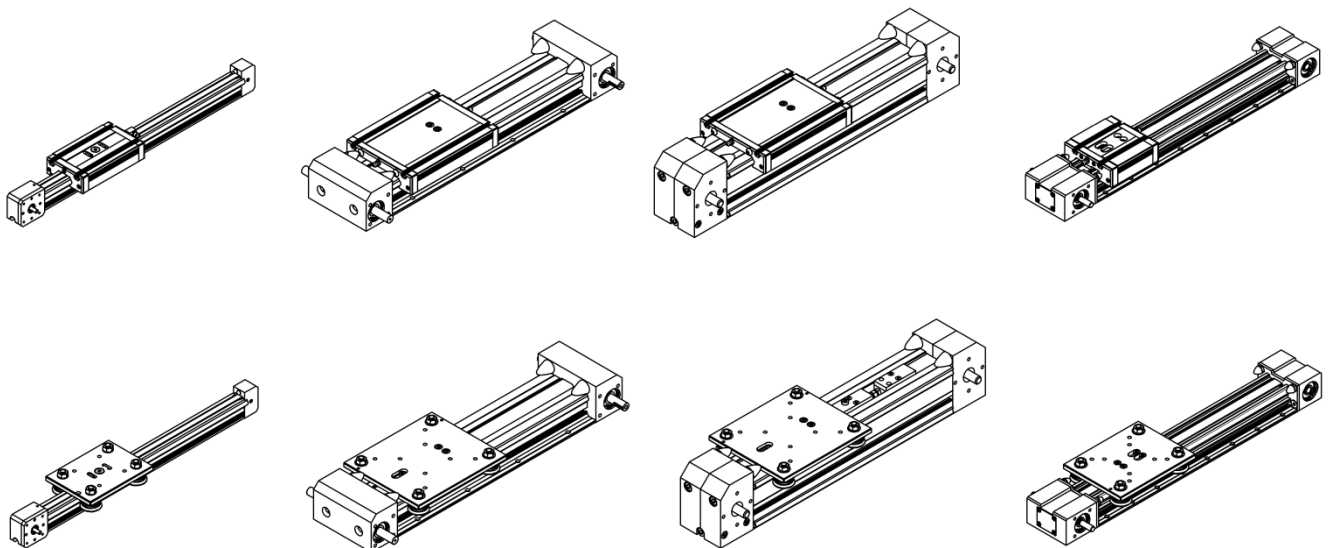


Linear units with **t**oothed belt drive

LEZ 1 – LEZ 2 – LEZ 3 – LEZ 9



Assembly instructions with:

- Installation instructions
- Maintenance instructions
- Declaration of incorporation

for a drive system

(A partly completed machinery as defined in Machine Directive 2006/42/EG)

About these assembly instructions

Abbreviations





MD = Machine Directive 2006/42/EG
 LEZ = Linear unit with toothed belt drive
 AC = Alternating Current, AC servomotor (always synchronous motor)
 BDC = Brushed DC, brush type Direct Current (DC) servomotor
 BLDC = Brushless DC servomotor
 PDF = Portable Document Format

Terminology

In these assembly instructions, "Product" always means linear unit with toothed belt drive.

Symbols used

In these instructions you will find various symbols which are there to alert you to important information / facts and hazards:

Symbol	Signal word	Meaning
	Danger	Warning of possible serious to fatal injuries to persons
	Caution! Fatal Voltage!	The lightning symbol is a clear warning of danger from electric current! Failure to heed this warning can lead to personal injuries with fatal consequences.
	Warning, caution!	Warning of possible minor injuries to persons, of possible faults or destruction of the product or possible damage to property. Failure to take account of the circumstances indicated by this symbol (text, picture or table) can result in serious damage to property.
	Important information or piece of advice	This is important information or a piece of advice on the functioning of this product.

Observing the safety instructions



Before commissioning the axis system (as a partly completed machine), working with it or making any additions or modifications to the electrical installation of the linear units, it is essential that you carefully read:

- the safety guidelines in these assembly instructions
- the safety guidelines for electric drives and control systems in the instruction manual of the positioning module, drive controller, drive module or drive control used.

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Although every care has been taken to avoid printing errors and mistakes, these cannot be ruled out. We would be grateful for any suggestions for improvements or information on possible mistakes or unclear formulation of facts and illustrations.

Note on CE compliance for partly completed machines:

isel/ linear units are CE compliant. They are deemed partly completed machines as defined in Machine Directive 2006/42/EG and are accordingly not marked explicitly with the CE symbol.

Only after the compliance assessment procedures for the machine have been completed is the (complete) machine or system in which these linear units are installed awarded the CE mark by the manufacturer or distributor of the machine.

No other machine parts and/or machine components to which the CE safety guidelines apply may be commissioned until all the relevant requirements of Machinery Directive 2006/42/EC are met.

isel Germany GmbH does not accept any responsibility once modifications have been made to the linear unit.

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Version of this documentation: **October 2011**

Other documentation from isel Germany GmbH:

'Nothing is so good it can't be improved upon.' In accordance with this motto, as the manufacturer, we are constantly improving all our manuals (including operating instructions and assembly instructions) at considerable cost to ourselves.

We are committed to doing so since this is of benefit to both you as our customers and us:

We want you to be able to work efficiently with the appropriate manuals and find the information you are looking for quickly. Many details in the manuals are the result of information we have received from our customers.

To support you, all the manuals are available to download in PDF format on our homepage:

<http://www.manuals.isel.com>

**In your own interest:**

Please read these assembly instructions carefully and keep them in a safe place. These instructions are part of the product "Linear unit with toothed belt drive LEZ 1 – LEZ 2 – LEZ 3 – LEZ 9", regardless of whether these instructions are supplied/available on an electronic storage medium (as PDF file on a CD, DVD or USB memory stick) or in printed form.

Please read and follow the safety guidelines in these assembly instructions.

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1 General

This manual contains all important information about the assembly/installation, commissioning and maintenance of your linear units. In addition, it provides information and important notes for your safety.

The isel linear units LEZ 1 – LEZ 2 – LEZ 3 – LEZ 9 are linear modules with toothed belt drives, ready for installation, which are used mainly in factory automation, handling systems and in light engineering.

These linear units are available in various standard lengths and can be fitted with special motor connections.

The wide range of configuration and combination options gives the user plenty of scope to implement his design ideas.

Please note:

The product is classed as an 'partly completed machine' and not a (complete) machine according to MD 2006/42/EC.

1.1 Safety guidelines



The following guidelines on safety and hazards are intended to protect you, third parties and the product. It is therefore essential you follow them.

Operating environment

- The product must not come directly into contact with moisture or water. The system (machine/system, in which the product is installed) is only suitable for dry premises indoors.
- When moving the product from cold to warm conditions, allow the product to adjust to the change in temperature for a few hours, to avoid possible damage from condensation.
- Do not install the product near devices which generate powerful electromagnetic fields. This could impair its operation.
- Avoid environments exposed to direct solar radiation, extreme heat, cold, humidity or moisture.

Power supply (only applies to products with multiphase motors, brushed DC/brushless DC or AC servomotors and a suitable motor output stage/controller)

- Connect the power supply for the output stage of the multiphase motor/output stage of the iMD10/iMD20 servomotor, the intermediate circuit of the final stage of the iMD40 servomotor (L, N and PE terminals) or the isel single axis/multi-axis controller (e.g. iMC-P/iMC-S8, MC-1-series, iPU-series, etc.) only to a grounded mains socket with a mains voltage of 230V AC/50...60 Hz (single phase of the AC grid).
- It is preferable to use for the output stage of the multiphase motor or the output stage of the iMD10/iMD20 servomotor the original power supply recommended by isel Germany GmbH (primary switching-mode power supply: 230V AC, secondary: 48V DC). Using a different, inappropriate power supply renders the warranty null and void. In addition, using an unsuitable power supply is associated with risks from electrical currents, such as electric shock, fire or short circuit!
- If you observe faults, operate the EMERGENCY STOP button on the (single axis) controller, the CNC control panel/CNC control console, the switchgear cabinet/switchgear box or a manual control device. Activating the EMERGENCY STOP button interrupts the power supply to the motor output stage. If the power supply used is damaged, you must not use it. Have a qualified technician check and if necessary repair the product.

The linear unit

- For safety reasons, in-house rebuilding and/or changing of the linear unit is forbidden.
- In operation, the linear unit must not be covered by supplies (electricity or compressed air), objects (e.g. tools) or tarpaulins, packaging or other materials etc. (e.g. clothing), because this can lead to mechanical damage or heat obstruction and sometimes fire.
- If using a single-axis/multi-axis controller to control a linear unit (equipped with an AC, brushed DC (BDC) or a brushless DC (BLDC) servo motor), you need to ensure that the controller or motor output stage used (in a control cabinet or on a mounting rack) is placed in a well-ventilated environment.

Operation

(applies only to products supplied with a motor and a suitable motor output stage or a suitable controller, e.g. a single-axis controller)

- Only if the motor, the tactile or inductive limit switches, the brake and the incremental measuring system (encoder) to the motor output stage/controller are correctly assembled, will parameterisation, commissioning and operation/programming of the product (as a fully-functioning drive system) function correctly. If the product malfunctions or you are unclear about its operational status, you should consult the relevant operating instructions/assembly instructions.

<http://www.manuals.isel.com>

- Here you will find instructions and information on how to check the functions you require and remove the causes of a possible malfunction or have these removed.
- You **must always carry out the instructions you find completely and correctly in order to ensure the product functions correctly.**
- Never allow children or other persons who are vulnerable or at risk to operate the product unsupervised.

1.2 Proper use

Linear units are used for linear movement of loads mounted firmly on the shaft slots/trolley in an environment where there is no risk of explosion under the defined operating and environmental conditions for this product. The device can be installed in any position (horizontally, vertically or at an angle).



The toothed belt drives in linear units do not generally lock automatically.

With vertical installation, the linear unit's motor (in this case, the weight of the shaft slot/trolley and the load to be moved must be calculated) should have a brake, which locks the movable shaft slots of the linear axis to prevent crashing/pancaking when the power is turned off. If no brake (e.g. magnetic brake) is fitted to the motor, another (electro-)mechanical brake must be used, e.g. on the toothed belt wheel.

The linear units referred to in these assembly instructions are considered partly completed machines (see article 2g of MRL 2006/42/EG). A partly completed machine is also defined here as follows (quote): "An partly completed machine is a unit which almost forms a machine, but cannot fulfil any given function independently".

A drive system represents a partly completed machine.

A partly completed machine is only intended to be installed in other machines or in other partly completed machines or equipment or be combined with it to form a machine together with it as defined in this directive."

The linear unit LEZ 1 – LEZ 2 – LEZ 3 – LEZ 9 is intended for installation in a machine or in other partly completed machines.

The product is not intended for use outside and for transporting people, nor in food handling areas and in clean rooms.

Any use other than as described above is improper and can lead to personal injury and damage to property.

1.3 Deliverables

The deliverables include:

- Assembly instructions and Declaration of incorporation according to MD 2006/42/EC
- Fixing material
- Limit switch cable
- Accessories (if any)

2 Installation instructions and overview of functions

This will give you an initial overview of the mechanical structure, the installation and assembly of linear units and a description of how they work.

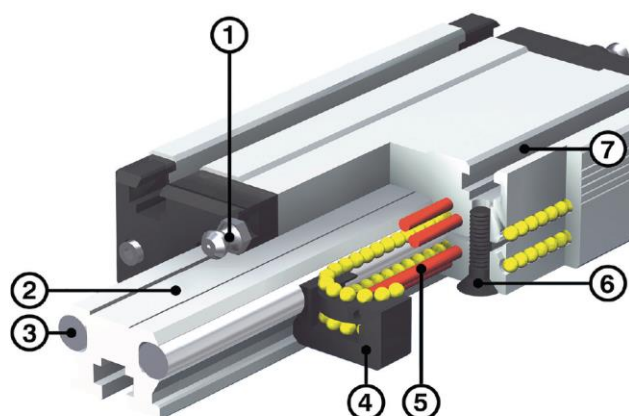
The instructions for commissioning/configuring the axis system and its programming by users depend on the motors used and the relevant controllers with output stages and can be found in the respective documentation.

2.1 Operation

Linear units in the LEZ series (toothed belt drive) are built as modules.

The basic carriers of these linear units are linear guide rails (LFS) with the corresponding shaft slots and trolley, the toothed belt drive and the optional motor drive module.

The linear guide rails (LFS) made by isel consist of rigid aluminum sections with precision steel shafts. Isel shaft slots rely on the rolling action of steel balls on steel inserts in aluminium sections and on precision steel shafts. 4 ball recirculations are used in each shaft slot. The recirculating ball steering systems are glass fibre reinforced.



Shaft slots

- 1) Lubrication on both sides for the ball recirculations.
- 2) The basic supports for all linear guides are extruded aluminium sections to DIN17615, which are fitted with T-groove slots for fastening in the base of the section or have mounting holes.
- 3) Precision steel shafts with a hardness of 60 ± 2 HRC are used as guide rails.
- 4) Glass fibre reinforced recirculating ball steering.
- 5) There are patented ball recirculation systems in the linear slot. Load-bearing balls run between two ground steel pins and the guidance shaft respectively.

run between two ground steel pins and the guidance shaft respectively.

6) The slot is adjusted by means of self-locking screws. For this, the rows of balls and shafts or pins are in contact with each other and thus pre-stressed.

The slots are set to the relevant pre-stress at the factory. All shaft slots are available as an option in stainless steel.

7) To fasten the transport loads, slot plates, etc., the shaft slots are fitted with T-groove slots and mounting holes.

Trolley

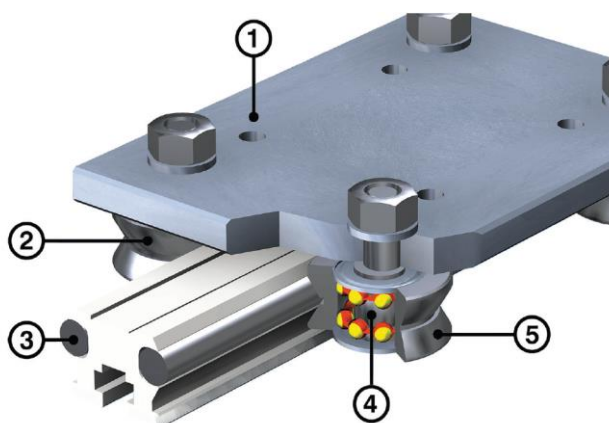
1) The ground steel fastening plate with a thickness of 8 mm is used simultaneously for housing the rollers and the load and is fitted with M6 fastening threads for this purpose.

2) Central rollers

3) All linear units can be fitted both with shaft slots and with a trolley.

4) Roller principle similar to a two-row ball bearing with ogival tracks.

5) Eccentric rollers for adjusting the trolley. All trolleys are preset in the factory.

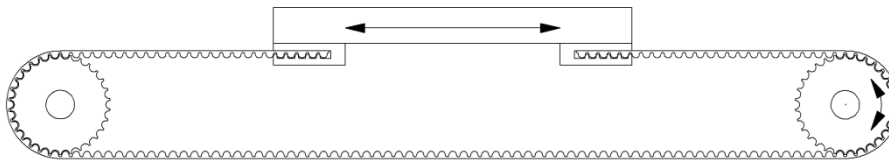


Belt drive

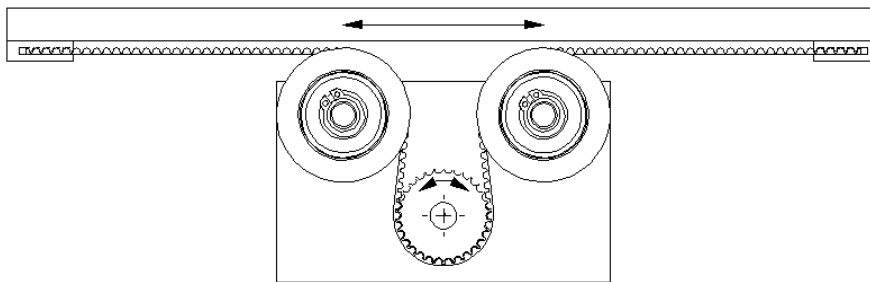
In linear units, toothed belts are used as the drive means for positioning and handling tasks. Compared with conventional chain drives, the belt drive is zero maintenance and needs no lubricating. In a circulating belt drive, there is a distinction between a stationary Ω -drive and a travelling Ω -drive for large distances. In the linear units LEZ 1 – LEZ 2 – LEZ 3 – LEZ 9, only the recirculating belt drive modus operandi is used. Linear guide rails also facilitate support for the top trunk, which leads to improved positioning accuracy with large axis lengths.

On the inside of the belt, there are rubber teeth which engage in a gearwheel. The positive fit of the gearing means that high forces can be transferred. Because the teeth preclude slippage, toothed belts are used to control or position the shaft slot/trolley.

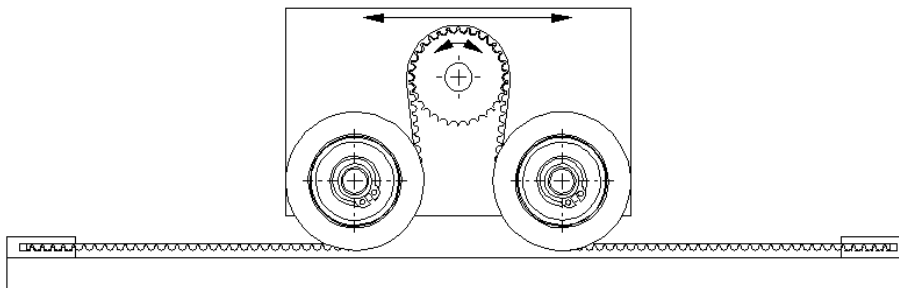
The actual force is transferred by a rope under tension embedded in the toothed belt.



Recirculating belt drive



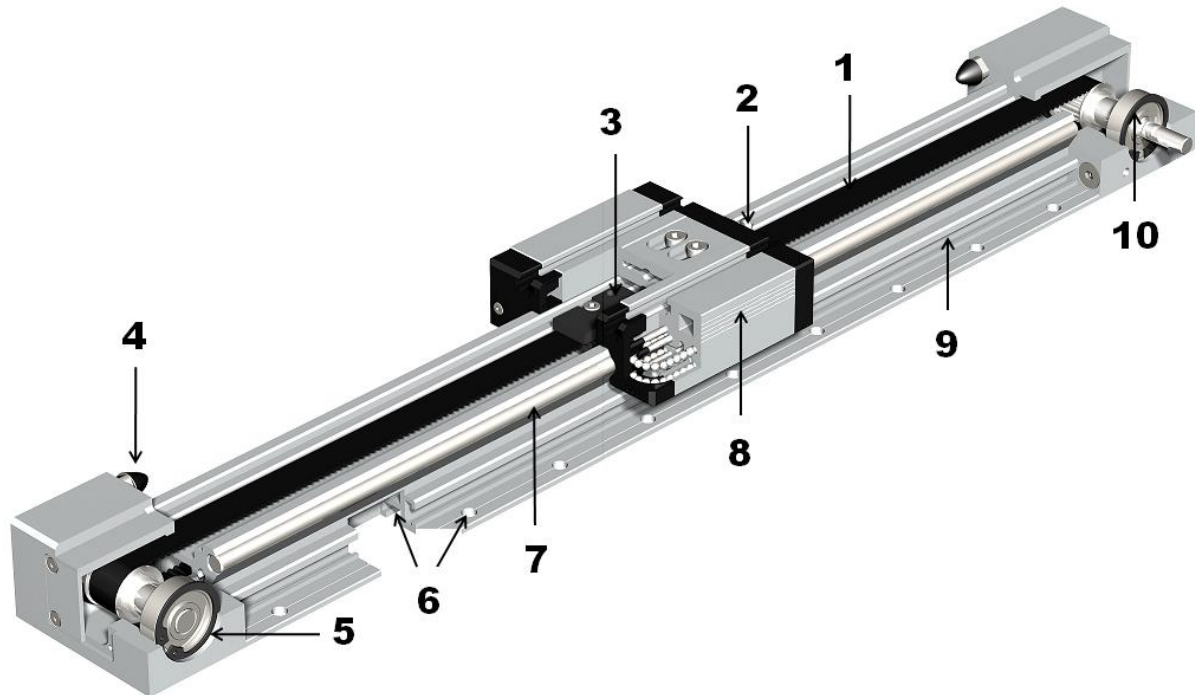
Stationary Ω -drive



Travelling Ω -drive

2.2 Construction of the toothed belt unit/drive elements

The appended drawings and part lists clarify the structure of linear units.



Example: LEZ 9

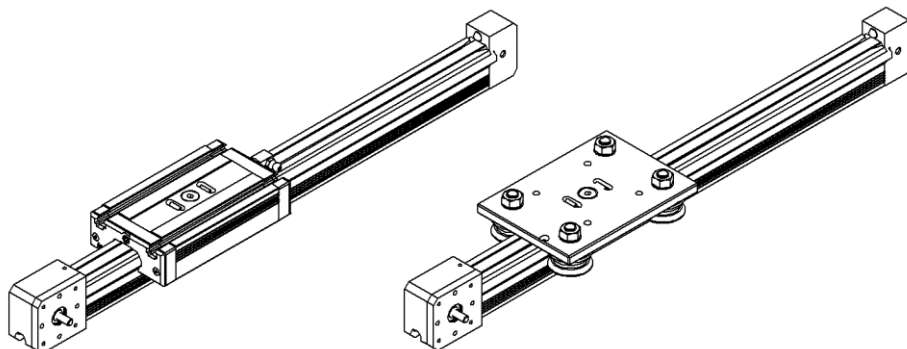
1) Toothed belt, HDT 3 M, 15 mm wide; **2)** central lubrication option; **3)** simple tensioning of the belt via locking bolts under the slot; **4)** buffers on both sides with parabolic springs; **5)** drive motor flanged on both sides; **6)** variable fixing options; **7)** 2 steel shafts Ø 8 mm pressed into the section and calibrated; **8)** patented isel shaft slots with T-groove slots, plane milled; **9)** rigid aluminium sections in lengths up to 6 m; **10)** embedded steel pinions on both sides

Alternative designs

Normally, isel linear units LEZ1-2-3-9 are delivered without drive modules.

They are prepared for use with flanged direct drive modules. However, the relevant drive modules can also be mounted to order.

LEZ 1

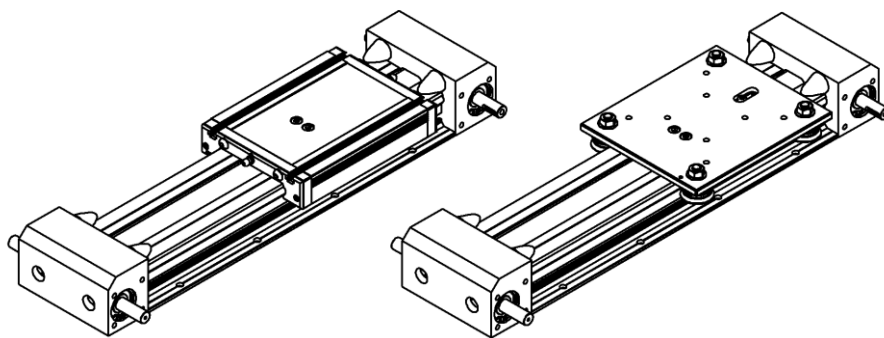


LEZ 1 with shaft slots

LEZ 1 with trolley

Ordering key	
232 005 XXXX	
Drives/Slides	Profile lengths LFS-8-2 (mm)
Trolley	
8 = without motor, with shaft slide	298, 398, 498, 598, 675, 698, 798, 998, 1498, 1798, 1998, 2498, 2998
9 = without motor, with trolley	(e. g. 398 mm = 040 675 mm = 068)
	Option: up to 6000 mm

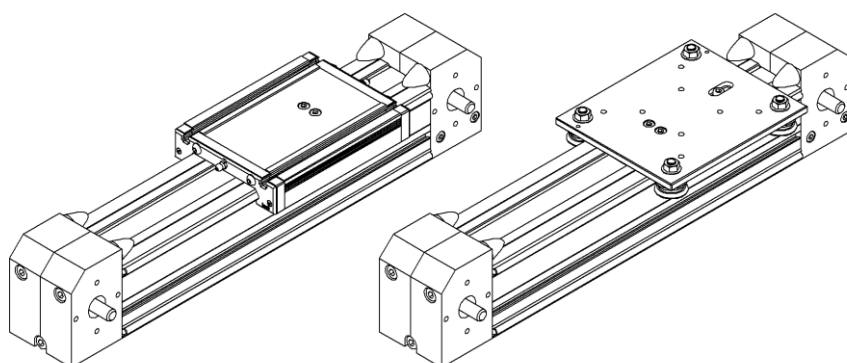
LEZ 2



LEZ 2 with shaft slots

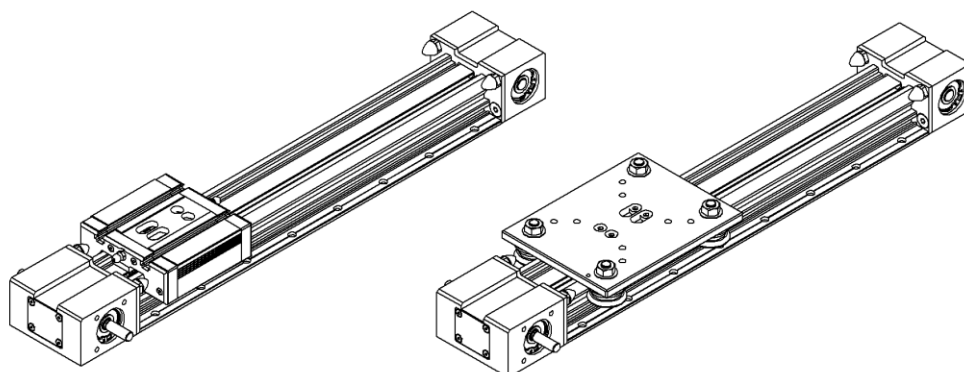
LEZ 2 with trolley

Ordering key	
232 002 XXXX	
Drives/Slides, Trolley	Profile lengths (mm)
8 = without motor, with shaft slides	696, 996, 1496, 1996, 2496, 2996
9 = without motor, with trolley	(e. g. 696 mm = 070 1496 mm = 150)
	Option: up to 6000 mm

LEZ 3


LEZ 3 with shaft slots LEZ 3 with trolley

Ordering key		Profile lengths (mm)
23200X XXXX		698, 998, 1498, 1998, 2498, 2998
		(e. g. 698 mm = 070 1498 mm = 150)
Feed	Slides, trolley	
6 = 150 mm / turn	0 = with shaft slides	
7 = 70 mm / turn	1 = with trolley	

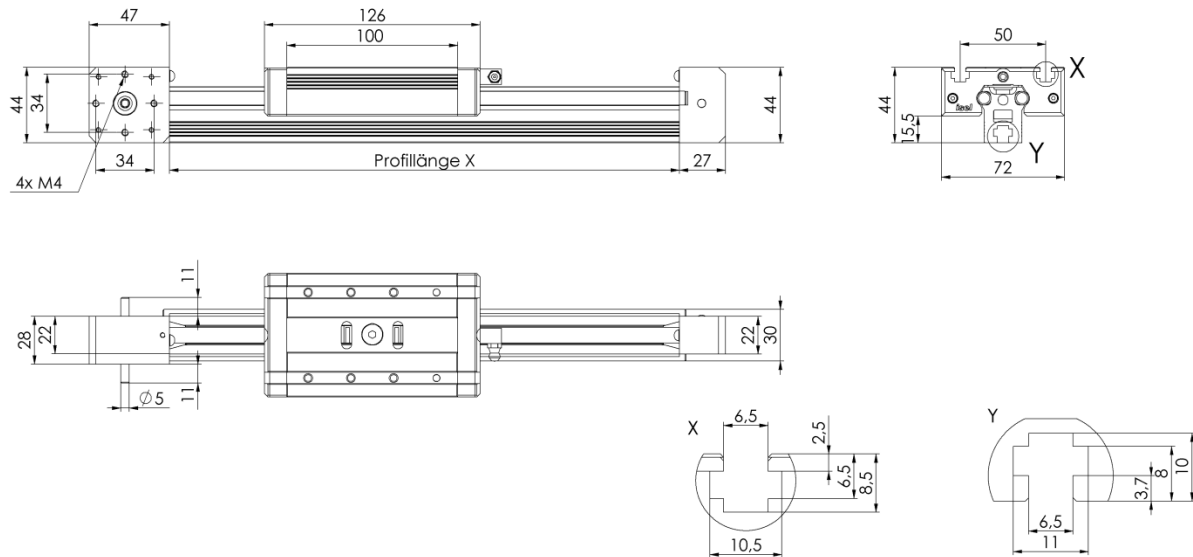
LEZ 9


LEZ 9 with shaft slots LEZ 9 with trolley

Ordering key		Note: Please order drive modules separately on the listed part numbers and specify here, whether the delivery should take place with or without attachment.
232010 XXXX*		
Profile lengths (mm) 496, 996, 1496, 1996, 2496, 2996 (e. g. 496 mm = 0050 1496 mm = 0150)		
		* Only for model with shaft slide (model with carriage on request)

LEZ 1 dimensions sheet

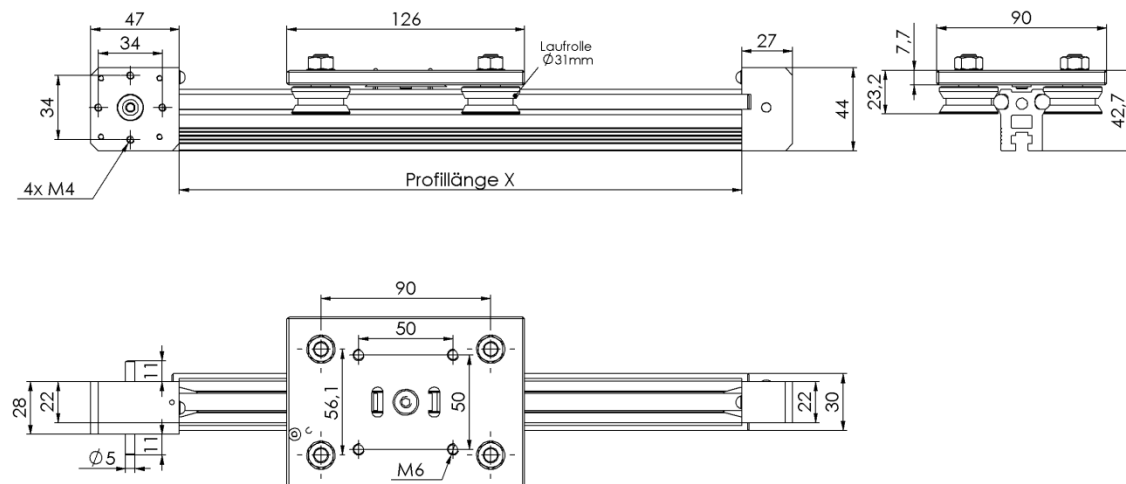
with shaft slots



Travel = Section length X – 150mm

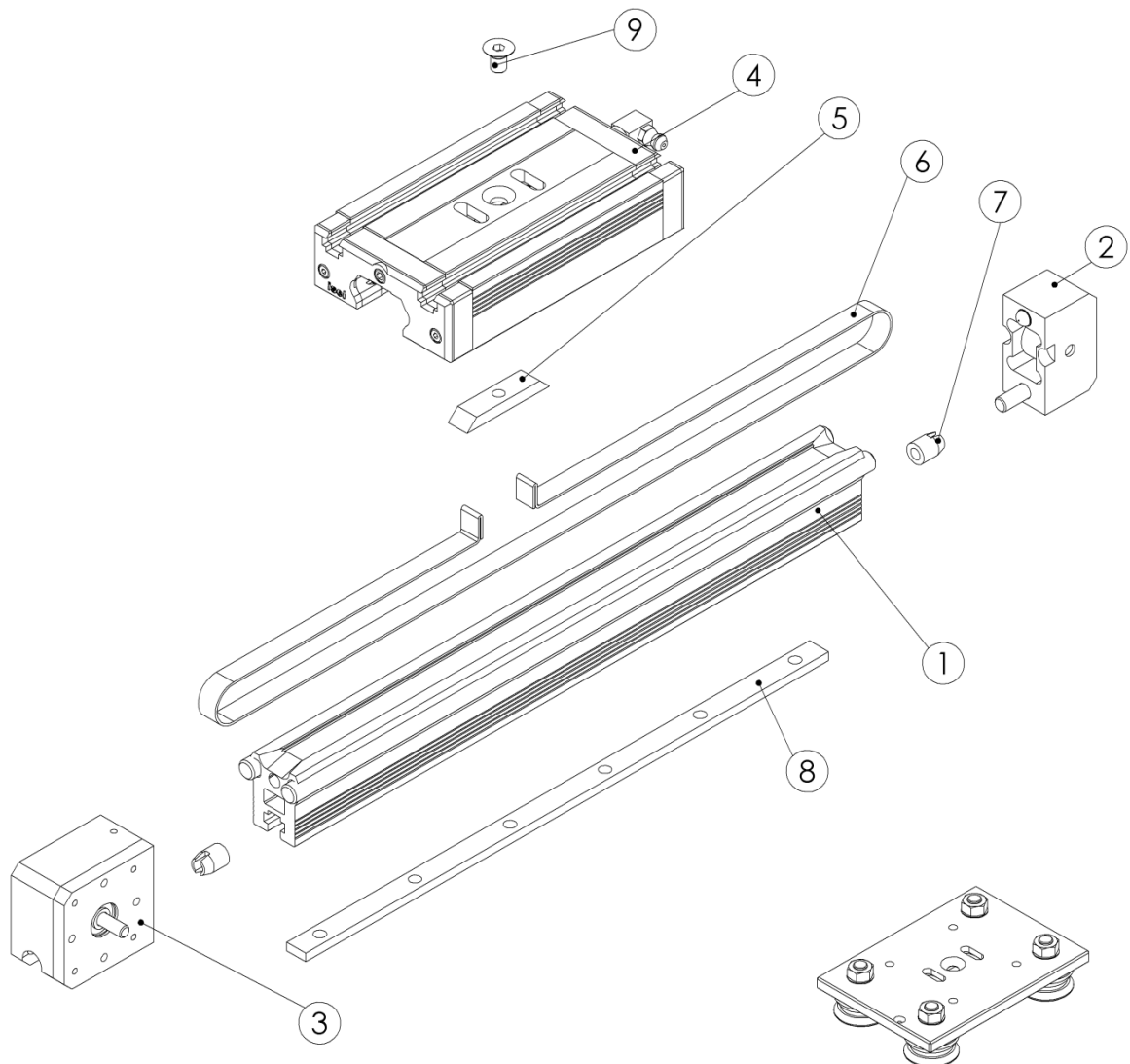
**Profillänge = section length*

with trolley



Travel = Section length X – 131mm

**Profillänge = section length / Laufrolle = roller*

LEZ 1 with shaft slots - exploded view


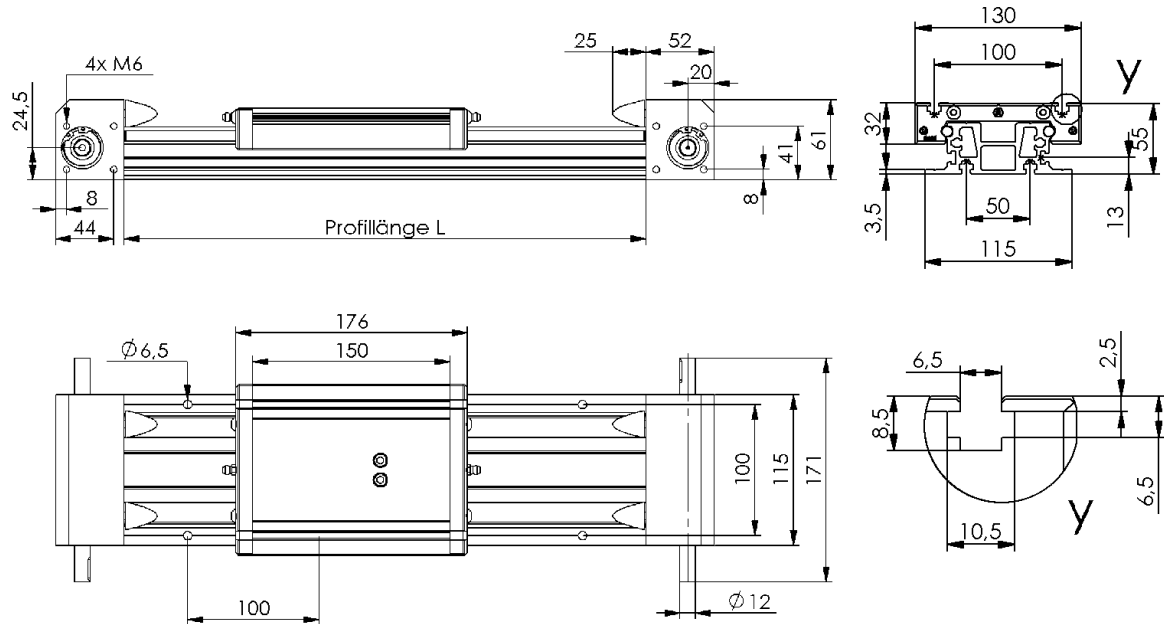
Item 4 also available as LW9
Part number: 623047 0001

LEZ 1 parts list

ITEM NO.	Part number	Quantity	DESCRIPTION
1	635005 xxxx	1	DZ0223 - Linear guide LFS-8-2
2	632125 0000	1	DZ0220 - LEZ1 deflector
3	632125 0001	1	DZ0221 - Drive block without LEZ1 motor
4	623070 0103	1	TE 2862-4 WS1 for LEZ 1
5	632125 2400	1	TE2400 clamp
6	632900	1	Toothed belt HTD-3M - B=9
7	892366 0121	2	Threaded bushing M9-M6
8	609011 xxxx	1	Threaded rail 10 x 4 -M6
9	891134 0101	1	Countersunk screw DIN 7991, M 6 x 10

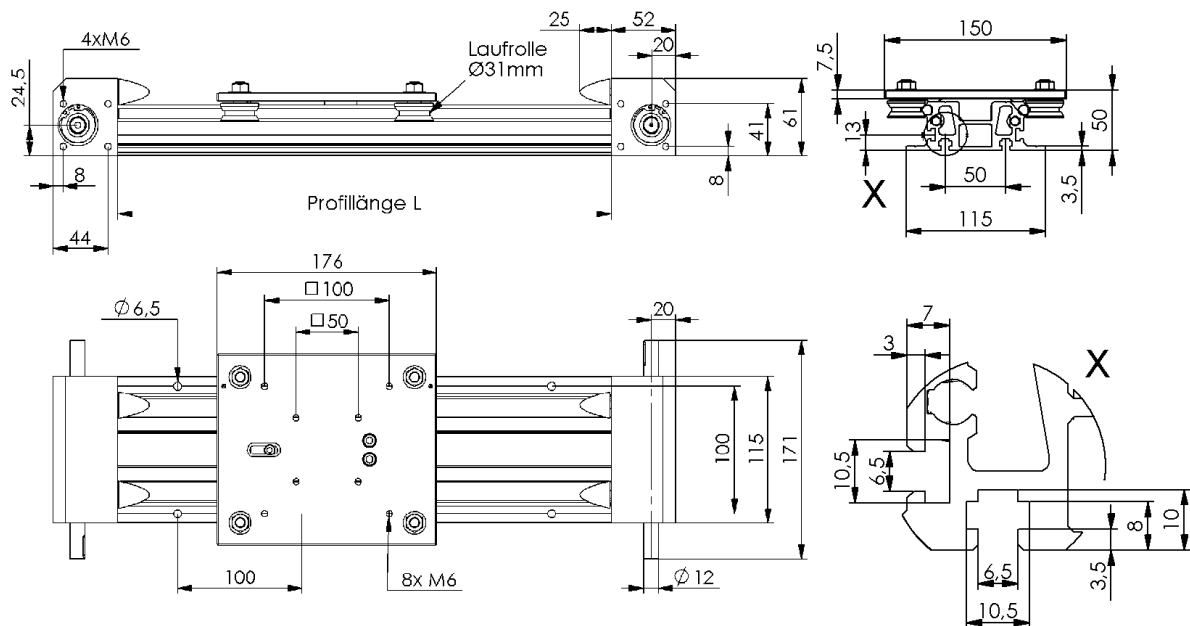
LEZ 2 dimensions sheet

with shaft slots

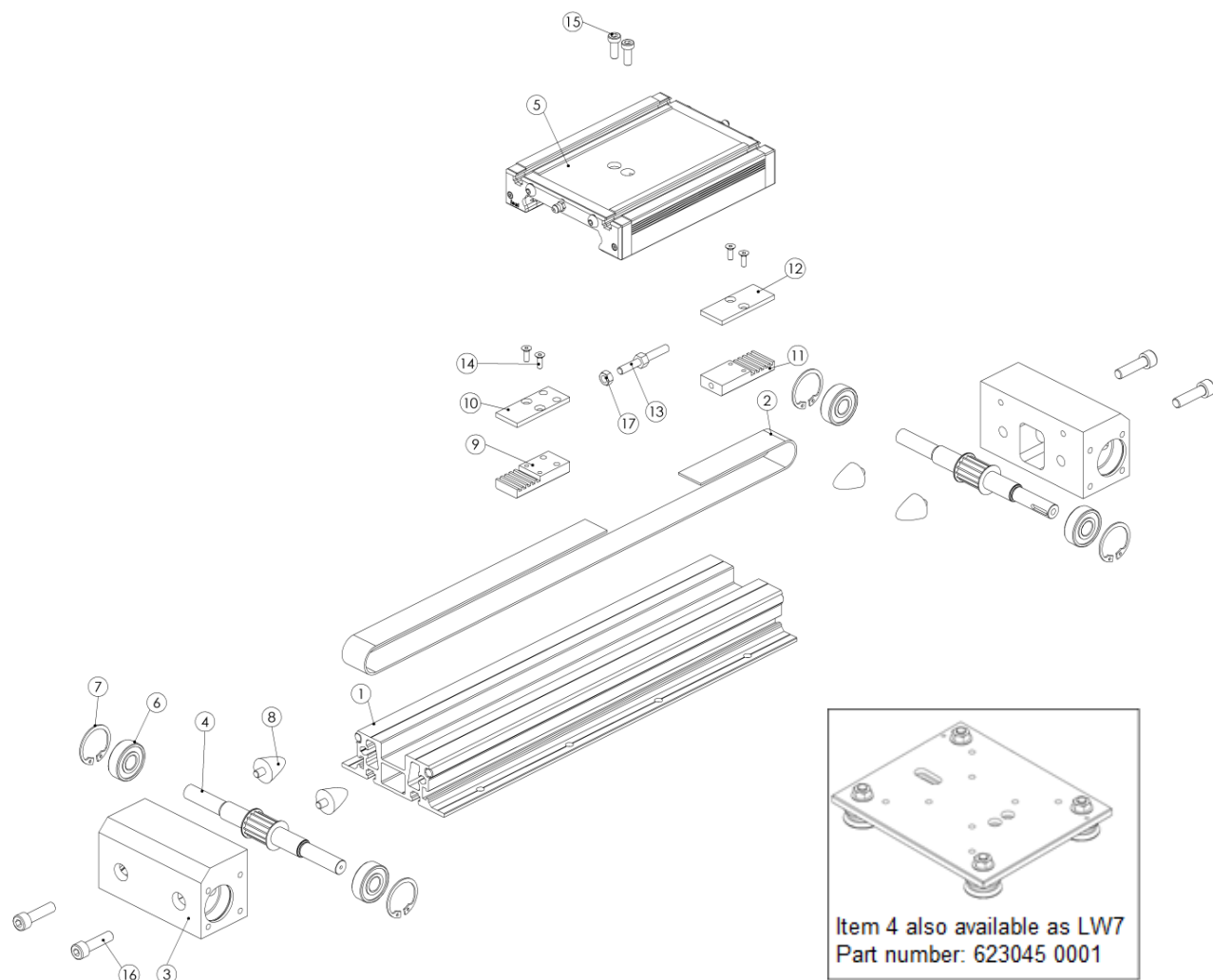

Travel = Section length X – 235 mm

*Profillänge = section length

with trolley


Travel = Section length X – 235 mm

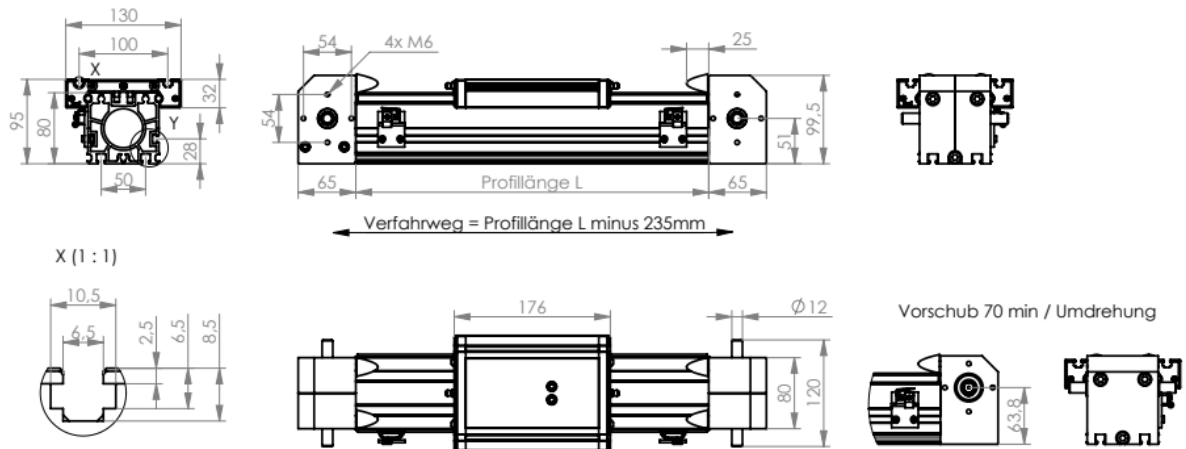
*Profillänge = section length / Laufrolle = roller

LEZ 2 with shaft slots - exploded view

LEZ 2 -parts list

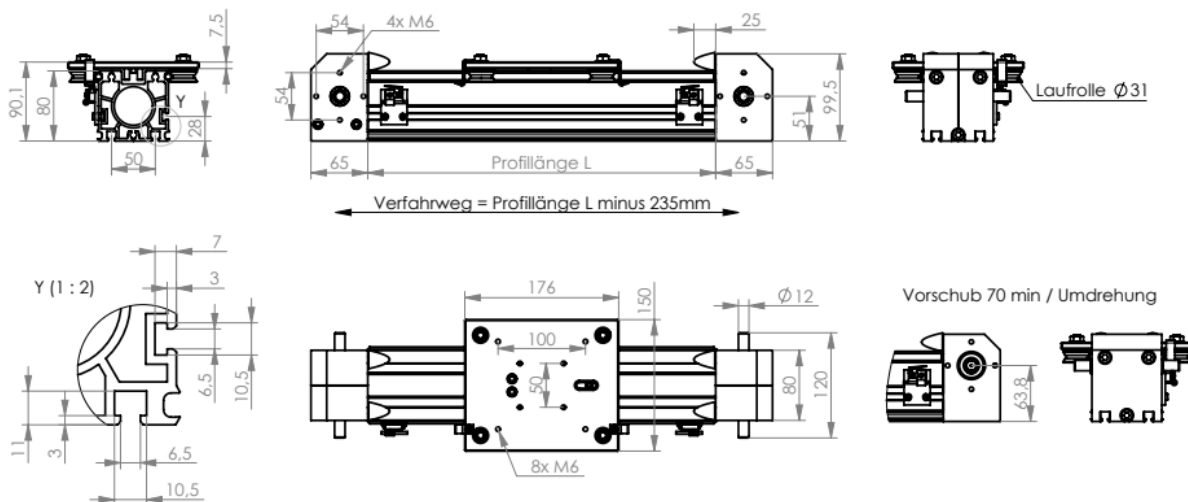
ITEM NO.	Part number	Quantity	DESCRIPTION
1	235008 0xxx	1	TE 3260-4 Linear guide MLF5
2	632902	1	Toothed belt HTD-5M B=25mm
3	632124 1592	2	TE 1592-3 Mounting block for ZF2
4	632124 1593	2	TE 1593-4 Toothed belt wheel HTD-5M-14 teeth
5	623073 0103	1	TE 2429-3 shaft slots WS3, completely assembled
6	896011 2322	4	Deep groove ball bearings, designation 6201-2Z
7	894030 0320	4	Locking ring DIN 473 D=32 mm S=1,2
8	632126 2816	4	TE 2816-4 rubber-bonded metal parabolic spring
9	632126 1982	1	TE 1982-4 clamp 2
10	632126 1984	1	TE 1984-4 Pressure plate for clamp 2
11	632126 1981	1	TE 1981-4 clamp 1
12	632126 1983	1	TE 1983-4 Pressure plate for clamp 1
13	632126 2421	1	TE 2421-4 Clamping bolt
14	891132 0121	4	Countersunk screw DIN 7991 M4x12
15	891124 0161	2	Cheese head screw DIN 6912 M6x16
16	891125 0301	4	Cheese head screw DIN 6912 M8x30
17	892025 0001	1	Hexagonal nut DIN 934 M6

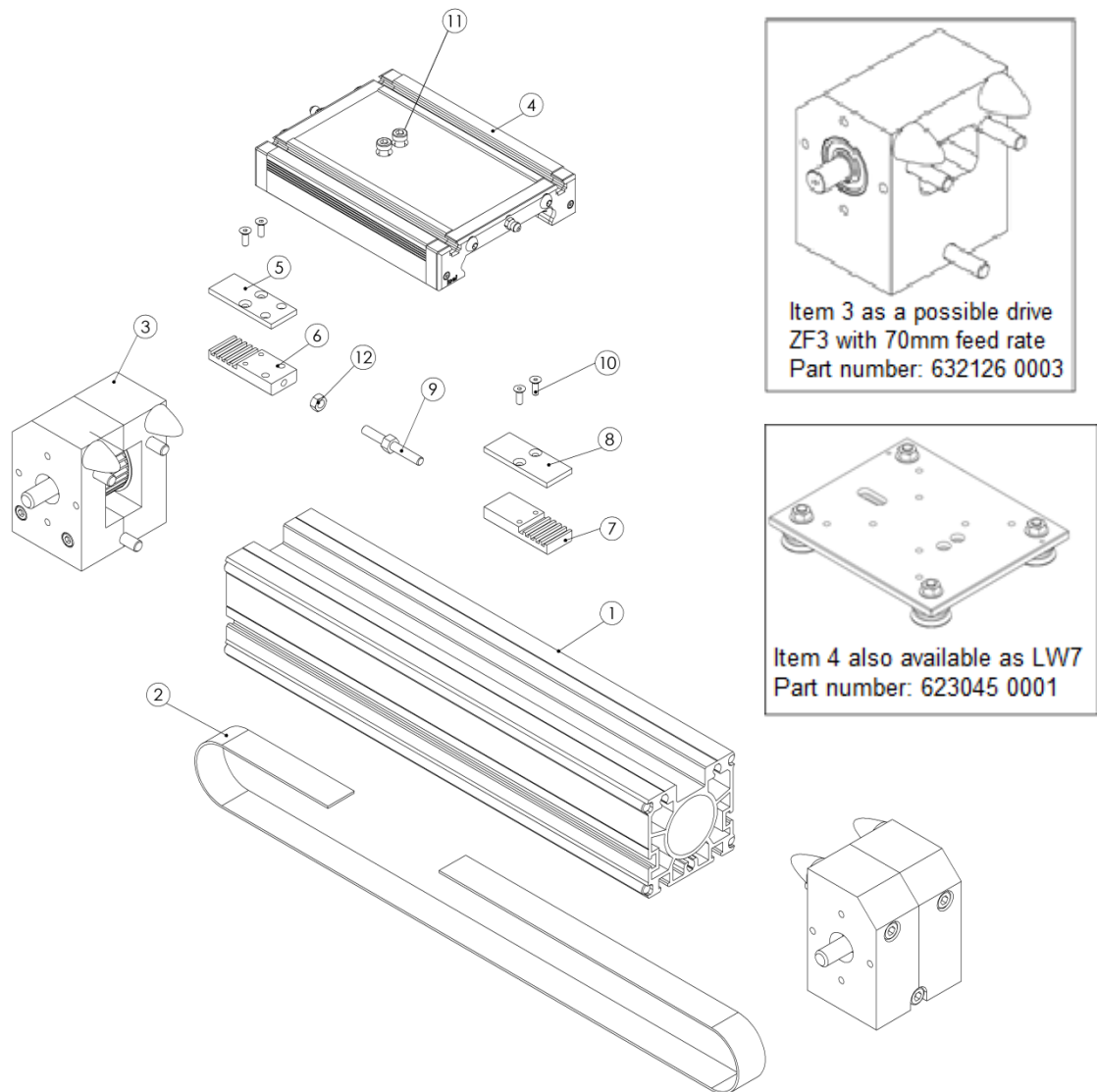
LEZ 3 dimensions sheet

with shaft slots



with trolley

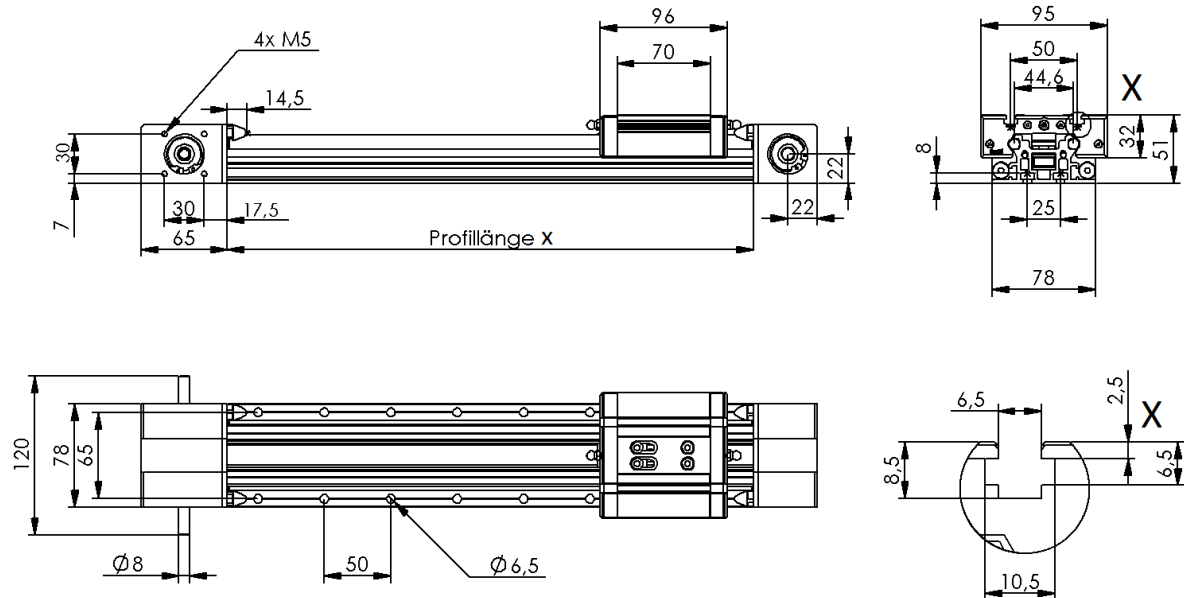


LEZ 3 with shaft slots - exploded view

LEZ 3 -parts list

ITEM NO.	Part number	Quantity	DESCRIPTION
1	235006 0xxx	1	TE 3259-4 Linear guide MLF4
2	632902	1	Toothed belt HTD-5M / 25 mm wide
3	632126 0003	2	DZ 0232-3 Drive ZF3 feed rate 150mm
4	623073 0103	1	TE 2429-3 shaft slots WS3, completely assembled
5	632126 1984	1	TE 1984-4 Pressure plate for clamp 2
6	632126 1982	1	TE 1982-4 clamp 2
7	632126 1981	1	TE 1981-4 clamp 1
8	632126 1983	1	TE 1983-4 Pressure plate for clamp 1
9	632126 2421	1	TE 2421-4 Clamping bolt
10	891132 0122	4	Countersunk screw DIN 7991 M4x12
11	891124 0161	2	Cheese head screw DIN 6912 M6x16
12	892025 0001	1	Hexagonal nut DIN 934 M6

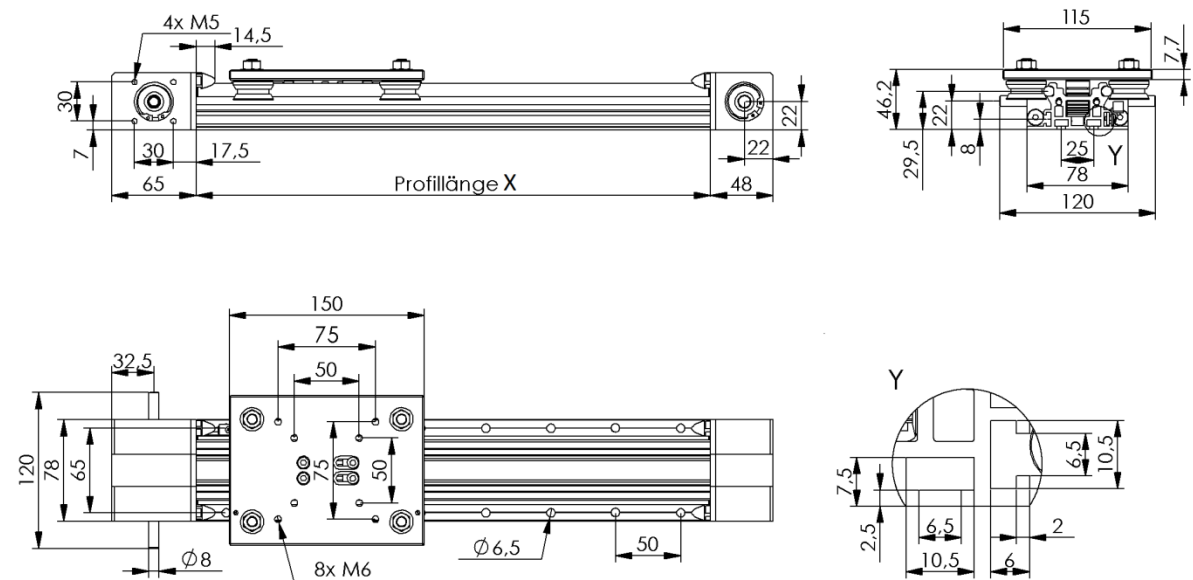
LEZ 9 dimensionssheet

with shaft slots

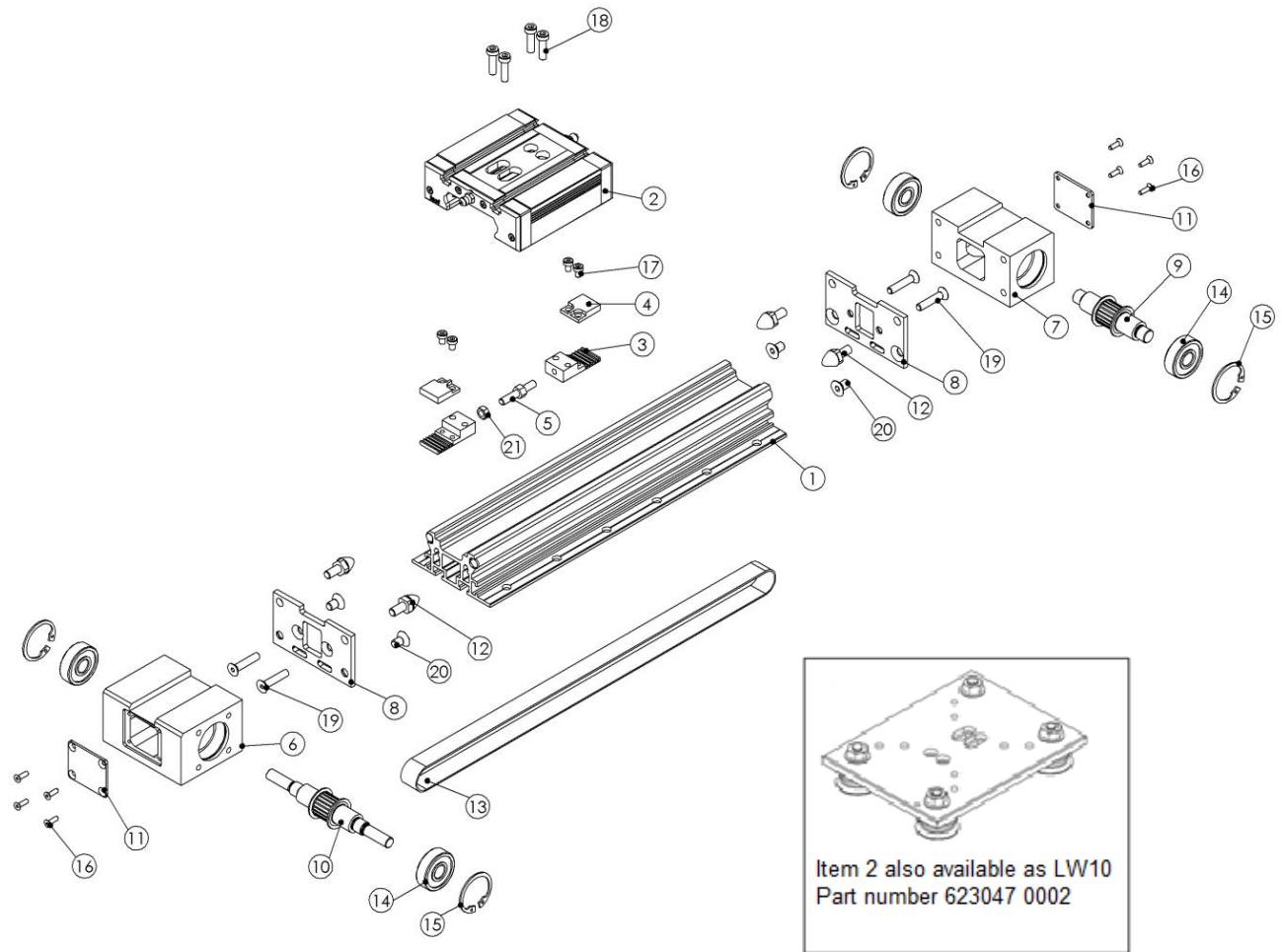

Travel = Section length X – 135 mm

*Profillänge = section length

with trolley


Travel = Section length X – 135 mm

*Profillänge = section length / Laufrolle = roller

LEZ 9 with shaft slots - exploded view

LEZ 9 -parts list

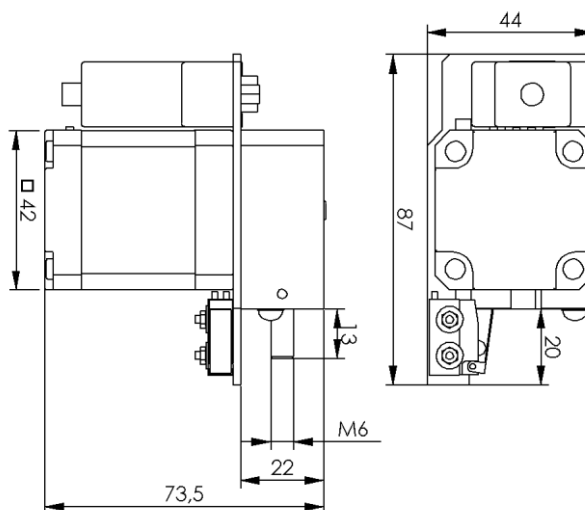
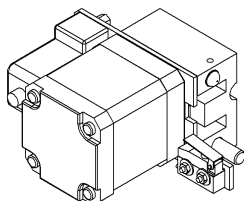
ITEM NO.	Part number	Quantity	DESCRIPTION
1	235012 0XXX	1	DZ2308 LFS-8-7 with pressed in steel shaft
2	632078 0073	1	DZ 2301- shaft slots WS11
3	632010 2363	2	DZ2363 - Clamp LEZ 9
4	632010 2364	2	DZ2364 - Pressure plate for clamp LEZ 9
5	616400 0003	1	DZ2365 - Clamping bolt LEZ 9
6	632010 2366	1	DZ2366 - Bearing LEZ 9
7	632010 2379	1	DZ2379 - Bearing block deflector LEZ 9
8	632126 2378	2	DZ2378 - Bearing spacer LEZ 9
9	616506 2370	1	DZ2370 - Toothed belt wheel HTD-3M-Z20 with edge disk for deflector
10	616506 2371	1	DZ2370 - Toothed belt wheel HTD-3M-Z20 with edge disk for drive
11	632126 2376	2	DZ2376 - Bearing cover LEZ 9
12	632126 2374	4	DZ2374 - Rubber-bonded metal parabolic spring d12
13	632901	1	Toothed belt HTD-3M - for LEZ 9
14	896011 0304	4	Single row deep groove ball bearing with sealing disk 6200-2RS1
15	894030 0310	4	Seeger rings for mounting holes DIN 472 - J30
16	891131 0101	8	Countersunk screw DIN 7991, M 3 x 10
17	891122 0061	4	Cheese head screw DIN 6912 M4x6
18	891123 0181	4	Cheese head screw DIN 6912 8.8 M 5x 18
19	891133 0251	4	Countersunk screw DIN 7991, M 5 x 25
20	891134 0101	4	Countersunk screw DIN 7991, M 6 x 10
21	892024 0001	1	Hexagonal nut DIN 934 8 M5

Drive modules

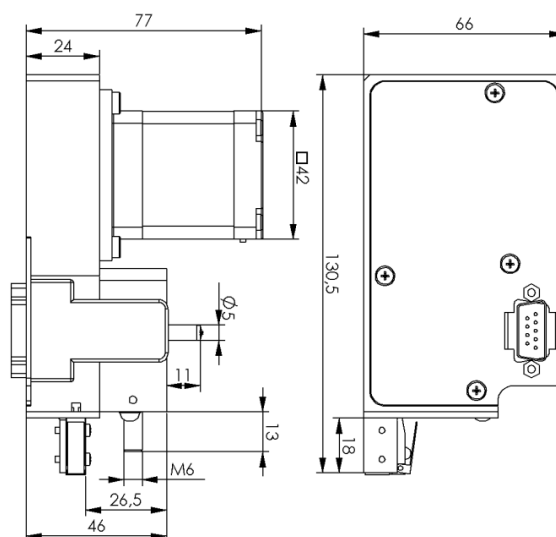
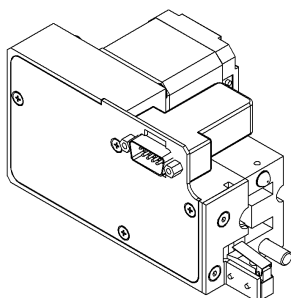
Various drive modules with multiphase motors, brushed servomotors (BDC) and brushless servomotors (BLDC) for the linear units LEZ 1-3 and LEZ 9 are offered as standard.

	Drive module	Direct drive	Stepdown ratio 2:1	Multiphase motor	Servo-motor	Part no.:
LEZ1	MS-045 HT	X		X		396048 3015
	MS-045 HT		X	X		396049 3015
	MS-135 HT		X	X		396056 3015
LEZ2	MS-600 HT		X	X		396086 3060
	EC 60S with brake		X		X	396415 3260
	EC 60S without brake		X		X	396415 3060
	EC 60L		X		X	396423 3060
	EC 86S		X		X	396444 3070
	EC 86L		X		X	396466 3070
LEZ3	MS-600 HT right	X		X		396085 0060
	MS-600 HT left	X		X		396085 0061
	MS-900 HT right	X		X		396088 0060
	MS-900 HT left	X		X		396088 0061
	DC 300	X			X	396114 0060
	EC 86S	X			X	396444 0070
	EC 86L	X			X	396466 0070
LEZ9	MS-200 HT right		X	X		396058 3017
	MS-200 HT left		X	X		396058 3018
	DC 100		X		X	396112 3063

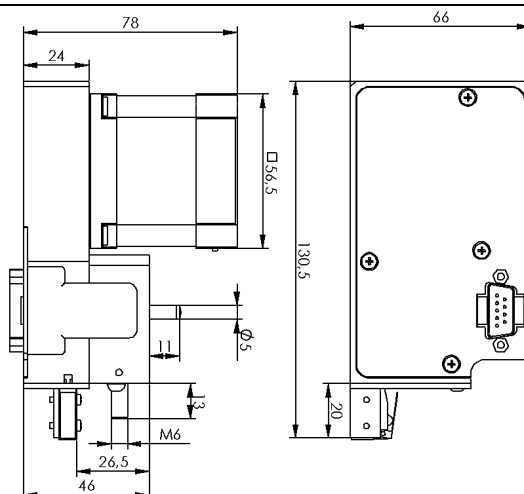
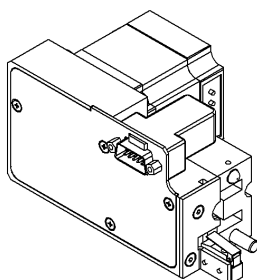
Dimensioned drawing of drive modules

Motor module MS-045 HT
 Direct drive


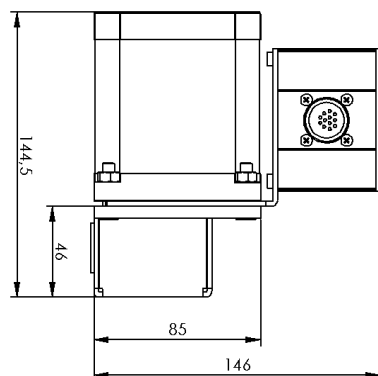
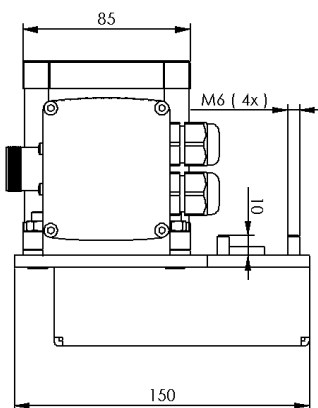
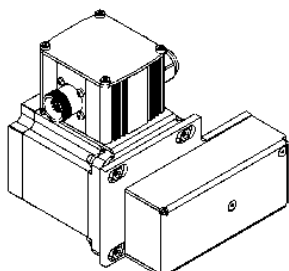
Part number	Motor module	L
396048 3015	MS-045 HT (direct)	73,5mm

Motor module MS-045 HT
 with stepdown ratio 2:1


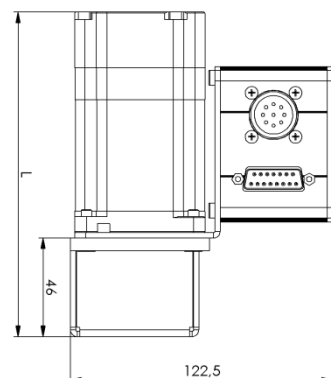
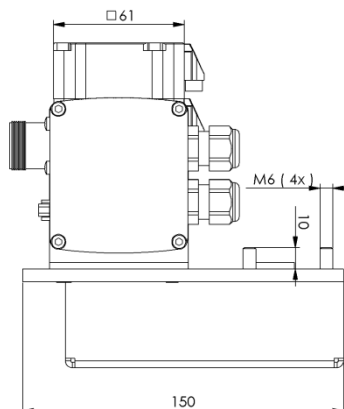
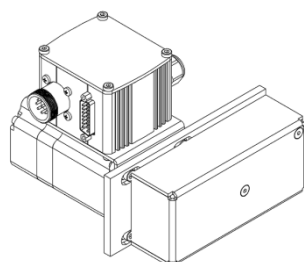
Part number	Motor module	L
396049 3015	MS-045 HT	77mm

Motor module MS-135 HT
 with stepdown ratio 2:1


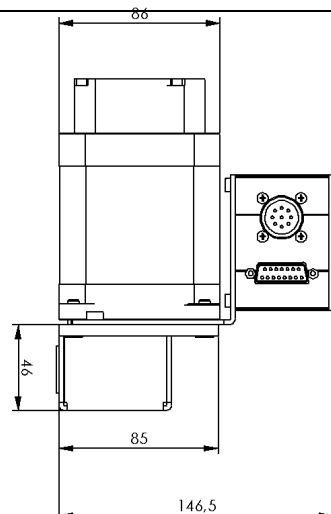
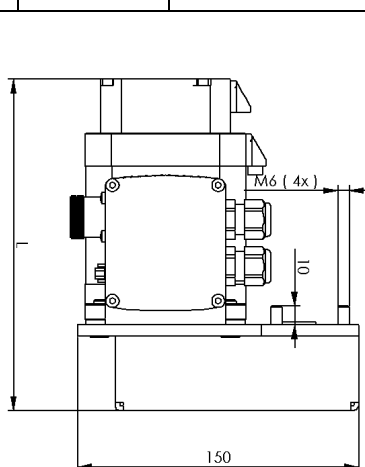
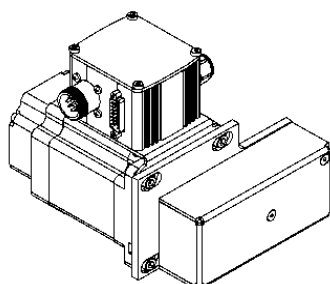
Part number	Motor module	L
396056 3015	MS-135 HT	78mm

Motor module MS-600 HT
 with stepdown ratio 2:1


Part number	Motor module	L
396086 3060	MS-600 HT	144,5mm

Motor module EC-60
 with stepdown ratio 2:1


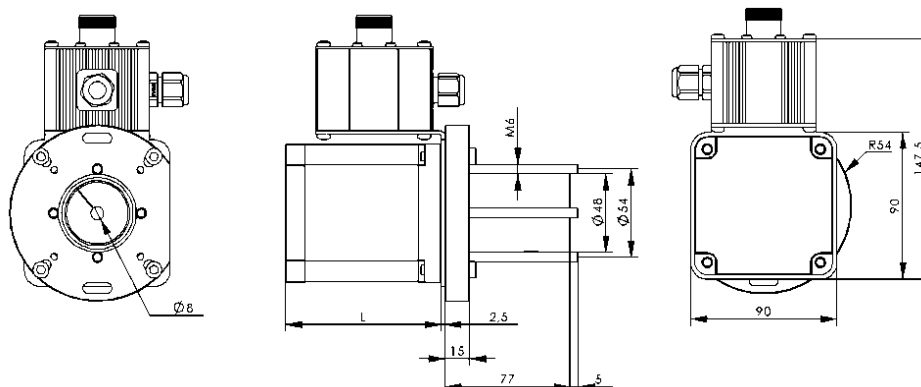
Part number	Motor module	L
396415 3260	EC 60S with brake	151,5mm
396415 3060	EC 60S without brake	198,5mm
396423 3060	EC60L	186,5mm

Motor module EC-86
 with stepdown ratio 2:1


Part number	Motor module	L
396444 3070	EC 86S	177,5mm
396466 3070	EC 86L	202,5mm

Motor module MS-600 HT

Direct drive

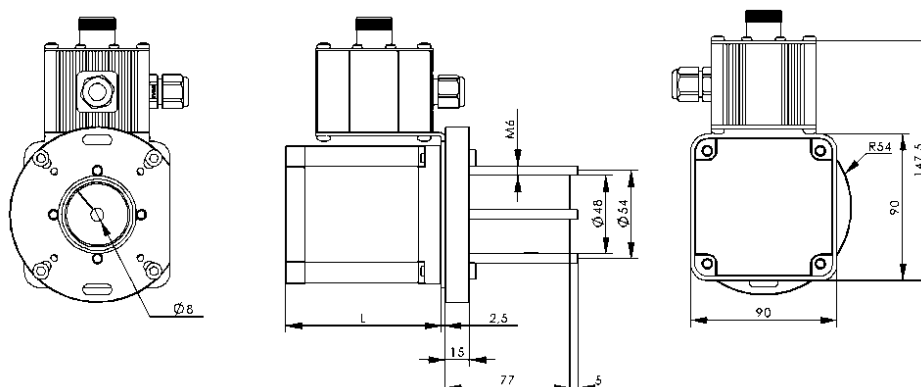


Part number	Motor module	L
396085 0060	MS 600 HT right	96mm
396085 0061	MS 600HT left	96mm

Part number	Motor module	L
396088 0060	MS 900 HT right	126mm
396088 0061	MS 900 HT left	126mm

Motor module EC-86

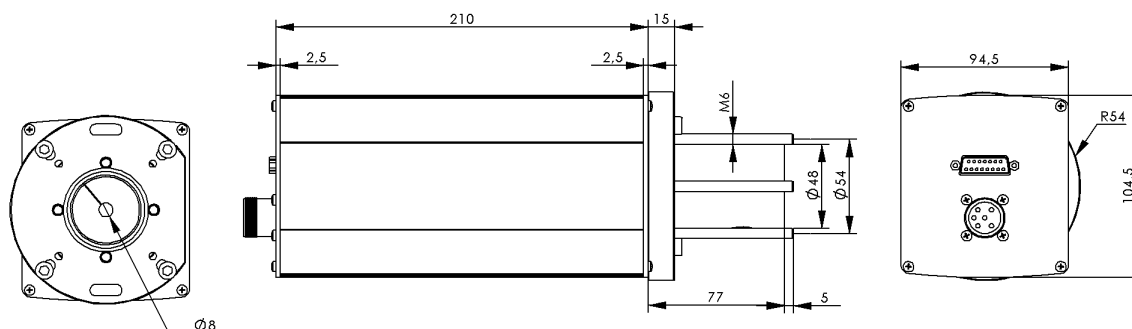
Direct drive



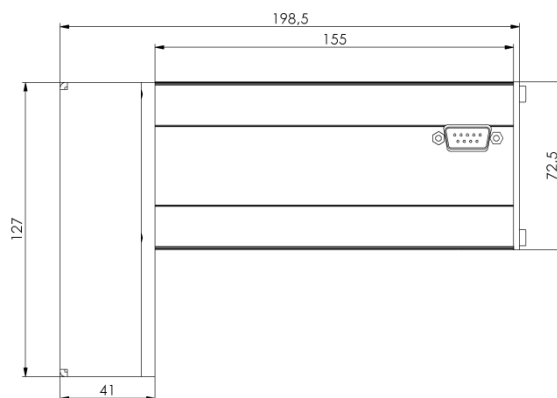
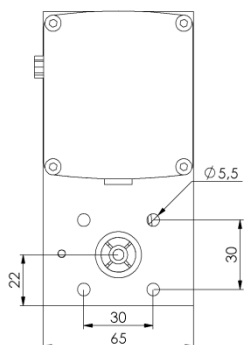
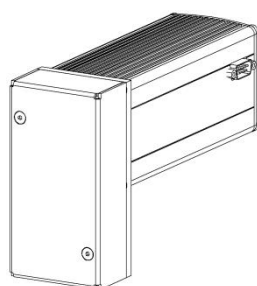
Part number	Motor module	L
396444 0070	EC 86S	177,5 mm
396466 0070	EC 86L	202,5mm

Motor module DC 300

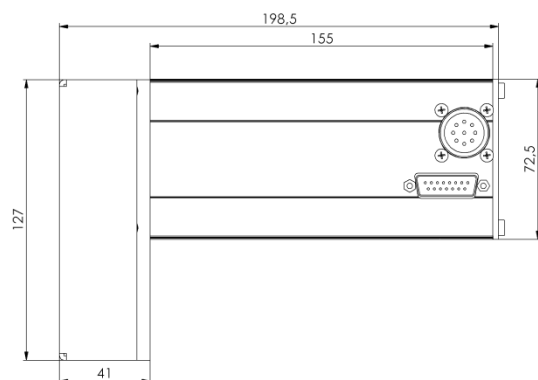
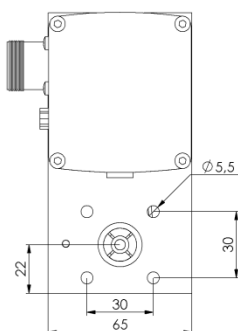
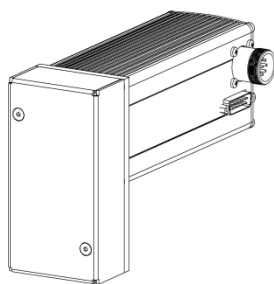
Directdrive



Part number	Motor module	L
396114 0060	DC 300	210 mm

Motor module MS-200 HT
 with stepdown ratio 2:1


Part number	Motor module	L
396058 3017	MS 200 HT right	198,5 mm
396058 3018	MS 200 HT left	198,5 mm

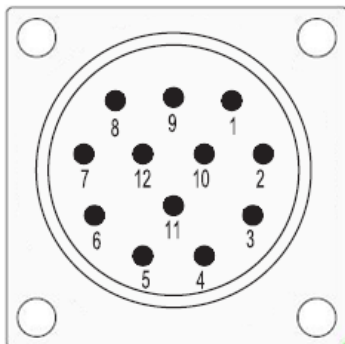
Motor module DC 100
 with stepdown ratio 2:1


Part number	Motor module	L
396112 3063	DC 100	198,5 mm

2.3 Motor module connection assignment

M23 12-pin connection assignment for multiphase motors

Motor connection



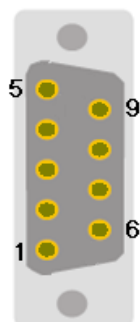
Insert pin mating view
on the plug side

M23 12-pin Pin

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

Sub-D 9-pin connection assignment for multiphase motors

Motor connection



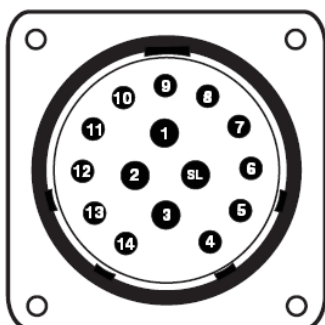
Insert pin mating view
on the plug side

Sub-D-9-pin Pin

- 1 Motor phase 1A
- 2 Motor phase 1B
- 3 Motor phase 2A
- 4 Motor phase 2B
- 5 +24V switch
- 6 +24V brake
- 7 Limit switch 2
- 8 GND brake
- 9 Limit switch 1
- Casing – cable shield

Amphenol 15-pin connection assignment for multiphase motors

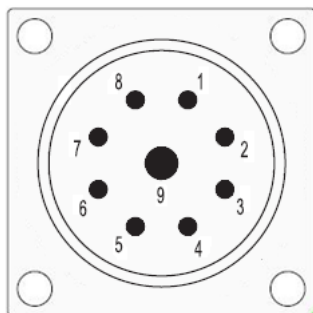
Motor connection



Insert pin mating view
on the plug side

Amphenol 15-pin Pin

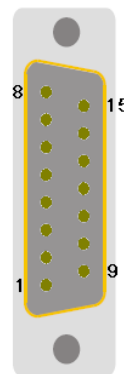
- 1 Motor phase 2B
- 2 Motor phase 2A
- 3 Motor phase 1B
- SL Motor phase 1A
- 4 +24V brake
- 5 +24V switch
- 6 GND brake
- 7 Cable shield
- 8 GND switch
- 9 Limit switch 1
- 10 Limit switch 2

Connection assignment for brushed DC servo motors (BDC)
Motor connection

 Insert pin mating view
on the plug side

M23 9-pin (8+1) pin

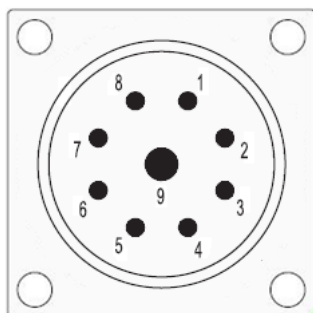
- 1 Motorphase1 (U+)
 - 2 Motorphase2 (U-)
 - 3 Motorphase1 (U+)*
 - 4 Motorphase2 (U-)*
 - 5 +24V brake
 - 6 GND brake
 - 7 ---
 - 8 ---
 - 9 Protective conductor PE
- Casing - cable shield

* Motor phases are partly connected via two wires

Encoder connection

 Insert pin mating view
on the plug side

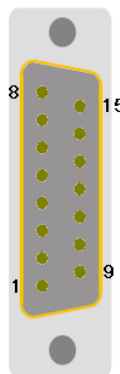
Sub-D 15-pin Pin

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

Connection assignment for 48V brushless DC servomotors (BLDC)
Motor connection

 Insert pin mating view
on the plug side

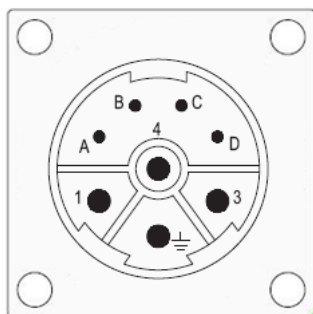
M23 9-pin (8+1) pin

- 1 Motor phase U
 - 2 Motor phase V
 - 3 Motor phase W
 - 4 ---
 - 5 +24V brake
 - 6 GND brake
 - 7 ---
 - 8 ---
 - 9 Protective conductor PE
- Casing - cable shield

Encoder connection

 Insert pin mating view
on the plug side

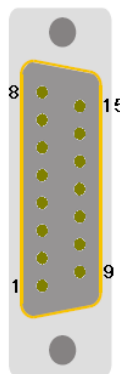
Sub-D 15-pin Pin

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

Connection assignment for 310V brushless DC servo motors (BLDC)
Motor connection

 Insert pin mating view
on the plug side

M23 9-pin (4+3+1) pins

- 1 Motor phase U
 - P Protective conductor PE
 - E conductor PE
 - 3 Motor phase W
 - 4 Motor phase V
 - A +24V brake
 - B GND brake
 - 7 ---
 - 8 ---
- Casing - cable shield

Encoder connection

 Insert pin mating view
on the plug side

Sub-D 15-pin Pin

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

3 Commissioning, general information

The linear unit is commissioned after assembling the relevant drive modules and the necessary wiring.

Follow the relevant instructions in the documentation of the motor modules, output stages or complete controller used.

Procedure:

- **Switch off the controller and check that it is isolated.**
- Connect the encoder lead.
- Connect the motor lead.
- Connect the reference switch lead.
- Switch on the controller and check that the reference switch is working correctly.
- Carry out a test run
 - first at a slow travel speed,
 - then under working conditions



Incorrect assembly (including loading on the axis system), cabling or commissioning increases the risks.

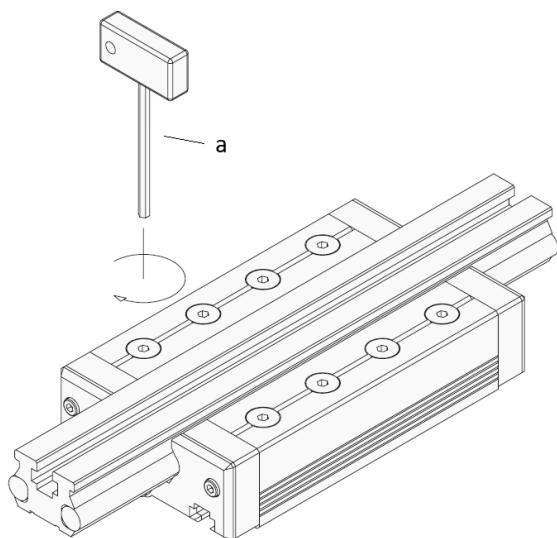


Unauthorised individuals should not be given access to the controller or the switch cabinet. There is a risk of electric current causing injuries. This is the responsibility of the individual who installed the machinery.

4 Assembly and servicing of the toothed belt unit

Before you can assemble your new linear unit you must remove any securing devices used in transport.

4.1 Setting up and servicing the shaft slot



The shaft slot is set by tightening the setting screws (by means of an Allen key (a)) on the underside of the shaft slot, proceeding in a cross-wise manner.

The desired prestressing is determined individually according to the shaft slot application.

Stiffness, torque loading, guidance accuracy and resistance to movement all increase with pre-stressing. The working life is reduced.

Maintenance:

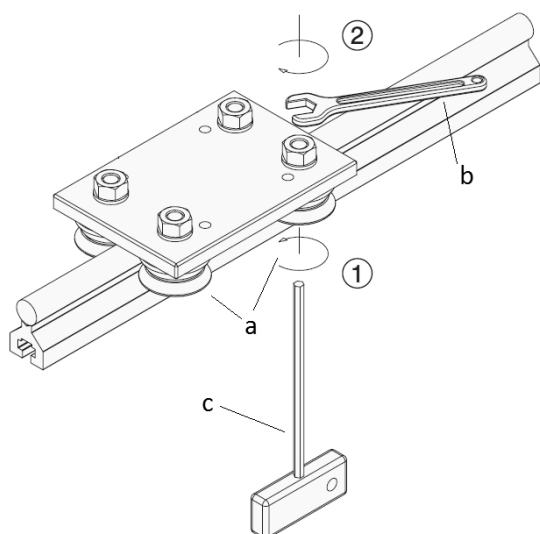
Shaft slots must be greased via the grease nipple every 300 hours of operation and in any event every three months. The grease nipples are on both sides of the front of the slot. The factory default setting is designed for the respective tasks in the relevant product descriptions and describes an average value for the stress data.

Note: Pushing on the guide rail is effected by slight forward and backward movement during the delay movement.

Grease

Sodium grease on a mineral base, recommended ISO viscosity class: ISO-VG 100 (original grease: transmission grease 4223 from Siebert GmbH). Too high a prestress reduces the working life. Feature: the shaft slot is difficult to move and can be difficult to move on the guide rails.

4.2 Setting up and servicing the trolley



Step 1:

Setting up the eccentric rollers (a).

Turn the roller with an Allen key (4mm(c)) so that the conical tracks on the steel shaft of the guide are screwed down. Choose the torque for this so that free play and easy running between the adjoining rollers are guaranteed.

Step 2:

Tighten the hexagonal nut with a SW 13 (b) wrench. Torque the hexagonal nut to 20 Nm. At the same time, maintain the roller at the preset position with an Allen key.

Check:

The trolley is set correctly if, when in motion, all rollers are turning and the trolley can be moved with ease. If the pre-stressing is too high, as a result of engaging the rollers too tightly, the working life is reduced.

Feature: the trolley is difficult to move and can be difficult to move on the guide rails.

4.3 Adjusting the belt drive

Toothed belt pretensioning

The toothed belt should be tensioned such that it is deflected on the half trunk length $s/2$ under the test load F by $d = s/50$ from the straight line.

The test load is dependent on the drive output and the belt speed.

To adjust the prestressing, we recommend:

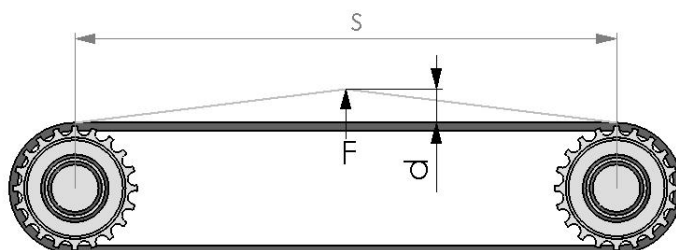
Toothed belt unit	Test load F
LEZ 1	5N...10N
LEZ 2	10N...15N
LEZ 3	10N...15N
LEZ 9	5N...10N



Unnecessarily high prestressing reduces the working life of the drive, increases the load on the bearings and wear on the teeth as well as tending to increase the noise level in operation.

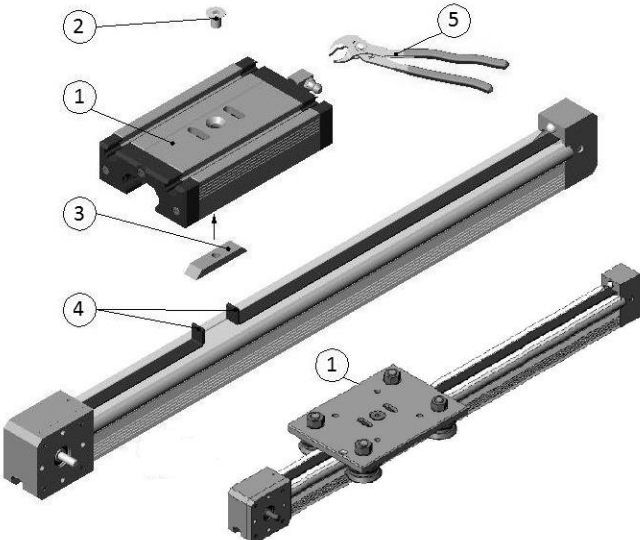
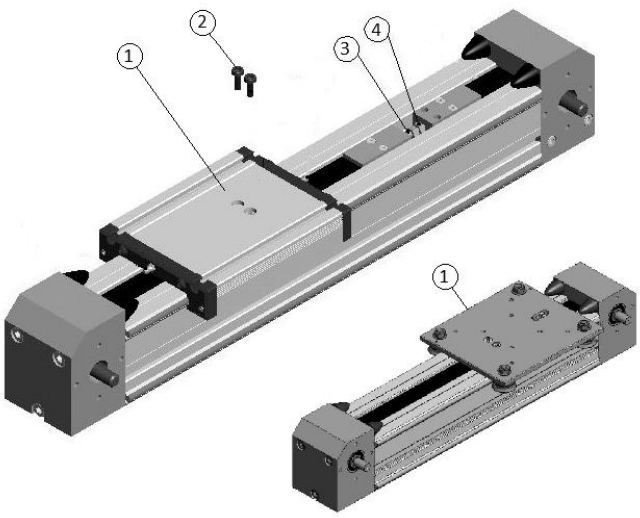


Too low a tension can lead to the belt teeth not engaging perfectly in the gearing and jumping out on overload.



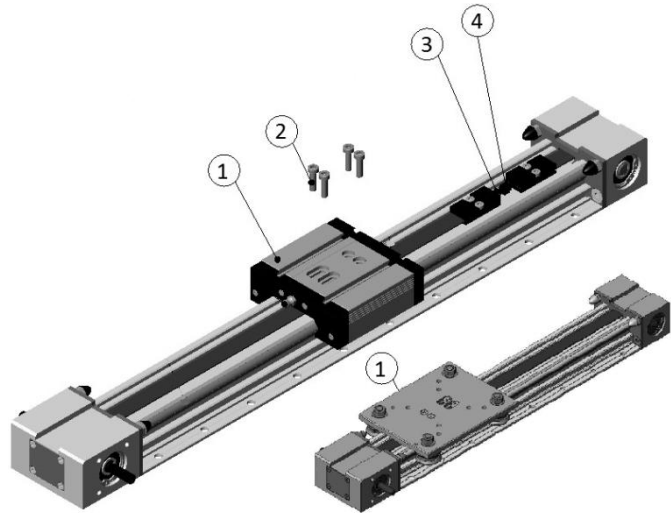
Retension the toothed belt

Retensioning of the toothed belt is unnecessary under normal operating conditions. However, should it become necessary under certain circumstances, proceed as follows:

<p>LEZ 1</p> <ol style="list-style-type: none"> 1. Fix an open end of the toothed belt (4) to the shaft slot/trolley (1) (a second person may be needed). 2. Carefully loosen the clamp (3) holding the toothed belt (4) using the locking screw (2). At the same time, secure the other end of the toothed belt (4) to the shaft slot/trolley (1) using a pair of pliers (5) 3. Correct the belt tension. 4. Fix the belt tension by tightening the locking screw (2). 	
<p>LEZ 2 / LEZ 3</p> <ol style="list-style-type: none"> 1. Remove both of the screws (2) on top of the slot. 2. Move the shaft slots/trolley (1) to the side. 3. Slacken the locknut (4) and turn the clamping bolt (3) until the required belt tension is reached. 4. Lock the screw again and screw the shaft slots/trolley (1) onto the tensioning unit using the two cheese head screws (2) 	

LEZ 9

- 1.** Remove the screws (2) on top of the slot.
- 2.** Move the shaft slots/trolley (1) to the side.
- 3.** Slacken the locknut (3) and turn the clamping bolt (4) until the required belt tension is reached.
- 4.** Lock the screw again and screw the shaft slots/trolley (1) onto the tensioning unit using the two cheese head screws (2)



4.4 Purpose/Assembly/Cleaning/Lubrication

Purpose

The toothed belt feeds LEZ1/2/3/9 are provided for positioning devices, workpieces, tools etc. The maximum possible load on the slots is dependent on the acceleration. Toothed belt feeds are available in different lengths, with and without drive module.



Risk of crushing

Ensure there is adequate protection against crushing in operation!

Assembly

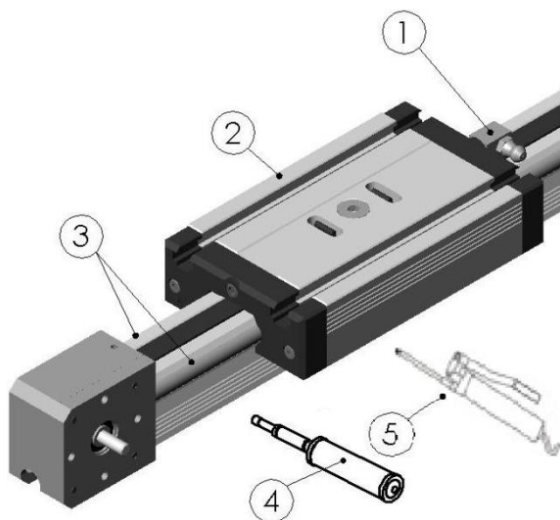
isel toothed belt feeds LEZ1/2/3/9 are prefabricated units (optional). complete with drive motor.

Cleaning

The toothed belt feeds LEZ1/2/3/9 are open units. Clean the feed regularly to remove dust and swarf. No objects (e.g. swarf) should be allowed to build up under the toothed belt and inside the section or to bond to the steel shaft.

Basic lubrication

Toothed belt units LEZ1/2/3/9 are fully lubricated ex works and can be used immediately. Only the two steel shafts (3) require regreasing in accordance with the following notes, using the grease nipple (1) on the shaft slots (2). All bearings and drive components are greased for life and require no further regreasing.



Greasing

Use an impact press (4) or hand greasegun (5) for greasing. Approx. three strokes on the isel push-type gun (4) equals 1 g of grease. Use the grease nipple (1) on the front of the shaft slot (2) for greasing.



Please note that if excessive force is used, the grease nipple (1) can be pressed out of the plastic threaded guide.

Proceed as follows:

1. Clean the steel shaft (3) and the grease nipple (1) to remove dirt and solid bodies if necessary.
2. Place the grease gun on the clean grease nipple (1) and force one stroke of grease in.
3. Move the shaft slot (2) to and fro several times to distribute the grease introduced.
4. Continue to add grease and distribute it until the desired amount is introduced.

Greasing plan

Regularly check the film of grease along both steel shafts for dry points and dirt, and regrease as necessary.

When idling or under average loads, you should regrease approximately every 300 hours of operation with a sodium grease GP00/00F-20 to DIN51502 or a comparable grease (part no.: 299031).

Greasing for toothed belt unit with trolley

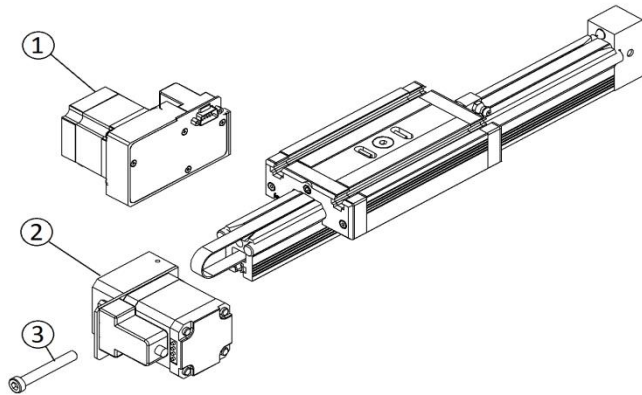
On delivery, the steel shafts and rollers are preserved with oil, which should not be removed if the parts are not dirty. Rollers based on twin-row deep groove ball bearings are sealed for life.

Always look for an even film of grease on the running surface of steel shafts. For this, regrease steel shafts with GP00/00F-20 grease to DIN 51502 (part no.: 299031) or a comparable grease.

Dry running is possible, but leads to increased wear, friction corrosion and significantly lower working life.

4.5 Assembling drive modules on LEZ 1 – LEZ 2 – LEZ 3 – LEZ 9

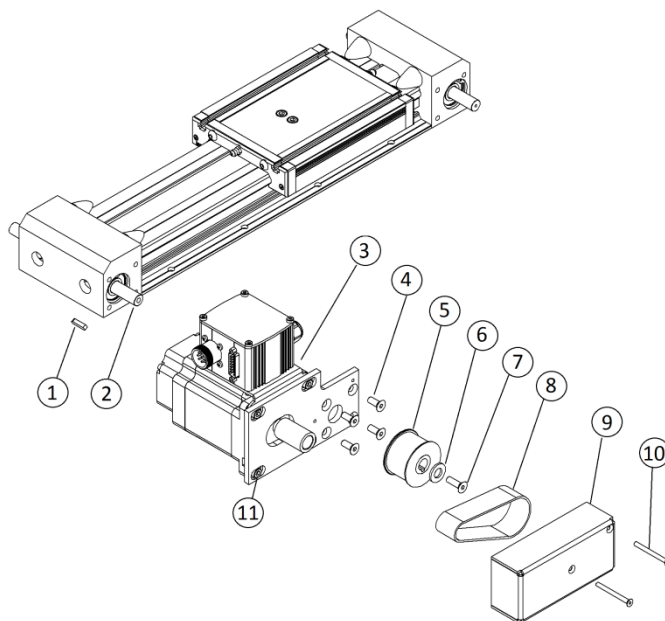
Assembling drive modules on LEZ 1



The diagram on the left clarifies assembly of the drive module on the linear unit LEZ 1. Note that parts to be connected must be free of swarf, rust and dirt.

The toothed belt of the linear drive is to be threaded in the open state into the drive module (surrounding the drive pinion). The motor module ((1) with step-down ratio or (2) as a direct drive) is to be secured to the linear unit by means of a cheese head screw to DIN 6912 8.8 M 6 x 45 (3). The toothed belt must then be retensioned as described in 4.3.

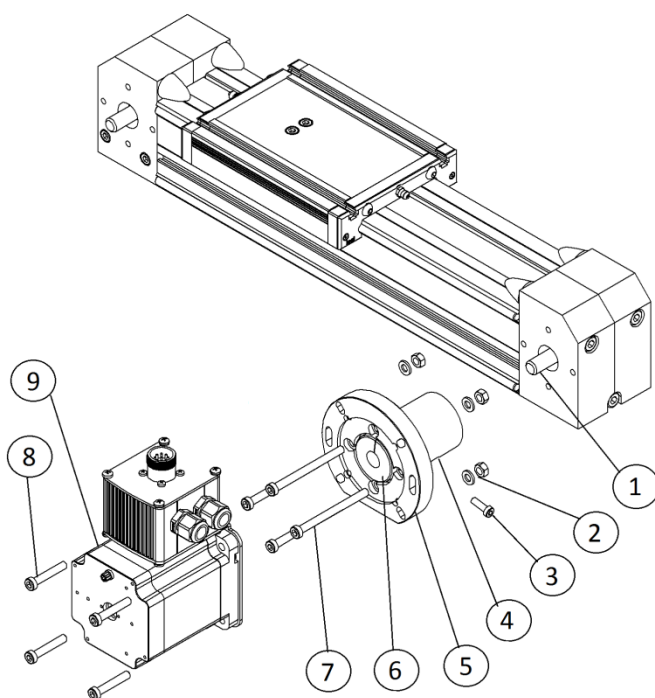
Assembling drive modules on LEZ 2



The diagram on the left clarifies assembly of the drive module with step-down gears on the linear unit LEZ 2. Note that parts to be connected must be free of swarf, rust and dirt. Gears must also have the same pitch as the toothed belt.

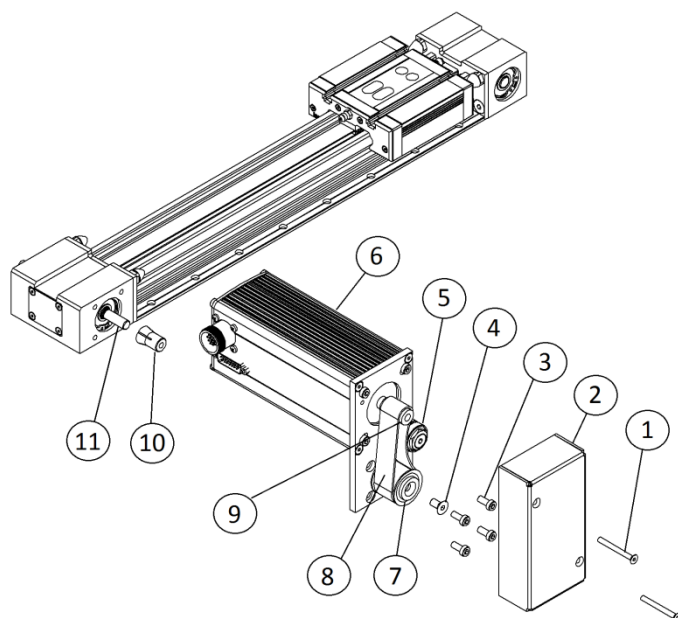
The motor module (3) is to be secured to the linear unit with 4 countersunk screws DIN 6912 8.8 M6x16 (4). The A4x4x18 feather key(1) is then to be placed in the groove of the gear shaft (2). Now push the gear (5) onto the shaft (2) and secure this with an 8.8 M6x20 countersunk screw to DIN 6912 (7) and a matching washer (6). Now assemble the toothed belt (8), over the gear (5) and over the gear which is on the motor shaft (bonded connection). The toothed belt must be assembled and hand tightened only. Now tension the toothed belt (8), with the screws on the motor slackened off and reset the motor in

position over the longitudinal holes. The belt prestressing is dependent on the power to be transferred and the drive specification. Owing to the force transferred by the toothed belt, however, only slight prestressing is needed. Then cover the step-down gears with the cover (9) and both countersunk screws DIN 7991 8.8 M4x45 (10).

Assembling drive modules on LEZ 3


The diagram on the left clarifies assembly of the drive module with direct drive on the linear unit LEZ 3. Note that parts to be connected must be free of swarf, rust and dirt.

Secure the coupling flange (5) and the spacer (4) to the linear unit with 4 cheese head screws DIN 6912 8.8 M6x75 (7). Now mount one half of the shaft coupling (6) on the motor shaft. The torque for the coupling clamp screws DIN 6912 8.8 M6x16 (3) is 3 Nm. Align the motor using the 4 cheese head screws DIN 6912 8.8 M6x35 (8) and the matching washers/nuts (2) so that the motor shaft and the linear unit shaft (1) are flush with each other. Now tighten the coupling clamp screw DIN 6912 8.8 M6x16 (3) on the gear shaft (1). In the case of the LEZ 3, the drive module is flanged on both sides.

Assembling drive modules on LEZ 9


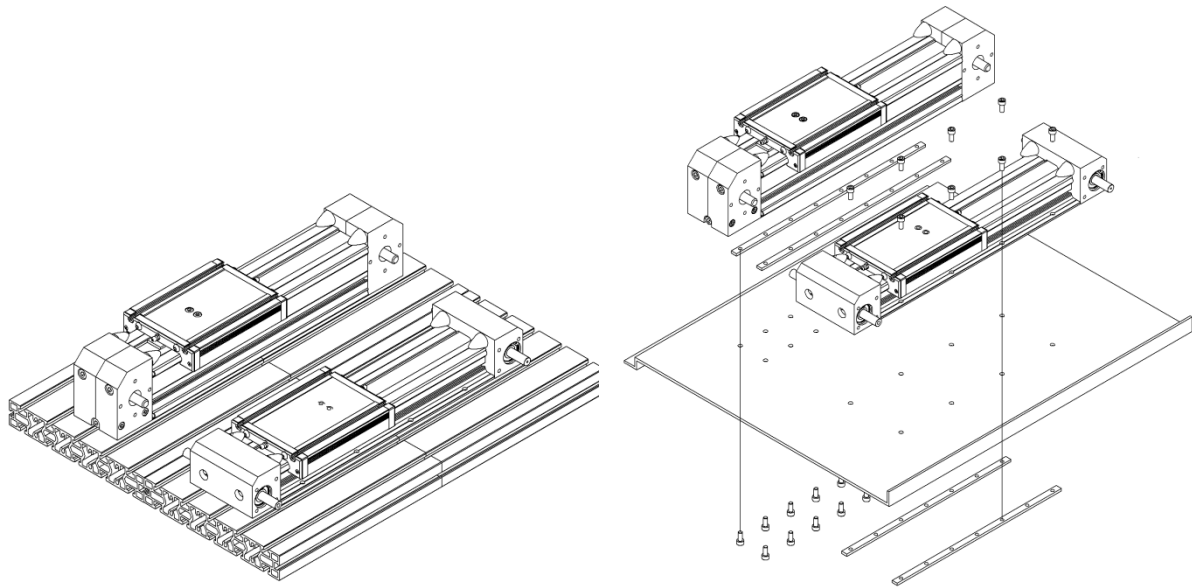
The diagram on the left clarifies assembly of the drive module with step-down gears on the linear unit LEZ 9. Note that parts to be connected must be free of swarf, rust and dirt. Gears must also have the same pitch as the toothed belt.

The motor module (6) is to be secured to the linear unit with 4 cheese head screws DIN 6912 8.8 M6x16 (3). Place the tensioning bushing (10) in the gear (7) and fix this loosely with a countersunk screw DIN 7991 8.8 M6x12 (4) so that it can then be pushed onto the gear shaft (11). Now assemble the toothed belt (8), over the gear (7) and over the gear (9) which is on the motor shaft (bonded connection). The toothed belt must be assembled manually without excessive force. Now tension the toothed belt (8) using the eccentric tensioning roller (5). The belt prestressing is dependent on the power to be transferred

and the drive specification. Owing to the force transferred by the toothed belt, however, only slight prestressing is needed. We recommend you use eccentric tensioning rollers to set the prestressing or to correct tolerances. Then cover the step-down gears with the cover (2) and both countersunk screws DIN 7991 8.8 M4x40 (10). In the case of the LEZ 9, the drive module is flanged on both sides.

4.6 Assembly / disassembly as individual components

You have several options for mounting the components individually:



A: Freestanding

B: Rack assembly

A) Freestanding installation of the linear unit

You can place the linear unit on a rack, a worktable or any other suitable, i.e. load-bearing support.



Choose the location carefully so that the product cannot fall or be knocked over by any impact or tug on the cables.

B) Rack mounting (recommended)

The shaft housing sections have a number of T-grooves on the underside for mounting linear units on your frame. These are used to house threaded rails or sliding nuts (accessories). Use M6 fastening screws to mount linear units on your rack from below.

As the topmost picture shows, you can also screw on the linear units LEZ 2 and LEZ 9 from above.



Make sure the mounting surfaces are sufficiently clean.

The aluminium sections used are extruded sections which, owing to the manufacturing process, are sometimes not completely straight or are twisted.

The tolerances for this deviation are laid down in DIN EN 12020-2.


isel linear units are plane milled and are therefore usually within these tolerances.

To achieve the desired guide accuracies and running, however, the axis system must be tensioned on an appropriately accurate surface or aligned using levelling plates. This achieves tolerances of minimal 0.1mm/1000 mm.

5 Fault list



Repairs to the product's electrical components should only be performed by a qualified electrician. Otherwise there is a risk of electric current causing fatal injuries.

Problem/Fault	Possible cause(s)	Remedy
Increased noise while running	Dirt	Clean the linear unit
Stiffness	Dirt Warping	Clean the linear unit Alignment , adjustment
Increased wear (Friction)	Overload Lack of lubricating film	Reduce load Shorten servicing interval
Increased play on shaft slots/trolley	Wear Overload Reduce the prestressing	Reduce load Shorten servicing interval Reset the prestressing
 Important: A hostile electromagnetic environment can cause faults.		



Do not attempt to manipulate the controller or output stage of the linear unit.

6 Technical specification

6.1 Electrical specification

Motor specification, mains supply values for final stages and controller

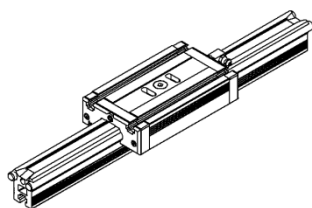
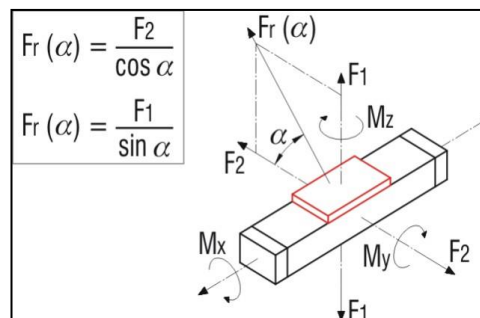
You will find the motor specification, mains supply values for final stages and the controller specification in the corresponding operating instructions.

6.2 Mechanical specification

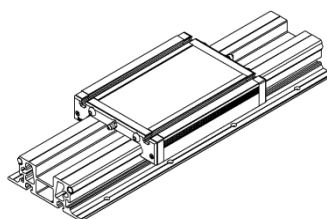
Feed	LEZ 1	LEZ 2	LEZ 3	LEZ 9
Aluminium section	LFS – 8 – 2 W 22 x H 32.5	LFS – 8 – 5 W 115 x H 40	LFS – 8 – 4 W 80 x H 80	LFS – 8 – 7 W 78 x H 36
Guide weight	2.00 kg/m	4.72 kg/m	6.48 kg/m	2.86 kg/m
Cross-section	$I_x cm^4$ 4.92 $I_y cm^4$ 3.62	$I_x cm^4$ 28 $I_y cm^4$ 137.5	$I_x cm^4$ 161.3 $I_y cm^4$ 168.6	$I_x cm^4$ 10.86 $I_y cm^4$ 29.3
Slot weight	0.43 kg	0.94 kg		0.4 kg
Trolley weight	1.03 kg	2.03 kg		1.3 kg
Specific mass without drive module	3 kg/m	7.9 kg/m	6.5 kg/m	4.4 kg/m
Shaft slots	WS1 L 126 x W 72 mm	WS 3 L 176 x W 130 mm		WS 11 L 96 x W 95 mm
feed rate per rotation	60 mm	70 mm	70 (150) mm	60 mm
Effective diameter of the synchronous disks	Ø 19.10 mm	Ø 22.28 mm	Ø 22.28 (70 mm) Ø 47.75 (150 mm)	Ø 19.10 mm
Moment of inertia of the synchronous disks	$e^{-7} 5.585 \text{ kgm}^2$	$e^{-6} 5.58 \text{ kgm}^2$	$e^{-6} 5.58 \text{ kgm}^2$ (at 70 mm/turn) $e^{-4} 1.79 \text{ kgm}^2$ (at 150 mm/turn)	$e^{-6} 5.86 \text{ kgm}^2$
Belt type	HTD - 3M Width 9 mm	HTD - 5M Width 25 mm		HTD – 3M Width 15 mm
Specific mass of the toothed belt	0.0225 kg/m	0.09 kg/m		0.04 kg/m
Lengths	L = 298...2998 (L max.5998)	L = 698 L max. = 5998 (in the 100 grid)		L=496.Lmax=5996 (in the 100 grid)
Travel	Section length L - 150mm	Section length L-235 mm		Section length L- 135mm
Repeat accuracy	± 0.2 mm			
Max. speed	1.5 m/s	3.5 m/s	5 m/s	3 m/s
max. mass to be accelerated	3 kg at 20m/s ²	13 kg at 20m/s ²	20 kg at 20m/s ²	6.5 kg at 20m/s ²

6.3 Load figures for the trolley/shaft slots

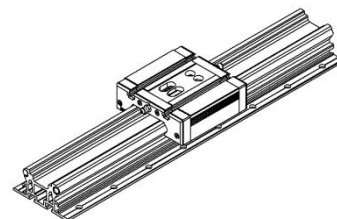
Linear unit	Shaft slots	Trolley
LEZ 1	WS 1	LW 9
LEZ 2	WS 3	LW 7
LEZ 3	WS 3	LW 7
LEZ 9	WS 11	LW 10



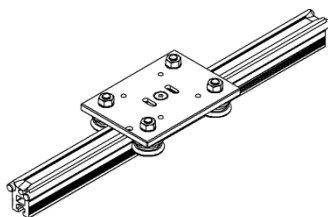
Shaft slots WS 1	
C_0	4590 N
C	2390 N
F_1 static	3920 N
F_1 dynamic	2041 N
F_2 static	4590 N
F_2 dynamic	2390 N
M_x static	55.0 Nm
M_y static	148.1 Nm
M_z static	173.4 Nm
M_x dynamic	28.6 Nm
M_y dynamic	77.1 Nm
M_z dynamic	90.2 Nm



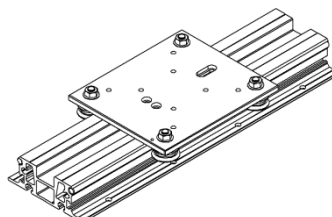
Shaft slots WS 3	
C_0	6945 N
C	3190 N
F_1 static	5931 N
F_1 dynamic	2724 N
F_2 static	6945 N
F_2 dynamic	3190 N
M_x static	255.9 Nm
M_y static	232.8 Nm
M_z static	272.5 Nm
M_x dynamic	117.5 Nm
M_y dynamic	106.9 Nm
M_z dynamic	125.1 Nm



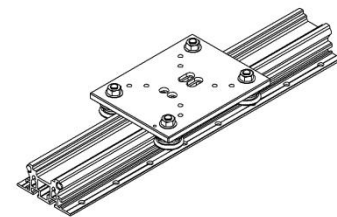
Shaft slots WS 11	
C_0	3114 N
C	1846 N
F_1 static	2659 N
F_1 dynamic	1576 N
F_2 static	3114 N
F_2 dynamic	1846 N
M_x static	67.3 Nm
M_y static	100.5 Nm
M_z static	117.6 Nm
M_x dynamic	39.9 Nm
M_y dynamic	59.5 Nm
M_z dynamic	69.7 Nm



Trolley LW 9	
C_0	2160 N
C	4000 N
F_1 static	4320 N
F_1 dynamic	3792 N
F_2 static	2160 N
F_2 dynamic	4000 N
M_x static	121.1 Nm
M_y static	194.4 Nm
M_z static	97.2 Nm
M_x dynamic	106.3 Nm
M_y dynamic	170.6 Nm
M_z dynamic	180.0 Nm



Trolley LW 7	
C_0	2160 N
C	4000 N
F_1 static	4320 N
F_1 dynamic	3792 N
F_2 static	2160 N
F_2 dynamic	4000 N
M_x static	246.8 Nm
M_y static	302.4 Nm
M_z static	151.2 Nm
M_x dynamic	216.7 Nm
M_y dynamic	265.4 Nm
M_z dynamic	280 Nm



Trolley LW 10	
C_0	2160 N
C	4000 N
F_1 static	3420 N
F_1 dynamic	3792 N
F_2 static	2160 N
F_2 dynamic	4000 N
M_x static	170.4 Nm
M_y static	248.4 Nm
M_z static	124.2 Nm
M_x dynamic	149.5 Nm
M_y dynamic	218.0 Nm
M_z dynamic	230.0 Nm

7 Decommissioning / Disposal

The symbol on the product or its packaging indicates that the product must not be disposed of with normal household waste. Users must deliver the products/used devices to a collection point for used electrical and electronic devices. The separate collection and proper disposal of your products/used devices helps to conserve natural resources and guarantees recycling, which in turn protects people's health and the environment. You can get information on where to find collection points for your used devices from your local borough council, local waste disposal companies or on the Internet.

8 CE Compliance



The linear units *LEZ 1/LEZ 2/LEZ 3/LEZ 9* are "partly completed machines" under MD 2006/42/EG and accordingly CE compliant (see installation declaration by the manufacturer, isel Germany GmbH).

As an 'partly completed machine' the product does not carry the CE mark, although it still conforms to the relevant European directives.

The manufacturer, isel Germany GmbH herewith confirms that this product is compliant with the following directives:

- EU directive 2006/42/EG "Machine Directive"
- EU directive 2006/95/EG "Electrical equipment for use within given voltage limits"/"Low voltage directive"
- EU directive 2004/108/EG "Electromagnetic Compatibility (EMC)"

The installation declaration for the product, *linear unit LEZ 1/LEZ 2/LEZ 3/LEZ 9*, is part of these installation instructions.

9 Service

For service and configuration of controllers/motor output stages (if in the deliverables) you can get advice from:

Mr Frank Hecht



Telefon: (06672) 86792-800



Email: Frank.Hecht@isel.com

Mr Maurice Grosser



Telefon: (06672) 86792-800



Email: Maurice.Grosser@isel.com

Mr Andreas Giebel



Telefon: (06672) 86792-800



Email: Andreas.Giebel@isel.com

Mr Philipp Farnung



Telefon: (06672) 86792-800



Email: Philipp.Farnung@isel.com



Internet: www.isel.com



Email: support@isel.com

10 Warranty

Warranty:

Over and above the seller's statutory liability and subject to the conditions below, as the manufacturer we guarantee the durability and flawless operation of properly used products from isel Germany GmbH. The warranty covers the functioning of isel Germany GmbH products and includes all defects that are demonstrably attributable to manufacturing or material faults.

Warranty exclusions:

All replaceable individual components, e.g. screws, connecting pins etc. are excluded from this warranty. Furthermore, we accept no liability for damage caused by:

- inappropriate or improper use
- faulty or negligent handling
- failure to observe installation instructions and instructions on care, as well as modifications or repairs carried out by users themselves
- effects on the material's surface caused by chemical or physical agents, as well improper use, e.g. damage by sharp objects

We do not accept any liability for consequential damage!

We do not accept any liability for damage to persons or property that is caused by incorrect handling or failure to obey the safety guidelines. In cases such as these no claim can be made against the warranty.

Warranty conditions:

Our warranty only covers at our discretion the repair or replacement of the product free of charge for first/end users within the warranty period.

Warranty period:

The warranty period under our Terms and Conditions of Trading (isel Germany GmbH's T&C, section VI) is one year.

For complaints, please contact the seller or manufacturer direct, quoting the invoice/delivery note number.

Manufacturer: *isel Germany GmbH*
Bürgermeister-Ebert-Straße 40
D-36124 Eichenzell, Germany

 **Tel:** +49 (0)6659 981-0
 **Fax:** +49 (0)6659 981-776
 **Email:** info@isel.com
 **Website:** www.isel.com

11 Declaration of incorporation in accordance with MD 2006/42/EG**Declaration of incorporation in accordance with EC Machine Directive (MD) 2006/42/EG, Appendix II B**

The manufacturer isel Germany GmbH
Bürgermeister-Ebert-Straße 40
D-36124 Eichenzell, Germany

hereby declares that the product **(partly completed machine)**

product description: Linear units with toothed belt drive LEZ 1,2,3,9
model name: LEZ 1,2,3,9
item number: 23200x xxxx

meets the essential health and safety requirements of Machinery directive 2006/42/EC Annex II.

The following harmonized norms were applied:

DIN EN ISO 12100:2011-03 Safety of machinery - General principles for design - Risk assessment and risk reduction.

DIN EN 60204-1:2019-06; VDE
0113-1:2019-06 Safety of machinery - Electrical equipment of machines - Part 1: General requirements

The technical documentation for this machine has been prepared in accordance with Annex VII, part B. The manufacturer undertakes to electronically transmit these specific technical documentations to national authorities on request.

The authorized representative for the compilation of the special technical documentation is:

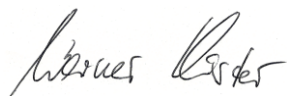
name: Christian Bley **capacity:** CE Beauftragter
company: isel Germany GmbH **address:** Bürgermeister-Ebert-Str., 40, D-36124, Eichenzell

The product (incomplete machine) is intended for incorporation into a machine or for assembly with other incomplete machines into a machine within the meaning of MRL, 2006/42/EC, Article 1, Section (1), letter a.

The commissioning of the incomplete machine (product) is prohibited until the machine in which this product has been incorporated or of which it is a component complies with the requirements of all relevant directives and this complete machine has a CE marking.

Place and date:

Dernbach, 18th October 2011



Werner Kister, managing director

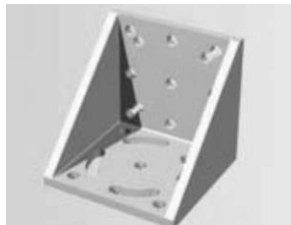
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13 Appendix

13.1 A1: Accessories

LEZ 1



Connection angles
• for LEZ 1

Part no.: 209110 0010



20/30 coupling
• for LEZ 1
• 1VE = 1 coupling

Part no.: 218001 5080

Shaft slots 1/70

- L 96 x W 72 x H 28.5mm
- Clamping surface plane milled, T-groove slots M6
- Central greasing option, adjustable for zero play
- Weight: 0.35 kg
- Option: stainless steel version

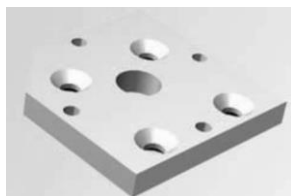
Part no.: 223100 0070
Stainlesssteel: 223101 0070

Limit switch set

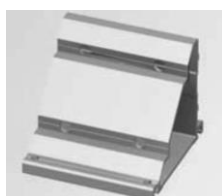
- Option: 2nd limit switch for LEZ 1

Part no.: 632125 0002

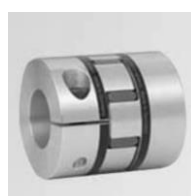
LEZ 2



Motor fastening plate
• for LEZ 2
• incl. fixing material
• for direct drive
Part no.: 2321999 0004



Connection angles
• for LEZ 2
• incl. fixing material
Part no.: 2321999 0005



Transmission shaft
Ø 25 mm

Length 1 m
Part no.: 219001 0125

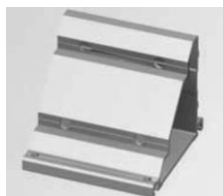
Length 2 m
Part no.: 219001 0225

Coupling for transmission shaft

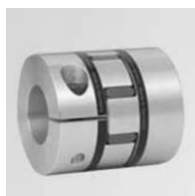
- for LEZ 2
- 1VE = 2 couplings

Part no.: 218050 0002

LEZ 3



Connection angles
• for LEZ 3
• incl. fixing material
Part no.: 2321999 0005



Coupling for transmission shaft
• for LEZ 2
• 1VE = 2 couplings
Part no.: 218050 0002

Transmission shaft Ø 25 mm

Length 1 m
Part no.: 219001 0125

Length 2 m
Part no.: 219001 0225

Limit switch set

Motor side
Part no.: 397201 0000

Deflection side
Part no.: 397201 xxxx

LEZ9

Shaft slots 1/70

- L 96 x W 96 x H 32 mm
- Clamping surface plane milled, T-groove slots M6



- Central greasing option, adjustable for zero play
 - Weight: 0.4 kg
 - Option: stainless steel version
- Part no.: 223111 0070
Stainless steel: 223111 0070

30/40 coupling
• for LEZ 9
• 1VE = 1 coupling
Part no.: 218001 8080

Threadedstrips/slidingnut	Part number	Note	
Threaded strips M6 (50 raster)	209011	VE 3 parts at 1m	
Sliding nut M6	209001 0005	VE 100 units	
Sliding nut 2 x M6	209002 0004	VE 50 units	
Sliding nut M5	209006 0001	VE 20 units	
Angled sliding nut 2 x M6	209021 0003	VE 25 units	
Special angle sliding nut 3x M6	209022 0003	VE 25 units	

Energy guidance chain

Energy guidance chain 3
VE 1 part at 1m
Part no.: 219204 1000

Connections for E-chain 3
with detensioning VE 1 set
Part no.: 219205 0002



13.2 A2 Miscellaneous

Assembly instructions [Product] Identification no.: 970232 BE 0001/10-2011