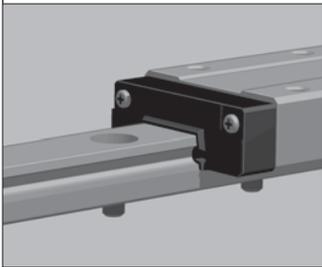
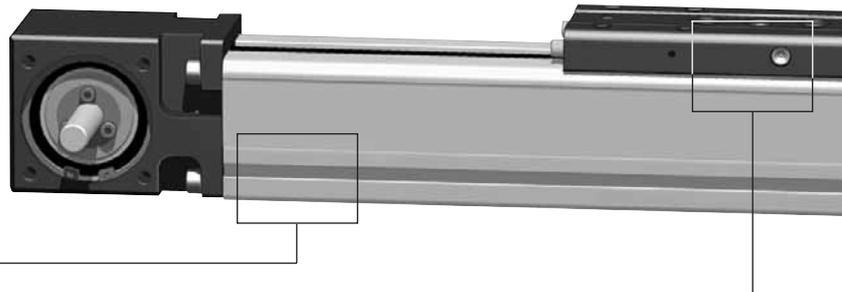


# WIESEL *SPEEDLine*<sup>®</sup>

## New technology right to the centre!

### WIESEL *SPEEDLine*<sup>®</sup> WH40

A linear drive unit for dynamic miniaturized applications. High performance with extremely small dimensions.



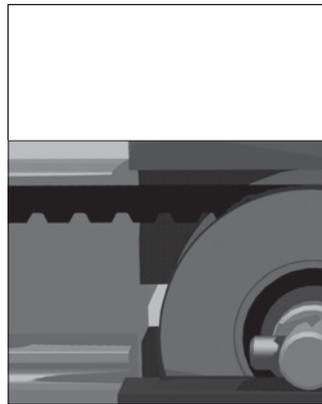
#### Linear guides

Precise positioning is made possible by a polished linear guide with a high degree of guide accuracy. A smaller motor can be added thanks to the low coefficient of friction. Rubber wipers protect the mechanism from dirt, thus increasing service life.



#### Completely new arrangement of the roller guideway

The H-Type arrangement of guidance allows high forces and moments and thereby the choice of a smaller size. Your benefit: lighter and more cost effective designs.

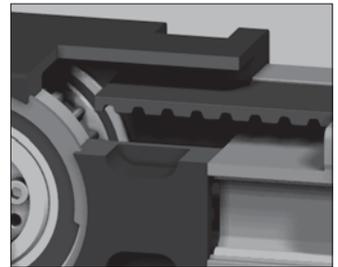


#### AT toothed belt

A proven drive element:

- high loading
- wear resistant
- high efficiency
- exact spacing
- low mass

Powered by **ATL *belt***



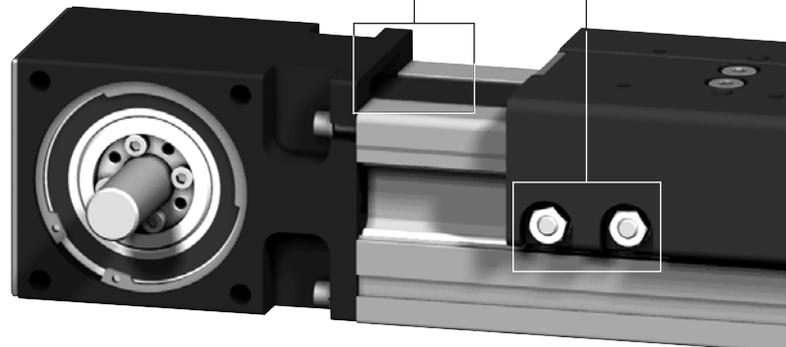
#### ATL toothed belt

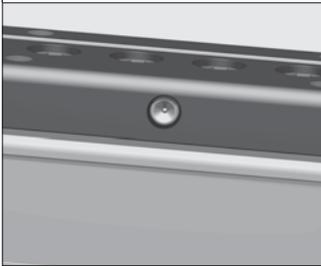
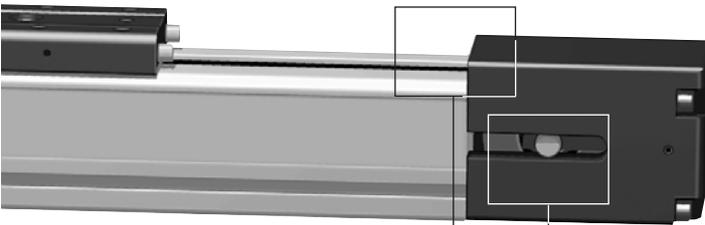
- with steel reinforcement especially suitable for linear drive units
- higher performance
- repeatability of  $\pm 0.05$  mm even at high feed forces

### WIESEL *SPEEDLine*<sup>®</sup> WH50. WH80. WH120 WHZ50. WHZ80

With the WIESEL *SPEEDLine*<sup>®</sup> single-axis solutions can be realized as well as two- and three-dimensional handling systems.

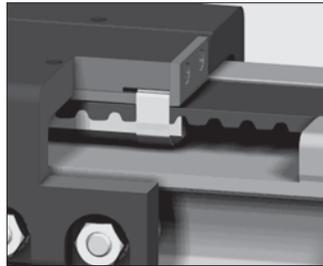
The WIESEL *SPEEDLine*<sup>®</sup> Z-axis is especially suitable for vertical movements. High dynamics and loads due to the reduced mass to be moved and the short design.





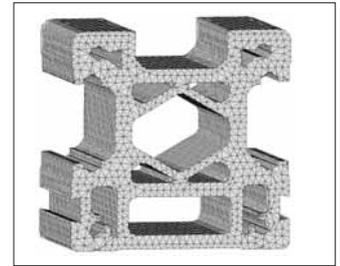
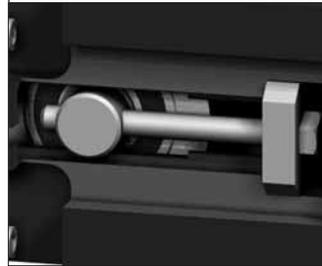
### Central lubrication

The linear guide system is conveniently relubricated from a central point. Whether by hand or automatically, maintenance is now a simple matter.



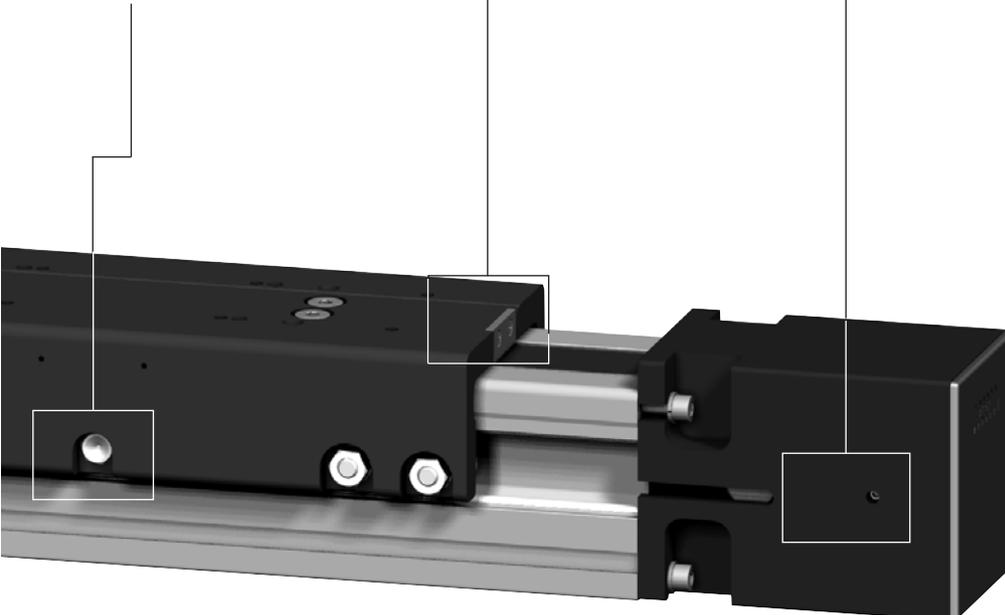
### Tensioning and exchange of toothed belt

The toothed belt can be retensioned and exchanged comfortably without dismounting the load (only WH50/80/120). Thus reducing your service costs.



### FEA optimized design

FEA analysis helps model and optimize the profile and the whole linear axis. The result: highest performance and reliability.



# General technical data

## WIESEL SPEEDLine®

### Speeds

The linear speed achieved by a linear drive unit depends on the pitch of the mechanical drive element and on the input rotational speed. The various linear speeds which can be achieved by the individual sizes are listed in the following table:

Size	Lead [mm/rev.]	$n_{\max}$ [rpm]	$v_{\max}$ [m/s]
WH40	100	1800	3
WH50/WHZ50	120	3250	6.5
WH80/WHZ80	200	3000	10
WH120	260	2308	10

### Installed position

The linear drive units can basically be installed in any position, provided that all the forces and moments occurring remain below the maximum values for the axis concerned.

### Safety advice

All sizes are generally **not self-locking**. It is therefore advisable to install suitable motors with holding brakes, particularly if the linear drive unit is installed vertically.

In case of a breakage of the toothed belt the load is released instantly. Therefore safety precautions have to be taken for applications which are critical with regard to safety.

### Loading

All specified maximum forces and moments refer to the centre/top of the power bridge. Load overlay at several coordinates: If compound loads occur with force and moment components in more than one direction, the maximum permissible loads must be reduced to 60% of the specified maximum values. When forces and moments are overlaid in two or three coordinates, it is necessary to reduce the maximum permissible load to 60% of the maximum value.

### Load ratings

See page 120

### Operating hours

The toothed belt as well as the roller guideway/linear guide allow continuous operation up to 100%. Extremely high loads, combined with long operating hours may reduce the lifetime.

### Temperatures

All series are designed for continuous operation at ambient temperatures up to 80°C. Temperatures up to 100°C are also permitted for brief periods. The linear drive units are not suited for operation at subzero temperatures.

### Idle torque

The indicated values for the idle torque are mean values determined in a rank. In individual cases these values can deviate.

### Straightness/torsion

The aluminium profiles (material AlMgSi 0.5) are extruded sections which may display deviations in straightness and torsion due to their manufacturing process. The tolerance of these deviations is defined in DIN 17615. The deviations found in NEFF linear drive units correspond to these limits at least, but are normally well below. In order to obtain the required guide accuracy, the linear drive unit must be aligned with the aid of levelling plates or clamped from a mounting surface machined with sufficient accuracy. This ensures that tolerances of at least 0.1 mm/1000 mm are achieved.

### Guide tube

A guide tube contains all elements of a linear drive unit except the mechanical drive element. It serves mainly as a support and holding capacity for higher loads and moments. For this purpose it is either mounted on the backside of a driven WIESEL® or installed parallel to it. All WIESEL® models are also available as guide tubes with guide.

### Stroke lengths

The stroke length specified in the order code represents the maximum possible linear displacement. Acceleration and deceleration paths must be taken into account when designing the system, as well as any required over-run.

### Repeatability

The repeatability is defined as the capability of a linear drive to get back to an actual position which was reached under the same conditions within the given tolerances. The repeatability amongst others is influenced by:

- Load
- Speed
- Deceleration
- Direction of travel
- Temperature

### Aggressive working environment

Because of their tough design WIESEL SPEEDLine® units can be used even in rough surroundings without additional covering. As a protection against coarse dirt optional wipers can be offered. In case of extreme dirt or fine dust/ filings a protective bellow is recommended and provided on request.

### Maintenance

#### Lubrication WH40

The linear guide must be lubricated via the grease nipple on the power bridge with the aid of a grease gun after 400 hours of operation or at least every 3 months. Grease: roller bearing grease (original grease: Fuchs Lubritech URETHYN E/M2).

#### Lubrication WH50/80/120

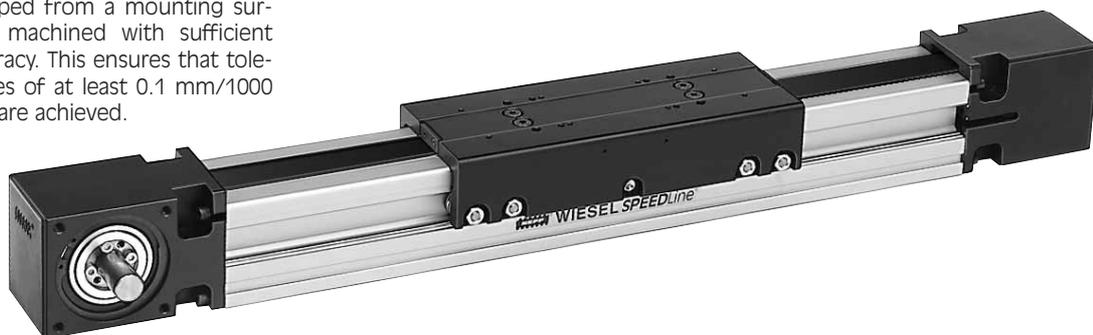
In order to obtain a useful lifetime of the guidance system the two guides should be permanently covered with a thin oil film. The two lubrication points which are arranged at the sides of the power bridge serve for lubrication.

#### Tensioning of toothed belt

The tension of the toothed belt can be adjusted with the aid of the tensioning screws on the guide casing which are intended for this. The linear units are delivered with optimal tension values in order to guarantee security in function. Changes in this adjustment must only be carried out in service cases and by NEFF service engineers.

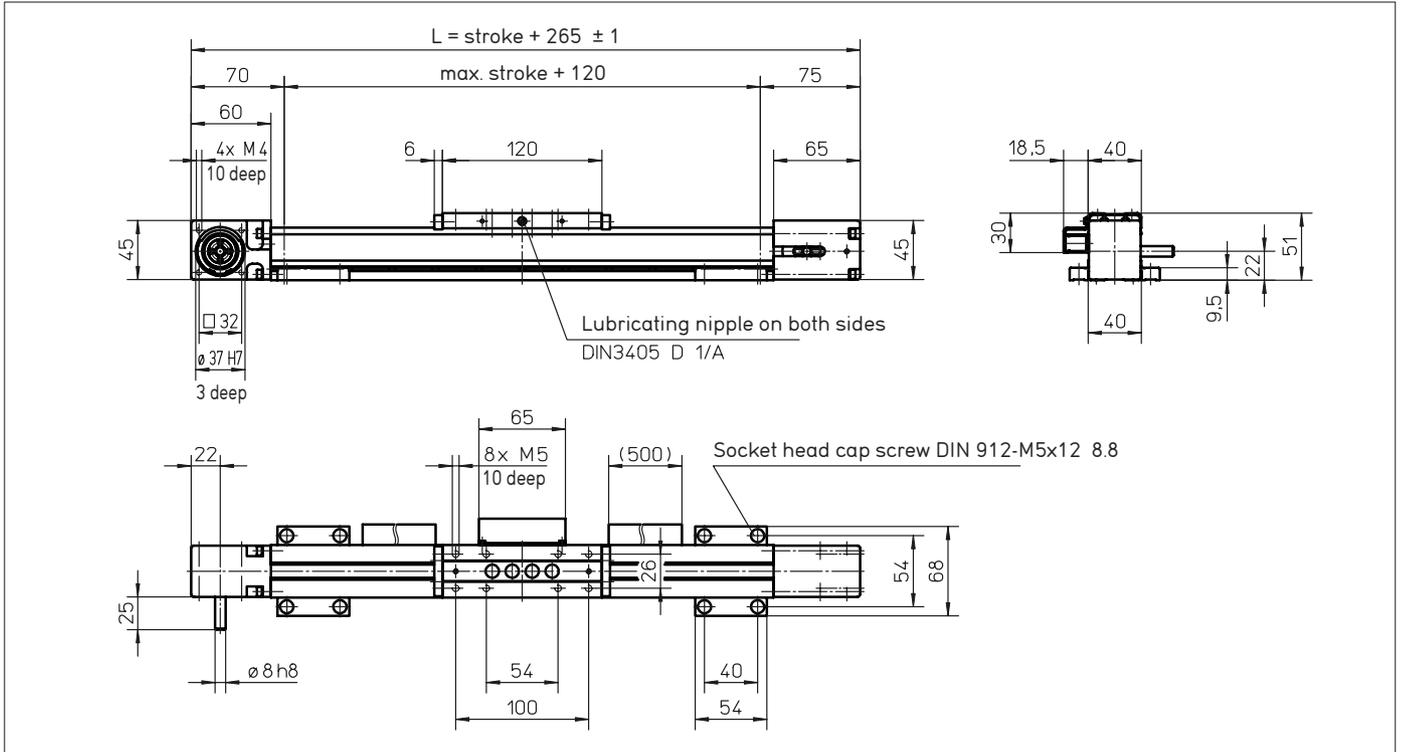
#### Pretensioning of the guidance system

The WIESEL® units leave the factory with optimal preloading values which guarantee optimum travelling characteristics as well as the necessary capacity in forces and moments. Changes in the preloading of the rollers must only be carried out after prior consultation with NEFF service engineers.



# WIESEL SPEEDLine® WH40

## with linear guide and AT toothed belt



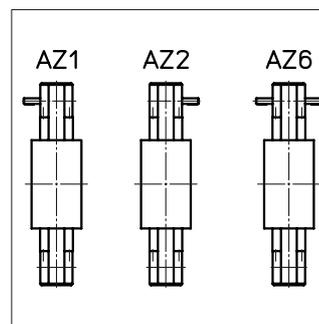
**Note:** The use of a long power bridge increases the total length.

### Technical data

- Linear speed: \_\_\_\_\_ max. 3.0 m/s
- Repeatability: \_\_\_\_\_ ± 0.05 mm
- Acceleration: \_\_\_\_\_ max. 40 m/s<sup>2</sup>
- Drive element: \_\_\_\_\_ Toothed belt 10AT5
- Pulley diameter: \_\_\_\_\_ 31.83 mm
- Stroke per revolution: \_\_\_\_\_ 100 mm
- Stroke length: \_\_\_\_\_ up to 2000 mm
- Length of power bridge: \_\_\_\_\_ 120 or 210 mm  
see page 26
- Geometrical moment of inertia: \_\_\_\_\_  
ly 12.6 · 10<sup>4</sup> mm<sup>4</sup>  
lz 15.3 · 10<sup>4</sup> mm<sup>4</sup>
- Weights  
Basic unit with zero stroke: \_\_\_\_\_ 1.19 kg  
100 mm stroke: \_\_\_\_\_ 0.15 kg  
Power bridge with rollers: \_\_\_\_\_ 0.28 kg
- Provided: \_\_\_\_\_ with 4 pieces KAO mounting brackets

### Execution of drive shafts

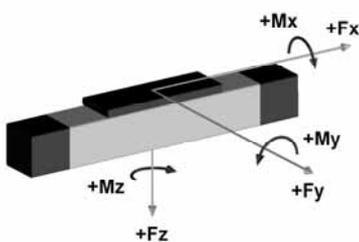
(Detailed description see page 123)  
Other executions on request.



### Idle torques [Nm]

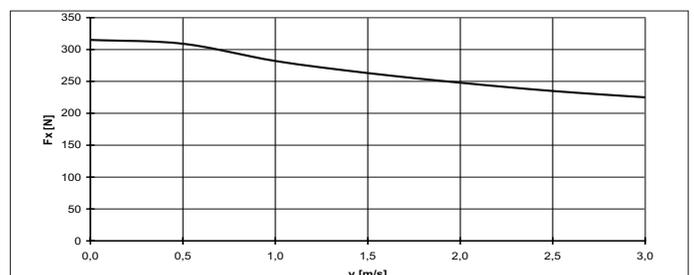
Rotational speed [rpm]	M <sub>idle</sub> [Nm]
150	0.1
900	0.3
1800	0.6

### Loads and load moments



Load	dynam. [N]
F <sub>x</sub> drive <sup>1)</sup>	max. 315
F <sub>y</sub>	450
±F <sub>z</sub>	600
Load moment	dynam. [Nm]
M <sub>x</sub>	10
M <sub>y</sub> <sup>2)</sup>	30
M <sub>z</sub> <sup>2)</sup>	30

### F<sub>x</sub> depending on the linear speed



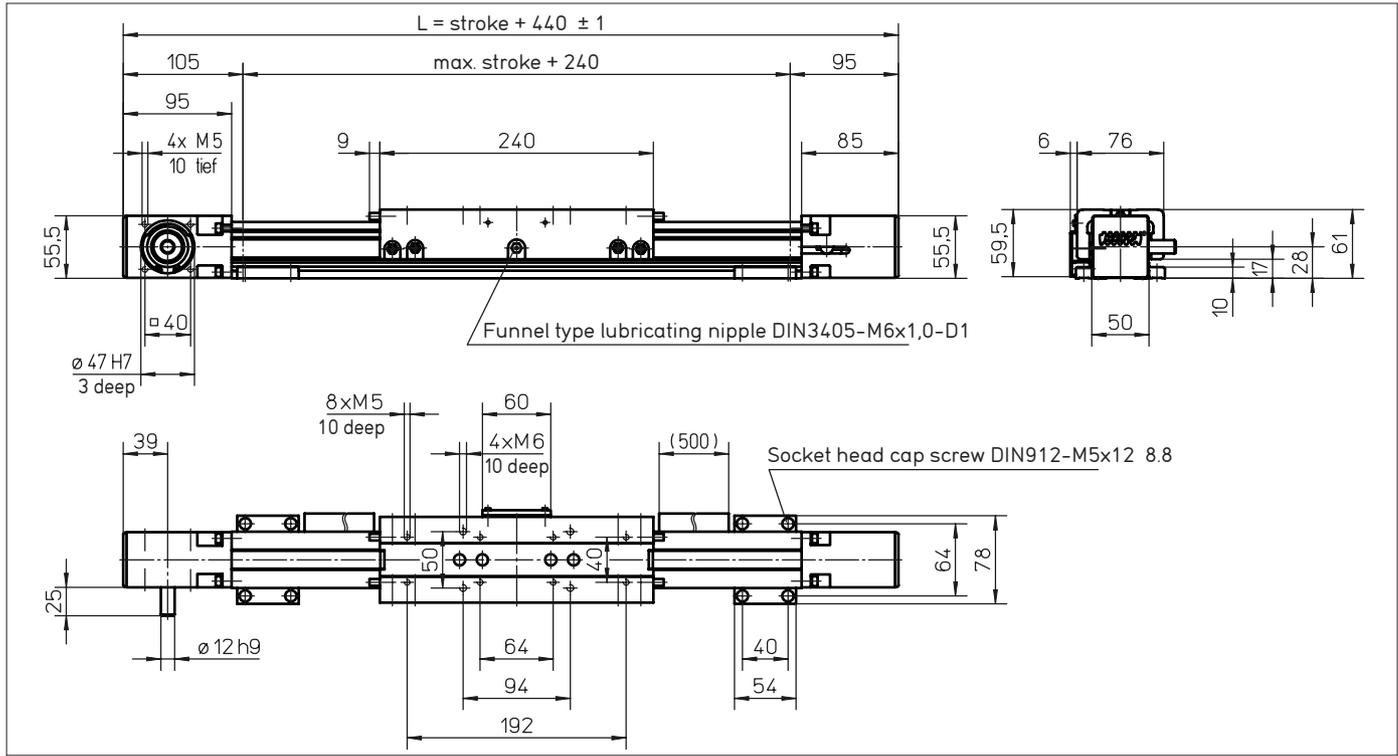
**Order Code** see page 123

<sup>1)</sup> Depending on the speed, see respective chart.

<sup>2)</sup> Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (page 26 and 27).

# WIESEL SPEEDLine® WH50

## with roller guideway and ATL toothed belt



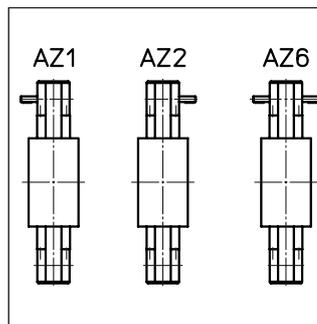
Note: In the section of the rail for the initiators the WIESEL® can not be fixed by means of KAO mounting brackets. Mounting kit for the lateral assembly of the initiators at the sides of the axis on request. Mounted wipers on request. The use of a long power bridge increases the total length.

### Technical data

- Linear speed: \_\_\_\_\_ max. 6.5 m/s
- Repeatability: \_\_\_\_\_ ± 0.05 mm
- Acceleration: \_\_\_\_\_ max. 40 m/s<sup>2</sup>
- Drive element: \_\_\_\_\_ Toothed belt 16ATL5
- Pulley diameter: \_\_\_\_\_ 38.20 mm
- Stroke per revolution: \_\_\_\_\_ 120 mm
- Stroke length: \_\_\_\_\_ up to 3000 mm
- Length of power bridge: \_\_\_\_\_ 240 or 400 mm, see page 26
- Geometrical moment of inertia:  $I_y$   $3.30 \cdot 10^5$  mm<sup>4</sup>  
 $I_z$   $2.65 \cdot 10^5$  mm<sup>4</sup>
- Weights
  - Basic unit with zero stroke: \_\_\_\_\_ 3.50 kg
  - 100 mm stroke: \_\_\_\_\_ 0.44 kg
  - Power bridge with rollers: \_\_\_\_\_ 0.90 kg
- Provided: \_\_\_\_\_ with 4 pieces KAO mounting brackets

### Execution of drive shafts

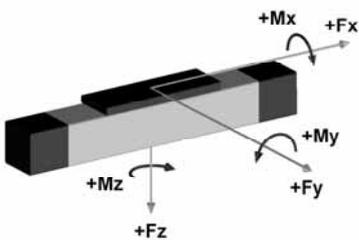
(Detailed description see page 123)  
Other executions on request.



### Idle torques [Nm]

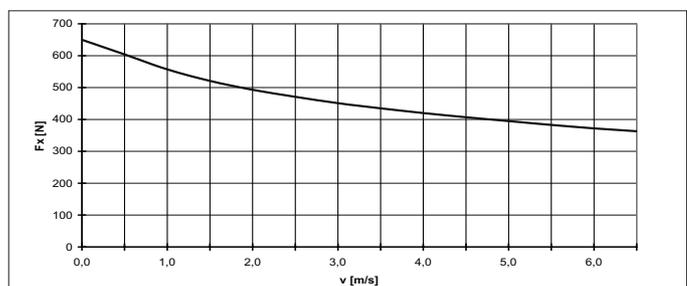
Rotational speed [rpm]	M <sub>idle</sub> [Nm]
150	1.7
1500	2.4
3250	3.8

### Loads and load moments



Load	dynam. [N]
F <sub>x</sub> drive <sup>1)</sup>	max. 670
F <sub>y</sub>	415
±F <sub>z</sub>	730
Load moment	dynam. [Nm]
M <sub>x</sub>	16
M <sub>y</sub> <sup>2)</sup>	87
M <sub>z</sub> <sup>2)</sup>	50

### F<sub>x</sub> depending on the linear speed



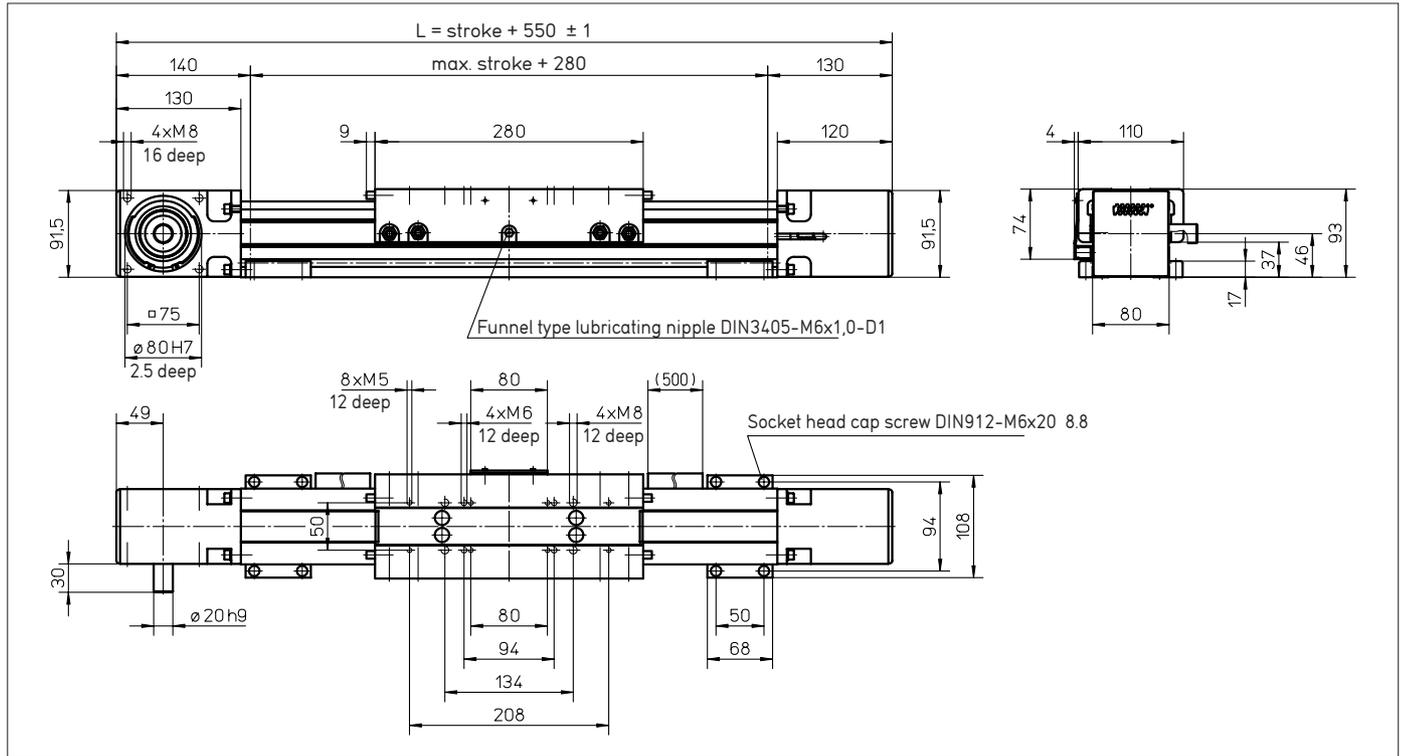
Order Code see page 123

<sup>1)</sup> Depending on the speed, see respective chart.

<sup>2)</sup> Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (page 26 and 27).

# WIESEL SPEEDLine® WH80

with roller guideway and ATL toothed belt



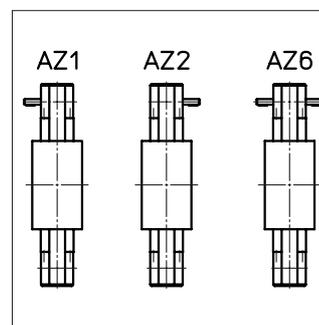
Note: Mounted wipers on request. The use of a long power bridge increases the total length.

## Technical data

- Linear speed: \_\_\_\_\_ max. 10 m/s
- Repeatability: \_\_\_\_\_ ± 0.05 mm
- Acceleration: \_\_\_\_\_ max. 40 m/s<sup>2</sup>
- Drive element: \_\_\_\_\_ Toothed belt 32ATL10
- Pulley diameter: \_\_\_\_\_ 63.66 mm
- Stroke per revolution: \_\_\_\_\_ 200 mm
- Stroke length: \_\_\_\_\_ up to 11000 mm
- Length of power bridge: \_\_\_\_\_ 280 or 450 mm, see page 26
- Geometrical moment of inertia:  $I_y 1.93 \cdot 10^6 \text{ mm}^4$   
 $I_z 1.80 \cdot 10^6 \text{ mm}^4$
- Weights  
Basic unit with zero stroke: \_\_\_\_\_ 8.63 kg  
100 mm stroke: \_\_\_\_\_ 0.93 kg  
Power bridge with carriage: \_\_\_\_\_ 2.75 kg
- Provided: \_\_\_\_\_ with 4 pieces KAO mounting brackets

## Execution of drive shafts

(Detailed description see page 123)  
Other executions on request.

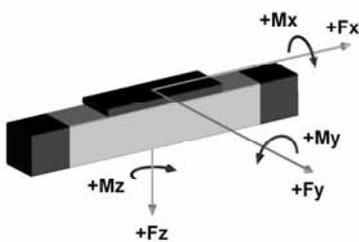


## Idle torque [Nm]

Rotational speed [rpm]	$M_{idle}$ [Nm]
150	2.4
1500	3.5
3000	5.0

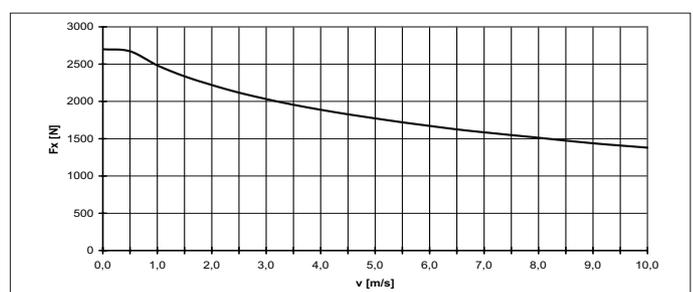
**Note:** For tube lengths of 6300 mm and over, the tubular profile is composed of two parts. The joint must be adequately supported. It may be possible to position the joint according to customer's wishes.

## Loads and load moments



Load	dynam. [N]
$F_x$ drive <sup>1)</sup>	max. 2700
$F_y$	882
$\pm F_z$	2100
Load moment	dynam. [Nm]
$M_x$	75
$M_y$ <sup>2)</sup>	230
$M_z$ <sup>2)</sup>	100

## $F_x$ depending on the linear speed



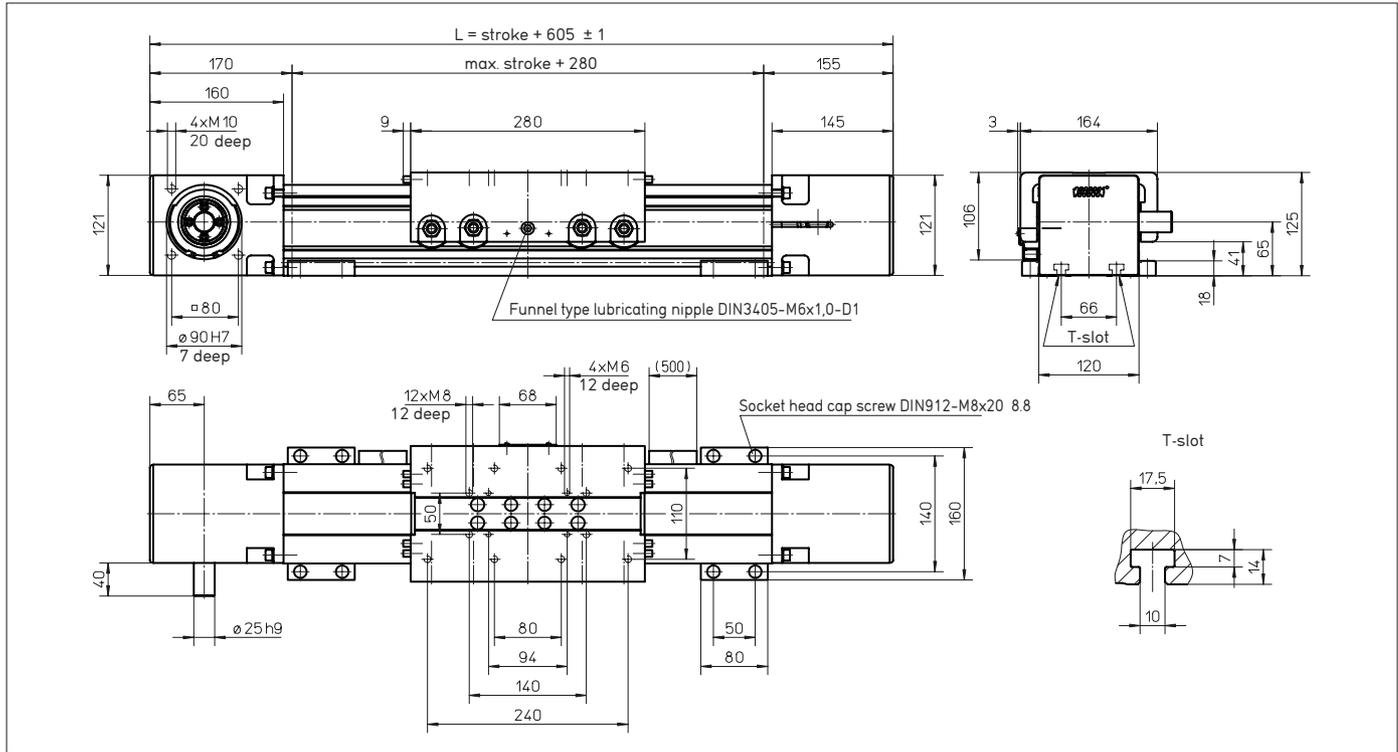
Order Code see page 123

<sup>1)</sup> Depending on the speed, see respective chart.

<sup>2)</sup> Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (page 26 and 27).

# WIESEL SPEEDLine® WH120

## with roller guideway and ATL toothed belt



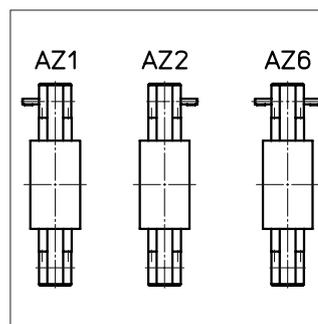
Note: Mounted wipers on request. The use of a long power bridge increases the total length.

### Technical data

- Linear speed: \_\_\_\_\_ max. 10 m/s
- Repeatability: \_\_\_\_\_ ± 0.05 mm
- Acceleration: \_\_\_\_\_ max. 40 m/s<sup>2</sup>
- Drive element: \_\_\_\_\_ Toothed belt 50ATL10
- Pully diameter: \_\_\_\_\_ 82.76 mm
- Stroke per revolution: \_\_\_\_\_ 260 mm
- Stroke length: \_\_\_\_\_ up to 11000 mm
- Length of power bridge: \_\_\_\_\_ 280 or 520 mm, see page 26
- Geometrical moment of inertia:  $I_y 6.69 \cdot 10^6 \text{ mm}^4$   
 $I_z 6.88 \cdot 10^6 \text{ mm}^4$
- Weights
  - Basic unit with zero stroke: \_\_\_\_\_ 17.00 kg
  - 100 mm stroke: \_\_\_\_\_ 1.64 kg
  - Power bridge with carriage: \_\_\_\_\_ 5.50 kg
- Provided: \_\_\_\_\_ with 4 pieces KAO mounting brackets

### Execution of drive shafts

(Detailed description see page 123)  
Other executions on request.

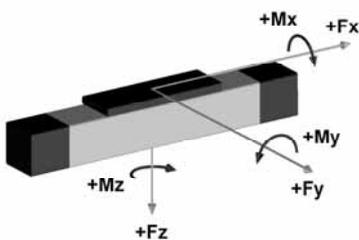


### Idle torques [Nm]

Rotational speed [rpm]	$M_{idle}$ [Nm]
150	4.8
1500	7.0
2308	10.0

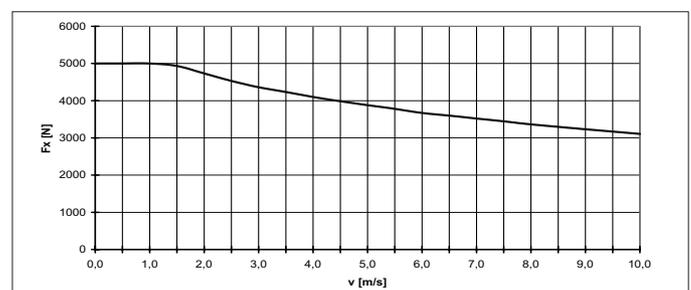
**Note:** For tube lengths of 4900 mm and over, the tubular profile is composed of two parts. The joint must be adequately supported. It may be possible to position the joint according to customer's wishes.

### Loads and load moments



Load	dynam. [N]
$F_x$ drive <sup>1)</sup>	max. 5000
$F_y$	4980
$\pm F_z$	9300
Load moment	dynam. [Nm]
$M_x$	500
$M_y$ <sup>2)</sup>	930
$M_z$ <sup>2)</sup>	500

### $F_x$ depending on the linear speed



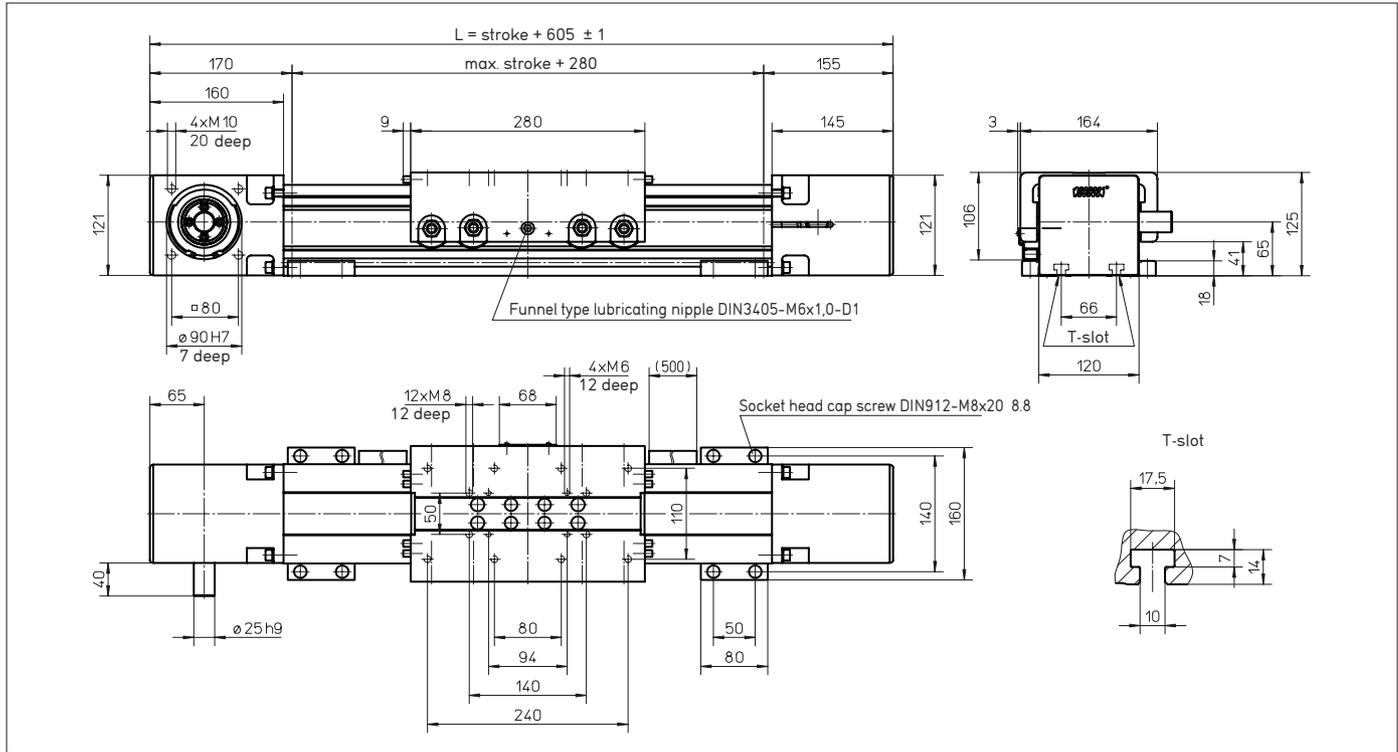
Order Code see page 123

<sup>1)</sup> Depending on the speed, see respective chart.

<sup>2)</sup> Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (page 26 and 27).

# WIESEL SPEEDLine® WH120

## with roller guideway and ATL toothed belt



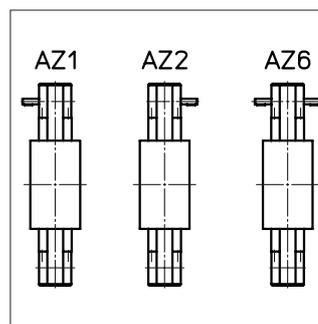
Note: Mounted wipers on request. The use of a long power bridge increases the total length.

### Technical data

- Linear speed: \_\_\_\_\_ max. 10 m/s
- Repeatability: \_\_\_\_\_  $\pm 0.05$  mm
- Acceleration: \_\_\_\_\_ max. 40 m/s<sup>2</sup>
- Drive element: \_\_\_\_\_ Toothed belt 50ATL10
- Pully diameter: \_\_\_\_\_ 82.76 mm
- Stroke per revolution: \_\_\_\_\_ 260 mm
- Stroke length: \_\_\_\_\_ up to 11000 mm
- Length of power bridge: \_\_\_\_\_ 280 or 520 mm, see page 26
- Geometrical moment of inertia:  $I_y 6.69 \cdot 10^6 \text{ mm}^4$   
 $I_z 6.88 \cdot 10^6 \text{ mm}^4$
- Weights
  - Basic unit with zero stroke: \_\_\_\_\_ 17.00 kg
  - 100 mm stroke: \_\_\_\_\_ 1.64 kg
  - Power bridge with carriage: \_\_\_\_\_ 5.50 kg
- Provided: \_\_\_\_\_ with 4 pieces KAO mounting brackets

### Execution of drive shafts

(Detailed description see page 123)  
Other executions on request.

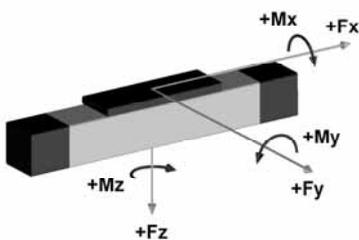


### Idle torques [Nm]

Rotational speed [rpm]	$M_{idle}$ [Nm]
150	4.8
1500	7.0
2308	10.0

**Note:** For tube lengths of 4900 mm and over, the tubular profile is composed of two parts. The joint must be adequately supported. It may be possible to position the joint according to customer's wishes.

### Loads and load moments

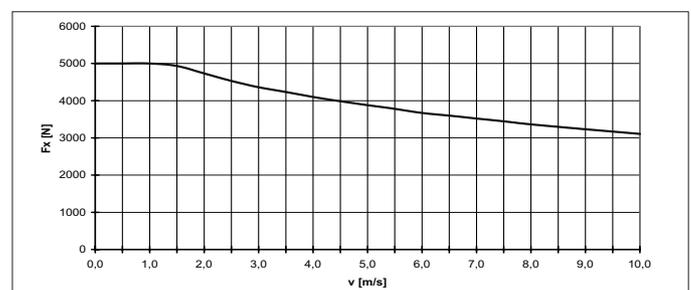


Load	dynam. [N]
$F_x$ drive <sup>1)</sup>	max. 5000
$F_y$	4980
$\pm F_z$	9300

Load moment	dynam. [Nm]
$M_x$	500
$M_y$ <sup>2)</sup>	930
$M_z$ <sup>2)</sup>	500

### $F_x$ depending on the linear speed



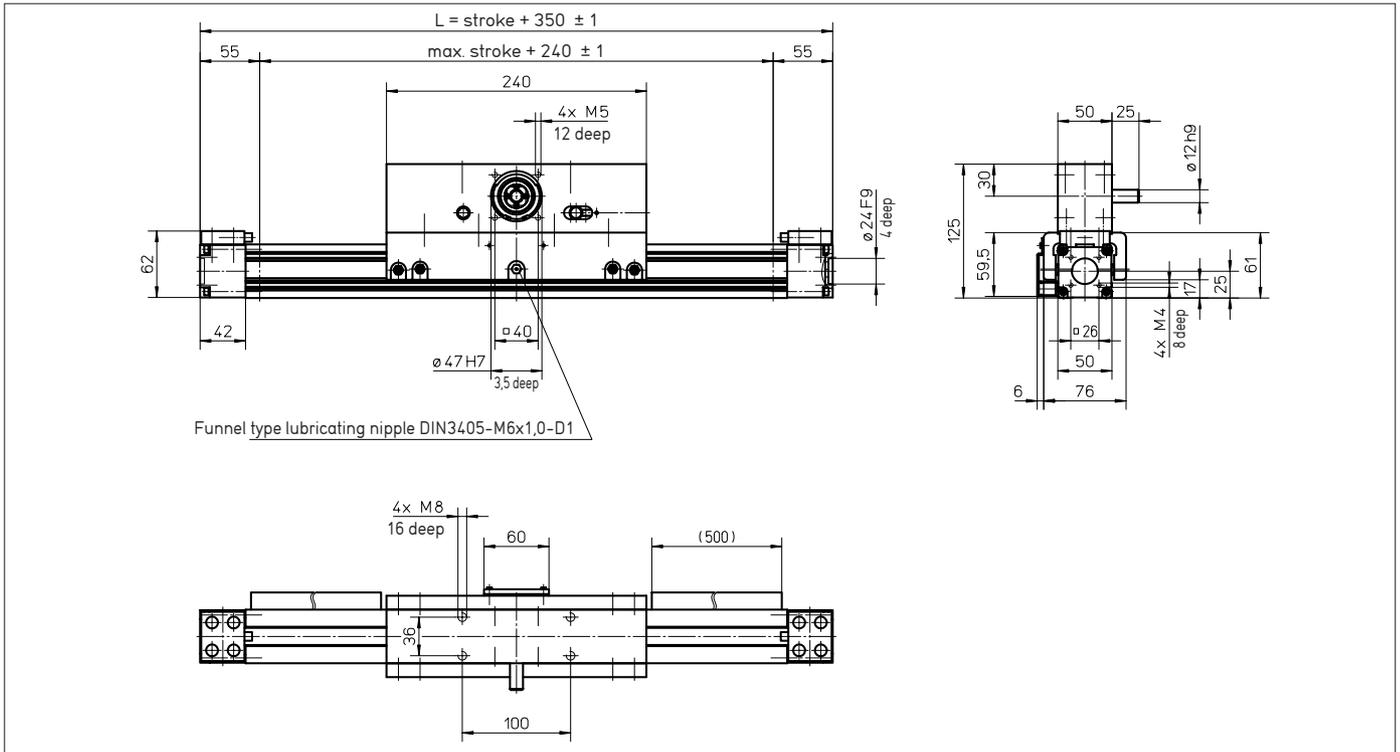
Order Code see page 123

<sup>1)</sup> Depending on the speed, see respective chart.

<sup>2)</sup> Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (page 26 and 27).

# WIESEL SPEEDLine® WHZ50

## with roller guideway and ATL toothed belt



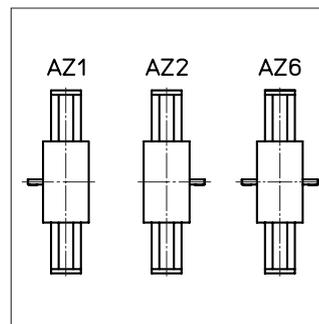
Note: In the section of the rail for the initiators the WIESEL® can not be fixed by means of KAO mounting brackets. Mounting kit for the lateral assembly of the initiators at the sides of the axis on request. Mounted wipers on request. The use of a long power bridge increases the total length.

### Technical data

- Linear speed: \_\_\_\_\_ max. 6.5 m/s
- Repeatability: \_\_\_\_\_ ± 0.05 mm
- Acceleration: \_\_\_\_\_ max. 40 m/s<sup>2</sup>
- Drive element: \_\_\_\_\_ Toothed belt 16ATL5
- Pulley diameter: \_\_\_\_\_ 38.20 mm
- Stroke per revolution: \_\_\_\_\_ 120 mm
- Stroke length: \_\_\_\_\_ up to 1500 mm
- Length of power bridge: \_\_\_\_\_ 240 or 400 mm, see page 26
- Geometrical moment of inertia:  $I_y 3.30 \cdot 10^5 \text{ mm}^4$   
 $I_z 2.65 \cdot 10^5 \text{ mm}^4$
- Weights
  - Basic unit with zero stroke: \_\_\_\_\_ 4.50 kg
  - 100 mm stroke: \_\_\_\_\_ 0.42 kg
  - Power bridge with carriage: \_\_\_\_\_ 2.90 kg

### Execution of drive shafts

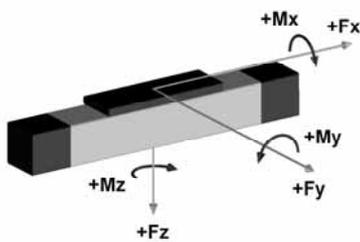
(Detailed description see page 123)  
Other executions on request.



### Idle torques [Nm]

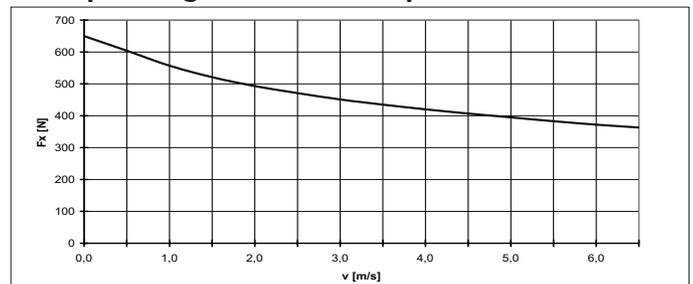
Rotational speed [rpm]	M <sub>idle</sub> [Nm]
150	1.7
1500	2.4
3250	3.8

### Loads and load moments



Load	dynam. [N]
F <sub>x</sub> drive <sup>1)</sup>	max. 670
F <sub>y</sub>	415
±F <sub>z</sub>	730
Load moment	dynam. [Nm]
M <sub>x</sub>	16
M <sub>y</sub> <sup>2)</sup>	87
M <sub>z</sub> <sup>2)</sup>	50

### F<sub>x</sub> depending on the linear speed

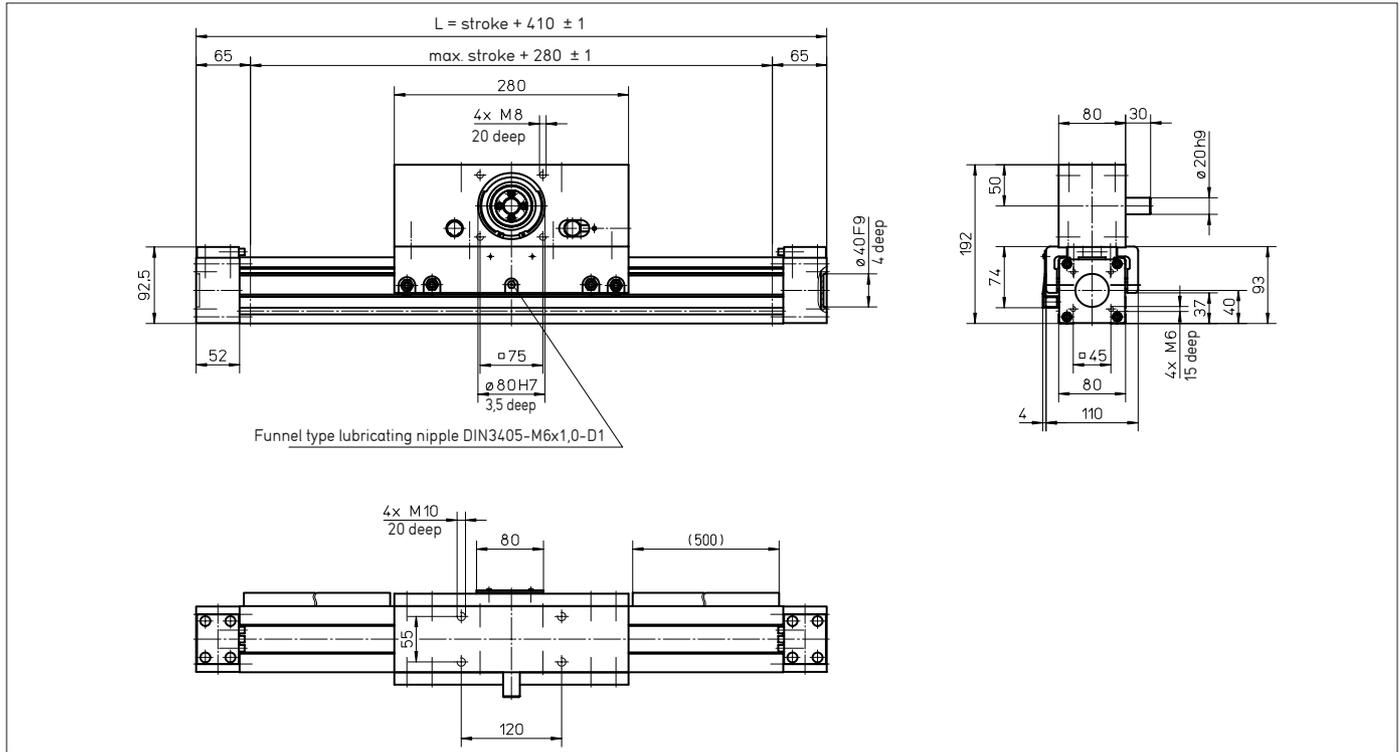


<sup>1)</sup> Depending on the speed, see respective chart.

<sup>2)</sup> Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (page 26 and 27).

# WIESEL SPEEDLine® WHZ80

## with roller guideway and ATL toothed belt



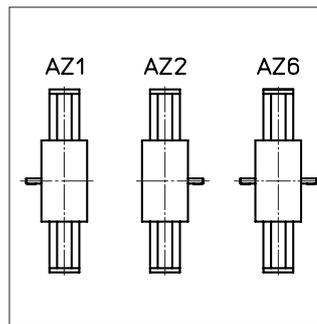
Note: Mounted wipers on request. The use of a long power bridge increases the total length.

### Technical data

- Linear speed: \_\_\_\_\_ max. 10 m/s
- Repeatability: \_\_\_\_\_ ± 0.05 mm
- Acceleration: \_\_\_\_\_ max. 40 m/s<sup>2</sup>
- Drive element: \_\_\_\_\_ Toothed belt 32ATL5
- Pulley diameter: \_\_\_\_\_ 63.66 mm
- Stroke per revolution: \_\_\_\_\_ 200 mm
- Stroke length: \_\_\_\_\_ up to 3000 mm
- Length of power bridge: \_\_\_\_\_ 280 or 450 mm, see page 26
- Geometrical moment of inertia:  $I_y$  1.93 · 10<sup>6</sup> mm<sup>4</sup>  
 $I_z$  1.80 · 10<sup>6</sup> mm<sup>4</sup>
- Weights  
Basic unit with zero stroke: \_\_\_\_\_ 11.20 kg  
100 mm stroke: \_\_\_\_\_ 0.91 kg  
Power bridge with carriage: \_\_\_\_\_ 6.65 kg

### Execution of drive shafts

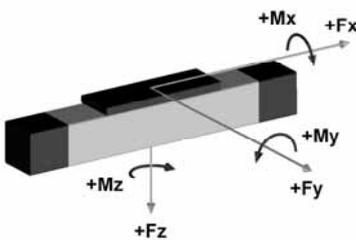
(Detailed description see page 123)  
Other executions on request.



### Idle torques [Nm]

Rotational speed [rpm]	M <sub>idle</sub> [Nm]
150	2.4
1500	3.5
3000	5.0

### Loads and load moments

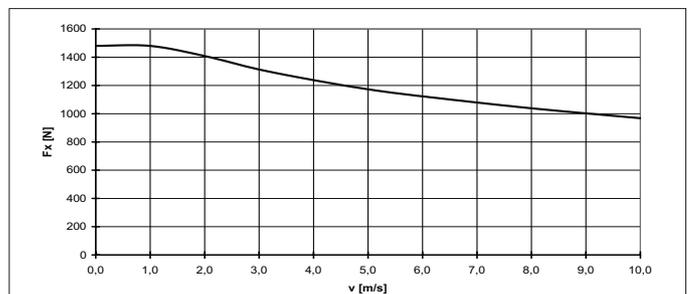


Load	dynam. [N]
F <sub>x</sub> drive <sup>1)</sup>	max. 1480
F <sub>y</sub>	882
±F <sub>z</sub>	2100

Load moment	dynam. [Nm]
M <sub>x</sub>	75
M <sub>y</sub> <sup>2)</sup>	230
M <sub>z</sub> <sup>2)</sup>	100

### F<sub>x</sub> depending on the linear speed

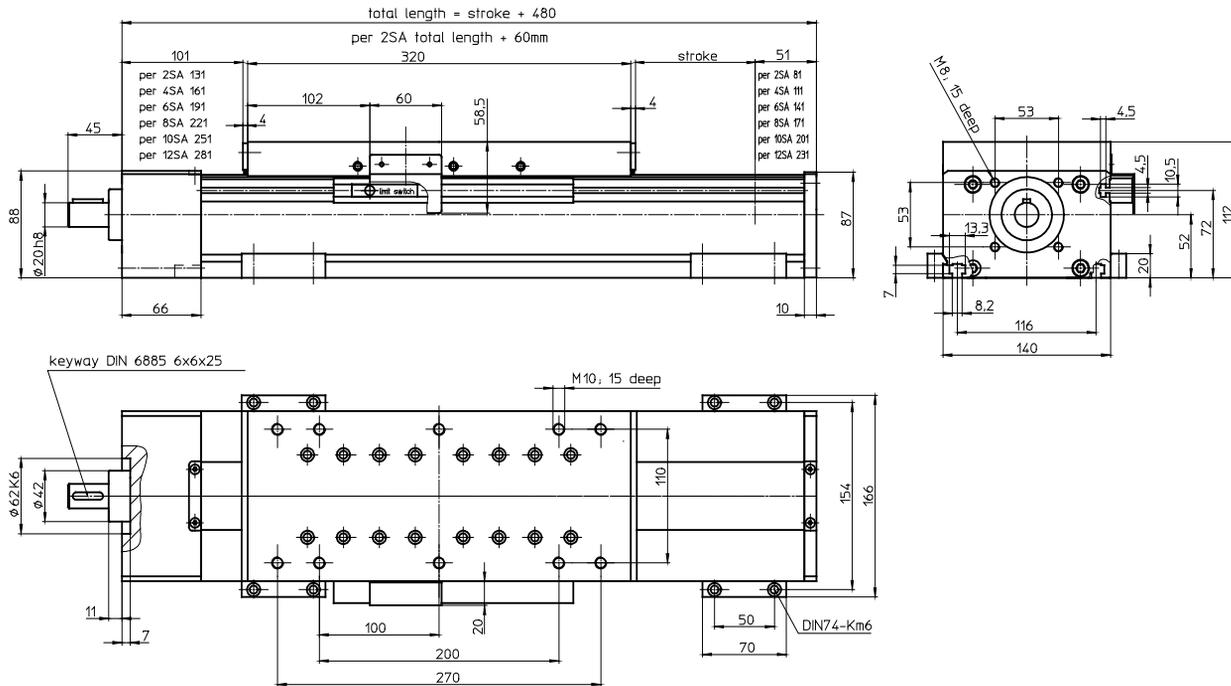


Order Code see page 123

<sup>1)</sup> Depending on the speed, see respective chart.

<sup>2)</sup> Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (page 26 and 27).

# with ball screw, trapezoidal screw, roller guideway or double linear guide



## Weights

Basic length, no stroke:  
100 mm stroke:  
Carriage:  
Idle torque:

## SRS

14.00 kg  
1.40 kg  
6.20 kg  
1.00 Nm

## SSS

15.00 kg  
1.90 kg  
7.00 kg  
1.50 Nm

## Technical data

Linear speed:  
Repeatability:  
Acceleration:  
Mass inertia:  
Drive element:

0.1 - 2.5 m/s \*\*  
 $\pm 0.03$  mm (ball screw)  
max. 20 m/s<sup>2</sup>  
2.2 kgcm<sup>2</sup>/m

### ball screw drive:

diameter: 25 mm  
pitch: 5, 10, 25, 50 mm

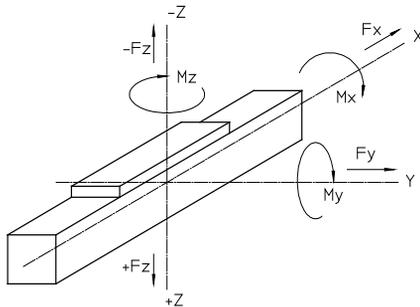
### trapezoidal screw:

diameter: 24 mm  
pitch: 5 mm

Total length:

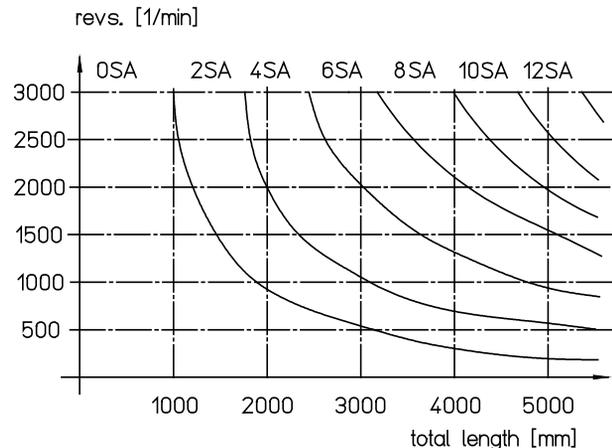
up to 5400 mm (longer on request)

## Loads and load moments



Type	with roller guideway (SRS)	with linear guide (SSS)
Load	dynamic [N]	dynamic [N]
<b>Fx **</b>	6000	6000
<b>Fy</b>	2500	2500
<b>Fz</b>	5000	6000
<b>-Fz</b>	3000	4000
Load moment	dynamic [Nm]	dynamic [Nm]
<b>Mx</b>	350	500
<b>My</b>	700	1000
<b>Mz</b>	700	1000

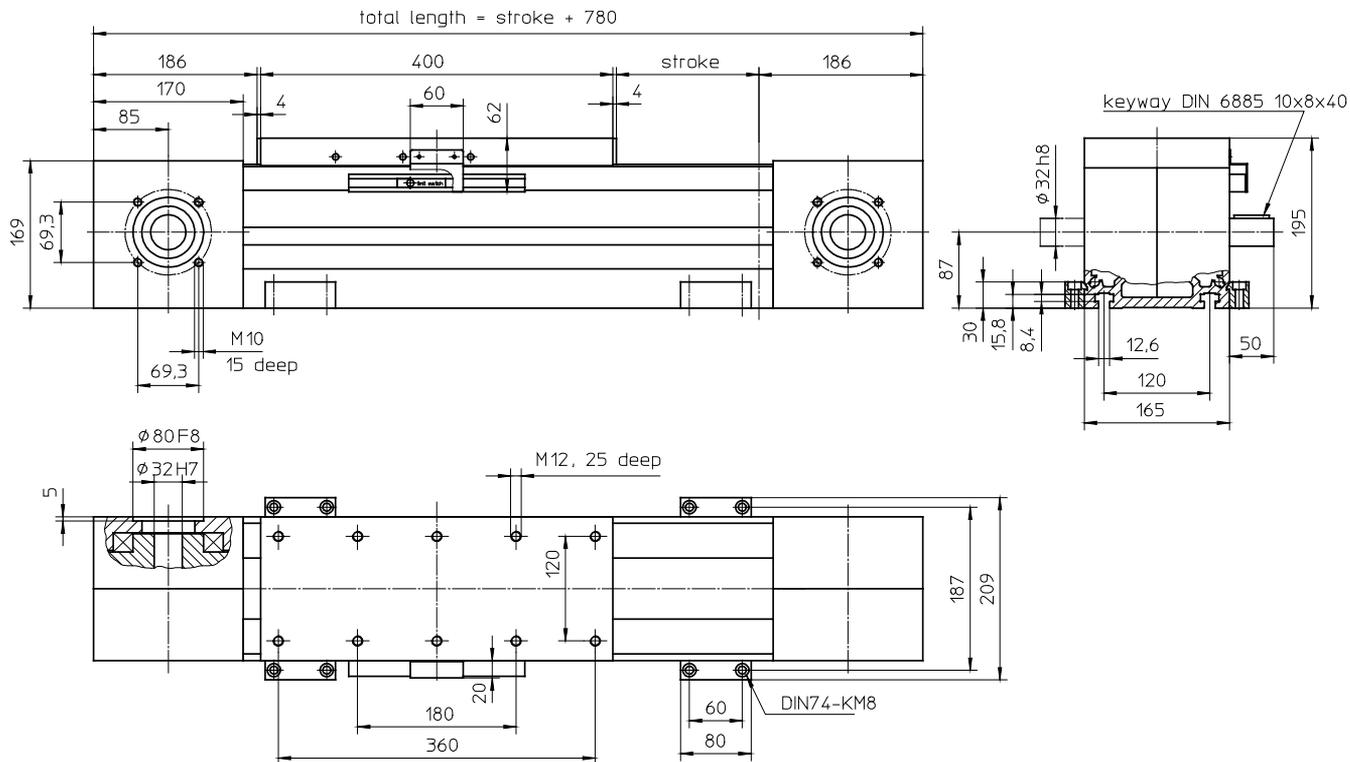
## Screw supports SA



\* MM only for pitch 5 / 10 / 25 possible

\*\* max. data for ball screw 2510

with tooth belt drive and integrated linear guide



## Weights

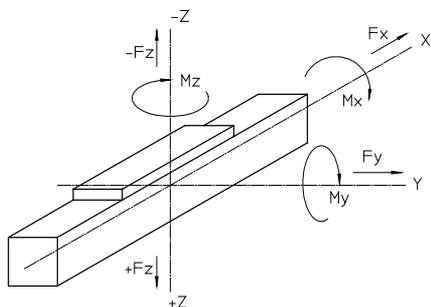
## ZSS

Basic length, no stroke:	42.40 kg
100 mm stroke:	3.50 kg
Carriage:	11.90 kg
Mass inertia:	0.085 kgm <sup>2</sup>

## Technical data

Linear speed:	up to 8 m/s
Repeatability:	± 0.08 mm
Acceleration:	60 m/s <sup>2</sup>
Idle torque:	12 Nm
Drive element:	tooth belt 75 AT 20
Stroke per revolution:	440 mm
Total length:	up to 7700 mm (longer on request)

## Loads and load moments

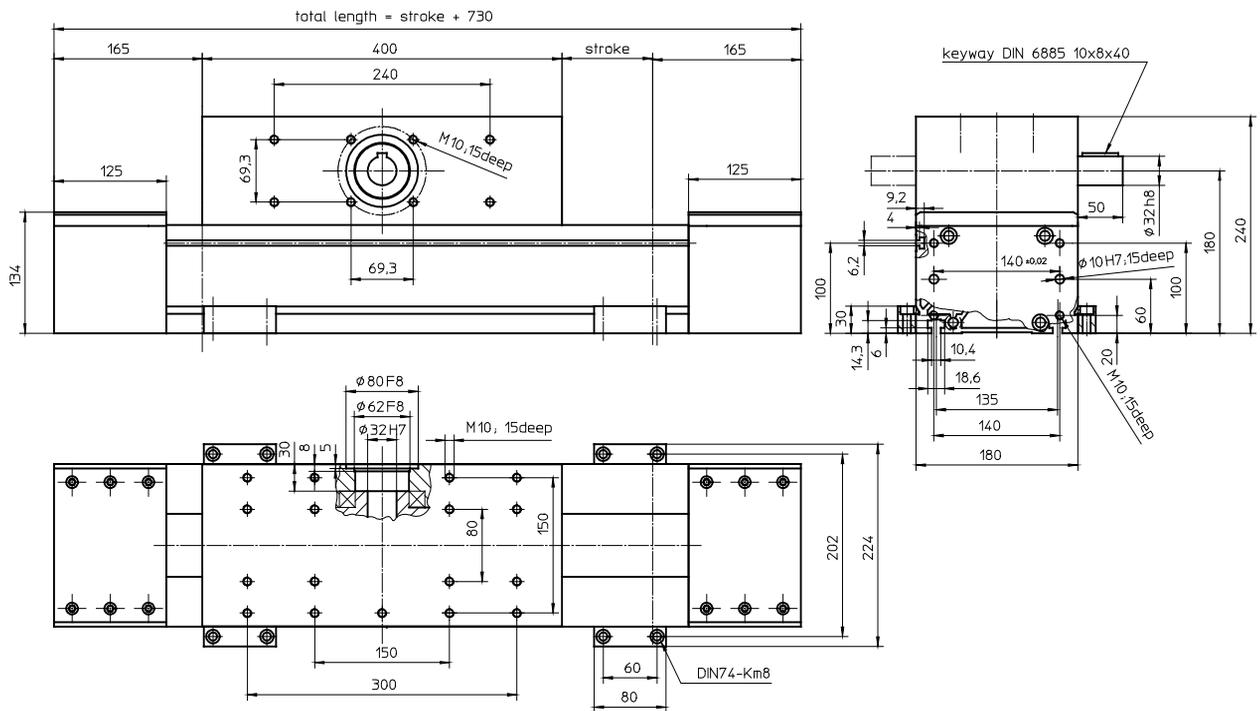


Type	with linear guide (ZSS)
Load	dynamic [N]
Fx	10000
Fy	5000
Fz	15000
-Fz	8000
Load moment	dynamic [Nm]
Mx	700
My	1400
Mz	1100

# Mechanical Linear Drive Beta 180 - ASS

16.10.2002

with tooth belt drive, double linear guide



## Weights

Basic length, no stroke:  
100 mm stroke:  
Carriage:

Mass inertia:

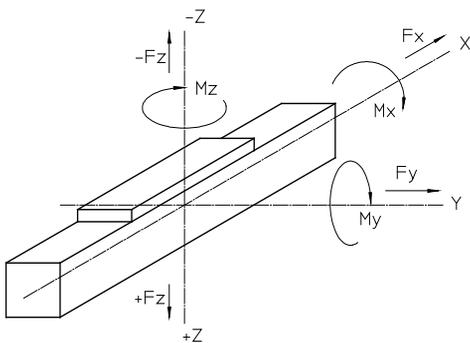
## ASS

48.90 kg  
2.80 kg  
25.60 kg  
  
0.062 kgm<sup>2</sup>

## Technical data

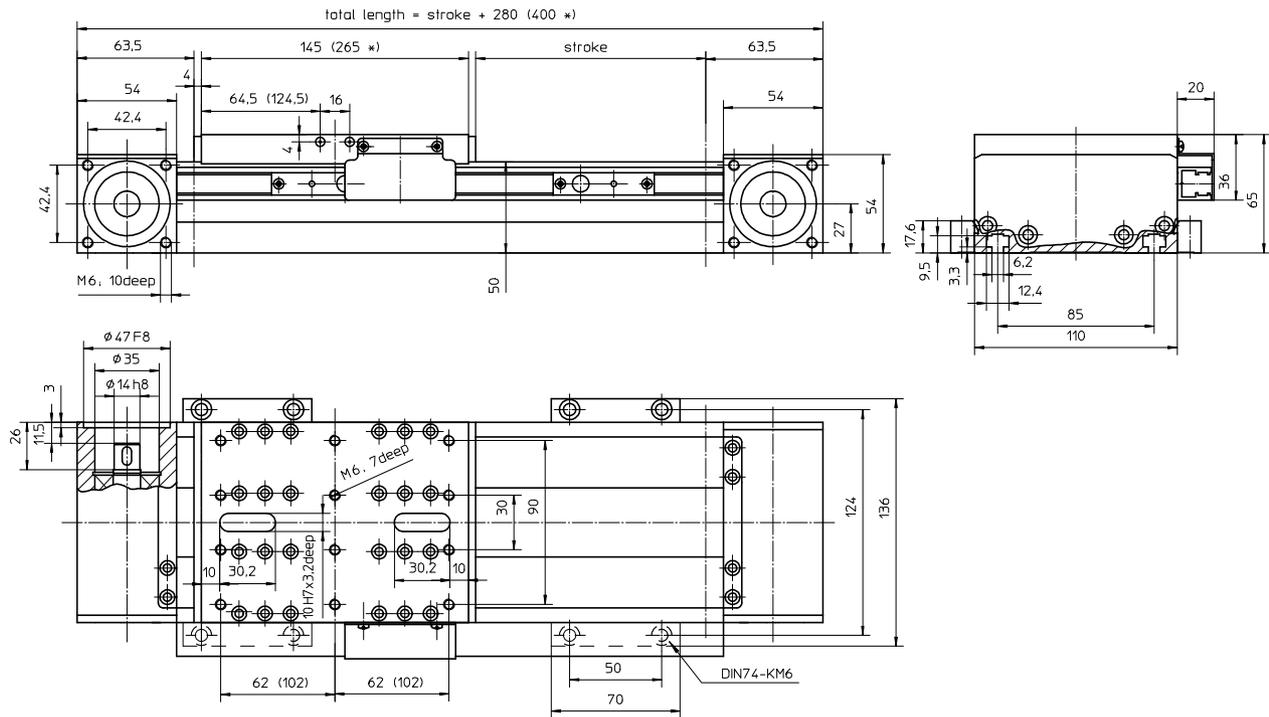
Linear speed: max. 8 m/s  
Repeatability: ± 0.08 mm  
Acceleration: max. 60 m/s<sup>2</sup>  
Idle torque: 8 Nm  
Drive element: tooth belt 75 AT 10  
Stroke per revolution: 320 mm  
Total length: up to 8200 mm (longer on request)

## Loads and load moments



Type	with linear guide (ASS)
Load	dynamic [N]
Fx	6000
Fy	6000
Fz	12000
-Fz	6000
Load moment	dynamic [Nm]
Mx	1500
My	3000
Mz	1500

# with tooth belt drive and integrated double linear guide



## Weights

Basic length, no stroke:  
 100 mm stroke:  
 Carriage:  
 Mass inertia:

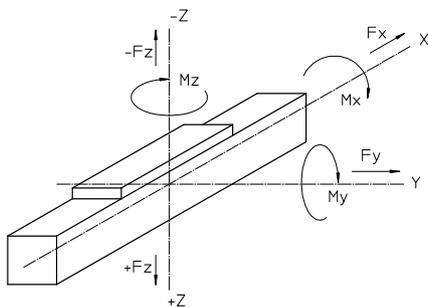
## ZSS

6.80 kg  
 1.00 kg  
 2.80 kg  
 0.0003 kgm<sup>2</sup>

## Technical data

Linear speed: max. 5 m/s  
 Repeatability: ± 0.08 mm  
 Acceleration: max. 40 m/s<sup>2</sup>  
 Idle torque: 1.6 Nm  
 Drive element: tooth belt 25 AT5  
 Stroke per revolution: 90 mm  
 Total length: up to 1500 mm

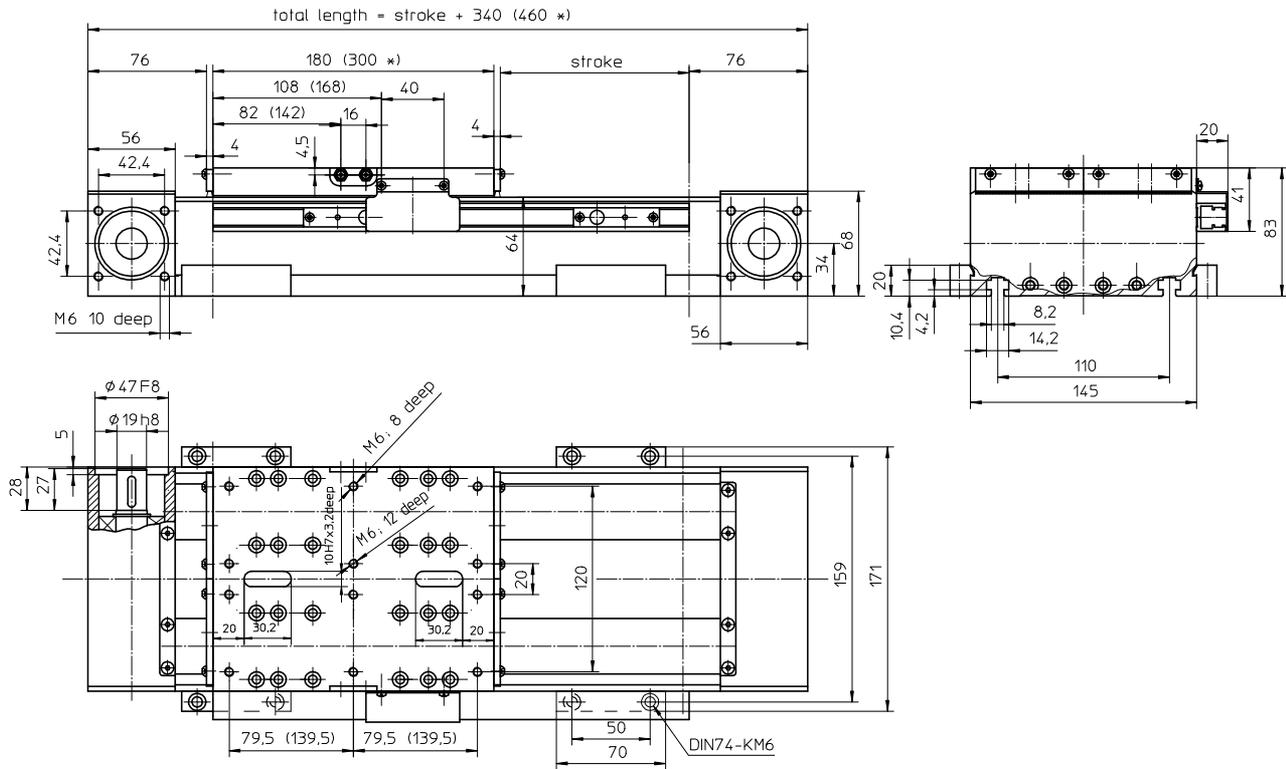
## Loads and load moments



Type	with linear guide (ZSS)
Load	dynamic [N]
F <sub>x</sub>	1000
F <sub>y</sub>	1200
F <sub>z</sub>	3000
-F <sub>z</sub>	1500
Load moment	dynamic [Nm]
M <sub>x</sub>	500
M <sub>y</sub>	650
M <sub>z</sub>	650

\* data in ( ) refers to 265 mm long carriage

# with tooth belt drive and integrated double linear guide



## Weights

Basic length, no stroke:  
 100 mm stroke:  
 Carriage:  
 Mass inertia:

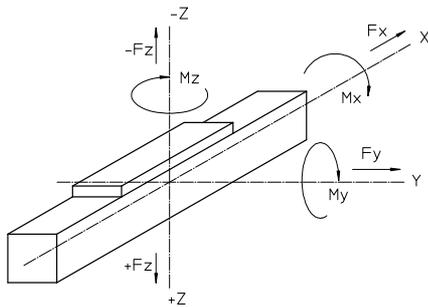
## ZSS

13.20 kg  
 1.40 kg  
 4.90 kg  
 0.0012 kgm<sup>2</sup>

## Technical data

Linear speed: max. 5 m/s  
 Repeatability: ± 0.08 mm  
 Acceleration: max. 40 m/s<sup>2</sup>  
 Idle torque: 2.2 Nm  
 Drive element: tooth belt 50 AT5  
 Stroke per revolution: 110 mm  
 Total length: up to 2000 mm

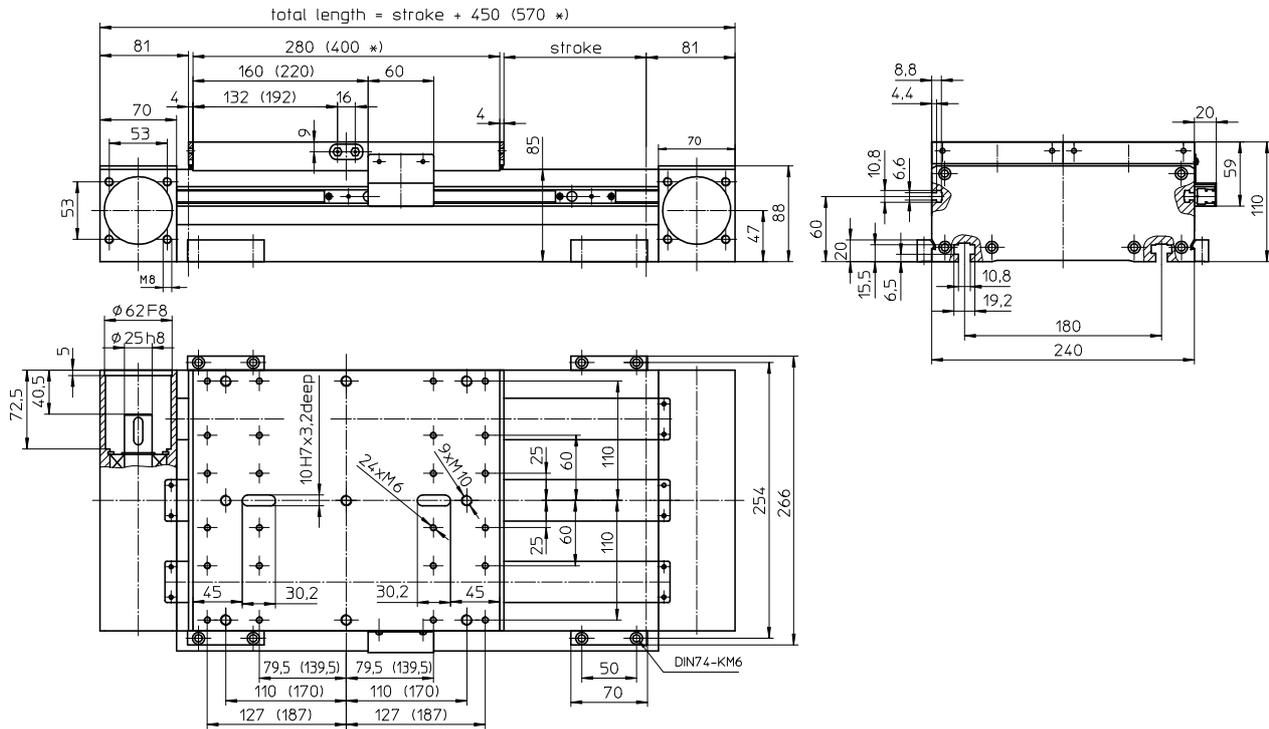
## Loads and load moments



Type	with linear guide (ZSS)
Load	dynamic [N]
Fx	2200
Fy	2500
Fz	5000
-Fz	3000
Load moment	dynamic [Nm]
Mx	800
My	1000
Mz	1000

\* data in ( ) refers to 300 mm long carriage

# with tooth belt drive and integrated double linear guide



## Weights

Basic length, no stroke:  
 100 mm stroke:  
 Carriage:  
 Mass inertia:

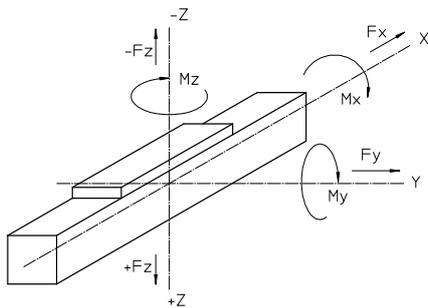
## ZSS

27.00 kg  
 3.20 kg  
 9.80 kg  
 0.020 kgm<sup>2</sup>

## Technical data

Linear speed: max. 5 m/s  
 Repeatability: ± 0.08 mm  
 Acceleration: max. 60 m/s<sup>2</sup>  
 Idle torque: 3.5 Nm  
 Drive element: tooth belt 50 AT10-E  
 Stroke per revolution: 150 mm  
 Total length: up to 4000 mm (longer on request)

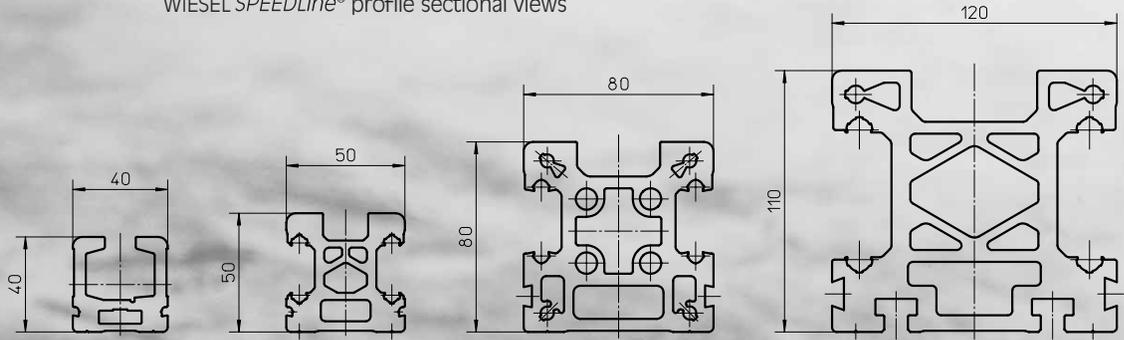
## Loads and load moments



Type	with linear guide (ZSS)
Load	dynamic [N]
Fx	3000
Fy	6000
Fz	12000
-Fz	8000
Load moment	dynamic [Nm]
Mx	4500
My	6000
Mz	4500

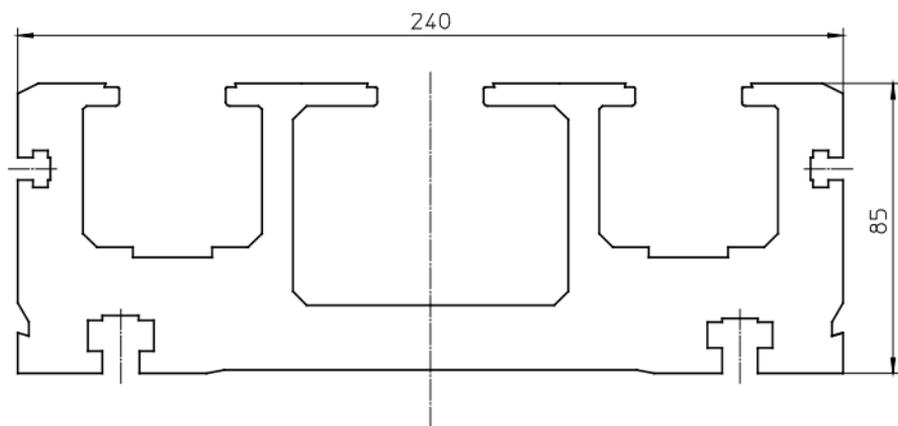
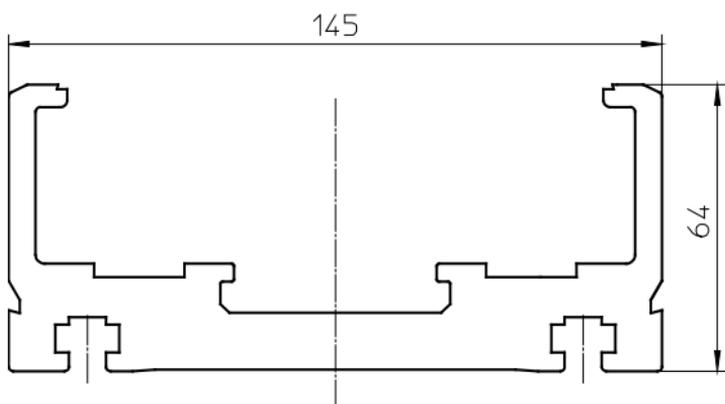
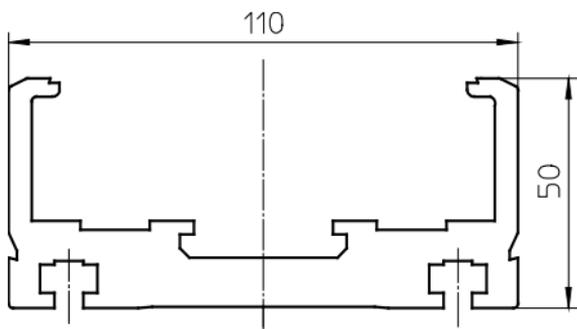
\* data in ( ) refers to 400 mm long carriage

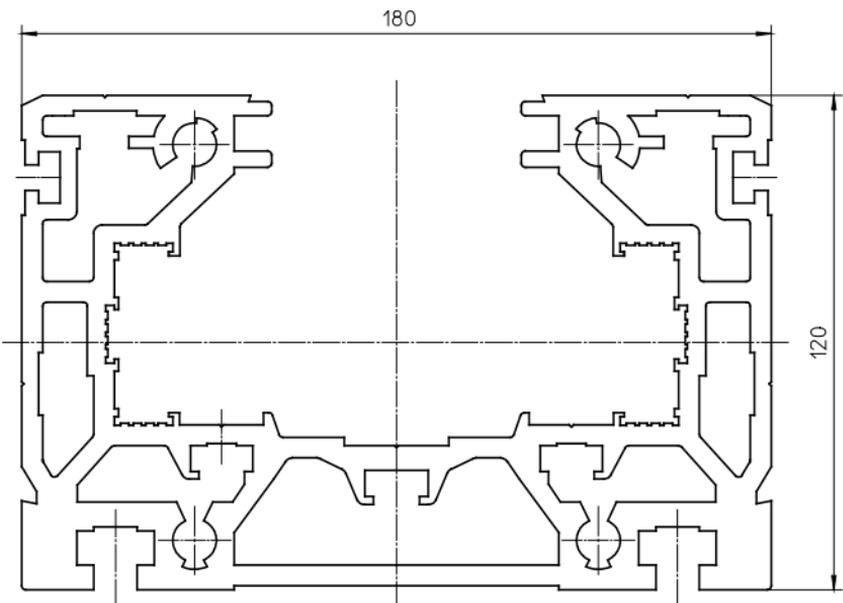
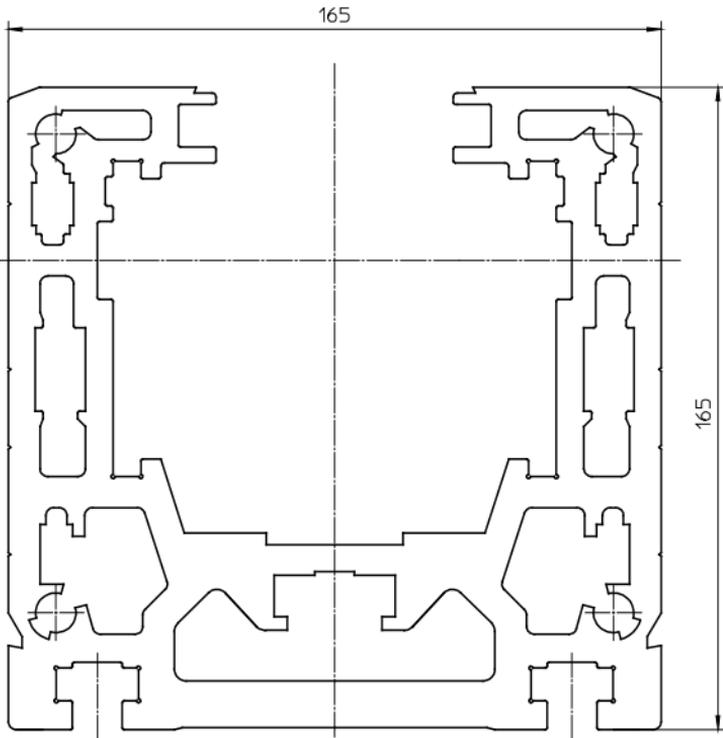
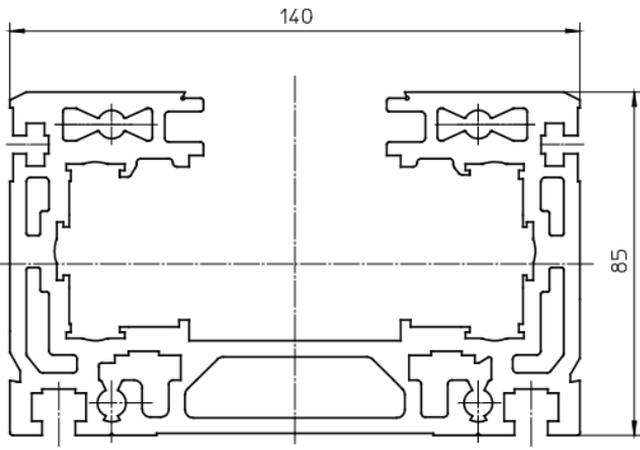
WIESEL SPEEDLine® profile sectional views



Tolerances of outer dimensions according to DIN 17615 part 3







# Drive selection

## for linear drive units with toothed belt drive

### Feed force $F_x$ [N]

$$F_x = m \cdot g \cdot \mu$$

### Acceleration force $F_a$ [N]

$$F_a = m \cdot a$$

In vertical applications, the mass acceleration  $a$  must be added to the acceleration due to gravity  $g$  [9.81 m/s<sup>2</sup>].

### Power from torque and rotational speed [kW]

$$P = \frac{M_A \cdot n_{\max} \cdot 2 \cdot \pi}{60 \cdot 1000}$$

### Definitions

$M_A$ = Required drive moment [Nm]	$m$ = Mass to be transported [kg] <sup>1)</sup>
$M_{\text{load}}$ = Moment resulting from the various loads [Nm]	$a$ = Acceleration [m/s <sup>2</sup> ]
$M_{\text{idle}}$ = Idle torque [Nm]	$d_o$ = Effective diam. of pulley [mm] <sup>2)</sup>
$M_{\text{rot}}$ = Rotational acceleration moment [Nm]	$P$ = Power [kW]
$M_{\text{trans}}$ = Translational acceleration moment [Nm]	$L$ = WIESEL® length [mm]
$F_x$ = Feed force [N]	$J_{\text{syn}}$ = Idle torque of pulley [kgm <sup>2</sup> ]
$F_a$ = Acceleration force [N]	$n_{\max}$ = Maximum rotational speed [rpm]
$g$ = Acceleration due to gravity [m/s <sup>2</sup> ]	$\mu$ = Friction factor
$V_{\max}$ = Maximum linear speed [m/s]	

### Calculating the drive moment $M_A$ [Nm]

The required drive moment is composed of the "load moment", the "acceleration moment" and the "idle torque".

$$M_A = M_{\text{load}} + M_{\text{trans}} + M_{\text{rot}} + M_{\text{idle}}$$

The value for the respective idle torque can be found with the corresponding mechanical linear drive units.

$$M_{\text{rot}} = J_{\text{syn}} \cdot \frac{2 \cdot \pi \cdot n_{\max}}{60} \cdot \frac{a}{V_{\max}}$$

$$M_{\text{trans}} = \frac{F_a \cdot d_o}{1000 \cdot 2}$$

$$M_{\text{load}} = \frac{F_x \cdot d_o}{1000 \cdot 2}$$

$M_A \text{ Total} =$

Type	$\mu$	$J_{\text{syn}}$ [kgm <sup>2</sup> ]	Spec. mass tooth belt [kg/m]
WH40	0.05	8.800 E-06	0.032
WH50	0.1	1.928 E-05	0.055
WH80	0.1	2.473 E-04	0.210
WH120	0.1	1.004 E-03	0.340

Type	$\mu$	$J_{\text{syn}}$ [kgm <sup>2</sup> ]	Spec. mass tooth belt [kg/m]
WHZ50	0.1	6.906E-05	0.055
WHZ80	0.1	5.026E-04	0.114
WM60 ZRT	0.1	2.127E-05	0.074
WM80 ZRT	0.1	1.115E-04	0.158
MLSH60 ZRT	0.1	4.604E-05	0.114

<sup>1)</sup> Total mass  $m$  = mass to be moved + mass of power bridge <sup>3)</sup> + mass of toothed belt

Mass of toothed belt = spec. mass of tooth belt [kg/m] · 2<sup>4)</sup> ·  $\frac{\text{WIESEL}^\circ\text{-length [mm]}}{1000}$

<sup>2)</sup> Values for the respective effective diametres, see at corresponding mechanical linear units.

<sup>3)</sup> For Z-axis moved dead mass to be taken into account.

<sup>4)</sup> To replace by 1 at Z-Axis

# General technical data

## WIESEL SPEEDLine®

### Speeds

The linear speed achieved by a linear drive unit depends on the pitch of the mechanical drive element and on the input rotational speed. The various linear speeds which can be achieved by the individual sizes are listed in the following table:

Size	Lead [mm/rev.]	$n_{\max}$ [rpm]	$v_{\max}$ [m/s]
WH40	100	1800	3
WH50/WHZ50	120	3250	6.5
WH80/WHZ80	200	3000	10
WH120	260	2308	10

### Installed position

The linear drive units can basically be installed in any position, provided that all the forces and moments occurring remain below the maximum values for the axis concerned.

### Safety advice

All sizes are generally **not self-locking**. It is therefore advisable to install suitable motors with holding brakes, particularly if the linear drive unit is installed vertically.

In case of a breakage of the toothed belt the load is released instantly. Therefore safety precautions have to be taken for applications which are critical with regard to safety.

### Loading

All specified maximum forces and moments refer to the centre/top of the power bridge. Load overlay at several coordinates: If compound loads occur with force and moment components in more than one direction, the maximum permissible loads must be reduced to 60% of the specified maximum values. When forces and moments are overlaid in two or three coordinates, it is necessary to reduce the maximum permissible load to 60% of the maximum value.

### Load ratings

See page 120

### Operating hours

The toothed belt as well as the roller guideway/linear guide allow continuous operation up to 100%. Extremely high loads, combined with long operating hours may reduce the lifetime.

### Temperatures

All series are designed for continuous operation at ambient temperatures up to 80°C. Temperatures up to 100°C are also permitted for brief periods. The linear drive units are not suited for operation at subzero temperatures.

### Idle torque

The indicated values for the idle torque are mean values determined in a rank. In individual cases these values can deviate.

### Straightness/torsion

The aluminium profiles (material AlMgSi 0.5) are extruded sections which may display deviations in straightness and torsion due to their manufacturing process. The tolerance of these deviations is defined in DIN 17615. The deviations found in NEFF linear drive units correspond to these limits at least, but are normally well below. In order to obtain the required guide accuracy, the linear drive unit must be aligned with the aid of levelling plates or clamped from a mounting surface machined with sufficient accuracy. This ensures that tolerances of at least 0.1 mm/1000 mm are achieved.

### Guide tube

A guide tube contains all elements of a linear drive unit except the mechanical drive element. It serves mainly as a support and holding capacity for higher loads and moments. For this purpose it is either mounted on the backside of a driven WIESEL® or installed parallel to it. All WIESEL® models are also available as guide tubes with guide.

### Stroke lengths

The stroke length specified in the order code represents the maximum possible linear displacement. Acceleration and deceleration paths must be taken into account when designing the system, as well as any required over-run.

### Repeatability

The repeatability is defined as the capability of a linear drive to get back to an actual position which was reached under the same conditions within the given tolerances. The repeatability amongst others is influenced by:

- Load
- Speed
- Deceleration
- Direction of travel
- Temperature

### Aggressive working environment

Because of their tough design WIESEL SPEEDLine® units can be used even in rough surroundings without additional covering. As a protection against coarse dirt optional wipers can be offered. In case of extreme dirt or fine dust/ filings a protective bellow is recommended and provided on request.

### Maintenance

#### Lubrication WH40

The linear guide must be lubricated via the grease nipple on the power bridge with the aid of a grease gun after 400 hours of operation or at least every 3 months. Grease: roller bearing grease (original grease: Fuchs Lubritech URETHYN E/M2).

#### Lubrication WH50/80/120

In order to obtain a useful lifetime of the guidance system the two guides should be permanently covered with a thin oil film. The two lubrication points which are arranged at the sides of the power bridge serve for lubrication.

#### Tensioning of toothed belt

The tension of the toothed belt can be adjusted with the aid of the tensioning screws on the guide casing which are intended for this. The linear units are delivered with optimal tension values in order to guarantee security in function. Changes in this adjustment must only be carried out in service cases and by NEFF service engineers.

#### Pretensioning of the guidance system

The WIESEL® units leave the factory with optimal preloading values which guarantee optimum travelling characteristics as well as the necessary capacity in forces and moments. Changes in the preloading of the rollers must only be carried out after prior consultation with NEFF service engineers.

