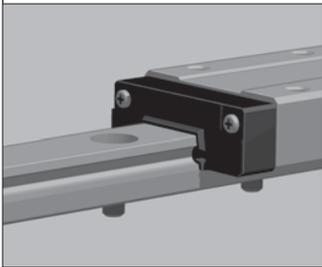
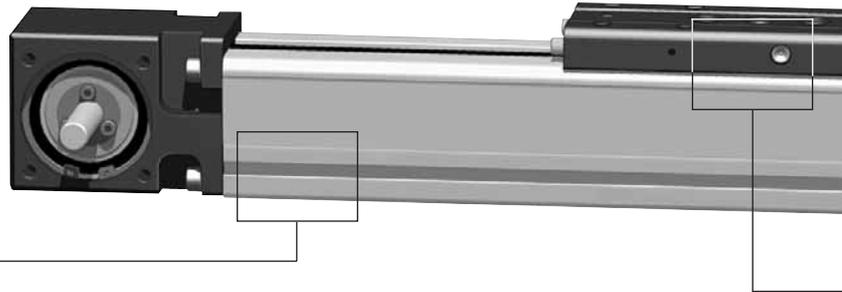


WIESEL *SPEEDLine*[®]

New technology right to the centre!

WIESEL *SPEEDLine*[®] 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.

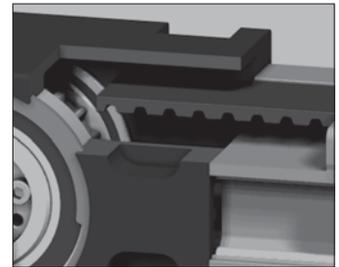


AT toothed belt

A proven drive element:

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

Powered by **ATL *belt***



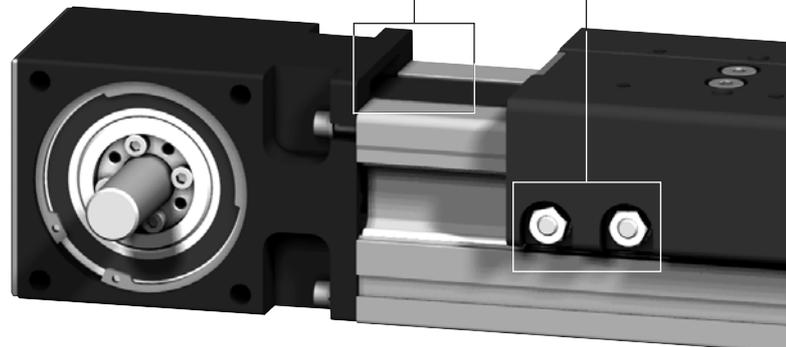
ATL toothed belt

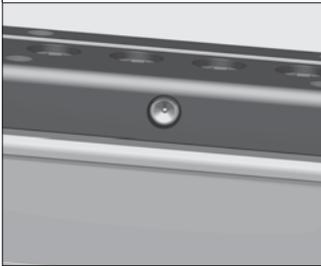
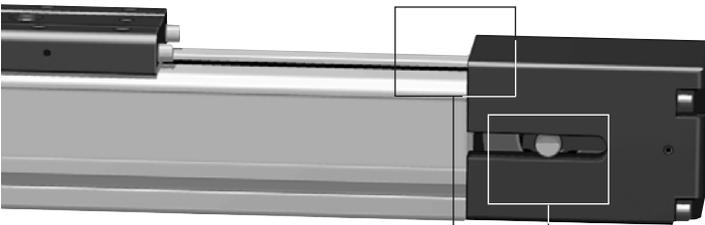
- with steel reinforcement especially suitable for linear drive units
- higher performance
- repeatability of ± 0.05 mm even at high feed forces

WIESEL *SPEEDLine*[®] WH50. WH80. WH120 WHZ50. WHZ80

With the WIESEL *SPEEDLine*[®] single-axis solutions can be realized as well as two- and three-dimensional handling systems.

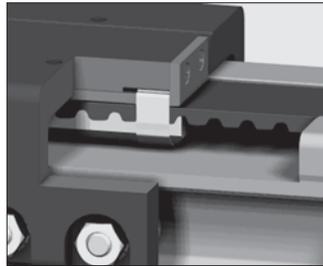
The WIESEL *SPEEDLine*[®] Z-axis is especially suitable for vertical movements. High dynamics and loads due to the reduced mass to be moved and the short design.





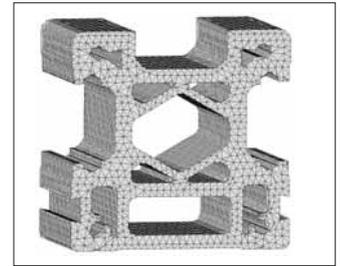
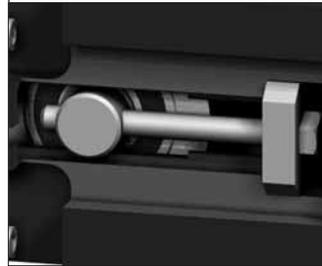
Central lubrication

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



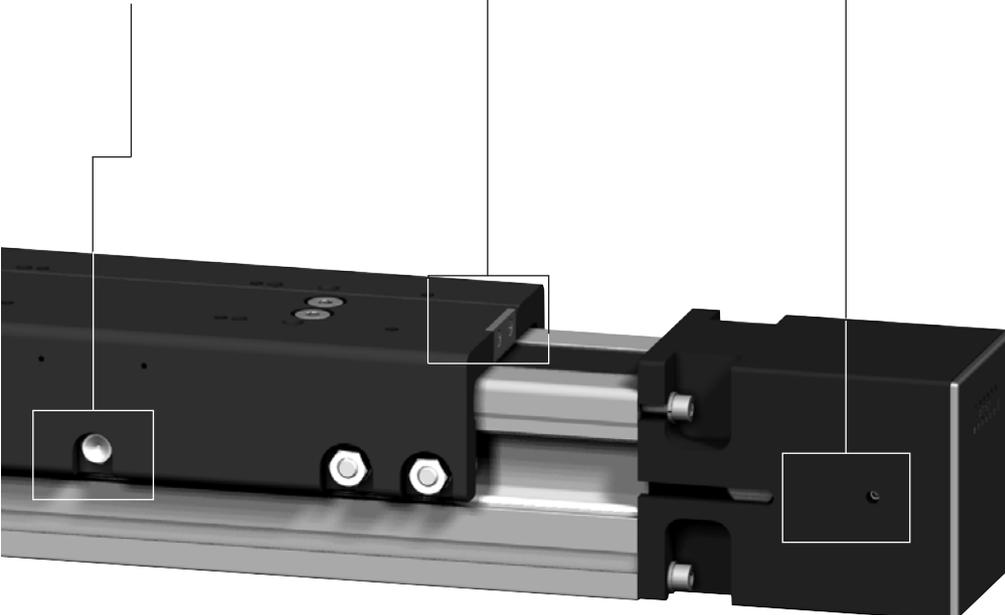
Tensioning and exchange of toothed belt

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

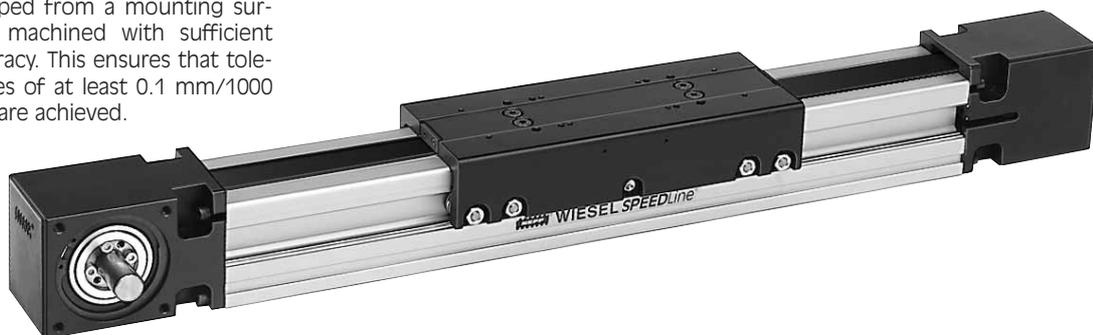
In order to obtain a useful lifetime of the guidance system the two guides should be permanently covered with a thin oil film. The two lubrication points which are arranged at the sides of the power bridge serve for lubrication.

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.

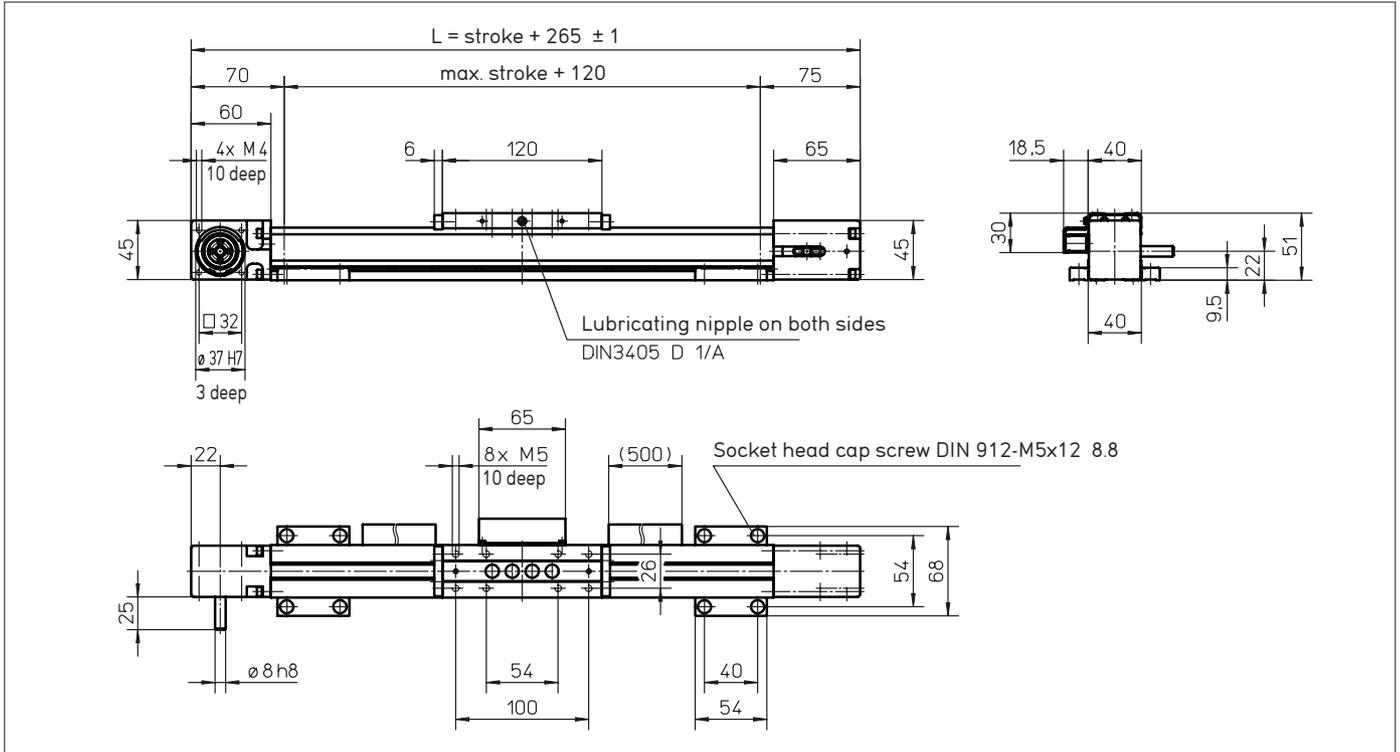
Pretensioning of the guidance system

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



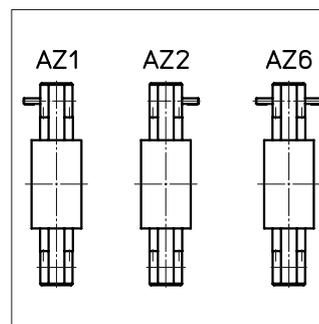
Note: The use of a long power bridge increases the total length.

Technical data

- Linear speed: _____ max. 3.0 m/s
- Repeatability: _____ ± 0.05 mm
- Acceleration: _____ max. 40 m/s²
- 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 · 10⁴ mm⁴
lz 15.3 · 10⁴ mm⁴
- 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

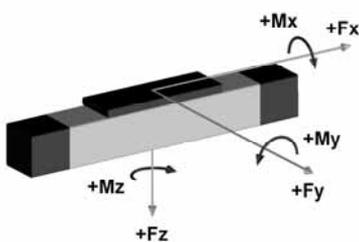
(Detailed description see page 123)
Other executions on request.



Idle torques [Nm]

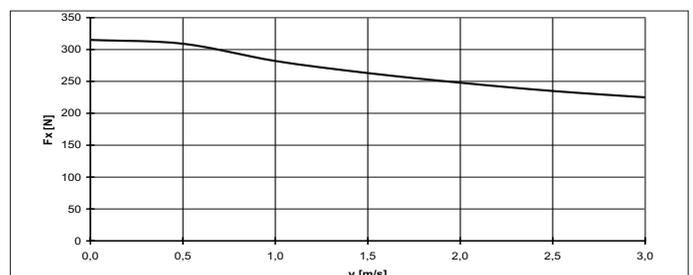
| Rotational speed [rpm] | M _{idle} [Nm] |
|------------------------|------------------------|
| 150 | 0.1 |
| 900 | 0.3 |
| 1800 | 0.6 |

Loads and load moments



| Load | dynam. [N] |
|------------------------|-------------|
| Fx drive ¹⁾ | max. 315 |
| Fy | 450 |
| ±Fz | 600 |
| Load moment | dynam. [Nm] |
| Mx | 10 |
| My ²⁾ | 30 |
| Mz ²⁾ | 30 |

Fx depending on the linear speed



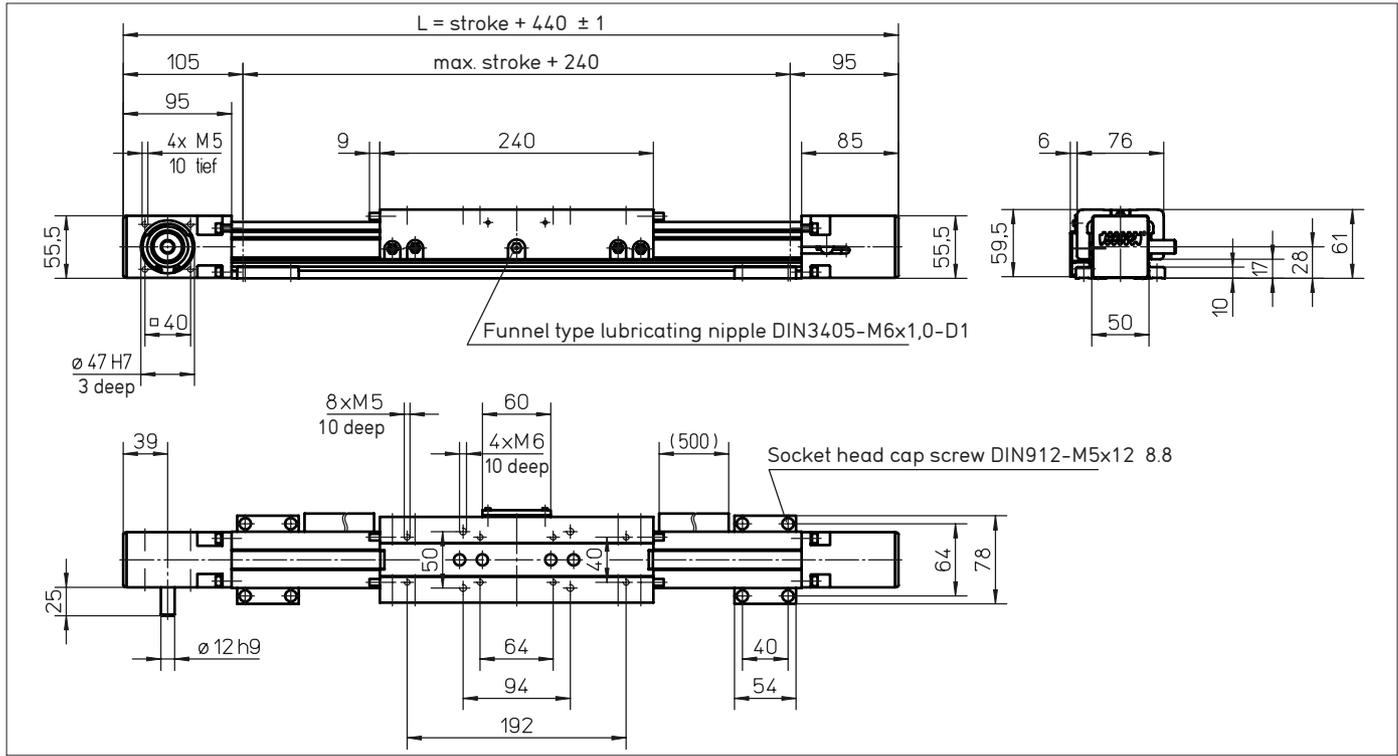
Order Code see page 123

¹⁾ Depending on the speed, see respective chart.

²⁾ 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



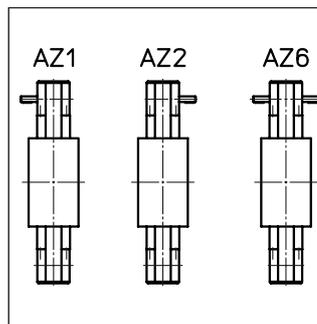
Note: In the section of the rail for the initiators the WIESEL® can not be fixed by means of KAO mounting brackets. Mounting kit for the lateral assembly of the initiators at the sides of the axis on request. Mounted wipers on request. The use of a long power bridge increases the total length.

Technical data

- Linear speed: _____ max. 6.5 m/s
- Repeatability: _____ ± 0.05 mm
- Acceleration: _____ max. 40 m/s²
- 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 $3.30 \cdot 10^5$ mm⁴
 I_z $2.65 \cdot 10^5$ mm⁴
- 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

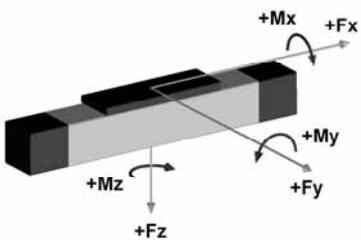
(Detailed description see page 123)
Other executions on request.



Idle torques [Nm]

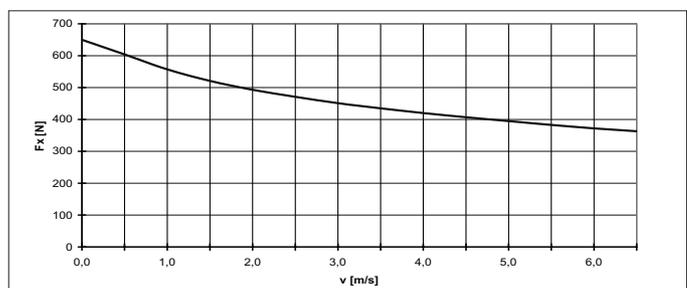
| Rotational speed [rpm] | M _{idle} [Nm] |
|------------------------|------------------------|
| 150 | 1.7 |
| 1500 | 2.4 |
| 3250 | 3.8 |

Loads and load moments



| Load | dynam. [N] |
|------------------------|-------------|
| Fx drive ¹⁾ | max. 670 |
| Fy | 415 |
| ±Fz | 730 |
| Load moment | dynam. [Nm] |
| Mx | 16 |
| My ²⁾ | 87 |
| Mz ²⁾ | 50 |

Fx depending on the linear speed



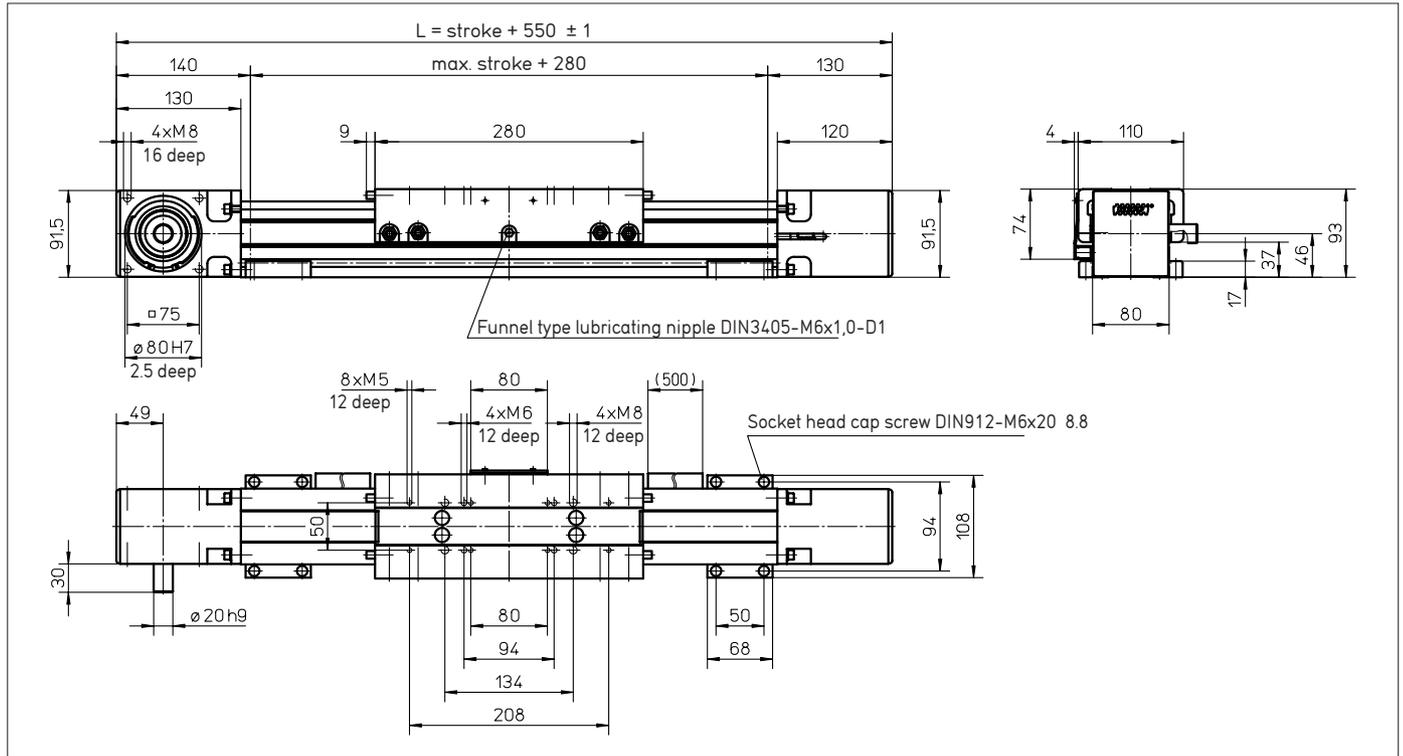
Order Code see page 123

¹⁾ Depending on the speed, see respective chart.

²⁾ 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



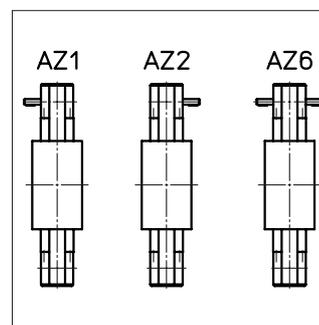
Note: Mounted wipers on request. The use of a long power bridge increases the total length.

Technical data

- Linear speed: _____ max. 10 m/s
- Repeatability: _____ ± 0.05 mm
- Acceleration: _____ max. 40 m/s²
- 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.

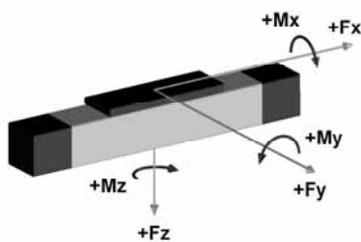


Idle torque [Nm]

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

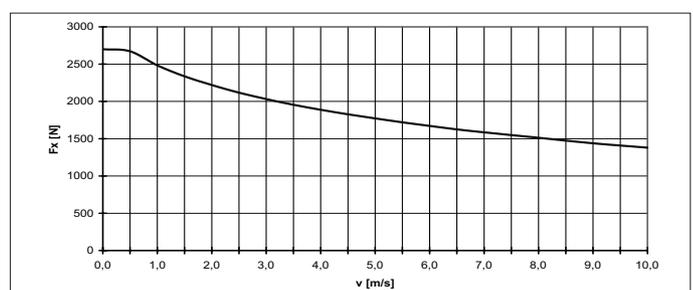
Note: For tube lengths of 6300 mm and over, the tubular profile is composed of two parts. The joint must be adequately supported. It may be possible to position the joint according to customer's wishes.

Loads and load moments



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

F_x depending on the linear speed



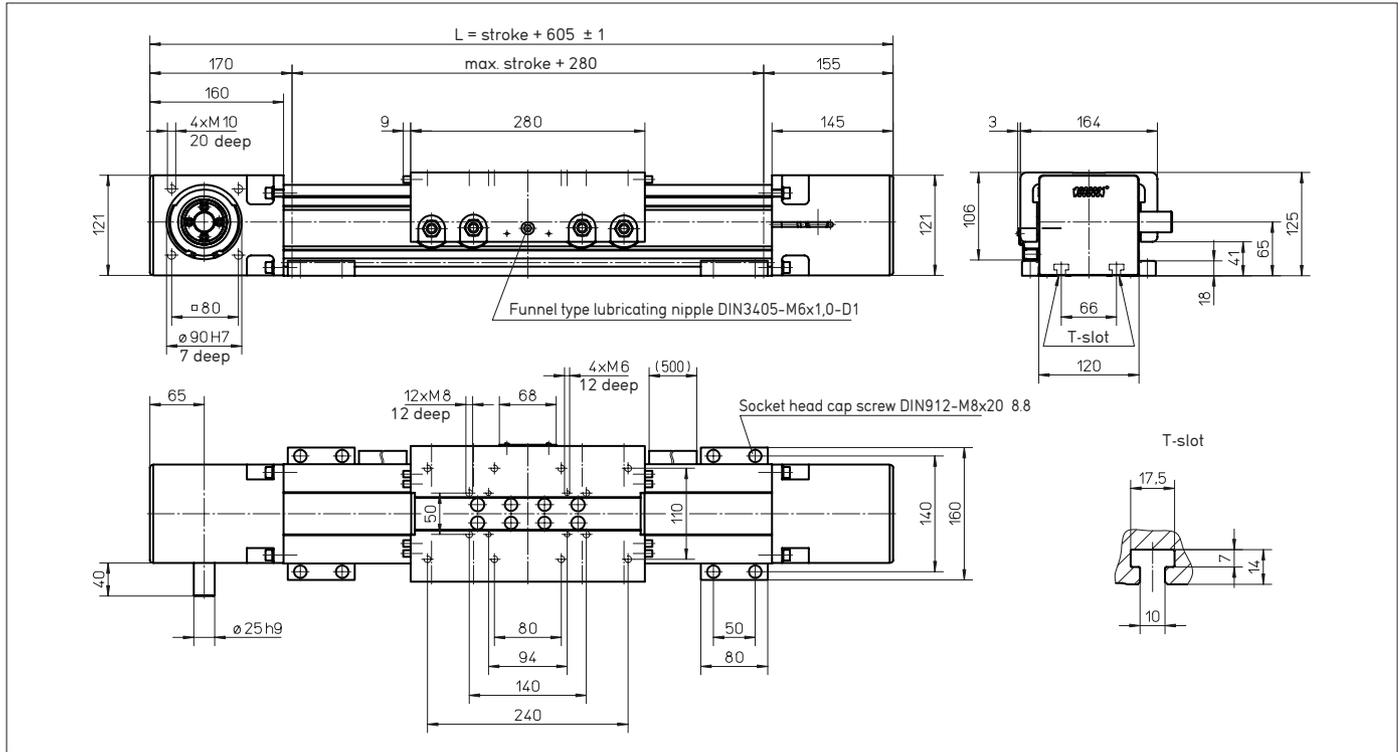
Order Code see page 123

¹⁾ Depending on the speed, see respective chart.

²⁾ 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



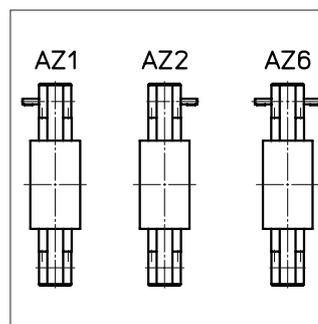
Note: Mounted wipers on request. The use of a long power bridge increases the total length.

Technical data

- Linear speed: _____ max. 10 m/s
- Repeatability: _____ ± 0.05 mm
- Acceleration: _____ max. 40 m/s²
- 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.

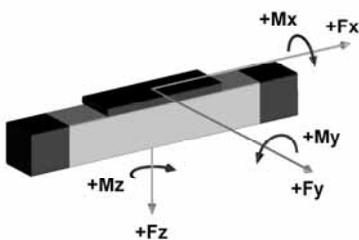


Idle torques [Nm]

| 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.

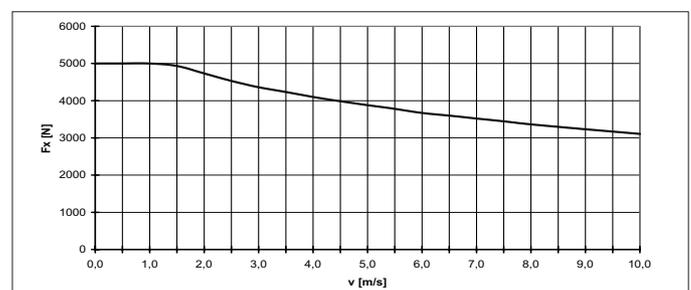
Loads and load moments



| Load | dynam. [N] |
|---------------------------|------------|
| F_x drive ¹⁾ | max. 5000 |
| F_y | 4980 |
| $\pm F_z$ | 9300 |

| Load moment | dynam. [Nm] |
|---------------------|-------------|
| M_x | 500 |
| M_y ²⁾ | 930 |
| M_z ²⁾ | 500 |

F_x depending on the linear speed



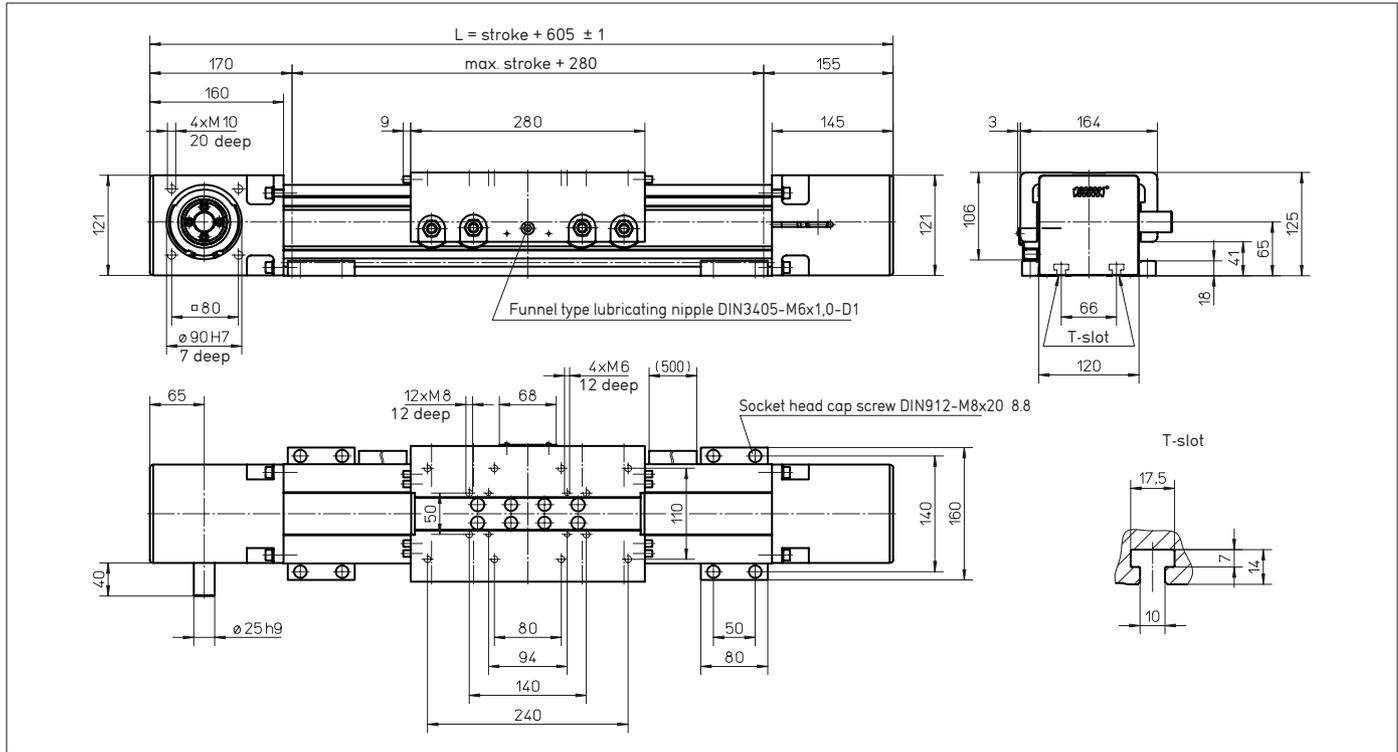
Order Code see page 123

¹⁾ Depending on the speed, see respective chart.

²⁾ 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



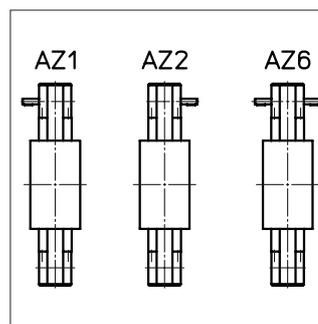
Note: Mounted wipers on request. The use of a long power bridge increases the total length.

Technical data

- Linear speed: _____ max. 10 m/s
- Repeatability: _____ ± 0.05 mm
- Acceleration: _____ max. 40 m/s²
- 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.

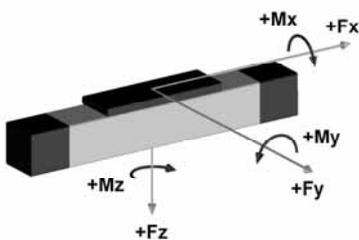


Idle torques [Nm]

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

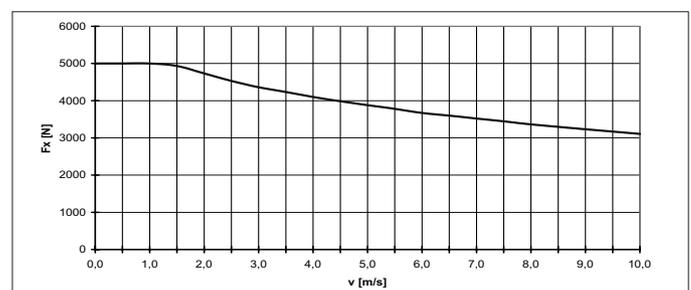
Note: For tube lengths of 4900 mm and over, the tubular profile is composed of two parts. The joint must be adequately supported. It may be possible to position the joint according to customer's wishes.

Loads and load moments



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

F_x depending on the linear speed



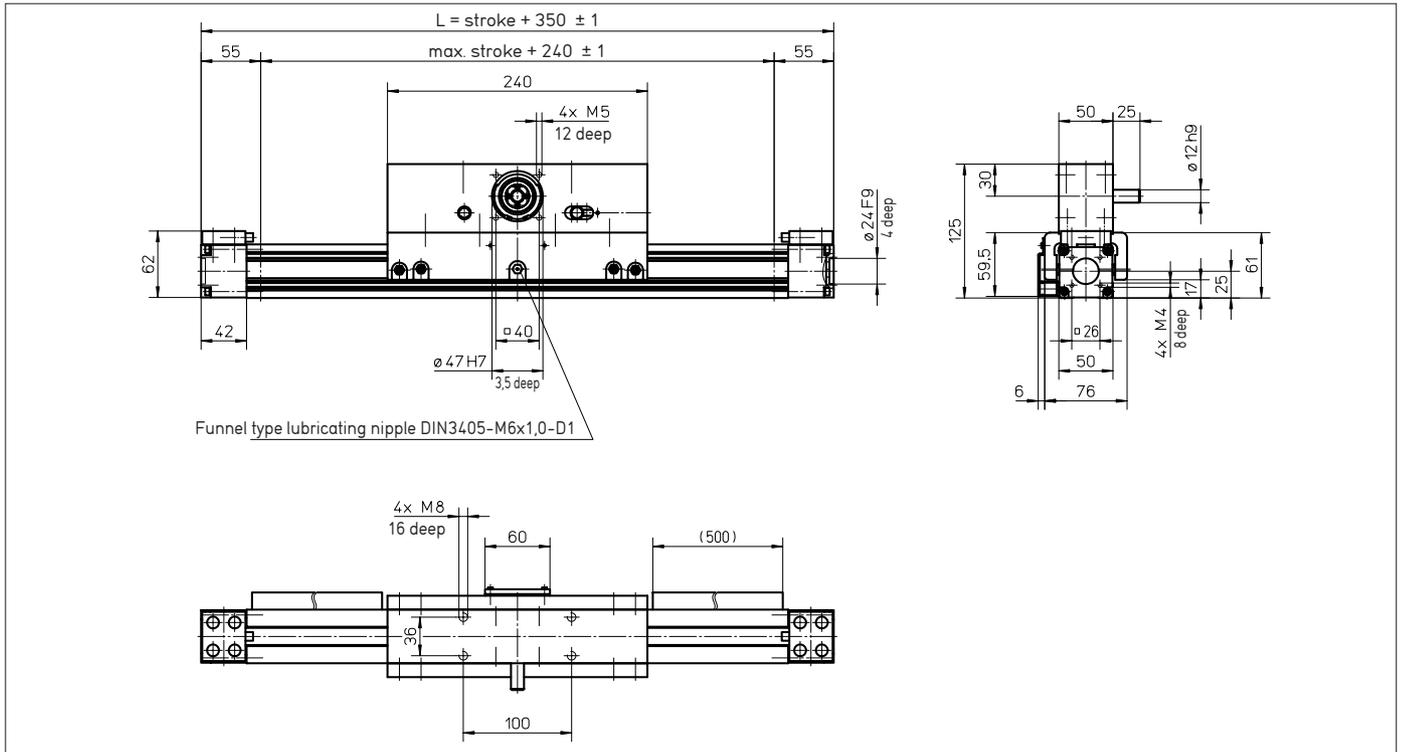
Order Code see page 123

¹⁾ Depending on the speed, see respective chart.

²⁾ 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



Funnel type lubricating nipple DIN3405-M6x1,0-D1

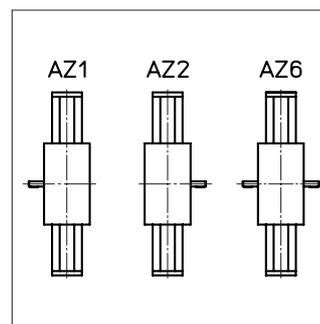
Note: In the section of the rail for the initiators the WIESEL® can not be fixed by means of KAO mounting brackets. Mounting kit for the lateral assembly of the initiators at the sides of the axis on request. Mounted wipers on request. The use of a long power bridge increases the total length.

Technical data

- Linear speed: _____ max. 6.5 m/s
- Repeatability: _____ ± 0.05 mm
- Acceleration: _____ max. 40 m/s²
- 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 · 10⁵ mm⁴
 I_z 2.65 · 10⁵ mm⁴
- 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

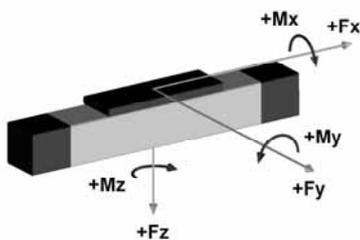
(Detailed description see page 123)
Other executions on request.



Idle torques [Nm]

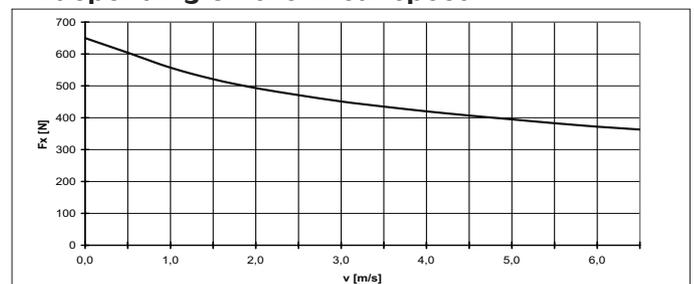
| Rotational speed [rpm] | M _{idle} [Nm] |
|------------------------|------------------------|
| 150 | 1.7 |
| 1500 | 2.4 |
| 3250 | 3.8 |

Loads and load moments



| | |
|------------------------------------|-------------|
| Load | dynam. [N] |
| F _x drive ¹⁾ | max. 670 |
| F _y | 415 |
| ±F _z | 730 |
| Load moment | dynam. [Nm] |
| M _x | 16 |
| M _y ²⁾ | 87 |
| M _z ²⁾ | 50 |

F_x depending on the linear speed

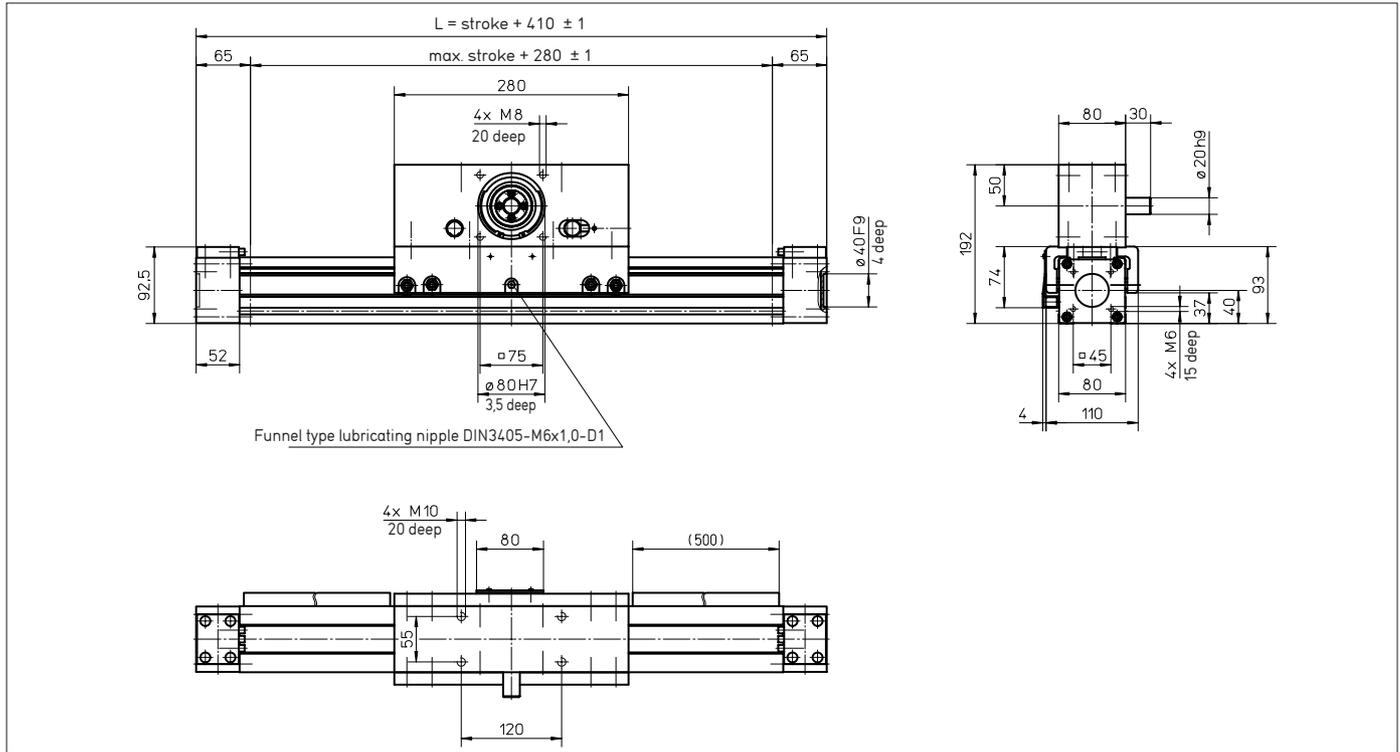


¹⁾ Depending on the speed, see respective chart.

²⁾ 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



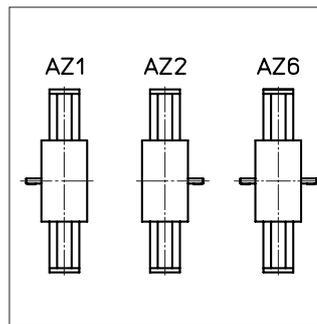
Note: Mounted wipers on request. The use of a long power bridge increases the total length.

Technical data

- Linear speed: _____ max. 10 m/s
- Repeatability: _____ ± 0.05 mm
- Acceleration: _____ max. 40 m/s²
- 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 $1.93 \cdot 10^6$ mm⁴
 I_z $1.80 \cdot 10^6$ mm⁴
- 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

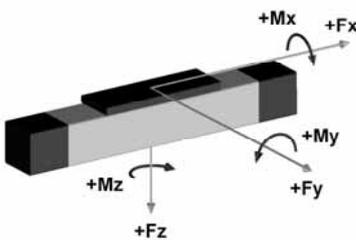
(Detailed description see page 123)
Other executions on request.



Idle torques [Nm]

| Rotational speed [rpm] | M _{idle} [Nm] |
|------------------------|------------------------|
| 150 | 2.4 |
| 1500 | 3.5 |
| 3000 | 5.0 |

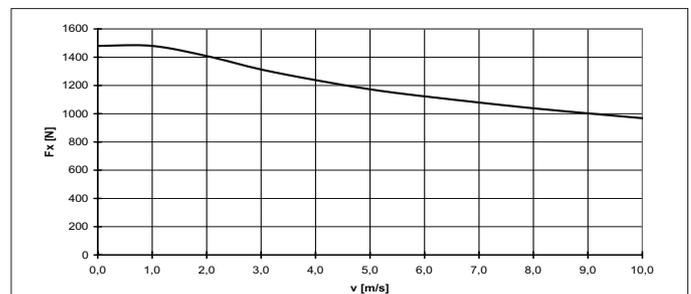
Loads and load moments



| Load | dynam. [N] |
|------------------------------------|------------|
| F _x drive ¹⁾ | max. 1480 |
| F _y | 882 |
| ±F _z | 2100 |

| Load moment | dynam. [Nm] |
|------------------------------|-------------|
| M _x | 75 |
| M _y ²⁾ | 230 |
| M _z ²⁾ | 100 |

F_x depending on the linear speed

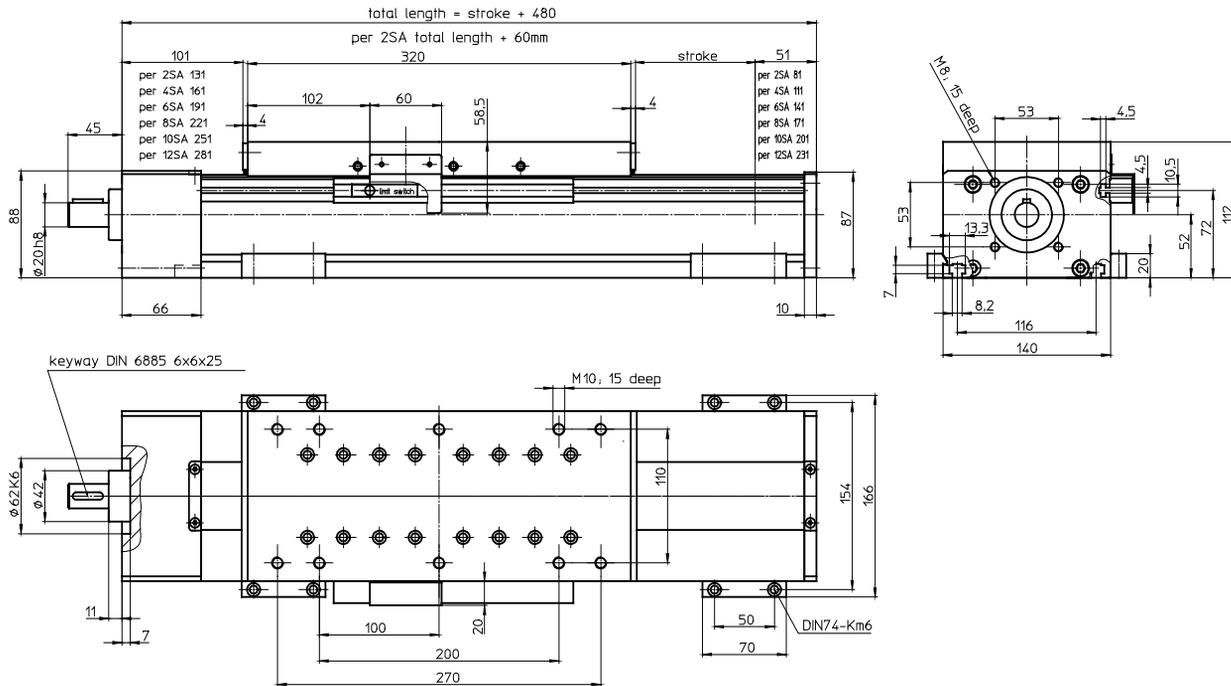


Order Code see page 123

¹⁾ Depending on the speed, see respective chart.

²⁾ 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 **
 ± 0.03 mm (ball screw)
max. 20 m/s²
2.2 kgcm²/m

ball screw drive:

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

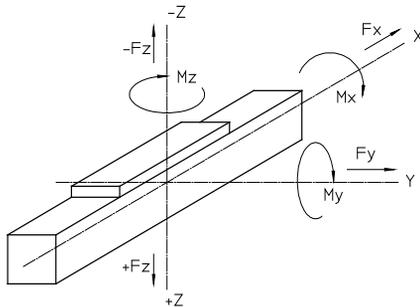
trapezoidal screw:

diameter: 24 mm
pitch: 5 mm

Total length:

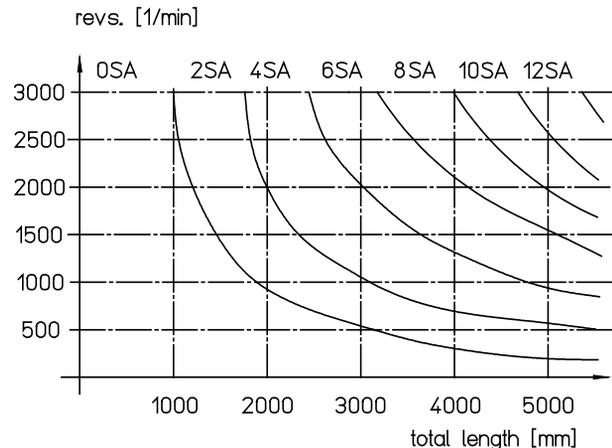
up to 5400 mm (longer on request)

Loads and load moments



| Type | with roller guideway (SRS) | with linear guide (SSS) |
|-------------------------|----------------------------|-------------------------|
| Load | dynamic [N] | dynamic [N] |
| F_x ** | 6000 | 6000 |
| F_y | 2500 | 2500 |
| F_z | 5000 | 6000 |
| -F_z | 3000 | 4000 |
| Load moment | dynamic [Nm] | dynamic [Nm] |
| M_x | 350 | 500 |
| M_y | 700 | 1000 |
| M_z | 700 | 1000 |

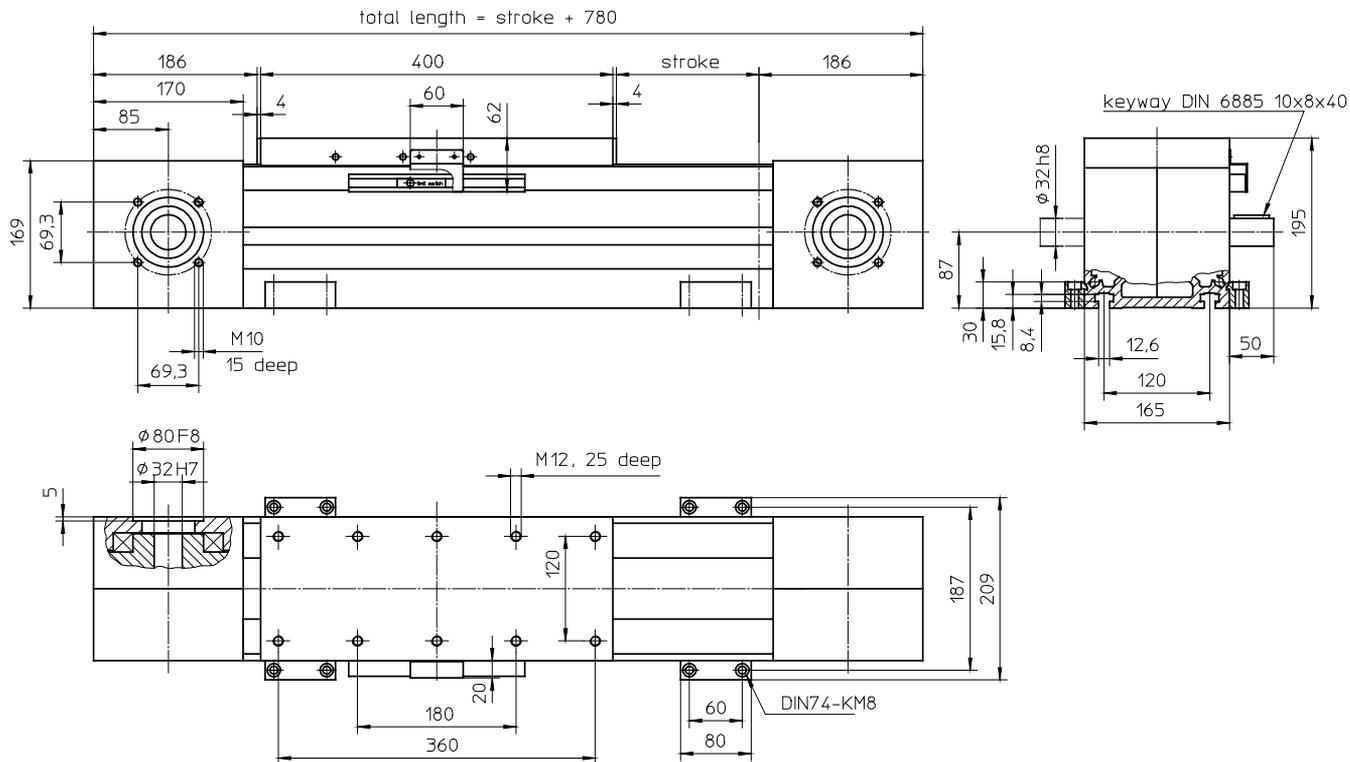
Screw supports SA



* MM only for pitch 5 / 10 / 25 possible

** max. data for ball screw 2510

with tooth belt drive and integrated linear guide



Weights

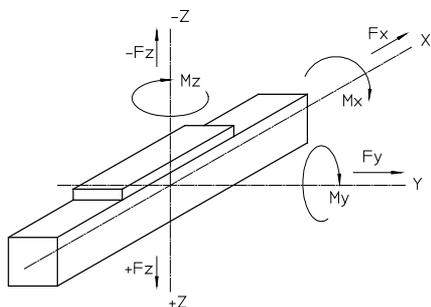
ZSS

| | |
|--------------------------|------------------------|
| Basic length, no stroke: | 42.40 kg |
| 100 mm stroke: | 3.50 kg |
| Carriage: | 11.90 kg |
| Mass inertia: | 0.085 kgm ² |

Technical data

| | |
|------------------------|-----------------------------------|
| Linear speed: | up to 8 m/s |
| Repeatability: | ± 0.08 mm |
| Acceleration: | 60 m/s ² |
| 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

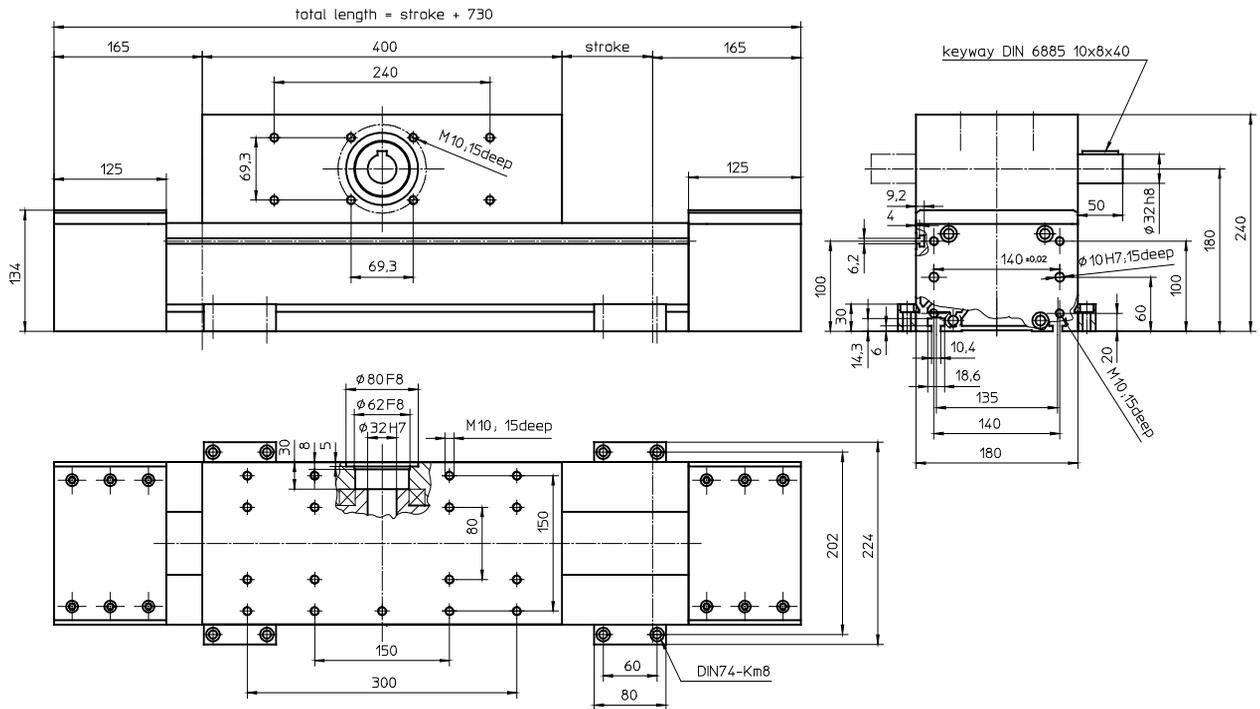


| Type | with linear guide (ZSS) |
|-------------|-------------------------|
| Load | dynamic [N] |
| Fx | 10000 |
| Fy | 5000 |
| Fz | 15000 |
| -Fz | 8000 |
| Load moment | dynamic [Nm] |
| Mx | 700 |
| My | 1400 |
| Mz | 1100 |

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

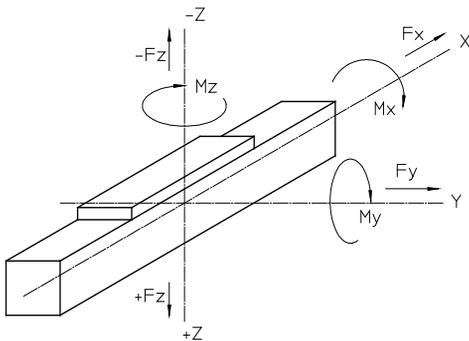
48.90 kg
2.80 kg
25.60 kg

0.062 kgm²

Technical data

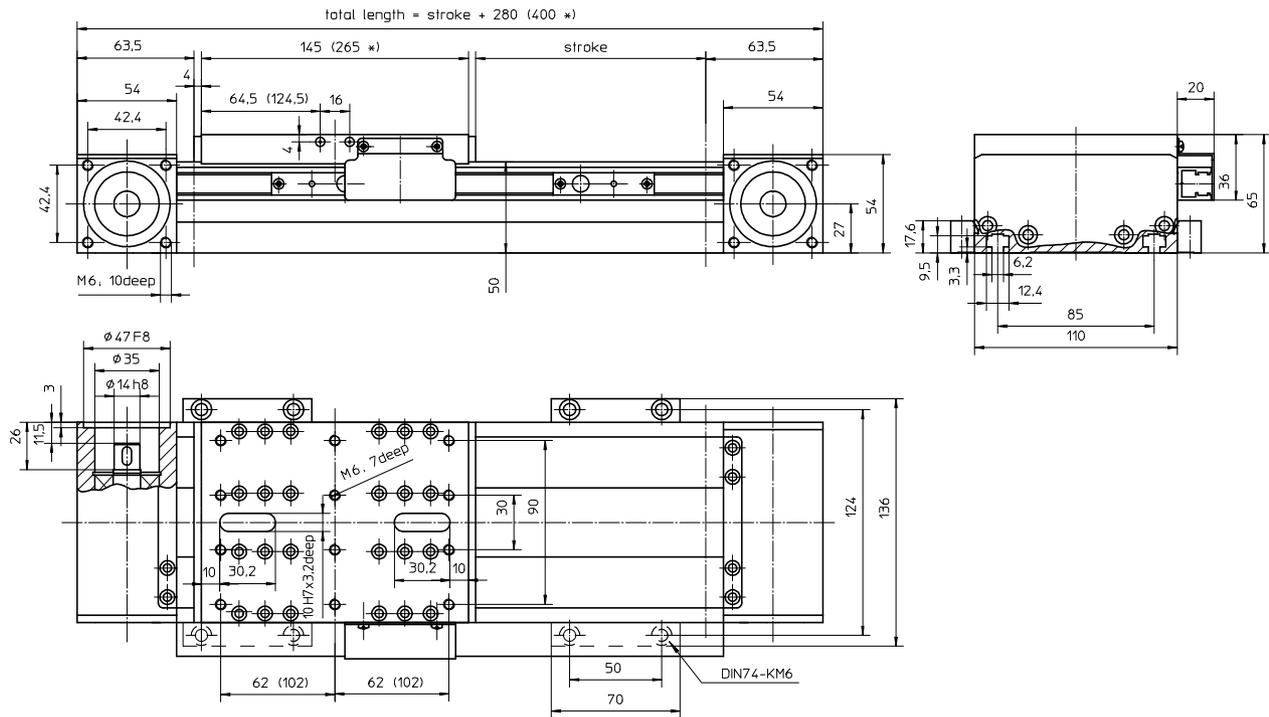
Linear speed: max. 8 m/s
Repeatability: ± 0.08 mm
Acceleration: max. 60 m/s²
Idle torque: 8 Nm
Drive element: tooth belt 75 AT 10
Stroke per revolution: 320 mm
Total length: up to 8200 mm (longer on request)

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:

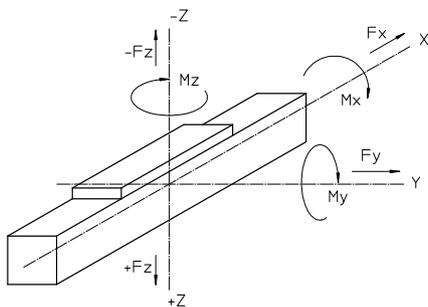
ZSS

6.80 kg
 1.00 kg
 2.80 kg
 0.0003 kgm²

Technical data

Linear speed: max. 5 m/s
 Repeatability: ± 0.08 mm
 Acceleration: max. 40 m/s²
 Idle torque: 1.6 Nm
 Drive element: tooth belt 25 AT5
 Stroke per revolution: 90 mm
 Total length: up to 1500 mm

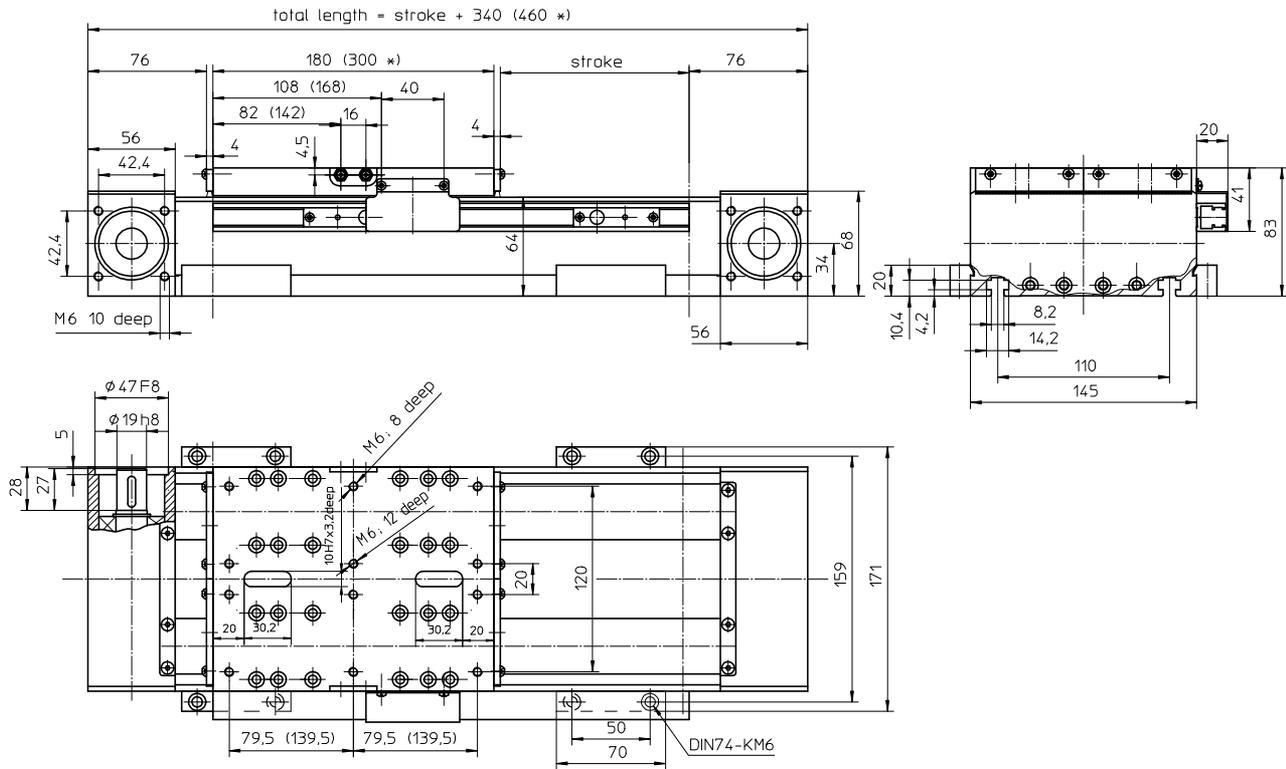
Loads and load moments



| Type | with linear guide (ZSS) |
|-----------------|-------------------------|
| Load | dynamic [N] |
| F _x | 1000 |
| F _y | 1200 |
| F _z | 3000 |
| -F _z | 1500 |
| Load moment | dynamic [Nm] |
| M _x | 500 |
| M _y | 650 |
| M _z | 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:

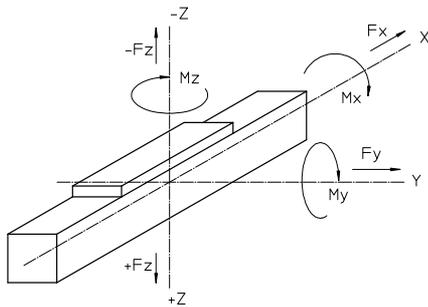
ZSS

13.20 kg
 1.40 kg
 4.90 kg
 0.0012 kgm²

Technical data

Linear speed: max. 5 m/s
 Repeatability: ± 0.08 mm
 Acceleration: max. 40 m/s²
 Idle torque: 2.2 Nm
 Drive element: tooth belt 50 AT5
 Stroke per revolution: 110 mm
 Total length: up to 2000 mm

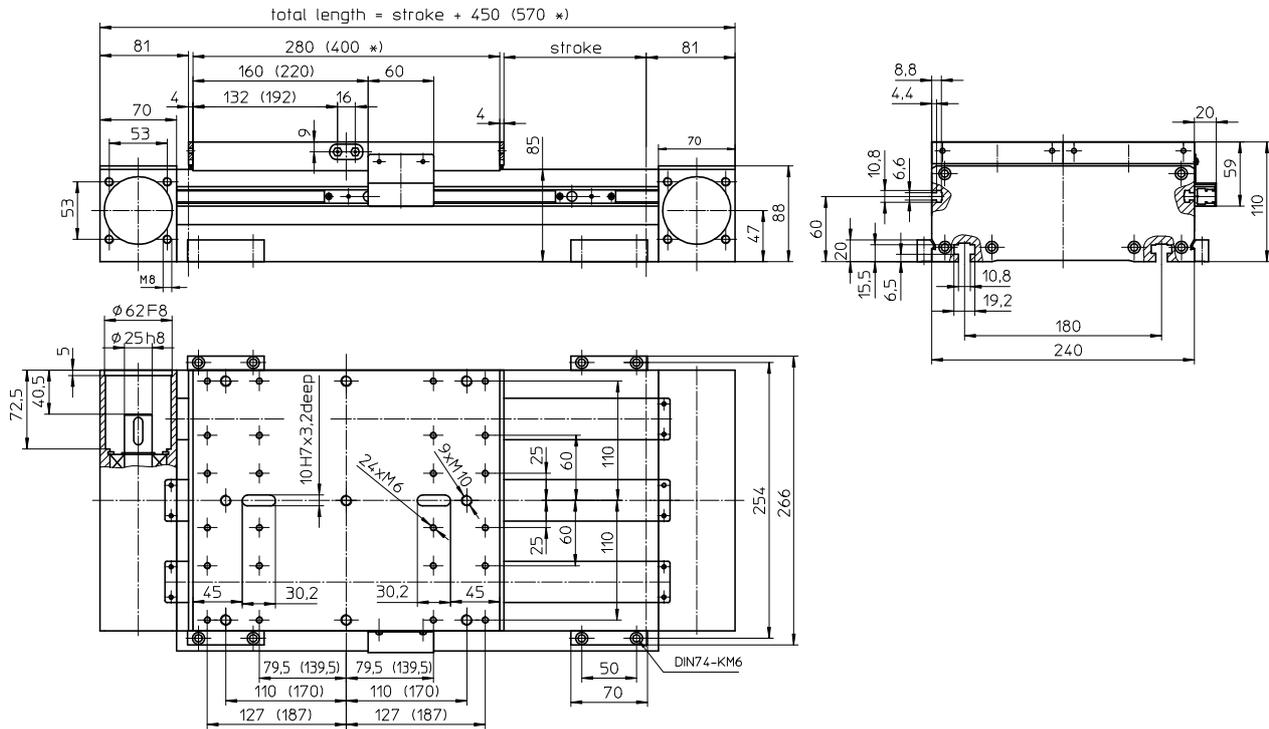
Loads and load moments



| Type | with linear guide (ZSS) |
|-----------------|-------------------------|
| Load | dynamic [N] |
| F _x | 2200 |
| F _y | 2500 |
| F _z | 5000 |
| -F _z | 3000 |
| Load moment | dynamic [Nm] |
| M _x | 800 |
| M _y | 1000 |
| M _z | 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:

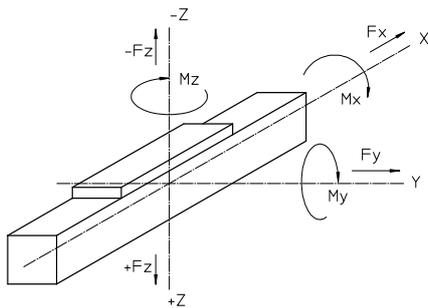
ZSS

27.00 kg
 3.20 kg
 9.80 kg
 0.020 kgm²

Technical data

Linear speed: max. 5 m/s
 Repeatability: ± 0.08 mm
 Acceleration: max. 60 m/s²
 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)

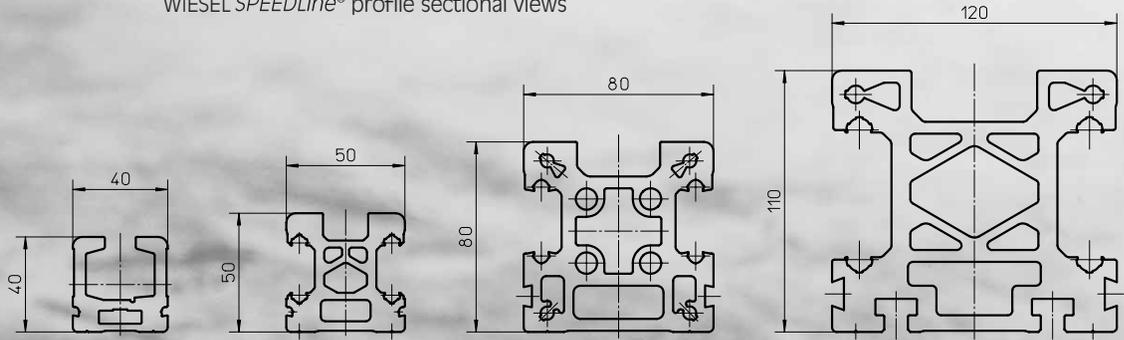
Loads and load moments



| 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 |

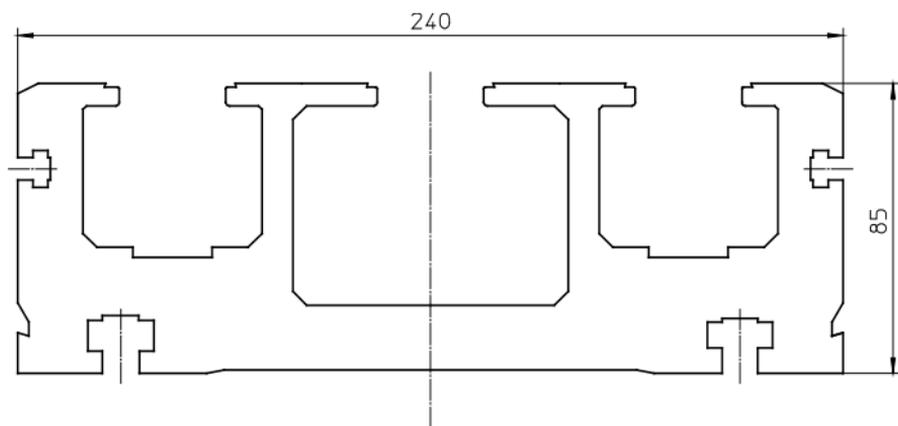
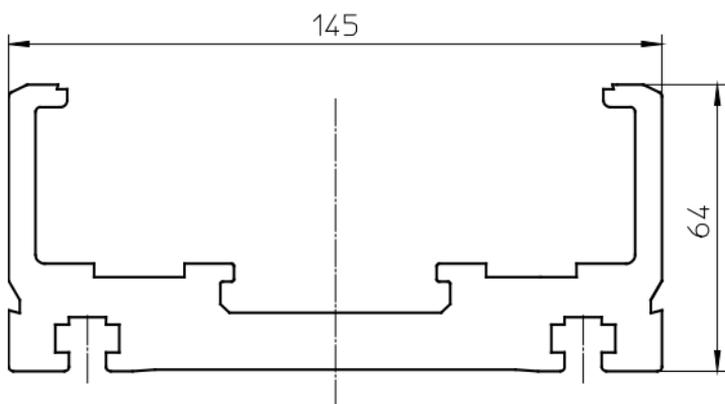
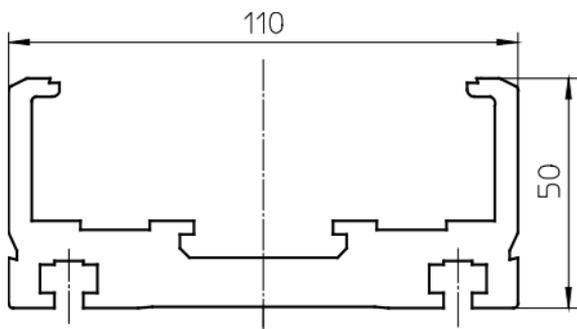
* data in () refers to 400 mm long carriage

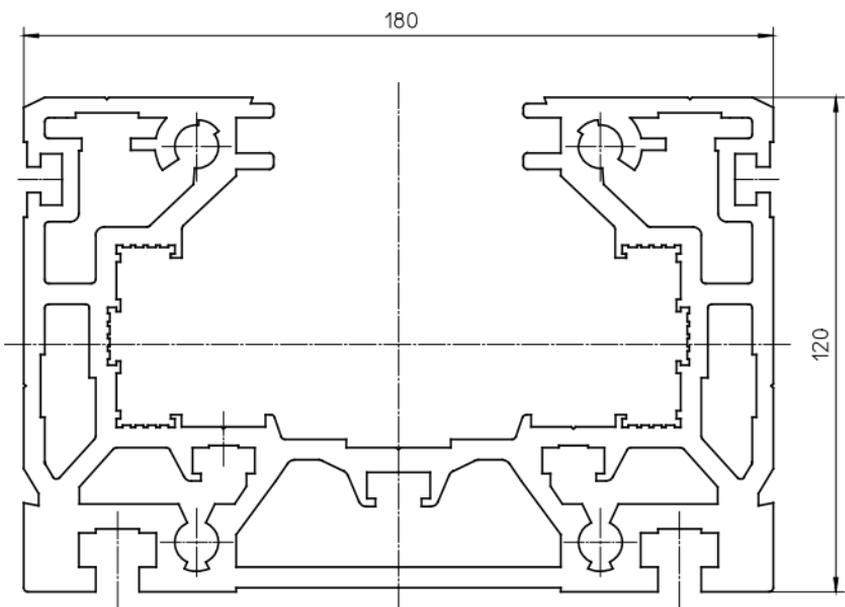
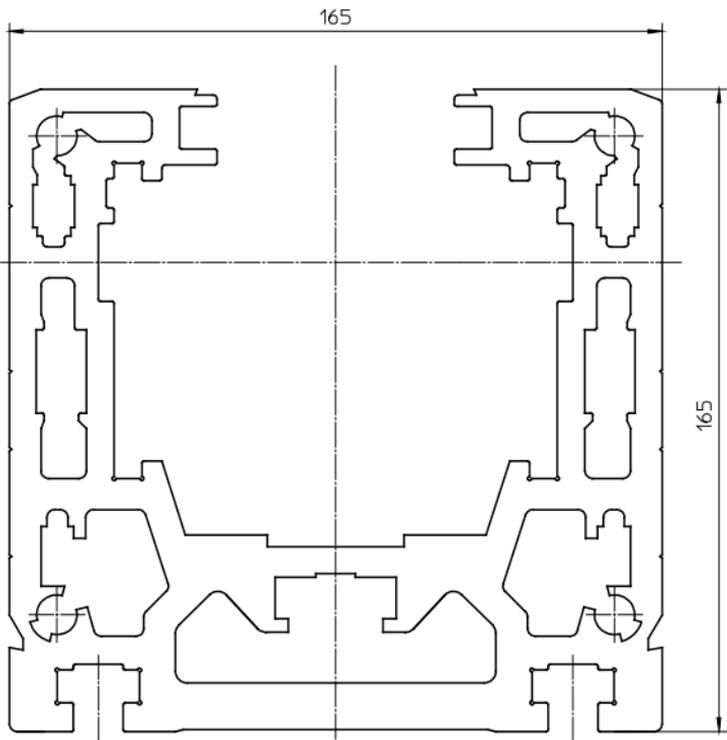
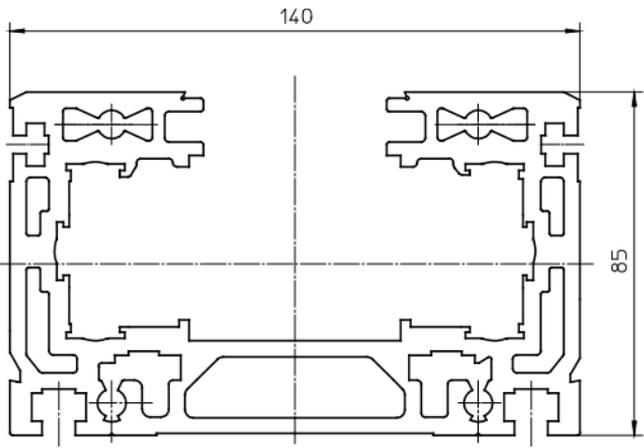
WIESEL SPEEDLine® profile sectional views



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/s²].

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_{load} | = Moment resulting from the various loads [Nm] |
| M_{idle} | = Idle torque [Nm] |
| M_{rot} | = Rotational acceleration moment [Nm] |
| M_{trans} | = Translational acceleration moment [Nm] |
| F_x | = Feed force [N] |
| F_a | = Acceleration force [N] |
| g | = Acceleration due to gravity [m/s ²] |
| V_{\max} | = Maximum linear speed [m/s] |

| | |
|------------------|--|
| m | = Mass to be transported [kg] ¹⁾ |
| a | = Acceleration [m/s ²] |
| d_o | = Effective diam. of pulley [mm] ²⁾ |
| P | = Power [kW] |
| L | = WIESEL® length [mm] |
| J_{syn} | = Idle torque of pulley [kgm ²] |
| n_{\max} | = Maximum rotational speed [rpm] |
| μ | = Friction factor |

Calculating the drive moment M_A [Nm]

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

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

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

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

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

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

$M_A \text{ Total} =$

| Type | μ | J_{syn} [kgm ²] | 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 | μ | J_{syn} [kgm ²] | 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 |

¹⁾ Total mass m = mass to be moved + mass of power bridge ³⁾ + mass of toothed belt

Mass of toothed belt = spec. mass of tooth belt [kg/m] · 2⁴⁾ · $\frac{\text{WIESEL}^{\circ}\text{-length [mm]}}{1000}$

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

³⁾ For Z-axis moved dead mass to be taken into account.

⁴⁾ 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.

