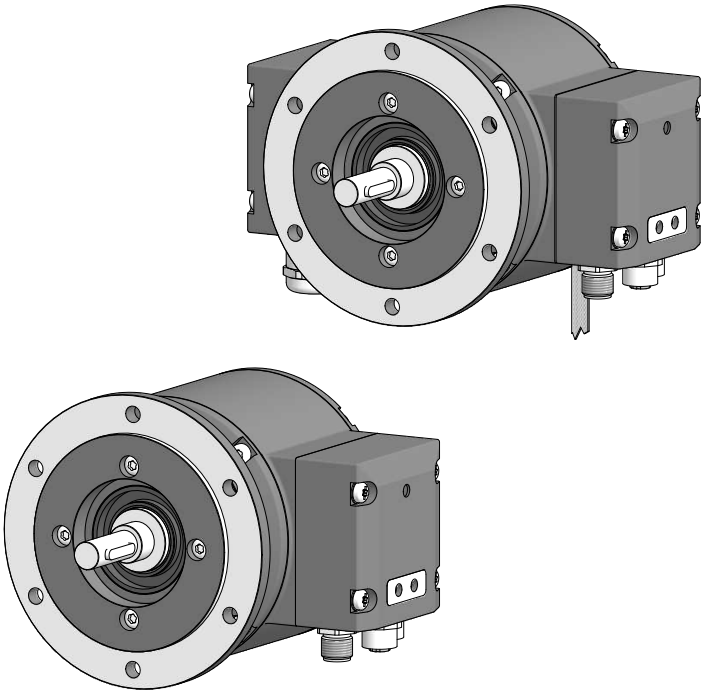
Baumer

Passion for Sensors

Installation and operating instructions



PMG 10 - PROFINET

Absolute encoder with magnetic sensing

MB249EN - 11171701, 16A3, Baumer_PMG10-PROFINET_II_EN

HÜBNER BERLIN
A Baumer Brand

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1.1 Symbol guide

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Disregarding could result in serious injury, death or damage to property

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Disregarding could result in damage to property or damage/malfunction of the encoder

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1.2 Intended use

The encoder is a precision measurement device for the acquisition of speed/position information for the control of drive units and the provision of electronic output signals for downstream devices.

The encoder must not be used for any other purpose. The function of the encoder is described in this mouting instruction. The customer must check the suitability for the purpose intended.

Mounting and selection must be executed by authorized and qualified personnel. Mounting, electrical commissioning or any other work with the encoder or system is to be performed by appropriately qualified staff only.

Do not put encoder into service if there is any visible evidence of damage.

Do not operate encoder beyond the limit values stated in this mounting instruction.

Any risk of personal injury, damage of the system or company equipment due to failure or malfunction of the encoder must be eliminated by corresponding safety measures.

Warning
Disregarding intended use could result in serious injury or damage to property.

1.3 Exclusion from liability

The manufacturer is not liable for any damage to persons or property resulting from unintended use of the encoder.

1.4 Maintenance and lifetime

The encoder may be only opened as described in this instruction. Repair or maintenance work that requires opening the encoder completely must be carried out by the manufacturer.

Alterations of the device are not permitted.

The expected operating life of the device depends on the ball bearings, which are equipped with a permanent lubrication.

In the event of queries or subsequent deliveries, the data on the device type label must be quoted, especially the type designation and the serial number.

1.5 Approvals and warranty

EU Declaration of Conformity meeting to the European Directives.

We grant a 2-year warranty in accordance with the regulations of the Central Association of the German Electrical Industry (ZVEI).

i warranty seal
Damaging the warranty seal on the encoder invalidates warranty.

1.6 Storage temperature and disposal

The storage temperature range of the encoder is between -15...+70 °C (caused by packing).

Encoder components are to be disposed of according to the regulations prevailing in the respective country.

2. SAFETY AND ATTENTION INSTRUCTIONS

2.1 Safety instructions

Explosion risk
Spark formation can cause a fire or an explosion.

» Do not use the encoder in areas with explosive and/or highly infl ammable materials. They may explode and/or catch fire by possible spark formation.

Risk of serious injuries due to rotating shafts
Hair and clothes may become tangled in rotating shafts. Touching the rotating parts can cause extremely serious injuries.

» Before all work switch off all operating voltages and ensure machinery is stationary.

» Prevent reconnection operating voltages by third parties.

Risk of serious injuries due to consequential damages
Plants can be deregulated due to malfunction or faulty signals of the encoder.

» Damage caused by faulty operation or by a malfunction of the encoder must be eliminated by corresponding safety measures.

Risk of burns due to formation of heat
The encoder heats up at higher speed so there is a serious risk of burning shortly after the machine has been turned off.

» Examine carefully whether the encoder overheats. Wear suitable gloves if necessary.

2.2 Attention instructions for mounting and operation

☞ Risk of destruction due to electrostatic charge
Electronic parts contained in the encoder are sensitive to high voltages.

» Do not touch plug contacts or electronic components.

» Protect output terminals against external voltages.

» Do not exceed max. operating voltage.

☞ Risk of destruction due to mechanical overload
Rigid mounting may give rise to constraining forces.

» Never restrict the freedom of movement of the encoder. The installation instructions must be followed.

» It is essential that the specified clearances and/or angles are observed.

☞ Risk of destruction due to mechanical shock
Violent shocks, e. g. due to hammer impacts, can lead to the destruction of the sensing system.

» Never use force. Assembly is simple when correct procedure is followed.

» Use suitable puller for disassembly.

☞ Risk of destruction due to contamination
Dirt penetrating inside the encoder can cause short circuits and damage the optical sensing system.

» Absolute cleanliness must be maintained when carrying out any work on the open terminal box.

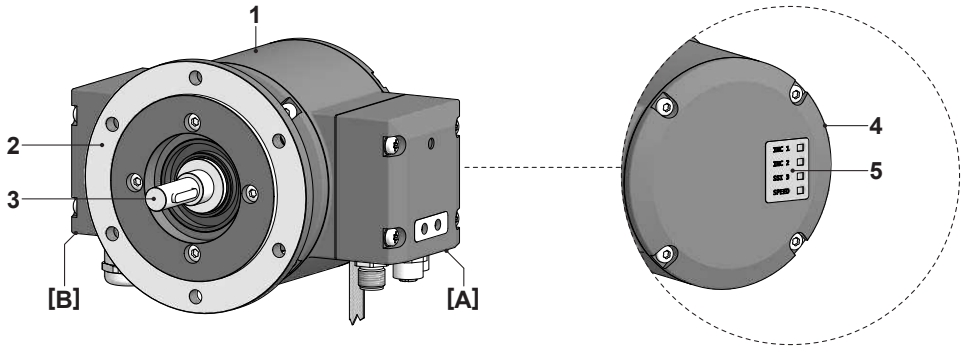
» When dismantling, never allow lubricants to penetrate the encoder.

☞ Risk of destruction due to adhesive fluids
Adhesive fluids can damage the optical sensing system and the bearings. Dismounting an encoder, secured to a shaft by adhesive may lead to the destruction of the unit.

» Do not use adhesive fluids for fixing.

3. PREPARATION

3.1 Scope of delivery



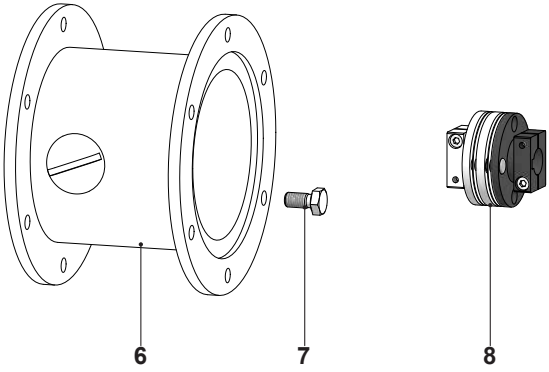
1 Housing
2 EURO flange B10
3 Solid shaft with key
4 Bearing shield
5 LED function indicators

Radial terminal boxes* (see *section 5*):
[A] Bus connecting box PROFINET
[B] Speed switch + additional output

* Depending on version

3.2 Required accessory for mounting (not included in scope of delivery)

i Connecting cables and connectors are required for the electrical connection. Details see *section 5, page 11*.



6 Installation fitting, customized

7 Fixing screws for installation fitting ISO 4017, M6x16 mm

8 Spring disk coupling K 35, available as accessory, see *section 4.4, page 9*.

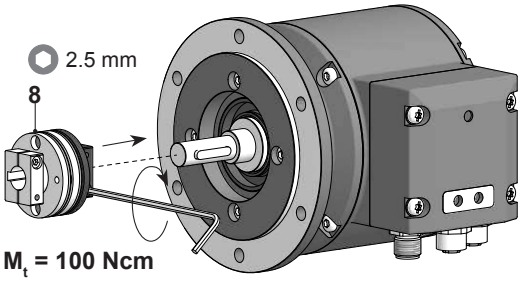
3.3 Required tools (not included in scope of delivery)

- 2.5 mm
- 10 und 22 mm
- TX 10, TX 20

4. MOUNTING

4.1 Mounting the spring disk couling to the encoder

We recommend using the Baumer Hübner spring disk coupling K 35, see *section 4.4, page 9*, available as accessory. When other couplings are used pay attention to manufacturer's notes.

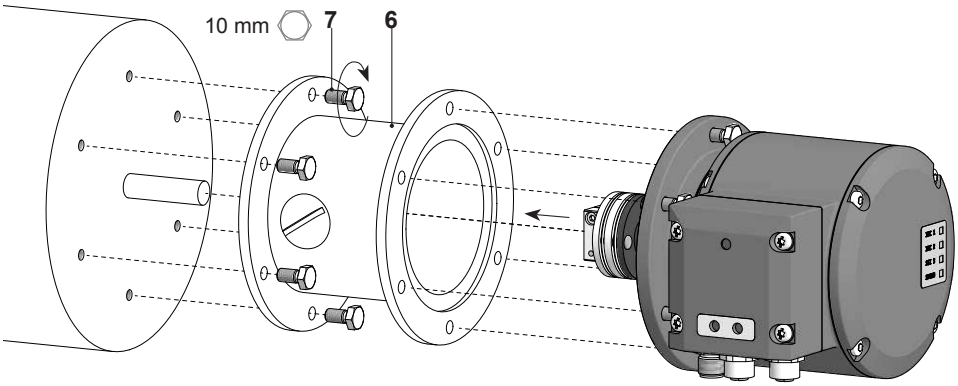


4.2 Mounting to drive shaft

☞ Lifetime restrictions and angle error by radial deviations
High runout of the drive shaft can cause encoder angle error.
High runout of the drive shaft can cause vibrations, which can shorten the lifetime of the encoder.

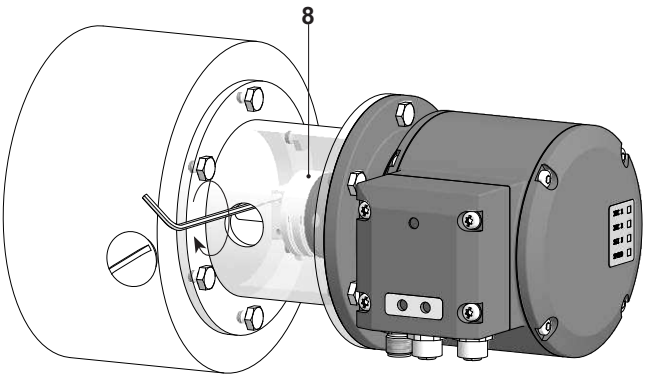
» Lubricate drive shaft!

» Minimize drive shaft runout (≤0.2 mm; ≤0.03 mm recommended).



i The encoder must be mounted with cable connection facing downward and not exposed to water.

4.3 Mounting the spring disk couling to drive shaft



2.5 mm

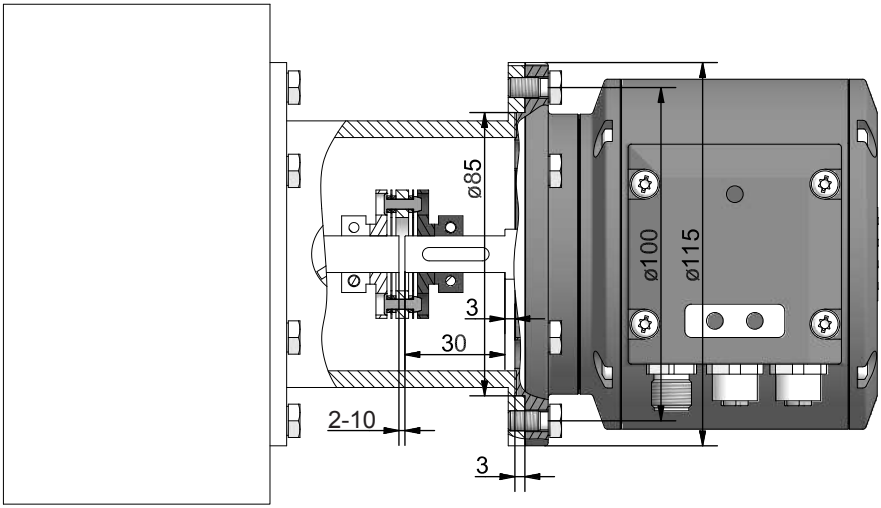
M_t = 2-3 Nm

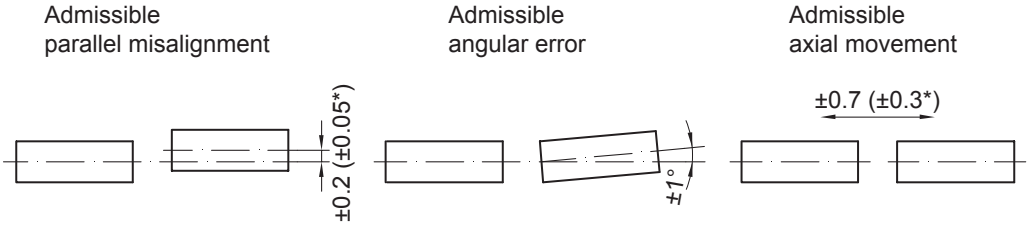
4.4 Maximum permissible mounting tolerance when the Baumer Hübner K 35 spring disk coupling is used

Encoders should be driven through the Baumer Hübner K 35 spring disk coupling (accessory), that can be pushed onto the shaft without axial loading.

☞ The encoder must be mounted on the drive with the least possible angular error and parallel misalignment.

☞ Risk of damaging the ball bearings
Coupling components must not be driven onto the shaft with improper force (e. g. hammer impacts), because of the risk of damaging the ball bearings.





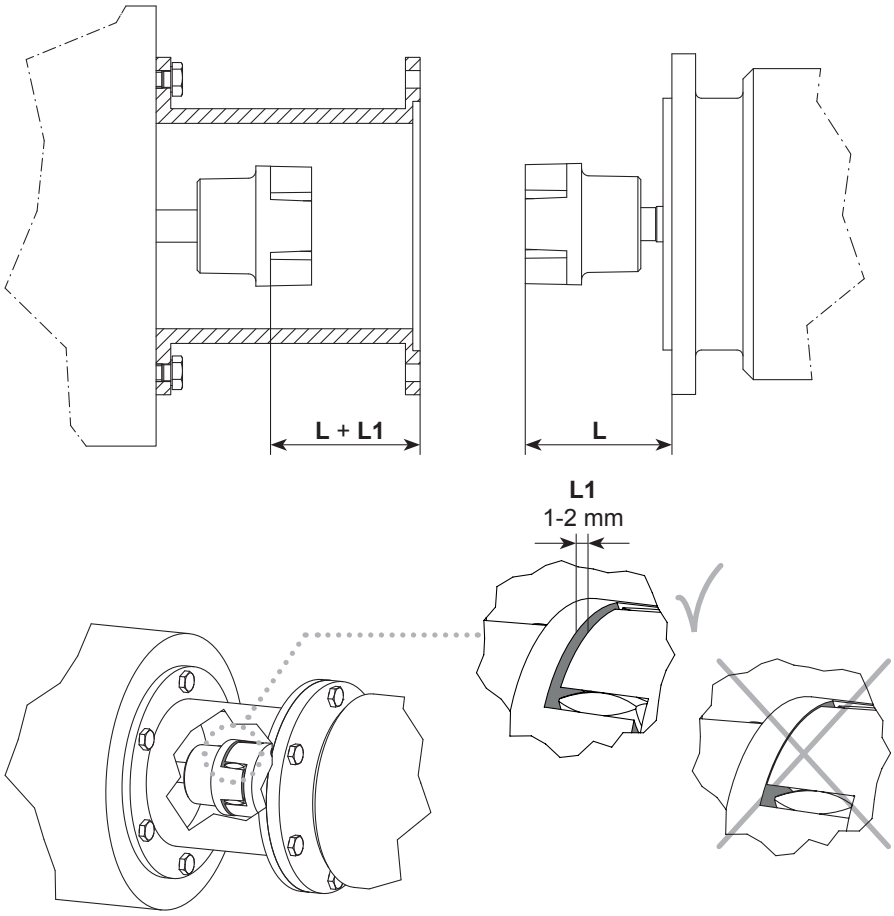
* For insulated hub version

All dimensions in millimeters, unless otherwise stated.

4.5 Note when using a jaw-type coupling (for example „ROTEX®“)

☞ Incorrect mounting of the jaw-type coupling can damage the encoder.
Avoid blocking of both coupling halves (claws pressed together). The encoder shaft must not subjected to direct axial shock.

» Use a depth gauge to find and observe the correct distances (**L**, **L1**), see below.



5. ELECTRICAL CONNECTION

5.1 PROFINET

i Please find a detailed instruction for the PROFINET interface and the device description file in the manual on the CD provided with the device.

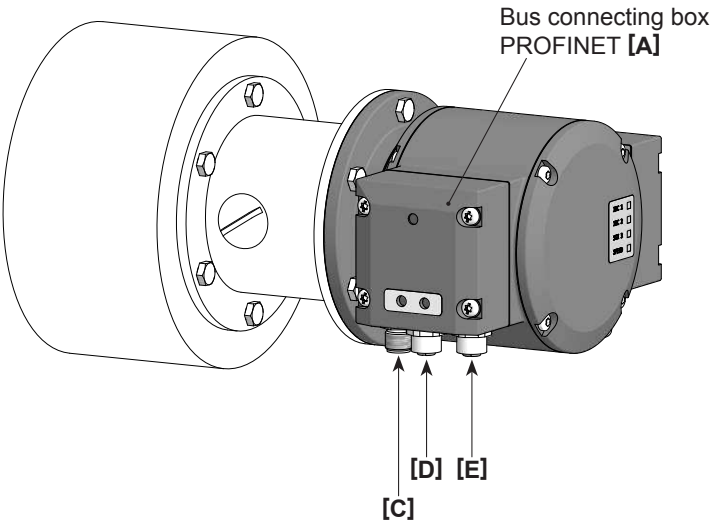
5.1.1 Features

Bus protocol	PROFINET
Device profile	Encoder profile PNO 3.162
Features	100 MBaud Fast Ethernet IP address programmable Realtime (RT) Class 1, IRT Class 2, IRT Class 3
Process data	Position value 32 bit input data

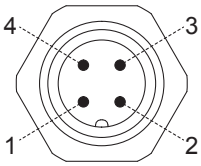
5.1.2 Terminal assignment

☞ Use connecting cable and connector exclusively in accordance to the PROFINET directive.

5.1.2.1 Bus connecting box PROFINET [A]

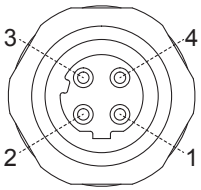


5.1.2.2 Connector M12 [C] „Voltage supply“ (male, 4-pin, A-coded)



MALE	CONNECTION	DESCRIPTION
1	UB	Voltage supply 10...30 VDC
2	-	Do not use
3	GND	Ground for UB
4	-	Do not use

5.1.2.3 Connector M12 [D] and [E] „Data transmission“ (female, 4-pin, D-coded)



FEMALE	CONNECTION	DESCRIPTION
1	TxD+	Transmission data+
2	RxD+	Receiving data+
3	TxD-	Transmission data-
4	RxD-	Receiving data-

5.2 Speed switch and additional output incremental

5.2.1 Terminal significance

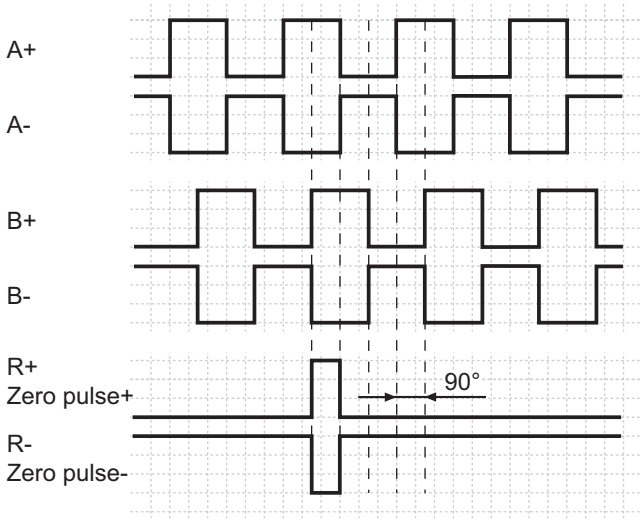
+UB	Voltage supply
⊥	Ground
A+	Channel A+
A–	Channel A– (Channel A+ inverted)
B+	Channel B+
B–	Channel B– (Channel B+ inverted)
R+	Zero pulse (reference signal)
R–	Zero pulse inverted
nE+	System OK+ / error output
nE–	System OK– / error output inverted
SP+*	DSL_OUT1 / speed switch (Open-Collector** or Solid State Relay**)
SP–*	DSL_OUT2 / speed switch (0 V** or Solid State Relay**)
SA*	RS485+ / programming interface
SB*	RS485– / programming interface
dnu	Do not use

* Only at version with speed switch

** Depending on version

5.2.2 Output signals incremental (additional output)

At positive rotating direction

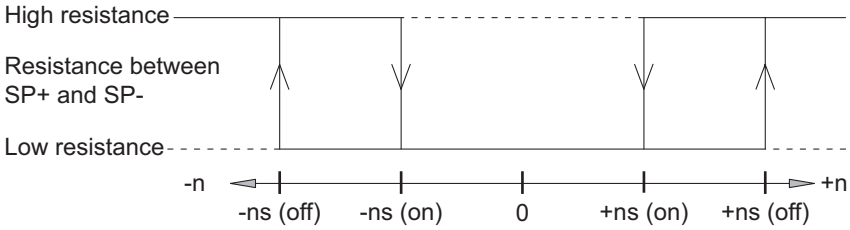


5.2.3 LED function displays

LED	red	green
INC1	Without function	Without function
INC2 (additional output incremental)	Undervoltage Overload Over-temperature	OK
Status	Internal error	OK
Speed	Speed higher switching speed (overspeed)	Speed lower switching speed

5.2.4 Speed switch - Switching characteristics

Event	State of the speed switch output
During initialisation	High resistance (overspeed)
After initialisation and speed ≤ -ns (off)	High resistance (overspeed)
-ns (off) < speed ≤ -ns (on)	State unchanged Low resistance (no overspeed) after initialisation if the encoder is rotating between the switching range during initialisation.
-ns (on) < speed < +ns (on)	Low resistance (no overspeed)
+ns (on) ≤ speed < +ns (off)	State unchanged Low resistance (no overspeed) after initialisation if the encoder is rotating between the switching range during initialisation.
+ns (off) ≤ speed	High resistance (overspeed)



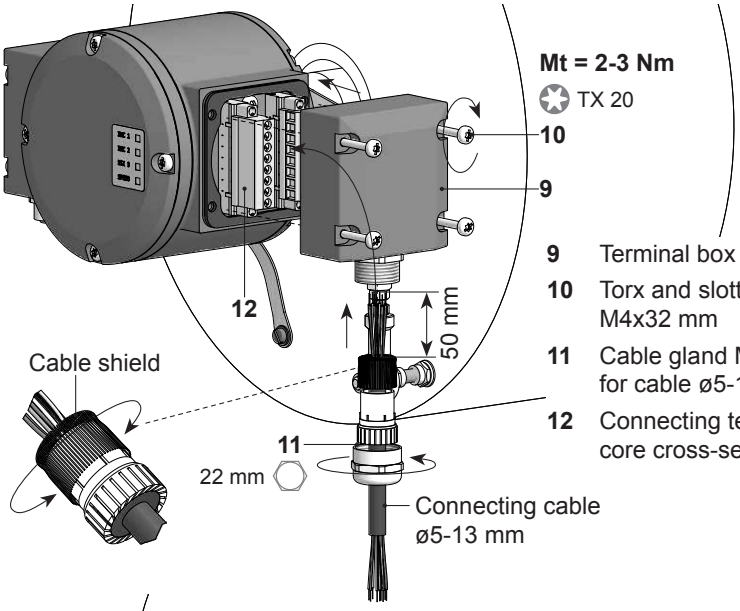
n = Speed
+ns (on) = Activation speed at shaft rotation in positive rotating direction*
+ns (off) = Deactivation speed at shaft rotation in positive rotating direction*
-ns (on) = Activation speed at shaft rotation in negative rotating direction*
-ns (off) = Deactivation at shaft rotation in negative rotating direction*

* See *section 6, page 17*

5.2.5 Cable connection

☞ To ensure the specified protection of the device the correct cable diameter must be used.

Connecting cables are not in scope of delivery.

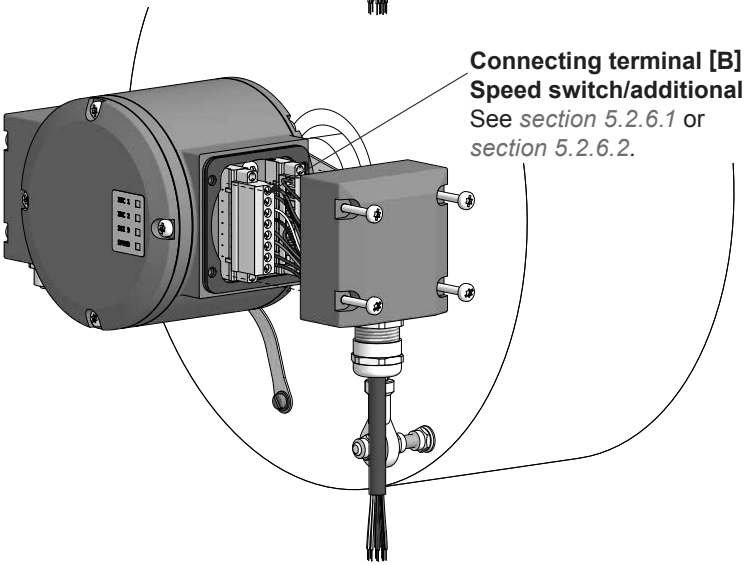


9 Terminal box cover

10 Torx and slotted screw, M4x32 mm

11 Cable gland M20x1.5 mm for cable ø5-13 mm

12 Connecting terminal, core cross-section ≤1.5 mm²

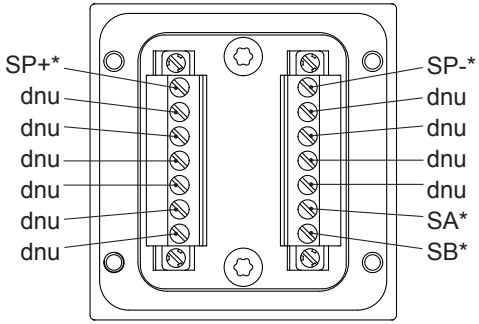


Connecting terminal [B] Speed switch/additional output. See *section 5.2.6.1* or *section 5.2.6.2*.

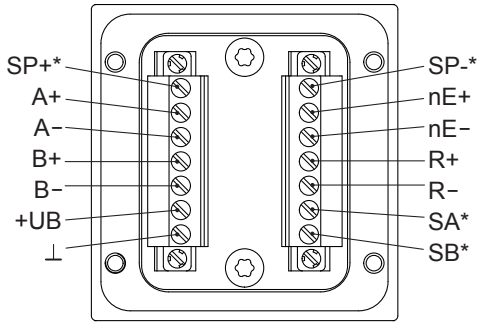
5.2.6 Assignment connecting terminal

☞ Do not connect voltage supply to outputs! Danger of damage!
Please, beware of possible voltage drop in long cable leads (inputs and outputs)!

5.2.6.1 Connecting terminal terminal box [B] Speed switch without additonal output

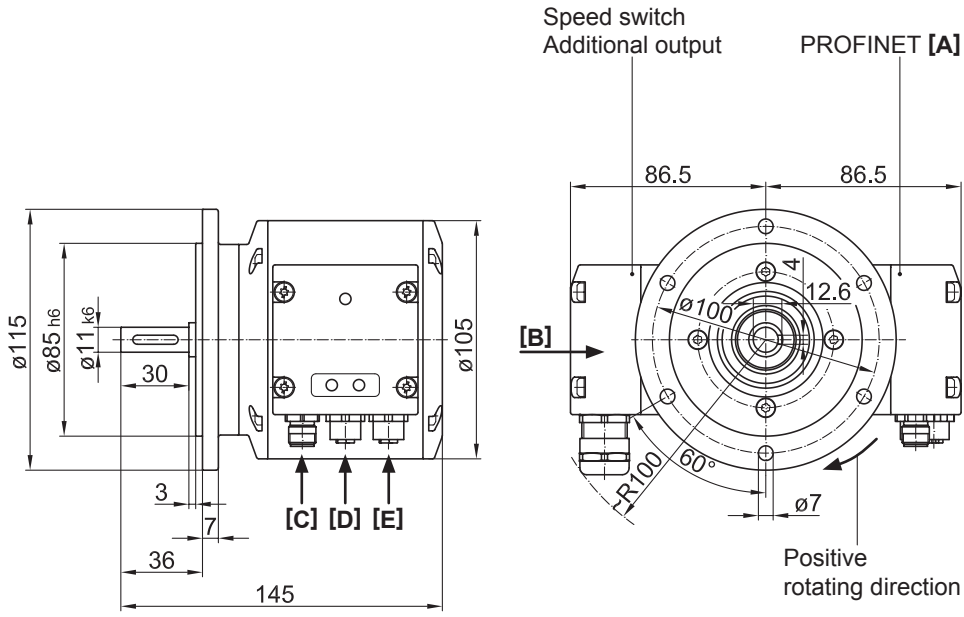


5.2.6.2 Connecting terminal terminal box [B] Speed switch with additonal output



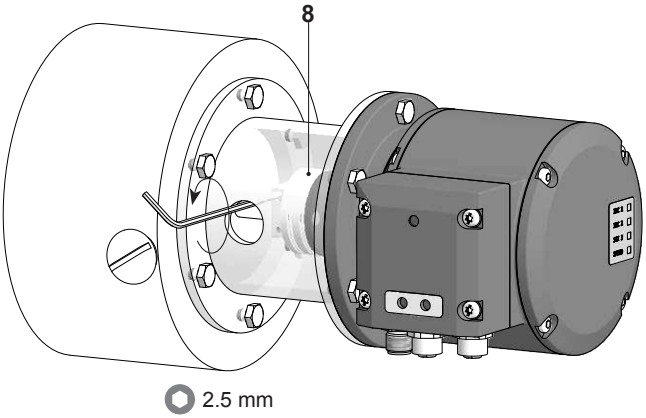
* Only at version with speed switch

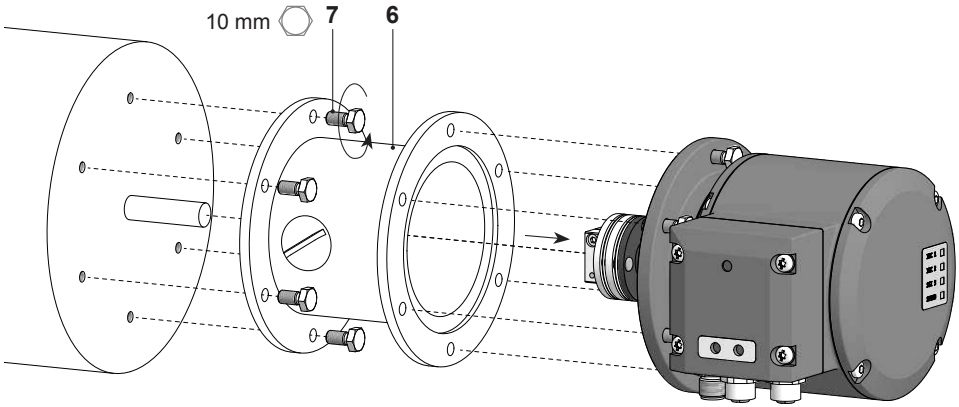
6. DIMENSION

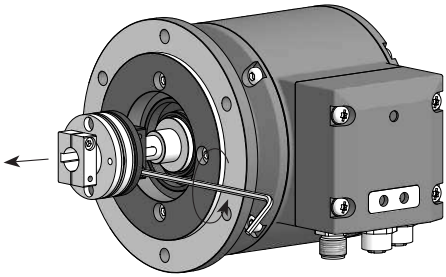


All dimensions in millimeters, unless otherwise stated.

7. DISMOUNTING







8. TECHNICAL DATA

8.1 Technical data - electrical ratings

Voltage supply	10...30 VDC
Short-circuit proof	Yes
Consumption w/o load	≤200 mA
Initializing time	≤500 ms after power on
Interface	PROFINET
Function	Multiturn
Transmission rate	100 MBaud
Device adress	Automatic address designation
Steps per turn	8192 / 13 bit
Number of turns	65536 / 16 bit
Additional outputs	Square-wave HTL Square-wave TTL (RS422)
Sensing method	Magnetic
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-3
Programmable parameters	Steps per revolution Number of revolutions Preset, scaling, rotating direction
Diagnostic function	Position or parameter error
Status indicator	DUO-LED und LEDs link/activity in bus connecting box 4 LEDs in device back side
Approvals	CE

8.2 Technical data - electrical ratings (speed switches)

Interface	RS485
Switching accuracy	±2 % (or Digit)
Switching outputs	1 output (Open-Collector* or Solid State Relay*)
Output switching capacity	30 VDC; ≤100 mA
Switching delay time	≤20 ms

* Depending on version

8.3 Technical data - mechanical design

Size (flange)	ø115 mm
Shaft type	ø11 mm solid shaft
Flange	EURO flange B10
Protection DIN EN 60529	IP 66/IP 67
Operating speed	≤6000 rpm
Range of switching speed	±2...6000 rpm, default 6000 rpm
Operating torque typ.	10 Ncm
Rotor moment of inertia	1 kgcm^2
Admitted shaft load	≤450 N axial ≤650 N radial
Materials	Housing: aluminium alloy Shaft: stainless steel
Operating temperature	-40...+85 °C
Relative humidity	95 % non-condensing
Resistance	IEC 60068-2-6 Vibration 30 g, 10-2000 Hz IEC 60068-2-27 Shock 400 g, 1 ms
Corrosion protection	IEC 60068-2-52 Salt mist Complies to ISO 12944-5:1998 Protective paint systems (C5-M)
Weight approx.	2.7 kg (depending on version)
Connection	Bus connecting box Terminal box speed switch/incremental

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