

Operating instructions  
**easyLINE S**

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Art.-Nr. 1055394

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## Contents

<b>1</b>	<b>Safety</b>	<b>7</b>
1.1	Definition of the Alerts	7
1.2	General Safety Instructions	7
<b>2</b>	<b>Range of application</b>	<b>9</b>
<b>3</b>	<b>Installation</b>	<b>10</b>
3.1	Assembly	10
3.2	Technical Data	10
3.2.1	Technical Data when Using a Planetary Gearbox	11
3.3	Securing easyLINE S	13
3.4	Attachment of grippers, cylinders, etc.	14
<b>4</b>	<b>Wiring</b>	<b>15</b>
4.1	Motors	15
4.2	Initiators	15
4.3	Energy chain	17
<b>5</b>	<b>Maintenance</b>	<b>18</b>
<b>6</b>	<b>Trouble shooting</b>	<b>19</b>
<b>7</b>	<b>Drawings and parts lists</b>	<b>21</b>
<b>8</b>	<b>Drawings</b>	<b>23</b>
8.1	easyLINE-S, stroke max. 100mm	23
8.2	easyLINE-S, from stroke 100mm	24
8.3	easyLINE-S, expolsion drawing, stroke max. 100mm	25
8.4	easyLINE S, expolsion drawing, from stroke 100mm	26
8.5	easyLINE-S, expolsion drawing Motor assambly	27
8.6	easyLINE-S, expolsion drawingm slide	28
8.7	Clamping element easyLINE	29
8.8	Clamping element type 105 Z	30
8.9	Clamping element type 105 Z axial	31
8.10	Clamping element type M105	32



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## Manufacturer's Declaration According to EG Machinery Recommendation

IEF Werner GmbH

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We declare herewith that the following products...

Designation of the products	part groups
easyLINE	1000010
easyLINE S	1000020
easyLINE AL	1000019
Modul 68	1000018
Modul 105	1000012
Modul 105 S	1000014
Modul 142	1000015
Modul 142 S	1000017
Modul 142 G	1000228

are intended for installation in a machine. The initial operation is forbidden until it is stated that the machine in which these products should be installed is corresponding to the regulations of EG Recommendation 98/37/EG from June 22, 1998.

Applied, harmonized rules in particular:

ISO 12100-1 :05-2004

ISO 12100 -2 :04-2004

EN 294

Furtwangen, 13.06.2005



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(Manfred Bär, president)



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# 1 Safety

## 1.1 Definition of the Alerts



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### WARNING

Indicates a potentially hazardous situation. Disregarding the safety regulations can result in serious injuries or death.

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### CAUTION

Indicates a potentially hazardous situation. Disregarding the safety regulations can result in material damage or injuries.

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**NOTE** Offers additional information.

## 1.2 General Safety Instructions



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### WARNING

The system has to be de-energized for all installation, disassembly or repair work. High risk of injuries!

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### CAUTION

Motor connectors may not be inserted or disconnected under live condition. Risk of burning of the contacts.

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### CAUTION

Linear modules always have to be operated in connection with suitable safety devices (e.g., safety cell, protective room, light curtain, etc.).

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### CAUTION

During operation, the heating of the motor, in particular of stepper motors, can cause the burning of the skin when touching the motor.

Install a protective device!

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In addition to the notes, warnings and cautions referred to above you will also find the adjacent symbol in the Operating Manual. The risk of crushing of limbs exists at this position.

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**NOTE**      Observe the Manufacturer's Declaration

The putting into operation of the linear module is prohibited until it is determined that the machine in which it is to be installed complies with the provisions of the EC Directive 98/37/EC dated June 22, 1998 or the corresponding national standards and the conformity with the Machinery Directive was determined by the manufacturer of the overall equipment or the agency that will be putting it into circulation.



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## 2 Range of application

The linear module type easyLINE S is a precise, linear positioning unit having a toothbelt drive system. The wide range of IEF Werner linear products can be used for many kinds of industrial automation, either integrated with new or existing automation or in combinations with other IEF Werner linear modules. Utilising a module 105 or 142 in conjunction with modules 68, 68D or easyLINE S, numerous combinations can be achieved to provide simple or complex multi-axis handling systems.

Applications range:

- Assembly automation
- Pallet systems
- Load and unload systems
- Manipulators for the packaging industry

Above mentioned linear units are not suited for transportation of people and animals or as press- and bending device for cold working on metal.

For special applications in the chemical field, the food sector or in an explosive surrounding you need to take additional measures. In case of doubt, please contact manufacturer.

### 3 Installation

#### 3.1 Assembly

The linear module easyLINE S can either be horizontally or vertically mounted.



#### CAUTION

If you mount the module vertically, only use motors with a spring power brake to avoid the carriage dropping down when the electrical supply is switched off.

#### 3.2 Technical Data

repeat accuracy	+/- 0,02 mm
weight (without motor and planetary gear)	4,5 kg
weight increase per 100 mm stroke	0,4 Kg
critical spindle speed	3000 U/min.
Mx	35 Nm
My	50 Nm
Mz	20 Nm
max. load	10 kg

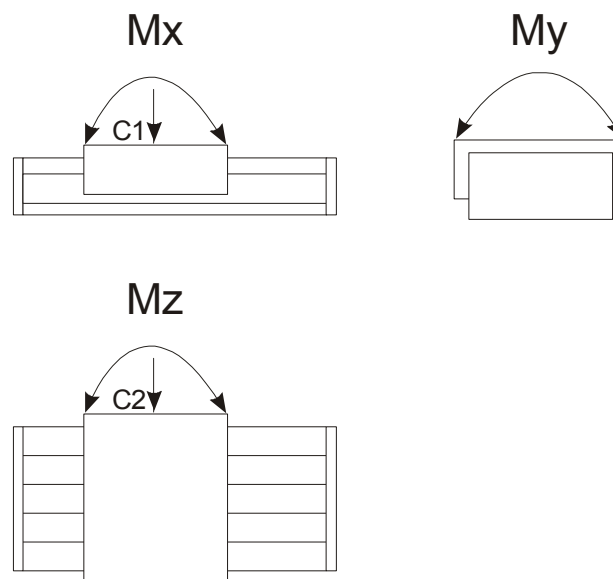


Fig. 1: Charge cases

### 3.2.1 Technical Data when Using a Planetary Gearbox

Gearbox types	Single-stage x :1	Torsional play, single-stage (arcmin)	Two-stage x :1	Torsional play, two-stage (arcmin)	Three-stage x :1	Torsional play, three-stage (arcmin)
TP 004 MF 1	5; 7; 10	< 5	21; 31; 61; 91	< 5	-----	
PLF 64 HP	4; 5; 8	< 3	16; 20; 25; 32; 40; 64	< 5	-----	-----
PLE 60	3; 4; 5; 8	< 20	9; 12; 15; 16; 20; 25; 32; 40; 64	< 25	60; 80; 100; 120; 160; 200; 256; 320; 512	< 30
WPLE 60	3; 4; 5; 8	< 30	9; 12; 15; 16; 20; 25; 32; 40; 64	< 35	60; 80; 100; 120; 160; 200; 256; 320; 512	< 40
PLE 80	3; 4; 5; 8	< 12	9; 12; 15; 16; 20; 25; 32; 40; 60	< 17	60; 80; 100; 120; 160; 200; 256; 320; 512	< 22
WPLE 80	3; 4; 5; 8	< 25	9; 12; 15; 16; 20; 25; 32; 40; 64	< 30	60; 80; 100; 120; 160; 200; 256; 320; 512	< 35
PLS 70 OP 11	3; 4; 5; 8; 10	< 3	12; 15; 16; 20; 25; 32; 40; 64; 100	< 5	-----	-----
WPLS 70 OP 11	4; 5; 8; 10	< 5	16; 20; 25; 32; 40; 64; 100	< 7	-----	-----
PLS 90 OP 11	3; 4; 5; 8; 10	< 3	12; 15; 16; 20; 25; 32; 40; 64; 100	< 5	-----	-----
WPLS 90 OP 11	4; 5; 8; 10	< 5	16; 20; 25; 32; 40; 64; 100	< 7	-----	-----



**CAUTION**

When using a planetary gearbox, attention must be paid to the recommended input speeds (**specification in rpm**).

Gearbox types	Single-stage [rpm]	Two-stage [rpm]	Three-stage [rpm]
TP 004 MF 1	3000	4500	-----
PLF 64 HP	3000	4500	-----
PLE 60	4000	4000	4000
WPLE 60	3000	3000	3000
PLE 80	4000	4000	4000
WPLE 80	3000	3000	3000
PLS 70 OP 11	5000	5000	-----
WPLS 70 OP 11	3000	3000	-----
PLS 90 OP 11	4500	4500	-----
WPLS 90 OP 11	2500	2500	-----

### 3.3 Securing easyLINE S

The use of clamping elements allows the linear unit easyLINE S to be easily secured to a level mounting surface. For safety reasons, continuous clamping sections are advised. This ensures hazardous shear points are avoided. Avoid drilling holes in the basic body. This can damage the internal parts and distorts the guide base.

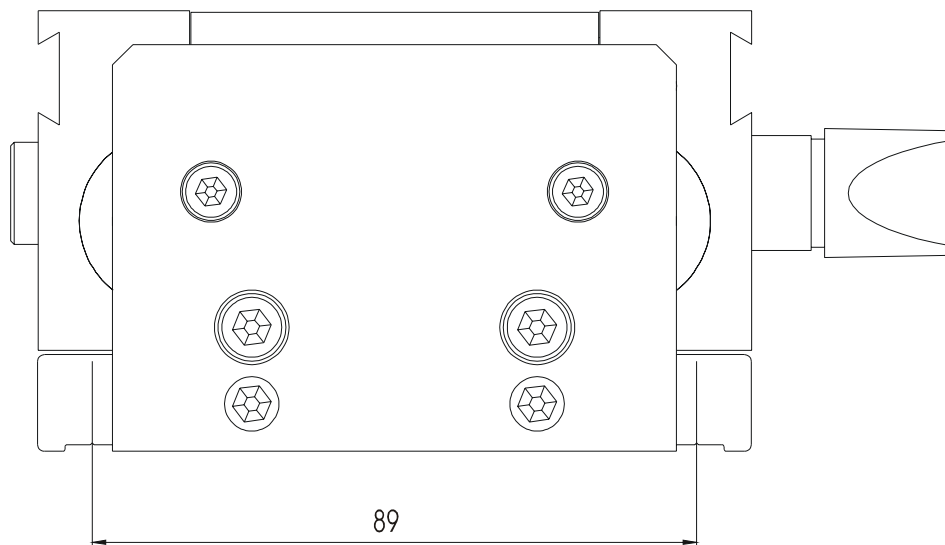


#### CAUTION

Avoid drilling holes in the basic body. In case of doubt please contact manufacturer.

Following clamping elements are good for attachment. (*drawings see chap. 8, Drawings*).

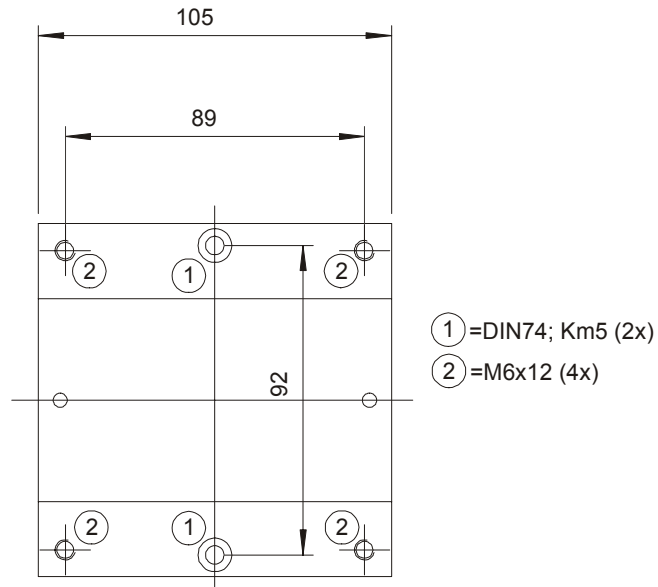
art.no.	assignment
028674	clamping element type 105 ( <i>see chap. 8.7, page 29</i> )
526631	clamping element type 105 Z ( <i>see chap. 8.8, page 30</i> )
526607	clamping element type 105 Z axial ( <i>see chap. 8.9, page 31</i> )
026975	clamping profile, L=customized ( <i>see chap. 8.10, page 32</i> )



**Fig. 2: easyLINE S, attachment with clamping elements**

### 3.4 Attachment of grippers, cylinders, etc.

Actuators (grippers, cylinder, etc.) attached to the easyLINE S could be mounted through the boring pictures on the slide.



**Fig. 3: easyLINE S, mounting detail standard slide**

## 4 Wiring

### 4.1 Motors



#### CAUTION

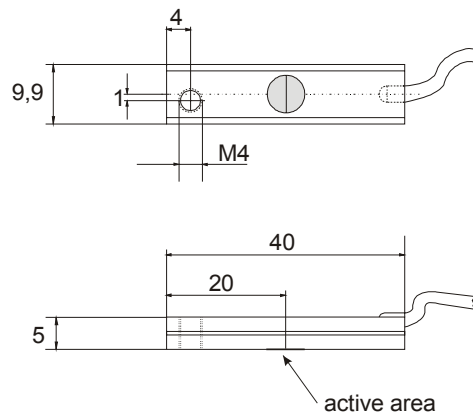
Wire the motor according to its data sheet. If you use customized motors ask the manufacturer which cables should be used to wire the motor.

### 4.2 Initiators

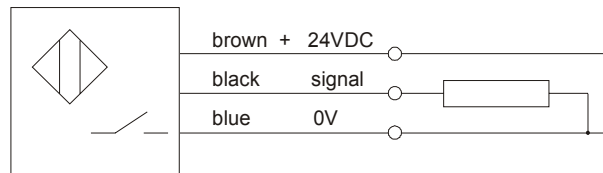
Inductive proximity switches (PNP-NC, art.no. 025165) are generally used as limit switches. These inductive limit switches are not security limit switches according to EN60204-1. By request an additional reference switch (PNP-NO, art.no. 726744) can be installed. The active switching is marked with a coloured circle symbol. Nc's are marked with a green point. No's are marked with a red point. The initiators with feed wires lay in a cable channel which is integrated in the base unit. They are connected centrally to a plug.

The cable channel is covered by a cover strip. The cover strip can be easily removed from the cable channel in order to move or change an initiator.

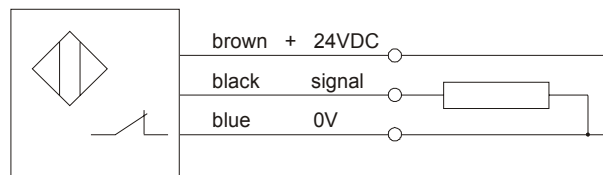
rated voltage incl. residual ripple	10...30 VDC $\leq$ 15 %
maximum admissible current	$I_a \leq$ 200 mA
potential difference at $I_a$ max.	$\leq$ 2,5 V
sampling frequency	$\leq$ 1000 Hz
consume current	$\leq$ 15 mA
nominal switch point at steel	1,5 mm $\pm$ 10 %
hysteresis	3...20 %
reproducibility (U = konst.)	$\pm$ 0,01 mm
working temperature	- 25 ° ... + 70 °C
protecting class	IP 65
short circuit proof	yes
reverse battery protection	yes



**Fig. 4: Dimensions initiator**

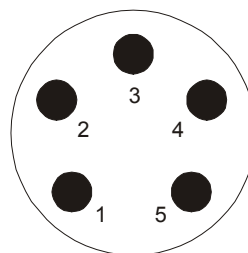


**Fig. 5: Assignment PNP – NO**



**Fig. 6: Assignment PNP – NC**

pin-no.	assignment	colour
1	+ 24 VDC	brown
2	imit switch negative movement	green
3	0 V	white
4	limit switch positive movement	yellow
5	reference switch	grey



**Fig. 7:pin assignment**



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### 4.3 Energy chain

Use a suitable energy chain for all moving cables. The following equation is valid for the minimum radius  $r_{\min}$  for energy chains by the use of IEF-cables.

$$r_{\min} \geq 10 \times \text{cable diameter}$$

If you use customized cables be aware of the EN 60204. Keep in reserve 30% of space within the energy chain. At the exit of the energy chain a pull relief has to be installed.

## 5 Maintenance

All rolling element units are given lifetime lubrication at the factory.

However, in order to guarantee a long service life for the dirt scraper, we recommend that you wet the guide shafts at regular intervals with Klüber ISOFLEX Super LDS 18 (IEF Art-No: 732934).

The spindle has to be greased with Klüber NCA15 (IEF Art-No: 729148).

**Recommended Service interval with normal working conditions:** 500 working hours.

(With heavy conditions the service intervals has to be shorter as normal.)



### CAUTION

Repairs should only be carried out by skilled engineers, who have read and understood the entire operating instructions.  
Only use genuine spare parts as Fa. IEF Werner cannot guarantee otherwise.

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### CAUTION

The system must be de-energized in order to carry out all assembly, disassembly or repair work on the linear module.

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## 6 Trouble shooting

### List of errors part 1

error	reason	solving the problem
increased running noise	the lifetime of the linear bearings is exceeded	replace the linear bearings (Z-Pos. 172)
	the linear bearings are damaged because of overloading	replace the linear bearings (Z-Pos. 172), reduce loading
	the linear bearings are damaged because of intense dirt	replace the linear bearings (Z-Pos. 172), clean the guide shafts more often
	the guide shafts are damaged	change the guide shafts, replace the linear bearings (Z-Pos. 172), check the loading, protect the linear module from intense dirt
	the guide shafts are rusty	replace the guide shafts, if necessary replace the linear bearings (Z-Pos. 172), grease the guide shafts more often or use stainless steel guide shafts
	spindle or nut damaged	Change spindle (Z-Pos. 40)
	motor (motor bearing) damaged	change the motor (Z-Pos. 70)
	motor with brake, the brake doesn't open	connect 24 VDC to the brake, if the brake doesn't still open change the motor (Z-Pos. 70)
The linear module doesn't move	coupler between spindle and motor isn't attracted.	Attract (Z-Pos. 120) coupler.
	limitswitch cable not connected	connect the cable
	initiator damaged	change initiators (Z-Pos. 180)
	limitswitch cable damaged	check the limitswitch cable and change it if necessary
	the soldered joint at the connector is seperated	solder the strands
	motor wiring not correct	check the wiring and change it if necessary
	motor damaged	change the motor (Z-Pos. 70)
	error in the ampliyer or in the controller	check the amplifier and the controller
	motor cable damaged	check the motor cable, if necessary replace the motor cable

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**List of errors part 2**

<b>error</b>	<b>reason</b>	<b>solving the problem</b>
reverse clearance	axial bearing damaged	change axial bearing (Z-Pos. 120)
	axial bearing unit not fixed	ring nut M20x1 attract hardly (Z-Pos. 140)
	spindle in the axial bearing not attached.	ring nut M6x0,5 attract hardly (Z-Pos. 150)
	spindle has play in the spindle nut	ring nut M20x1 attract hardly (Z-Pos. 140)
	close spindle	change (Z-Pos. 40) Spindle
The linear module crashes during the search of the home position	sense of rotation wrong	change sense of rotation
	parting of the motor cable	replace the cable

## 7 Drawings and parts lists

### List part 1

Z-Pos.	art.no.	part (1)/ partsgroup(0)			assignment
10	28688	1			cover strip
20	1000022	0	O		basic profile type easyLINE S
30	31052	1		+	endplate easyLINE stroke<=100mm
30	31076	1		+	endplate easyLINE stroke>100mm
40	527301	1	O	+	spindle stroke 100
40	30870	1	O	+	spindle stroke 150
40	31069	1	O	+	spindle stroke 200
40	31070	1	O	+	spindle stroke 250
40	31071	1	O	+	spindle stroke 300
40	31072	1	O	+	spindle stroke 350
50	31050	1			bearing plate easyLINE
60	31051	1		+	motor flange 56/2P
60	31161	1		+	motor flange 60/5P
60	971137	1		+	motor flange 6SM27
70	1000041	0	O	+	motor
80	31048	1			slide plate easyLINE
90	31055	1			slide easyLINE S1
100	31053	1	O		spindle nut easyLINE
110	732224	1			plastic cover D=25/20,5
120	737184	1	O		bearing ZKLN 0619.2Z
130	734161	1			cover D=16/12
140	626612	1			ring nut M20x1, nickelized
150	626613	1			ring nut M6x0,5, nickelized
160	729824	1	O	+	coupler d=5/d=6
160	729823	1	O	+	coupler d=5/d=6,35
160	737174	1	O	+	Rotex coupler d=5/d=9
170	31054	1			slide easyLINE S2
171	26481	1			bumper, green
172	626046	1			linear bearing type16
173	1000492	1			safety screw
180	25615	1	O	+	limitswitch pnp nc
180	726744	1	O		limitswitch pnp no
190	28585	1			initiator holder

**List part 2**

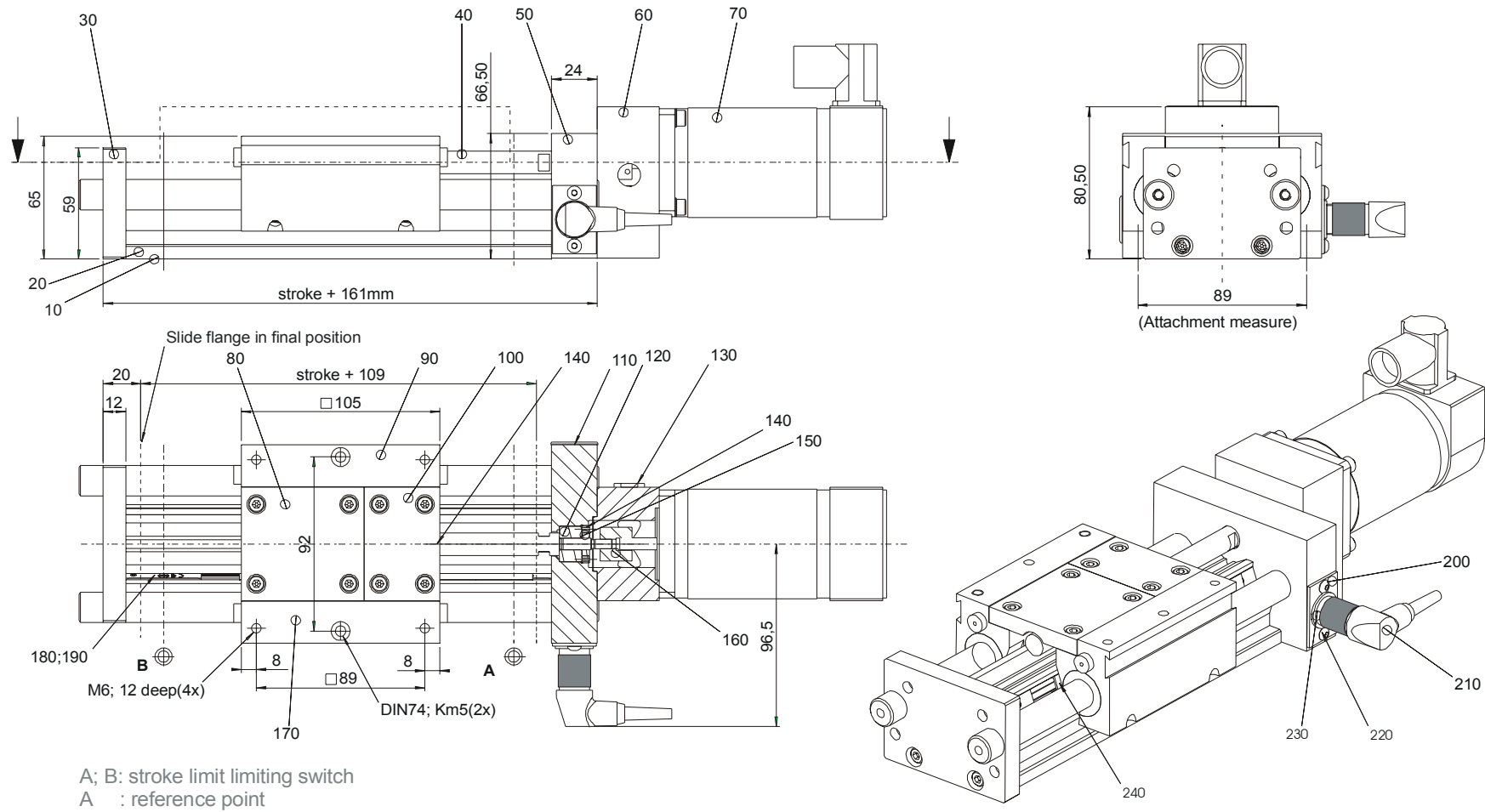
Z-Pos.	art.no.	part (1)/ partsgroup(0)			assignment
200	25626	1			holding tin
210	725164	1			connector (angle) type WKV 50/6
220	626038	1			screw ISO 7380 M3x8
230	725163	1			socket plug type SFV 50/6
240	28668	1			cover strip easyLINE
240	28668	1			cover strip easyLINE
250	730268	1	O	+	bearing 626.2RS

O Spare and wearing part

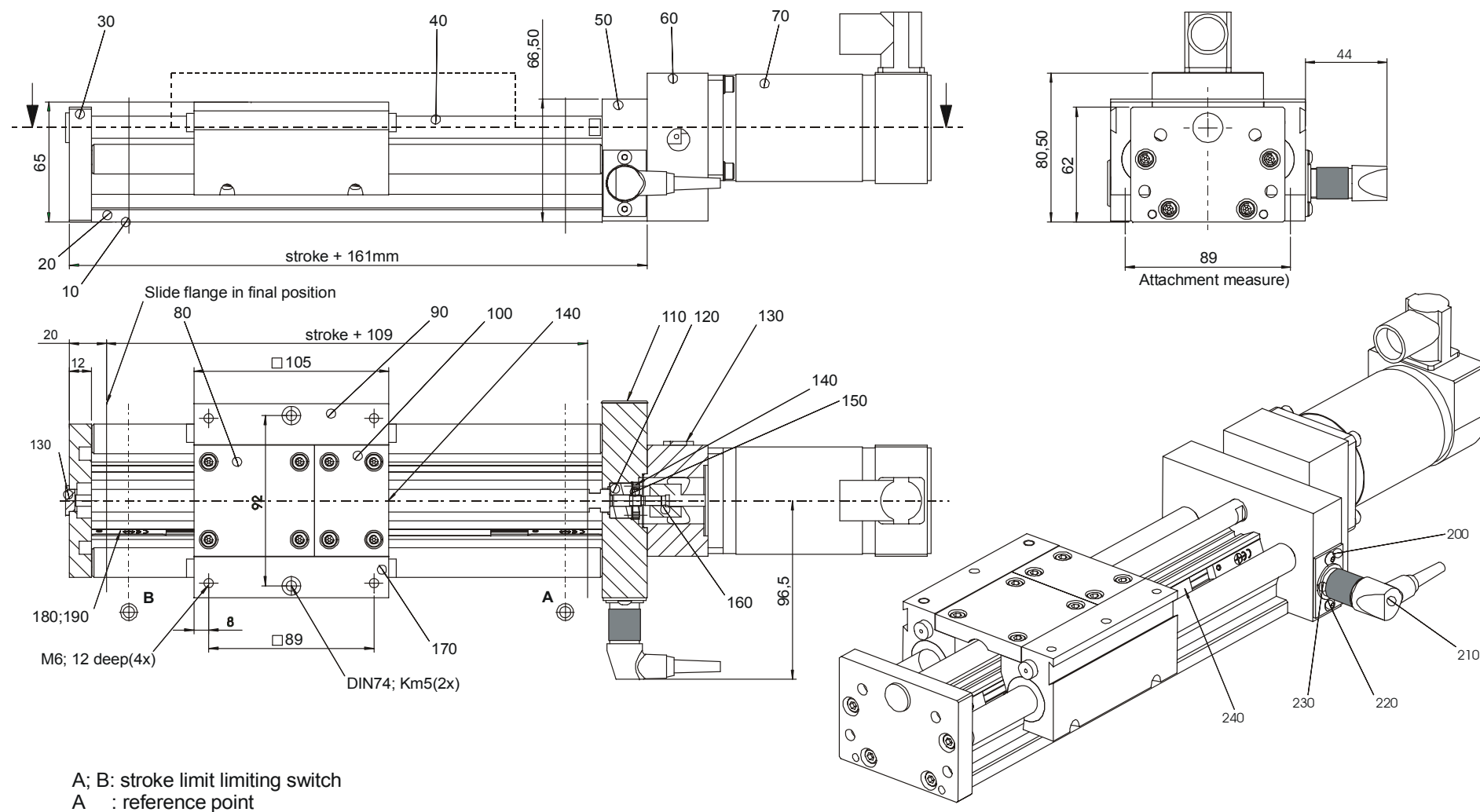
+ depending to the order

## 8 Drawings

### 8.1 easyLINE-S, stroke max. 100mm

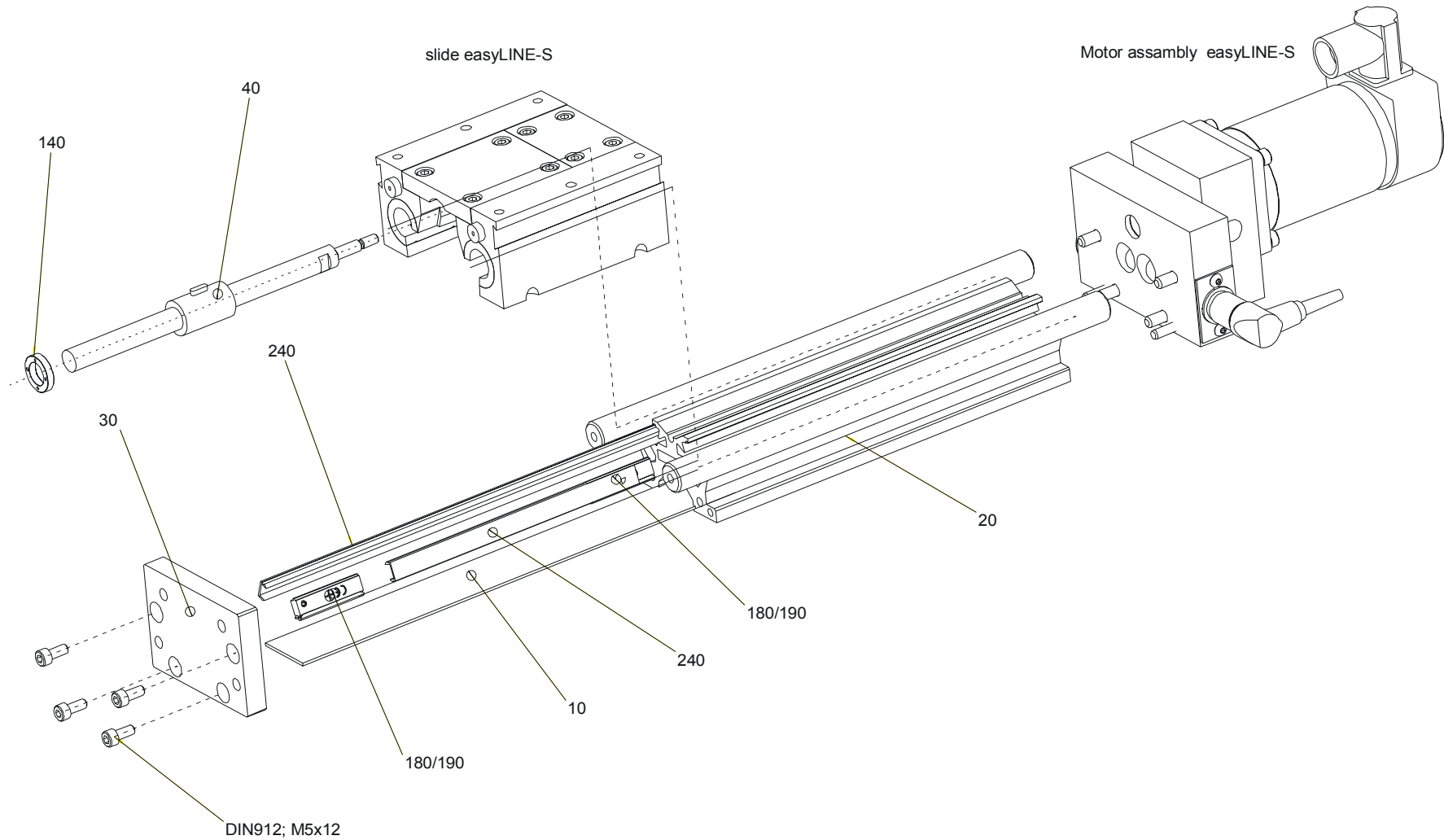


## 8.2 easyLINE-S, from stroke 100mm

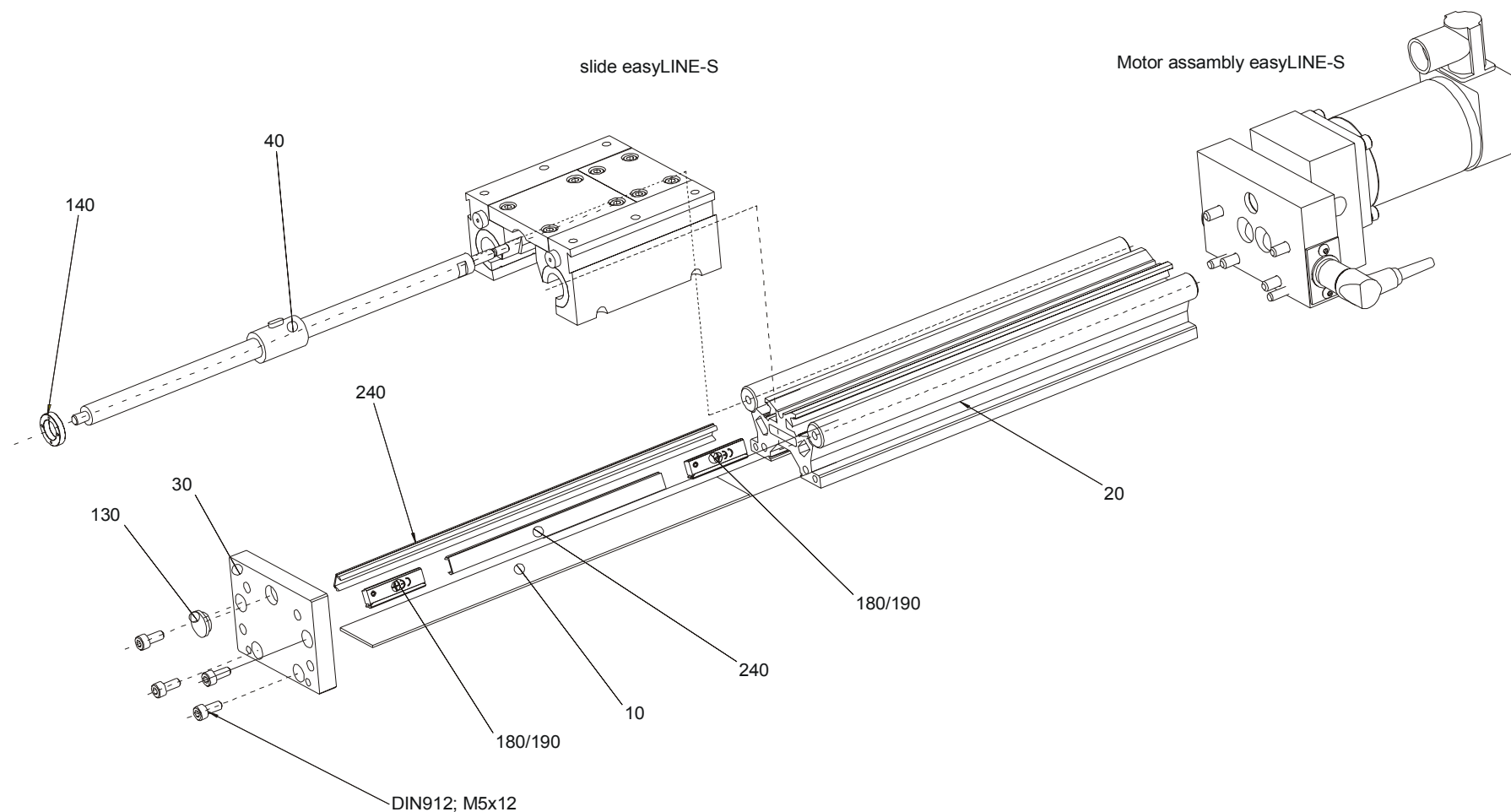




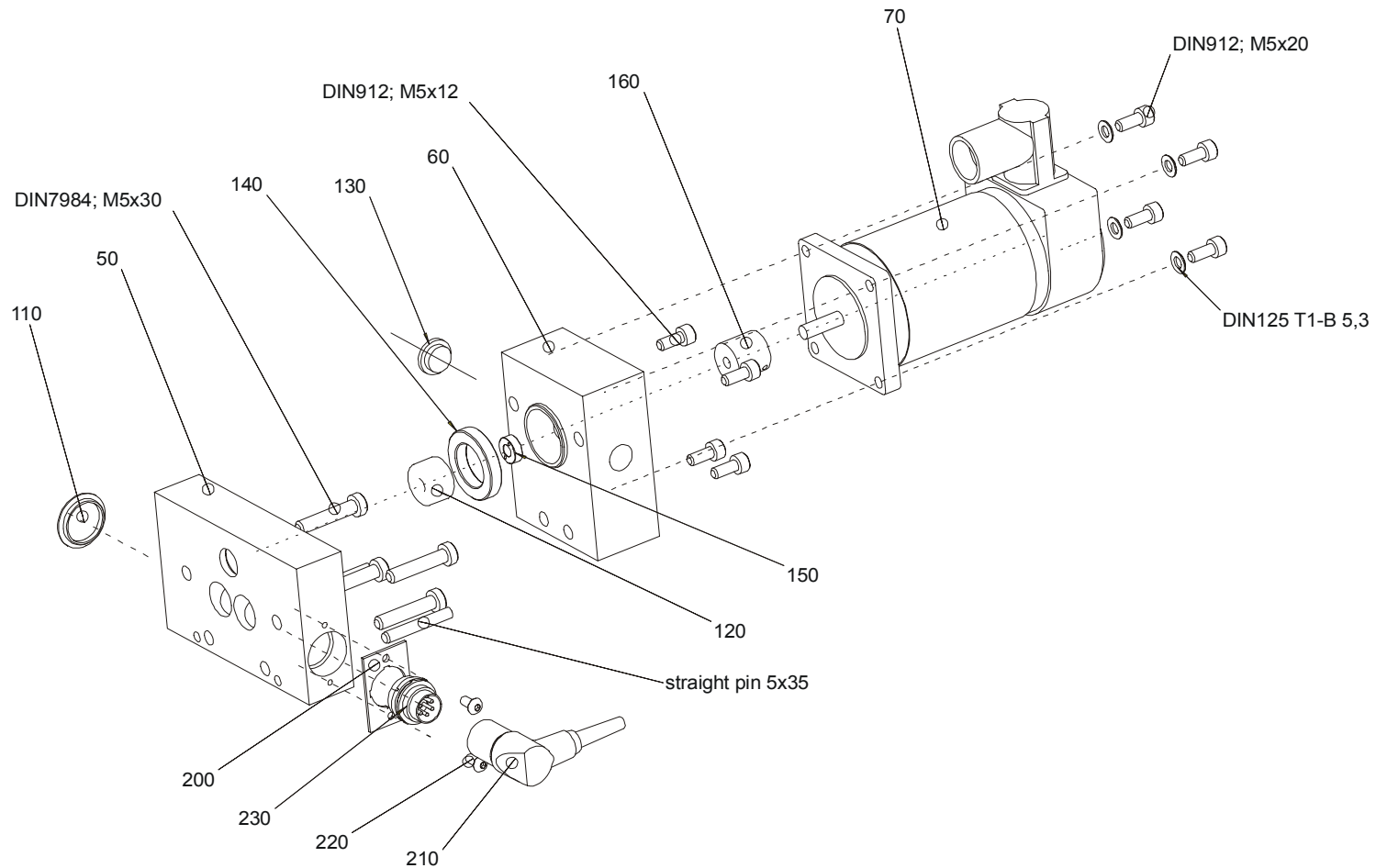
### 8.3 easyLINE-S, explosion drawing, stroke max. 100mm



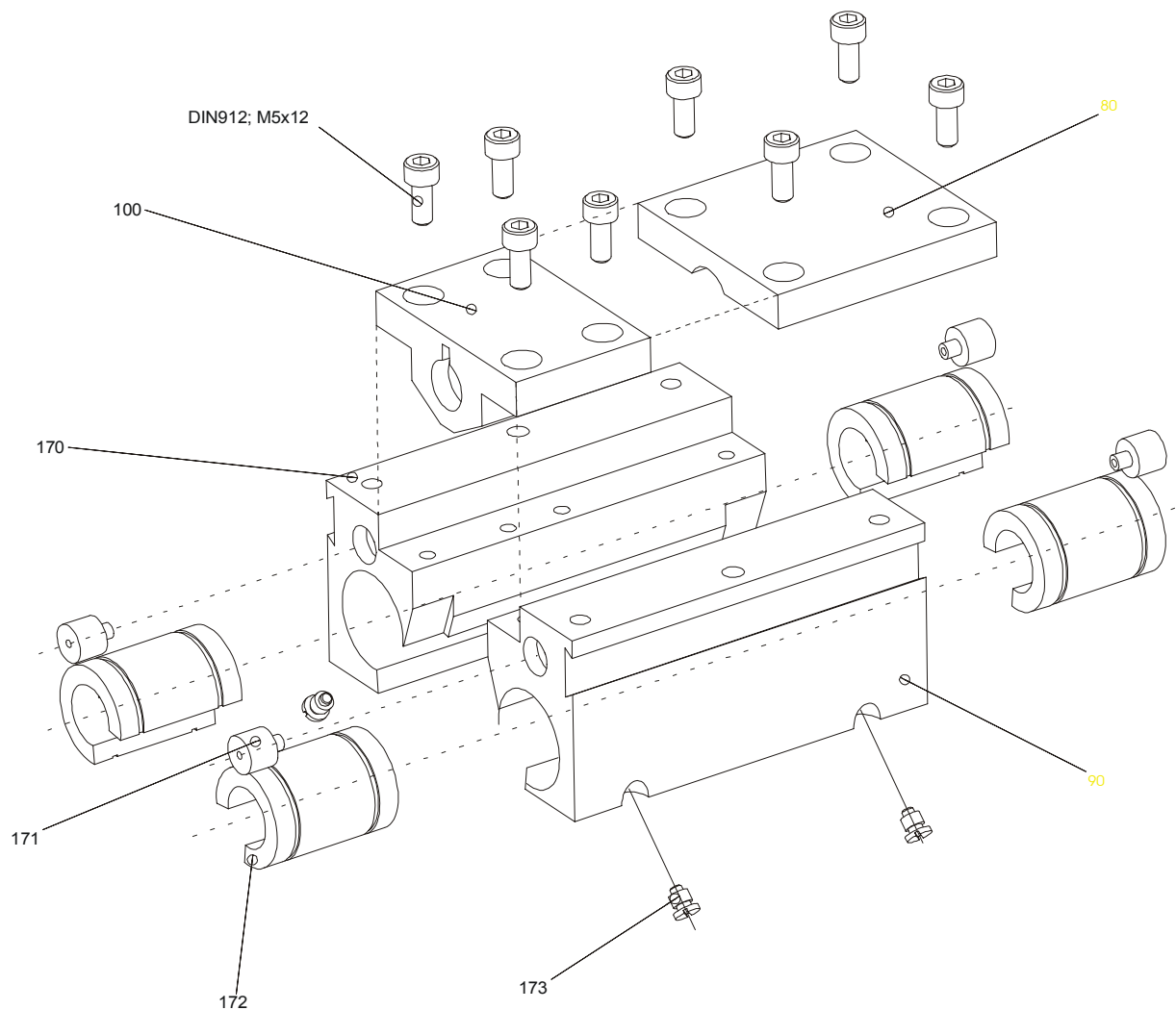
## 8.4 easyLINE S, expulsion drawing, from stroke 100mm



## 8.5 easyLINE-S, explosion drawing Motor assembly

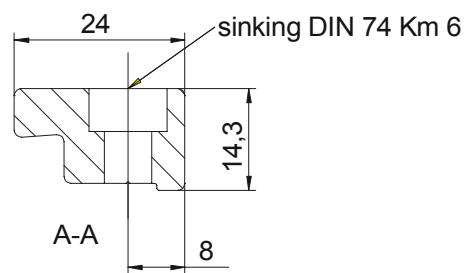
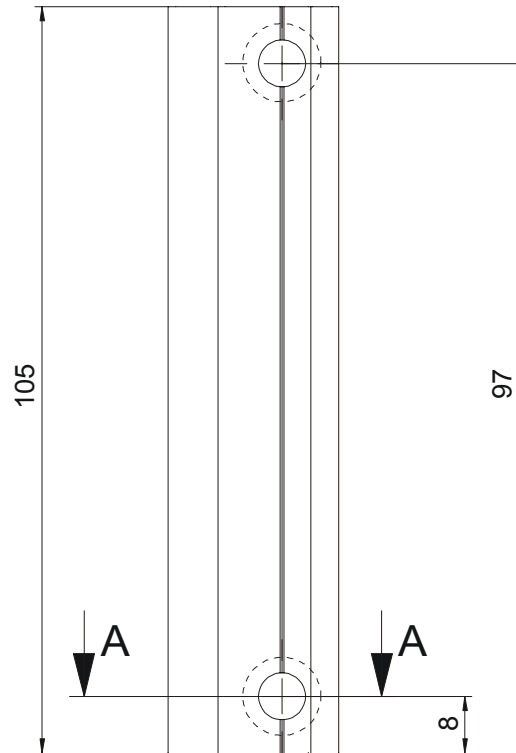


## 8.6 easyLINE-S, explosion drawingm slide



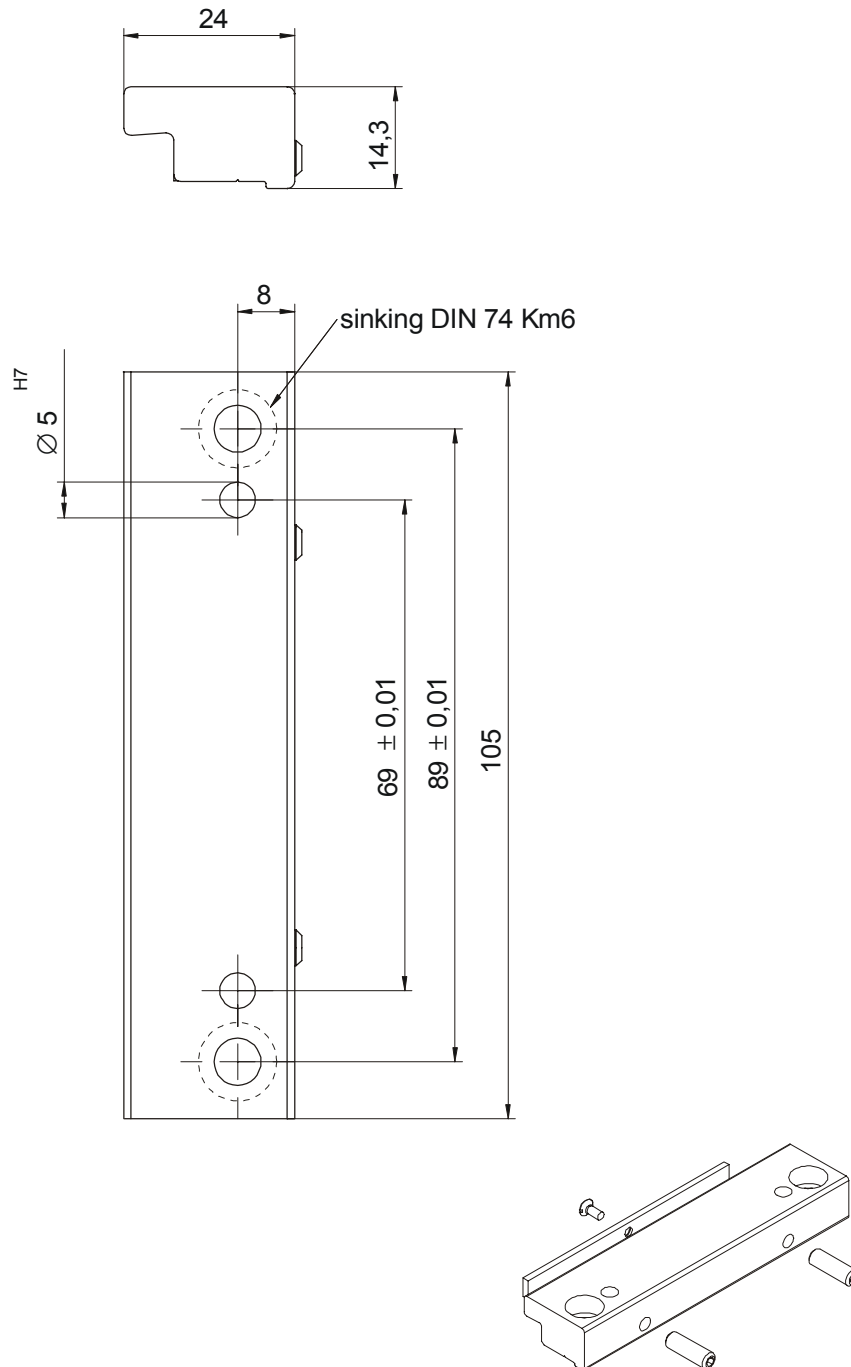
## 8.7 Clamping element easyLINE

(Art.Nr.: 028674)



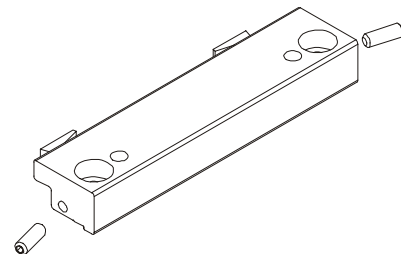
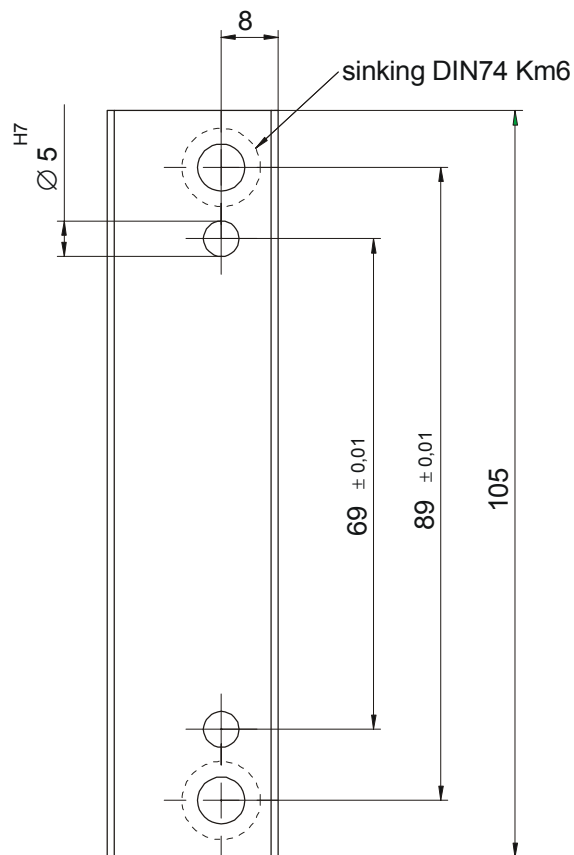
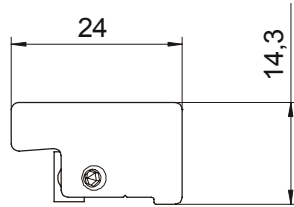
## 8.8 Clamping element type 105 Z

(Art.Nr.: 526631)



## 8.9 Clamping element type 105 Z axial

(Art.Nr.: 526607, axial calibration)



## 8.10 Clamping element type M105

( Art.No.: 026975, available length up to 5000 mm)

