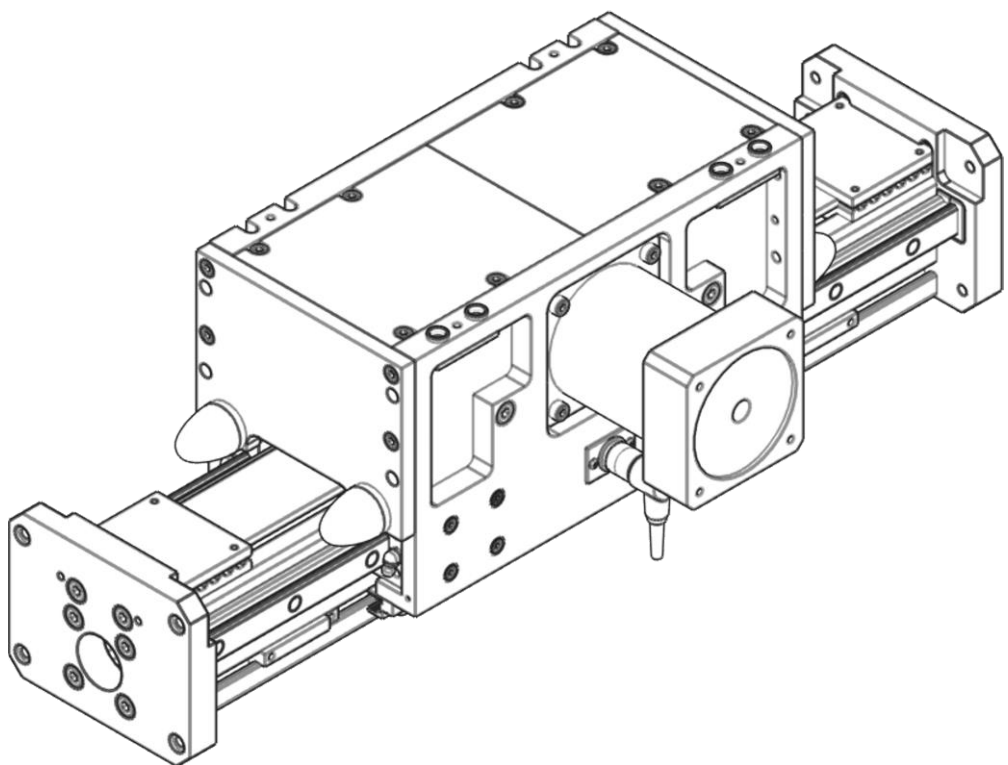


Mounting instructions

Product name: Module 160/20 ZR10
Document-ID: 1139553



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

IEF-Werner GmbH
Wendelhofstraße 6
DE-78120 Furtwangen
Phone: +49 7723-925-0
Fax: +49 7723-925-100
www.ief-werner.de
info@ief-werner.de

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_1139553_Module160-20_ZR10_R1a.doc	July 2015	English translation of the original German document "MAN_DE_1090099_Modul160-20-ZR10_R1a.doc" from 3 rd of March 2010.
MAN_EN_1139553_Module160-20_ZR10_R1b.doc	August 2015	Conversion of the English version into the new layout and insertion of section Replacing Guide Carriages, page 39.
MAN_EN_1139553_Module160-20_ZR10_R1c.doc	June 2016	Chapter 8.2 with graphics complemented: see Figure 21 and Figure 22, page 40
MAN_EN_1139553_Module160-20_ZR10_R1d.doc	July 2019	Main graphics changed due to the omission of the covers (at the grease nipples) on the slide.

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We are always grateful for suggestions for improvements and information about errors.

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Module 160/20 ZR10

Translation (EN) of the original instructions (DE)

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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, 1. 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 160/20 ZR10	TG1001590

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 2014/30/EU of the European parliament and of the council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility
- Directive 2014/35/EU of the European parliament and of the council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

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:

- DIN EN ISO 12100-1,-2 / DIN EN ISO 13857 / DIN EN ISO 13850 / DIN EN 60204-1

The commissioning of the delivered component (incomplete machine) 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 and address of the documentation officer: IEF-Werner GmbH, Furtwangen

Furtwangen, July 2019



Stefan Deck (Manager)

2 Safety

2.1 Definition of Warning Notes

DANGER



Indicates danger.

Non-observance of the safety provisions causes serious injury or 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 result in slight or minor injuries.

ATTENTION

Warning of property damage!

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

2.2 General Warning Notes

The module 160/20 ZR10 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.

ATTENTION

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

2.2.1 Special Hazard Warnings

WARNING



Danger of crushing limbs.

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

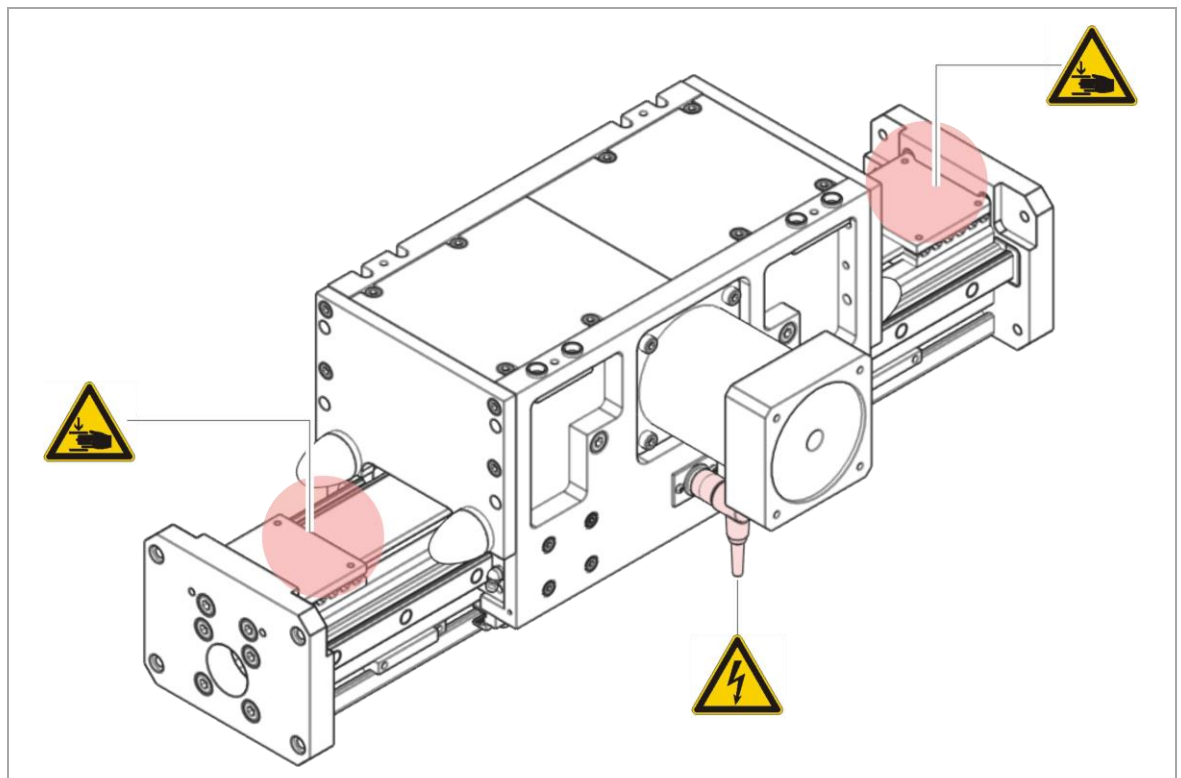


Figure 1 Dangers on module 160/20 ZR10

3 Intended Use

The linear unit Module 160/20 ZR10 (see Figure 2) was designed for use in the commercial area. Use of a high-quality guide warrants high dynamics and good running behaviour. The guide carts of the outer guide system are equipped with axial seals to protect from contamination. Use of the linear unit 160/20 ZR10 under conditions with increased contamination and abrasive dusts, however, should be avoided because there are no further protective measures like bellows covers, etc.

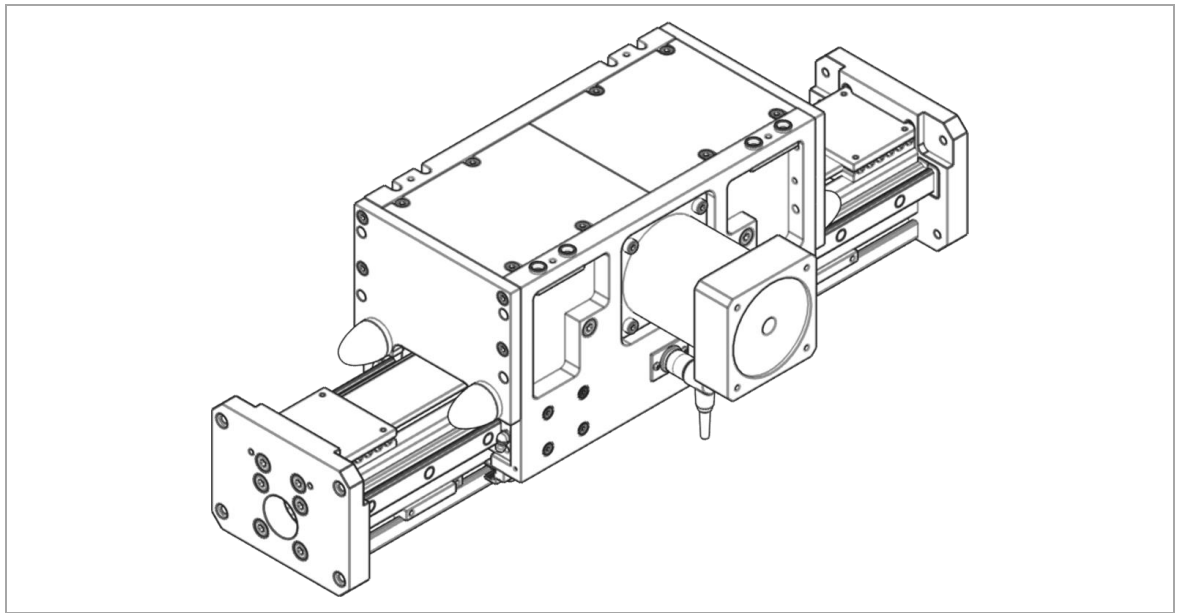


Figure 2 Linear unit Module 160/20 ZR10

In combination with many standardised installation elements and the other linear modules (e.g. module 80/15 ZR10) and carriage units by IEF-Werner GmbH, complex multi-axis handling systems can be developed as well.

The areas of application of module 160/20 ZR10 are accordingly diverse.

The areas of use range from:

- Loading and unloading stations of tool machines
- Manipulators for the packaging industry
- Positioning and handling systems for Euro pallets

3.1 Reasonably foreseeable Misuse

The linear module 160/20 ZR10 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.

4 Description of the Main Assemblies

The unit essentially consists of the following two main assemblies:

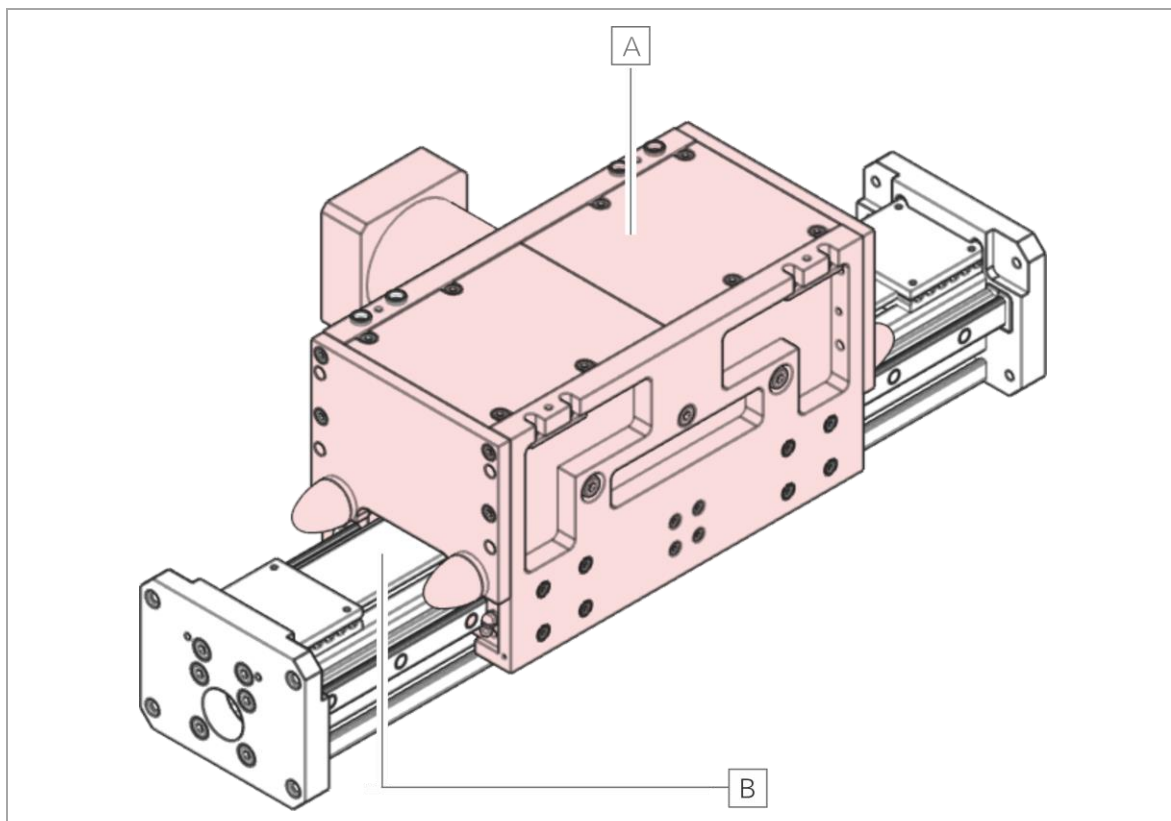


Figure 3 Main assembly groups of the module

A Slide unit

B Slide guidance

Further information regarding the main assembly groups and their sub assembly groups can be found in section 9: Part lists and drawings, page 41 onwards.

5 Assembly Instructions

5.1 Installation Position

Usually, the linear module 160/20 ZR10 is used vertically in vertical operation.

However, there are applications where the linear module is to be used as a boom axis (horizontally). Talk to us before using the linear module in horizontal operation (manufacturer / IEF-Werner GmbH), since possible large strokes to be performed mean that not every application is possible.

CAUTION



Danger of unintended lowering of basic body.

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

5.2 Motor Attachment Versions

ATTENTION

Wire motors according to motor data sheet.

When using customer-specific motors, inquire at the respective manufacturer with which cable the motor has to be connected.

The motor attachment in the linear unit 160/20 ZR10 is always in connection with a planetary or angular planetary gear. Depending on requirements (space), an axial planetary gear or angular planetary gear can be chosen.

CAUTION



Danger of unintended lowering of basic body.

If work must be performed on a vertically installed axis, measures to secure the basic body against inadvertent lowering must be taken for reasons of safety. If these safety measures are not taken, there is a considerable risk of injury!

5.2.1 Installation variant 1 – Axial Planetary Gear

The design of the reduction of the gear is according to the dynamic requirements or the masses to be moved.

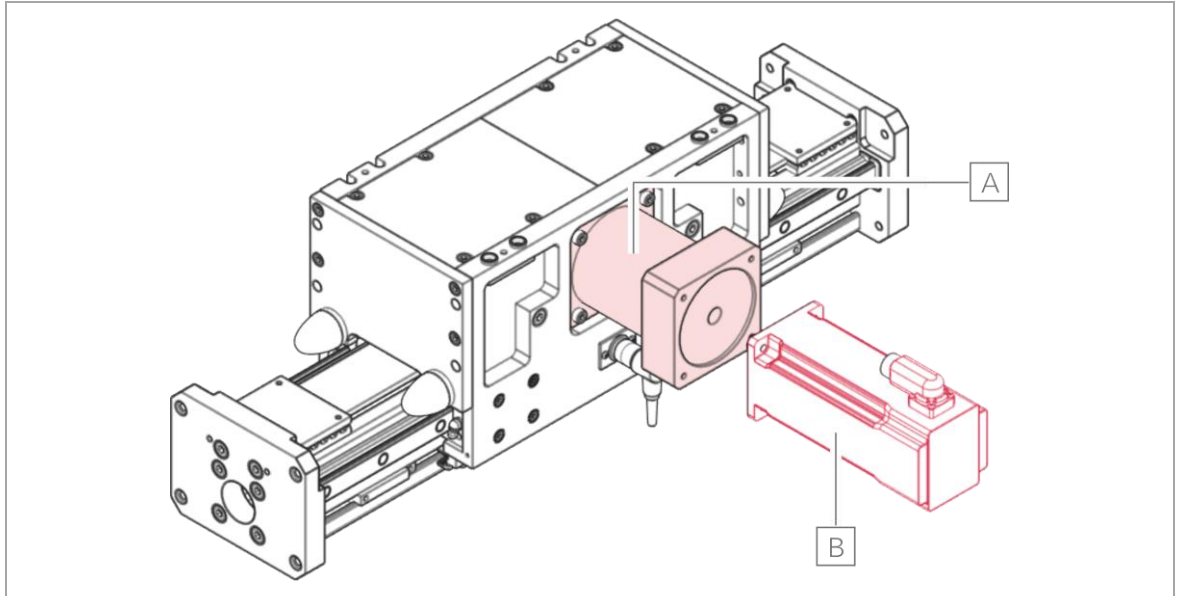


Figure 4 Motor attachment via axial planetary gear

A Axial planetary gear

B Motor

5.2.2 Installation variant 2 – Angular Planetary Gear

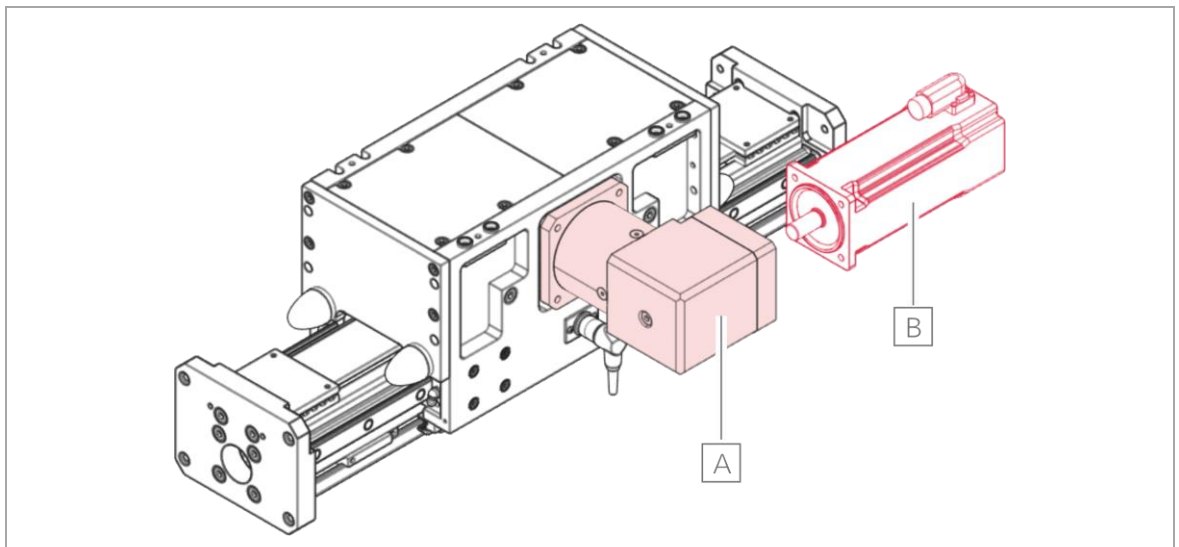


Figure 5 Motor attachment via angular planetary gear

A Angular planetary gear

B Motor

Drive Sprocket

The drive sprocket is firmly connected to the gear output shaft (see Figure 7, page 20) (the drive sprocket has a special tensioning system integrated). There are tensioning systems for gear output shafts of 20 mm and 22 mm diameter available.

ATTENTION

When installing the sprocket on the gear output shaft, observe that the installation size of 15 mm is complied with, since malfunction will otherwise occur (see Figure 6, below).

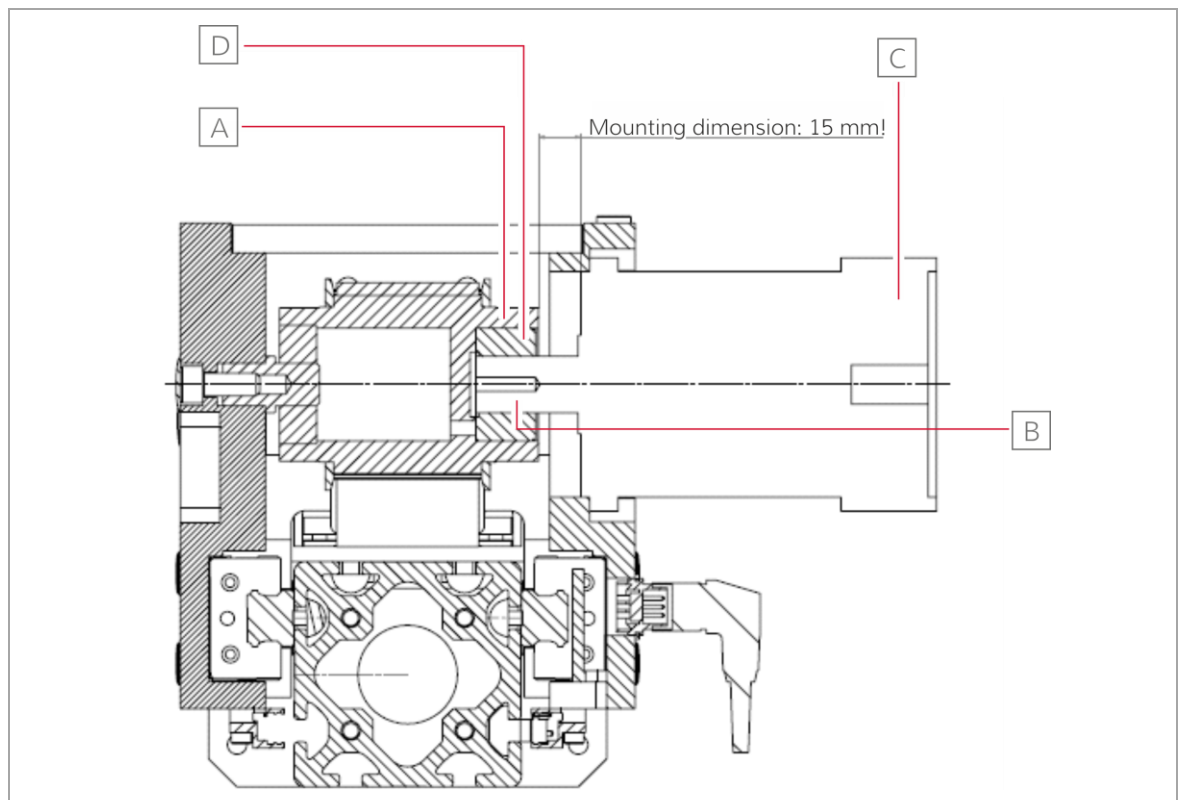


Figure 6 Installation size drive sprocket

- A Drive sprocket
- C Gear

- B Gear output shaft
- D Tensioning system

When installing the drive sprocket [A] on the gear output shaft [B], six screws DIN EN 4762 - M5 x 20 are tightened firmly clockwise in several passes.

During installation, concentricity of the drive sprocket must be continually reviewed (see Figure 7, below).

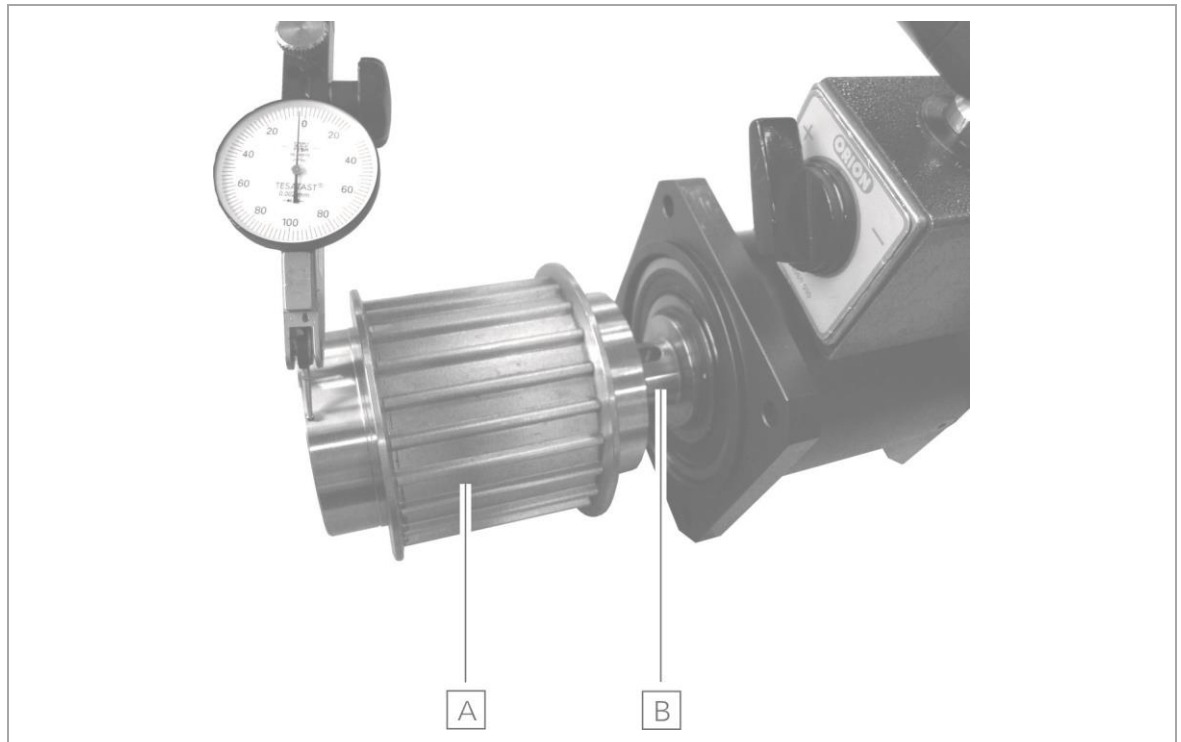


Figure 7 Concentricity test drive sprocket

A Drive sprocket

B Gear output shaft

If a concentricity deviation of more than 0.05 mm is found, the drive sprocket must be turned to the position of the largest deviation and the concentricity deviation corrected by tightening the opposite screws.

Check or correct repeatedly to ensure that the overall deviation of the concentricity does not exceed 0.05 mm.

We recommend securing the screws with a shaft-groove safety medium.

5.3 Attachment

The attachment of the linear unit 160/20 ZR10 to an installation surface takes place only on the short carriage part, so that the long basic body performs the movement. For this purpose, there are eight passage bores at the short carriage part ($\varnothing 8.3$) for M8 screws (see Figure 8, below). The axle can be hooked on one side to four M8 screws previously screwed into the installation surface and then attached with the other passage bores. Here, the possible use of four centring sleeves item no.: 737543 is provided as well, which can ensure a reproducible installation.

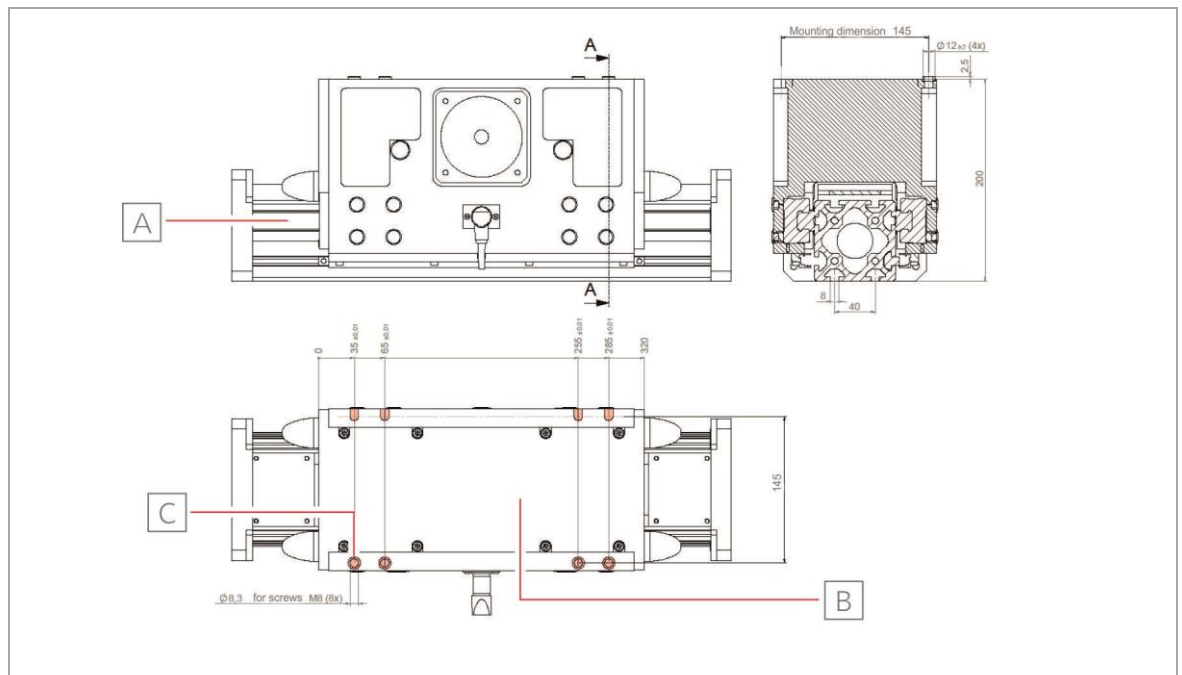


Figure 8 Attachment 160/20 ZR10

A 'Long' basic body

B 'Short' carriage part

C Eight passage bores for M8 screws

The installation area has to be a flat surface.

All deviations may cause tensioning of the guide system.

The maximum deviation may be 0.1 mm / 320 mm.

5.3.1 Installation of Actuators

Actuators to be attached to the linear unit module 160/20 ZR10 (cylinders, gripper modules, etc.) may be attached to the end plates. For this purpose, there are four threaded bores size M8 in the end plate. Each threaded bore can take up centring sleeves of item no.: 737543. By using centring sleeves, a reproducible installation is achieved.

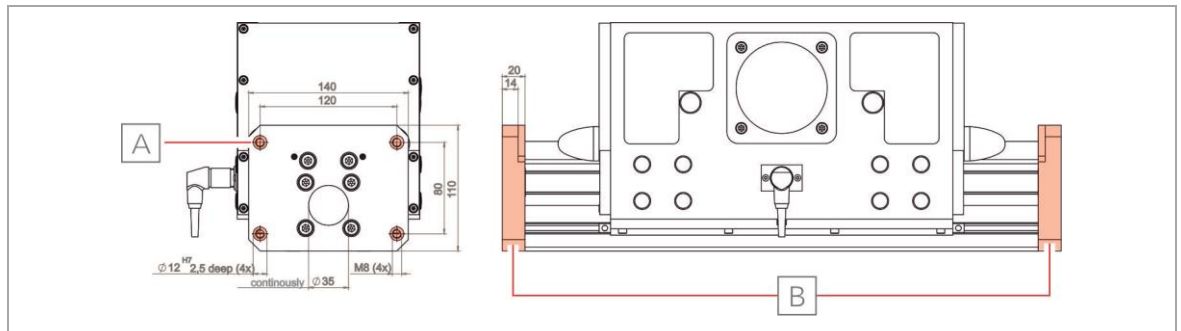


Figure 9 Hole pattern of end plates

A Threaded bores M8 (in total four pieces)

B End plates

5.4 Wiring

5.4.1 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.

5.4.2 Initiators

Inductive proximity switches (PNP normally closed contacts, green switch operating point) are used as standard stroke limit switches.

Optionally, an additional reference point switch (PNP normally open contact, red switch operating point) can be used. An LED is available to detect the switch status. Initiators and cables are installed in an aluminium profile at the short slide part (see also Figure 14, page 26) and routed centrally to a plug.

The stroke limit and reference point switches are actuated contact-free by switching cams placed movable in the aluminium basic body (see also Figure 14, page 26).

These stroke limit switches are not safety limit switches according to EN60204-1.

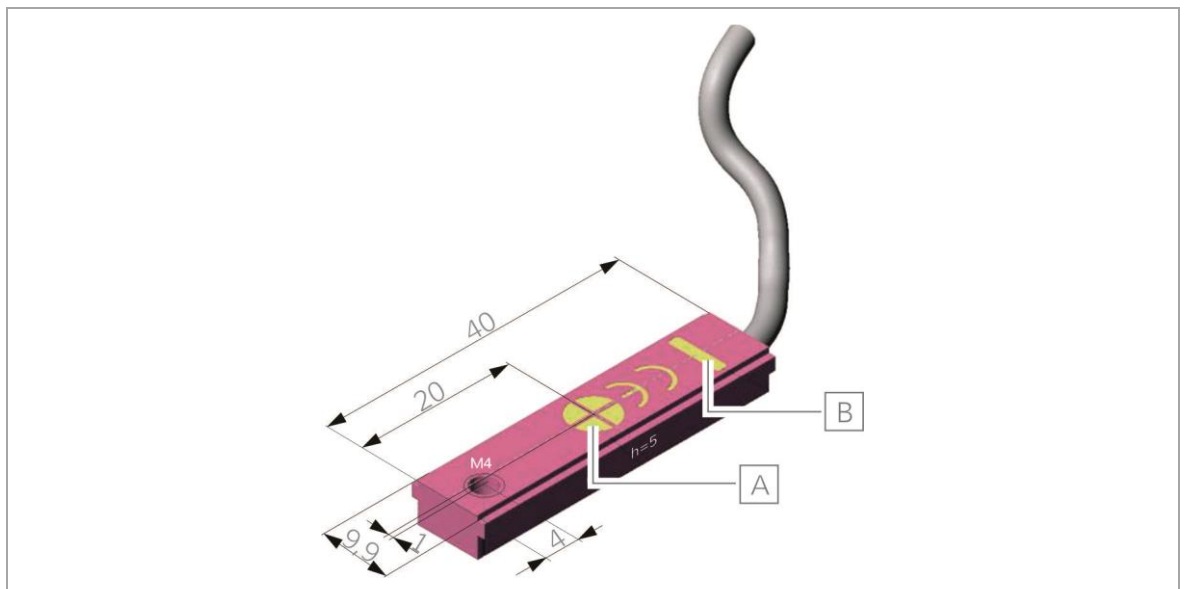


Figure 10 Initiator

A Active area

B LED

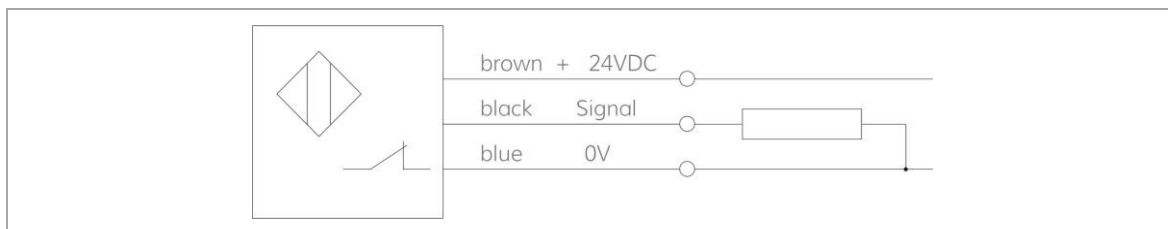


Figure 11 Pin assignment PNP normally closed contact

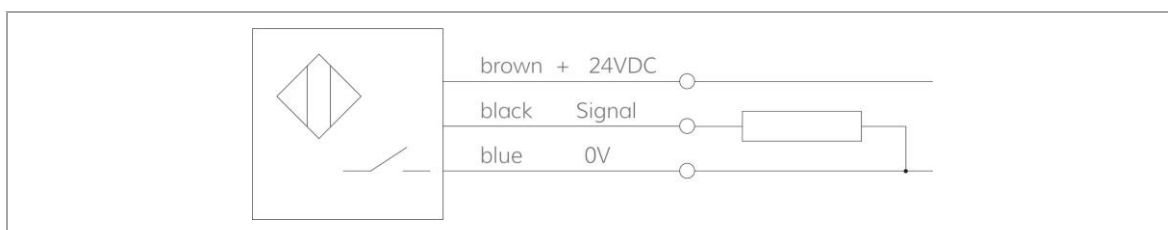


Figure 12 Pin assignment PNP normally open contact

Technical Data of Initiators

Parameter	Value
Operating voltage	(10 ... 30) VDC
Operating voltage residual ripple	< 10 %
Current load capacity	$I_a \leq 150 \text{ mA}$
Voltage drop at I_a max.	$\leq 3.5 \text{ V}$
Switching frequency	$\leq 1 \text{ kHz}$
Own current consumption	$\leq 10 \text{ mA}$
Nominal switching distance on steel	2 mm
Switching hysteresis	(3 ... 15) %
Reproducibility (R_{\max})	$\pm 3 \%$
Operating temperature	(-25 ... + 70) °C
Protection class	IP 67
Short-circuit proof (response value for short circuit protection 160 mA)	yes
Protected against polarity reversal	yes

Limit Switch

The limit 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

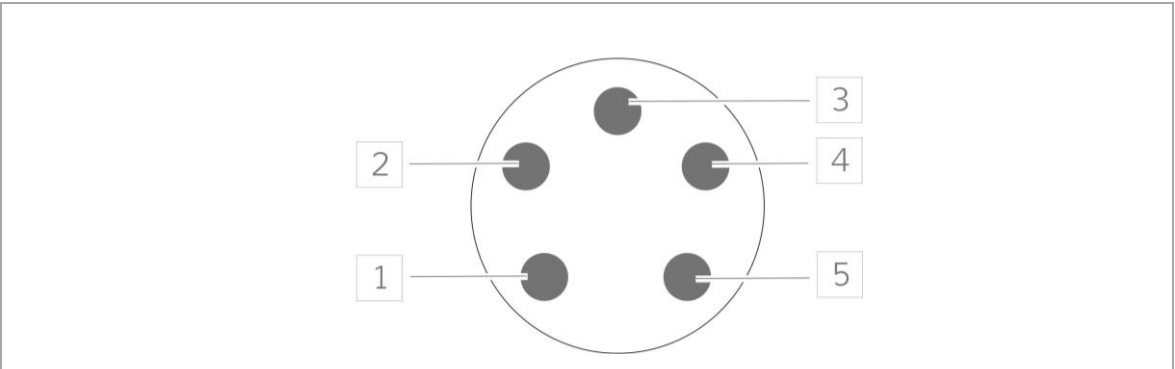


Figure 13 Pin assignment limit switch, view on the pins

Installation of Initiators

The proximity switches (limit switches) are installed at the short carriage part in a special aluminium profile (switch strip). If an initiator (limit switch) has to be replaced or if an additional reference point switch must be installed, the aluminium profile (switch strip) with the proximity switches can be screwed off of the short sliding part.

The initiators (limit switches) are actuated contact-free by switching cams movably placed in the aluminium basic body (of the 'long' basic body).

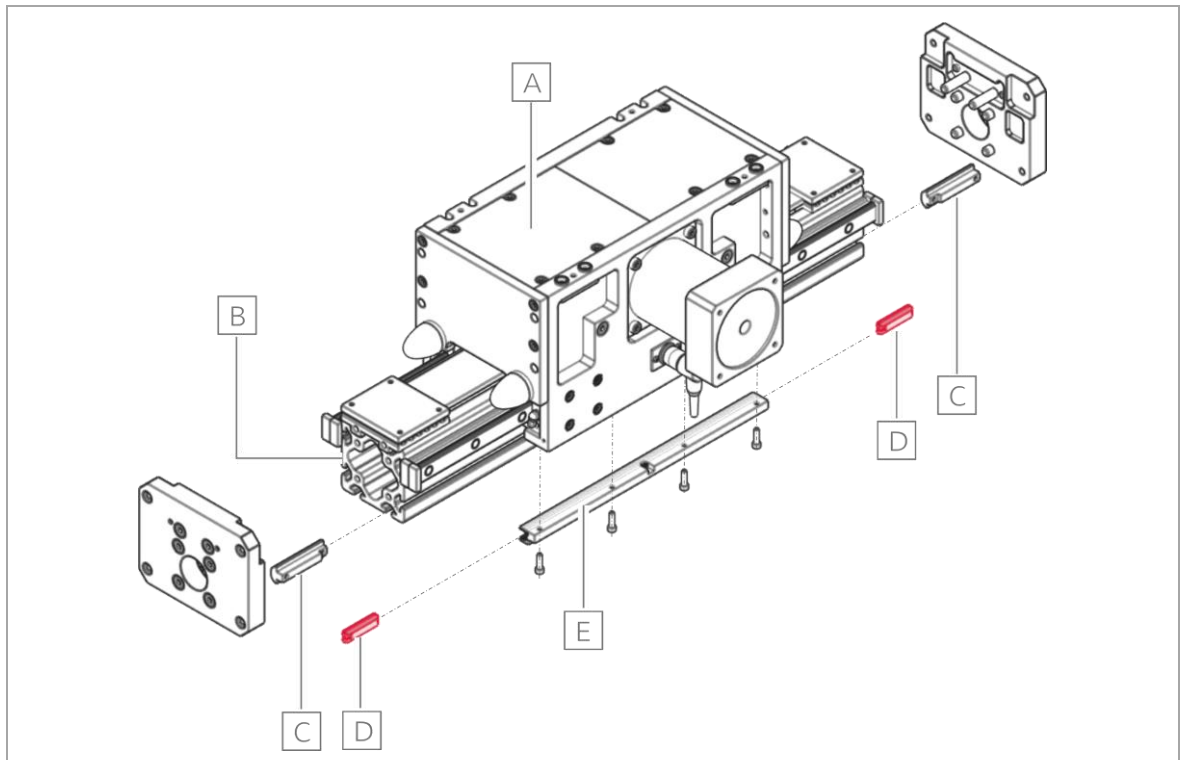


Figure 14 Installation of initiators

- | | |
|---------------------------------------|-----------------------------------|
| A 'Short' slide part | B 'Long' basic body |
| C Switching cam | D Proximity switch (limit switch) |
| E Aluminium profile (switching strip) | |

Intermediate Stop

CAUTION**Danger of unintended lowering of basic body.**

If work must be performed on a vertically installed axis, measures to secure the basic body against inadvertent lowering must be taken for reasons of safety. If these safety measures are not taken, there is a considerable risk of injury!

To limit the stroke of the linear unit for constructional reasons, there is the option of installing an intermediate stop (item no.: 1088221: Stop cpl.) at the linear unit. For this purpose, the toothed belt must be relieved (see section Tensioning the Toothed Belt, page 38).

The intermediate stop may be attached in the desired position by introducing four slot nuts into the grooves in the basic body with four recessed-head screws M6 x 16 (item no.: 626050). If an intermediate stop is used, observe that the switching cam (see Figure 14, page 26) is set so that the limit switch switches before mechanically blocking.

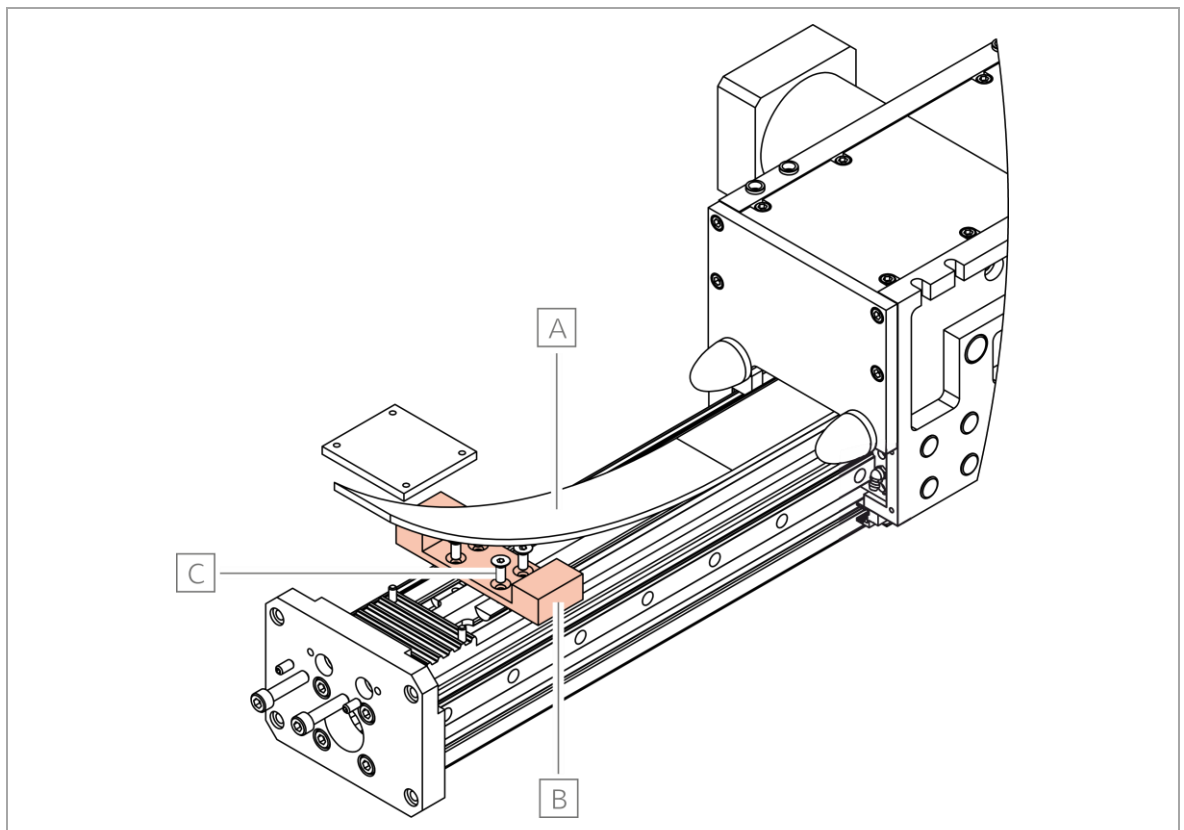


Figure 15 Intermediate stop

A Toothed belt

B Intermediate stop (1088221: Stop cpl.)

C Recessed-head screws (4 pcs*.)

5.4.3 Cable routing

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

The minimum radius r_{\min} 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 ordering also cables and cable routing chains at IEF-Werner GmbH.

Please get in touch with us, we'd appreciate to advise you

5.5 Technical Data

5.5.1 Tightening Torques for Screw Connections

Strength class	M2,5	M3	M4	M5	M6	M8
8.8	0,5	1,28	2,7	5,5	9,5	23
10.9	0,8	1,8	3,8	8	13	32
12.9	1,0	2,1	4,6	9,5	16	39

Tightening torques in [Nm]

5.5.2 Technical Data of the Linear Module 160/20 ZR10

Feature	Unit	Value
Length at stroke = 0 mm	[mm]	430
Basic weight, stroke = 0 mm incl. angular planetary gear	[kg]	24.5
Moved mass at stroke = 0 mm	[Kg]	7.25
Weight increase per 60 mm stroke	[kg]	0.742
Stroke graduation	[mm]	60
Max. stroke	[mm]	1.500
Rope pull strength of the toothed belt	[N]	7.950
Max. transmissible infeed force at 1.5m/sec. movement speed	[N]	3.000
Max. carrying capacity in vertical direction	[kg]	50
F_x, F_z max. [N]	(see Figure 17, page 31)	
M_y max.	[Nm]	200
Repeating accuracy	[mm]	± 0.05
Infeed constant (without gear)	[mm/U]	220
Max. movement speed (at motor speed 4000 rpm)*	[m/sec.]	1.5
Max. acceleration	[m/sec ²]	40
Area inertia of the profile cross-section		
$I_x =$	[mm ⁴]	1390000
$I_y =$	[mm ⁴]	1390000
Temperature range	[° C]	0 - 60

* The indicated values depend on the respective mass to be moved. Deviations in the movement speed may occur depending on the type or design of the planetary or angular planetary gear or motor speed.

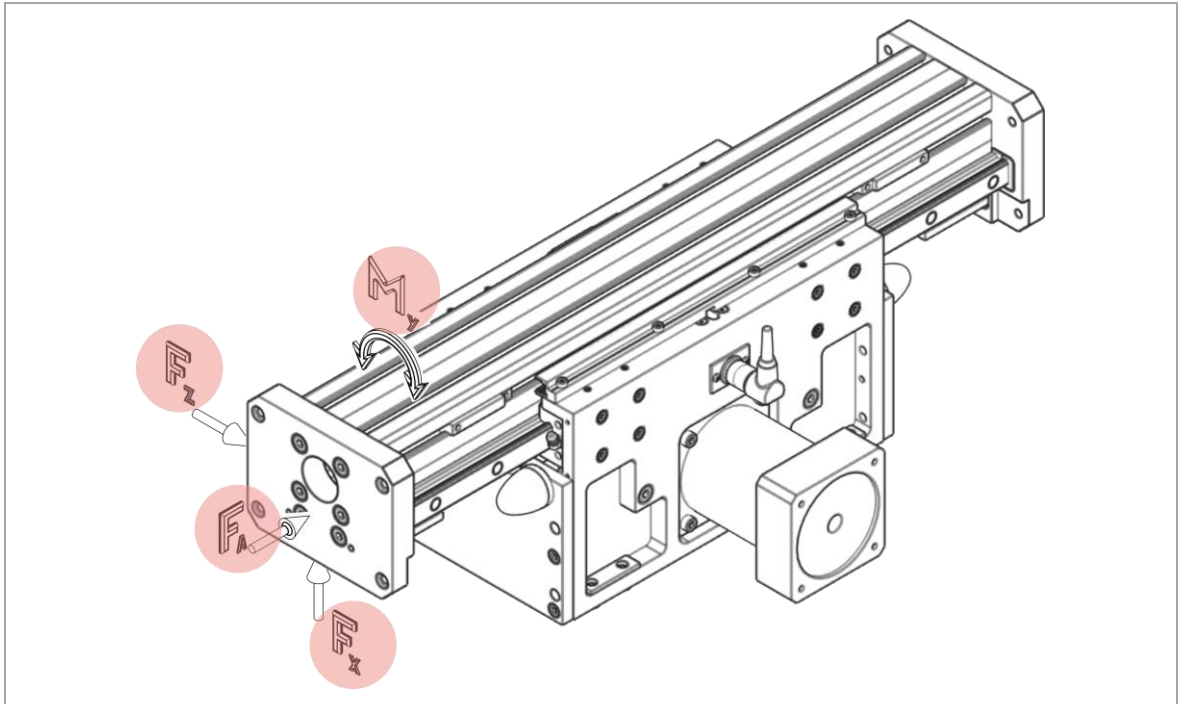


Figure 16 Forces and moments module 160/20 ZR10

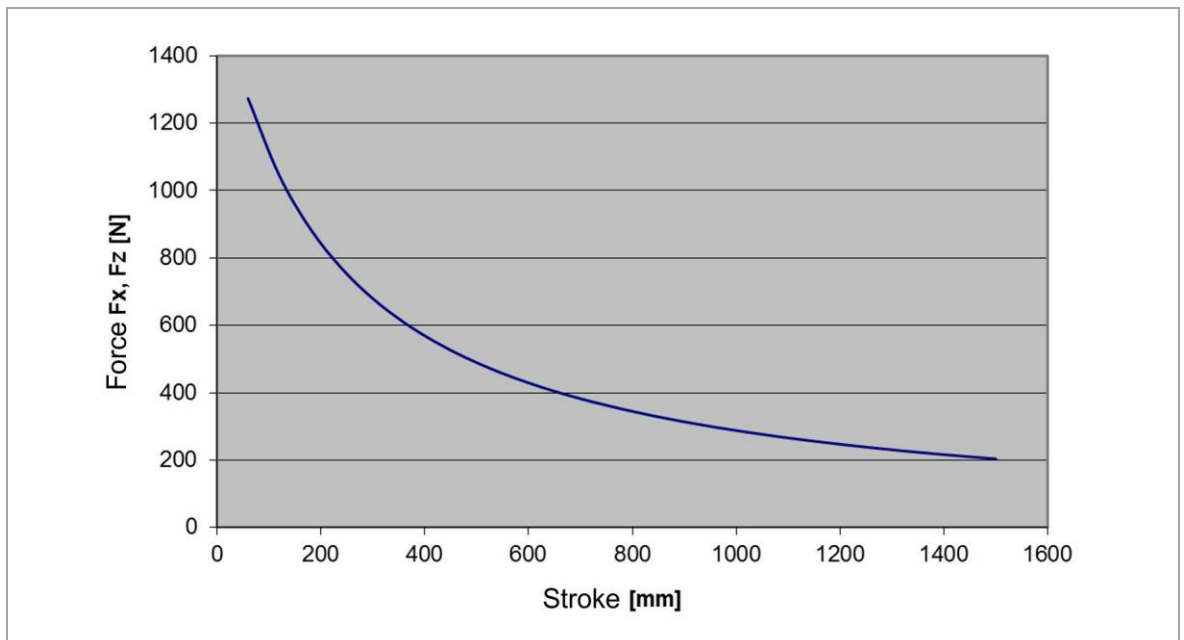


Figure 17 Maximum force Fx, Fz [N] depending on stroke

5.5.3 Type Plate

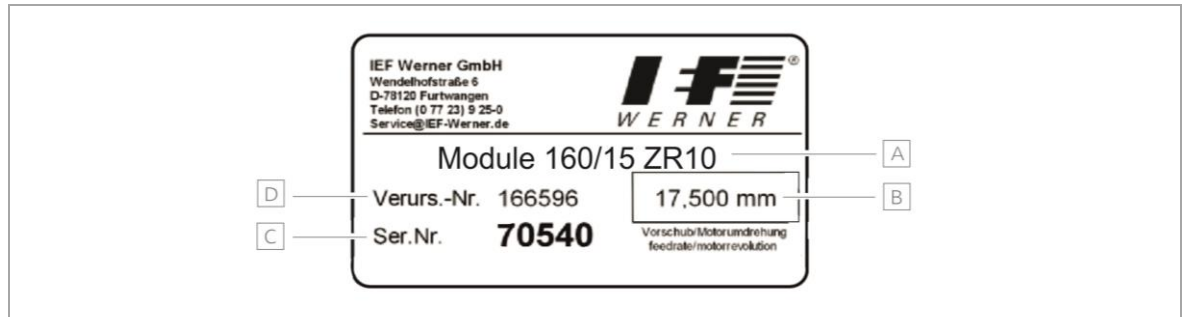


Figure 18 Type plate

A Type designation

B Feed / motor revs

C Serial number

D Order number

5.5.4 Technical Data when using a Planetary Gear

Before commissioning, observe the possible input speeds of the planetary gear used. Too-high input speeds can lead to increased wear at the gear and / or thermal problems.

Consider the information of the respective gear manufacturer in any case, e.g.:

- <http://www.neugart.de/index.php/de/Produkte/Standardgetriebe>
- <http://alpha.wittenstein.de/de-de/>

6 Maintenance

6.1 Lubricating the Guide Carriages

The guide carriages are lubricated externally (see Figure 19, below). For this purpose, the front cover must be removed by loosening the screws. Each guide carriage has an angular lubrication nipple. We recommend a lubrication interval of 600 operating hours. Greasing should take place with the lubricant Isoflex NCA 15 (Klüber). This lubricant can be procured in 50-gram tubes under item no.: 729148, or in the form of a hand grease gun (item no.: 1067378, filled with 150-gram Isoflex NCA 15) from IEF-Werner GmbH.

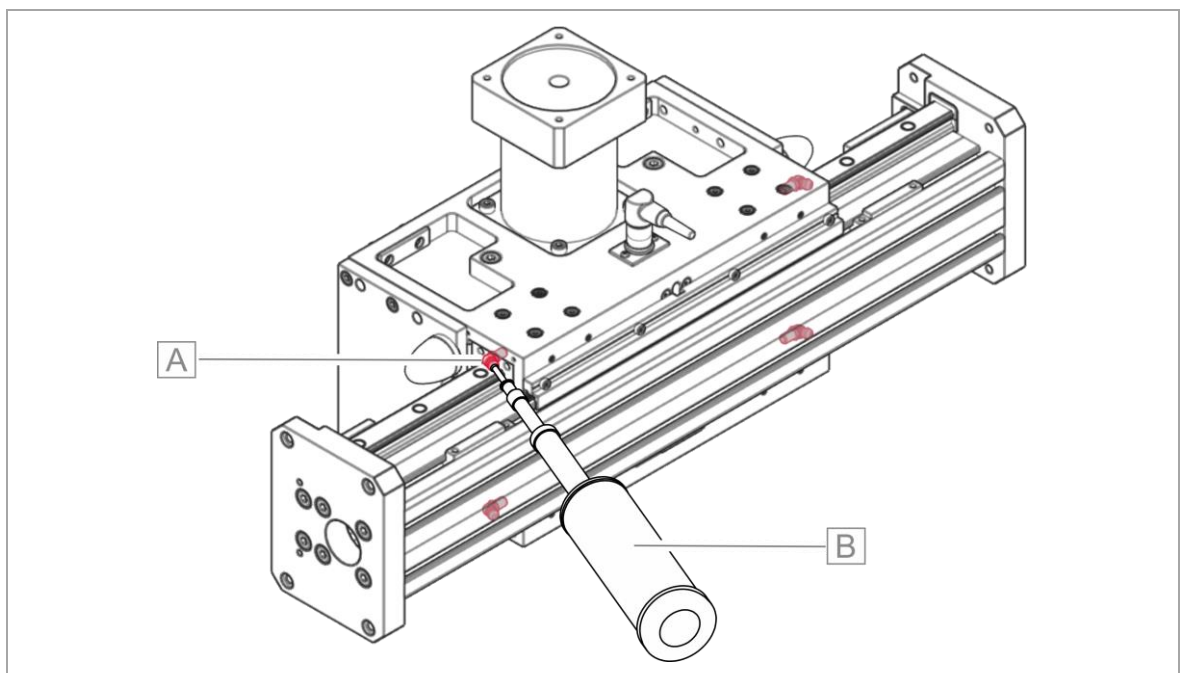


Figure 19 Position of lubrication nipple

A Angular lubrication nipple

B Hand grease gun

After greasing the guide carriages, there is the possibility that excessive grease that comes out of the guide carriage will deposit on the guide rails and collect on the end plate. To avoid lubricant dripping from the end plate and contaminating the environment, the lubricant is bound with fleece inlays (lubricating felts).

7 Troubleshooting

Interference	Reason	Correction
Increased running noise	Nominal service life of guide carriage exceeded	Replace guide carriages
	Guide carriage runs dry	Grease via angle lubrication nipple at the guide carriages
	Toothed belt produces vibrations or running noise	Change belt tensions (see section Tensioning the Toothed Belt, page 38)
	Deflector roll blocks	Replace deflector roll (see Figure 23, page 44)
	Nominal service life of planetary gear exceeded or planetary gear defective	Replace planetary gear
	Support bearing of drive sprocket defective	Replace ball bearings
	Motor (motor bearing) defective	Replace motor (see Figure 23, page 44)
	Motor with brake, brake does not open correctly	Apply current to the brake, if the brake still does not open properly, replace motor
Linear drive unit does not move	Limit switch cable not connected	Connect cable
	Limit switch defective	Replace limit switch (see section Installation of Initiators, page 26)
	Limit switch cable defective	Check limit switch cable, replace
	Solder connection on socket has come loose	Solder on wires
	Planetary gear defective	Replace planetary gear
	Motor connected incorrectly	Check and change connector assignment, if required
	Motor defective	Replace motor (see Figure 23, page 44)
	Error in power electronics or control unit	Check power electronics or control unit
	Motor cable defective	Check motor cable, replace cable if required

Module 160/20 ZR10

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Interference	Reason	Correction
Linear drive unit moves mechanically against the stop during the reference run	Incorrect direction of rotation	Change motor rotation direction
	Switching point of limit switch or reference switch is not reached	Set switching cams for end position switch or reference pint switch (see section Installation of Initiators, page 26)

8 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.

ATTENTION

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

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

8.1 Tensioning the Toothed Belt

CAUTION

If work must be performed on a vertically installed axis, measures to secure the basic body against inadvertent lowering must be taken for reasons of safety. If these safety measures are not taken, there is a considerable risk of injury!

A toothed belt AT10 with highly flexible strand and a width of 50 mm is used for power transfer. The toothed belt is connected to a 2-part belt buckle on both ends (see Figure 20, below). The belt buckle is connected to the end plate with two clamping screws M8. By tightening the clamping screws, tension of the toothed belt can be adjusted. Tightening the two threaded pins M6 fastens the position of the belt buckle.

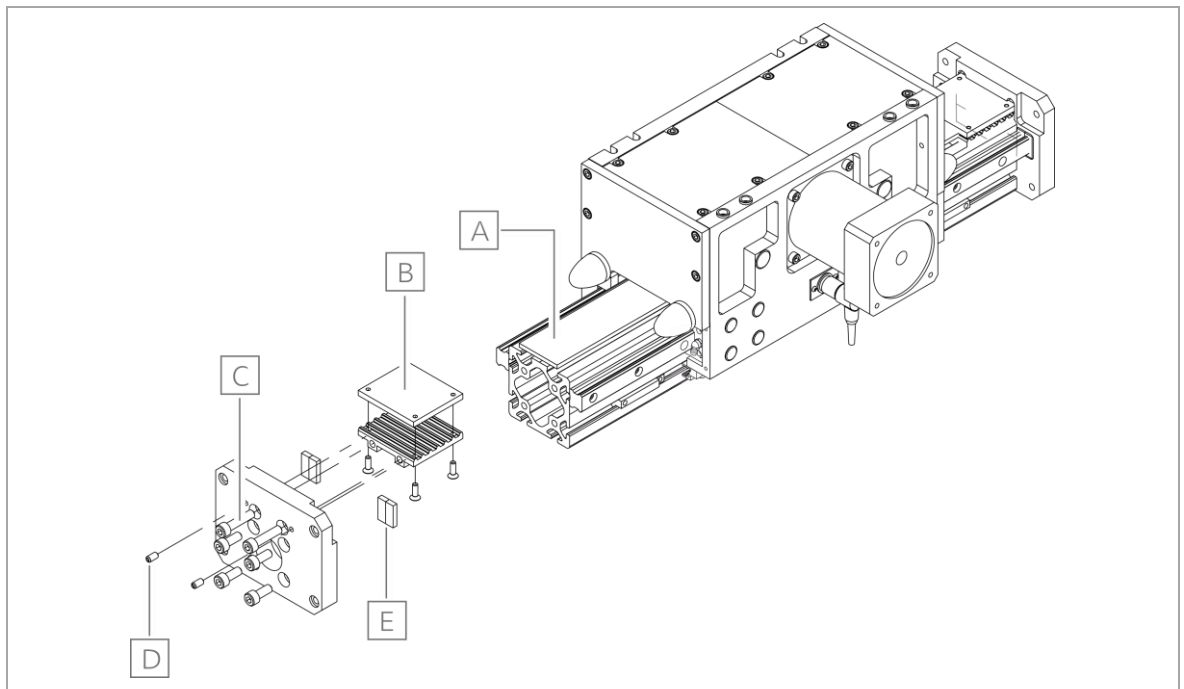


Figure 20 Belt buckle

- | | |
|----------------------------|------------------------|
| A Toothed belt | B Belt buckle |
| C Tensioning screw M8 (2x) | D Threaded pin M6 (2x) |
| E Lubrication felt (4x) | |

8.2 Replacing Guide Carriages

To change the guide carriages, it is necessary to remove the two cover plates.
This requires the un-loosening of the belt tension.

As the module 160/20 ZR10 is a gravitationally impacted linear drive (vertical operation), the tooth belt can only be relieved, if the basic body of the linear unit is secured against falling down.

Nevertheless, we recommend, removing the linear unit of the respective assembly face entirely before changing the guide carriage, so that this service intervention can be conducted in a non-dangerous state.

Replacing guide carriages as following (descriptions for Figure 21, 40)

1. Release the tension of the toothed belt [A] from both sides by unscrewing the screws M8 x 35 [B].
The threaded pins M6 x 12 [C] must not be displaced, because these determine the way of tension of the toothed belt.
2. Remove both end plates [D] by unscrewing the four cylinder screws M8 x 20 [E].

Continuation replacing guide carriages (descriptions for Figure 22, 40)

3. Loosening of the 4 threaded pins M6 x 10 [F] each side.
4. Loosening as well as unscrewing of the fastening screws M5 x 10 [G] at the guide carriages (4 pieces per guide carriage).
Attention: The levelling elements / threaded sleeves M12 x 1 [H] (4 pieces per guide carriage) must not be unscrewed or displaced.
5. Push defective guide carriage [I] off the guide rail [J].
6. Pull new, lubricated guide carriage [I] carefully onto the guide rail.
Attention: Pull guide carriage [I] onto the guide rail [J] in the way that the reference edge of the guide carriage is arranged oppositely to the threaded pins M6 x 10 [F].
When pulling up the guide carriage, use insertion aid (plastic part) in the guide carriage.
7. Position guide carriage [I] at the corresponding position in the carriage [K].
8. Per guide carriage [I] tighten 2 threaded pins M6 x 10 [F] in order to push reference edge of the guide carriage on the locating shoulder of carriage part.
9. Per guide carriage [I] tighten four fastening screws M5 x 10 [G] firmly and – if available – cover with plastic cover caps.

See Figure 21, 40 again

10. Screw on the both end plates [D] with each 4 pieces cylinder screws M8 x 20 [E].
11. Fixing the toothed belt with screws [B] and tighten it with the threaded pins [C].

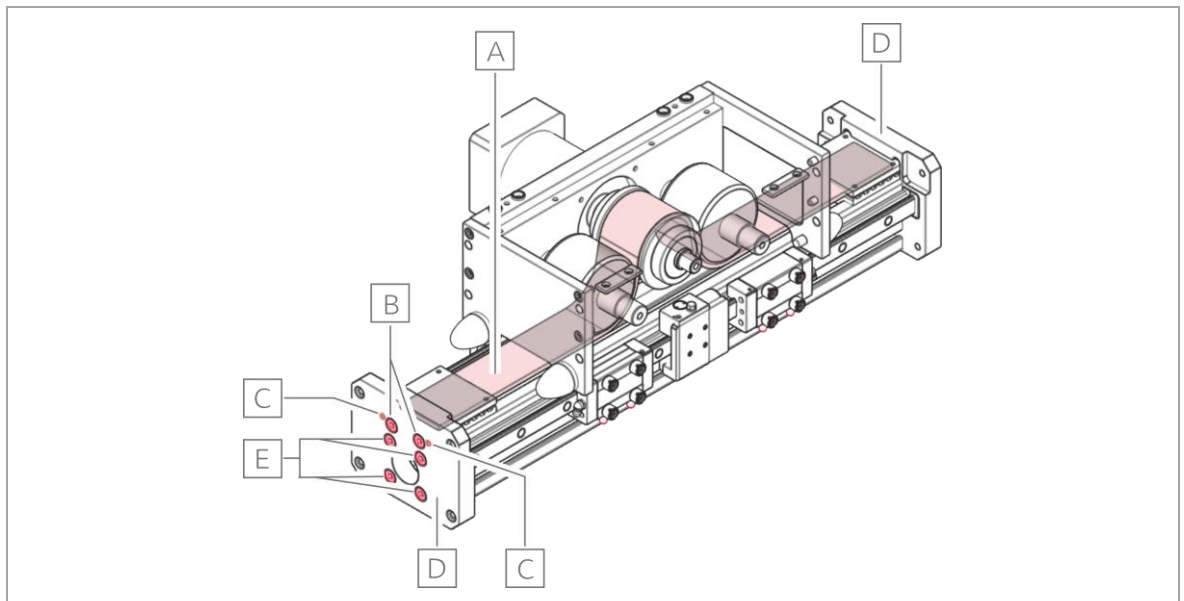


Figure 21 Procedure to replace the guide carriages part 1

- | | |
|--|---|
| A Toothed belt | B Clamping screws M8 x 35
(2 pieces per end plate) |
| C Threaded pins M6 x 12 (2 pieces per end plate) | D End plates (2 pieces) |
| E Cylinder screws M8 x 20 (4 pieces per end plate) | |

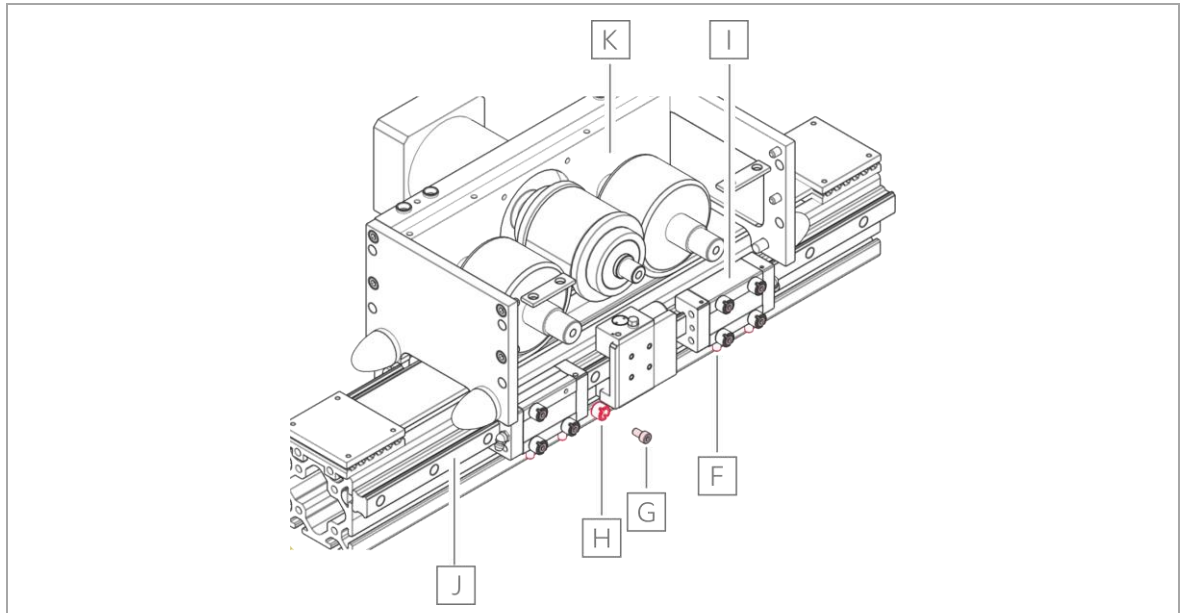


Figure 22 Procedure to replace the guide carriages part 2

- | | |
|--|---|
| F Threaded pins M6 x 10
(2 pieces per guide carriage) | G Fastening screws M5 x 10
(4 pieces per guide carriage) |
| H Levelling elements / threaded sleeves
(4 pieces per guide carriage) | I Guide carriage (2 pieces each side) |
| J Guide rail | K Carriage |

9 Part lists and drawings

9.1 Module 160/20 ZR10, TG1001590

Z-Pos.	Item no	Part (1) / Part group (0)	Usage	Designation
10	1001593	0	+	Basic body
20	1001595	0	+	Guide rail
30	736156	1	+	Slotted key, type 8 St/M5
40	1087700	1		Sprocket 160/20 cpl.
50	1087821	1		Side plate gear
60	1087822	1		Side plate bearing
70	1087808	1		Cover carriage
80	1087806	1		Front plate carriage
100	1022741	1		Parabola spring
110	1087719	1		End plate M160/20
120	1087723	1		Levelling screw M12 x 1
130	1115553	1		Toothed belt 50AT10 E-strand 0.90 mm
140	1087714	1		Switch strip M160/20
150	1087751	1		Switching cam M160/20
160	1088860	1	+	Drop protection, complete
170	1087792	1		Deflector roll complete
180	1087789	1		Belt buckle complete
190	1020649	1		Linear recirculating ball unit
200	1087717	1		Limit switch bracket
210	737543	1		Centring sleeve
220	1087836	1		Lubrication felt end plate
225	1130596	1		Spacer plate

Module 160/20 ZR10

Translation (EN) of the original instructions (DE)

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Z-Pos.	Item no.	Part (1) / Part group (0)	Usage	Designation
230	25626	1		Retaining plate
240	725163	1		Installation plug round
250	1072646	1		Lens-head screw M3 x 8 V2A
260	725164	1		Coupling angled
270	25165	1	+	Proximity switch PNP normally closed
271	726744	1	+	Proximity switch PNP normally open
280	28585	1	+	Limit switch holder
300	1023434	1		Sealing plug
340	1000041	0		Motors
350	626061	1		Cyl. Screw M4 x 16 DIN 912
370	626056	1		Cyl. Screw M6 x 16 DIN 912
380	626043	1		Cyl. Screw M8 x 20 DIN 912
390	626487	1		Cyl. Screw M5 x 10 DIN 912
400	626037	1		Cyl. Screw M6 x 20 DIN 912
405	626488	1		Cyl. Screw M5 x 12 DIN 912
410	1019719	1		Cyl. Screw M5 x 18 DIN 912
420	626190	1		Threaded pin M6 x 10 DIN 913
430	626191	1		Threaded pin M6 x 12 DIN 913
440	626479	1		Recessed head screw M4 x 12
450	626255	1		Cyl. Screw M8 x 35 DIN ISO 4762
460	1055531	1		Membrane socket (not illustrated)
461	1088221	1	+	Stopper complete
470	626764	1		Cyl. Screw M6 x 12 DIN 912

Z-Pos.	Item no.	Part (1) / Part group (0)	Usage	Designation
490	734168	1	+	Clamping set, type PSV 2016 22 x 40
491	1089292	1	+	Clamping set for shaft 20 mm
500	626973	1		Cyl. Screw M5 x 25 DIN 912
510	1146414	1		Clamping element with spring accumulator
520	1146418	1		Cover bracket
530	626251	1		Cyl. Screw M8 x 12 DIN 912

+ Use depending on design

Spare and wearing parts lists will be created according to customer's order.

Module 160/20 ZR10

Translation (EN) of the original instructions (DE)

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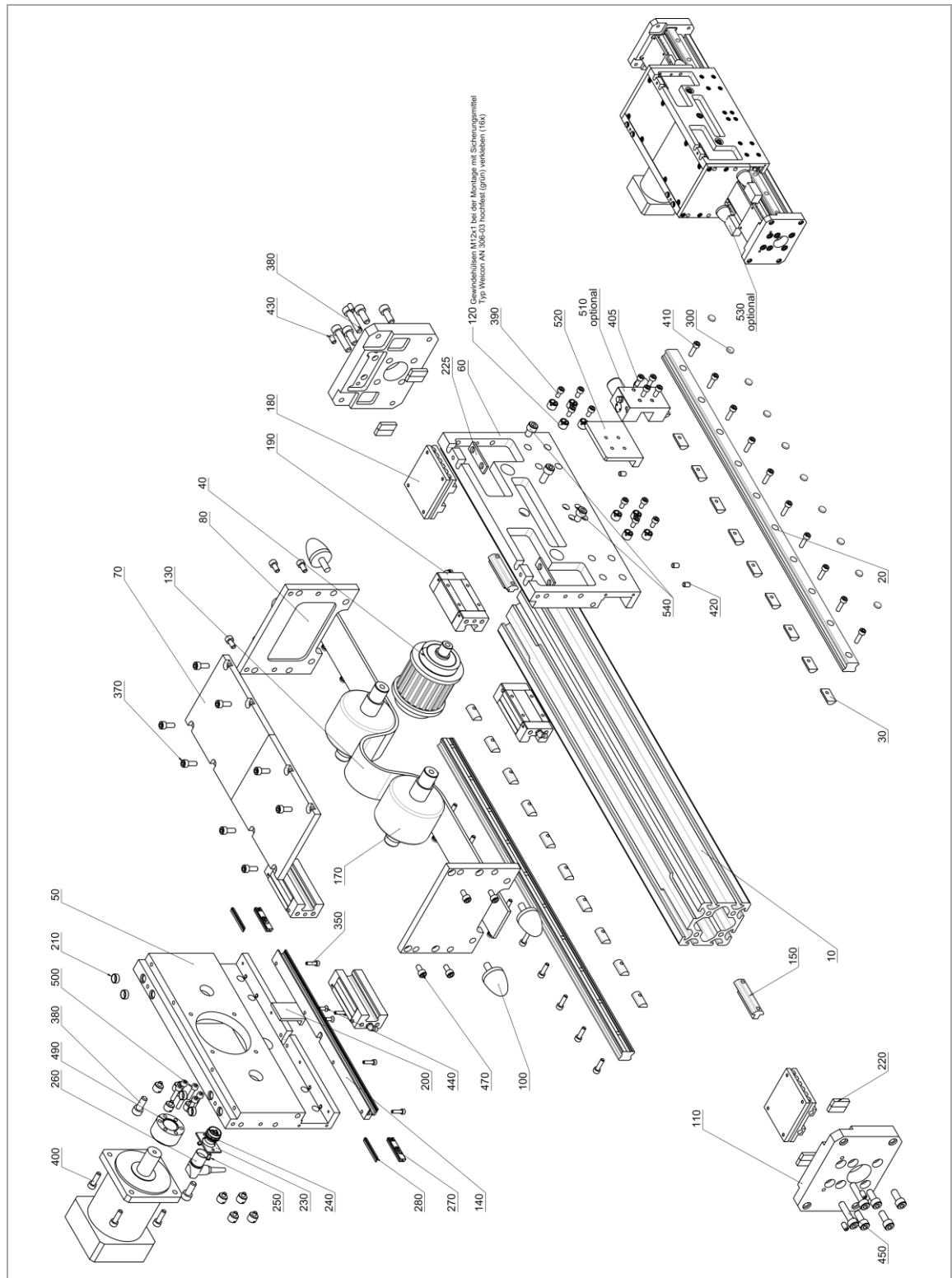


Figure 23 Exploded drawing module 160/20 ZR10 TG 1001590

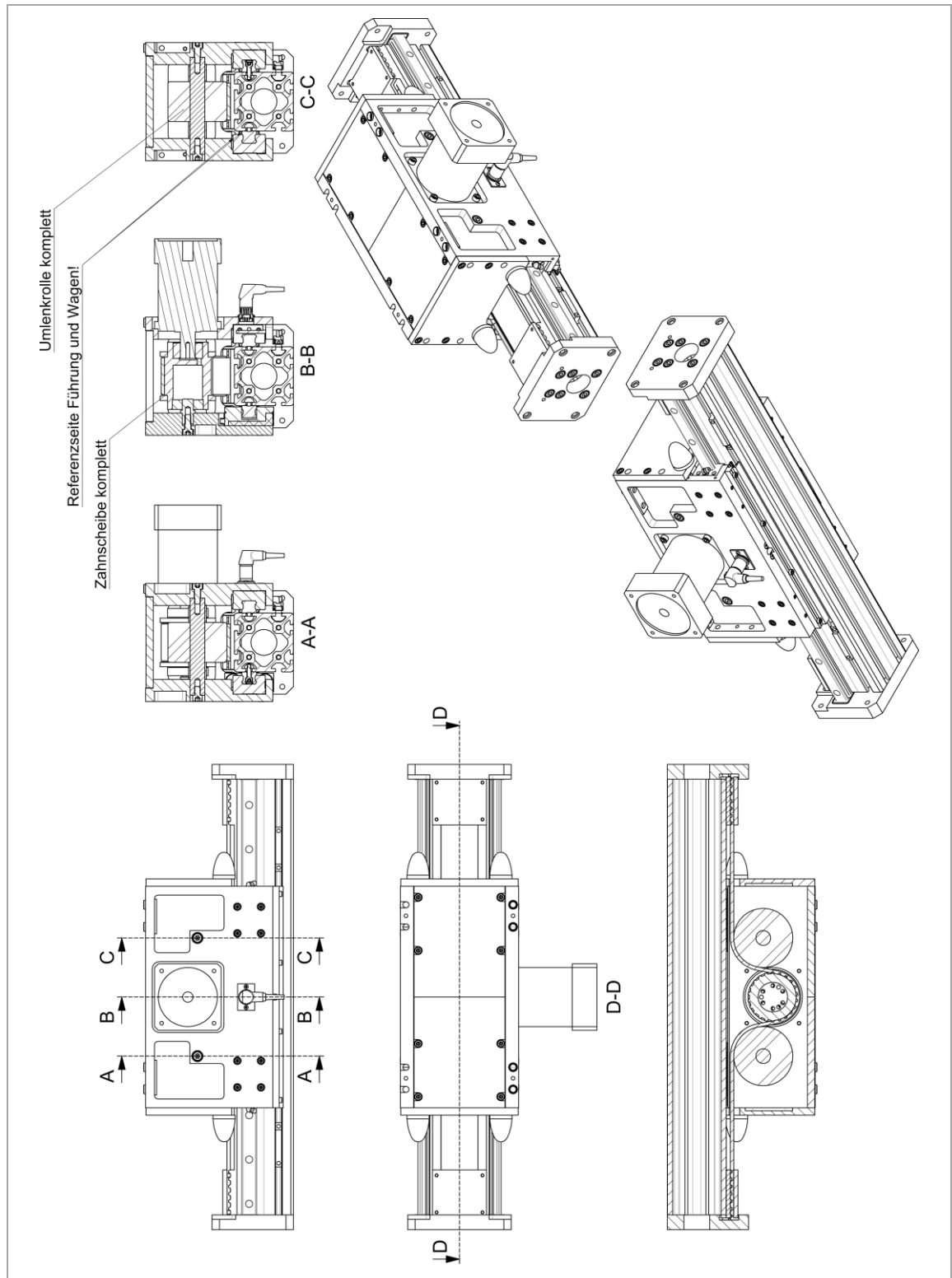


Figure 24 Drawing module 160/20 ZR10 TG 1001590

9.2 Switching Cam Installation Sizes

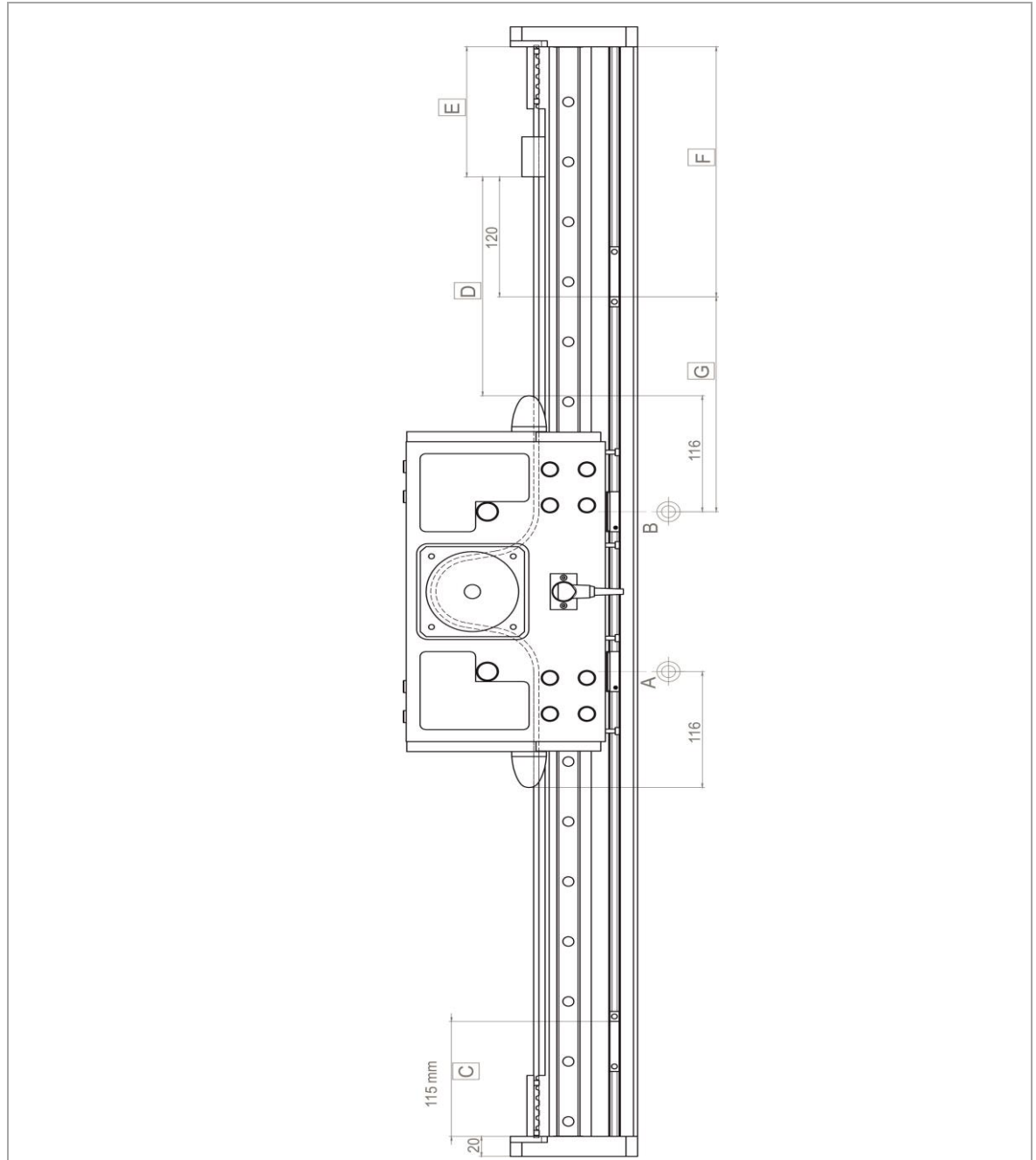


Figure 25 Switching cam

- | | |
|--------------------------------------|--------------------------------------|
| A Switching point | B Switching point |
| C Standard distance of switching cam | D Switching distance + 4 mm |
| E Distance switching cam – 120 mm | F Distance switching cam – end plate |
| G Switching distance | |

9.3 Scaled Drawing

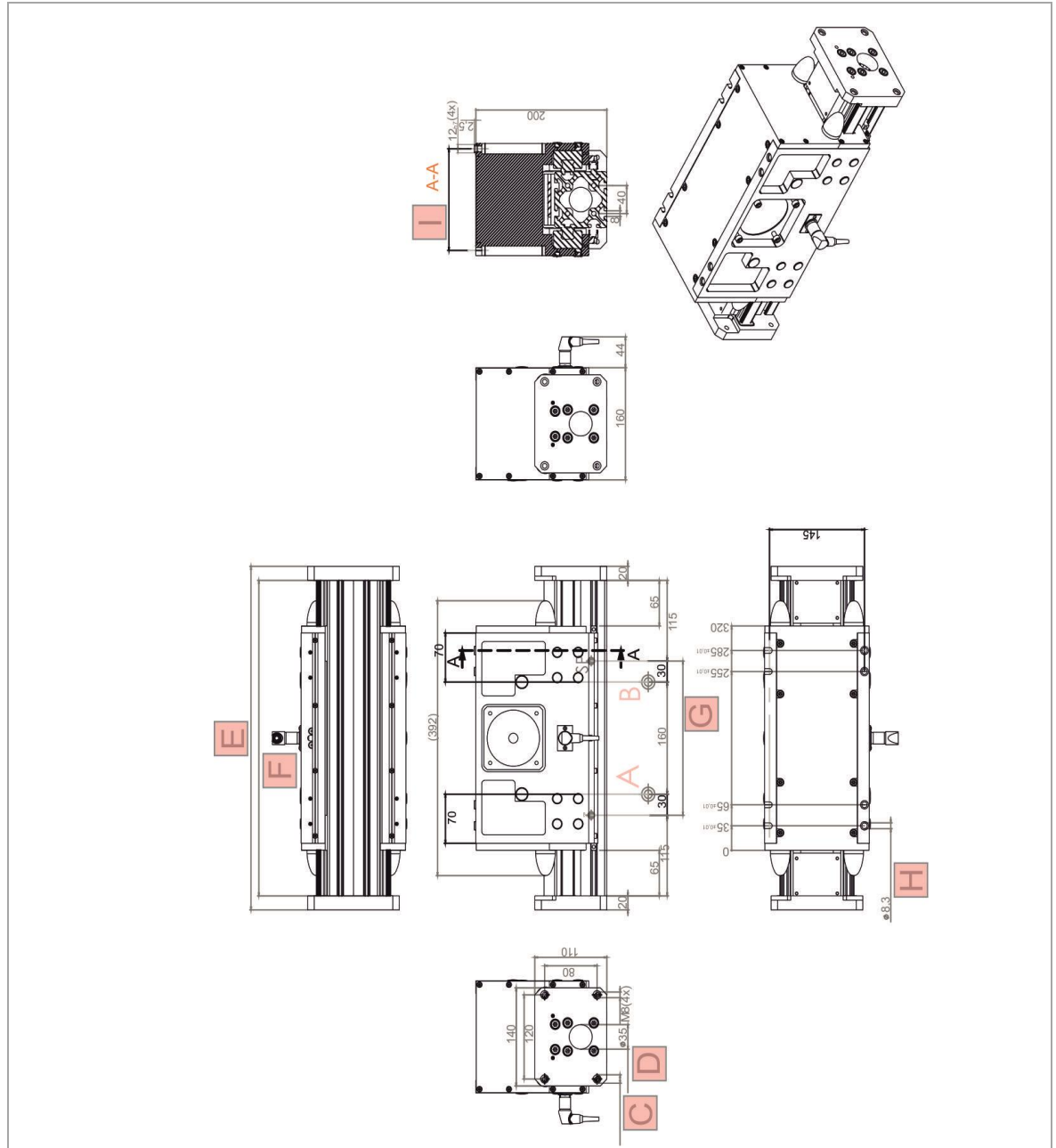


Figure 26 Scaled drawing

- | | |
|--|--|
| A Stroke limit end switch (reference point) | B Stroke limit end switch |
| C $\varnothing 12H7$ 2,5 deep (4x) | D Consistently $\varnothing 35$ |
| E $L_{ges} = stroke_{eff} + 430$ | F 450 minimum basic body length |
| G min. $stroke_{eff}$: 60 mm (+ 160 = 220),
longer strokes + n x 60 mm | H $\varnothing 8,3$ for screws M8 (8x) |
| I Mounting dimension 145 | |