isel®

From Components to Systems

Automation

2009/2E

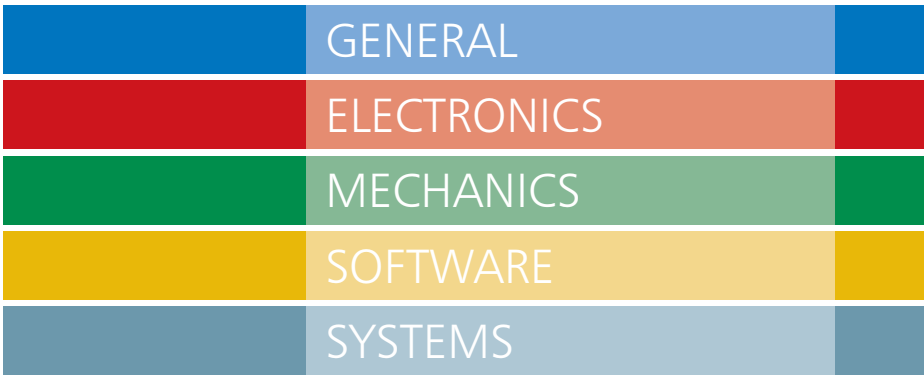
Electronics

Mechanics

Software

Systems

isel®



isel®

Business hours:

- Sales, Order Processing and Reception
  Monday – Thursday 07:30 – 16:30
  Friday 07:30 – 14:00
- Shipping and Receiving Department
  Monday – Thursday 07:00 – 15:00
  Friday 07:00 – 12:30
- Customer pick-up
  Monday – Thursday 08:00 – 13:00
  Friday 08:00 – 11:00

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isel®

This catalogue presents the production & sales program of **isel Germany AG** .
The product philosophy "From components to systems" is thoroughly represented on the following catalogue pages.

If the products pictured here do not cover your needs, please contact us, we will find a solution for virtually any problem, including training and service.

We will gladly consult you.

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Locations

Eiterfeld (Hessia) factory sized approx. 8000 m² Production, warehouse and office space

Eichenzell (Hessia) factory sized approx. 11,000 m² Production, warehouse and office space

Dermbach (Thuringia) factory sized approx. 14,000 m² Production, warehouse and office space

Index

The company

The company isel Germany AG founded 1972 in Eiterfeld (Hessia) under the company name isert-Elektronik is the core company of the isel group of companies.

The company objective are the development, production, sales and service of components and systems for automation.

The product range from components to systems made by isel includes CNC units, CNC machines, automation, handling and robotics with step, servo, linear, and torque motors including controls.

The company isel Germany AG has locations in Germany in. Eichenzell (Hessia), Eiterfeld (Hessia) and Dermbach (Thuringia) with a total of 33,000 m² of production, warehouse and office space.

Company objectives

The objective of isel Germany AG is to provide products and services at a favourable cost/performance ratio and a high level of quality.

The division industrial automation is covered by isel Germany AG with development, production, sales and service in addition to consultation, training and project planning.

The modular alignment of isel components for the fields of ELECTRONICS, MECHANICS, SOFTWARE and SYSTEMS form an important role. Open interfaces of the CNC controls used in addition to software allow flexibility for customer-oriented customisations.

The business field also includes remittance work and project planning for OEM customers in all fields.

The technical specifications and information are to the best of our knowledge.
In line with further development, technical specifications are subject to change.
The release of this catalogue voids all previously issued catalogues.

Quality assurance in accordance with international standards ...

The quality assurance system for our products comprises all areas which contribute to achieving the quality goals. It is based on legal requirements, customer requirements and the internal isel Germany AG quality requirements.
The quality assurance system ensures the production processes are manageable and that products are only sent on to the next production step if they meet the respective specifications.

In accordance with DIN ISO 9001:2000 the following elements have been introduced and are being applied:

- Control of documents, data
- purchasing
- inspection (receiving, intermediate and final inspection)
- inspection equipment monitoring
- inspection status
- Handling of faulty products
- Corrective and preventive measures
- Handling, warehousing, packaging, preservation and shipping

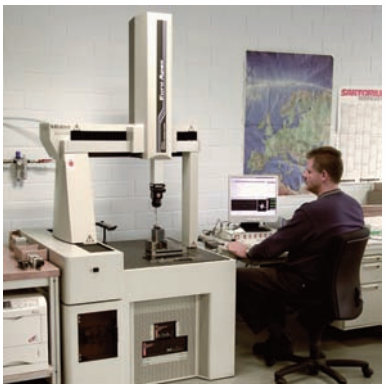
Coordinate measuring equipment

Mitutoyo BHN-715S

Specifications: X-axis = 700 mm
Y-axis = 1500 mm
Z-axis = 600 mm
Touch system: TP 200
Changer magazine: SCR 200
Length measurement deviation:
MPE = (5.0+5.5*L/1000)µm

Mitutoyo Euro C 544 Apex

Specifications: X-axis = 500 mm
Y-axis = 400 mm
Z-axis = 400 mm
Touch system: TP 200
Changer magazine: SCR 200
Length measurement deviation:
MPE = (2.9+4.0*L/1000)µm



Mitutoyo Euro C 574 Apex

Specifications: X-axis = 500 mm
Y-axis = 700 mm
Z-axis = 400 mm
Touch system: TP 200
Changer magazine: SCR 200
Length measurement deviation:
MPE = (2.9+4.0*L/1000)µm

Technical specifications subject to change.

... and the quality requirements of our customers and isel Germany AG

Surface roughness tester Mitutoyo

Type: SJ - 201 P
Test procedure: Ra, Ry, Rz, Rq, Rt

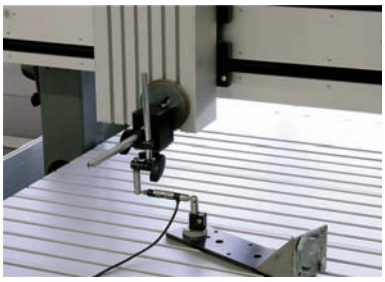
Hardness tester Wolpert

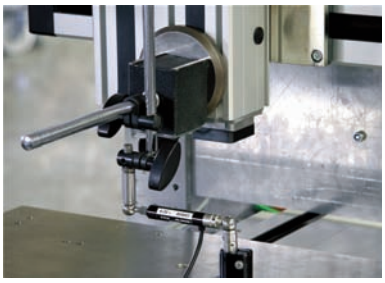
Type:
Dia Testor 2 Rc
Test procedure: Vickers, Brinell and Rockwell

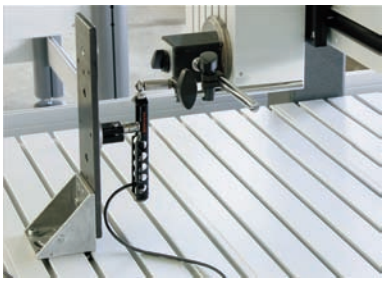
Layer thickness measurement device Elektro Physik

Type: Minitest 600 B
Probe for iron and non-iron measurements.

QC 10 accuracy check







The QC 10 system allows the routine inspection of our machines.
The measurement of the circularity detects geometric and control machine faults such as for example squareness, contouring errors, guide clearance, straightness faults and backlash. The system is traceable according to DIN ISO 9000.

XL-80 Laser Interferometer

We use the laser system for calibrating machine tools and coordinate measuring equipment for ...

... position measurement

Position measurement is the most common measurement performed on machines. The system captures the positioning and repeat accuracy by comparing the position value indicated by the machine and the actual position captured by the Laser Interferometer System.

... tilt angle measurement

On machine tools and coordinate measuring equipment the cause for positioning faults is oftentimes the tilt of the axis. With the Abbe effect the faults continue to increase with an increasing distance from the axle location.

... Measuring the dynamic behaviour

The software for dynamic measurements allows for motion sequences, speeds, accelerations, vibrations and the capabilities of servo drives to be determined.

Technical specifications subject to change.


electron
NB_FAN
AUX
RTL8101L

ELECTRONICS

Motors/Sensors

Overview

Regulators/Controls Overview

Two-phase stepper motor MS 56

Two-phase stepper motor MS 56

Drive unit MD 24

Features

- Stepping angle 1.8°, lower precision in micro-step operation
- Very high torque with rare-earth magnets
- Optimised for use with positioning controls
- Optimal ratio of torque and scale
- 8-wire connection
- Minor stepping angle error, not cumulative
- Protection class IP43

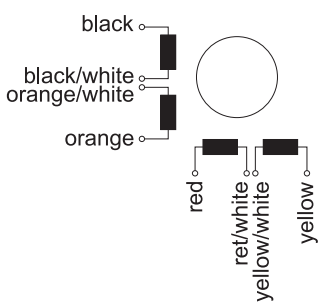
General

2-phase stepper motors show similar characteristics as synchronous motors. They are easy to control and are marked by excellent durability and reliability at a favourable price. This opens a broad spectrum of applications. The MS series 2 phase stepper motors are high torque types. A particularly high torque is achieved through the use of rare-earth magnets.

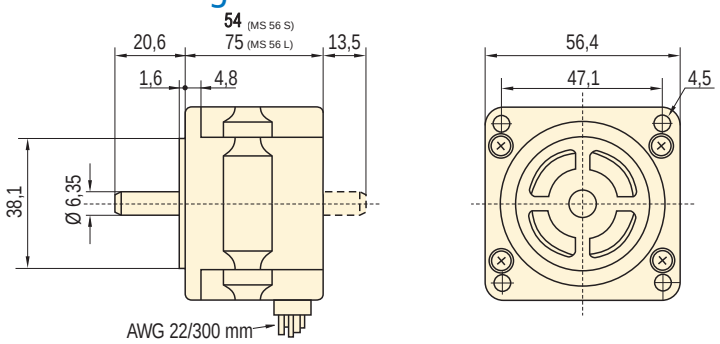
Technical specifications

Description	Holding torque Bipolar Nm.	Winding current per phase parallel / serial A	Coil voltage per phase parallel / serial V	Winding inductance per phase mH	Weight kg	Overall length (without shaft) mm	Item no.
MS 56 S	1.35	4.2 / 2.1	1.5 / 2.9	1.8	0.7	54	470550
MS 56 L	2	4.2 / 2.1	2.1 / 4.2	3.1	1.0	75	470580

Wiring diagram

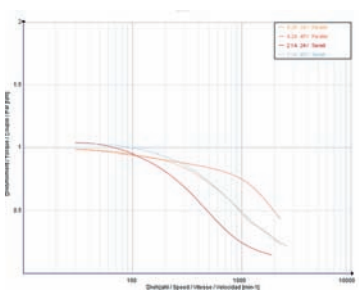


Scale drawing

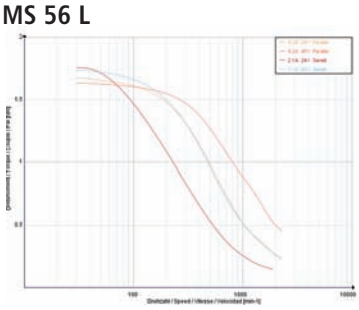


Torque curves

MS 56 S



MS 56 L



Technical specifications subject to change.

Two-phase stepper motor MS 86

Two-phase stepper motor MS 86

Drive unit MD 28

Features

- Stepping angle 1.8°, lower precision in micro-step operation
- Very high torque with rare-earth magnets
- Optimised for use with positioning controls
- Optimal ratio of torque and scale
- 8-wire connection
- Minor stepping angle error, not cumulative
- Protection class IP43
- Optional: drive unit

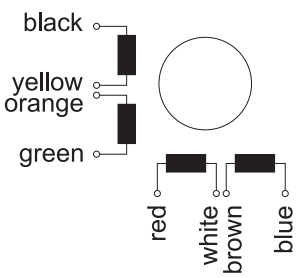
General

2-phase stepper motors show similar characteristics as synchronous motors. They are easy to control and are marked by excellent durability and reliability at a favourable price. This opens a broad spectrum of applications. The MS series 2 phase stepper motors are high torque types. A particularly high torque is achieved through the use of rare-earth magnets.

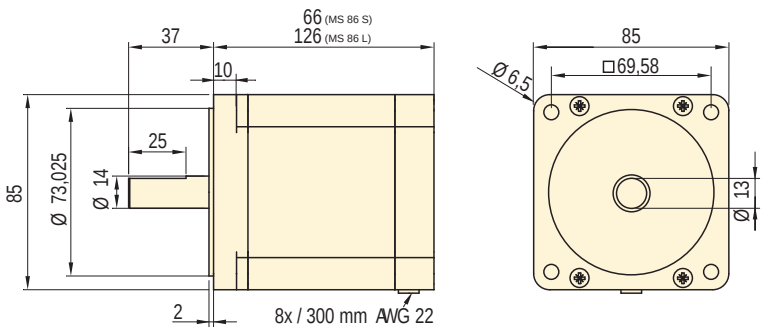
Technical specifications

Description	Holding torque Bipolar Nm.	Winding current per phase parallel / serial A	Coil voltage per phase parallel / serial V	Winding inductance per phase mH	Weight kg	Overall length (without shaft) mm	Item no.
MS 86 S	3.01	6.3 / 3.18	1.4 / 2.8	1.5	1.7	66	470820
MS 86 L	9	5.6 / 2.8	2.6 / 5.3	4.2	3.8	126	470880

Wiring diagram

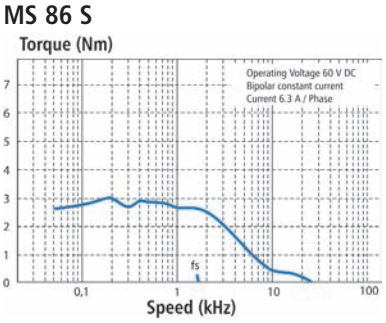


Scale drawing

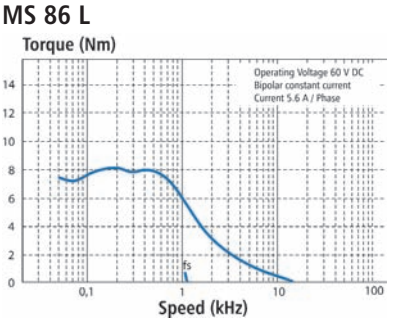


Torque curves

MS 86 S

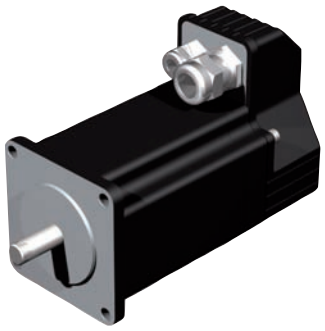


MS 86 L



Technical specifications subject to change.

Three-phase stepper motor ST 56



Three-phase stepper motor ST 56

Drive unit MD 34

Features

- Stepping angle 1.2°, higher precision in micro-step operation
- Very high torque with rare-earth magnets
- High power density, optimal ratio of torque and scale
- 6-wire connection
- Star- or delta connection
- Minor stepping angle error, not cumulative
- Protection class IP43
- Optimised for use with positioning controls

General

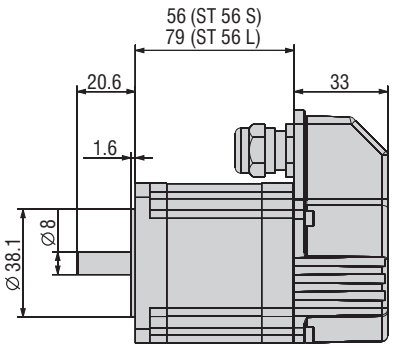
3-phase stepper motors, just as the prevalent 2-phase stepper motors, offer a high degree of reliability and durability. However, they do feature higher step precision and better resonance properties.
This opens a broad spectrum of applications.

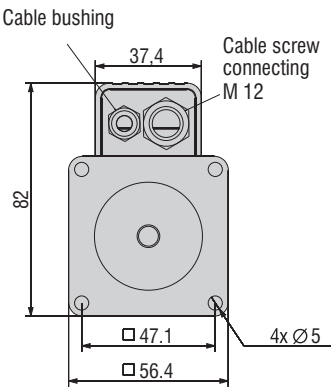
Using the matching drive module the control, too, is very easy. The ST series 3 phase stepper motors are high torque types. A particularly high torque is achieved through the use of rare-earth magnets.

Technical specifications

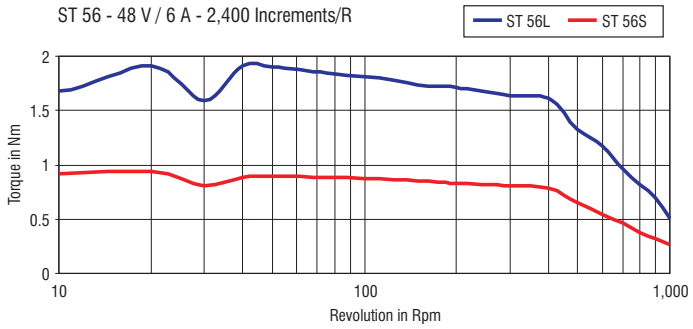
Description	Holding torque Nm	Winding current per phase A	Coil voltage per phase V	Winding inductance per phase mH	Stepping angle °	Connecting lead	Weight kg	Flange size mm	Overall length (without shaft) mm	Ø / length shaft side A mm	Resistance per phase Ohm	Item no.
ST 56 S	0.9	6.3	3.34	1.3	1.2°	6	0.79	56.4	56	8 / 20.6	0.53	396 700 5000
ST 56 L	1.5	6.3	5.04	2.1	1.2°	6	1.32	56.4	79	8 / 20.6	0.8	396 701 5000

Scale drawings



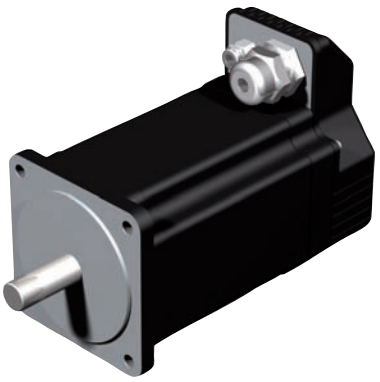


Torque curves



Technical specifications subject to change.

Three-phase stepper motor ST 86



Three-phase stepper motor ST 86

Drive unit MD 38

Features

- Stepping angle 1.2°, higher precision in micro-step operation
- Very high torque with rare-earth magnets
- High power density, optimal ratio of torque and scale
- 6-wire connection
- Star- or delta connection
- Minor stepping angle error, not cumulative
- Protection class IP43
- Optimised for use with positioning controls

General

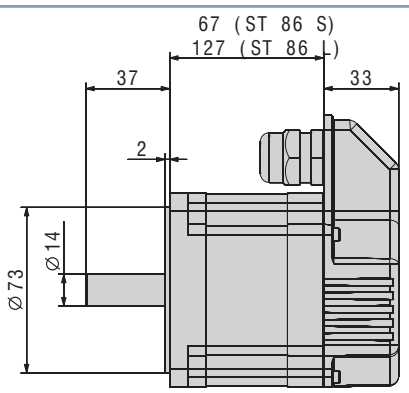
3-phase stepper motors, just as the prevalent 2-phase stepper motors, offer a high degree of reliability and durability. However, they do feature higher step precision and better resonance properties.
This opens a broad spectrum of applications.

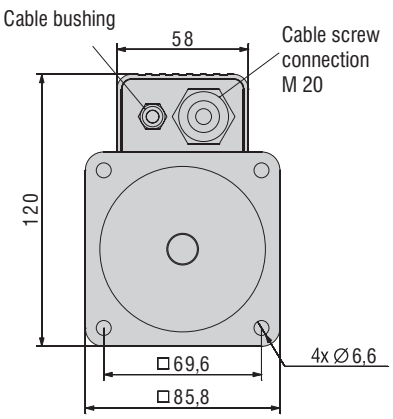
Using the matching drive module the control, too, is very easy. The ST series 3 phase stepper motors are high torque types. A particularly high torque is achieved through the use of rare-earth magnets.

Technical specifications

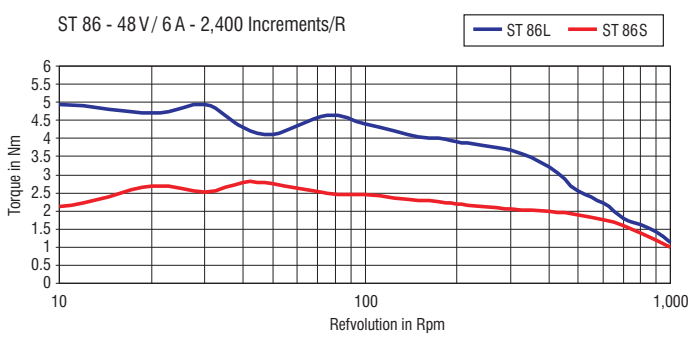
Description	Holding torque Nm	Winding current per phase A	Coil voltage per phase V	Winding inductance per phase mH	Stepping angle °	Connecting lead	Weight kg	Flange size mm	Overall length (without shaft) mm	Ø / length shaft side A mm	Resistance per phase Ohm	Item no.
ST 86 S	2.26	6.36	3.7	1.6	1.2°	6	1.65	85.8	67	14 / 37	0.58	396 702 5000
ST 86 L	6.4	9.47	5.4	2.34	1.2°	6	3.8	85.8	127	14 / 37	0.57	396 703 5000

Scale drawings





Torque curves



Technical specifications subject to change.

electronics

Servo motor DC 100

Drive controller iMD 10

Features

- Brush covered servo motor
- Low-impedance winding construction
- Good dynamics
- 2-finger brush (high durability)
- Incremental encoder with 512 impulses/revolution
- Protection class IP43/Encoder IP50

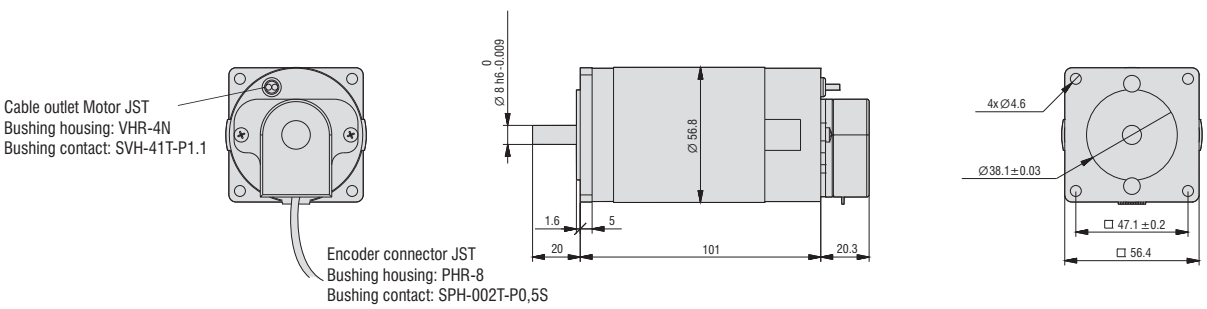
General

Brush-coated DC servo motors are the entry level of controlled drive technology. They feature great dynamics and are proven in drive technology. The added-on encoder allows for very precise positioning. This predestines the use in CNC machines and in automation technology.

Technical specifications

Description	Voltage V	Idle speed 1/min	No-load current A	Nominal speed 1/min	Nominal torque Ncm	Nominal current A	Effective output W	Peak current A	Item no.
DC 100	48	3,400	0.25	3,000	30	2.8	95	6.5	471022 0020

Scale drawings



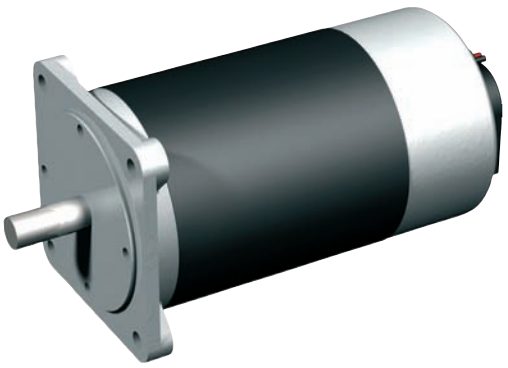
Terminal assignment

Cable coding	1	2	3	4	5	6	7	8
Conductor colouring	Black	Red	Green	Brown	Grey	White	Yellow	Orange
Driver output	0V	Vcc	SIG A	SIG $\overline{A}$	SIG $\overline{B}$	SIG B	SIG Z	SIG $\overline{Z}$

Technical specifications subject to change.

Servo motor

DC 300



Drive controller iMD 10

Features

- Brush covered servo motor
- Low-impedance winding construction
- Good dynamics
- 2-finger brush (high durability)
- Incremental encoder with 512 impulses/revolution optional 1000 impulses/revolution
- Protection class IP43/Encoder IP50

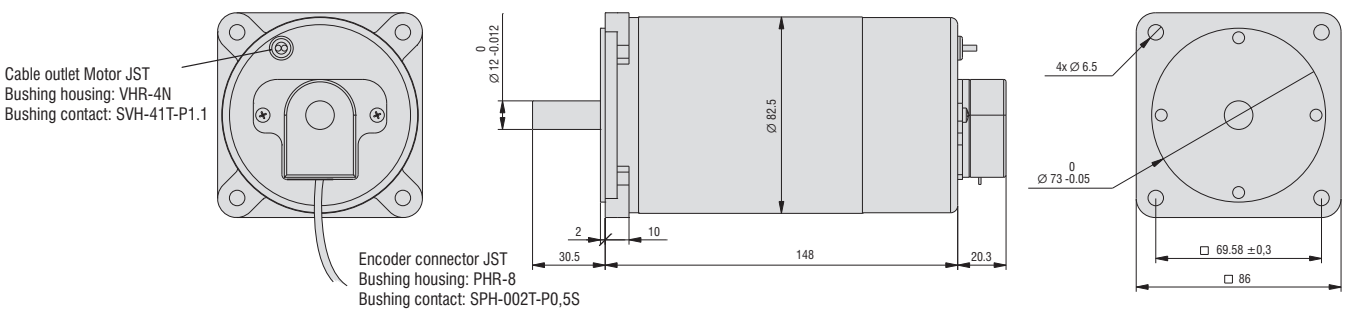
General

Brush-coated DC servo motors are the entry level of controlled drive technology. They feature great dynamics and are proven in drive technology. The added-on encoder allows for very precise positioning. This predestines the use in CNC machines and in automation technology.

Technical specifications

Description	Voltage V	Idle speed 1/min	No-load current A	Nominal rotation speed 1/min	Nominal torque Ncm	Nominal current A	Effective output W	Peak current A	Item no.
DC 300	48	3,200	1	3,000	100	9	315	20	471024

Scale drawings



Terminal assignment

Cable coding	1	2	3	4	5	6	7	8
Conductor colouring	Black	Red	Green	Brown	Grey	White	Yellow	Orange
Driver output	0V	Vcc	SIG A	SIG $\overline{A}$	SIG $\overline{B}$	SIG B	SIG Z	SIG $\overline{Z}$

Technical specifications subject to change.

electronics

Servo motor EC 60

Drive controller iMD 20

Features

- Electronically commutated 3-phase servo motor
- Brushless drive
- High delivery output with a compact design
- Incremental measuring system
- Hall effect sensors
- Protective type IP 44
- Application areas: positioning controls, torque control
- Connects via round connector
- Option: brake

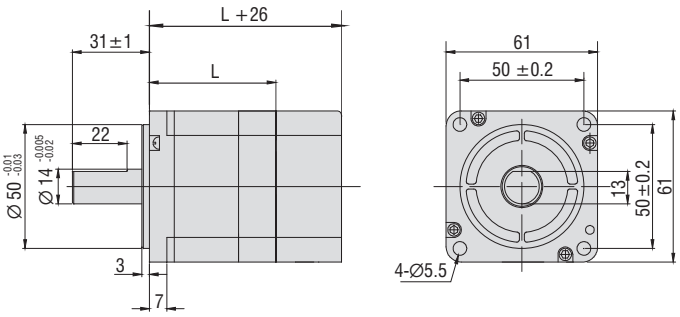
General

Brushless EC-motors are designed as electronically commutated 3-phase synchronous motors. Compared to brush-covered drives, these motors feature an even longer lifetime as they are subject to less wear. Further, the high power density and dynamics as related to the overall size must be pointed out. These motors are used in many areas of automation technology and in CNC machines.

Technical specifications

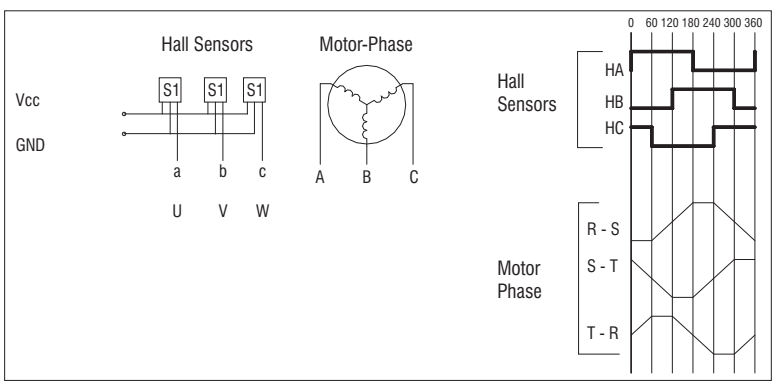
Description	Nominal output W	Nominal voltage V DC	Current A	Number of poles	Nominal speed rpm	Torque at Nominal speed Nm	Peak torque Nm	Torque constant Nm / A	Length L mm	Weight kg	Encoder P/R	Peak current A	Item no..
EC 60 S	156	48	6.9	8	3,000	0.5	1.75	0.12	71	1.25	1,000	20	474156 0048
EC 60 L	235	48	10.5	8	3,000	0.75	2.25	0.12	91	1.6	1,000	31.5	474235 0048

Scale drawings



Model	Shaft diameter	Shaft shape
EC 60 S	Ø 14 mm	Flat 1 x 25
EC 60 L	Ø 14 mm	Flat 1 x 25

Terminal assignment



Technical specifications subject to change.

Servo motor EC 86

Drive controller iMD 40

Features

- Electronically commutated 3-phase servo motor
- Brushless drive
- High delivery output with a compact design
- Incremental measuring system
- Hall effect sensors
- Protective type IP 44
- Application areas: positioning controls, torque control
- Connects via round connector
- Option: brake

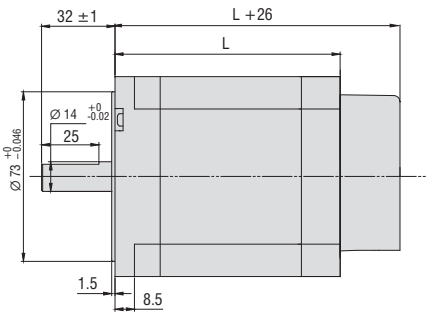
General

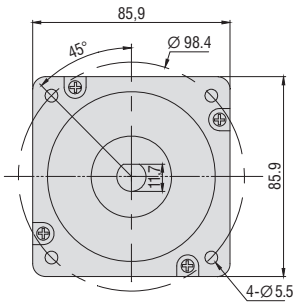
Brushless EC-motors are designed as electronically commutated 3-phase synchronous motors. Compared to brush-covered drives, these motors feature an even longer lifetime as they are subject to less wear. Further, the high power density and dynamics as related to the overall size must be pointed out. These motors are used in many areas of automation technology and in CNC machines.

Technical specifications

Description	Nominal output W	Nominal voltage V DC	Current A	Number of poles	Nominal speed rpm	Torque at Nominal speed Nm	Peak torque Nm	Torque constant Nm / A	Length L mm	Weight kg	Encoder P/R	Peak current A	Item no..
EC 86 S	440	310	3.4	8	3,000	1.4	5.0	0.74	100	2.6	1,000	11	474440 0310
EC 86 L	660	310	3.6	8	3,000	2.1	7.4	0.74	125	4	1,000	12.6	474660 0310

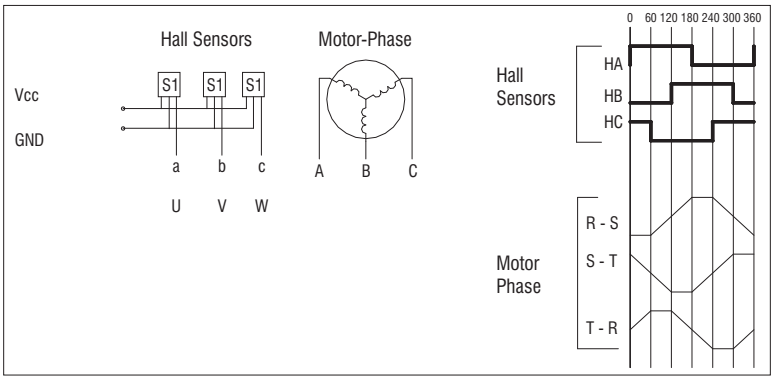
Scale drawings





Model	Shaft diameter	Shaft shape
EC 86 S	Ø 14 mm	Flat 1 x 25
EC 86 L	Ø 14 mm	Flat 1 x 25

Terminal assignment

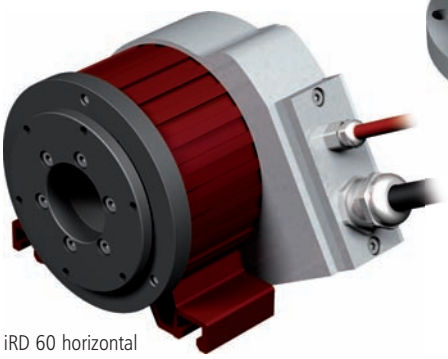


Technical specifications subject to change.

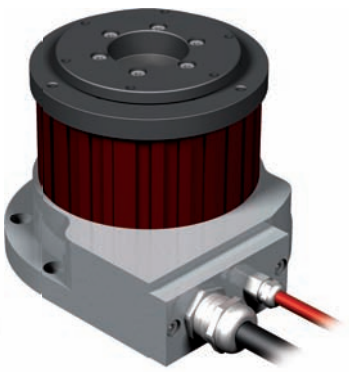
electronics

Torque motors

iRD 60



iRD 60 horizontal



iRD 60 vertical

Driver controller iMD 40

Features

- compact design with hollow shaft
- horizontal and vertical design
- PG gland
- high dynamics and torsional strength
- high acceleration left/right no signal dead range
- backlash-free 4-point bearings with great rotation and axial run-out accuracy
- high torques up to 10 Nm and speeds up to 1,200 rpm
- magnetic measuring system
- temperature monitor
- magnetic measuring system with index track (incremental or sin/cos)

Optional:

- Drive controller
- larger scale and output
- round connector
- Brake

General

The iRD series torque motors are multi-pole, permanent-exciter three-phase current synchronous motors with hollow shaft rotors with an optimal price/performance ratio. The respective unit consists of rotor, housing, bearing and sensor system. With the iRD compact torque motors high torques are produced right on the rotor. This eliminates unnecessary elasticity and gear backlash. Add to his minimised frictional losses, high torsional rigidity and a high level of efficiency.

The seal between rotor and stator ensures trouble-free operation, even under complex conditions. The precise 4-point bearing is designed for high stress, with excellent rotation and axial run-out accuracy. The integration of the measuring system on the rotor shaft achieves high repeat and positioning accuracy. The iRD torque motors are virtually maintenance-free with a long lifetime.

Technical specifications

	iRD 60/50	iRD 60/100
Intermediate circuit voltage [V]	330	330
Nominal current (A)	3	3
Peak current [A]	7.5	7.5
Nominal torque [Nm]	2.7	5
Peak torque [Nm]	5	10
Max. speed [rpm]	1,200	1,000
Diameter [mm]	130*	130*
Height [mm]	123	173
Rotor inertia [kg/cm²]	8.8	12.2

	iRD 60/50	iRD 60/100
Concentricity ± [mm]	2/100	2/100
Axial run-out ± [mm]	2/100	2/100
Permissible stat. load [N]	1,570	1,570
Permissible dyn. load [N]	1,225	1,225
Encoder option 1 [Inc/r] incremental	18,000	18,000
Encoder option 2 [sin/r] analogue	90	90
Pull-out torque for bearing [Nm]	140	140
Dimensions (LxWxH)* [mm]	140x130x123	140x130x173

* only applicable for the upright version

Order data

Torque Motor iRD 60/50,
Ø/L = 130*/123 mm
Horizontal Item no.: **267011 0000**
Vertical Item no.: **267010 0000**

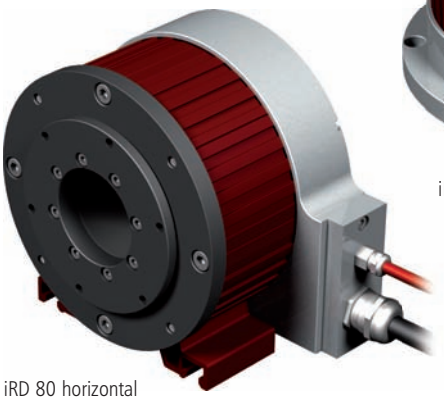
Torque Motor iRD 60/100,
Ø/L = 130*/173 mm
Horizontal Item no.: **267031 0000**
Vertical Item no.: **267030 0000**

* only applicable for the upright version

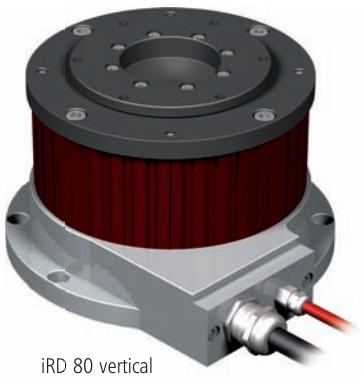
Technical specifications subject to change.

Torque motors

iRD 80



iRD 80 horizontal



iRD 80 vertical

Driver controller iMD 40

Features

- compact design with hollow shaft
- horizontal and vertical design
- PG gland
- high dynamics and torsional strength
- high acceleration left/right no signal dead range
- backlash-free 4-point bearings with great rotation and axial run-out accuracy
- high torques up to 50 Nm and speeds up to 1,200 rpm
- magnetic measuring system
- temperature monitor
- magnetic measuring system with index track (incremental or sin/cos)

Optional:

- drive controller
- larger scale and output
- round connector
- brake

General

The iRD series torque motors are multi-pole, permanent-exciter three-phase current synchronous motors with hollow shaft rotors with an optimal price/performance ratio. The respective unit consists of rotor, housing, bearing and sensor system. With the iRD compact torque motors high torques are produced right on the rotor. This eliminates unnecessary elasticity and gear backlash. Add to his minimised frictional losses, high torsional rigidity and a high level of efficiency.

The seal between rotor and stator ensures trouble-free operation, even under complex conditions. The precise 4-point bearing is designed for high stress, with excellent rotation and axial run-out accuracy. The integration of the measuring system on the rotor shaft achieves high repeat and positioning accuracy. The iRD torque motors are virtually maintenance-free with a long lifetime.

Technical specifications

	iRD 80/50	iRD 80/100
Intermediate circuit voltage [V]	330	330
Nominal current (A)	6	6
Peak current [A]	15	15
Nominal torque [Nm]	8	14
Peak torque [Nm]	15	25
Max. speed [rpm]	1,200	1,000
Diameter [mm]	170*	170*
Height [mm]	130	180
Rotor inertia [kg/cm²]	28	39.9

	iRD 80/50	iRD 80/100
Concentricity ± [mm]	2/100	2/100
Axial run-out ± [mm]	2/100	2/100
Permissible stat. load [N]	1,495	1,495
Permissible dyn. load [N]	1,360	1,360
Encoder option 1 [Inc/r] incremental	22,800	22,800
Encoder option 2 [sin/r] analogue	114	114
Pull-out torque for bearing [Nm]	230	230
Dimensions (LxWxH)* [mm]	179x170x130	179x170x180

* only applicable for the upright version

Order data

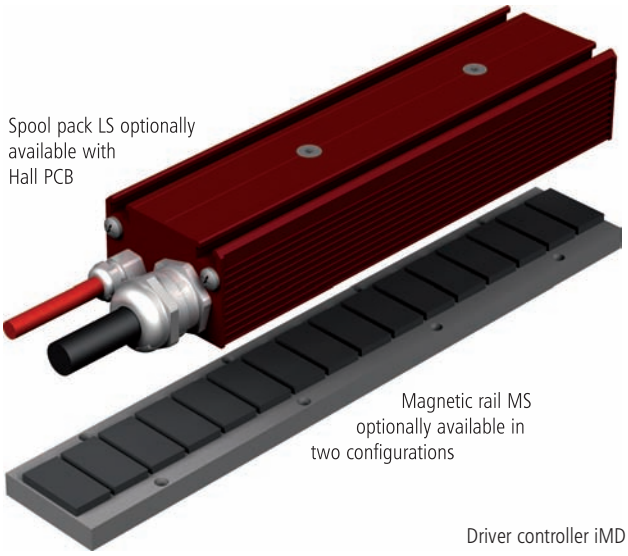
Torque Motor iRD 80/50,
Ø/L = 170*/130 mm
Horizontal Item no.: **267111 0000**
Vertical Item no.: **267110 0000**

Torque Motor iRD 80/100,
Ø/L = 170*/180 mm
Horizontal Item no.: **267131 0000**
Vertical Item no.: **267130 0000**

Technical specifications subject to change.

electronics

Linear motors iLM 25



Driver controller iMD 40

Features

- Ready-to-install systems consist of Primary part (spool pack LS) and Secondary part (magnetic rail MS)
- compact design
- high acceleration
- high speed
- high dynamics
- high degree of efficiency
- Motor length made to order
- Secondary part (magnetic rail MS) can be combined from various elements
- Control with single-phase or three-phase servo inverters
- Optional:
  - Drive controller
  - String potentiometer and linear guides

General

The iLM series linear motors are linear 3-phase servo motors in various sizes and any length at an optimal price/performance ratio.
The integrated Hall sensors provide the position information for commutating the motors. The primary part features a temperature sensor to protect the motor. Permanently electrical connection (Hall, spools and temperature sensor) is made via permanently attached cables.
The direct power transmission eliminates all mechanical transmission elements such as spindles and tooth belts, completely eliminating any friction and backlash. This allows higher speeds and dynamics to be realised.
The therefore reduced cycle times lower production costs and increase productivity. Since the drive itself does not contain any mechanical elements, noise, wear and maintenance costs incurred are minimised. Drive mechanisms with linear motors compared to other linear drives are more accurate, quicker, free of backlash (no dead signal range) and more robust.

Technical specifications

* Applies to a working air gap of 1 mm.

	Intermediate circuit voltage [V]	Number of spools	Nominal current (A)	Peak current [A]	Feed force [N]	max. feed force [N]	max. initial power [N]*	nominal speed [m/s] at nominal current	max. speed [m/s] at peak current
iLM 25 with LS 25/6	330	6	2.6	6.5	70	170	500	6.6	4.7
iLM 25 with LS 25/12	330	12	2.6	6.5	140	340	1000	4.0	3.0

Order information

Spool pack LS 25 with 6 spools, without Hall PCB (L/W/H approx.180/50/33mm)
Weight: 2.00kg
Item no.: **486000 0002**

Spool pack LS 25 with 12 spools, without Hall PCB (L/W/H 335/50/33mm)
Weight: 3.50 kg
Item no.: **486000 0004**

Magnetic rail MS 25 with 8 magnets (L/W/H approx.124/50/11mm)
Item no.: **486100 0124**

Spool pack LS 25 with 6 spools, with Hall PCB (L/W/H 220/50/33mm)
Weight: 2.20kg
Item no.: **486001 0002**

Spool pack LS 25 with 12 spools, with Hall PCB (L/W/H 375/50/33mm)
Weight: 3.70kg
Item no.: **486001 0004**

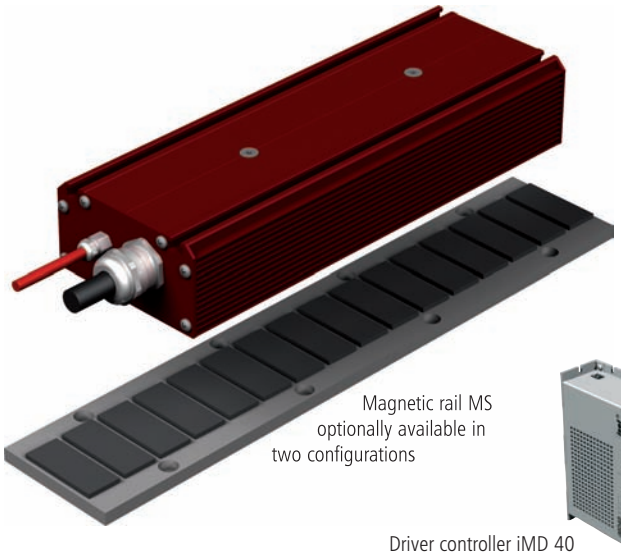
Magnetic rail MS 25 with 32 magnets (L/W/H approx.496/50/11mm)
Item no.: **486100 0496**

The magnetic rails can be can be strung together in any quantity.

Technical specifications subject to change.

Linear motors

iLM 50



Magnetic rail MS
optionally available in
two configurations

Driver controller iMD 40

Characteristics

- Ready-to-install systems consist of active part (spool pack LS) and passive part (magnetic rail MS)
- compact design
- high acceleration
- high speed
- high dynamics
- high degree of efficiency
- Motor length made to order
- Secondary part (magnetic rail MS) can be combined from various elements
- Control with single-phase or three-phase servo inverters
- Optional:
  - Drive controller
  - String potentiometer and linear guides

General

The iLM series linear motors are linear 3-phase servo motors in various sizes and any length at an optimal price/performance ratio.
The integrated Hall sensors provide the position information for commutating the motors. The primary part features a temperature sensor to protect the motor. Permanently electrical connection (Hall, spools and temperature sensor) is made via permanently attached cables.
The direct power transmission eliminates all mechanical transmission elements such as spindles and tooth belts, completely eliminating any friction and backlash. This allows higher speeds and dynamics to be realised.
The therefore reduced cycle times lower production costs and increase productivity. Since the drive itself does not contain any mechanical elements, noise, wear and maintenance costs incurred are minimised. Drive mechanisms with linear motors compared to other linear drives are more accurate, quicker, free of backlash (no dead signal range) and more robust.

Technical specifications

* Applies to a working air gap of 1 mm.

	Intermediate circuit voltage [V]	Number of spools	Nominal current (A)	Peak current [A]	Feed force [N]	max. feed force [N]	max. initial power [N]*	nominal speed [m/s] at nominal current	max. speed [m/s] at peak current
iLM 50 with LS 50/6	330	6	6.0	15.0	285	675	1995	5.1	3.6
iLM 50 with LS 50/12	330	12	6.0	15.0	570	1350	3990	3.5	2.4

Order information

Spool pack LS 50 with 6 spools, without Hall PCB (L/W/H 280/100/52.5 mm)
Weight: 7.50 kg
Item no.: **486010 0002**

Spool pack LS 50 with 12 spools, without Hall PCB (L/W/H 532/100/52.5 mm)
Weight: 13.00 kg
Item no.: **486010 0004**

Magnetic rail MS 50
with 8 magnets
(L/W/H approx. 200/80/11mm)
Item no.: **486110 0200**

Spool pack LS 50 with 6 spools, without Hall PCB (L/W/H 343/100/52.5 mm)
Weight: 8.00 kg
Item no.: **486011 0002**

Spool pack LS 50 with 12 spools, without Hall PCB (L/W/H 595/100/52.5 mm)
Weight: 13.50 kg
Item no.: **486011 0004**

Magnetic rail MS 50
with 32 magnets
(L/W/H approx. 800/80/11mm)
Item no.: **486110 0800**

The magnetic rails can be can be strung together in any quantity.

Subject to technical alterations.

electronics

Encoder

EI 30/56

Features

- No signal adjustment required
- Precision: 512 increments/r (EI 30)
  1000 increments/r (EI 56)
- Compact housing
  L 35 x W 30 x H 15 mm (EI30)
  L 66 x W 56 x H 17 mm (EI56)
- Operating temperature -25°C – 100°C
- TTL compatible
- Two channels and index signal
- for shaft diameter 6.35 mm
- Easy installation

General

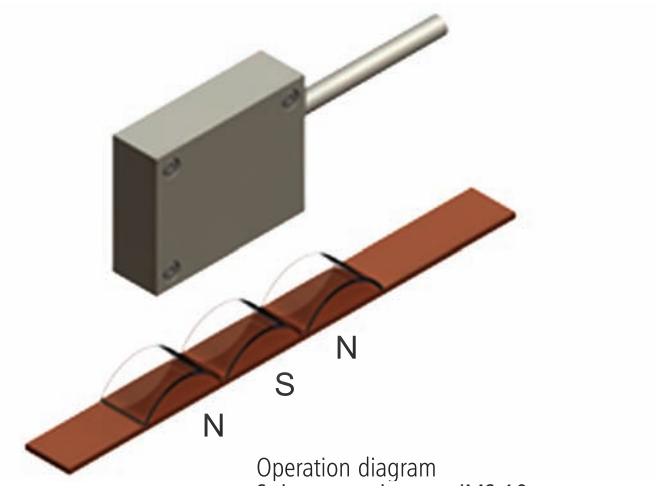
The EI 30/56 encoders are powerful 3-channel incremental encoders. For both encoders the assembly group includes transmitters with LED-source, the receiver and the code disc which rotates between the transmitter and receiver. The signals upgraded via a driver component are output as a differential input (RS422). The application interface forms an 8-pole round cable.

Technical specifications

	EI 30	EI 56
Signal form output	Square-wave signal	
output signals	Phase A, /A, B, /B, Z, /Z	
Power consumption	≤ 40 mA	
output current	0 - 5 mA	
Threshold frequency	100 KHz	
Phase shifting of the output signals	90° ± 45°	
Connection voltage	5 V DC	
Signal lever	$V_H \geq 85\%$ Vcc, $V_L \leq 0.3$ V	
Number of impulses/revolution	512	1,000
Output circuit	Driver component AM26LS31	
Inertia of the code wheel	approx. 6.0 x 10^{-8} Kgm²	
Shaft diameter	6.35	
Shock resistance	980 m/s², 6 ms, each twice in XYZ	
Vibration test	50 m/s², 10 - 200 Hz, each 2 hours in XYZ	
Medium durability	MTBF ≥ 50,000 h (+25° C, 2,000 rpm)	
Weight	approx. 20 g (with 0.5 metre cable)	approx. 25 g (with 0.5 metre cable)
Operating humidity	30 - 85% (no condensation)	
Storage temperature	-40° C - 110° C	
Operating temperature	-25° C - 100° C	
Weld point temperature	≤ 260° C	
Protective category	IP 50	
Item no.	**397 911 2356**	**397 911 2306**

Technical specifications subject to change.

String potentiometer iMS 10



Operation diagram
String potentiometer iMS 10

Features

- OEM measuring head with sensor L 50 x W 24 x H 8 mm
- reliable, sturdy, economical
- 2 channels A and B, Differential operation incremental RS 422 or Differential operation analogue 1VSS
- Accuracy incremental/ digital 10µm, for analogue 1VSS, 2mm=1 SINUS-period applies
- Repeat accuracy = ±10µm
- 2 optional, magnetic switch, open commutator outputs for easy end position monitoring
- Magnetic tape on self-adhesive, rust proof steel mounting tape

optional:

- Reference impulse
- Accuracy 5µm

General

The touch-less operation, magnetic string potentiometer iMS is sturdy, reliable and vastly resilient to dirt. A code applied to a magnetic tape is captured by a measuring head and processed.
The available peripheral interfaces are RS 422 compatible, incremental as well as analogue 1V tip-tip SINUS/ COSINUS interfaces.
A reference impulse is optionally available.

Technical specifications

	iMS-10-A	iMS-10-I
Signal form	analogue, 1V SS	RS 422, square-wave
Path feed rate	up to 6.0 m/s	10 µm / 2 µm edge separation A-B Channel: 3.0 m/s
Output signals	SIN,/SIN,COS,/COS Differential output Track SIN to COS 90° Phase shifting optional Z,/Z comparative reference track	A, / A, B, / B Differential output, track A to B 90° Phase shifting relative angle error A-B ±10% optional Z, / Z reference track
End position monitoring	open Collector Umax = 5 V, Isink = 10 mA	
Power consumption	<100 mA normal operation	
Accuracy	one SINUS period on 2 mm	10µm, optionally 5 µm, edge separation A to B ≥ 2 µS, other options available
Input voltage	5 V DC, +/-2%, optional: 7V ... 15 V DC	
Operating distance	0.8 mm ± 0.2 mm	
Dumping	in all axles < 1 degree	
Shock resistance	5 g	
Weight	50 g	
Item no.	**390254 0000** (without housing)	390255 0800 (without housing)
	563150 (Magnetic tape on self-adhesive, rust-free steel mounting tape 2 mm pole pitch, 10 mm wide; 1.3 mm thick, ±40 µm accuracy)	

Technical specifications subject to change.

electronics

Drive units

for 2-phase stepper motors MD 24/28

Features

- High performance, low-noise level
- Supply voltage to 50 VDC (80 VDC)*
- Output current up to 4.2 A (7.8 A)*
- Automatic current reduction
- Suitable for 2-phase and 4-phase stepper motors
- Clock/direction interface
- Input frequency for clock input up to 300 KHz
- 15 (14)* selectable solution up to 25,600 steps/rev (51,200 steps/rev)*
- Opto-isolated, TTL compatible Inputs
- Differential protection, Overvoltage, overcurrent

* MD 28

General

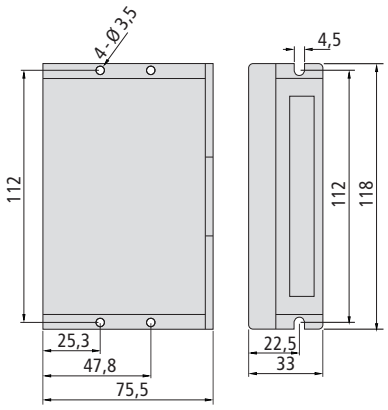
The stepper motor drive units MD24/MD28 are high-capacity output stages for 2-phase and 4-phase stepper motors. The units are capable of microstepping and thereby allow for a silent run of the connected motors.
Special chopper technology of the motor current permits higher rotational speed and torques on motors comparable to common drive units.
The clock/direction interface allows for a simple connection to diverse motion controllers or to a SPS.

Technical Data

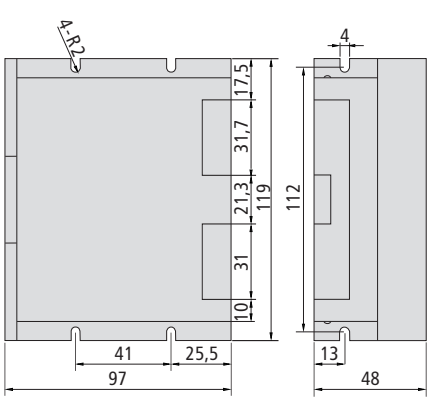
		MD 24			MD 28		
Parameter	Unit	Min.	Typical	Max.	Min.	Typical	Max.
Output current	A	1.0	-	4.2 (3.0A RMS)	2.8	-	7.8
Supply voltage	VDC	20	36	50	24	68	80
Current-Logic-Signals	mA	7	10	16	7	10	16
Clock input frequency	KHz	0	-	300	0	-	300
Isolation resistance	MΩ	500			500		
Item no.		316303			316304		

Dimensional drawing

MD 24



MD 28



Subject to technical changes.

Drive units

for 3-phase stepper motors MD 34/38

Features

- High performance, low-noise level
- Supply voltage up to 50 VDC (80 VDC)*
- Output current up to 8.3 A (5.9 A RMS)
- Inputs are TTL compatible
- Automatic current reduction
- Suitable for 3-phase stepper motors with 3 or 6 connections
- Input frequency for clock input up to 300 KHz
- 8 (16)* selectable solution up to 10.000 steps/rev (25.600 steps/rev)*
- Current adjustable via DIP switch, 16 (8)* different values
- Clock/direction interface
- Differential protection, short circuit, and overvoltage

* MD 38

General

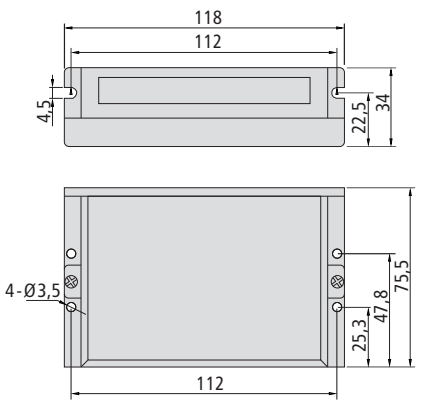
The stepper motor drive units MD34/MD38 are high-capacity output stages for 3-phase stepper motors. The units are capable of microstepping and can therefore operate quietly and with low vibration and with the special control technology are almost as quiet running as servo motors. In comparison to 3-phase drive units commonly available, the heating of the motor and output stages are 15% - 30% lower.
The clock/direction interface allows for a simple connection to different motion controllers or a SPS.

Technical Data

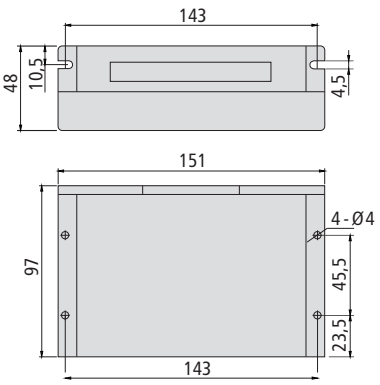
		MD 34			MD 38		
Parameter	Unit	Min.	Typical	Max.	Min.	Typical	Max.
Output current	A	2.1	-	8.3 (5.9 RMS)	2.1	-	8.3 (5.9 RMS)
Supply voltage	VDC	20	36	50	24	68	80
Current-Logic-Signals	mA	7	10	16	7	10	16
Clock input frequency	KHz	0	-	300	0	-	300
Isolation resistance	MΩ	500			500		
Item no.		316307			316308		

Dimensional drawing

MD 34



MD 38



Subject to technical changes.

electronics

Drive Regulator
for servo motors

iMD 10 / 20

iMD 10

iMD 20

General

The drive regulators iMD10/20 are well-priced final stages for brush and brushless servo motors. Typical field of applications are CNC machines and automation technology.

The housing of the final stages are optimized for the installation into the switch cabinet. Different user interfaces are available for the integration into own applications. Here, the CANopen interface must be highlighted.

A special software is available for easy startup.

Features	iMD 10	iMD 20
Motor type	Servo motors with brushes. (Brushed DC)	Brushless servo motors (Brushless DC, BLDC)
Supply voltage	40-95 VDC	40-95 VDC
Motor current	Continuous current 12 A, surge current 25 A	Continuous current 12 A, surge current 25 A
CAN-Bus interface	CANopen DS301 V4.0 and DS402 V1.0 of the CiA (CAN in automation)	CANopen DS301 V4.0 and DS402 V1.0 of the CiA (CAN in automation)
RS-232 interface (asynchronous, 19.2 or 57.6 kBit/sec.)	For startup (DcSetup.exe) or e.g. SPS connection; effective transfer protocol	For startup (AcSetup.exe) or e.g. SPS connection; effective transfer protocol
Measuring system	Incremental encoder (RS422); Max. input frequency: 1.25 MHz	Incremental encoder (RS422); Max. input frequency: 1.25 MHz
Commutation		Hall sensor signals
Analog input (±10V)	11 Bit solution	11 Bit solution
PWM switching frequency	Max. 12.5 kHz	Max. 16.4 kHz
Input for end and reference switch	✓	✓
Digital current, rotation speed and position control	Scan times min. 80 µs / 244 µs / 488 µs for current / rotational speed / Position controller	Scan times min. 61 µs 244 µs / 488 µs for current / Rotational speed / position controller
Brake control	✓	✓
Gantry operation or synchronous control	From 2 modules, master slave via CAN-Bus	From 2 modules, master slave via CAN-Bus
Monitoring of the motor current	Short circuit, I^2t	Short circuit, I^2t, Pulse-by-Pulse
Monitoring of the encoder signal	✓	✓
Monitoring of the software by internal watchdog timer	✓	✓
Simple updating of the firmware via RS-232	Possible on site by customer or service technician	Possible on site by customer or service technician
Zero speed monitoring	Redundancy acc. to ISO standard	Redundancy acc. to ISO standard
Dimensions	180 mm x 35 mm x 110 mm	180 mm x 35 mm x 120 mm
Item no.	314 020	314 030

Subject to technical changes.

Drive regulator
for servo motors

iMD 40

iMD 40

General

The fully digital drive regulator iMD40 is a well-priced, final stage directly fed from the grid for brushless servo motors up to 2 KW.

Here, the short regulator cycle times ensure ideal behaviors for highly dynamic drives. Extensive parameter options allow for flexible adjustment of different applications.

Next to point-to-point positioning and revolution control, continuous path control and time synchronized multiple-axes application are feasible via the implemented CANopen Protocoll DSP402.

A +/-10V interface as well as a RS232 are available as additional interfaces.
All necessary adjustments can be performed via an user-friendly startup CNC machines

A redundant zero speed monitor has been integrated in the drive regulator, which reduces the outlay of external devices of a control to a minimum and makes the use of the machine easy.

The drive regulator is also suitable for rotary drives as well as for respective linear drives. Typical field of applications are CNC machines and automation technology.

The compact housing of the drive regulator has been optimized for the installation into switch cabinets.

Features	iMD 40
Motor type	Brushless servo motors (Brushless DC, BLDC)
Supply voltage	230 VAC grid, 1-phase
Motor current	Continuous current 6.5 A Peak current 8 A
CAN-Bus-Interface	CANopen DS301 V4,0 and DS402 V1.0 of the CiA (CAN in automation)
RS-232 interface (asynchronous, 19.2 or 57.6 kBit/sec.)	For startup (AcSetup.exe) or e.g. SPS connection; effective transfer protocol
Measuring system	Incremental encoder (RS422); Max. input frequency: 1.25 MHz
Commutation	Hall sensor signals
Analog input (±10V)	11 Bit solution
PWM switching frequency	Max. 16.4 kHz
Input for end and reference switch	✓
Digital current, rotation speed and position control	Scan times: min. 61µs / 244 µs / 488 µs for current / Rotational speed / position controller
Brake control	✓
Gantry operation or synchronous control	From 2 modules, master slave via CAN-Bus
Monitoring of the motor current	Short circuit, I^2t, Pulse-by-Pulse
Monitoring of the encoder signal	✓
Monitoring of the software by internal watchdog timer	✓
Simple update of firmware via RS-232	Possible on site by customer or service technician
Zero speed monitoring	Redundancy acc. to ISO standard
Dimensions	180 mm x 50 mm x 150 mm
Item no.	314 040

Subject to technical changes.

Updated information available at www.electronics.isel.com

electronics

Motion kits

iMK

iMK 20 S/L

iMK 40 S/L

General

The motion kits consist of brushless servo motors incl. matching drive regulator. The motion kits are suitable for the use in the range of small to medium performance up to 2KW.
The servo motors are electronically commutated 3-phase motors with incremental encoders and hall sensors. These are available in 4 manufactured sizes. (For more information see catalog pages about EC 60S/L and EC 80S/L)
The two drive regulators iMD20/40 are constructed for supply voltages of 40 -90VDC (iMD20) or 230VAC.
As interface for higher-level controls. CANopen interfaces as well as an analogous +/-10V interface can be used. (For more information see catalog pages about iMD20 and iMD40).

Technical Data

	iMK 20S	iMK 20L	iMK 40S	iMK 40L
Motor type	EC 60 S	EC 60 L	EC 86 S	EC 86 L
Motor performance [W]	157	235	440	660
Nominal torque [Nm]	0.5	0.75	1.4	2.1
Peak moment [Nm]	Jan 75	Feb 25	5.0	7.5
Nominal speed [U/min]	3,000			
Encoder solution [Inkr]	1,000			
Supply voltage	40-95 V DC		230 V AC	
CAN-Bus interface	CANopen DS301, DS402 of the CiA (CAN in automation)			
Analog input (+/-10V)	11 Bit solution			
PWM switching frequency	8.2 KHz or 16.4 KHz			
Current / rotational speed / position cc	Scan times min 61 µs, 344µs, 488 µs			
Input for reference & end switch	✓			
Brake control	✓			
Gantry operation or synchronous oper	✓			
Motor current monitoring	✓			
Monitoring of the encoder signal	✓			
Watchdog	✓			
Electrical isolation	Processor. Power element, I/O`s			
Zero speed monitoring	✓			
Drive regulator dimensions	180 x 35 x 120 mm		180 x 50 x 150 mm	
Item no.	317000 0002	317000 0003	317000 0004	317000 0005

Technical specifications subject to change.

System Module iSM 5

System module iSM-5

General

The system module iSM5 combines the functions "Monitoring the safety circuits" (VDE113, DIN EN60204) and "Evaluation of faults" in one module.

This makes the safety technical base functions to operate the CNC machine available in a highly compact module. The assembly thereby reduce the common wiring in the control cabinet, through the integration of these important functions, to a minimum.

The CANopen interface serves as the interface to the software. By doing so, essential states of the module are available directly in the user software (Remote, ProNC), which allows for a very simple system diagnosis.

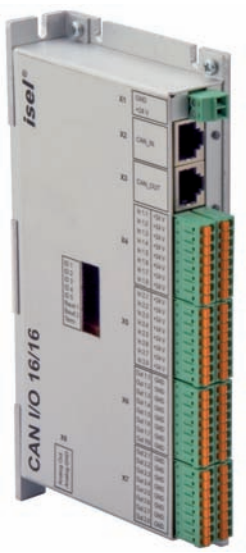
Technical Data

Inputs (24VDC)	Idleness, door circuit control, end switch, spindle control, spindle idleness
Outputs (24VDC)	Door circuit control, spindle control
Outputs (230VAC)	Main spindle (6A), power supply for final stages (6A)
Fault analysis	4 inputs, can be configured via software
CAN-Bus interface	CAN Ver. 2.0b, 1MBit, DS301/DS401
RS 232 interface	Configuration, diagnosis, firmware update
other interfaces	Connection operating panel
Operating mode	Automatic mode, setting mode
Safety categories (EN954)	3
Stop categories	0/1
Supply voltage	24 V DC
Switching output supply	85 – 264 V AC (47 – 63 Hz)
Dimensions	182 x 50 x 89 mm
Item no.	**321232**

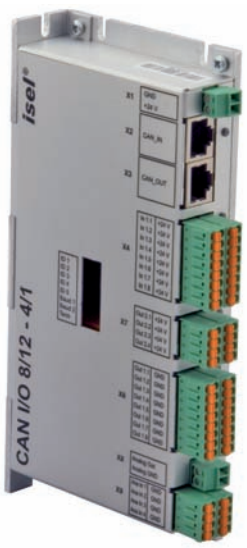
Updated information available at www.electronics.isel.com

Technical specifications subject to change.

CAN Control Components



CAN-I/0 Module 16/16



CAN-I/0 Module 8/12 - 4/1

General

The two isel CANopen-I/O Modules provide inexpensive access into the world of modern industrial automation. They can be installed on-site or in the switch cabinet.

A supply voltage of 24VDC, the electrical isolation of the inputs and outputs as well as the potential terminals available directly on the module ensure for a large scope of possible application.

The connection via push terminals and status indication allocated directly at the connection provide for a high degree of assembly and ease of maintenance.

Technical Data

	CAN-I/O Module 16/16	CAN-I/O Module 8/12-4/1
Digital inputs	16 via optocoupler (input current approx. 8mA)	8 via optocoupler (input current approx. 8mA)
Digital outputs	16 8 x Relay, Imax < 5 A 8 x electronic, Imax <350	12 4 x Relay, Imax < 5 A 8 x electronic, Imax <350
Analog output	1 0 V - 10 V via 8 Bit D/A converter (the electronic outputs are no longer useable during the use of the analog output)	1 0 V - 10 V via 8 Bit D/A converter
Analog input	--	4 0 V - 10 V, 10 Bit solution
Protection type	IP20	
Supply voltage	24 VDC (logic voltage), 24 VDC (process voltage)	
Performance acceptance	160 mA (logic and relay) I_{Last} depends on the external wiring	
Ambient temperature	-5° C to +40° C	
Storage temperature	-25° C to +70° C	
Relative humidity	Max. 95%	
Protection type	IP20	
Weight	260 g	
Housing size	85 x 180 x 28 mm (W x H x D)	
Item no.	**321002**	**321004**

Characteristics

CAN-I/0 Module 16/16

- 16 Digital inputs via optocoupler (input current approx. 8mA)
- 16 Digital outputs, 8 x relays Imax < 5A 8 x electronic, Imax < 350 mA (thermal protection, differential protection)
- An analog output , 0 V - 10 V via 8 Bit D/A converter (during the use of the analog output the electronic outputs are no longer useable)

CAN-I/0 Module 8/12 - 4/1

- 8 Digital inputs via optocoupler (input current approx. 8mA)
- 12 Digital outputs, 4 x relays Imax < 5A 8 x electronic, Imax < 350 mA (thermal protection, differential protection)
- An analog output , 0 V - 10 V via 8 Bit D/A converter
- 4 Analog inputs, 0 V - 10 V, 10 Bit solution

Technical specifications subject to change.

CAN Control Components

Universal CAN positioning module
CPC 12 with +/- 10 V output

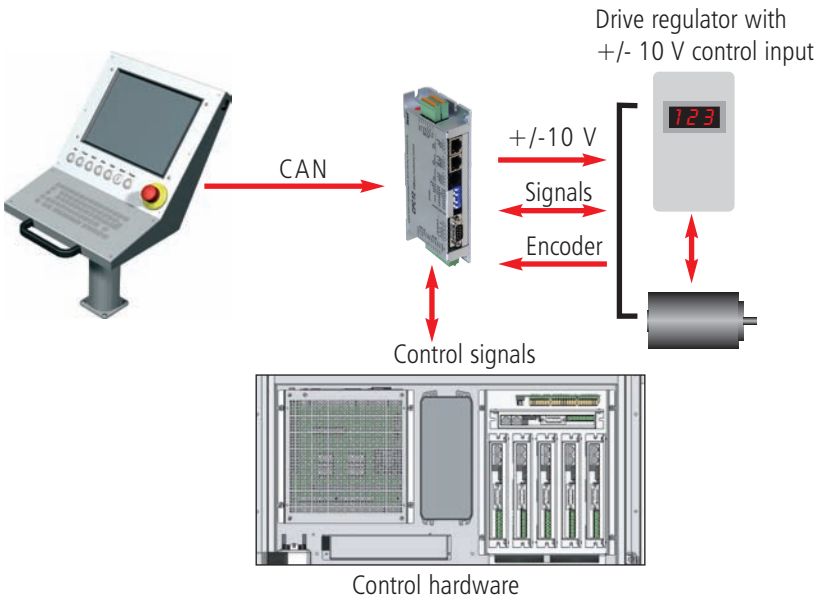
General

The CAN position module CPC12 serves for the adjustment of drive regulators from diverse third-party manufacturers with +/-10V interface to the CAN-CNC control.

This allows for the operation - next to CAN regulators not offered by isel - of non CAN compatible or not directly driver sided compatible modules to this control.

The necessary control inputs and outputs are hereby provided by the CPC12 module.

Application diagram



Characteristics

CAN Positioning module CPC 12

- Activation of any drive regulators and frequency converters with +/- 10-V input
- Digital position control with cycle time 488 µs
- Supply voltage + 24 V DC
- CANopen DS 301, DSP 402, transfer rate up to 1 Mbd
- RS232 for start-up or SPS coupling
- Outputs for the release of external servo controllers and brake control
- Input for reference / end switch
- Incremental Encoder (RS422)
- Monitoring of limit switch of the positioning axes with Emergency OFF message
- Optionally as multi-axes solution in switch cabinet
- Gantry operation or synchronous control from 2 modules, master slave via CAN-Bus

Item no.: **320 210**

Updated information available at www.electronics.isel.com

Technical specifications subject to change.

electronics

Industry PC iPC 10/20

Characteristics

- Universal Industry PC's
  L 190 x W 200 x H 52 mm
- Sturdy aluminum housing
  with feed brackets
- Energy-efficient and low-noise level
- Connection 12(24*)VDC
- Windows® compatible
- Ideal price/performance ratio

Technical Data

	iPC 10	iPC 20
CPU	Intel® Atom 230 1.6 GHz	Intel® Atom 330 2x1.6 GHz, DualCore
Formfaktor Mainboard	Mini-ITX	Mini-ITX
Main memory	DDR2 RAM ≥ 1GB	DDR2 RAM ≥ 1GB
Hard disks (S-ATA)	2½ inch ≥160 GB	2½ inch ≥160 GB
Graphic	Intel GMA 950	Intel GMA 950
Monitor	VGA	VGA
Audio	Realtek® High Definition Audio, 4 Channel	Intel® High Definition Audio, 6 Channel
LAN	1x10/100 Mbit/s	1 x 1,000 Mbit/s
Supply voltage	12(24*)VDC/60W	12(24*)VDC/60W
External connections	4xUSB 2.0, PS2 Keyboard/Mouse, Parallelport, RJ45, COM Port, Line Out, Line In, microphone	S-Video, 4xUSB 2.0, PS2 Keyboard/Mouse, Parallelport, RJ45, COM Port, Line Out, Line In, microphone
Options (Software)	Windows	Windows
Wall power supply (Option)	60W (Art.-No. 370215)	60W (Art.-No. 370215)
humidity	Max. 90% (non-condensing)	Max. 90% (non-condensing)
Ambinet temperature	0°C to 55°C	0°C to 55°C
Protection type	IP20	IP20
Weight	1.1 kg	1.1 kg
Dimensions WxDxH	200x190x52 mm	200x190x52 mm
Item no.	371065	371063

* optional

General

The universal industry PC's iPC10/ iPC20 are Windows compatible PCs at an ideal price/performance ratio, for applications in the industrial sector as well as home and office.

The supply voltage of 12(24*) V DC also allows the use in vehicles. With mounting holes arranged at a 90° angle a vertical or horizontal assembly is possible.

All connections are at the front, this especially eases the installation in the switch cabinet.

Technical specifications subject to change.

CAN-PC iSR 10/11

Characteristics

- CAN-CNC/SPS control on PC basis
- During the design of drive solution, especially flexibility of the drives and control is demanded. The iSR product family offers the perfect solution for this.
- The integrated CAN-Bus interface allows the access to final stage series iMD and CAN-I/O modules from isel as well as the world of CANopen devices.
- The numerous inputs and outputs as well as additional add-ons with Soft-SPS allows for almost any problem to be solved.

Technical Data

	iSR 10	iSR 11
CPU	Intel® Atom 230 1,6 GHz	Intel® Atom 230, 1,6 GHz
Formfaktor Mainboard	Mini ITX Mainboard	Mini ITX Mainboard
Main memory	DDR2-667RAM ≥ 1 GB	DDR2-667RAM ≥ 1 GB
Hard disks (S-ATA)	2½ inch ≥160 GB	2½ inch ≥160 GB
Graphic	on-board	on-board
Ethernet	1 on-board	1 on-board
USB	4 x USB 2.0	4 x USB 2.0
Supply voltage	12 (24*) VDC	12 (24*) VDC
External connections	1xVGA, 4xUSB 2.0, 3xAudio, 1xLAN, 1xRS232, 1xParallel, 2xPS2, 2(1)xCAN	1xVGA, 4xUSB 2.0, 3xAudio, 1xLAN, 1xRS232, 1xParallel, 2xPS2, 2(1)xCAN, I/O Voltage (24 VDC)
Options (Software)	Windows, ProNC	Windows, ProNC
Fieldbus	CAN-Bus 1-Channel Baud ratge up to 1 M-baud	CAN-Bus 1-channel Baud ratge up to 1 M-baud
I/O's		16 x digital inputs 8 x digital inputs 1 x 8 Bit analog output
Wall power supply (Option)	60W (Art.-No. 370215)	60W (Art.-No. 370215)
humidity	Max. 90% (non-condensing)	Max. 90% (non-condensing)
Ambinet temperature	0°C to 55°C	0°C to 55°C
Protection type	IP20	IP20
Dimensions	210 x 75 x 200 mm	210 x 75 x 200 mm
Item no.	371060	371061

* optional

Technical specifications subject to change.

General

The CAN PC's iSR10/11 are controlling computers on PC basis at an ideal price/performance ratio. The housings are optimized for the installation into the switch cabinet. They differ due to different equipment characteristics.

The iSR 10 forms the basis variant as the controlling computer with integrated 1-channel CANopen PCI card.

Based on this, the iSR11 has additionally an integrated I/O component with 16 digital inputs, 8 digital outputs and an 8 bit analog output.

These two CAN PC's field of application is mainly the control of CNC machines and in the field of automation technology. An alternative with the automation software CoDeSys is the preparation. The respective software is available at isel.

When combining different operating units, a high-performance control platform for different applications is obtained.

Updated information available at www.electronics.isel.com

CNC control panel iBP 10 / 17

Figures:
10" and 17" CNC control panel iBP with wall and table brackets

Characteristics

iBP 10

- 10" TFT Touchscreen Display
- 85 Key long stroke keyboard (IP20)
- Dimensions: W 300x L 240x H 360 mm
- Weight: approx. 10kg

iBP 17-1

- 17" TFT Touchscreen Display
- 102 Key silicon keyboard (IP65 with) integrated 2 button mouse pointer
- Dimensions: W 425x L 355x H 510 mm
- Weight: approx. 20kg

iBP 17-2

- 17" TFT Touchscreen Display
- 102 Key stainless steel keyboard (IP65 with) integrated 2 button mouse trackball
- Dimensions: W 425x L 355x H 510 mm
- Weight: approx. 20kg

General

The CNC control panels are sturdy and high-performance operating units for different applications in the industrial automation sector and much more.
An external PC can be connected and operated via the standard lead-through connecting lines. All CNC control panels have an integrated touchscreen monitor, a keyboard and a control panel with stainless steel buttons and 2 channel emergency OFF switch for the operation of CNC machines. The different mounting option allow a wall as well as table installation. There are 3 manufactured sizes available.

General Features

- Sturdy metal housing with Aluminium face plates
- Pivot-mounted with wall and table brackets
- Simple connection of external PC systems
- Touchscreen monitor
- Sturdy and fail-safe housing
- Control panel with stainless steel buttons
- 2 Channel emergency OFF switch

Ordering information

10" CNC Control Panel iBP 10, English keyboard	Item no.: **371070 0112**
17" CNC Control Panel iBP 17-1, English silicon keyboard	Item no.: **371071 0112**
17" CNC Control Panel iBP 17-2, English stainless steel keyboard	Item no.: **371072 0112**

Technical specifications subject to change.

CNC control terminal iBT 10 / 17

Figures:
10" and 17" CNC control terminal iBT with wall and table brackets

Characteristics

iBT 10

- 10" TFT Touchscreen Display
- 85 Key long stroke keyboard (IP20)
- Dimensions: W 300x L 240x H 360 mm
- Weight: approx. 10kg

iBT 17-1

- 17" TFT Touchscreen Display
- 102 Key silicon keyboard (IP65 with) integrated 2 button mouse pointer
- Dimensions: W 425x L 355x H 510 mm
- Weight: approx. 20kg

iBT 17-2

- 17" TFT Touchscreen Display
- 102 Key stainless steel keyboard (IP65) with integrated 2 button mouse trackball
- Dimensions: W 425x L 355x H 510 mm
- Weight: approx. 20kg

General

The CNC control terminals are sturdy and high-performance operating units for different applications in the industrial automation sector and much more.
All CNC control terminals have an integrated control computer (INTEL® ATOM Processor), touchscreen monitor, a keyboard and a control panel with stainless steel buttons and 2 channel emergency OFF switch for the operation of CNC machines. The different mounting option allow a wall as well as table installation. There are 3 manufactured sizes available.

General Features

- Sturdy metal housing with Aluminium face plates
- Pivot-mounted with wall and table brackets
- Integrated control computer:
  * Intel® ATOM 230 1.6 GHz
  * 1 GB RAM
  * 8 GB flash memory
  * 4 x USB 2.0
  * 10/100 MBit LAN
  * Realtek 4 Channel Audio
- Touchscreen monitor
- Sturdy and fail-safe housing
- Control panel with stainless steel buttons
- 2 Channel emergency OFF switch

Option:

- Hard drive

Ordering information

10" CNC Control Panel iBT 10, English keyboard	Item no.: **371073 0112**
17" CNC Control Panel iBT 17-1, English silicon keyboard	Item no.: **371074 0112**
17" CNC Control Panel iBT 17-2, English stainless steel keyboard	Item no.: **371075 0112**

Technical specifications subject to change.

Updated information available at www.electronics.isel.com

electronics

Step Controller

IT116 Mini/IT116 Flash

IT 116 Mini

Rear side
IT 116

General

The step controllers IT116 Mini /IT 116 Flash are freely programmable compact controls for a linear and rotational axis with 2 phase stepper motors. The step controller consists of an intelligent motor output, a processor core with flash memory for the interpretation of PAL PC user programs and the signal generation for motor outputs, the required network components, a safety circuit (stop category 0 acc. to EN 60204) as well as a housing with network input filter and control elements.

The integrated operating system also supports the

DNC mode of the controller:
PC / laptop connected permanently with step controller via serial interfaces as well as the
CNC mode of the controller:
The step controller operates the user program self-sufficiently (stand alone)+ without PC connection.

Ordering information

Step-Controller IT 116 Mini	Item no.: **381017 ***
Step-Controller IT 116 Flash (115 V AC, 60 Hz)	Item no.: **381016 0115 ***
Step Controller IT 116 Flash (230 V AC, 50 Hz)	Item no.: **381016 ***

*** incl. PAL PC and remote**

Characteristics

IT 116 Mini

- Performance output 24 V DC / 3.3 A peak for 2 phase stepper motors
- Max. 1,600 micro steps/revolutions
- Supply voltage:
  Broadrange power input:
  90 V AC /264 V AC, 50…60 Hz
- Dimensions:
  W 105 x H 110 x D 350 mm

IT 116 Flash

- Performance output 48 V DC / 4.2 A peak for 2 phase stepper motors
- Max. 25,600 steps/revolution
- Supply voltage:
  115 V AC / 230 V AC, 50…60 Hz,
  refer to article number for IT116 Flash
- Dimensions:
  W 105 x H 111 x D 320 mm

General Features

- Automatic current reduction to 50% phase current at motor rotation speed < 1 rpm
- Motor current/microstep solution adjustable via DIP switch
- Integrated 32-Bit RISC Processor (embedded controller) with flash memory for firmware and PAL-PC user program
- RS-232 Interface (at front) for hook-up with PC/ Notebook (program download)
- USB Interface (at front) to load user programs from USB memory stick (USB-On The Go)
- Control signals: Program-start/stop, reset on controller rear side
- 4 Opto-isolated signal inputs (signal voltage: 24 V DC)
- 4 Relay outputs (24 V DC, 300 mA)
- Activation (24 V DC) motor brake
- Remote connector on controller rear side for external emergency OFF (2 channel)
- Euro cooling fin housing
- Programming with PAL-PC 2.1 (part of the scope of delivery)

Technical specifications subject to change.

Servo Controller

MC 1-10/MC 1-20

MC 1
Face side

MC 1
Rear side

General

The servo controllers MC1 series are freely programmable compact controls for a linear and rotational unit with servo motors. The 1 axis controllers integrate all necessary components (interfaces, motion controller, voltage supply, drive regulator, safety circuits, control elements) that are required to control an axis in a compact table housing. The enclosed software PAL-PC can be used for programming.

There are two options available:

- MC-10: To control servo motors with brushes

- MC-20: To control servo motors without brushes

Ordering information

MC1-10	Item no.: **381518 0010 ***
MC1-20	Item no.: **381518 0020 ***

*** incl. PAL PC and remote**

Characteristics

MC-10

- Activation of any servo motors with brushes
- Start-up program "DcSetup"
- Technical specifications of the drive regulator refer to "drive regulator iMD10"

MC-20

- Activation of any brushless servo motors
- Evaluation of hall signals
- Start-up program "AcSetup"
- Technical specifications of the drive regulator refer to "drive regulator iMD20"

General Features

- Output max. 500W
- 32 Bit high performance RISC processor with 256 KByte flash
- User programme in CNC mode for up to 650 commands
- Processing of the program in CNC or DNC mode
- Programming with PAL-PC (CNC mode), @-format (CNC mode), ProNC, Remote (DNC mode)
- LC Display with 4 rows a' 20 symbols (freely programmable)
- USB Interface (OTG to load for user programs from USB stick
- additional control signals (start, stop) adaptable
- Connection for incremental encoder
- 6 (8) Relay outputs (24 V DC, 300 mA)
- 8 Relay outputs (24 V DC / 700 mA)
- Stop category 0 acc. to EN60204
- Emergency OFF via connecter in superordinated safety circuits can be integrated
- Broadrange power input: 115VAC/230VAC, 50..60Hz
- Table housing W 204 x H 149 x D286

Technical specifications subject to change.

electronics

Step Controller

iMC-M

Figure:
Face and rear side
Step controller iMC-M

General

The servo controllers iMC-M1/2 (standard color: grey) are freely programmable compact controls for a linear and rotational unit with 2-phase stepper motors. The 4 axes controller integrates all necessary components (interface, motion controller, voltage supply, final stages, safety circuit incl. door control, operating elements) that are required to control the machine, in a compact table housing.

There are two options available:

- **iMC-M1:** with intelligent core module to control via RS232 or USB interface
  The controller operates hereby either in DNC mode (permanently connected with the computer) or in CNC mode (after the transfer of the user program as "Stand Alone" controller) e.g. via the enclosed PAL-PC software.
- **iMC-M2:** with clock direction module (Sub-D 25) to the parallel port of a PC
  This permits the use of many software packages.

Ordering information

Controller iMC-M2 with clock direction module	Item no.: 381402 0004*
Controller iMC-M1 with core module	Item no.: 381401 0004*
Converter USB-RS 232	Item no.: 372000 0001

*** incl. PAL PC and remote**

Characteristics

iMC-M1 (with core module)

- 8 Signal input (24 V DC)
- 8 Signal outputs (24 V DC / 300 mA), max. 2 A total current
- 1 Relay output (230 V AC / 6 A)
- 1 Analog output (0 – 10 V)
- RS232/USB* programming interface (front)
- RS485 Interface to connect external devices such as laser, dispenser and such (front)
- 32 Bit RISC processor with memory for user program
- USB interface for USB stick (OTG) to load user programs
- Programming with PAL-PC (DNC and CNC mode), @-Format (DNC and CNC mode), ProNC, Remote, Galaad, Labview (DNC-Mode), diverse Standard languages

* available as of 3rd quarter 2009

iMC-M2 (with clock direction module)

- 1 Signal input
- 2 Signal outputs (24 V DC / 300 mA)
- 1 Relay output (230 V AC, 6 A)
- Parallel port interface as interface for different on the market available software such as WinPC-NC , Mach3, Galaad, EdiTask, EMC (Linux), etc.

General Features

- 4 Final stages (36 V / 3.5 A) for 2-phase stepper motors (power supply 200W)
- At an angle of intersection of 1.8° up to 1,600 micro steps/revolution (1/8 microstep)
- Automatic current reduction
- Motor current adjustable via software
- additional control signals (start, stop, reset) adaptable.
- Safety circuits (emergency Off, door circuit control) via an external connection in superordinated safety circuits can be integrated
- Broadrange power input: 115 V AC / 230 V AC, 50..60 Hz
- Table housing W 304 x H 112 x D210

Technical specifications subject to change.

Step controller

iMC-MP

Figure:
Face and rear side
Step controller iMC-MP

General

The step controllers iMC-MP (standard color: grey) are freely programmable compact controls with max. 4 final stages for 2-phase stepper motors.
The controllers integrate all necessary components (interfaces, motion controller, voltage supply, drive regulator, safety circuits, control elements) that are required to control a machine, in a compact table housing. With the controller iMC-MP1 with core module it is possible to control, during at least one integrated final stage, up to 3 additional external final stages with clock direction module. The signals required for this are provided by the respective external interfaces.

There are two options available:

- **iMC-MP1n:** with intelligent core module to control via RS232 or USB interface The controller operates hereby either in DNC mode (permanently connected with the computer) or in CNC mode (after the transfer of the user program as "Stand Alone" controller) e.g. via the enclosed PAL-PC software.
- **iMC-MP2:** with clock direction module (Sub-D 25) to the parallel port of a PC This permits the use of many software packages.

Ordering information

2 Axes controller	iMC-MP1-2 with core module	Item no.: **381403 0002***
	iMC-MP2-2 with clock direction module	Item no.: **381404 0002***
3 Axes controller	iMC-MP1-3 with core module	Item no.: **381403 0003***
	iMC-MP2-3 with clock direction module	Item no.: **381404 0003***
4 Axes controller	iMC-MP1-4 with core module	Item no.: **381403 0004***
	iMC-MP2-4 with clock direction module	Item no.: **381404 0004***
Converter USB –RS232		Item no.: **372000 0001**

*** incl. PAL PC and remote**

Technical specifications subject to change.

Characteristics

iMC-MP1 (with core module)

- 8 Signal input (24 V DC)
- 8 Relay outputs (24 V DC / 300 mA), max. 2 A total current
- 1 Relay output (230 V AC / 6 A)
- 1 Analog output (0 – 10V)
- 3 Clock/direction interfaces for the control of external final stages
- RS232/USB* Programming interface (front)
- RS485 Interface to connect external devices such as laser, dispenser and such (front)
- 32 Bit RISC processor and memory for user program
- USB interface for USB stick (OTG) to load user programs
- Programing with PAL PC (DNC and CNC mode), @-Format (DNC and CNC mode), ProNC, Remote, Galaad, Labview (DNC mode), diverse standard languages

* available as of 3rd quarter 2009

iMC-MP2 (with clock direction module)

- 1 Signal input
- 2 Signal outputs (24VDC/300mA)
- 1 Relay output (230VAC,6A)
- Parallel port interface as interface for different on the market available software such as WinPC-NC , Mach3, Galaad, EdiTask, EMC (Linux), etc.

General Features

- Max. 4 Final stages (48V/4.2A) for 2-phase stepper motors (power supply 500W)
- At an angle of intersection of 1.8° up to 25.600 micro steps/revolutions. (1/128 microstep)
- Automatic current reduction
- Motor current adjustable via DIP switch
- Additional control signals (start, stop, reset) adaptable.
- Safety circuits (emergency Off, door circuit control) via an external connection in superordinated safety circuits can be integrated
- Broadrange power input: 115VAC/230VAC, 50..60Hz
- Table housing W 379 x H 137 x D260

electronics

Servo controller

iMC-V

Figure:
Face and rear side
Servo controller iMC-V

General

The CAN controllers of the iMC-V series are compact, high-performance drive controls for 2 to 6 DC servo motors at an ideal price/performance ratio.

The shapely table housing integrates all control components that are required to solve a multitude of automation tasks. They comprise of final stages, to I/O components to safety control. In addition, a 26cm (10.2") touchscreen TFT display and a keyboard is integrated, which allows for a comfortable operation.

A CANopen-PCI card is integrated in the control computer as interface. This serves as CAN master for the drive regulator and the I/O component. In addition, external expansion of up to 128 CAN nodes are possible without problems.

The NC control core allows interpolation of up to 6 axes (linear, circular and helix), as well as online and lock-ahead track processing. During the use of the ProNC software, individual axes can be controlled as handling axes (next to the interpolated axes).

All final stages have an automatic jolt limitation and a zero speed monitoring (up to safety category 3).

Ordering information

2 Axes controller iMC-V2	Item no.: **354000 2020***
3 Axes controller iMC-V3	Item no.: **354000 2030***
4 Axes controller iMC-V4	Item no.: **354000 2040***
5 Axes controller iMC-V5	Item no.: **354000 2050***
6 Axes controller iMC-V6	Item no.: **354000 2060***

*** incl. PAL PC and remote**

Characteristics

- Sturdy table housing
- Control of 2 to 6 axes
- NC control via CANopen Fieldbus
- 4 Quadrant drive regulator (iMD20)
  - short scan times
  - evaluation for incremental encoder
  - idleness monitoring
  - differential protection
  - overvoltage and undervoltage protection
  - excess temperature protection
- Power supply 1,000 W / 48 V
- Broadrange power input:
  115 V AC / 230 V AC, 50...60 Hz
- Safety control
  - up to safety category 3
  - door circuit control
  - spindle control
- I/O component
  - 16 x digital inputs
  - 8 x digital inputs
  - 1 analog output
- Integrated control computer on Windows®basis with
  - CANopen PCI card
  - Driver software for CNC control
- Software: Remote, ProNC (optional)
  CAD/CAM software (optional)
- Table housing
  W 530 x H 210 x D 365 mm

Option:

- without TFT display and keyboard

Technical specifications subject to change.

Servo controller

iMC-VP

Figure:
Face and rear side
Servo controller iMC-VP

General

The CAN controllers of the iMC-VP series are compact, high-performance drive controls for 2 to 6 DC servo motors at an ideal price/performance ratio. By using high performance and directly from the mains powered drive regulator iMD 40, this controller especially finds use where higher performances are required.

The shapely table housing integrates all control components that are required to solve a multitude of automation tasks. They comprise of final stages, to I/O components to safety control. At the front, a 26cm (10") touchscreen TFT display and a keyboard is integrated, which allows for comfortable operation.

A CANopen-PCI card is integrated in the control computer as interface. This serves as CAN master for the drive regulator and the I/O component. In addition external expansion of up to 128 CAN nodes are possible without problems.

The NC control core allows interpolation of up to 6 axes (linear, circular and helix), as well as online and lock-ahead track processing. During the use of the Pro-NC software, individual axes can be controlled as handling axes (next to the interpolated axes).

All final stages have an automatic jolt limitation and a zero speed monitoring (up to safety category 3).

Characteristics

- Sturdy table housing
- Control of 2 to 6 axes
- NC control via CANopen Fieldbus
- 4 Quadrant drive regulator (iMD40)
  - short scan times
  - evaluation for incremental encoder
  - idleness monitoring
  - differential protection
  - overvoltage and undervoltage protection
  - excess temperature protection
- Mains-operated, intermediate circuit voltage 310 V
- Supply voltage:
  230 V AC, 50 Hz
- Safety control
  - up to safety category 3
  - door circuit control
  - spindle control
- I/O component
  - 16 x digital inputs
  - 8 x digital inputs
  - 1 analog output
- Integrated control computer on Windows®basis with
  - CANopen PCI card
  - Driver software for CNC control
- Software: Remote
- Table housing
  W 530 x H 250 x D 375 mm

Options:

- 3-phase mains supply
- without TFT display and keyboard

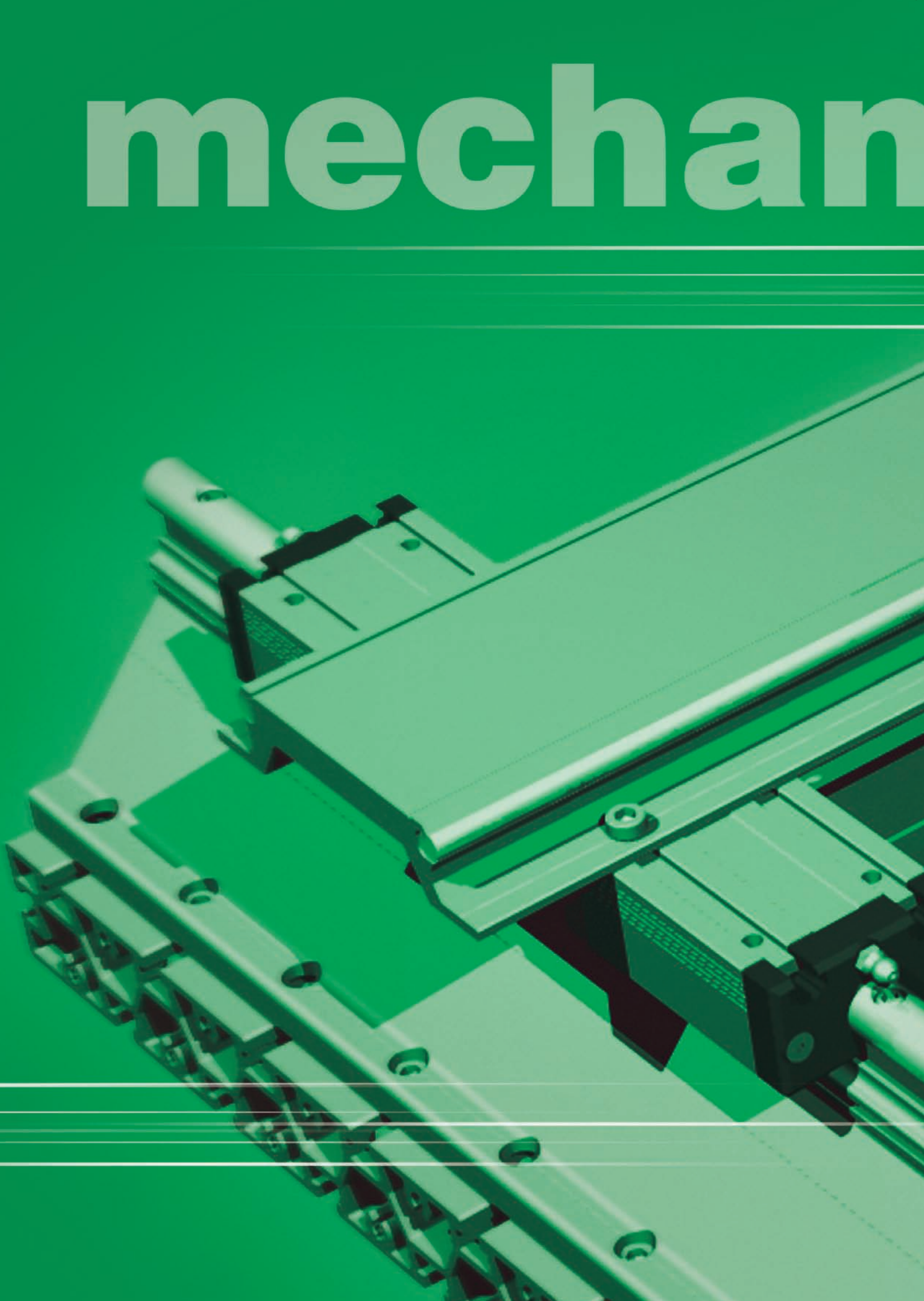
Ordering information

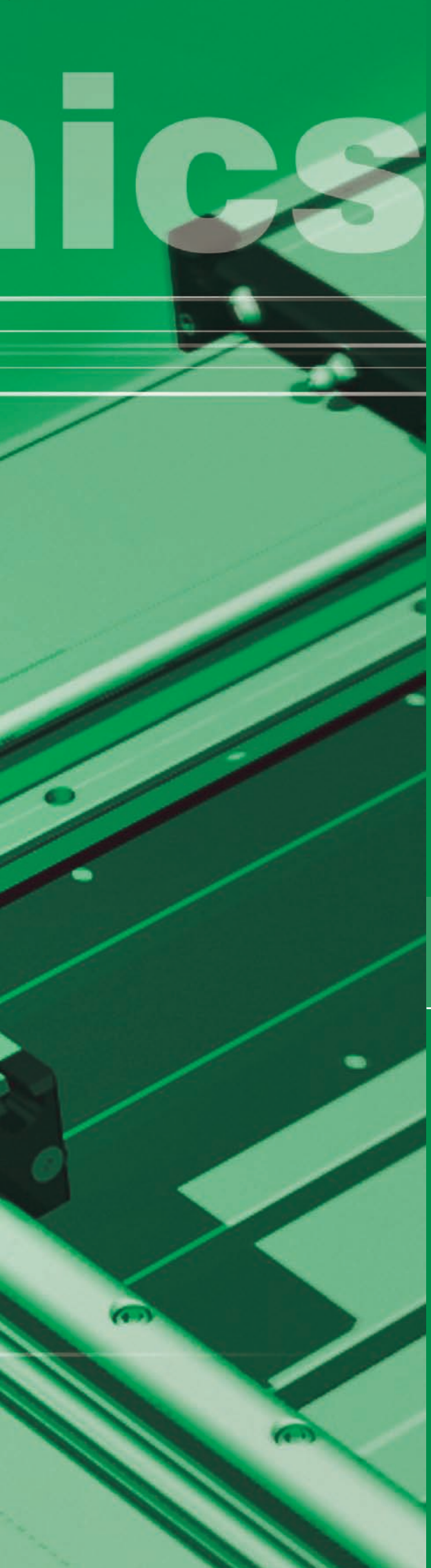
2 Axes controller iMC-VP2	Item no.: **354001 2020***
3 Axes controller iMC-V3	Item no.: **354001 2030***
4 Axes controller iMC-V4	Item no.: **354001 2040***
5 Axes controller iMC-VP5	Item no.: **354001 2050***
6 Axes controller iMC-VP6	Item no.: **354001 2060***

*** incl. PAL PC and remote**

Technical specifications subject to change.

mechan





MECHANICS

Aluminum profiles

Overview

Aluminum profiles

Overview

T-groove panels

PT profiles

Characteristics

- Universal precision, clamping and machining surface
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Both ends face milled
- Usable with any machine
- Thick-walled, non-warping and extremely inherently stable
- Profile cut upon request

Option:
- Unmachined

Technical specifications

	PT 25		
Dimensions (W x H)	125 x 20 mm	250 x 20 mm	375 x 20 mm
Length	up to 3 metres (special lengths available upon request)		
Weight	4810 g/m	9560 g/m	13,710 g/m
T-slots	one-sided in a 25 mm grid		
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
Resisting momentum W_x	38.94 cm^3	147.88 cm^3	319.79 cm^3
Resisting momentum W_y	6.46 cm^3	12.77 cm^3	17.90 cm^3

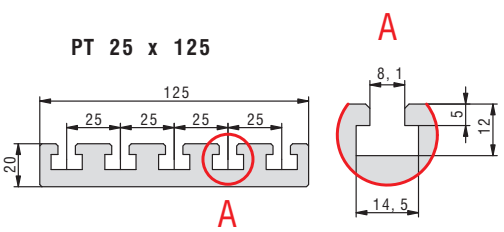
Order data

Profile name	Item no.: L=**3000 mm**
PT 25 W 125 x H 20 mm	201 014 **3000**
PT 25 W 250 x H 20 mm	201 018 **3000**
PT 25 W 375 x H 20 mm	201 020 **3000**

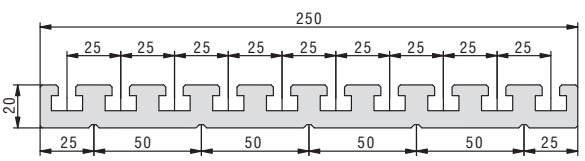
100 mm grid,
available 400 – 3000 mm

Scale drawings

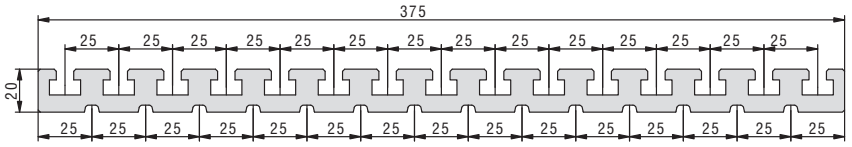
PT 25 x 125



PT 25 x 250



PT 25 x 375



T-blocks see accessories aluminium profiles

Technical specifications subject to change.

T-groove panels

PT profiles

Characteristics

- Universal precision, clamping and machining surface
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Both ends face milled
- Usable with any machine
- Thick-walled, non-warping and extremely inherently stable
- Profile cut upon request

Option:
- Unmachined

Technical specifications

	PT 50	
Dimensions (W x H)	250 x 20 mm	375 x 20 mm
Length	up to 3 metres (special lengths available upon request)	
Weight	10,020 g/m	14,840 g/m
T-slots	one-sided in a 50 mm grid	
Moment of inertia I_x	2062.99 cm^4	6745.96 cm^4
Moment of inertia I_y	13.85 cm^4	20.63 cm^4
Resisting momentum W_x	165.04 cm^3	359.78 cm^3
Resisting momentum W_y	13.85 cm^3	20.63 cm^3

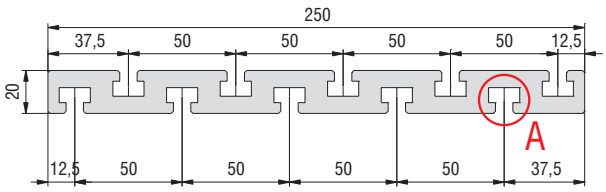
Order data

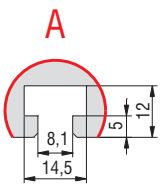
Profile name	Item no.: L=**3000 mm**
PT 50 W 250 x H 20 mm	201 016 **3000**
PT 50 W 375 x H 20 mm	201 019 **3000**

100 mm grid,
available 400 – 3000 mm

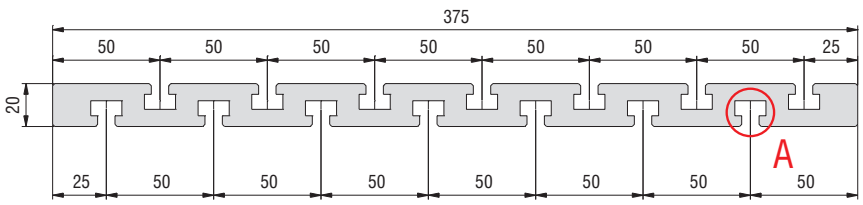
Scale drawings

PT 50 x 250





PT 50 x 375



Technical specifications subject to change.

Rectangular profiles

RE profiles

Characteristics

- Universal precision, clamping and machining surface
- As a stabiliser for machine and pedestal designs
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Lightweight, very sturdy
- Suitable for numerous applications when combined with the accessories
- Profile cut upon request

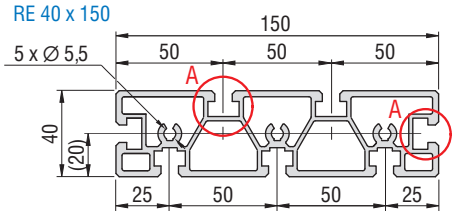
Technical specifications

	RE 40		
Dimensions (W x H)	150 x 40 mm	250 x 40 mm	350 x 40 mm
Length	up to 3 metres (special lengths available upon request)		
Weight	4790 g/m	7593 g/m	10,417 g/m
	several hollow chambres and T-groove indents for slide nuts or thread slats M6 respectively, as well as front intakes for M6 screws		
Moment of inertia I_x	393.7 cm⁴	1654.53 cm⁴	4306.69 cm⁴
Moment of inertia I_y	33.42 cm⁴	54.18 cm⁴	75.00 cm⁴
Resisting momentum W_x	52.49 cm³	131.64 cm³	246.1 cm³
Resisting momentum W_y	16.71 cm³	27.09 cm³	37.5 cm³

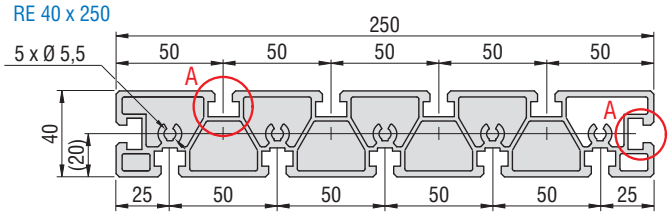
Order data

Profile name	Item no.: L=**3000 mm**
RE 40 W 150 x H 40 mm	201 035 **3000**
RE 40 W 250 x H 40 mm	201 030 **9000**
RE 40 W 350 x H 40 mm	201 031 **8305**

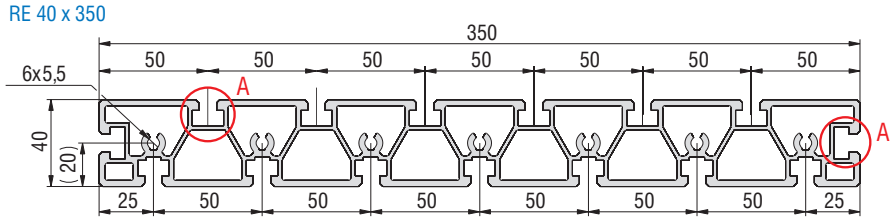
RE 40 x 150

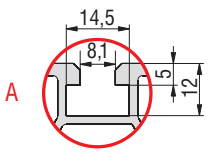


RE 40 x 250



RE 40 x 350





Technical specifications subject to change.

Rectangular profiles

RE profiles

Characteristics

- Universal precision, clamping an machining surface
- As a stabiliser for machine and pedestal designs
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Lightweight, very sturdy
- Both ends face milled
- Suitable for numerous applications when combined with the accessories
- Profile cut upon request

Technical specifications

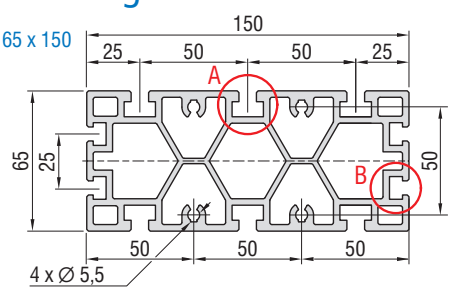
	RE 65		
Dimensions (W x H)	150 x 65 mm	250 x 65 mm	350 x 65 mm
Length	up to 3 metres (special lengths available upon request)		
Weight	7,725 g/m	12,420 g/m	17,030 g/m
	several hollow chambres and T-groove indents for slide nuts or thread slats M6 respectively, as well as front intakes for M6 screws		
Moment of inertia I_x	633.47 cm⁴	2,658.48 cm⁴	6,953.91 cm⁴
Moment of inertia I_y	148.87 cm⁴	243.85 cm⁴	338.52 cm⁴
Resisting momentum W_x	84.46 cm³	212.68 cm³	397.37 cm³
Resisting momentum W_y	45.83 cm³	75.03 cm³	104.16 cm³

Order data

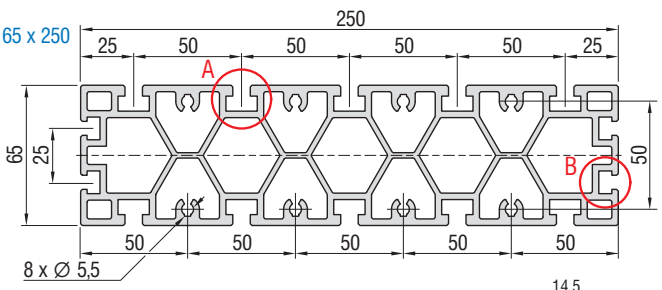
Profile name	Item no.: L=**3000 mm**
RE 65 W 150 x H 65 mm	201 034 **3000**
RE 65 W 250 x H 65 mm	201 032 **3000**
RE 65 W 350 x H 65 mm	201 033 **3000**

Scale drawings

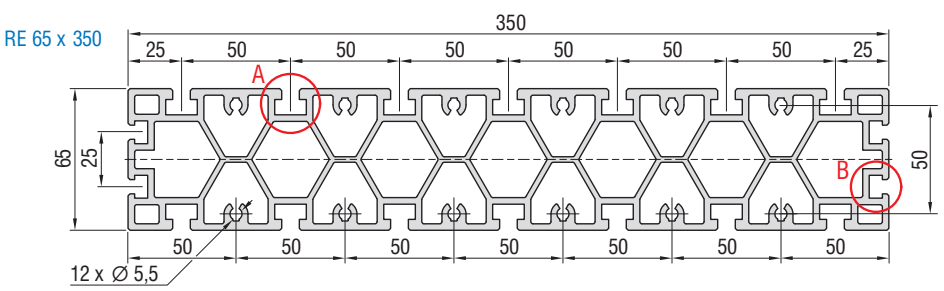
RE 65 x 150

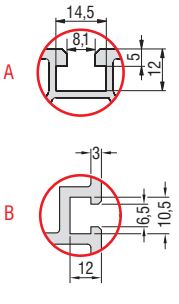


RE 65 x 250



RE 65 x 350





Technical specifications subject to change.

Panel profiles

PP profiles

Characteristics

- For the quick and easy assembly of frames, tables and racks
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Lightweight, very solid
- Upright particularly suited as load-bearing facing, tolerate higher loads
- Our profile connectors with profile boreholes and hexagon socket screws together with PS profiles form very solid, warp-, twist- and bend-resistant connections
- Profile cut upon request

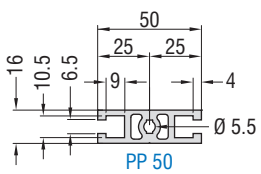
Technical specifications

	PP 50	PP 100	PP 150	PP 200	PP 250
dimensions (W x H)	50 x 16 mm	100 x 16 mm	150 x 16 mm	200 x 16 mm	250 x 16 mm
length	up to 3 m (special lenghts upon request)				
weight	1,140 g/m	1,890 g/m	2,640 g/m	3,390 g/m	4,140 g/m
	hollow indention Ø 5.5 mm for M6	2 hollow indentions Ø 5.5 mm for M6 in a grid of 50	3 hollow indentions Ø 5.5 mm for M6 in a grid of 50	4 hollow indentions Ø 5.5 mm for M6 in a grid of 50	5 hollow indentions Ø 5.5 mm for M6 in a grid of 50
inertia moment I_x	8.13 cm⁴	67.27 cm⁴	213.92 cm⁴	482.77 cm⁴	908.52 cm⁴
inertia moment I_y	1.37 cm⁴	2.46 cm⁴	3.55 cm⁴	4.64 cm⁴	5.74 cm⁴
moment of resistance W_x	3.25 cm³	13.45 cm³	28.52 cm³	48.27 cm³	72.68 cm³
moment of resistance W_y	1.71 cm³	3.08 cm³	4.44 cm³	5.80 cm³	7.17 cm³

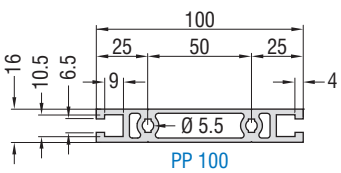
Order data

Profile name	Item no.: L=**3000 mm**
PP 50 W 50 x H 16 mm	201 040 **3000**
PP 100 W 100 x H 16 mm	201 041 **3000**
PP 150 W 150 x H 16 mm	201 042 **3000**
PP 200 W 200 x H 16 mm	201 043 **3000**
PP 250 W 250 x H 16 mm	201 009 **3000**

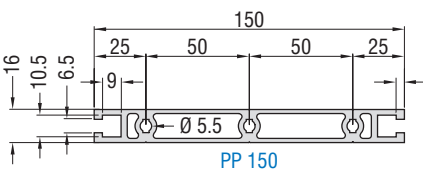
Scale drawings



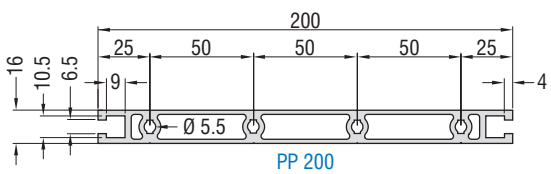
PP 50



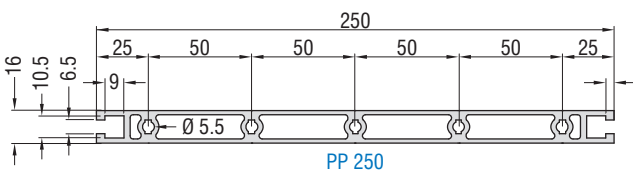
PP 100



PP 150



PP 200



PP 250

Technical specifications subject to change.

Tradeshow profiles

PM profiles

Characteristics

- For the quick and easy assembly of e.g. tradeshow booths and pillars
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Lichtweight, sturdy, elegant
- With T-grooves angled 45° for versatility
- Our clamping joints with profile bore-hole and tension elements form very solid, warp-, twist- and bend-resistant connections between the profiles
- Profile cut upon request

Technical specifications

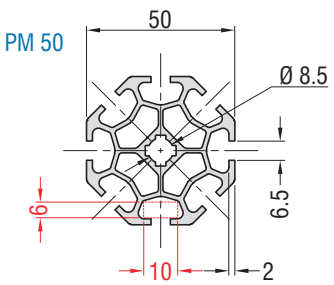
	PM 50	PM 100
dimensions (W x H)	50 x 50 mm	100 x 100 mm
length	2500 mm	3000 mm
weight	1,700 g/m	3,270 g/m
	8 T-groove indentions in an angle of 45° hollow indention, Ø 8.5 mm for M10	8 T-groove indentions in an angle of 45° hollow indention, Ø 8.5 mm for M10
inertia moment I_x	12.27 cm⁴	107.20 cm⁴
inertia moment I_y	12.27 cm⁴	107.20 cm⁴
moment of resistance W_x	4.91 cm³	21.44 cm³
moment of resistance W_y	4.91 cm³	21.44 cm³

Order data

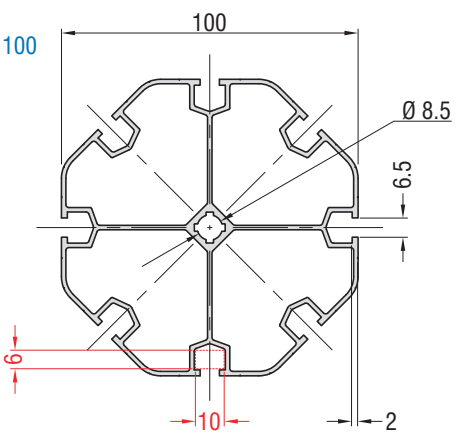
Profile name	Item no.: L=**2500 mm** Item no.: L=**3000 mm**
PM 50 W 50 x H 50 mm	200004 **2500**
100 PM W 100 x H 100 mm	200005 **3000**

Scale drawings

PM 50



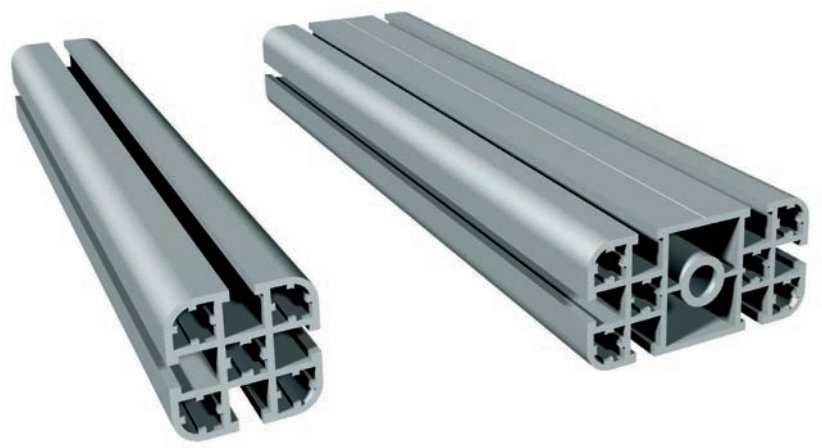
PM 100



Technical specifications subject to change.

Lightweight frame profiles

PL profiles



Characteristics

- For the quick and easy assembly of frames, tables and racks
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Lightweight, compact, sturdy
- Suitable for heavier loads
- Our clamping joints with profile borehole and tension elements form very solid, warp-, twist- and bend-resistant connections between the profiles
- Profile cut upon request

Options: charcoal grey, light grey

Technical specifications

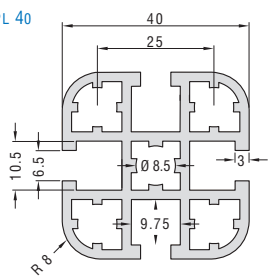
	PL 40	PL 80
dimensions (W x H)	40 x 40 mm	80 x 40 mm
length	up to 3 m (special lenghts upon request)	
weight	1,530 g/m	2,900 g/m
	4 T-groove indentions for T-groove blocks M6 5 hollow indentions, Ø 8.5 mm for M10	6 T-groove indentions for T-groove blocks M6 6 hollow indentions, Ø 8.5 mm for M10 hollow indention, Ø 10.2 mm for M12
inertia moment I_x	8.38 cm^4	64.40 cm^4
inertia moment 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

Order data

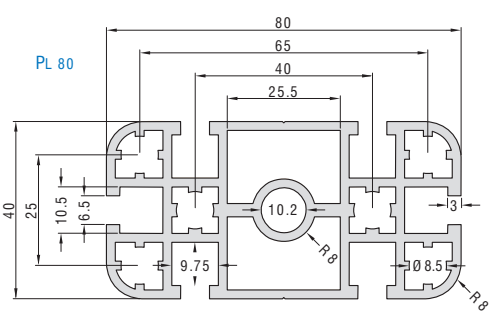
Profile name	Item no.: L=**3000 mm**
PL 40 W 40 x H 40 mm	200 008 **3000**
PL 80 W 80 x H 40 mm	200 009 **3000**

Scale drawings

PL 40



PL 80



Technical specifications subject to change.

Universal profiles

PU profiles

Characteristics

- For the quick and easy assembly of frames, tables and racks
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Lightweight, compact, sturdy
- All-purpose
- Suitable for heavier loads
- Our clamping joints with profile borehole and tension elements form very solid, warp-, twist- and bend-resistant connections between the profiles
- Profile cut upon request

Options: charcoal grey, light grey

Technical specifications

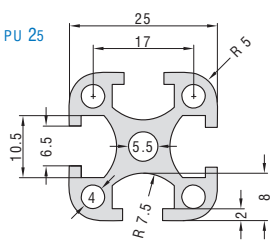
	PU 25	PU 50
dimensions (W x H)	25 x 25 mm	50 x 25 mm
length	up to 3 m (special lenghts upon request)	
weight	690 g/m	1,270 g/m
	4 T-groove indentions for slide nuts M6 hollow indention, Ø 5.5 mm for M6	4 T-groove indentions for slide nuts M6 2 hollow indentions, Ø 5.5 mm for M6
inertia moment I_x	1.43 cm^4	10.99 cm^4
inertia moment 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

Order data

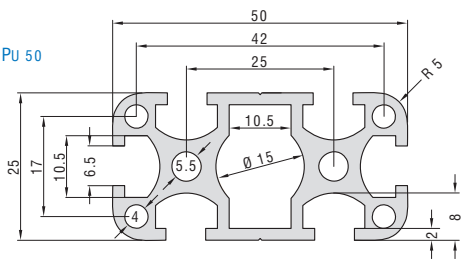
Profile name	Item no.: L=**3000 mm**
PU 25 W 25 x H 25 mm	200 001 **3000**
PU 50 W 50 x H 25 mm	200 002 **3000**

Scale drawings

PU 25



PU 50



Technical specifications subject to change.

Stand profiles

PS profiles

Characteristics

- For the quick and easy assembly of frames, tables and racks
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Lightweight, compact, sturdy
- Suitable for heavier loads
- Our clamping joints with profile boreholes and tension elements form very solid, warp-, twist-and bend-resistant connections between the profiles
- Profile cut upon request

Options:
- charcoal grey
- light grey

Technical specifications

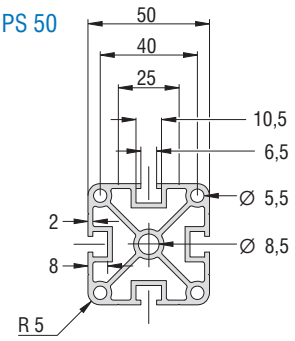
	PS 50	PS 80
dimensions (W x H)	50 x 50 mm	80 x 80 mm
length	up to 3 m (special lengths upon request)	
weight	2,300 g/m	5,390 g/m
	4 T-groove indentions for slide nuts M6 4 hollow indentions Ø 5.5 mm for M6 hollow indention Ø 8.5 mm for M10	4 T-groove indentions for slide nuts M6 4 hollow indentions Ø 8.5 mm for M10 hollow indention Ø 10.2 mm for M12
inertia moment I_x	22.06 cm⁴	135.95 cm⁴
inertia moment I_y	22.06 cm⁴	135.95 cm⁴
moment of resistance W_x	8.82 cm³	33.99 cm³
moment of resistance W_y	8.82 cm³	33.99 cm³

Order data

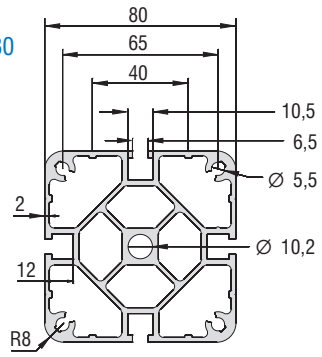
Profile name	Item no.: L=**3000 mm**
PS 50 W 50 x H 50 mm	200 003 **3000**
PS 80 W 80 x H 80 mm	200 014 **3000**

Scale drawings

PS 50



PS 80



Technical specifications subject to change.

Stand profiles

PS profiles

Characteristics

- For the quick and easy assembly of frames, tables and racks
- Aluminium, anodized
- Manufactured according to DIN EN 12020-2
- Lightweight, compact, sturdy
- Suitable for heavier loads
- Our clamping joints with profile boreholes and tension elements form very solid, warp-, twist- and bend-resistant connections between the profiles
- Profile cut upon request

Options:
- charcoal grey
- light grey

Technical specifications

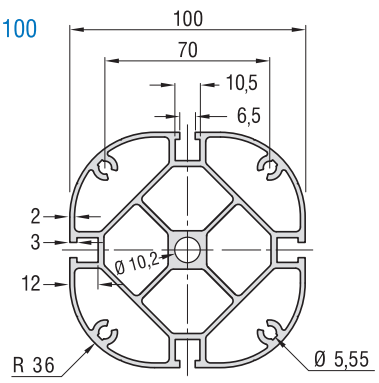
	PS 100	PS 140
dimensions (W x H)	100 x 100 mm	140 x 140 mm
length	up to 3 m (special lengths upon request)	
weight	5,100 g/m	9,215 g/m
	4 T-groove indentions for slide nuts M6 4 hollow indentions Ø 5.55 mm for M6 hollow indention Ø 10.2 mm for M12	4 T-groove indentions for slide nuts M6 4 hollow indentions Ø 5.5 mm for M6 4 hollow indentions Ø 3.4 mm for M4 hollow indention Ø 14 mm for M16
inertia moment I_x	163.00 cm^4	601.80 cm^4
inertia moment 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

Order data

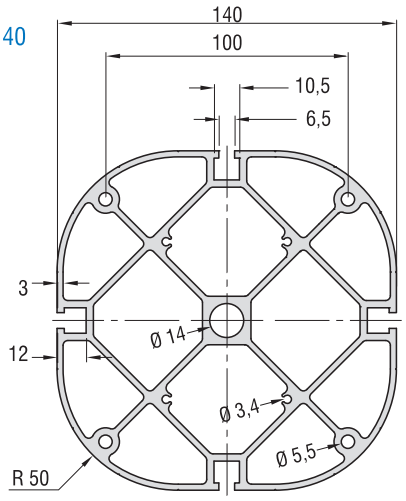
Profile name	Item no.: L=**3000 mm**
PS 100 W 100 x H 100 mm	200 015 **3000**
PS 140 W 140 x H 140 mm	200 016 **3000**

Scale drawings

PS 100



PS 140



Technical specifications subject to change.

Stand profiles

PS profiles

Characteristics

- For the quick and easy assembly of frames, tables and racks
- Aluminium, anodized
- Lightweight, compact, sturdy
- Smooth, dirt-repellent surface
- Profile cut upon request
- Manufactured according to DIN EN 12020-2

Options:
- charcoal grey
- light grey

Technical specifications

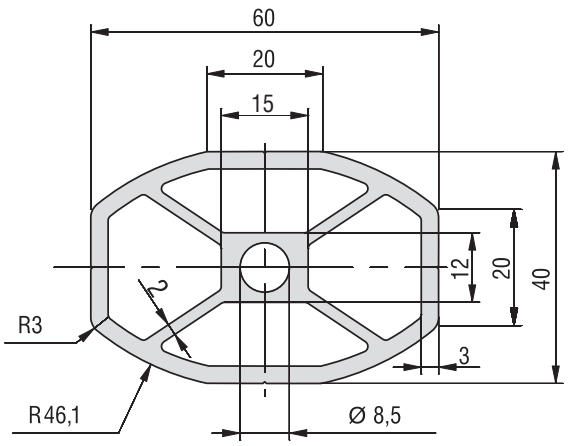
	PS 60x40	PS 80x60
dimensions (W x H)	60 x 40 mm	80 x 60 mm
length	up to 3 m (special lengths upon request)	
weight	1.96 kg/m	3.71 kg/m
	hollow indention Ø 8.5 mm for M10	hollow indention Ø 10.2 mm for M12
inertia moment I_x	22.56 cm^4	70.19 cm^4
inertia moment I_y	11.28 cm^4	42.96 cm^4
moment of resistance W_x	7.5 cm^3	17.55 cm^3
moment of resistance W_y	5.6 cm^3	14.32 cm^3

Order data

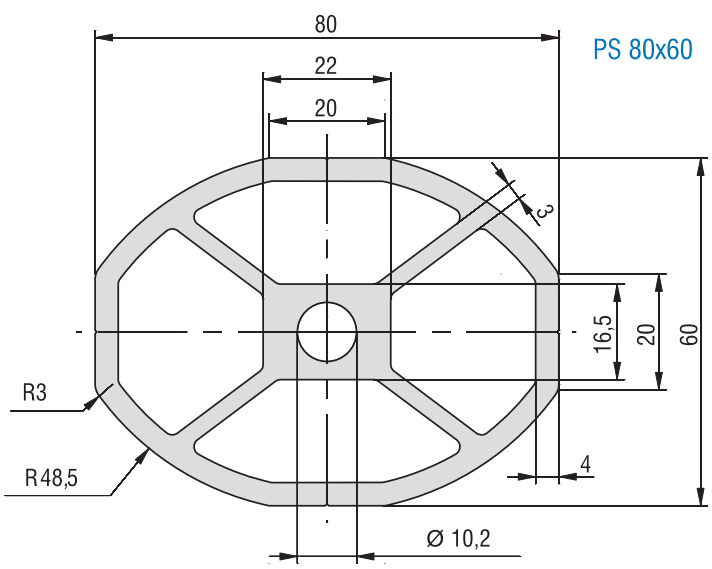
Profile name	Item no.: L=**3000 mm**
PS 60x40 W 60 x H 40 mm	200 006 **3000**
PS 80x60 W 80 x H 60 mm	200 007 **3000**

Scale drawings

PS 60x40



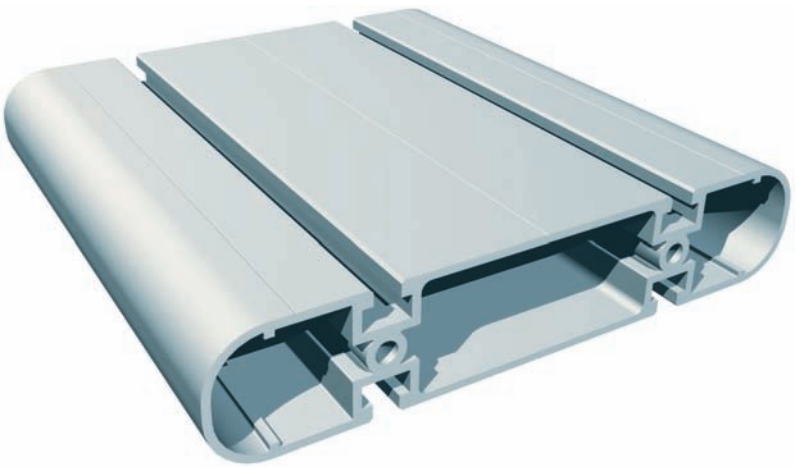
PS 80x60



Technical specifications subject to change.

Stand profile

PS profiles



Characteristics

- For the quick and easy assembly of equipment racks, tables and racks
- Aluminium anodized
- Elegant and sturdy
- For inserting and screwing into the matching Die-cast aluminium feet
- Smooth, dirt-repellent surface
- Manufactured according to DIN EN 12020-2
- Profile cut upon request

Options:
- charcoal grey
- light grey

Technical specifications

	PS 200
Dimensions (W x H)	200 x 40 mm
Length	up to 3 metres (special lengths available upon request)
Weight	5940 g/m
Moment of inertia I_x	870.00 cm⁴
Moment of inertia I_y	45.00 cm⁴
Resisting momentum W_x	86.9 cm³
Resisting momentum W_y	22.8 cm³

Die-cast aluminium foot

2 pieces, with casters
Mounting materials included

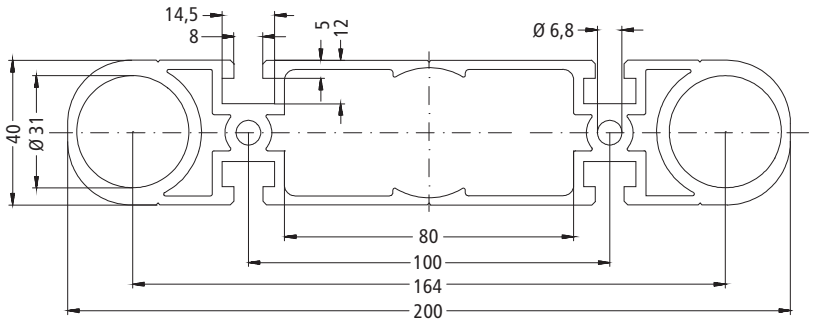
Options:
- charcoal grey
- light grey

Order data

Name (PS 200)	Item number
Aluminium anodized, 3m	**208050 3000**

Die-cast aluminium foot	Item number
Silver-grey (SU 2 pieces)	**248700 3000**

Scale drawing



Technical specifications subject to change.

Accessories

Threaded bars

Threaded bar M6
- 13 x 6 mm • galvanised
- M6 Ra 50 mm • SU 3 pcs. 1 m each
- for PT / RE 40, 65

Item no.: **209 010**

Threaded bar M6
- 10 x 4 mm • galvanised
- M6 Ra 50 mm • SU 3 pcs. 1 m each
- for all except PT / RE 40, 65 / SP

Item no.: **209 011**

Slide nuts

Slide nut M6 (Image 1)
- L25 x W10 x H3.5 • galvanised
- SU 100 pieces
- for all except PT / RE 40, 65

Item no.: **209 001 0005**

Slide nut M6 (Image 1)
- L 25 x W 13 x H 5 • galvanised
- SU 50 pieces
- for PT / RE 40, 65

Item no.: **209 004 0001**

Slide nut 2 x M6 (Image 2)
- L45 x W10 x H3.5 • galvanised
- SU 50 pieces
- for all except PT / RE 40, 65

Item no.: **209 002 0004**

Slide nut 2 x M6 (Image 2)
- L 45 x W 13 x H 6 • galvanised
- 2xM6 Ra 25mm • VE 25 pieces
- for PT / RE 40, 65

Item no.: **209 005 0001**

Slide nut M5
- L25 x W10 x H3.5 • galvanised
- SU 20 pieces
- for all except PT / RE 40, 65

Item no.: **209 006 0001**

Angle slide nut 2 x M6 (Image 3)
- galvanised • SU 25 pieces
- for all except PT / RE 40, 65

Item no.: **209 021 0003**

Speciality angle slide nut 3 x M6 (Image 4)
- galvanised • SU 25 pieces
- for all except PT / RE 40, 65

Item no.: **209 022 0003**

T-blocks

T-blocks M6
- DIN 508 • hardened
- SU 20 pieces
- for PT / RE 40, 65

Item no.: **209 119 0003**

Clamp

Clamp SE
- with setscrew M6
- SU 2 pieces
- for RE / PT

Item no.: **290 051**

Tensioning devices

Lever tensioning device SH 1
- for RE / PT

Item no.: **290 001**

Lever tensioning device SH 2
- for RE / PT

Item no.: **290 002**

Stop rails

Stop rail (galvanised)
- W 20 x H 10 • Ra 50
- SU 2 pcs. + mounting material

L 125 mm
Item no.: **290 021 0125**

L 175 mm
Item no.: **290 021 0175**

L 225 mm
Item no.: **290 021 0225**

Edging tape / profile

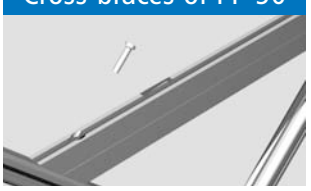
Edging tape black 1-pieces
- for plate thicknesses 3 - 6 mm
- SU 10 m
- for all except PT

Item no.: **209 202 0001**

Edging profile black 2-piece
- for plate thicknesses 3 - 6 mm
- SU 3 pcs. 3 m each
- for all except PT

Item no.: **209 212 3000**

Cross-braces of PP 50



Cross-braces of PP 50
- L 490 mm
- mitre cut
- M6 boreholes
- for all except PT / RE 40, 65

Item no.: **209 300 0000**

Strap hinge

Plastic strap hinge
- L 65 x W 40
- SU 10 pcs. + mount
- Ra 43 x 20 mm
- for PL

Item no.: **209 050 0012**

Aluminium strap hinge
- L 40 x W 40 mm
- SU 10 pcs. + mount
- Ra 25 x 25 mm
- for all except PT / RE 40, 65

Item no.: **209 050 0011**

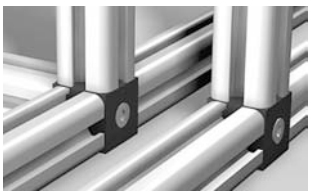
Accessories

Profile joint cubes

Profile joint cubes
black
- SU 10 pieces + mounting material
- for PU 25

2x
Item no.: **209 104 0002**

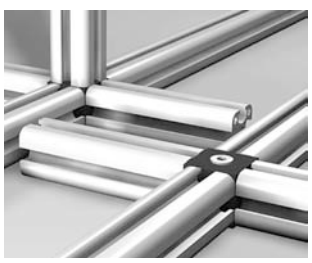
3x
Item no.: **209 103 0002**



Profile joinnt cube black
- SU 10 pieces + mounting material
- for PU 25

3x
Item no.: **209 106 0002**

4x
Item no.: **209 107 0002**

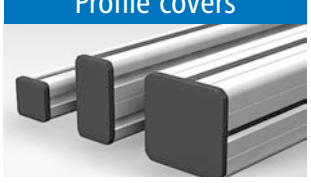


Profile joint cubes
black
- SU 10 pieces + mounting material
- for PU 25

4x
Item no.: **209 108 0002**

5x
Item no.: **209 109 0002**

Profile covers



Profile covers black
- PU 25 - 25 pcs.
  Item no.: **209 105 0003**
- PU 50 - 25 pcs.
  Item no.: **209 126 0003**
- PL 40 - 20 pcs.
  Item no.: **209 127 0003**
- PL 80 - 20 pcs.
  Item no.: **209 128 0003**
- PS 50 - 25 pcs.
  Item no.: **209 129 0003**
- PS 80 - 20 pcs.
  Item no.: **209 130 0003**
- PS 140 - 10 pcs.
  Item no.: **209 130 1001**

Aluminium corner connection

Aluminium corner connection
- L 25 x W 25 x H 15 • galvanised
- SU 10 pieces + mounting material
- for PL, PS, PU, PP

natural
Item no.: **209 114 0101**

black
Item no.: **209 114 0111**

Aluminium corner connection
- L 40 x W 40 x H 22
- SU 10 pieces + mounting material
- für PP / PL / PS / PU

natural
Item no.: **209 115 0101**

black
Item no.: **209 115 0111**

Aluminium corner connection
- L 50 x W 50 x H 15
- SU 10 pieces + mounting material
- für RE / PU / PS / PU

natural
Item no.: **209 116 0101**

black
Item no.: **209 116 0111**

Aluminium corner connection
- L 80 x W 80 x H 22
- SU 10 pieces + mounting material
- für PP / PL / PS / PU

natural
Item no.: **209 117 0101**

black
Item no.: **209 117 0111**

Plastic equipment feet

Plastic equipment feet
with rubber plate
- SU 4 pieces, with setscrews
- black

for PL 40 / PS 50
- Ø 60
- Setscrews M10 x 45
  Item no.: **209 032 0003**

for PL 80 / PS 80
- Ø 80
- Setscrews M12 x 45
  Item no.: **209 034 0001**

for PL 80 / PS 80
- Ø 120
- Locking screws M12 x 45
- black
  Item no.: **209 033 0003**

Casters

Rubber casters Ø 75 M10
- SU 4 pieces
- 2 with and 2 without locking brake
- for PL 40 / PS 50

Item no.: **209 043 0011**

Aluminium equipment feet

Aluminium equipment feet
with rubber plate
for PU 50
- SU 4 pieces, with setscrews and adapter bushings
- Ø 50
- Setscrews M6 x 30
- natural
  Item no.: **209 030 0000**

for PS 100
- Ø 170
- Setscrews M16 x 100
- black
  Item no.: **209 035 0001**

T-groove cover

T-groove cover
- SU 30 m
- (turquoise = similar to RAL 5018)
- for all except PT / RE 40, 65

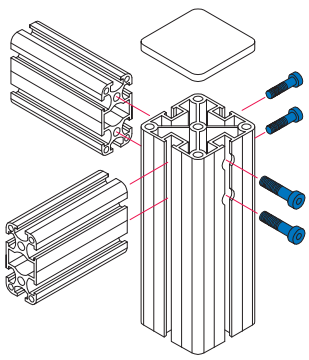
black Item no.: **209 201 0004**
turquoise Item no.: **209 201 0003**

Technical specifications subject to change.

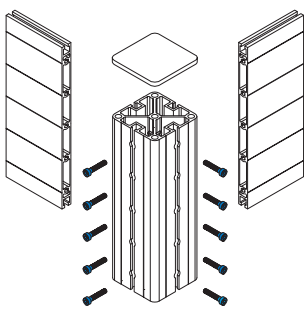
Profile connections

Examples:

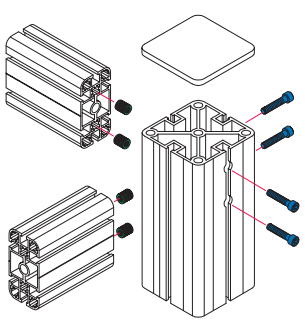
PS 50 with PU 50



PS 50 with PP 250



PS 80 with PL 80



Hexagon socket screws

Hexagon socket screws M6 x 25 mm

- SU 10 pcs.
  Item no.: **209 147 0009**
- SU 50 pcs.
  Item no.: **209 147 0010**

Hexagon socket screws M6 x 50 mm

- SU 10 pcs.
  Item no.: **209 147 0003**
- SU 50 pcs.
  Item no.: **209 147 0004**

Hexagon screw driver SW 5

- DIN 911
- SU 1 piece

Item no.: **931 152**

Threaded bushings

Threaded bushings M9 / M6

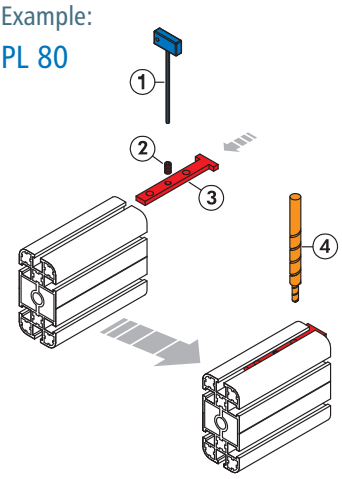
- SU 10 pcs.
  Item no.: **209 147 0001**
- SU 50 pcs.
  Item no.: **209 147 0002**

Threaded bushings M10 / M6

- SU 10 pcs.
  Item no.: **209 147 0124**
- SU 50 pcs.
  Item no.: **209 147 0125**

Example:

PL 80



① Sechskantschraubendreher SW 3
② Gewindestift M5
③ Bohrschablone
④ Stufenbohrer
Ø 6 mm / Ø 10,4 mm

Example PL 80

Drill jig 1

Item no.: **290 015 0001**

Drill jig 2

Item no.: **290 015 0002**

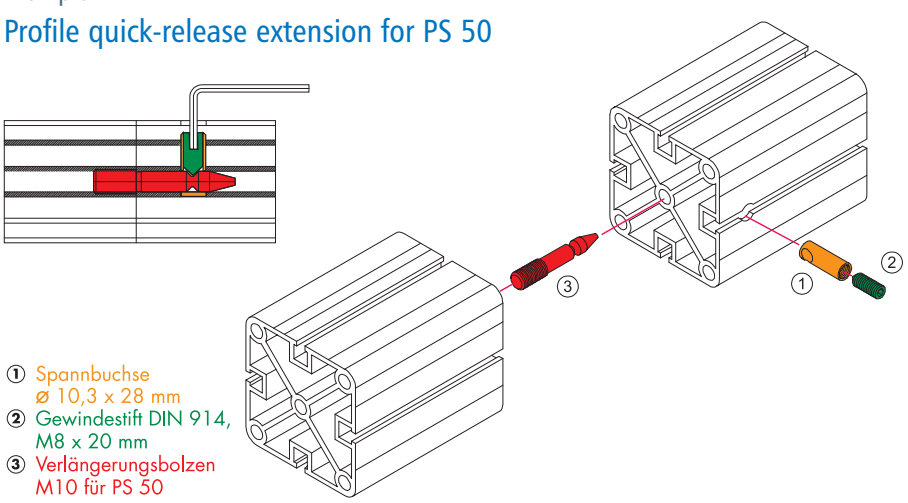
Step drill

- Ø 6 / Ø 10.4 mm

Item no.: **400 090**

Example:

Profile quick-release extension for PS 50



① Spannbuchse
ø 10,3 x 28 mm
② Gewindestift DIN 914,
M8 x 20 mm
③ Verlängerungsbolzen
M10 für PS 50

for PS 50 / PL 40 (M10)

- Clamping bushing, grub screw, extension bolt
- 10 sets
  Item no.: **209 147 0120**
- 50 sets
  Item no.: **209 147 0121**

for PS 80 / PL 80 (M12)

- Clamping bushing, grub screw, extension bolt
- 10 sets
  Item no.: **209 147 0122**
- 50 sets
  Item no.: **209 147 0123**

matching drill jig 2

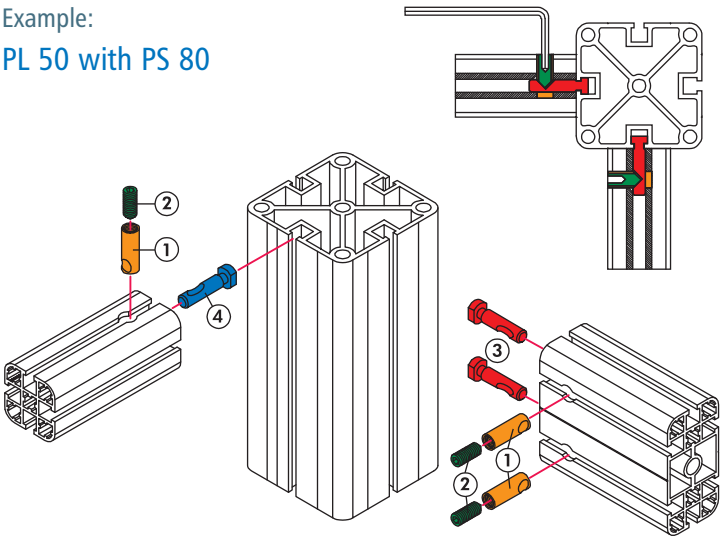
Item no.: **290 015 0002**

Technical specifications subject to change.

Profile quick-release connectors

Example:

PL 50 with PS 80

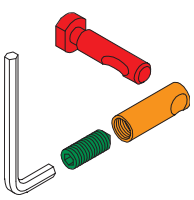


① Spannbuchse ø 10,3 x 28 mm
② Gewindestift DIN 914, M6 x 20 mm
③ Verbindungsbolzen 0° für PL 40 u. PL 80
④ Verbindungsbolzen 90° für PL 40 u. PL 80

Quick release connector 0°

e.g. for

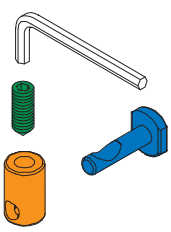
PL / PS 80



Quick release connector 90°

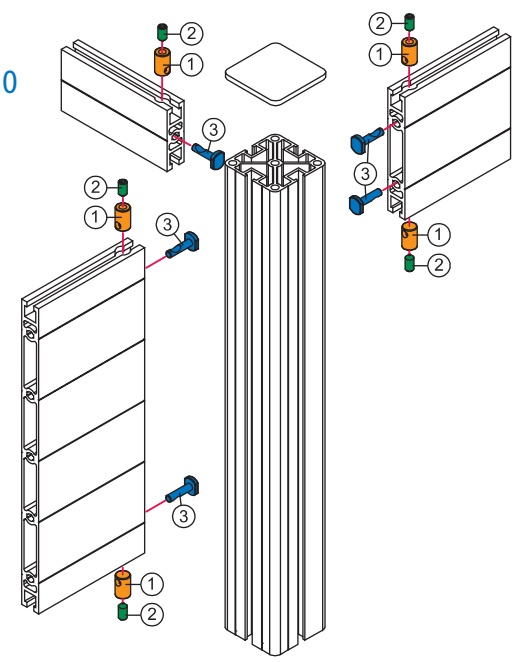
e.g. for

für PP / PU / PS



Example:

PP 50 with PS 50



① Spannbuchse ø 10,3 x 16,5 mm
② Gewindestift DIN 914, M6 x 12 mm
③ Verbindungsbolzen 90°

Technical specifications subject to change.

Quick-release connector 0°

for PL 80 / PS 80

- Clamping bushing, grub screw and bolt 0°
- 10 sets:
  Item no.: **209 147 0102**
- 50 sets:
  Item no.: **209 147 0103**

für PP / PU / PS / PU

- Clamping bushing, grub screw and bolt 0°
- 10 sets:
  Item no.: **209 147 0100**
- 50 sets:
  Item no.: **209 147 0101**

Quick-release connector 90°

for PL / PS 80

- Clamping bushing, grub screw and bolt 90°
- 10 sets:
  Item no.: **209 147 0112**
- 50 sets:
  Item no.: **209 147 0113**

for PP / PU / PS

- Clamping bushing, grub screw and bolt 90°
- 10 sets:
  Item no.: **209 147 0110**
- 50 sets:
  Item no.: **209 147 0111**

Step drill

- Ø 6 / Ø 10.4 mm

Item no.: **400 090**

matching drill jig 2

Item no.: **290 015 0002**

Hexagon screw driver SW 3

- DIN 911

Item no.: **931 150**

Work benches

AT

Pictured: AT 2 with optional shelf

Characteristics

Work benches AT for chucking fixtures, tension materials as well as measuring, inspecting, testing, etc.

- Frame made of aluminium profiles, PP series &
  AT 1 with feet - PS series 60x40
  AT 2 with feet - PS series 80x60
- Work surface made of aluminium profiles RE series with T-groove indents

Options

- Lengths up to 2 m
- Shelf
- Casters

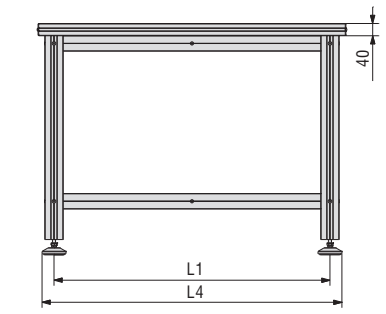
AT 1
with feet

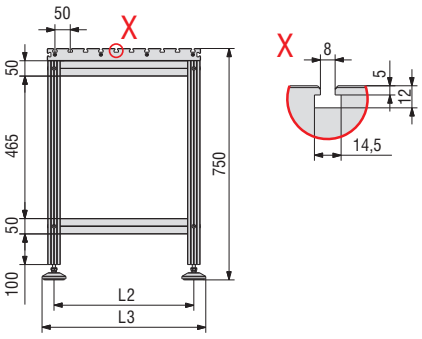
AT 2
with casters

Order data

Item no.	Description	Workload: distributed load	Weight
248 550 0010	AT 1, W 1000 x T 500 x H 750 mm	200 kg	approx. 30 kg
248 550 0012	AT 2, W 1500 x T 750 x H 750 mm	400 kg	approx. 60 kg

Scale drawings





Description	W	D	L 1	L 2	L 3	L 4
AT 1	1000	500	900	456	536	980
AT 2	1500	750	1380	680	800	1500

Technical specifications subject to change.

Assembly tables

MT

Figure: MT 4

Characteristics

Machine tables MT for chucking fixtures, tension materials as well as measuring, inspecting, testing, etc.

- Frame made of aluminium profiles series PP and PS80
- Table and portal top made of RE series aluminium profiles with T-groove indents

Options

- additional protal profile
- Shelf
- Shrouding cover

MT 1

MT 2
with shelf

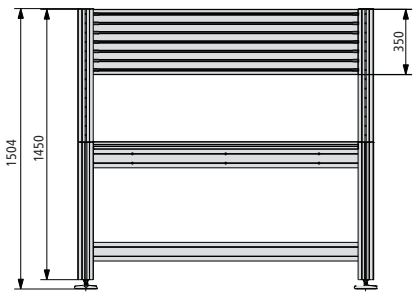
MT 3
with shelf and portal profile

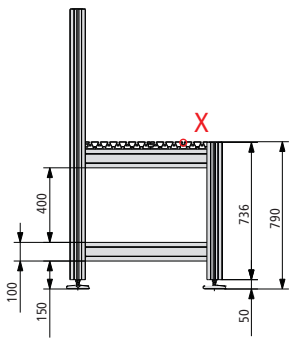
MT 4
with shelf, portal profile and shrouding cover

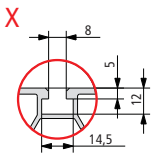
Order data

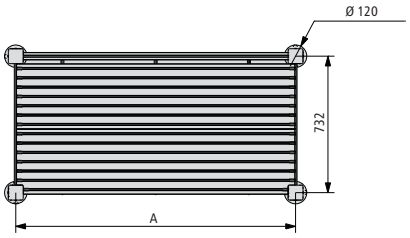
Item no.	Description	Workload: distributed load	Weight
248 553 0001	MT 1 W 1000	150 kg	approx. 70 kg
248 553 0002	MT 2 W 1500	250 kg	approx. 90 kg
248 553 0003	MT 3 W 2000	400 kg	approx. 112 kg
248 553 0004	MT 4 W 2500	400 kg	approx. 132 kg

Scale drawings





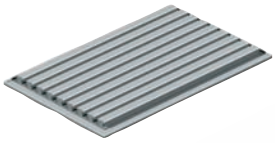




Description	A
MT 1	1000
MT 2	1500
MT 3	2000
MT 4	2500

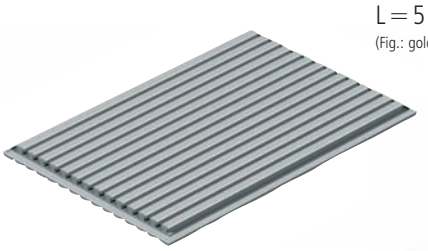
Technical specifications subject to change.

Aluminium T-groove panels



PT 25 x 250
L = 375 mm

PT 25 x 250
L = 550 mm
(Fig.: gold anodisation option)



PT 25 x 375
L = 550 mm

PT 25 x 375
L = 750 mm
(Fig.: gold anodisation option)

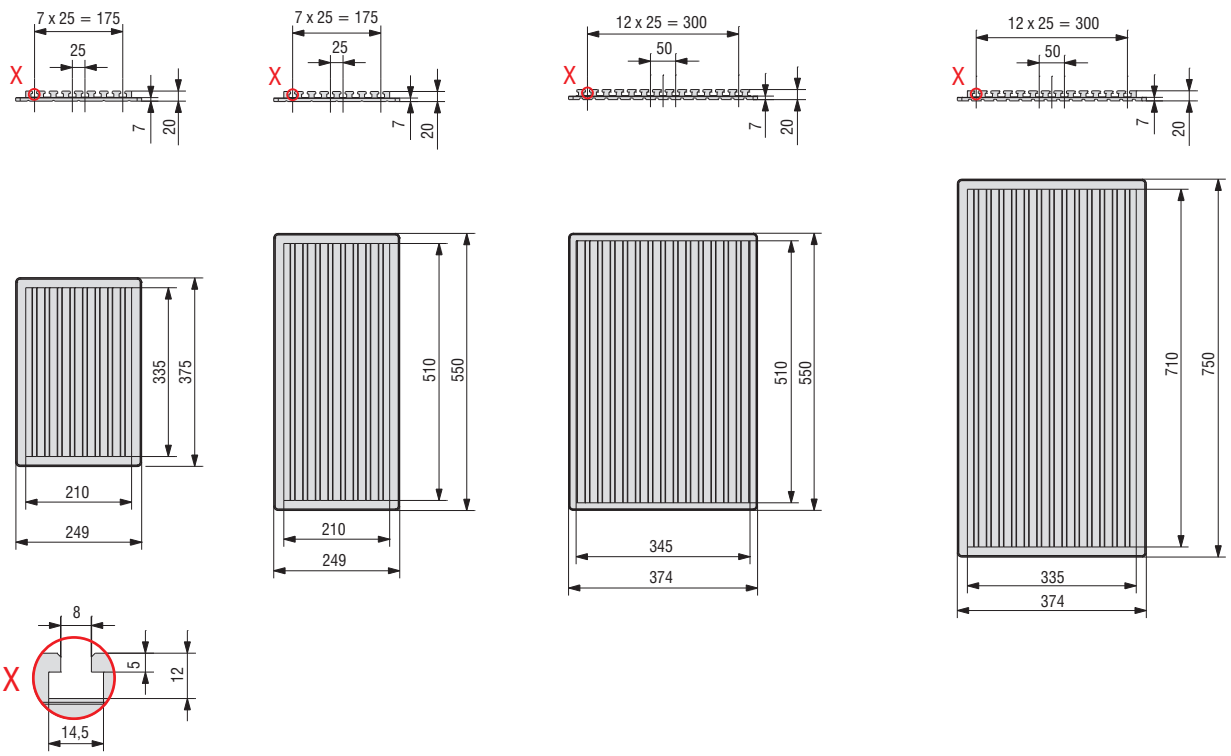
Characteristics

- Universal precision-, clamping- and working surface
- Aluminium anodized
- Both ends face milled
- T-groove grid 25 mm for isel T-blocks and M6
- With drainage groove for minimal amounts of liquid
- Usable with any machine
- Thick-walled and extremely inherently stable
- Super lightweight and elegant

Options

- Versatile accessories, e.g. stop rail, T-groove tensioning devices, isel vacuum suction unit (Vakufit), vice
- Wear-resistant, ultra-hard surface (hard coated)
  Mounting boreholes per customer request
- Other measurements available upon request
- Gold anodized

Scale drawings



Item numbers

PT 25 x 250, L = 375
Item no. **269053 2537**

PT 25 x 250, L = 550
Item no. **269053 2555**

PT 25 x 375, L = 550
Item no. **269053 3755**

PT 25 x 375, L = 750
Item no. **269053 3775**

Technical specifications subject to change.

Aluminium-T-groove panels

PT 25
Ø 250 mm

PT 25
Ø 350 mm
(Fig.: gold anodisation option)

PT 25 x 375
Ø 600 mm

PT 25 x 375
Ø 750 mm
(Fig.: gold anodisation option)

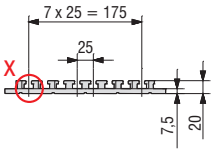
Characteristics

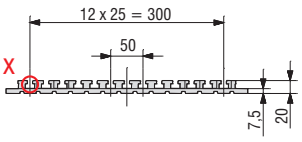
- Universal precision-, clamping- and working surface
- For rotating applications
- Aluminium anodized
- Both ends face milled
- T-grooves in a 25 mm grid for isel T-blocks and M6 slide nuts
- With drainage groove for minimal amounts of liquid
- Usable with any machine
- Thick-walled and extremely inherently stable
- Super lightweight and elegant

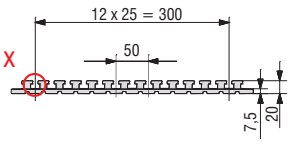
Options

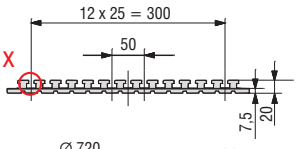
- Versatile accessories, e.g. stop rail, T-groove tensioning devices, isel vacuum suction unit (Vakufit), vice
- Wear-resistant, ultra-hard surface (hard coated)
  Mounting boreholes per customer request
- Other measurements available upon

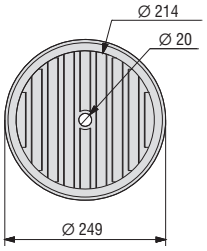
Scale drawings

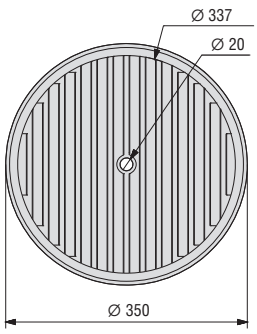


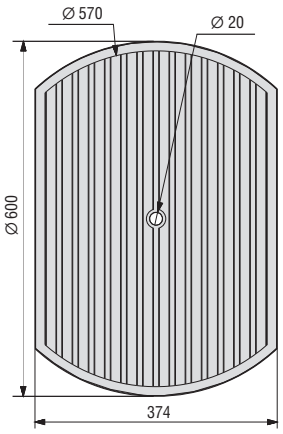


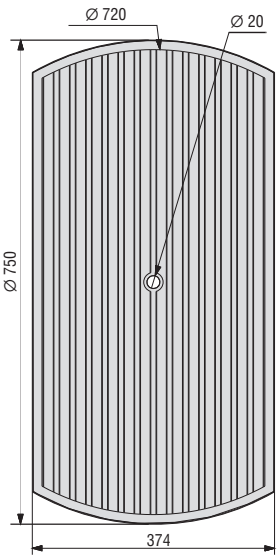


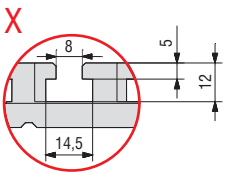












Item numbers

PT 25, Ø 250 mm
Item no. **269052 0250**

PT 25, Ø 350 mm
Item no. **269052 0350**

PT 25 x 375, Ø 600 mm
Item no. **269052 0550**

PT 25 x 375, Ø 750 mm
Item no. **269052 0750**

Technical specifications subject to change.

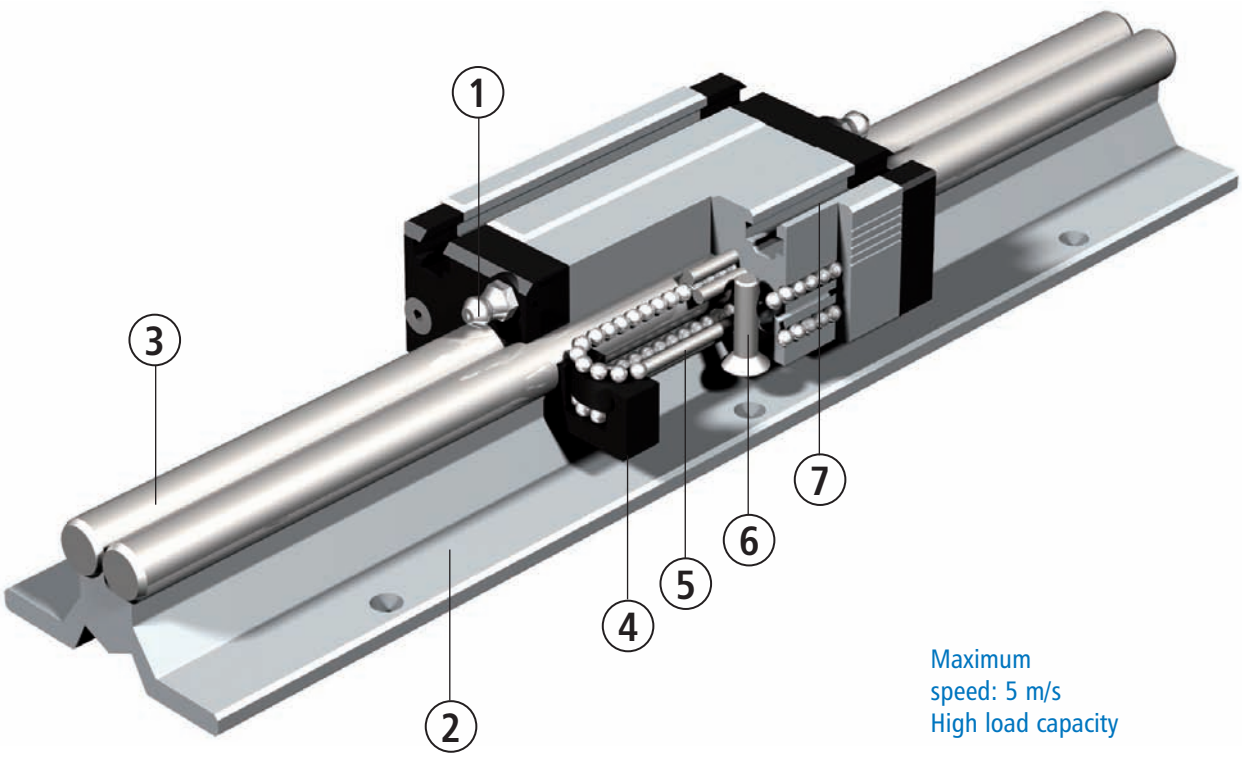
Linear Guides

Overview

Linear Guides

Overview

Function of linear guide slides



Maximum
speed: 5 m/s
High load capacity

General

The patented linear guide slides are perfectly suited for the construction of complex multi-axle systems for handling and processing.

The broad range of models satisfies many areas of application.

All models feature a profile length of 100mm.

1. A double sided greasing option is available for the ball races.

2. The base supports on all linear guides are aluminium extruder profiles as per DIN EN 12020-2, featuring T-groove heeling or retaining bores for mounting in the base of tread groove.

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.

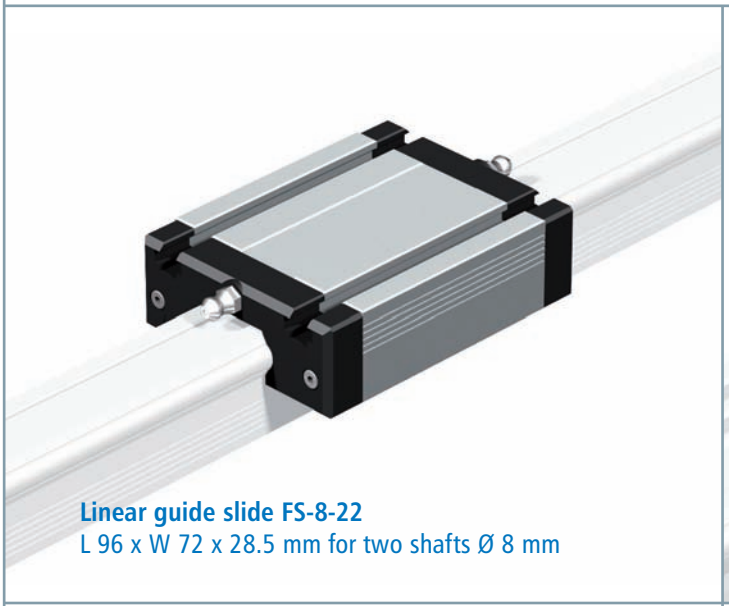
4. The ball deflections are fibre-glass reinforced.

5. Inside the linear slide are 4 ball races. Supporting balls run between two ground steel pins and the guide shaft. (Steel shaft Ø 12mm or 16mm)

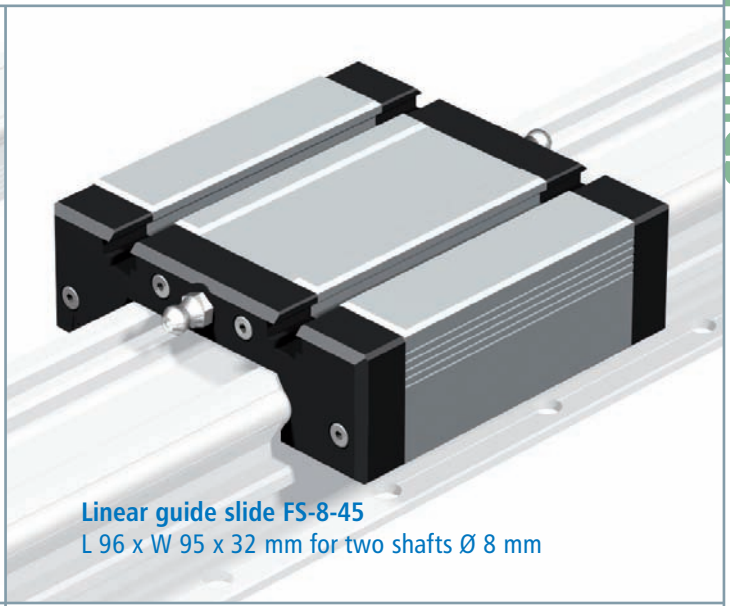
6. The slides are adjusted via selflocking setscrews. The rows of balls and shafts or pins are engaged against each other and therefore biased (adjusted backlash-free).
   The slides are adjusted to the applicable bias voltage at the factory.
   All shaft slides are optionally available in a stainless finish.

7. The shaft slides feature T-groove indents or mounting holes for fastening transport loads, slide plates, etc.

Overview linear guide slides



Linear guide slide FS-8-22
L 96 x W 72 x 28.5 mm for two shafts Ø 8 mm



Linear guide slide FS-8-45
L 96 x W 95 x 32 mm for two shafts Ø 8 mm

Linear guide slide FS-12-0
L 96 x W 50 x 31.5 mm for one shaft Ø 12 mm

Linear guide slide FS-12-12
L 96 x W 62 x 31.5 mm for two shafts Ø 12 mm

Linear guide slide FS-16-0
L 94 x W 55 x 33.5 mm for one shaft Ø 16 mm

Steel linear guide slide FS-16-S0
L 94 x W 58 x 33.7 mm for one shaft Ø 16 mm

mechanics

Linear guide

LFS-8-2

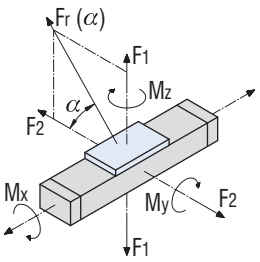
Figure:
Linear guide rail and linear guide slide

Load data

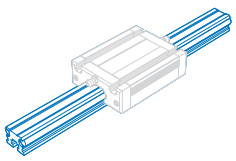
Linear guide Aluminium FS-8-22	
C_o	3114 N
C	1846 N
F_1 stat.	2659 N
F_1 dyn.	1576 N
F_2 stat.	3114 N
F_2 dyn.	1846 N
M_x stat.	37.3 Nm
M_y stat.	100.5 Nm
M_z stat.	117.6 Nm
M_x dyn.	22.1 Nm
M_y dyn.	59.5 Nm
M_z dyn.	69.7 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



Linear guide slide LS-8-2

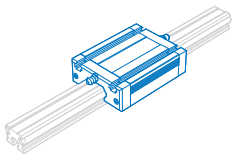


- 2 precision steel shafts Ø 8 mm
  Mounting grid 100 mm
- Shaft intake contour
  (Clamp joint)
- Aluminium profile track with T-groove indents, anodized
- Conditionally cantilevered
- Standard length 3 m,
  segmentable as needed
- Weight: 2.01 kg/m

Item no.: **235002 0998** (Length 1 m)
235002 1998 (Length 2 m)
235002 2998 (Length 3 m)

Option:
- Other lengths (longer or shorter)

Linear guide slide FS-8-22

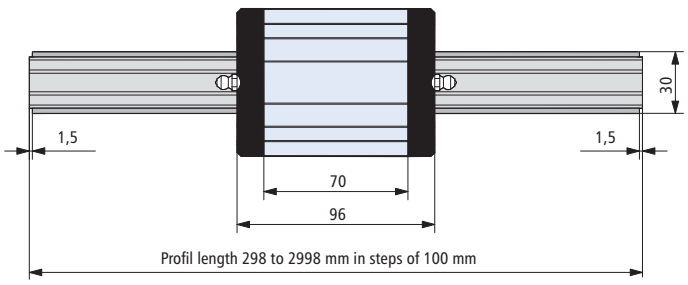


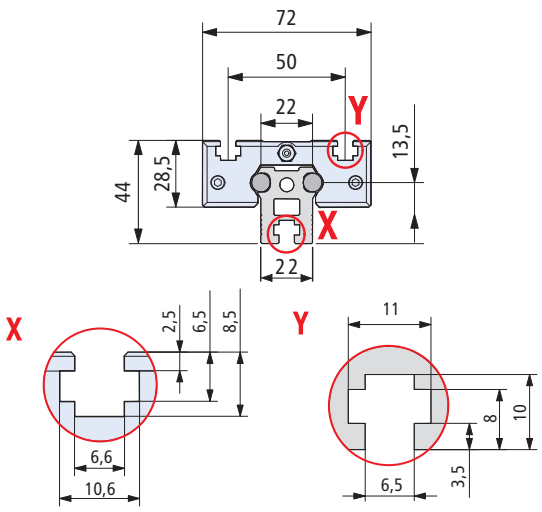
- Aluminium slide with 8 steel inserts
  L 96 x W 72 x H 28.5 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.35kg

Item no.: **223100 0070**

Option:
- Linear guide slides with sliding bushes

Scale drawings





Technical specifications subject to change.

made by isel®

Linear guide

LFS-8-7

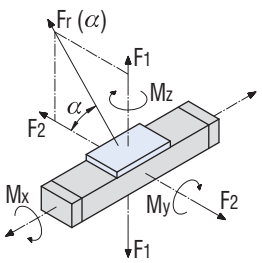
Figure:
Linear guide rail and linear guide slide

Load data

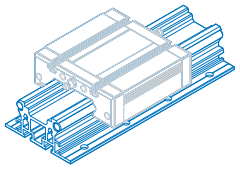
Linear guide Aluminium FS-8-45	
C_o	3114 N
C	1846 N
F_1 stat.	2659 N
F_1 dyn.	1576 N
F_2 stat.	3114 N
F_2 dyn.	1846 N
M_x stat.	67.3 Nm
M_y stat.	100.5 Nm
M_z stat.	117.6 Nm
M_x dyn.	39.9 Nm
M_y dyn.	59.5 Nm
M_z dyn.	69.7 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



Linear guide rail LS-8-7

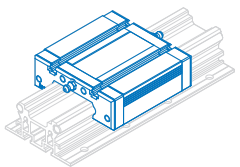


- 2 precision steel shafts Ø 8 mm
  Mounting grid 100 mm
- Shaft intake contour
  (Clamp joint)
- Aluminium profile track with T-groove indents, anodized
- Conditionally cantilevered
- Standard length 3 m,
  segmentable as needed
- Weight: 2.9 kg/m

Item no.: **235012 0099** (Length 1 m)
235012 0199 (Length 2 m)
235012 0299 (Length 3 m)

Option:
- Other lengths (longer or shorter)

Linear guide slide FS-8-45

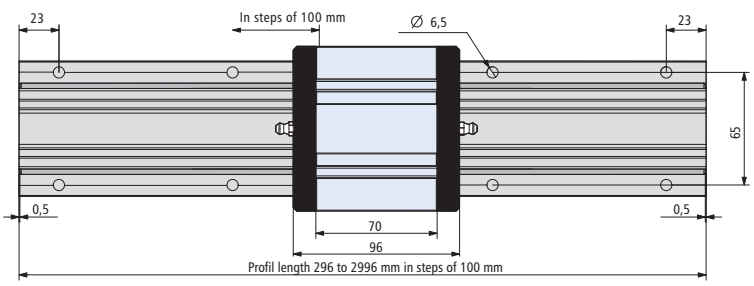


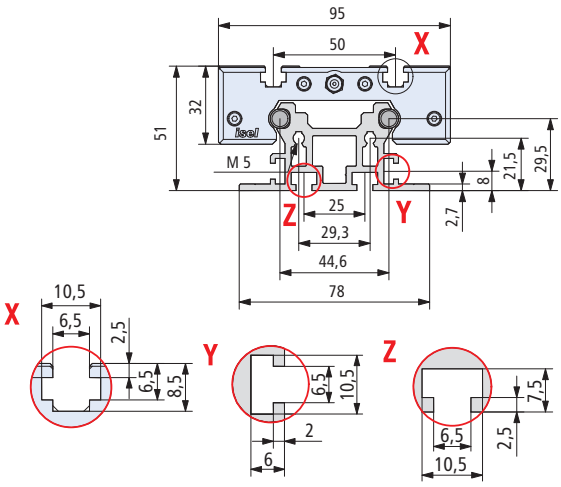
- Aluminium slide with 8 steel inserts
  L 96 x W 96 x H 32 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.40 kg

Item no.: **223111 0070**

Option:
- Linear guide slides with sliding bushes

Scale drawings





Technical specifications subject to change.

Linear guide

LFS-12-11

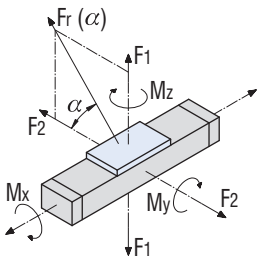
Figure:
Linear guide rail and linear guide slide

Load data

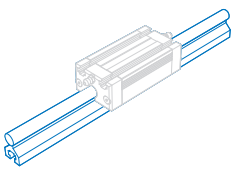
Linear guide Aluminium FS-12-0	
C_o	3303 N
C	1873 N
F_1 stat.	2821 N
F_1 dyn.	1599 N
F_2 stat.	3303 N
F_2 dyn.	1873 N
M_x stat.	-
M_y stat.	105.3 Nm
M_z stat.	123.3 Nm
M_x dyn.	-
M_y dyn.	59.7 Nm
M_z dyn.	69.9 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



Linear guide rail LS-12-11

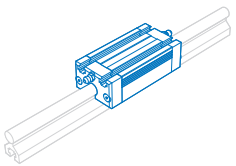


- 1 precision steel shaft Ø 12 mm
  Mounting grid 100 mm
- Aluminium profile track with T-groove indents, anodized
- Precise shaft intake contour milled in a clamp mount
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 1.26 kg/m

Art.-no.: **220002 0998** (Length 1 m)
220002 1998 (Length 2 m)
220002 2998 (Length 3 m)

Option:
- Other lengths (longer or shorter)

Linear guide slide FS-12-0

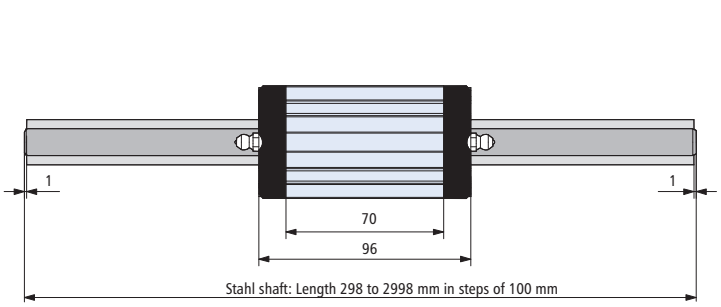


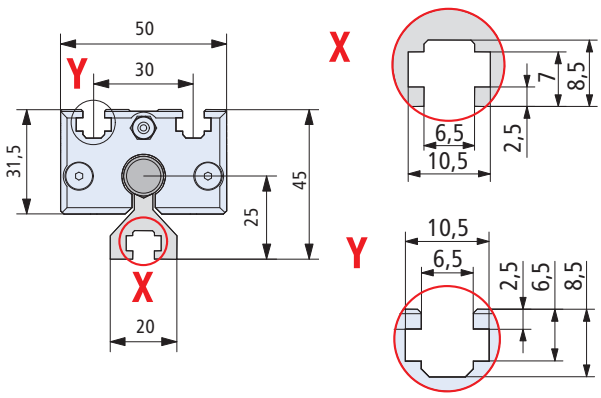
- Aluminium slide with 8 steel inserts
  L 96 x W 50 x H 31.5 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.32 kg

Item no.: **223106 0070**

Option:
- Linear guide slides with sliding bushes

Scale drawings





Technical specifications subject to change.

Linear guide

LFS-12-2

Figure:
Linear guide rail and linear guide slide

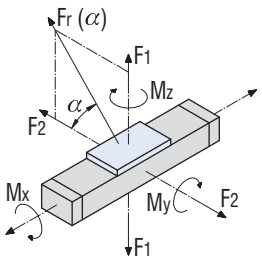
Figure:
2 precision steel shafts with linear guide slides and shaft intake brackets

Load data

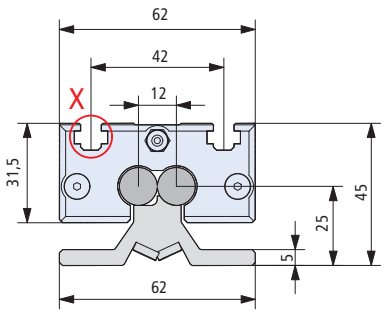
Linear guide Aluminium	FS-12-12
C_o	3303 N
C	1873 N
F_1 stat.	2821 N
F_1 dyn.	1599 N
F_2 stat.	3303 N
F_2 dyn.	1873 N
M_x stat.	29.8 Nm
M_y stat.	105.3 Nm
M_z stat.	123.3 Nm
M_x dyn.	16.8 Nm
M_y dyn.	59.7 Nm
M_z dyn.	69.9 Nm

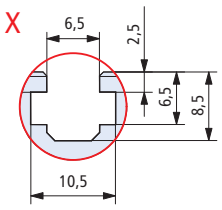
$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



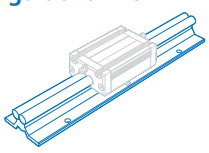
Scale drawing





Technical specifications subject to change.

Linear guide rail LS-12-2

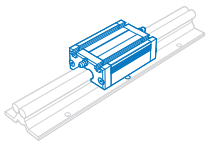


- 2 precision steel shafts Ø 12mm Mounting grid 100 mm
- Milled shaft intake contour
- Aluminium profile track with T-groove indents, anodized
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 3.29 kg/m

Item no.: **235200 0998** (Length 1 m)
235200 1998 (Length 2 m)
235200 2998 (Length 3 m)

Option:
- Other lengths (longer or shorter)
- Shaft intake brackets

Linear guide slide FS-12-12



- Aluminium slide with 8 steel inserts L 96 x W 62 x H 31.5 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.33 kg

Item no.: **223104 0070**

Option:
- Linear guide slides with sliding bushes

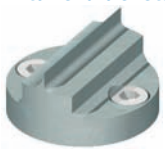
Linear guide rail LS-12-1

(1 steel shaft)

Item no.: **227312 0998** (Length 1 m)
227312 1998 (Length 2 m)
227312 2998 (Length 3 m)

Option:
- Other lengths (longer or shorter)

Shaft intake brackets



- Ø40 mm, hole spacing 28 mm
- Zinc casting
- SU 10 pieces

Item no.: **221 501**

mechanics

Linear guides

LFS-12-4
LFS-12-6

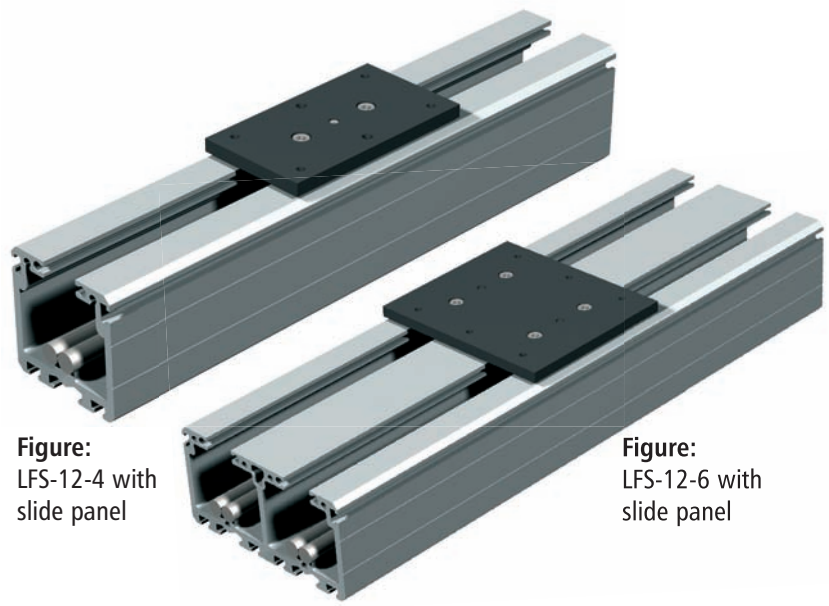
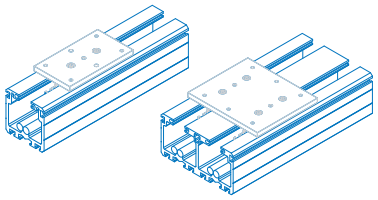


Figure:
LFS-12-4 with slide panel

Figure:
LFS-12-6 with slide panel

Linear guide rails LS-12-4 and LS-12-6



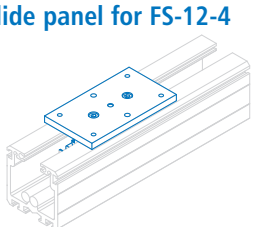
- 2 or 4 precision steel shafts ∅ 12 mm, twist-free, Mounting grid 100 mm
- Aluminium linear guide rail, anodized
- Milled shaft intake contour
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weights:
  6.2 kg/m (LS-12-4)
  9.5 kg/m (LS-12-6)

Item no. for linear guide rail LS-12-4
235400 0099 (Length 1 m)
235400 0199 (Length 2 m)
235400 0299 (Length 3 m)

Item no. for linear guide rail LS-12-6
235700 0099 (Length 1 m)
235700 0199 (Length 2 m)
235700 0299 (Length 3 m)

Options:
- Profile sealed with abrasion-proof sealing lips (not pictured)
- Other lengths (longer or shorter)

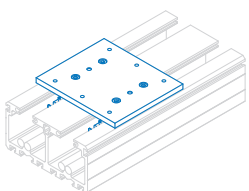
Slide panel for FS-12-4



- 1 or 2 linear guide slides
- Slide panel (steel ground)

1 slide: L 125 x W 70 x H 8 mm
Item no.: 277001
2 slides: L 255 x W 70 x H 8 mm
Item no.: 277002

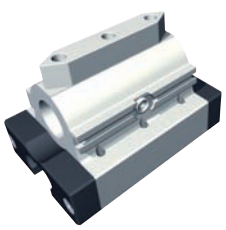
Slide panel for FS-12-4



- 2 or 4 linear guide slides
- Slide panel (steel ground)

1 slide: L 125 x W 145 x H 8 mm
Item no.: 277017
2 slides: L 250 x W 145 x H 8 mm
Item no.: 277018

Linear guide slides FS-12



- Aluminium slide with steel insert L 95 x W 62 x H 64 mm
- Milled clamping surface
- 4 ball races, adjustable backlash-free
- Side lubricating nipple
- Weight: powered 0.34 kg
  Carriage 0.40 kg

Item no.: 223030 0070

Load data

Linear guide LFS-12-4

Linear guide 1 x aluminium FS-12-4	
C_o	2576.65 N
C	1461.14 N
F_1 stat.	2200.67 N
F_1 dyn.	1247.93 N
F_2 stat.	2576.65 N
F_2 dyn.	1464.14 N
M_x stat.	36.45 Nm
M_y stat.	82.16 Nm
M_z stat.	96.20 Nm
M_x dyn.	20.67 Nm
M_y dyn.	46.59 Nm
M_z dyn.	54.55 Nm

Linear guide 2 x aluminium FS-12-4	
C_o	5153.30 N
C	2319.41 N
F_1 stat.	4401.33 N
F_1 dyn.	1980.96 N
F_2 stat.	5153.30 N
F_2 dyn.	2319.41 N
M_x stat.	46.49 Nm
M_y stat.	182.08 Nm
M_z stat.	213.18 Nm
M_x dyn.	20.92 Nm
M_y dyn.	81.95 Nm
M_z dyn.	95.95 Nm

Linear guide LFS-12-6

Linear guide 2 x aluminium FS-12-6	
C_o	5153.30 N
C	2319.41 N
F_1 stat.	4401.33 N
F_1 dyn.	1980.96 N
F_2 stat.	5153.30 N
F_2 dyn.	2319.41 N
M_x stat.	376.59 Nm
M_y stat.	104.31 Nm
M_z stat.	192.39 Nm
M_x dyn.	169.49 Nm
M_y dyn.	73.95 Nm
M_z dyn.	86.59 Nm

Linear guide 4 x aluminium FS-12-6	
C_o	5153.30 N
C	2319.41 N
F_1 stat.	4401.33 N
F_1 dyn.	1980.96 N
F_2 stat.	5153.30 N
F_2 dyn.	2319.41 N
M_x stat.	211.54 Nm
M_y stat.	164.31 Nm
M_z stat.	192.39 Nm
M_x dyn.	95.21 Nm
M_y dyn.	73.95 Nm
M_z dyn.	86.59 Nm

Technical specifications subject to change.

Linear guide

LFS-12-5

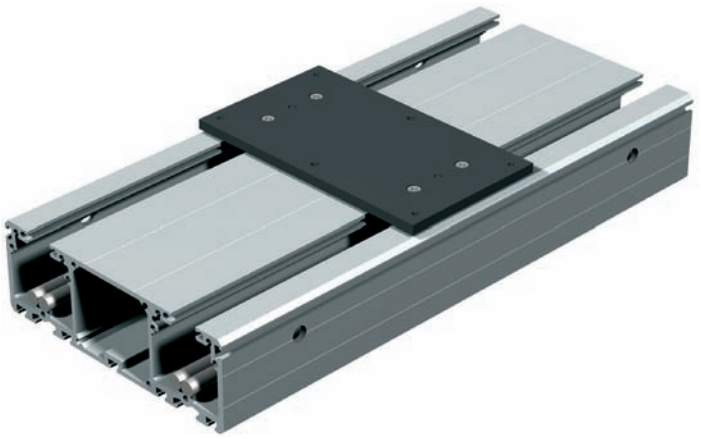
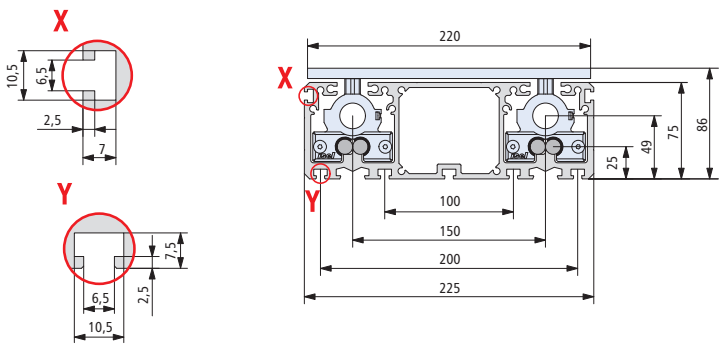


Figure:
Linear guide rail and linear guide slide with slide panel

Scale drawings



Load data

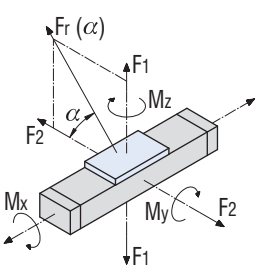
Linear guide LFS-12-5

Linear guide 2 x aluminium FS-12-5	
C_o	5153.30 N
C	2319.41 N
F_1 stat.	4401.33 N
F_1 dyn.	1980.96 N
F_2 stat.	5153.30 N
F_2 dyn.	2319.41 N
M_x stat.	376.59 Nm
M_y stat.	164.31 Nm
M_z stat.	192.39 Nm
M_x dyn.	169.49 Nm
M_y dyn.	73.95 Nm
M_z dyn.	86.59 Nm

Linear guide 4 x aluminium FS-12-5	
C_o	5153.30 N
C	2319.41 N
F_1 stat.	4401.33 N
F_1 dyn.	1980.96 N
F_2 stat.	5153.30 N
F_2 dyn.	2319.41 N
M_x stat.	376.59 Nm
M_y stat.	164.31 Nm
M_z stat.	192.39 Nm
M_x dyn.	169.49 Nm
M_y dyn.	73.95 Nm
M_z dyn.	86.59 Nm

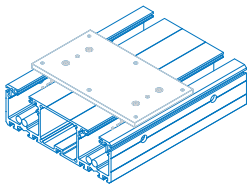
$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



Technical specifications subject to change.

Linear guide rail LS-12-5

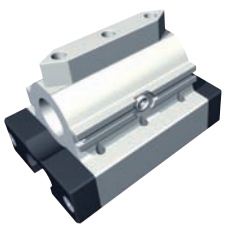


- 4 precision steel shafts Ø 12 mm Twist-proof
- Aluminium linear guide rail, anodized
- Milled shaft intake contour
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 11.8 kg/m

Item no.: **235500 0099** (Length 1 m)
235500 0199 (Length 2 m)
235500 0299 (Length 3 m)

Options:
- Profile sealed with abrasion-proof sealing lips (not pictured)
- Other lengths (longer or shorter)

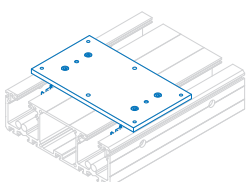
Linear guide slide FS-12-5



- Aluminium slide with steel insert L 95 x W 62 x H 64 mm
- Milled clamping surface
- 4 ball races, adjustable backlash-free
- Side lubricating nipple
- Weight: powered 0.339 kg
  Carriage 0.399 kg

Item no.: **223030 0070**

Slide panel for FS-12-5



- 2 or 4 linear guide slides
- Slide panel (steel ground)

1 slide: L 220 x W 125 x H 8 mm
Item no.: **277003**
2 slides: L 255 x W 220 x H 8 mm
Item no.: **277004**

mechanics

Linear guide

LFS-12-100

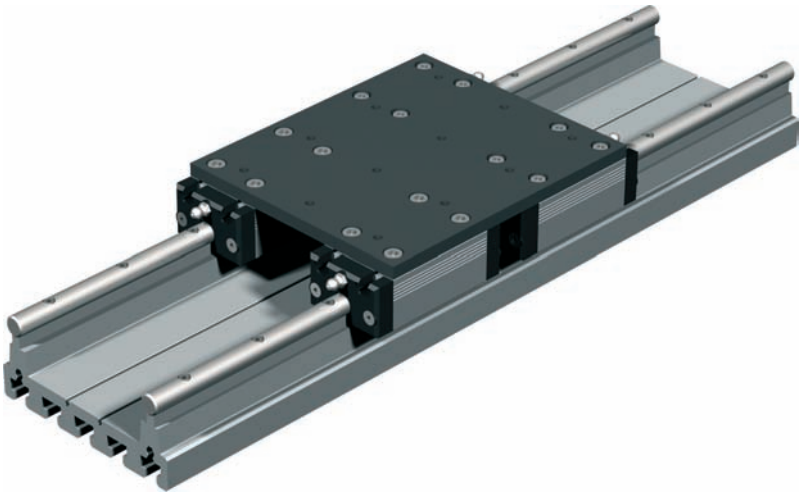


Figure:
Linear guide rail and 4 linear guide slides with slide panel

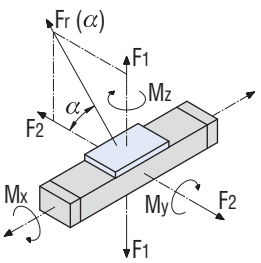
Load data

Linear guide LFS-12-100 2 aluminium slides	
C_o	4955 N
C	2810 N
F_1 stat.	4232 N
F_1 dyn.	2399 N
F_2 stat.	4955 N
F_2 dyn.	2810 N
M_x stat.	215.8 Nm
M_y stat.	148.1 Nm
M_z stat.	173.4 Nm
M_x dyn.	122.3 Nm
M_y dyn.	84.9 Nm
M_z dyn.	98.3 Nm

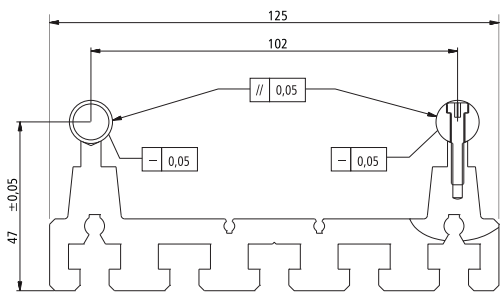
Linear guide LFS-12-100 4 aluminium slides	
C_o	6606 N
C	3746 N
F_1 stat.	5642 N
F_1 dyn.	3198 N
F_2 stat.	6606 N
F_2 dyn.	3746 N
M_x stat.	287.7 Nm
M_y stat.	310.3 Nm
M_z stat.	363.3 Nm
M_x dyn.	163.1 Nm
M_y dyn.	175.9 Nm
M_z dyn.	206.0 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$

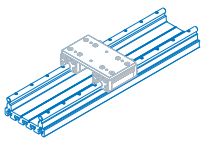


Scale drawing



The two prismatic shaft intake contours are simultaneously produced clamped on a dual side milling cutter. This process ensures a high parallelism between the two precision steel shafts to each other. Both steel shafts are bolted down onto the milled profile in a grid of 100 mm.

Linear guide rail LS-12-100



- 2 precision steel shafts Ø 12mm Mounting grid 100 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Precise shaft intake contour milled in a clamp mount
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 7.5 kg/m

Item no.: **220034 0099** (Length 1 m)
220034 0199 (Length 2 m)
220034 0299 (Length 3 m)

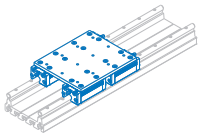
Option:
- Other lengths (longer or shorter)

Linear guide slide FS-12-0

- Aluminium slide with 8 steel inserts L 100 x W 50 x H 32 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.30 kg

Item no.: **223106 0070**

Linear guide slide FS-12-0 with slide panel



- 2 or 4 linear guide slides
- Slide panel (steel ground)
- adjustable backlash-free
- Weight: 1.48 kg or 3.47 kg respectively

Item no.: **223240 0028** (2 slides)
223240 0029 (4 slides)

Technical specifications subject to change.

made by isel®

Linear guide

LFS-12-150

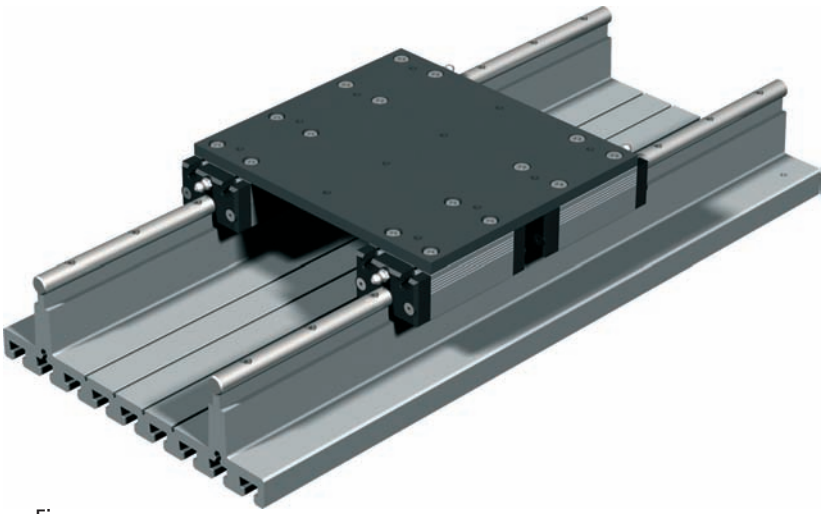


Figure:
Linear guide rail and 4 linear guide slides with slide panel

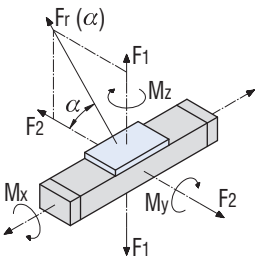
Load data

Linear guide LFS-12-150 2 aluminium slides	
C_o	4955 N
C	2810 N
F_1 stat.	4232 N
F_1 dyn.	2399 N
F_2 stat.	4955 N
F_2 dyn.	2810 N
M_x stat.	317.4 Nm
M_y stat.	148.1 Nm
M_z stat.	173.4 Nm
M_x dyn.	179.9 Nm
M_y dyn.	83.9 Nm
M_z dyn.	98.3 Nm

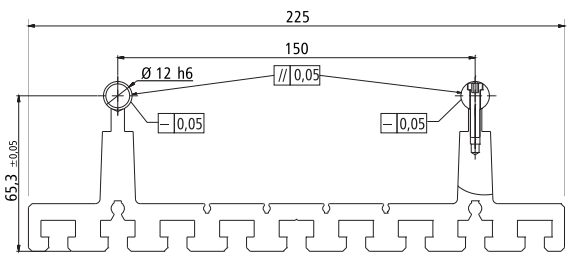
Linear guide LFS-12-150 4 aluminium slides	
C_o	6606 N
C	3746 N
F_1 stat.	5642 N
F_1 dyn.	3198 N
F_2 stat.	6606 N
F_2 dyn.	3746 N
M_x stat.	423.2 Nm
M_y stat.	310.3 Nm
M_z stat.	363.3 Nm
M_x dyn.	239.9 Nm
M_y dyn.	175.9 Nm
M_z dyn.	206.0 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



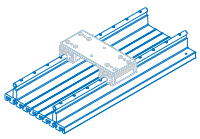
Scale drawing



The two prismatic shaft intake contours are simultaneously produced clamped on a dual side milling cutter. This process ensures a high parallelism between the two precision steel shafts to each other. Both steel shafts are bolted down onto the milled profile in a grid of 100 mm.

Technical specifications subject to change.

Linear guide rail LS-12-150



- 2 precision steel shafts Ø 12mm Mounting grid 100 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Precise shaft intake contour milled in a clamp mount
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 7.44 kg/m

Item no.: **220035 0099** (Length 1 m)
220035 0199 (Length 2 m)
220035 0299 (Length 3 m)

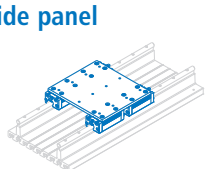
Option:
- Other lengths (longer or shorter)

Linear guide slide FS-12-0

- Aluminium slide with 8 steel inserts L 100 x W 50 x H 32 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.30 kg

Item no.: **223106 0070**

Linear guide slide FS-12-0 with slide panel



- 2 or 4 linear guide slides
- Slide panel (steel ground)
- adjustable backlash-free
- Weight: 1.48 kg or 3.05 kg respectively

Item no.: **223240 0030** (2 slides)
223240 0031 (4 slides)

mechanics

Linear guide

LFS-12-200

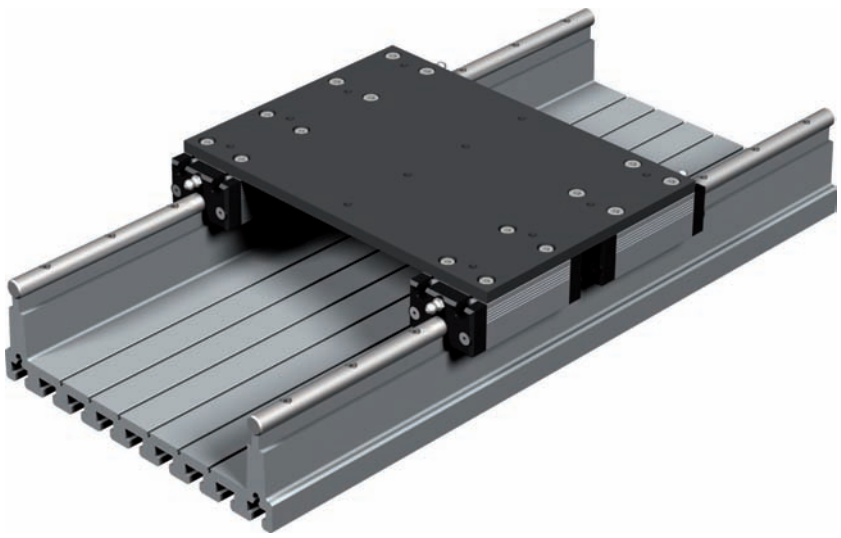


Figure:
Linear guide rail and 4 linear guide slides with slide panel

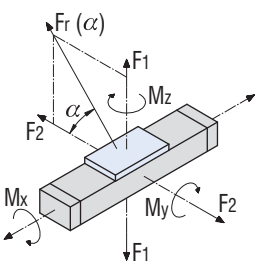
Load data

Linear guide LFS-12-200 2 aluminium slides	
C_o	4955 N
C	2810 N
F_1 stat.	4232 N
F_1 dyn.	2399 N
F_2 stat.	4955 N
F_2 dyn.	2810 N
M_x stat.	423.2 Nm
M_y stat.	148.1 Nm
M_z stat.	173.4 Nm
M_x dyn.	239.9 Nm
M_y dyn.	83.9 Nm
M_z dyn.	98.3 Nm

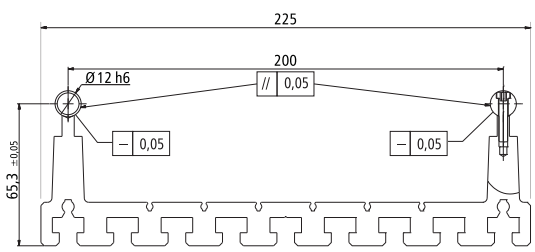
Linear guide LFS-12-200 4 aluminium slides	
C_o	6606 N
C	3746 N
F_1 stat.	5642 N
F_1 dyn.	3198 N
F_2 stat.	6606 N
F_2 dyn.	3746 N
M_x stat.	564.2 Nm
M_y stat.	310.3 Nm
M_z stat.	363.3 Nm
M_x dyn.	319.8 Nm
M_y dyn.	175.9 Nm
M_z dyn.	206.0 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$

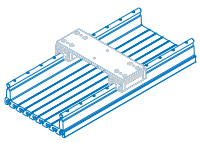


Scale drawing



The two prismatic shaft intake contours are simultaneously produced clamped on a dual side milling cutter. This process ensures a high parallelism between the two precision steel shafts to each other. Both steel shafts are bolted down onto the milled profile in a grid of 100 mm.

Linear guide rail LS-12-200



- 2 precision steel shafts Ø 12mm
  Mounting grid 100 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Precise shaft intake contour milled in a clamp mount
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 12.4 kg/m

Item no.: **220032 0099** (Length 1 m)
220032 0199 (Length 2 m)
220032 0299 (Length 3 m)

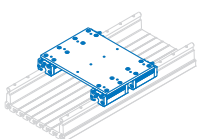
Option:
- Other lengths (longer or shorter)

Linear guide slide FS-12-0

- Aluminium slide with 8 steel inserts L 100 x W 50 x H 32 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.30 kg

Item no.: **223106 0070**

Linear guide slide FS-12-0 with slide panel



- 2 or 4 linear guide slides
- Slide panel (steel ground)
- adjustable backlash-free
- Weight: 1.98 kg or 4.12 kg respectively

Item no.: **223240 0032** (2 slides)
223240 0033 (4 slides)

Technical specifications subject to change.

Linear guide

LFS-12-250

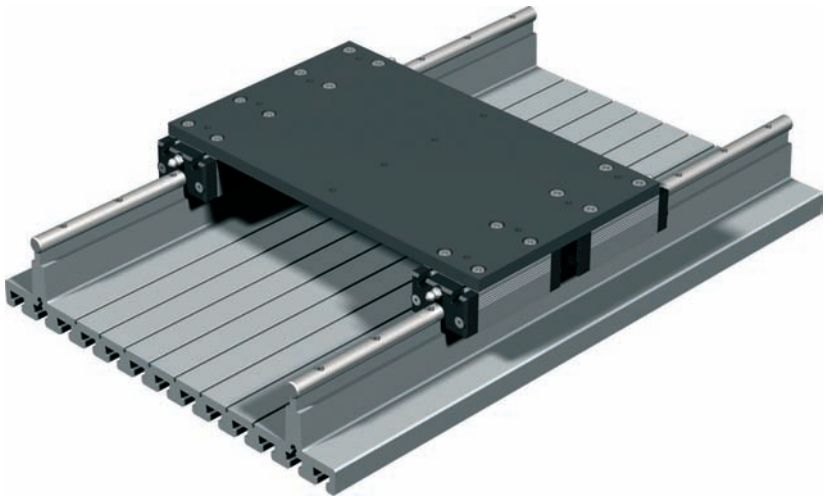


Figure:
Linear guide rail and 4 linear guide slides with slide panel

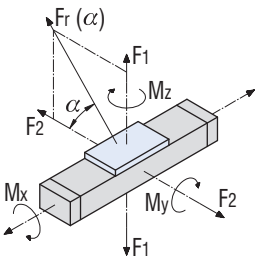
Load data

Linear guide LFS-12-250 2 aluminium slides	
C_o	4955 N
C	2810 N
F_1 stat.	4232 N
F_1 dyn.	2399 N
F_2 stat.	4955 N
F_2 dyn.	2810 N
M_x stat.	528.9 Nm
M_y stat.	148.1 Nm
M_z stat.	173.4 Nm
M_x dyn.	299.8 Nm
M_y dyn.	83.9 Nm
M_z dyn.	98.3 Nm

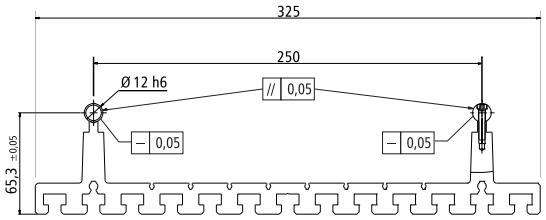
Linear guide LFS-12-250 4 aluminium slides	
C_o	6606 N
C	3746 N
F_1 stat.	5642 N
F_1 dyn.	3198 N
F_2 stat.	6606 N
F_2 dyn.	3746 N
M_x stat.	705.3 Nm
M_y stat.	310.3 Nm
M_z stat.	363.3 Nm
M_x dyn.	399.8 Nm
M_y dyn.	175.9 Nm
M_z dyn.	206.0 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$

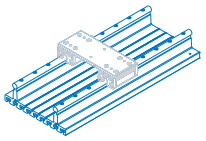


Scale drawing



The two prismatic shaft intake contours are simultaneously produced clamped on a dual side milling cutter. This process ensures a high parallelism between the two precision steel shafts to each other. Both steel shafts are bolted down onto the milled profile in a grid of 100 mm.

Linear guide rail LS-12-250



- 2 precision steel shafts Ø 12mm Mounting grid 100 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Precise shaft intake contour milled in a clamp mount
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 16.2 kg/m

Item no.: **220031 0099** (Length 1 m)
220031 0199 (Length 2 m)
220031 0299 (Length 3 m)

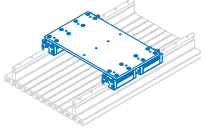
Option:
- Other lengths (longer or shorter)

Linear guide slide FS-12-0

- Aluminium slide with 8 steel inserts L 100 x W 50 x H 32 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.30 kg

Item no.: **223106 0070**

Linear guide slide FS-12-0 with slide panel



- 2 or 4 linear guide slides
- Slide panel (steel ground)
- adjustable backlash-free
- Weight: 2.23 kg or 4.66 kg respectively

Item no.: **223240 0034** (2 slides)
223240 0035 (4 slides)

Technical specifications subject to change.

mechanics

Steel shaft guide

SF 12

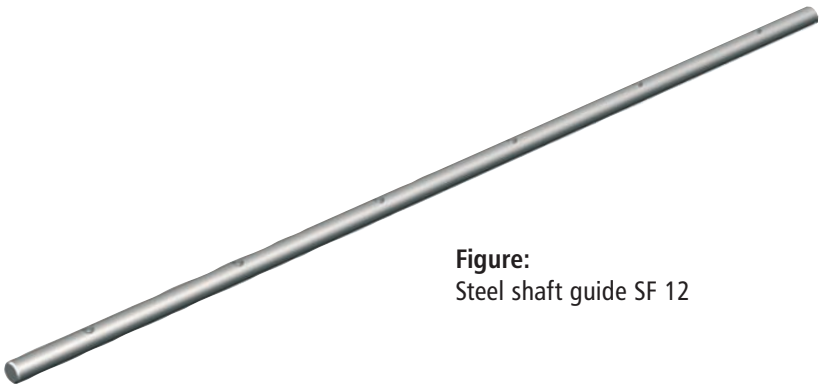


Figure:
Steel shaft guide SF 12

Guide shaft SW 12

- Precision steel shaft Ø 12 mm, length 3 m
- Hardened and ground
- with M5 blind hole thread in a 100 mm grid
  or
  with through boring for M4 in a 100 mm grid

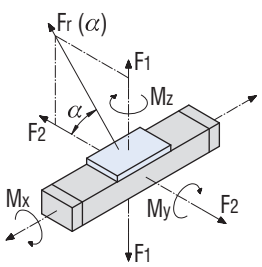
Item no.:
220019 0299 (SW12, 3m length for M5)
220020 0299 (SW12, 3m length for M4)

Load data

Guide slide FS 12	
C_o	1100 N
C	2500 N
F_1 stat.	2200 N
F_1 dyn.	2100 N
F_2 stat.	1100 N
F_2 dyn.	2500 N
M_x stat.	0.00 Nm
M_y stat.	82.5 Nm
M_z stat.	41.2 Nm
M_x dyn.	0.00 Nm
M_y dyn.	78.7 Nm
M_z dyn.	93.7 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$

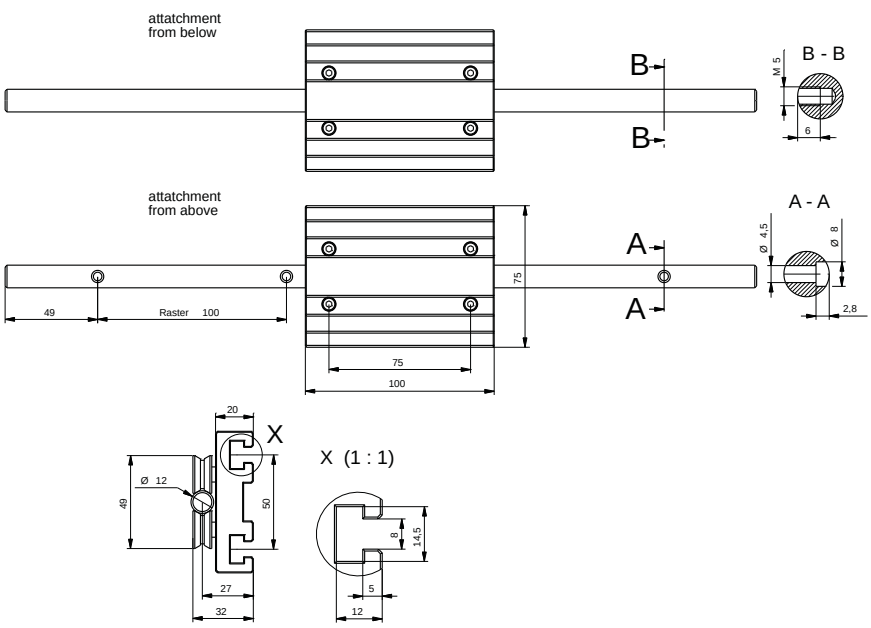


Roller

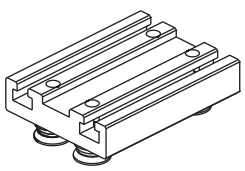
with two-row angular ball bearing, hardened and ground,
Ø 20 mm,
M4 tap hole,
SU 10 pieces

Item no.: **222010 0001**

Scale drawing



Guide slide FS 12



- L 100 x W 75 x H 20 mm
- For 1 Precision steel shaft
- With 4 rollers
- T-groove clamping surface
- Weight: 0.36 kg

Item no.: **223260 1203**

- L 100 x W 75 x H 20 mm
- For 2 Precision steel shafts
- With 4 rollers
- T-groove clamping surface
- Weight: 0.36 kg

Item no.: **223260 1204**

Technical specifications subject to change.

made by isel®

Steel shaft guide

SF 16

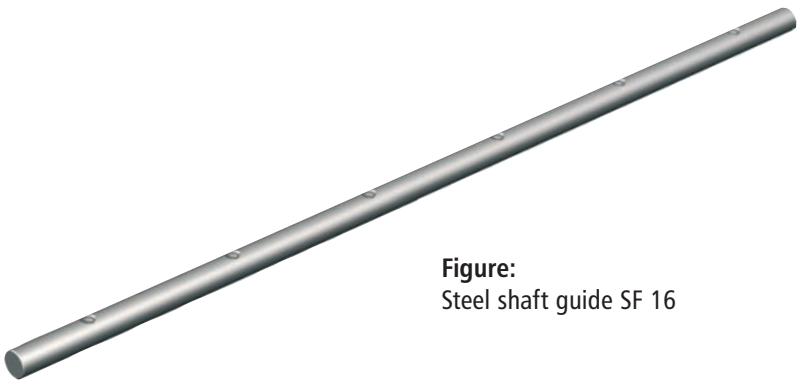


Figure:
Steel shaft guide SF 16

Guide shaft SW 16

- Precision steel shaft Ø 16 mm, Length 3 m
- Hardened and ground
- with M6 blind hole thread in a 100 mm grid
  or
  with through boring for M5 in a 100 mm grid

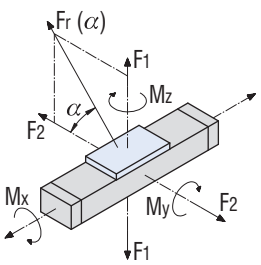
Item no.:
220024 0299 (SW16, 3m length for M6)
220023 0299 (SW16, 3m length for M5)

Load data

Guide slide FS 16	
C_o	2160 N
C	4000 N
F_1 stat.	4320 N
F_1 dyn.	3870 N
F_2 stat.	2160 N
F_2 dyn.	4000 N
M_x stat.	0.00 Nm
M_y stat.	151.2 Nm
M_z stat.	75.6 Nm
M_x dyn.	0.00 Nm
M_y dyn.	135.4 Nm
M_z dyn.	140 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$

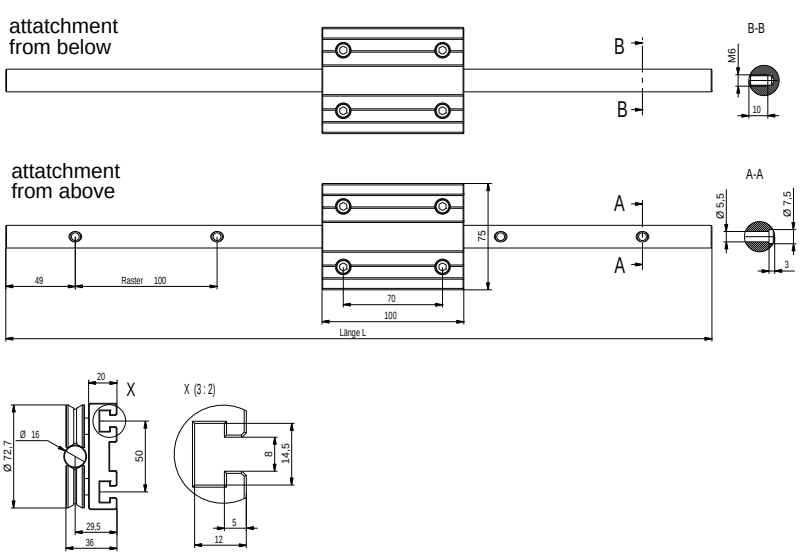


Roller

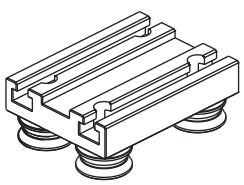
with two-row angular ball bearing, hardened and ground,
Ø 30 mm,
M6 tap hole,
SU 10 pieces

Item no.: **222010 0002**

Scale drawing



Guide slide FS 16



- L 100 x W 75 x H 20 mm
- With 4 rollers
- T-groove clamping surface
- Weight: 0.50 kg

Item no.: **223260 1601**

Technical specifications subject to change.

mechanics

Linear guide

LFS-16-2

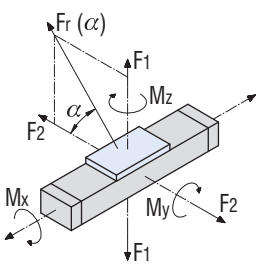
Figure:
Linear guide rail and linear guide slide

Load data

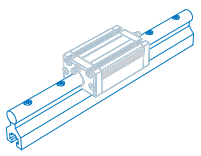
Linear guide Aluminium FS-16-0	
C_o	3286 N
C	1773 N
F_1 stat.	2806 N
F_1 dyn.	1514 N
F_2 stat.	8286 N
F_2 dyn.	1773 N
M_x stat.	--
M_y stat.	104.7 Nm
M_z stat.	122.6 Nm
M_x dyn.	--
M_y dyn.	56.4 Nm
M_z dyn.	66.1 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



Linear guide rail LS-16-2

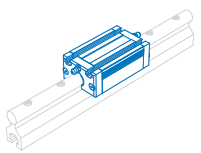


- 1 precision steel shaft Ø 16 mm
  Mounting grid 100 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Shaft intake contour
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 1.26 kg/m

Item no.: **220002 0998** (Length 1 m)
220002 1998 (Length 2 m)
220002 2998 (Length 3 m)

Option:
- Other lengths (longer or shorter)

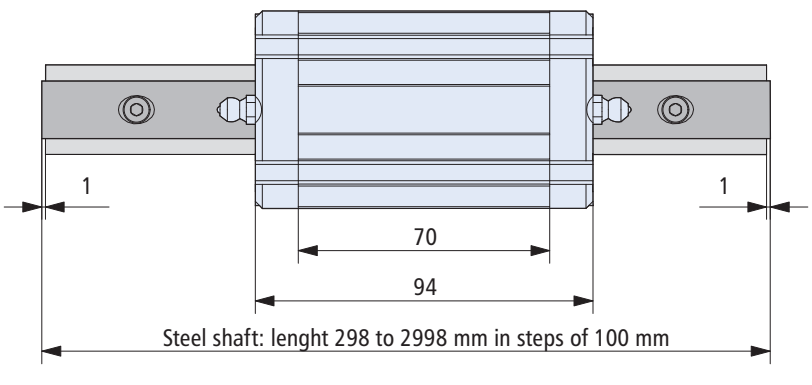
Linear guide slide FS-16-0

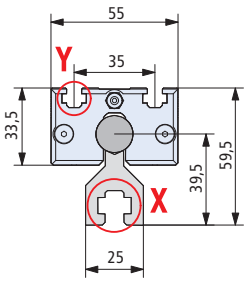


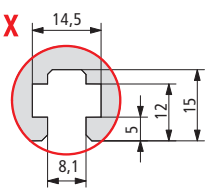
- Aluminium slide with 8 steel inserts
  L 94 x W 55 x H 33.5 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.32 kg

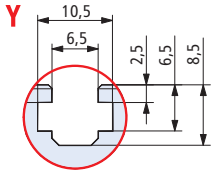
Item no.: **223220**

Scale drawing









Technical specifications subject to change.

made by isel®

Linear guide

LFS-16-S2

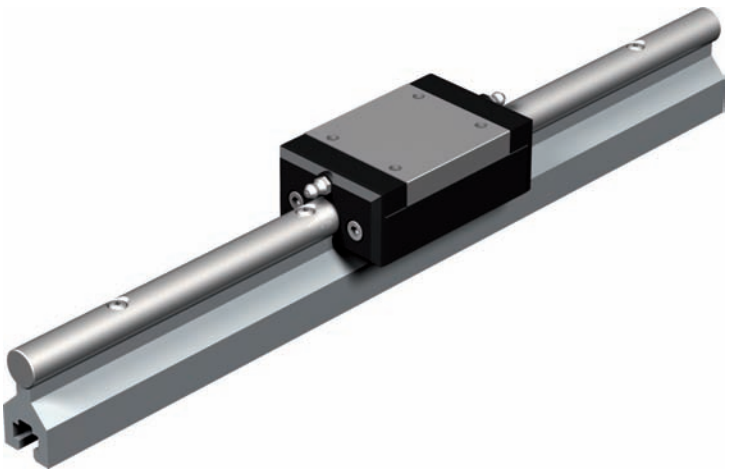


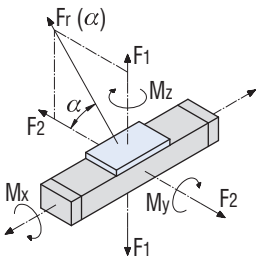
Figure:
Linear guide rail and linear guide slide

Load data

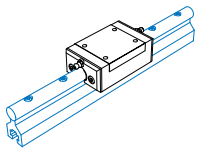
Linear guide Steel FS-16-S0	
C_0	5065 N
C	3238 N
F_1 stat.	4325 N
F_1 dyn.	2765 N
F_2 stat.	5065 N
F_2 dyn.	3238 N
M_x stat.	-
M_y stat.	113.4 Nm
M_z stat.	132.8 Nm
M_x dyn.	-
M_y dyn.	72.4 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



linear guide rail LS-16-2

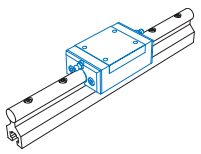


- 1 precision steel shaft Ø 16 mm
  Mounting grid 100 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Shaft intake contour
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 1.26 kg/m

Item no.: **220002 0998** (Length 1 m)
220002 1998 (Length 2 m)
220002 2998 (Length 3 m)

Option:
- Other lengths (longer or shorter)

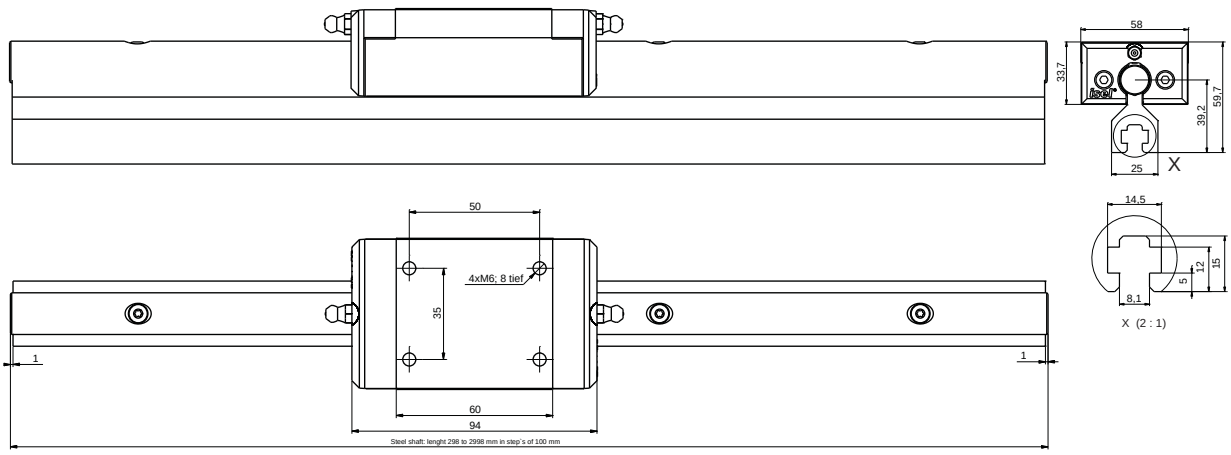
Linear guide slide FS-16-S0



- Steel slide
  L 94 x W 58 x 33.7 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.72 kg

Item no.: **223210**

Scale drawing



Technical specifications subject to change.

mechanics

Linear guide

LFS-16-150

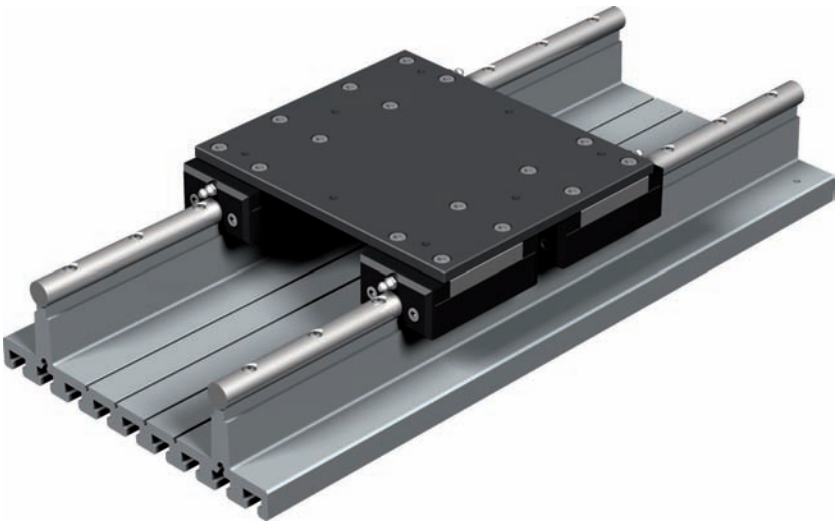


Figure:
Linear guide rail and 4 linear guide slides with slide panel

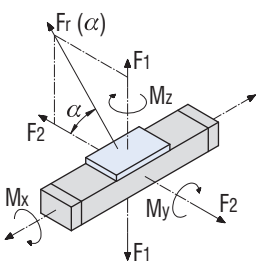
Load data

Linear guide LFS-16-150 2 steel slides	
C_o	7598 N
C	4857 N
F_1 stat.	6488 N
F_1 dyn.	4148 N
F_2 stat.	7598 N
F_2 dyn.	4857 N
M_x stat.	486.6 Nm
M_y stat.	194.6 Nm
M_z stat.	227.9 Nm
M_x dyn.	311.1 Nm
M_y dyn.	124.4 Nm
M_z dyn.	145.7 Nm

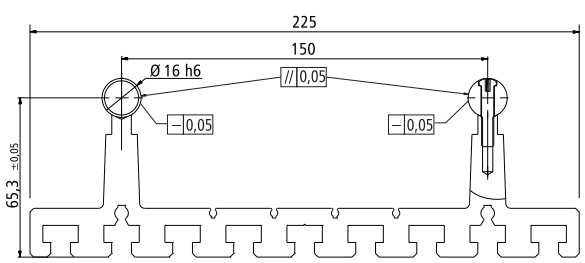
Linear guide LFS-16-150 4 steel slides	
C_o	10.130 N
C	6476 N
F_1 stat.	8650 N
F_1 dyn.	5530 N
F_2 stat.	10.130 N
F_2 dyn.	6476 N
M_x stat.	648.8 Nm
M_y stat.	475.8 Nm
M_z stat.	557.2 Nm
M_x dyn.	414.8 Nm
M_y dyn.	304.2 Nm
M_z dyn.	356.2 Nm

$$Fr\,(\alpha) = \frac{F2}{\cos\alpha}$$

$$Fr\,(\alpha) = \frac{F1}{\sin\alpha}$$

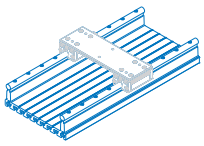


Scale drawing



The two prismatic shaft intake contours are simultaneously produced clamped on a dual side milling cutter. This process ensures a high parallelism between the two precision steel shafts to each other. Both steel shafts are bolted down onto the milled profile in a grid of 100 mm.

Linear guide rail LS-16-150



- 2 precision steel shafts Ø 16 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Precise shaft intake contour milled in a clamp mount
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 13.85 kg/m

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

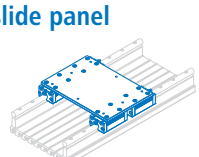
Option:
- Other lengths (longer or shorter)

Linear guide slide FS-16-S0

- Steel slide L 94 x W 58 x 33.7 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.72 kg

Item no.: **223210**

Linear guide slide FS-16-S0 with slide panel



- 2 or 4 linear guide slides
- Slide panel (steel ground)
- Adjustable backlash-free
- Weight: 2.5 kg or 5.1 kg respectively

Item no.: **223240 0036** (2 slides)
223240 0037 (4 slides)

Technical specifications subject to change.

made by isel®

Linear guide

LFS-16-200

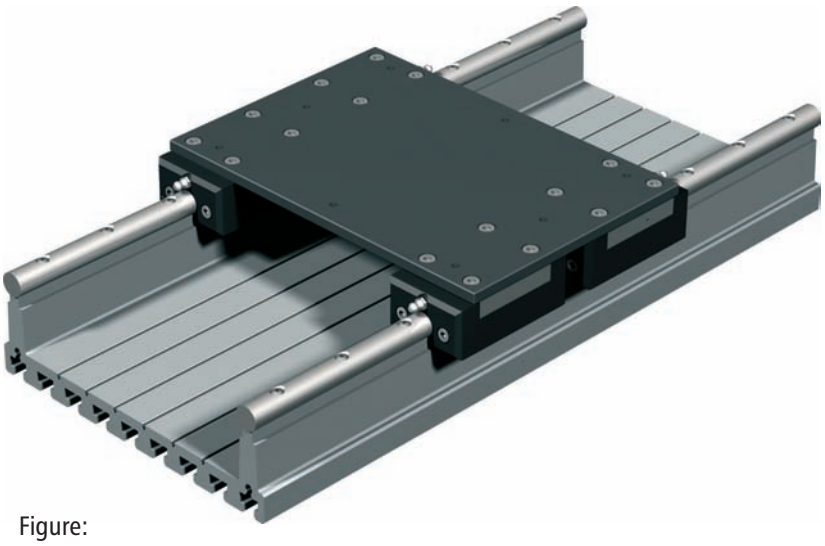


Figure:
Linear guide rail and 4 linear guide slides with slide panel

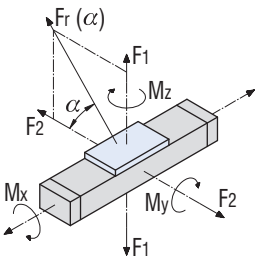
Load data

Linear guide LFS-16-200 2 steel slides	
C_o	7598 N
C	4857 N
F_1 stat.	6488 N
F_1 dyn.	4148 N
F_2 stat.	7598 N
F_2 dyn.	4857 N
M_x stat.	648.8 Nm
M_y stat.	194.6 Nm
M_z stat.	227.9 Nm
M_x dyn.	414.8 Nm
M_y dyn.	124.4 Nm
M_z dyn.	145.7 Nm

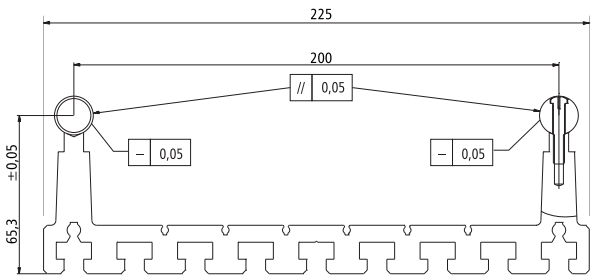
Linear guide LFS-16-200 4 steel slides	
C_o	10130 N
C	6476 N
F_1 stat.	8650 N
F_1 dyn.	5530 N
F_2 stat.	10130 N
F_2 dyn.	6476 N
M_x stat.	865.0 Nm
M_y stat.	475.8 Nm
M_z stat.	557.2 Nm
M_x dyn.	553.0 Nm
M_y dyn.	304.2 Nm
M_z dyn.	356.2 Nm

$$Fr\,(\alpha) = \frac{F2}{\cos\alpha}$$

$$Fr\,(\alpha) = \frac{F1}{\sin\alpha}$$

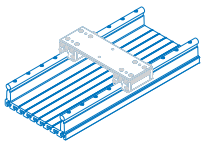


Scale drawing



The two prismatic shaft intake contours are simultaneously produced clamped on a dual side milling cutter. This process ensures a high parallelism between the two precision steel shafts to each other. Both steel shafts are bolted down onto the milled profile in a grid of 100 mm.

Linear guide rail LS-16-200



- 2 precision steel shafts Ø 16 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Precise shaft intake contour milled in a clamp mount
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 13.85 kg/m

Item no.: **220025 0099** (Length 1 m)
220025 0199 (Length 2 m)
220025 0299 (Length 3 m)

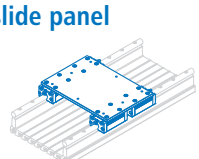
Option:
- Other lengths (longer or shorter)

Linear guide slide FS-16-S0

- Steel slide L 94 x W 58 x 33.7 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.72 kg

Item no.: **223210**

Linear guide slide FS-16-S0 with slide panel



- 2 or 4 linear guide slides
- Slide panel (steel ground)
- Adjustable backlash-free
- Weight: 2.8 kg or 5.8 kg

Item no.: **223240 0038** (2 slides)
223240 0039 (4 slides)

Technical specifications subject to change.

mechanics

Linear guide

LFS-16-250

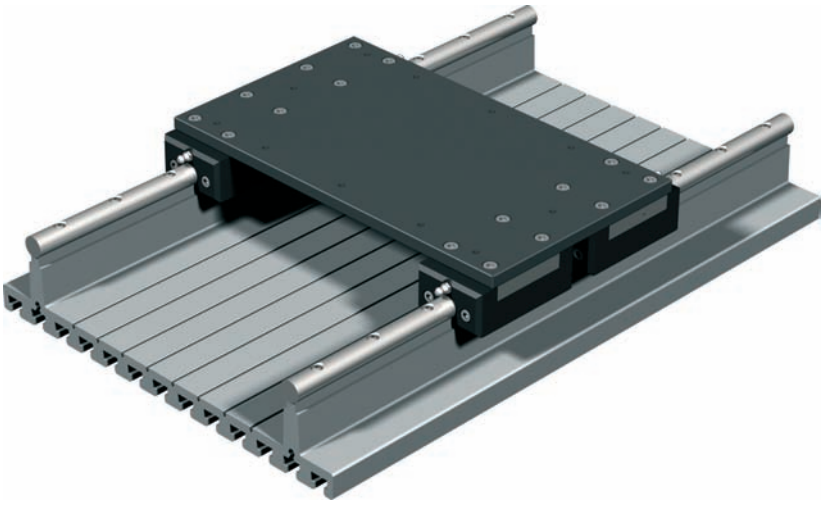


Figure:
Linear guide rail and 4 linear guide slides with slide panel

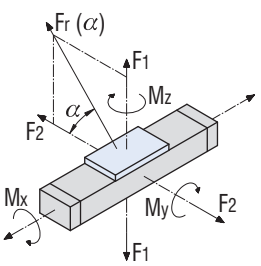
Load data

Linear guide LFS-16-250 2 steel slides	
C_o	7598 N
C	4857 N
F_1 stat.	6488 N
F_1 dyn.	4148 N
F_2 stat.	7598 N
F_2 dyn.	4857 N
M_x stat.	810.9 Nm
M_y stat.	194.6 Nm
M_z stat.	227.9 Nm
M_x dyn.	518.4 Nm
M_y dyn.	124.4 Nm
M_z dyn.	145.7 Nm

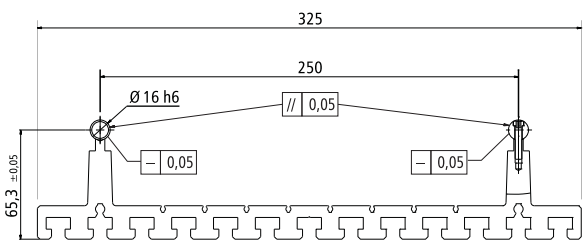
Linear guide LFS-16-250 4 steel slides	
C_o	10130 N
C	6476 N
F_1 stat.	8650 N
F_1 dyn.	5530 N
F_2 stat.	10130 N
F_2 dyn.	6476 N
M_x stat.	1081.3 Nm
M_y stat.	475.8 Nm
M_z stat.	557.2 Nm
M_x dyn.	691.3 Nm
M_y dyn.	304.2 Nm
M_z dyn.	356.2 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$

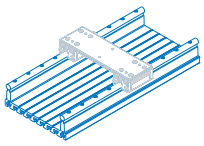


Scale drawing



The two prismatic shaft intake contours are simultaneously produced clamped on a dual side milling cutter. This process ensures a high parallelism between the two precision steel shafts to each other. Both steel shafts are bolted down onto the milled profile in a grid of 100 mm.

Linear guide rail LS-16-250



- 2 precision steel shafts Ø 16 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Precise shaft intake contour milled in a clamp mount
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 17.5 kg/m

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

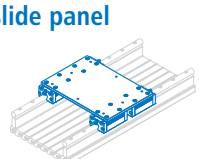
Option:
- Other lengths (longer or shorter)

Linear guide slide FS-16-S0

- Steel slide L 94 x W 58 x 33.7 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.72 kg

Item no.: **223210**

Linear guide slide FS-16-S0 with slide panel



- 2 or 4 linear guide slides
- Slide panel (steel ground)
- Adjustable backlash-free
- Weight: 3.5 kg or 7.0 kg respectively

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

Technical specifications subject to change.

made by isel®

Linear guide

LFS-16-300

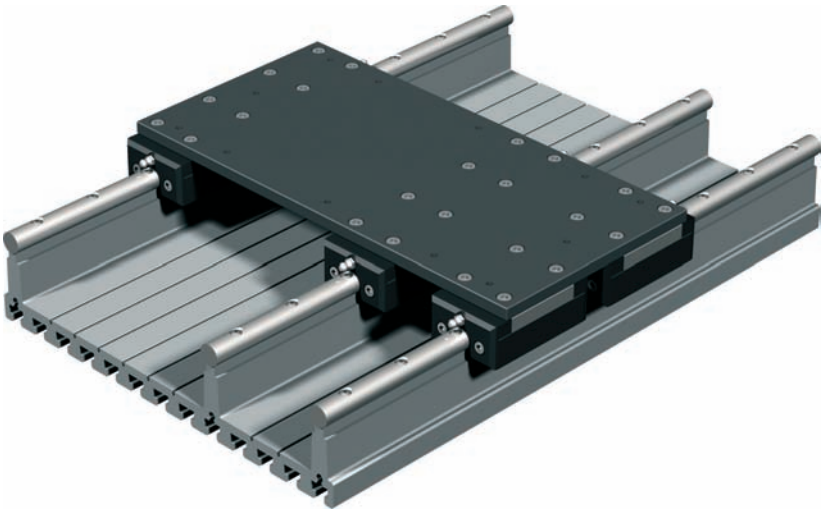


Figure:
Linear guide rail and 4 linear guide slides with slide panel

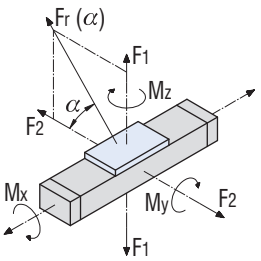
Load data

Linear guide LFS-16-300 3 steel slides	
C_o	8864 N
C	5667 N
F_1 stat.	7569 N
F_1 dyn.	4839 N
F_2 stat.	8864 N
F_2 dyn.	5667 N
M_x stat.	1135.3 Nm
M_y stat.	227.1 Nm
M_z stat.	265.9 Nm
M_x dyn.	725.8 Nm
M_y dyn.	145.2 Nm
M_z dyn.	170.0 Nm

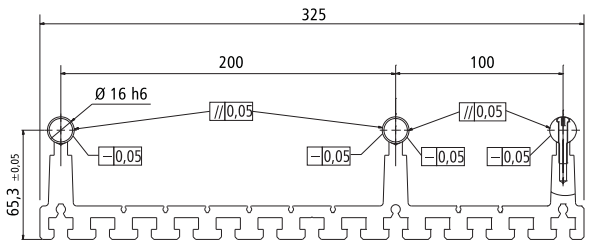
Linear guide LFS-16-300 6 steel slides	
C_o	11396 N
C	7286 N
F_1 stat.	9731 N
F_1 dyn.	6221 N
F_2 stat.	11396 N
F_2 dyn.	7286 N
M_x stat.	1459.7 Nm
M_y stat.	535.2 Nm
M_z stat.	626.8 Nm
M_x dyn.	933.2 Nm
M_y dyn.	342.2 Nm
M_z dyn.	400.7 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



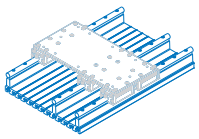
Scale drawing



The two prismatic shaft intake contours are simultaneously produced clamped on a dual side milling cutter. This process ensures a high parallelism between the two precision steel shafts to each other. Both steel shafts are bolted down onto the milled profile in a grid of 100 mm.

Technical specifications subject to change.

Linear guide rail LS-16-300



- 2 precision steel shafts Ø 16 mm
- Aluminium profile track with T-groove indents, 25 mm grid, anodized
- Precise shaft intake contour milled in a clamp mount
- Conditionally cantilevered
- Standard length 3 m, segmentable as needed
- Weight: 20.3 kg/m

Item no.: **220028 0099** (Length 1 m)
220028 0199 (Length 2 m)
220028 0299 (Length 3 m)

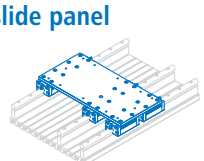
Option:
- Other lengths (longer or shorter)

Linear guide slide FS-16-S0

- Steel slide L 94 x W 58 x 33.7 mm
- 4 ball races, adjustable backlash-free
- Lubricating nipple on the face
- Weight: 0.72 kg

Item no.: **223210**

Linear guide slide FS-16-S0 with slide panel



- 3 or 6 linear guide slides
- Slide panel (steel ground)
- Adjustable backlash-free
- Weight: 4.5 kg (3x) or 9.1 kg (6x) respectively

Item no.: **223240 0042** (3 slides)
223240 0043 (6 slides)

Linear guide

iLF-10

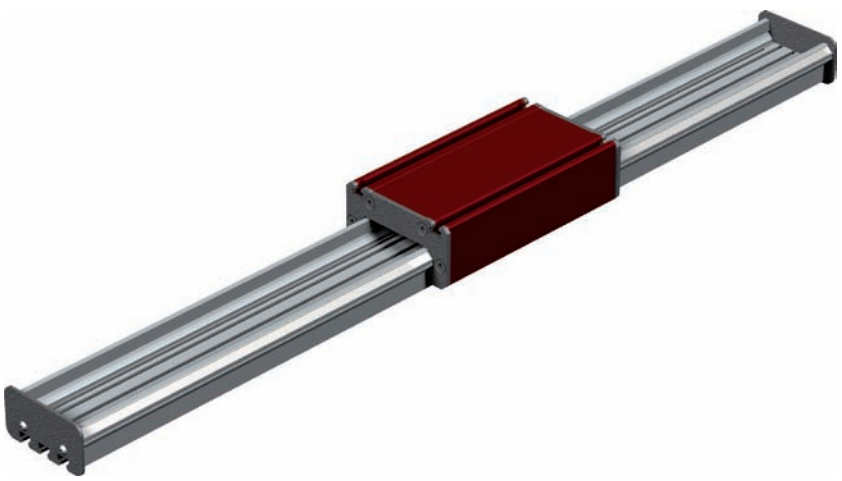


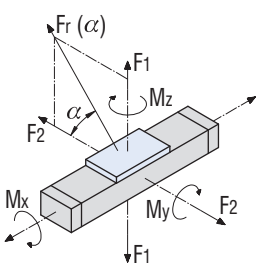
Figure:
Linear guide rail and linear guide slide

Load data

Linear guide iLF-10	
C_o	1702 N
C	3472 N
F_1 stat.	1702 N
F_1 dyn.	3472 N
F_2 stat.	1702 N
F_2 dyn.	3472 N
M_x stat.	64 Nm
M_y stat.	138 Nm
M_z stat.	138 Nm
M_x dyn.	131 Nm
M_y dyn.	282 Nm
M_z dyn.	282 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



Linear guide rail LF-10

- Aluminium profile anodized with T-groove indents
- Swallowtail guide with 4 steel band inserts
- conditionally cantilevered
- Standard length 3m (max.6m)
- Weight: 4.2 kg/m

Item no.: **220027 0099** (Length 1 m)
220027 0199 (Length 2 m)
220027 0299 (Length 3 m)

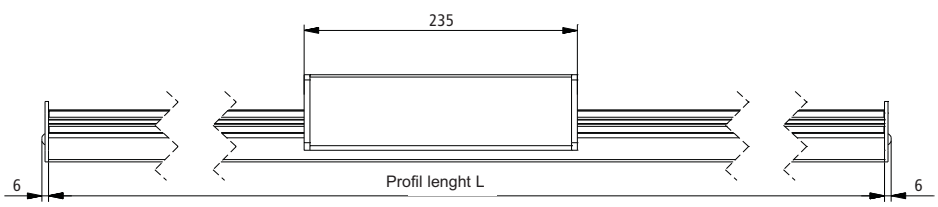
Option:
- Other lengths (longer or shorter)

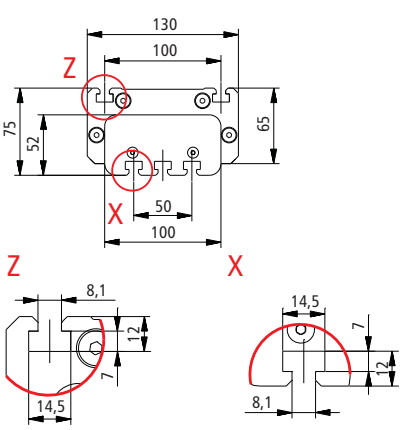
Linear guide slide LS-10

- Aluminium slide red anodized L 235 x W 125 x H 65 mm
- 4 ball bearings Ø 19 with rotary bearing inserts
- adjustable backlash-free
- smooth-running and maintenance-free
- Weight: 1.9 kg

Item no.: **223014**

Scale drawing





Technical specifications subject to change.

Linear guide

iLF-20

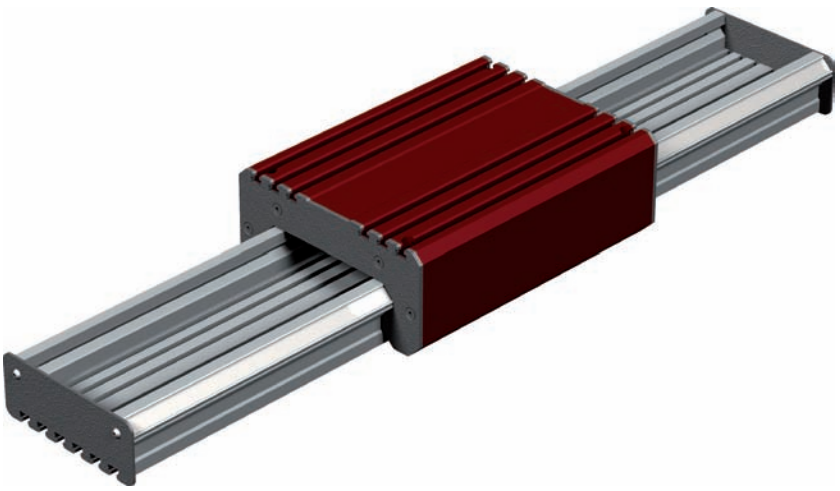


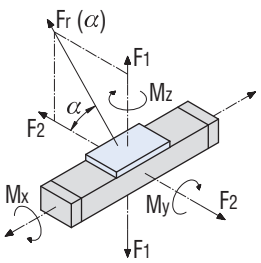
Figure:
Linear guide rail and linear guide slide

Load data

Linear guide iLF-20	
C_o	8553 N
C	15652 N
F_1 stat.	8553 N
F_1 dyn.	15652 N
F_2 stat.	8553 N
F_2 dyn.	15652 N
M_x stat.	622 Nm
M_y stat.	1035 Nm
M_z stat.	1035 Nm
M_x dyn.	1138 Nm
M_y dyn.	1894 Nm
M_z dyn.	1894 Nm

$$Fr(\alpha) = \frac{F2}{\cos \alpha}$$

$$Fr(\alpha) = \frac{F1}{\sin \alpha}$$



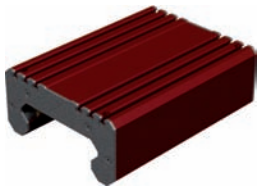
Linear guide rail LF-20

- Aluminium profile anodized with T-groove indents
- Swallowtail guide with 4 steel band inserts
- conditionally cantilevered
- Standard length 3m (max.6m)
- Weight: 12.2 kg/m

Item no.: **220026 0099** (Length 1 m)
220026 0199 (Length 2 m)
220026 0299 (Length 3 m)

Option:
- Other lengths (longer or shorter)

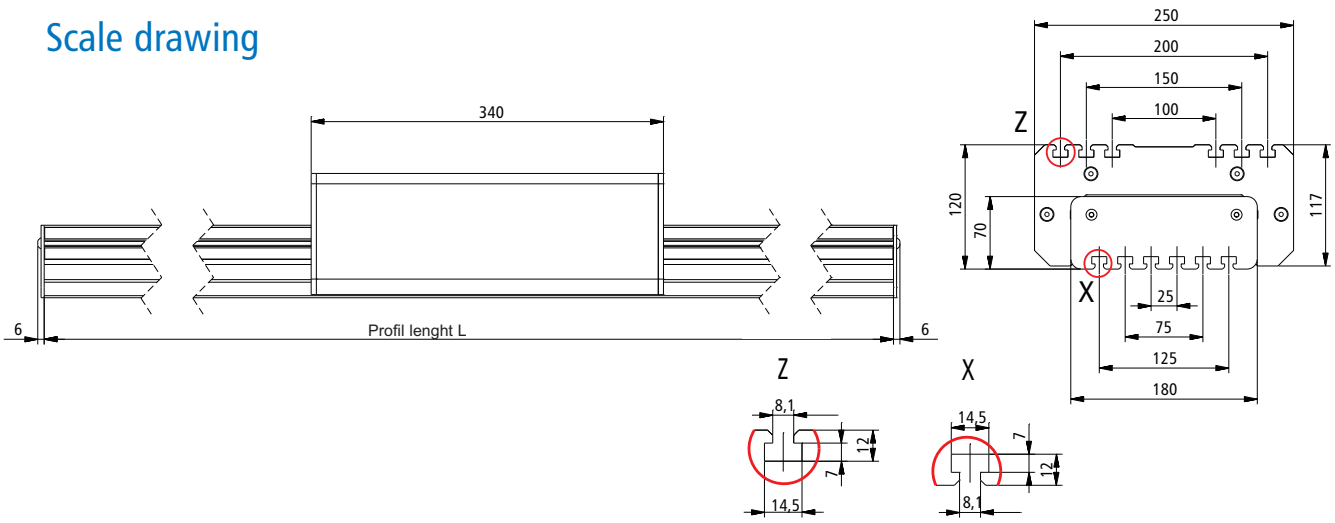
Linear guide slide LS-20



- Aluminium slide red anodized L 340 x W 250 x H 117 mm
- 4 ball bearings Ø 42 with rotary bearing inserts
- adjustable backlash-free
- smooth-running and maintenance-free
- Weight: 9.8 kg

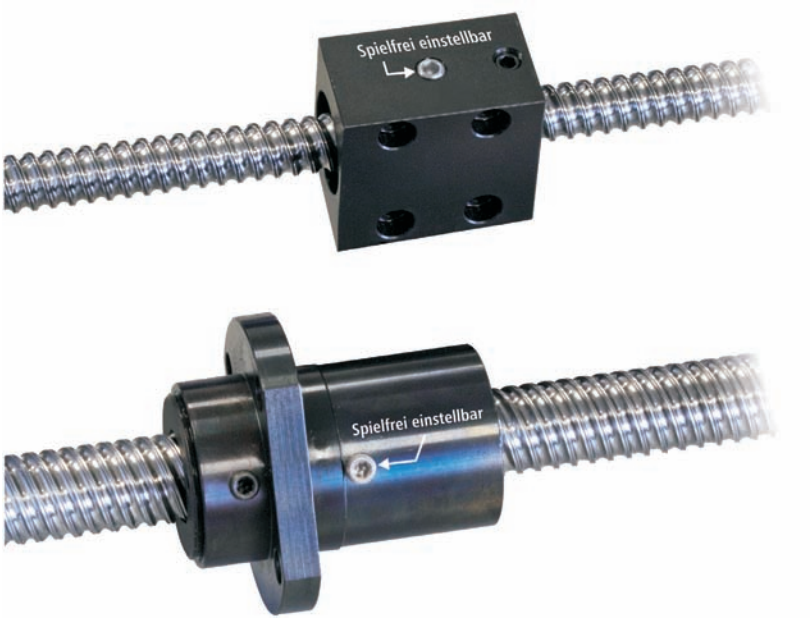
Item no.: **223015**

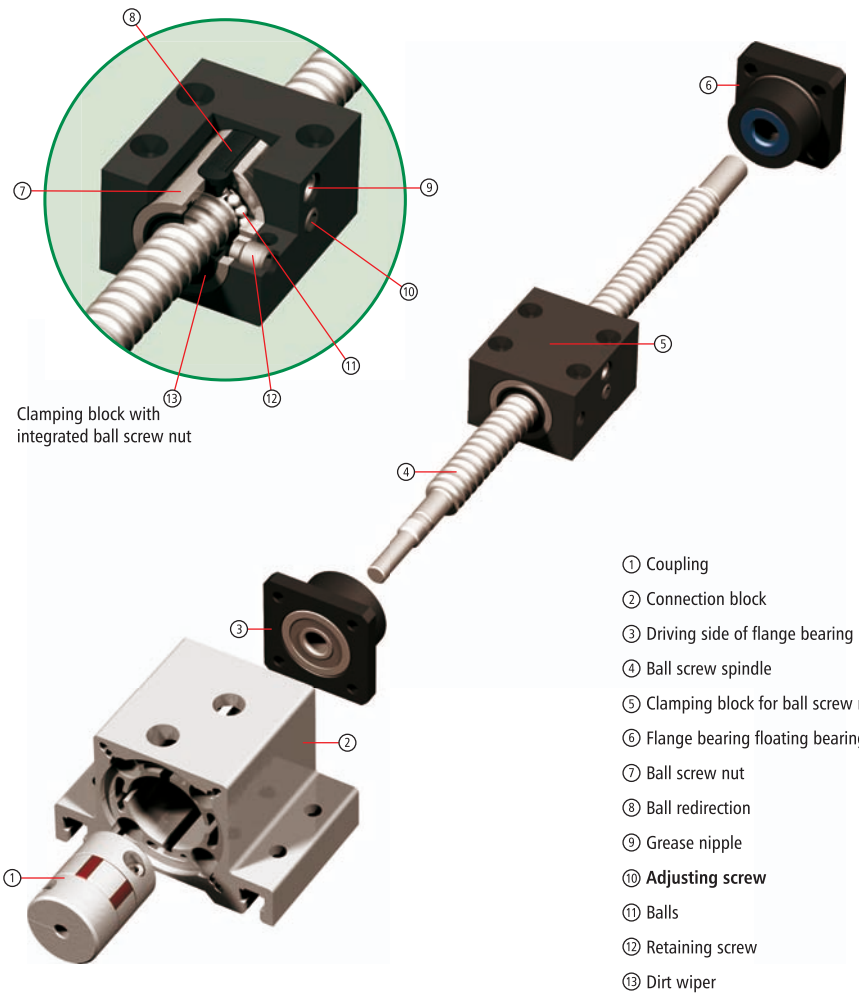
Scale drawing



Technical specifications subject to change.

Ball screw assemblies 16/25 mm





Clamping block with integrated ball screw nut

① Coupling
② Connection block
③ Driving side of flange bearing
④ Ball screw spindle
⑤ Clamping block for ball screw nut
⑥ Flange bearing floating bearing side
⑦ Ball screw nut
⑧ Ball redirection
⑨ Grease nipple
⑩ **Adjusting screw**
⑪ Balls
⑫ Retaining screw
⑬ Dirt wiper

General

Ball screw assemblies **made by isel** are precise, wear-resistant and tried and tested drives with an excellent price/performance ratio.
Here the motions are transformed effectively and with low friction into linear movements with a repetitive accuracy of less than 0.01 mm to 300 mm length.

The ball bearing assemblies consist of hardened ball bearing screws Ø 16 mm and Ø 25 mm, pitch 2.5/5/10 and 20 mm as well as hardened and ground ball screw nuts. These have multiple ball races with internal ball return.
The special construction and design of the ball screw nuts allows a bakklash-free adjustment of the run on the ball bearing screws.
For this purpose the ball screw nuts are fastened on the respective clamping bloks and adjusted backlash-free using an adjusting screw.

The quality of the ball screw assemblies is in accordance with the international standards as well as the internal quality requirements. For this purpose the measurements such as screw accuracy, pitch accuracy, etc. are performed in an air conditioned QA room at +20°C using a 3D measuring machine.

Upon request the ball bearing screws can be supplied in various lengths with one- or two-sided end machining.

Additional accessories such as flange bearings, couplings and controls boards complete the product line.

Technical specifications subject to change.

Ball screw assemblies 16/25 mm

Characteristics ball bearing screws

- Ball bearing screw Ø 16/25 mm rolled, hardened and polished
- Material CF53 induction hardened 60±2 HRC
- screw pitches 2.5/5/10 and 20 mm
- Standard length 3 m, max. 3.7 m
- Manufactured according to DIN 69051, Section 3, tolerance class 7

Options:

- End machining according to isel standard or custom
- screw support at a screw length > 1500 mm (2000 mm)
- tolerance class 5 for a surcharge

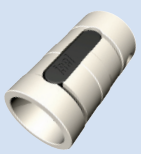
Characteristics ball bearing nuts

- Ball bearing nuts for screw Ø 16/25 mm, hardened and ground
- Material 16MnCr5, case-hardened 60±2 HRC
- Nut pitches 2.5/5/10 and 20 mm
- Multiple ball races with internal ball return (ball Ø 3.5 mm)
- Double-ended plastic sealing as dirt wiper

Accessories:

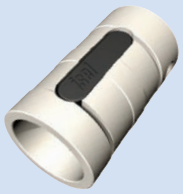
- Clamping blocks for flange or foot mounting with lubricating nipple, retaining screw and adjusting screw

Order data



Ball bearing nut
for screw Ø 16 mm
Pitch 2.5 mm Item no. 213503
Pitch 5.0 mm Item no. 213505
Pitch 10.0 mm Item no. 213510

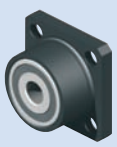
Ball bearing screw
Ø 16 mm
Pitch 2.5 mm Item no. 211132 0305
Pitch 5.0 mm Item no. 211134 0305
Pitch 10.0 mm Item no. 211135 0305



Ball bearing nut
for screw Ø 25 mm,
Pitch 5.0 mm Item no. 213700 0005
Pitch10.0 mm Item no. 213700 0010
Pitch 20.0 mm Item no. 213700 0020

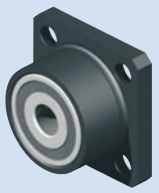
Ball bearing screw
Ø 25 mm
Pitch 5.0 mm Item no. 211144 0300
Pitch 10.0 mm Item no. 211145 0300
Pitch 20.0 mm Item no. 211146 0300

Clamping block
for 16 KG nut
with flange mounting
Item no. 213501

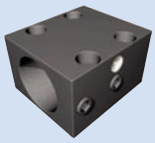


Bearing flange
for 16 KG screw
with 2 angular contact ball bearings
Item no. 216504 0001

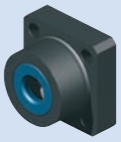
Clamping block
for 25 KG nut
with flange mounting,
Item no. 213700 9003



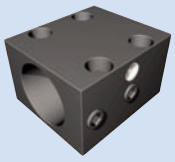
Bearing flange
for 25 KG screw
with 2 angular contact ball bearings
Item no. 216504 0006



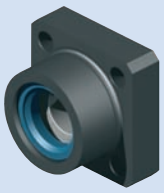
Clamping block
for 16 KG nut
with foot mounting
Item no. 213500



Bearing flange
for 16 KG screw
with needle bearing
Item no. 216504 0002



Clamping block
for 25 KG nut
with foot mounting,
Item no.213700 9001



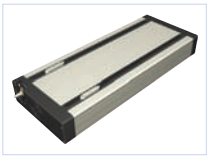
Bearing flange
for 25 KG screw
with needle bearing
Item no. 216504 0005

Other lengths with and without end machining as well as screw supports available upon request. Detailed information and drawings for the drive sections are available at www.isel-germany.de

Technical specifications subject to change.

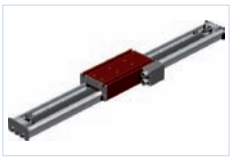
Linear Units

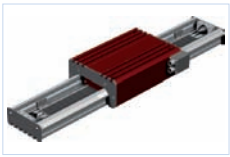
Overview

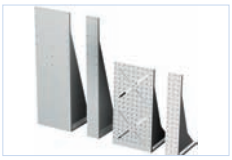


Linear Units

Overview







Linear unit
with belt drive

LEZ 1

Figure:
Drive unit MD 24

Characteristics

- Backlash-free feed with belt drive
- aluminium profile, miniature linear guide LFS-8-2
- toothed belt with 3 mm gapping Width 9 mm
- Repeat accuracy smaller or equal ± 0.2 mm
- Feed max. 1.5 m/s
- Shaft slide WS 1 L 126 x W 75 mm

Options:
- Special lengths in a grid 100 mm
- Stepper Motor or servo motor
- Drive control

General

The linear units in the LEZ series with toothed belt feed feature a modular set-up and are suitable for quick positioning in the area of installation automation and machine handling.
Due to their sturdy and rigid aluminium constructions they are primarily used where work pieces need to be processed or transported.

The patented shaft slides with ball races are used as guide slides. All LEZ series linear units can also be supplied with the matching drive units as well as special connecting angles, allowing various combinations in cross, H-, and multi-axle configurations.

Technical specifications

Belt type	HTD 3M, width 9 mm
Slide weight	0.430 kg
Weight without drive unit	1,000 mm ^ = 3 kg
Specific mass of the toothed belt	0.0225 kg/m
Specific guide weight	0.200 kg/100 mm
Effective diameter of the synchronised pulleys	Ø 19.1 mm
Mass inertia moment of the synchronised pulleys	$5.585 \cdot 10^{-6}$ kgm²
Theoretic feed per rotation	60 mm

Order data

Without drive:

Item no.: 232005 8100 L = 998 mm
Item no.: 232005 8300 L = 2998 mm

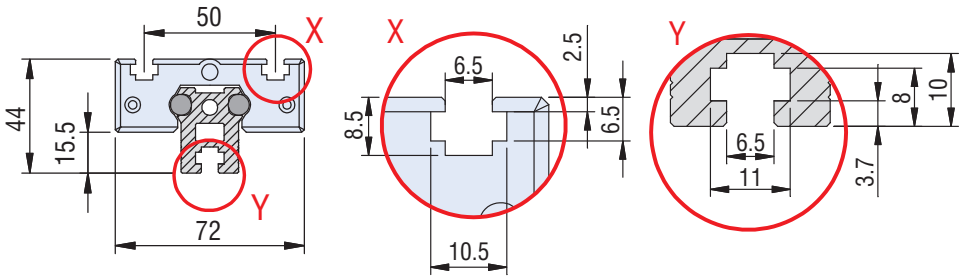
With stepper motor 1: 1

Item no.: 232005 100 L = 996 mm
Item no.: 232005 300 L = 2996 mm

With stepper motor 2: 1

Item no.: 232005 2100 L = 996 mm
Item no.: 232005 2300 L = 2996 mm

Scale drawings



Technical specifications subject to change.

Linear unit
with belt drive

LEZ 9

Figure:
Drive unit MD 24

Characteristics

- Backlash-free feed with belt drive
- Aluminium profile, Linear guide LFS-8-7
- Toothed belt with 3 mm gapping Width 15 mm
- Repeat accuracy smaller or equal ± 0.2 mm
- Feed max. 2 m/s
- Shaft slide WS 11 L 96 x W 95 mm

Options:
- Special lengths in a grid 100 mm
- Stepper Motor or servo motor
- Drive control

General

The linear units in the LEZ series with toothed belt feed feature a modular set-up and are suitable for quick positioning in the area of installation automation and machine handling.
Due to their sturdy and rigid aluminium constructions they are primarily used where work pieces need to be processed or transported.

The patented shaft slides with ball races are used as guide slides. All LEZ series linear units can also be supplied with the matching drive units as well as special connecting angles, allowing various combinations in cross, H-, and multi-axle configurations.

Technical specifications

Belt type	HTD 3M, width 15 mm
Slide weight	0.4 kg
Weight without drive unit	1,000 mm ^ = 4.4 kg
Specific mass of the toothed belt	0.04 kg/m
Specific guide weight	0.29 kg/100 mm
Effective diameter of the synchronised pulleys	Ø 19.1 mm
Mass inertia moment of the synchronised pulleys	$5.86 \cdot 10^{-6}$ kgm²
Theoretic feed per rotation	60 mm

Order data

Without drive:

Item no.: 232010 0100 L = 996 mm
Item no.: 232010 0300 L = 2996 mm

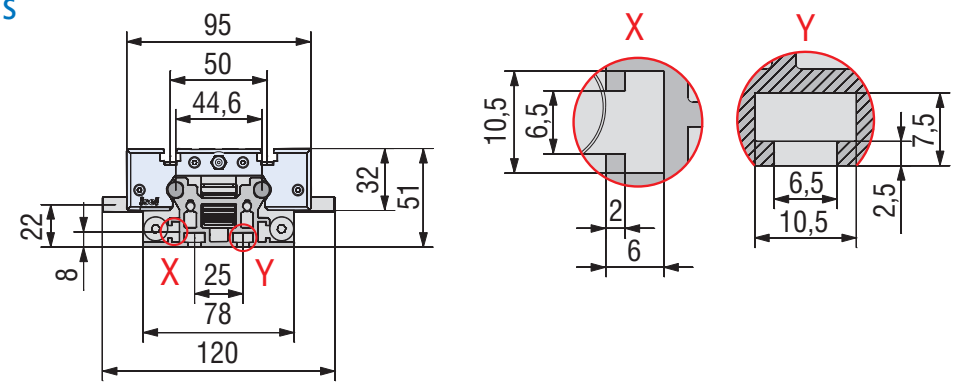
With stepper motor:

Item no.: 232010 10005 L = 996 mm
Item no.: 232010 30005 L = 2996 mm

With stepper motor and drive unit:

Item no.: 232010 010005S L = 996 mm
Item no.: 232010 030005S L =2996 mm

Scale drawings



Technical specifications subject to change.

Linear units
with spindle drive

LES 4 / LES 6

Figures:
LES 4 / 6 - prepared for
flange-mounted motor modules

Figure:
Drive control iMD 10/20

Characteristics

- Aluminium shaft profile, anodized
  W 75 x H 75 mm (linear unit LES 4)
  W 150 x H 75 mm (linear unit LES 6)
- Clamping surface and profile underside planer milled
- with 2 or 4 precision steel shafts
  Ø 12 h6, Material Cf53, hardness 60 ±2HRC
- Aluminium shaft slide WS 5/70,
  2 x WS 5/70 (70 mm long), backlash-free adjustable, centralised lubrication
- Ball screw assemblies with 5mm pitch
- Profile sealed with abrasion-resistant sealing lip
- Aluminium diecast end plate with 2 limit or reference switches, Repeat accuracy ± 0.02 mm
- sealed angular ball bearing inside drive steel flange

General

The LES series linear units with spindle drive feature a modular configuration and can be used for many applications.
The rigid aluminium profiles with precision steel shafts form the basis. The feed motion is carried out with ball screw assemblies, stepper motors or servo motors are used as power drives. The LES series linear units can be used horizontally as well as vertically. The patented shaft slide with continuous ball race is used as the guide slide. The supporting balls run between 2 ground steel pins and the guide shaft. Available in sizes up to 3 metres long, per customer specifications.

Technical specifications

	LES 4	LES 6
Moment of inertia I_x	107.711 cm⁴	707.100 cm⁴
Moment of inertia I_y	125.843 cm⁴	212.200 cm⁴
Centre of gravity (see scale drawing)	33.23 mm	32.78 mm
Cross-sectional area	18.81 cm²	30.07 cm²
Material	AlMgSiO, 5F22	AlMgSiO, 5F22
Anodisation	E6/EV1	E6/EV1
Steel shaft weight	6.2 kg/m	11.4 kg/m
Weight of steel shafts and spindles	7.6 kg/m	12.8 kg/m

Order data LES 4

Without drive, spindle pitch 5 mm,
1 shaft slide:

Item no.: 234003 0049 (Length 490 mm)
Item no.: 234003 0099 (Length 990 mm)
Item no.: 234003 0149 (Length 1490 mm)

with DC servo motor,
spindle pitch 5 mm, 1 shaft slide:

Item no.: 234003 004901 (Length 490 mm)
Item no.: 234003 009901 (Length 990 mm)
Item no.: 234003 014901 (Length 1490 mm)

Order data LES 6

Without drive, spindle pitch 5 mm,
2 shaft slides:

Item no.: 234603 0049 (Length 490 mm)
Item no.: 234603 0099 (Length 990 mm)
Item no.: 234603 0149 (Length 1490 mm)

with DC servo motor,
spindle pitch 5 mm, 2 shaft slide:

Item no.: 234603 004901 (Length 490 mm)
Item no.: 234603 009901 (Length 990 mm)
Item no.: 234603 014901 (Length 1490 mm)

Options:

- Special lengths in a grid 100 mm available upon request, max. 2990 mm
- Electromagnetic brake
- Steel slide LS2
  Item no. 991112
- Limit switch add-on kit (see accessories)
- Ball screw assembly with 10mm pitch
- max. length 3 m with spindle support (1.5 m and up)
- Motor module with stepper motor or servo motor
- Drive control

Technical specifications subject to change.

Linear unit
with spindle drive

LES 5

Figure:
LES 5 - prepared for flange-mounted motor modules

Figure:
Drive control iMD 10/20

Characteristics

- Aluminium shaft profile W 225 x H 75 mm, anodized
- Clamping surface and profile underside planer milled
- with 4 precision steel shaft Ø 12 h6, Material Cf53, hardness 60 ± 2 HRC
- Aluminium shaft slide WS 5/70, 2 x WS 5/70 (70 mm long), adjustable without backlash, centralised lubrication
- Ball screw assembly with 5mm pitch
- Profile sealed with abrasion-resistant sealing lip
- Aluminium diecast end plate
- with 2 limit or reference switches, Repeat accuracy ± 0.02 mm
- Sealed angular ball bearings inside drive steel flange

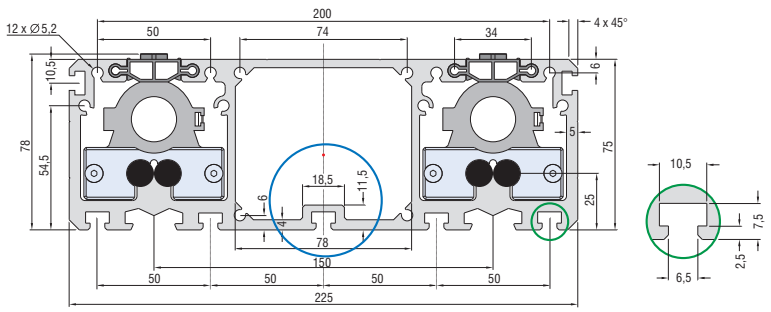
General

The LES series linear units with spindle drive feature a modular configuration and can be used for many applications.
The rigid aluminium profiles with precision steel shafts form the basis. The feed motion is carried out with ball screw assemblies, stepper motors or servo motors are used as power drives. The LES series linear units can be used horizontally as well as vertically. The patented shaft slide with continuous ball race is used as the guide slide. The supporting balls run between 2 ground steel pins and the guide shaft. Available in sizes up to 3 metres long, per customer specifications.

Technical specifications

Moment of inertia I_x	2361.654 cm⁴
Moment of inertia I_y	298.925 cm⁴
Centre of gravity (see scale drawing)	33.39 mm
Cross-sectional area	42.49 cm²
Material	AlMgSi0, 5F22
Anodisation	E6/EV1
Steel shaft weight	13.8 kg/m
Weight of steel shafts and spindles	15.2 kg/m

Scale drawing



Feed range
for 2xWS 5/70 = L1 -150 mm, for 4xWS 5/70 = L1 -280 mm

Technical specifications subject to change.

Options:

- Special lengths in a 100 mm grid available upon request, max. 2990 mm
- Electromagnetic brake
- Steel slide LS2 Item no. 991112
- Limit switch add-on kit (see accessories)
- Ball screw assembly with 10mm pitch
- max. length 3 m with spindle support (1.5 m and up)
- Motor module with stepper motor or servo motor
- Drive control

Order data

Without drive, spindle pitch 5 mm, 2 shaft slides:

Item no.: 234303 0049 (Length 490 mm)
Item no.: 234303 0099 (Length 990 mm)
Item no.: 234303 0149 (Length 1490 mm)

with DC servo motor, spindle pitch 5 mm, 2 shaft slide:

Item no.: 234303 004901 (Length 490 mm)
Item no.: 234303 009901 (Length 990 mm)
Item no.: 234303 014901 (Length 1490 mm)

Linear unit
with screw drive

LES-12-100

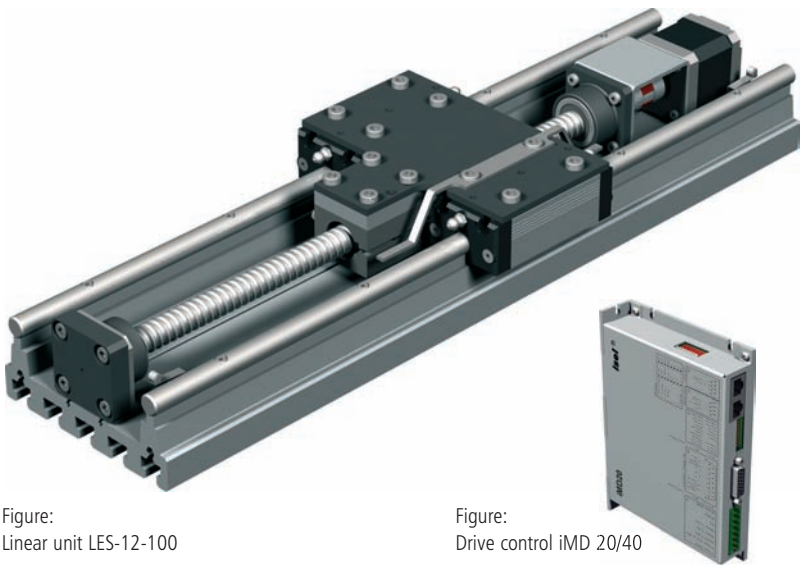


Figure:
Linear unit LES-12-100

Figure:
Drive control iMD 20/40

Characteristics

- Aluminium shaft profile W 125 x H 47 mm
- Length: 0.5 / 1.0 / 2.0 / 3.0 m
- 2 precision steel shafts Ø 12mm with precisely milled shaft intakes
- 4 aluminium slides FS-12-O
- Centralised lubrication option
- with 2 limit or reference switches, Repeat accuracy ± 0.02 mm
- Ball screw assembly Ø16x5mm
- Motor module with servo motor

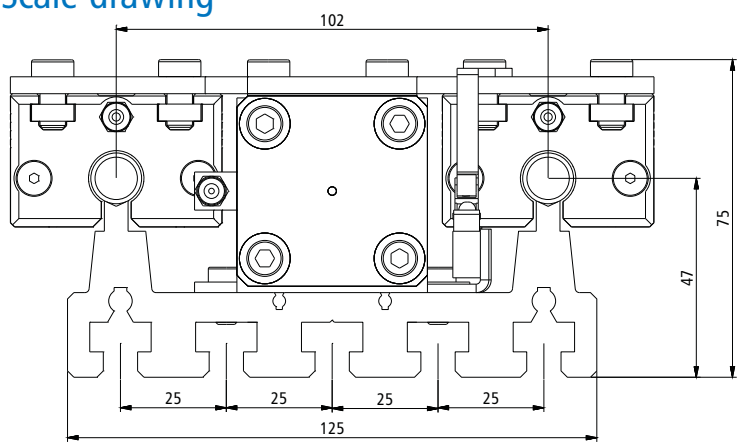
General

The LES series linear units with spindle drive feature a modular configuration and can be used for many applications.
The rigid aluminium profiles with precision steel shafts form the basis. The feed motion is carried out with ball screw assemblies, stepper motors or servo motors are used as power drives. The LES series linear units can be used horizontally as well as vertically. The patented shaft slide with continuous ball race is used as the guide slide. The supporting balls run between 2 ground steel pins and the guide shaft. Available in sizes up to 3 metres long, per customer specifications.

Technical specifications

Moment of inertia I_x	367.16 cm^4
Moment of inertia I_y	34.27 cm^4
Cross-sectional area	21.05 cm^2
Material	AlMgSiO, 5F22
Anodisation	E6/EV1
Weight with steel shafts	7.43 kg/m

Scale drawing



Options:
- Other lengths (longer or shorter)
- Bellows cover
- Profile cover
- Ball screw assembly Ø16x2.5 / 10 mm
- Motor module with stepper motor
- Brake
- Drive control

Order data

Item no.: 238013 004907 (length 0.5 m)
Item no.: 238013 009907 (length 1 m)
Item no.: 238013 019907 (length 2 m)
Item no.: 238013 029907 (length 3 m)

Technical specifications subject to change.

Linear unit
with spindle drive

LES-12-150

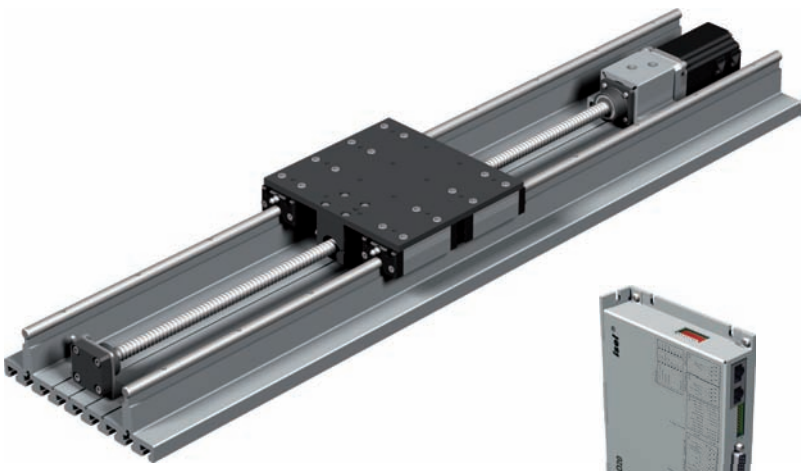


Figure:
Linear unit LES-12-150

Figure:
Drive control iMD 20/40

Characteristics

- Aluminium shaft profile W 225 x H 63.5 mm
- Length: 0.5 / 1.0 / 2.0 / 3.0 m
- 2 precision steel shafts Ø 12mm with precisely milled shaft intakes
- 4 aluminium slides FS-12-O
- Centralised lubrication option
- with 2 limit or reference switches, Repeat accuracy ± 0.01 mm
- Ball screw assembly Ø16x5 mm
- Motor module with servo motor

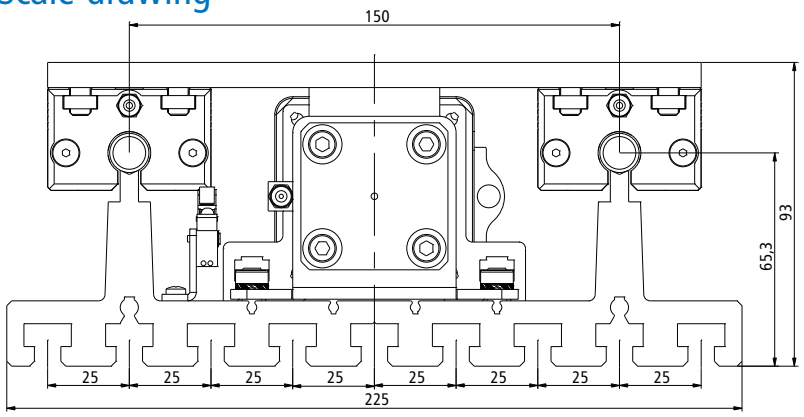
General

The LES series linear units with spindle drive feature a modular configuration and can be used for many applications.
The rigid aluminium profiles with precision steel shafts form the basis. The feed motion is carried out with ball screw assemblies, stepper motors or servo motors are used as power drives. The LES series linear units can be used horizontally as well as vertically. The patented shaft slide with continuous ball race is used as the guide slide. The supporting balls run between 2 ground steel pins and the guide shaft. Available in sizes up to 3 metres long, per customer specifications.

Technical specifications

Moment of inertia I_x	1899.61 cm^4
Moment of inertia I_y	104.94 cm^4
Cross-sectional area	39.63 cm^2
Material	AlMgSiO, 5F22
Anodisation	E6/EV1
Weight with steel shafts	12.43 kg/m

Scale drawing



Options:
- Other lengths (longer or shorter)
- Bellows cover
- Profile cover
- Ball screw assembly Ø16x2.5 / 10 mm
- Ball screw assemblies Ø25x5/10/20mm
- Motor module with stepper motor
- spindle support (1.5 m and up)
- brake
- Drive control

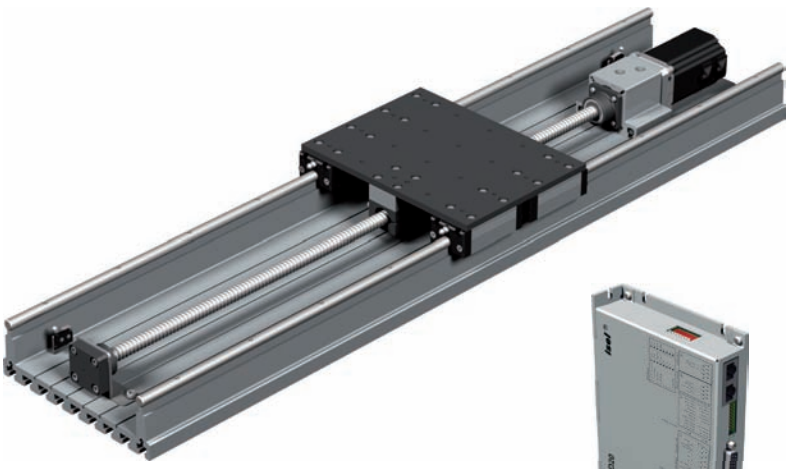
Order data

Item no.: 238023 004907 (Length 0.5 m)
Item no.: 238023 009907 (Length 1 m)
Item no.: 238023 019907 (Length 2 m)
Item no.: 238023 029907 (Length 3 m)

Subject to technical alterations.

Linear unit
with spindle drive

LES-12-200



Linear unit LES-12-200

Drive control iMD 20/40

Characteristics

- Aluminium shaft profile W 225 x H 63.5 mm
- Length: 0.5 / 1.0 / 2.0 / 3.0 m
- 2 precision steel shafts Ø 12mm with precisely milled shaft intakes
- 4 aluminium slides FS-12-O
- Centralised lubrication option
- with 2 limit or reference switches, Repeat accuracy ± 0.01 mm
- Ball screw assembly Ø16x5 mm
- Motor module with servo motor

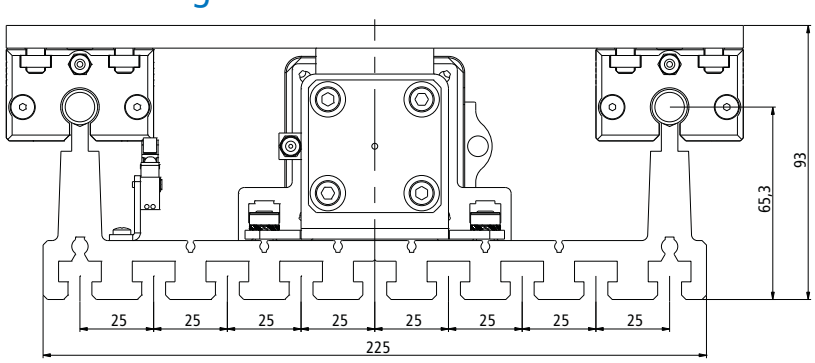
General

The LES series linear units with spindle drive feature a modular configuration and can be used for many applications.
The rigid aluminium profiles with precision steel shafts form the basis. The feed motion is carried out with ball screw assemblies, stepper motors or servo motors are used as power drives. The LES series linear units can be used horizontally as well as vertically. The patented shaft slide with continuous ball race is used as the guide slide. The supporting balls run between 2 ground steel pins and the guide shaft. Available in sizes up to 3 metres long, per customer specifications.

Technical specifications

Moment of inertia I_x	2344.64 cm^4
Moment of inertia I_y	104.94 cm^4
Cross-sectional area	39.45 cm^2
Material	AlMgSiO, 5F22
Anodisation	E6/EV1
Weight with steel shafts	12.38 kg/m

Scale drawing



Options:
- Other lengths (longer or shorter)
- Bellows cover
- Profile cover
- Ball screw assembly Ø16x10 mm
- Ball screw assemblies Ø25x5/10/20mm
- Motor module with stepper motor
- Spindle support 1.5 m and up
- Brake
- Drive control

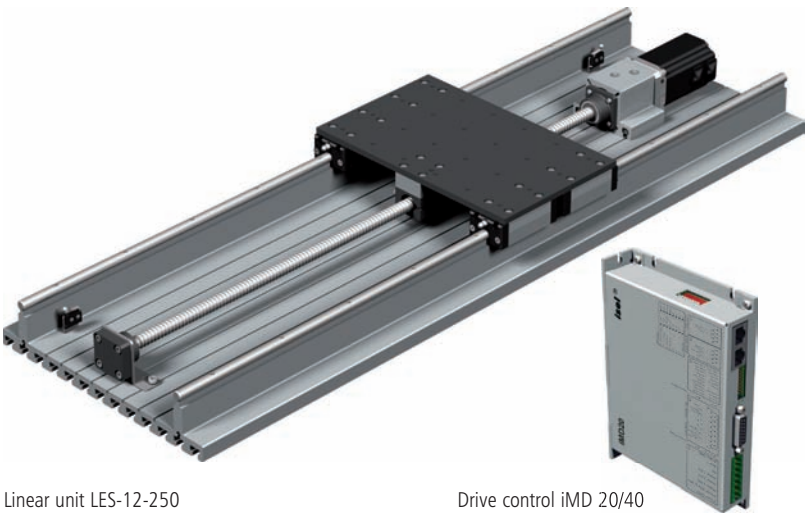
Order data

Item no.: 238033 004907 (Length 0.5 m)
Item no.: 238033 009907 (Length 1 m)
Item no.: 238033 019907 (Length 2 m)
Item no.: 238033 029907 (Length 3 m)

Technical specifications subject to change.

Linear unit
with spindle drive

LES-12-250



Linear unit LES-12-250

Drive control iMD 20/40

Characteristics

- Aluminium shaft profile W 325 x H 63.5 mm
- Length: 0.5 / 1.0 / 2.0 / 3.0 m
- 2 precision steel shafts Ø 12mm with precisely milled shaft intakes
- 4 aluminium slides FS-12-O
- Centralised lubrication option
- with 2 limit or reference switches, Repeat accuracy ± 0.01 mm
- Ball screw assembly Ø16x5 mm
- Motor module with servo motor

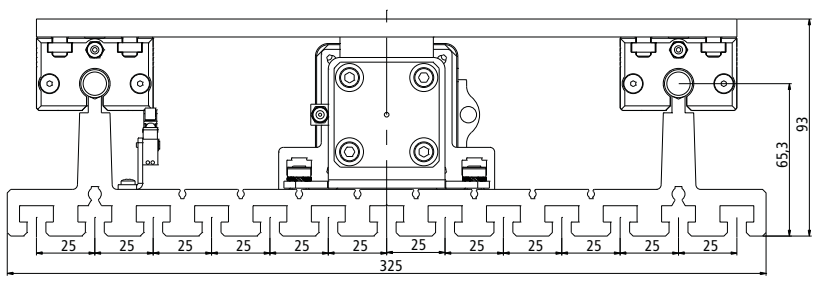
General

The LES series linear units with spindle drive feature a modular configuration and can be used for many applications.
The rigid aluminium profiles with precision steel shafts form the basis. The feed motion is carried out with ball screw assemblies, stepper motors or servo motors are used as power drives. The LES series linear units can be used horizontally as well as vertically. The patented shaft slide with continuous ball race is used as the guide slide. The supporting balls run between 2 ground steel pins and the guide shaft. Available in sizes up to 3 metres long, per customer specifications.

Technical specifications

Moment of inertia I_x	5637.55 cm^4
Moment of inertia I_y	121.37 cm^4
Cross-sectional area	53.63 cm^2
Material	AlMgSiO, 5F22
Anodisation	E6/EV1
Weight with steel shafts	14.41 kg/m

Scale drawing



Options:
- Other lengths (longer or shorter)
- Bellows cover
- Profile cover
- Ball screw assembly Ø16x10 mm
- Ball screw assemblies Ø25x5/10/20mm
- Motor module with stepper motor
- Spindle support 1.5 m and up
- Brake
- Drive control

Order data

Item no.: 238043 004907 (Length 0.5 m)
Item no.: 238043 009907 (Length 1 m)
Item no.: 238043 019907 (Length 2 m)
Item no.: 238043 029907 (Length 3 m)

Technical specifications subject to change.

mechanics

Linear unit
with direct drive

iLD-16-150

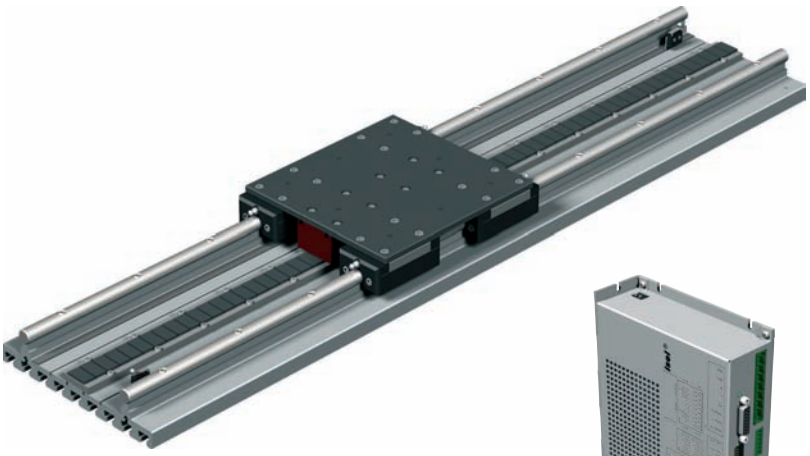


Figure:
Linear unit iLD-16-150

Figure:
Driver controller iMD 40

Characteristics

- Aluminium linear guide W 225 x H 63.5 mm with magnetic track MS 25
- Internal magnetic tape
- Drive slide with spool pack LS 25 (6 coils) and path measuring head 10μm
- 4 steel shaft slides FS-16-SO
- Quiet operation, adjustable backlash-free
- Great dynamic and speeds to max. 2 m/s
- No signal dead range, elimination of mechanical transmission elements
- No maintenance or lubrication required
- With 2 limit or reference switches Repeat accuracy ± 0.01 mm
- Standard lengths to 3m (segment as needed)

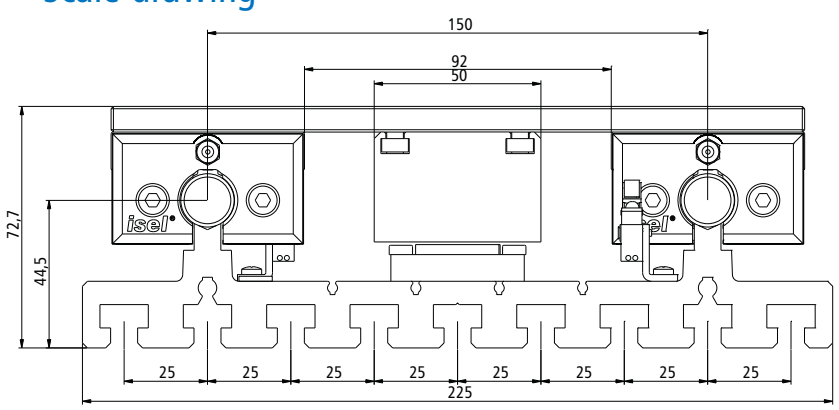
General

The iLD 16 series linear units with direct drives are modular. The base is comprised of the rigid aluminium profiles with 16-style precision steel shafts as well as magnetic tracks mounted in-between with a path tape rule and limit switches.
They are particularly suited for applications requiring speed and precision. The max. path feed rate is 2 m/s. The feed motion is performed with a minimum of 2 drive slides with integrated spool pack and path measuring head.
The linear units can be used vertically as well as horizontally, with or without brake. Dynamics and speed are determined by the number of spools inside the spool pack. Special attention was paid to an ideal price/performance ratio in the construction and the design. The iLD 16 linear units with direct drive have no mechanical transmission elements, no signal dead range, and require no maintenance or lubrication. Add to this a compact construction with high performance, accuracy and durability.

Technical specifications

Moment of inertia I_x	20.86 cm^4
Moment of inertia I_y	1495.64 cm^4
Cross-sectional area	34.04 cm^2
Material	AlMgSiO, 5F22
Anodisation	E6/EV1
Weight with steel shafts	12.31 kg/m

Scale drawing



Options:
- Drive control
- Bellows cover
- Profile cover
- String potentiometer 5 μm
- Circular connector
- Locking brake
- Spool packs with 3 / 9 or 12 spools

Order data

Item no.: 237620 1099 (Length 1 m)
Item no.: 237620 1199 (Length 2 m)
Item no.: 237620 1299 (Length 3 m)

Technical specifications subject to change.

Linear unit
with direct drive

iLD-16-200

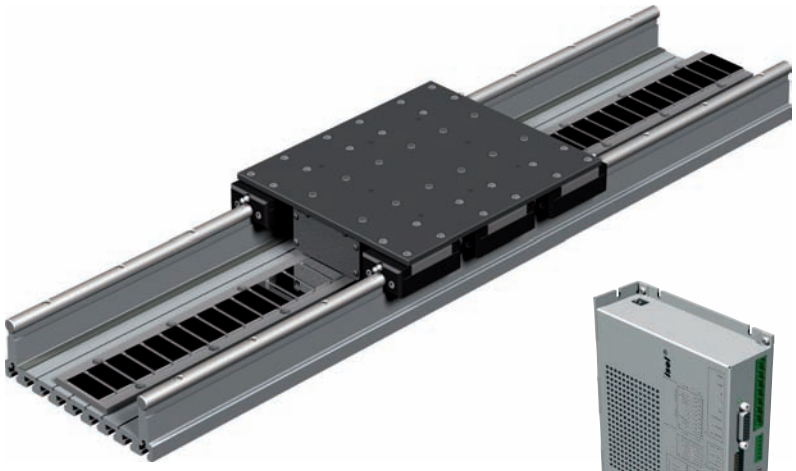


Figure:
Linear unit iLD-16-200

Figure:
Driver controller iMD 40

Characteristics

- Aluminium linear guide W 225 x H 63.5 mm with magnetic track MS 50
- Internal magnetic tape
- Drive slide with spool pack LS 50 (6 coils) and path measuring head 10μm
- 6 steel shaft slides FS-16-SO
- Quiet operation, adjustable backlash-free
- Great dynamic and speeds to max. 2 m/s
- No signal dead range, elimination of mechanical transmission elements
- No maintenance or lubrication required
- With 2 limit or reference switches Repeat accuracy ± 0.01 mm
- Standard lengths to 3m (segment as needed)

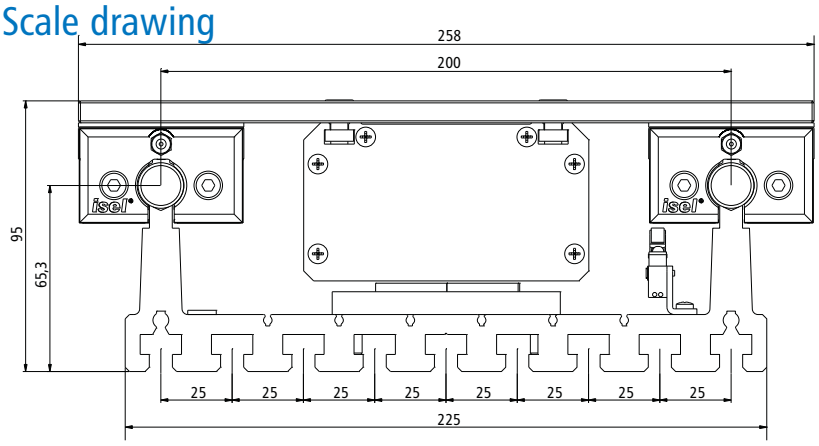
General

The iLD 16 series linear units with direct drives are modular. The base is comprised of the rigid aluminium profiles with 16-style precision steel shafts as well as magnetic tracks mounted in-between with a path tape rule and limit switches.
They are particularly suited for applications requiring speed and precision. The max. path feed rate is 2 m/s. The feed motion is performed with a minimum of 2 drive slides with integrated spool pack and path measuring head.
The linear units can be used vertically as well as horizontally, with or without brake. Dynamics and speed are determined by the number of spools inside the spool pack. Special attention was paid to an ideal price/performance ratio in the construction and the design. The iLD 16 linear units with direct drive have no mechanical transmission elements, no signal dead range, and require no maintenance or lubrication. Add to this a compact construction with high performance, accuracy and durability.

Technical specifications

Moment of inertia I_x	70.77 cm^4
Moment of inertia I_y	2200.01 cm^4
Cross-sectional area	39.58 cm^2
Material	AlMgSiO, 5F22
Anodisation	E6/EV1
Weight with steel shafts	13.8 kg/m

Scale drawing



Technical specifications subject to change.

Options:
- Drive control
- Bellows cover
- Profile cover
- String potentiometer 5 μm
- Circular connector
- Locking brake
- Spool packs with 3 / 9 or 12 spools

Order data

Item no.: 237520 1099 (Length 1 m)
Item no.: 237520 1199 (Length 2 m)
Item no.: 237520 1299 (Length 3 m)

Current information available at www.mechanics.isel.com

Linear unit
with direct drive

iLD 10

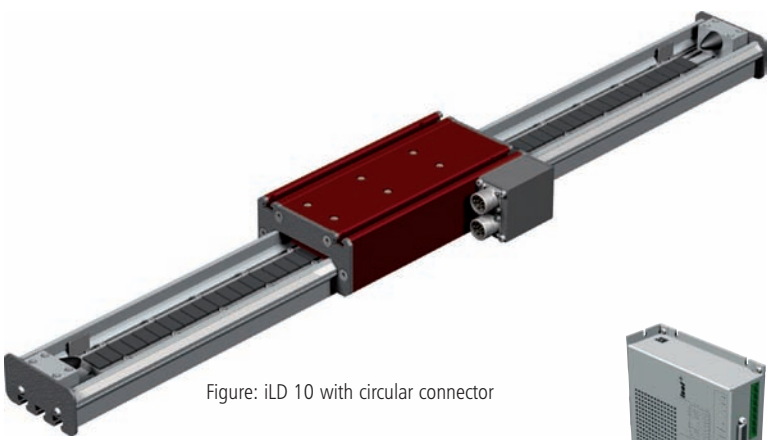


Figure: iLD 10 with circular connector

Driver controller iMD 40

Characteristics

- Aluminium linear guide with magnetic track and drive slide with spool pack
- No signal dead range, elimination of mechanical transmission elements
- Higher performance on a smaller scale
- String potentiometer 10 µm
- Guide is stable and twist-proof
- Widely separated guide surfaces of swallowtail shaped strip steel
- Cleanroom-compatible version
- Quiet operation, adjustable backlash-free
- High dynamics with movement speeds of up to 6.0 m/s
- No maintenance or lubrication required
- Profile lengths to 6m

Optional:
- Drive control
- Bellows cover
- String potentiometer 5 µm
- Circular connector

General

The iLD 10 linear units with direct drives are for tasks and applications in the handling area with a favourable price/ performance ratio. The base is comprised of aluminium profiles with swallowtail design shaped steel guides and internal magnetic tracks with a string potentiometer. Inside the drive slides are at least 4 ball bearings, adjusted backlash-free, as well as the spool pack with path measuring head. This results in a quiet operation without signal dead range, with high dynamics and movement speed.

Technical specifications

	iLD 10-6	iLD 10-12
Weight profile (incl.end plates) [kg/1000mm]	8.80	8.80
Weight slides [kg]	4.40	6.30
Acceptable static load		
Force in Z direction [N]	1,202	702
Force in Y direction [N]	1,202	702
Momentum around X-axis [Nm]	64	64
Momentum around Y-axis [Nm]	138	138
Momentum around Z-axis [Nm]	138	138
Acceptable dynamic load		
Force in Z direction [N]	2,972	2,472
Force in Y direction [N]	2,972	2,472
Momentum around X-axis [Nm]	131	131
Momentum around Y-axis [Nm]	282	282
Momentum around Z-axis [Nm]	282	282
Max. feed force [N]	170	340
Max. nominal speed [m/s]	6.0	6.0

Order data

Drive slide AS 10-6
with spool pack and hall PCB
W/H/L 130x65x255 mm
Item no.: 486020 0002

Drive slide AS 10-12
with spool pack and hall PCB
W/H/L 130x65x410 mm
Item no.: 486020 0004

Linear guide MF 10
with magnetic track MS 25
W/H/L 100x52x1000 mm
Item no.: 486120 1000

Linear guide MF 10
with magnetic track MS 25
W/H/L 100x52x2000 mm
Item no.: 486120 2000

Linear guide MF 10
with magnetic track MS 25
W/H/L 100x52x3000 mm
Item no.: 486120 3000

Subject to technical alterations.

Linear unit
with direct drive

iLD 20

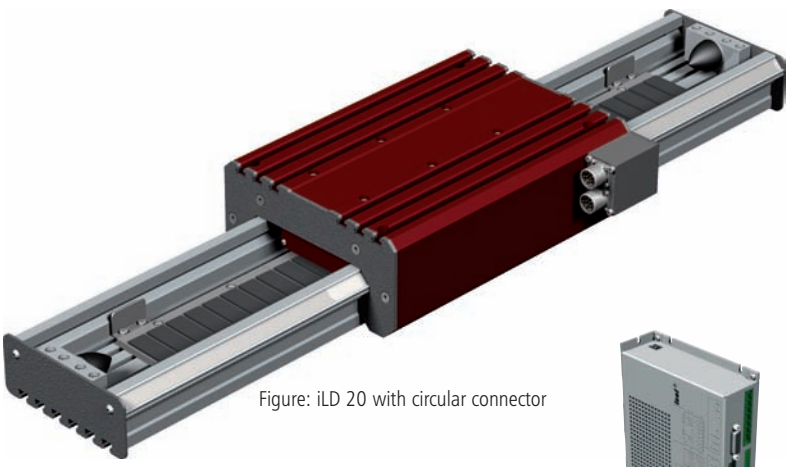


Figure: iLD 20 with circular connector

Driver controller iMD 40

Characteristics

- Aluminium linear guide with magnetic track and drive slide with spool pack
- No signal dead range, elimination of mechanical transmission elements
- Higher performance on a smaller scale
- String potentiometer 10 µm
- Guide is stable and twist-proof
- Widely separated guide surfaces of swallowtail shaped strip steel
- Cleanroom-compatible version
- Quiet operation, adjustable backlash-free
- High dynamics with movement speeds of up to 6.0 m/s
- No maintenance or lubrication required
- Profile lengths to 6m

Optional:
- Drive control
- Bellows cover
- String potentiometer 5 µm
- Circular connector

General

The iLD 10 linear units with direct drives are for tasks and applications in the handling area with a favourable price/ performance ratio. The base is comprised of aluminium profiles with swallowtail design shaped steel guides and internal magnetic tracks with a string potentiometer. Inside the drive slides are at least 4 ball bearings, adjusted backlash-free, as well as the spool pack with path measuring head. This results in a quiet operation without signal dead range, with high dynamics and movement speed.

Technical specifications

	iLD 20-6	iLD 20-12
Weight profile (incl.end plates) [kg/1000mm]	21.30	21.30
Weight slides [kg]	17.30	28.00
Acceptable static load		
Force in Z direction [N]	6,558	4,663
Force in Y direction [N]	6,558	4,663
Momentum around X-axis [Nm]	622	622
Momentum around Y-axis [Nm]	1,035	1,035
Momentum around Z-axis [Nm]	1,035	1,035
Acceptable dynamic load		
Force in Z direction [N]	13,657	11,662
Force in Y direction [N]	13,657	11,662
Momentum around X-axis [Nm]	1,138	1,138
Momentum around Y-axis [Nm]	1,894	1,894
Momentum around Z-axis [Nm]	1,894	1,894
Max. feed force [N]	675	1,350
Max. nominal speed [m/s]	6.0	6.0

Technical specifications subject to change.

Order data

Drive slide AS 20-6
with spool pack and hall PCB
W/H/L 250x117x360 mm
Item no.: 486030 0002

Drive slide AS 20-12
with spool pack and hall PCB
W/H/L 250x117x612 mm
Item no.: 486030 0004

Linear guide MF 20
with magnetic track MS 50
W/H/L 180x70x1000 mm
Item no.: 486130 1000

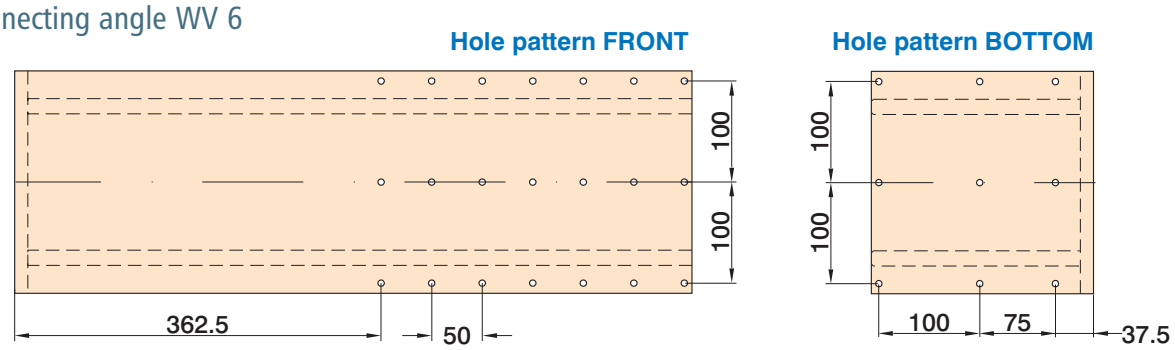
Linear guide MF 20
with magnetic track MS 50
W/H/L 180x70x2000 mm
Item no.: 486130 2000

Linear guide MF 20
with magnetic track MS 50
W/H/L 180x70x3000 mm
Item no.: 486130 3000

Connecting angles

Hole pattern

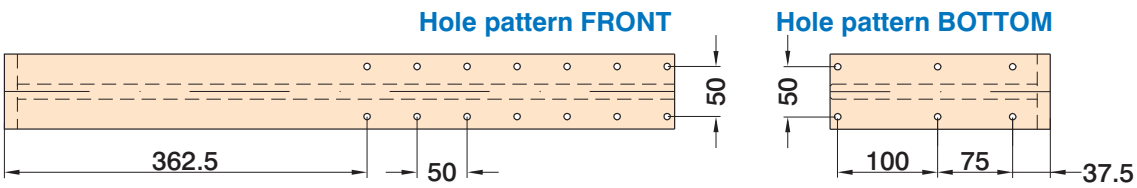
Connecting angle WV 6



all holes Ø 6.5

Hole pattern

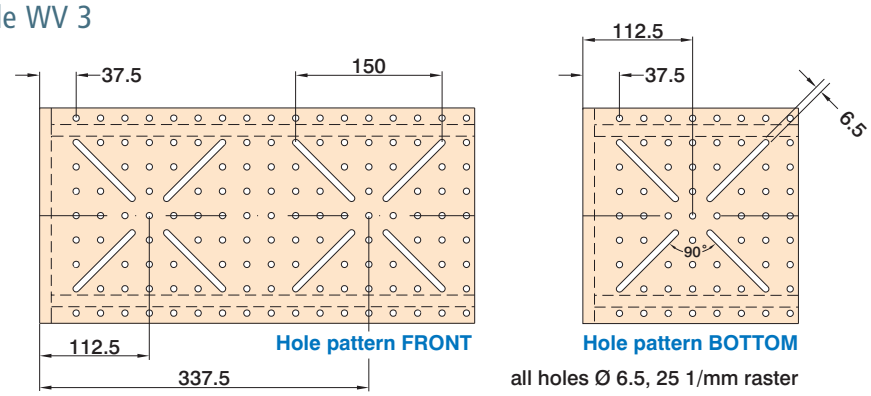
Connecting angle WV 5



all holes Ø 6.5

Hole pattern

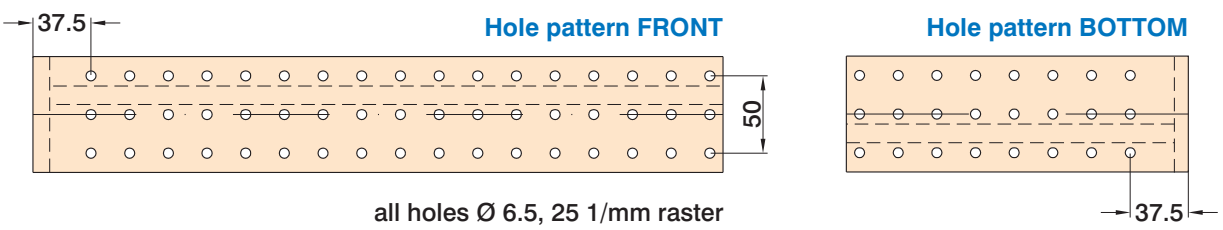
Connecting angle WV 3



all holes Ø 6.5, 25 1/mm raster

Hole pattern

Connecting angle WV 2



all holes Ø 6.5, 25 1/mm raster

Connecting angles

Connecting elements

Connecting angles with face milled clamping surfaces

WV 2 WV 3 WV 5 WV 6

Connecting angle **WV 6**
- blank
- Aluminium, welded, 13.28 kg
- L220 x W220 x H670

Item no.: 209 110 0060

Connecting angle **WV 3**
- blank
- Aluminium sheet, 1.06 kg
- L221 x W221 x H446

Item no.: 209 110 0032

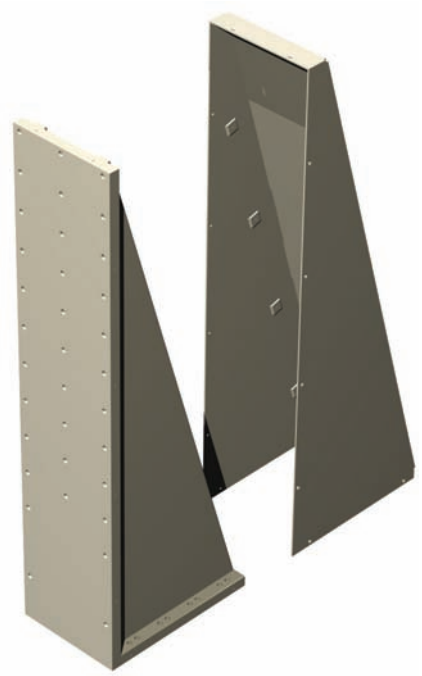
Connecting angle **WV 5**
- blank
- Aluminium, welded, 5.26 kg
- L220 x W75 x H670

Item no.: 209 110 0050

Connecting angle **WV 2**
- blank
- Aluminium sheet, 2.58 kg
- L221 x W75 x H446

Item no.: 209 110 0022

Compatible cover sheets



Cover sheet for **WV 6**
- anodized
- Aluminium sheet, 1.80 kg

Item no.: 209 110 0061

Cover sheet for **WV 5**
- anodized
- 2Aluminium sheet, 1.80 kg

Item no.: 209 110 0051

Cover sheet for **WV 3**
- anodized
- Aluminium sheet, 1.15 kg

Item no.: 209 110 0031

Cover sheet for **WV 2**
- anodized
- Aluminium sheet, 0.78 kg

Item no.: 209 110 0021

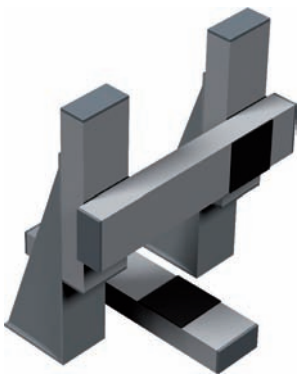
Technical specifications subject to change.

Sample combinations

2-axle combinations

3-axle combinations

Gantry combinations

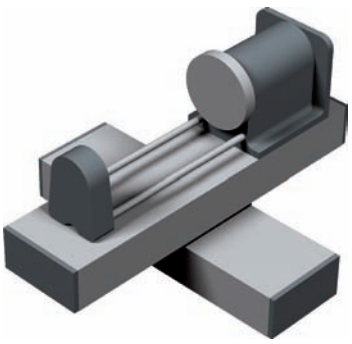


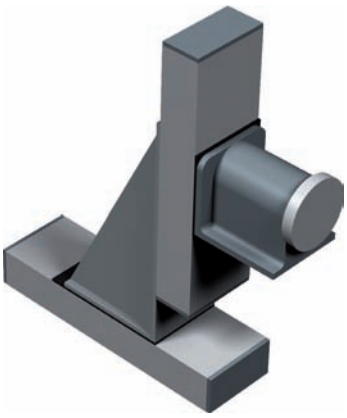
Technical specifications subject to change.

Sample combinations

Linear units
Turning units

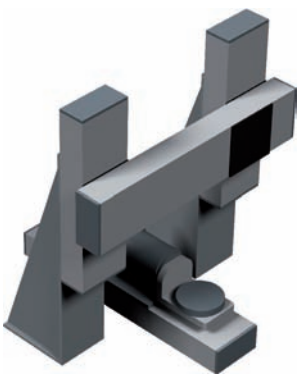
3-axle combinations

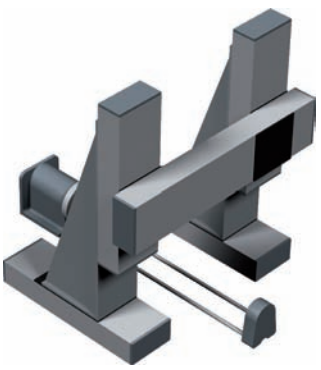




Multi-axle combinations

Gantry combinations

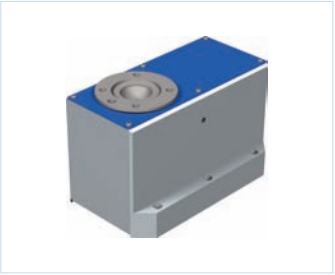


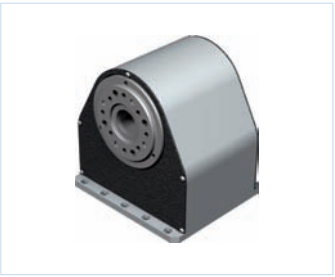


Technical specifications subject to change.

Rotation units

Overview



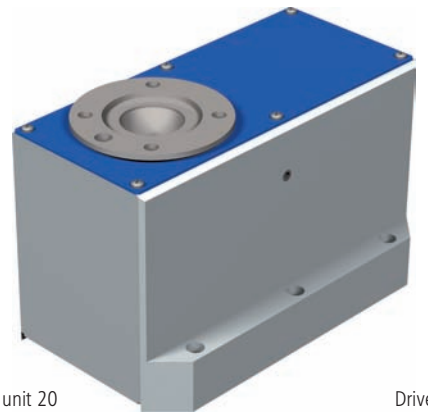


Rotation units

Overview

mechanics

Turning unit ZR 20



Turning unit 20

Drive unit MD 24

Characteristics

- Low-backlash belt drive with stepper motor
- Speed reduction 1:20
- Shaft with through-boring Ø15
- Adapter flange, with inside cone SK 20

Options:
- Drive unit
- Round tool changer
- Chuck
- Adapter flange

Technical specifications

	Stepper motor MS 045 HT*
Reduction gear ratio	1:20
Output speed [1/min]	0-60
Working torque (0-1600Hz) [Nm]	8
Nominal holding torque (static load) [Nm]	14
Min.step values (positioning accuracy) [arcmin]	3.5

* Values at half-step operation

Accessories

Chuck seat SK20
with assembly ring
for tools Ø 3-12.0mm
Item no.: 239122 9001

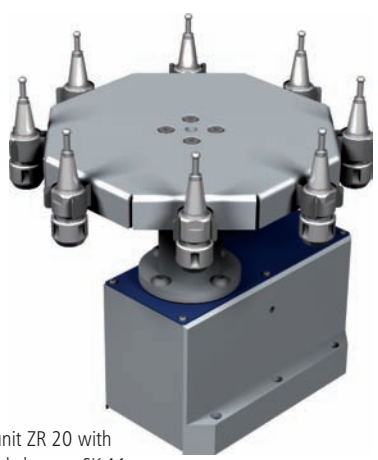
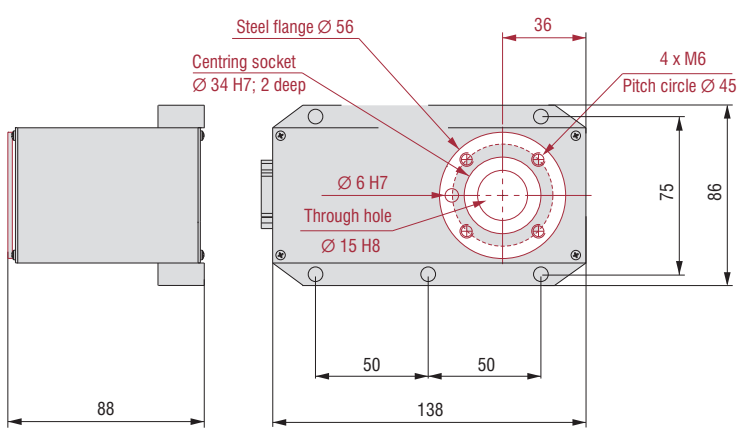


Figure:
Turning unit ZR 20 with round tool changer SK 11

Scale drawing



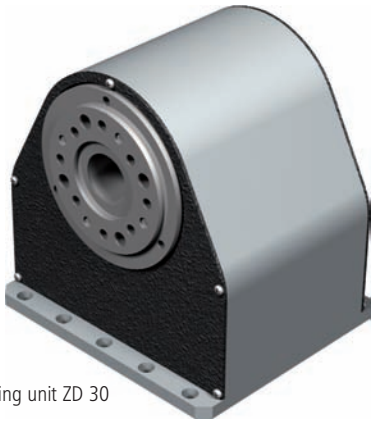
Order data

Turning unit ZR 20 with stepper motor Item no.: 260300 0000

Technical specifications subject to change.

Turning units

ZD 30



Turning unit ZD 30

Drive unit MD 24

Characteristics

- low-backlash belt drive with stepper motor
- Speed reduction 1:20
- Shaft with through-boring Ø15
- Adapter flange with inside cone SK 20
- Weight: 2.9 kg

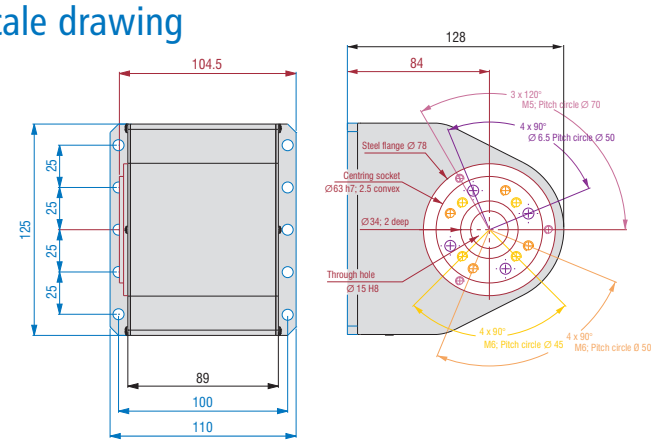
Options:
- Drive unit
- Chuck
- Adapter flanges

Technical specifications

	Stepper motor MS 045 HT*
Reduction gear ratio	1:30
Output speed [1/min]	0-40
Working torque (0-1600Hz) [Nm]	12
Nominal holding torque (static load) [Nm]	20
Min.step values (positioning accuracy) [arcmin]	2.5

* Values at half-step operation

Scale drawing



Accessories

Chuck seat SK20
with assembly ring
for tools Ø 3-12mm
Item no.: 239122 9001

Tailstock unit
200mm / L 331
Item no.: 269100 1060

300mm / L 431
Item no.: 269100 1070

400mm / L 531
Item no.: 269100 1080

500mm / L 631
Item no.: 269100 1090

3-jaw chuck Ø80 mm
incl. adapter flange
Item no.: 269060 0080

4-jaw chuck Ø80 mm
incl. adapter flange
Item no.: 269061 0080

Order data

Turning unit ZD 30 Item no.: 261100 0000

Technical information subject to change.

Turning units

D 2

Turning units 2

Drive unit MD 24

Characteristics

- low-backlash belt drive with stepper motor
- Speed reduction 1:40
- Steel flange Ø 86mm, 56 ± 3 HRC
- Weight: 10.6 kg

Options:
- Drive unit
- Mounting plate
- Tailstock unit
- Chuck
- Adapter flanges

Technical specifications

	Stepper motor MS 200 HT*
Reduction gear ratio	1:40
Output speed [1/min]	0-30
Working torque (0-500/500-1000 Hz) [Nm]	35/30
Nominal torque [Nm]	--
Nominal holding torque (static load) [Nm]	55
Min. step values (positioning accuracy) [arcmin]	2

* Values at half-step operation

Accessories

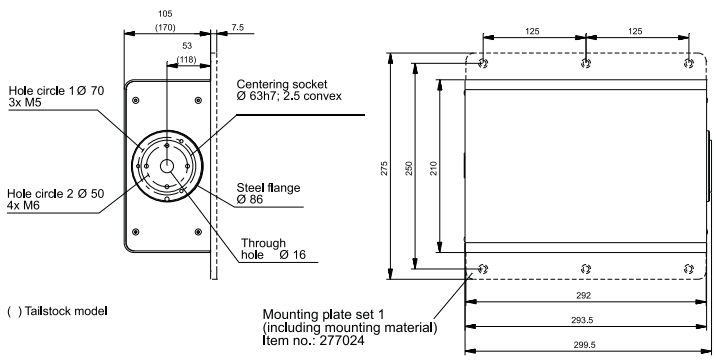
3-jaw chuck Ø80 mm
incl. adapter flange
Item no.: 269060 0080

Ø 100 mm
Item no.: 269060 0100

4-jaw chuck Ø80 mm
incl. adapter flange
Item no.: 269061 0080

Ø 100 mm
Item no.: 269061 0100

Scale drawing



Order data

Turning unit D 2	Item no.: 264000 0001
Turning unit D 2, with tailstock unit (L=1,000 mm)	Item no.: 264000 0011
Turning unit D 2, with tailstock unit (L=1,500 mm)	Item no.: 264000 0021
Turning unit D 2, with tailstock unit (L=2,000 mm)	Item no.: 264000 0031

Technical specifications subject to change.

Turning units

RF 1

Turning unit RF 1

Drive unit MD 24

Characteristics

- low-backlash belt drive with stepper motor drive
- Speed reduction 1:52
- Weight: 14.6 kg

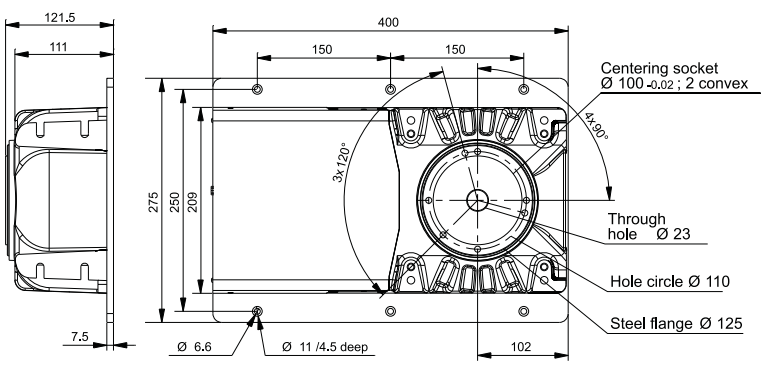
Options:
- Mounting plate
- Chuck
- Drive unit

Technical specifications

	Stepper motor MS 200 HT*
Reduction gear ratio	01:52
Output speed [1/min]	0-23
Working torque (0-500Hz) [Nm]	42
Working torque (500-1000 Hz) [Nm]	38
Nominal torque [Nm]	--
Nominal holding torque (static load) [Nm]	75
Min. step values (positioning accuracy) [arcmin]	2

* Values at half-step operation

Scale drawing



Accessories

Aluminium T-slot disk
Ø 245mm / PT 25
Item no.: 269050 0245

Aluminium T-slot disk
Ø 350mm / PT 25
Item no.: 269050 0350

Aluminium turn-table
Ø 490mm / PT 25
Item no.: 269051 0500

3-jaw chuck Ø125 mm
incl. adapter flange
Item no.: 269060 0125

4-jaw chuck Ø125 mm
incl. adapter flange
Item no.: 269061 0125

Order data

Turning unit RF1 Item no.: 260241 0001

Technical specifications subject to change.

mechanics

Turning units

RDH-M

Turning unit RDH-M
(Hollow shaft version)

Turning unit RDH-M
(Solid shaft version)

Characteristics

- With precision gear
  - Very resistant and rigid output bearing
  - Zero backlash and high torsional stiffness
- Speed reduction 1:51
- Servo motor
- Protection category IP 65
- Rustproof finish
- Transmission accuracy <1 arcmin
- Repeat accuracy $<\pm 6$ arcsec
- Optionally as solid shaft or hollow shaft
- Maintenance-free
- Dimensions:
  W 235 x L 198.5 x H 215.5 mm

Option:

- Stepper motor
- Tailstock unit
- Chuck
- Speed reduction 1:101

Technical specifications

		Stepper motor MS 200 HT *		EC servo motor MD 100 (brushless)	
Reduction gear ratio		1:51	1:101	1:51	1:101
Nominal output speed	[1/min]	4	2	22	11
		at 1,500 Hz (225 1/min)		bei 1,100 1/min	
Max. output speed	[1/min]	24	12	59	30
		at 8,000 Hz		--	
Nominal torque	[Nm]	24	46	15	29
		at 1,500 Hz		--	
Max. torque (temporary)	[Nm]	--	--	46	88
Nominal holding torque (static load)	[Nm]	55	108	33	65
Max. load capacity of the drive	[Nm]	98	157	98	157
		Limit for repeatable peak torque			
Dynamic load rating C	[N]	21,800			
Static load rating C_0	[N]	35,800			

* Values at half-step operation

Accessories

Chuck

3-jaw chuck*
Ø 100
Item no.: 269060 0100
Ø 125
Item no.: 269060 0125

Chuck

4-jaw chuck*
Ø 100
Item no.: 269061 0100
Ø 125
Item no.: 269061 0125

* Incl. adapter flange

Tailstock unit RE M

for RDH-M

Item no.: 269100 2100 (1,000 mm)
Item no.: 269100 2150 (1,500 mm)
Item no.: 269100 2200 (2,000 mm)

Order data

Turning unit RDH-M
EC servo motor MD 200
brushless
Speed reduction 1:51
with solid shaft
Item no.: 266201 0100

Turning unit RDH-M
Stepper motor
MS 200 HT
Speed reduction 1:51
with solid shaft
Item no.: 266201 0000

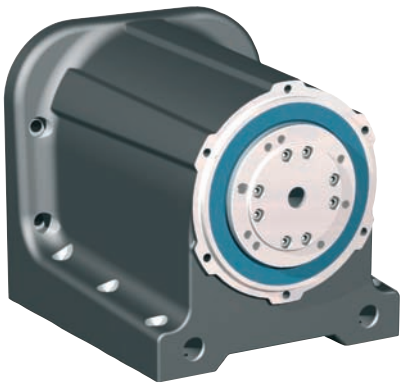
Turning unit RDH-M
EC servo motor MD 200
brushless
Speed reduction 1:51
with hollow shaft
Item no.: 266211 0100

Turning unit RDH-M
Stepper motor
MS 200 HT
Speed reduction 1:51
with hollow shaft
Item no.: 266211 0000

Subject to technical alterations.

Turning units

RDH-S



Turning unit RDH-S
(Hollow shaft version)

Turning unit RDH-S
(Solid shaft version)

Characteristics

- With precision gear
  - Very resistant and rigid output bearing
  - Zero backlash and high torsional stiffness
- Speed reduction 1:51
- Servo motor
- Protection category IP 65
- Rustproof finish
- Transmission accuracy <1.5 arcmin
- Repeat accuracy $<\pm 6$ arcsec
- Optionally as solid shaft or hollow shaft
- Maintenance-free
- Dimensions:
  W 150 x L 166 x H 146.5 mm

Option:

- Stepper motor
- Tailstock unit
- Chuck
- Speed reduction 1:101

Technical specifications

		Stepper motor MS 200 HT *		EC servo motor MD 100 (brushless)	
Reduction gear ratio		1:51	1:101	1:51	1:101
Nominal output speed	[1/min]	4	2	22	11
		at 1,500 Hz (225 1/min)		at 1,100 1/min	
Max. output speed	[1/min]	24	12	59	30
		at 8,000 Hz		--	
Nominal torque	[Nm]	7	11	7	11
		at 1,500 Hz		--	
Max. Torque (temporary)	[Nm]	--	--	7	11
Nominal holding torque (static load)	[Nm]	7	11	7	11
Max. load capacity of the drive	[Nm]	18	28	18	28
		Limit for repeatable peak torque			
Dynamic load rating C	[N]	5,800			
Static load rating C_0	[N]	8,600			

* Values at half-step operation

Order data

Turning unit RDH-S
EC servo motor MD 100
brushless
speed reduction 1:51
with solid shaft
Item no.: 266101 0100

Turning unit RDH-S
Stepper motor
MS 045 HT
Speed reduction 1:51
with solid shaft
Item no.: 266101 0000

Turning unit RDH-S
EC servo motor MD 100
brushless
speed reduction 1:51
with hollow shaft
Item no.: 266111 0100

Turning unit RDH-S
Stepper motor
MS 045 HT
Speed reduction 1:51
with hollow shaft
Item no.: 266111 0000

Technical specifications subject to change.

Accessories

Chuck

3-jaw chuck*
Ø 80
Item no.: **269060 0080**

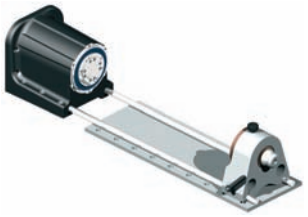
Chuck

4-jaw chuck*
Ø 80
Item no.: **269061 0080**

* Incl. adapter flange

Tailstock unit RE S

for RDH-S
Item no.: **269100 1020** 200 mm
Item no.: **269100 1030** (300 mm)
Item no.: **269100 1040** (400 mm)
Item no.: **269100 1050** (500 mm)



Turning swivel unit

DSH-S

Characteristics

- With precision gear
  - Very resistant and rigid output bearing
  - Zero backlash and high torsional stiffness
- with rotation axisRDH-S
- Speed reduction 1:51
- Servo motor
- Protection category IP 65
- Rustproof finish
- Transmission accuracy <1.5 arcmin
- Repeat accuracy $<\pm 6$ arcsec
- Maintenance-free
- Variable swivel range

Options:
- Stepper motor
- Hollow shaft
- Chuck
- Speed reduction 1:101

Accessories

Chuck

3-jaw chuck*
Ø 80 Item no.: **269060 0080**

Chuck

4-jaw chuck*
Ø 80 Item no.: **269061 0080**

* Incl. adapter flange

Order data

Turning swivel unit DSH-S
Speed reduction 1:51
EC servo motor MD 100
brushless
Item no.: 265411 1000

Turning swivel unit DSH-S
Speed reduction 1:101
EC servo motor MD 100
brushless
Item no.: 265411 0000

Turning swivel unit DSH-S
Speed reduction 1:51
Stepper motor MS 045 HT
Item no.: 265410 1000

Turning swivel unit DSH-S
Speed reduction 1:101
Stepper motor MS 045 HT
Item no.: 265410 0000

Technical specifications subject to change.

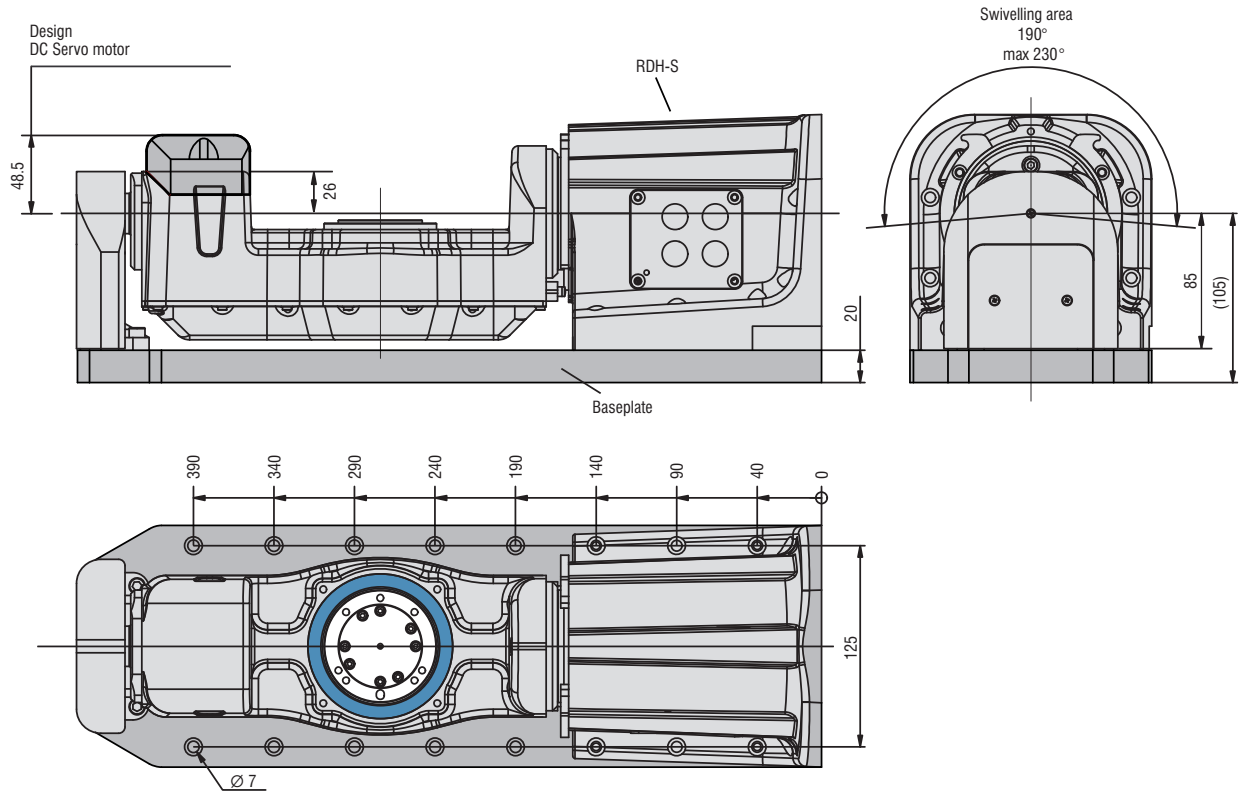
Turning swivel unit DSH-S

Technical specifications

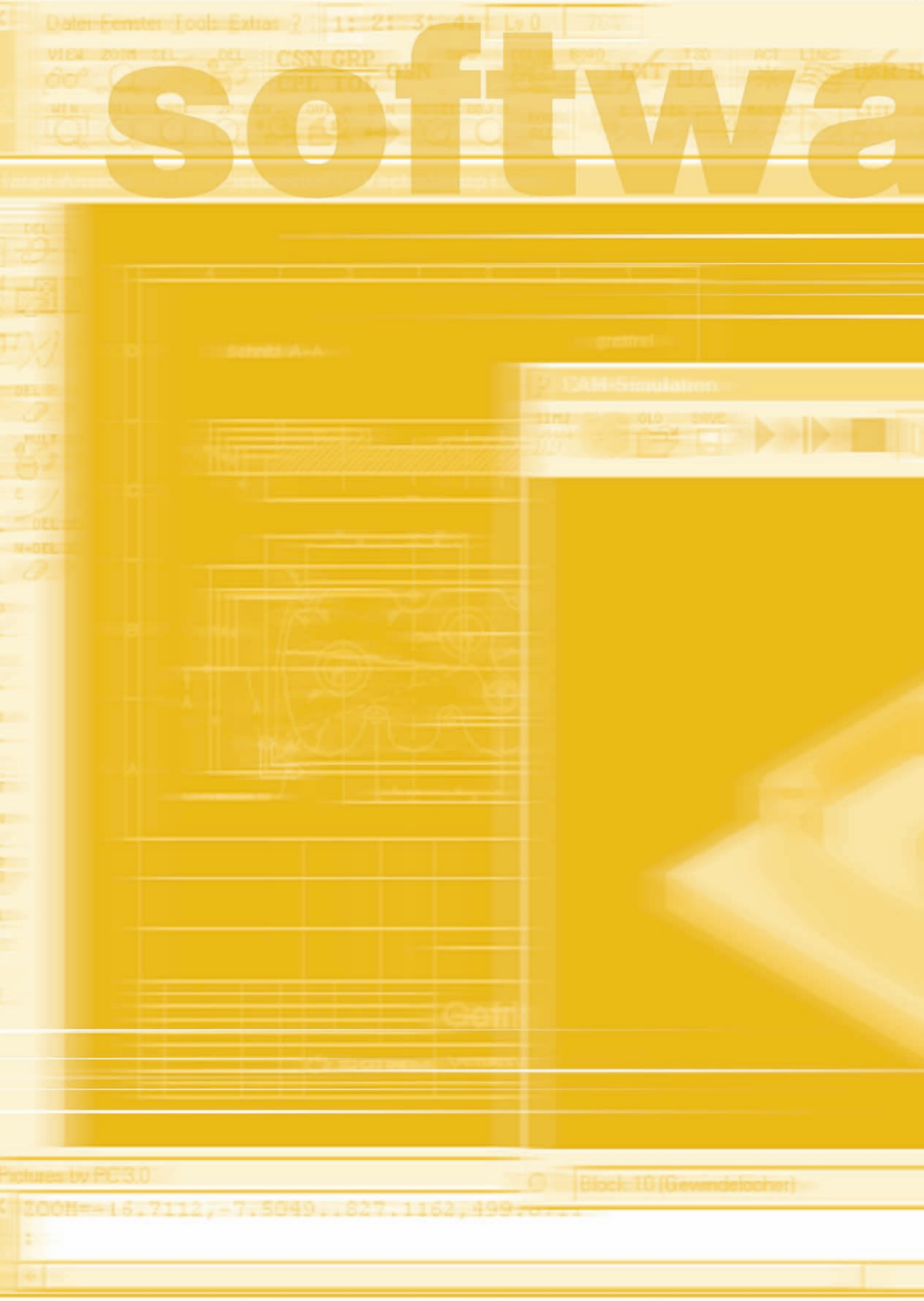
		Stepper motor MS 045 HT *		EC servo motor MD 100 (brushless)	
Reduction gear ratio		1:51	1:101	1:51	1:101
Nominal output speed	[1/min]	4	2	22	11
		at 1,500 Hz (225 1/min)		at 1,100 1/min	
Max. output speed	[1/min]	24	12	59	30
		at 8,000 Hz		--	
Nominal torque	[Nm]	7	11	7	11
		at 1,500 Hz		--	
Max. Torque (temporary)	[Nm]	--	--	7	11
Nominal holding torque (static load)	[Nm]	7	11	7	11
Max. capacity of the drive	[Nm]	18	28	18	28
		Limit for repeatable peak torque			
Dynamic load rating C	[N]	5,800			
Static load rating C0	[N]	8,600			

* Values at half-step operation

Scale drawings



Technical specifications subject to change.

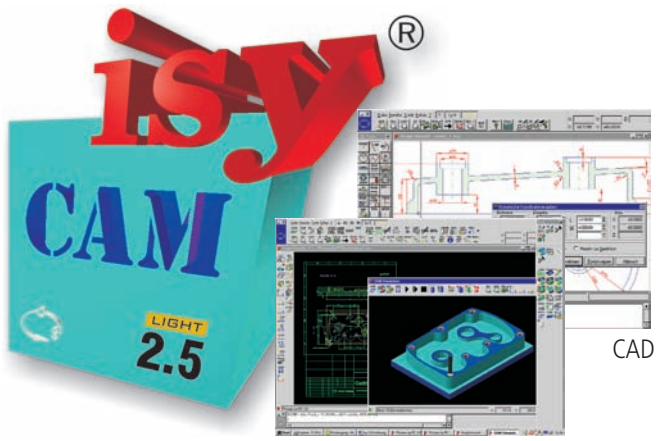

softwa

SOFTWARE

Software for full controls and system solutions

software

isy-CAM 2.5



CAD

CAM

a complete suite with:

- 2D-CAD/Design
- 2.5D-CAM to 3+1 axle
- integrated machine control
- Service

General

The isy-CAM 2.5 provides customers with a Windows®based CAD/CAM suite.
It provides a universal solution from design to production with CNC-machines.
The software package offered is a perfect entry into the world of CAD/CAM. With "windows-like" operation via graphic menus and dialogue boxes.
The **CAD component** features all functions required for design in the area of 2D. The **CAM component** can easily and quickly produce machining data - right from the design data - for the machine control. This machining data can then directly be output to the CNC machine or control via the integrated operating and output software Remote.

Postprocessor functions

- Tool list with selection and specification of the tool geometry
- Immersion versions/ start up strategy
- Automatic residual material processing
- Synchronism / counter-rotation
- Oversize/undersize machining
- Calculation tolerances
- Tool path spacing
- Random determination of processing sequence of technology blocks
- Postprocessor motion for generating the NCP data for 3 axles (X/Y/Z) or cylinder barrel surface with one 4.axle (rotation axis)

Features

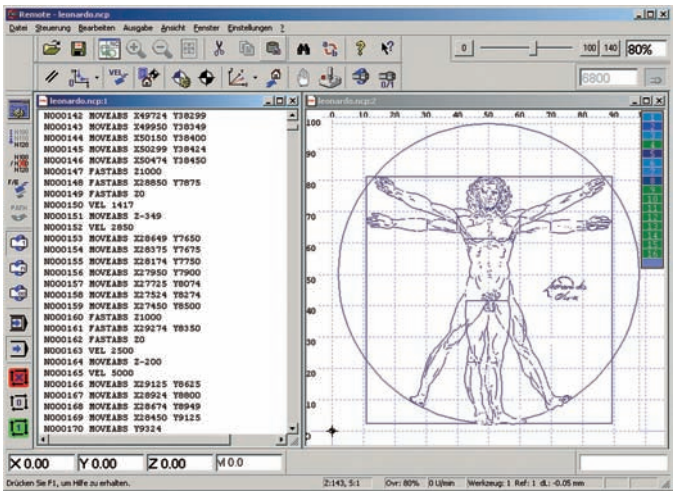
- Any line style and colour
- Integrated online help, customizable user interface
- Parallel and autonomous processing of multiple drawings
- Geometric elements such as dot, lines, ellipses, circles, curves (polygons, splines, Bezier curves, NURBS), polygons, etc.
- Direct use of Windows fonts
- Professional number and text editing functions
- Hatching, any hatching style
- Automatic sort and alignment functions
- Outline & interactively modify contours
- Numerical entry options for absolute, relative and polar coordinates
- Import: DXF, HPGL, AI, EPS, TIFF, BMP, NC, NCP
- Export: DXF, HPGL, AI, WMF, EMF, TIFF, JPG, BMP
- Extensive DIN/ISO-compliant measuring and dimensioning functions
- Trim, cut and stretch curves, conversions of various types of geometries
- Geometry manipulation through shifting and copying as translation, rotation, scale, reflection
- Intelligent object capture
- Optimal verification of calculated NCP-data through integrated online simulation of the tool paths
- Generates machining data for all typical 2D- und 2.5D-manufacturing tasks

Order information

Item no.: **Z13-337030**
isy-CAM 2.5 Plus Software (Windows)

Remote

Control software for Windows



General

Remote is a universal control program for outputting files into the machining- processes milling, boring, bonding, die sinking, appliquéing as well as jet cutting or laser cutting/welding.
Supported file formats are the isel proprietary NCP format (ASCII file with machining data generated by a CAM postprocessor), the isel proprietary CNC format (ASCII files with an expanded format for universal use in the areas process automation, generated by ProNC) as well as the G Code format according to DIN 66025.
Remote is primarily used to control CNC machines in a wide variety of tasks and machining, flexibility is therefore a key feature of the program.
A vast array of options allows it to easily be adapted to the present requirements.

Range of functions

- Support of digital joysticks
- Control panel "File quick selection" for batch production
- Utility milling / batch output with offsets
- Graphic display of the machining file with zero point and dimensions

File formats isel-NCP, DIN66025 / G-Code
- Linear and circular interpolation, helix interpolation, boring cycles
- Access to digital and analogue in- and outputs
- When using a CAN-control: in-/output "On-The-Fly" (without stopping movement) for dosing applications
- Message window, messages in the status line, time delay, entry of variables values
- Definition and utilisation of machine positions (tool zero point, parking position, home position, ...)

Additional functions for file format isel-CNC(ProNC output format)
- Repeat loops, counting loops, unconditional and conditional branch
- Arithmetical and trigonometric functions
- Subprogramming
- Real and character string variables
- Open and save process variables
- Access to user-specific expansions, option of opening the user software

Features

- Runs on Windows operating systems (Windows 2000, XP, Vista)
- Compatible with earlier program versions
- Processing of file formats DIN66025(G code), NCP or CNC
- Immediate execution without converting or translating the file
- Integrated text editor with numerous functions for quick corrections to the existing NC program
- Utilisation of up to 6 interpolating axes (Cartesian coordinate system and 3 auxiliary axes)
- Look-Ahead path processing with CAN control
- Administration of a milling spindle
- 2 I/O units suitable (max. 64 inputs, 64 outputs)
- Signal in- and outputs for process synchronisation
- Manual axis movement via joystick, keyboard and mouse
- Step-by-step processing and system monitoring for start-up
- User interface customisable for easy operation, batch production, handshake with Master-SPS, ...
- Operating panels for movement control, in-/output, spindles and tool change with pushbuttons
- Control panel for max. 6 handling axes autonomous of interpolating axes
- Available in various languages (German, English, French, Hungarian)

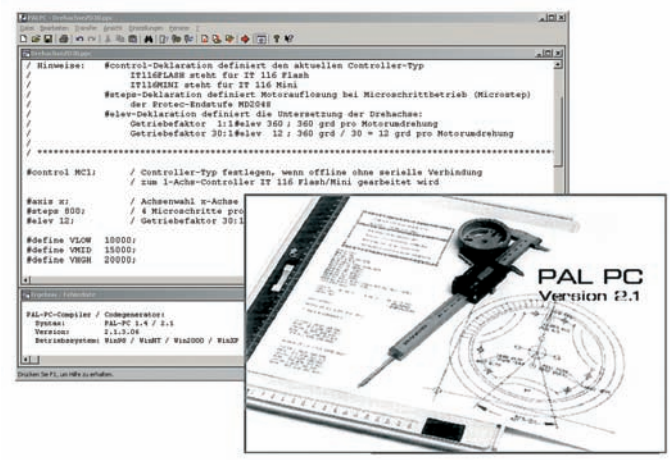
Order information

Item no.: **Z12-334500**
Remote - Software for CAN-CNC controls (Windows)

software

PAL-PC

Process automation software for Windows



General

PAL-PC for quick, easy and cost-efficient execution of automation projects such as handling systems, automatic boring machines, cycle equipment, measuring and testing systems, Automatic machines for single and bath processing and much more....

PAL-PC is a modern program development environment for CNC-stepper motor controllers and CNC machines.

PAL-PC uses the memory operation (CNC mode) of the target controller. PAL-PC is used to create automation solutions where the controller operates in Stand-Alone mode, i.e. independent of a control computer.

PAL-PC runs on the operating systems Windows 2000, XP and Vista

Range of functions

- Path commands for relative and absolute positioning
- Execute movements until events occur at a port
- Teach-In programming (linear)
- Linear 2D-interpolation, reversible to 3D-interpolation
- Circular interpolation
- Analysis of input signals for process control
- Loops for repeating command blocks
- Unconditional and conditional branches
- Analysis of the program selection unit
- Notifications displayed on a screen
- Send and receive synchronisation characters
- Additional tools for automated processing of typical tasks

Order information

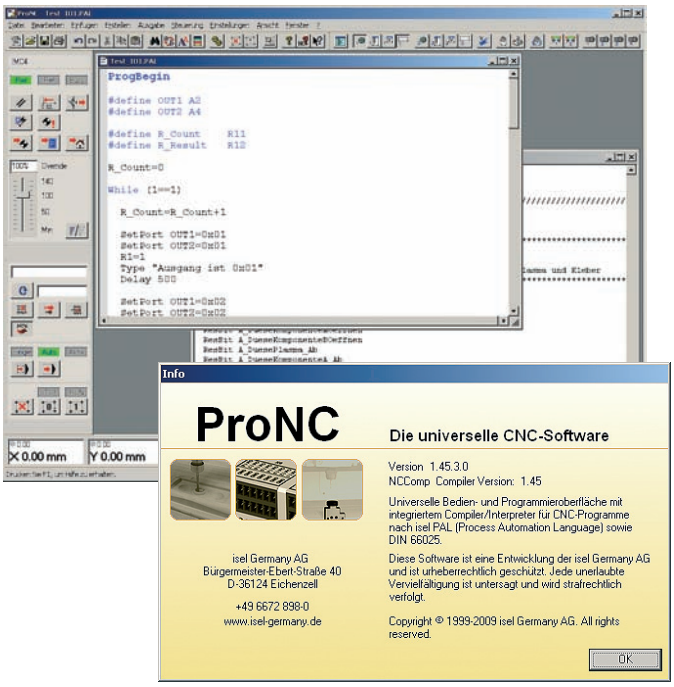
Item no.: **Z11-331810**
PAL-PC - Software for CAN-CNC controls (Windows)

Features

- Compatible with previous versions (PAL-PC program created with a previous version of PAL-PC can be used without making modifications)
- Programming according to isel-PAL or DIN66025: In addition to the PAL format, users who are familiar with programming according to DIN66025 can also create their PAL-PC applications with the respective G-code commands.
- Integrated editor: Quick and easy editing of source text, editing functions such as “Find”, “Replace”, “Copy” and “Insert”
- Automated code generation, multiple undo/redo for efficient program creation
- PAL-PC can (depending on the type of controller used) route controllers with up to 4 axes
- Terminal for direct communication with the control
- Download externally created CNC programs
- Automatic determination of type and transmission rate of the connected controller
- Display of compiler errors and navigation to the error in the source code
- Command quick overview with optional insert into the program
- Teach-In programming via keyboard or mouse
- Target positions transferred into the editor as formatted source code
- Real-time display of current input statuses
- Set outputs during programming
- Available in German and English

ProNC

Process automation software for Windows



General

The basis of any automation solution is a powerful software to aid in quickly and easily implementing the tasks at hand into practical solutions. Here the control and programming interface ProNC lends itself as an ideal solution.

ProNC runs on the operating systems Windows 2000, XP and Vista
ProNC is available for numerous controls and controllers by isel
ProNC Applications can be created according to isel-PAL or DIN66025

ProNC is perfectly suited for automation solutions in the areas of milling, boring, dosing, assembly, handling, feeding and quality control, where the user programs are primarily created in text form through the use of Teach-In functions as well as the integration of contour datasets (e. g. NCP format).

Range of functions

- Path commands for relative and absolute positioning of the interpolating axes
- Program additional axes in handling mode
- Circular interpolation, helix interpolation, boring cycles
- Repeat loops, counting loops, unconditional and conditional branches
- Numerous mathematical and trigonometric functions
- Subprogramming, symbolic variable
- Real and character string variables
- Message window, messages in the status line
- Open and save process variables
- Access to digital + analogue in- and outputs
- "On-The-Fly" In-/Outputs (without stopping movement) for dosing applications
- Access to user-specific expansion DLLs (Dynamic Link Libraries)
- Easy debug support (interruption points, monitoring of status and variable)

Order information

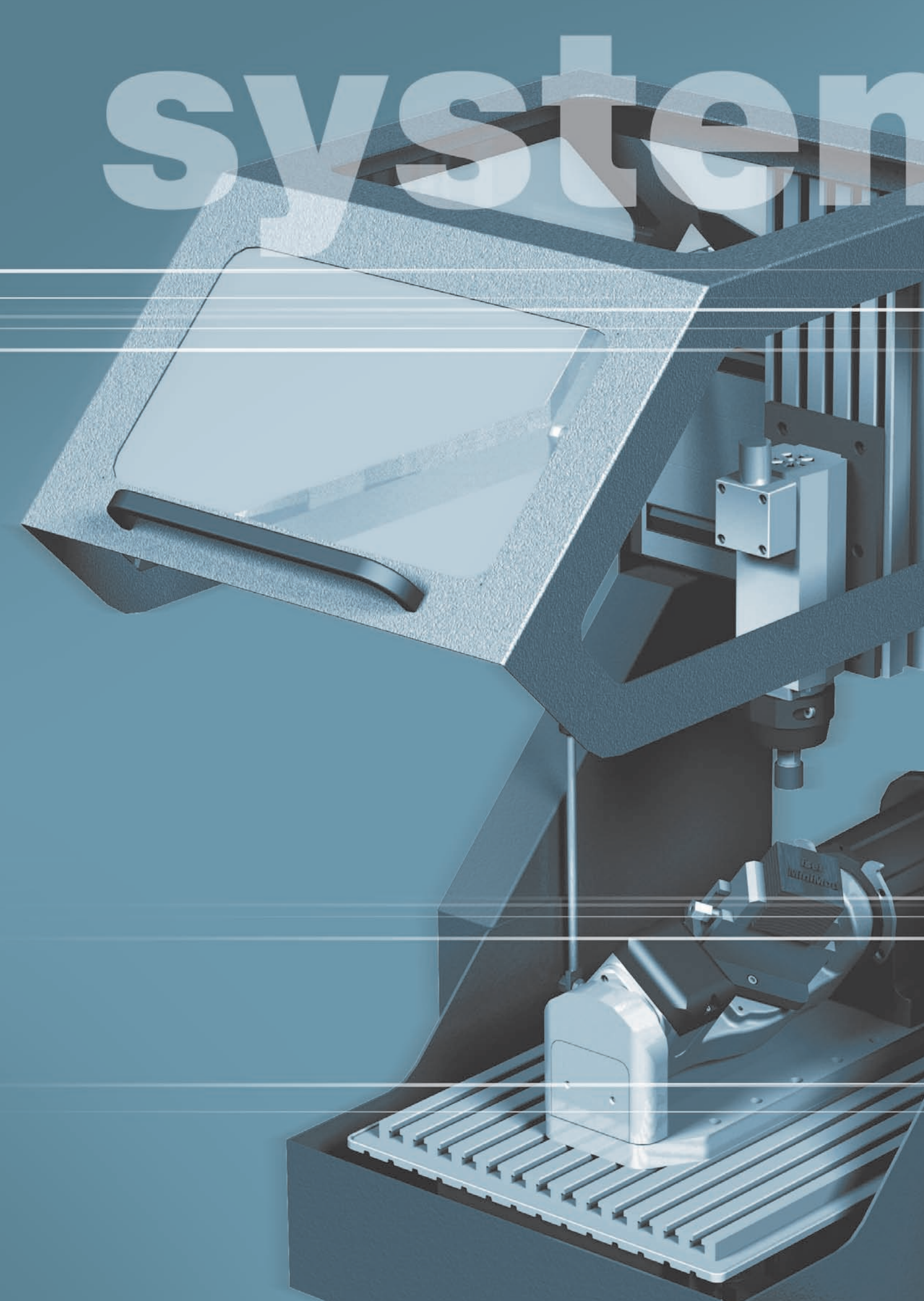
Item no.: **Z11-333500**
ProNC - Software for CAN-CNC controls (Windows)

Training and application solutions available upon request!

Features

- Programming according to DIN66025 (G-codes) or isel-PAL
- Compatible with previous program versions (ProDIN, ProPAL)
- Integrated text editor with numerous functions for quick and efficient editing of the source code
- Import of geometric data (NCP, e.g. from isy-CAD/CAM)
- Use of up to 6 interpolating axes and up to 6 handling axes (with CAN controller)
- Look-Ahead path processing with CAN control
- Suitable for up to 4 spindle motors
- Suitable for up to 4 I/O units (max. 64 inputs, 64 outputs)
- Signal in- and outputs for process synchronisation
- Teach-In with joystick, keyboard and mouse
- Offline programming with simulation modules
- Step-by-step processing, stops and system monitoring for start-ups
- Individually upgradeable with software libraries
- Operating panels for movement control, in-/output, spindles and tool change with pushbuttons
- Control panel for max. 6 handling axes autonomous of interpolating axes
- Available in German and English

Current information available at www.software-en.isel.com


syste

SYSTEMS

CNC Machines

Overview

CNC Machines

Overview

CNC machine
with step controller

ICP

Illustration: **ICP 4030**

General

CNC machines of the series **ICP** are tried and tested, wired ready for mains connection, 3-D compatible CNC machines with high operating comfort for a multitude of automatable task at an ideal price/performance ratio.

The basis is a chassis made of powder-coated steel panel elements.

The design provides for high precision during the set-up of the machine as well as ease of maintenance . The resonance and vibration behaviors of the machine series is optimized and thereby reaches as low noise emission.

The machines can be easily operated while in seating position with the help of a sliding door. This allows for shorter cycle times when opening the hood and thereby increases profitability.

The clearance free ball screw used in the linear axes ensure high precision, accuracy and quiet running. The high torque stepper motors of the axes drive are ideally adjusted to the mechanics, control and software.

The controller with 4-axis micro step control, integrated into the CNC machine, is easily accessible for easy maintenance via a removable rear panel.

The CNC machine **ICP** has a fixed portal area, the machine table with the thereon attached workpiece is moved during the machining process.

CNC machine
with step controller

ICP

Applications

ICP®-CNC Machines
are the basis for the set-up
of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and Fastening
- Buring and polishing
- Forming and modeling
- Bonding and casting
- Soldering and welding
- Measuring and testing
- Scanning

... etc.

Options

For **ICP**®-CNC Machines
special devices and tools for different
requirements and applications are
available:

- Drilling and milling spindle
- Engraving spindle
- Frequency converter
- Tool changer
- Cooling/spraying device
- Rotary unit
- T-Groove table milled
- Extraction
- Vacuum clamping plates

- FlatCom
- CNC Joystick
- I/O Module
- Applications

We are able to design and manufacture for OEM customers, in collaboration, special machines.

Technical Data

	ICP 4030	ICP 3020
Traversing range X/Y/Z (mm)	400 x 300 x 140	300 x 200 x 90
Table clamping area WxD (mm)	600 x 375	500 x 250
Opening (mm)	170	115
Dimensions WxDxH (mm)	780 x 850 x 810	610 x 650 x 715
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable	
Process speed X/Y/Z (mm/s)	60	
Repeat accuracy (mm)	≤ 0,02	
Drive motors	Stepper motors	
Drive elements X/Y/Z	Ball screw drive, clearance free adjustable	
Control	Step controller iMC-M with 4 final stages 36V/3,5A and power supply 200W with CPU board, alternatively with clock direction interface module Step controller iMC-M with 4 final stages 48V/4.2A and power supply 500W with CPU board, alternatively with clock direction interface module	
Operation	Function keys and Emergency OFF	
Software	PAL-PC, Remote, Windows, ProNC, isy-CAD/CAM, Galaad, Win PC-NC, EdiTask, EMC (Linux)	
Weight (kg) *	approx. 120	approx. 102
Item no.: Series M (with iMC-M) *	280220 2405	280210 2406
Item no.: Series M (with iMC-MP) *	280220 7405	280210 7406

Subject to technical changes.

Updated information available at www.systems.isel.com

CNC machine
with step controller

MiniMod®
Series M / P

Illustration:
MiniMod M/P 20
With protective cover, milling spindle and rotary unit

Illustration:
MiniMod M/P 60
with milling spindle

General

MiniMod®-CNC machines are set-up modular, with high operating comfort for a multitude of automatable tasks at an ideal price/performance ratio.

The basis is a a sturdy aluminum steel frame with linear units. The clearance free ball screws used in the linear axes ensure high precision, accuracy and smooth running.

MiniMod®-CNC machines are available as compact units in 4 standard sizes with traverse paths of

X = 300 mm,
Y = 200 / 400 / 600 / 800 mm,
Z = 150 mm

in an open design and with a traverse path of Y = 200 mm in a closed design (with protective cover).

The linear units with stepper motors are ideally adjusted to the control and the software. The stepper motor controller of the **MiniMod®** with safety circuit is located in the right inductor.

The M series contains the Step Controller iMC-M, the P series the Step Controller iMC-MP. (refer to section "Controls".)

Operation is done from the front with function keys.

For all CNC machines (standard color: grey) extensive accessories and software applications as well as designs with other traverse ranges are available.

CNC machine
with step controller

MiniMod® Series M / P

Applications

MiniMod®-CNC Machines are the basis for the set-up of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and fastening
- Buring and polishing
- Forming and modeling
- Bonding and casting
- Soldering and welding
- Measuring and testing
- Scanning

... etc.

Options

For **MiniMod®**-CNC Machines special devices and tools for different requirements and applications are available:

- Drilling and milling spindle
- Frequency converter
- Tool changer
- Cooling/spraying device
- Rotary unit
- T-Groove table milled
- Extraction
- Vacuum clamping plates
- FlatCom
- Protective cover
- CNC Joystick
- I/O Module
- Applications

We are able to design and manufacture for OEM customers, in collaboration, special machines.

Technical Data

	MiniMod M/P 20	MiniMod M/P 40	MiniMod M/P 60	MiniMod M/P 80
Traversing range X/Y/Z (mm)	300 x 200 x 150	300 x 400 x 150	300 x 600 x 150	300 x 800 x 150
Table clamping area WxD (mm)	325 x 500	325 x 700	325 x 900	325 x 1100
Opening (mm)	250			
Dimensions WxDxH (mm)	640 x 500 x 715	640 x 700 x 715	640 x 900 x 715	640 x 1100 x 715
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable			
Process speed X/Y/Z (mm/s)	50/100			
Repeat accuracy (mm)	≤ 0,02			
Drive motors	Stepper motors			
Drive elements X/Y/Z	Ball screw drive, clearance free adjustable			
Control	Step controller iMC-M with 4 final stages 36V/3,5A and power supply 200W with CPU board, alternatively with clock direction interface module Step controller iMC-M with 4 final stages 48V/4.2A and power supply 500W with CPU board, alternatively with clock direction interface module			
Operation	Function key, Emergency OFF (optional: control panel)			
Software	PAL-PC, Remote, Windows, ProNC, isy-CAD/CAM, Galaad, Win PC-NC, EdiTask, EMC (Linux)			
Weight (kg) *	approx. 90	approx. 95	approx. 100	approx. 105
Item no.: Series M (with iMC-M) *	281010 0001	281010 0002	281010 0003	281010 0004
Item no.: Series P (with iMC-MP) *	281010 0101	281010 0102	281010 0103	281010 0104

* without protective cover

Technical specifications subject to change.

Updated information available at www.systems.isel.com

CNC machine
with step controller

MiniFLAT®
Series M / P

Illustration:
MiniFlat M/P 40
with frame, protective cover
Milling spindle and control panel

Illustration:
MiniFlat M/P 20
with milling spindle

General

MiniFlat® CNC machines are set-up modular (with and without baseframe), with high operating comfort for a multitude of automatable tasks and applications at an ideal price/performance ratio.

The basis is a a sturdy aluminum steel frame with linear units. The clearance free ball screws used in the linear axes ensure high precision, accuracy and smooth running.

MiniFlat®-CNC machines are available as compact units in 4 standard sizes with traverse paths of

X = 300 mm,
Y = 200 / 400 / 800 / 1.000 mm,
Z = 150 mm

in open and closed design (with protective cover).

The linear units with stepper motors are ideally adjusted to the control and the software. The stepper motor controller with safety circuit is located at the back side of the **MiniFlat®**.

The M series contains the Step Controller iMC-M, the P series the Step Controller iMC-MP. (refer to section “Controls”.)

Operation is done from the front with function keys or optionally with the control panel.

For all CNC machines (standard color: grey) extensive accessories and software applications as well as designs with other traverse ranges are available.

Technical specifications subject to change.

CNC machine
with step controller

MiniFLAT® Series M / P

Applications

MiniFlat®-CNC Machines are the basis for the set-up of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and fastening
- Buring and polishing
- Bonding and casting
- Soldering and welding
- Measuring and testing
- Scanning

... etc.

Options

For **MiniFlat®**-CNC Machines special devices and tools for different requirements and applications are available:

- Drilling and milling spindle
- Frequency converter
- Tool changer
- Cooling/spraying device
- Rotary unit
- T-Groove table milled
- Extraction
- Vacuum clamping plates
- FlatCom
- Baseframe
- Protective cover
- CNC Joystick
- I/O Module
- Applications
- Control panel

We are able to design and manufacture for OEM customers, in collaboration, special machines.

Technical Data

	MiniFLAT M/P 20	MiniFLAT M/P 40	MiniFLAT M/P 80	MiniFLAT M/P 100
Traversing range X/Y/Z (mm)	300 x 200 x 150	300 x 400 x 150	300 x 800 x 150	300 x 1000 x 150
Table clamping area WxD (mm)	325 x 600	325 x 800	325 x 1200	325 x 1400
Opening (mm)	200			
Dimensions WxDxH (mm)	750 x 630 x 700	750 x 830 x 700	750 x 1230 x 700	750 x 1430 x 700
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable			
Process speed X/Y/Z (mm/s)	50/100			
Repeat accuracy (mm)	≤ 0,02			
Drive motors	Stepper motors			
Drive elements X/Y/Z	Ball screw drive, clearance free adjustable			
Control	Step controller iMC-M with 4 final stages 36V/3,5A and power supply 200W with CPU board, alternatively with clock direction interface module Step controller iMC-M with 4 final stages 48V/4.2A and power supply 500W with CPU board, alternatively with clock direction interface module			
Operation	Function key, Emergency OFF (optional: control panel)			
Software	PAL-PC, Remote, Windows, ProNC, isy-CAD/CAM, Galaad, Win PC-NC, EdiTask, EMC (Linux)			
Weight (kg) *	approx. 60	approx. 66	approx. 78	approx. 84
Item no. M Series (with iMC-M) *	281110 0001	281110 0002	281110 0003	281110 0004
Item no. P Series (with iMC-MP) *	281110 0101	281110 0102	281110 0103	281110 0104

* without base frame, without protective cover

Technical specifications subject to change.

Updated information available at www.systems.isel.com

CNC machine
with step controller

FlatCom®
Series P

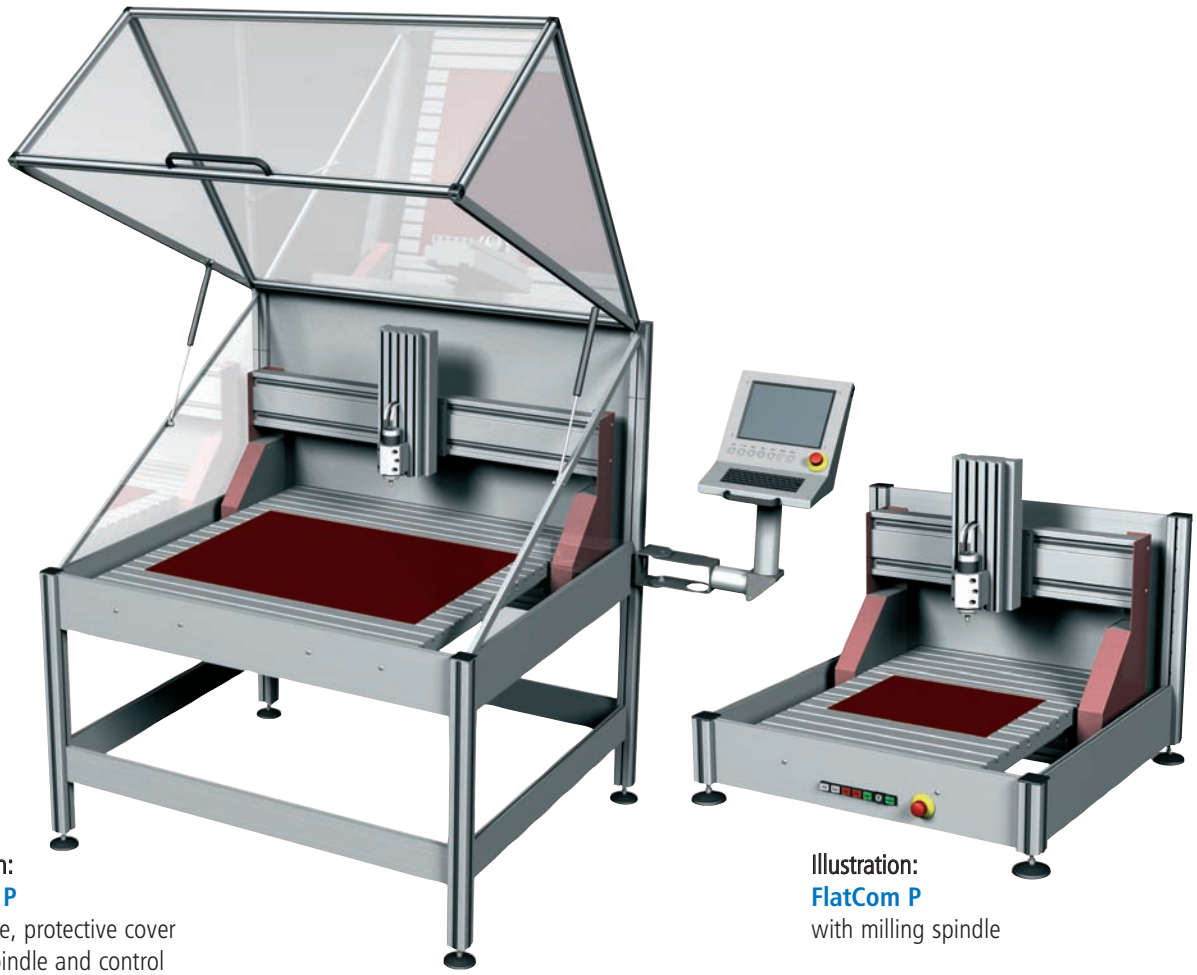


Illustration:
FlatCom P
with frame, protective cover
Milling spindle and control panel

Illustration:
FlatCom P
with milling spindle

General

FlatCom®-CNC machines are set-up modular (with and without baseframe), with high operating comfort for a multitude of automatable tasks and applications at an ideal price/performance ratio.

The basis is a a sturdy aluminum steel frame with linear units. The clearance free ball screws used in the linear axes ensure high precision, accuracy and smooth running.

FlatCom®-CNC machines are available as compact units in 4 standard sizes with traverse paths of

X = 400 / 800 mm,
Y = 300 / 600 / 600 / 1.200 mm,
Z = 150 mm

in open and closed design with protective cover.

The linear units with stepper motors are ideally adjusted to the control and the software. The stepper motor controller with safety circuit is located at the back side of the **FlatCom®**.

The P series has the step controller iMC-MP. (refer to section "Controls".)

Operation is done from the front with function keys or optionally with the control panel.

For all CNC machines (standard color: grey) extensive accessories and software applications as well as designs with other traverse ranges are available.

Technical specifications subject to change.

CNC machine
with step controller

FLATCOM® Series P

Applications

Flat-Com®-CNC machines of the P series are the basis for the set-up of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and fastening
- Buring and polishing
- Bonding and casting
- Soldering and welding
- Measuring and testing
- Scanning and scaling

... etc.

Options

For **Flat-Com®**- CNC machines of the A series have special devices and tools for different requirements and applications are available:

- Drilling and milling spindle
- Frequency converter
- Tool changer
- Cooling/spraying device
- Rotary unit
- T-Groove table milled
- Extraction
- Vacuum clamping plates
- FlatCom
- Baseframe
- Protective cover
- CNC Joystick
- I/O Module
- Applications
- Control panel

We are able to design and manufacture for OEM customers, in collaboration, special machines.

Technical Data

	FLATCOM P 30	FLATCOM P 60	FLATCOM P 70	FLATCOM P 120
Traversing range X/Y/Z (mm)	400 x 300 x 150	400 x 600 x 150	800 x 600 x 150	800 x 1,200 x 150
Table clamping area WxD (mm)	550 x 750	550 x 1,000	950 x 1,000	950 x 1,750
Opening (mm)	200			
Dimensions WxDxH (mm) without base frame with base frame	850 x 820 x 730 850 x 820 x 1,310	850 x 1,070 x 730 850 x 1,070 x 1,310	1,250 x 1,070 x 730 1,250 x 1,070 x 1,310	1,250 x 1,820 x 730 1,250 x 1,820 x 1,310
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable			
Process speed X/Y/Z (mm/s)	100			
Repeat accuracy (mm)	≤ 0,02			
Drive motors	Stepper motors			
Drive elements X/Y/Z	Ball screw drive, clearance free adjustable			
Control	Step controller iMC-M with 4 final stages 48V/4.2A and power supply 500W with CPU board, alternatively with clock direction interface module			
Operation	Function key, Emergency OFF (optional: control panel)			
Software	PAL-PC, Remote, Windows, ProNC, isy-CAD/CAM, Galaad, Win PC-NC, EdiTask, EMC (Linux)			
Weight without base frame (kg) *	approx.110	approx. 120	approx. 170	approx. 255
Item no. **without base frame*** **with base frame***	275409 55665 275408 55665	275419 55665 275418 55665	275429 55665 275428 55665	275439 55665 275438 55665

* without protective cover

Technical specifications subject to change.

Updated information available at www.systems.isel.com

CNC machine
with servo controller

ICV 4030

Figure: ICV 4030

General

CNC basis machines of the series **ICV** are tried and tested, wired ready for mains connection, 3-D compatible CNC machines with high operating comfort for a multitude of automatable task at an ideal price/performance ratio.

The basis is a chassis made of powder-coated steel panel elements. The design layout provides for high precision during the set-up of the machine as well as ease of maintenance. The resonance and vibration behaviors of the machine series is optimized and thereby reaches a low noise emission.

The machines can be easily operated while in seating position with the help of a sliding door. This allows for shorter cycle times when opening the hood and thereby increases profitability.

The clearance free ball screw used in the linear axes ensure high precision, accuracy and quiet running. The DC servo motors of the axis drive are ideally adjusted to the mechanics, control and software.

The servo controller with CAN-BUS integrated into the CNC machine, is easily via accessible for maintenance via the rear panel.

The CNC machine **ICV** has a fixed portal area, the machine table with the thereon attached workpiece is moved during the machining process.

CNC Machine
with servo controller

ICV 4030

Applications

The company **ICV4030**®CNC Machine are the basis for the set-up of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and Fastening
- Buring and polishing
- Forming and modeling
- Bonding and casting
- Soldering and welding
- Measuring and testing
- Scanning

... etc.

Options

For **ICV4030**®CNC Machine special devices and tools for different requirements and applications are available:

- Drilling and milling spindle
- Engraving spindle
- Cooling/spraying device
- Frequency converter
- Tool changer
- Rotary unit
- Rotary / swivel unit
- T-Groove table milled
- Extraction
- Vacuum clamping plates
- Pneumatic accessories
- CNC Joystick
- I/O Module
- Applications

We are able to design and manufacture for OEM customers, in collaboration, special machines.

Technical specifications

	ICV 4030
Traversing range X/Y/Z (mm)	395 x 300 x 100
Table clamping area WxD (mm)	600 x 375
Opening (mm)	150
Dimensions WxDxH (mm)	771 x 835 x 806
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable
Process speed X/Y/Z (mm/s)	250
Repeat accuracy (mm)	≤ 0,02
Drive motors	DC servo motors
Drive elements X/Y/Z	Ball screw drive, adjustable backlash-free
Control	CAN controller iMC with 3 drive regulators CAN PC (computer with I/O module) safety circuit and zero speed monitoring Power supply 48 V / 500 W
Operation	Function key and Emergency OFF
Software	Remote optional: Windows, ProNC, isy-CAD/CAM
Weight (kg) *	approx. 150
Item no.*	**280230 4405**

Technical specifications subject to change.

Updated information available at www.systems.isel.com

CNC Machine
with servo controller

MiniMod® Series V

Figure:
MiniMod V 20
with protective cover, milling spindle and rotary / swivel unit

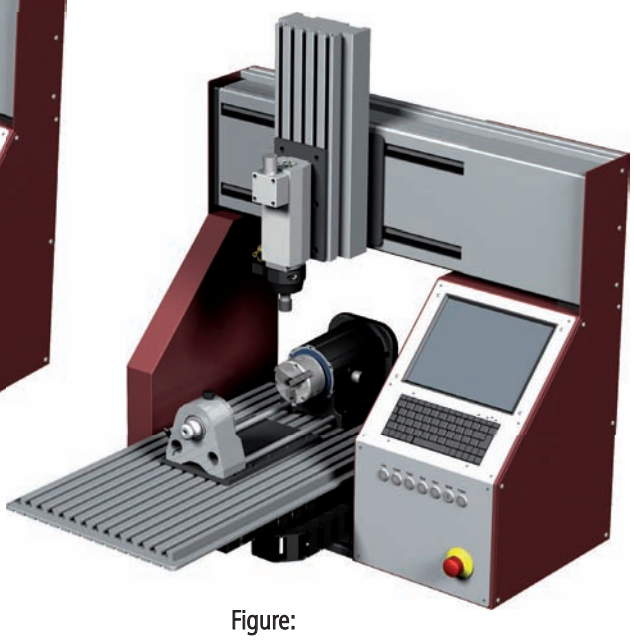


Figure:
MiniMod V 60
with milling spindle and rotary axis RDH-S with tailstock

General

MiniMod® CNC machines are set-up modular, with high operating comfort for a multitude of automatable tasks at an ideal price/performance ratio.

The basis are sturdy aluminum steel frames with linear units. The clearance free ball screws used in the linear axes ensure high precision, accuracy and smooth running.

MiniMod®-CNC machines are available as compact units in 4 standard sizes with traverse paths of

X = 300 mm,
Y = 200 / 400 / 600 / 800 mm,
Z = 200 mm

in open and closed design with protective cover.

The linear units with DC servo motors (max. 5 axes) are respectively adjusted to the mechanics, control and software.

The controller of the **MiniMod®** with safety circuit and and zero speed monitor that is located in the right inductor. Operation is via a control panel with 10" monitor, touchscreen and keyboard.

On the **MiniMod®** the portal area is fixed and the thereon attached workpiece is moved on the machining table.

For all CNC machines (standard color: grey) extensive accessories and software applications as well as designs with other traverse ranges are available.

Technical specifications subject to change.

CNC Machine
with servo controller

MiniMod® Series V

Applications

MiniMod®-CNC Machines are the basis for the set-up of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and Fastening
- Buring and polishing
- Forming and modeling
- Bonding and casting
- Soldering and welding
- Measuring and testing
- Scanning

... etc.

Options

For **MiniMod®**-CNC Machines special devices and tools for different requirements and applications are available:

- Drilling and milling spindle
- Frequency converter
- Tool changer
- Cooling/spraying device
- Rotary unit
- Rotary / swivel unit
- T-Groove table milled
- Extraction
- Vacuum clamping plates
- Pneumatic accessories
- Protective cover
- CNC Joystick
- I/O Module
- Applications

We are able to design and manufacture for OEM customers, in collaboration, special machines.

Technical specifications

	MiniMod® V 20	MiniMod® V 40	MiniMod® V 60	MiniMod® V 80
Traversing range X/Y/Z (mm)	300 x 200 x 200	300 x 400 x 200	300 x 600 x 200	300 x 800 x 200
Table clamping area WxD (mm)	325 x 500	325 x 700	325 x 900	325 x 1100
Opening (mm)	300			
Dimensions WxDxH (mm)	805 x 500 x 815	805 x 700 x 815	805 x 900 x 815	805 x 1,100 x 815
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable			
Process speed X/Y/Z (mm/s)	250			
Repeat accuracy (mm)	≤ 0,02			
Drive motors	DC servo motors			
Drive elements X/Y/Z	Ball screw drive, adjustable backlash-free			
Control	CAN controller iMC with 3 drive regulators (max.5) CAN PC (computer with I/O module) safety circuit and zero speed monitoring Power supply 48 V / 500 W			
Operation	CNC control panel, 10" monitor with touchscreen, keyboard, function keys and emergency OFF			
Software	Remote optional: Windows, ProNC, isy-CAD/CAM			
Weight (kg) *	approx. 100	approx. 105	approx. 110	approx. 115
Item no.*	**281000 0205**	**281000 0206**	**281000 0207**	**281000 0208**

* without protective cover

Technical specifications subject to change.

Updated information available at www.systems.isel.com

CNC Machine
with servo controller

EuroMod®

Figure: **EuroMod**
with milling spindle
and open sliding door

General

EuroMod®-CNC machines are set-up modular, with high operating comfort for a multitude of automatable tasks at an ideal price/performance ratio.

The basis is a a sturdy aluminum steel frame with linear units. The clearance free ball screw used in the linear axes ensure high precision, accuracy and quiet running.

EuroMod®-CNC machines are available as compact units in 4 standard sizes with traverse paths of

X = 650 / 1,000 mm,
Y = 300 / 450 / 650 / 1,200 mm,
Z = 250 mm

in open and closed design with sliding door and transparent cover.

The DC servo motors for the 3 axis (max. 5 axis) are ideally adjusted to the mechanics, control and software.

The controller of the **EuroMod**® with safety circuit and zero speed monitor is located at an integrated control cabinet. Operation is via a control panel with 17" monitor with touchscreen, keyboard and mouse.

On the **EuroMod**® the portal area is fixed and the thereon attached workpiece is attached on the movable machining table.

For all CNC machines (standard color: grey) extensive accessories and software applications as well as designs with larger traverse ranges are available.

Technical specifications subject to change.

CNC Machine
with servo controller

EuroMod®

Applications

EuroMod®-CNC Machines are the basis for the set-up of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and Fastening
- Buring and polishing
- Forming and modeling
- Bonding and casting
- Soldering and welding
- Measuring and testing
- Scanning and scaling
- Sawing and cutting

... etc.

Options

For **EuroMod**®-CNC Machines special devices and tools for different requirements and applications are available:

- Drilling and milling spindle
- Frequency converter
- Tool changer
- Cooling/spraying device
- Rotary unit
- T-Groove table milled
- Extraction
- Protective cover
- Vacuum clamping plates
- Pneumatic accessories
- CNC Joystick
- I/O Module
- Applications
- Direct drives

We are able to design and manufacture special machines.

Technical specifications

	EuroMod MP 30	EuroMod MP 45	EuroMod MP 65	EuroMod MP 120
Traversing range X/Y/Z (mm)	650/300/250	650/450/250	1000/650/250	1000/1200/250
Table clamping area WxD (mm)	900x350	900x500	1,200x700	1,200x1,250
Opening (mm)	350			
Dimensions WxDxH (mm)	1,160x800x1700	1,160x1,110x1,700	1,480x1,510x1,700	1,480x2,610x1,700
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable			
Process speed X/Y/Z (mm/s)	250			
Repeat accuracy (mm)	≤ 0,02			
Drive motors	DC servo motors, 48 V			
Drive elements X/Y/Z	Ball screw assemblies adjustable backlash-free			
Control	CAN controller iMC with 3 drive regulators CAN PC (computer with I/O module) safety circuit with zero speed monitoring Power supply 48 V / 1,000 W			
Operation	CNC Control Panel 17" mit Touchscreen, Tastatur und Maus			
Weight (kg)	approx. 250	approx. 280	approx. 375	approx. 475
Software	Windows, ProNC, isy CAD-CAM			
Item no.	275133 33665	275143 33665	275153 33665	275163 33665

Technical specifications subject to change.

Updated information available at www.systems.isel.com

CNC Machine
with servo controller

FlatCom®
Series M

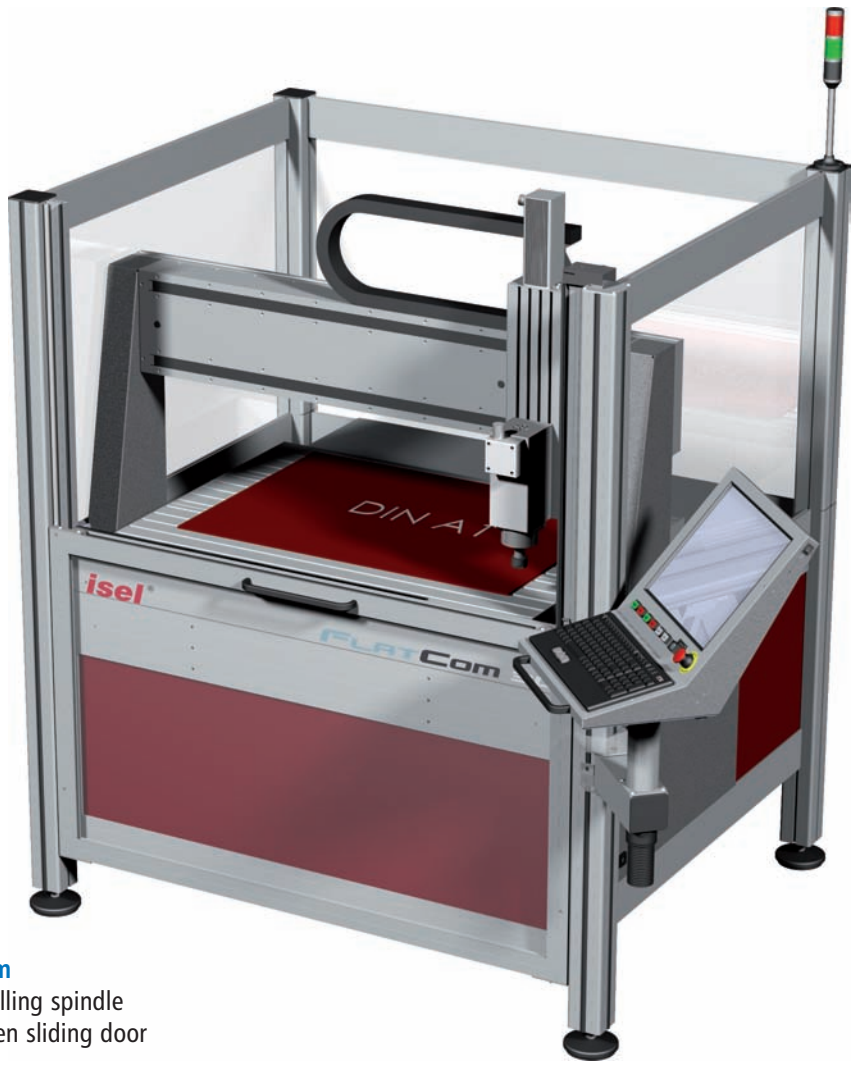


Figure: **FlatCom**
with milling spindle
and open sliding door

General

FlatCom®-CNC machines are set-up modular, with high operating comfort for a multitude of automatable tasks at an ideal price/performance ratio.
The basis is a a sturdy aluminum steel frame with linear units. The clearance free ball screw used in the linear axes ensure high precision, accuracy and quiet running.

FlatCom®-CNC machines are available as compact units in 4 standard sizes with traverse paths of

X = 550 / 900 mm,
Y = 350 / 650 / 950 / 1250 mm,
Z = 200 mm

in open and closed design with sliding door and transparent cover.

The DC servo motors of the 3 axis (max. 4 axis) are ideally adjusted to the mechanics, control and software.

The controller of the **FlatCom®** with safety circuit and zero speed monitor is located at an integrated control cabinet. Operation is via a control panel with 17" monitor with touchscreen, keyboard and mouse.

On the **FlatCom®** the portal area is fixed and the thereon attached workpiece is moved on the fixed machining table.

For all CNC machines (standard color: grey) extensive accessories and software applications as well as designs with larger traverse ranges are available.

CNC Machine
with servo controller

FlatCom® Series M

Applications

FlatCom®-CNC Machines are the basis for the set-up of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and Fastening
- Buring and polishing
- Forming and modeling
- Bonding and casting
- Soldering and welding
- Measuring and testing
- Scanning and scaling
- Sawing and cutting

... etc.

Options

For **FlatCom®**-CNC Machines special devices and tools for different requirements and applications are available:

- Drilling and milling spindle
- Frequency converter
- Tool changer
- Cooling/spraying device
- Rotary unit
- T-Groove table milled
- Extraction
- Protective cover
- Vacuum clamping plates
- Pneumatic accessories
- CNC Joystick
- I/O Module
- Applications
- Direct drives

We are able to design and manufacture special machines.

Technical specifications

	FlatCom M 35	FlatCom M 65	FlatCom M 95	FlatCom M 125
Traversing range X/Y/Z (mm)	550x350x200	550x650x200	900x950x200	900x1,250x200
Table clamping area WxD (mm)	700x500	700x750	1,050x1,000	1,050x1,500
Opening (mm)	250			
Dimensions WxDxH (mm)	1,160x900x1,700	1,160x1,200x1,700	1,480x1,500x1,700	1,480x1,800x1,700
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable			
Process speed X/Y/Z (mm/s)	≤ 250			
Repeat accuracy (mm)	≤ 0,02			
Drive motors	Servo motors			
Drive elements X/Y/Z	Ball screw assemblies adjustable backlash-free			
Control	CAN controller iMC with 3 drive regulators CAN PC computer with I/O module safety circuit with zero speed monitoring Power supply 48 V / 1,000 W			
Operation	CNC Control Panel 17" mit Touchscreen, Tastatur und Maus			
Software	Windows, ProNC, isy CAD-CAM			
Weight (kg)	300	350	450	525
Item no.	**275303 32665**	275313 32665	275323 32665	275333 32665

Technical specifications subject to change.

Updated information available at www.systems.isel.com

CNC Machine
with servo controller

FLATCOM® Series L

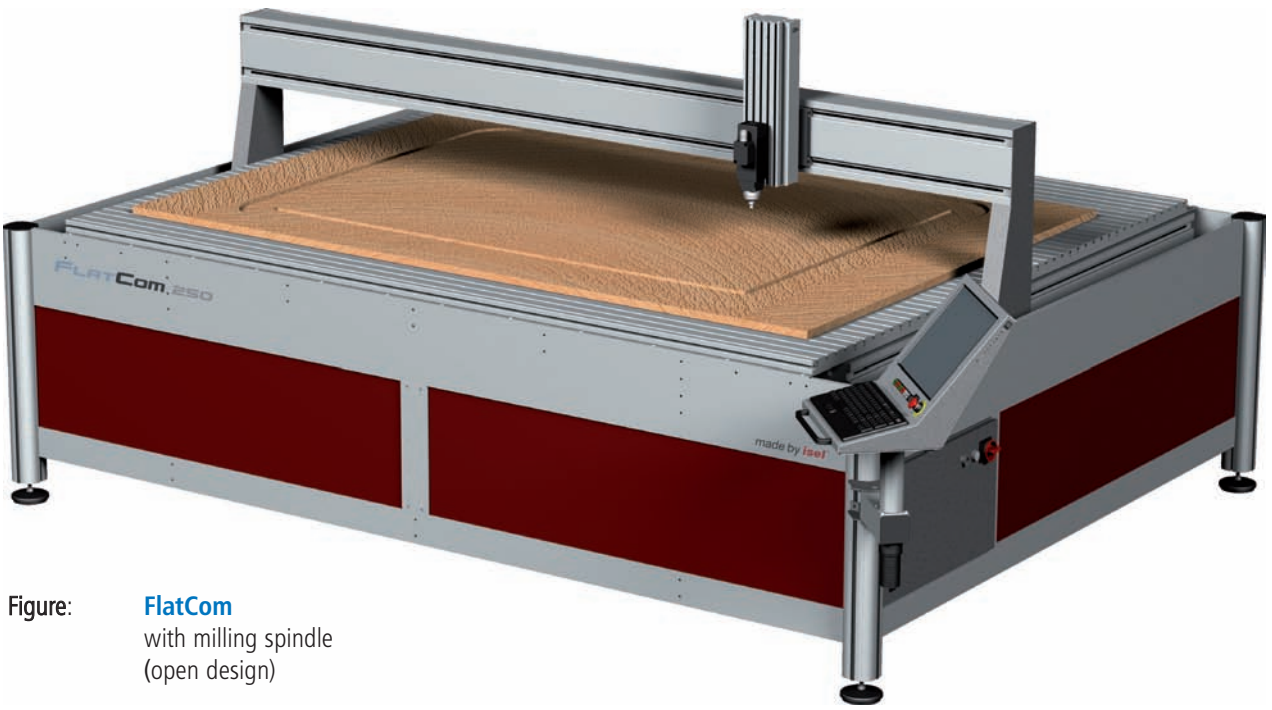


Figure: **FlatCom**
with milling spindle
(open design)

General

FlatCom®-CNC machines are set-up modular, with high operating comfort for a multitude of automatable tasks at an ideal price/performance ratio.
The basis is a a sturdy aluminum steel frame with linear units. The clearance free ball screw or direct drive used in the linear axes ensure high precision, accuracy and quiet running.

FlatCom®-CNC machines are available as compact units in 3 standard sizes with traverse paths of

X = 1,500 / 2,500 / 3,000 mm,
Y = 1,700 mm,
Z = 200 mm in open and closed design.

The CNC machines can be manufactured depending on requirement and application with linear units in different designs and sizes up to 500mm opening height.

The servo motors for the 4 axis (Gantry drive) in Y direction are ideally adjusted to the mechanics, control and software.

The controller of the **FlatCom®** with safety circuit and zero speed monitor is located at an integrated control cabinet. Operation is via a control panel with 17" monitor with touchscreen, keyboard and mouse.

On the **FlatCom®** the machine table is fixed and the portal in Y direction is movable. On direct drives (linear motors) the traverse range in Y direction can be extended at will (e.g. 6m). This is possible due to the linear units mounted on the side of the machine table.

For all CNC machines (standard color: grey) extensive accessories and software applications as well as designs with other traverse ranges are available.

Technical specifications subject to change.

CNC Machine
with servo controller

FlatCom® Series L

Applications

FlatCom®-CNC Machines are the basis for the set-up of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and Fastening
- Buring and polishing
- Forming and modeling
- Bonding and casting
- Laser and water jet cutting
- Soldering and welding
- Measuring and testing
- Scanning and scaling
- Sawing and cutting

... etc.

Options

For **FlatCom®**-CNC Machines special devices and tools for different requirements and applications are available:

- Drilling and milling spindle
- Frequency converter
- Tool changer
- Cooling/spraying device
- Rotary unit
- T-Groove table milled
- Extraction
- Vacuum clamping plates
- Pneumatic accessories
- CNC Joystick
- I/O Module
- Applications
- Protective cover
- Direct drives

We are able to design and manufacture special machines.

Technical specifications

	FlatCom® L 150	FlatCom® L 250	FlatCom® L 300
Traversing range X/Y/Z (mm)	1,500x1,700x200	2,500x1,700x200	3,000x1,700x200
Table clamping area WxD (mm)	1,750x2,250	2,750x2,250	3,250x2,250
Opening (mm)	250 (max.500)		
Dimensions WxDxH (mm)	2,216x2,430x1,600	3,216x2,430x1,600	3,716x2,430x1,600
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable		
Process speed X/Y/Z (mm/s)	250 (max.500)		
Repeat accuracy (mm)	≤ 0,02		
Drive motors	Servo motors		
Drive elements X/Y/Z	Ball screw assemblies adjustable backlash-free		
Control	CAN controller iMC with 4 drive regulators (iMD 40) CAN PC (computer with I/O module) safety circuit with zero speed monitoring		
Operation	CNC Control Panel 17" mit Touchscreen, Tastatur und Maus		
Software	Windows, ProNC, isy CAD/CAM		
Weight (kg) *	**approx. 435**	**approx. 510**	**approx. 580**
Item no.*	**275062 34565**	**275072 34565**	**275082 34565**

* without protective cover

Technical specifications subject to change.

Updated information available at www.systems.isel.com

CNC Machine
with servo controller

ModuStar

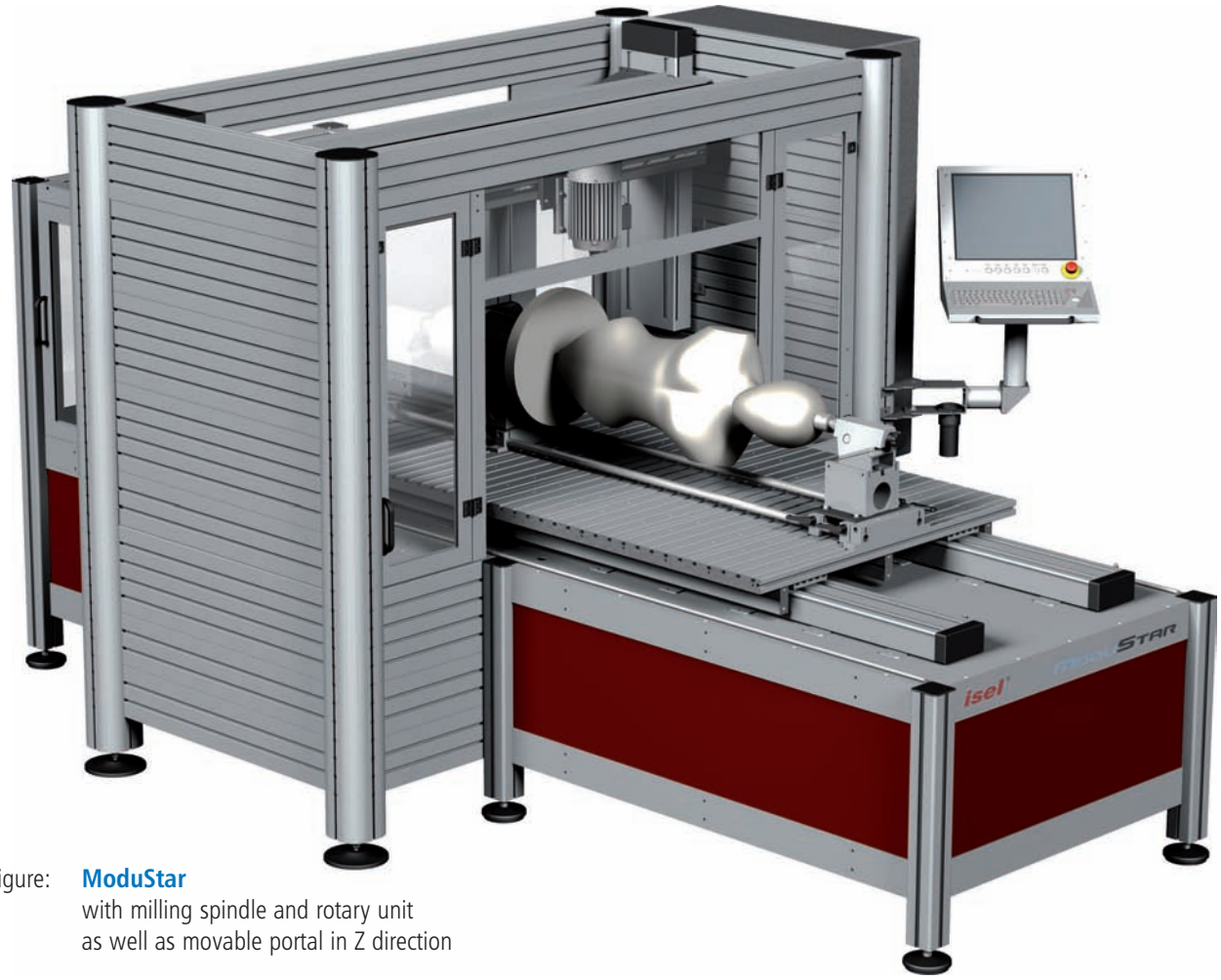


Figure: **ModuStar**
with milling spindle and rotary unit
as well as movable portal in Z direction

General

ModuStar® CNC machines are set-up modular, with high operating comfort for a multitude of automatable tasks at an ideal price/performance ratio.
The machine concept consist of 3 standardized aluminum steel frames with two-sided flexible fittings and the respective linear units. The clearance free ball screw (e.g. direct drive) used in the linear units ensure high precision, accuracy and quiet running.

ModuStar® CNC machines are available as compact and high performance units in 3 standard sizes with traverse path of

X = 1,000 / 1,500 / 2,000 mm,
Y = 1,500 / 2,500 / 3,000 mm,
Z = 400 mm

in open and closed design.

The CNC machines can be manufactured depending on requirement and application with linear units in different designs and sizes up to 1,200 mm opening height.

The controller of the **ModuStar®** with safety circuit and zero speed monitor is located at an integrated control cabinet. Operation is via a control panel with 17" monitor with touchscreen, keyboard and mouse.

On the **ModuStar®** the portal in X direction is fixed and the machine table in Y direction is movable on two linear units. With direct drives (linear motors) the traverse range in Y direction can be extended at will (e.g. 6m). In order to-do this, the fittings with the respective linear units plus the work table are extended respectively.

For all CNC machines (standard color: grey) extensive user accessories and software applications as well as designs with other traverse ranges are available.

For traverse ranges larger than 1,500 mm spindle support is required or direct drive is used.

CNC Machine
with servo controller

ModuStar

Applications

ModuStar®-CNC Machines are the basis for the set-up of machines for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and Fastening
- Buring and polishing
- Forming and modeling
- Bonding and casting
- Laser and water jet cutting
- Soldering and welding
- Measuring and testing
- Scanning and scaling
- Sawing and cutting

... etc.

Options

For **ModuStar®**-CNC Machines special devices and tools for different requirements and applications are available:

- Drilling and milling spindle
- Frequency converter
- 2 Tool changer
- 2 separate Z-axis
- Movable portal in Z direction
- Rotary / swivel unit
- Cooling/spraying device
- Rotary unit
- T-Groove table milled
- Extraction
- Vacuum clamping plates
- Pneumatic accessories
- Protective cover
- CNC Joystick
- I/O Module
- Applications
- Direct drives (linear motor)

We are able to design and manufacture for OEM customers, in collaboration, special machines.

Technical specifications

	ModuStar MP 100	ModuStar MP 150	ModuStar MP 200
Traversing range X/Y/Z (mm)	1,000 x 1,800 x 400	1,500 x 2,800 x 400	2,000 x 3,300 x 400
Table clamping area WxD (mm)	1,000 x 1,500	1,500 x 2,500	2,000 x 3,000
Opening (mm)	600 (max. 1,200)		
Dimensions WxDxH (mm)	2,550 x 3,500 x 1,900	3,050 x 4,500 x 1,900	3,550 x 5,500 x 1,900
Guides	Linear units with precision steelshafts and ball circulation skid, clearance free adjustable		
Process speed X/Y/Z (mm/s)	≤ 250 (max. 500)		
Repeat accuracy (mm)	≤ 0,02		
Drive motors	Servo motors		
Drive elements X/Y/Z	Ball screw assemblies adjustable backlash-free		
Control	CAN controller iMC with 3 drive regulators (iMD 40) CAN PC (computer with I/O module) safety circuit with zero speed monitoring		
Operation	CNC Control Panel 17" mit Touchscreen, Tastatur und Maus		
Software	Windows, ProNC, isy CAD-CAM		
Weight (kg) *	approx. 1,100	approx. 1,400	approx. 1,800
Item no.*	275503 35065	275513 35065	275523 35065

* without protective cover

Technical specifications subject to change.

CNC Machine table

ModuFix®

Figure:
ModuFix® 100
3 linear units,
1 rotary unit with milling spindle

General

ModuFix®-CNC machining tables are built modular with high operating comfort for a variety of tasks and applications at an ideal price/performance ratio.
The basis are our machine tables MT made of sturdy aluminum frames with T-groove profiles.

The basic configuration of the **ModuFix®**-CNC machines is the machine table MT as well as a switch cabinet with integrated PC, 17" monitor, touchscreen and keyboard.

ModuFix®-CNC machines are available as compact units in 4 standard sizes in length of

1000 / 1500 / 2000 / 2500 mm

in open and closed design with transparent protective cover.

The mechanical components (linear and rotary units) can be individual built-on the machine table for the respective application (e.g. CNC milling).

The same applies for the electrical components in the switch cabinet (e.g.: step controller or servo controller) next to the connecting cable.

ModuFix®-CNC machining tables have a multitude of use, e.g. for:
- Test and test set-ups of any type
- CNC technology (Didaktik) for the training and occupational field

CNC Machine table

ModuFix®

Applications

ModuFix®-CNC Machine tables serves as the basic equipment for test and test set-ups as well as CNC technology for:

- Drilling and milling
- Assembling and mounting
- Imprinting and engraving
- Metering and Fastening
- Buring and polishing
- Bonding and casting
- Soldering and welding
- Measuring and testing
- Scanning

... etc.

Options

For **ModuFix®**-CNC machine tables mechanical components (linear units, rotary units) and electronic components (step controller or servo controller) as well as equipment and tools for different requirements and applications are available:

- Drilling and milling spindle
- Frequency converter
- Tool changer
- Cooling/spraying device
- Extraction
- I/O Module
- Safety circuits
- Impact resistant protective cover
- Pneumatic accessories
- Vacuum clamping plates
- Applications

We gladly assist you with the selection and compilation of individual components and accessories.

Technical specifications

	ModuFix 100	ModuFix 150	ModuFix 200	ModuFix 250
Total size WxDxH (mm)	1,000 x 750 x 1,500	1,500 x 750 x 1,500	2,000 x 750 x 1,500	2,500 x 750 x 1,500
Switch cabinet WxDxH (mm)	650 x 250 x 400			
Operation	integrated PC with 17" monitor, touchscreen, keyboard, function keys and emergency OFF			
mechanical components	Can be compiled as needed. The individual components such as linear and rotary units, or also step controller (e.g.: iMC-M or iMC-MP) and servo controller (iMC-V or iMC-VP) can be found under the respective section MECHANICS or ELECTRONICS. Individual control programs are also further described under the SOFTWARE section.			
electronic components				
Software				
Weight (kg) *	approx.105	approx.125	approx.137	approx.157
Item no.*	**248552 0001**	**248552 0002**	**248552 0003**	**248552 0004**

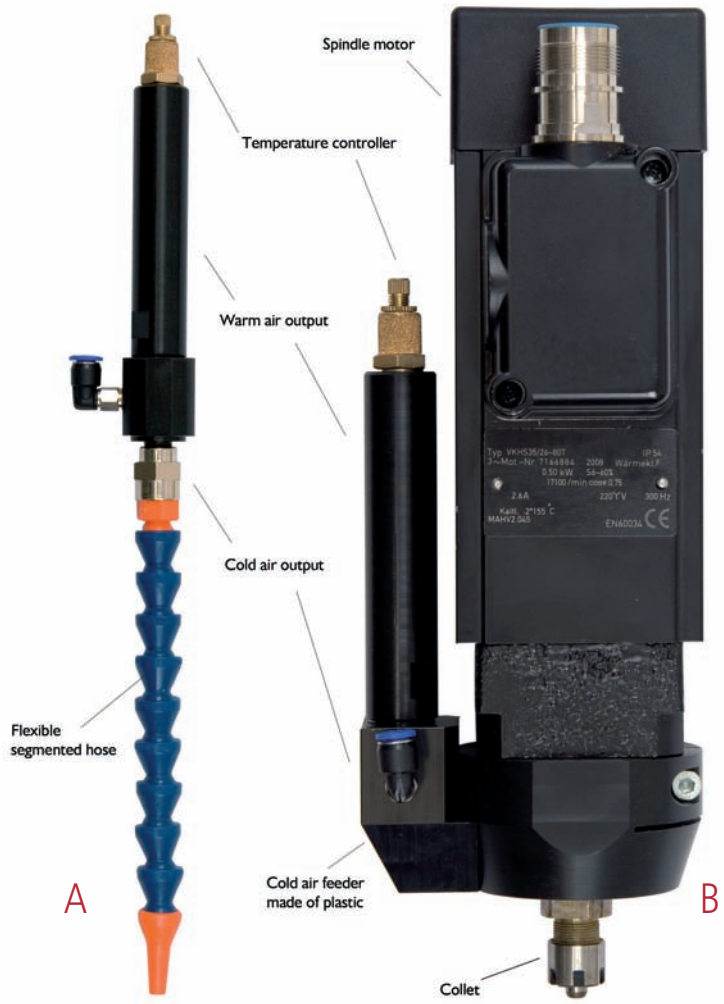
* Is only applicable for the basic equipment without any mechanical or electronic components as well as no protective cover. The individual components differ from customer to customer.

Updated information available at www.systems.isel.com

Technical specifications subject to change.

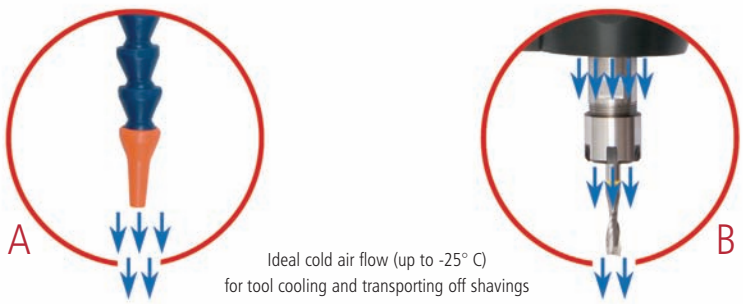
CoolMin

Function principle



CoolMin external with hose
Item 239011 0119

CoolMin internal



Ideal cold air flow (up to -25° C)
for tool cooling and transporting off shavings

Tool and material cooling

Dry machining is nowadays for many milling tasks the selection of choice. Up to now, material, tool wear and tear and finish quality offer forced cooling with respective coolants/ lubricants.
This always means more humidity. Even spray cooling with minimum amounts leads to unintended side effects such as fouling, adhering of the shavings to the tool or surface and depending on material also effect on the material structure.
With the patented cooling method introduced here, the very good cooling of tools and surfaces make side effects a problem of the past.
The shavings are dry and depending on the material, easy to extract or blow off.
The surface is preserved and through the direct tool cooling (also appropriate for tools with inside cooling) long periods of tool use is obtained.
Basis of the cooling method is a cold air nozzle that operates on the whirlpool principle and separates the air flow in warm and cold air.
To operate the system only pressurized air (6 to 10 bar) is required.

Technical specifications:

- Pressurized inlet: 6-10 bar
- Cool air outlet: of up to -25 °C
- Warm air oulet: up to max. 70 °C
- Air use approx. 150 l/min
- Special maintenance unit with 1μm filter
- Maintenance free cold air nozzle

Technical specifications subject to change.

Spindle motor

iSA 500

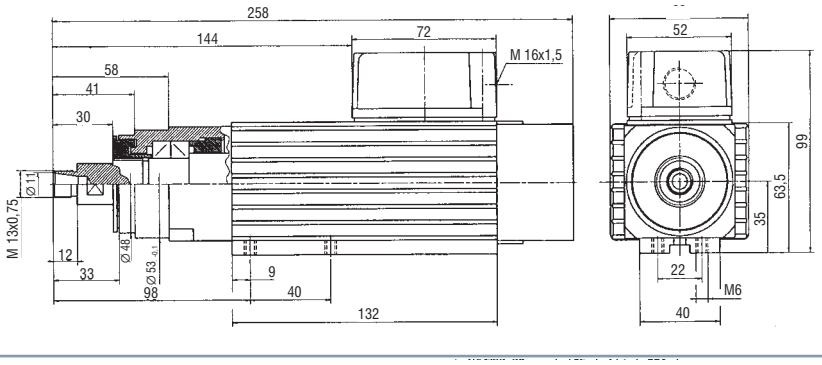
iSA 500 with
manual tool changing

iSA 500 with manual tool changing
and CoolMin tool cooling system

Technical specifications

Description	iSA 500
Torque at nominal speed 18.000 U/min. [Nm]	0.21
Rev [U/min.]	5,000 to 30,000
Number of poles	2
Nominal voltage [V]	3 x 220
S 6 = 40% nominal voltage [kW]	0.5
Rotation [mm]	0.01
Weight [kg]	3

Scale drawings



Standard universal drill and milling machines up to 2kW can be used for simpler applications and requirements.

	Item No.:	Load speed min⁻¹	Voltage V	Coefficient %	Acceptance W	Capacity W	Torque Nm
UFM 500	420003 0500	22,600	230	68	500	345	0.14
UFM 1050	420003 1050	21,000	230	71	1050	720	0.32

Clamping blocks	Item No.:
Fastening 75 mm	290 905
Fastening 100 and 150 mm	290 902
Fastening 100 mm	290 903
Fastening 125 mm	290 904

matching collet chucks available !

UFM 500 UFM 1050

Technical specifications subject to change.

Characteristics

- Sturdy 2-pole three-phase motor (asynchronous motor)
- Rectangle built, protection type IP54, Insulation class F
- Cast sign A side
- Aluminium cast B side
- Special shaft for drill and milling tools
- Nominal output 0.5 kW (S6-40% operation)
- Revolutions range 5,000 U/min. - 30,000 U/min.
- Manual tool exchange
- Clamping range Ø 3 mm – Ø 6.35 mm = 1/8"
- Self-ventilating B side
- Revolution control via frequency converter
- Spindle bearing
  - 2 spindle ball bearing A side (milling side)
  - 1 bearing B side (vent side)

Options:
- CoolMin (internal and external)
- Mounting plate
- Different clamping tools

Ordering information

Spindle motor iSA 500
Item no.: 477004 3130

Spindle motor iSA 500
with converter
Item no.: 310704 1611

Spindle motor iSA 500
with converter and CoolMin
Item no.: 310704 1631

CoolMin with hose
Item no.: 239011 0119

Collet chuck type ER 1
Ø 3.0 mm
Item no.: 239170 3000
Ø 3.175 mm
Item no.: 239170 3175
Ø 6.0 mm
Item no.: 239170 6000*
Ø 6.350 mm
Item no.: 239170 6350

* part of the standard scope of delivery iSA 500

Updated information available at www.systems.isel.com

systems

Spindle motor

iSA 750

iSA 750 with
manual tool changing

Characteristics

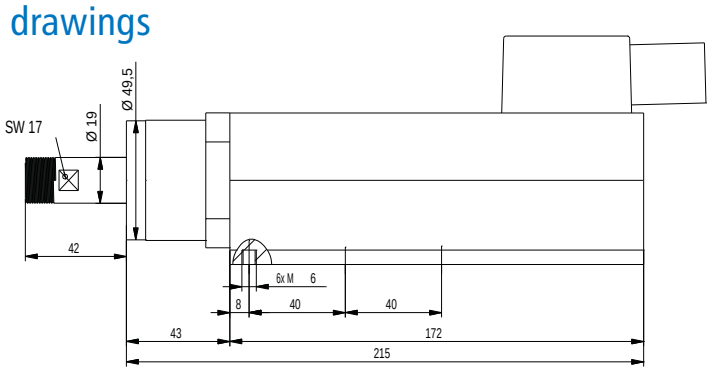
- Sturdy 2-pole three-phase motor (asynchronous motor)
- Rectangle built, protection type IP54, Insulation class F
- Steel sign A side
- Aluminium cast B side
- Special shaft for drilling and milling tools
- Nominal output 0.75 kW (S6-40% operation)
- Revolutions range 3,000 U/min. - 24,000 U/min.
- Manual tool exchange
- Clamping range Ø 3 mm – Ø 8 mm
- Self-ventilating B side
- Revolution control via frequency converter
- Spindle bearing
  - 2 spindle ball bearing A side (milling side)
  - 1 bearing B side (vent side)

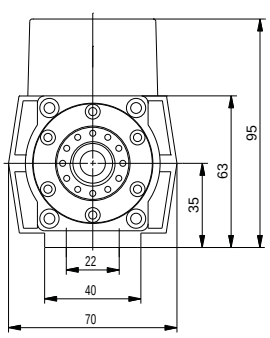
Options:
- CoolMin (internal and external)
- Mounting plate
- Circular connector
- Different clamping tools

Technical specifications

Description	iSA 750
Torque at nominal speed 24,000 U/min. [Nm]	0.3
Rev [U/min.]	3,000 to 24,000
Number of poles	2
Nominal voltage [V]	3 x 220
S 6 = 40% nominal voltage [kW]	0.75
Rotation [mm]	0.01
Weight [kg]	3.2

Scale drawings





Ordering information

Spindle motor iSA 750
Item no.: 477007 3124

Spindle motor iSA 750
with converter
Item no.: 310707 1611

Spindle motor iSA 750
with converter and CoolMin
Item no.: 310707 1631

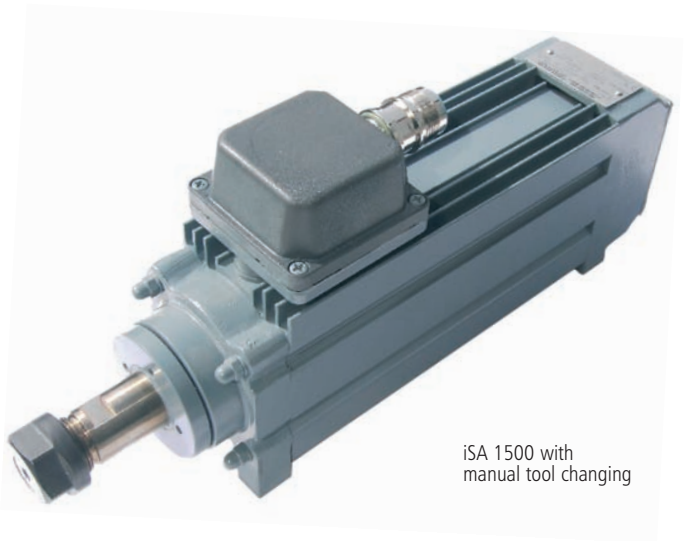
CoolMin with hose
Item no.: 239011 0119

Collet chuck type ER 16
Ø 3.0 mm **Item no.: 239171 3000**
Ø 3.175 mm **Item no.: 239171 3175**
Ø 6.0 mm **Item no.: 239171 6000***
Ø 8.0 mm **Item no.: 239171 8000**

* part of the standard scope of delivery iSA 750

Technical specifications subject to change.

Spindle motor iSA 1500



iSA 1500 with manual tool changing

Characteristics

- Sturdy 2-pole three-phase motor (asynchronous motor)
- Rectangle built, protection type IP54, Insulation class F
- Cast sign A and B side
- Special shaft for drilling and milling tools
- Nominal output 1.5 kW (S6-40% operation)
- Revolutions range 5,000 U/min. - 20,000 U/min.
- Manual tool exchange
- Clamping range Ø 3 mm – Ø 13 mm
- Self-ventilating B side
- Revolution control via frequency converter
- Spindle bearing
  - 2 spindle ball bearing A side (milling side)
  - 1 bearing B side (vent side)
- Very small built, therefore in-line configuration is possible

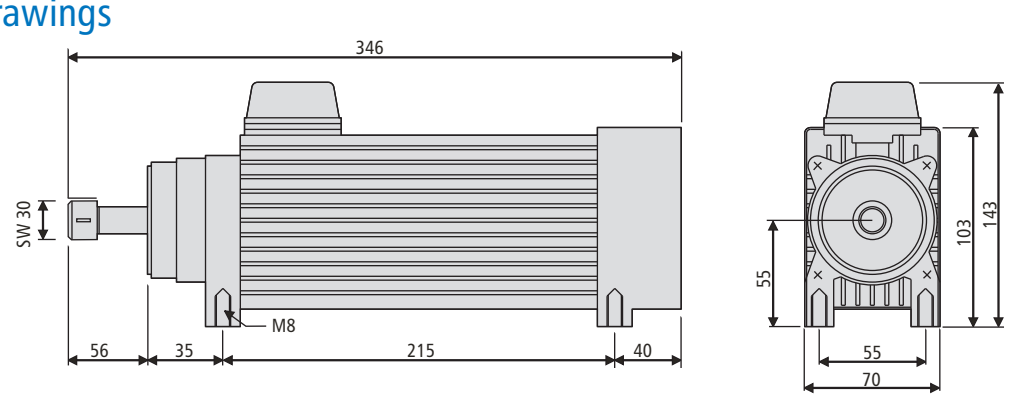
Options:
- CoolMin (internal and external)
- Mounting plate
- Circular connector
- Different clamping tools

Note:
Special milling spindles up to max. 7.5 kW and 20,000 U/min. deliverable on short-notice

Technical specifications

Description	iSA 1500
Torque at nominal speed 20,000 U/min. [Nm]	2.2
Rev [U/min.]	5,000 to 20,000
Number of poles	2
Nominal voltage [V]	3 x 200
S 6 = 40% nominal voltage [kW]	1.5
Rotation [mm]	0.01
Weight [kg]	6.5

Scale drawings



Ordering information

Spindle motor iSA 1500
Item no.: 477510 3120

Spindle motor iSA 1500
with converter
Item no.: 310610 3614

Spindle motor iSA 1500
with converter and CoolMin
Item no.: 310610 3634

CoolMin with hose
Item no.: 239011 0119

Collet chuck type ER 20
Ø 6.0 mm **Item no.: 239172 6000***
Ø 8.0 mm **Item no.: 239172 8000**
Ø 10.0 mm **Item no.: 239172 0100**
Ø 12.0 mm **Item no.: 239172 0120**

* part of the standard scope of delivery iSA 1500

Technical specifications subject to change.

Updated information available at www.systems.isel.com

Spindle motor

iSA 900

iSA 900 with
automatic tool exchange SK 11

Characteristics

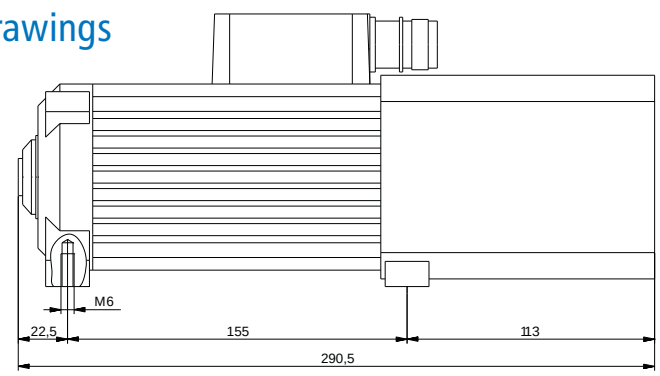
- Sturdy 2-pole three-phase motor (asynchronous motor)
- Rectangle built, protection type IP55, Insulation class F
- Cast sign A and B side
- Special shaft for drill and milling tools
- Nominal output 0.9 kW (S6-40% operation)
- Revolutions range 5,000 U/min. - 24,000 U/min.
- Manual tool exchange
- Clamping range Ø 3 mm – Ø 6.35 mm = 1/8"
- Separately driven fan B side
- Revolution control via frequency converter
- Clearance free, double precision position
- Manual tool exchange SK 11 pneumatic (7.5 bar)

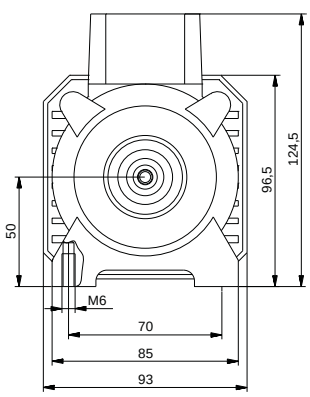
Option:
- CoolMin (external)
- Mounting plate
- Circular connector
- Different clamping tools

Technical specifications

Description	iSA 900
Torque at nominal speed 24,000 U/min. [Nm]	0.37
Rev [U/min.]	6,000 to 24,000
Number of poles	2
Nominal voltage [V]	220
S 6 = 40% nominal voltage [kW]	0.9
Rotation [mm]	0.01
Weight [kg]	5.5

Scale drawings





Ordering information

Spindle motor iSA 900
Item no.: 477009 3324

Spindle motor iSA 900
with converter
Item no. 310709 3612

CoolMin with hose
Item no.: 239011 0119

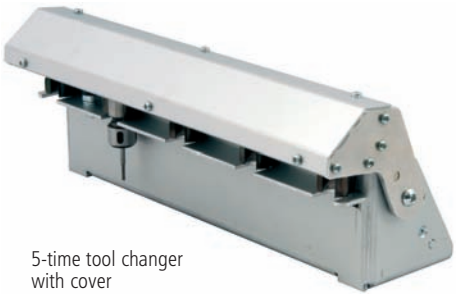
Tool holder SK 11
Item no.: 239111 0000

Collet chucks
Ø 3.0mm **Item no.: 239110 3000**
Ø 3.175mm **Item no.: 239110 3175**
Ø 6.0mm **Item no.: 239110 6000**
Ø 6.350mm **Item no.: 239110 6350**

Technical specifications subject to change.

Tool changer

5-time tool changer
without cover



5-time tool changer
with cover

4-time tool changer
with cover

Tool changing station SK 11 without cover

5-time changer
Item no.: 239011 0054

8-time changer
Item no.: 239011 0084

Tool changing station SK 11 with cover, incl. pneumatic

5-time changer
Item no.: 239011 0053

8-time changer
Item no.: 239011 0083

Tool changing station SK 20 with cover, incl. pneumatic

4-time changer
Item no.: 239011 0040

10-time changer
Item no.: 239011 0100

5-time changer
Item no.: 239011 0050

Option:
Round tool changer

Dust extraction

....for spindles
MAW 2.11 K, MAW 2.22 K
• with pneumatic opening of the dust cover
Item no.: 239 011 0120

... for spindle motor iSA 750
• with manually activated opening of the dust cover
Item no.: 239 011 0122

Available for more milling motors upon request !

Inside diameter
Extraction hose
80 mm

Dust cover
closed

Dust cover open

Updated information available at www.systems.isel.com

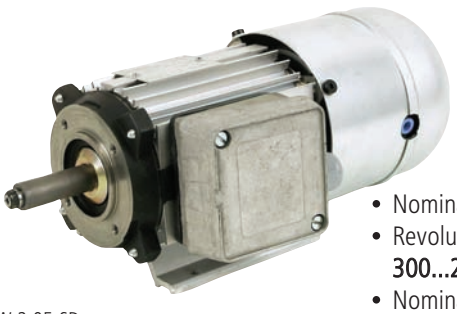
Technical specifications subject to change.

systems

Main spindle drive-asynchronous

HSAW 2.05-SDF
HSAW 2.11-KF

Spindle motor



MAW 2.05-SD

- Nominal output **500 W**
- Revolutions range **300...24,000 min^{-1}**
- Nominal torque **0.26 Nm**
- Tool change **directly with pneumatic telescopic cylinder (MAW 2.05-SD)**
- Built size **56**

Main spindle drive

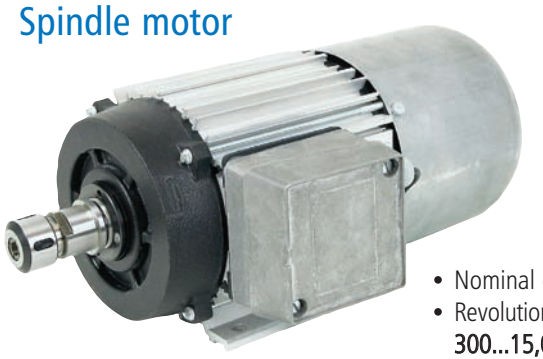
Description	Item No.:
Main spindle drive HSAW 2.05-SDF	310705 2611

Included in the scope of delivery:
- Spindle motor MAW 2.05-SD
- Frequency converter (1500 VA)
- Connecting line converter motor (L=8 m)
- Throttle valve
- Connecting panel
- Collet chuck (d=3 mm)
- Maintenance unit with pressure monitoring
- Air hose
- Screwdriver

Technical specifications

Description	Item No.: (PG threaded joints)	Item No.: (Circular connector)	Revolutions range min^{-1}	Number of poles	Nominal voltage	Nominal output leistung kW (S6-40%)	Nominal speed min^{-1}	Continues output S1 kW	Rotation 1/100 mm	Weight kg
MAW 2.05-SD	477505 1224	477505 3224	300-24,000	2	3 x 210 V	05	18,000	0.3	2	4

Spindle motor



MAW 2.11-K

- Nominal output **1100 W**
- Revolutions range **300...15,000 min^{-1}**
- Nominal torque **2.8 Nm**
- Tool change or **automatic (SK 20)**
- Built size **71**

Main spindle drive

Description	Item No.:
Main spindle drive HSAW 2.11-KF	310711 3611

Included in the scope of delivery:
- Spindle motor MAH 2.11-KF
- Frequency converter (1500 VA)
- Connecting line converter motor (L=8 m)
- Throttle valve
- Maintenance unit
- Connecting panel
- Air hose

Technical specifications

Description	Item No.: (PG threaded joints)	Item No.: (Circular connector)	Revolutions range min^{-1}	Number of poles	Nominal voltage	Nominal output kW (S6-40%)	Nominal speed min^{-1}	Continues output S1 kW	Rotation 1/100 mm	Weight kg	Tool holder K= Chuck seat (SK20) S= Collet chuck
MAW 2.11-K**	477711 1313	477711 3313	300-15,000	2	3 x 210 V	1.1	4,200	0.75	2	11	K (ø 3-12.7 mm)*

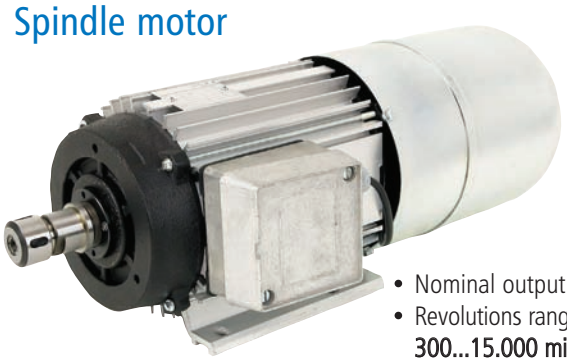
* Collet chuck holder SK20 with collet chuck 6 mm is part of the spindles scope of delivery.
** Also available up to 20,000 U/min. (special bearing).

Technical specifications subject to change.

Main spindle drive-asynchronous

HSA 2.22-KF
HSA 4.22-KF
HSAW 2.22-K3SC

Spindle motor



MAW 2.22-K
MAW 4.22-K

- Nominal output **2200 W**
- Revolutions range **300...15.000 min^{-1} / 200..0.70.500 min^{-1} ***
- Nominal torque **7,5 / 15,1 Nm ***
- Tool change **automatic (SK20)**
- Built size **80**

***** initial value for MAW 2.22-K
second value MAW 2.22-K

Main spindle drive

Description	Item No.:
Main spindle drive HSAW 2.22-KF	310722 3611
Main spindle drive HSAW 4.22-KF	310722 3612

Included in the scope of delivery:
- Spindle motor MAW 2.22-K/MAW 4.22-K
- Frequency converter (4,000 VA)
- Connecting line converter motor (L=8 m)
- Throttle valve
- Maintenance unit
- Connecting panel
- Air hose

Technical specifications

Description	Item No.: (PG threaded joints)	Item No.: (Circular connector)	Revolutions range min^{-1}	Number of poles	Nominal voltage	Nominal output kW (S6-40%)	Nominal speed min^{-1}	Continues output S1 kW	Rotation 1/100 mm	Weight kg	Tool holder K= Chuck seat (SK20) S= Collet chuck
MAW 2.22-K	477822 1313	477822 3313	300-15,000	2	3 x 400 V	2.2	4,500	1.5	2	18	K (ø 3-12.7 mm)*
MAW 4.22-K	477822 1307	477822 3307	200-7,500	4	3 x 400 V	2.2	2,250	1.5	2	18	K (ø 3-12.7 mm)*

* Collet chuck holder SK20 with collet chuck 6 mm is part of the spindles scope of delivery.

Spindle motor

MAW 2.22-K3S

- Nominal output **2,200 W**
- Revolutions range **300...15,000 min^{-1}**
- Tool change **automatic (SK 30)**
- Built size **80**
- 3-time mounting (spindle ball bearing)

Main spindle drive

Description	Item No.:
Main spindle drive HSAW 2.22-K3SC	310730 3615

Included in the scope of delivery:
- Spindle motor MAH 2.22-K3S
- Frequency converter (4,000 VA)
- Throttle valve
- Maintenance unit
- Connecting panel
- Air hose
- Collet chuck (d=6 mm)
- Collet chuck holder
- Collet chuck accessories

Technical specifications

Item No.: Spindle motor MAW 2.22-K3S	Item No.: Main spindle drive HSAW 2.22-K3SC	Revolutions range min^{-1}	Number of poles	Nominal voltage	Nominal output leistung kW (S6-40%)	Nominal speed min^{-1}	Continues output S1 kW	F_{axial} / F_{radial} N	Rotation 1/100 mm	Weight kg
477822 1515	310730 3615	300-15,000	2	3 x 400 V	2.2	4,500	1.5	400/350	2	18.5

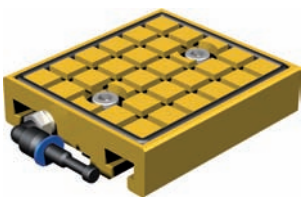
Main spindle drive **HSAW** consists of a spindle motor, an adjusted frequency converter as well as accessories.

Technical specifications subject to change.

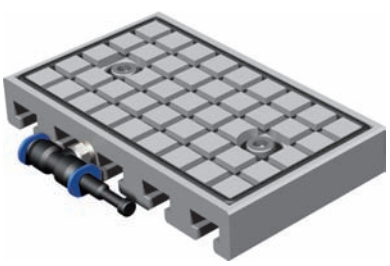
Vacuum clamping plates

VakuFit®

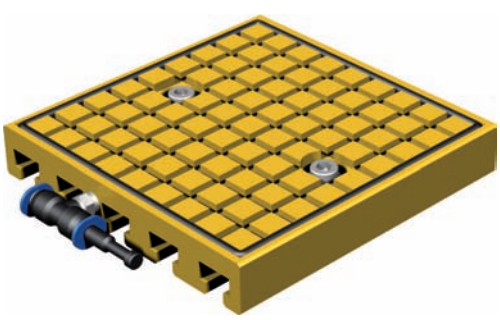
VakuFit - S
L 75 x W 41.5 x H 20 mm
Item no.: 216601 0015



VakuFit - S
L 75 x W 85 x H 20 mm
Item no.: 216601 0016



VakuFit - S
L 125 x W 75 x H 20 mm
Item no.: 216601 0011



VakuFit - S
L 125 x W 125 x H 20 mm
Item no.: 216601 0012

VakuFit - S

The vacuum clamping plates made of naturally anodized aluminum allow for a flexible clamping system on any T-Groove plate. Sealing is done with a foamed 4 mm caulking strip that is freely placed according to the groove raster. The hose connections at the vacuum are suitable for 6 mm hoses.

Depending on the material properties of the clamped workpiece, up to 6 vacuums (e.g. 125 x 75) can be connected to a pneumatic vacuum pump. At 5.5 bar pressurized air a vacuum of up to 80% is reached. The system is suitable for small clamping tasks up to clamping large sized plates or pieces.

Option:
- Tension plate gold anodized

Pneumatic vacuum pump incl vacuum meter,

pressure regulator, maintenance unit with filter, hose, vacuum filter

Item no.: 216600 0009

Pneumatic vacuum pump with energy efficient system incl vacuum meter,

pressure regulator, maintenance unit with filter, hose, vacuum filter

Item no.: 216600 0008

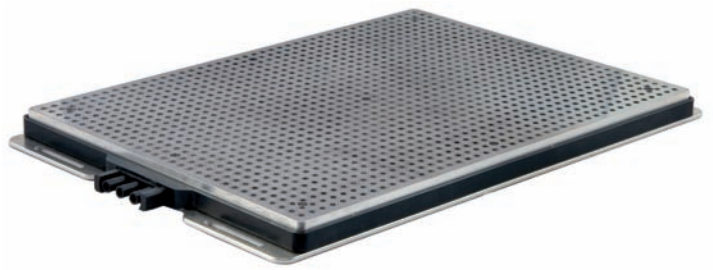
Technical specifications subject to change.

Vacuum clamping plates

VakuFit®

Example figure

Multi-connection for high flow rate and ideal vacuum distribution



All vacuum plates can be aligned large-scale to each other.

Item number	Description	DIN	Clamping surface
216601 0017	VT 2115	A5	210 x 150 mm
216601 0018	VT 3021	A4	300 x 210 mm
216601 0019	VT 4230	A3	420 x 300 mm
216601 0020	VT 6042	A2	600 x 420 mm

VakuFit - L

The breadboard for the vacuum voltage have little requirement on the vacuum pump. The plates are nearly non-warping and therefor good for engraving work and clamping plate material.

The difference compared to other vacuum clamp options are material milling up to a certain part of the total surface is not a problem and the parts stay safely clamped. Material catches can be easily implemented with 5 mm dowels in the breadboard. The breadboard rubber mats are waste material and can be used several times. Next to the standard plates we also offer specials customer requests for special tasks, up to complete packages.

Note

The adhesion is proportional to covered surface, the friction coefficient and differential pressure. To increase the friction coefficient, a breadboard rubber mat is enclosed in the scope of delivery.

Scope for delivery

- 1x connection adapter
- 1x screwdriver 68mm
- 1x breadboard rubber mat
- 1x cover rubber mat for covering empty holes
- 3x connecting hose
- Operation instructions

Technical specifications subject to change.

Components for the semiconductor sector

Top mounted:
isel-Single Arm Wafer Handling Robot IWH-TA in standard design with 2-link arm
Item no.: 250011 1102141

Bottom mounted:
isel-Single Arm Wafer Handling Robot IWH-TA in heavy duty design with 3-link arm
Item no.: 250072 1173241

Wafer-Handling-Robot

The wafer handlers of the IWH series (Single arm robot, 3-link arm robot, dual arm robot) represents an innovative construction and are class 1clean room compatible.
High flexibility and performance is achieved with the modular design.
This state-of-the-art handling solution is suitable for handling wafers and masks and stands out due to highest reliability and precision.
Extremly responsive, brushless motors, coupled with directly powered harmonic drives ensure precise, dynamic and fail-safe arm movement.

Example:
Customer solution with 1200 mm axis length and axis module placed on side

Vertical robot

The vertical robot of the IVR series represents a high-quality, compact design. With selected components and the reduction of parts, a very stiff and dynamic robot system has been achieved..

This new handling solution is suitable for handling wafers and other substrates. Extremely responsive, brushless motors, coupled with directly powered Harmonic Drive® drives ensure precise, dynamic and fail-safe arm movement.

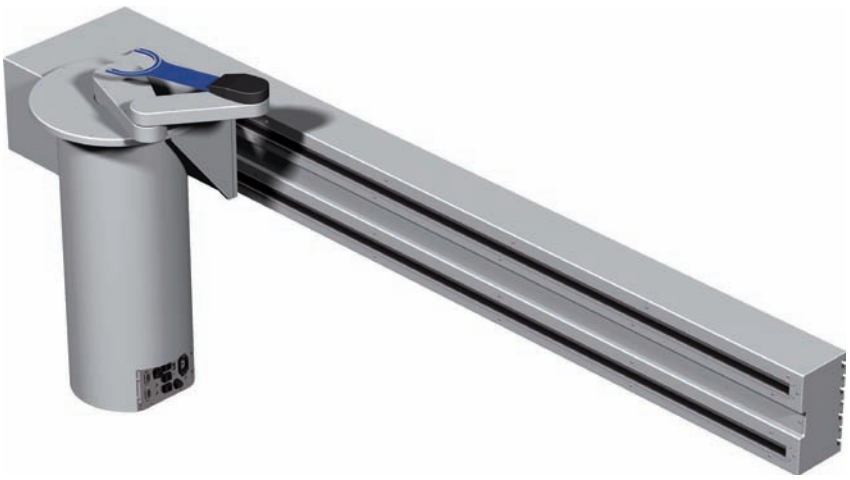
The industrial external servo control with 32-Bit real time core allows for an almost seamless integration of traverse axes and other devices. The control ensures quiet running together with multiple path segments.

The control supports RS-232 and ethernet interfaces.

Item no.: 250080 0001

Technical specifications subject to change.

Components for the semiconductor sector



isel-Linear Track
with sideways mounted
isel wafer handling
Robot series IWH-TA

Linear Track

The linear track series ILT can be seamlessly integrated into the handling area of your system. The track control is done in connection with our robots of the IWH series. The system is highly effective and therefor ensures high transfer rates by combining the linear tracks with the isel robots.
Depending on the use, the mounting can be done below the robot or on the side. By using brushless servo motors, the linear tracks are dynamic, low in maintenance and have quiet running.

Item no.: 250031 1042002

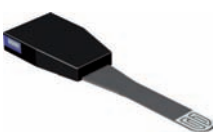
isel three axes prealigner
IPA series with
connection field on the side
and PEEK Pin/Chuck
Item no.: 250021 1011

isel one axis prealigner
IPA series with
connection field on the rear side
Item no.: 250092 1011

Prealigner

The isel prealigner of the IPA series are innovative, highly precise, class 1 clean room compatible prealigner solutions with integrated electronic measuring equipment, mains adapter and intelligent control. Both prealigner options are also available as "high precision" versions, which characterize a higher precision compared to standard versions.

Without adjustment to the prealigner the high-performance measuring sensor system can align transparent, semi-transparent and nontransparent wafers of 2" (50mm) to 12" (300 mm).



Paddle EE with scanner
Item no.:
250048 0180000

Horse Shoe-EE without scanner
Item no.:
250048 0200000

Double-EE with
Thru beam scanner
Item no.: 250046 0740000

End effectors

The isel end effectors are available for wafer sizes up to 12" (300 mm). The IEE have a low weight and high rigidity as well as a very good price.performance ratio. They are furthermore available with different wafer mapping sensors and different surface coating.

Technical specifications subject to change.

Golf Training Robot TopSwing 2

Figure:
Golf Training Robot **TopSwing 2**
Hexapod leverage with golf club and extended support legs

General

The **TopSwing 2** is an electronically controlled drive robot. With the topswing golf robot the ideal golf hit for beginners or pro golfers is practiced. Individual swing curves are determined, saved and exactly reproduced. The critical phases - from take away via the arm rotation up to release are adjusted to the detail to the personal objective of the user, his level of performance and his physical precondition.

The **TopSwing 2** consists of six linear axes and 1 rotation axis on the golf club that is controlled by a PC. All axes meet at one point where the golf club is attached. After the computer program has been adjusted, the robot can swing steep or flat, slow or fast, angle early or late, from the inside to the outside. The use are the indoors and outdoors (in a covered area).

Golf Training Robot TopSwing 2

Characteristics

- Complete solution incl. all necessary hard and software
- Hexapod system an ideal human/machine interface
- Exact reproducibility
- Movement in full hits, sections or slow motion
- Almost any programmable golf club and swing curve
- Predefined original swings of many golf pros are available
- Ideal to learn the perfect golf hit
- For beginners up to pros
- Fast learning process via a type of muscle memory with correct samples

Technical specifications

Movement speed	up to 4 m/s on the tool flange
Dimensions W x D x H	850 (1,550*) x 3,500 x 2,850 mm
Connecting data	400 V, 16 A, 50-60 Hz, 3 phases
Drive motors	brushless servo motors with incremental encoder
Guides	6 clearance free linear guides with belt drive and clearance free rotating axis
Guide of the club	Hexapoden bell-crank linkage
Control	Integrated robot control for 7 axes
Control electronics	Industry PC
Power electronics	7 performance final stages for brushless DC motors
Operation	Keyboard, mouse, hand terminal, emergency Off
Software	Windows based application
Weight	approx. 380 kg
Item no.	274507 6159

Technical specifications subject to change.

Order

isel Germany AG

Sender

isel Germany AG
Order processing
Buergermeister-Ebert-Straße 40

D-36124 Eichenzell

Phone: +49 (0)6659/981-0
Fax: +49 (0)6659/981776

Customer no.:

Company

Department/name

Street

Post code/place

Your item number

Your telephone no.: Fax no.:

Your e-mail address:

Amount	Item no.	Item description	Unit price

I order the afore-mentioned articles according to your sales, order and payment conditions.

Date

Company stamp/signature

General terms of payment and delivery // Software terms of use

As of: 01-06-2009

I. Scope of applicability

1. The following terms and conditions of sale are applicable to all contracts for the delivery of goods concluded between the customer and us. By placing an order and receiving the goods supplied by us, the customer confirms his acceptance of our terms and conditions. These terms and conditions shall also be applicable to all future business transactions, even if they are not expressly agreed again. Deviating terms and conditions of the customer are not binding for us unless expressly recognised, even if we have not expressly rejected such terms and conditions. The deviating terms and conditions are already herewith expressly rejected. The following terms and conditions of sale shall also be applicable where we unconditionally perform an order from the customer despite our knowledge of opposing or deviating terms and conditions of the customer.
2. Other agreements, amendments and understandings require written confirmation.
3. All agreements reached between the customer and us with regard to performance of the purchase contracts are drawn up in writing in those contracts.

II. Offers and conclusion of contracts

1. An order from the customer is deemed an offer to conclude a purchase contract. We may accept this offer by communicating a confirmation of offer within a period of two weeks or else by delivering the ordered goods within the same period.
2. Our offers are non-binding and subject to change, except where they are expressly described as binding. The scope of our obligation to perform is determined solely by our written confirmation of order.
3. The documents forming the basis for an offer or confirmation of order on our part, such as illustrations, drawings and specifications of dimensions and weights, are to be understood as approximate values only, insofar as they have not been described expressly as binding.
4. We reserve all property rights, copyrights and other protected privileges in respect of all illustrations, calculations, drawings and other documents, materials, models, specimens and specifications. The customer may only pass these on to third parties with our written consent, irrespective of whether they are marked as being confidential.
5. Evident errors or printing, arithmetic, spelling or calculation mistakes are not binding for us and do not found an entitlement for the customer to claim damages.
6. We reserve the right to implement design changes or other modifications to technical data and performance parameters where this is deemed to serve technical progress.

III. Pricing and terms of payment

1. Our prices are applicable ex works excluding packaging, unless specified otherwise in the confirmation of order. Our prices do not include value-added tax. Where applicable, this will be specified separately on the invoice at the statutory rate applicable on the date of invoicing. The costs for packaging will be charged at our discretion.
2. Deliveries are performed exclusively on the basis of cash on delivery or advance payment in the currency "EURO".
3. All orders are performed on the basis of the prices and discount rates applicable at the time of delivery. A discount for cash payment may only be deducted in case of a specific written agreement between us and the customer. This written agreement may also be deemed concluded, for example, by way of our confirmation of order.
4. Deliveries on account must be expressly agreed. The purchase price is then due for payment net (without deductions) immediately upon receipt of the invoice by the customer, insofar as no other period for payment is stipulated in the confirmation of order. A payment is only deemed effected once we are able to dispose of the amount. In case of payments by cheque, the payment is only deemed effected after the cheque has been submitted and credited to our account. We are not obliged to accept bills or drafts.
5. If the customer falls into arrears with payment, then the statutory rules shall apply.
6. All claims against the customer on our part become due for payment immediately, if a deadline for payment is not observed or the customer violates other contractual agreements or we gain knowledge of circumstances which may be expected to reduce the creditworthiness of the customer. In such a case, we are furthermore entitled to perform any outstanding deliveries only against advance payment or the furnishing of security, even if other agreements were reached previously. Following expiry of a reasonable period of grace, we are in this case also entitled to withdraw from the contract or to demand compensation for non-performance. We may furthermore prohibit the resale of goods supplied subject to a reservation of ownership, demand their return or transfer of immediate possession at the expense of the customer, and cancel an authorisation to collect.
7. The customer is only entitled to offset payments if the counterclaims are non-appealable, recognised by us or undisputed, even if notifications of defects or counterclaims are pending. The customer is only entitled to exercise a right of retention if his counterclaim is based on the same contractual relationship.

IV. Period for delivery or performance

1. Delivery dates and deadlines are exclusively non-binding indications, unless expressly agreed as binding. The delivery period specified by us begins only after clarification of all technical questions and details of performance.
2. The customer must fulfil the obligations resting upon him properly and in good time. The agreed delivery deadline is extended – notwithstanding our rights arising from the customer's default – by the period by which the customer is in default with his obligations from the present or any other contract. This applies also where a fixed delivery date was agreed.
3. If the underlying transaction of the purchase contract is a fixed-date transaction in the sense of § 286 para. 2 no. 4 BGB (German Civil Code) or § 376 HGB (German Commercial Code), then we are liable in accordance with the statutory regulations. The same applies also where the customer is entitled to assert the frustration of his interest in further performance of the contract due to a delay in delivery attributable to us. In this case, our liability is limited to the amount of the foreseeable, typically arising damage. The limitation of liability is not applicable where the delay in delivery is due to a deliberate violation of the contract attributable to us, for which purposes such fault on the part of our representatives or agents is deemed attributable to us.
We are similarly liable towards the customer in accordance with the statutory regulations in case of a delay in delivery arising from a deliberate or grossly negligent violation of the contract attributable to us, for which purposes such fault on the part of our representatives or agents is deemed attributable to us. Our liability is limited to the amount of the foreseeable, typically arising damage if the delay in delivery is not due to deliberate violation of the contract attributable to us.
4. In a case in which a delay in delivery attributable to us arises from culpable violation of an essential contractual duty, for which purposes such fault on the part of our representatives or agents is deemed attributable to us, we are liable in accordance with the statutory regulations with the proviso that the liability for compensatory damages is in this case limited to the amount of the foreseeable, typically arising damage.
5. The customer is in case of a delay in delivery attributable to us otherwise entitled to demand flat-rate compensation amounting to 0.5% of the delivery value for each full week of the delay, but in total no more than 5% of the delivery value.
6. All further liability for a delay in delivery attributable to us is excluded. Further statutory claims and rights on the part of the customer which may be available to him alongside the claim for compensatory damages due to a delay in delivery attributable to us remain unaffected.
7. We are entitled to effect partial delivery or partial performance at any time, insofar as this is reasonable for the customer.
8. Delivery deadlines are deemed to have been observed if the goods leave our premises in good time.
9. Cases of force majeure entitle us to delay the delivery for the period of the hindrance and a reasonable response time or else to withdraw from the portion of the contract which has not yet been performed. Strikes, lock-outs and other circumstances which significantly impair or otherwise render our delivery impossible are deemed equivalent to force majeure, irrespective of whether they affect us directly or a supplier. The customer is entitled to demand a statement from us as to whether we intend to withdraw or deliver within a reasonable period. If we make no such statement, then the customer is entitled to withdraw.
10. If the customer falls into default with his acceptance of our delivery, then we are entitled to demand reimbursement of the damage incurred and any additional expense. The same applies also where the customer culpably violates duties to cooperate. The risks of deterioration and accidental loss pass to the customer with his default in accepting or debtor's delay.

V. Transfer of risk – Dispatch and packaging – Delivery

1. Goods are dispatched and delivered insured at the customer's risk and expense, unless we have been prohibited accordingly by the customer. We will make every effort to take into account the wishes and interests of the customer when choosing the form of dispatch and forwarding route; any ensuing additional costs are to be paid by the customer, even if carriage-paid delivery was otherwise agreed. All liability is excluded in respect of the choice of transport means and forwarding route.
2. All risk passes to the customer upon handing-over to the forwarder, carrier or the customer himself as collector, but at the latest upon the goods leaving the works or warehouse.
3. In case of deliveries with erection or assembly at the customer's site, risk passes upon taking-over for own operations or, if agreed, after successful test operation. If the dispatch, delivery, start or performance of erection or assembly, taking-over for own operations or test operation is delayed for reasons attributable to the customer, or of the customer falls into default of acceptance for any other reasons, then risk already passes to the customer with the corresponding readiness.
4. We do not take back transport packaging or any other packaging in accordance with the directive on packaging, with the exception of pallets. The customer must provide for disposal of the packaging at his own expense.
5. If dispatch is delayed at the wishes or through the fault of the customer, then we take the goods into storage at the customer's risk and expense. In this case, the notification of readiness for dispatch is deemed equivalent to actual dispatch.
6. The minimum order amount for deliveries to be dispatched is 100 EURO (excluding VAT) for inland sales or 250 EURO for foreign sales. Inland orders below the minimum order value will be delivered subject to invoicing of an extra handling charge of 50 EURO (excluding VAT), in addition to the usual costs for packaging and dispatch. Foreign orders below the minimum order value will not be accepted for delivery.
7. Orders for custom products or for quantities and dimensions which are not specified in our catalogue must be submitted in written form by the customer. Where appropriate, an agreed advance payment must be made. If we accept orders for custom products in large quantities, then our delivery may exceed or fall short of the specified quantity by a reasonable amount (generally ±10%). Dispatch packaging is always charged at cost price.

VI. Warranty/liability

1. In contractual relations with registered traders and between companies we give a warranty of freedom from defects for our products for a period of one year.
2. For milling spindles and other wearing parts we give a warranty of freedom from defects for a period of 6 months. This warranty period of 6 months applies also to milling spindles which are integrated into a machine system.
3. Advice on applications is provided according to the best of our knowledge. All specifications and information with regard to the suitability and applicability of our goods, however, remain non-binding and do not release the customer from the requirement to perform his own calculations, tests and trials. The customer is himself responsible for compliance with statutory and authority regulations concerning use of the goods. We are liable for the suitability of the goods for a particular purpose only if this suitability has been expressly warranted in writing.
4. We provide a warranty for material defects as follows, to the exclusion of all further claims and subject to the following stipulations and the stipulations of Sections VIII and IX:
5. If the customer is a registered trader, he can assert claims for defects only if he has complied properly with his duties of inspection and notification of complaint in accordance with § 377 HGB. Other customers must submit their notice of complaint to us in writing within 10 days after receiving the goods. In the case of transactions with non-traders this applies only insofar as the defect is an evident defect. Notices of complaint can only be considered if the goods are still in the state in which they were delivered.
6. In case of justified notifications of defect we are entitled, to the exclusion of rights on the part of the customer, to withdraw from the contract or to reduce the purchase price or else obliged to rectify our performance, unless we are entitled to refuse rectifying performance on the basis of statutory regulations. The customer must grant us a reasonable period for rectifying performance. The rectifying performance may be effected by way of remedying of the defect (reworking) or replacement delivery at our own discretion. We bear the necessary expenses in case of remedying of the defect, insofar as the expenses are not increased due to the goods concerned being at a place other than the place of performance. If the rectifying performance is not successful, the customer may at his own discretion demand a reduction of the purchase price or declare his withdrawal from the contract. Remedying is deemed unsuccessful after the second unsuccessful attempt, insofar as further attempts at remedy are not justifiable and reasonable for the customer on account of the nature of the goods. The customer may only assert claims for damages due to defect under the following terms after an unsuccessful attempt at rectifying performance. The customer's rights to claim further damages under the following terms remain unaffected.
7. Returns of goods subject of a complaint are permissible only with our consent. Goods must be returned in the original or an equivalent packaging. Carriage costs are to be paid by the customer. Costs will be reimbursed only in case of a justified notification of defect. If the customer demands an inspection of the delivered goods and specifies a defect for which we would be liable, then we charge a handling fee for each inspected item which is shown not to be defective.
8. Warranty claims on the part of the customer expire one year after delivery to the customer, unless we have fraudulently concealed the defect; in this case the statutory regulations shall apply. Our duties arising from Section VI no. 9 and Section VI no. 10 remain unaffected.
9. We are obliged in accordance with the statutory regulations to take back the new goods or else to reduce the purchase price also without the otherwise necessary specification of a deadline if the customer's customer as end user of the new movable sold (consumer goods sales) is able to demand return of the goods or reduction of the purchase price from the customer due to the defect in the goods or if such a resulting claim under a right of recourse has been expressed against the customer. We are in this case furthermore obliged to reimburse the expenses, in particular transport, travel, labour and material costs, incurred by the customer in conjunction with his rectifying performance for the end user due to a defect in the goods present at the passing of risk from us to the customer. This claim is excluded if the customer failed to comply properly with his duties of inspection and notification of complaint in accordance with § 377 HGB.
10. The obligation under Section VI no. 9 is excluded insofar as the notice of defect is based on marketing statements or other contractual agreements which did not originate from us, or if the customer has given special guarantees to the end user. The obligation is similarly excluded if the customer himself was not obliged to perform the warranty duties towards the end user under statutory regulations or failed to assert such opposition to the claim made against him. This applies also where the customer has performed warranty duties towards the end user which go beyond the statutory scope.
11. We are liable according to the statutory regulations and irrespective of the following limitations of liability for injury to life, body or health which is attributable to a negligent or deliberate violation of duties by us, our legal representatives or our agents, as well as for damage which is covered by a liability under the Product Liability Act (Produkthaftungsgesetz). In case of damage which is not covered by sentence 1 above and which is attributable to deliberate or grossly negligent violations of contract or fraudulent actions by us, our legal representatives or our agents, we are liable in accordance with the statutory regulations. In this case, however, the liability for damages is limited to the amount of the foreseeable and typically arising damage, insofar as we, our legal representatives or our agents have not acted deliberately. To the extent to which we have given a warranty of quality or durability in respect of the goods or parts thereof, we are liable also within the framework of this warranty. In case of damage arising from the absence of the warranted quality or durability but not directly in the goods themselves, however, we are liable only where the risk of such damage is evidently covered by the warranty of quality and durability.
12. All further liability is excluded, irrespective of the legal nature of the asserted claim. This applies in particular also to tortious claims or claims for the reimbursement of futile expenses in lieu of performance; our liability in accordance with Section IV no. 6 to Section IV no. 10 of these terms and conditions remains unaffected. Where our liability is excluded or limited, this applies also to the personal liability of our staff, employees, representatives and agents.
13. Claims on the part of the customer for compensatory damages due to a defect expire one year after delivery of the goods. This does not apply in cases of injury to life, body or health for which we, our legal representatives or our agents are to blame, or where we or our legal representatives have acted deliberately or with gross negligence, or where our simple agents have acted with gross negligence.
14. We furthermore accept no liability for damage arising from the following circumstances: Unsuitable or improper use or storage, incorrect assembly by the customer or any third party, own modifications and attempts at repair, natural wear, incorrect or negligent handling, chemical influences, electrical influences, etc. over which we have no control, as well as in case of use for purposes other than those intended or failure to observe our operating instructions and catalogue specifications. Our warranty is also waived if the customer or any third party performs modifications without our prior written authorisation and without any other justification (delayed rectification of a fault on our part), in particular modifications to controllers/software, even if the fault occurs in a part which was not modified.
15. In case of legal defects, where use of the delivered goods violates industrial property rights or copyright in Germany, we will at our expense obtain a principle right for the customer or else modify the delivered goods in a manner reasonable for the customer and such that the rights are no longer violated. If this is not possible at economically reasonable expense or within a reasonable period, then the customer is entitled to withdraw from the contract. We will furthermore indemnify the customer against any undisputed or non-appealable claims.
16. Our above obligation is attendant subject to the above liability stipulations for cases of violation of property rights and copyright. The obligation under clause 15 is thus only effective if the customer informs us without delay of any claims of violation of property rights and copyright, the customer supports us to a reasonable extent in contesting the asserted claims and/or permits us to make corresponding modifications, we retain the right to take all defensive measures, including out-of-court settlements, the violation is not attributable to an instruction of the customer, and the violation is not due to the customer himself modifying the delivered goods or using the goods in a manner not compliant with the contract.

VII. Repairs and returns

1. If the customer wishes a cost estimate to be provided before performance of repairs, then this must be expressly specified. The costs of carriage and packaging are to be paid by the customer. The invoice amount for repairs is payable immediately without deductions of any kind. All repairs, including those performed as warranty repairs, are performed at our works, insofar as no other written agreement exists.
2. Returns of delivered goods are possible only after prior consultation and agreement, and are subject to appropriate mark-downs. All returns of custom products and software are excluded! All shipments and returns are to enclose a copy of the delivery note or invoice. The costs of the return shipment are to be paid by the customer. Returns must be delivered free of charge to our address.

VIII. Assembly

1. Assembly work is to be paid for separately, unless agreed otherwise in writing. The costs of assembly comprise in particular travel costs, daily allowances, the usual daily rates for working time and supplements for overtime, for work at nights or on Sundays and public holidays, for work under aggravated circumstances and for planning and supervision.
2. The costs for preparation, travelling, waiting and site-to-quarters times will be invoiced separately. If the assembly or commissioning is delayed for reasons not attributable to us, then the customer is to bear all costs for the waiting time and for any further travel which becomes necessary.
3. The customer is at his own expense to provide the necessary helpers in appropriate numbers with their required tools. The customer is furthermore to provide sufficiently large, suitable, dry and lockable rooms for the keeping of machine parts, equipment, materials, tools, etc. He is to take the same measures to protect our property and the assembly personnel as he would take to protect his own property. If the nature of the customer's operations requires special protective clothing or protective equipment for the assembly personnel, then he is also to provide this clothing and equipment.
4. Our assembly personnel and their subcontractors are not authorised to perform work which is not performed to fulfil our obligation to deliver and erect or assemble the goods nor to have such work performed by the customer or a third party without prior consultation with us. We are not liable for such work which is not attributable to our sphere of responsibility. If the assembly is performed by the customer or a third party commissioned to do so by him, then our correspondingly valid operating and assembly instructions are to be observed.

IX. Software, use of software and supplementary warranty and defect claims

1. For all software of whatever kind from us, including the corresponding documentation, the customer is in exchange for payment granted a non-exclusive, non-transferable and in terms of time unlimited right of use on a particular or individually specified hardware product. We remain the holders of the copyright and all other industrial property rights. The right of duplication is granted only for the purpose of data backups. Copyright notices must not be removed.
2. We supply installation and start-up instructions with appropriate safety notes for the software in printed form. All other documentation is provided only in the form of software data. When a new software release is sent to the customer, the correspondingly necessary software data will also be sent. We are also entitled to supply the documentation by way of an online help function or online documentation.
3. All communication to third parties requires our prior written consent. Where software is supplied for the purpose of resale, acceptance of this condition by the third party must be ensured. Modifications are not permitted.
4. In case of a violation of these stipulations, the customer is to pay a contractual penalty amounting to 10 times the order value for each violation. Further claims for compensatory damages remain unaffected. The contractual penalty is to be offset from any claims for compensatory damages. The customer is entitled to furnish proof that less or no damage has been incurred. The software and the corresponding documentation are in this case to be returned without delay.
5. The above stipulations are not applicable to exclusively customer-specific software developed on the basis of specifications provided by the customer. Such software developed within the framework of a contractually agreed complete control solution is composed specifically for the customer through the combination of modular software components created for a diversity of application cases (standard software modules) and is matched to the contractual performance specifications (customer-specific application software).
6. Upon full payment of the purchase price for the customer-specific application software, we grant the customer an exclusive and in terms of territory and time unlimited right of use, but without the customer acquiring any rights of any kind in respect of the individual standard software modules on which the customer-specific adaptation is based.
7. Irrespective of these stipulations, we remain entitled to create and offer further customer-specific software solutions on the basis of this development to accommodate the task specifications of other customers. We in any case retain a simple right of use in respect of the customer-specific solutions for our own internal purposes.
8. Subject to the stipulations of Section VI, we provide a warranty for the proper duplication of our software. Software from us will run on hardware products specified by us. Warranty duties are fulfilled by way of replacement delivery. Beyond this, we give no warranty regarding the flawless quality of the software and its data structure, unless agreed otherwise in writing. In the case of customer-specific software, we give a warranty in respect of the function and performance properties defined in the specifications, the confirmation of order, the documentation or the jointly determined work/process descriptions. We give no warranty regarding the flawless quality of the programs as used in all applications intended by the customer, in particular not in those applications which were not known to us or tested at the time of creation/acceptance.

X. Reservation of ownership

1. The supplied goods remain our property until all claims have been settled, including all open account balance claims which we hold now or in the future against the customer (reserved goods). In case of behaviour contrary to the contract on the part of the customer, e.g. payment arrears, we are entitled to take back the reserved goods after having previously specified a reasonable period of grace. If we take the reserved goods back, then this is deemed to represent withdrawal from the contract. If we seize the reserved goods, then this is deemed to represent withdrawal from the contract. We are entitled to dispose of reserved goods which are taken back. After deduction of a reasonable amount to cover the costs of disposal, the proceeds of disposal are to be offset against the amounts owed to us by the customer.
2. The customer is to handle the reserved goods with due care and is at his own expense to insure them adequately for their original value against fire, water damage and theft. Maintenance and inspection work which becomes necessary is to be performed by the customer in good time and at his own expense.
3. The customer is entitled to resell and/or make use of the reserved goods in the course of proper business, provided he is not in arrears with payments. He is not permitted to pledge the reserved goods nor to assign them as security. Claims arising from reselling or on any other legal basis (insurance, unlawful action) in respect of the reserved goods (including all open account balance claims) are already herewith assigned to us in full by the customer as security; we herewith accept this assignment. We authorise the customer revocably to collect the claims assigned to us in his own name for his account. The authorisation to collect can be revoked at any time, should the customer fail to properly fulfil his payment obligations. The customer is also not authorised to assign claims for the purpose of collection by way of factoring, unless an obligation is founded at the same time whereby the factor is to effect considerations up to the amount of the claims directly to us as long as we still hold claims against the customer.
4. Any processing or refashioning of the reserved goods by the customer is in all cases deemed to be performed on our behalf. Insofar as the reserved goods are processed with other items not belonging to us, we acquire co-ownership of the new goods according to the ratio between the value of the reserved goods (final invoice amount including VAT) and that of the other processed items at the time of processing. The same stipulations apply to the new goods arising through such processing as to the reserved goods. Where the reserved goods are combined inseparably with other items not belonging to us, we acquire co-ownership of the new goods according to the ratio between the value of the reserved goods (final invoice amount including VAT) and that of the other combined items at the time of combining. If the customer's product is to be considered the principal good as a result of the combining, then we and the customer are agreed that the customer is to assign proportional co-ownership of this good to us; we herewith accept this assignment. Our resulting sole or co-ownership of a good is to be kept for us by the customer.
5. In case of access to the reserved goods by a third party, in particular in case of seizure, the customer is to draw attention to our ownership and is to inform us without delay so that we are able to assert our ownership rights. If the third party is not in a position to reimburse the judicial and extrajudicial costs incurred by us in this connection, then the customer is to be liable accordingly.
6. We are obliged to release securities assigned to us insofar as the realisable value of our securities exceeds the secured claims by more than 10%; the decision as to which securities are to be released is left to our discretion.

XI. Place of performance, place of jurisdiction and applicable law

1. The place of performance and jurisdiction in respect of deliveries and payments (including actions pertaining to cheques and bills) as well as for all disputes arising between us and the customer from purchase contracts concluded between us and the customer, if the customer is a registered trader, a legal person under public law or a special trust under public law, or if he has his residence or business offices outside the Federal Republic of Germany, is the court at the place of our business offices in 36124 Eichenzell, Germany. We are entitled, however, to file action against the customer at the place of his residence or business offices.
2. The relationships between the contract parties are governed solely by the law applicable in the Federal Republic of Germany to the exclusion of all bilateral and multilateral treaties relevant to the transaction; the applicability of UN Law on International Sales, in particular, is excluded.

XII. Miscellaneous

1. If the customer exports our goods to territories outside the Federal Republic of Germany, then we accept no liability for an ensuing violation of property rights held by third parties. The customer is obliged to provide compensation for all damage arising from the exporting of goods which we did not supply expressly for export.
2. If any of the stipulations of these general terms and conditions of business are shown to be invalid, then this shall not affect the validity of the remaining stipulations. We and the customer are to replace the invalid stipulations with new stipulations which are legally permissible and correspond as closely as possible to the original legal and economic intention and purpose.
3. All changes and amendments to these general terms and conditions of business become effective only if executed in writing. This applies also to an agreement to waive this requirement of the written form.

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