

mechanics



MECHANICS

Aluminium profiles	C2
Linear guides	C18
Drive elements.....	C48
Linear units	C56
Rotational units.....	C102

Aluminium profiles

Overview

PP profiles Panel profiles

C 4



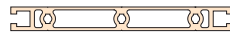
PP 25



PP 50



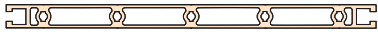
PP 100



PP 150



PP 200



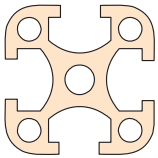
PP 250



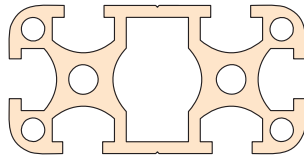
PP 50L

PU profiles Universal profiles

C 5



PU 25



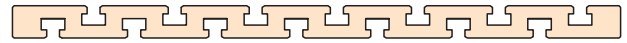
PU 50

PT profiles T-groove panels

C 6



PT 25



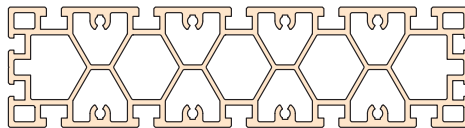
PT 50

RE profiles Rectangular profiles

C 8



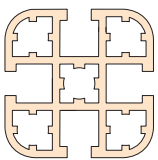
RE 40



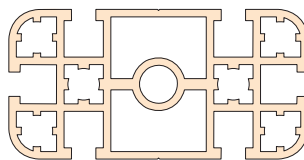
RE 65

PL profiles Light frame profiles

C 10



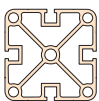
PL 40



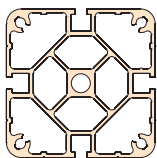
PL 80

PS profiles Stand profiles

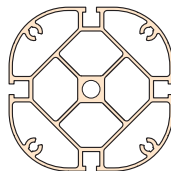
C 11



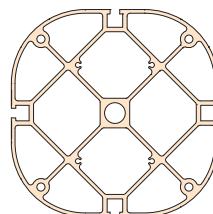
PS 50



PS 80



PS 100



PS 140

Aluminium profiles

Overview

AT	Workbenches		C 13
	Accessories		C 14
	Profile connections		C 16
	Profile quick clamping extension		C 17

Linear guides

Overview

Slide functional overview
General notes



C 20

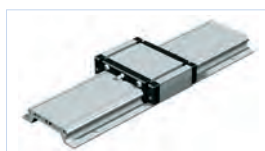
LFS-8-1 Linear guide rails
LFS-8-2



C 22

with LW 6 carriage
with WS 1 aluminium slide

LFS-8-3 Linear guide rail



C 24

with LW 7 carriage
with WS 3 aluminium slide

LFS-8-4 Linear guide rail



C 26

with LW 7 carriage
with WS 3 aluminium slide

LFS-12-1 Linear guide rail



C 28

with LW 3 carriage
with WS 4 aluminium slide
with LS 1 steel slide

LFS-12-11 Linear guide rail



C 30

with LW 5 carriage
with WS 6 aluminium slide

LFS-12-2 Linear guide rail



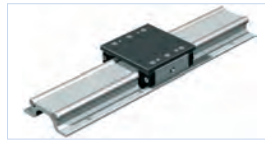
C 32

with LW 3 carriage
with WS 4 aluminium slide

Linear guides

Overview

LFS-12-3 Linear guide rail



C 34

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

LFS-12-10 Linear guide rail



C 36

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

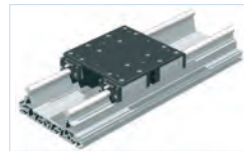
LFS-16-2 Linear guide rail



C 38

with ILW 3 carriage
with IWS 1 aluminium slide
with ILS 1 steel slide

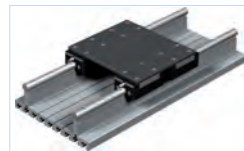
LFS-16-120 Linear guide rail



C 40

with 2 or 4 IWS 1 aluminium slides
with 2 or 4 ILS 1 steel slides

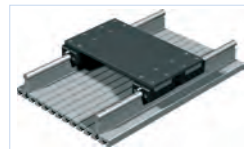
LFS-16-150 Linear guide rail



C 42

with ILS1 steel slide
with IWS1 aluminium slide

LFS-16-250 Linear guide rail



C 43

with ILS1 steel slide
with IWS1 aluminium slide

Accessories

C 44

Operating loads calculation

C 45

CAD data on our website www.isel.com

Panel profiles



PP profiles

Features

- For fast and easy erection of frames, benches and racks
- Aluminium, naturally anodised
- Produced to DIN EN 12020-2
- easy, very strong under load
- Top edge particularly suitable as a load-bearing cladding, also takes very high loads
- Our profile linkages produce very rigid connections, resistant to tension, distortion and bending by means of drillings and Allen screws in conjunction with PS profiles.
- Profile cutting to order
- Extensive range of accessories (see page C14)

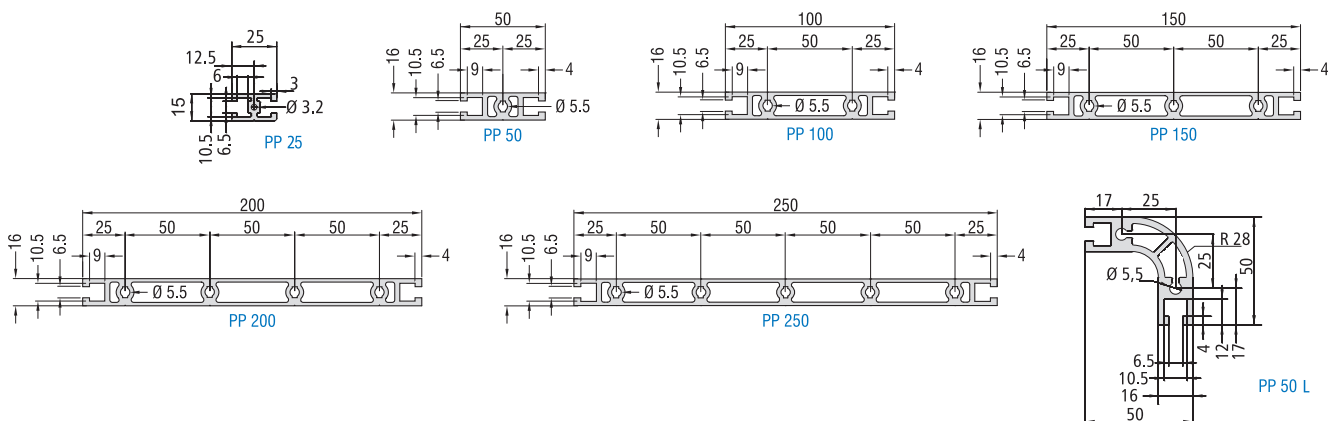
Technical specification

	PP 25	PP 50 L	PP 50	PP 100	PP 150	PP 200	PP 250
Dimensions (W × H)	25 x 15 mm	50 x 50 mm	50 x 16 mm	100 x 16 mm	150 x 16 mm	200 x 16 mm	250 x 16 mm
Length	up to 3 metres (special lengths to order)						
Weight	appr. 0.5 kg/m	appr. 1.7 kg/m	appr. 1.1 kg/m	appr. 1.9 kg/m	appr. 2.6 kg/m	appr. 3.4 kg/m	appr. 4.1 kg/m
	1 cavity insert Ø 3.2 mm for M4 screw	2 cavity inserts Ø 5.5 mm for M6 screw	1 cavity insert Ø 5.5 mm for M6 screw	2 cavity inserts Ø 5.5 mm for M6 screw in 50 mm raster	3 cavity inserts Ø 5.5 mm for M6 screw in 50 mm raster	4 cavity inserts Ø 5.5 mm for M6 screw in 50 mm raster	5 cavity inserts Ø 5.5 mm for M6 screw in 50 mm raster
Moment of inertia I_x	0.88 cm ⁴	13.25 cm ⁴	8.13 cm ⁴	67.27 cm ⁴	213.92 cm ⁴	482.77 cm ⁴	908.52 cm ⁴
Moment of inertia I_y	0.54 cm ⁴	13.25 cm ⁴	1.37 cm ⁴	2.46 cm ⁴	3.55 cm ⁴	4.64 cm ⁴	5.74 cm ⁴
Moment of resistance W_x	0.70 cm ³	4.39 cm ³	3.25 cm ³	13.45 cm ³	28.52 cm ³	48.27 cm ³	72.68 cm ³
Moment of resistance W_y	0.70 cm ³	4.39 cm ³	1.71 cm ³	3.08 cm ³	4.44 cm ³	5.80 cm ³	7.17 cm ³

Ordering information

Part no. for L = 1000 mm	201 044 1000	201 045 1000	201 040 1000	201 041 1000	201 042 1000	201 043 1000	201 009 1000
Part no. for L = 3000 mm	201 044 3000	201 045 3000	201 040 3000	201 041 3000	201 042 3000	201 043 3000	201 009 3000

Dimensioned drawings



Universal profiles

PU 25 / PU 50



Merkmale

- For fast and simple erection of frames, benches and racks
- Aluminium, naturally anodised
- Produced to DIN EN 12020-2
- Light, compact & stable
- For universal use
- Suitable for very high loads
- Our clamped linkages produce very rigid connections, resistant to tension, distortion and bending, between profiles by means of profile drillings and clamping elements.
- Profile cutting to order
- Extensive range of accessories (see page C14)

Option: - powder coatings
in anthracite and light grey

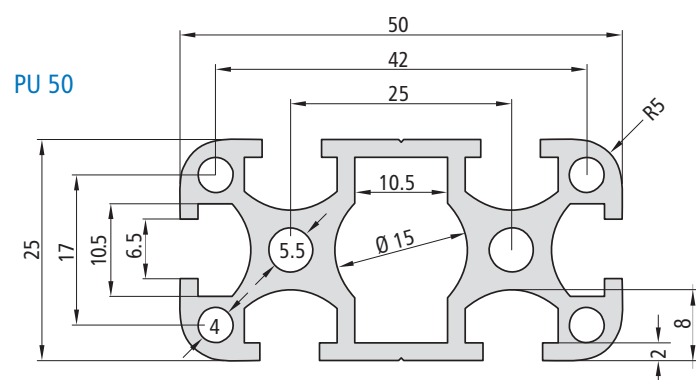
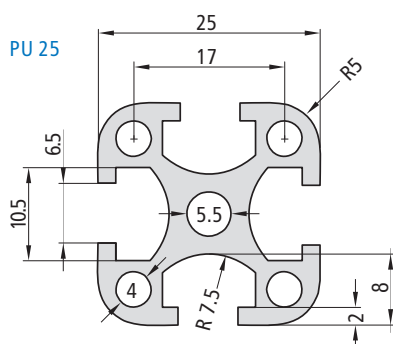
Technical specification

	PU 25	PU 50
Dimensions (W × H)	25 x 25 mm	50 x 25 mm
Length	up to 3 metres (special lengths to order)	
Weight	appr. 0.7 kg/m	appr. 1.3 kg/m
	4 T-key inserts for M6 sliding nuts Cavity insert, Ø 5.5 mm for M6	4 T-key inserts for M6 sliding nuts 2 cavity inserts, Ø 5.5 mm for M6
Moment of inertia I_x	1.43 cm ⁴	10.99 cm ⁴
Moment of inertia I_y	1.43 cm ⁴	2.81 cm ⁴
Moment of resistance W_x	1.14 cm ³	4.40 cm ³
Moment of resistance W_y	1.14 cm ³	2.25 cm ³

Ordering information

Profile description	Part no.: L = 1000 mm Part no.: L = 3000 mm
PU 25 W 25 × H 25 mm	200 001 1000 200 001 3000
PU 50 W 50 × H 25 mm	200 002 1000 200 002 3000

Dimensioned drawings



T-groove panels

PT 25



Features

- Universal precision, clamping and machining surface
- Aluminium, naturally anodised
- Produced to DIN EN 12020-2
- Milled flat on both sides
- For use with any machine
- Thick walled, distortion-free and extremely form-retaining
- Profile cutting to order
- Extensive range of accessories (see page C14)
- Option:
 - Drainage channel for small quantities of liquid

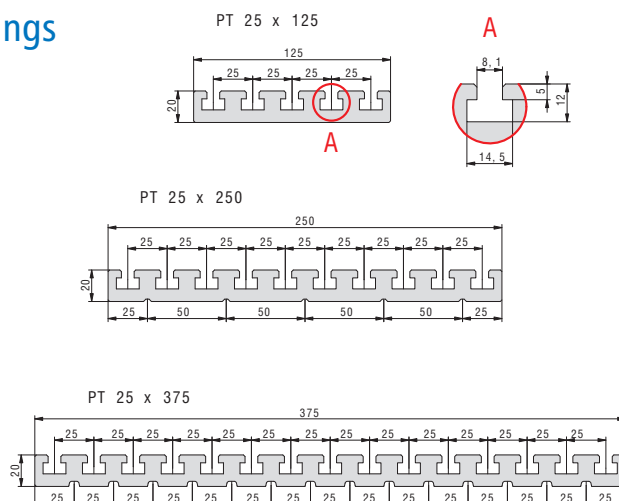
Technical specification

	PT 25		
	125 x 20 mm	250 x 20 mm	375 x 20 mm
Dimensions (W × H)	125 x 20 mm	250 x 20 mm	375 x 20 mm
Length	up to 3 metres (special lengths to order)		
Weight	appr. 4.8 kg/m	appr. 9.6 kg/m	appr. 13.7 kg/m
T-grooves	one-sided in 25 mm raster		
Moment of inertia I_x	243.36 cm ⁴	1848.57 cm ⁴	5996.01 cm ⁴
Moment of inertia I_y	6.46 cm ⁴	12.77 cm ⁴	17.90 cm ⁴
Moment of resistance W_x	38.94 cm ³	147.88 cm ³	319.79 cm ³
Moment of resistance W_y	6.46 cm ³	12.77 cm ³	17.90 cm ³

Ordering information

L [mm]	PT 25 W 125 × H 20 mm	PT 25 W 250 × H 20 mm	PT 25 W 375 × H 20 mm
	Part no.	Part no.	Part no.
400	201 014 0400	201 018 0400	201 020 0400
500	201 014 0500	201 018 0500	201 020 0500
600	201 014 0600	201 018 0600	201 020 0600
700	201 014 0700	201 018 0700	201 020 0700
800	201 014 0800	201 018 0800	201 020 0800
900	201 014 0900	201 018 0900	201 020 0900
1000	201 014 1000	201 018 1000	201 020 1000
1100	201 014 1100	201 018 1100	201 020 1100
1200	201 014 1200	201 018 1200	201 020 1200
1300	201 014 1300	201 018 1300	201 020 1300
1400	201 014 1400	201 018 1400	201 020 1400
1500	201 014 1500	201 018 1500	201 020 1500
1800	201 014 1800	201 018 1800	201 020 1800
2000	201 014 2000	201 018 2000	201 020 2000
2500	201 014 2500	201 018 2500	201 020 2500
3000	201 014 3000	201 018 3000	201 020 3000

Dimensioned drawings



T-slot blocks - see accessories, aluminium profiles

T-groove panels

PT 50



Features

- Universal precision, clamping and machining surface
- Aluminium, naturally anodised
- Produced to DIN EN 12020-2
- Milled flat on both sides
- For use with any machine
- Thick walled, distortion-free and extremely form-retaining
- Profile cutting to order
- Extensive range of accessories (see page C14)

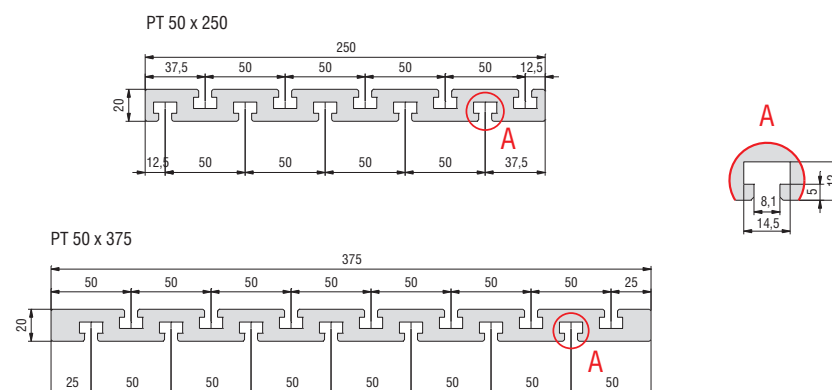
Technical specification

	PT 50	
	250 x 20 mm	375 x 20 mm
Dimensions (W × H)	250 x 20 mm	375 x 20 mm
Length	up to 3 metres (special lengths to order)	
Weight	appr. 10.0 kg/m	appr. 14.8 kg/m
T-grooves	both-sided in 50 mm raster	
Moment of inertia I_x	2062.99 cm ⁴	6745.96 cm ⁴
Trägheitsmoment I_y	13.85 cm ⁴	20.63 cm ⁴
Moment of resistance W_x	165.04 cm ³	359.78 cm ³
Moment of resistance W_y	13.85 cm ³	20.63 cm ³

Ordering information

L [mm]	PT 50 W 250 x H 20 mm	PT 50 W 375 x H 20 mm
	Part no.	Part no.
400	201 016 0400	201 019 0400
500	201 016 0500	201 019 0500
600	201 016 0600	201 019 0600
700	201 016 0700	201 019 0700
800	201 016 0800	201 019 0800
900	201 016 0900	201 019 0900
1000	201 016 1000	201 019 1000
1100	201 016 1100	201 019 1100
1200	201 016 1200	201 019 1200
1300	201 016 1300	201 019 1300
1400	201 016 1400	201 019 1400
1500	201 016 1500	201 019 1500
1800	201 016 1800	201 019 1800
2000	201 016 2000	201 019 2000
2500	201 016 2500	201 019 2500
3000	201 016 3000	201 019 3000

Dimensioned drawings



T-slot blocks - see accessories, aluminium profiles

Rectangular profiles

RE 40



Features

- Universal precision, clamping and machining surface
- As a stabiliser for machine and sub-frame constructions
- Aluminium, naturally anodised
- Produced to DIN EN 12020-2
- Light & very stable
- Numerous applications with the accessories are possible
- Profile cutting to order
- Extensive range of accessories (see page C14)

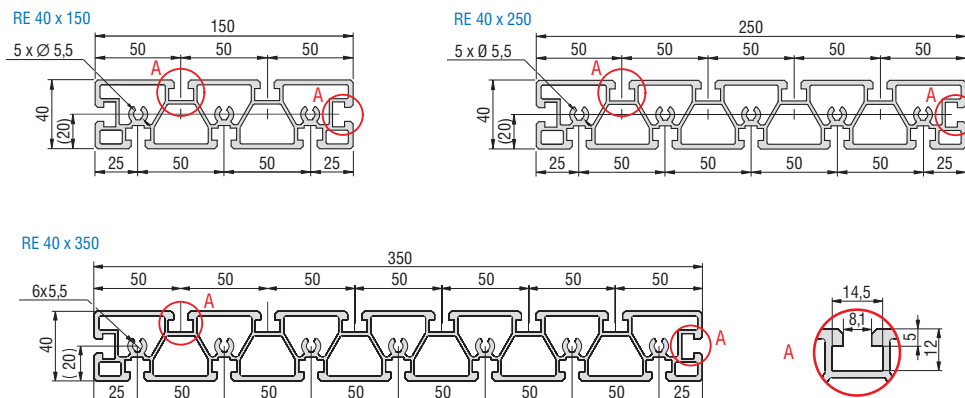
Technical specification

	RE 40		
Dimensions (W × H)	150 x 40 mm	250 x 40 mm	350 x 40 mm
Length	up to 3 metres (special lengths to order)		
Weight	appr. 4.8 kg/m	appr. 7.6 kg/m	appr. 10.4 kg/m
	various cavities and T-slot inserts for sliding nuts or M6 tapped strips for frontal inserts for M6 screws		
Moment of inertia I_x	393.7 cm ⁴	1654.53 cm ⁴	4306.69 cm ⁴
Moment of inertia I_y	33.42 cm ⁴	54.18 cm ⁴	75.00 cm ⁴
Moment of resistance W_x	52.49 cm ³	131.64 cm ³	246.1 cm ³
Moment of resistance W_y	16.71 cm ³	27.09 cm ³	37.5 cm ³

Ordering information

Profile description	Part no.: L = 1000 mm Part no.: L = 3000 mm
RE 40 W 150 x H 40 mm	201 035 1000 201 035 3000
RE 40 W 250 x H 40 mm	201 030 1000 201 030 9000
RE 40 W 350 x H 40 mm	201 031 1000 201 031 8305

Dimensioned drawings



Rectangular profiles

RE 65



Features

- Universal precision, clamping and machining surface
- As a stabiliser for machine and sub-frame constructions
- Aluminium, naturally anodised
- Produced to DIN EN 12020-2
- Light & very stable
- Milled flat on both sides
- Numerous applications with the accessories are possible
- Profile cutting to order
- Extensive range of accessories (see page C14)

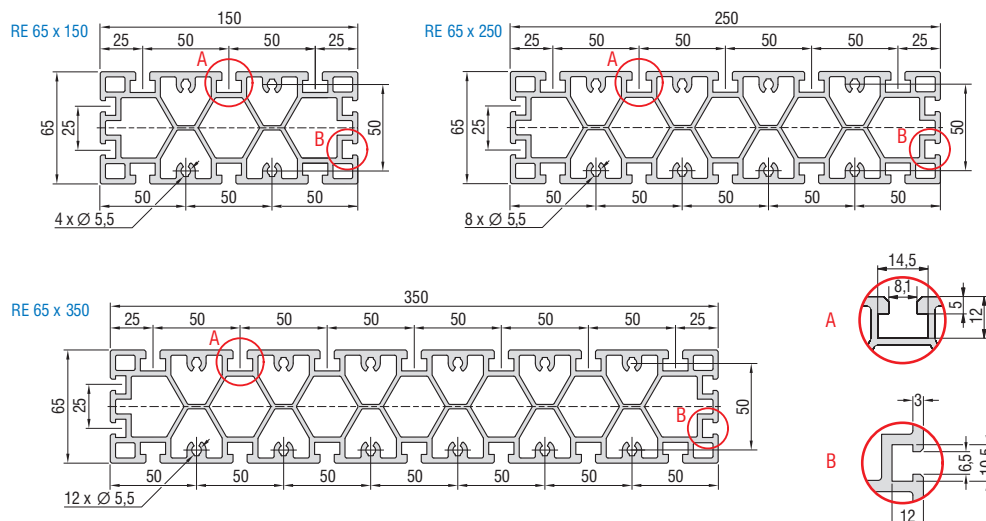
Technical specification

	RE 65		
Dimensions (W × H)	150 x 65 mm	250 x 65 mm	350 x 65 mm
Length	up to 3 metres (special lengths to order)		
Weight	appr. 7.7 kg/m	appr. 12.4 kg/m	appr. 17.0 kg/m
	various cavities and T-slot inserts for sliding nuts or M6 tapped strips for frontal inserts for M6 screws		
Moment of inertia I_x	633.47 cm ⁴	2,658.48 cm ⁴	6,953.91 cm ⁴
Moment of inertia I_y	148.87 cm ⁴	243.85 cm ⁴	338.52 cm ⁴
Moment of resistance W_x	84.46 cm ³	212.68 cm ³	397.37 cm ³
Moment of resistance W_y	45.83 cm ³	75.03 cm ³	104.16 cm ³

Ordering information

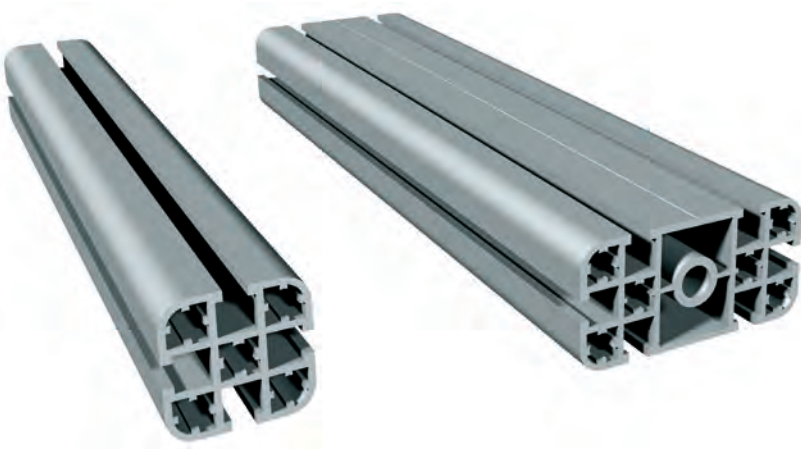
Profile description	Part no.: L = 1000 mm Part no.: L = 3000 mm
RE 65 W 150 x H 65 mm	201 034 1000 201 034 3000
RE 65 W 250 x H 65 mm	201 032 1000 201 032 3000
RE 65 W 350 x H 65 mm	201 033 1000 201 033 3000

Dimensioned drawings



Light frame profiles

PL 40/PL 80



Features

- For fast and simple erection of frames, benches and racks
- Aluminium, naturally anodised
- Produced to DIN EN 12020-2
- Light, compact & stable
- Suitable for very high loads
- Our clamped linkages produce very rigid connections between profiles, resistant to tension, distortion and bending, through profile drillings and clamping elements
- Profile cutting to order
- Extensive range of accessories (see page C14)

Option: - powder coatings
in anthracite and light grey

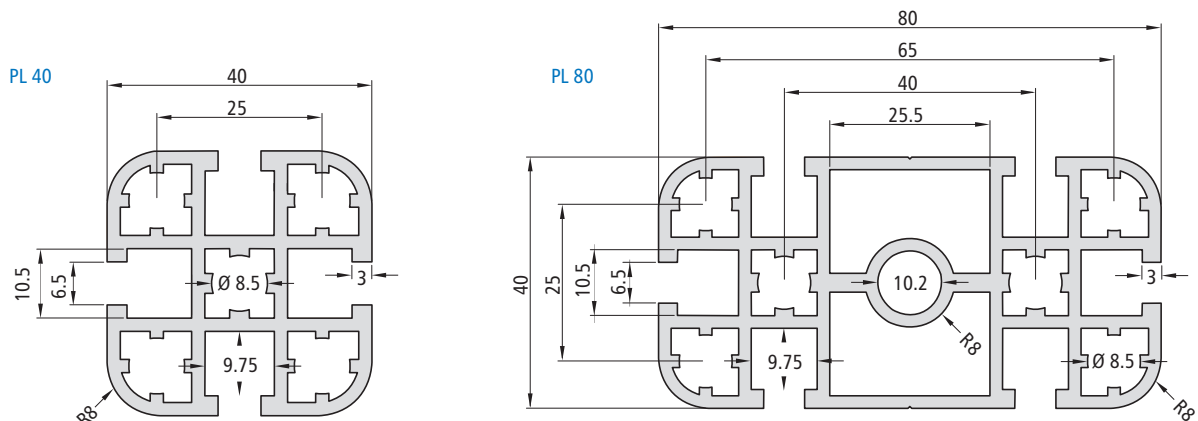
Technical specification

	PL 40	PL 80
Dimensions (W × H)	40 x 40 mm	80 x 40 mm
Length	up to 3 metres (special lengths to order)	
Weight	appr. 1.5 kg/m	appr. 2.9 kg/m
	4 T-slot inserts for M6 sliding nuts 5 cavity inserts, Ø 8.5 mm for M10	6 T-slot inserts for M6 sliding nuts 6 cavity inserts, Ø 8.5 mm for M10 Cavity insert, Ø 10.2 mm for M12
Moment of inertia I_x	8.38 cm ⁴	64.40 cm ⁴
Moment of inertia I_y	8.38 cm ⁴	16.36 cm ⁴
Moment of resistance W_x	4.19 cm ³	16.10 cm ³
Moment of resistance W_y	4.19 cm ³	8.18 cm ³

Ordering information

Profile description	Part no.: L = 1000 mm Part no.: L = 3000 mm
PL 40 W 40 x H 40 mm	200 008 1000 200 008 3000
PL 80 W 80 x H 40 mm	200 009 1000 200 009 3000

Dimensioned drawings



Stand profiles

PS 50 / PS 80



Features

- For fast and simple erection of frames, benches and racks
- Aluminium, naturally anodised
- Produced to DIN EN 12020-2
- Light, compact & stable
- **Suitable for high loads**
- Our clamped linkages produce very rigid connections, resistant to tension, distortion and bending, between profiles
- Profile cutting to order
- Extensive range of accessories (see page C14)

Option: - powder coatings
in anthracite and light grey

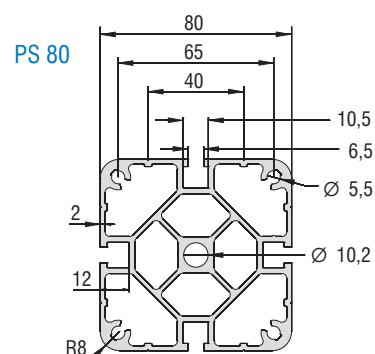
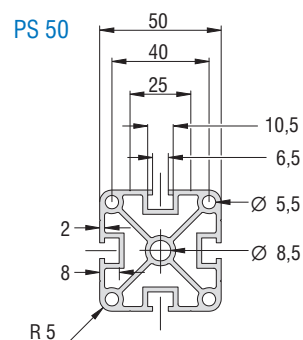
Technical specification

	PS 50	PS 80
Dimensions (W × H)	50 x 50 mm	80 x 80 mm
Length	up to 3 metres (special lengths to order)	
Weight	appr. 2.3 kg/m	appr. 4.5 kg/m
	4 T-slot inserts for M6 sliding nuts 4 cavity inserts, Ø 5.5 mm for M6 Cavity insert, Ø 8.5 mm for M10	4 T-slot inserts for M6 sliding nuts 4 cavity inserts, Ø 5.5 mm for M6 Cavity insert, Ø 8.5 mm for M10
Moment of inertia I_x	22.06 cm ⁴	111.8 cm ⁴
Moment of inertia I_y	22.06 cm ⁴	111.8 cm ⁴
Moment of resistance W_x	8.82 cm ³	27.95 cm ³
Moment of resistance W_y	8.82 cm ³	27.95 cm ³

Ordering information

Profile description	Part no.: L = 1000 mm Part no.: L = 3000 mm
PS 50 W 50 x H 50 mm	200 003 1000 200 003 3000
PS 80 W 80 x H 80 mm	200 014 1000 200 014 3000

Dimensioned drawings



Stand profiles

PS100 / PS140



Features

- For fast and easy erection of frames, benches and racks
 - Aluminium, naturally anodised
 - Produced to DIN EN 12020-2
 - Light, compact & stable
 - Suitable for high loadings
 - Our clamped linkages produce very rigid connections, resistant to tension, distortion and bending, between profiles
 - Profile cutting to order
 - Extensive range of accessories (see page C14)
- Option: - powder coatings
in anthracite and light grey

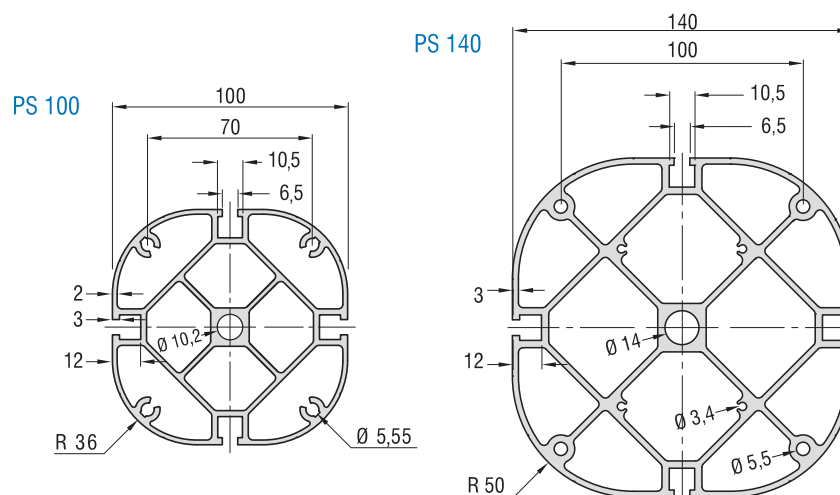
Technical specification

	PS 100	PS 140
Dimensions (W × H)	100 x 100 mm	140 x 140 mm
Length	up to 3 metres (special lengths to order)	
Weight	appr. 5.1 kg/m	appr. 9.2 kg/m
	4 T-slot inserts for M6 sliding nuts 4 cavity inserts, Ø 5.55 mm for M6 Cavity insert, Ø 10.2 mm for M12	4 T-slot inserts for M6 sliding nuts 4 cavity inserts, Ø 5.5 mm for M6 4 cavity inserts, Ø 3.4 mm for M4 Cavity insert, Ø 14 mm for M16
Moment of inertia I_x	163.00 cm ⁴	601.80 cm ⁴
Moment of inertia I_y	163.00 cm ⁴	598.11 cm ⁴
Moment of resistance W_x	32.60 cm ³	85.97 cm ³
Moment of resistance W_y	32.60 cm ³	85.44 cm ³

Ordering information

Profile description	Part no.: L = 1000 mm Part no.: L = 3000 mm
PS 100 W 100 x H 100 mm	200 015 1000 200 015 3000
PS 140 W 140 x H 140 mm	200 016 1000 200 016 3000

Dimensioned drawings



Workbenches

AT



Figure with insert base option

Features

Workbenches AT for clamping devices, clamping means, for measurement, checking, testing, etc.

- Sub-frame from aluminium profiles PS series with braces made from aluminium panel profiles PP series
- Aluminium bench plate RE series of right angle profiles 40 × 250 mm with T-key inserts

Options

- length up to 2 m
- Various accessories

Accessories

Insert base for AT 1
Part no.: **248551 0010**

Insert base for AT 2
Part no.: **248551 0012**



Bench 1

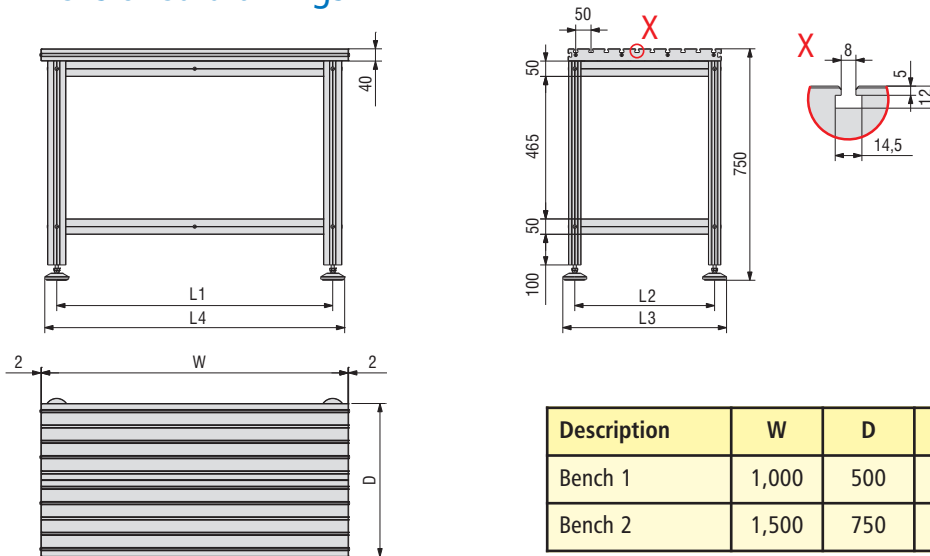


Bench 2

Ordering information

Part no.	Description	Loading: surface load	Weight
248 550 0010	Bench 1, W 1000 × D 500 × H 750 mm	200 kg	appr. 30 kg
248 550 0012	Bench 2, W 1500 × D 750 × H 750 mm	400 kg	appr. 60 kg

Dimensioned drawings



Description	W	D	L 1	L 2	L 3	L 4
Bench 1	1,000	500	900	456	536	980
Bench 2	1,500	750	1,380	680	800	1,500

Accessories

Tapped rails



M6 tapped rail

- 13 x 6 mm
- galvanised
- M6 Ra 50 mm
- VE 3 pcs. at 1m
- for PT/RE 40, 65

Part no.: **209010**

M6 tapped rail

- 10 x 4 mm
- galvanised
- M6 Ra 50 mm
- VE 3 pcs. at 1m
- for all except PT/RE 40, 65/SP

Part no.: **209011**

Sliding nuts



M6 sliding nut (Figure 1)

- L25 x W10 x H3.5
- galvanised
- VE 100 pcs.
- all except PT/RE 40, 65

Part no.: **209001 0005**

M6 sliding nut (Figure 1)

- L 25 x W 13 x H 5 mm
- galvanised
- VE 50 pcs.
- for PT/RE 40, 65

Part no.: **209004 0001**

2 x M6 sliding nuts (Figure 2)

- L45 x W10 x H3.5
- galvanised
- VE 50 pcs.
- for all except PT/RE 40, 65

Part no.: **209002 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 pcs.
- for PT/RE 40, 65

Part no.: **209005 0001**

M5 sliding nut

- L25 x W10 x H3.5
- galvanised
- VE 20 pcs.
- for all except PT/RE 40, 65

Part no.: **209006 0001**

Angle sliding nut

2 x M6 (Figure 3)

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

Part no.: **209021 0003**

Special angle sliding nut

3 x M6 (Figure 4)

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

Part no.: **209022 0003**

Sliding nuts



M5/M6 sliding nuts

- galvanised
- VE 20 pcs.
- for PT25, PT 50, PS 200, RE 40 and RE 65 (securing only possible at the top) 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)

rhombus-shaped

Part no.: **209005 0005** (M5/Figure 4)Part no.: **209005 0006** (M6/Figure 5)

Tension rods



Tension rods SE

- with M6 setting screw
- VE 2 pcs.
- for RE/PT

Part no.: **290051**

Clamping devices



Hand lever clamping device SH 1

- for RE/PT

Part no.: **290001**

Hand lever clamping device SH 2

- for RE/PT

Part no.: **290002**

Stop rails



Stop rail (galvanised)

- W 20 x H 10
- Ra 50
- VE 2 pcs. + fixing material

L 125 mm

Part no.: **290021 0125**

L 175 mm

Part no.: **290021 0175**

L 225 mm

Part no.: **290021 0225**

T-slot blocks



M6 T-slot block

- DIN 508
- hardened
- VE 20 pcs.
- for PT/RE 40, 65

Part no.: **209119 0003**

Edging strip/section



Black edging strip

1-part

- for plate thicknesses 3 - 4 mm
- VE 10 m

Part no.: **209202 0002**

(PU profiles)

Part no.: **209202 0001**

(PP-/RE- and PS profiles)

Black edging profile 2-part

- Plate thicknesses 3 - 6 mm
- VE 3 pcs. at 3 m
- for all except PT

Part no.: **209212 3000**

PP 50 cross-braces



PP 50 cross-braces

- L 490 mm
- mitred
- M6 drillings
- for all except PT/RE 40, 65

Part no.: **209300 0000**

Hinge strip



Plastic hinge strip

- L 65 x W 40
- VE 10 pcs. + fixing
- Ra 43 x 20 mm
- for PL

Part no.: **209050 0012**

Aluminium hinge strip

- L 40 x W 40 mm
- VE 10 pcs. + fixing
- Ra 25 x 25 mm
- for all except PT/RE 40, 65

Part no.: **209050 0011**

Subject to technical modifications.

Accessories

Profile connection cubes



Profile connection cubes black

- VE 10 pcs. + fixing material
 - for PU 25
- 2×Part no.: **209104 0002**
3×Part no.: **209103 0002**



Profile connection cubes, black

- VE 10 pcs. + fixing material
 - for PU 25
- 3×Part no.: **209106 0002**
4×Part no.: **209107 0002**



Profile connection cubes black

- VE 10 pcs. + fixing material
 - for PU 25
- 4×Part no.: **209108 0002**
5×Part no.: **209109 0002**

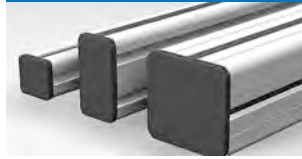
T-groove cover



T-key cover

- VE 30 m
 - (turquoise = similar to RAL 5018)
 - for all except PT/RE 40, 65
- black Part no.: **209201 0004**
turquoise Part no.: **209201 0003**
light grey Part no.: **209201 0007**

Profile covers



Profile covers, black

- PU 25 - 25 pcs.
Part no.: **209105 0003**
- PU 50 - 25 pcs.
Part no.: **209126 0003**
- PL 40 - 20 pcs.
Part no.: **209127 0003**
- PL 80 - 20 pcs.
Part no.: **209128 0003**
- PS 50 - 25 pcs.
Part no.: **209129 0003**
- PS 80 - 20 pcs.
Part no.: **209130 0003**
- PS 140 - 10 pcs.
Part no.: **209130 1001**

Aluminium corner connectors



Aluminium corner connectors

- L 25 × W 25 × H 15 mm
 - VE 10 pcs. + fixing material
 - for PL, PS, PU, PP
- natural
Part no.: **209114 0101**
black
Part no.: **209114 0111**

- L 40 × W 40 × H 22 mm
 - VE 10 pcs. + fixing material
 - for PP/PL/PS/PU
- natural
Part no.: **209115 0101**
black
Part no.: **209115 0111**

- L 50 × W 50 × H 15 mm
 - VE 10 pcs. + fixing material
 - for RE/PU/PS
- natural
Part no.: **209116 0101**
black
Part no.: **209116 0111**

- L 80 × W 80 × H 22 mm
 - VE 10 pcs. + fixing material
 - for PP/PL/PS/PU
- natural
Part no.: **209117 0101**
black
Part no.: **209117 0111**

Plastic equipment bases



Plastic equipment bases with rubber plate

- VE 4 pcs. + setting screws
- black

for PL 40/PS 50

- Ø 60
 - M10 × 50 setting screws
- Part no.: **209032 0003**

for PL 80/PS 80

- Ø 80
 - M12 × 50 setting screws
- Part no.: **209034 0001**

for PL 80/PS 80

- Ø 120
 - Setting screws M12 × 50
 - black
- Part no.: **209033 0003**

Guide rollers



Rubber-tired guide rollers Ø 75 (M10)

- VE 4 pcs.
- 2 with and 2 without locking device
- for PL 40/PS 50

Part no.: **209043 0011**

Aluminium equipment bases



Aluminium equipment bases with rubber plate

for PU 50

- VE 4 units, with setting screws and reducing bushings
 - Ø 50
 - M6 × 30 setting screws
 - natural
- Part no.: **209030 0000**

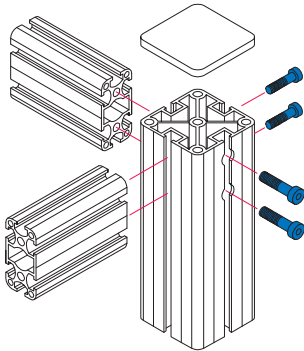
for PS 100/140

- Ø 170
 - M16 × 100 setting screws
 - black
- Part no.: **209035 0001**

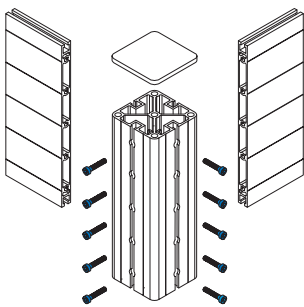
Profile connections

Examples:

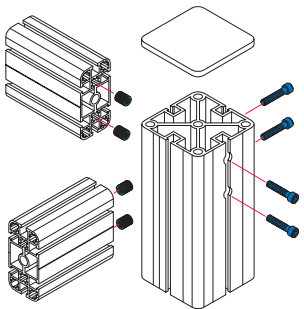
PS 50 with PU 50



PS 50 with PP 250



PS 80 with PL 80



Allen screws

Allen screws
M6 × 25 mm

- VE 10 pcs.
Part no.: **209147 0009**
- VE 50 units
Part no.: **209147 0010**

Allen screws
M6 × 50 mm

- VE 10 pcs.
Part no.: **209147 0003**
- VE 50 units
Part no.: **209147 0004**

Allen key
SW 5

- DIN 911
- VE 1 pcs.
Part no.: **931152**

Tapped bushings

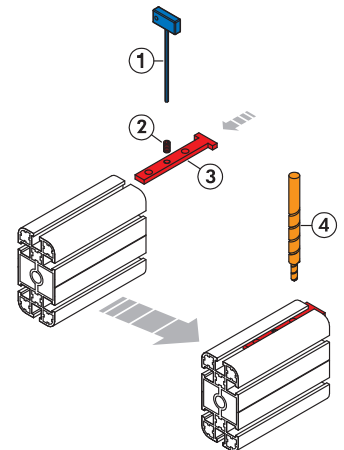
Tapped bushings
M9/M6

- VE 10 pcs.
Part no.: **209147 0001**
- VE 50 units
Part no.: **209147 0002**

Tapped bushings
M10/M6

- VE 10 pcs
Part no.: **209147 0124**
- VE 50 pcs
Part no.: **209147 0125**

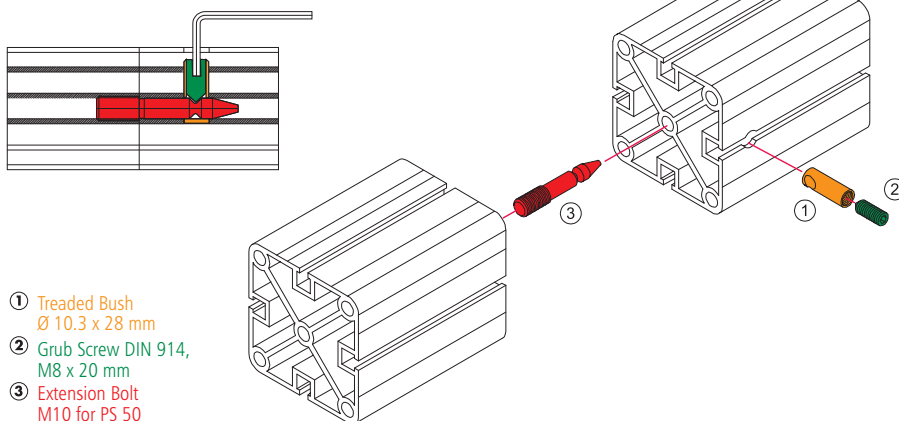
Example PL 80



- ① Hexagon-Socket Screwdriver
- ② Grub Screw
- ③ Drilling Template
- ④ Twist Drill
Ø 6 mm / Ø 10.4 mm

Example:

Profile quick clamping extension for PS 50



- ① Treaded Bush
Ø 10.3 x 28 mm
- ② Grub Screw DIN 914,
M8 x 20 mm
- ③ Extension Bolt
M10 for PS 50

for PS 50/PL 40 (M10)

- Locking bush, tapped pin, extension bolts
Part no.: **209147 0120**
- 50 sets
Part no.: **209147 0121**

for PS 80/PL 80 (M12)

- Locking bush, tapped pin, extension bolts
• 10 sets
Part no.: **209147 0122**
- 50 sets
Part no.: **209147 0123**

matching drill pattern 2

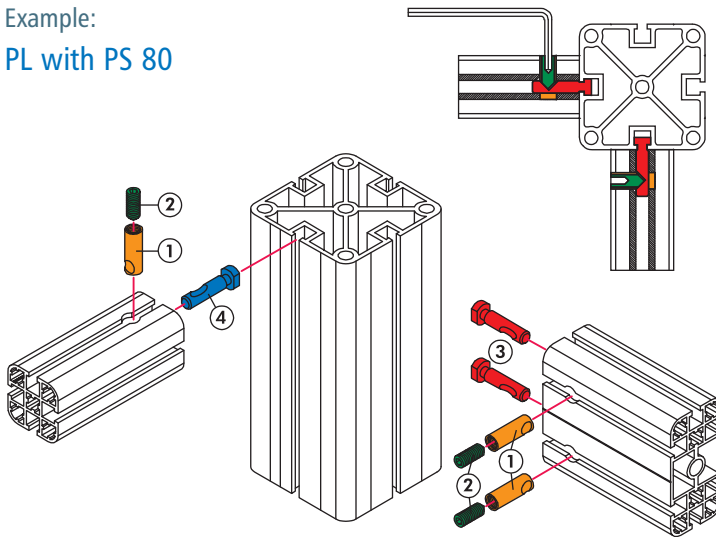
Part no.: **290015 0002**

Stepped drill

- Ø 6/Ø 10.4 mm
Part no.: **400090**

Profile quick clamping connections

Example:
PL with PS 80



- ① Treaded Bush $\varnothing 10.3 \times 28$ mm
- ② Grub Screw DIN 914, M6 x 20 mm
- ③ Connection Bolt 0° for PL 40 and PL 80
- ④ Connection Bolt 90° for PL 40 and PL 80

Quick clamping connection

for PL

- Locking bush, tapped pin and bolts 0°
- 10 sets:
Part no.: **209147 0102**
- 50 sets:
Part no.: **209147 0103**

for PL

- Locking bush, tapped pin and bolts 90°
- 10 sets:
Part no.: **209147 0112**
- 50 sets:
Part no.: **209147 0113**

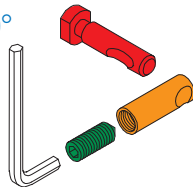
for PP/PU

- Locking bush, tapped pin and bolts 0°
- 10 sets:
Part no.: **209147 0100**
- 50 sets:
Part no.: **209147 0101**

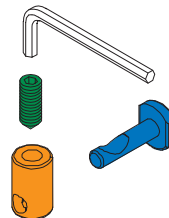
for PP/PU

- Locking bush, tapped pin and bolts 90°
- 10 sets:
Part no.: **209147 0110**
- 50 sets:
Part no.: **209147 0111**

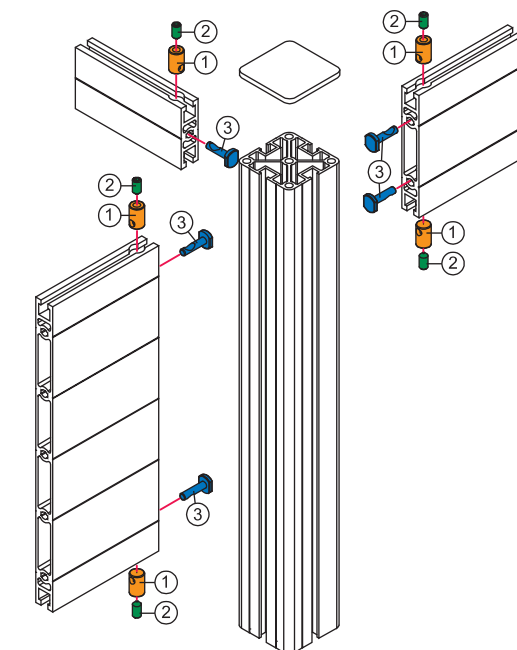
Quick
Clamping
Connection 0°
e.g. for
PL/PS 80



Quick
Clamping
Connection 90°
e.g. for
PP/PU/PS



Example:
PP with PS 50



- ① Treaded Bush $\varnothing 10.3 \times 16,5$ mm
- ② Grub Screw DIN 914, M6 x 12 mm
- ③ Connection Bolt 90°

Stepped drill

- $\varnothing 6$ mm/ $\varnothing 10.4$ mm
- Part no.: **400090**

matching drill pattern 2

- Part no.: **290015 0002**

Allen key SW 3

- DIN 911
- Part no.: **931150**

Linear guides

Overview

Slide functional overview
General notes



C 20

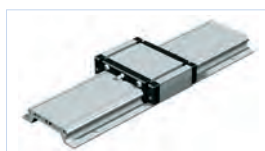
LFS-8-1 Linear guide rails
LFS-8-2



C 22

with LW 6 carriage
with WS 1 aluminium slide

LFS-8-3 Linear guide rail



C 24

with LW 7 carriage
with WS 3 aluminium slide

LFS-8-4 Linear guide rail



C 26

with LW 7 carriage
with WS 3 aluminium slide

LFS-12-1 Linear guide rail



C 28

with LW 3 carriage
with WS 4 aluminium slide
with LS 1 steel slide

LFS-12-11 Linear guide rail



C 30

with LW 5 carriage
with WS 6 aluminium slide

LFS-12-2 Linear guide rail



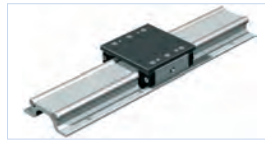
C 32

with LW 3 carriage
with WS 4 aluminium slide

Linear guides

Overview

LFS-12-3 Linear guide rail



C 34

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

LFS-12-10 Linear guide rail



C 36

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

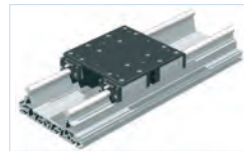
LFS-16-2 Linear guide rail



C 38

with ILW 3 carriage
with IWS 1 aluminium slide
with ILS 1 steel slide

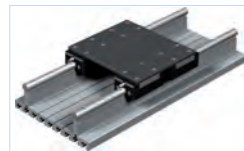
LFS-16-120 Linear guide rail



C 40

with 2 or 4 IWS 1 aluminium slides
with 2 or 4 ILS 1 steel slides

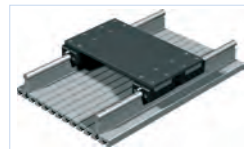
LFS-16-150 Linear guide rail



C 42

with ILS1 steel slide
with IWS1 aluminium slide

LFS-16-250 Linear guide rail



C 43

with ILS1 steel slide
with IWS1 aluminium slide

Accessories

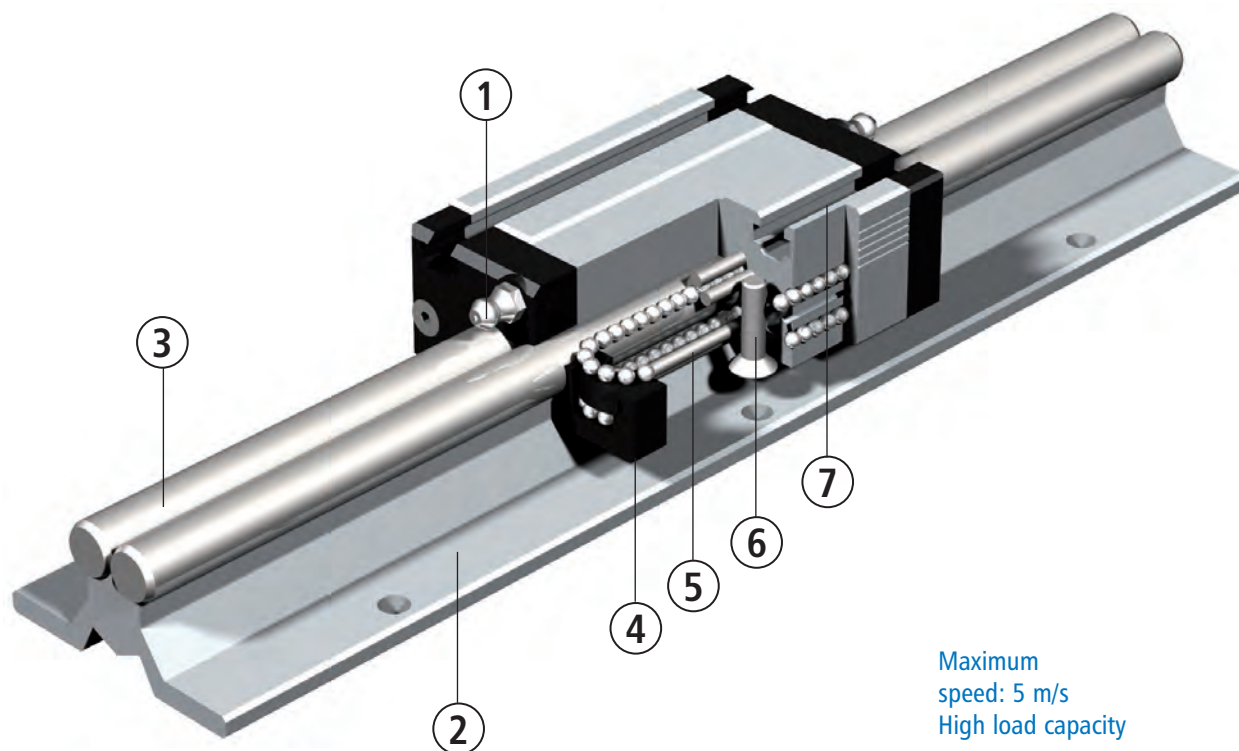
C 44

Operating loads calculation

C 45

CAD data on our website www.isel.com

Linear guide slide function



Maximum
speed: 5 m/s
High load capacity

Aluminium shaft slides

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

A 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. Both sides greasing option for the recirculating balls.
2. The basic supports for all linear guides are extruded aluminium profiles to DIN EN 12020-2, which are provided with T-key inserts for fastening in the body of the profile or have fixing borings.
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 is reinforced with glass fibre.
5. There are patented recirculating balls in the linear slides. 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 slides are preset in the factory to the correct stress. All shaft slides are optionally available stainless.

7. To secure transport loads, slide plates, etc., the shaft slides are provided with T-key inserts or fixing borings.

General notes

Load capacity and working life

Installation position

In principal, the installation position 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 from 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 at least 0.1 mm/1,000 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 C_0
- the static torques M_{0X} , M_{0Y} and M_{0Z}

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 slides
WS 1/70



Figure:
LFS-8-2 with
aluminium slides 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
- Anti-twist lock
- Aluminium shaft housing profile, naturally anodised
- Fixing from below with M6 tapped rails in T-key insert
- Conditionally self-supporting
- Special lengths to order
- Weights: appr. 1.6 kg/m (LFS-8-1)
appr. 2.0 kg/m (LFS-8-2)

Options:

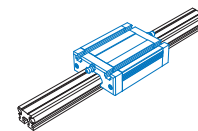
- stainless design
- drilled for M6 (LFS-8-1 only)

Ordering key

235 00X XXXX

LFS-8-1/standard=0 Length in mm (in 100 mm raster)
LFS-8-1/stainless =1 e.g. **0029** = Length 298
LFS-8-2/standard=2 **0299** = Length 2998
LFS-8-2/stainless =3 Steel shaft length: Total length L - 3 mm

Profile up to 6,000 mm available without impact connection, steel shafts divided.



Aluminium slide

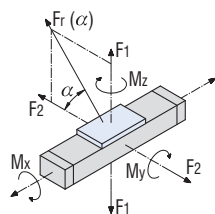
- With recirculating ball guide
- Clamping surface plane milled
- M6 T-key inserts
- Central lubrication option
- Adjustable for no play
- Option: stainless design

Load data

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

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

Carriage LW 6	
C ₀	2160 N
C	4000 N
F ₁ stat.	4320 N
F ₁ dyn.	3792 N
F ₂ stat.	2160 N
F ₂ dyn.	4000 N
M _x stat.	121.1 Nm
M _y stat.	194.4 Nm
M _z stat.	97.2 Nm
M _x dyn.	106.3 Nm
M _y dyn.	170.6 Nm
M _z dyn.	180.0 Nm



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

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

L 96 x W 72 x H 28.5 mm (WS 1/70)
(Weight: appr. 0.4 kg)

Part no.: **223100 0070**

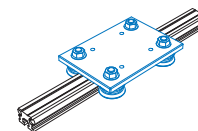
Stainless steel: **223101 0070**

L 126 x W 72 x H 28.5 mm (WS 1)

(Weight: appr. 0.5 kg)

Part no.: **223100**

Stainless steel: **223101**



Carriage LW 6

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

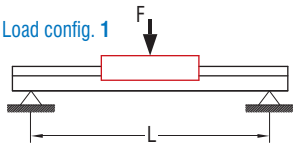
Part no.: **223011**

Linear guide rails

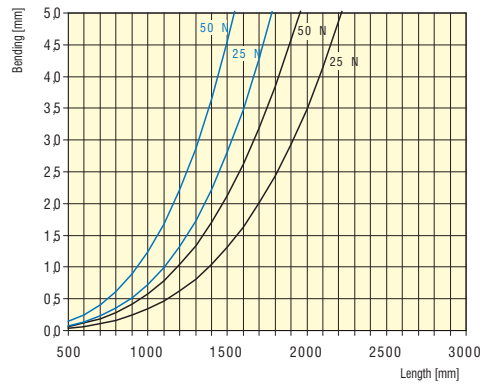
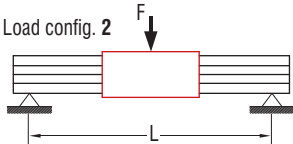
LFS-8-1 LFS-8-2

Bending

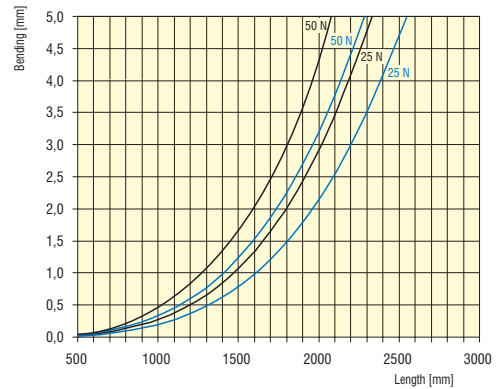
■ Load config. 1



■ Load config. 2



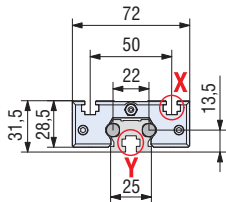
LFS-8-1



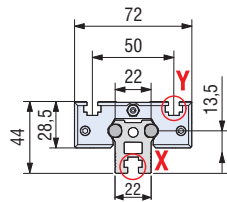
LFS-8-2

Dimensioned drawings

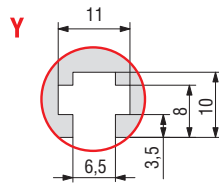
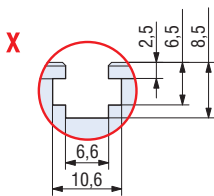
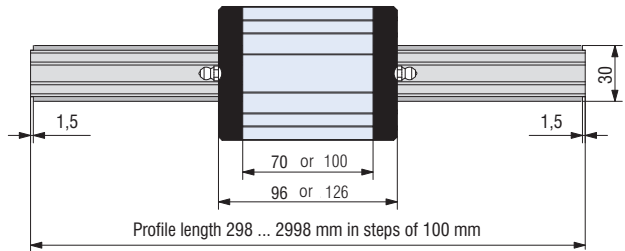
LFS-8-1 or LFS-8-2 with aluminium slide WS 1/70 or WS 1



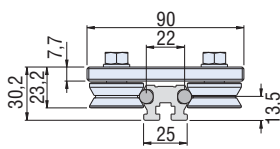
LFS-8-1



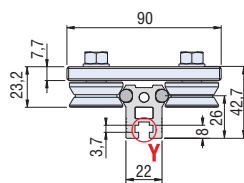
LFS-8-2



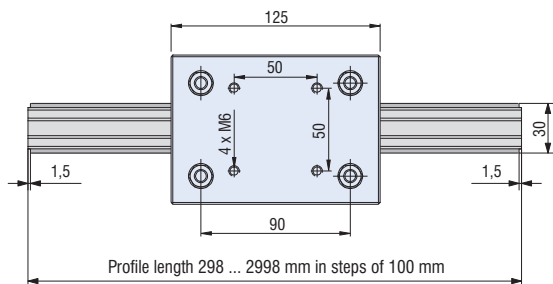
LFS-8-1 or LFS-8-2 with carriage LW 6



LFS-8-1

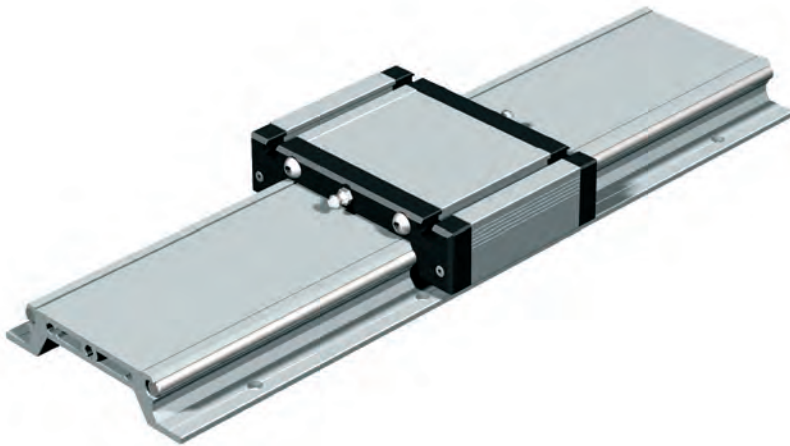


LFS-8-2



Linear guide rail

LFS-8-3



Features

- W 115 × H 25.5 mm
- 2 precision steel shafts Ø 8
- 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: appr. 3.2 kg/m
- Option: stainless design

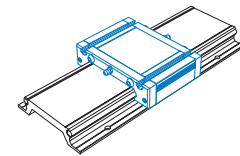
Ordering key

235 00X XXXX

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

Steel shaft length: Length overall L - 1 mm

Profile up to 6000 mm available without impact link, 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 design

L 96 × W 130 × H 32 mm (WS 3/70)

(Weight: appr. 0.5 kg)

Part no.: **223103 0070**

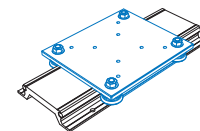
Stainless steel: **223103 1070**

L 176 × W 130 × H 32 mm (WS 3)

(Weight: appr. 0.9 kg)

Part no.: **223103**

Stainless steel: **223103 1000**



Carriage LW 7

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

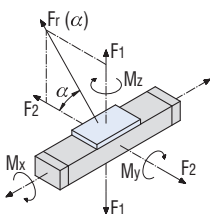
Part no.: **223012**

Load data

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

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

Carriage LW 7	
C ₀	2160 N
C	4000 N
F ₁ stat.	4320 N
F ₁ dyn.	3792 N
F ₂ stat.	2160 N
F ₂ dyn.	4000 N
M _x stat.	246.8 Nm
M _y stat.	302.4 Nm
M _z stat.	151.2 Nm
M _x dyn.	216.7 Nm
M _y dyn.	265.4 Nm
M _z dyn.	280.0 Nm



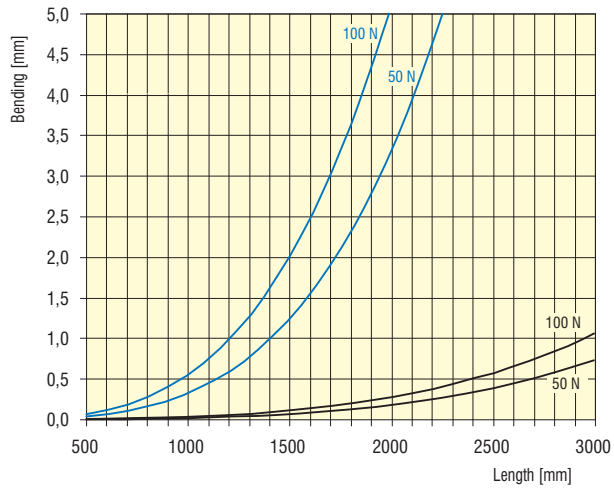
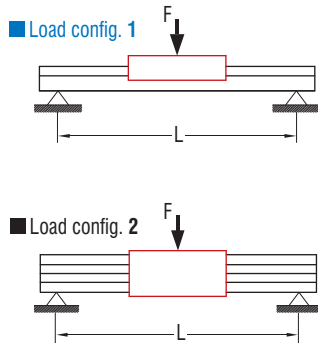
$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

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

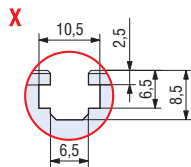
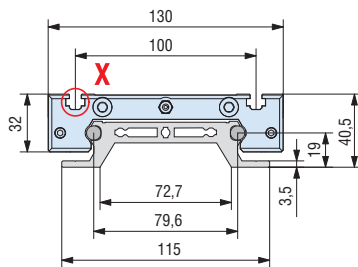
Linear guide rail

LFS-8-3

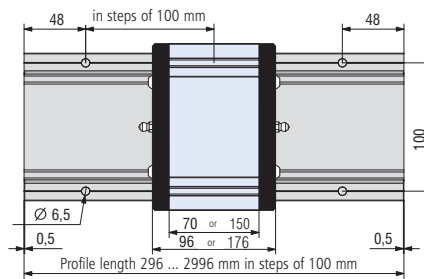
Bending



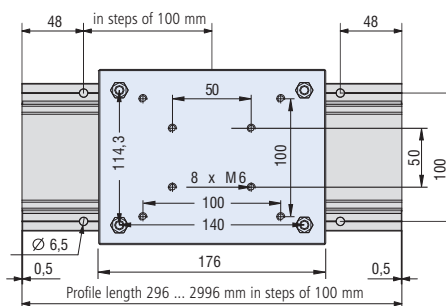
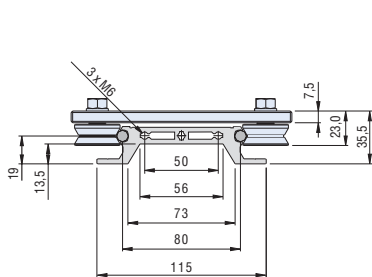
Dimensioned drawings



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



LFS-8-3 with carriage LW7



Linear guide rail

LFS-8-4



Diagram:
LFS-8-4 with 2 steel shafts
and an aluminium slide

Diagram:
LFS-8-4 with 4 steel shafts
and two aluminium slides (optional)

Features

- W 80 × H 80 mm
- 2 precision steel shafts Ø 8
- anti-twist
- Aluminium shaft housing profiles, naturally anodised
- Fixing from below with M6 tapped rails in the T-key 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: appr. 7.2 kg/m
- Options: stainless design
 - 2 extra steel shafts
 - 2. slides or carriage

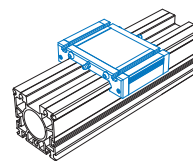
Ordering key

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: Length overall L - 3 mm

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



Aluminium slide

- Clamping surface plane milled
- M6 T-key inserts
- Central lubrication option
- adjustable for no play
- Option: stainless steel version

L 96 × W 130 × H 32 mm (WS 3/70)

(Weight: appr. 0.5 kg)

Part no.: 223103 0070

Stainless steel: 223103 1070

L 176 × W 130 × H 32 mm (WS 3)

(Weight: appr. 0.9 kg)

Part no.: 223103

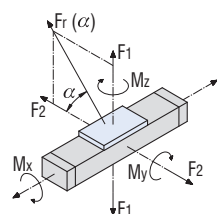
Stainless steel: 223103 1000

Load data

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

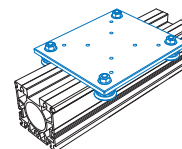
Shaft slide WS 3	
C ₀	6945 N
C	3190 N
F ₁ stat.	5931 N
F ₁ dyn.	2724 N
F ₂ stat.	6945 N
F ₂ dyn.	3190 N
M _x stat.	255.9 Nm
M _y stat.	232.8 Nm
M _z stat.	272.5 Nm
M _x dyn.	117.5 Nm
M _y dyn.	106.9 Nm
M _z dyn.	125.1 Nm

Laufwagen LW 7	
C ₀	2160 N
C	4000 N
F ₁ stat.	4320 N
F ₁ dyn.	3792 N
F ₂ stat.	2160 N
F ₂ dyn.	4000 N
M _x stat.	246.8 Nm
M _y stat.	302.4 Nm
M _z stat.	151.2 Nm
M _x dyn.	216.7 Nm
M _y dyn.	265.4 Nm
M _z dyn.	280.0 Nm



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

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



Carriage LW 7

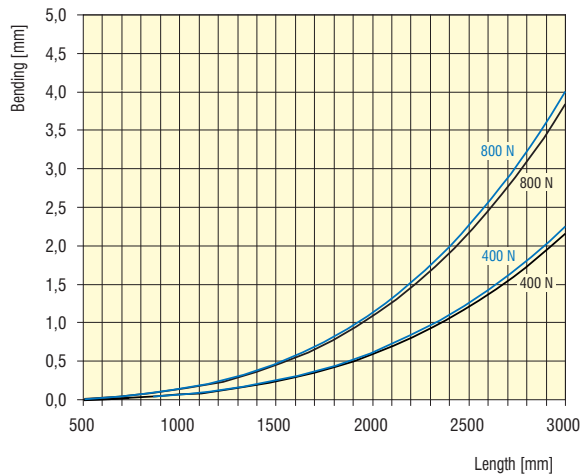
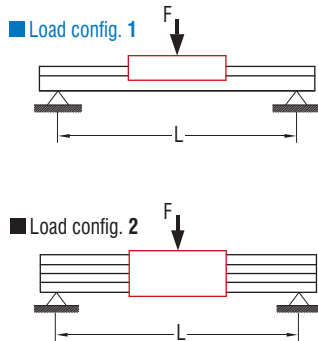
- L 175 × W 150 × H 7.5 mm
- ground steel plate
- 4 rollers Ø 31, sealed for life
- adjustable for no play
- Weight: appr. 2 kg

Part no.: 223012

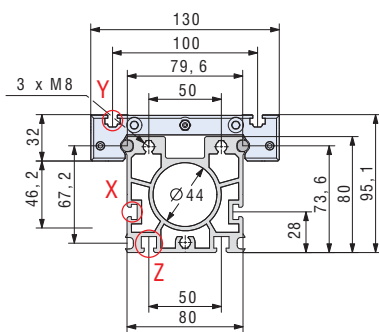
Linear guide rail

LFS-8-4

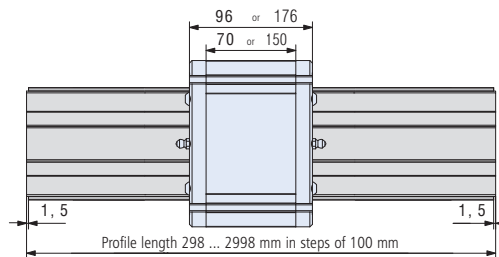
Bending



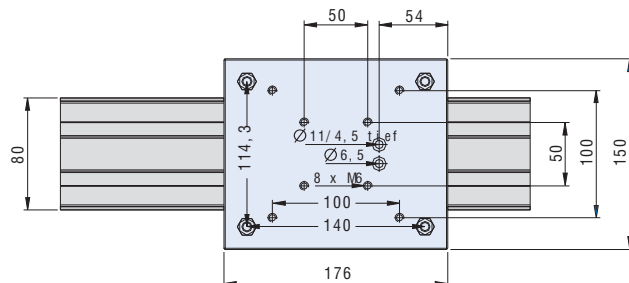
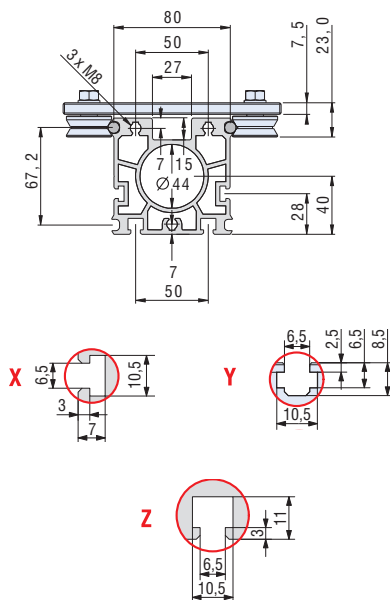
Dimensioned drawings



LFS-8-4 with aluminium slide WS 3/70 or WS 3



LFS-8-4 with carriage LW 7



Linear guide rail

LFS-12-1

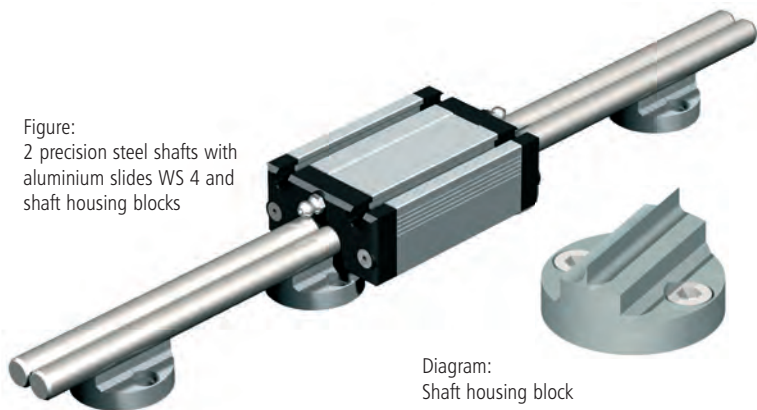


Figure:
2 precision steel shafts with aluminium slides WS 4 and shaft housing blocks

Diagram:
Shaft housing block

Features

- W 40 × H 27 mm
- 2 precision steel shafts Ø 12
- 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: appr. 1.9 kg/m

Ordering key

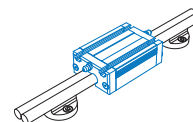
227 312 XXXX

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 slides

- Clamping surface plane milled
- Weight: appr. 0.3 kg
- Option: stainless design

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

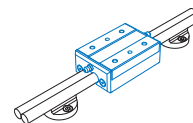
Part no.: **223104 0070**

stainless steel: **223104 1070**

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

Part no.: **223104**

Stainless: **223104 1000**

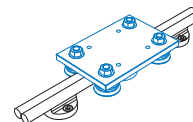


Steel slide LS 1

L 91 × W 60 × H 32 mm

- Clamping surface ground
- Weight: appr. 0.8 kg

Part no.: **223006**



Carriage LW 3

L 125 × W 85 × H 7.7 mm

- ground steel plate
- Weight: appr. 0.9 kg

Part no.: **223008**

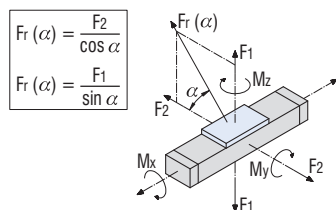
Shaft housing blocks

- 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		Carriage 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 stat.	2821 N	F ₁ stat.	4157 N	F ₁ stat.	3549 N	F ₁ stat.	4320 N
F ₁ dyn.	1599 N	F ₁ dyn.	2071 N	F ₁ dyn.	2130 N	F ₁ dyn.	3846 N
F ₂ stat.	3303 N	F ₂ stat.	4868 N	F ₂ stat.	3508 N	F ₂ stat.	2160 N
F ₂ dyn.	1873 N	F ₂ dyn.	2426 N	F ₂ dyn.	2105 N	F ₂ dyn.	4000 N
M _x stat.	29.8 Nm	M _x stat.	43.9 Nm	M _x stat.	36.2 Nm	M _x stat.	109.5 Nm
M _y stat.	105.3 Nm	M _y stat.	155.2 Nm	M _y stat.	129.0 Nm	M _y stat.	194.4 Nm
M _z stat.	123.3 Nm	M _z stat.	181.7 Nm	M _z stat.	127.5 Nm	M _z stat.	97.2 Nm
M _x dyn.	16.8 Nm	M _x dyn.	21.8 Nm	M _x dyn.	21.7 Nm	M _x dyn.	97.4 Nm
M _y dyn.	59.7 Nm	M _y dyn.	77.3 Nm	M _y dyn.	77.4 Nm	M _y dyn.	173.0 Nm
M _z dyn.	69.9 Nm	M _z dyn.	90.5 Nm	M _z dyn.	76.5 Nm	M _z dyn.	180.0 Nm

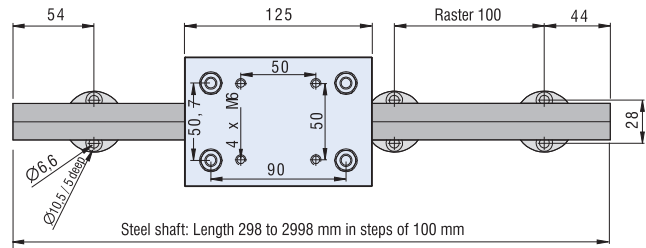
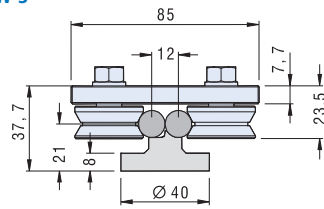


Linear guide rail

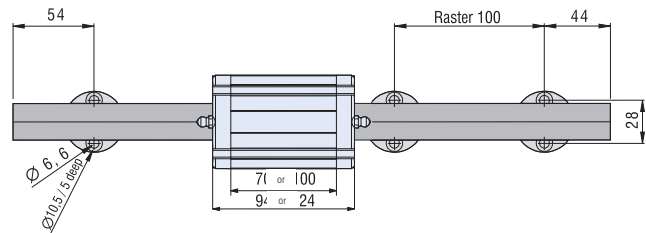
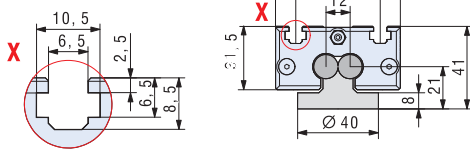
LFS-12-1

Dimensioned drawings

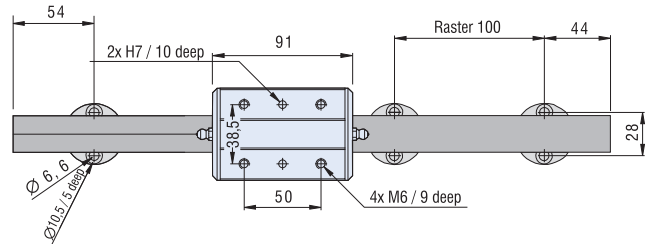
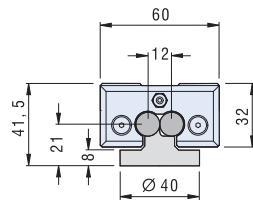
LFS-12-1 with Carriage LW 3



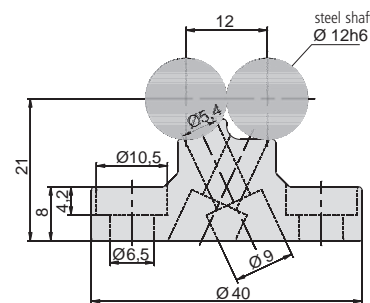
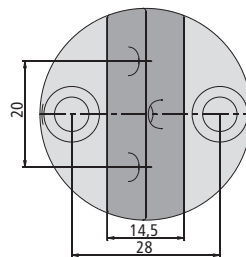
LFS-12-1 with shaft slide WS 4/70 or WS 4



LFS-12-1 with steel slide LS 1



Shaft housing block



Linear guide rail

LFS-12-11



Features

- W 20 × H 31 mm
- Precision steel shaft Ø 12
- Aluminium shaft housing profile, naturally anodised
- Securing from below with M6 tapped rails in T-groove insert on flat surface
- Special lengths to order
- Weight: appr. 1.3 kg/m

Ordering key

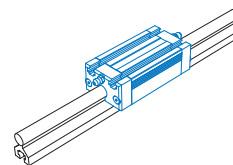
220 002 XXXX

Length in mm

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

0998 = Length 998

Profile length = Length overall L - 2 mm



Aluminium slide

- With recirculating ball guide
- M6 T-groove inserts
- Central lubrication system option
- Adjustable for no play
- Option: stainless steel design

L 96 × W 50 × H 31.5 mm (WS 6/70)
(Weight: appr. 0.3 kg)

Part no.: **223106 0070**

Stainless steel: **223106 1070**

L 126 × W 50 × H 31.5 mm (WS 6)
(Weight: appr. 0.5 kg)

Part no.: **223106**

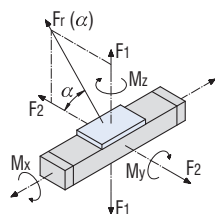
Stainless steel: **223106 1000**

Loading data

Shaft slide WS 6/70	
C ₀	3303 N
C	1873 N
F ₁ stat.	2821 N
F ₁ dyn.	1599 N
F ₂ stat.	3303 N
F ₂ dyn.	1873 N
M _x stat.	-
M _y stat.	105.3 Nm
M _z stat.	123.3 Nm
M _x dyn.	-
M _y dyn.	59.7 Nm
M _z dyn.	69.9 Nm

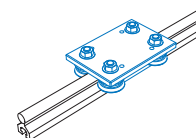
Shaft slide WS 6	
C ₀	4868 N
C	2426 N
F ₁ stat.	4157 N
F ₁ dyn.	2071 N
F ₂ stat.	4868 N
F ₂ dyn.	2426 N
M _x stat.	-
M _y stat.	155.2 Nm
M _z stat.	181.7 Nm
M _x dyn.	-
M _y dyn.	77.3 Nm
M _z dyn.	90.5 Nm

Carriage LW 5	
C ₀	2160 N
C	4000 N
F ₁ stat.	4320 N
F ₁ dyn.	3846 N
F ₂ stat.	2160 N
F ₂ dyn.	4000 N
M _x stat.	-
M _y stat.	162.0 Nm
M _z stat.	81.0 Nm
M _x dyn.	-
M _y dyn.	144.2 Nm
M _z dyn.	150.0 Nm



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

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



Carriage LW 5

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

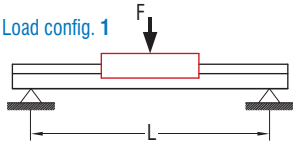
Part no.: **223010**

Linear guide rail

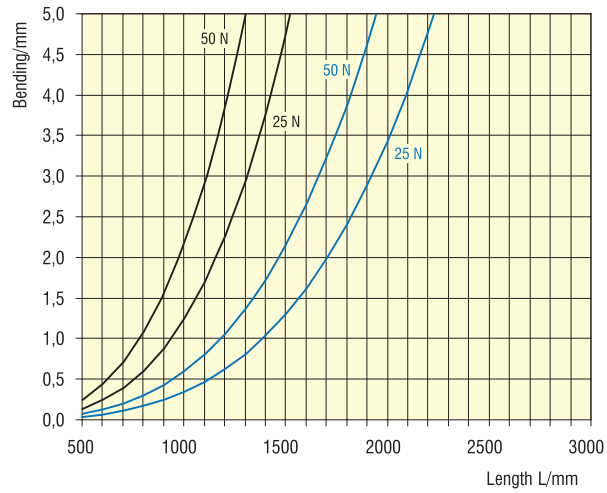
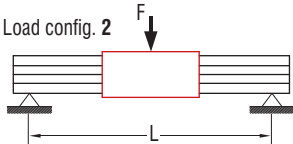
LFS-12-11

Bending

■ Load config. 1

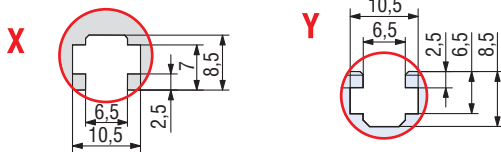
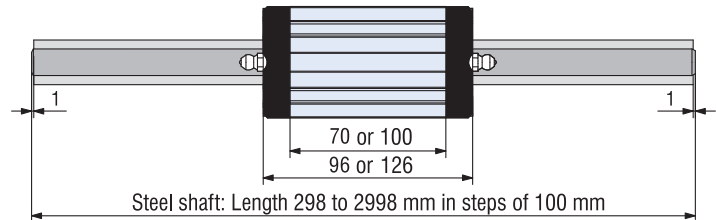
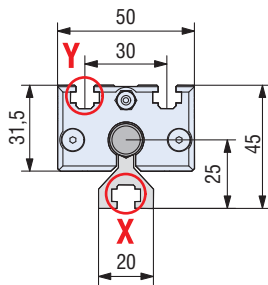


■ Load config. 2

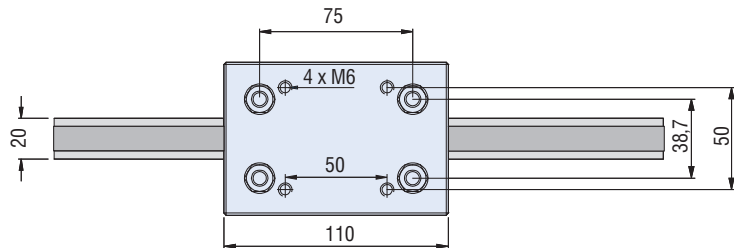
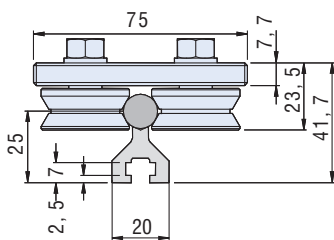


Dimensioned drawings

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



LFS-12-11 with Carriage **LW5**



Linear guide rail

LFS-12-2



Features

- W 62 × H 31 mm
- 2 precision steel shafts Ø 12
- 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 drillings 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: appr. 3.3 kg/m

Ordering key

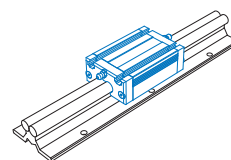
235 200 XXXX

Length in mm

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

0998 = Length 998

Profile length = Length overall L -2 mm



Aluminium slide

- With recirculating ball guide
- Clamping surface plane milled
- Option: stainless steel design

L 94 × W 62 × H 31.5 mm (WS 4/70)

(Weight: appr. 0.33 kg)

Part no.: **223104 0070**

Stainless steel: **223104 1070**

L 124 × W 62 × H 31.5 mm (WS 4)

(Weight: appr. 0.46 kg)

Part no.: **223104**

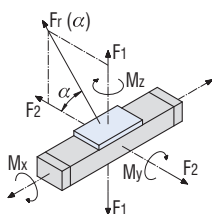
Stainless steel: **223104 1000**

Loading data

Shaft slide WS 4/70	
C ₀	3003 N
C	1873 N
F ₁ stat.	2821 N
F ₁ dyn.	1599 N
F ₂ stat.	3303 N
F ₂ dyn.	1873 N
M _x stat.	29.8 Nm
M _y stat.	105.3 Nm
M _z stat.	123.3 Nm
M _x dyn.	16.8 Nm
M _y dyn.	59.7 Nm
M _z dyn.	69.9 Nm

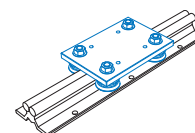
Shaft slide WS 4	
C ₀	4868 N
C	2426 N
F ₁ stat.	4157 N
F ₁ dyn.	2071 N
F ₂ stat.	4868 N
F ₂ dyn.	2426 N
M _x stat.	43.9 Nm
M _y stat.	155.2 Nm
M _z stat.	181.7 Nm
M _x dyn.	21.8 Nm
M _y dyn.	77.3 Nm
M _z dyn.	90.5 Nm

Carriage LW 3	
C ₀	2160 N
C	4000 N
F ₁ stat.	4320 N
F ₁ dyn.	3846 N
F ₂ stat.	2160 N
F ₂ dyn.	4000 N
M _x stat.	109.5 Nm
M _y stat.	194.4 Nm
M _z stat.	97.2 Nm
M _x dyn.	97.4 Nm
M _y dyn.	173.0 Nm
M _z dyn.	180.0 Nm



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

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



Carriage LW 3

- L 125 × W 85 × H 7.7 mm
- ground steel plate
- Weight: 0.93 kg

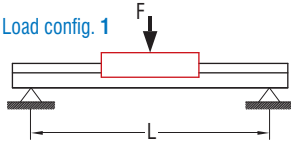
Part no.: **223008**

Linear guide rail

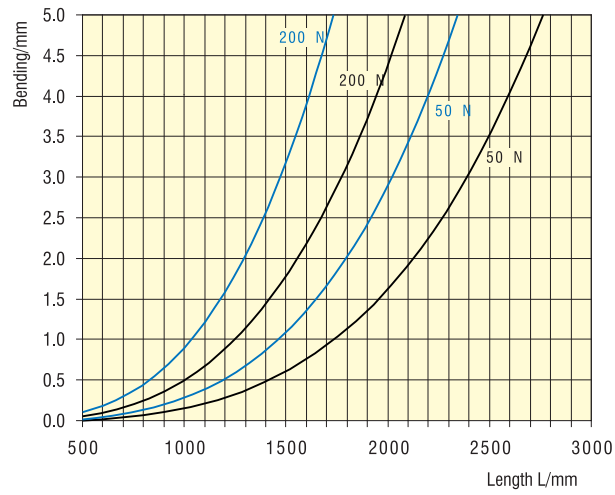
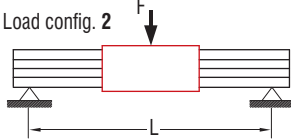
LFS-12-2

Bending

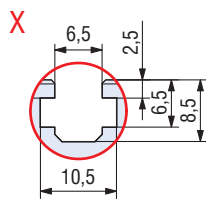
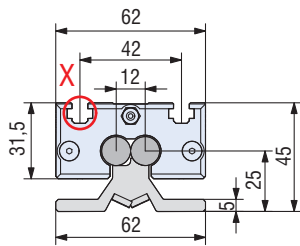
■ Load config. 1



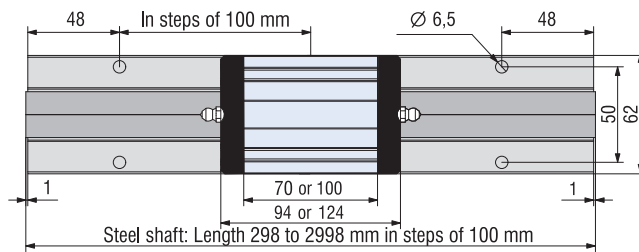
■ Load config. 2



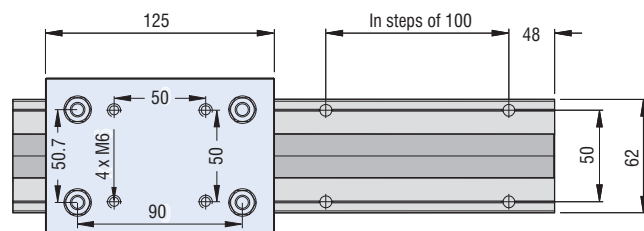
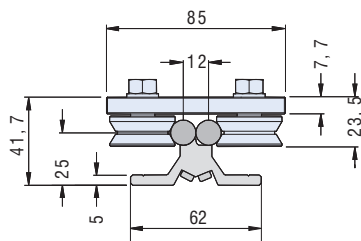
Dimensioned drawings



LFS-12-2 with aluminium slide WS 4/70 or WS 4

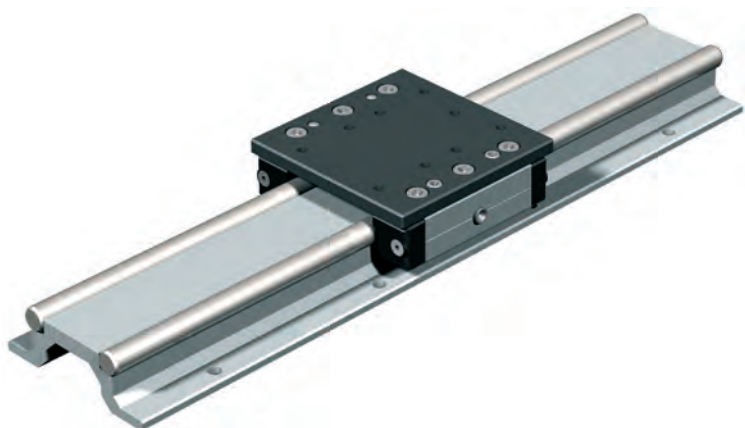


LFS-12-2 with Carriage LW3



Linear guide rail

LFS-12-3



Features

- W 90 × H 31 mm
- 2 precision steel shafts Ø 12
- 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: appr. 3.9 kg/m

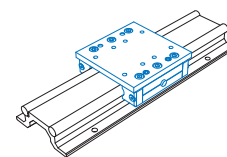
Ordering key

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.



Slide

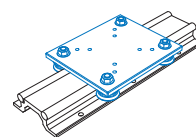
- ground steel plate
- central lubrication system option
- adjustable for no play

L 100 × W 100 × H 32 mm (WS 7/70)
 (Weight: appr. 0.8 kg)

Part no.: **223107 0070**

L 200 × W 100 × H 32 mm (WS 7)
 (Weight: appr. 1.7 kg)

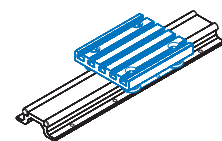
Part no.: **223107**



Carriage LW 8

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

Part no.: **223013**



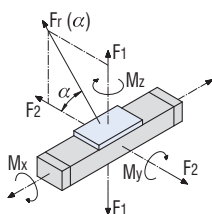
Carriage LW 2

- L 150 × W 125 × H 34.5 mm
- Aluminium T-groove plate
- 4 rollers Ø 31, sealed for life
- adjustable for no play
- Weight: 0.97 kg

Part no.: **223005**

Loading data

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



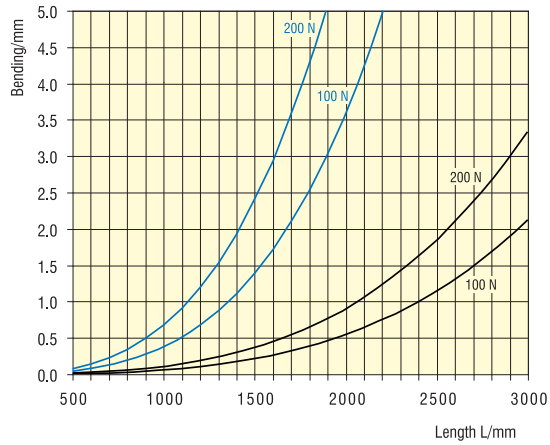
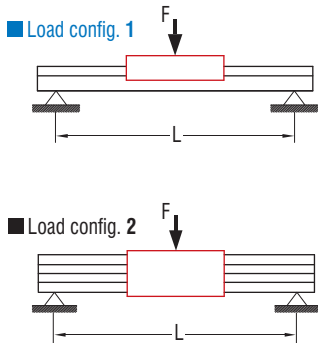
$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

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

Linear guide rail

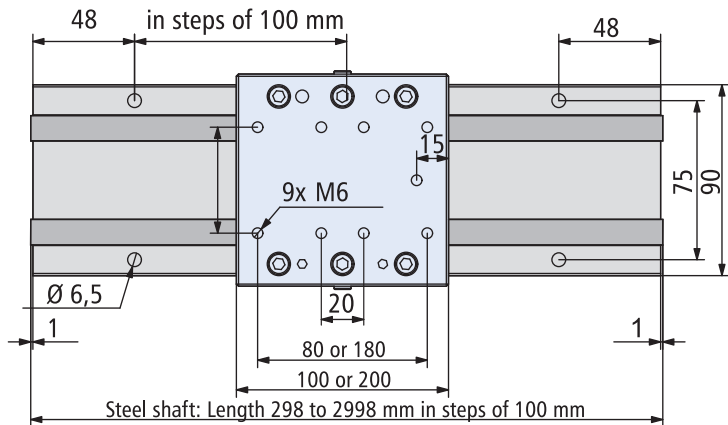
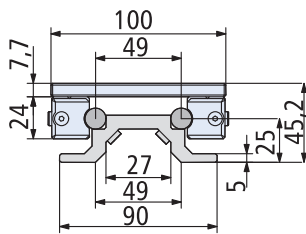
LFS-12-3

Bending

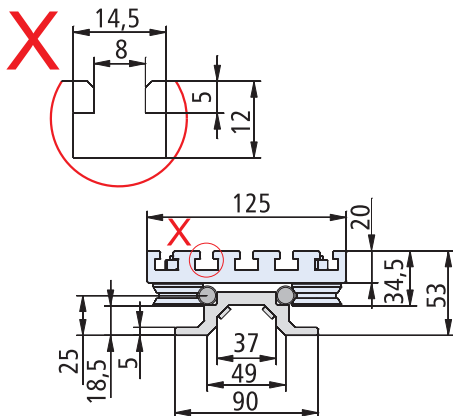
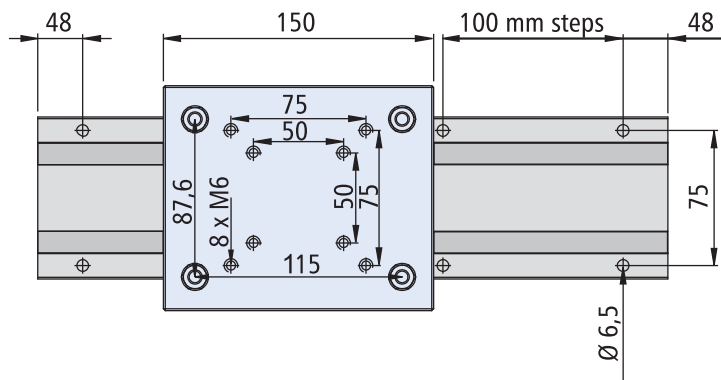
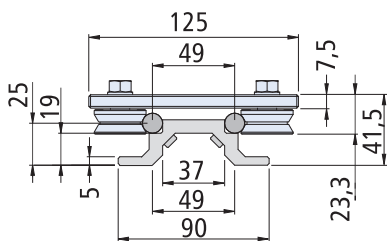


Dimensioned drawings

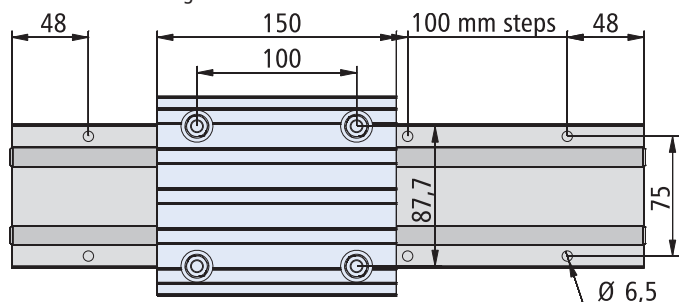
LFS-12-3 with aluminium slide WS 7



LFS-12-3 with Carriage LW 8

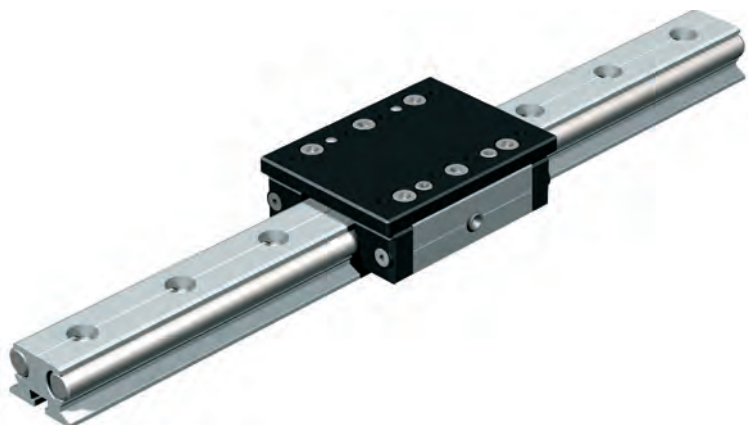


LFS-12-3 with Carriage LW 2



Linear guide rail

LFS-12-10



Features

- W 36 × H 24.5 mm
- 2 precision steel shafts Ø 12
- anti-twist
- Aluminium shaft housing profile, naturally anodised
- Fixing from below with M6 tapped rails in T-groove insert and from above M6 drillings in 50 mm raster
- conditionally freeloading
- Special lengths to order
- Weight: appr. 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 with rod linkage to order.

Slide

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

L 100 × W 75 × H 31.5 mm (WS 8/70)

(Weight: appr. 0.7 kg)

Part no.: **223108 0070**

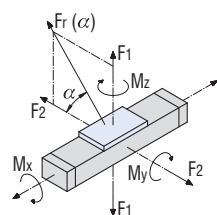
L 150 × W 75 × H 31.5 mm (WS 8)

(Weight: appr. 1.0 kg)

Part no.: **223108**

Loading data

Slide WS 8/70		Slide WS 8		Carriage 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 stat.	2821 N	F ₁ stat.	4157 N	F ₁ stat.	4320 N	F ₁ stat.	652 N	F ₁ stat.	1927 N
F ₁ dyn.	1599 N	F ₁ dyn.	2071 N	F ₁ dyn.	3846 N	F ₁ dyn.	607 N	F ₁ dyn.	1138 N
F ₂ stat.	3303 N	F ₂ stat.	4868 N	F ₂ stat.	2160 N	F ₂ stat.	645 N	F ₂ stat.	1905 N
F ₂ dyn.	1873 N	F ₂ dyn.	2426 N	F ₂ dyn.	4000 N	F ₂ dyn.	600 N	F ₂ dyn.	1125 N
M _x stat.	46.7 Nm	M _x stat.	68.8 Nm	M _x stat.	135.4 Nm	M _x stat.	16.0 Nm	M _x stat.	46.0 Nm
M _y stat.	105.3 Nm	M _y stat.	155.2 Nm	M _y stat.	194.4 Nm	M _y stat.	13.0 Nm	M _y stat.	119 Nm
M _z stat.	123.3 Nm	M _z stat.	181.7 Nm	M _z stat.	97.2 Nm	M _z stat.	13.0 Nm	M _z stat.	118 Nm
M _x dyn.	26.4 Nm	M _x dyn.	34.2 Nm	M _x dyn.	120.5 Nm	M _x dyn.	15.0 Nm	M _x dyn.	27.0 Nm
M _y dyn.	59.7 Nm	M _y dyn.	77.3 Nm	M _y dyn.	173.0 Nm	M _y dyn.	12.0 Nm	M _y dyn.	71.0 Nm
M _z dyn.	69.9 Nm	M _z dyn.	90.5 Nm	M _z dyn.	180.0 Nm	M _z dyn.	12.0 Nm	M _z dyn.	70.0 Nm



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

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

Carriage LW 4

- L 125 × W 97 × H 7.7 mm
- ground steel plate
- 4 rollers Ø 31, 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

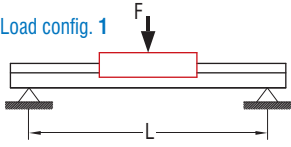
Part no.: **223002**

Linear guide rail

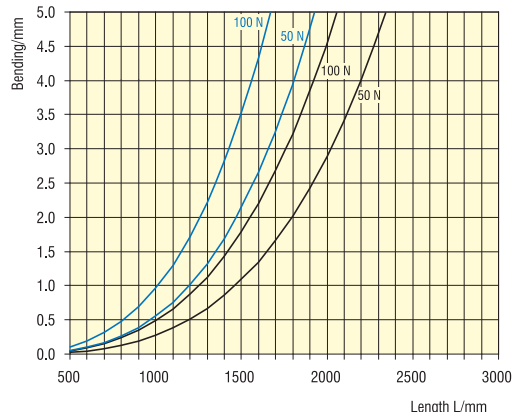
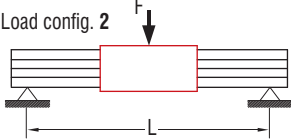
LFS-12-10

Bending

■ Load config. 1

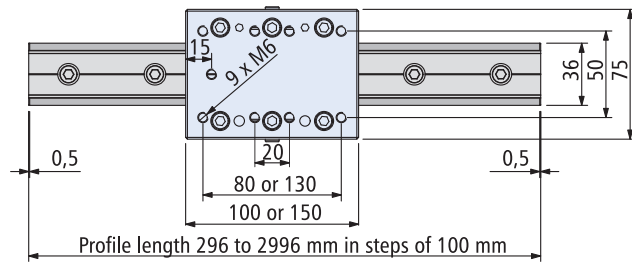
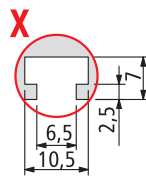
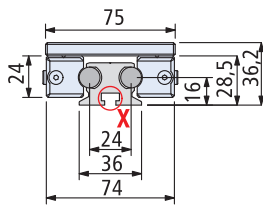


■ Load config. 2

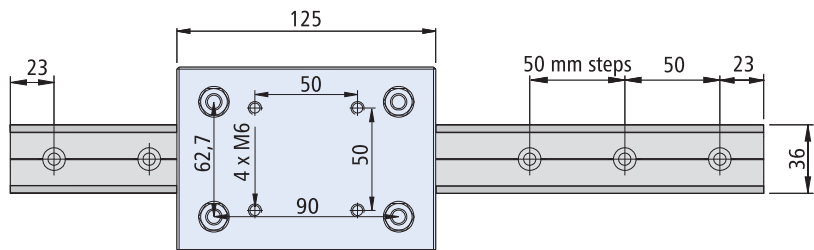
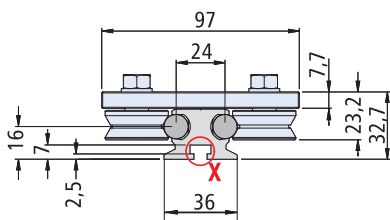


Dimensioned drawings

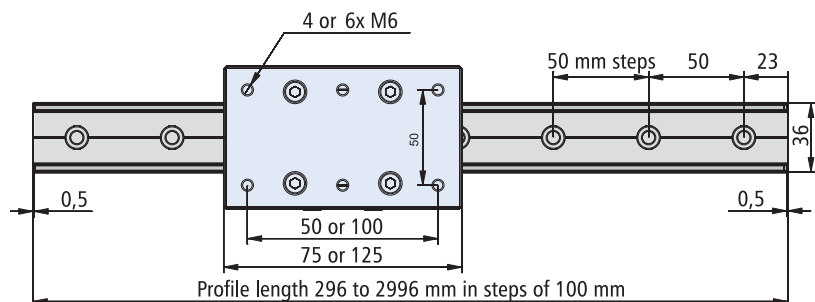
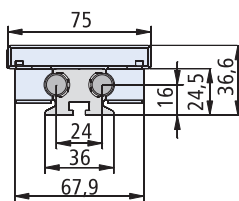
LFS-12-10 with slide WS 8



LFS-12-10 with Carriage LW 4



LFS-12-10 with dual track set



Linear guide rail

LFS-16-2



Features

- W 25 × H 47.5 mm
- Precision steel shaft Ø 16
- Aluminium shaft housing profile, naturally anodised
- Securing from below on flat surface with M6 tapped rails in T-groove insert
- not self-supporting
- Lengths in 100 mm raster
- max. Length 2998 mm
- Special lengths to order
- Weight: appr. 2.7 kg/m

Ordering key

220 004 XXXX

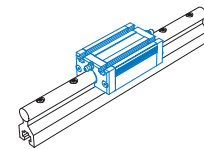
Length in mm (in 100 mm raster)

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

0299 = Length 2998

Profile length = Length overall L -2 mm

Special lengths to order



Aluminium slide IWS 1

- L 94 × W 55 × H 33.5 mm
- Clamping surface plane milled
- Weight: 0.32 kg
- Option: stainless steel design

Part no.: **223220**

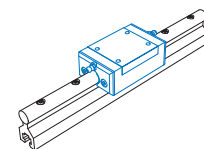
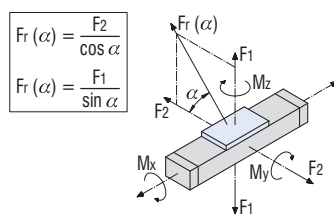
Stainless steel: **223220 0001**

Loading data

Carriage ILW 1	
C ₀	2160 N
C	4000 N
F _{1 stat.}	4320 N
F _{1 dyn.}	3897 N
F _{2 stat.}	2160 N
F _{2 dyn.}	4000 N
M _{1 stat.}	-
M _{1 dyn.}	194.4 Nm
M _{2 stat.}	97.2 Nm
M _{2 dyn.}	-
M _{3 dyn.}	175.3 Nm
M _{4 dyn.}	180.0 Nm

Slide IWS 1	
C ₀	3286 N
C	1773 N
F _{1 stat.}	2806 N
F _{1 dyn.}	1514 N
F _{2 stat.}	3286 N
F _{2 dyn.}	1773 N
M _{1 stat.}	--
M _{1 dyn.}	104.7 Nm
M _{2 stat.}	122.6 Nm
M _{2 dyn.}	--
M _{3 dyn.}	56.4 Nm
M _{4 dyn.}	66.1 Nm

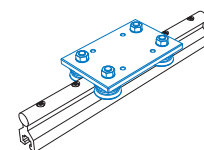
Steel slide ILS 1	
C ₀	5065 N
C	3238 N
F _{1 stat.}	4325 N
F _{1 dyn.}	2765 N
F _{2 stat.}	5065 N
F _{2 dyn.}	3238 N
M _{1 stat.}	-
M _{1 dyn.}	113.4 Nm
M _{2 stat.}	132.8 Nm
M _{2 dyn.}	-
M _{3 dyn.}	72.4 Nm
M _{4 dyn.}	84.8 Nm



Steel slide ILS 1

- L 94 × W 58 × H 33.7 mm
- Clamping surface ground
- Weight: 0.72 kg

Part no.: **223210**



Carriage ILW 1

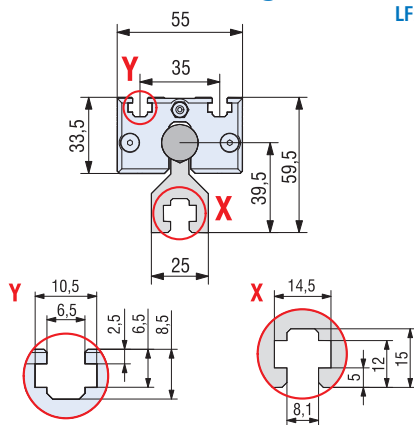
- L 125 × W 80 × H 7.7 mm
- ground steel plate
- Weight: 0.87 kg

Part no.: **223230**

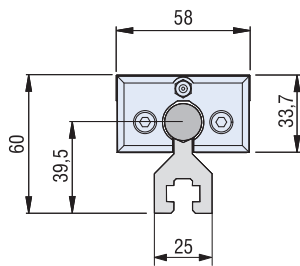
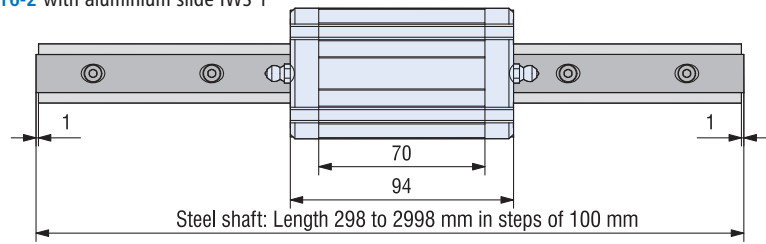
Linear guide rail

LFS-16-2

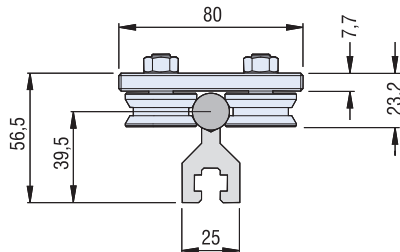
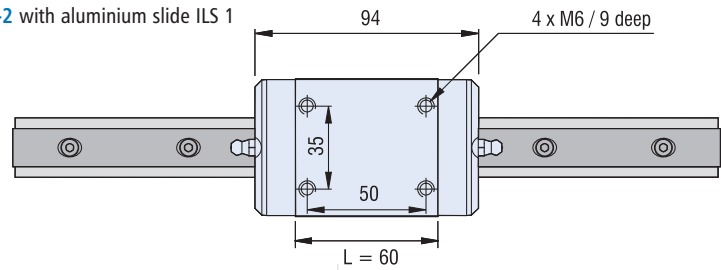
Dimensioned drawings



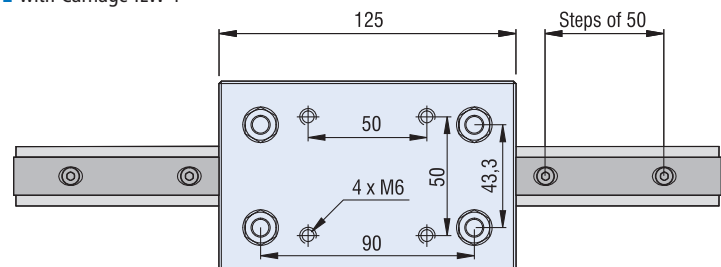
LFS-16-2 with aluminium slide IWS 1



LFS-16-2 with aluminium slide ILS 1

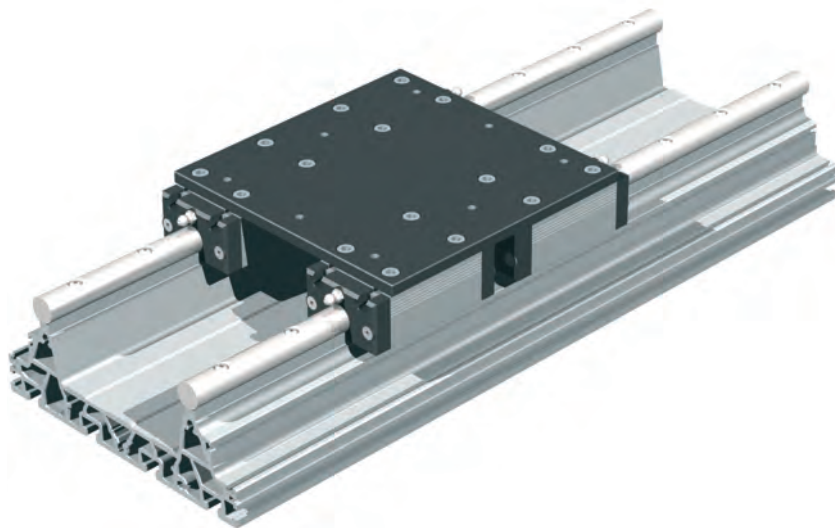


LFS-16-2 with Carriage ILW 1



Linear guide rail

LFS-16-120



Features

- W 190 × H 61 mm
- 2 precision steel shafts Ø 16
- anti-twist
- Aluminium shaft housing profile naturally anodised
- Securing from below with M6 tapped rails in T-groove profile
- conditionally not self-supporting
- Any guide length
- Weight: 10.2 kg/m

Ordering key

220 008 XXXX

Length in mm (in 100 mm raster)

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

0299 = Length 2998

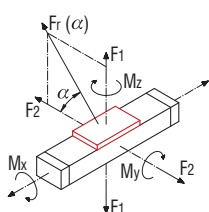
Profile length = Length overall L -2 mm

Special lengths to order

Loading data

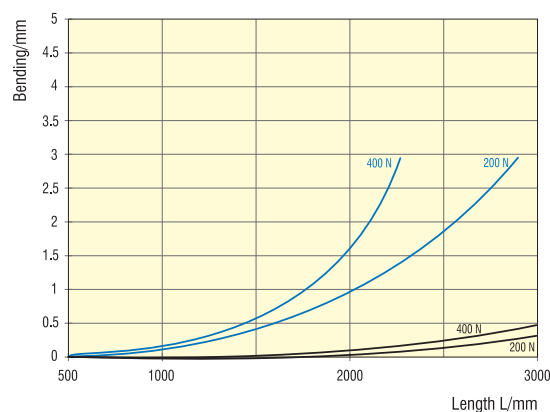
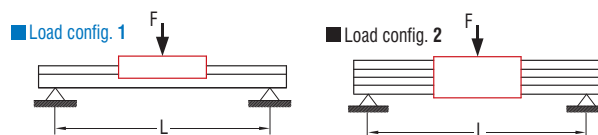
$$F_r(\alpha) = \frac{F_2}{\cos \alpha}$$

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



Unit with 2x IWS1		Unit with 2x ILS1		Unit with 4x IWS1		Unit with 4x ILS1	
C ₀	4929 N	C ₀	7598 N	C ₀	6572 N	C ₀	10130 N
C	2660 N	C	4857 N	C	3546 N	C	6476 N
F ₁ stat.	4209 N	F ₁ stat.	6488 N	F ₁ stat.	5612 N	F ₁ stat.	8650 N
F ₁ dyn.	2271 N	F ₁ dyn.	4148 N	F ₁ dyn.	3028 N	F ₁ dyn.	5530 N
F ₂ stat.	4929 N	F ₂ stat.	7598 N	F ₂ stat.	6572 N	F ₂ stat.	10130 N
F ₂ dyn.	2660 N	F ₂ dyn.	4857 N	F ₂ dyn.	3546 N	F ₂ dyn.	6476 N
M _x stat.	253 Nm	M _x stat.	389 Nm	M _x stat.	337 Nm	M _x stat.	519 Nm
M _x dyn.	147 Nm	M _x dyn.	195 Nm	M _x dyn.	309 Nm	M _x dyn.	476 Nm
M _y stat.	173 Nm	M _y stat.	228 Nm	M _y stat.	361 Nm	M _y stat.	557 Nm
M _y dyn.	136 Nm	M _y dyn.	249 Nm	M _y dyn.	182 Nm	M _y dyn.	332 Nm
M _z stat.	79 Nm	M _z stat.	124 Nm	M _z stat.	167 Nm	M _z stat.	304 Nm
M _z dyn.	93 Nm	M _z dyn.	146 Nm	M _z dyn.	195 Nm	M _z dyn.	356 Nm

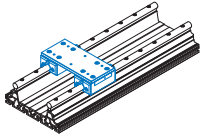
Bending



Linear guide rail

LFS-16-120

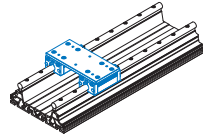
Slide unit with 2 × steel slide ILS 1 (kit)



- L 84 × W 178 × H 8 mm
- ground steel plate
- 2 × ILS 1, central lubrication option
- adjustable for no play
- Total weight: 2.30 kg

Part no.: **223240 0009**

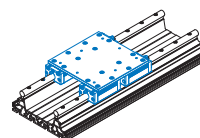
Slide unit with 2 × aluminium slide IWS 1 (kit)



- L 84 × W 178 × H 8 mm
- ground steel plate
- 2 × IWS 1, central lubrication option
- adjustable for no play
- Total weight: 1.50 kg

Part no.: **223240 0007**

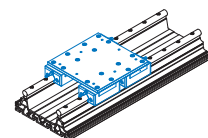
Slide unit with 4 × aluminium slide IWS 1 (kit)



- L 180 × W 178 × H 8 mm
- ground steel plate
- 4 × IWS 1, central lubrication option
- adjustable for no play

Part no.: **223240 0008**

Slide unit with 4 × steel slide ILS 1 (kit)

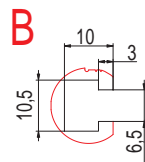
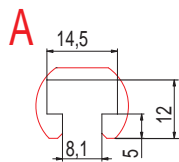
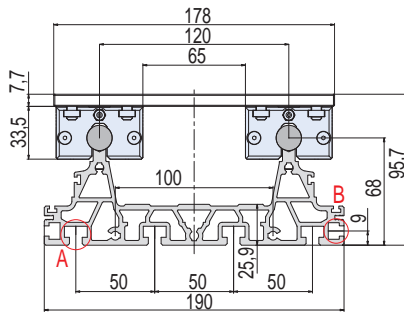


- L 180 × W 178 × H 8 mm
- ground steel plate
- 4 × ILS 1, central lubrication option
- adjustable for no play

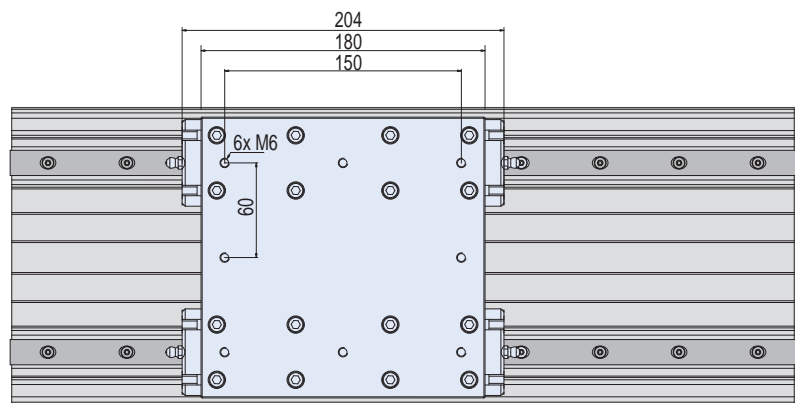
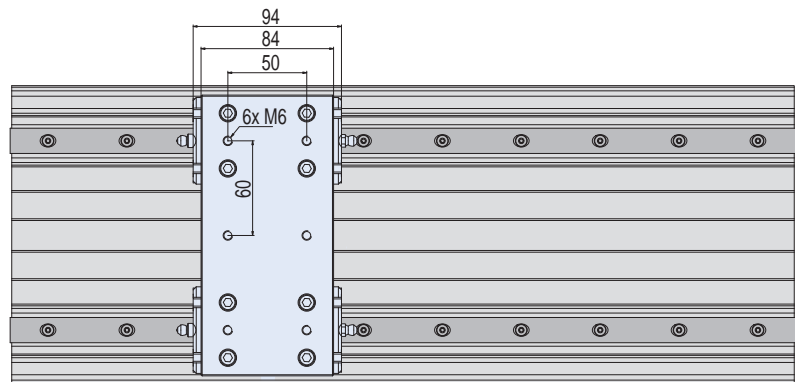
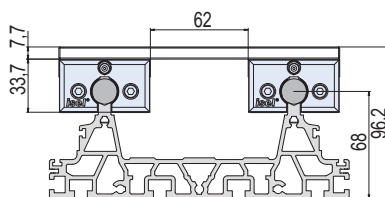
Part no.: **223240 0010**

Dimensioned drawings

Aluminium slide IWS 1



Steel slide ILS 1



Linear guide

LFS-16-150

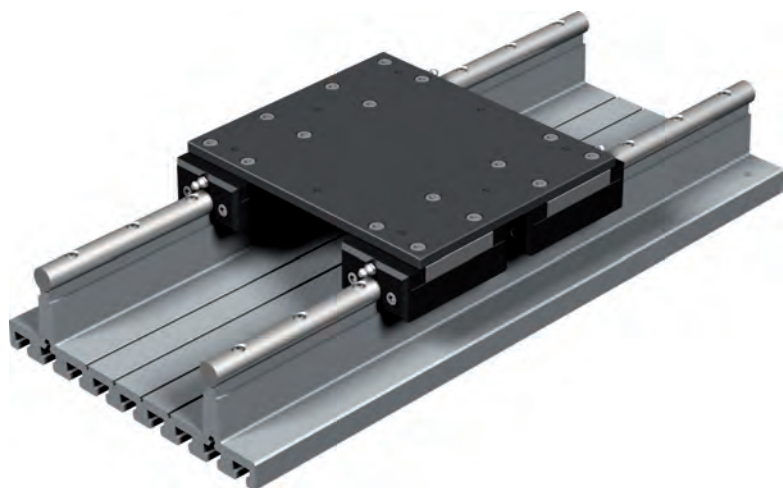
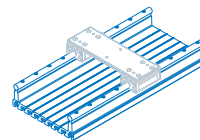


Figure:
Linear guide rail and 4 linear guide slide with slot plate

Linear guide rail LS-16-150



- 2 precision steel shafts Ø 16 mm
- Aluminium profile rail with T-groove inserts, raster 25 mm, anodised
- exact, shaft housing outline milled in a clamping fixture
- Conditionally freeloading
- Standard length 3 m, any number of segments
- Weight: 13.9 kg/m

Part no.: **220030 0099** (Length 1 m)
220030 0199 (Length 2 m)
220030 0299 (Length 3 m)

Option:

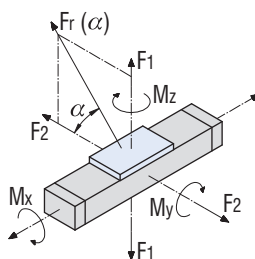
- Other lengths (longer or shorter)

Loading data

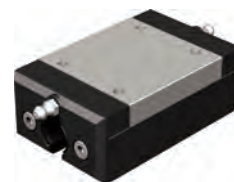
Linear guide LFS-16-150 2 steel slide		Linear guide LFS-16-150 4 steel slide	
C ₀	7598 N	C ₀	10130 N
C	4857 N	C	6476 N
F ₁ stat.	6488 N	F ₁ stat.	8650 N
F ₁ dyn.	4148 N	F ₁ dyn.	5530 N
F ₂ stat.	7598 N	F ₂ stat.	10130 N
F ₂ dyn.	4857 N	F ₂ dyn.	6476 N
M _x stat.	486.6 Nm	M _x stat.	648.8 Nm
M _y stat.	194.6 Nm	M _y stat.	475.8 Nm
M _z stat.	227.9 Nm	M _z stat.	557.2 Nm
M _x dyn.	311.1 Nm	M _x dyn.	414.8 Nm
M _y dyn.	124.4 Nm	M _y dyn.	304.2 Nm
M _z dyn.	145.7 Nm	M _z dyn.	356.2 Nm

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

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



Steel slide ILS 1

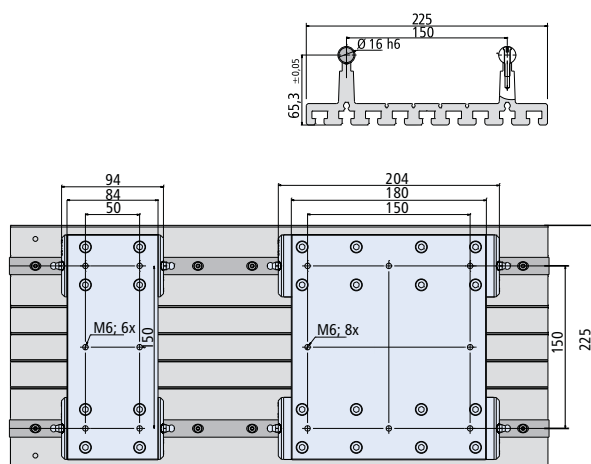


- Steel slide
L 94 × W 58 × H 33.7 mm
 - 4 recirculating balls, adjustable for no play
 - Grease nipple on front
 - Weight: 0.7 kg
- Part no.: **223210**

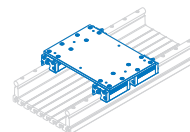
Aluminium slide IWS 1

- L 94 × W 55 × H 33.5 mm
 - Clamping surface plane milled
 - Weight: 0.32 kg
 - Option: stainless steel design
- Part no.: **223220**
 Stainless steel: **223220 0001**

Dimensioned drawing



Aluminium slide IWS 1 with slot plate



- 2 or 4 linear guide slides
 - Slot plate (ground steel)
 - Adjustable for no play
 - Weight: 2.5 kg or 5.1 kg
- Part no.: **223240 0036** (2 slides)
223240 0037 (4 slides)

Linear guide

LFS-16-250

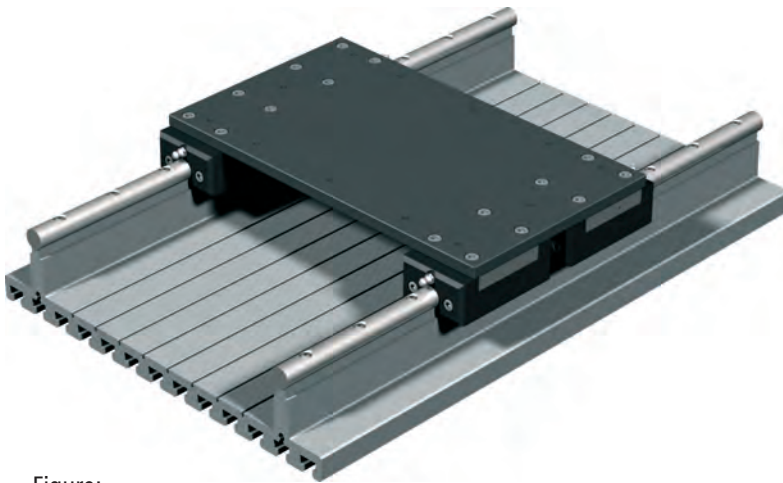
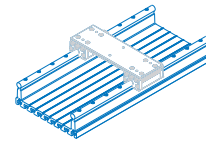


Figure:
Linear guide rail and 4 linear guide slide with slot plate

Linear guide rail LS-16-250



- 2 precision steel shafts Ø 16 mm
- Aluminium profile rail with T-groove inserts, raster 25 mm, anodised
- exact, shaft housing outline milled in a clamping fixture
- Conditionally not self-supporting
- Standard length 3 m, any number of segments
- Weight: 17.5 kg/m

Part no.: **220029 0099** (Length 1 m)
220029 0199 (Length 2 m)
220029 0299 (Length 3 m)

Option:

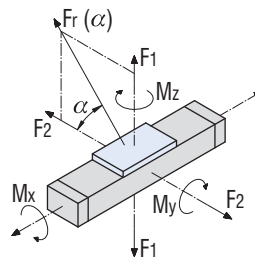
- Other lengths (longer or shorter)

Loading data

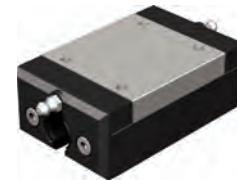
Linear guide LFS-16-250 2 steel slide		Linear guide LFS-16-250 4 steel slide	
C_0	7598 N	C_0	10130 N
C	4857 N	C	6476 N
F_1 stat.	6488 N	F_1 stat.	8650 N
F_1 dyn.	4148 N	F_1 dyn.	5530 N
F_2 stat.	7598 N	F_2 stat.	10130 N
F_2 dyn.	4857 N	F_2 dyn.	6476 N
M_x stat.	810.9 Nm	M_x stat.	1081.3 Nm
M_y stat.	194.6 Nm	M_y stat.	475.8 Nm
M_z stat.	227.9 Nm	M_z stat.	557.2 Nm
M_x dyn.	518.4 Nm	M_x dyn.	691.3 Nm
M_y dyn.	124.4 Nm	M_y dyn.	304.2 Nm
M_z dyn.	145.7 Nm	M_z dyn.	356.2 Nm

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

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



Steel slide ILS 1



- Steel slide
L 94 × W 58 × H 33.7 mm
- 4 recirculating balls, adjustable for no play
- Grease nipple on front
- Weight: 0.7 kg

Part no.: **223210**

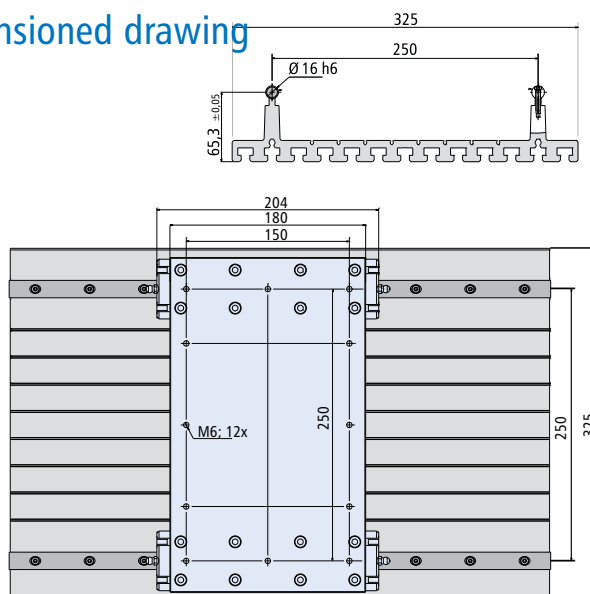
Aluminium slide IWS 1

- L 94 × W 55 × H 33.5 mm
- Clamping surface plane milled
- Weight: 0.32 kg
- Option: stainless steel design

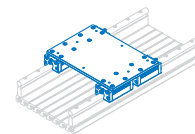
Part no.: **223220**

Stainless steel: **223220 0001**

Dimensioned drawing



Aluminium slide IWS 1 with slot plate



- 2 or 4 linear guide slides
- Slot plate (ground steel)
- Adjustable for no play
- Weight: 3.5 kg or 7.0 kg

Part no.: **223240 0040** (2 slides)
223240 0041 (4 slides)

Accessories

Tapped rails



M6 tapped rail

- 10 × 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 × W 10 × H 3.5 mm
 - galvanised
 - VE 100 units
 - all except PT/RE 40, 65
- Part no.: **209 001 0005**

2 × M6 sliding nuts (Figure 2)

- L 45 × W 10 × H 3.5 mm
 - galvanised
 - VE 50 units
 - for all except PT/RE 40, 65
- Part no.: **209 002 0004**

2 × M6 sliding nuts (Figure 2)

- L 45 × W 13 × H 6 mm
 - galvanised
 - 2 × M6 Ra 25 mm
 - VE 25 units
 - for PT/RE 40, 65
- Part no.: **209 005 0001**

Angle sliding nut

2 × M6 (Figure 3)

- galvanised
 - VE 25 units
 - for all except PT/RE 40, 65
- Part no.: **209 021 0003**

Special angle sliding nut

3 × M6 (Figure 4)

- galvanised, VE 25 units
 - for all except PT/RE 40, 65
- Part no.: **209 022 0003**

Sliding nuts



M5 sliding nuts

- galvanised
 - VE 20 units
 - 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 × W20 × H19 mm, VE 2 units
- Part no.: **222 002 0001**

Linear ball bearing, medium

- L60 × W20.5 × H17.8 mm, VE2 units
- Part no.: **222 000**

Linear ball bearing, small

- L40 × W20 × H19 mm, VE 2 units
- Part no.: **222 001**

Grease/grease gun

Grease

Part no.: **299 032 0002**

Impact press for grease and oil

Part no.: **299 032 0003**

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 thread (SF12) or M6 (SF16) in 100 mm raster or with stepped bore for M4 (SF 12) or M5 (SF 16) in 100 mm raster

Part no.: 220019 0299

(SF12, 3m, blind hole thread for M5)

Part no.: 220020 0299

(SF12, 3m, stepped bore for M4)

Part no.: 220023 0299

(SF16, 3m, stepped bore for M5)

Part no.: 220024 0299

(SF16, 3m, blind hole thread for M6)

Rollers



Roller Ø 20 mm for SF 12

- with M4 tapped drilling
- VE 2 units

Part no.: **222 010**

Roller Ø 30 mm for SF 16

- with M6 tapped drilling
- VE 2 units

Part no.: **222 010 0003**

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**

Operating loads calculation

Effective loading calculation

Various factors affect the calculation of the loading of isel guides. This includes the position of the C of G of the load, tensile and compressive forces, torques, load and acceleration forces.

For a linear bench on 4 bearings, the bearing forces are calculated according to the force application point for various load directions.

The dimension $L_1/2$ is used as the dimension L (see dimensioned drawings for the relevant guides).

The calculation can also be applied to a slot configuration with 2 slide.

The load factor in this case is $C_0/2$.

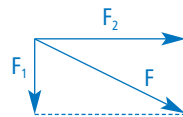
Combined load

If the load alignment of an element does not coincide with one of the main load directions, then the equivalent load is calculated:

$$P = |F_1| + |F_2|$$

If a force F and a torque M load an element simultaneously, then the dynamically equivalent load is:

$$P = |F| + |M| \cdot \frac{C_0}{M_{0(XYZ)}}$$



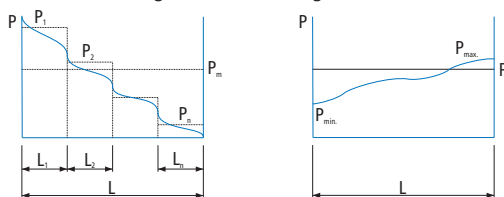
P [N]	dynamically equivalent load
F [N]	opposing force = $\sqrt{F_1^2 + F_2^2}$
F_1 [N]	vertical component see sketch (4)
F_2 [N]	horizontal component see sketch (4)
C_0 [N]	static load factor
M [Nm]	opposing torque
$M_{0(XYZ)}$ [Nm]	static torque in the direction of the opposing torque

According to DIN, the dynamically equivalent load should not exceed the value $P = 0.5 \cdot C$.

Equivalent load calculation

Operating conditions

A Incremental change B Uniform change



Equivalent load

$$P = \sqrt[3]{\frac{1}{L} \cdot (P_1^3 \cdot L_1 + P_2^3 \cdot L_2 + P_3^3 \cdot L_3 + \dots + P_n^3 \cdot L_n)}$$

$$P = \frac{1}{3} \cdot (P_{min} + 2 \cdot P_{max})$$

P	dynamically equivalent load [N]	P_{min}	smallest load [N]
$P_{1...n}$	Individual load [N]	P_{max}	largest load [N]
L	Total travel [m]		
$L_{1...n}$	Individual travel [m]		

Static safety

Operating conditions

Normal motion	S_0 1.0 - 3.0
High speed	2.0 - 4.0
With impacts and vibration	3.0 - 5.0

$$S_0 = \frac{C_0}{P_0} = \frac{M_0}{M}$$

S_0	static load safety
C_0	static load factor [N]
P_0	statically equivalent bearing loading [N]
M_0	static loading torque [Nm]
M	equivalent static torque [Nm]

Nominal working life

The nominal working life is achieved or exceeded by 90% of an adequately large quantity of identical bearings, before the first signs of material fatigue become apparent.

$$L = \left(\frac{C}{P}\right)^3$$

$$L_h = \frac{833}{H \cdot n_{osz}} \cdot \left(\frac{C}{P}\right)^3$$

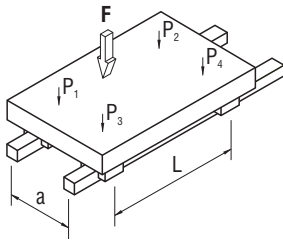
$$L_h = \frac{1666}{V} \cdot \left(\frac{C}{P}\right)^3$$

L [m]	nominal working life in units of 100,000 m
L_h [h]	nominal working life in hours run
C [N]	dynamic load factor
P [N]	dynamically equivalent load
H [m]	single stroke of the oscillating motion
n_{osz} [min]	Number of double strokes per minute
v [m/min]	average speed of movement

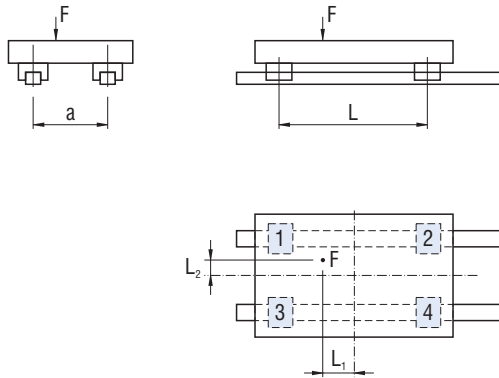
Operating loads calculation

Load vertically on the bench surface

Loading



Dimensioned figure



Load on a Carriage

$$P_1 = \frac{F}{4} + \frac{F \cdot L_1}{2L} + \frac{F \cdot L_2}{2a}$$

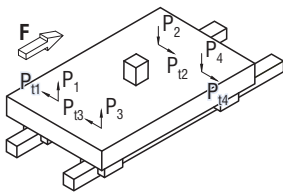
$$P_2 = \frac{F}{4} - \frac{F \cdot L_1}{2L} + \frac{F \cdot L_2}{2a}$$

$$P_3 = \frac{F}{4} + \frac{F \cdot L_1}{2L} - \frac{F \cdot L_2}{2a}$$

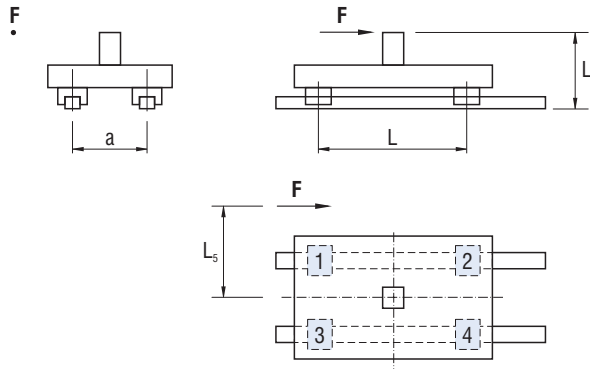
$$P_4 = \frac{F}{4} - \frac{F \cdot L_1}{2L} - \frac{F \cdot L_2}{2a}$$

Load in direction of motion

Loading



Dimensioned figure



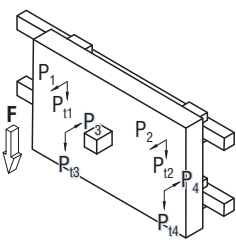
Load on a Carriage

$$P_{1...4} = \frac{F \cdot L_6}{2L}$$

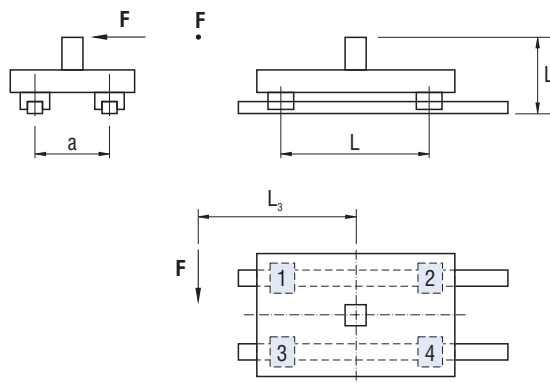
$$P_{11...14} = \frac{F \cdot L_5}{2L}$$

Load at right angles to the direction of motion

Loading



Dimensioned figure



Load on a Carriage

$$P_{1...4} = \frac{F \cdot L_4}{2a}$$

$$P_{11} = P_{13} = \frac{F}{4} + \frac{F \cdot L_3}{2L}$$

$$P_{12} = P_{14} = \frac{F}{4} - \frac{F \cdot L_3}{2L}$$

Space for your notes

Drive elements

Overview

Function overview	C 49
Ball screw spindle Ø 16	C 50
Ball screw spindle Ø 25	C 50
Ball bearing nut 2	C 51
Ball bearing nut 3	C 51
Clamping blocks for nut version 3	C 52
Flange bearing for spindle Ø 16	C 53
Flange bearing for spindle Ø 25	C 53
Bearing supports	C 54
Shaft couplings	C 55

Information

The ball screw nuts from **isel Germany AG** are of high quality, precise and abrasion-resistant (hardened and polished). Together with the ball screw spindles, they convert rotations into linear movements most friction-poorly.

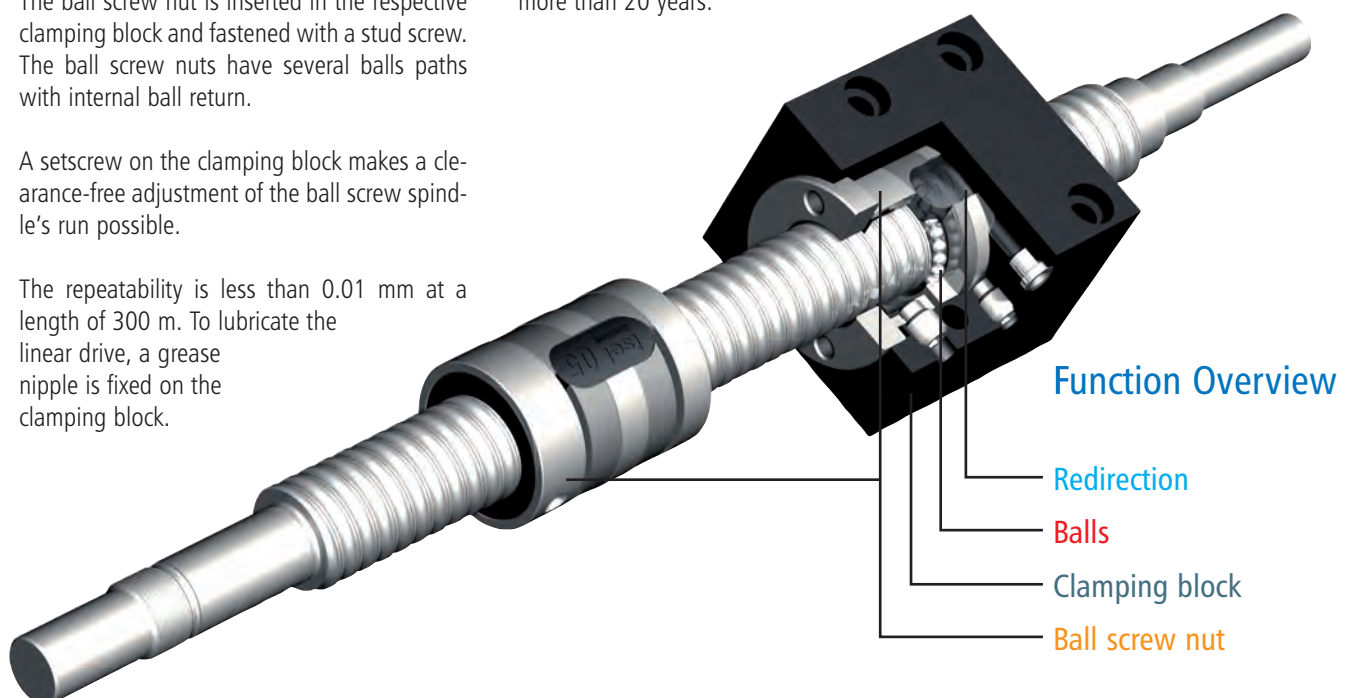
The ball screw nut is inserted in the respective clamping block and fastened with a stud screw. The ball screw nuts have several balls paths with internal ball return.

A setscrew on the clamping block makes a clearance-free adjustment of the ball screw spindle's run possible.

The repeatability is less than 0.01 mm at a length of 300 m. To lubricate the linear drive, a grease nipple is fixed on the clamping block.

The ball screw spindles are produced with modern machines; they are rolled, hardened and polished.

Our linear drives are technically mature and have stood the test in practice for more than 20 years.

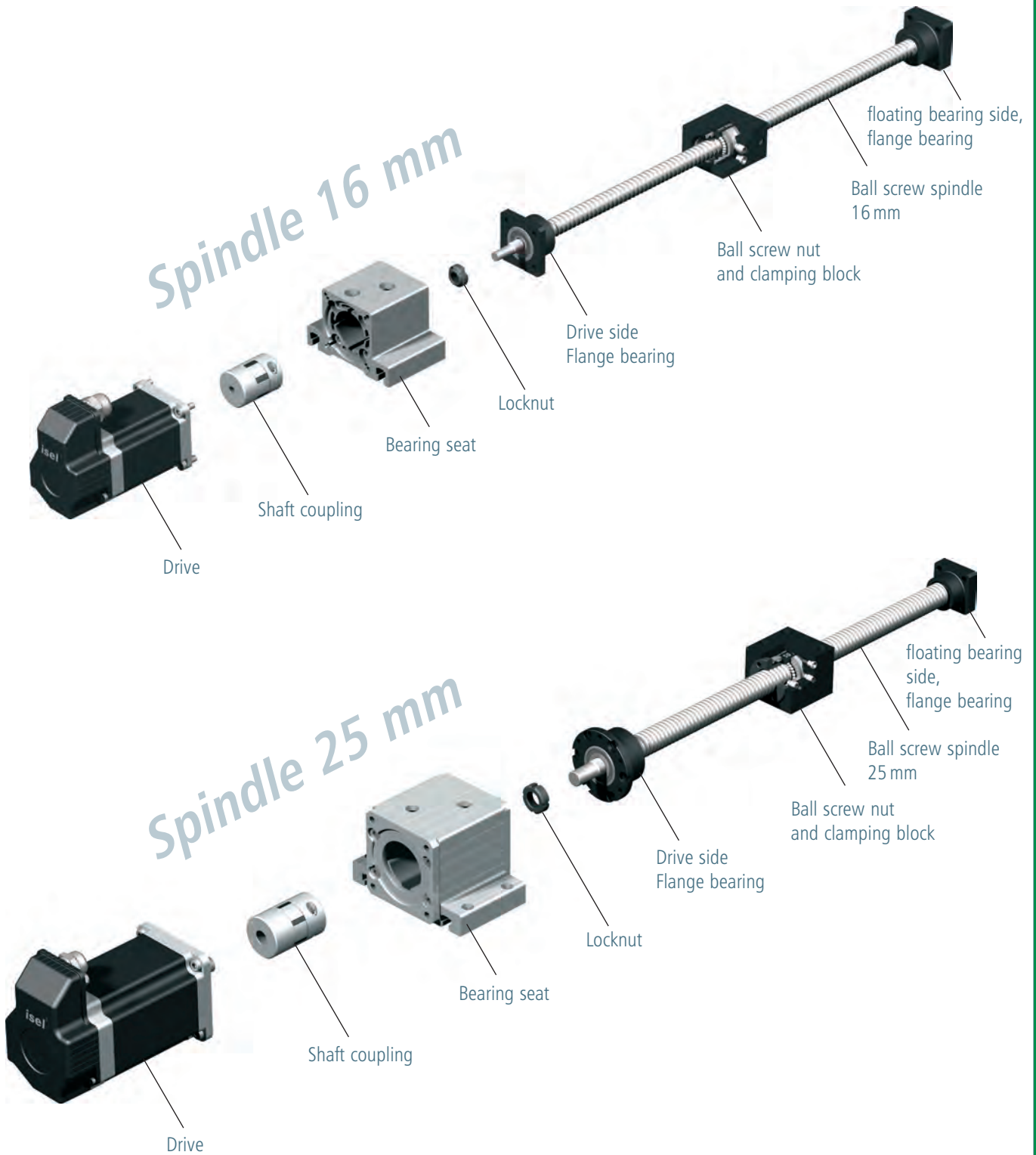


Drive elements

Overview

Linear Drives

The most commonly used type of drive for a linear unit is a directly or by a tooth belt driven ball screw spindle.



Ball screw spindles

Ø 16, 25 mm

Ø 16 features

- Ø 16 mm, rolled, hardened and polished
- Material CF 53, inductively hardened (HRC 60 ± 2); (for detailed information see DIN 17212)
- Spindle pitches: 2.5 / 4 / 5 / 10 and 20 mm
- Lengths up to max. 3052 mm available
- End machining to isel standard or to order (see "Available lengths")
- Produced to DIN 69051, Part3, Tolerance class 7

Options

- End machining to order

Available lengths

Without end machining
in 100 mm raster

- 452 to 1052 mm
- 1252 mm • 1552 mm
- 1752 mm • 2052 mm
- 2252 mm • 2752 mm
- 3052 mm

Special length according to
drawing: 211 13X 0998

Both-sided end machining
in 100 mm raster

- 368 mm to 3068 mm

Special length to drawing:
211 13X 5999

Ordering key

211 13X XXXX

Spindle pitch

- 2** = 2.5 mm
- 3** = 4 mm
- 4** = 5 mm
- 5** = 10 mm
- 6** = 20 mm

End machining

- 0** = not machined
- 5** = both-sided machining suitable for all feeds (aluminium profile length + 78 mm)

Lengths

- e.g. **045** = 452 mm
- 086** = 868 mm
- 305** = 3052 mm (rounded to the final digit)

See "Available lengths" for permissible Combinations.

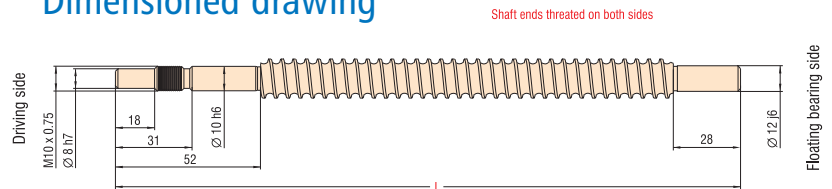
Ordering information

Slotted nut

- Self-locking
- M 10 x 0.75 mm

Part no.: **890257 0011**

Dimensioned drawing



Ø 25 features

- Ø 25 mm, hardened and polished
- Material CF 53, inductively hardened (HRC 60 ± 2); (for detailed information see DIN 17212)
- Spindle pitches: 5/10 and 20 mm
- Lengths up to max. 3052 mm available
- End machining to isel standard or to order (see "Available lengths")
- Produced to DIN 69051, Part 3, Tolerance class 7

Options

- End machining to order

Available lengths

Without end machining
in 100 mm raster

- 500 to 3,000 mm
- Special length to
drawing: 211 14X 0999

Shaft ends on both sides machined
in steps of 100 mm

- 295 to 2,995 mm

Ordering key

211 14X XXXX

Spindle pitch

- 4** = 5 mm
- 5** = 10 mm
- 6** = 20 mm

End machining

- 0** = not machined
- 2** = both sides

Lengths

- e.g. **050** = 500 mm
- 100** = 1000 mm
- 289** = 2895 mm (rounded to the final digit)

See "Available lengths" for permitted combinations.

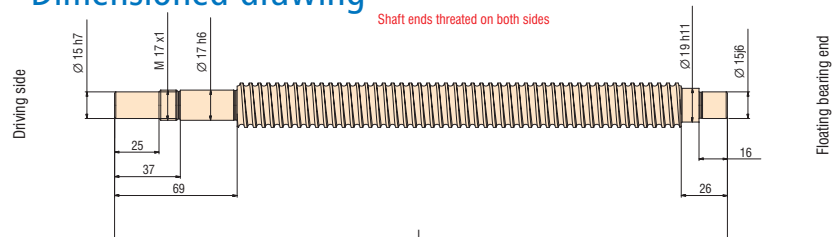
Ordering information

Slotted nut

- Self-locking
- M 17 x 1.0 mm

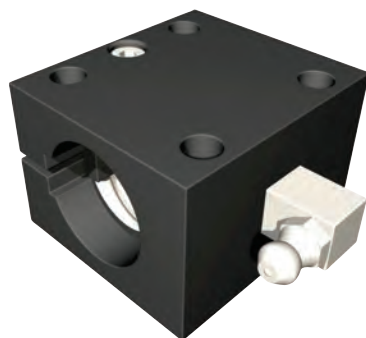
Part no.: **890259 0011**

Dimensioned drawing



Ball bearing nuts

Version 2- $\varnothing 16$



Features

- Material 16MnCr5 or 20MnCr5, pressed, hardened, polished
- Versions for recirculating ball spindle $\varnothing 16$ mm
- Nut pitches: 2.5/4/5/10 mm
- Balls are rerouted internally
- as block housing with base fixing
- Regreasing through grease nipples 90° , 0°

Load factors

Pitch	Nominal \varnothing	Dynamic load factor	Static load factor
2.5 mm	16 mm	3500 N	5500 N
4.0 mm	16 mm	4600 N	7200 N
5.0 mm	16 mm	4600 N	7200 N
10.0 mm	16 mm	4200 N	6500 N

Ordering information

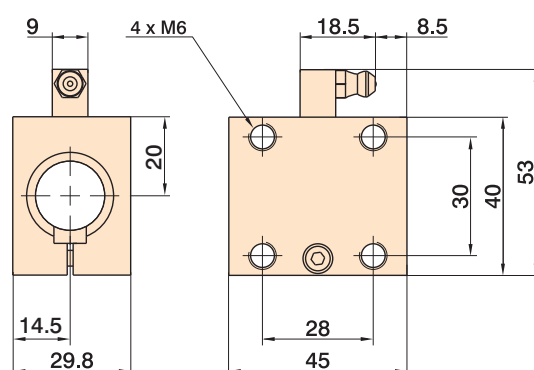
only for spindles $\varnothing 16$

Pitch	Part no.
2.5 mm	213 003 1003
4.0 mm	213 003 1004
5.0 mm	213 003 1005
10.0 mm	213 003 1010

matching:
Dirt scraper

- VE 2 pcs. Part no.: 213500 0001

Dimensioned drawings



Version 3- $\varnothing 16$ $\varnothing 25$



Features

- Material 16MnCr5, ground
- Versions for recirculating ball spindles $\varnothing 16$ and $\varnothing 25$ mm
- Nut pitches: 2.5/4/5/10 and 20 mm ($\varnothing 16$ mm), 5/10 and 20 mm ($\varnothing 25$ mm)
- Balls are rerouted internally
- The version with nut pitch 20 mm is supplied with scrapers

Load factors

Pitch (mm)	Nominal \varnothing (mm)	Dyn. load factor (N)	Static load factor (N)
2.5	16	3500	5500
4.0	16	4600	7200
5.0	16	4600	7200
10.0	16	4200	6500

5.0	25	5100	12600
10.0	25	5100	12600
20.0	25	3570	8800

Ordering information

only for spindles
 $\varnothing 25$

Pitch	Part no.
5.0 mm	213 700 0005
10.0 mm	213 700 0010
20.0 mm	213 700 0020

matching:
dirt scraper
• VE 2 pcs.
Part no.: 213700 9000

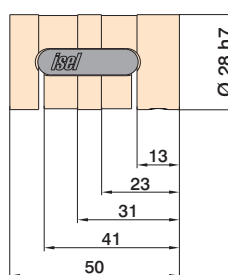
only for
spindles $\varnothing 16$

Pitch	Part no.
2.5 mm	213 503
4.0 mm	213 514
5.0 mm	213 505
10.0 mm	213 510
20.0 mm	213 520

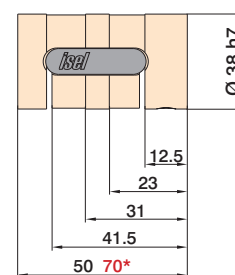
matching:
dirt scraper
• VE 2 pcs.
Part no.: 213500 0001

Dimensioned drawings

for spindle $\varnothing 16$



for spindle $\varnothing 25$

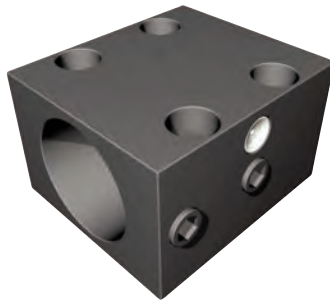


*) At pitch = 20

Clamping blocks For nut version 3



Flange securing



Base securing

Features

- Material steel, gunmetal finish
- Versions for recirculating ball spindles $\varnothing 25$ and $\varnothing 16$ mm
- Nut pitches
5 / 10 and 20 mm ($\varnothing 25$ mm)
2.5 / 4 / 5 / 10 and 20 mm ($\varnothing 16$ mm)
- Recirculating ball nuts are adjustable for no play
- Clamping blocks for base and flange securing

Ordering information

Clamping block 2 $\varnothing 16$
Flange securing

Pitch	Part no.
all	213 501

Clamping block 1 $\varnothing 16$
Base securing

Pitch	Part no.
all	213 500

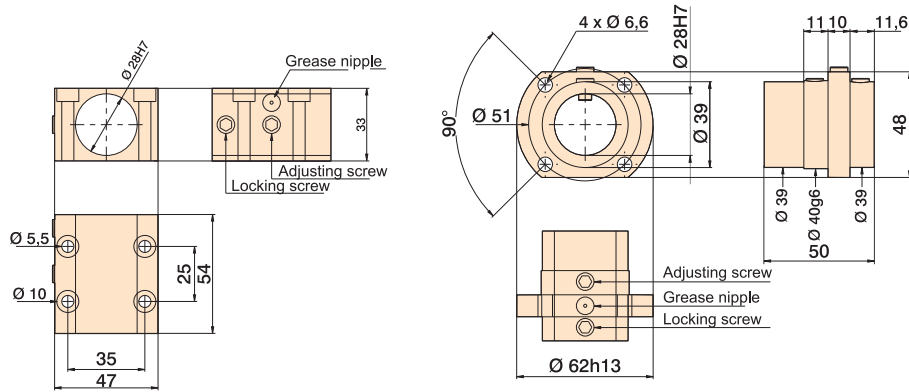
Clamping block 2 $\varnothing 25$
Flange securing

Pitch	Part no.
5 / 10	213 700 9003
20	213 700 9004

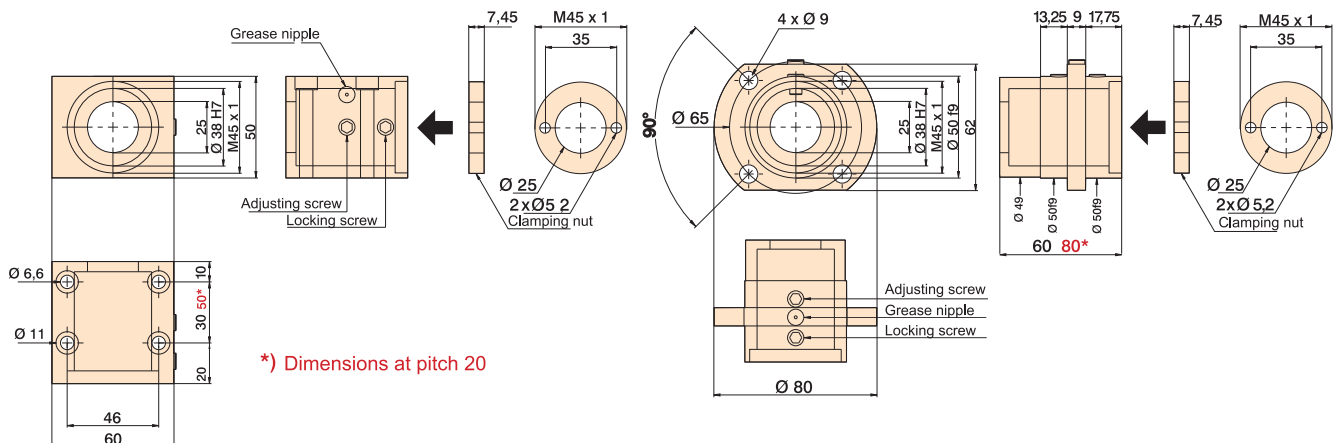
Clamping block 1 $\varnothing 25$
Base securing

Pitch	Part no.
5 / 10	213 700 9001
20	213 700 9002

Dimensioned drawings – spindle clamping blocks $\varnothing 16$

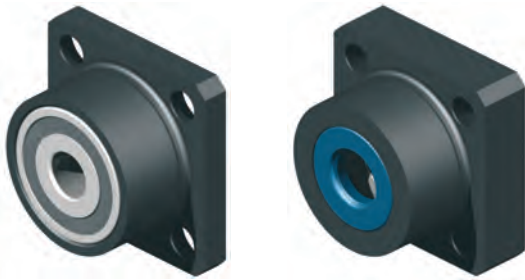


Dimensioned drawings – spindle clamping blocks $\varnothing 25$



Flange bearing

for spindle \varnothing 16 mm



Flange bearing
drive side

Flange bearing
Floating bearing side

Ordering information

Flange bearing, drive side

Part no.: **216 504 0001**

Flange bearing, floating bearing side

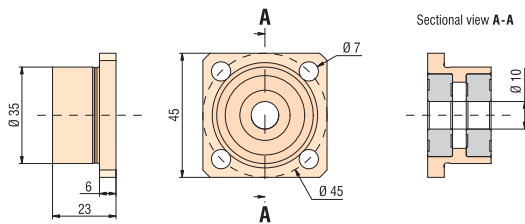
Part no.: **216 504 0002**

Features

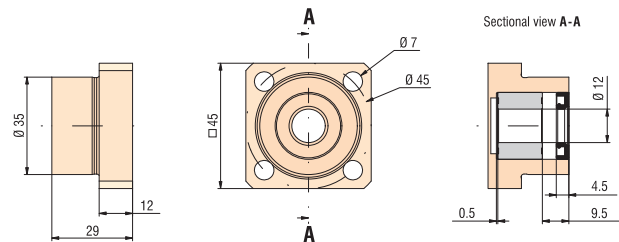
- Bearing, spindle drive side (fixed bearing side) and the spindle floating bearing side
- Flange bearing, drive side: Bushing with two pressed angular contact ball bearings in an O-configuration
- Flange bearing, floating bearing side (counterbearing): bushing with a pressed needle bearing

Dimensioned drawings

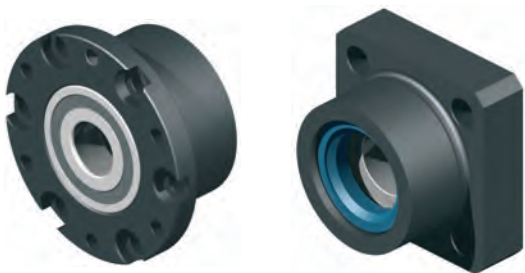
Flange bearing
drive side



Flange bearing
Floating bearing side



for spindle \varnothing 25 mm



Flange bearing
drive side

Flange bearing
floating bearing side

Ordering information

Flange bearing, drive side

Part no.: **216 504 0006**

Flange bearing, floating bearing side

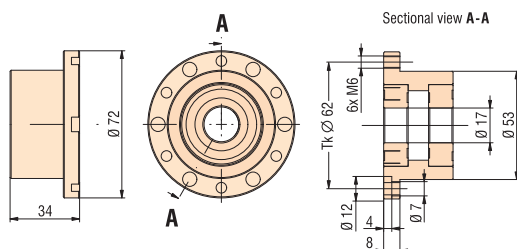
Part no.: **216 504 0005**

Features

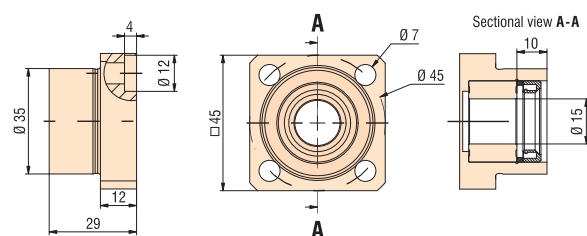
- Bearing, spindle drive side (fixed bearing side) and the spindle floating bearing side
- Flange bearing, drive side: Bushing with two pressed angular contact ball bearings in an O-configuration
- Flange bearing, floating bearing side (counterbearing): bushing with a pressed needle bearing

Dimensioned drawings

Flange bearing
drive side

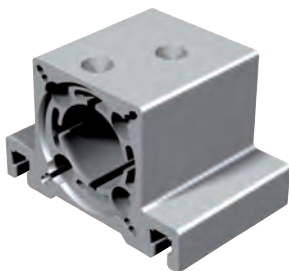


Flange bearing
floating bearing side



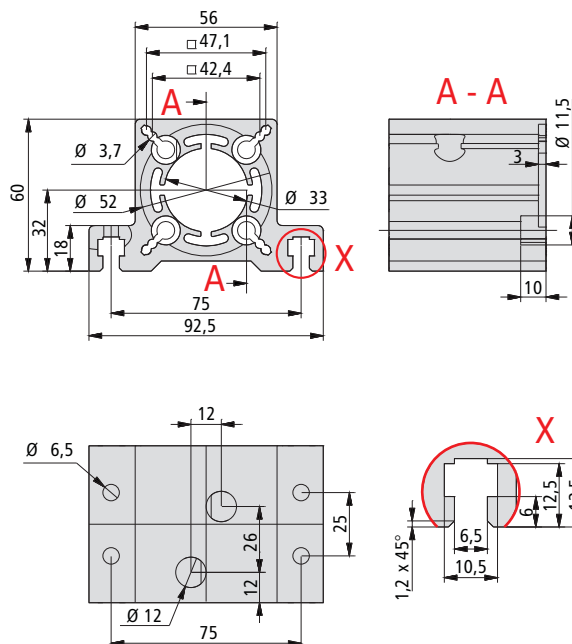
Bearing supports

Bearing support 1

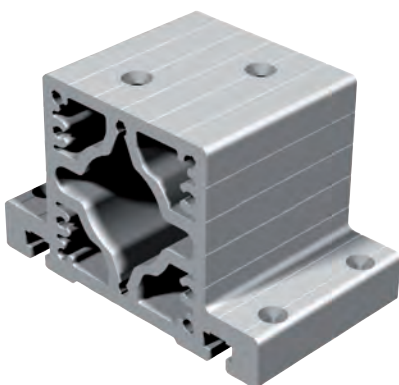


- Aluminium profile to DIN EN 12020-2
- As a parallel connection of flange bearing and motor flange
- Flat milled securing surfaces
- Version for recirculating ball spindle $\varnothing 16$ mm
- Universal securing options

Part no.: **216504 0007**

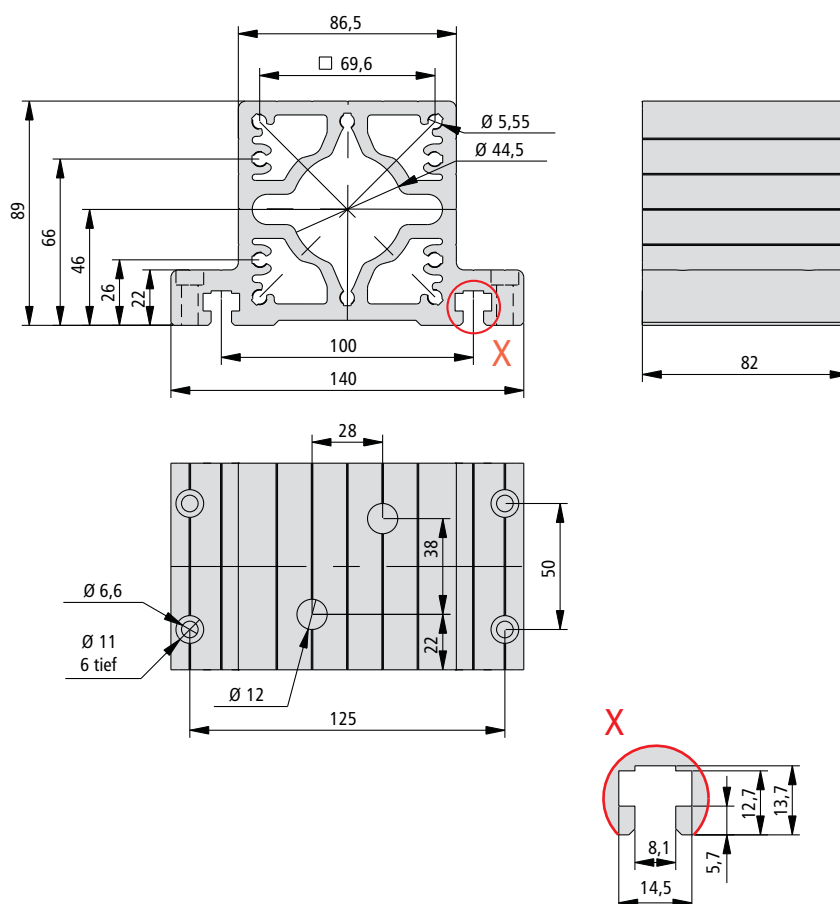


Bearing support 2



- Aluminium profile to DIN EN 12020-2
- As a parallel linkage of flange bearing and motor flange
- Version for recirculating ball spindle $\varnothing 25$ mm
- Universal securing options

Part no.: **216504 0008**



Shaft couplings

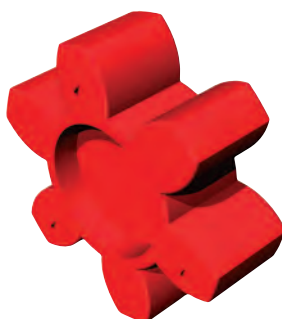
Connection options Direct drive	LES 4	LES 6	LES 5	Angular transmission Securing 0°	Angular transmission Securing 90°
MS 135 HT - 2 MS 200 HT - 2 DC 100 EC 60	Connection via clutch housing 1 short bushing with corresponding shaft coupling				Clutch housing 1 long bushing
MS 600 HT MS 900 HT DC 300 EC 86	Connection via clutch housing 2 short bushing with corresponding shaft coupling				Clutch housing 2 long bushing
Angular transmission Securing 0°	split clutch housing short bushing with corresponding shaft coupling			Connection via Transmission shaft set	
Angular transmission Securing 90°	split clutch housing long bushing with corresponding shaft coupling				

Shaft couplings



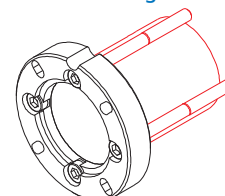
Deliverables: 2 aluminium blocks,
3 PUR sprockets (86°, 92° and 98°
Shore) and matching adjusting screws
For part no. see table

PUR sprockets

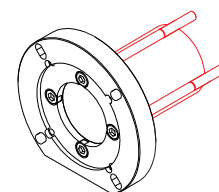


for WK 20/30 Part no.: **217 011 00****
for WK 30/40 Part no.: **217 012 00****
for WK 40/60 Part no.: **217 013 00****
for ** use the Shore hardness

Clutch housing 1 + 2

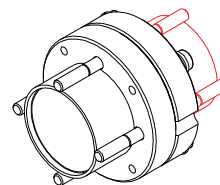


short bushing
Part no.: **218 100 0001**
long bushing
Part no.: **218 100 0002**



short bushing
Part no.: **218 100 1001**
long bushing
Part no.: **218 100 1002**

split clutch housing



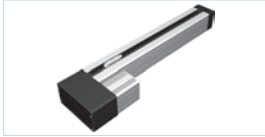





short bushing
Part-no.: **218 100 2001**
long bushing
Part-no.: **218 100 2002**

Clutch	Part no.	d 1	d 2
20/30	218001 5060	5.0	6.0
	218001 9999	from 4 to 7 mm	
30/40	218002 6380	6.35	8.0
	218002 8080	8.0	8.0
40/60	218002 9999	from 4 to 13 mm	
	218003 9580	9.52	8.0
	218003 9999	from 4 to 18 mm	

Other clutches to order.







Linear units

Overview

LES functional overview		C 58
LES 4 with spindle drive		C 60
LES 6 with spindle drive		C 62
LES 5 with spindle drive		C 64
LES 16-150 with spindle drive		C 66
LES 16-250 with spindle drive		C 67
Calculations		C 68
Combination examples		C 70
Motor modules		C 72
Installation kit <small>with angular transmission</small>		C 76
Slot/crossbench plates		C 78
T-key slot plates		C 81
Angle bracket		C 82
Accessories		C 85
Cross bench 10/20		C 86

Linear units

Overview

LEZ functional overview		C 88
LEZ 1 with toothed belt drive		C 90
LEZ 2 with toothed belt drive		C 92
LEZ 3 with toothed belt drive		C 94
LEZ 9 with toothed belt drive		C 96
Accessories		C 98
Examples in use		C 99
iLD with direct drive	 	C 100

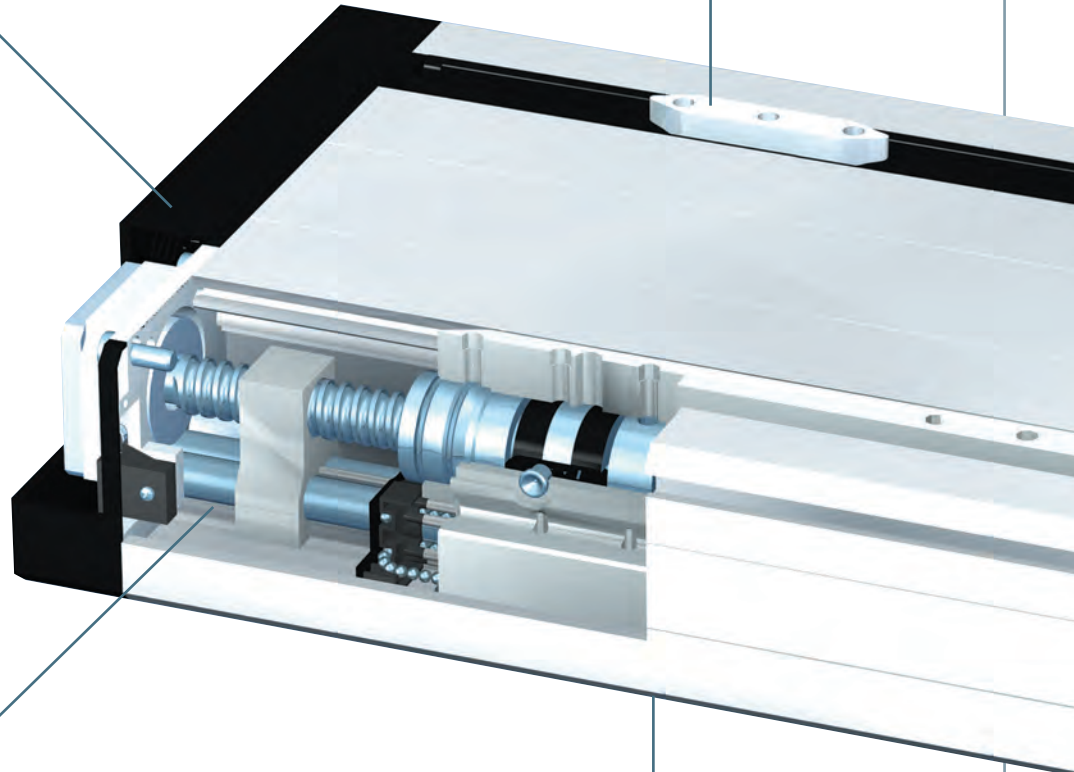
CAD data on our website www.isel-germany.de

Functional overview

at example LES 5

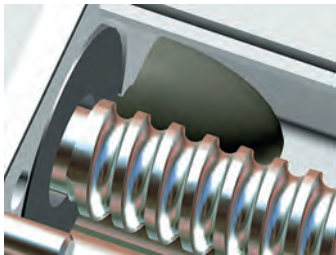
Plastic cap
electromagnetically shielded

Clamping surface
milled flat

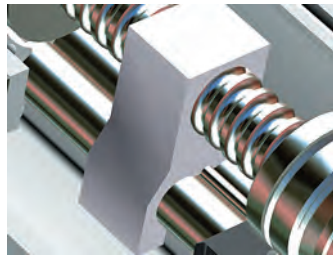


Shaft housing outline
precision milled

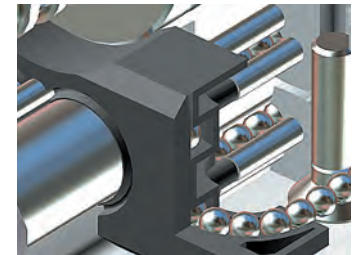
Profile underside
milled flat



- End position buffering both sides with soft PVC parabolic springs
- Counter-bearing with 2 needle bushings



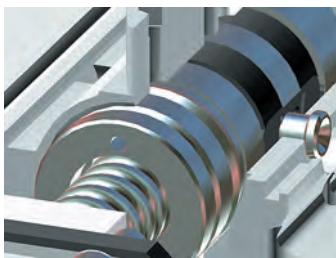
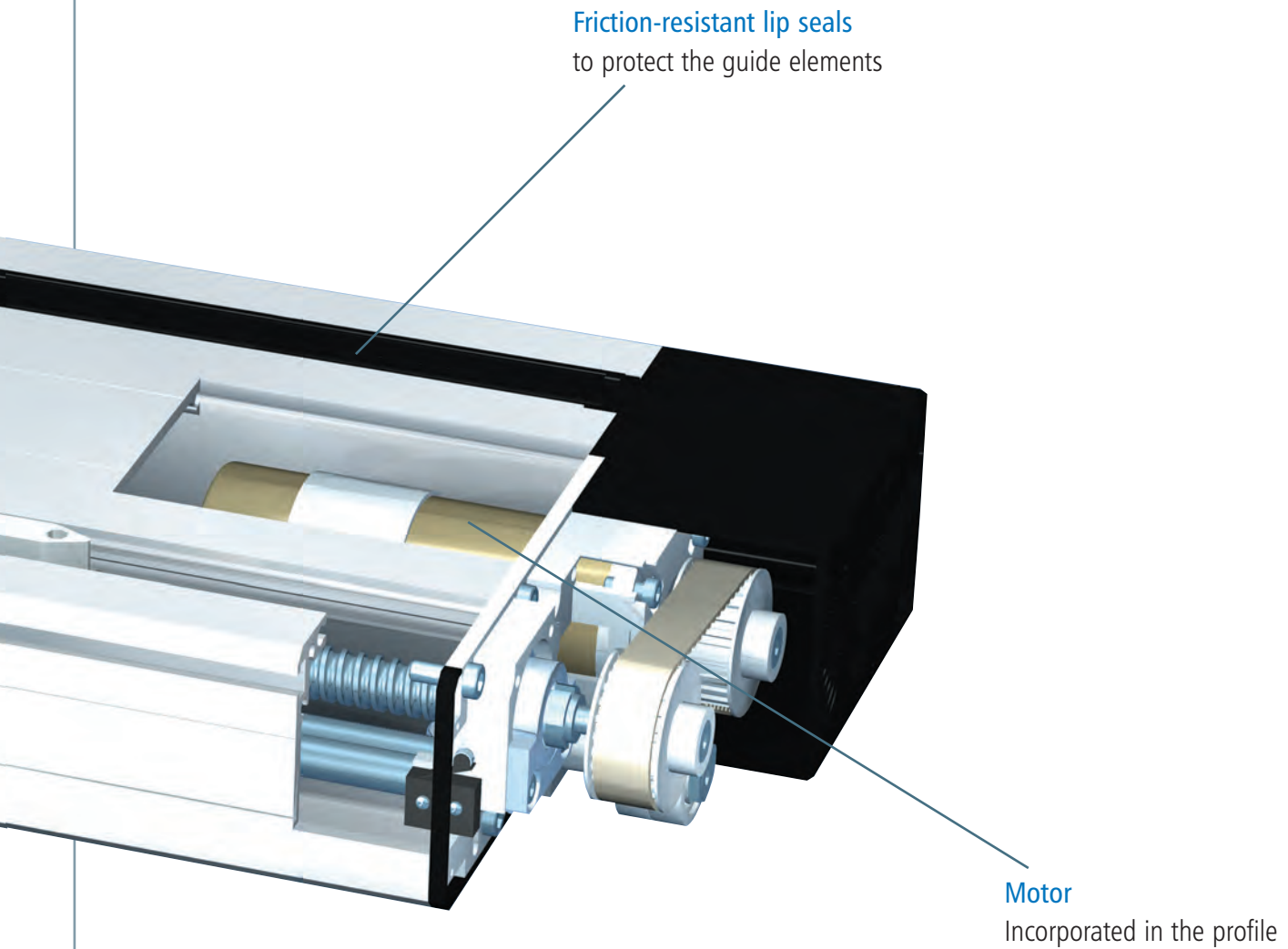
- Spindle support from a profile length of 1500 mm without limiting the travel



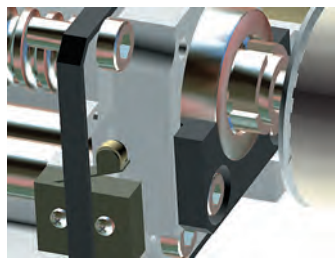
- Recirculating ball in patented aluminium linear slots
- Glass fibre reinforced loop components with scrapers

Functional overview

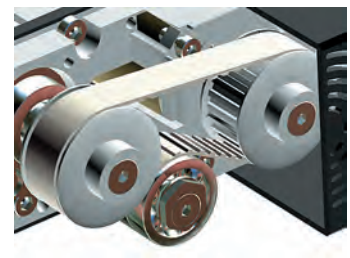
at example LES 5



- Preset play-free recirculating ball nut with scrapers
- Central lubrication system for recirculating ball nut and circulations



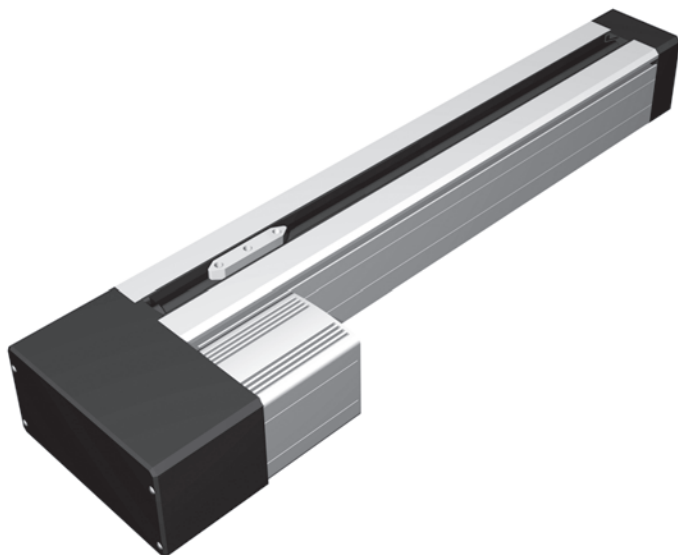
- Integrated overrun limit switch
- Spindle bearing with angular contact bearings
- Axially free from play by means of self-locking special nuts



- Belt return and connecting electronics covered completely by protective cap

Linear units with spindle drive

LES 4



LES 4 with side 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 slots WS 5/70, 2 x WS 5/70 (70 mm long), adjustable for no play, central lubrication system
- Recirculating ball transmission with 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, Repeatability ± 0.02 mm
- sealed angular contact bearings in drive - steel flange

Ordering key

234 **XXX** **0XXX**

Drive

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

Shaft slots

- 0** = 1 Shaft slots 70 mm
- 2** = 2 shaft slots 70 mm

Profile length (L1)

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

Standard profile lengths in 100 mm raster - to order

Recirculating ball drive

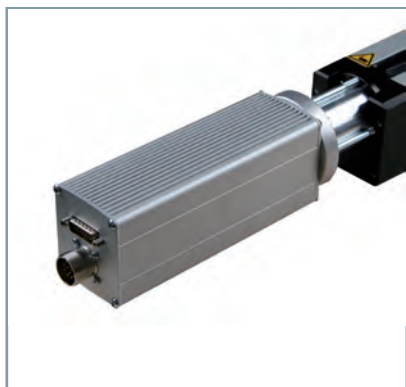
- 0** = none
- 1** = Pitch 2.5 mm
- 2** = Pitch 4.0 mm
- 3** = Pitch 5.0 mm
- 4** = Pitch 10 mm
- 5** = Pitch 20 mm

Options:

- Black powder-coated aluminium profile
- Electromagnetic brake
- Steel slots LS2 (Part no. 223007)
- Limit switch attachment kit (see accessories)

Drive modules

see page 72 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 <small>see dimensioned drawing</small>	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

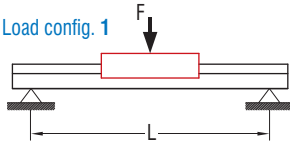
No load running torques					
Speed (rpm)	Spindle pitch				
	2.5	4	5	10	20
500	15	15	16	17	18
1500	19	19	19	20	21
3000	23	24	24	25	26

Linear units with spindle drive

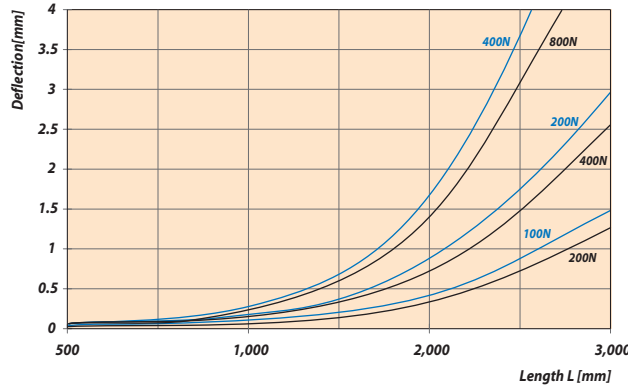
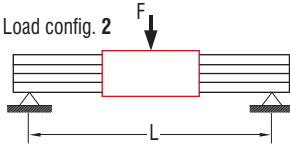
LES 4

Bending

■ Load config. 1



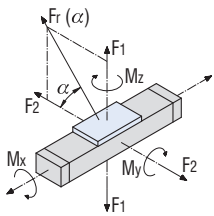
■ Load config. 2



Load factors

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

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



LES 4 with one WS 5/70

C_0	2576.65 N
C	1461,14 N
$F_1 \text{ stat.}$	2200.67 N
$F_1 \text{ dyn.}$	1247.93 N
$F_2 \text{ stat.}$	2576.65 N
$F_2 \text{ dyn.}$	1461.14 N
$M_x \text{ stat.}$	36.45 Nm
$M_y \text{ stat.}$	82.16 Nm
$M_z \text{ stat.}$	96.20 Nm
$M_x \text{ dyn.}$	20.67 Nm
$M_y \text{ dyn.}$	46.59 Nm
$M_z \text{ dyn.}$	54.55 Nm

LES 4 with two WS 5/70

C_0	4,954.5 N
C	2,809.5 N
$F_1 \text{ stat.}$	4,231.5 N
$F_1 \text{ dyn.}$	2,398.5 N
$F_2 \text{ stat.}$	4,954.5 N
$F_2 \text{ dyn.}$	2,809.5 N
$M_x \text{ stat.}$	44.7 Nm
$M_y \text{ stat.}$	126.945 Nm
$M_z \text{ stat.}$	148.635 Nm
$M_x \text{ dyn.}$	25.2 Nm
$M_y \text{ dyn.}$	71.955 Nm
$M_z \text{ dyn.}$	84.285 Nm

permissible spindle speeds

LES 4 / 5 / 6	Spindle pitch p [mm]	max. permissible feed speed v permissible [mm/s]				
		2.5	4	5	10	20
Profile length L [mm]	max. permissible spindle speed n [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

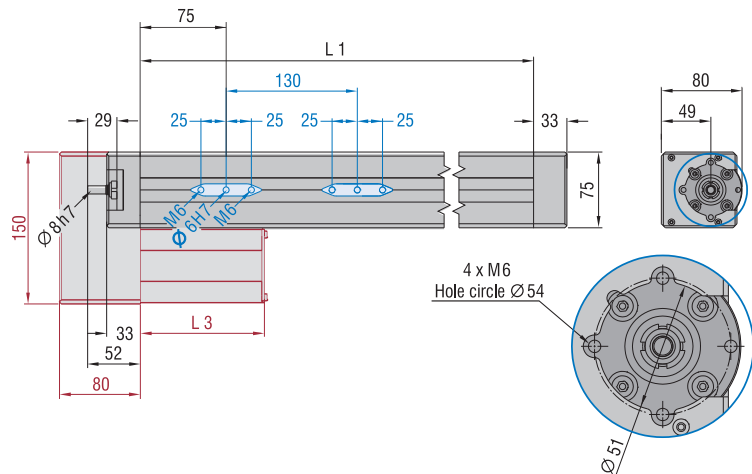
* with spindle support

Dimensioned drawing

process travel

at 1xWS 5/70 = L1 -150 mm
at 2xWS 5/70 = L1 -280 mm

external limit switches see page C85



Dimensioned drawing Aluminium profile

