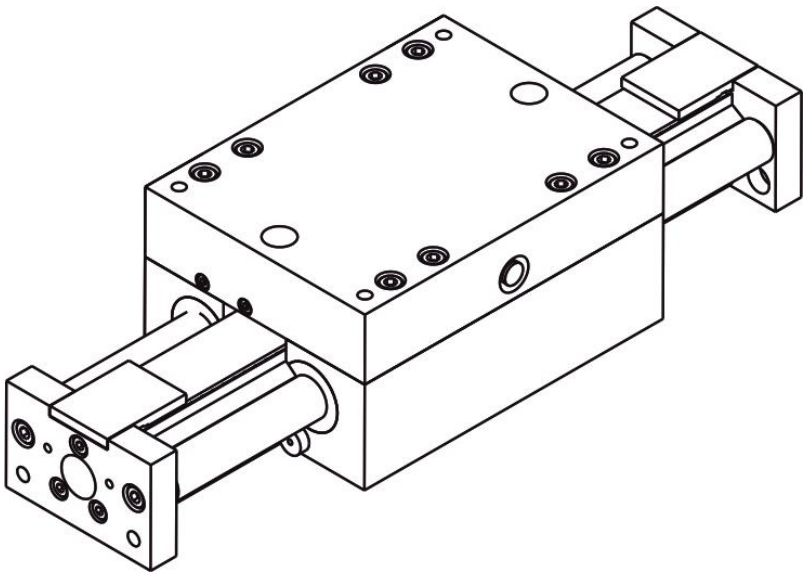
Operating instructions

Product name: Module 68
Product-ID: 1040579



Original version DE | Translation of the original instructions

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Use

- The operating instructions must be available near by the component at all times.
- The operating instructions are an integral part of the component / device.
- Always use the complete original (or the original translation) of these operating instructions.

Supplier & Manufacturer

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Service

Find your IEF service station on our website:

- http://www.ief-werner.de

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Change History:

Document Code	Date	Modification
MAN_EN_1040579_Module 68_R2a.doc	06.02.2010	Document updated regarding the new machinery directive (MRL 2006/42/EC)
MAN_EN_1040579_Module 68_R2b.doc	04.10.2011	Indication of tightening torque of 7.5 Nm at the clamp ring (see chapter 5.4, 🗎 26)
MAN_EN_1040579_Module 68_R2c.doc	20.03.2013	Change article no. of toothed belt 25 AT5 in chapter 7.1, 🗎 30 & 7.2, 🗎 32
MAN_EN_1040579_Module 68_R2d.doc	28.06.2016	Article no. corrected (see table drawing item 120 in 7.2, 🗎 32) and document generally updated
MAN_EN_1040579_Module 68_R2e.doc		Inductive sensor with fixing screws taken out of the parts list chapter 7.3, 🗎 34 and graphic Figure 18and inserted in parts list 7.1, 🗎 30 & 7.2, 🗎 32and graphic Figure 15 Figure 16 New layout

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1 Declaration of incorporation

EC declaration of incorporation in the sense of the EC directive 2006/42/EC (machinery), Annex II B

The manufacturer:
IEF-Werner GmbH
Wendelhofstraße 6
78120 Furtwangen – Germany

hereby declares that the following products (the incomplete machine/component):

Designation	IEF-Werner parts group number
Module 68	TG1000018

where possible based on the scope of delivery, correspond to the following basic requirements of the directive on Machinery (2006/42/EC):
Annex I, item: 1.1.2; 1.1.3; 1.1.5; 1.3.2; 1.3.4; 1.5.1; 1.7.3; 1.7.4;

The incomplete machine also corresponds to the following further directives:
Directive 2004/108/EC of the council, dated 15 December 2004, for harmonisation of the legal provisions of the member states on electromagnetic compatibility.
Directive 2006/95/EC of the council, dated 12 December 2006, for harmonisation of the legislation of the member states regarding electrical equipment for use within specified voltage thresholds.

The technical documents were generated according to Annex VII part B and may be electronically submitted to the national authorities upon justified request.

List of some applied harmonised standards:
EN ISO 12100-1,-2 / EN ISO 13857 / EN ISO 13850 / EN 60201-1

Commissioning of the incomplete machine (component/device) delivered by us is not permitted until it has been determined that the overall system into which the component is installed meets the basic safety and health protection requirements according to Annex I of the above EC directive 2006/42/EC.

Name of the documentation officer: Frank Reichelt, technical editor
Address of the documentation officer: see manufacturer's address

Furtwangen, November 2016 Manfred Bär (Manager)

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2 Safety

2.1 Definition of Warning Notes

⚠ DANGER

Indicates danger.

Non-observance of the safety provisions causes death.

⚠ WARNING

Indicates potential danger.

Non-observance of the safety provisions may cause death or severe injury.

⚠ CAUTION

Indicates potential danger.

Non-observance of the safety provisions may cause injury.

ATTENTION

Indicates potential danger.

Non-observance of the safety provisions may cause property damage.

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2.2 General Warning Notes

The Module 68 must only be commissioned by specialists who have received safety-technical instructions and are able to assess potential dangers.

Furthermore, all chapters of these operating instructions must have been read and understood completely.

⚠ DANGER

Warning of dangerous electrical voltage.

The system must be powered down for all assembly, disassembly or repair work.
Non-observance of the safety provisions may cause death.

⚠ WARNING

Linear modules must only be operated with their protective device/s.

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

⚠ CAUTION

Warning of hot surface.

During operation, the heated drive, in particular of stepper motors may cause skin burns when touched. Install a protective device, if possible! Do not touch the marked areas or wait for an adequate cooling time.

⚠ CAUTION

Do not remove plugs or clamps when live.

Motor connectors or clamps must not be inserted or disconnected when live.
Risk of burning of the contacts and risk of flying sparks

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2.2.1 Special Hazard Warnings

In addition, this Original User's Manual also contains the following special hazard warning:

⚠ WARNING

Danger from crushing of limbs.

These points of the components pose the danger of crushing limbs in operation.

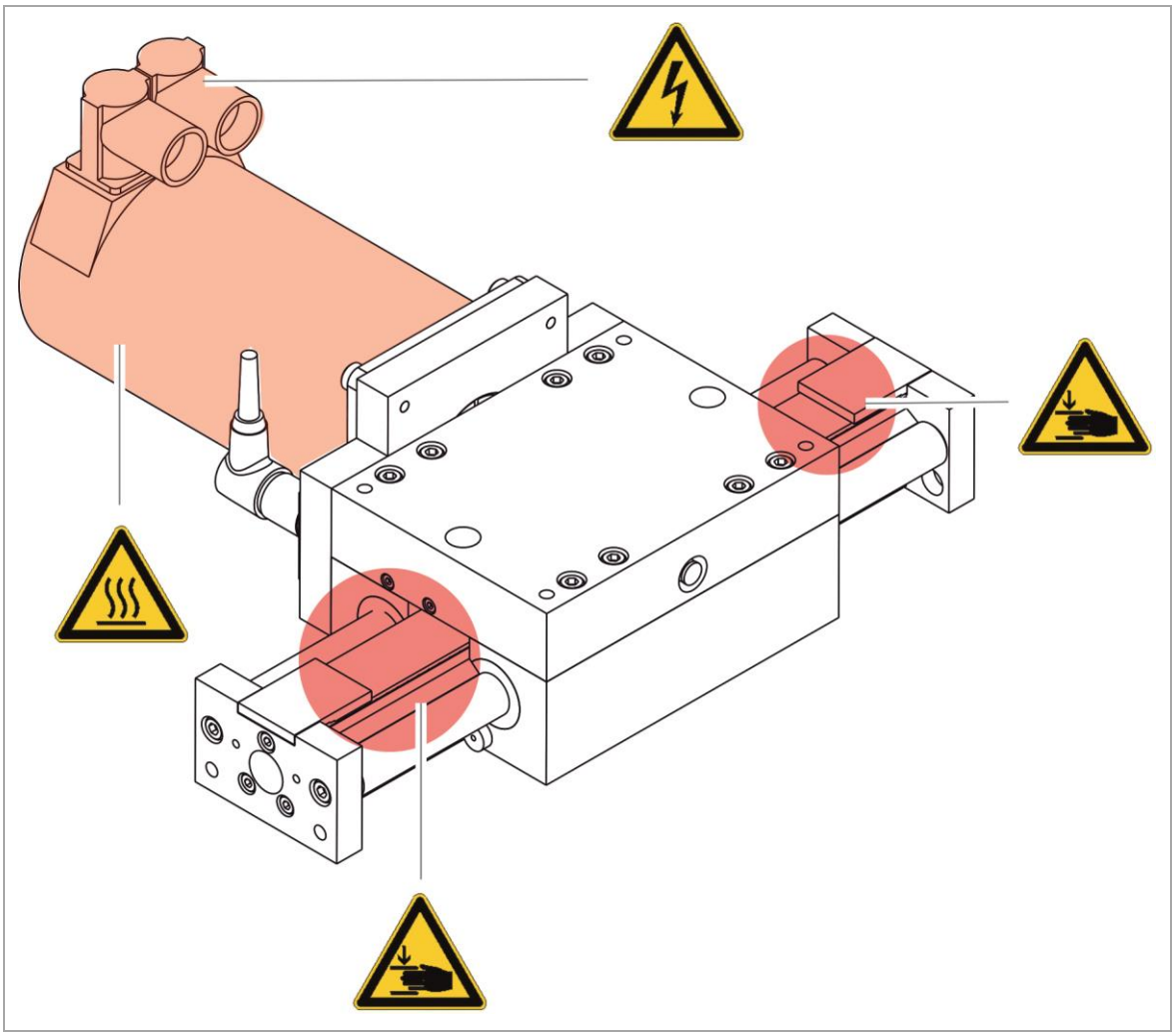

Figure 1 Dangers on Module 68

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3 Intended Use

The linear unit Module 68 and Module 68 D (rotating unit) are precise, linear adjustment units with toothed belt drive that are used in the commercial area as an attachment part in connection with other components.

In combination with many standardised installation elements and other linear modules of IEF-Werner GmbH (e.g. easyLINE, module 105, module 105 S and module 142, module 142 S), complex multi-axis handling systems can be developed as well.

The areas of application of module 68 or module 68 D are accordingly diverse.

They range from:

- Stop adjustment in the wood industry
- Automated assembly lines
- Joining and press in processes in precision engineering
- Loading and unloading station of machine tools up to
- Manipulators for the packaging industry

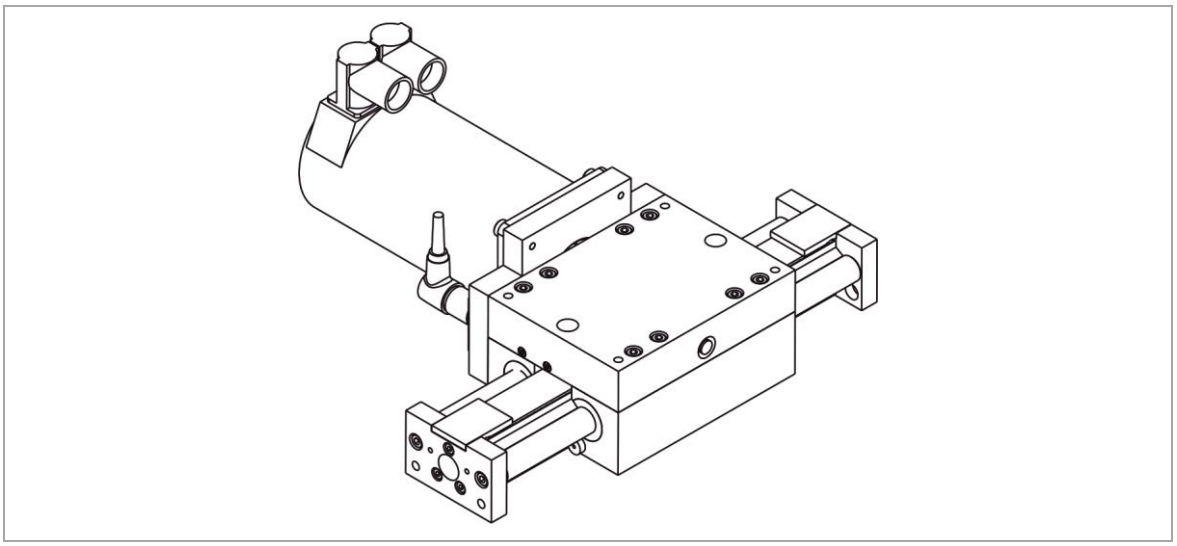

Figure 2 Linear unit Module 68

3.1 Reasonably foreseeable misuse

The linear module 68 is not to be used for certain applications such as the transport of persons and animals or as a pressing/bending device for cold working of metal.

Use of the linear module without additional measures is also not possible in special fields of application, such as the chemical or food industry or in explosive atmospheres.

In case of doubt, consult the manufacturer.

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4 Assembly Instructions

4.1 Installation Position

The installation position is optional, this means the linear module 68 and Module 68 D can be used horizontally as well as vertically.

ATTENTION

In the vertical installation position, use only motors with spring-operated brake to prevent the lowering of the drive in de-energized condition!

4.2 Overview of motor installation variants

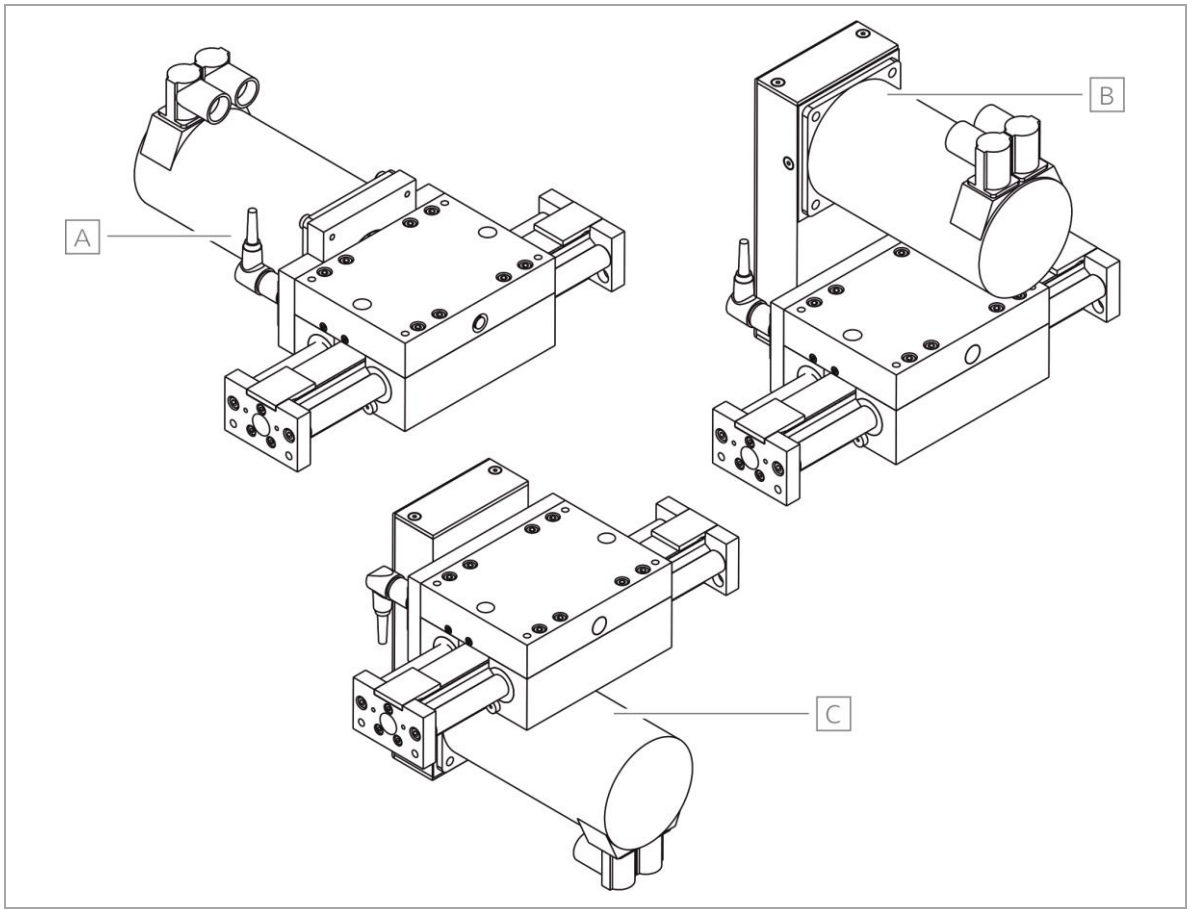

Figure 3 Motor installation variants Module 68

A Motor installation variant 1
B Motor installation variant 2
C Motor installation variant 3

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4.3 Attachment

Module 68 and module 68 D are generally attached to the carriage.

The basic body moves freely. Special connections screws (see Figure 5, below) are provided for attachment.

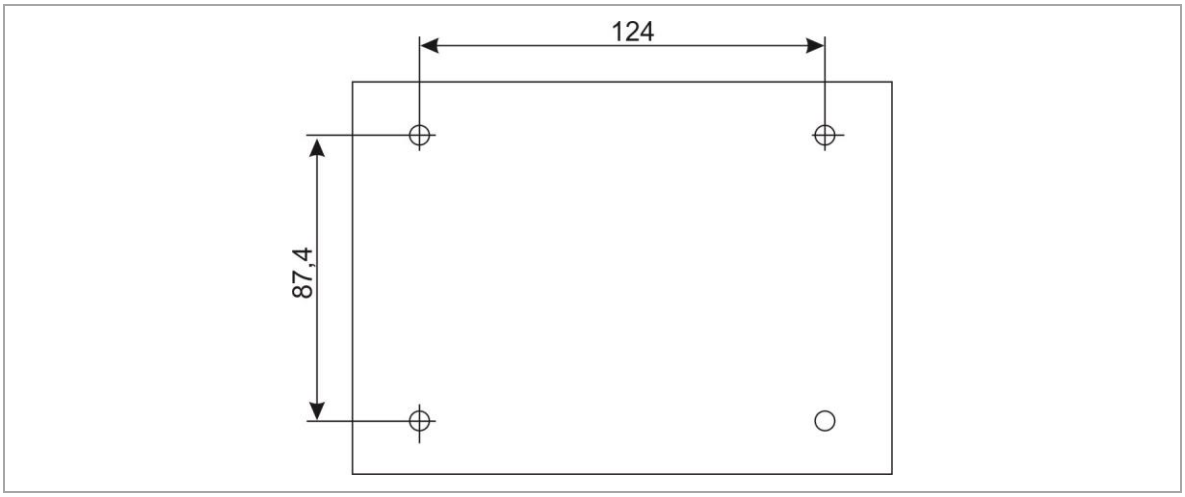

Figure 4 Assembly drilling template Module 68

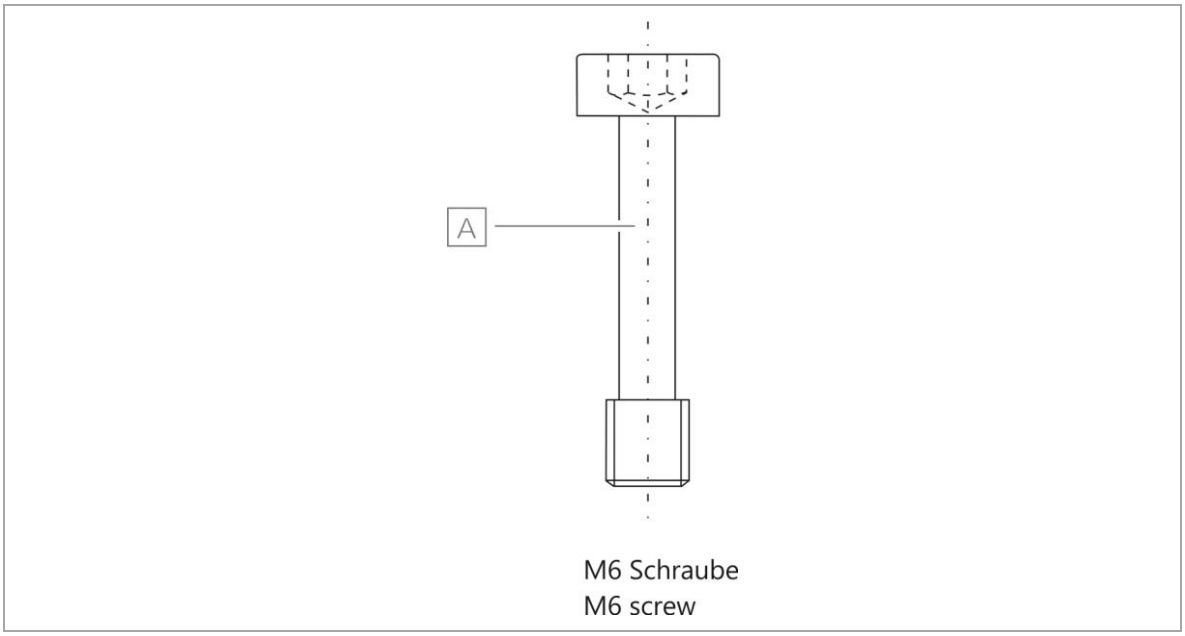

Figure 5 Connection screw

A Connection screw M6 for Module 68

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4.4 Installation of actuators

Actuators (pick-up modules, cylinders, etc.) to be installed on the Module 68 are usually attached to the linear unit using the drill template (see Figure 6, below) on the end plates.

For module 68 D a shaft stub is available (see Figure 7, below).

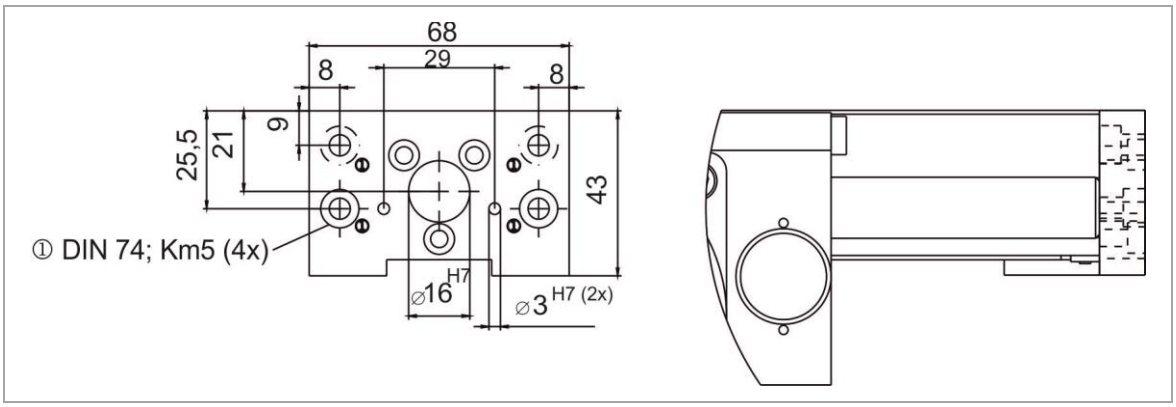

Figure 6 Drilling template of the end plate Module 68

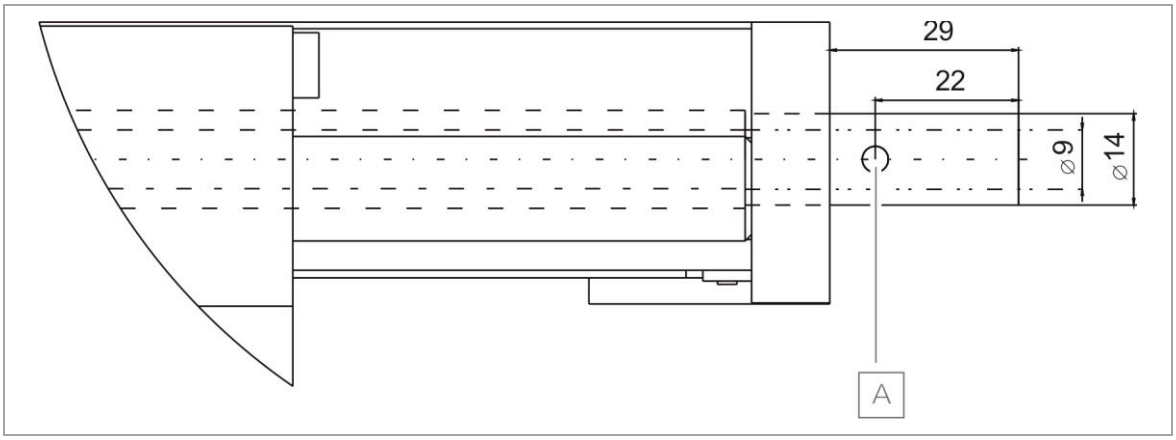

Figure 7 Shaft stub, Module 68 D

A Mounting hole = Ø 4 mm

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4.5 Wiring

4.5.1 Motors

ATTENTION

The electrical connection of the motors is performed according to the motor data sheet.

For customer-specific motors, the data sheet must be requested from the respective manufacturer and the motor connected accordingly.

4.5.2 Initiators

Inductive proximity switches (PNP normally closed) are used as standard stroke limitation switches.

ATTENTION

The stroke limitation switches are not safety limitation switches according EN60204-1.

The initiators and their supply lines are protected in the carriage or, for the rotating unit (Module 68 D), in the motor flange cover of the rotating unit drive.

The respective connections are centrally connected to one plug. If an additional reference point switch is required, it must be installed externally in a suitable position.

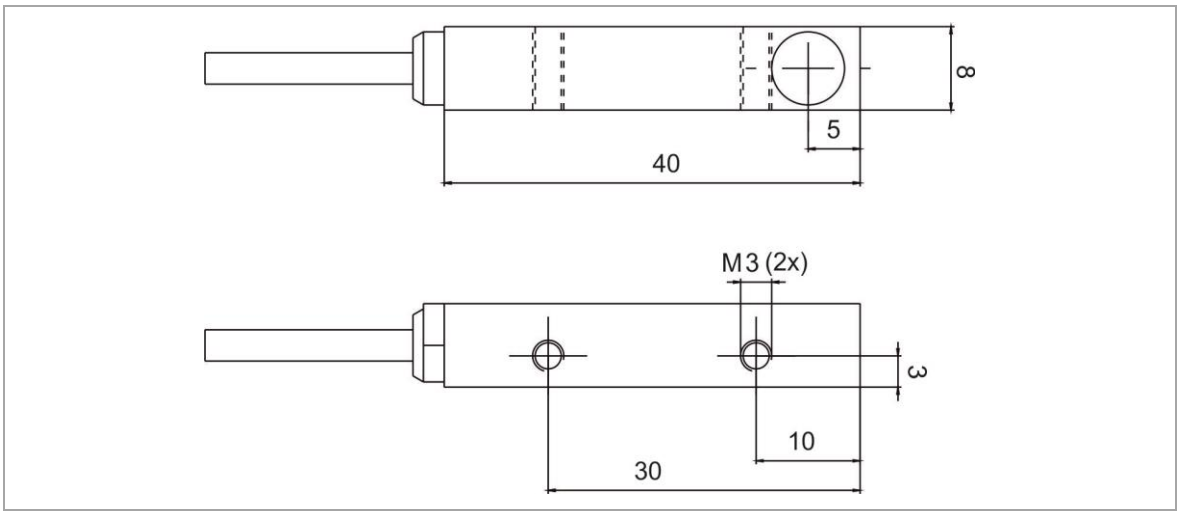

Figure 8 Dimension drawing of initiator

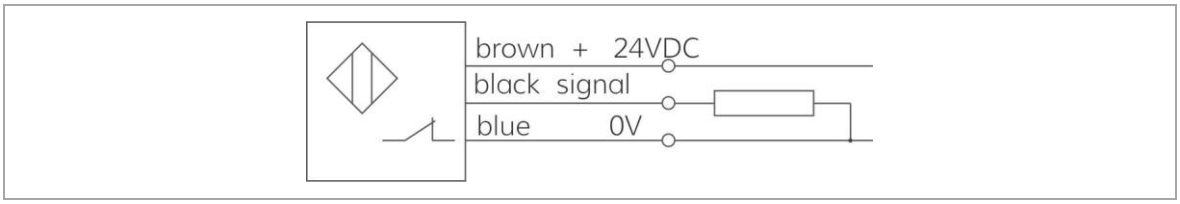

Figure 9 Connection designation PNP normally closed contact

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4.5.3 Technical Data of Initiators

Parameter	Value
Operating voltage incl. residual ripple	(10 ... 30) VDC ≤ 15 %
Current load capacity	I_a ≤ 299 mA
Voltage drop at I_a max.	≤ 2.5 V
Switching frequency	≤ 1000 Hz
Own current consumption	≤ 15 mA
Nominal operating distance on steel	1.5 mm ± 10%
Switching hysteresis	≤ 5%
Function display	yes
Operating temperature	- 25 °C ... + 70 °C
Protection class	IP 65
Short-circuit proof	yes
Protected against polarity reversal	yes

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4.5.4 Limit Switch

The limit position switch is assigned as follows:

Pin-No.	Assignment	IEF-Werner cables
1	+ 24 V	brown
2	Limit switch negative direction	green
3	0 V	white
4	Limit switch positive direction	yellow
5	Reference switch	grey

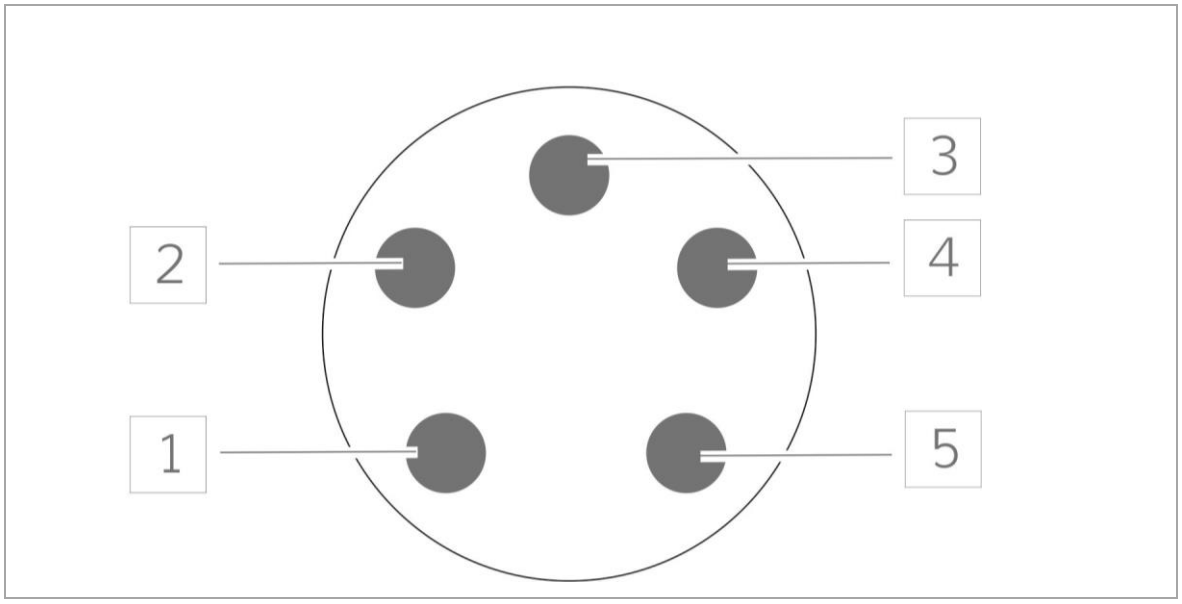

Figure 10 Pin assignment of limit switch

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4.5.5 Technical Data

4.5.6 Tightening Torques for Screw Connections

Screw 8.8	Tightening torque [Nm]
M3	1.1
M4	2.5
M5	5.0
M6	8.5
M8	21.0
M10	41.0
M12	71.0

4.5.7 Technical Data of the Linear Module 68

Parameter	Value	
	Module 68	Module 68 D
Repeating accuracy	+/- 0.04 mm	+/- 0.15°
Weight (without motor) at stroke 0	4.55 kg	5.85 kg
Weight gain per 100 mm stroke	0.45 kg	0.55 kg
Maximum movement or rotating speed	2 m/s	360 °/s
Rope pull resistance toothed belt, main drive	1,680 N	1,680 N

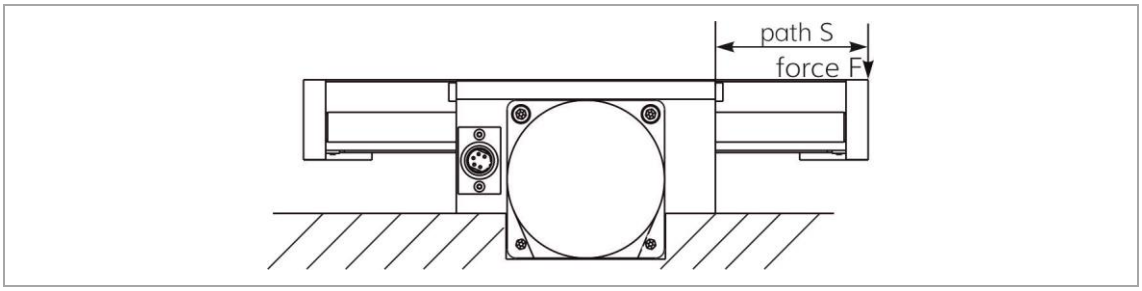

Figure 11 Load capacity

Load capacity module 68 in cantilever operation, horizontal without rotating axis.

F (N)	120	85	70	55	40
S (mm)	100	200	300	400	500

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4.5.8 Cable routing

For all moving cables, suitable cable routing has to be used to effectively prevent cable breaks.

The minimum radius rmin for cable routing chains is calculated for IEF-Werner cables according to the following formula:

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

When different cables are used, EN 60204 must be observed. In addition, it must be ensured that a space reserve of 30% is kept free within the routing chains. A strain relief for the cables has to be attached at the outlet of the cable routing chain.

We recommend purchasing genuine cables and energy chains of IEF-Werner GmbH.
Please contact us. We will gladly advise you.

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4.5.9 Type plate

The type label of the Module 68 is attached on following position:

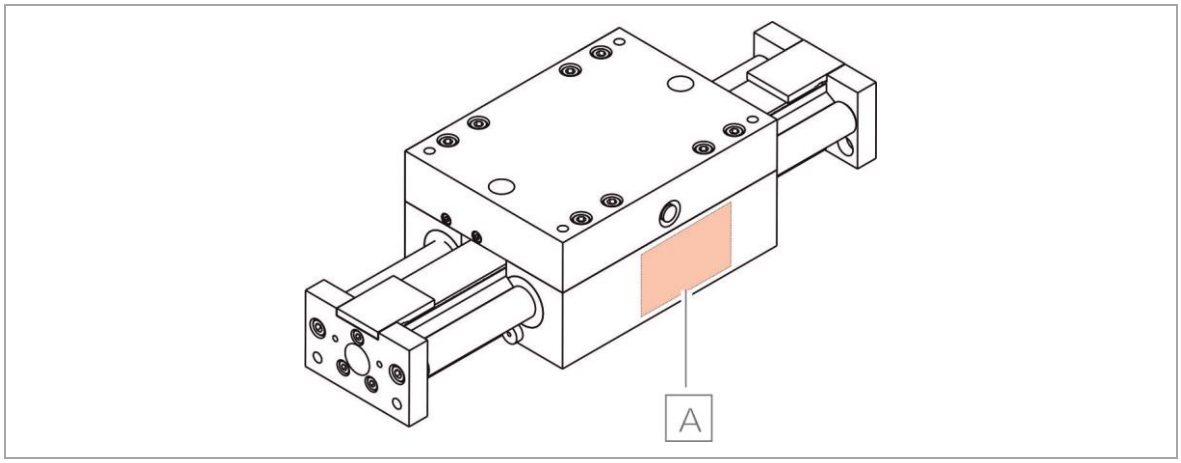

Figure 12 Position of type plate

A Type plate Module 68

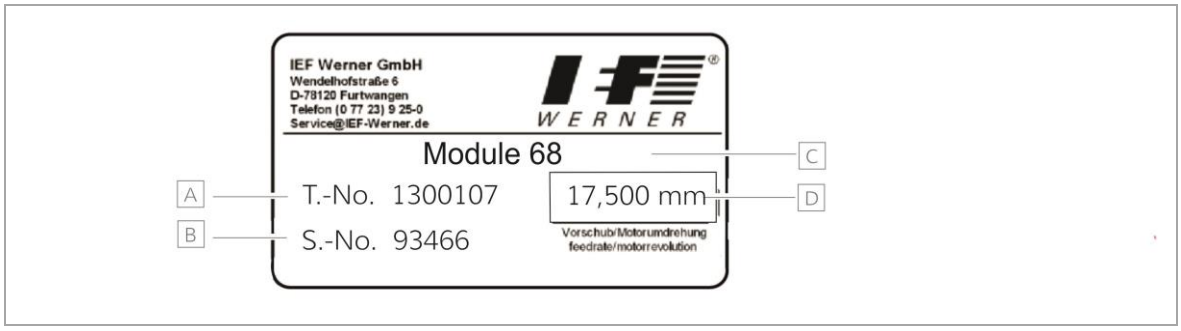

Figure 13 Type plate

A Part number
B Serial number
C Type designation
D Feed/motor revolution

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4.5.10 Technical Data when using a Planetary Gear

Before commissioning, observe the possible input speeds of the gear manufacturers.
Too-high input speeds can lead to increased wear at the gear and/or thermal problems.
The precision of the linear unit is influenced by the reverse play of the gears.

Example:

The gear reverse play (S) is 9 angle minutes.
How high is the reverse play at the carriage of the linear unit?

Infeed constant of the linear unit (Vk): 140 mm

Reverse play at the carriage = (Vk • S) / (360x60)
= (140 mm • 9) / (360x60)
= 0.058 mm

Consider the information of the respective gear manufacturer in any case.
e.g. http://www.neugart.de/index.php/gb/products/Standard-gearboxes/PSN
http://alpha.wittenstein.de/

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5 Maintenance and Repair

DANGER

Warning of dangerous electrical voltage.

The system must be powered down for all assembly, disassembly or repair work. Non-observance of the safety provisions may cause death.

CAUTION

Any repairs must only be performed by specialist personnel who have read and understood these original operating instructions.

Only use genuine spare parts, since IEF-Werner GmbH will not assume any warranty otherwise

5.1 Lubrication of guide carriage

During the design of the linear units Module 68 and Module 68 D, great importance was placed on the use of low-maintenance components.

All roller elements were provided with lifetime lubrication in the factory.

To avoid danger of over-lubrication of the linear bearings, no external lubrication nipples were attached to the carriage part.

However, to achieve a high service life of the dirt wipers, we recommend lubricating the guide shafts with special grease at regular intervals. The lubricant may be procured from IEF in tubes of 50 gr (part no.729148) each.

The recommended maintenance intervals add up to approx. 200 operating hours under regular ambience conditions. The maintenance intervals should be reduced under difficult ambient conditions.

5.2 Tooth belt tension

The toothed belt tension for module 68 is set with spacer ring.

- See chapter Module 68, TG1000018, Installation variant 1, 🗎 30 and
- Module 68, TG1000018, installation variants 2 and 3,🗎 32

5.3 Belt tension gear toothed belt

The belt tension of the gear toothed belt should be 150 N.

- See chapter Module 68 gearbox, TG 1000032, 🗎 36, drawing item 20.

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5.4 Drive unit

Always observe the installation size for the drive unit. See Figure 14, below and Figure 15, 31, drawing item 100.

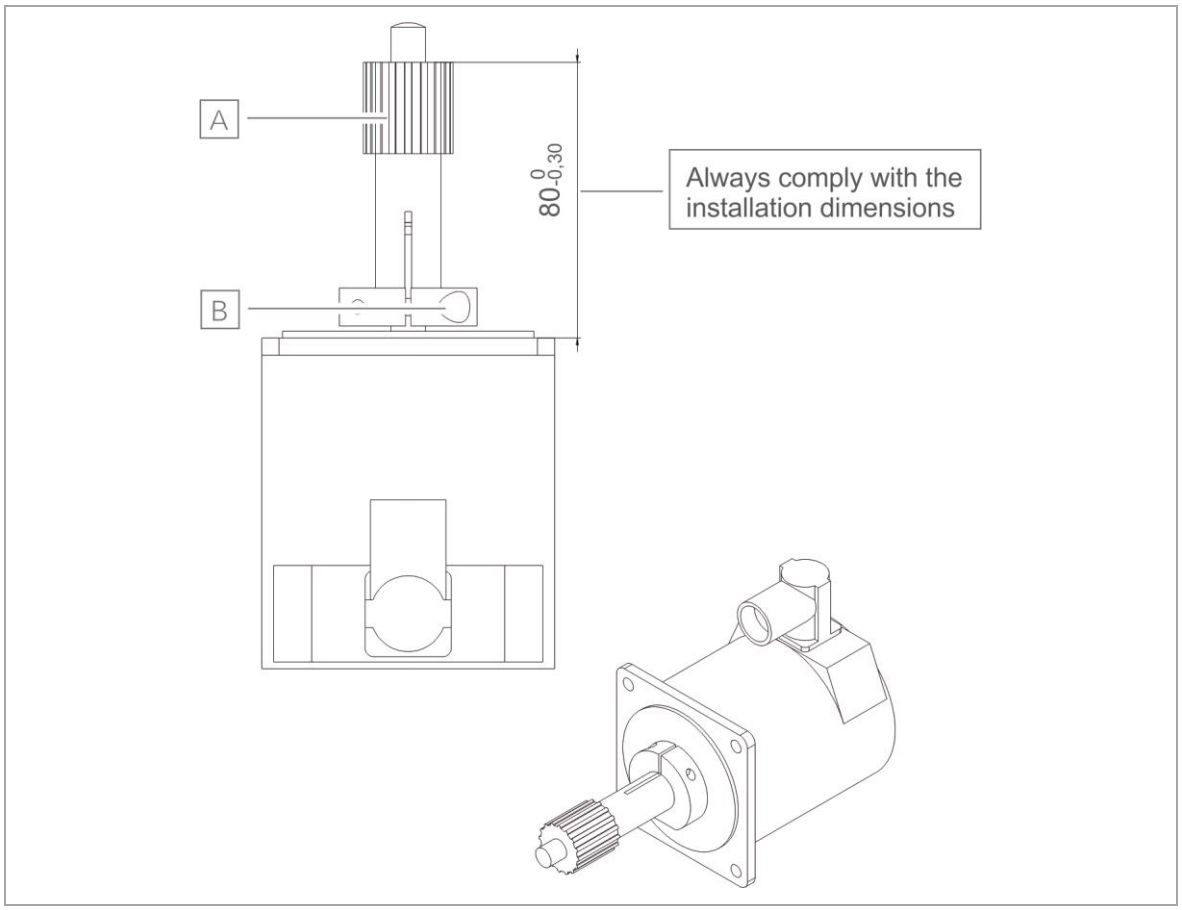

Figure 14 Drive unit, installation variant 1

A Drive unit

B Clamping ring
Tightening torque: 7.5 Nm

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6 Troubleshooting

Interference	Reason	Correction
Increased running noise	Nominal service life of guide linear bearing exceeded	Replace all linear bearings
	Linear bearing worn due to overload (too-high torque, etc.)	Replace all linear bearings, reduce load
	Linear bearing worn from strong contamination	Replace all linear bearings, clean guide elements, guide shafts more often if required
	Guide shafts corroded	Replace guide shafts, replace linear bearing if required, lubricate guide shafts more often
	Guide shafts worn	Replace guide shafts, replace all linear bearings, check load, protect linear module from strong contamination
	Drive unit worn	Replace drive unit
	Toothed belt runs dry	Slightly lubricate toothed belt on the toothed inner side
	Toothed belt tension too high	Install reconciled spacer sleeves as shaft stop
	Toothed belt strongly contaminated on the toothed inner side	Replace toothed belt, protect linear module from strong contamination
	Toothed belt defective	Replace toothed belt
	Motor (motor bearing) defective	Replace motor
	For motor with brake: Brake does not open	Apply current to the brake, if the brake still does not open, replace motor

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Interference	Reason	Correction
Linear drive unit does not move	Limit switch cable not connected	Connect the cable
	Limit switch defective	Replace limit switch
	Limit switch cable defective	Check limit switch cable, replace cable, if required
	Solder connection on socket has come loose	Solder on wires
	Motor connected incorrectly	Check and change connector assignment, if required
	Motor defective	Replace motor
	Error in power electronics or control unit	Check the power electronics or the control unit
	Motor cable defective	Check motor cable, replace cable, if required
Play on reversal	Drive toothed belt not tensioned	Pull deflection unit to stop on spacer sleeves
Linear drive unit moves mechanically against the stop during the reference run	Incorrect direction of rotation	Change motor direction of rotation
	Broken motor cable	Replace cable

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7 Parts lists and drawings

7.1 Module 68, TG1000018, Installation variant 1

Drawing item	Part-No.	Designation
10	27008	End plate
20	1080057	Belt tensioner
30	TG1000023	Basic body
40	526820	Carriage complete
50	+	Flange plate (depending on motor)
60	25626	Retaining plate
70	725163	Installation plug round, type: SFV 50/6
80	725164	Angled coupling, type: WKV 50/6
90	TG1000041	Motor and motor flange (depending on design)
100	+	Drive unit (depending on motor)
110	732284	Plastic cover, Ø 25/20.5, type: GPN 910/766
120	1114530	Toothed belt, type: 25AT5 E-wire 0.3
130	730385	Spacer Ring, type: EVO 3 (for limitation of the belt tension)
140	726122	Inductive sensor, type: BES 516-300-S180-02
150	626705	Cylinder screw, type: ISO 4762-M x 8 – 8.8

+ use depending on design

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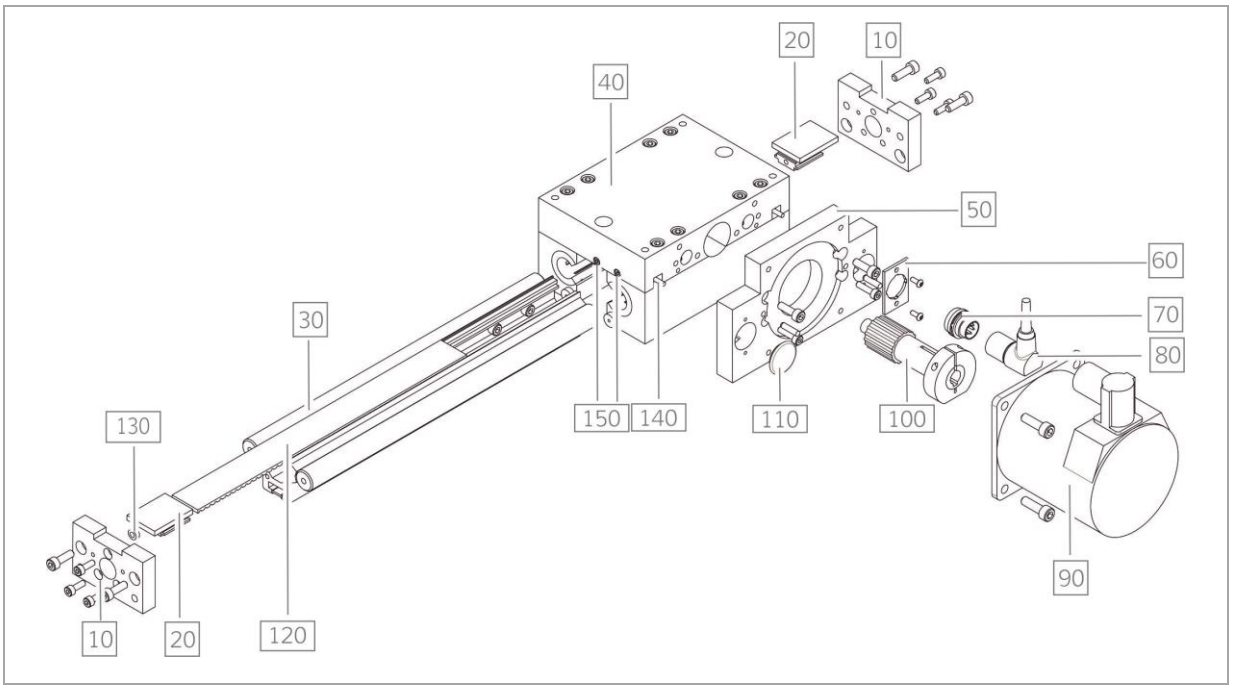

Figure 15 Module 68 installation variant 1, exploded view

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7.2 Module 68, TG1000018, installation variants 2 and 3

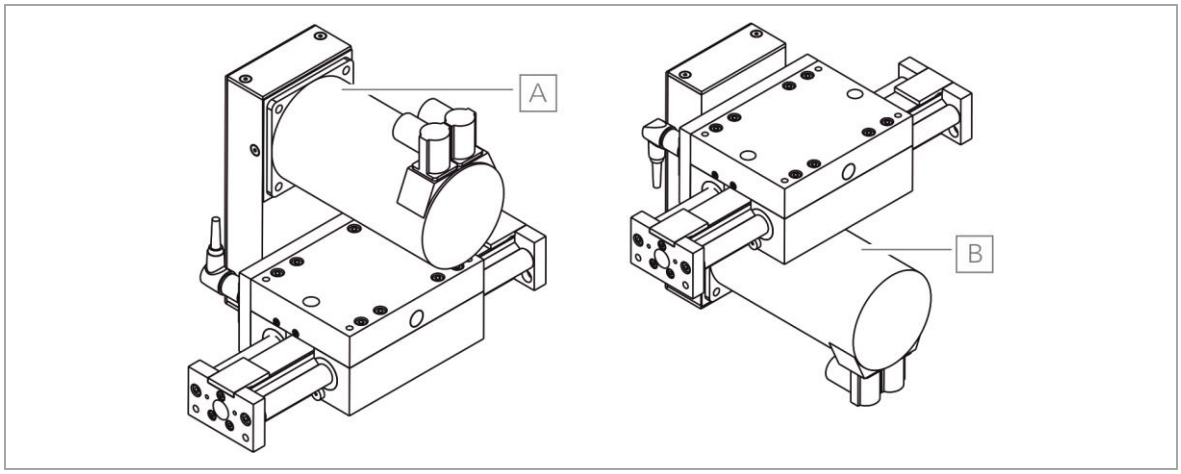

Figure 16 Module 68, installation variants 2 and 3

A Motor installation variant 2

B Motor installation variant 3

Module 68 installation variant 3

Drawing item	Part-No.	Designation
10	27008	End plate
20	1080057	Belt tensioner
30	TG1000023	Basic body
40	526820	Carriage complete
60	25626	Retaining plate
70	725163	Installation plug round, type: SFV 50/6
80	725164	Angled coupling, type: WKV 50/6
90	+ TG1000041	Motor and motor flange (depending on design)
100	526649	Drive unit module 68V complete
120	1114530	Toothed belt, type: 25AT5 E-wire 0.3
130	730385	Spacer Ring, type: EVO 3 (for limitation of the belt tension)
140	726122	Inductive sensor, type: BES 516-300-S180-02
150	626705	Cylinder screw, type: ISO 4762-M x 8 – 8.8
160	+ TG1000032	Gearbox (see Module 68 gearbox, TG 1000032, 🗎 36)

+ use depending on design

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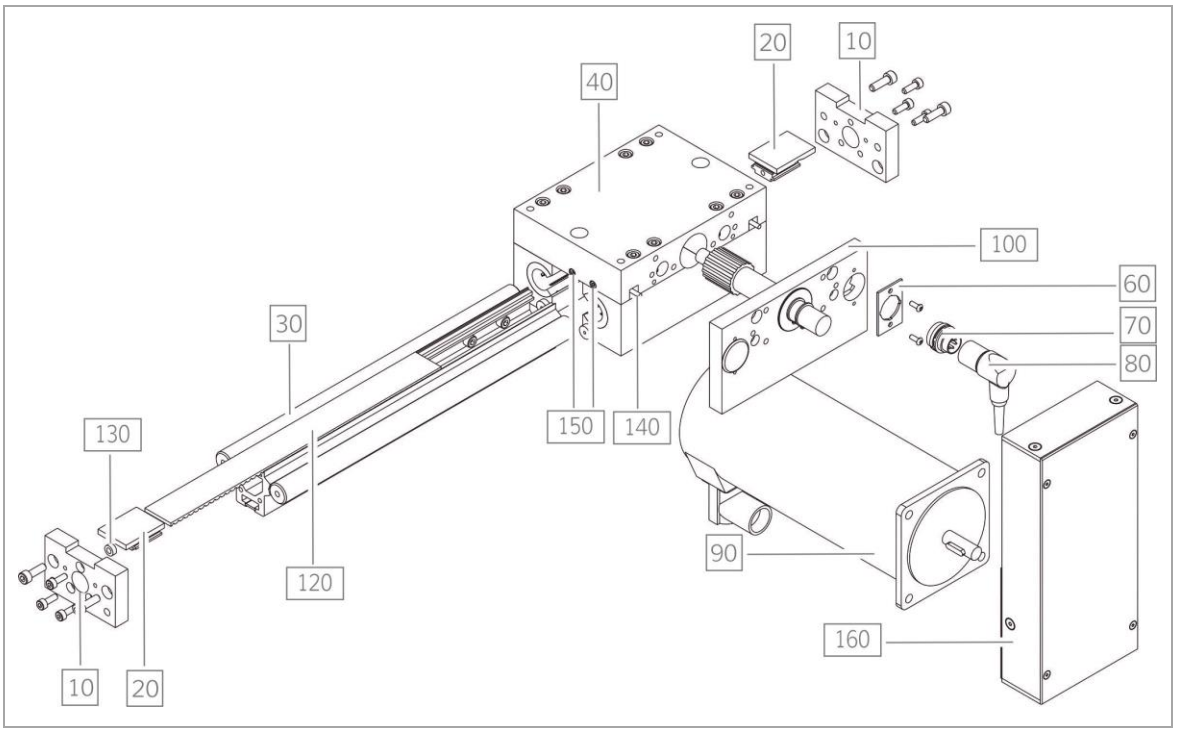

Figure 17 Module 68, installation variant 3, exploded view

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7.3 Carriage Module 68, Part no. 526820

Drawing item	Part-No.	Designation	
10	25639	Carriage plate	
20	25631	Shaft	
30	525181	Clamping block complete, type: module 105	
..10	30332	Clamping block	See Figure 21, 38
..20	1000466	Linear bearing	
..30	26481	Damper	
..40	100492	Fixing screw	
40	525796	Clamping block complete, type: module 68	
..10	27664	Clamping block with milling cut out	See Figure 20, 38
..20	1000466	Linear bearing	
..30	26481	Damper	
..40	100492	Fixing screw	
50	25625	Guide roller	
60	625144	Needle roller bearings	
80	1010367	Sealing plug Ø 13.7 mm nature, type: GPN300 V 10	

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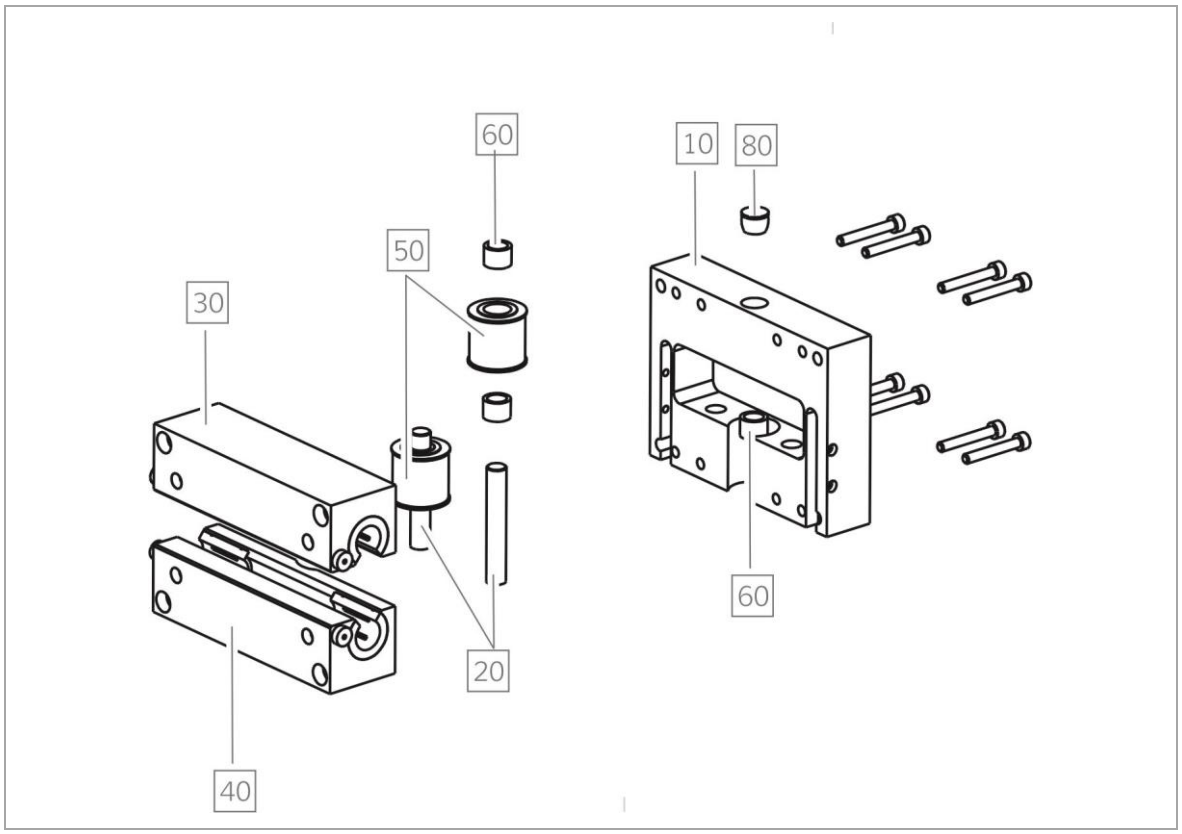

Figure 18 Carriage module 68, exploded view

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7.4 Module 68 gearbox, TG 1000032

Drawing item	Part-No.	Designation
10	526645	Motor flange assembly
20	+	Gear toothed belt
30	+	Driven toothed disc
40	527263	Clamping set, type: 15/28
50	+	Motor toothed disc

+ use depending on design

Additionally, please observe the wear parts lists included with the delivery according to the order.

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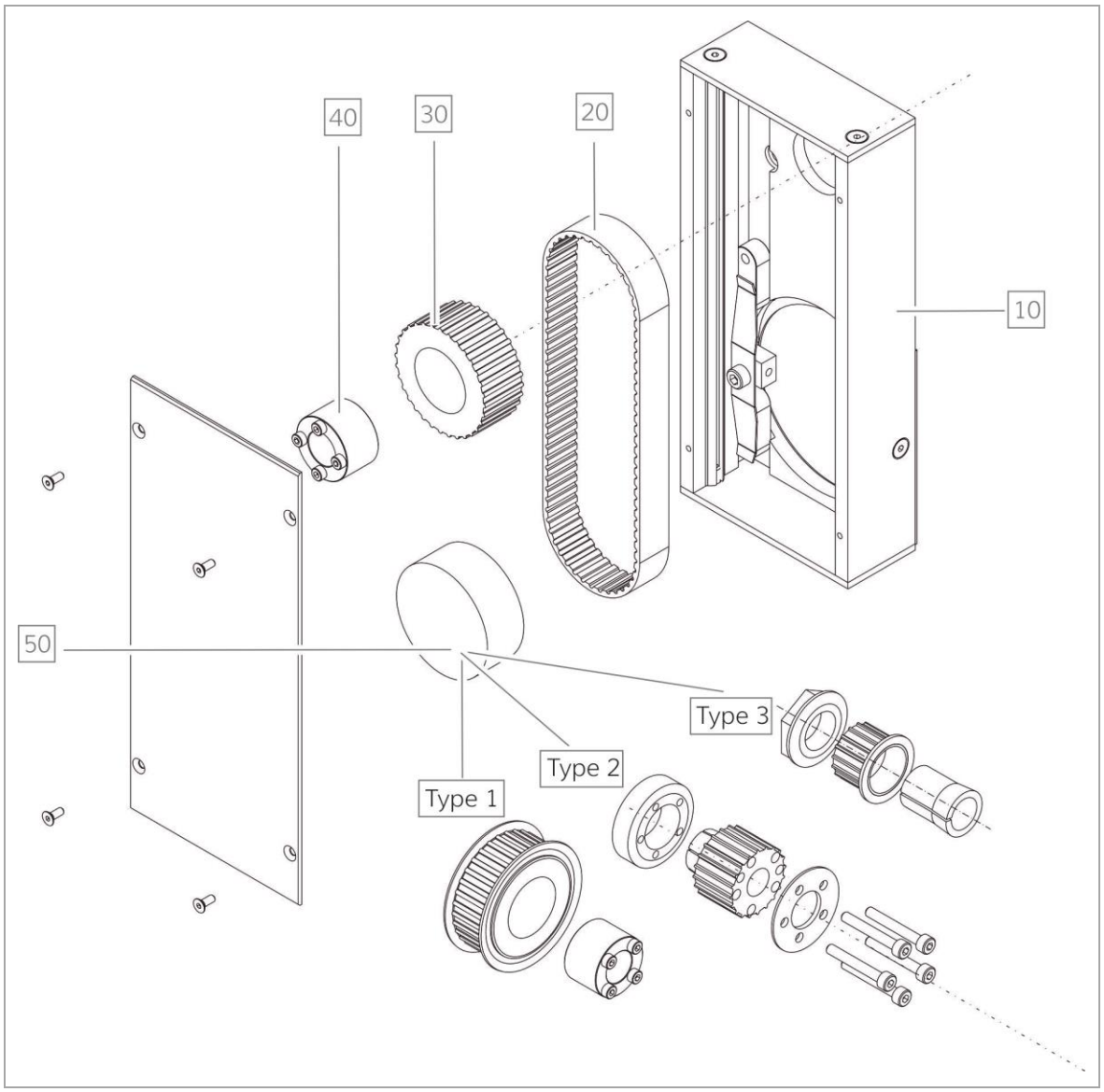

Figure 19 Belt drive module 68, exploded view

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7.5 Clamping block complete, Part No. 525796

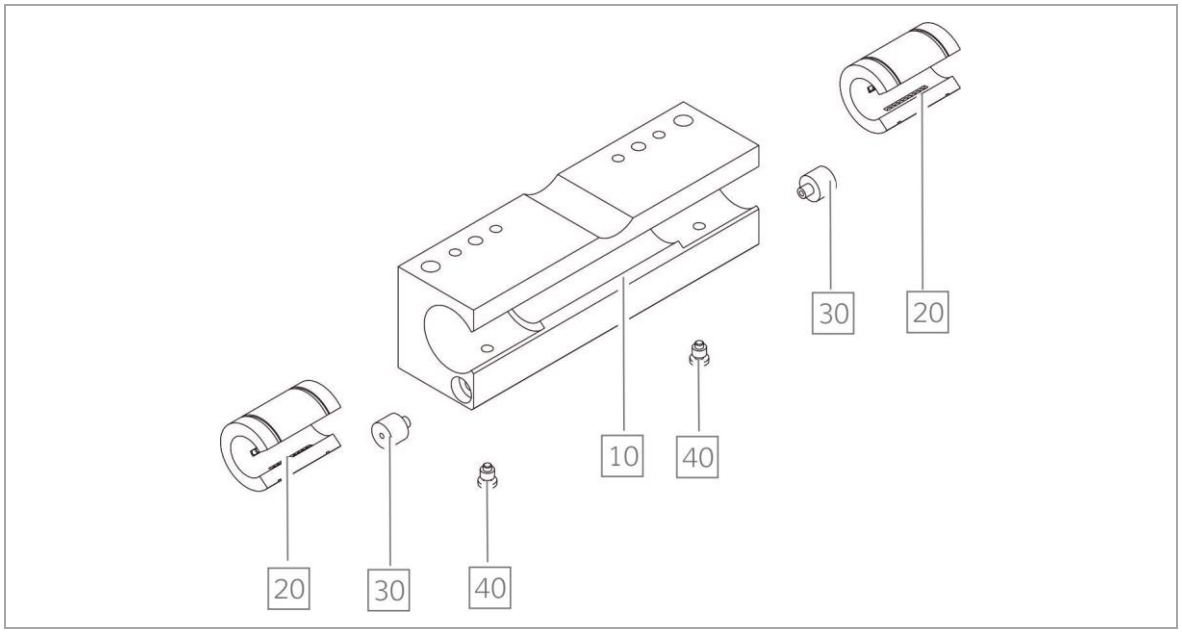

Figure 20 Clamping block module 68, exploded view
(see Carriage Module 68, Part no. 526820, 🗎 34, drawing item. 40)

7.6 Clamping block complete, Part No. 525181

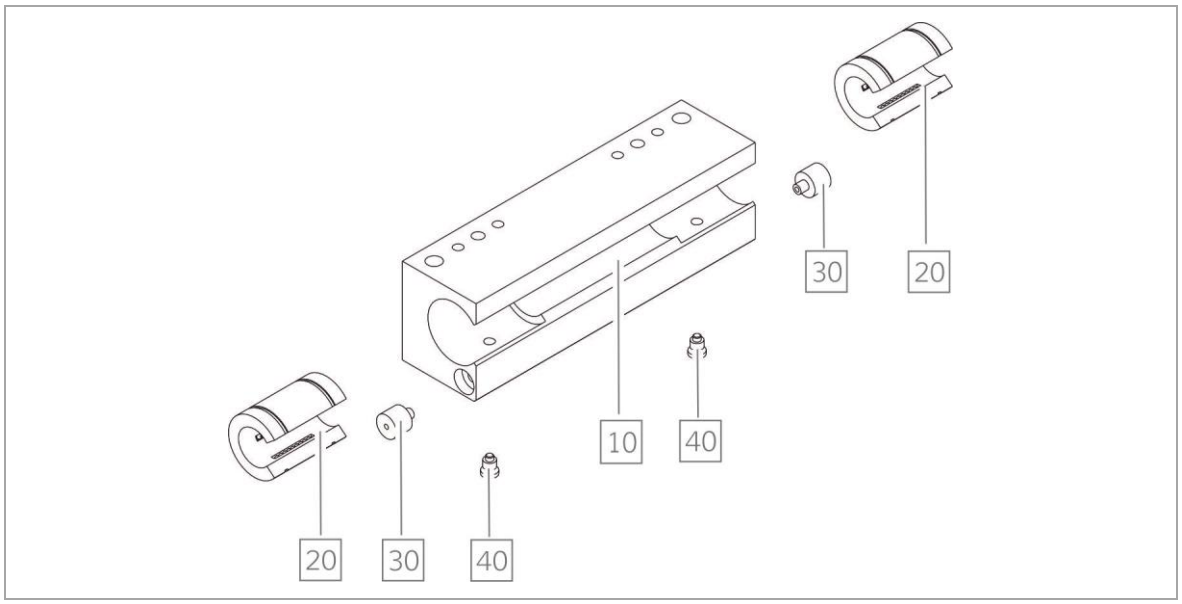

Figure 21 Clamping block module 105, exploded view
(see Carriage Module 68, Part no. 526820, 🗎 34, Drawing item 30)

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