	150	1150	1000	2000	25	100	50
B38.02.003	250	1150	1000	2000	25	200	100

\* Maximum stroke between fixed stops.

\*\*  $F_x = F_{allowable}$ ;  $F_u = 575$  N =  $F_y$

**Type LZR 2000-38.41-15 with side mounted Carriage Wagon**

**Load Data LZR 2000-38.41-15 with side mounted Carriage Wagon**

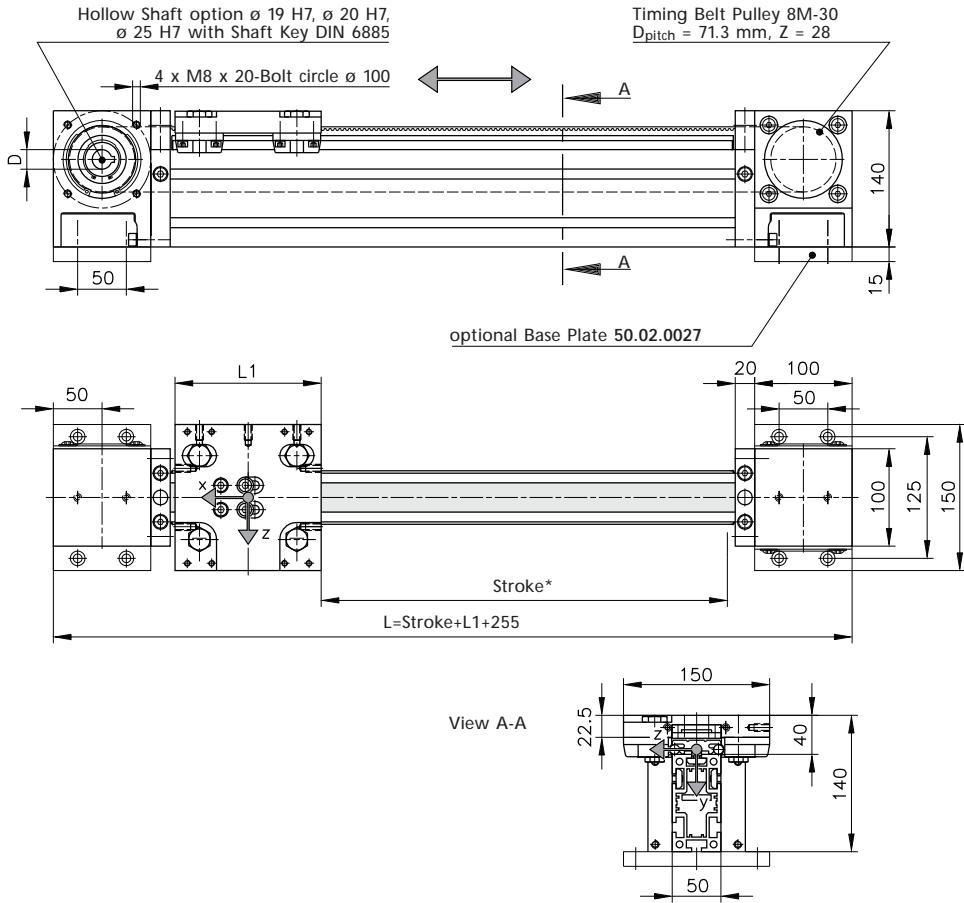
Ident-No.	L1 [mm]	$F_x^{**}$ [N]	$F_{y0}$ [N]	$F_{z0}$ [N]	$M_{x0}$ [Nm]	$M_{y0}$ [Nm]	$M_{z0}$ [Nm]
B38.02.007	250	1150	1000	2000	25	200	100

\* Maximum stroke between fixed stops.

\*\*  $F_x = F_{allowable}$ ;  $F_u = 575$  N =  $F_y$

# Series 50

Type LZR 2004-38.41-30 with Carriage Wagon

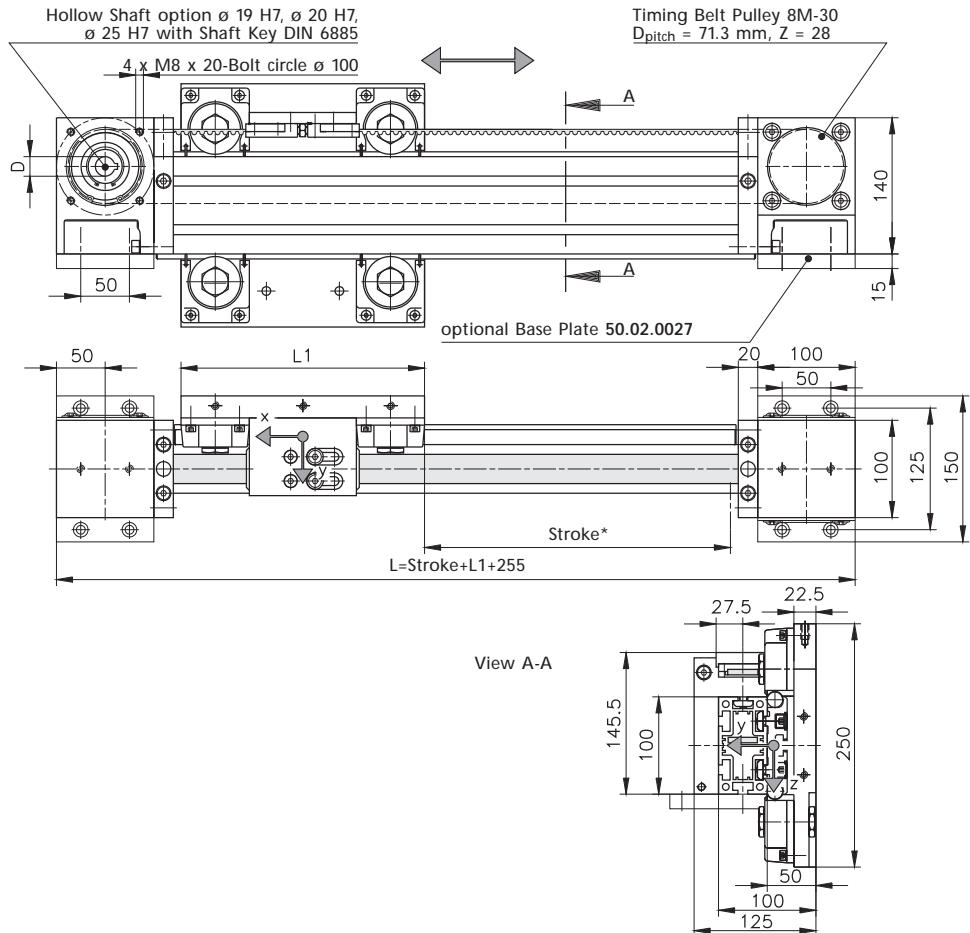


Load Data LZR 2004-38.41-30 with Carriage Wagon

Ident-No.	L1 [mm]	$F_x^{**}$ [N]	$F_{yo}$ [N]	$F_{zo}$ [N]	$M_{x0}$ [Nm]	$M_{yo}$ [Nm]	$M_{zo}$ [Nm]
B38.02.004	150	4000	1000	2000	25	100	50
B38.02.004	250	4000	1000	2000	25	200	100

\* Maximum stroke between fixed stops.

\*\*  $F_x = F_{allowable}$ ;  $F_u = 2000$  N =  $F_v$

*Type LZR 2004-38.44-30 with side mounted Carriage Wagon*

**Load Data LZR 2004-38.44-30 with side mounted Carriage Wagon**

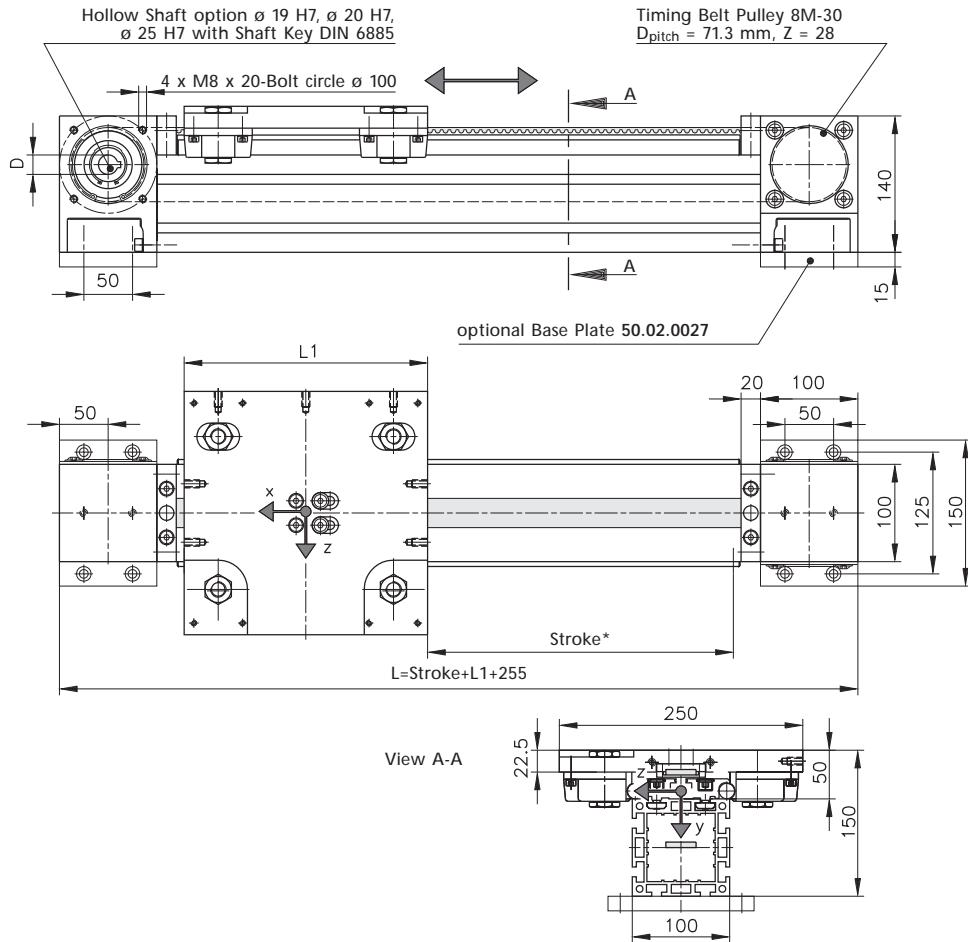
Ident-No.	L1 [mm]	$F_x^{**}$ [N]	$F_{y0}$ [N]	$F_{z0}$ [N]	$M_{x0}$ [Nm]	$M_{y0}$ [Nm]	$M_{z0}$ [Nm]
B38.02.005	250	4000	1600	4000	80	350	150
B38.02.005	450	4000	1600	4000	80	760	300

\* Maximum stroke between fixed stops.

\*\*  $F_x = F_{allowable}$ ;  $F_u = 2000$  N =  $F_v$

# Series 50

Type LZR 2005-38.44-30 with Carriage Wagon



## Load Data LZR 2005-38.44-30 with Carriage Wagon

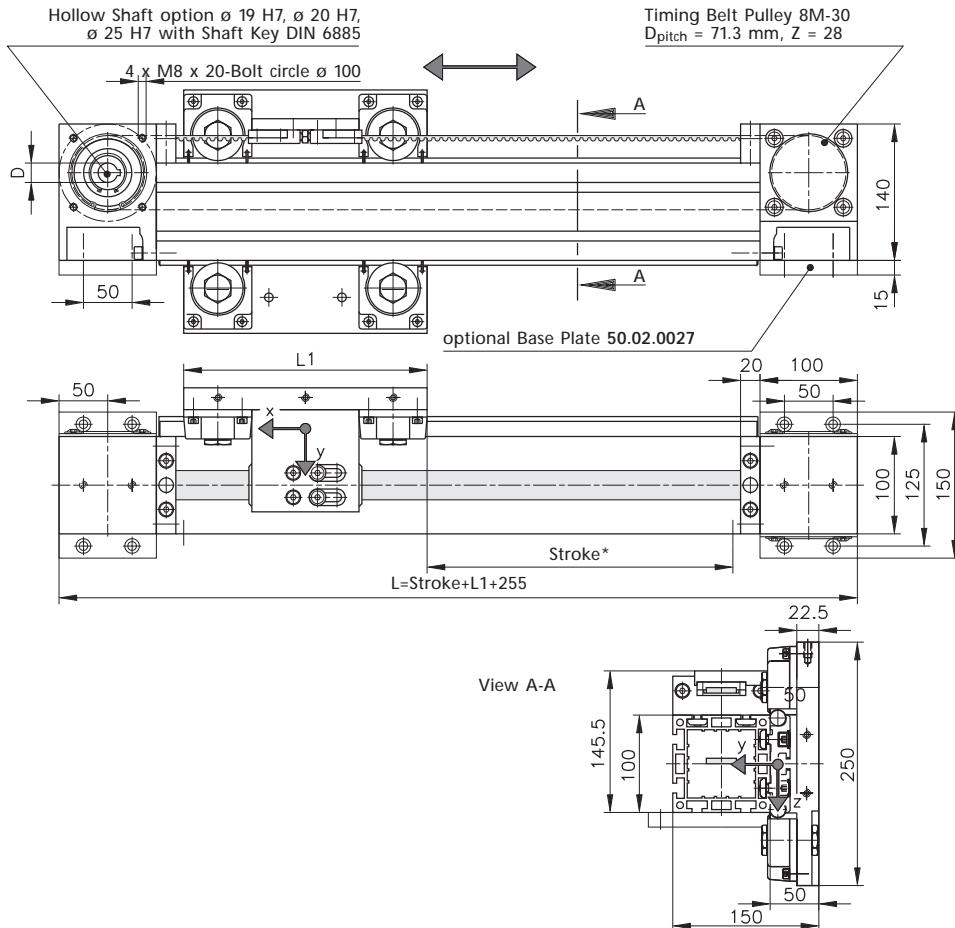
Ident-No.	L1 [mm]	$F_x^{**}$ [N]	$F_{yo}$ [N]	$F_{zo}$ [N]	$M_{x0}$ [Nm]	$M_{yo}$ [Nm]	$M_{zo}$ [Nm]
B38.02.006	250	4000	1600	4000	80	350	150
B38.02.006	450	4000	1600	4000	80	760	300

\* Maximum stroke between fixed stops.

\*\*  $F_x = F_{allowable}$ ;  $F_u = 2000 \text{ N} = F_v$

# Series 50

## Type LZR 2005-38.44-30 with side mounted Carriage Wagon



### Load Data LZR 2005-38.44-30 with side mounted Carriage Wagon

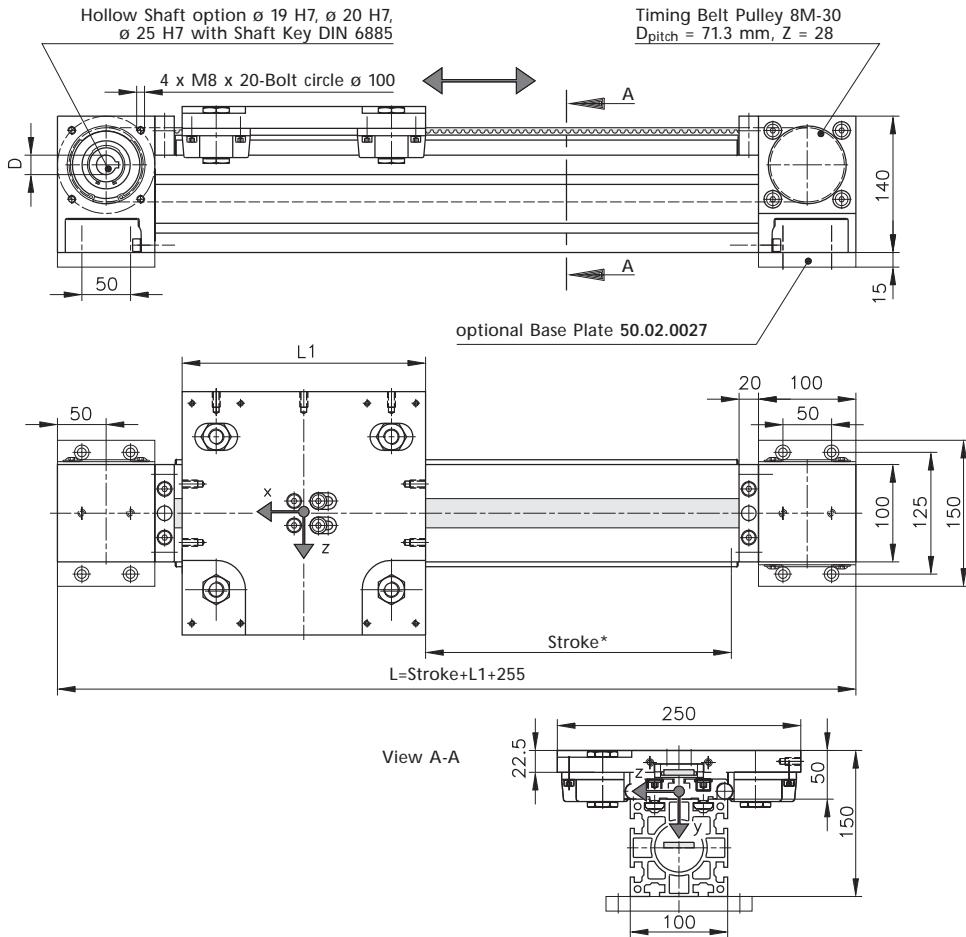
Ident-No.	L1 [mm]	$F_x^{**}$ [N]	$F_{y0}$ [N]	$F_{z0}$ [N]	$M_{x0}$ [Nm]	$M_{y0}$ [Nm]	$M_{z0}$ [Nm]
B38.02.009	250	4000	1600	4000	80	350	150
B38.02.009	450	4000	1600	4000	80	760	300

\* Maximum stroke between fixed stops.

\*\*  $F_x = F_{allowable}$ ;  $F_u = 2000$  N =  $F_v$

# Series 50

Type LZR 2011-38.44-30 with Carriage Wagon

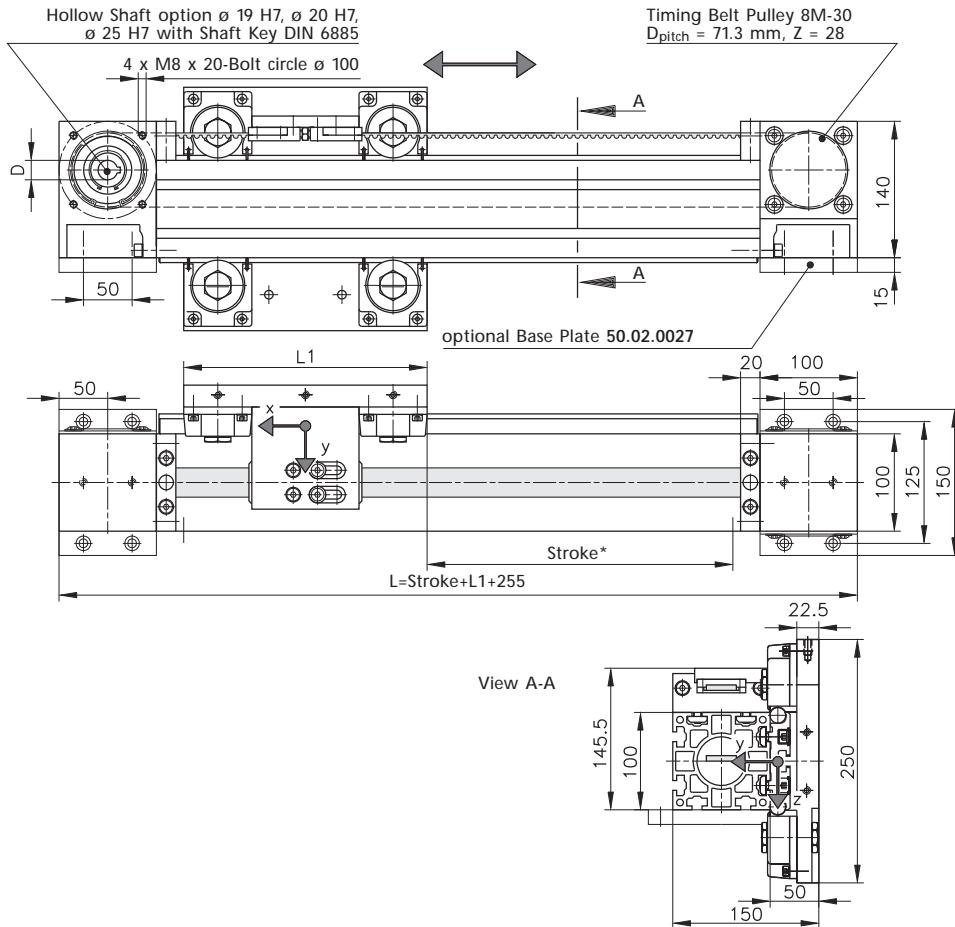


Load Data LZR 2011-38.44-30 with Carriage Wagon

Ident-No.	L1 [mm]	$F_x^{**}$ [N]	$F_{yo}$ [N]	$F_{zo}$ [N]	$M_{x0}$ [Nm]	$M_{yo}$ [Nm]	$M_{zo}$ [Nm]
B38.02.011	250	4000	1600	4000	80	350	150
B38.02.011	450	4000	1600	4000	80	760	300

\* Maximum stroke between fixed stops.

\*\*  $F_x = F_{allowable}$ ;  $F_u = 2000$  N =  $F_v$

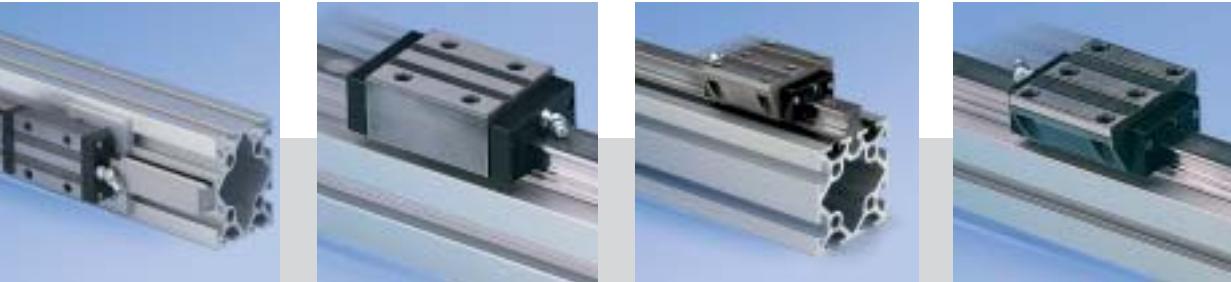
*Type LZR 2011-38.44-30 with side mounted Carriage Wagon*

*Load Data LZR 2011-38.44-30 with side mounted Carriage Wagon*

Ident-No.	L1 [mm]	$F_x^{**}$ [N]	$F_{y0}$ [N]	$F_{z0}$ [N]	$M_{x0}$ [Nm]	$M_{y0}$ [Nm]	$M_{z0}$ [Nm]
B38.02.010	250	4000	1600	4000	80	350	150
B38.02.010	450	4000	1600	4000	80	760	300

\* Maximum stroke between fixed stops.

\*\*  $F_x = F_{allowable}$ ;  $F_u = 2000$  N =  $F_y$

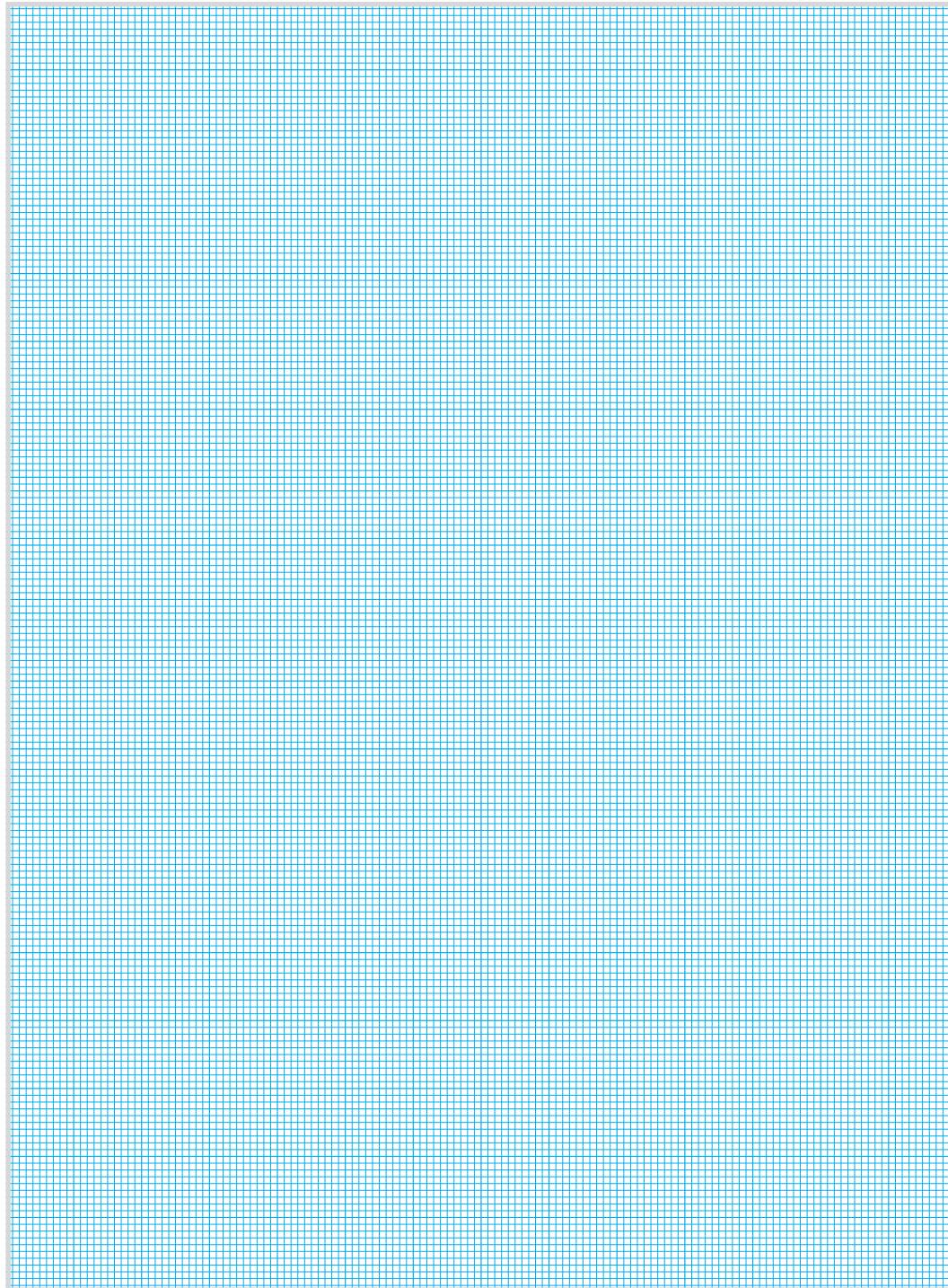
# mk Recirculating Ball Bearings



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	General Information	97
	Size 25	98
	Size 30	100

# mk Recirculating Ball Bearing Guides



## General Information



### Recirculating Ball Bearings

#### Typical Construction

The mk Recirculating Ball Bearing Assemblies consist of one Guideway and a Carriage with recirculating ball bearings.

The carriages are made of hardened polished steel, and the ball tracks are sealed on all sides with plastic returns which guide the four ball rows. The carriage can be placed directly onto the end of the guideway.

The recirculating ball bearing assemblies can be loaded from all directions, and are very stiff, high load capacity linear guides.

The standard guide carriages offered by mk are lightly preloaded and are therefore suitable for the most common applications. If several carriages are to run on the same guideway, in a parallel arrangement for example, we recommend using carriages with no preload and some play to compensate for alignment errors and for smoother carriage travel.

For high stiffness and variable loads we recommend carriages with high preloads and precise, stiff mounting surfaces. mk supplies these versions on request.

The indicated maximum load values include a safety factor  $s_0 = 5$  against plastic deformation at ball contact, as well as  $s_0 = 2$  for the track mounting using 8.8 socket screws.

#### Order Example Guideway

Guideway	KU 25.10
----------	----------

Ident-No.	B51.04.404
-----------	------------

Size	= .....mm
------	-----------

Length	L = .....mm
--------	-------------

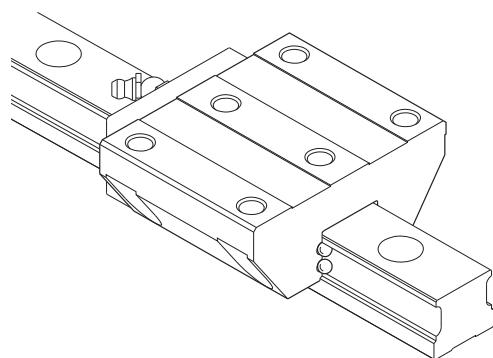
#### Order Example Carriage

Carriage	KU 25.11
----------	----------

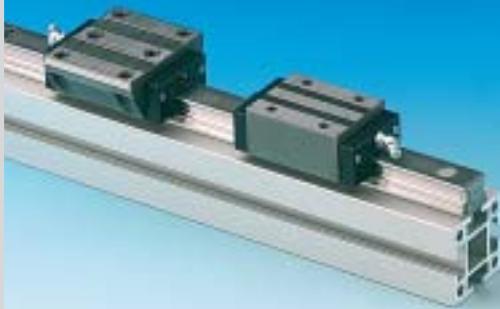
Ident-No.	K116041125
-----------	------------

Size	= .....mm
------	-----------

Carriage	normal
----------	--------



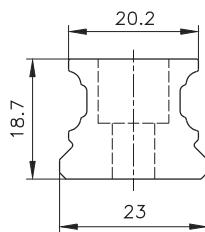
# Recirculating Ball Bearings



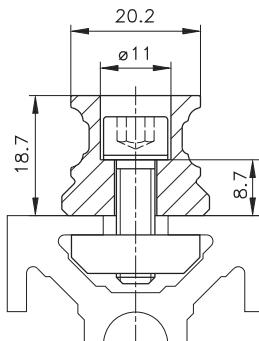
## Guideway KU 25.10

Guideway KU 25.10 is designed to be used with Carriage KU 25.11 or KU 25.13. Each element must be ordered separately.

Guideway KU 25.10 is especially suited for use with mk Series 40 and 50 profiles. Because of the narrow mounting area, it is not suitable for the 14 mm T-slots of Series 60.



Guideway  
KU 25.10  
K116041025  
 $m = 2.7 \text{ kg/m}$



Guideway KU 25.10  
with mounting hardware  
B51.04.404

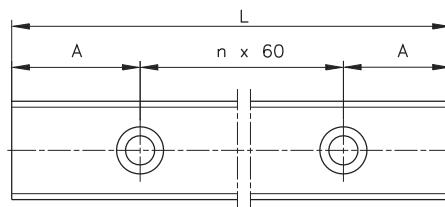
### Hole Spacing:

Guideway L to 1980 mm single piece

Range of A:  $20 \leq A < 50$

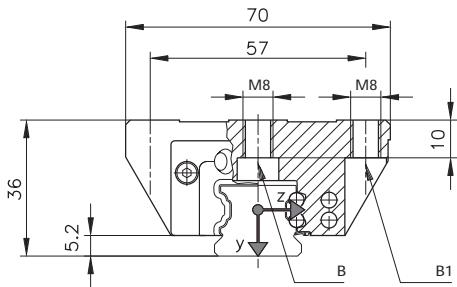
$$N = \frac{L - (2 \times A)}{60} + 1 \quad (+1 \text{ each break})$$

L = Length of the Guideway  
A = Distance to first mounting hole (symmetric)  
N = Number of mounting screws

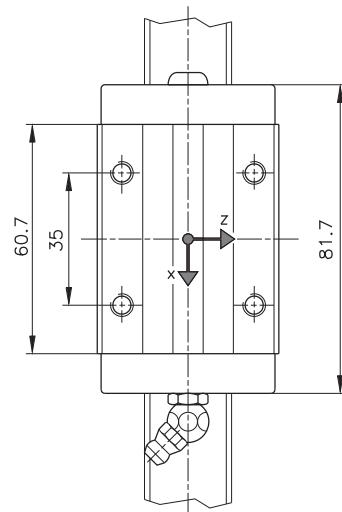
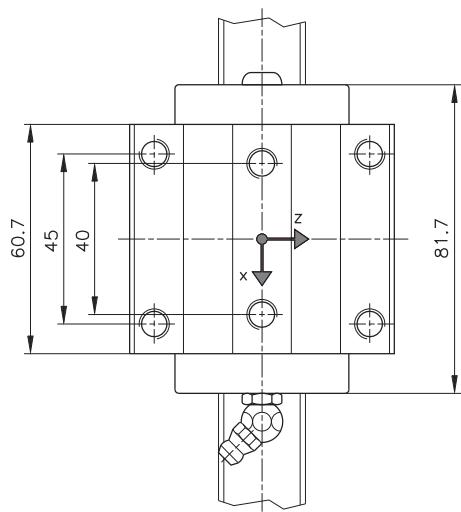
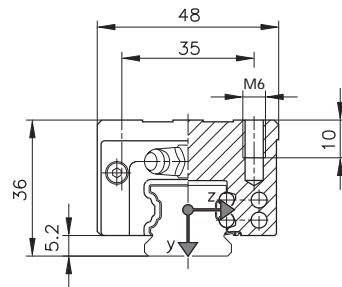


## Carriages

Normal carriage  
KU 25.11



Narrow carriage  
KU 25.13



B=Thru-hole for M6 screw DIN 6912

B1=Thru-hole for M6 screw DIN EN ISO 4762

### Load Data

Ident-No.	Description	$F_{yo}$ [N]	$F_{zo}^*$ [N]	$M_{xo}$ [Nm]	$M_{yo}$ [Nm]	$M_{zo}$ [Nm]	$C_0$ [N]	$C$ [N]	$m_{Carriage}$ [kg]
K116041125	KU 25.11	7000	7000	75	75	75	37.000	17.900	0.71
K116041325	KU 25.13	7000	7000	75	75	75	37.000	17.900	0.56

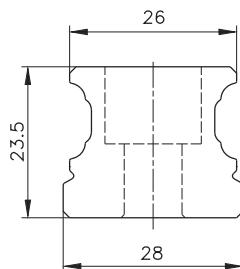
\*Reduce side load to 2000 N for track mounted to structural profiles using 8.8 screws only - with no additional mechanical track supports.

# Recirculating Ball Bearings

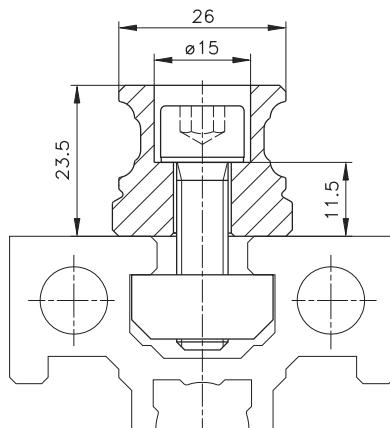
## Guideway KU 30.10

Guideway KU 30.10 is designed to be used with Carriage KU 30.11 or KU 30.13. Each element must be ordered separately.

Guideway KU 30.10 is especially suited for use with mk Series 60.



Guideway  
KU 30.10  
K116041030  
 $m = 4.3 \text{ kg/m}$



Guideway KU 30.10  
with mounting hardware  
B51.04.406

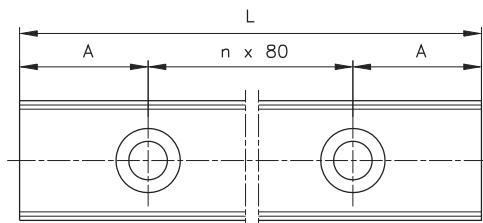
### Hole Spacing:

Guideway L1 to 2000 mm single piece

Range of A:  $20 \leq A < 60$

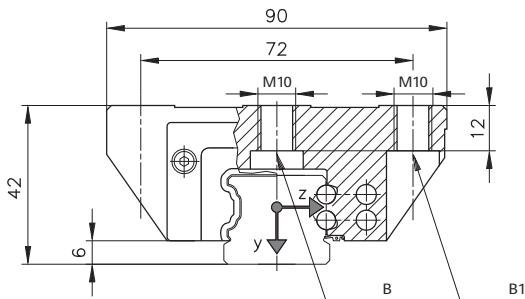
$$N = \frac{L_1 - (2 \times A)}{80} + 1 \quad (+1 \text{ each break})$$

L1 = Length of the Guideway  
A = Distance to first mounting hole (symmetric)  
N = Number of mounting screws

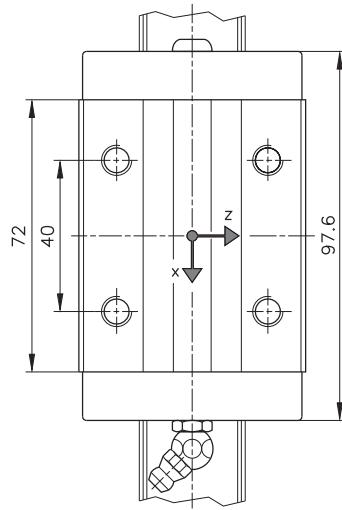
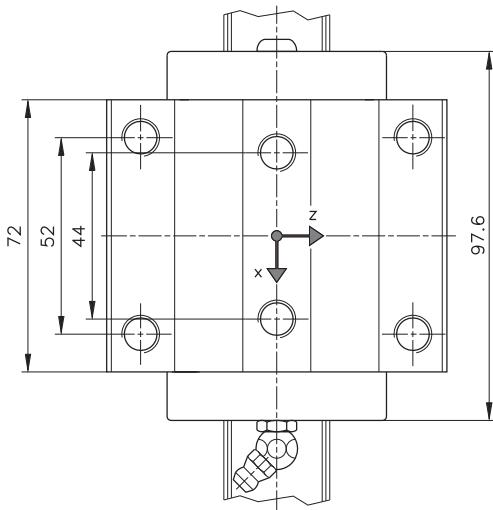
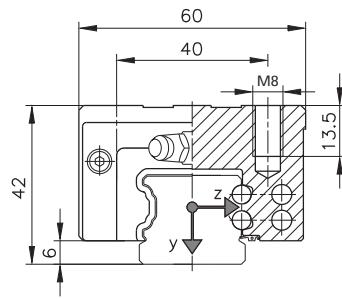


## Carriages

Normal carriage  
KU 30.11



Narrow carriage  
KU 30.13



B=Thru-hole for M8 screw DIN 6912

B1=Thru-hole for M8 screw DIN EN ISO 4762

### Load Data

Ident-No.	Description	F <sub>y0</sub> [N]	F <sub>z0*</sub> [N]	M <sub>x0</sub> [Nm]	M <sub>y0</sub> [Nm]	M <sub>z0</sub> [Nm]	C <sub>0</sub> [N]	C [N]	m <sub>Carriage</sub> [kg]
K116041130	FW 30.11	10000	10000	140	140	140	55.000	27.500	1.4
K116041330	FW 30.13	10000	10000	140	140	140	55.000	27.500	1.09

\*Reduce side load to 3500 N for track mounted to structural profiles using 8.8 screws only - with no additional mechanical track supports.

## Application examples



Exhibit for displaying combined LZR 2005 with foamed combination profile as support profile and cross-carriage with support rollers



VST 2011 for manual adjustment of the conveyor height and double VST 2015 with timing belt coupling for width adjustment of the ZRF-P 2040.02 cycle conveyor



VST 2011 with digital display  
for width adjustment of the  
GUF-P 2000 AC side conveyor



Double VST 2011 adjusting unit



VST 2011 for motor drive  
with manual swiveling unit  
on LZR 2005-38.44-30



VST 2011 with digital display for width adjustment of the  
pneumatic centering unit on the modular belt conveyors

## Application examples



Double LZR 2011 -38.44-30 as changeable table  
for raw material plates. Product changes in two  
planes one above the other



Linear module with duplex  
chain based on LZR 2005-38.44-30  
as lift for pallet transport



Two-axis application,  
Z axis with cross-carriage  
and Omega drive



Connection of Y axis to X axis  
with adapter plate and console



Horizontal slide carriage consisting of LZR 2005-38.44-30  
linear module with fork-shaped gripper for transferring  
and unloading of workpiece baskets



Drive X axis LZR 2004-38.41  
with power split



Linear assembly for manual lane width adjustment and clamping  
of the pneumatic centralizer and the electromotive turning unit

## Application examples



Lifts with 2-lane timing belt conveyor based on LZR 2005-38-44 with internally-arranged carriages



Lift with synchronous conveyor belt for transporting plastic bins.  
LZR 2005-38-44-30 linear module with two side carriages



Lift from LZR 2005-38-44-30 linear module with motor-driven adjusting unit mounted on the carriage



Lift for chain conveyors, storage system consisting of linear module with counterweight



Electromotive VST 2015 with recirculating ball bearing guide



Linear module with double carriage, toothed belt and servo motor as lift with toothed belt conveyor



Linear Module with dual-carriage, asynchronous gearmotor, variable speed and triplex-chain as lift with timing belt conveyor

## Application examples



X-Z Gantry with magnetic grippers  
and frame with integrated guarding



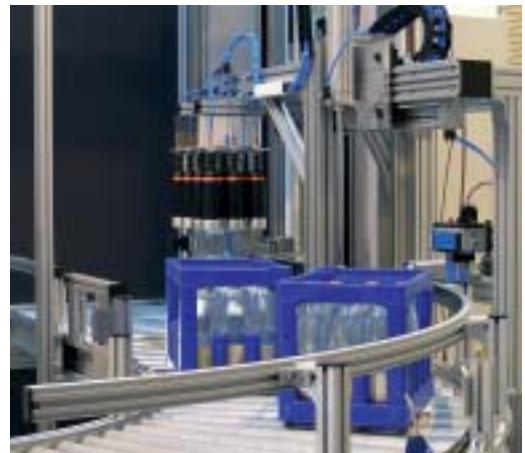
X-Y-Z Gantry for machine loading with  
swiveling axis and vacuum gripper



X-Z Gantry with vacuum gripper as handling and loading system of steel. Two independent loading systems on common X axis with guide rollers and riding rack drive



X-Z Gantry with gripper for transferring crankshafts. X axis as LZR with support roller and timing belts, Z axis with timing belt Omega drive and fall arrest



X-Z Axis combination with pneumatic drive and suction device for loading and unloading drink crates

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- Part configuration online
- Shopping cart function for online requests

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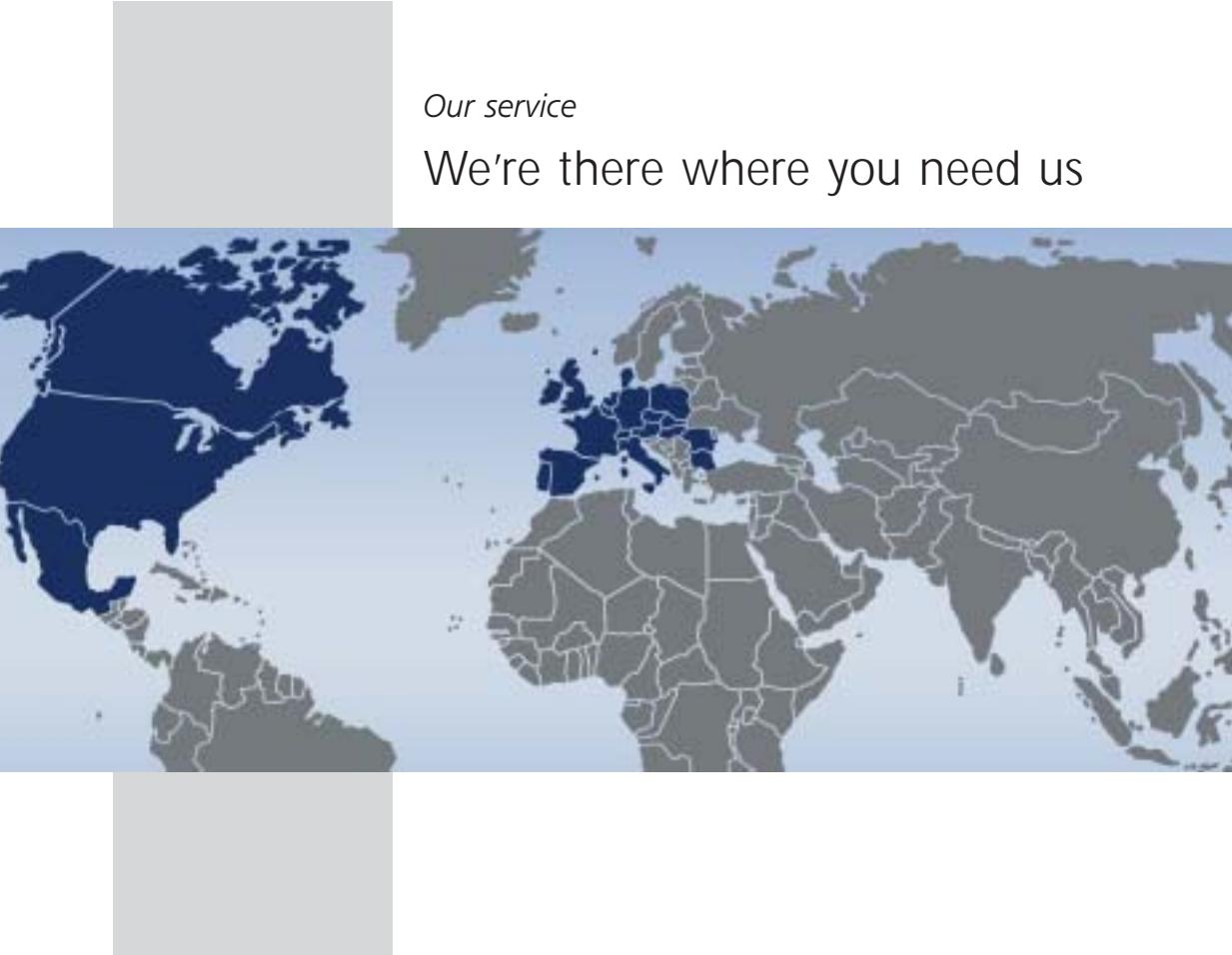
As a registered user, you can view the history of your orders at mk in our online shop. Follow the status of your online or off-line orders. Find out, for example, whether your order is currently in assembly or whether it has already been shipped.

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- We cover a wide range of applications due to standardization and modularization of these units
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Headquarters, Troisdorf,  
Germany

Every hour of downtime for you or one of your customers costs you money and reputation. Therefore, we are on your side in the planning and design phase, as well in after-sales business as a partner. Our international network of

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Our catalogs are organized by our four main business areas. Various product flyers complement our catalogs.

Current information about mk products and other interesting topics are also available on our website at [www.mk-group.com](http://www.mk-group.com).

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More than 250 combinable system profiles made of high-quality alloys, perfected and stability-oriented connectors, as well as a comprehensive range of accessories is available in our comprehensive 300-page mk profile technology catalog.

## *mk Conveyor Technology Catalog*



20 different conveyor systems from belt, timing belt, chain and flat top chain conveyors to roller conveyors are available in our 320+ page mk conveyor technology catalog. Our mk INOX conveyor technology catalog includes belt and flat top chain conveyors, as well as roller conveyors made of stainless steel.

## *mk Linear Motion Catalog*



mk linear technology stands for optimal, needs-based design. Gliding assemblies, track roller assemblies and recirculating ball bearings are displayed on 130 pages. You have the choice between profile and linear guides, as well as complete linear modules.

## *mk Factory Equipment Catalog*



Building on our profile technology, a comprehensive range of modules for individual factory equipment is on 160 pages. It includes guarding, system workstations, guard rails, treads and platforms in modular design.

## *CD mk QuickDesigner*



The "mk QuickDesigner" software package includes the 3D guarding configurator "mk Config" and the "mk Parts" CAD library. You can use these tools to quickly and easily design your guarding.

## *Mini-CD mk E-Catalog*



The handy Mini-CD contains all mk catalogs in the form of an eBook. You can conveniently page and search through the catalogs on your screen, as well as save them as PDF files.

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