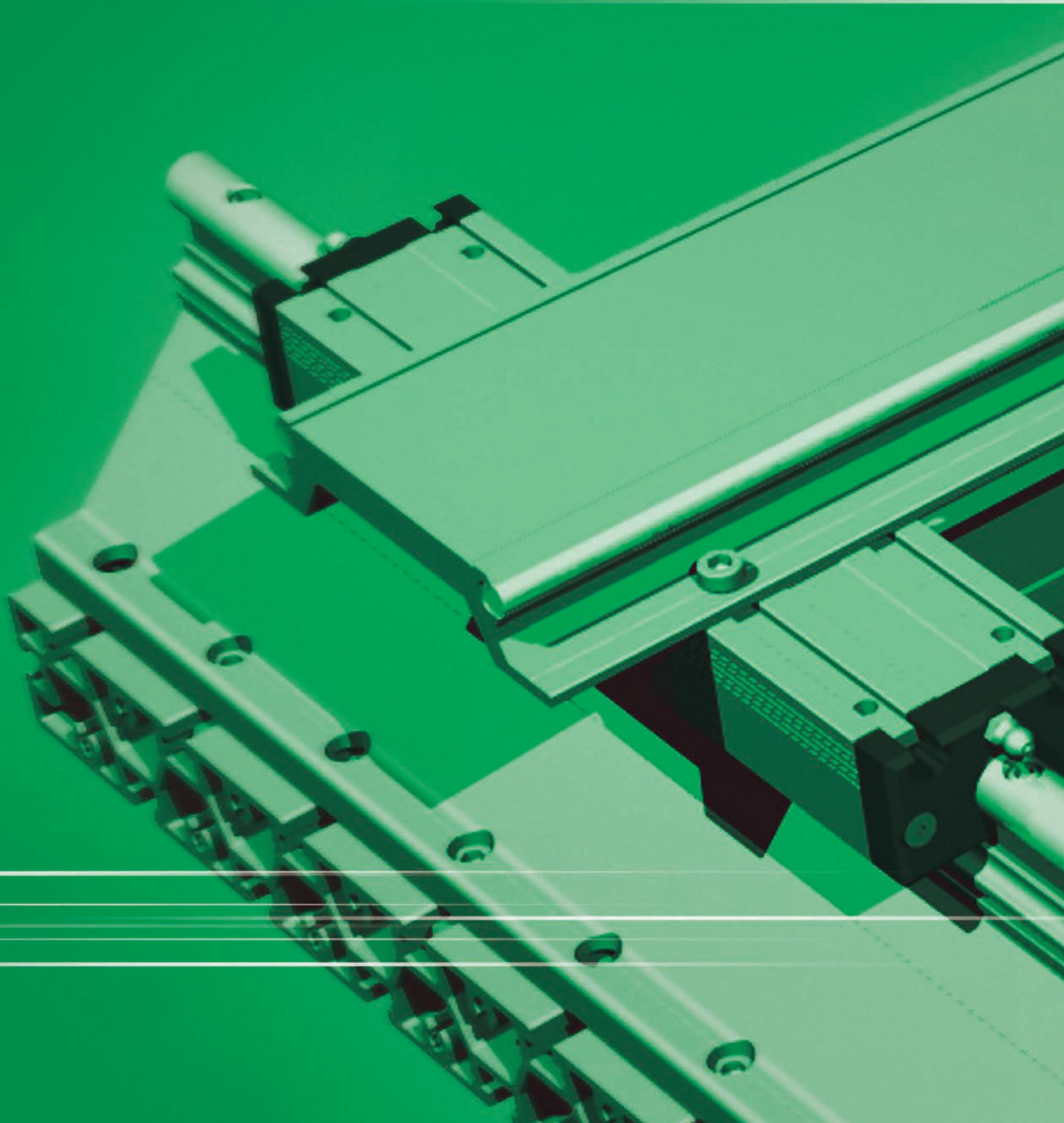
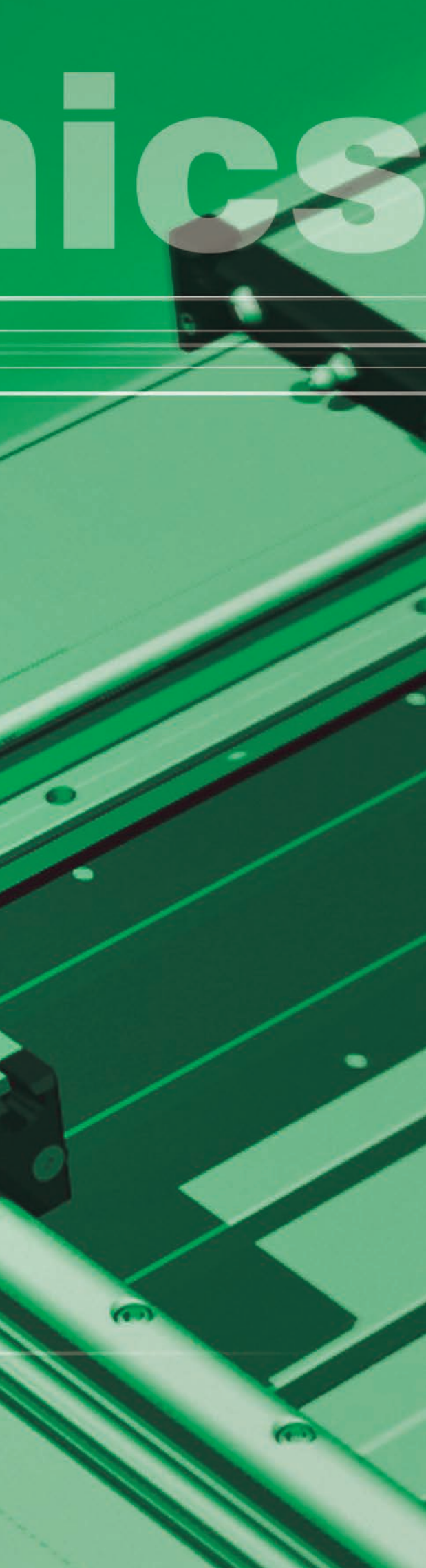


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MECHANICS

Aluminium profilesB-2

Linear guidesB-4

Drive elementsB-26

Linear unitsB-34

Rotational unitsB-72

Aluminium profiles

Overview

Tried and tested proprietary developments for a wide range of applications

isel aluminium profiles all come from our own production and are often used in industry and mechanical engineering. With their flexible application options, their compact design and their high stability, any plant can be installed easily and quickly.

Our aluminium profiles are naturally anodised and extrusion press profiles manufactured in accordance with DIN EN 12020-2 in the standard lengths of 1 m / 3 m and 6 m, width and height are variable. On request, however, we can also cut your aluminium profile to the length you wish.

Various aluminium profiles cover a wide range of requirements, so that you too can find the right solution for your design at isel.

Whether it is for the construction of machine frames, connecting elements or universal clamping surfaces:

With our aluminium profiles you just can't go wrong!

Our aluminium profiles offer excellent value for money and combine low weight with high strength. An extensive range of accessories completes our aluminium profile range.

You will find further information in our separate sub-catalogue and, of course, also at **www.isel.com**



www.isel.com/en/products/mechanics/aluminium-profiles



Direct link to the e paper catalogue



Aluminium profiles

Overview



Connection and angle profiles

- aluminium T-profiles naturally anodised, length 6 m
- T-slot and hollow indentions for nuts and bolts
- chipless compound of blanks with quick connectors
- fitting plate material like perforated plates mirror glass, acrylic, PVC and web plates



Frame and rectangular profiles

- aluminium T-profiles naturally anodised, length 6 m
- angle connections with miter for frame and display application
- T-slots suitable for LED strip and plate fastening 1 to 8 mm
- die cast aluminium feet and castors for mobile use and slot covers in different colors



Hollow and stand profiles

- aluminium T-profiles naturally anodised, length 6 m
- suitable design for stands and trade fair structures with angle connectors
- fastening elements for advertising banners, lighting and boards
- adjustable feet and rollers for different floors, slot nuts and bolts up to M8 threads



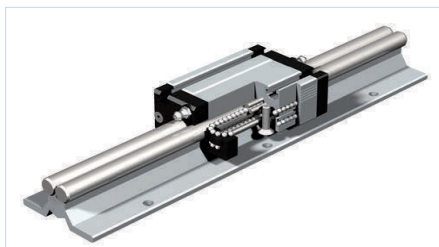
Clamping and mounting profiles

- aluminium T-profiles naturally anodised, length 3 m and 6 m
- single-sided and double-sided T-slots with 25 and 50 mm raster
- clamping plates for machines, tables and linear guides
- slot nuts and threaded inserts for M4 to M8

Linear guides

Overview

Slides functional overview
General notes



B-4

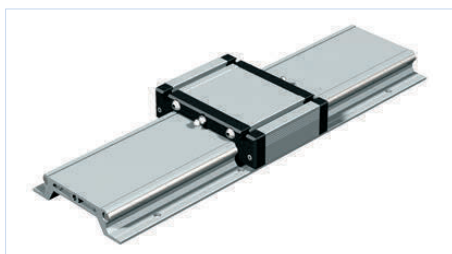
LFS-8-1
LFS-8-2
Linear guide rails



B-6

with LW 6 trolley
with WS 1 aluminium slide

LFS-8-3
Linear guide rails



B-8

with LW 7 trolley
with WS 3 aluminium slide

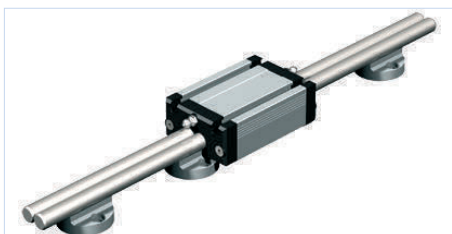
LFS-8-4
Linear guide rails



B-10

with LW 7 trolley
with WS 3 aluminium slide

LFS-12-1
Linear guide rails



B-14

with LW 3 trolley
with WS 4 aluminium slide
with LS 1 steel slides

Linear guides

Overview

LFS-12-11

Linear guide rails

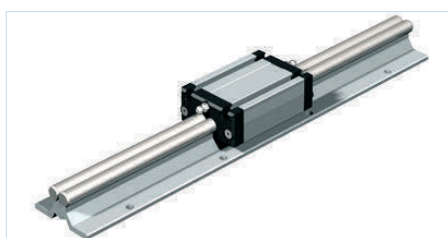


B-16

with LW 5 trolley
with WS 6 aluminium slide

LFS-12-2

Linear guide rails

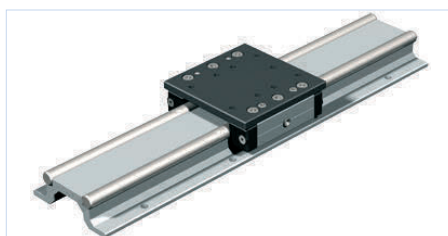


B-18

with LW 3 trolley
with WS 4 aluminium slide

LFS-12-3

Linear guide rails

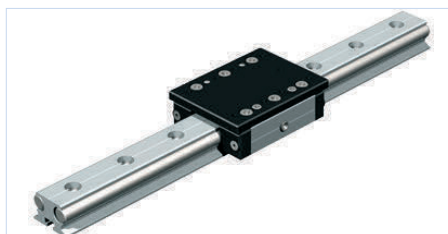


B-20

with LW 2 trolley
with LW 8 trolley
with WS 7 aluminium slide

LFS-12-10

Linear guide rails



B-22

with LW 4 trolley
with WS 8 aluminium slide
with dual track set 1 + 2

Accessories

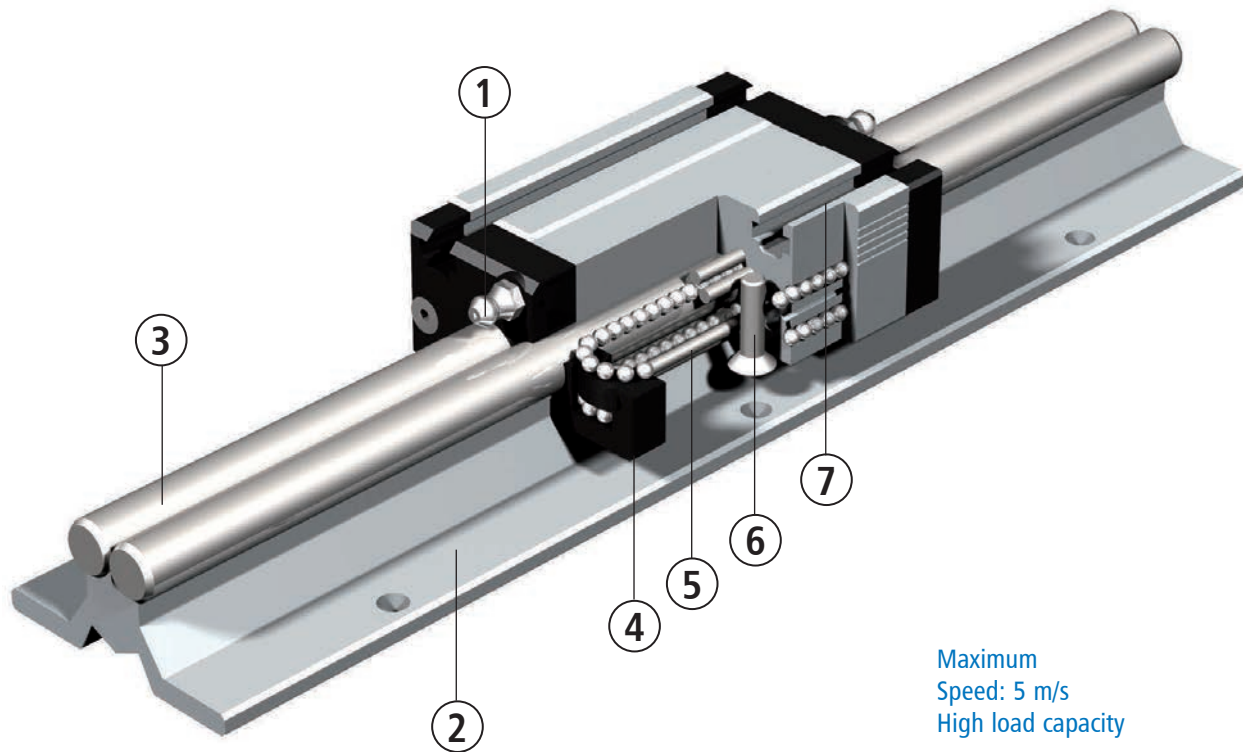
B-24



CAD data can be found on www.isel.com and



Linear guide slide function



Maximum
Speed: 5 m/s
High load capacity

Aluminium shaft slides

The shaft slides from isel are perfectly suited for assembling of complex multiple axis systems for handling and machining.

The wide range of models covers a multitude of applications.

All models can be produced to order with various profile lengths (70, 100, 150 and 200 mm).

1. Lubrication options to both sides for the recirculating balls.
2. The basic supports for all linear guides are extruded aluminium profiles compliant with DIN EN 12020-2, which are provided with T-slot inserts for fastening in the body of the profile or with drilled hole fixing points.
3. Precision steel shafts with a hardness of 60 ± 2 HRC are used as guide rails. All LFS-8 versions are optionally available with stainless steel shafts.
4. The recirculating ball steering systems are glass fibre reinforced.
5. There are recirculating balls in the linear slide. Ball bearings run in each case between two ground steel pins and the guidance shaft.
6. The slide is adjusted with self-locking setting screws. This is how the rows of balls and shafts or pins are used with each other and thus pre-stressed. The slide are preset in the factory to the correct stress. All shaft slides are optionally available in a stainless version.
7. To secure transport loads, slot plates, etc., the shaft slide are provided with T-slot inserts or fixing borings.

General notes

Load capacity and working life

Installation site

In principal, the installation site for linear guides can be chosen anywhere. You merely have to consider whether all the forces and moments arising are below the maximum values for the relevant axes.

Temperatures

All linear guides are designed for continuous operation at ambient temperatures of up to 60 °C. In short-term operation, maximum temperatures of 80 °C are permissible.

Linear guides are unsuitable for temperatures below freezing.

Straightness/Warping

The aluminium profiles used are extruded profiles, which exhibit divergences regarding straightness and may be warped, owing to the manufacturing process.

The tolerance of this deviation is set out in DIN EN 12020-2.

In the worst case, the linear guide deviations equal these limits, but typically they are lower.

In order to achieve the desired guidance accuracy, the guide must be aligned using shims or clamped to a bearing service machined to the corresponding accuracy. This achieves tolerances of 0.1 mm/1000 mm.

Principles

Load capacity and working life

The dimensioning of a linear guide is based on the load capacity of the individual elements. The load capacity is described by:

- the dynamic load factor C
- the static load factor C0
- the static torques MOX, MOY and MOZ

The basis of the dynamic load factors according to DIN is a nominal working life of 100,000 m displacement path. Far East suppliers often quote load factors for a nominal working life of 50,000 m displacement path; this produces load factor figures which are approximately 20% higher than those according to DIN.

Dynamic load capacity

The fatigue characteristics of the material determine the dynamic load capacity. The working life - the fatigue period - also depends on:

- the stress on the linear guide
- the speed at which the linear guide moves
- the statistical randomness of the first damage occurring

Useful life

Useful life means the working life actually achieved by a linear guide. The useful life may differ from the computed working life.

The following can lead to premature failure through wear or fatigue:

- Misalignments between guide rails or guidance elements
- Contamination of the guide rails
- Insufficient lubrication
- Oscillating motion with very small lifts (formation of grooves)
- Vibrations at rest (formation of grooves)

Owing to the multiplicity of installation and operating relationships, it is impossible to determine the useful life of a linear guide exactly in advance. The safest way to make an accurate estimate of the useful life is, as before, a comparison with similar installations.

Linear guide rails

LFS-8-1 LFS-8-2

Figure:
LFS-8-1 with
aluminium slide WS 1/70



Figure:
LFS-8-2 with
aluminium slide WS 1/70

Features

- W 30 x H 20 mm (LFS-8-1)
W 30 x H 32.5 mm (LFS-8-2)
- 2 precision steel shafts Ø 8 mm
- anti-twist lock
- aluminium shaft housing profile, naturally anodised
- fixing from below with M6 tapped rails in the T-key insert
- conditionally self-supporting
- special lengths to order
- weights: approx. 1.6 kg/m (LFS-8-1)
approx. 2.0 kg/m (LFS-8-2)

Options:

- stainless steel version
- drilled for M6 (LFS-8-1 only)

Ordering key

235 00X XXXX

LFS-8-1 / standard = **0**

LFS-8-1 / stainless = **1**

LFS-8-2 / standard = **2**

LFS-8-2 / stainless = **3**

Length LFS-8-1

in mm (in a grid of 100 mm)

e.g. **0029** = Length 298

0299 = Length 2998

Length LFS-8-2

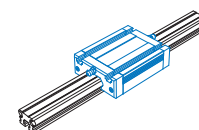
in mm (in a grid of 100 mm)

e.g. **0298** = Length 298

2998 = Length 2998

Steel shaft length: total length L - 3 mm

Profile up to 6000 mm available without impact connection, steel shafts divided.



Aluminium slide

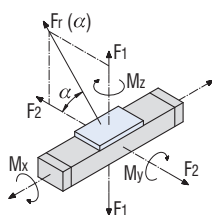
- with recirculating ball guide
- clamping surface plane milled
- M6 T-key inserts
- central lubrication option
- adjustable for no play
- option: stainless steel version

Load data

Shaft slide WS 1/70	
C ₀	3114 N
C	1846 N
F ₁ static	2659 N
F ₁ dynamic	1576 N
F ₂ static	3114 N
F ₂ dynamic	1846 N
M _x static	37.3 Nm
M _y static	100.5 Nm
M _z static	117.6 Nm
M _x dynamic	22.1 Nm
M _y dynamic	59.5 Nm
M _z dynamic	69.7 Nm

Shaft slide WS 1	
C ₀	4590 N
C	2390 N
F ₁ static	3920 N
F ₁ dynamic	2041 N
F ₂ static	4590 N
F ₂ dynamic	2390 N
M _x static	55.0 Nm
M _y static	148.1 Nm
M _z static	173.4 Nm
M _x dynamic	28.6 Nm
M _y dynamic	77.1 Nm
M _z dynamic	90.2 Nm

Trolley LW 6	
C ₀	2160 N
C	4000 N
F ₁ static	4320 N
F ₁ dynamic	3792 N
F ₂ static	2160 N
F ₂ dynamic	4000 N
M _x static	121.1 Nm
M _y static	194.4 Nm
M _z static	97.2 Nm
M _x dynamic	106.3 Nm
M _y dynamic	170.6 Nm
M _z dynamic	180.0 Nm



$$Fr(\alpha) = \frac{F_2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F_1}{\sin \alpha}$$

L 96 × W 72 × H 28.5 mm (WS 1/70)

(weight: approx. 0.4 kg)

Part no.: **223100 0070**

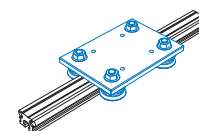
Stainless steel: **223101 0070**

L 126 × W 72 × H 28.5 mm (WS 1)

(weight: approx. 0.5 kg)

Part no.: **223100**

Stainless steel: **223101**



Trolley LW 6

- L 125 x W 90 x H 7.7 mm
- ground steel plate
- 4 rollers Ø 31 mm, sealed for life
- adjustable for no play
- weight: approx. 1 kg

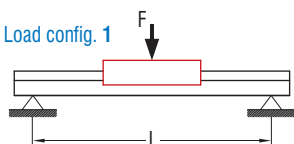
Part no.: **223011**

Linear guide rails

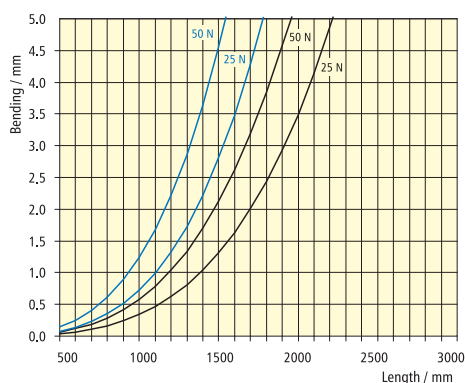
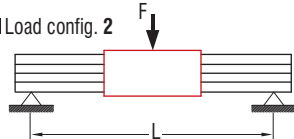
LFS-8-1 LFS-8-2

Bending

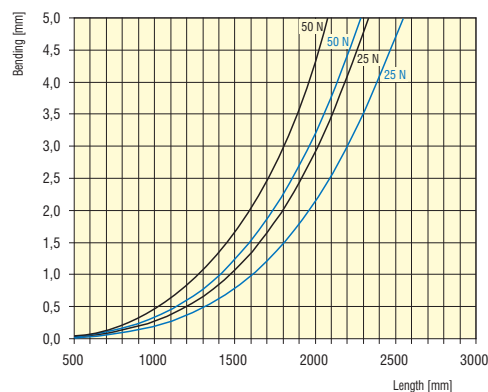
■ Load config. 1



■ Load config. 2



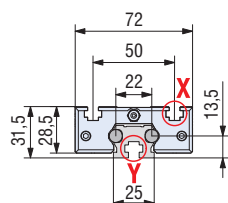
LFS-8-1



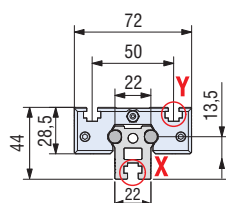
LFS-8-2

Dimensioned drawings

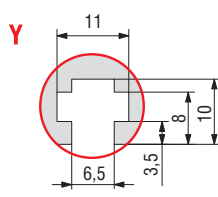
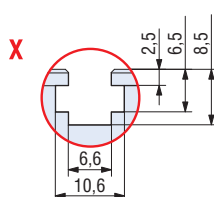
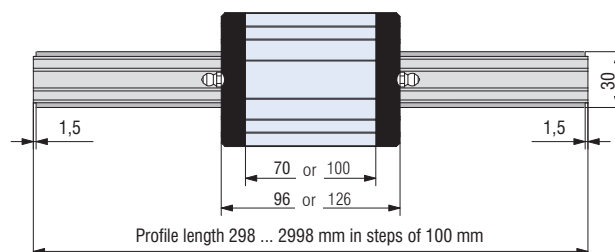
LFS-8-1 or LFS-8-2 with aluminium slide WS 1/70 or WS 1



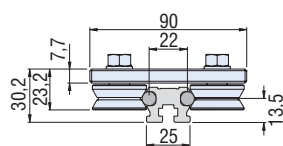
LFS-8-1



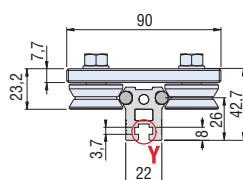
LFS-8-2



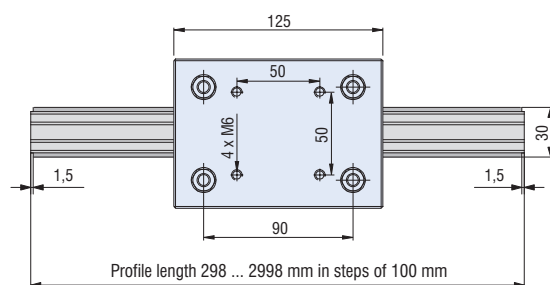
LFS-8-1 or LFS-8-2 with trolley LW 6



LFS-8-1



LFS-8-2



Linear guide rails

LFS-8-3



Features

- W 115 x H 25.5 mm
- 2 precision steel shafts Ø 8 mm
- particularly resistant to twisting
- aluminium shaft housing profile, naturally anodised
- fixing from above through M6 drillings in the raster 100 mm
- conditionally self-supporting
- special lengths to order
- weight: approx. 3.2 kg/m
- option: stainless steel version

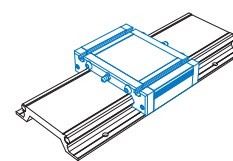
Ordering key

235 00X XXXX

Standard = 4 Length in mm (in 100 mm raster)
 Stainless = 5 e.g. 0029 = Length 296
 0299 = Length 2996

Length overall L - 1 mm

Profile up to 6000 mm available without impact connection, steel shafts divided.



Aluminium slide

- with recirculating ball guide
- clamping surface plane milled
- M6 T-key inserts
- central lubrication option
- adjustable for no play
- option: stainless steel version

L 96 x W 130 x H 32 mm (WS 3/70)
 (weight: approx. 0.5 kg)

Part no.: **223103 0070**

Stainless steel: **223103 1070**

L 176 x W 130 x H 32 mm (WS 3)
 (weight: approx. 0.9 kg)

Part no.: **223103**

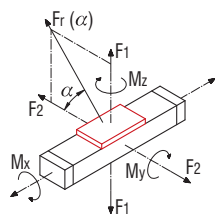
Stainless steel: **223103 1000**

Load data

Shaft slide WS 3/70	
C ₀	3141 N
C	1879 N
F ₁ static	2682 N
F ₁ dynamic	1604 N
F ₂ static	3141 N
F ₂ dynamic	1879 N
M _x static	115.7 Nm
M _y static	105.3 Nm
M _z static	123.3 Nm
M _x dynamic	69.2 Nm
M _y dynamic	62.9 Nm
M _z dynamic	73.7 Nm

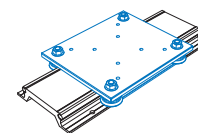
Shaft slide WS 3	
C ₀	6945 N
C	3190 N
F ₁ static	5931 N
F ₁ dynamic	2724 N
F ₂ static	6945 N
F ₂ dynamic	3190 N
M _x static	255.9 Nm
M _y static	232.8 Nm
M _z static	272.5 Nm
M _x dynamic	117.5 Nm
M _y dynamic	106.9 Nm
M _z dynamic	125.1 Nm

Trolley LW 7	
C ₀	2160 N
C	4000 N
F ₁ static	4320 N
F ₁ dynamic	3792 N
F ₂ static	2160 N
F ₂ dynamic	4000 N
M _x static	246.8 Nm
M _y static	302.4 Nm
M _z static	151.2 Nm
M _x dynamic	216.7 Nm
M _y dynamic	265.4 Nm
M _z dynamic	280 Nm



$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

$$F_r(\alpha) = \frac{F_1}{\sin \alpha}$$



Trolley LW 7

- L 175 x W 150 x H 7.5 mm
- ground steel plate
- 4 rollers Ø 31 mm, sealed for life
- adjustable for no play
- weight: approx. 2 kg

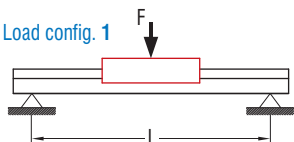
Part no.: **223012**

Linear guide rails

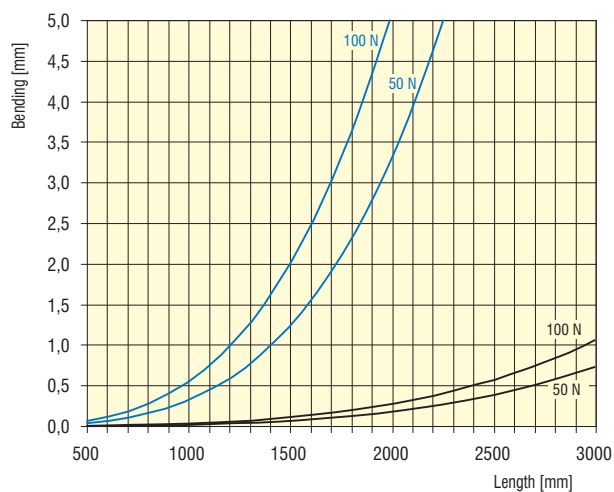
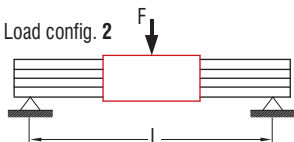
LFS-8-3

Bending

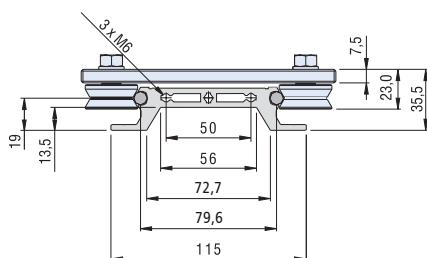
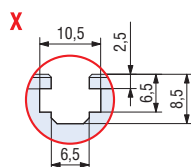
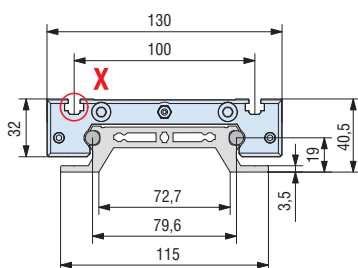
■ Load config. 1



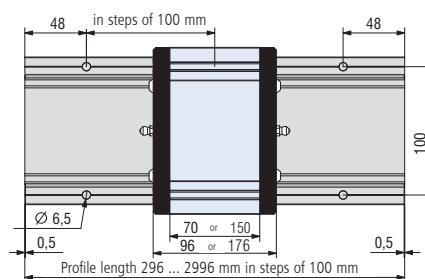
■ Load config. 2



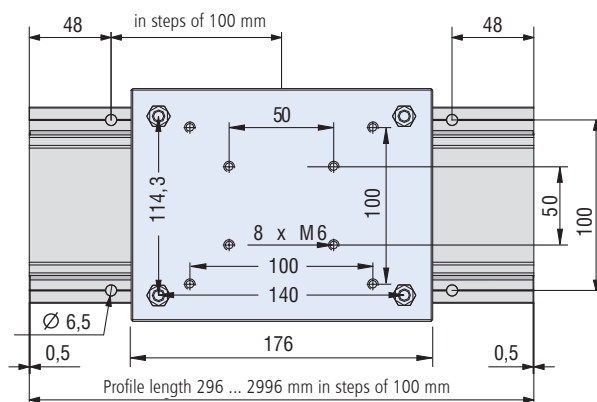
Dimensioned drawings



LFS-8-3 with aluminium slide WS 3/70 or WS 3



LFS-8-3 with trolley LW7



Linear guide rails

LFS-8-4

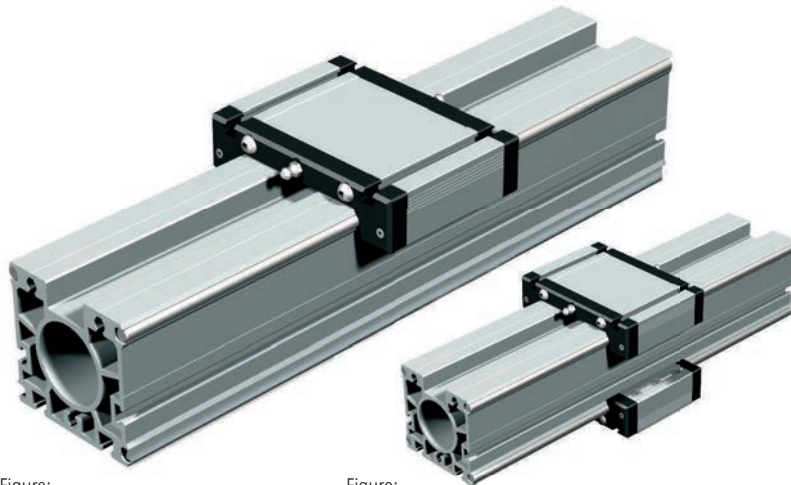


Figure:
LFS-8-4 with 2 steel shafts
and an aluminium slot

Figure:
LFS-8-4 with 4 steel shafts
and two aluminium slide (optional)

Features

- W 80 x H 80 mm
- 4 precision steel shafts Ø 8 mm
- anti-twist
- aluminium shaft housing profiles, naturally anodised
- fixing from below with M6 tapped rails in the T-slot inserts or in the head side through M8 drillings
- side T-key inserts for limit switch securing
- conditionally self-supporting
- special lengths to order
- weight: approx. 7.2 kg/m
- options: stainless steel version with 2 steel shafts 2 slide or trolley

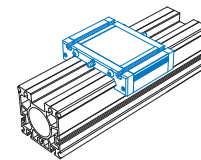
Ordering key

235 00X XXXX

Standard = **6** Length in mm (in 100 mm raster)
Stainless = **7** e.g. **0029** = Length 298
 0299 = Length 2998

Steel shaft length: total length L - 3 mm

Profile up to 6000 mm available without impact connection, steel shafts divided.



Aluminium slide

- clamping surface plane milled
- M6 T-slot inserts
- central lubrication option
- adjustable for no play
- option: stainless steel version

L 96 x W 130 x H 32 mm (WS 3/70)
(weight: approx. 0.5 kg)

Part no.: **223103 0070**

Stainless steel: **223103 1070**

L 176 x W 130 x H 32 mm (WS 3)
(weight: approx. 0.9 kg)

Part no.: **223103**

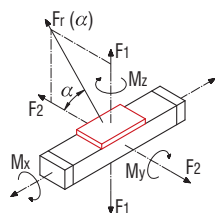
Stainless steel: **223103 1000**

Load data

Shaft slide WS 3/70	
C ₀	3141 N
C	1879 N
F ₁ static	2682 N
F ₁ dynamic	1604 N
F ₂ static	3141 N
F ₂ dynamic	1879 N
M _x static	115.7 Nm
M _y static	105.3 Nm
M _z static	123.3 Nm
M _x dynamic	69.2 Nm
M _y dynamic	62.9 Nm
M _z dynamic	73.7 Nm

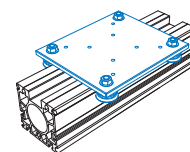
Shaft slide WS 3	
C ₀	6945 N
C	3190 N
F ₁ static	5931 N
F ₁ dynamic	2724 N
F ₂ static	6945 N
F ₂ dynamic	3190 N
M _x static	255.9 Nm
M _y static	232.8 Nm
M _z static	272.5 Nm
M _x dynamic	117.5 Nm
M _y dynamic	106.9 Nm
M _z dynamic	125.1 Nm

Trolley LW 7	
C ₀	2160 N
C	4000 N
F ₁ static	4320 N
F ₁ dynamic	3792 N
F ₂ static	2160 N
F ₂ dynamic	4000 N
M _x static	246.8 Nm
M _y static	302.4 Nm
M _z static	151.2 Nm
M _x dynamic	216.7 Nm
M _y dynamic	265.4 Nm
M _z dynamic	280 Nm



$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

$$F_r(\alpha) = \frac{F_1}{\sin \alpha}$$



Trolley LW 7

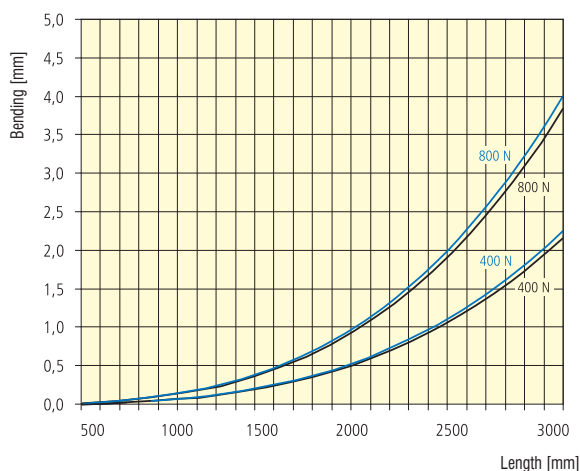
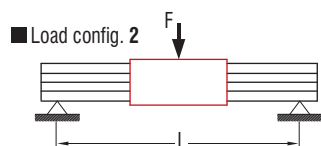
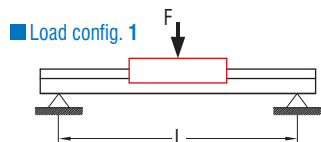
- L 175 x W 150 x H 7.5 mm
- ground steel plate
- 4 rollers Ø 31 mm, sealed for life
- adjustable for no play
- weight: approx. 2 kg

Part no.: **223012**

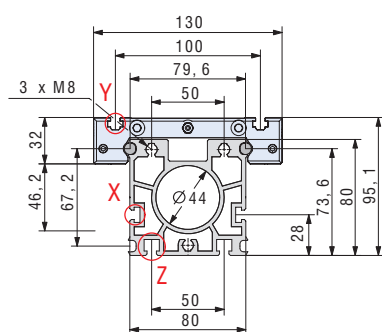
Linear guide rails

LFS-8-4

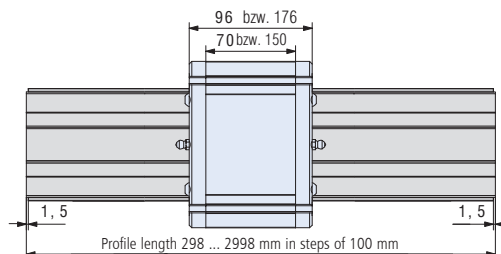
Bending



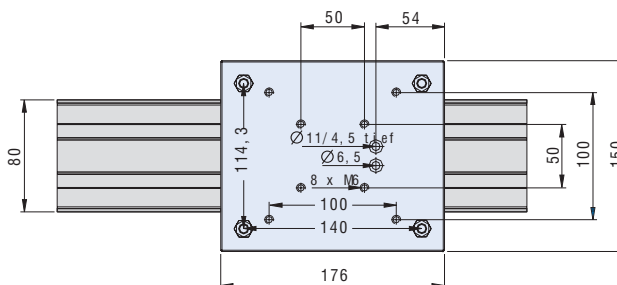
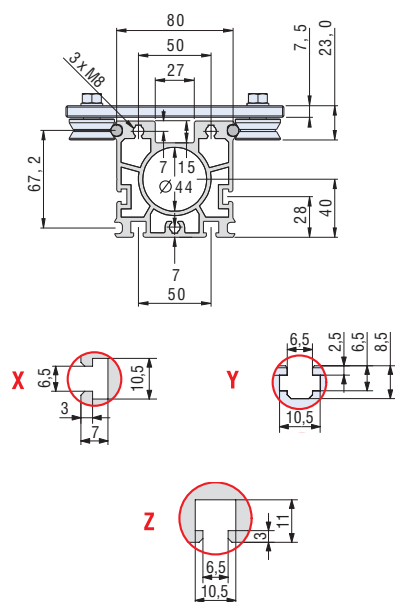
Dimensioned drawings



LFS-8-3 with aluminium slide WS 3/70 or WS 3



LFS-8-4 with trolley LW 7



Linear guide rails

LFS-12-1

Figure:
2 precision steel shafts with
aluminium slide WS 4 and
Shaft housing blocks

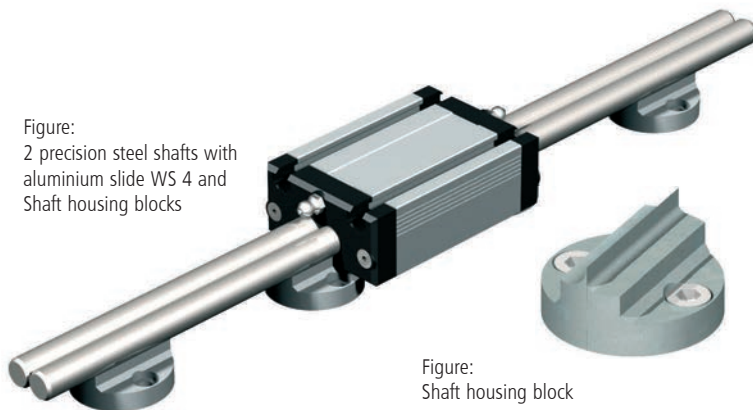


Figure:
Shaft housing block

Features

- W 40 x H 27 mm
- 2 precision steel shafts Ø 12 mm
- anti-twist
- aluminium shaft housing blocks
- securing from above or below with M6 drillings in the housing blocks
- guide any length up to 3m
- special lengths to order
- weight: approx. 1.9 kg/m

Ordering key

227 312 XXXX

Length in mm (in 100 mm raster)

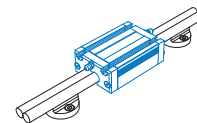
e.g. **0298** = Length 298

2998 = Length 2998

Special lengths to order

N.B.!

The part no. refers to one steel shaft only !



Aluminium slide

- clamping surface plane milled
- adjustable for no play
- option: stainless steel version

L 94 x W 62 x H 31.5 mm (WS 4/70)

(weight: approx. 0.33 kg)

Part no.: **223104 0070**

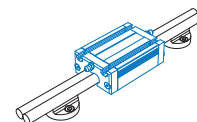
Stainless steel: **223104 1070**

L 124 x W 62 x H 31.5 mm (WS 4)

(weight: approx. 0.46 kg)

Part no.: **223104**

Stainless steel: **223104 1000**

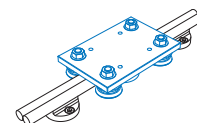


Steel slide LS 1

L 91 x W 60 x H 32 mm

- clamping surface ground
- weight: approx. 0.8 kg

Part no.: **223006**



Trolley LW 3

L 125 x W 85 x H 7.7 mm

- ground steel plate
- weight: approx. 0.9 kg

Part no.: **223008**

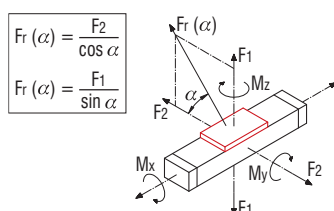
Shaft housing blocks

- Ø 40 mm, hole spacing 28 mm
- cast zinc, VE 10 units

Part no.: **221501**

Load data

Shaft slide WS 4/70		Shaft slide WS 4		Steel slide LS 1		Trolley LW 8	
C ₀	3003 N	C ₀	4868 N	C ₀	3508 N	C ₀	2160 N
C	1873 N	C	2426 N	C	2105 N	C	4000 N
F ₁ static	2821 N	F ₁ static	4157 N	F ₁ static	3549 N	F ₁ static	4320 N
F ₁ dynamic	1599 N	F ₁ dynamic	2071 N	F ₁ dynamic	2130 N	F ₁ dynamic	3846 N
F ₂ static	3303 N	F ₂ static	4868 N	F ₂ static	3508 N	F ₂ static	2160 N
F ₂ dynamic	1873 N	F ₂ dynamic	2426 N	F ₂ dynamic	2105 N	F ₂ dynamic	4000 N
M _x static	29.8 Nm	M _x static	43.9 Nm	M _x static	36.2 Nm	M _x static	109.5 Nm
M _y static	105.3 Nm	M _y static	155.2 Nm	M _y static	129.0 Nm	M _y static	194.4 Nm
M _z static	123.3 Nm	M _z static	181.7 Nm	M _z static	127.5 Nm	M _z static	97.2 Nm
M _x dynamic	16.8 Nm	M _x dynamic	21.8 Nm	M _x dynamic	21.7 Nm	M _x dynamic	97.4 Nm
M _y dynamic	59.7 Nm	M _y dynamic	77.3 Nm	M _y dynamic	77.4 Nm	M _y dynamic	173.0 Nm
M _z dynamic	69.9 Nm	M _z dynamic	90.5 Nm	M _z dynamic	76.5 Nm	M _z dynamic	180.0 Nm

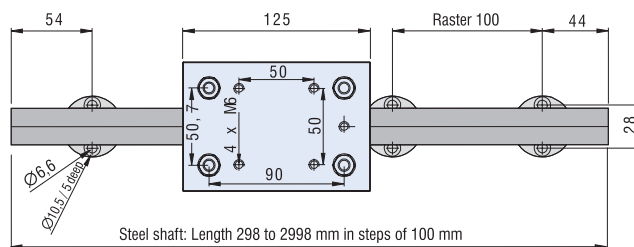


$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

$$F_r(\alpha) = \frac{F_1}{\sin \alpha}$$

LFS-12-1

LFS-12-1 with trolley **LW 3**

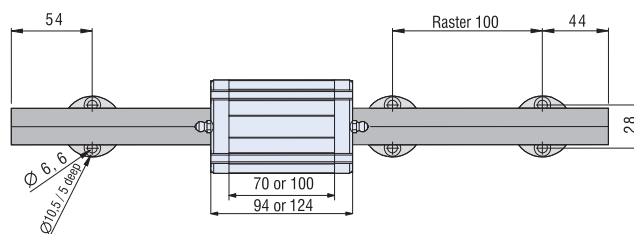


Steel shaft: Length 298 to 2998 mm in steps of 100 mm

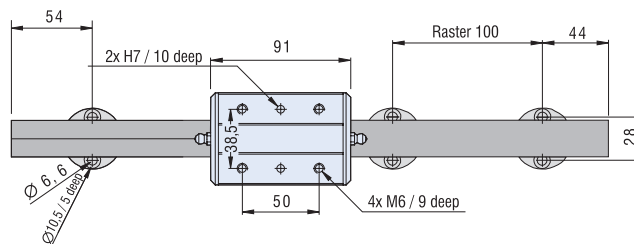
Technical drawing of a mechanical part. The drawing shows a cross-section of a part with a central hole. The dimensions are as follows:

- Overall width: 10,5
- Distance from left edge to center of hole: 6,5
- Distance from center of hole to right edge: 2,5
- Overall height: 8,5
- Distance from top edge to center of hole: 6,5
- Distance from center of hole to bottom edge: 2,5

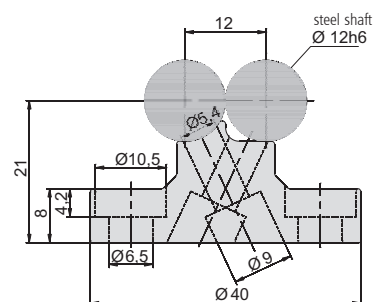
A red 'X' is placed over the top-left corner of the part, indicating a manufacturing error or a specific feature.



Technical drawing of a 3D-printed part, showing a top view with dimensions: 60, 12, 41,74, 21, 8, 32, and Ø 40.



Technical drawing of a mechanical part. The part is circular with a diameter of 28. It features a central vertical slot with a width of 14.5. On the left side, there is a circular feature with a diameter of 20. The part is shaded to indicate its three-dimensional form.



Linear guide rail

LFS-12-11



Features

- W 20 x H 31 mm
- precision steel shaft Ø 12 mm
- aluminium shaft housing profile, naturally anodised
- securing from below with M6 tapped rail in T-slot insert on flat surface
- special lengths available on request
- weight: approx. 1.3 kg/m

Ordering key

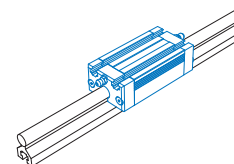
220 002 XXXX

Length in mm

e.g. **0298** = Length 298

0998 = Length 998

Profile length = Length overall L -2 mm



Aluminium slides

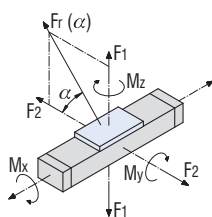
- with recirculating ball guide
- M6 T-slot inserts
- central lubrication system option
- adjustable for no play
- option: stainless steel version

Load data

Shaft slides WS 6/70	
C ₀	3303 N
C	1873 N
F ₁ static	2821 N
F ₁ dynamic	1599 N
F ₂ static	3303 N
F ₂ dynamic	1873 N
M _x static	-
M _y static	105.3 Nm
M _z static	123.3 Nm
M _x dynamic	-
M _y dynamic	59.7 Nm
M _z dynamic	69.9 Nm

Shaft slides WS 6	
C ₀	4868 N
C	2426 N
F ₁ static	4157 N
F ₁ dynamic	2071 N
F ₂ static	4868 N
F ₂ dynamic	2426 N
M _x static	-
M _y static	155.2 Nm
M _z static	181.7 Nm
M _x dynamic	-
M _y dynamic	77.3 Nm
M _z dynamic	90.5 Nm

Trolley LW 5	
C ₀	2160 N
C	4000 N
F ₁ static	4320 N
F ₁ dynamic	3846 N
F ₂ static	2160 N
F ₂ dynamic	4000 N
M _x static	-
M _y static	162.0 Nm
M _z static	81.0 Nm
M _x dynamic	-
M _y dynamic	144.2 Nm
M _z dynamic	150.0 Nm



$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

$$F_r(\alpha) = \frac{F_1}{\sin \alpha}$$

L 96 x W 50 x H 31.5 mm (WS 6/70)
(weight: approx. 0.3 kg)

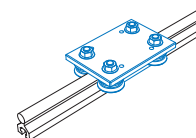
Part no.: **223106 0070**

Stainless steel: **223106 1070**

L 126 x W 50 x H 31,5 mm (WS 6)
(weight: approx. 0.5 kg)

Part no.: **223106**

Stainless steel: **223106 1000**



Trolley LW 5

- L 110 x W 75 x H 7.7 mm
- Ground steel plate
- 4 rollers Ø 31 mm, sealed for life
- Adjustable for no play
- Weight: 0.81 kg

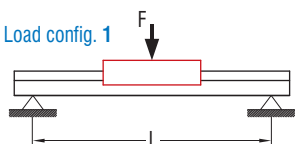
Part no.: **223010**

Linear guide rail

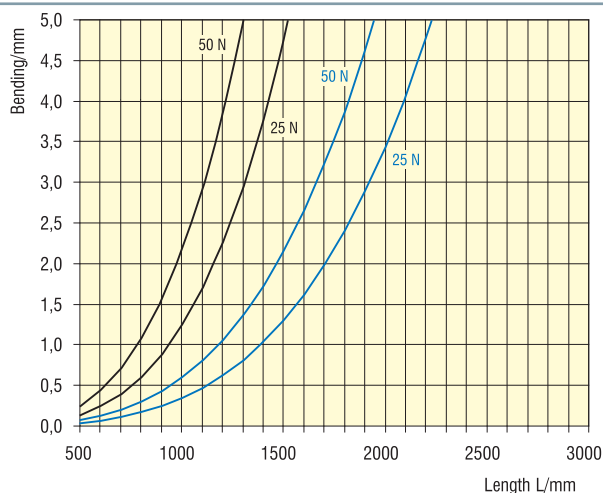
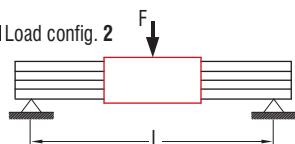
LFS-12-11

Bending

■ Load config. 1

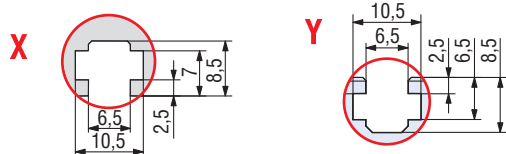
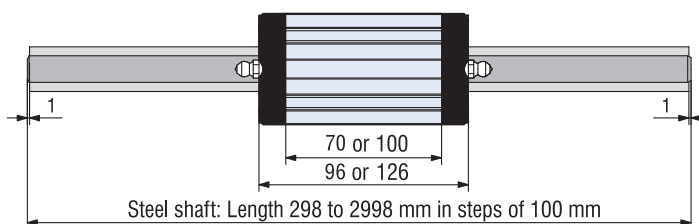
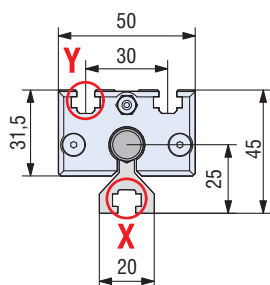


■ Load config. 2

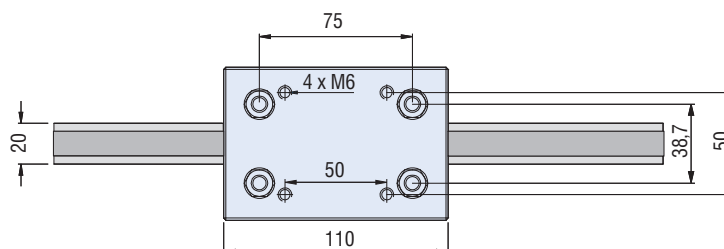
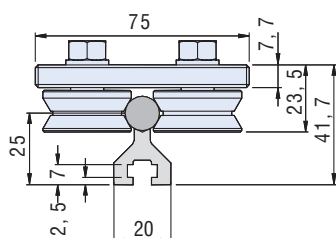


Dimensioned drawings

LFS-12-11 with aluminium slides **WS 6/70** or **WS 6**



LFS-12-11 with trolley **LW5**



Linear guide rail

LFS-12-2



Features

- W 62 x H 31 mm
- 2 precision steel shafts Ø 12 mm
- anti-twist lock
- aluminium shaft housing profile, naturally anodised
- high parallelism through patented shaft housing outline
- high guidance accuracy
- securing from above or below using drilled holes Ø 6.5 in 100 mm raster on flat surface
- lengths in 100 mm raster
- max. length up to 2998 mm
- special lengths to order
- weight: approx. 3.3 kg/m

Ordering key

235 200 XXXX

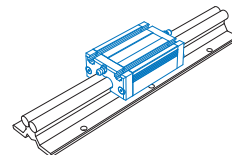
Length in mm

e.g. **0298** = Length 298

0998 = Length 998

Profile length = Length overall L -2 mm

Aluminium slides



- with recirculating ball guide
- clamping surface plane milled
- adjustable for no play
- option: stainless steel version

L 94 x W 62 x H 31.5 mm (WS 4/70)
(weight: approx. 0.33 kg)

Part no.: **223104 0070**

Stainless steel: **223104 1070**

L 124 x W 62 x H 31.5 mm (WS 4)
(weight: approx. 0.46 kg)

Part no.: **223104**

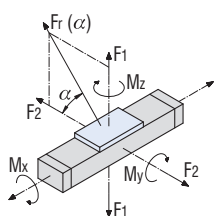
Stainless steel: **223104 1000**

Load data

Shaft slides WS 4/70	
C ₀	3003 N
C	1873 N
F ₁ static	2821 N
F ₁ dynamic	1599 N
F ₂ static	3303 N
F ₂ dynamic	1873 N
M _x static	29.8 Nm
M _y static	105.3 Nm
M _z static	123.3 Nm
M _x dynamic	16.8 Nm
M _y dynamic	59.7 Nm
M _z dynamic	69.9 Nm

Shaft slides WS 4	
C ₀	4868 N
C	2426 N
F ₁ static	4157 N
F ₁ dynamic	2071 N
F ₂ static	4868 N
F ₂ dynamic	2426 N
M _x static	43.9 Nm
M _y static	155.2 Nm
M _z static	181.7 Nm
M _x dynamic	21.8 Nm
M _y dynamic	77.3 Nm
M _z dynamic	90.5 Nm

Trolley LW 3	
C ₀	2160 N
C	4000 N
F ₁ static	4320 N
F ₁ dynamic	3846 N
F ₂ static	2160 N
F ₂ dynamic	4000 N
M _x static	109.5 Nm
M _y static	194.4 Nm
M _z static	97.2 Nm
M _x dynamic	97.4 Nm
M _y dynamic	173.0 Nm
M _z dynamic	180.0 Nm



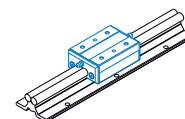
$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

$$F_r(\alpha) = \frac{F_1}{\sin \alpha}$$

Steel slide LS 1

- L 91 x W 60 x H 32 mm
- clamping surface ground
- weight: approx. 0.8 kg

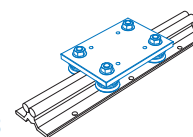
Part no.: **223006**



Trolley LW 3

- L 125 x W 85 x H 7.7 mm
- Ground steel plate
- Weight: 0.93 kg

Part no.: **223008**

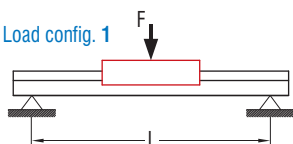


Linear guide rail

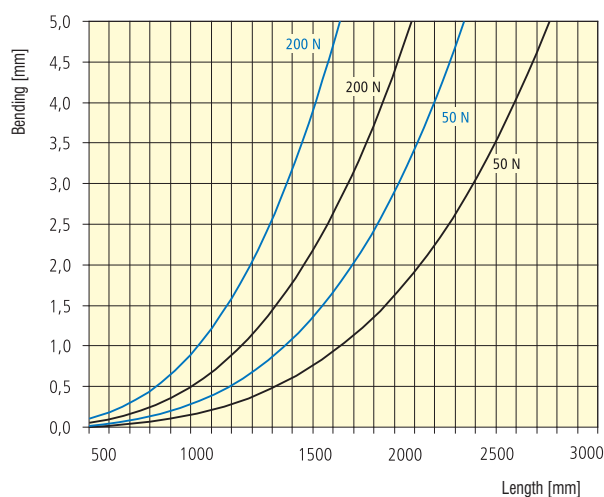
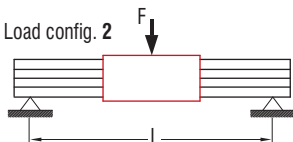
LFS-12-2

Bending

■ Load config. 1

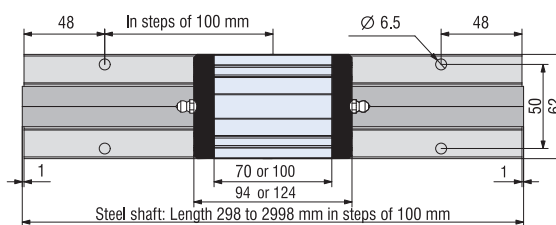
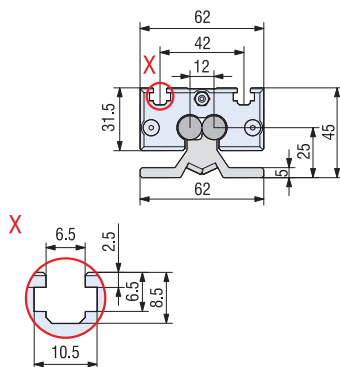


■ Load config. 2

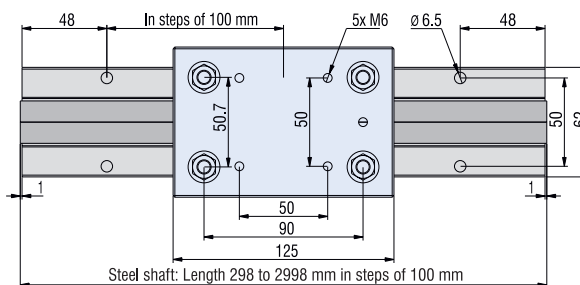
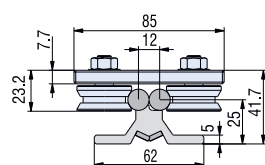


Dimensioned drawings

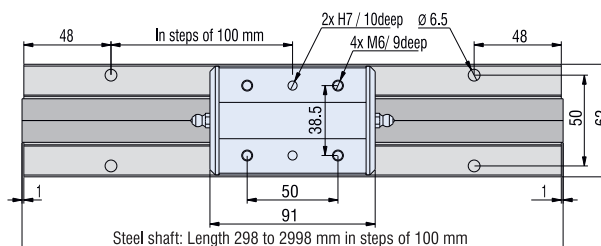
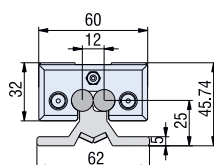
LFS-12-2 with aluminium slides **WS 4/70 or WS 4**



LFS-12-2 with trolley **LW3**

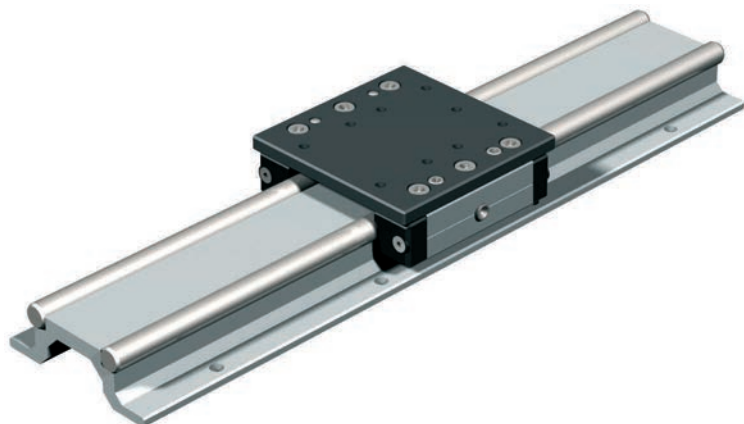


LFS-12-2 with steel slide **LS 1**



Linear guide rail

LFS-12-3



Features

- W 90 x H 31 mm
- 2 precision steel shafts Ø 12 mm
- anti-twist
- aluminium shaft housing profile, naturally anodised
- increased shaft spacing allows higher torques to be absorbed
- securing from above or below with M6 drillings in 100 mm raster
- any guide length
- weight: approx. 3.9 kg/m

Ordering key

235 300 XXXX

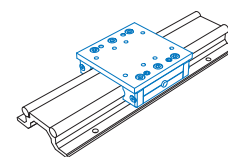
Length in mm (in 100 mm raster)

e.g. **0029** = Length 298

0299 = Length 2998

Profile length = Length overall L - 2 mm

Special lengths over 3000 mm with rod linkage to order.



Slides

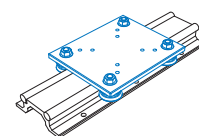
- ground steel plate
- central lubrication system option
- adjustable for no play

L 100 x W 100 x H 32 mm (WS 7/70)
(weight: approx. 0.8 kg)

Part no.: **223107 0070**

L 200 x W 100 x H 32 mm (WS 7)
(weight: approx. 1.7 kg)

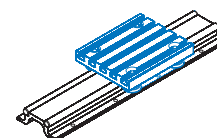
Part no.: **223107**



Trolley LW 8

- L 150 x W 125 x H 7.5 mm
- ground steel plate
- 4 rollers Ø 31 mm, sealed for life
- adjustable for no play
- weight: 1.51 kg

Part no.: **223013**



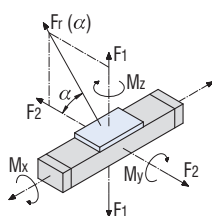
Trolley LW 2

- L 150 x W 125 x H 34.5 mm
- aluminium T-slot plate
- 4 rollers Ø 31 mm, sealed for life
- adjustable for no play
- weight: 0.97 kg

Part no.: **223005**

Load data

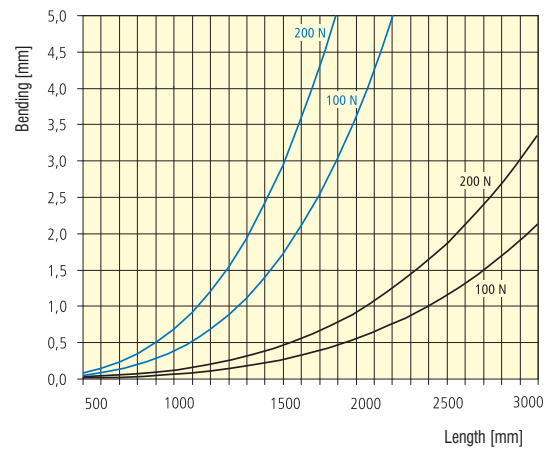
Shaft slides WS 7/70		Shaft slides WS 7		Trolley LW 2		Trolley LW 8	
C ₀	3303 N	C ₀	7303 N	C ₀	3114 N	C ₀	2160 N
C	1873 N	C	3179 N	C	1846 N	C	4000 N
F ₁ static	2821 N	F ₁ static	6237 N	F ₁ static	2659 N	F ₁ static	4320 N
F ₁ dynamic	1599 N	F ₁ dynamic	2715 N	F ₁ dynamic	1576 N	F ₁ dynamic	3846 N
F ₂ static	3303 N	F ₂ static	7303 N	F ₂ static	3114 N	F ₂ static	2160 N
F ₂ dynamic	1873 N	F ₂ dynamic	3179 N	F ₂ dynamic	1846 N	F ₂ dynamic	4000 N
M _x static	82.0 Nm	M _x static	181.2 Nm	M _x static	216.0 Nm	M _x static	189.2 Nm
M _y static	105.3 Nm	M _y static	232.8 Nm	M _y static	100.5 Nm	M _y static	248.4 Nm
M _z static	123.3 Nm	M _z static	272.5 Nm	M _z static	108.0 Nm	M _z static	124.2 Nm
M _x dynamic	46.4 Nm	M _x dynamic	78.8 Nm	M _x dynamic	168.4 Nm	M _x dynamic	168.4 Nm
M _y dynamic	59.7 Nm	M _y dynamic	101.3 Nm	M _y dynamic	192.3 Nm	M _y dynamic	221.1 Nm
M _z dynamic	69.9 Nm	M _z dynamic	118.6 Nm	M _z dynamic	200.0 Nm	M _z dynamic	230.0 Nm



$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

$$F_r(\alpha) = \frac{F_1}{\sin \alpha}$$

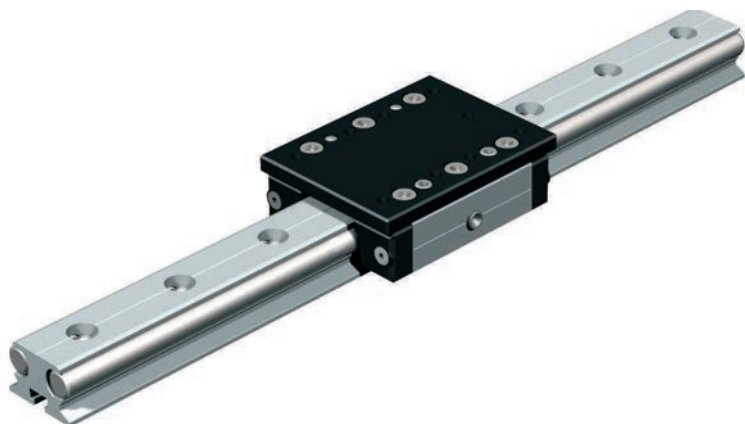
LFS-12-3



Technical drawing of a three-part assembly. The drawing shows three horizontal components stacked vertically. The top component is a plate with a width of 48 and a length of 150. The middle component is a plate with a width of 100 and a length of 150. The bottom component is a plate with a width of 48 and a length of 150. The assembly is shown in a perspective view. Dimensions are indicated by arrows and numbers. The width of the top and bottom plates is 48. The length of the top and bottom plates is 150. The width of the middle plate is 100. The length of the middle plate is 150. The assembly is shown in a perspective view. Dimensions are indicated by arrows and numbers. The width of the top and bottom plates is 48. The length of the top and bottom plates is 150. The width of the middle plate is 100. The length of the middle plate is 150. The assembly is shown in a perspective view. Dimensions are indicated by arrows and numbers. The width of the top and bottom plates is 48. The length of the top and bottom plates is 150. The width of the middle plate is 100. The length of the middle plate is 150.

Linear guide rail

LFS-12-10



Features

- W 36 x H 24.5 mm
- 2 precision steel shafts Ø 12 mm
- anti-twist
- aluminium shaft housing profile, naturally anodised
- fixing from below with M6 tapped rail in T-slot insert and from above M6 drillings in the Raster 50 mm
- conditionally self-supporting
- special lengths to order
- weight: approx. 2.9 kg/m

Ordering key

220 001 XXXX

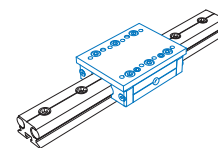
Length in mm (in 100 mm raster)

e.g. **0300** = Length 296

3000 = Length 2996

Profile length = Length overall L - 1 mm

Special lengths over 3000 mm with rod linkage to order.



Slides

- ground steel plate
- lubrication system option
- adjustable for no play

L 100 x W 75 x H 31.5 mm (WS 8/70)

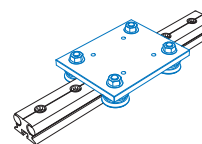
(weight: approx. 0.7 kg)

Part no.: **223108 0070**

L 150 x W 75 x H 31.5 mm (WS 8)

(weight: approx. 1,0 kg)

Part no.: **223108**

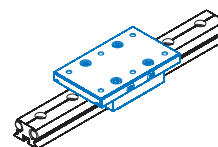


Trolley LW 4

- L 125 x W 97 x H 7.7 mm

- ground steel plate
- 4 rollers Ø 31 mm, sealed for life
- adjustable for no play
- weight: 1.02 kg

Part no.: **223009**



For steel shafts Ø 12 mm

Dual track set 1

- L75 x W75 x H30.2 mm
- With 2 SMALL linear ball bearings

Part no.: **223001**

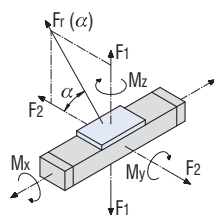
Dual track set 2

- L125 x W75 x H30.2 mm
- With 2 LARGE linear ball bearings

Part no.: **223002**

Load data

Slides WS 8/70		Slides WS 8		Trolley LW 4		Dual track set 1		Dual track set 2	
C ₀	3303 N	C ₀	4868 N	C ₀	2160 N	C ₀	645 N	C ₀	1905 N
C	1873 N	C	2426 N	C	4000 N	C	600 N	C	1125 N
F ₁ static	2821 N	F ₁ static	4157 N	F ₁ static	4320 N	F ₁ static	652 N	F ₁ static	1927 N
F ₁ dynamic	1599 N	F ₁ dynamic	2071 N	F ₁ dynamic	3846 N	F ₁ dynamic	607 N	F ₁ dynamic	1138 N
F ₂ static	3303 N	F ₂ static	4868 N	F ₂ static	2160 N	F ₂ static	645 N	F ₂ static	1905 N
F ₂ dynamic	1873 N	F ₂ dynamic	2426 N	F ₂ dynamic	4000 N	F ₂ dynamic	600 N	F ₂ dynamic	1125 N
M _x static	46.7 Nm	M _x static	68.8 Nm	M _x static	135.4 Nm	M _x static	16.0 Nm	M _x static	46.0 Nm
M _y static	105.3 Nm	M _y static	155.2 Nm	M _y static	194.4 Nm	M _y static	13.0 Nm	M _y static	119 Nm
M _z static	123.3 Nm	M _z static	181.7 Nm	M _z static	97.2 Nm	M _z static	13.0 Nm	M _z static	118 Nm
M _x dynamic	26.4 Nm	M _x dynamic	34.2 Nm	M _x dynamic	120.5 Nm	M _x dynamic	15.0 Nm	M _x dynamic	27.0 Nm
M _y dynamic	59.7 Nm	M _y dynamic	77.3 Nm	M _y dynamic	173.0 Nm	M _y dynamic	12.0 Nm	M _y dynamic	71.0 Nm
M _z dynamic	69.9 Nm	M _z dynamic	90.5 Nm	M _z dynamic	180.0 Nm	M _z dynamic	12.0 Nm	M _z dynamic	70.0 Nm



$$Fr(\alpha) = \frac{F_2}{\cos \alpha}$$

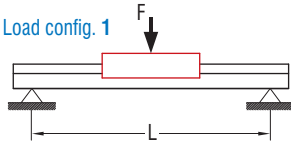
$$Fr(\alpha) = \frac{F_1}{\sin \alpha}$$

Linear guide rail

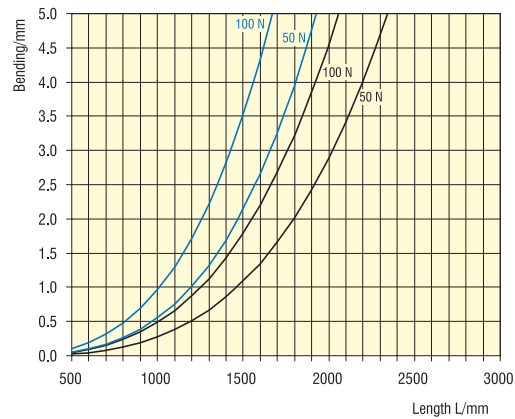
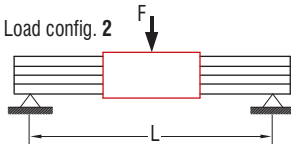
LFS-12-10

Bending

■ Load config. 1

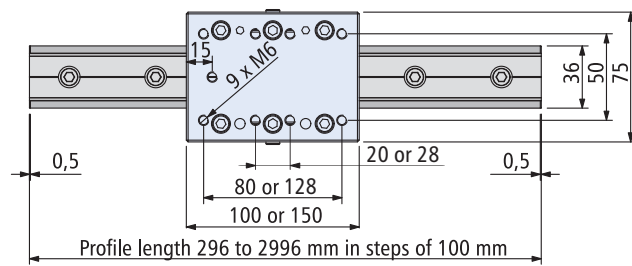
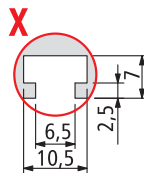
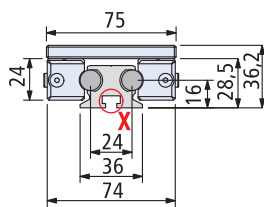


■ Load config. 2

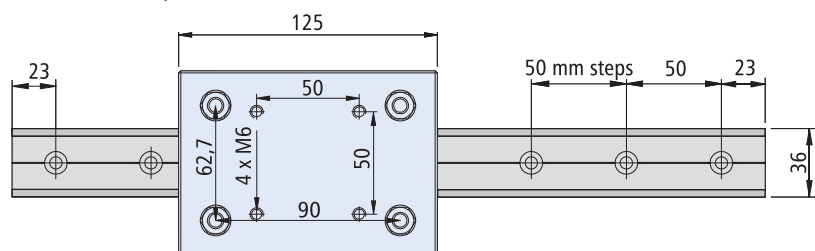
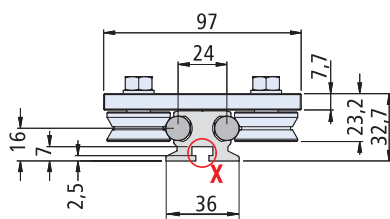


Dimensioned drawings

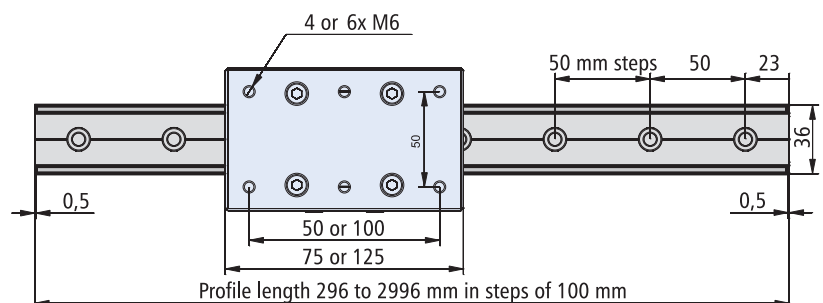
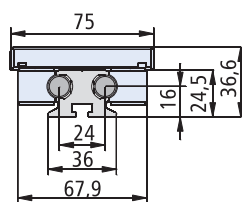
LFS-12-10 with slides WS 8



LFS-12-10 with trolley LW 4



LFS-12-10 with dual track set



Accessories

Tapped rail



M6 tapped rail

- 10 x 4 mm
- galvanised
- M6 Ra 50 mm
- VE 3 units at 1 m

Part no.: **209 011**

Sliding nuts



M6 sliding nut (Figure 1)

- L 25 x W 10 x H 3.5 mm
- galvanised
- VE 100 unit
- all except PT/RE 40, 65

Part no.: **209 001 0005**

2 x M6 sliding nuts (Figure 2)

- L 45 x W 10 x H 3.5
- galvanised
- VE 50 unit
- for all except PT/RE 40, 65

Part no.: **209 002 0004**

2 x M6 sliding nuts (Figure 2)

- L 45 x W 13 x H 6 mm
- galvanised
- 2 x M6 Ra 25 mm
- VE 25 unit
- for PT/RE 40, 65

Part no.: **209 005 0001**

Angle sliding nut

2 x M6 (Figure 3)

- galvanised
- VE 25 units
- for all except PT/RE 40, 65

Part no.: **209 021 0003**

Special angle sliding nut

3 x M6 (Figure 4)

- galvanised, VE 25 unit
- for all except PT/RE 40, 65

Part no.: **209 022 0003**

Sliding nuts



M5 sliding nuts

- galvanised • VE 20 unit
- for all except PT25, PT 50, PS 200, RE 40 and RE 65
- (securing only possible from above)

with spring

Part no.: **209005 0002**

(M5/Figure 1)

Part no.: **209005 0003**

(M6/Figure 2)

with large chamfer

Part no.: **209005 0004**

(M6/Figure 3)

in rhombus shape

Part no.: **209005 0005**

(M5/Figure 4)

Part no.: **209005 0006**

(M6/Figure 5)

Linear ball bearing



for steel shafts Ø 12 mm

Linear ball bearing large

- L80 x W20 x H19 mm, VE 2 units

Part no.: **222 002 0001**

Linear ball bearing medium

- L60 x W20.5 x H17.8 mm, VE2 units

Part no.: **222 000**

Linear ball bearing small

- L40 x W20 x H19 mm, VE 2 units

Part no.: **222 001**

Grease/grease gun

Grease

Part no.: **299 031**

Impact press for grease and oil

Part no.: **931 170**

Guide shafts



Guide shaft SF 12/SF 16

- precision steel shafts
- Ø 12 or 16 mm, length 3 m
- hardened and ground
- with M5 blind hole tapping (SF12) or M6 (SF16) in 100 mm raster or with drilled holes for M4 (SF 12) or M5 (SF 16) in 100 mm raster

Part no.: **220019 0299**

(SF12, 3m, with blind holes for M5)

Part no.: **220020 0299**

(SF12, 3m, with stepped holes for M4)

Part no.: **220023 0299**

(SF16, 3m, with stepped holes for M5)

Part no.: **220024 0299**

(SF16, 3m, with blind holes for M6)

Rollers



Roller Ø 20 mm for SF 12

- with M4 tapped drilling
- VE 2 units

Part no.: **222 010**

Rollers



Roller Ø 21 mm

- concentric
- VE 2 units

Part no.: **222 003**

- eccentric
- VE 2 units

Part no.: **222 004**

Roller Ø 31 mm

- concentric
- VE 2 units

Part no.: **222 006**

- eccentric
- VE 2 units

Part no.: **222 007**

Space for your notes

Drive elements

Overview

Ball screw spindles Ø 12 - 25 mm

B-28

Plastic nuts

B-29

Ball screw nut with single-path return

B-30

Clamping blocks for nuts with single-path return

B-31

Ball screw nut with complete ball return

B-32

Flange bearings

B-33

Information

Ball screw nuts supplied by isel Germany are high-quality, precise and wear-free (hardened and ground). Combined with ball screw spindles, ball screw nuts ensure that rotary motion is converted into linear motion at extremely low values of friction.

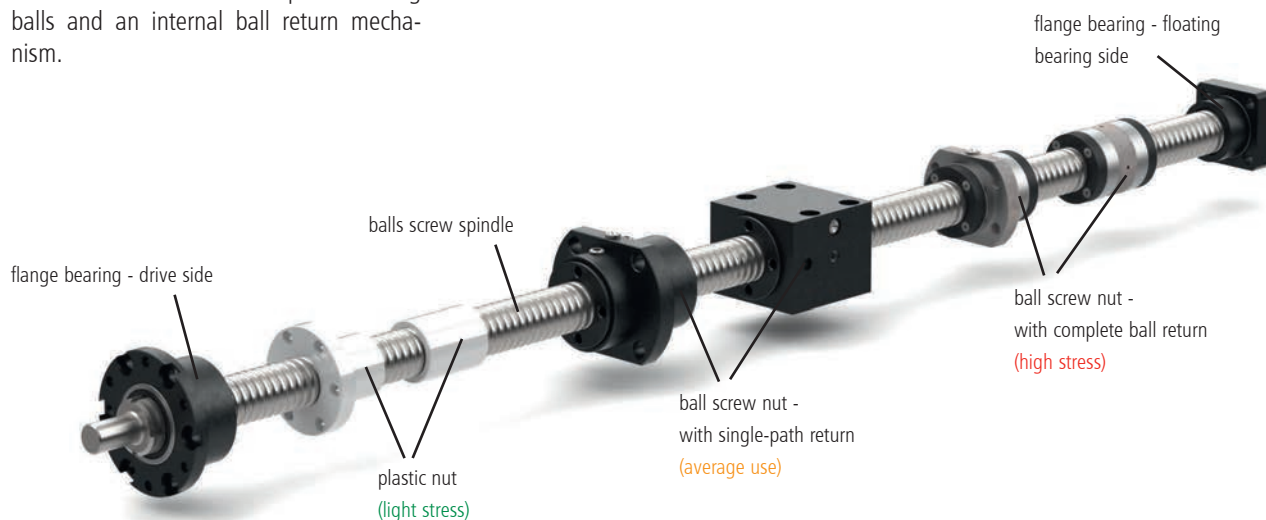
The ball screw nut is positioned and held in the clamping block using a stud screw. The ball screw nuts contain multiple circulating balls and an internal ball return mechanism.

Adjustment of the clamping block stud screw allows the ball screw spindle to move freely, without backlash.

Repeat accuracy is less than 0.01 mm on a length of 300 mm. The linear drive is lubricated via the grease nipple on the clamping block.

Ball screw spindles are roll manufactured using modern machines prior to hardening and polishing.

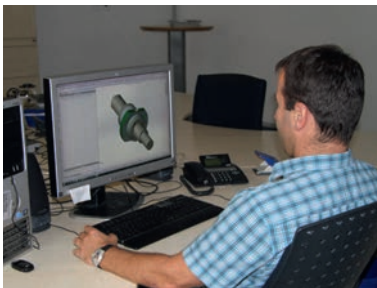
Our linear drives are technically advanced and have proven themselves over a period of more than 20 years of practical application.



Contract Manufacturing

With more than 1 million units soled, "isel" has created core competence in the area of ball screws. Our drives are technically mature and have proved themselves in many applications in practical use. The specialist skills of our highly qualified employees are a significant contributing factor on our path to creating technically perfect and economically successful solutions. isel Germany AG offers products to meet every special customer requirement. Thanks to our very modern manufacturing plants, we are able to carry out all work processes (rolling, hardening and polishing) efficiently and according to the customer's specifications. They precisely meet the special requirements that you give to us. Please get in contact with us or give us a call to discuss your area of application or individual case. You will find us an attentive and skilled partner. Our in-house design department checks all technical requirements and works in close collaboration with the production engineers to ensure your order can be quickly and flexibly integrated into the production process.

Visit us on our website and look at our current product video:



The company isel Germany AG has been manufacturing ball screw spindles on modern CNC controlled production machines also using robotics for over 25 years.

Included amongst our long-standing clients are companies from the areas of

- machine and equipment construction
- medical technology
- electronics industry
- semiconductor industry
- wood-working
- training and other related areas



Ball screw spindles

Ø 12, 16, 20, 25 mm



Features

- rolled, hardened and polished
- material CF 53, inductively hardened (HRC 60±2)
- length up to 3,052 mm available (Special length on request!)
- end machining to isel standard or according to customers specifications
- tolerance class ISO 7 Δ 300 mm

Available length

End machining in a grid of 100 mm	Ø 12
without	252 bis 1552 mm
one-sided	252 bis 552 mm
two-sided	252 bis 1552 mm

	Ø 16
without	352 bis 3052 mm
one-sided	352 bis 1052 mm
two-sided	368 bis 3068 mm

	Ø 20
without	252 bis 3052 mm
one-sided	252 bis 1052 mm
two-sided	252 bis 3052 mm

	Ø 25
without	300 bis 3000 mm
one-sided	352 bis 1052 mm
two-sided	295 bis 2995 mm

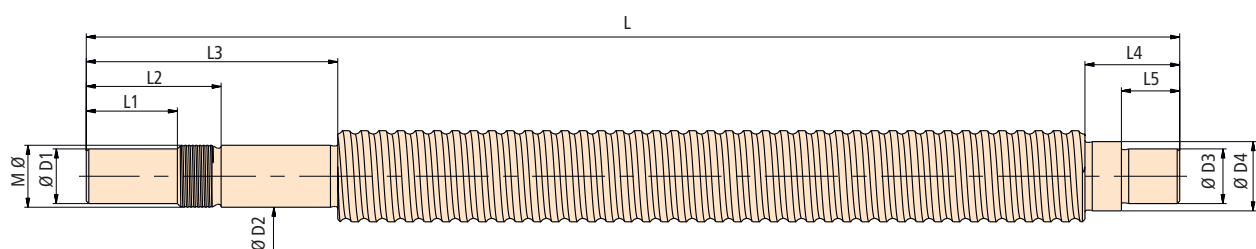
Ordering key

Diameter	Spindle pitch	End machining	Lengths
2 = 12 mm	2 = 2,5 mm (only for Ø 12, 16mm)	0 = not machined	e.g. 045 = 452 mm
3 = 16 mm	3 = 4 mm (only for Ø 16 mm)	1 = one-sided	086 = 868 mm
4 = 25 mm	4 = 5 mm	2 = both sided (only for Ø 12, 25 mm)	305 = 3,052 mm
5 = 20 mm	5 = 10 mm (not at Ø 12 mm)	5 = both sided (only for Ø 16, 20 mm)	(rounded to the final digit)
	6 = 20 mm (not at Ø 12 mm)		

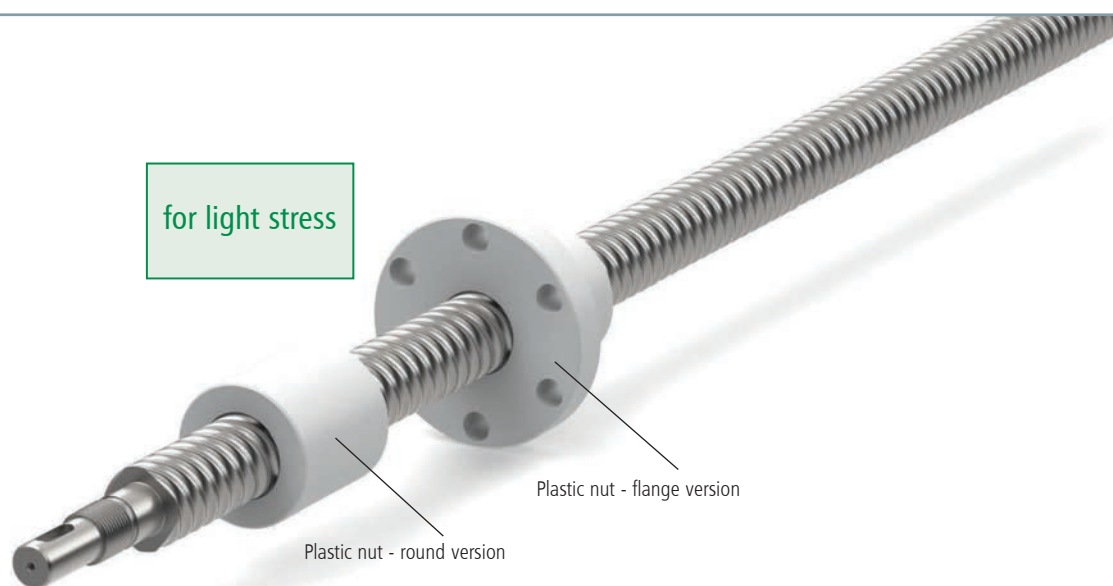
See „available length“ for permissible combinations!

Dimensioned drawing

	Spindle pitch	L [max.]	L1	L2	L3	L4	L5	M	D1	D2	D3	D4
Ø 12	2.5 / 5	1552	10	20	40	19	-	M8x 1	6.35 h7	8 h6	-	7 h6
Ø 16	2.5 / 4 / 5 / 10 / 20	3068	18	31	52	28	-	M10 x 0.75	8 h7	10 h6	-	12 h6
Ø 20	5 / 10 / 20	3052	20	32	55	27.5	-	M12x 1	10 h7	12 h6	-	12/14 h6
Ø 25	5 / 10 / 20	3000	25	37	69	26	16	M17x 1	15 h7	17 h6	15 j6	19 h11



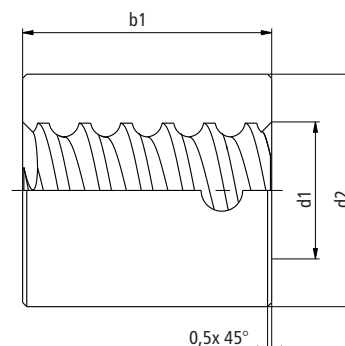
Plastic nuts round- or flange version for isel standard spindles



Technical data

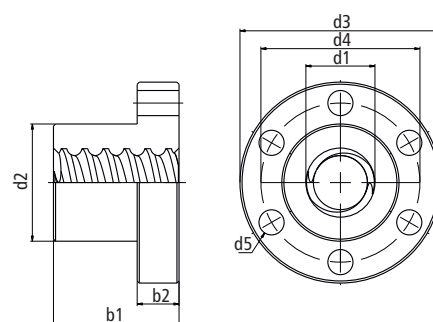
Round nut

Item-No.	thread d1 x P	b1	d2	F axial (at V _{max.}) [N]	V _{max.} [mm/s] [feed]
213612 0025	12 x 2.5	25	24	123	33
213612 0050	12 x 5	25	24	123	66
213616 0050	16 x 5	30	28	179	50
213616 0100	16 x 10	30	28	179	100
213616 0200	16 x 20	30	28	179	199
213620 0050	20 x 5	35	33	238	40
213620 0100	20 x 10	35	33	235	80
213620 0200	20 x 20	35	33	235	159
213625 0050	25 x 5	40	32	381	32
213625 0100	25 x 10	40	32	381	64
213625 0200	25 x 20	40	32	386	127



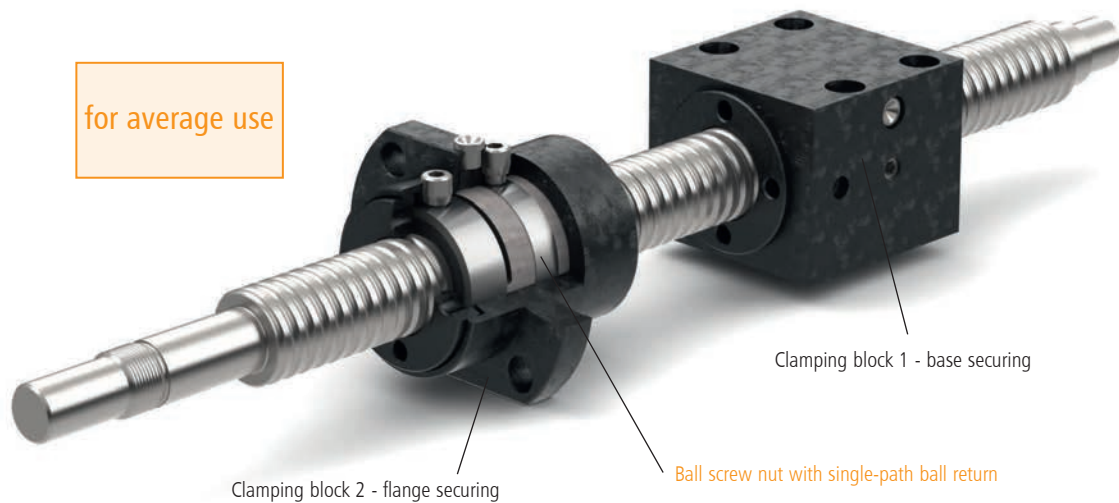
Flange nut

Item	thread d1 x P	d2	d3	d4	d5	b1	b2	F axial (at V _{max.}) [N]	V _{max.} [mm/s] [feed]
213812 0025	12 x 2.5	24	42	34	5	25	8	123	33
213812 0050	12 x 5	24	42	34	5	25	8	123	66
213816 0050	16 x 5	28	48	38	6	30	10	179	50
213816 0100	16 x 10	28	48	38	6	30	10	179	100
213816 0200	16 x 20	28	48	38	6	30	10	179	199
213820 0050	20 x 5	33	55	45	7	35	10	238	40
213820 0100	20 x 10	33	55	45	7	35	10	235	80
213820 0200	20 x 20	33	55	45	7	35	10	235	159
213825 0050	25 x 5	32	55	45	7	40	10	381	32
213825 0100	25 x 10	32	55	45	7	40	10	381	64
213825 0200	25 x 20	32	55	45	7	40	10	386	127



Ball screw nut with single-path ball return

for average use



Ordering data

Ø	Item-No.	spindle pitch	D	L	dynamic load [N]	static load [N]
12	213412 0003	2.5	24	37.5	3,000	1,900
	213412 0005	5	24	37.5	2,000	1,300
16	213503	2.5	28	50	3,500	5,500
	213514	4	28	50	4,600	7,200
	213505	5	28	50	4,600	7,200
	213510	10	28	50	4,200	6,500
	213520	20	28	50	2,500	1,900
20	213420 0005	5	33	50	9,000	5,000
	213420 0010	10	33	50	8,000	4,500
	213420 0020	20	33	50	3,500	2,200
25	213700 0005	5	38	50	5,100	12,600
	213700 0010	10	38	50	5,100	12,600
	213700 0020	20	38	70	3,570	8,800

Features ball screw nuts

- material 16MnCr5, sharpened
- version as round nuts
- pitches: 2.5 / 5 / 10 / 20 mm
- with integrated end-cap ball return
- the version with pitch 20 mm is supplied with scrapers

Dust Seal

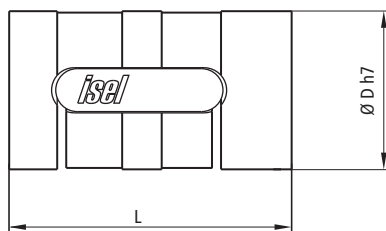
- for ball screw nuts Ø 12, 16, 20, 25 mm (QTY 2 pieces)

Ø 12 mm Item-No.: [213500 0003](#)

Ø 16 mm Item-No.: [213500 0001](#)

Ø 20 mm Item-No.: [213500 0002](#)

Ø 25 mm Item-No.: [213700 9000](#)



... and suitable clamping blocks

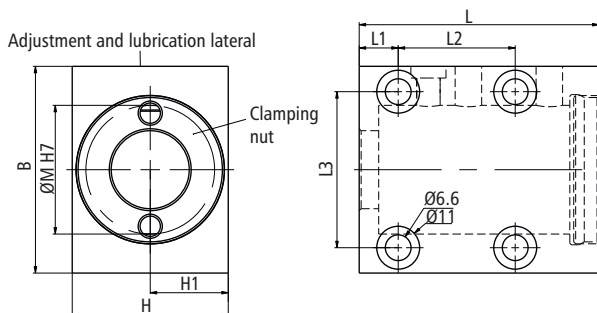
Features clamping blocks

- material steel, gunmetal finish
 - versions for recirculating ball spindles
Ø 12, 16, 20, 25 mm
 - clamping blocks for base and flange securing
- Nut pitches
2.5/5 mm (Ø 12 mm)
2.5/4/5/10 and 20 mm (Ø 16 mm)
5/10 and 20 mm (Ø 20 mm)
5/10 and 20 mm (Ø 25 mm)

Ordering data and dimensioned drawings of the clamping blocks

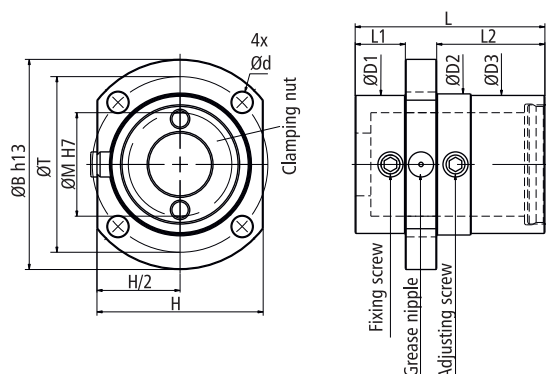
Base securing

	Item-No.	M	L	B	H	H1	L1	L2	L3	Clamping nut
Ø 12	213400	24	37.5	44	29	14.5	7	20	31	-
Ø 16	213500	28	54	47	33	16.5	14.5	25	35	-
Ø 20	213600	33	61.5	53	40	20	10	30	40	1x
Ø 25 - pitch 5/10	213700 9001	38	60	60	49.5	25	10	30	46	1x
Ø 25 - pitch 20	213700 9002	38	80	60	50	25	10	50	46	1x



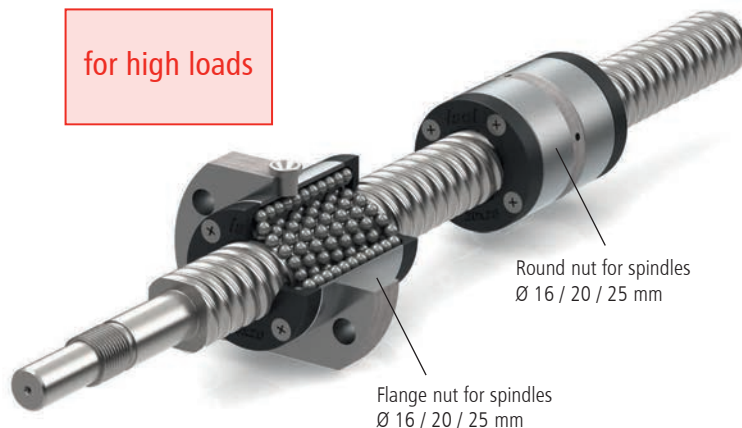
Flange securing

	Item-No.	M	L	B	H	d	T	D1	D2	D3	L1	L2	Clamping nut
Ø 12	213401	24	37.5	53	42	4.5	45	35	37 g6	35	3	24.5	-
Ø 16	213501	28	50	62	48	6.6	51	39	40 g6	39	11.6	28.4	-
Ø 20	213601	33	60.5	67	53	6.6	56	44	45 g6	44	16	34.5	1x
Ø 25 - pitch 5/10	213700 9003	38	60	80	62	9	65	49	50 f9	50 f9	32.25	17.75	1x
Ø 25 - pitch 20	213700 9004	38	80	80	62	9	65	49	50 f9	50 f9	52.25	17.75	1x



Ball screw nut with complete ball return

for high loads



Features

- material 16MnCr5, sharpened
- version as round nut or flange nut
- pitch: 20 mm
- with integrated end-cap ball return
- integrated dust seal function in the deflector

Dimensioned drawings

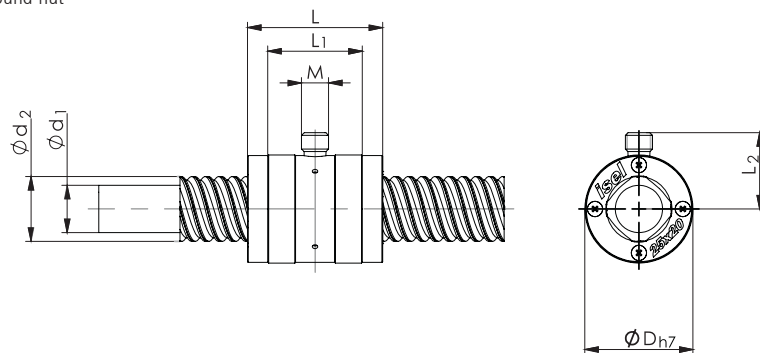
Round nut

Ø	Item-No.	pitch	d2	d1	Ø D _{h7}	L	L ₁	M	L ₂	dynamic load factor	static load factor
16	211336 0020	20	16	10	30	45,5	33,5	M8 x 0,75	22,5	13.000 N	29.000 N
20	211356 0020	20	20	14	35	46,5	34,5	M8 x 0,75	25,5	15.000 N	35.000 N
25	211346 0020	20	25	21	40	50	35	M10 x 0,75	28,3	16.000 N	40.000 N

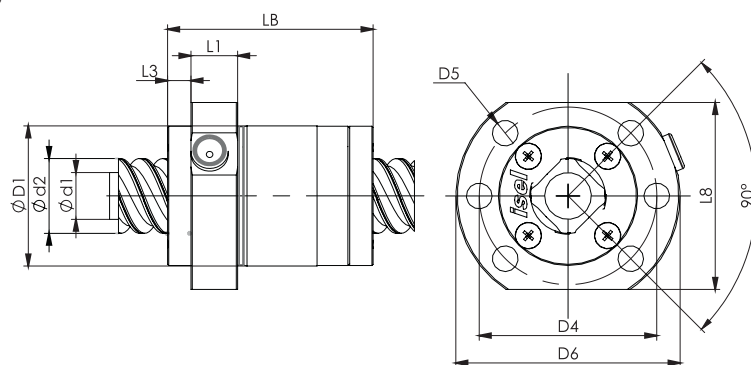
Flange nut

Ø	Item-No.	pitch	d2	d1	D1 _{g6}	LB	L1	L3	L8 _{h13}	D4	D6 _{h13}	D5	dynamic load factor	static load factor
16	211236 0020	20	16	10	30	45,5	10	6	40	38	48	6x Ø5,5	13.000 N	29.000 N
20	211256 0020	20	20	14	35	46,5	10	11	44	47	58	4x Ø 6,6	15.000 N	35.000 N
25	211246 0020	20	25	21	40	50	10	12,5	48	51	62	4x Ø6,6	16.000 N	40.000 N

Round nut



Flange nut



Flange bearings



flange bearing - drive side



flange bearing - floating bearing side

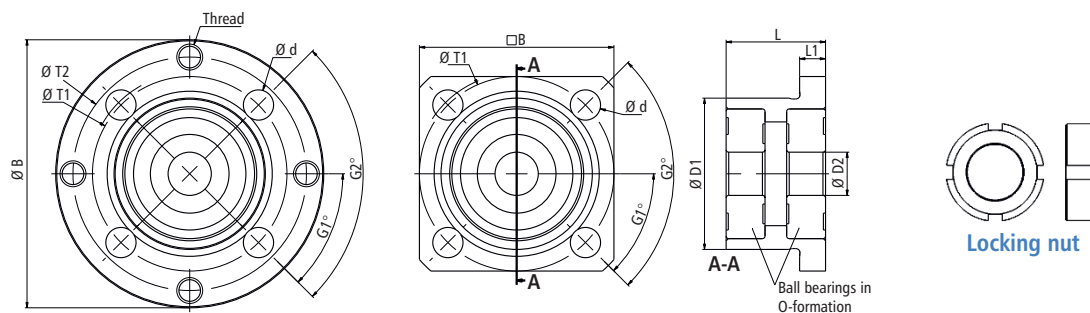
Features

- bearing, spindle drive side(fixed bearing side) and the spindle floating bearing side
- flange bearing, drive side: bushing with two pressed angular contact ball bearings in an O-configuration
- flange bearing, floating bearing side (counter-bearing): bushing with pressed needle bearing

Ordering data and dimensioned drawings

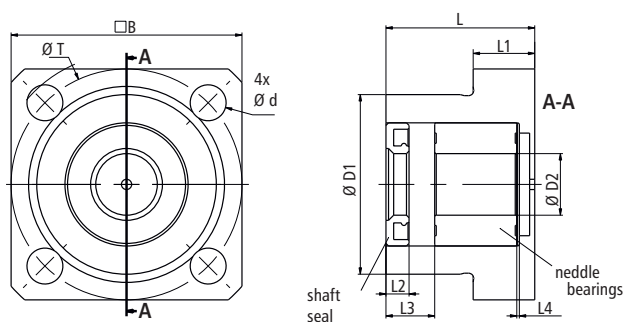
Drive side and locking nut

	Version	Item-No.	B	L	L1	D1	D2	T1	T2	G1	G2	d	Thread
Ø 12	angular	216504 0030	40	19.5	8	35	8	38.2	-	45°	90°	4x Ø 4.5	-
Ø 16	angular	216504 0001	45	23	6	35	10	45	-	45°	90°	4x Ø 12 x 4U / Ø 7	-
Ø 16	round	216504 0003	62	23	6	35	10	45	54	45°	90°	4x Ø 12 x 4U / Ø 7	4x M6
Ø 20	round	216504 0031	64	23	8	39.5	12	50	54	45°	90°	4x Ø 12 x 4U / Ø 7	4x M6
Ø 25	round	216504 0006	72	34	8	53	17	62	62	30°	60°	6x Ø 12 x 4U / Ø 7	6x M6



Floating bearing side

	Item-No.	B	L	L1	L2	L3	L4	D1	D2	T	d
Ø 12	216504 0032	35	20	8	6	6.5	0.5	28	7	38.2	Ø7.5 x 4U Ø4.5
Ø 16	216504 0002	45	29	12	4.5	9.5	0.5	35	12	45	Ø12 x 4U Ø7
Ø 20	216504 0033	50	29.5	12	4.5	5	1.5	35	12	50	Ø12 x 4U Ø7
Ø 25	216504 0005	45	29	12	8	10	0	35	15	45	Ø12 x 4U Ø7



Linear units

Overview

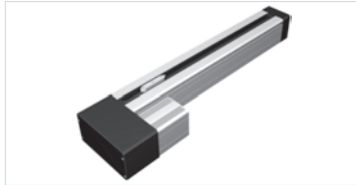
LES functional overview

B-36

LES 4

with spindle drive

B-38



LES 6

with spindle drive

B-40



LES 5

with spindle drive

B-42



Combination examples

B-44

Motor modules

B-46

Clutch housing

B-48

Motor leads

B-50

Installation kit with angular transmission

B-52

Slots/crossbench plates

B-54

T-slot plates

B-57

Angles brackets

B-58

Accessories

B-61

Linear units

Overview

LEZ functional overview

B-62

LEZ 1

with toothed belt drive

B-64



LEZ 2

with toothed belt drive

B-66



LEZ 3

with toothed belt drive

B-68



Accessories

B-70

Example in use

B-71



CAD data can be found on www.isel.com and



Functional overview

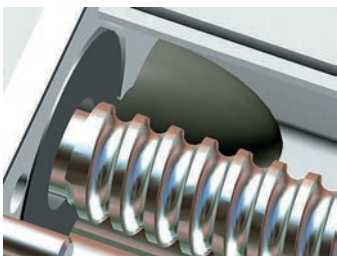
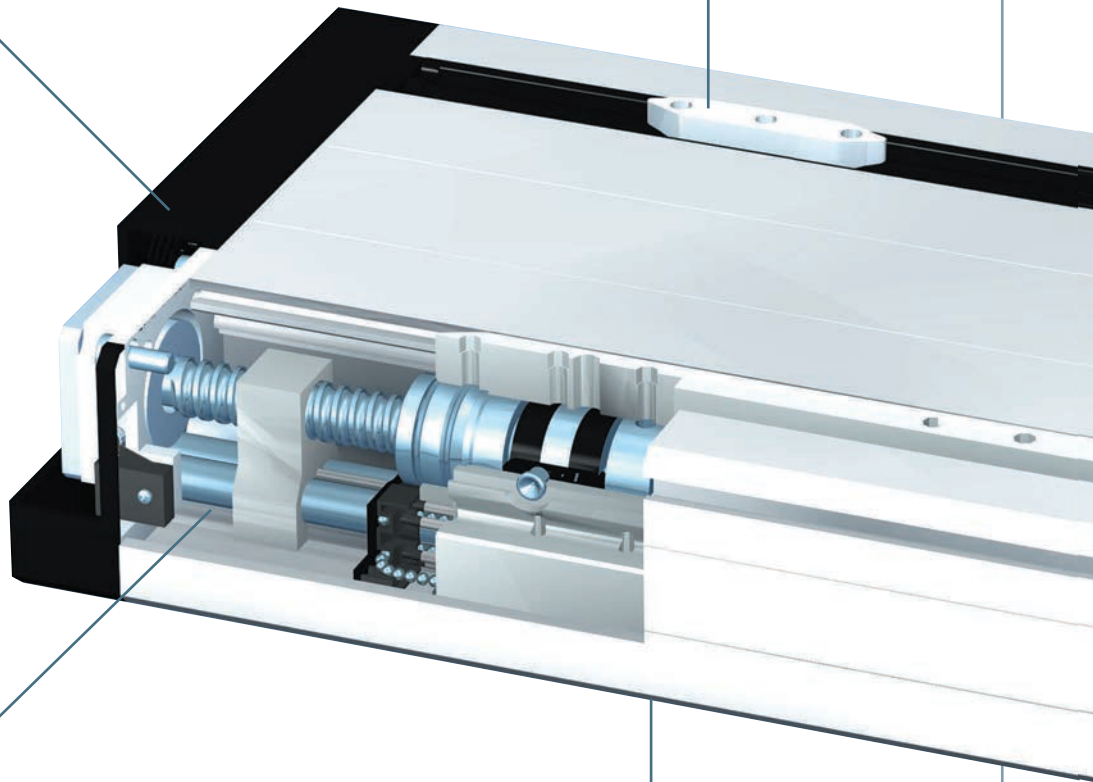
at example LES 5

Plastic cap
electromagnetically shielded

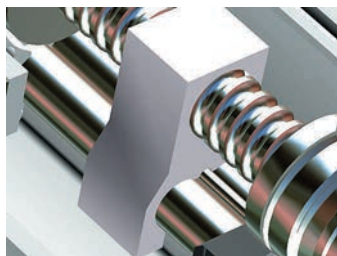
Clamping surface
milled flat

Shaft housing outline
precision milled

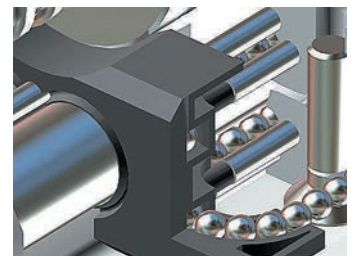
Profile underside
milled flat



- end position buffering both sides with soft PVC parabolic springs
- counter-bearing with 2 needle sleeves



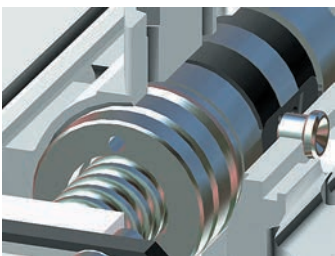
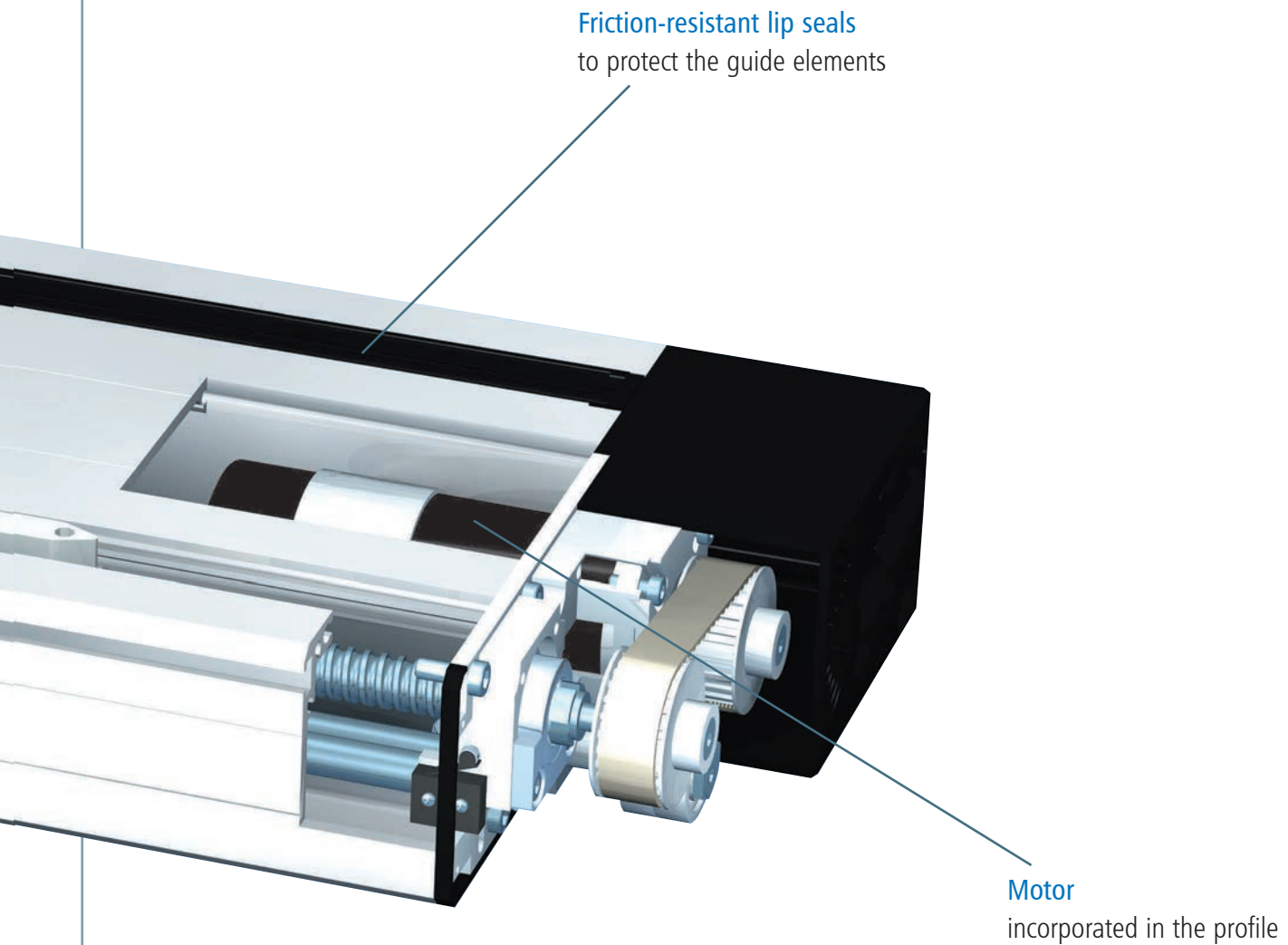
- spindle support from a profile length of 1500 mm without limiting the process range



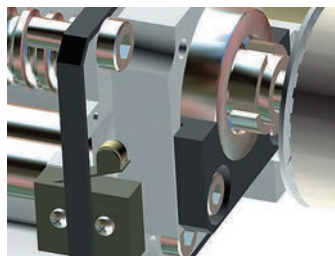
- recirculating ball in patented aluminium linear slides
- glass fibre reinforced loop components with scrapers

Functional overview

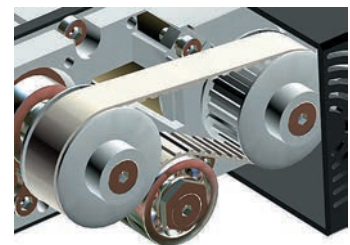
at example LES 5



- preset play-free recirculating ball nut with scrapers
- central lubrication system for recirculating ball nut and circulations



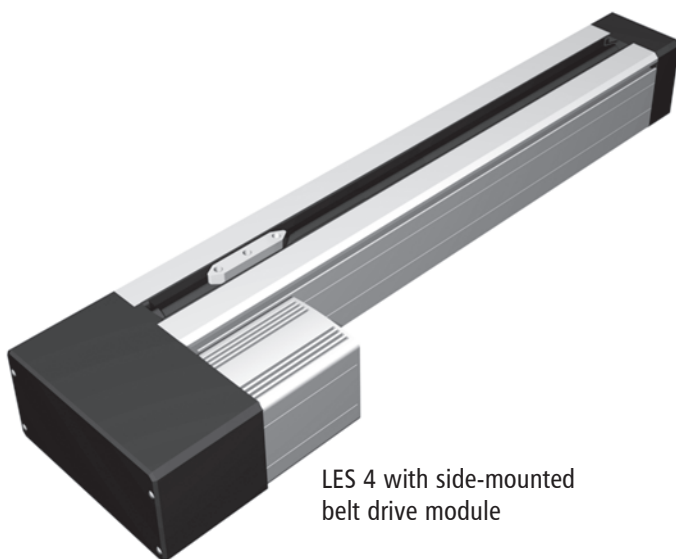
- integrated overrun limit switch
- spindle bearing with angular contact bearings
- axially free from play by means of self-locking special nuts



- belt return and connecting electronics covered completely by protective cap

Linear units with spindle drive

LES 4



LES 4 with side-mounted
belt drive module

Features

- aluminium shaft housing profile
W75 × H75 mm, naturally anodised
- clamping area and profile
underside milled flat
- with 2 precision steel shafts
Ø 12 h6, material Cf53,
hardness 60 ± 2 HRC
- aluminium shaft slides WS 5/70,
2 x WS 5/70 (70 mm long), adjustable
for no play, central lubrication system
- recirculating ball drive
2.5/4/5/10 and 20 mm pitches
- profile sealing with
friction-resistant lip seals
- cast aluminium end plates
- with 2 limit or reference switches,
repeat accuracy ± 0.02 mm
- sealed angular contact bearings
in drive - steel flange

Ordering key

2 3 4 X X X 0 X X X

Drive

- 0 = Preparation
Direct drive modules
1 = Preparation
Belt drive module

Shaft slides

- 0 = 1 Shaft slides 70 mm
1 = 1 Shaft slides 200 mm
2 = 2 Shaft slides 70 mm

Profile length (L1)

- e.g. 029 = 290 mm (min.)
299 = 2990 mm (max.)
(rounded to the last digit)

Standard profile lengths available
in 100 mm raster

Recirculating ball drive

- 0 = without
1 = Pitch 2.5 mm
2 = Pitch 4.0 mm
3 = Pitch 5.0 mm
4 = Pitch 10 mm
5 = Pitch 20 mm
6 = Pitch 20 mm (with
complete ball return)

Options:

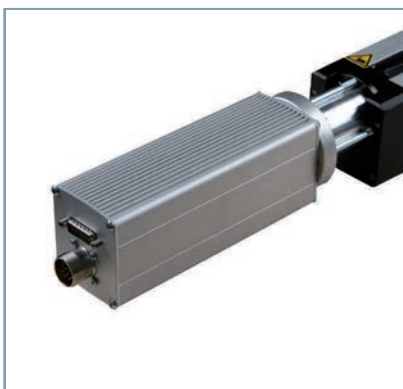
- black anodized aluminium profile
- electromagnetic brakes in the motor
module or in drive spindle extension
- steel slide LS2 (Part no. 223007)
- external limit switch attachment set
(see accessories)

Available on request:

- length measuring system
- bellows gaiter cover
- assembly left of the motor module

Drive modules

see pages B-46 et seq. of the catalogue



Technical specification Aluminium profile

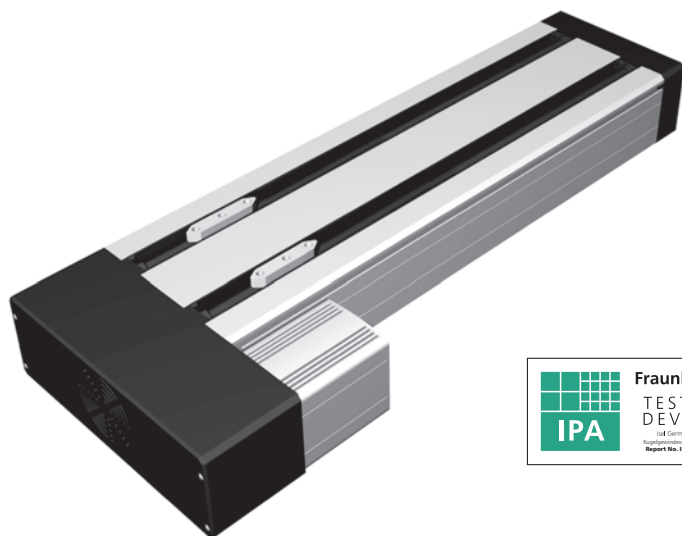
Aluminium profile LES 4	
Moment of inertia I_x	107.711 cm ⁴
Moment of inertia I_y	125.843 cm ⁴
*Centre of gravity see dimensioned drawing	33.23 mm
Cross-sectional area	18.81 cm ²
Material	AlMgSiO, 5F22
Anodising	E6/EV1
Weight with steel shafts	6.2 kg/m
Weight with steel shafts and spindles	7.6 kg/m

No load running torques

No load torques (Ncm)					
Speed (rpm)	Spindle pitch				
	2.5	4	5	10	20
500	15	15	16	17	18
1500	19	19	19	20	21
3000	23	24	24	25	26

Linear units with spindle drive

LES 6



LES 6 with side belt drive module

Features

- aluminium shaft housing profile W150 × H75 mm, naturally anodised
- clamping area and profile underside milled flat
- with 4 precision steel shafts Ø 12 h6, material Cf53, hardness 60 ± 2 HRC
- aluminium shaft slides WS 5/70, 2 x WS 5/70 (70 mm long), adjustable for no play, central lubrication system
- recirculating ball drive 2.5/4/5/10 and 20 mm pitches
- profile sealing with friction-resistant lip seals
- cast aluminium end plates
- with 2 limit or reference switches, repeat accuracy ± 0.02 mm
- sealed angular contact bearings in drive - steel flange

Ordering key

2 3 4 X X X 0 X X X

Drive

- 6 = Preparation
Direct drive modules
- 7 = Preparation
Belt drive module

Shaft slides

- 0 = 2 Shaft slides 70 mm
- 1 = 2 Shaft slides 200 mm
- 2 = 4 Shaft slides 70 mm

Profile length (L1)

e.g. 029 = 290 mm (min.)

299 = 2990 mm (max.)

(rounded to the last digit)

Standard profile lengths available in 100 mm raster

Recirculating ball drive

- 0 = without
- 1 = Pitch 2.5 mm
- 2 = Pitch 4.0 mm
- 3 = Pitch 5.0 mm
- 4 = Pitch 10 mm
- 5 = Pitch 20 mm
- 6 = Pitch 20 mm (with complete ball return)

Options:

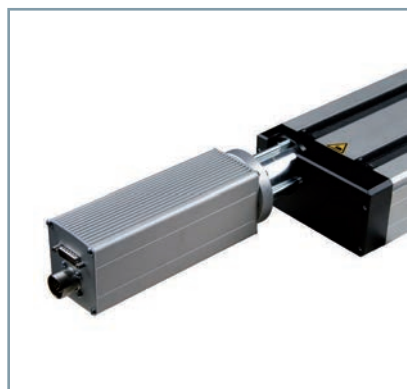
- black anodized aluminium profile
- electromagnetic brake
- steel slides LS2 (Part no. 223007)
- limit switch attachment kit (see accessories)

To order:

- length measuring system
- bellows gaiter cover
- assembly left of the motor module

Drive modules

see pages B-46 et seq. of the catalogue



Technical specification Aluminium profile

Aluminium profile LES 6	
Moment of inertia I_x	707.100 cm ⁴
Moment of inertia I_y	212.200 cm ⁴
*Centre of gravity see dimensioned drawing	32.78 mm
Cross-sectional area	30.07 cm ²
Material	AlMgSi0, 5F22
Anodising	E6/EV1
Weight with steel shafts	11.4 kg/m
Weight with steel shafts and spindles	12.8 kg/m

No load running torques

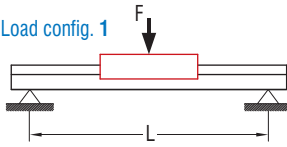
No load torques (Ncm)					
Speed (rpm)	Spindle pitch				
	2.5	4	5	10	20
500	17	17	18	20	21
1500	20	20	22	24	25
3000	24	25	26	29	30

Linear units with spindle drive

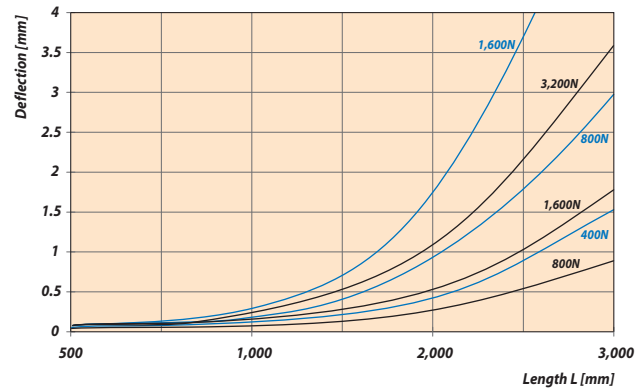
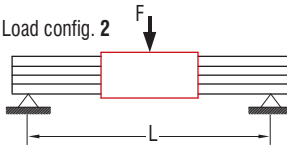
LES 6

Bending

Load config. 1



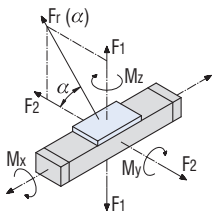
Load config. 2



Load factors

$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

$$F_r(\alpha) = \frac{F_1}{\sin \alpha}$$



LES 6 with two WS 5/70	
C_0	5,153.30 N
C	2,319.41 N
F_1 stat.	4,401.33 N
F_1 dyn.	1,980.96 N
F_2 stat.	5,153.30 N
F_2 dyn.	2,319.14 N
M_x stat.	211.54 Nm
M_y stat.	164.31 Nm
M_z stat.	192.39 Nm
M_x dyn.	95.21 Nm
M_y dyn.	73.95 Nm
M_z dyn.	86.59 Nm

LES 6 with four WS 5/70	
C_0	6,606 N
C	3,746 N
F_1 stat.	5,642 N
F_1 dyn.	3,198 N
F_2 stat.	6,606 N
F_2 dyn.	3,746 N
M_x stat.	211.575 Nm
M_y stat.	366.73 Nm
M_z stat.	429.39 Nm
M_x dyn.	119.925 Nm
M_y dyn.	207.87 Nm
M_z dyn.	243.49 Nm

permissible spindle speeds

LES 4 / 5 / 6	Spindle pitch [mm]	max. permissible feed speed v permissible [mm/s]				
		2.5	4	5	10	20
Profil length L [mm]	max. permissible feed speed [rpm]					
490	4000	167	267	333	667	1333
990	3000	125	200	250	500	1000
1390	1500	63	100	125	250	500
1490 *	3000	125	200	250	500	1000
1990 *	1650	69	110	138	275	550
2490 *	1050	44	70	88	175	350
2990 *	750	31	50	63	125	250

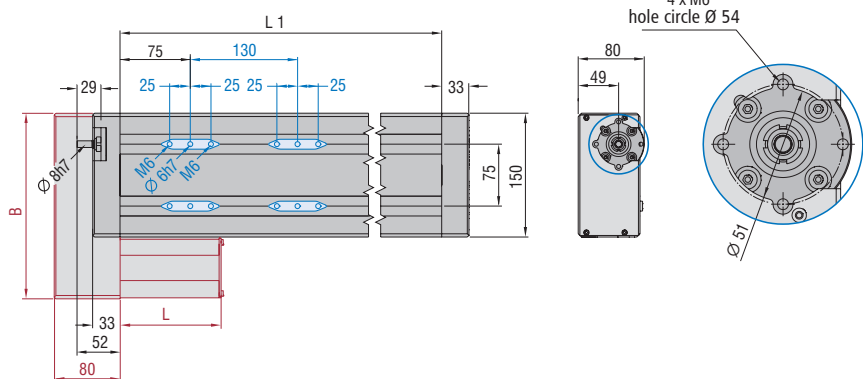
* with spindle support

dimensioned drawing

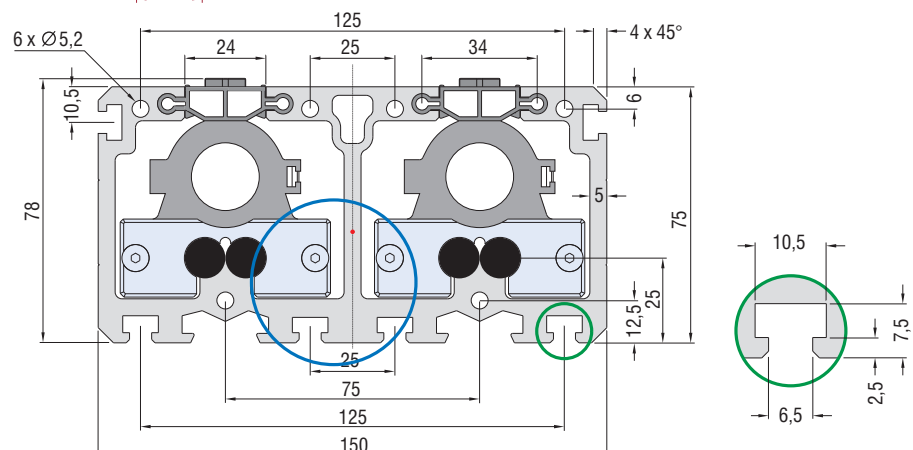
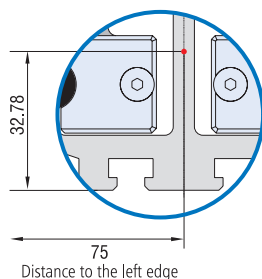
process travel

at 2xWS 5/70 = L1 -150 mm
at 4xWS 5/70 = L1 -280 mm

motor module dimensions see pages B-47
external limit switches see pages B-61



dimensioned drawing Aluminium profile



calculations on the „theoretical critical speed“ and the „drive size“
can be found at www.isel.com/en/products/mechanics/linear-units/linear-units-les6

Linear units with spindle drive

LES 5



LES 5 with integrated belt drive module

Features

- aluminium shaft housing profile W225 × H75 mm, naturally anodised
- clamping area and profile underside milled flat
- with 4 precision steel shafts Ø 12 h6, material Cf53, Hardness 60 ± 2 HRC
- aluminium shaft slides WS 5/70, 2 x WS 5/70 (70 mm long), adjustable for no play, central lubrication system
- recirculating ball drive 2.5/4/5/10 and 20 mm pitches
- profile sealing with friction-resistant lip seals
- cast aluminium end plates
- with 2 limit or reference switches, repeat accuracy ± 0.02 mm
- sealed angular contact bearings in drive - steel flange

Ordering key

2 3 4 X X X 0 X X X

Drive

- 3 = Preparation
Direct drive modules
- 4 = Preparation
Belt drive module

Shaft slides

- 0 = 2 Shaft slides 70 mm
- 1 = 2 Shaft slides 200 mm
- 2 = 4 Shaft slides 70 mm

Profile length (L1)

e.g. 029 = 290 mm (min.)

299 = 2990 mm (max.)

(rounded to the last digit)

Standard profile lengths available in 100 mm raster

Recirculating ball drive

- 0 = without
- 1 = Pitch 2.5 mm
- 2 = Pitch 4.0 mm
- 3 = Pitch 5.0 mm
- 4 = Pitch 10 mm
- 5 = Pitch 20 mm
- 6 = Pitch 20 mm (with complete ball return)

Options:

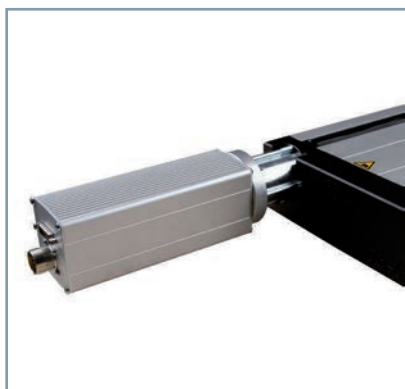
- black anodized aluminium profile
- electromagnetic brake
- steel slides LS2 (Part no. 223007)
- limit switch attachment kit (see accessories)

Available on request:

- length measuring system
- bellows gaiter cover

Drive modules

see pages B-46 et seq. of the catalogue



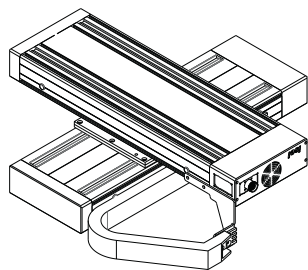
Technical specification Aluminium profile

Aluminium profile LES 5	
Moment of inertia I_x	2,361.654 cm ⁴
Moment of inertia I_y	298.925 cm ⁴
*Centre of gravity see dimensioned drawing	33.39 mm
Cross-sectional area	42.49 cm ²
Material	AlMgSi0, 5F22
Anodising	E6/EV1
Weight with steel shafts	13.8 kg/m
Weight with steel shafts and spindles	15.2 kg/m

No load running torques

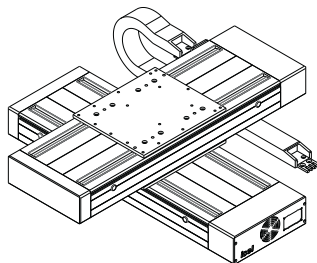
No load torques (Ncm)					
Speed (rpm)	Spindle pitch				
	2.5	4	5	10	20
500	15	15	16	17	18
1500	19	19	19	20	21
3000	23	24	24	25	26

Combination examples LES ... with cable drag chain 9



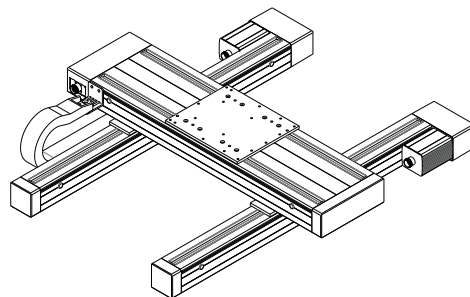
Crossbench

2 x LES 5
PS 4 with VP 2
Fixing cable drag chain 9
Slide on slide assembly



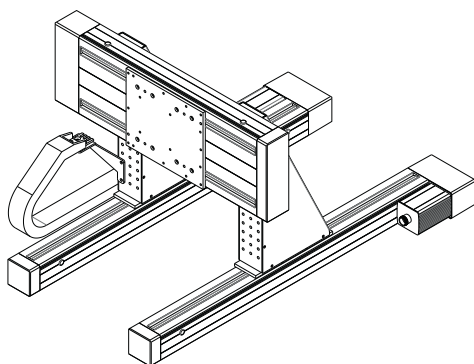
Crossbench

2 x LES 5
PS 4 with VP 2
Fixing cable drag chain 9
Profile on slide assembly



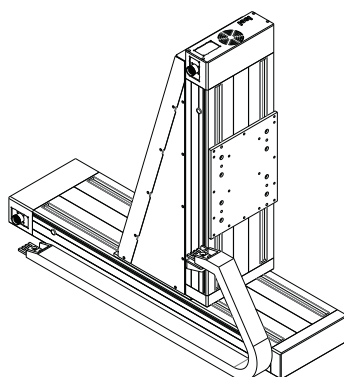
2-axis H-design

2 x LES 4, LES 5, 2 x PS 2, PS 4,
Fixing cable drag chain 9
Gantry mode



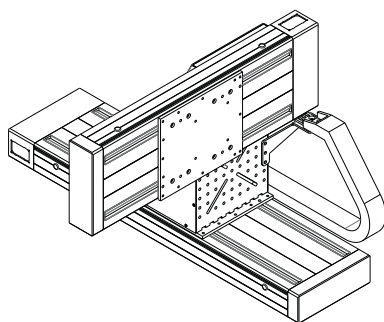
2-axis flatbed configuration

2 x LES 4, LES 5, 2 x PS 2
2 x WV 2, PS 4, Fixing cable drag chain 9
Gantry mode



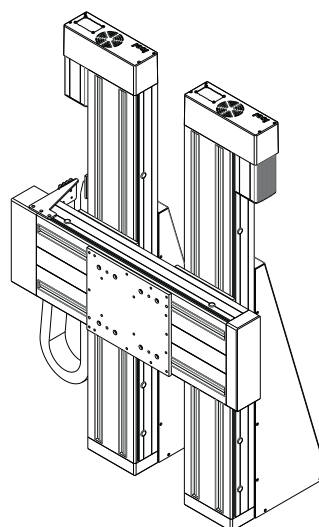
2-axis lifting configuration

2 x LES 5, 2 x PS 4, WV 6,
Fixing cable drag chain 9



2-axis boom configuration

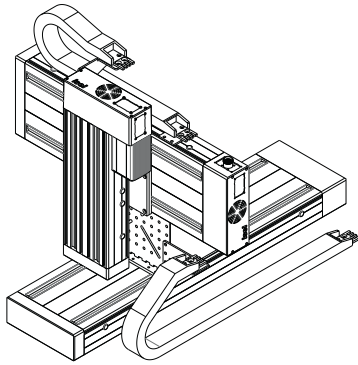
2 x LES 5
2 x PS 4
WV 3
Fixing cable drag chain 9



2-axis H-design

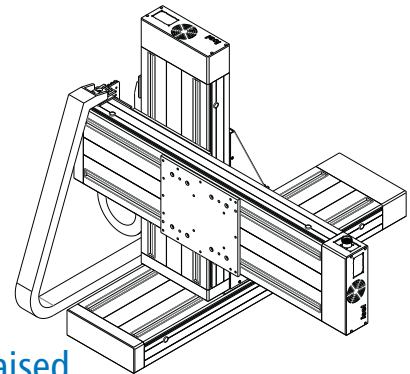
LES 5, 2 x LES 6, 2 x WV 7,
2 x PS 12, PS 4,
Fixing cable drag chain 9,
Gantry mode

Combination examples LES ... with cable drag chain 9



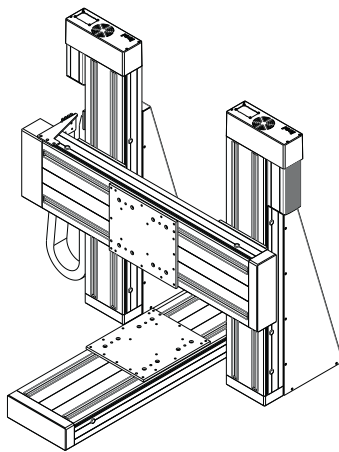
3-axis boom configuration

2 x LES 5, LES 6, WV 3, PS 4, PS 7, Fixing cable drag chain 9



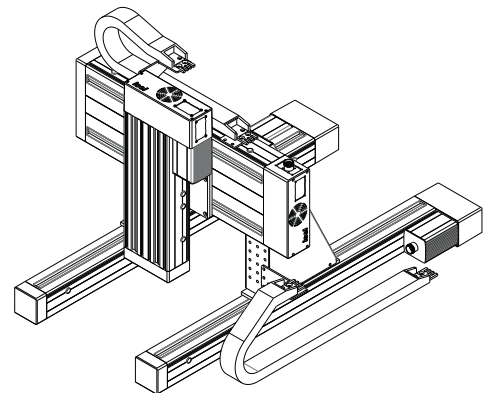
3-axis raised configuration

3 x LES 5, WV 3, 2 x PS 4, VP 2, Fixing cable drag chain 9



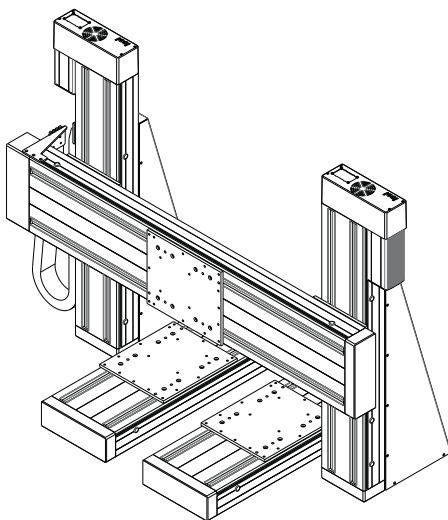
3-axis portal configuration

2 x LES 5, 2 x LES 6, 2 x WV 7, 2 x PS 4, 2 x PS 12, Gantry mode, Fixing cable drag chain 9



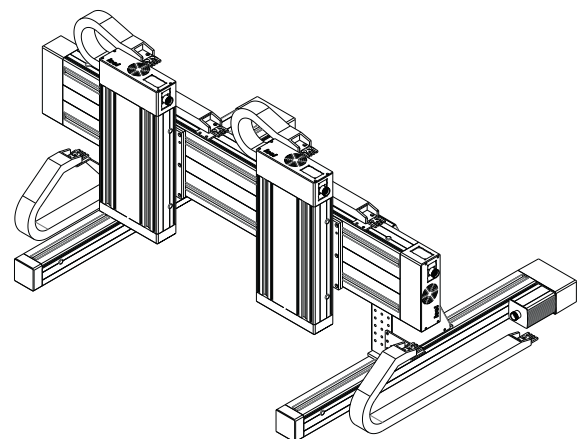
3-axis flatbed configuration

2 x LES 4, LES 5, LES 6, 2 x PS 2, 2 x WV 2, PS 4, PS 7, Fixing cable drag chain 9, Gantry mode



4-axis portal configuration

3 x LES 5, 2 x LES 6, 2 x WV 7, 3 x PS 4, 2 x PS 12, Fixing cable drag chain 9



5-axis flatbed configuration

2 x LES 5 (Z-axis), LES 5 (2 spindle drives)
2 x LES 4, 2 x PS 2, 2 x WV 2,
2 x PS 4 with VP 2
Fixing cable drag chain 9

Motor modules

LES 4/5/6 direct drives	Part no.	Part no. with brake	Single axis controller	Multiple axis controller	Motor lead controller	Motor lead control cabinet	encoder lead
Stepper motor MS 135	396055 0060	---	IT 116 Flash	iMC-P / iMC-S8	392750 XX00		
Stepper motor MS 200 HT-2	396058 0060	396058 0260	IT 116 Flash	iMC-P / iMC-S8	392750 XX00		
EC servomotor EC 60 TM 200W 48V	396421 0060	396421 0260	MC 1-20	iCU-EC / iPU-EC	392759 XX00	392760 XX00	392740 XX00
EC servomotor EC 60 TM 200W 310V	396421 0070	396421 0270	MC 1-40	iCU-EC / iPU-EC	392307 XX00	392305 XX00	392740 XX00
EC servomotor EC 60 TM 400W 48V	396440 0080	396440 0280	MC 1-20	iCU-EC / iPU-EC		392303 XX00	392740 XX00
EC servomotor EC 60 TM 400W 310V	396440 0070	396440 0270	MC 1-40	iCU-EC / iPU-EC	392307 XX00	392305 XX00	392740 XX00
EC servomotor EC 80 TM 750W 310V	396475 0070	396475 0270	MC 1-40	iCU-EC / iPU-EC	392307 XX00	392305 XX00	392740 XX00
Stepper motor MS 300 HT-2	396082 0060	396082 0260	iMC-S8	iMC-S8	392750 XX00		
Stepper motor MS 600 HT	396085 0060	---	iMC-S8	iMC-S8	392750 XX00		
Stepper motor MS 900 HT	396088 0060	---	iMC-S8	iMC-S8	392750 XX00		

LES 5 integrated	Part no.	Part no. with brake	Single axis controller	Multiple axis controller	Motor lead controller	Motor lead control cabinet	encoder lead
Stepper motor MS 200 HT-2	396058 1060	396058 1260	IT 116 Flash	iMC-P / iMC-S8	392740 XX00		
EC servomotor EC 60 TM 200W 48V	396421 1060	396421 1260	MC 1-20	iCU-EC / iPU-EC	392759 XX00	392760 XX00	392740 XX00
EC servomotor EC 60 TM 200W 310V	396421 1070	396421 1270	MC 1-40	iCU-EC / iPU-EC	392307 XX00	392305 XX00	392740 XX00
EC servomotor EC 60 TM 400W 48V	396440 1080	396440 1280	MC 1-20	iCU-EC / iPU-EC		392303 XX00	392740 XX00
EC servomotor EC 60 TM 400W 310V	396440 1070	396440 1270	MC 1-40	iCU-EC / iPU-EC	392307 XX00	392305 XX00	392740 XX00

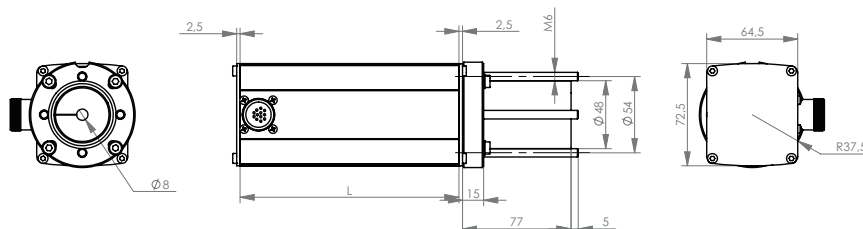
LES 4/LES 6 side mounting	Part no.	Part no. with brake	Single axis controller	Multiple axis controller	Motor lead controller	Motor lead control cabinet	encoder lead
Stepper motor MS 200 HT-2	396058 2060	396058 2260	IT 116 Flash	iMC-P			
EC servomotor EC 60 TM 200W 48V	396421 2060	396421 2260	MC 1-20	iCU-EC / iPU-EC	392759 XX00	392760 XX00	392740 XX00
EC servomotor EC 60 TM 200W 310V	396421 2070	396421 2270	MC 1-40	iCU-EC / iPU-EC	392307 XX00	392305 XX00	392740 XX00
EC servomotor EC 60 TM 400W 48V	396440 2080	396440 2280	MC 1-20	iCU-EC / iPU-EC		392303 XX00	392740 XX00
EC servomotor EC 60 TM 400W 310V	396440 2070	396440 2270	MC 1-40	iCU-EC / iPU-EC	392307 XX00	392305 XX00	392740 XX00

Motor modules

Dimensioned drawing

Motor module 1

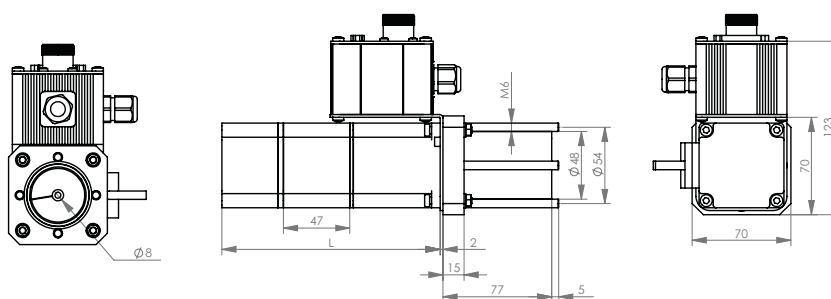
Part no.	Motor module	Length L
396112 0060	DC 100	185 mm
396055 0360	MS 135 with brake	105 mm
396055 0060	MS 135	105 mm
396058 0360	MS 200 with brake	155 mm
396058 0060	MS 200	155 mm



Dimensioned drawing

EC 60

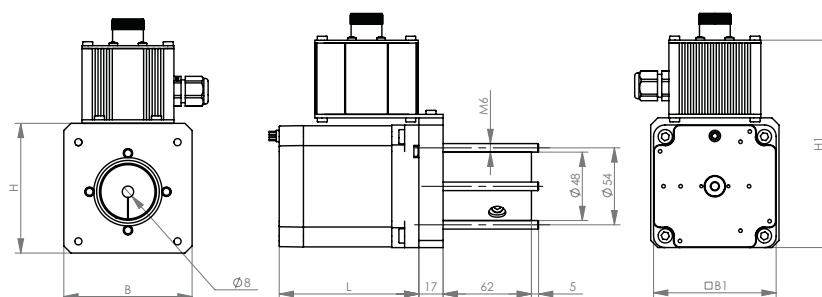
Part no.	Motor module	Length L
396421 0060	EC 60 TM 200W 48V	103,5 mm
396421 0260	EC 60 TM 200W 48V with brake	150,5 mm
396421 0070	EC 60 TM 200W 310V	107,7 mm
396421 0270	EC 60 TM 200W 310V with brake	154,7 mm
396440 0080	EC 60 TM 400W 48V	131,5 mm
396440 0280	EC 60 TM 400W 48V with brake	178,5 mm
396440 0070	EC 60 TM 400W 310V	135,7 mm
396440 0270	EC 60 TM 400W 310V with brake	178,5 mm



Dimensioned drawing

Motor module 2

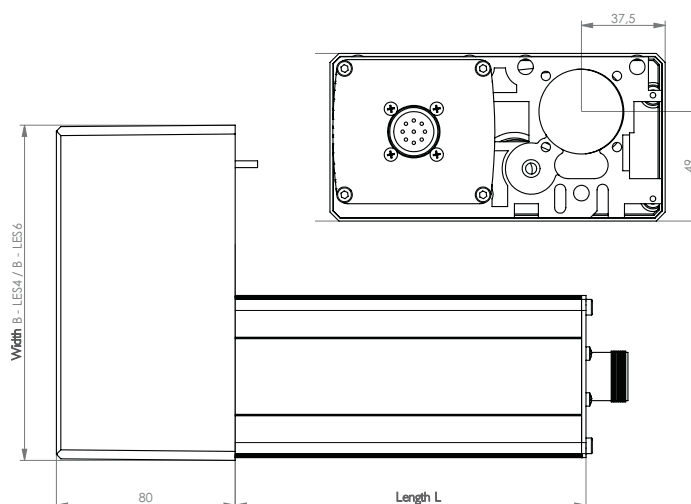
Part no.	Motor module	L	H	H1	B	B1
396475 0070	EC 80 TM 750W	143 mm	85 mm	139,5 mm	80 mm	80 mm
396475 0270	EC 80 TM 750W mit Bremse	191 mm	85 mm	139,5 mm	80 mm	80 mm
396085 0060	MS 600 HT	96 mm	91 mm	145,5 mm	90 mm	86 mm
396088 0060	MS 900 HT	126 mm	91 mm	145,5 mm	90 mm	86 mm



Dimensioned drawing

Motor module / side mounting

Part no.	LES4/LES6 side mounting	Length L	Width B LES4	Width B LES6
396058 2060	MS 200 HT	107 mm	150 mm	225 mm
396058 2260	MS 200 HT with brake	157 mm	150 mm	225 mm
396421 2060	EC 60 TM 200W 48V	277 mm	160 mm	235 mm
396421 2260	EC 60 TM 200W 48V with brake	277 mm	160 mm	235 mm
396421 2070	EC 60 TM 200W 310V	277 mm	160 mm	235 mm
396421 2270	EC 60 TM 200W 310V with brake	277 mm	160 mm	235 mm
396440 2080	EC 60 TM 400W 48V	277 mm	160 mm	235 mm
396440 2280	EC 60 TM 400W 48V with brake	277 mm	160 mm	235 mm
396440 2070	EC 60 TM 400W 310V	277 mm	160 mm	235 mm
396440 2070	EC 60 TM 400W 310V with brake	277 mm	160 mm	235 mm



Clutch housing

Drive element accessories

Connection options

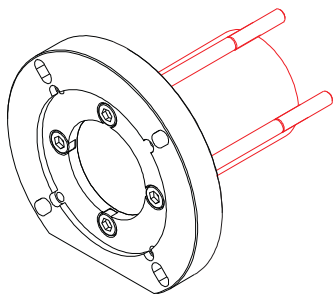
Direct drive preparation

Connecting options <i>Direct drive</i>	LES 4	LES 6	LES 5	Angular gear fixing 0°	Angular gear fixing 90°
MS 200 HT-2 EC 60	Connection via coupling casing 1 <i>short sleeve</i> with adequate shaft coupling				Coupling casing 1 <i>long sleeve</i>
MS 600 HT MS 900 HT EC 86	Connection via coupling casing 2 <i>short sleeve</i> with adequate shaft coupling				Coupling casing 2 <i>long sleeve</i>
Angular gear fixing 0°	split coupling casing <i>short sleeve</i> with adequate shaft coupling			Connection via transmission shaft set	
Angular gear fixing 90°	split coupling casing <i>short sleeve</i> with adequate shaft coupling				

Ordering overview

Clutch housing

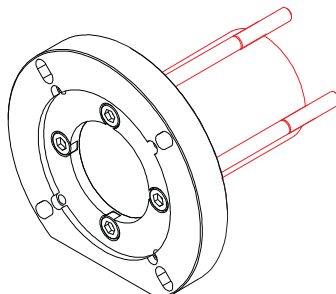
Clutch housing 1



short sleeve
Part no.: 218 100 0001

long sleeve
Part no.: 218 100 0002

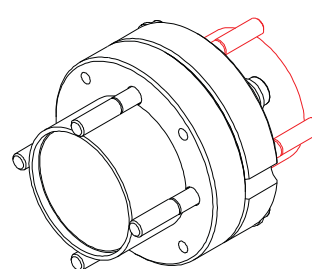
Clutch housing 2



short sleeve
Part no.: 218 100 1001

long sleeve
Part no.: 218 100 1002

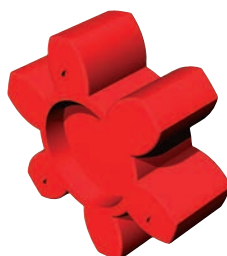
Split clutch housing



short sleeve
Part no.: 218 100 2001

long sleeve
Part no.: 218 100 2002

Clutches



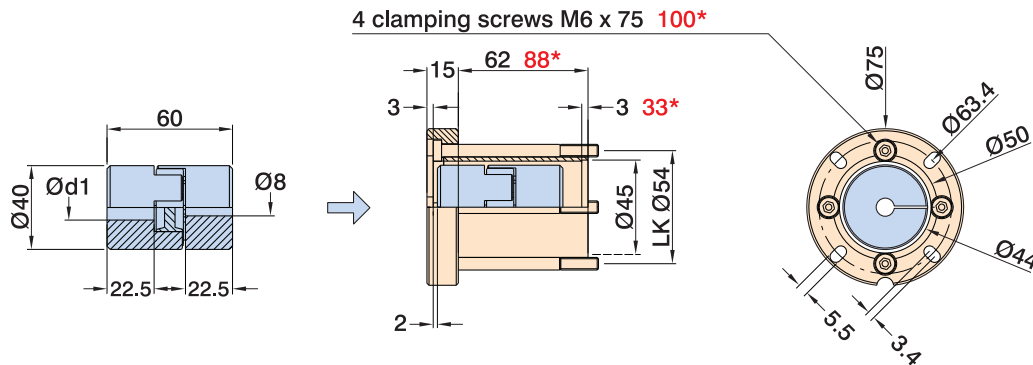
coupling	Item no.:	d ₁	d ₂
20/30	218 001 5060	5,0	6,0
	218 001 9999	from 4 to 7 mm	
30/40	218 002 6380	6,35	8,0
	218 002 8080	8,0	8,0
	218 002 9999	from 6 to 13 mm	
40/60	218 003 9580	9,52	8,0
	218 003 9999	from 8 to 18 mm	

Clutch housing

Drive element accessories

Dimensioned drawing

Coupling casing 1



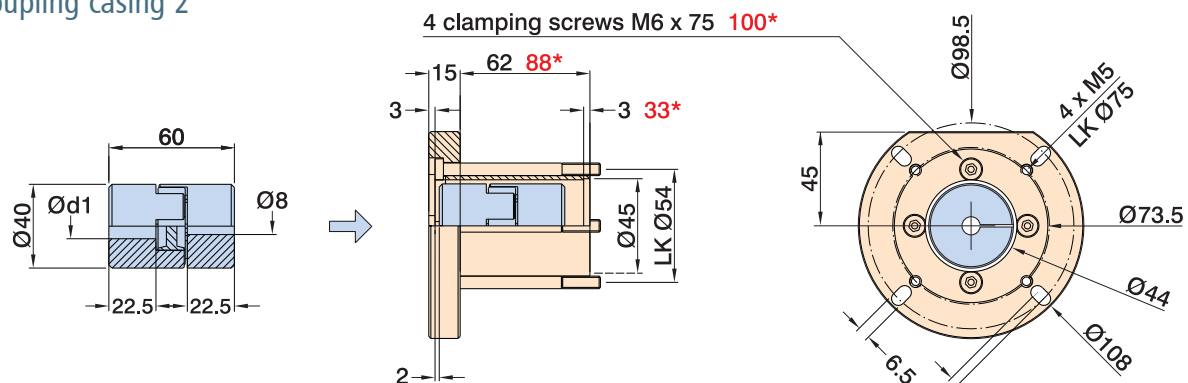
*) Measures refer to the dimensions with long sleeves

d1 = engine shaft diameter 6.35/8/9 mm

Suitable shaft coupling WK 40/60 on page 2-68 (not included in scope of delivery)

Dimensioned drawing

Coupling casing 2



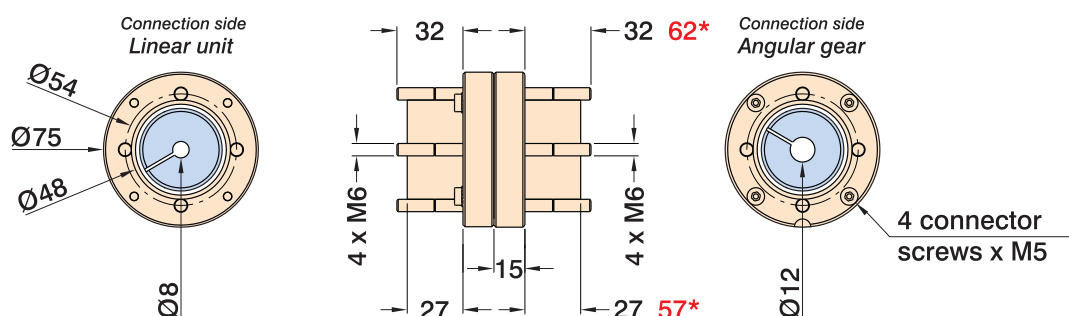
*) Measures refer to the dimensions with long sleeves

d1 = engine shaft diameter 6.35/8/9 mm

Suitable shaft coupling WK 40/60 on page 2-68 (not included in scope of delivery)

Dimensioned drawing

Split coupling casing



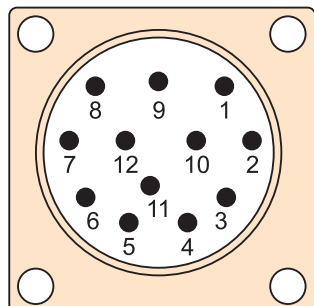
*) Measures refer to the dimensions with long sleeves

Suitable shaft coupling WK 40/60 on page 2-68 (not included in scope of delivery)

Motor pin assignments

Pin assignment for stepper motors

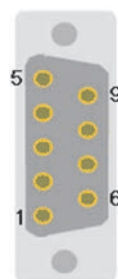
Motor connection



View of pin insert at the insertion side

M23 12-pin Pin	
1	Motor phase 1A
2	Motor phase 1B
3	Motor phase 2A
4	Motor phase 2B
5	+24V switch
6	+24V brake
7	GND switch
8	GND brake
9	Limit switch 1
10	Limit switch 2
11	---
12	---
Housing - cable shield	

Motor connection

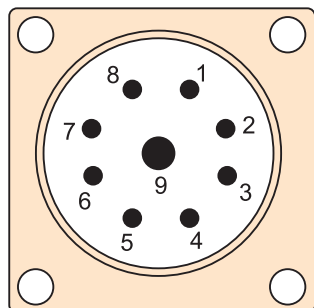


View of pin insert on the socket side

Sub-D 9-pin Pin	
1	Motor phase 1A
2	Motor phase 1B
3	Motor phase 2A
4	Motor phase 2B
5	+24V switch
6	+24V brake
7	Limit switch 2
8	GND brake
9	Limit switch 1
Housing - cable shield	

Pin assignment for brushless EC servo motors (BLDC) 48V

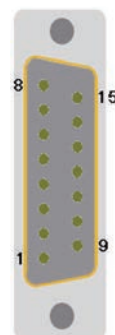
Motor connection



View of pin insert on the socket side

M23 9-pol. (8+1) pin	
1	Motor phase U
2	Motor phase V
3	Motor phase W
4	---
5	+24V brake
6	GND brake
7	---
8	---
9	Earthing lead
Housing - cable shield	

Encoder connection

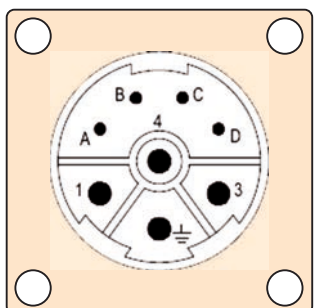


View of pin insert on the socket side

Sub-D 15-pin Pin	
1	Hall signal A
2	+5V encoder/Hall
3	Encoder track/Z
4	Encoder track/B
5	Encoder track/A
6	+24V switch
7	Limit switch 1
8	GND switch
9	Hall signal B
10	GND encoder
11	Encoder track Z
12	Encoder track B
13	Encoder track A
14	Hall signal C
15	Limit switch 2
Housing - cable shield	

Pin assignment for brushless EC servomotors (BLDC) 310V

Motor connection



View of pin insert at the insertion side

M23 8-pol. (4+3+1) pin	
1	Motor phase U
PE	Earthing lead
3	Motor phase W
4	Motor phase V
A	+24V brake
B	GND brake
C	Temp +
D	Temp -
Housing - cable shield	

Encoder connection



View of pin insert at the insertion side

Sub-D 15-pin Pin	
1	Hall signal A
2	+5V encoder/Hall
3	Encoder track/Z
4	Encoder track/B
5	Encoder track/A
6	+24V switch
7	Limit switch 2
8	GND switch
9	Hall signal B
10	GND encoder
11	Encoder track Z
12	Encoder track B
13	Encoder track A
14	Hall signal C
15	Limit switch 2
Housing - cable shield	

Motor leads

Overview of motor leads for stepper, DC servo and EC motors*

Part number	Description
392750 0500	5-metre stepper motor lead M23 12-pin plug - socket 1:1
392755 0500	5-metre stepper motor lead D-sub 9-pin plug - M23 12-pin socket
392781 0500	5-metre stepper motor lead D-sub 9-pin plug - socket 1:1
392759 0500	5-metre DC/EC servo motor lead M23 9-pin (8 + PE) plug - socket 1:1
392760 0500	5-metre DC/EC servo motor lead M23 9-pin (8+PE) socket - wire end ferrules
392740 0500	5-metre encoder lead D-sub 15-pin plug - socket 1:1
392325 0500	5-metre encoder lead M23 17-pin socket - D-sub 15-pin plug
392305 0500	3-metre EC/AC servo motor lead M23 310V (4+3+PE) socket - wire end ferrules
392307 0500	5-metre EC servo motor lead M23 (4+3+PE) plug - socket 1:1

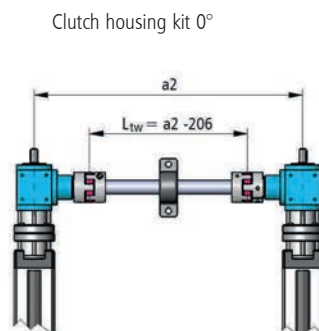
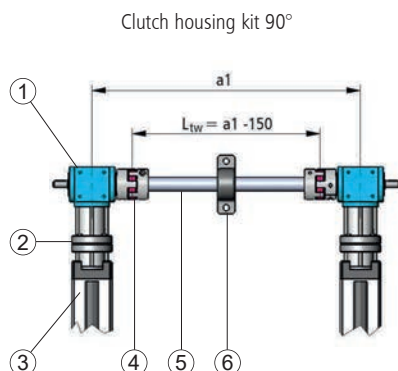
All listed motor and encoder leads are fit for use with tow chains.

* Different lengths available on request!

Installation kit with angular transmission

Drive element accessories

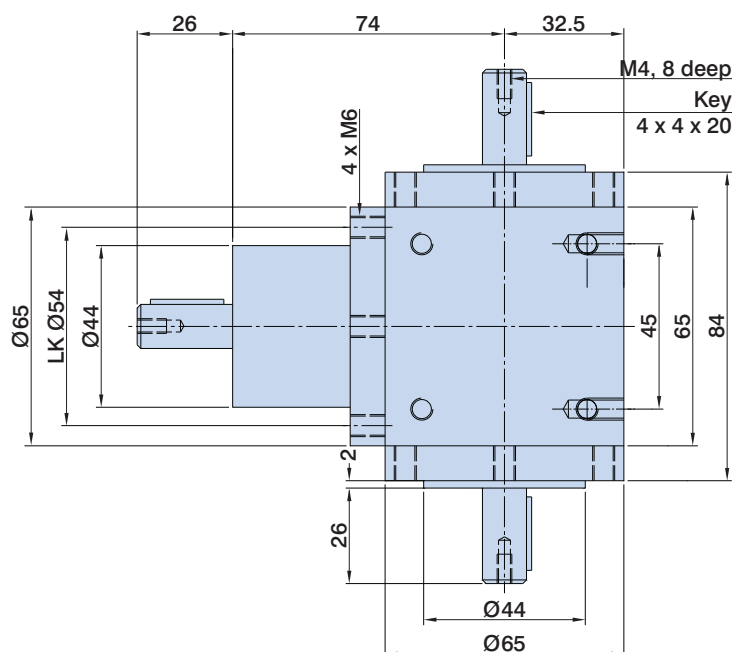
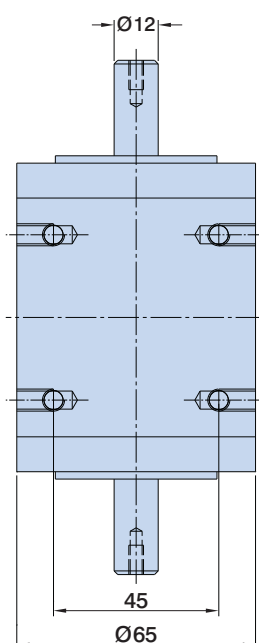
Installation alternatives



- ① Angular gear
- ② Split coupling casing with shaft coupling WK 40/60
- ③ LES 4, LES 6 or LES 5 (preparation for direct drive)
- ④ Coupling for transmission shaft Ø 25
- ⑤ Transmission shaft Ø 25
- ⑥ Pedestal bearing - recommendable from : transmission shaft length of 1,500 mm up

Dimensioned drawing

Angular transmission



Ordering overview

Installation kit with angular transmission

for H-design on LES 4/LES 6/LES 5,
0° mounting

Scope of delivery: 2 x ①, 2 x ②, 2 x ④

Part no.: **216150 0001**

for H-design on LES 4/LES 6/LES 5,
90° mounting

Scope of delivery: 2 x ①, 2 x ②, 2 x ④

Part no.: **216150 0002**

For matching direct drive modules LES 4/5/6 see table on page **B-46**

Transmission shaft

Hollow shaft Ø 25 mm × 4 mm, blank
1000 mm

Part no.: **219001 0125**

Hollow shaft Ø 25 mm × 4 mm, blank
2000 mm

Part no.: **219001 0225**

Coupling/stationary bearing

Coupling for transmission shaft
12 to 25 mm adaptor, VE 2 units

Part no.: **218050 0002**

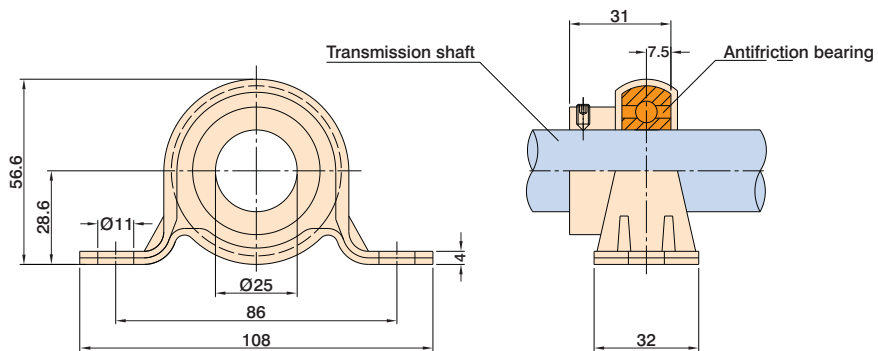
Stationary bearing for transmission shaft
VE 1 unit

Part no.: **896202 5562**

Installation kit with angular transmission

Drive element accessories

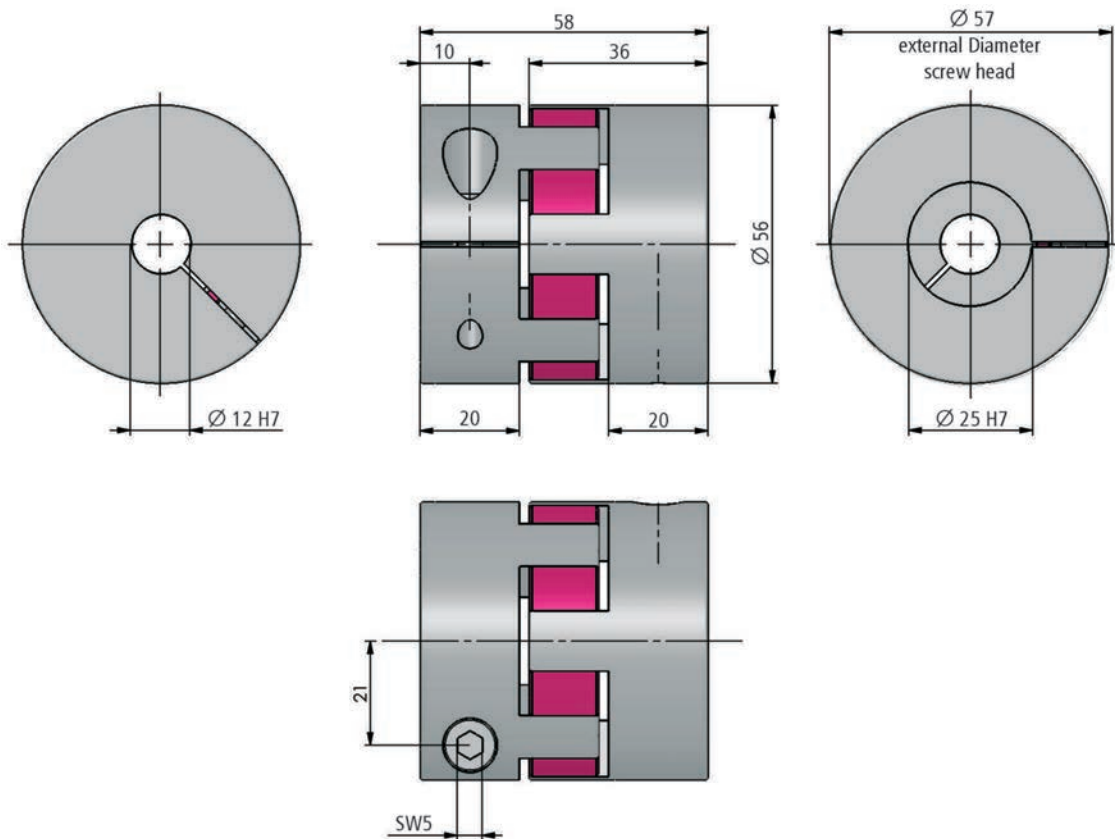
Dimensioned drawing and technical specification



Pedestal bearing - to avoid vibrations/to support the transmission shaft (recommendable from a transmission shaft length of 1,500 mm up)

Transmissible torque	18 Nm
Weight of coupling	0,205 kg
Weight of shaft	0,540 kg/m
Moment of inertia of both couplings	$1,340 \cdot 10^{-4} \text{ kgm}^2$
Moment of inertia of shaft	$8,171 \cdot 10^{-6} \text{ kgm}^2 / 100 \text{ mm}$

Dimensioned drawing - coupling



Part no. **218050 0002**

Slide/crossbench plates

Connectors

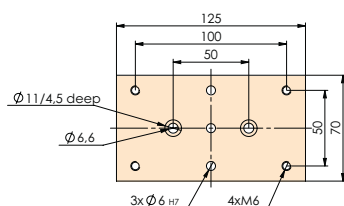
Hole diagram, slide plate PS 1

L 125 x W 70 x H 7.7 mm

Mounting on:

LES 4 with 1 x WS 5/70

Part no.: **277001**



Hole diagram, slide plate PS 2

L 255 x W 70 x H 7.7 mm

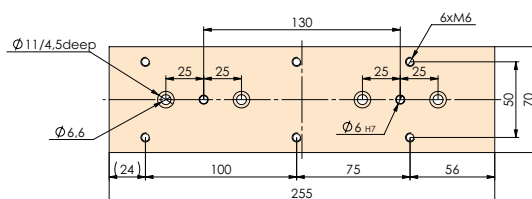
Mounting on:

LES 4 with 2 x WS 5/70

Fixing option for:

Angle bracket WV 2 / WV 5

Part no.: **277002**



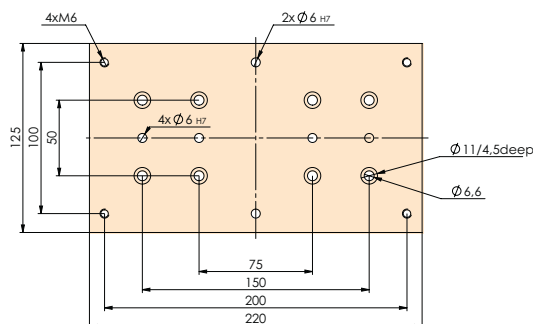
Hole diagram, slide plate PS 3

L 220 x W 125 x H 7.5 mm

Mounting on:

LES 5 with 2 x WS 5/70

Part no.: **277003**



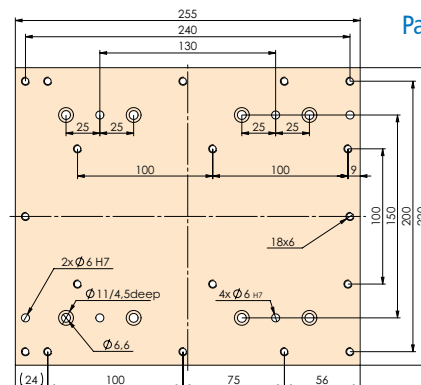
Hole diagram, slide plate PS 4

L 225 x W 220 x H 7.5 mm

Mounting on: LES 5 with 4 x WS 5/70

Mounting on crossbench: LES 5 with LES 5 (in conjunction with VP 2) Fixing option for: Angle bracket WV 3 / WV 6

Part no.: **277004**



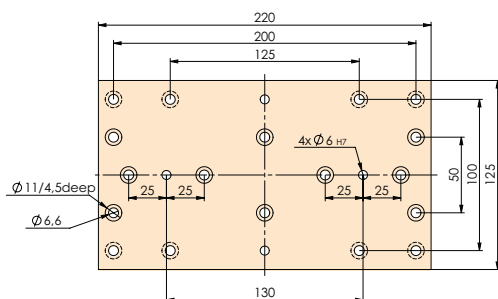
Hole diagram, slide plate PS 6

L 220 x W 125 x H 7.5 mm

Mounting on: LES 4 with 2 x WS 5/70

Mounting on crossbench: LES 4 with LES 5 (in conjunction with PS 3). Fixing option for: LES 4/LES 5

Part no.: **277011**



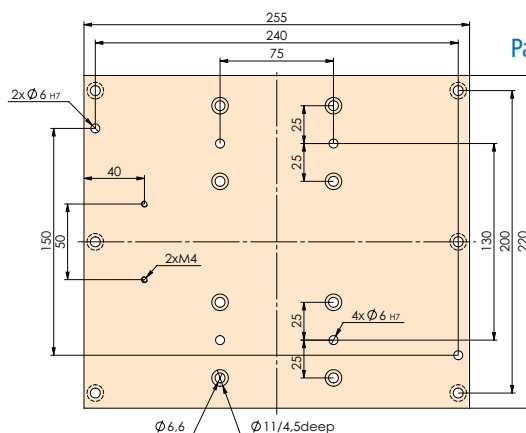
Hole diagram, slide plate PS 7

L 255 x W 220 x H 7.5 mm

Mounting on: LES 6 with 4 x WS 5/70

Mounting on crossbench: LES 6 with LES 5 (in conjunction with PS 4)

Part no.: **277016**



Slide/crossbench plates

Connectors

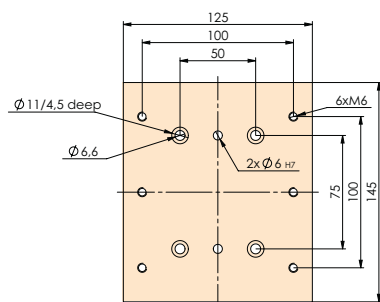
Hole diagram, slide plate PS 8

L 125 × W 145 × H 7.5 mm

Mounting on:

LES 6 with 2 × WS 5/70

Part no.: 277017



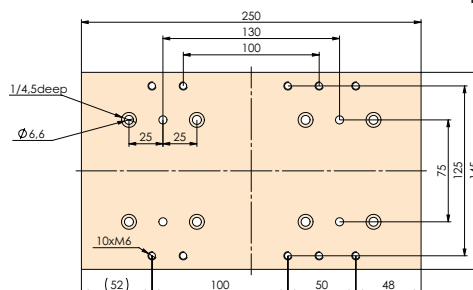
Hole diagram, slide plate PS 9

L 250 × W 145 × H 7.5 mm

Mounting on: LES 6 with 4 × WS 5/70

Fixing option for: Angle bracket WV 7

Part no.: 277018



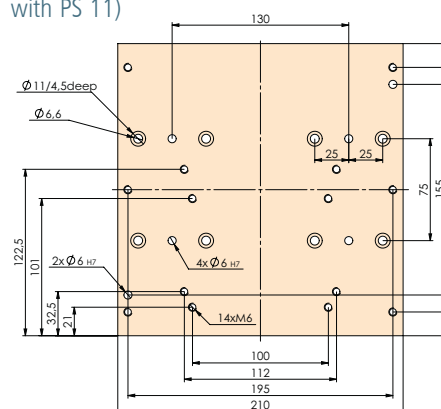
Hole diagram, slide plate PS 10

L 210 × W 215 × H 7.5 mm

Mounting on: LES 6 with 4 × WS 5/70

Mounting on crossbench: LES 6 with LES 6 (in conjunction with PS 11)

Part no.: 277019



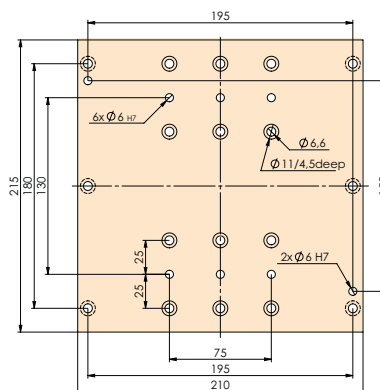
Hole diagram, slide plate PS 11

L 210 × W 215 × H 7.5 mm

Mounting on: LES 6 with 4 × WS 5/70

Mounting on crossbench: LES6 with LES4 (in conjunction with PS10) Fixing option for: LES 6

Part no.: 277020



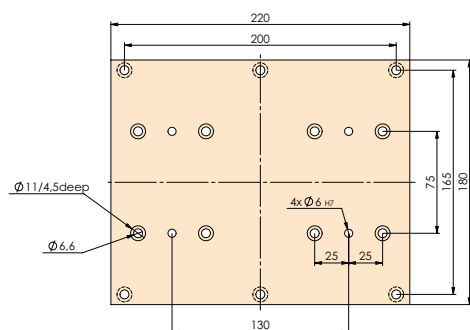
Hole diagram, slide plate PS 12

L 220 × W 180 × H 7.5 mm

Mounting on: LES 6 with 4 × WS 5/70

Fixing option for: LES 5

Part no.: 277021



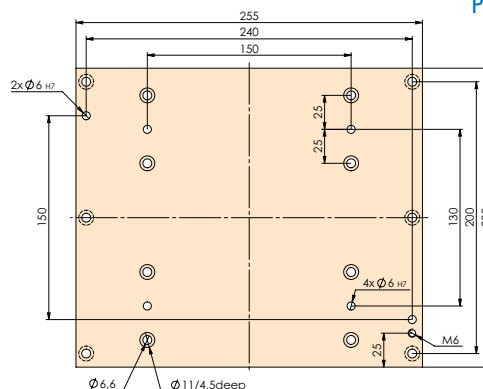
Hole diagram, connection plate VP 2

L 255 × W 220 × H 7.5 mm

Mounting on: LES 5 with 4 × WS 5/70

Fixing option for: LES 5

Part no.: 277006



Slide/crossbench plates

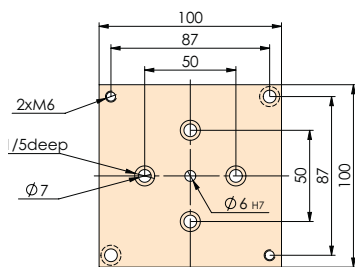
Connectors

Hole diagram, slide plate set for crossbench LES 4

L 100 x W 100 x H 8 mm

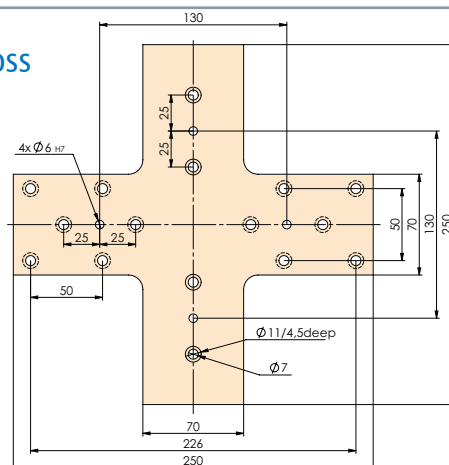
Mounting on: LES 4
Fixing option for: LES 4

Part no.: **277008**



Connecting cross 2 x LES 4

Part no.: **277007**



Crossbench connection plates 1



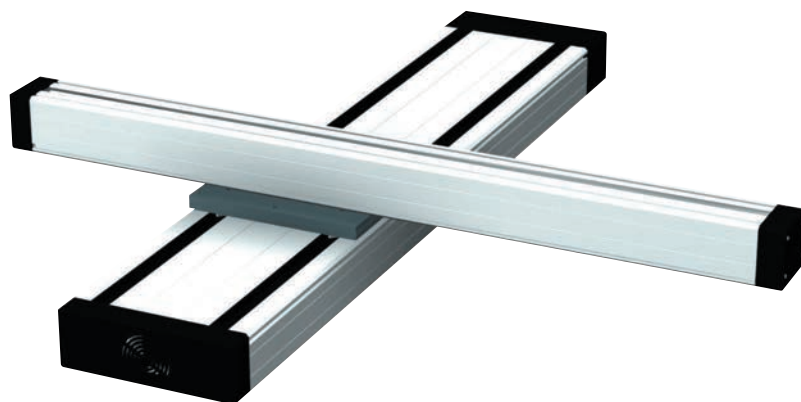
Crossbench connection plates 1

2 × L 255 × W 220 × H 8 mm

one set from PS 4 and VP 2,
for right-angled connection
two linear guides LES 5

Part no.: **277010**

Crossbench connection plates 2



Crossbench connection plates 2

2 × L 220 × W 125 × H 8 mm

one set from PS 3 and PS 6,
for right-angled connection
one linear guide LES 5 with one
linear guide LES 4

Part no.: **277012**

Additional combination examples



Crossbench LES 5 and LES 6
PS 4 and PS 7



Crossbench 2 × LES 6
PS 10 and PS 11



Crossbench LES 4 and LES 6
PS 11 and PS 10

T-slot slide plates

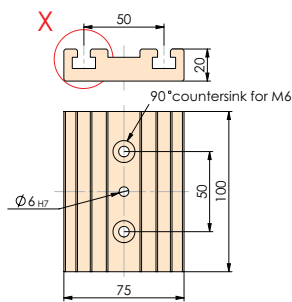
Connectors

Hole pattern T-slot plate PT 25 × 250 for LES 4

L 100 x W 75 x H 20 mm

Mounting on: LES 4 with 1 x WS 5/70

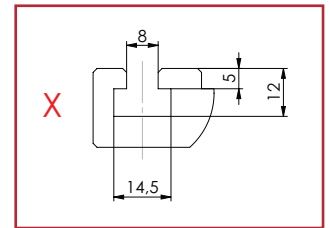
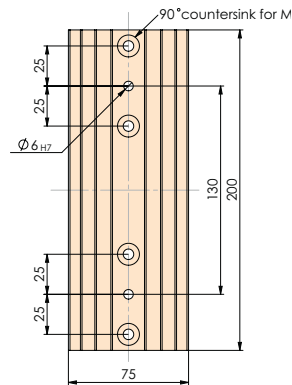
Part no.: **277030 0001**



L 200 x W 75 x H 20 mm

Mounting on: LES 4 with 2 x WS 5/70

Part no.: **277030 0002**

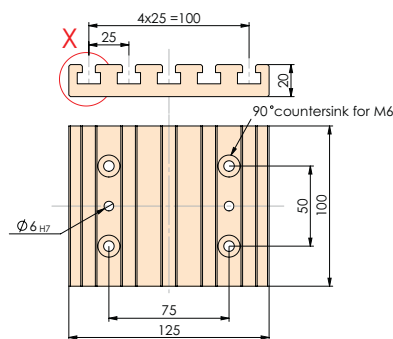


Hole pattern T-slot plate PT 25 × 250 for LES 6

L 100 x W 125 x H 20 mm

Mounting on: LES 6 with 2 x WS 5/70

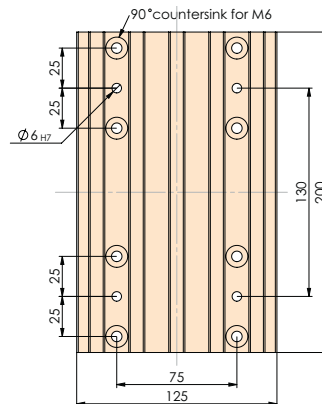
Part no.: **277030 0003**



L 200 x W 125 x H 20 mm

Mounting on: LES 6 with 4 x WS 5/70

Part no.: **277030 0004**

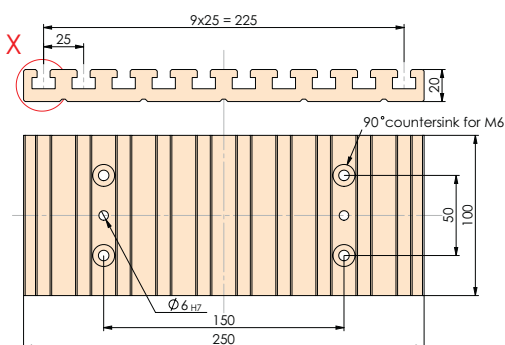


Hole pattern T-slot plate PT 25 × 250 for LES 5

L 100 x W 250 x H 20 mm

Mounting on: LES 5 with 2 x WS 5/70

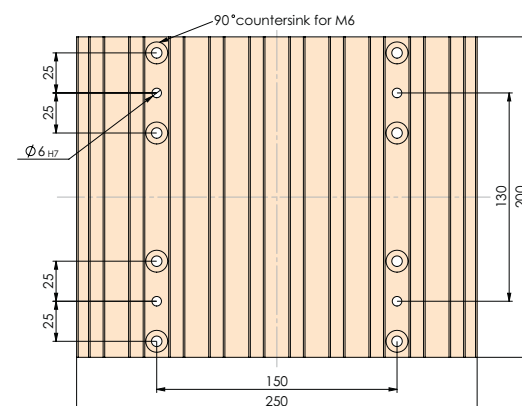
Part no.: **277030 0005**



L 200 x W 250 x H 20 mm

Mounting on: LES 5 with 4 x WS 5/70

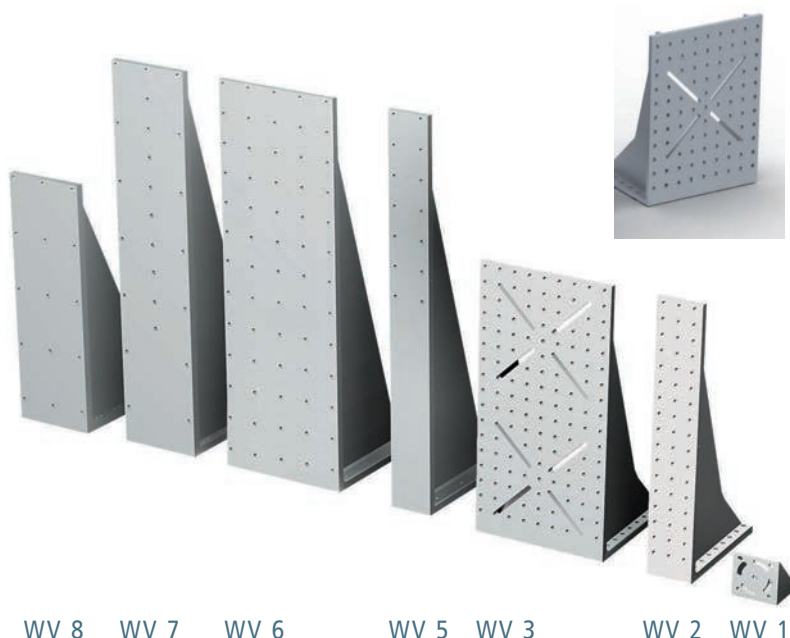
Part no.: **277030 0006**



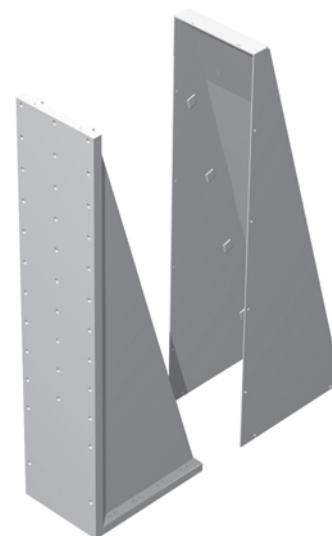
Angle brackets

Connectors

Angle bracket with clamping surfaces milled flat



matching cover plates



Angle bracket **WV 1**

- blank
- aluminium casting (0.2 kg)
- L71 x W75 x H71

Part no.: **209110 0010**

Angle bracket **WV 2**

- blank
- aluminium casting (2.6 kg)
- L221 x W75 x H446

Part no.: **209110 0022**

Angle bracket **WV 3**

- blank
- aluminium casting (5.8 kg)
- L221 x W221 x H446

Part no.: **209110 0032**

Angle bracket **WV 5**

- blank
- aluminium welded (5.26 kg)
- L220 x W75 x H670

Part no.: **209 110 0050**

Angle bracket **WV 6**

- blank
- aluminium welded (13.3 kg)
- L220 x W220 x H670

Part no.: **209110 0060**

Angle bracket **WV 7**

- blank
- aluminium welded (10.8 kg)
- L220 x W145 x H670

Part no.: **209110 0070**

Angle bracket **WV 8**

- blank
- aluminium welded (7.4 kg)
- L222 x W145 x H446

Part no.: **209110 0080**

Angle bracket **WV 19**

- blank
- aluminium welded (2.5 kg)
- L150 x W221 x H300

Part no.: **209110 0190**

Cover plate for **WV 2**

- naturally anodised
- aluminium sheet (0.8 kg)

Part no.: **209110 0021**

Cover plate for **WV 3**

- naturally anodised
- aluminium sheet (1.15 kg)

Part no.: **209110 0031**

Cover plate for **WV 5**

- naturally anodised
- aluminium sheet (1.20 kg)

Part no.: **209 110 0051**

Cover plate for **WV 6**

- naturally anodised
- aluminium sheet (1.8 kg)

Part no.: **209110 0061**

Cover plate for **WV 7**

- naturally anodised
- aluminium sheet (1.5 kg)

Part no.: **209110 0071**

Cover plate for **WV 8**

- naturally anodised
- aluminium sheet (1 kg)

Part no.: **209110 0081**

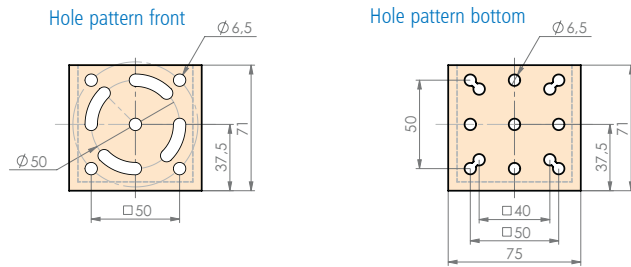
Angle brackets

Connectors

Hole diagram

Angle bracket WV 1

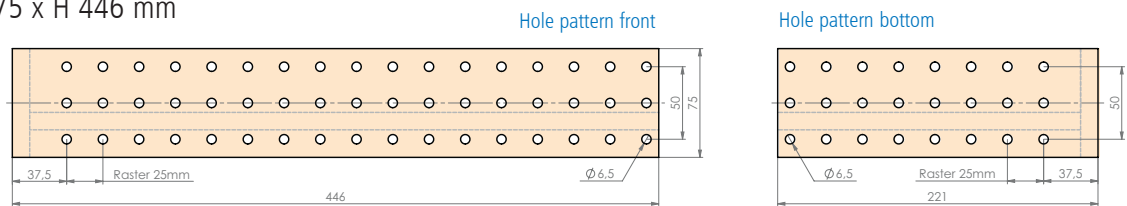
L 71 x W 75 x H 71 mm



Hole diagram

Angle bracket WV 2

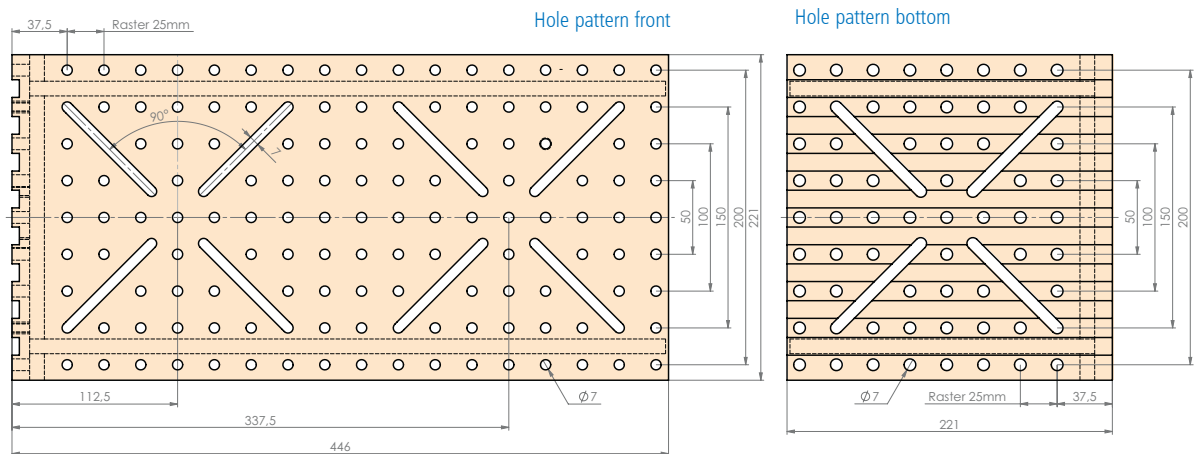
L 221 x W 75 x H 446 mm



Hole diagram

Angle bracket WV 3

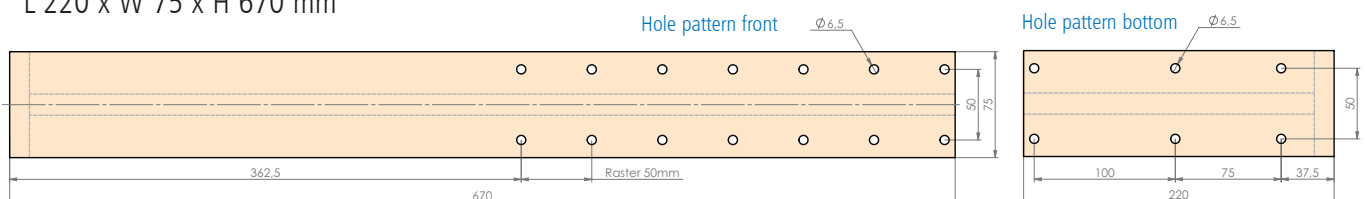
L 221 x W 221 x H 446 mm



Hole diagram

Angle bracket WV 5

L 220 x W 75 x H 670 mm



Angle brackets

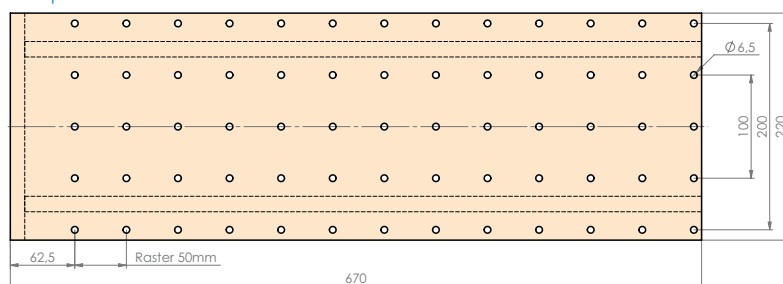
Connectors

Hole diagram

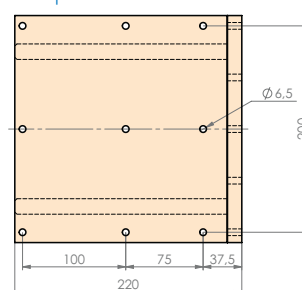
Angle bracket WV 6

L 220 x W 220 x H 670 mm

Hole pattern front



Hole pattern bottom

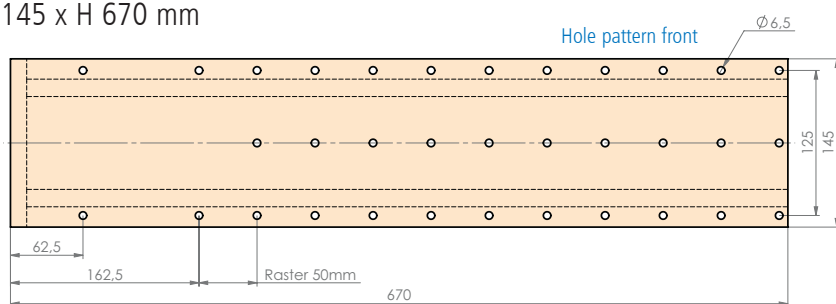


Hole diagram

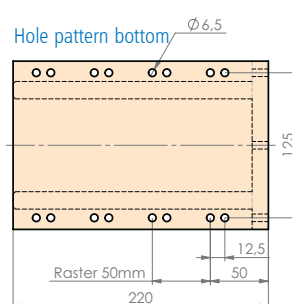
Angle bracket WV 7

L 220 x W 145 x H 670 mm

Hole pattern front



Hole pattern bottom

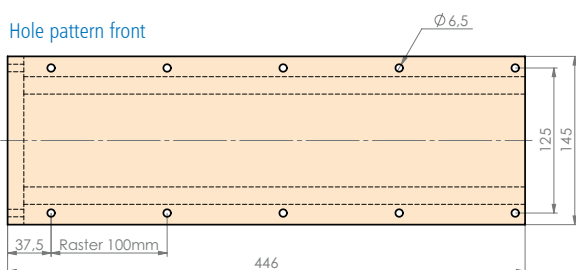


Hole diagram

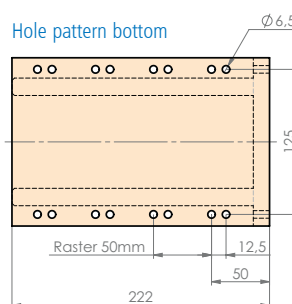
Angle bracket WV 8

L 222 x W 145 x H 446 mm

Hole pattern front



Hole pattern bottom

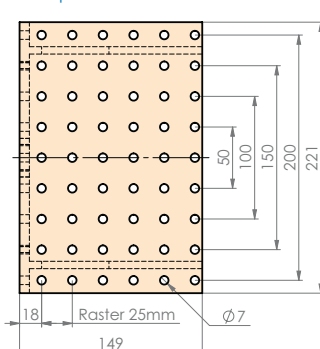


Hole diagram

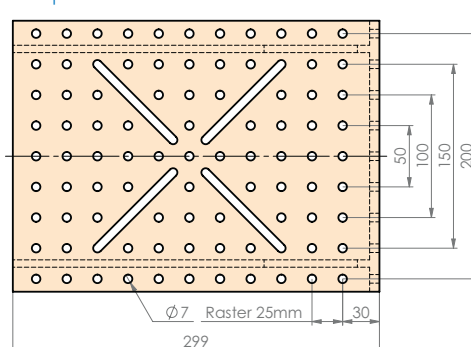
Angle bracket WV 19

L 150 x W 221 x H 300 mm

Hole pattern front



Hole pattern bottom



Accessories

Energy guidance chain



Energy guide chain 3

- VE 1 unit at 1 m

Part no.: **219204 1000**

Connectors

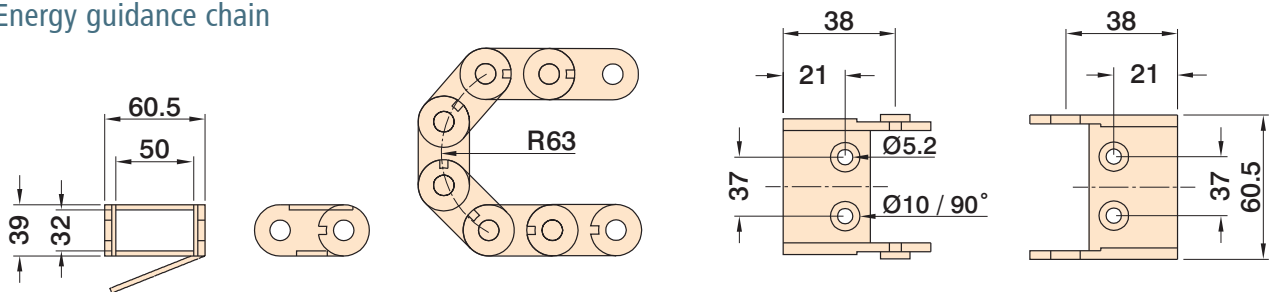
for energy chain 3

- with strain relief
- VE 1 kit

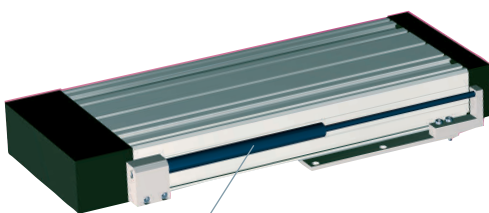
Part no.: **219205 0002**

Dimensioned drawing

Energy guidance chain



Attachment kits



Gas pressure spring

Gas strut attachment kit

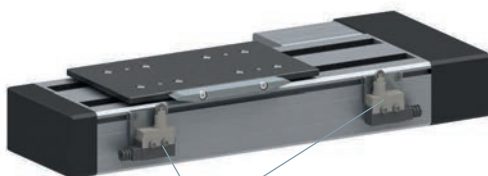
- hub 220 mm
- nominal length 490 mm

Part no.: **216450 0001**

Gas strut attachment kit

- stroke 300 mm
- nominal length 690 mm

Part no.: **216451 0001**



External limit switch

Limit switch attachment kit for LES 4

- for external limit switches

Part no.: **216460 0001**

Limit switch attachment kit LES 5

- for external limit switches

Part no.: **216460 0002**

Limit switch attachment kit LES 6

- for external limit switches

Part no.: **216460 0003**

Mounting set for sealing air

- for LES4 - LES6

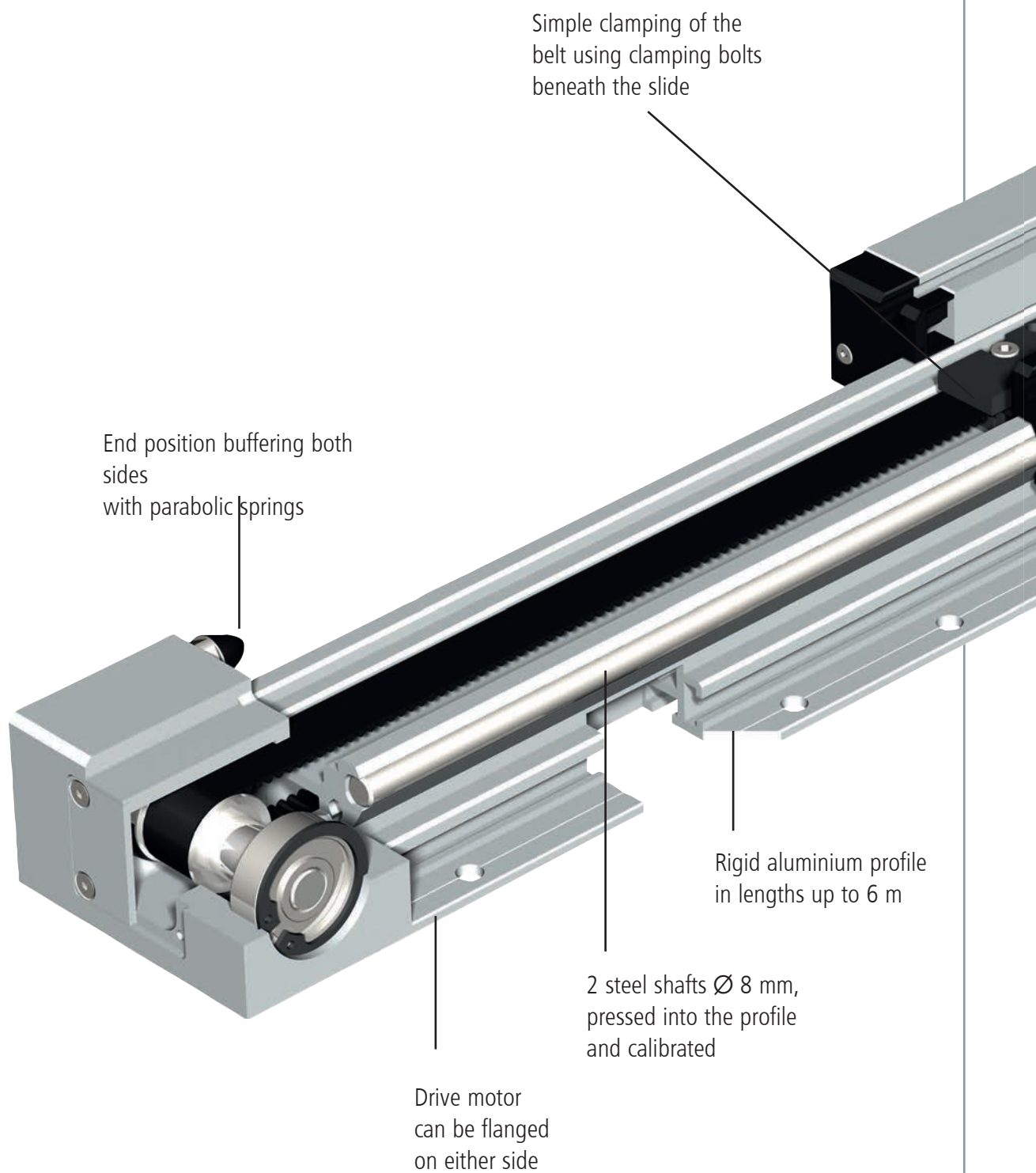
Part no.: **216460 0006**

Mounting plate, mounting-friendly screwing from above

- for LES4 Part no.: **623025 6837**
- for LES5 Part no.: **623025 6833**
- for LES6 Part no.: **675015 0362**

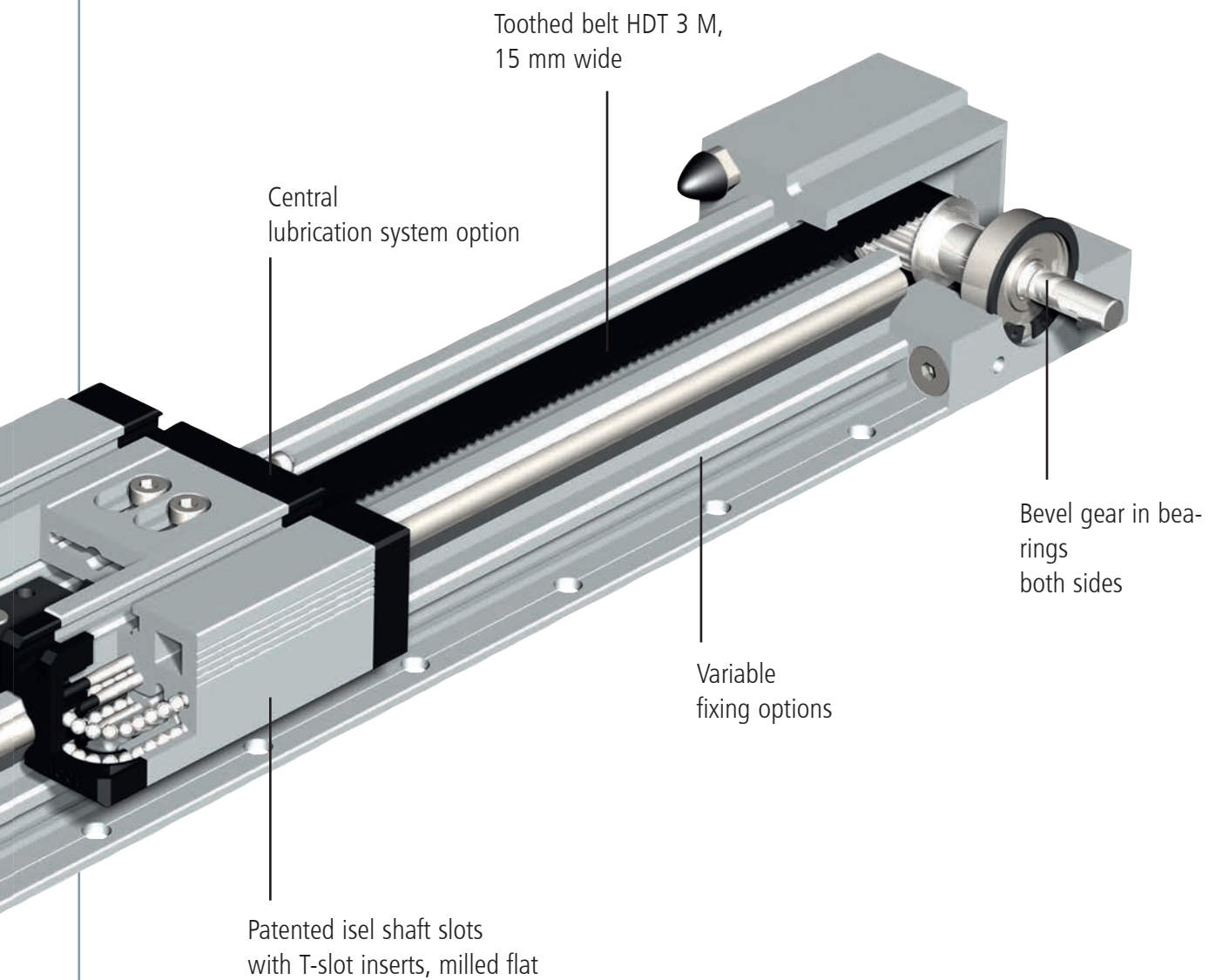
Functional overview

Linear unit with toothed belt drive



Functional overview

Linear unit with toothed belt drive



Linear units

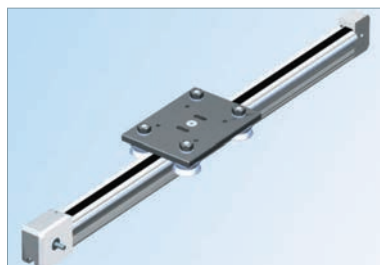
with toothed belt drive

LEZ 1

Guides
and shaft slides
also available stainless.



with shaft slide



with trolley

Features

- aluminium profile, miniature linear guide LFS-8-2
- no-play feed with toothed belt drive
 - toothed belt with 3 mm interval, width 9 mm
- feed per turn: 60 mm
- repeatability less than or equal to ± 0.2 mm
- max. feed. 1.5 m/s

Accessories can be found on pages B-70.

Options:

- special 100 mm raster lengths to order, max. 6000 mm
- securing with integrated M6 tapped rail, raster 50 mm

Ordering key

232 005 XXXX

Drives/Slides

Trolley

- 8 = without motor, with shaft slide
9 = without motor, with trolley

Profile lengths LFS-8-2 (mm)

298, 398, 498, 598, 675, 698, 798, 998, 1498, 1798, 1998, 2498, 2998
(e. g. 398 mm = 040
675 mm = 068)
Option: up to 6000 mm

Technical specification

Belt type.....HTD 3M, width 9 mm
Slide weight.....0.430 kg
Weight without drive module.....1000 mm = 3 kg
specific weight of the toothed belt.....0.0225 kg/m
Trolley weight.....1.03 kg
specific guide weight.....0.200 kg/100 mm
Effective Ø of the synchronous disks.....19.10 mm
Moment of inertia of the synchronous discs..... 5.585×10^{-7} kgm²
Feed per turn.....60 mm

Drive module
with stepper motor
MS-048 HT

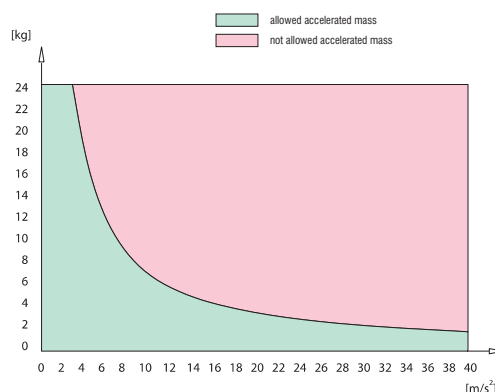


Drive module
with stepper motor
MS-135 HT



Load diagram

Permitted accelerated weights relative to the belt strength.*



* with vertical construction, the acceleration due to gravity ($g = 9.81$ m/s²) must be taken into account

Bending data is on page B-9.

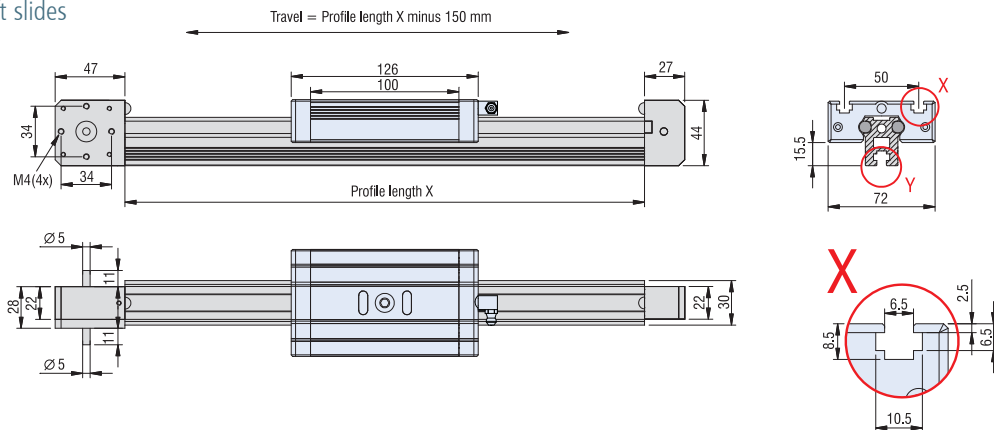
Linear units

with toothed belt drive

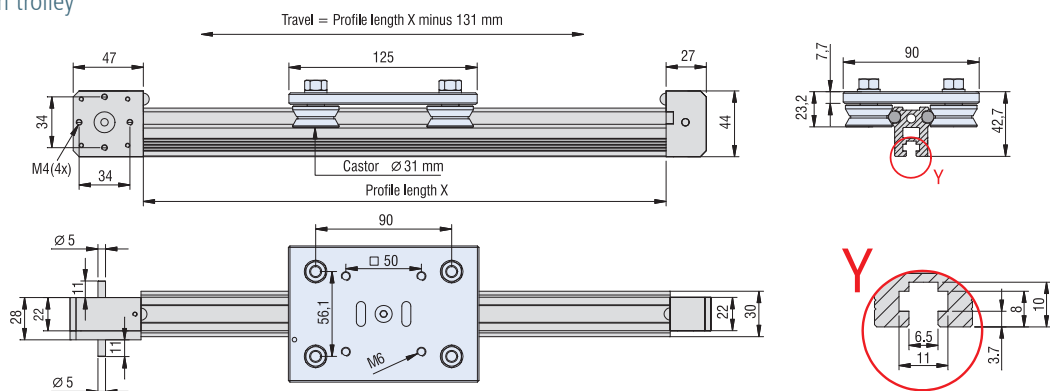
LEZ 1

Dimensioned drawings

without motor, with shaft slides



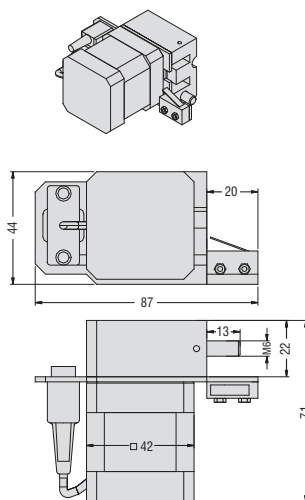
without motor, with trolley



Motor modules (Motor pin assignments are on Page B-50.)

Drive module with stepper motor
MS-048 HT (direct drive)
Feed: 60 mm / turn

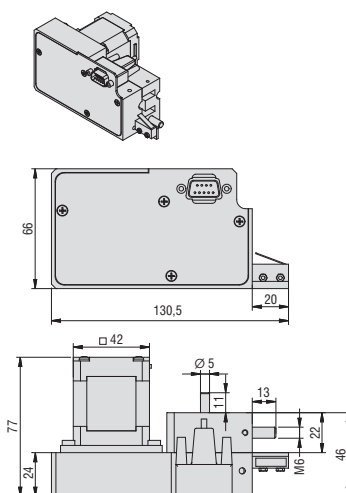
Part no.: **396048 3015**



Total length with motor module:
profile length + 94 mm

Drive module with stepper motor
MS-048 HT (reduction 2:1)
Feed: 30 mm / turn

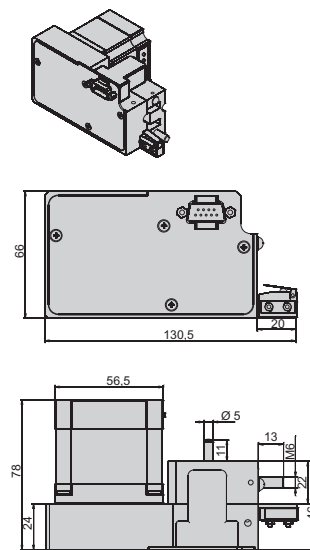
Part no.: **396049 3015**



Total length with motor module:
profile length + 138 mm

Drive module with stepper motor
MS-135 HT (reduction 2:1)
Feed: 30 mm / turn

Part no.: **396056 3015**



Drive module
with servo motor
EC-42
(reduction 2:1)
Feed: 30 mm / turn

Part no.:
396407 3060

Total length with
motor module:
profile length
+ 163,5 mm

Linear units

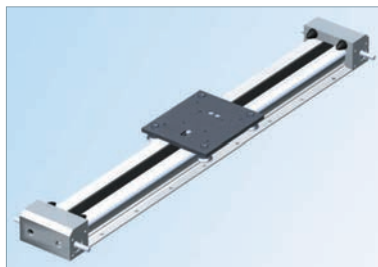
with toothed belt drive

LEZ 2

Guides
and shaft slides
also available in a stain-
less version



with shaft slide



with trolley

Features

- aluminium profile with miniature linear guide LFS-8-5
- no-play feed with toothed belt drive - toothed belt with 5 mm interval, width 25 mm
- max. feed. 5 m/s
- shaft slides WS 3, L 176 × W 130 mm
- feed per turn: 70 mm
- repeat accuracy less than or equal to ± 0.2 mm
- available in lengths up to 6,000 mm

Accessories can be found on pages **B-70**

Options:

- special 100 mm raster lengths available to order, max. 6000 mm
- also as direct drive with
 - stepper motor
 - Servomotor
- overrun limit switch with lead (only integrated in conjunction with drive module)

Ordering key

232 002 XXXX

Profile lengths (mm)

696, 996, 1496, 1996,
2496, 2996

(e. g. 696 mm = 070
1496 mm = 150)

Option: up to 6000 mm

Drives/Slides, Trolley

8 = without motor, with shaft slides

9 = without motor, with trolley

Technical specification

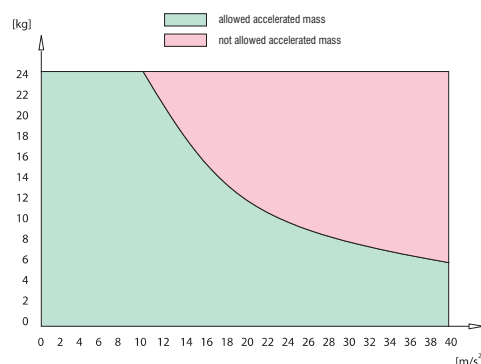
Belt type.....	HTD 5M, width 25 mm
Slide weight.....	0,940 kg
Weight without drive module.....	1000 mm $\hat{=}$ 7.9 kg
specific weight of the toothed belt.....	0.09 kg/m
Roller carriage weight.....	2.03 kg
specific guide weight.....	0.472 kg/100 mm
Effective diameter of the synchronous disks.....	$\varnothing$ 22.28 mm
Moment of inertia of the synchronous disks.....	$5.58 \cdot 10^{-6}$ kgm ²
Feed per turn.....	70 mm

Linear guide rail LFS-8-5

Moment of inertia I_x	137,48 cm ⁴
Moment of inertia I_y	27,98 cm ⁴
Resistance torque W_x	23,91 cm ³
Resistance torque W_y	13,09 cm ³

Load diagram

Permitted accelerated weights relative to the belt strength.*



* with vertical construction, the acceleration due to gravity ($g = 9.81$ m/s²) must be taken into account

Drive module
with servo motor
EC 60 L



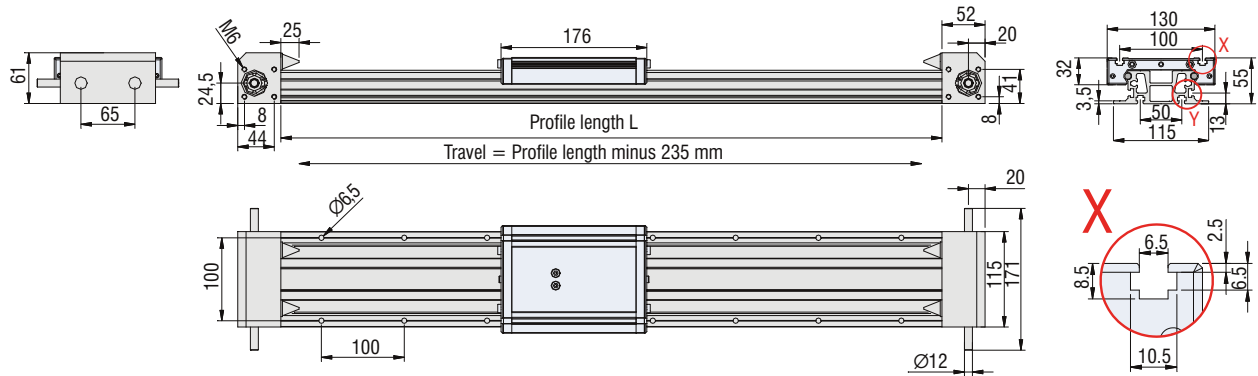
Linear units

with toothed belt drive

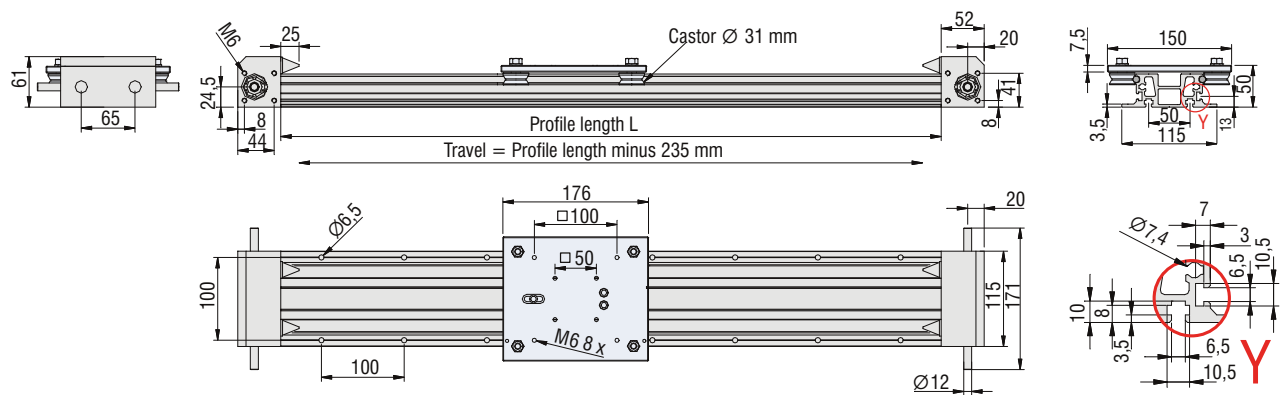
LEZ 2

Dimensioned drawings

without motor, with shaft slides



without motor, with trolley



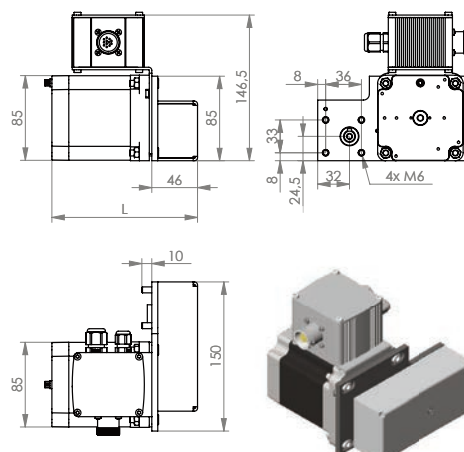
Motor modules

(Motor pin assignments are on Page B-50)

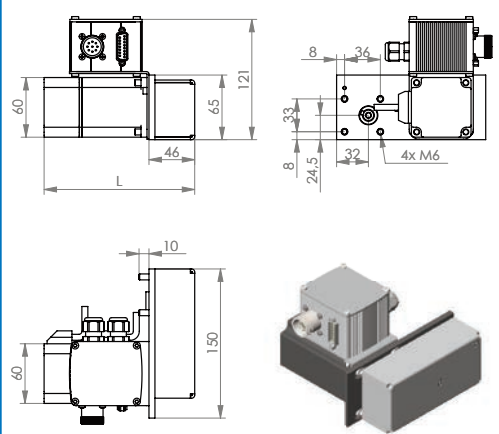
Drive module with stepper motor and EC servomotors
Reduction 2:1, Feed: 35 mm / turn

Part number	Motor module	Length L
396086 3060	stepper motor MS 600 HT	146,5
396089 3060	stepper motor MS 900 HT	174,5
396421 3060	EC servomotor EC60 TM 200W 48V	151,5
396421 3070	EC servomotor EC60 TM 200W 310V	155,7
396440 3080	EC servomotor EC60 TM 400W 48V	179,5
396440 3070	EC servomotor EC60 TM 400W 310V	183,7
396421 3260	EC servomotor EC60 TM 200W 48V - with brake	198,5
396421 3270	EC servomotor EC60 TM 200W 310V - with brake	202,7
396440 3280	EC servomotor EC60 TM 400W 48V - with brake	226,5
396440 3270	EC servomotor EC60 TM 400W 310V - with brake	226,5

Dimensioned drawing | stepper motor



Dimensioned drawing | EC servomotors



Linear units

with toothed belt drive

LEZ 3

Guides
and shaft slides
also available stainless.



with shaft slide



with trolley

Features

- aluminium profile, miniature linear guide LFS-8-4
- no-play feed with toothed belt drive, toothed belt with 5 mm interval, width 25 mm
- max. feed. 5 m/s
- shaft slides WS3, L176 × W130 mm
- Feed per turn: 70 mm or 150 mm
- repeat accuracy less than or equal to ± 0.2 mm
- limit or reference switch accuracy < 0.1 mm
- available in lengths up to 6,000 mm
- motor modules can be flange-mounted on left or right side

Ordering key

23200X XXXX

Profile lengths (mm)

698, 998, 1498, 1998, 2498, 2998

(e. g. 698 mm = 070

1498 mm = 150)

Feed

6 = 150 mm / turn

7 = 70 mm / turn

Slides, trolley

0 = with shaft slides

1 = with trolley

Accessories can be found on page B-70.

Options:

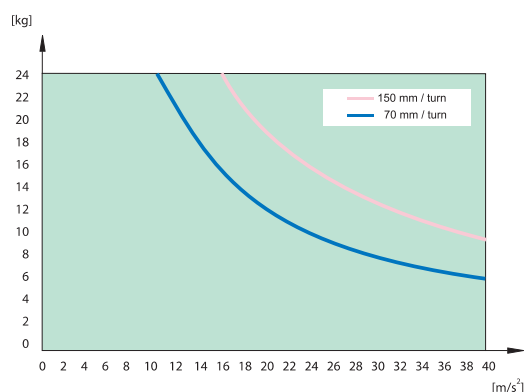
- special 100 mm raster lengths available to order, max. 6000 mm

Technical specification

Belt type.....	HTD 5M, width 25 mm
Slide weight.....	0.940 kg
Weight without drive module.....	1000 mm = 10.5 kg
specific weight of the toothed belt.....	0.09 kg/m
Roller carriage weight.....	2.03 kg
specific guide weight.....	0.648 kg/100 mm
Feed per turn.....	70 mm or 150 mm
Effective diameter of the synchronous disks	
Feed 70 mm/turn.....	22.28 mm
Feed 150 mm/turn.....	47.75 mm
Moment of inertia of the synchronous disks	
Feed 70 mm/turn.....	5.58E-6 kgm ²
Feed 150 mm/turn.....	1,796.10 ⁻⁴ kgm ²

Load diagram

Permitted accelerated weights relative to the belt strength.*



* with vertical construction, the acceleration due to gravity ($g=9.81$ m/s²) must be considered

Bending data can be found on page B-9.

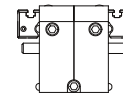
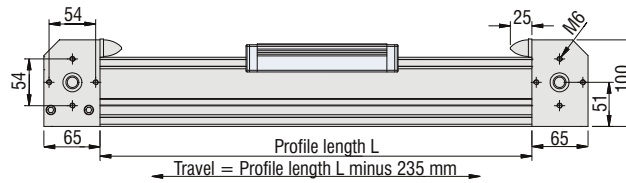
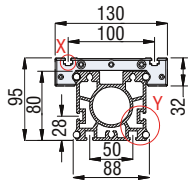
Linear units

with toothed belt drive

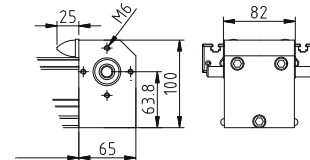
LEZ 3

Dimensioned drawings

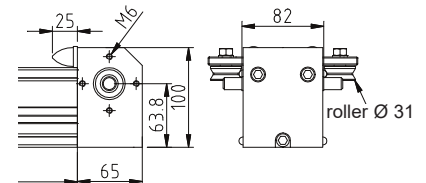
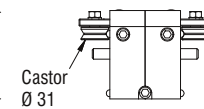
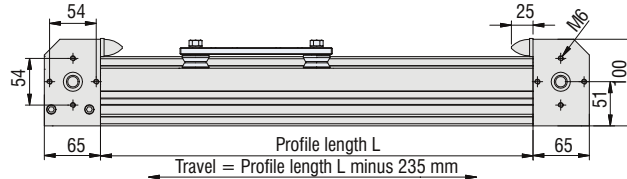
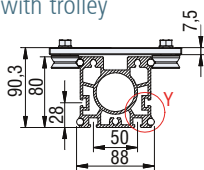
with shaft slides



Feed: 70 mm/turn

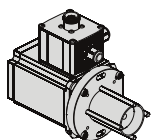


with trolley



Motor modules

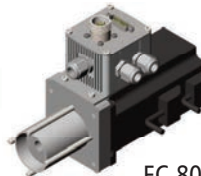
(Motor pin assignments are on Page B-50)



Drive module
with stepper motor
(direct drive)

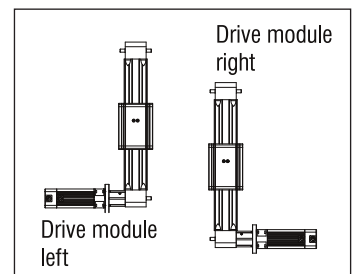


EC 60



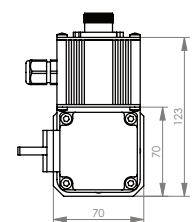
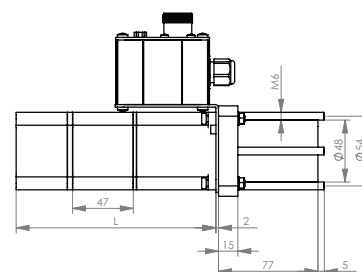
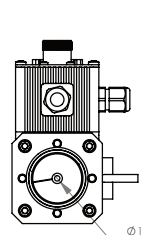
EC 80

Drive module
with EC servo-
motor
(direct drive)



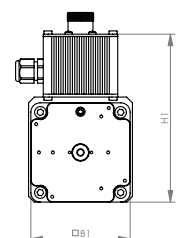
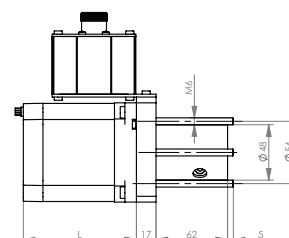
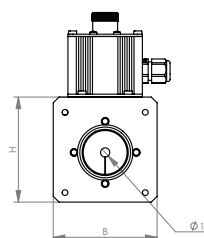
Dimensioned drawing | EC 60

Part number	Motor module	Length L
396421 006012	EC 60 TM 200W 48V	103,5 mm
396421 026012	EC 60 TM 200W 48V with brake	150,5 mm
396421 007012	EC 60 TM 200W 310V	107,7 mm
396421 027012	EC 60 TM 200W 310V with brake	154,7 mm
396440 008012	EC 60 TM 400W 48V	131,5 mm
396440 028012	EC 60 TM 400W 48V with brake	178,5 mm
396440 007012	EC 60 TM 400W 310V	135,7 mm
396440 027012	EC 60 TM 400W 310V with brake	178,5 mm



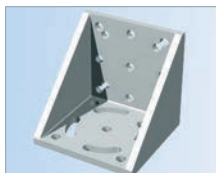
Dimensioned drawing | Motor module 2

Part no.	Motor module	L	H	H1	B	B1
396475 007012	EC 80 TM 750W	143 mm	85 mm	139,5 mm	80 mm	80 mm
396475 027012	EC 80 TM 750W with brake	191 mm	85 mm	139,5 mm	80 mm	80 mm
396085 006012	MS 600 HT	96 mm	91 mm	145,5 mm	90 mm	86 mm
396088 006012	MS 900 HT	126 mm	91 mm	145,5 mm	90 mm	86 mm



Accessories

LEZ 1



Angle bracket

- for LEZ 1

Part-no.: **209110 0010**



20/30 coupling

- for LEZ 1
- 1 VE = 1 coupling

Part-no.: **218001 5081**

Shaft slides 1/70

- L 96 x W 72 x H 28.5 mm
- clamping surface plane milled, T-slide thread M6
- central greasing option, adjustable for no play
- weight: 0.35 kg
- option: stainless steel version

Part-no.: **223100 0070**
stainless steel: **223101 0070**

Transmission shaft

Length 1 m
Part-no.: **227008 1000**

LEZ 2



Motor mounting plate

- for LEZ 2
- including fixing material
- for direct drive

Part-no.: **232199 0004**



Coupling for transmission shaft

- for LEZ 2
- 1 VE = 2 pieces couplings

Part-no.: **218050 0002**

Transmission shaft ø 25 mm

Length 1 m
Part-no.: **219001 0125**
Length 2 m
Part-no.: **219001 0225**

Vertical bearing for transmission shaft

VE 1 piece
Part.-no.: **896202 5562**

LEZ 3



Coupling for transmission shaft

- for LEZ 3
- 1 VE = 2 pieces couplings

Part-no.: **218050 0002**

Transmissions shaft ø 25 mm

Length 1 m
Part-no.: **219001 0125**
Length 2 m
Part-no.: **219001 0225**

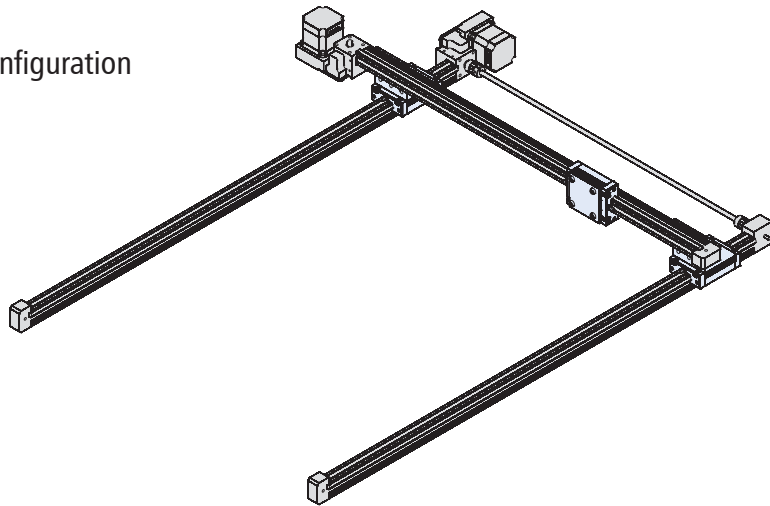
Vertical bearing for transmission shaft

VE 1 piece
Part.-no.: **896202 5562**

Examples in use

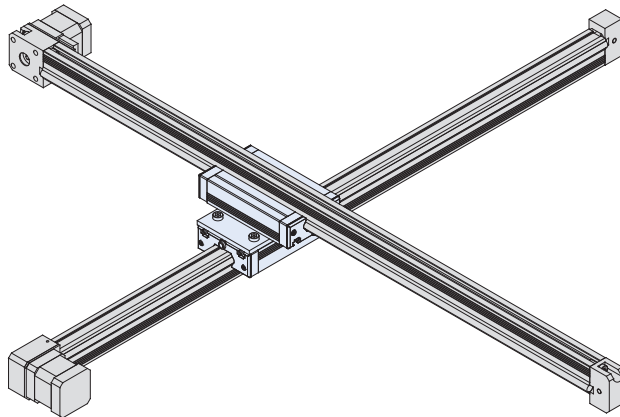
LEZ 1

- 2-axis flatbed configuration



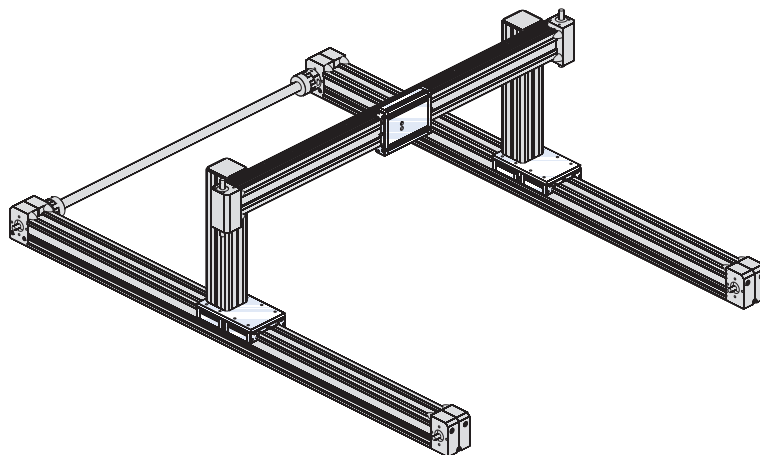
Crossbench LEZ 1

- 2 x LEZ 1



2-axis H-design

- 2 x LEZ 3
- 1 x LEZ 2
- Transmission shaft



Rotational units

Overview

RDH-M

Indexing table / Rotary unit

B-74



RDH-S

Indexing table / Rotary unit

B-76



RDH-XS

Indexing table / Rotary unit

B-78

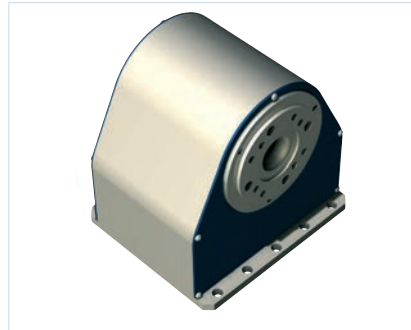


Rotational units

Overview

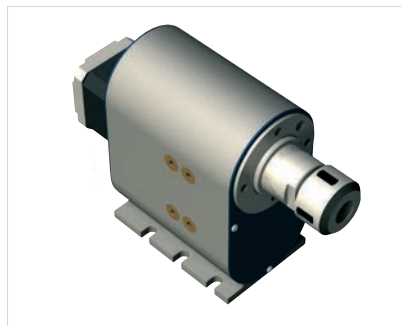
ZD 30 Rotary unit

B-80



MD 1 Miniature rotary unit

B-82



Pin assignments

B-84

Transported loads
Machining forces
Feed

B-85

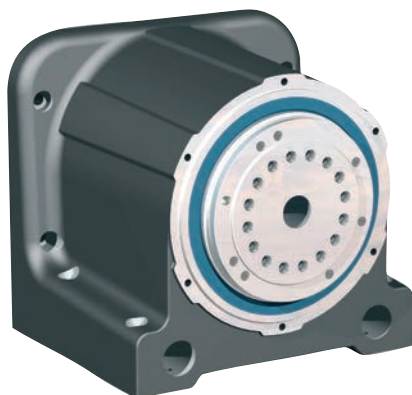


CAD data on our website www.isel.com and on



Indexing table / Rotary unit

RDH-M



RDH-M as Indexing table
(solid shaft design)

RDH-M as Rotary unit
(hollow shaft design)



Features

- with precision transmission
 - High load capacity, rigid drive bearing
 - Absence of play and high torsional rigidity
- reduction 1:51 or 1:101
- stepper or servomotor
- protection class IP 65
- stainless design
- transfer accuracy < 1 minute of arc
- repeatability < ± 6 seconds of arc
- available in solid or hollow shaft design
- no maintenance

For pin assignment see page **B-84**

For transport loads see page **B-85**

Ordering key

2 6 6 2 X X 0 X 0 0

Flanged shaft

- 0 = solid shaft
1 = hollow shaft

Transmission reduction

- 0 = 101
1 = 51

Motors

- 0 = stepper motor MS 200 HAT with encoder (400 imp., 3-channel, RS422)
3 = brushless EC servomotor EC 60S
4 = brushed DC servomotor DC 100
5 = Stepper motor without encoder

Accessories



Chuck assembly

3-jaw chuck Ø 125
Part no.: **269063 2125**
* including flange



Aluminium T-slot plate

Ø 240 mm/PT 25
Part no.: **269050 0240**

Ø 365 mm/PT 25
Part no.: **269050 0365**



Tailstock unit RE M

Part no.: **269100 2100**
(1000 mm)
Part no.: **269100 2150**
(1500 mm)
Part no.: **269100 2200**
(2000 mm)

Indexing table / Rotary unit

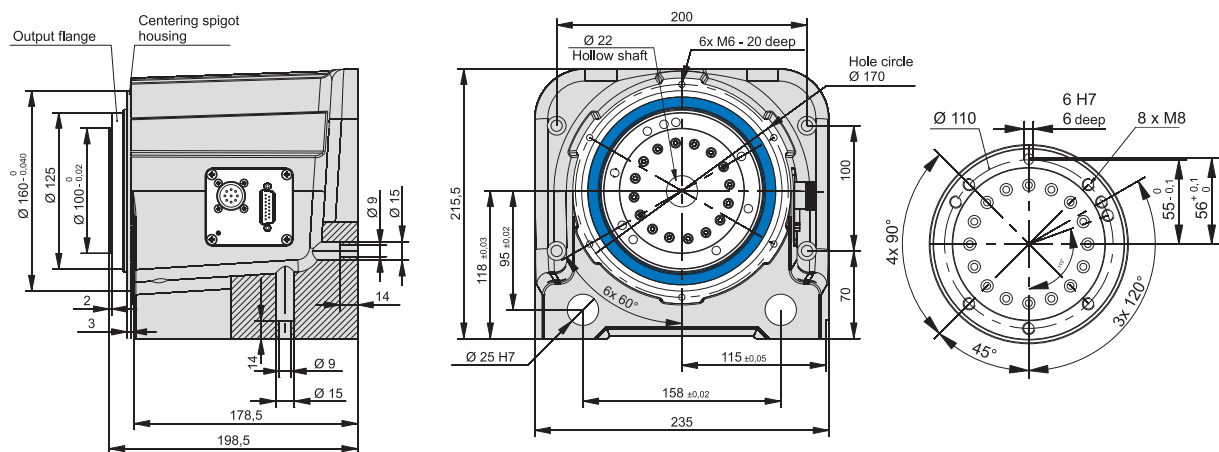
RDH-M

Technical specification

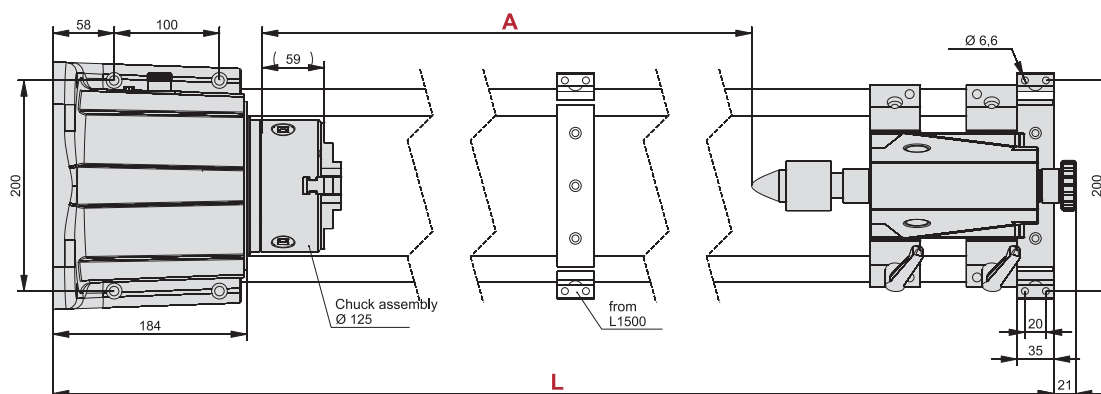
	stepper motor MS 200 HT *		EC servomotor EC 60S (brushless)		DC servo motor DC 100 (brushed)	
Reduction ratio	1:51	1:101	1:51	1:101	1:51	1:101
Nominal output speed [1/min]	4	2	22	11	22	11
	at 1500 Hz (225 1/min)		at 1100 1/min			
Max. output speed [1/min]	24	12	59	30	59	30
	at 8000 Hz		--			
Nominal torque [Nm]	24	46	9	17	7	14
	at 1500 Hz		--			
Max. torque (short term) [Nm]	--	--	42	80	39	73
Rated holding torque (static load) [Nm]	55	108	26	51	15	30
Max. transmission load [Nm]	98	157	98	157	98	157
	Limit for repeatable peak torque					
Dynamic load factor C [N]	21800					
Static load factor C ₀ [N]	35800					
Weight [kg]	13.7					

* Values for half-step operation

Dimensioned drawings

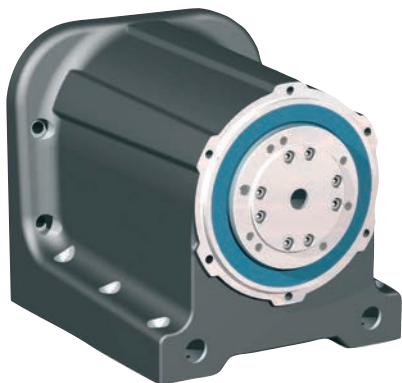


Versions	Part no.	L	A
Tailstock unit RE-M 1000 mm	269100 2100	1110	624.5
Tailstock unit RE-M 1500 mm	269100 2150	1610	1124.5
Tailstock unit RE-M 2000 mm	269100 2200	2110	1624.5



Indexing table / Rotary unit

RDH-S



RDH-S as Indexing table
(solid shaft design)

RDH-S as Rotary unit
(hollow shaft design)



Features

- with precision transmission
 - high load capacity, rigid drive bearing
 - absence of play and high torsional rigidity
- reduction 1:51 or 1:101
- stepper or servomotor
- protection class IP 65
- stainless design
- transfer accuracy < 1.5 minute of arc
- repeatability < ± 6 seconds of arc
- available in solid or hollow shaft design
- no maintenance

For pin assignment see page **B-84**

For transport loads see page **B-85**

Ordering key

2 6 6 1 X X 0 X 0 0

Flanged shaft

- 0 = solid shaft
1 = hollow shaft

Transmission reduction

- 0 = 101
1 = 51

Motors

- 0 = stepper motor MS 045 HT with encoder (400 imp., 3-channel, RS422)
2 = brushless DC servomotor RE 40
3 = brushless EC servomotor EC 42
5 = Stepper motor without encoder

Accessories



Chuck assembly

3-jaw chuck Ø 65

Part no.: **269060 3065***

3-jaw chuck Ø 80

Part no.: **269063 2080***

3-jaw chuck Ø 100

Part no.: **269063 2100***

* including flange



Circular plate

Ø 150 mm

Part no.: **269 050 0150**



Tailstock unit RE S

for RDH-S

Part no.: **269100 1020** (200 mm)

Part no.: **269100 1030** (300 mm)

Part no.: **269100 1040** (400 mm)

Part no.: **269100 1050** (500 mm)

Indexing table / Rotary unit

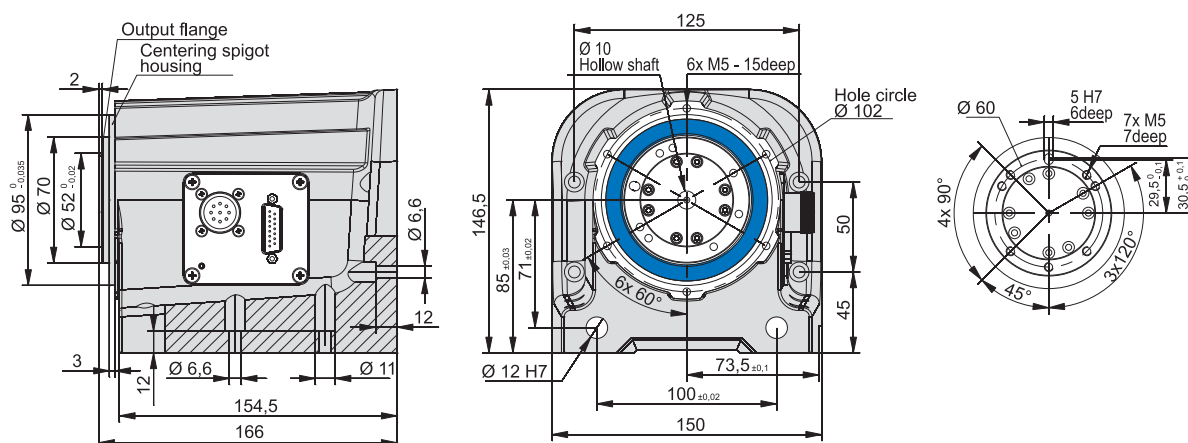
RDH-S

Technical specification

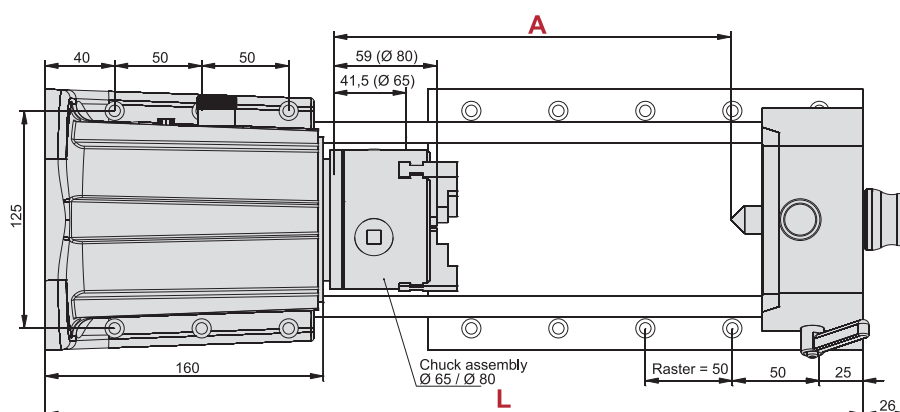
	stepper motor MS 045 HT *		EC servomotor EC 42 (brushless)		DC servo motor RE 40 (with brushes)	
Reduction ratio	1:51	1:101	1:51	1:101	1:51	1:101
Nominal output speed [1/min]	4	2	22	11	22	11
	at 1500 Hz (225 1/min)		at 1100 1/min		at 1100 1/min	
Max. output speed [1/min]	24	12	59	30	69	35
	at 8000 Hz		--			
Nominal torque [Nm]	7	11	4.8	9.2	4.6	9
	at 1500 Hz		--			
Max. torque (short term) [Nm]	--	--	7	11	7	11
Rated holding torque (static load) [Nm]	7	11	7	11	7	11
Max. transmission load [Nm]	18	28	18	28	18	28
	Limit for repeatable peak torque					
Dynamic load factor C [N]	5800					
Static load factor C ₀ [N]	8600					
Weight [kg]	4.6					

* Values for half-step operation

Dimensioned drawings



Versions	Part no.	L	A
Tailstock unit RE-S 200 mm	269100 1020	370	128
Tailstock unit RE-S 300 mm	269100 1030	470	228
Tailstock unit RE-S 400 mm	269100 1040	570	328
Tailstock unit RE-S 500 mm	269100 1050	670	428



Indexing table/Rotary unit

RDH-XS



RDH-XS as Rotary unit

RDH-XS as Indexing table



Features

- with precision transmission
 - high load capacity, rigid drive bearing
 - absence of play and high torsional rigidity
- reduction 1:50 or 1:100
- stepper or servomotor
- protection class IP 65
- stainless design
- transfer accuracy < 2 minutes of arc
- repeatability < ± 1 minute of arc
- no maintenance

For pin assignment see page B-84

For transport loads see page B-85

Ordering key

2 6 6 0 0 X 0 X 0 0

Transmission reduction

0 = 100

1 = 50

Motors

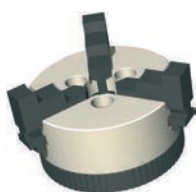
0 = stepper motor MS 045 HT with encoder (400 imp., 3-channel, RS422)

2 = brushed DC servomotor RE 40

3 = brushless EC servomotor EC 42

5 = Stepper motor without encoder

Accessories

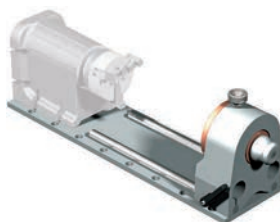


Chuck assembly

3-jaw chuck Ø 65

Part no.: **269060 4065***

* including flange



Tailstock unit RE XS

for RDH-XS

Part no.: **269100 0020** (200 mm)Part no.: **269100 0030** (300 mm)Part no.: **269100 0040** (400 mm)Part no.: **269100 0050** (500 mm)

Indexing table/Rotary unit

RDH-XS

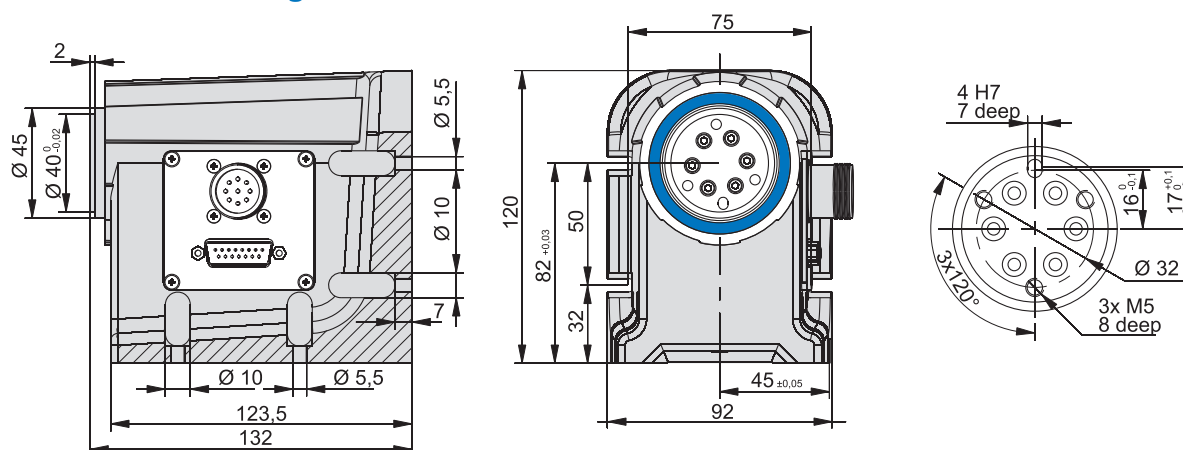
Technical specification

	stepper motor MS 045 HT *		EC servomotor EC 42		DC servo motor RE 40	
Reduction ratio	1:50	1:100	1:50	1:100	1:50	1:100
Nominal output speed [1/min]	5	2	22	11	22	11
	at 1500 Hz (225 1/min)		at 1100 1/min		at 1100 1/min	
Max. output speed [1/min]	24	12	59	30	70	35
	at 8000 Hz (1200 rpm)		--			
Nominal torque [Nm]	5	7	5	7	5	7
	at 1500 Hz (225 1/min)		--			
Max. torque (short term) [Nm]	--	--	5	7	5	7
Rated holding torque (static load) [Nm]	5	7	5	7	5	7
Max. transmission load [Nm]	9	14	9	14	9	14
	Limit for repeatable peak torque					
Dynamic load factor C [N]	392					
Static load factor C ₀ [N]	392					
Weight [kg]	2.3					

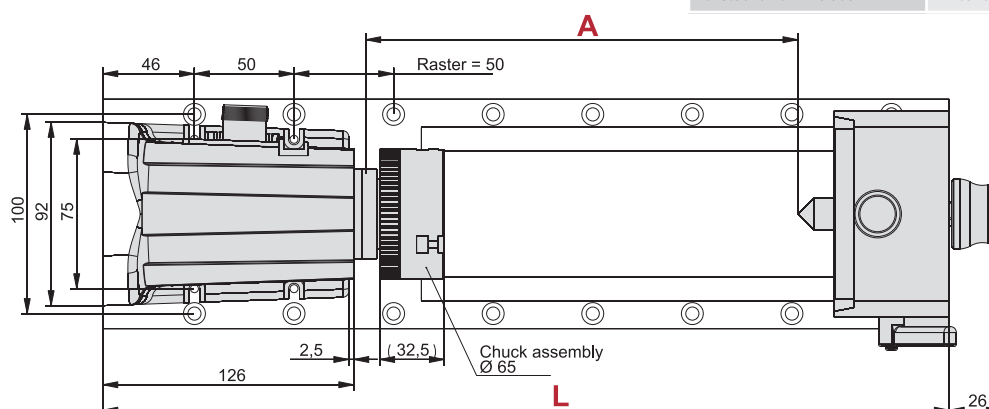
*

Dimensioned drawings

Values for half-step operation

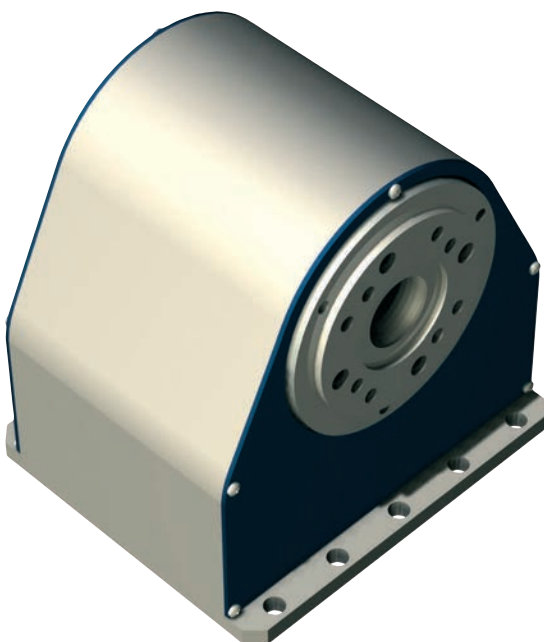


Versions	Part no.	L	A
Tailstock unit RE-XS 200 mm	269100 0020	325	117
Tailstock unit RE-XS 300 mm	269100 0030	425	217
Tailstock unit RE-XS 400 mm	269100 0040	525	317
Tailstock unit RE-XS 500 mm	269100 0050	625	417



Rotary unit

ZD 30



Features

- low play toothed belt drive with stepper motor
- reduction 1 : 30
- shaft with Ø 15 mm boring
- housing flange with inner cone SK 20
- weight: 2,9 kg

For pin assignment see page **B-84**

For transport loads see page **B-85**

Options:

- CNC controller via Sub D

Ordering data

ZD 30 rotary unit

Part no.: **261100 0000**

Accessories



Chuck assembly

3-jaw chuck Ø 65

Part no.: **269060 2065***



Chuck assembly

3-jaw chuck Ø 80

Part no.: **269063 3080***

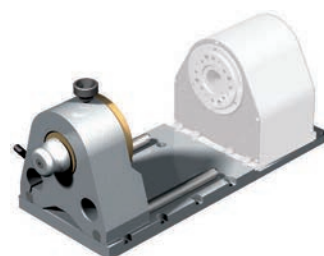


Collet holder

Clamping ring housing SK 20 for tools Ø 3 - 13 mm, with installation ring

Part no.: **239122 9001**

Clamping rings are on page E-44.



Tailstock unit RE-ZD30

200 mm Part no.: **269 100 1060** L 331

300 mm Part no.: **269 100 1070** L 431

400 mm Part no.: **269 100 1080** L 531

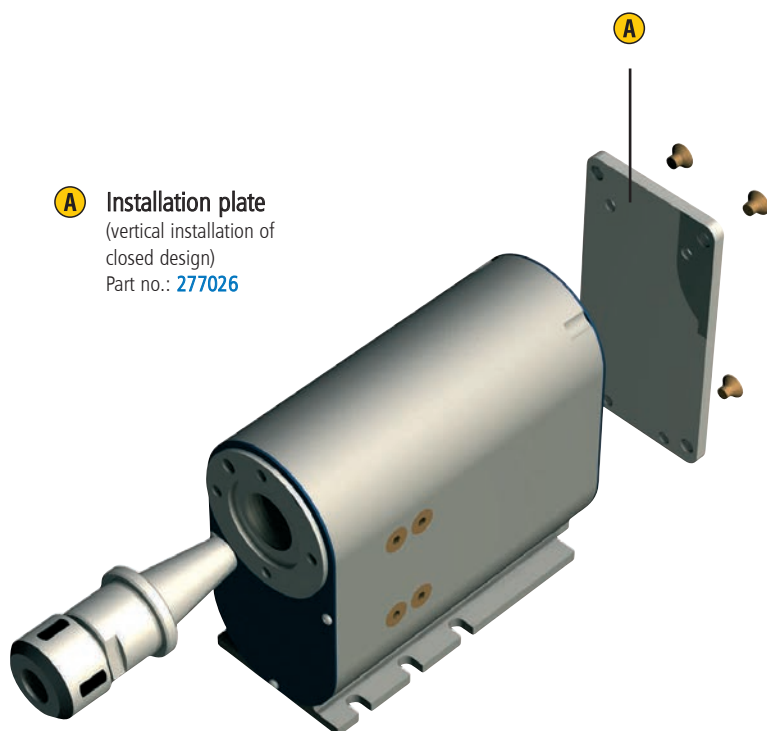
500 mm Part no.: **269 100 1090** L 631

* including flange

ZD 30

Mini rotary unit

MD 1



A Installation plate
(vertical installation of
closed design)
Part no.: **277026**

Features

- low play toothed belt drive with stepper or DC servo motor
- reduction 1 : 20
- shaft Ø9 mm with boring
- housing flange with inner cone SK 20
- weight:
depending on design, from 1.35 kg

For pin assignment see page **B-84**

For transport loads see page **B-85**

Options:

- additional installation plate
(vertical installation possible)
- CNC controller

Ordering key

2 6 1 0 1 0 0 X 1 0

Motors

- 0** = MS 045 HT stepper motor
2 = DC servomotor RE 40, with brushes
3 = brushless EC servomotor EC 42

Accessories



Chuck assembly

3-jaw chuck Ø 65

Part no.: **269060 2065***

* incl. Flange



Collet holder

Collet holder SK 20
for tools Ø 3 - 13 mm, with
installation ring

Part no.: **239122 9001**

Collets are on page E-44.

Mini rotary unit

MD 1

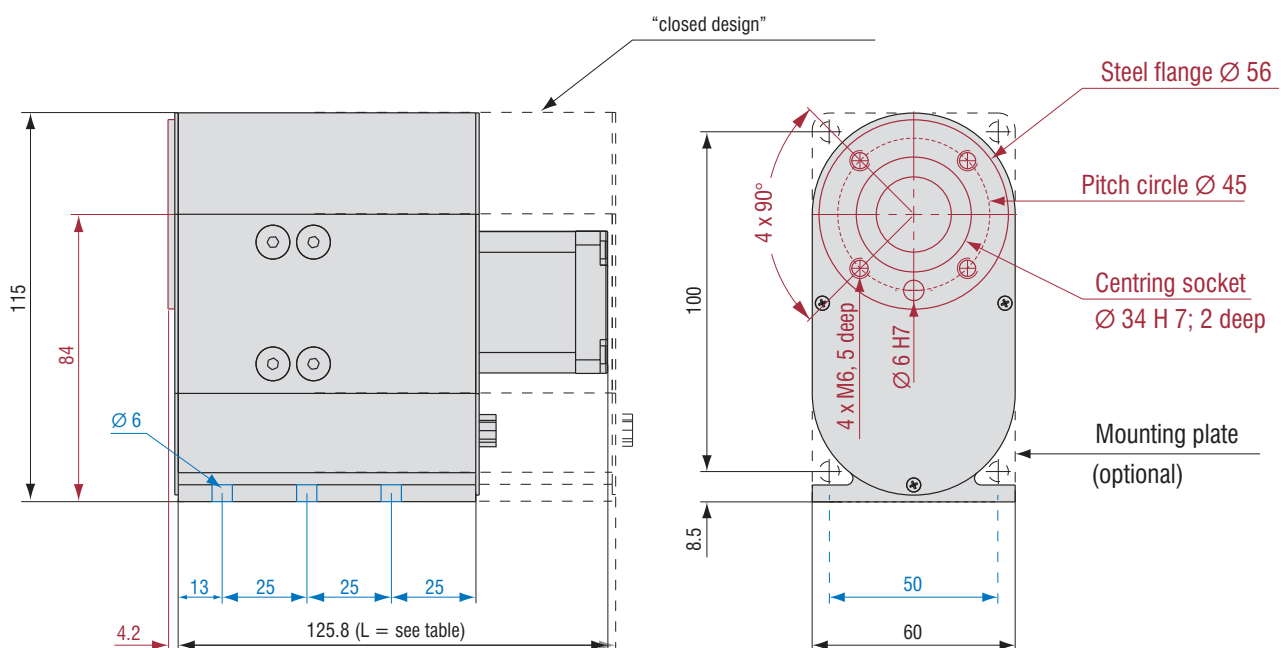
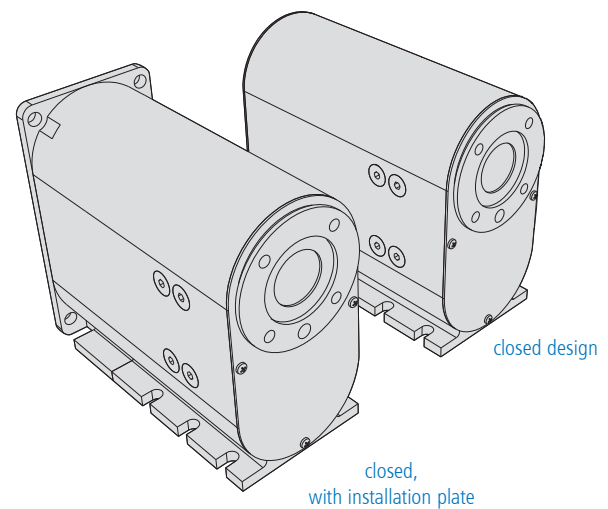
Technical specification

	MS 045 HT stepper motor *	DC servomotor RE 40	EC servomotor EC 42
Reduction ratio	1:20	1:20	1:20
Output speed [1/min]	0 - 60	0 - 175	0 - 150
Operating torque (0 - 1600 Hz) [Nm]	8	--	--
Rated torque [Nm]	--	3	3.2
Rated holding torque (static load) [Nm]	14	3.9	4
Min. step (positional accuracy) [arcmin]	3.5	2	2
Gewicht [kg]	1.35		

* Values for half-step operation

Dimensioned drawings

	Length L per step	Length L for DC servo
closed design	129 mm	180 mm
closed with installation plate	133 mm	184 mm

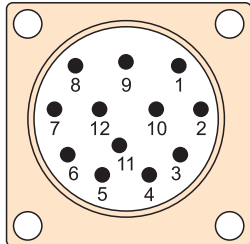


Motor pin assignments

Pin assignment for 12-pin stepper motors

(for RDH)

Motor connection



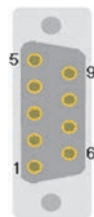
Plug side view of pin insert

M23 12-pin Pin	
1	Motor phase 1A
2	Motor phase 1B
3	Motor phase 2A
4	Motor phase 2B
5	+24V switch
6	+24V brake
7	GND switch
8	GND brake
9	Limit switch 1
10	Limit switch 2
11	---
12	---
Housing - cable shield	

Pin assignment for 9-pin stepper motors

(for iZD 54, MD 1, ZD 30, ZR 20, ZDS 2030)

Motor connection



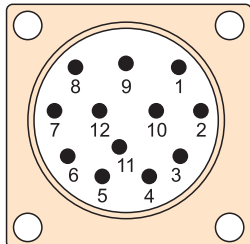
Plug side view of pin insert

Sub-D 9-pin Pin	
1	Motor phase 1A
2	Motor phase 1B
3	Motor phase 2A
4	Motor phase 2B
5	+24V switch
6	+24V brake
7	Limit switch 2
8	GND brake
9	Limit switch 1
Housing - cable shield	

Pin assignment for stepper motors with encoder

(for RDH)

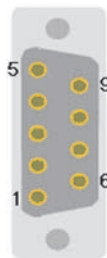
Motor connection



Plug side view of pin insert

M23 12-pin Pin	
1	Motor phase 1A
2	Motor phase 1B
3	Motor phase 2A
4	Motor phase 2B
5	+24V switch
6	+24V brake
7	GND switch
8	GND brake
9	Limit switch 1
10	Limit switch 2
11	---
12	---
Housing - cable shield	

Encoder connection

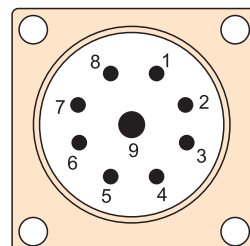


Plug side view of pin insert

Sub-D 9-pin Pin	
1	+5V encoder
2	Encoder track A
3	Encoder track B
4	Encoder track Z
5	---
6	GND encoder
7	Encoder track/A
8	Encoder track/B
9	Encoder track/Z
Housing - cable shield	

Pin assignment for DC servo motors with brushes (BDC)

Motor connection

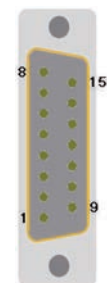


Plug side view of pin insert

M23 9-pol. (8 + 1) pin	
1	Motor phase 1 (V+)
2	Motor phase 1 (V-)
3	Motor phase 1 (V+)*
4	Motor phase 1 (V-)*
5	+24V brake
6	GND brake
7	---
8	---
9	Earthing lead
Housing - cable shield	

* Part motor phase connection over 2 wires.

Encoder connection

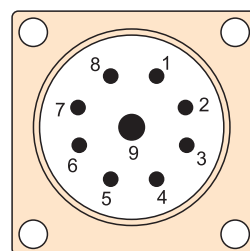


Plug side view of pin insert

Sub-D 15-pin Pin	
1	---
2	+5V encoder
3	Encoder track/Z
4	Encoder track/B
5	Encoder track/A
6	+24V switch
7	Limit switch 1
8	GND switch
9	---
10	GND encoder
11	Encoder track Z
12	Encoder track B
13	Encoder track A
14	Reference switch
15	Limit switch 2
Housing - cable shield	

Pin assignment for brushless EC servomotors (BLDC) 48V

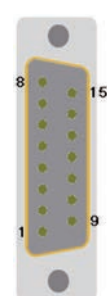
Motor connection



Plug side view of pin insert

M23 9-pol. (8 + 1) pin	
1	Motor phase U
2	Motor phase V
3	Motor phase W
4	---
5	+24V brake
6	GND brake
7	---
8	---
9	Earthing lead
Housing - cable shield	

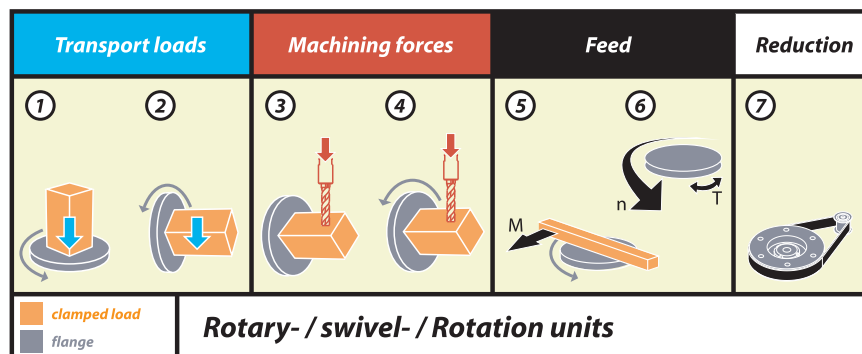
Encoder connection



Sub-D 15-pin Pin	
1	Hall signal A
2	+5V encoder/Hall
3	Encoder track/Z
4	Encoder track/B
5	Encoder track/A
6	+24V switch
7	Limit switch 1
8	GND switch
9	Hall signal B
10	GND encoder
11	Encoder track Z
12	Encoder track B
13	Encoder track A
14	Hall signal C
15	Limit switch 2
Housing - cable shield	

Turn/tilt/rotation units:

Transport loads, machining forces, feed



Rotary or tilting units	1*	2 *	3	4	5	6	7
RDH-M (step)	100 kg	45 kg	55 Nm	24 Nm	24 Nm	4 rpm	1:51
RDH-M (step)	160 kg	70 kg	108 Nm	45 Nm	45 Nm	2 rpm	1:101
RDH-M (EC-servo, brushless)	110 kg	50 kg	26 Nm	9 Nm	9 Nm	22 rpm	1:51
RDH-M (EC-servo, brushless)	180 kg	80 kg	51 Nm	17 Nm	17 Nm	11 rpm	1:101
RDH-S (step)	30 kg	15 kg	7 Nm	7 Nm	7 Nm	4 rpm	1:51
RDH-S (step)	48 kg	24 kg	11 Nm	11 Nm	11 Nm	2 rpm	1:101
RDH-S (EC-servo, brushless)	30 kg	15 kg	7 Nm	4.6 Nm	4.6 Nm	22 rpm	1:51
RDH-S (EC-servo, brushless)	48 kg	24 kg	11 Nm	4.6 Nm	9.2 Nm	11 rpm	1:101
RDH-S (DC-servo)	25 kg	13 kg	7 Nm	4.6 Nm	4.6 Nm	22 rpm	1:51
RDH-S (DC-servo)	40 kg	20 kg	11 Nm	8.7 Nm	8.7 Nm	11 rpm	1:101
RDH-XS (step)	30 kg	10 kg	5 Nm	5 Nm	5 Nm	24 rpm	1:50
RDH-XS (step)	30 kg	10 kg	7 Nm	7 Nm	7 Nm	12 rpm	1:100
RDH-XS (EC-servo, brushless)	30 kg	10 kg	5 Nm	5 Nm	5 Nm	59 rpm	1:50
RDH-XS (EC-servo, brushless)	30 kg	10 kg	7 Nm	7 Nm	7 Nm	30 rpm	1:100
RDH-XS (DC-servo)	30 kg	10 kg	5 Nm	5 Nm	5 Nm	70 rpm	1:50
RDH-XS (DC-servo)	30 kg	10 kg	7 Nm	7 Nm	7 Nm	35 rpm	1:100
MD 1 (step)	5 kg	2.5 kg	14 Nm	8 Nm	8 Nm	60 rpm	1:20
MD 1 (DC servo)	6 kg	3 kg	3.9 Nm	3 Nm	3 Nm	175 rpm	1:20
MD 1 (EC servo, brushless)	6 kg	3 kg	4 Nm	3.2 Nm	3.2 Nm	150 rpm	1:20
ZR 20 (step)	10 kg	5 kg	14 Nm	8 Nm	8 Nm	60 rpm	1:20
ZD 30 (step)	14 kg	8 kg	20 Nm	12 Nm	12 Nm	40 rpm	1:30

*) Guideline values will vary according to application.