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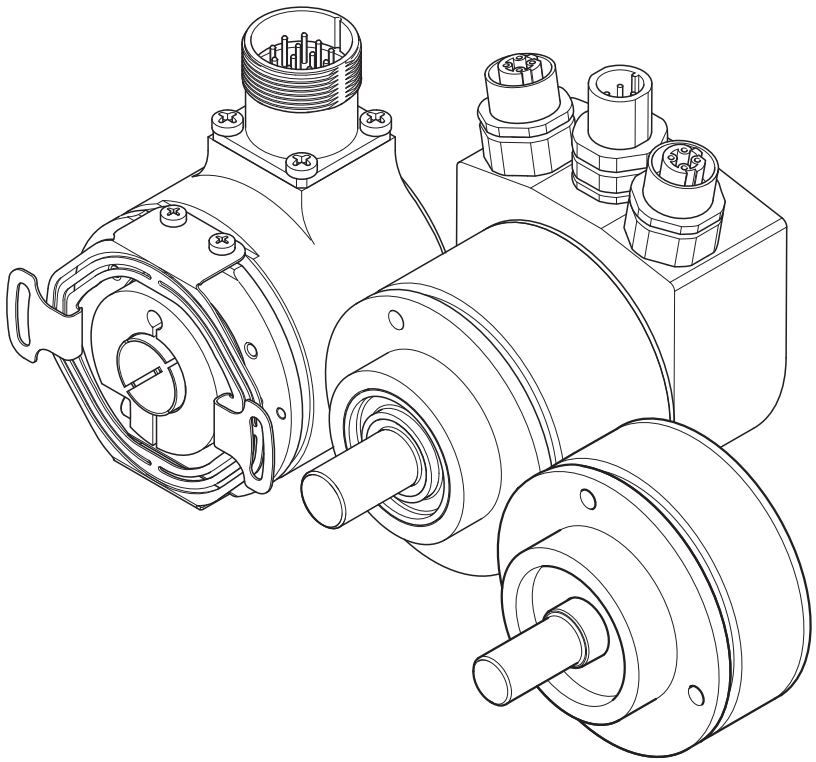
Mounting Instructions



D-02M-Abs2x (1.2)

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Doc. no. D-02M-Abs2x (1.2)

Table of contents

1 About this manual

The absolute rotary encoders dealt with comprise the following devices:

Name	Global features/pptions						
	Type[1]	SSI	Analog U	Analog I	Resolver	Fieldbus[2]	Ex protection
GEL 235	S, M1	X		X		C, E, P	X
GEL 2351	S		X	X			
GEL 2352	S, M1	X				C	
GEL 2035	S, M2	X			X		
GEL 2037	M1	X			X		

1.1 General information

These Mounting Instructions are part of the product and describe how to use it safely.

- ▶ Please read the Mounting Instructions carefully before you begin installation.
- ▶ Keep the Mounting Instructions in a safe place for the entire service life of the product.
- ▶ Make sure that the Mounting Instructions are available to personnel at all times.
- ▶ Pass the Mounting Instructions on to each following owner or user of the product.
- ▶ Insert all additions received from the manufacturer.
- ▶ Failure to follow these Mounting Instructions may result in damage to the product, which may result in its failure to operate as intended.

1.2 Validity

These Mounting Instructions apply to the standard design of the product. This includes all types that are n o t marked with a **Y** behind the product number in the type code.

A product marked with Y is a customised design with a special assembly and/or modified technical specifications. Depending on the customised modification, additional or other documents may be valid.

1.3 Other applicable documents

Depending on the device type, other documents may be applicable:

- Fieldbus reference CANopen
- Fildbus reference PROFIBUS-DP
- Fieldbus reference EtherCAT

(1) S = single turn, M1 = mechanic multiturn (gear box), M2 = electronic multiturn (with buffer battery)
(2) C = CANopen, E = EtherCAT, P = PROFIBUS-DP

- Operating instructions for GEL 235 Ex design

1.4 Target group

These Mounting Instructions are intended for operators, manufacturers, electrical engineers, and licensed electricians under the supervision of an electrical engineer.

1.5 Abbreviations and explanations of terms

DC	Direct current
ESD	Electrostatic discharge, or Electrostatic sensitive device
EMC	Electromagnetic compatibility
Encoder	Short form of the term “absolute rotary encoder”
SW 17	(“Schlüsselweite”) A/F 17 mm (≈ 2/3 inch)
M4	Metric general purpose thread with 4 mm diameter

1.6 Symbols, signal words, notes

The following symbols, signal words, and notes are used in these operating instructions so that you can recognize particular information faster:

⚠WARNING **Note about a possible danger**
Failure to follow can cause death or severe injuries.

⚠CAUTION **Note about a dangerous situation**
Failure to follow can cause slight injuries.

NOTICE Notes about avoiding property damage

ⓘ Important information for the understanding and optimization of workflows

► Work step to be performed

→ page 6 Page reference to another part of these operating instructions

2 Safety instructions

2.1 Designated use

The absolute rotary encoders are intended exclusively for measurement tasks in the industrial and commercial realm. It is to be installed in a system and requires the connection to special evaluation electronics, which, for example, are contained in a positioning controller or an electronic counter.

In the standard design, the GEL 235 absolute rotary encoder is **not** intended for use in areas subject to explosion. For this, a special design is available. All other types must not be used in areas subject to explosion.

Any other use is not a designated use.

2.2 Notes for operators and manufacturers

Personnel training

- ▶ Make sure that the following requirements are met:
  - – Installation, operation, maintenance and removal tasks are only performed by trained electricians under the supervision of an electrical engineer.
  - – Personnel has received training in electromagnetic compatibility and in handling electrostatic-sensitive devices.
- ▶ Provide personnel with all applicable accident prevention and safety regulations.
- ▶ Ensure that personnel is familiar with all applicable accident prevention and safety regulations.

2.3 Modifications and conversions

Unauthorized modifications or conversions may damage the product.

NOTICE Do not make any modifications or conversions to the product, with the exception of activities described in these operating instructions.

2.4 Rotating parts

⚠CAUTION **Danger of injury due to rotating shafts**
Hair and clothing can get caught in rotating shafts. Before performing all work on the encoder, switch off the operating voltage to the drive shaft and secure it against switching on again!

2.5 Notes about avoiding property damage and malfunctions

The encoders are designed to be extremely robust. Nevertheless, they can be damaged due to impermissible mechanical loads. Mechanical damage can quickly cause the failure of the measurement system.

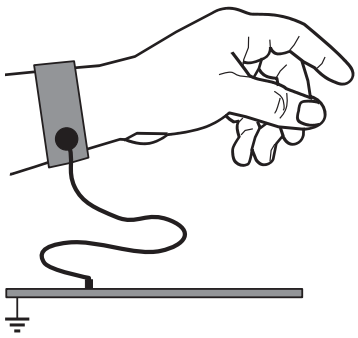
2.5.1 Handling of the encoders

- ▶ Do not hit or step on the housing or the shaft.
- ▶ Do not open the encoder and do not take it apart.
- ▶ Do not drill or grind the shaft or the housing.
- ▶ Only mount the encoder as described in these Mounting Instructions.
- ▶ Keep the load on the shaft as small as possible in order not to unnecessarily shorten the life of the bearing.
- ▶ Seal unused connector sockets by a cap or dummy/bus termination connector to keep the specified protection class.

2.5.2 Electrostatic discharge

Electrostatic discharge can destroy the electronic components.

NOTICE Only touch the plug pins and connection wires with suitable body grounding, for example, using an ESD armband:



2.5.3 Cable routing

The connection cable can be damaged if it is bent too much.

2.5.4 Mechanical overload of the bearings

NOTICE

Due to a fixed mounting of the encoder on the fixture, forces are exerted on the bearings. These cause permanent overloading of the bearings and thus shorten the life span of the encoder.

- ► For the connection of the full shaft to the drive shaft, use a flexible coupling in order to avoid an overloading of the bearings.
- ► Make sure that the maximum shaft loads are adhered to according to the specifications

2.5.5 Saving battery power (GEL 2035 multiturn only)

The encoder can be put in a “sleep mode” to lengthen battery’s life (delivery condition). This is applicable for the following situations:

- Longer lasting abandonment of the plant
- Storing the encoder as spare part
- Dismounting and subsequently storing an encoder
- Returning a defective encoder to the factory

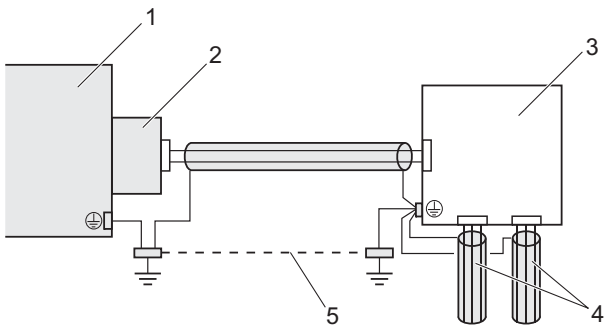
For activation of the sleep mode the Preset function is used as described in section 5.3.1 (→ page 24), but with the encoder **not being energized**. The PRESET signal voltage may vary between 3 VDC and 30 VDC.

When (re)energizing the encoder it supplies the adjusted PRESET value independent of the position of the (resting) encoder shaft. Therefore, an electronic adjustment of the encoder would be necessary to resume operation. For this reason, the sleep mode only makes sense in those situations mentioned above.

2.6 EMC notes

To improve the electromagnetic environment, please heed the following installation notes:

- ▶ Use only plugs with a metal housing or a housing of metallized plastic as well as screened cables.
- ▶ Connect the screen, if provided in the screening concept, to the connector housing.
- ▶ Apply the screens across a large area.
- ▶ Keep all unscreened cables as short as possible.
- ▶ Design the ground connections with a large cross-section (e.g. as induction-poor ground strap or flat-band conductor) and keep them short.
- ▶ If there are potential differences between machine and electronics ground connections, make sure that no equalizing currents can flow through the cable screen. To do this, connect a potential equalization line with a large cross-section or use cables with separated 2-way screening.
  For cables with separated 2-way screening, connect the screens only on one side.



1 Machine
2 Absolute rotary encoder
3 Evaluation electronics
4 Control lines
5 Potential equalization line (only for extreme disturbance levels or long cables)

- The sensor is part of a machine or system. Incorporate the potential equalization for the sensor into the overall screening concept.
- Lay signal and control lines spatially separated from the power cables. If this is not possible, then use pair-stranded and screened cables and/or lay the encoder cable in a steel conduit.
- Make sure that external protective measures against surges are taken (EN 61000-4-5).

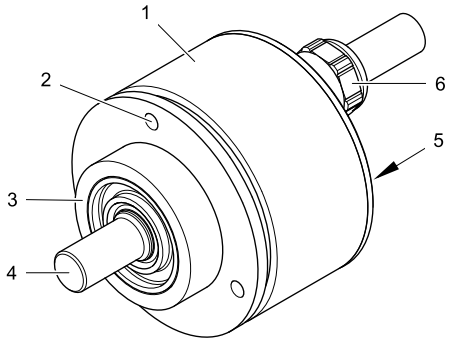
3 Description

3.1 Task

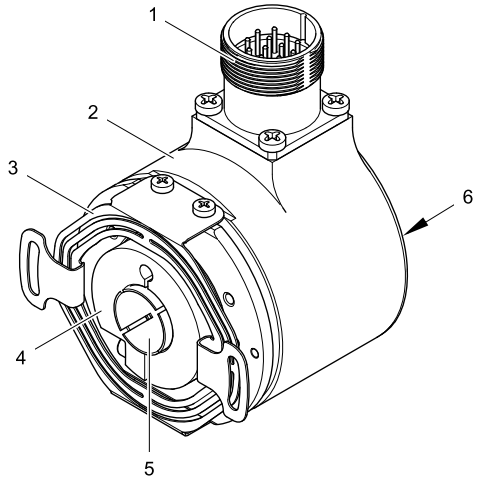
The absolute rotary encoder measures the angle of a machine axis via one or several turns and delivers a corresponding digital output signal.

3.2 Construction

Exemplary illustration for GEL 235 with axial cable outlet (on the left) and radial connector outlet (on the right):



1 Encoder housing
2 Mounting screw holes
3 Clamping flange, alternative: synchro flange
4 Full shaft
5 PRESET button (opening on the back side, optional)
6 Axial cable gland, alternative: radial orientation or fieldbus/analog interface cover



1 Plug connection, alternative: axial orientation or fieldbus/analog interface cover
2 Encoder housing
3 Torque support
4 Clamping ring
5 Semi hollow shaft
6 PRESET button (opening on the back side, optional)

3.3 Function

The sensing principle of the GEL 235 and GEL 235x is based on a touchless magnetic scanning of a ferromagnetic steel disk (contour disk): Magneto-resistive sensors scan three slightly-offset tracks and deliver corresponding sinusoidal signals. The phase position of the three sinusoidal signals is unique within a revolution.

Based on the vernier principle, the integrated electronics evaluate the phase position and form the absolute position in the range of the existing resolution of the encoder from this.

With the GEL 203x encoders, evaluation of the position of a diametral magnet mounted on the shaft results in the corresponding absolute position.

Multiturn encoders use either a mechanic or an electronic gear (cf. table → page 5).

With the SSI variant, the position value is output serially in binary or grey code. Furthermore, this encoder delivers 64 sin/cos differential signals per revolution for an external interpolation.

With the analog variant, the absolute position is output either as 0–10 V voltage or 4–20 mA current values.

With the fieldbus variants (CANopen, PROFIBUS-DP), the data format and additional functions are discussed in a separate document (Reference manual).

A separate electronic circuit is required for the supply of the encoder, the evaluation of the measured value, and to build up the control loop.

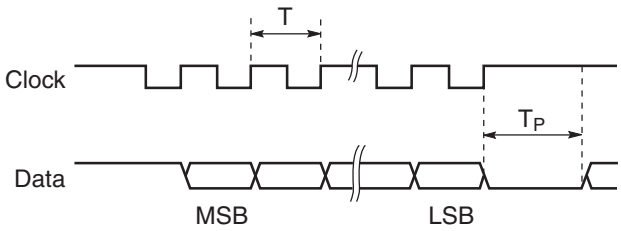
3.4 SSI data output

The maximum clock frequency of 2 MHz applies only for very short transmission cables. For longer cables, there arise the following limitations:

Cable length up to	Max. clock frequency		Cable length up to	Max. clock frequency
50 m	400 kHz		200 m	200 kHz
100 m	300 kHz		400 m	100 kHz

The data and clock lines must be twisted and screened in pairs.

There must be a clock pulse space of at least 16 µs maintained between two position queries.



T Period duration of the clock signal (= 1/clock rate)

T_p Clock pulse space

3.5 Adjustment possibilities

- Preset function: Adaptation of encoder measurement value can to the system-specific requirements (→ page 24)
- Sense of rotation: Electrically inversion (→ page 25)
- Teach-in function: Limitation of the encoder's measurement range for achieving a higher resolution (→ page 24)

4 Mounting

The following steps are required for the mounting of the encoder:

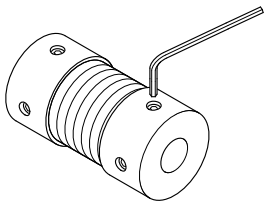
1. Check fixture
2. Mount encoder
3. Mount fieldbus cable with corresponding encoder type
4. Lay cable

4.1 Check fixture

For all required measurement details, see the dimensional drawings in section 9.2 (→ page 29ff).

▶ Check whether all necessary holes have been made in the fixture.

▶ If an encoder with full shaft is used, check whether an appropriate flexible coupling is mounted on the drive shaft, e.g.:



4.2 Mount encoder

Tools and aids (not in scope of delivery):

- Mounting screws M4 with washers, possibly eccentric disks (see also section Mounting accessories → page 34), the length of the screws depends on the wall thickness of the encoder fixture (depth of the drilling holes in the encoders is 7 mm)
- Sealant for mounting screws if clearance holes are used (recommended: Loctite 542)

⚠CAUTION

Danger of injury due to rotating shafts
Hair and clothing can get caught in the rotating shafts.
Before all work on the encoder, switch off the operating voltage to the drive shaft and secure it against switching on again!

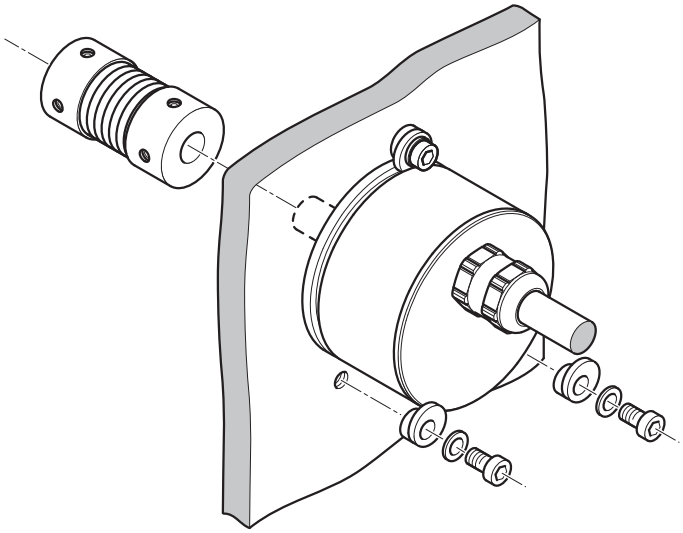
NOTICE

- Only touch the connector pins and wires with suitable body grounding, e.g. via an ESD armband in order to prevent damage to the electronic components due to electrostatic discharge.
- To connect the drive and full shaft encoder axis, use only a flexible coupling as depicted in the pictures below.

Since the encoders can be used many different ways, the way it is attached is also variable. Therefore, no step-by-step instructions for installation will be provided here, but rather only a graphic overview of some usual mounting possibilities (mainly for GEL 235). For the other encoders, similar procedures are applicable.

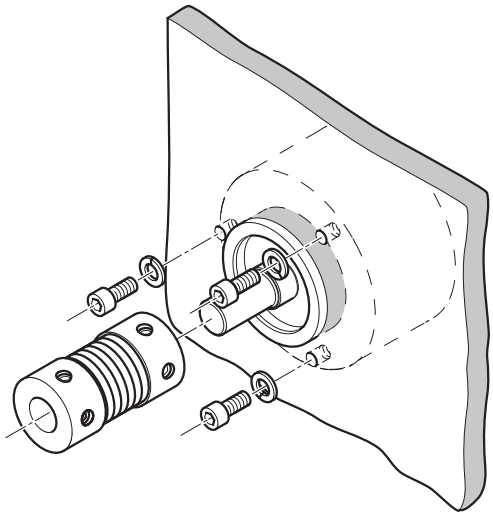
4.2.1 Synchro flange

- Mounting on a system-side housing wall using clamping pieces

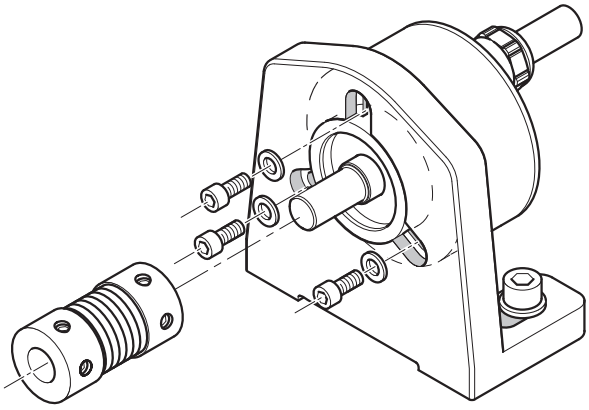


4.2.2 Clamping flange

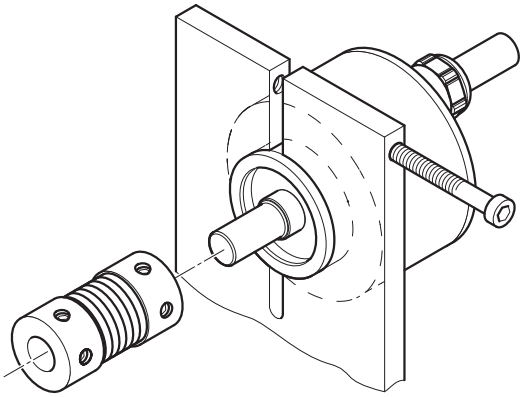
- Mounting on a system-side housing wall



- Attachment on a mounting bracket (accessory part from LENORD+BAUER)



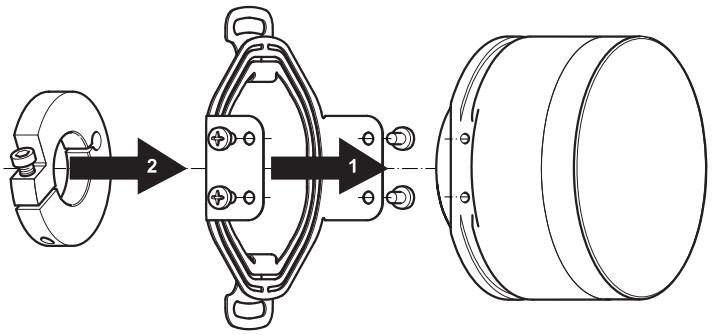
- Mounting using a clamping device



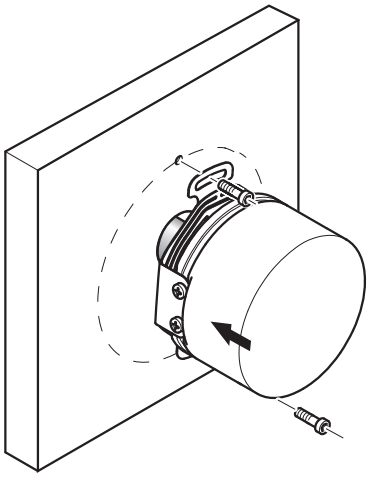
4.2.3 Semi hollow shaft

If not factory-adjusted:

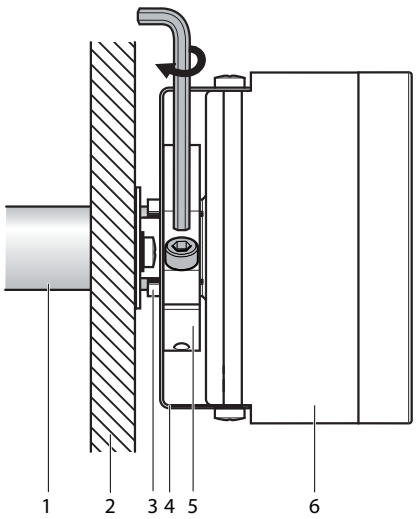
- ▶ Attach the torque supply to the encoder using four cross-head screws (1); tightness: 1 Nm.
- ▶ Push the clamping ring loosely onto the semi hollow shaft (2).



- ▶ Push the encoder onto the drive shaft and screw the torque support onto the fixture:



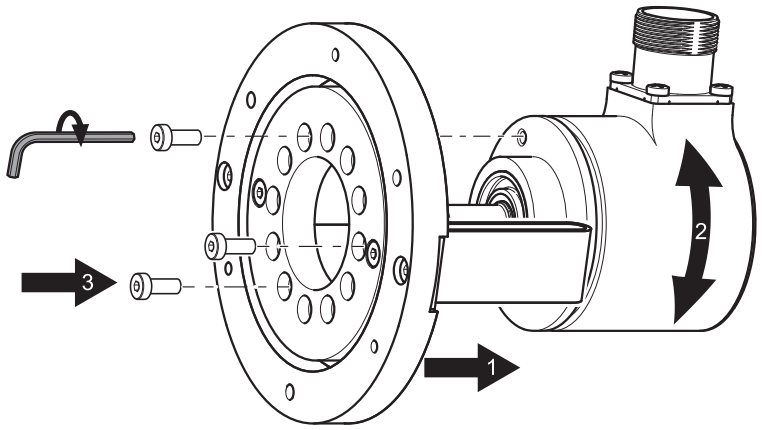
- ▶ Jam the clamping ring with the M3 Allen screw; tightness: 1 Nm.



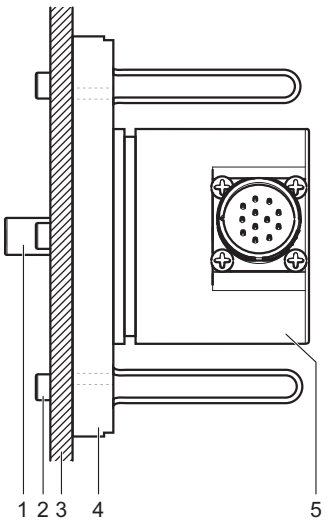
1 Drive shaft
2 Fixture
3 Semi hollow shaft
4 Torque support
5 Clamping ring
6 Encoder

4.2.4 Flex flange (GEL 2037)

- ▶ Push the Flex flange onto the clamping flange of the encoder (1).
- ▶ Turn the encoder slightly until its three M4 threaded holes fit the corresponding bore holes in the Flex flange (2).
- ▶ Join both parts by means of three cylinder head screws (3); tightness: 2.5 Nm.



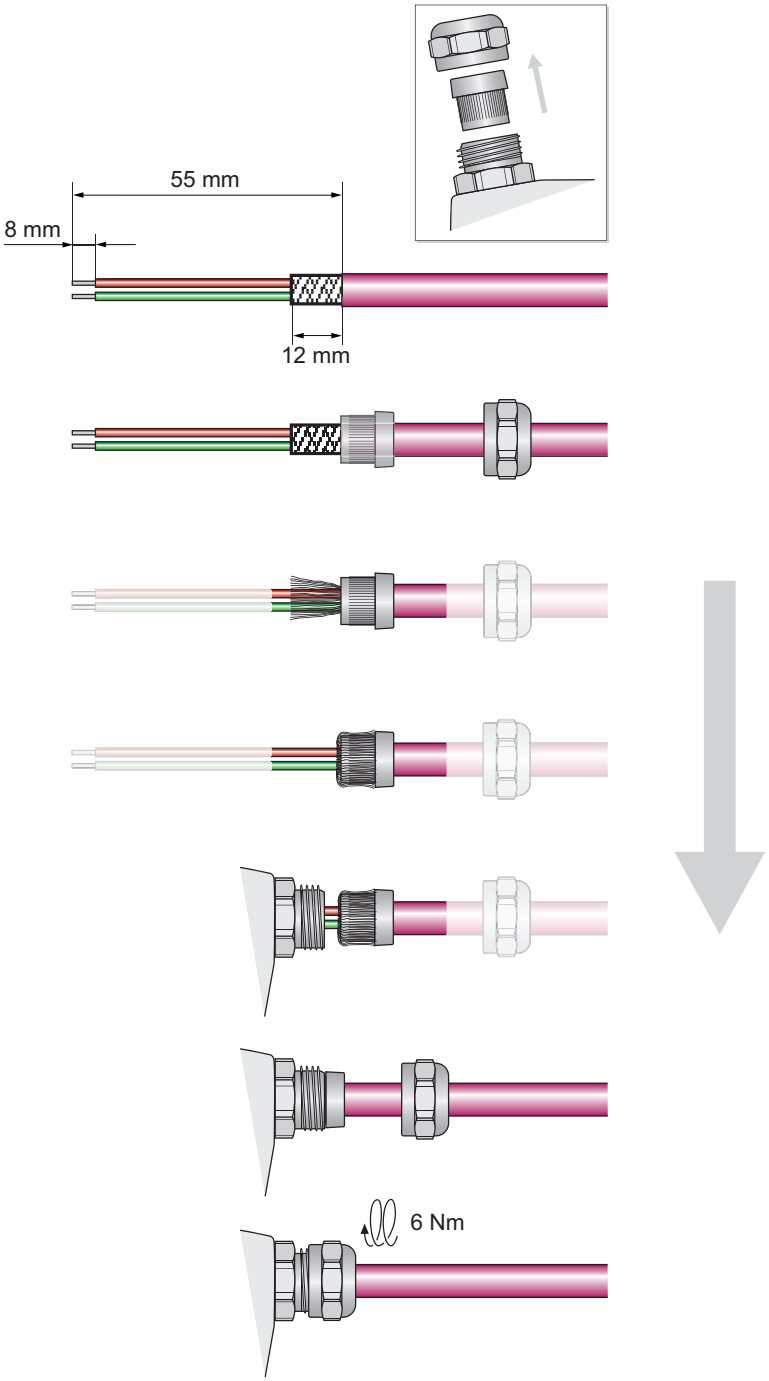
- ▶ Mount the unit to the designated fixture (customer-specific).



1 Encoder shaft
2 Fixing screws
3 Customer-specific fixture
4 Flex flange
5 Encoder

4.3 Cable mounting with GEL 235 interface cover

- ▶ Disconnect the interface cover and encoder: Remove 2 screws on the back side of the interface cover.
- ▶ Prepare the cable gland, bus cable, and supply cable (only PROFIBUS) as follows and mount:



- ▶ After performing the connection work, connect the interface cover and encoder: Tighten 2 screws on the back side of the interface cover.
- ▶ Check the housing seal to ensure that it is seated correctly.
- ▶ Seal bushings that are not needed with a blind cover.

4.4 Lay cable

- ▶ Lay the cable paying attention to the EMC notes (→ page 9).
- ▶ Seal unused connector sockets by a cap or dummy/bus termination connector to keep the specified protection class.

5 Commissioning

▶ Check whether all cables are laid and the encoder is mounted firmly.

5.1 Connection

ⓘ Connection of the fieldbus variants: → separate Reference document.

▶ Check whether the connector plug is wired correctly, according to the connection schemes further below.

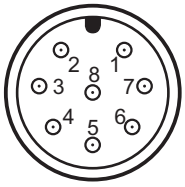
ⓘ Connect inputs that are not used/assigned to GND.

▶ Connect the encoder.

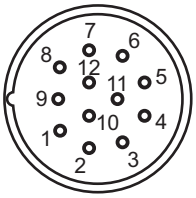
▶ Supply the encoder with voltage.

5.1.1 SSI

8-pole connector M12 (GEL 2352)

Pin	Signal	Explanation
1	GND	Ground
2	PRESET	Set actual value to centre of measurement range
3	DATA-	Output: Differential data signal according to RS 485
4	DATA+	
5	CLOCK-	Input: Differential clock signal according to RS 485
6	CLOCK+	
7	V_S	Supply voltage
8	CW/CCW	Direction of rotation (flange side view): ascending clockwise (CW) = GND (default), ascending counter-clockwise (CCW) = V_S
		Connector socket (pins, connection side view)

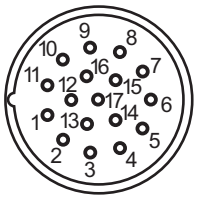
12-pole connector M23 (GEL 235, GEL 203x)

Pin	Cable	Signal	Explanation
1	blue	GND	Ground
2	brown	DATA+	Output: Differential data signal according to RS 485
3	grey-pink	CLOCK+	Input: Differential data signal according to RS 485
4	yellow	SIN–	Differential track signals (output) (1)
5	green	SIN+	
6	violet	COS–	
7	black	COS+	
8	rot	U_B	Supply voltage
9	pink	PRESET	Set actual value to centre of measurement range
10	white	DATA–	Output: Differential data signal according to RS 485
11	red-blue	CLOCK–	Input: Differential data signal according to RS 485
12	grey	CW/CCW	Direction of rotation inversion(1) Direction of rotation (flange side view) ● GND (default): ascending clockwise (CW) ● V_S: ascending counter-clockwise (CCW)
			Connector socket (pins, connection side view)

(1) only GEL 235; not connected with GEL 203x

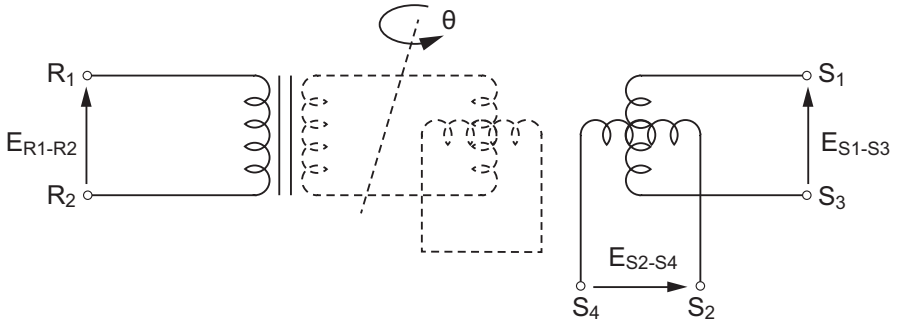
17-pole connector with resolver M23 (GEL 203x)

SSI signals	Pin	Resolver signals	Explanation
	1	R1	*see schematic further below*
	2	R2	
	3	S4	
	4	S3	
	5		not connected
	6		
	7		
CLOCK–	8		Input: Differential data signal according to RS 485
DATA–	9		Output: Differential data signal according to RS 485
GND	10		Ground
V_S	11		Supply voltage
PRESET	12		Set actual value to centre of measurement range
	13	S2	*siehe Bild weiter unten*
	14	S1	
CLOCK+	15		Input: Differential data signal according to RS 485
DATA+	16		Output: Differential data signal according to RS 485
	17		not connected



Connector socket (pins, connection side view)

Resolver circuit:

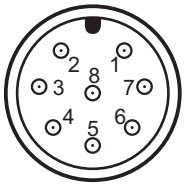


$E_{R1-R2} = E \cdot \sin(\omega \cdot t)$ ⟶ $E_{S1-S3} = K \cdot E_{R1-R2} \cdot \cos\theta$

$E_{S2-S4} = K \cdot E_{R1-R2} \cdot \sin\theta$

5.1.2 Analog

8-pole connector M12 (GEL 235, GEL 2351)

Pin	Signal	Explanation
1	GND	Ground
2	PRESET (1)	Istwert auf Messbereichsmitte setzen
3	T_Low (2)	Teach-in: low limit of measuring range
4	T_High (2)	Teach-in: high limit of measuring range
5	AOUT	Analog output 4–20 mA/0–10 V
6	AGND	Analog ground
7	V_S	Supply voltage
8	CW/CCW (3)	Direction of rotation inversion Direction of rotation (flange side view) ● GND (default): ascending clockwise (CW) ● V_S: ascending counter-clockwise (CCW)
		Connector socket (pins, connection side view)

5.2 Function check

ℹ The fieldbus variants can be checked on the respective bus with the help of the master.

For a function check outside of system operation, the evaluation electronics used must support the display of the position values. Otherwise, a separate counter with SSI input – for the analog variant with voltage or current measurement input –, appropriate voltage supply, and clock signal output (SSI) is required.

▶ Make sure that

- the encoder is connected correctly to the operational evaluation electronics or a separate counter
- the supply voltage is present
- the SSI clock signal is present if using a SSI encoder.

▶ Turn the drive shaft slowly and observe the display of the position value on the display of the evaluation electronics or the counter.
For correct function, a constantly increasing or decreasing value must be observed.

(1) only GEL 2351 without Teach-in function; not connected with Teach-in function and GEL 235
(2) GEL 2351: with Teach-in function (otherwise not connected)
(3) only GEL 2351; not connected with GEL 235

5.3 Measured value adaptation

Prerequisite for the adjustments described in the following:

- The encoder is supplied with voltage.
- The machine axis with coupled encoder can be turned manually (mechanically or electrically).

5.3.1 PRESET (SSI, analog)

By means of the PRESET function the actual position is set to the centre of the measuring range and saved permanently until a new PRESET procedure is triggered.

With single turn encoders, that means the half of definition range (SSI, analog). With multiturn encoders (SSI), the actual position is set to the half number of revolutions with single turn part = 0.

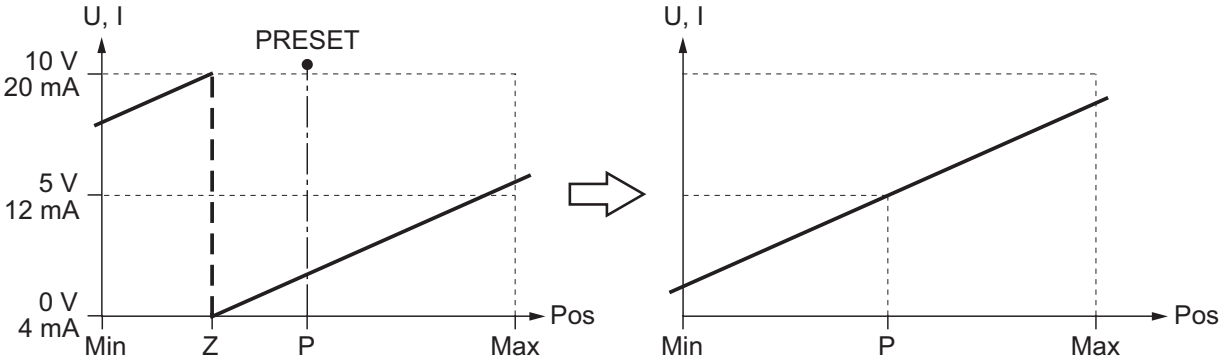
▶ Turn the machine axis to the desired PRESET position.

▶ Apply supply voltage $+V_S$ to the PRESET input of the connector for at least 0.1 s.

For encoders with optional PRESET button:

▶ Depress the button through the opening in the back side with a dull point (e.g. a match).

Example for an analog encoder:



Pos	Position of the machine axis
Min, Max	Working range of the machine (arbitrary determination)
P	PRESET position
Z	Zero position of the encoder (360° → 0° transition)

GEL 2035 multiturn: This procedure is also used for putting an encoder in the sleep mode to save battery power. The encoder must be disconnected from the power supply to do so; signal voltage from 3 to 30 VDC (see also section 2.5.5).

5.3.2 Teach-in (analog)

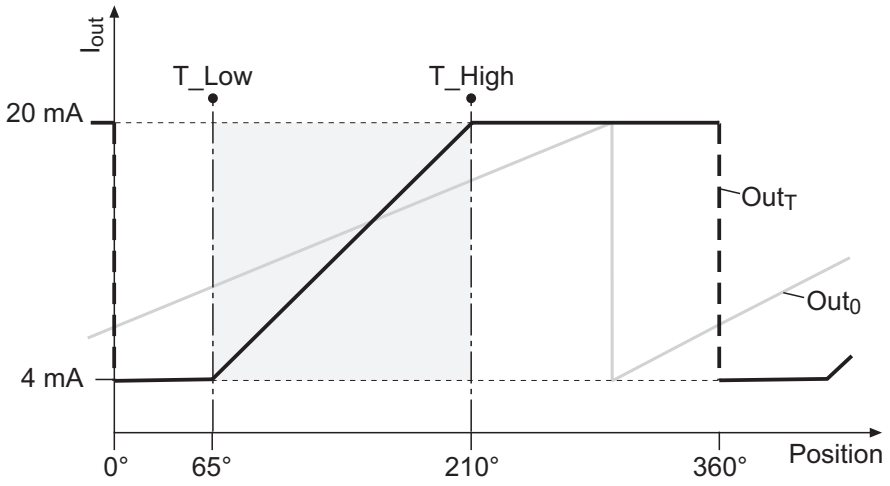
▶ Turn machine axis into the position for the lower working range limit.

▶ Apply $+V_S$ to T_Low input for at least 0.1 s.

▶ Turn machine axis into the position for the upper working range limit.

▶ Apply $+V_S$ to T_High input for at least 0.1 s.

Principle (example for current output):



Out_0, Out_T	Output signal graph before (index 0) or after (index T) the adaptation via the teach-in signals; the desired working range is shaded in grey, the degree specification on the x-axis is selected arbitrarily
I_{out}	Output signal 4–20 mA
T_Low, T_High	Positions in which the teach-in signal with the same name is set

The output signal graph is now compressed between the two teach-in points along the position axis. This setting is saved permanently until a new teach-in procedure is triggered.

5.3.3 Counting direction (SSI, analog)

If, when looking at the encoder axis and turning the axis clockwise the position value should count **up**,

▶ connect the CW/CCW input to **GND**, otherwise to supply voltage V_S.

6 Disassembly and disposal

6.1 Disassembly of the encoder

NOTICE If a still-intact device should be removed, for example for a retrofitting, only touch the plug pins and connection wires with suitable body grounding, for example using an ESD armband in order to prevent damage to the electronic components due to electrostatic discharge.

- ▶ Unplug the connection of the encoder.
- ▶ Make the connection cable accessible.
- ▶ Loosen the coupling connection.
- ▶ Loosen and remove the mounting screws of the encoder.
- ▶ Remove the encoder from the drive shaft.

GEL 2035 multiturn only:

- ▶ If applicable, put the encoder in the sleep mode to save battery power (see section 2.5.5).

6.2 Disposal

- ▶ Dispose of a faulty encoder according to the regional regulations for electric and electronic devices.

7 Maintenance

The encoder contains no parts that require maintenance.

Do **not** try to repair the encoder yourself. Necessary repairs may only be made by LENORD+BAUER or an explicitly-authorized agent.

⚠WARNING No change may be made to devices that are operated in areas **subject to explosion**. Service work may only be performed by specially-trained and authorized personnel.

When?	What?
Encoder faulty	▶ Change the encoder.
Regularly	▶ Check the encoder for damage. Ex design: Damage to the device that can compromise the explosion protection is not permitted – the device must be taken out of service and it must be ensured that it can no longer be operated. ▶ Check all seals for possible damage and to ensure their tight fit. ▶ Check all screws, couplings, and clamping elements as well as cable entries to ensure a tight fit. ▶ Ex design: Check that the guidelines according to EN 60079-19, EN 60079-17, and EN 61241-17 are adhered to.(1) ▶ Clean the encoder (see further below).
If necessary (not Ex)	▶ Change the plug (not component of the scope of supply). Consider that when so doing, you must shorten the length of the connection cable.

Cleaning the encoder

NOTICE

To avoid damage to the encoder, please heed the following points:

– Do not use a high-pressure cleaner.

– If the plug connector has been unplugged, do not allow water, dirt or other substances to penetrate its open parts.

▶ Clean the encoder with water or a non-corrosive cleanser.

(1) According to these guidelines, the company operating electrical systems in areas subject to explosion is obligated to have these checked by an electrician to ensure their proper condition.

8 Malfunctions

Additional malfunctions in the fieldbus variants are listed in the separate Reference manual of the respective type.

Malfunction	Possible causes	Remedy
No or low output signal	Electrical connection defective	▶ Check all electrical connections between the encoder and the power supply as well as the evaluation electronics to ensure that they are correct, contact is secure, and they are dry.
Measurement range outside of the required positioning range	Measurement range not set correctly (preset function) or shifted due to slip in the shaft connection	▶ Check the shaft coupling for correct clamping and if necessary, reset the measurement range (→ page 24).

9 Technical data

9.1 Specifications

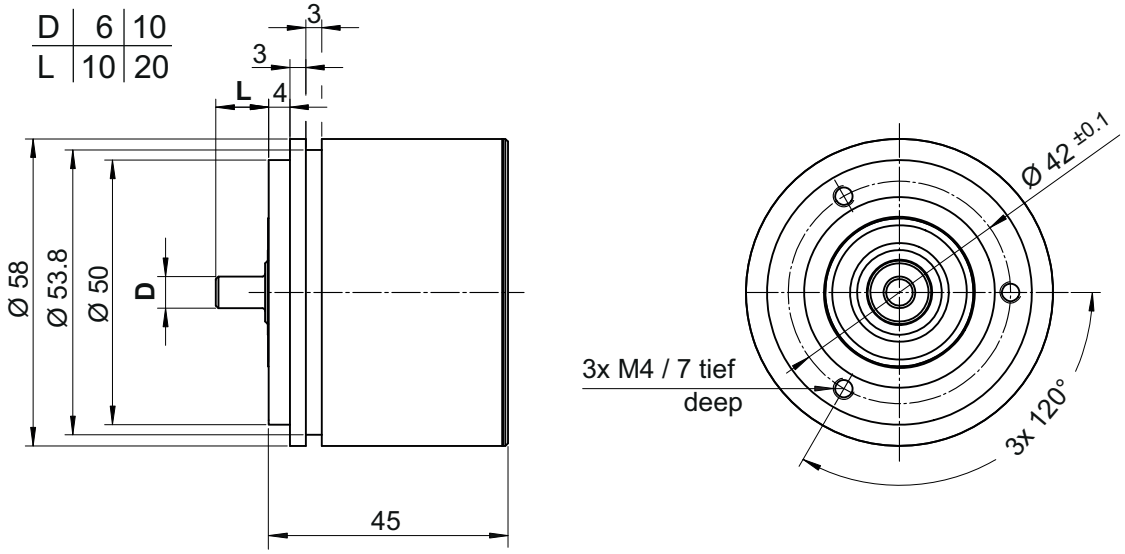
The specifications for the particular encoder can be found in the Product Information supplied with the encoder and in the Technical Information data sheet that can be downloaded from the LENORD+BAUER website (→ www.lenord.de).

NOTICE For the GEL 235 Ex design, different or complementary details apply in some cases (→ separate document).

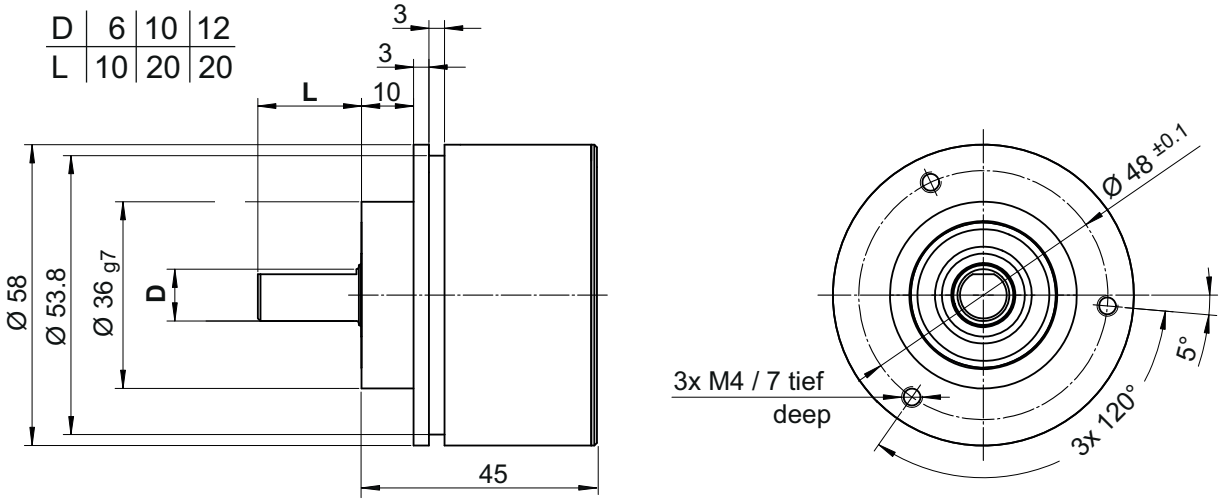
9.2 Dimensional drawings

9.2.1 GEL 235

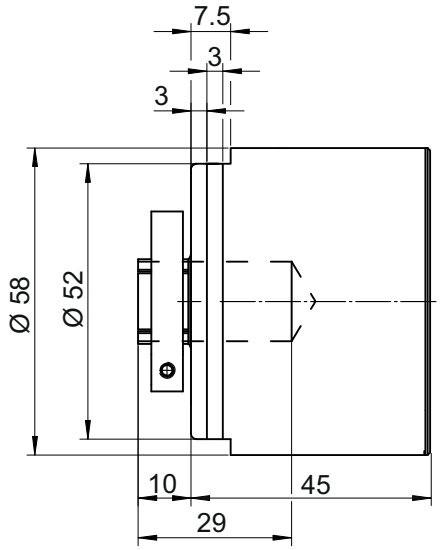
Synchro flange

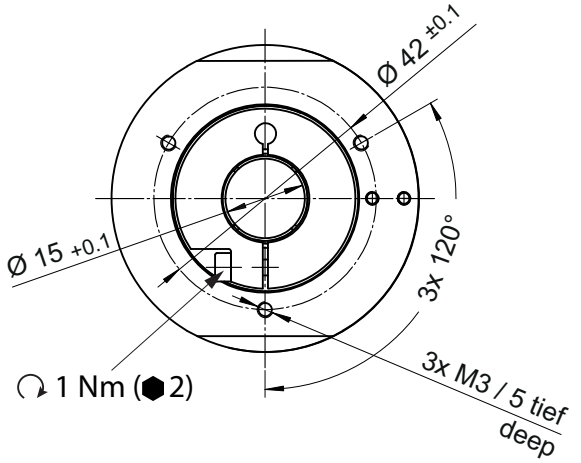


Clamping flange



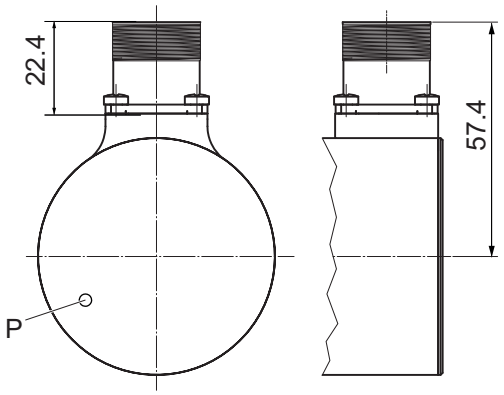
Semi hollow shaft



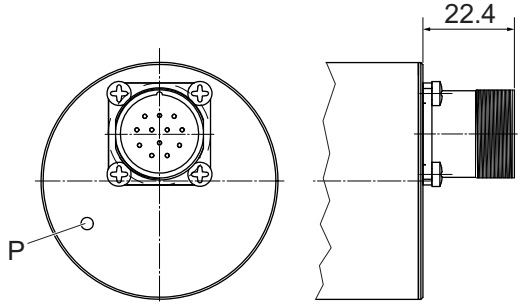


Connection variants

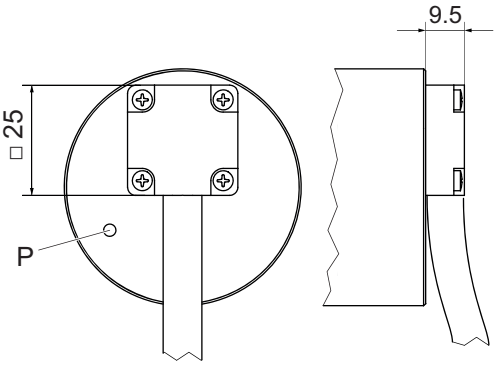
(P = PRESET-button)



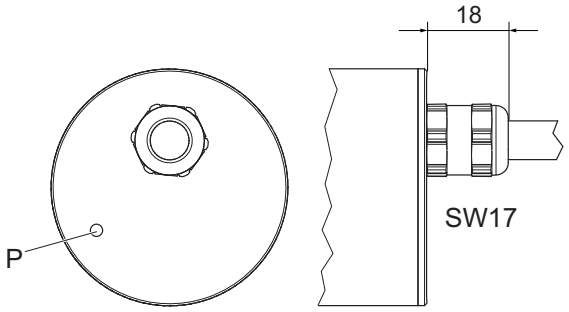
Radial connector socket



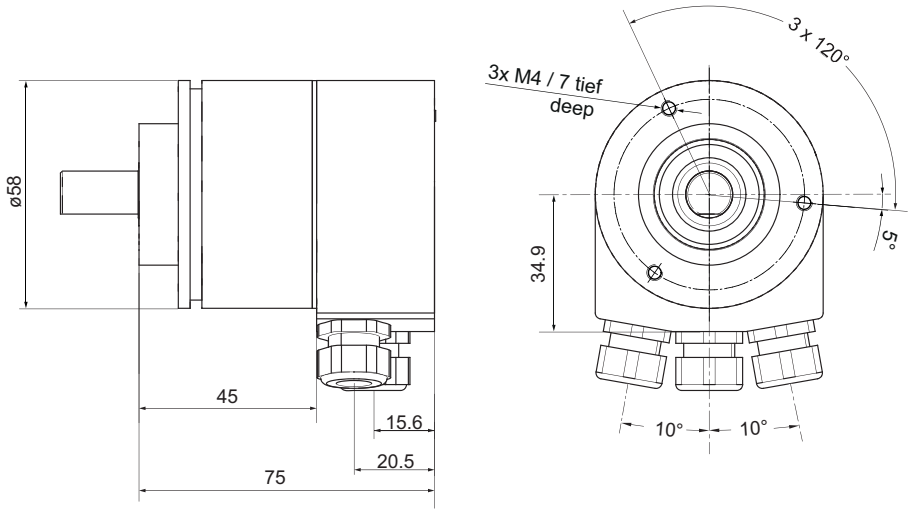
Axial connector socket



axialflex® cable outlet



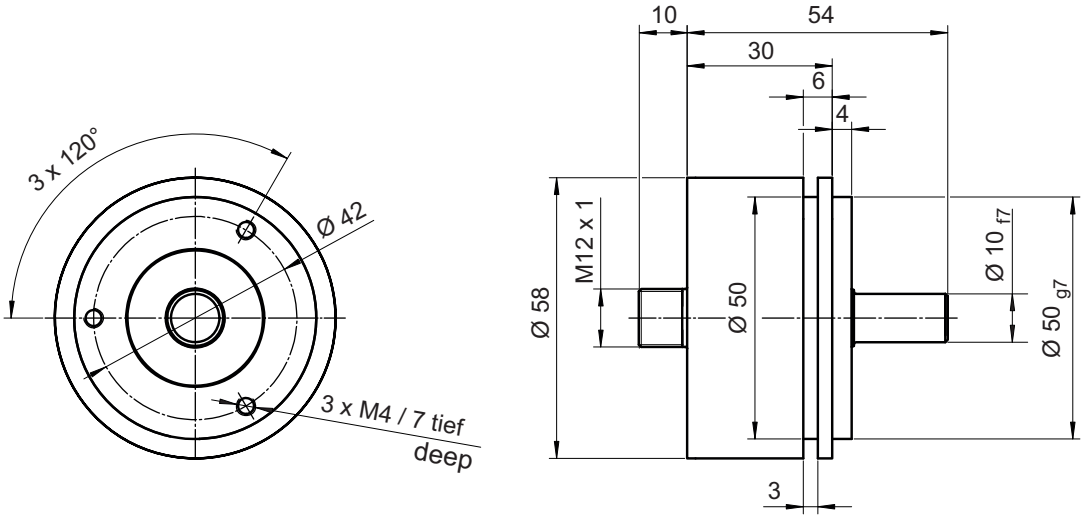
Axial cable gland



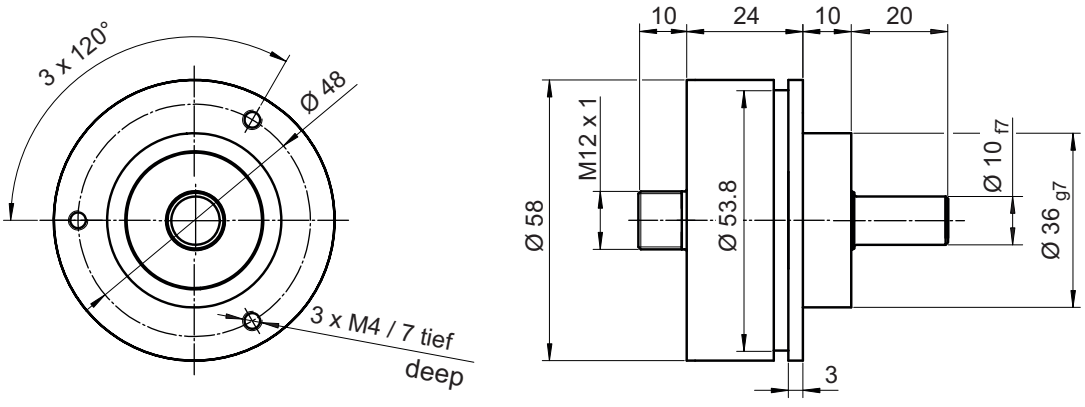
Interface cover (example for PROFIBUS-DP)

9.2.2 GEL 2351/2352

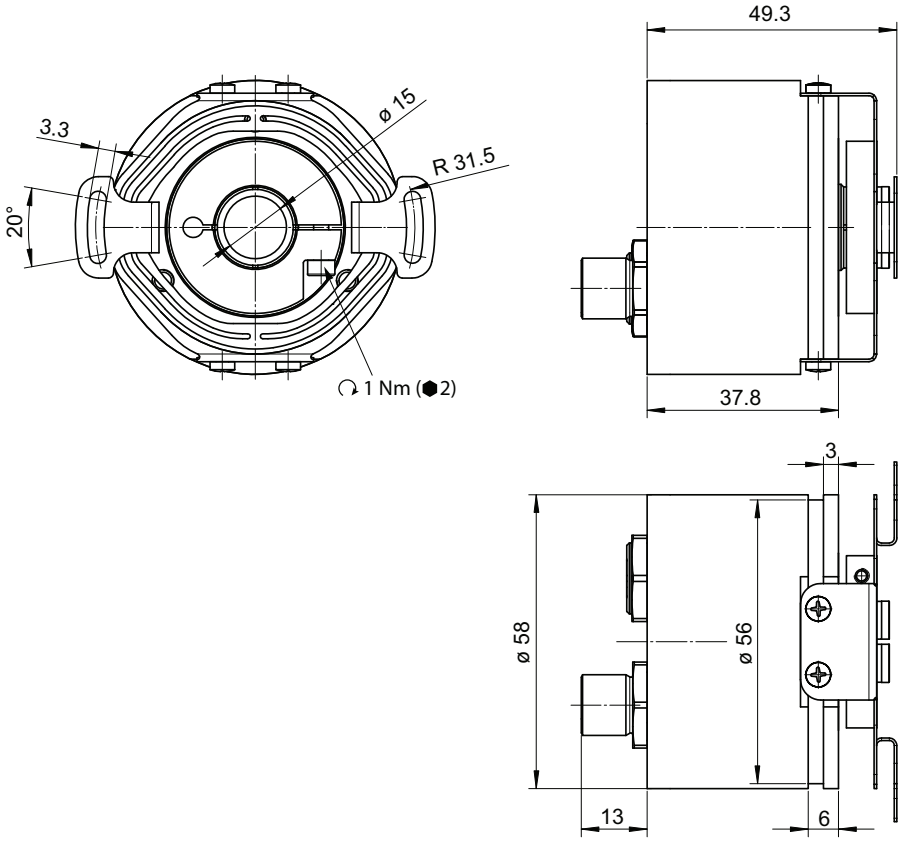
Synchro flange



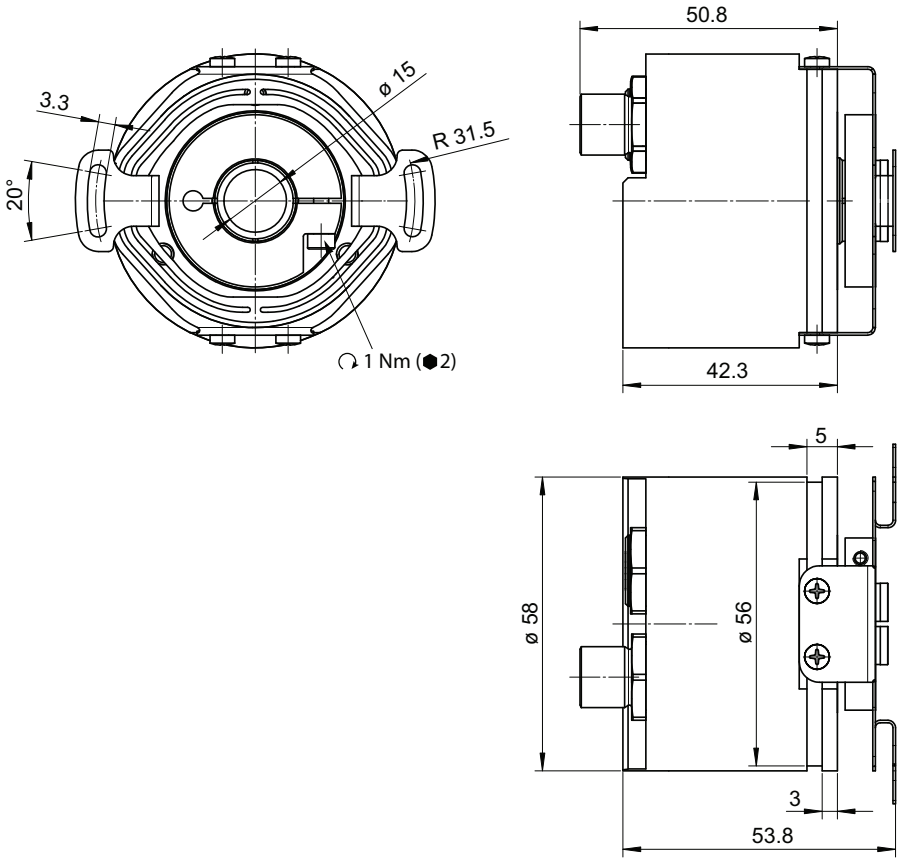
Clamping flange



Semi hollow shaft (only GEL 2352 and GEL 2035)



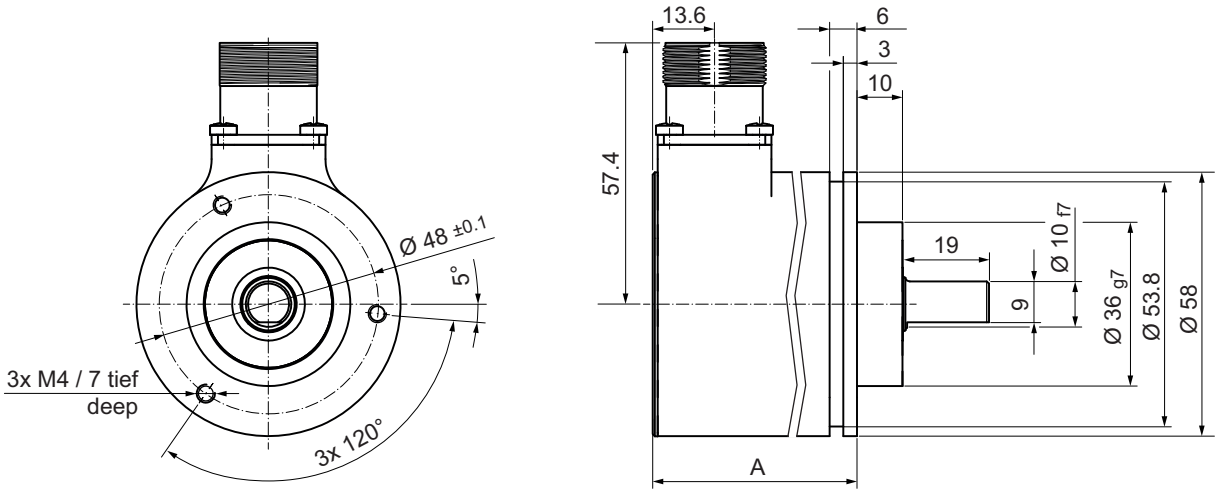
Single turn



Multiturn

9.2.3 GEL 203x

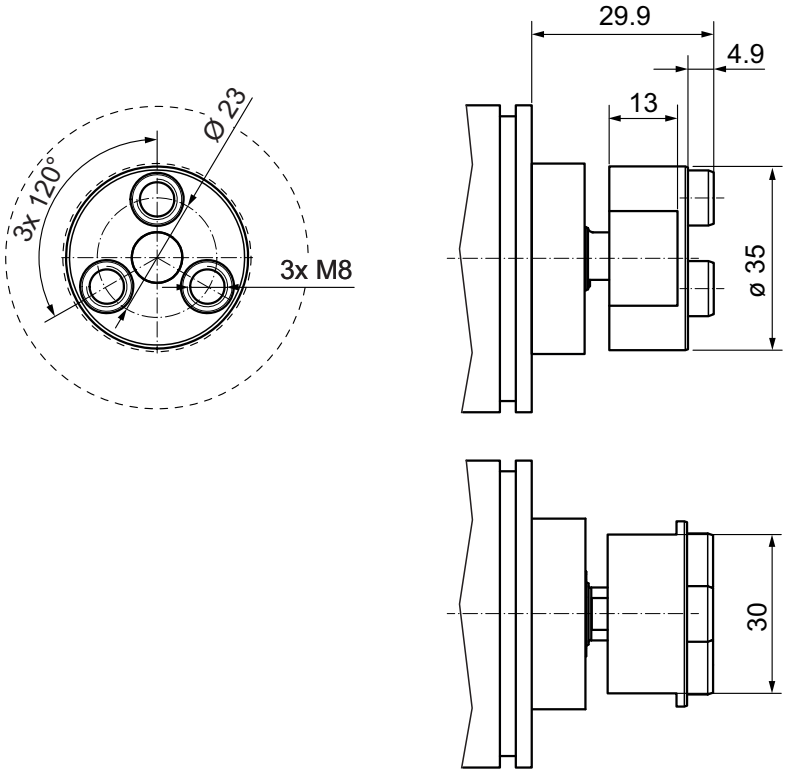
Clamping flange



Measure A (mm):

Typ	GEL 2035	GEL 2037
SSI	44.9	52.8
SSI + Resolver	63.1	
Heavy duty flange	69.7	

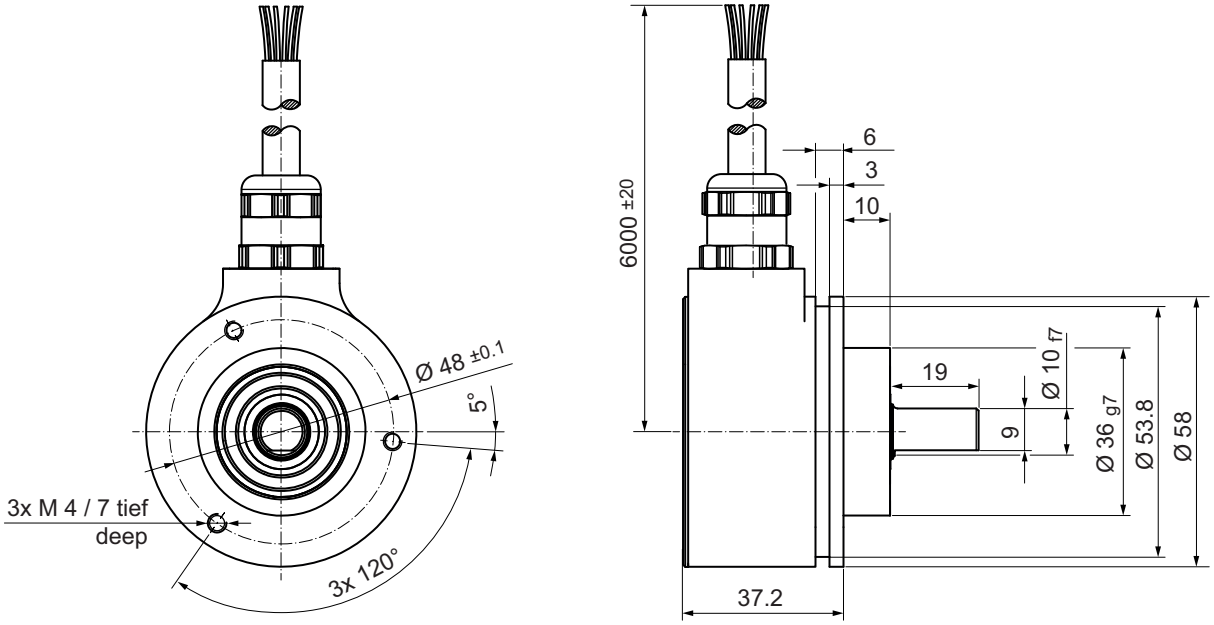
Clamping flange with target wheel adaptor



Semi hollow shaft

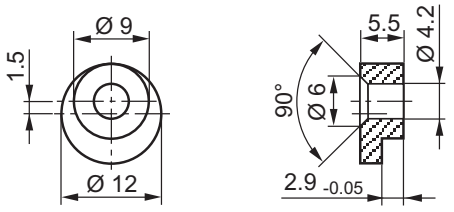
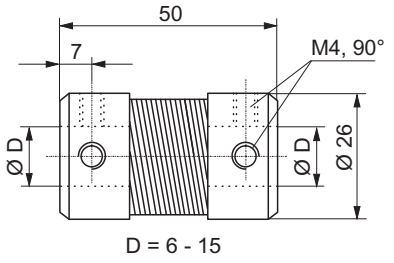
Wie GEL 2352, → page 32.

Type IP 69K (only GEL 2035)

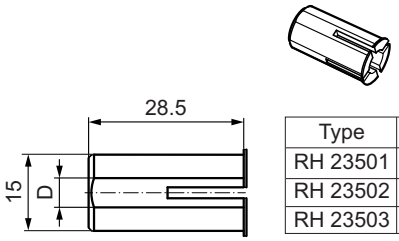


9.3 Mounting accessories

For the encoder mounting, LENORD+BAUER offers the following accessories, among others (dimensions in mm):

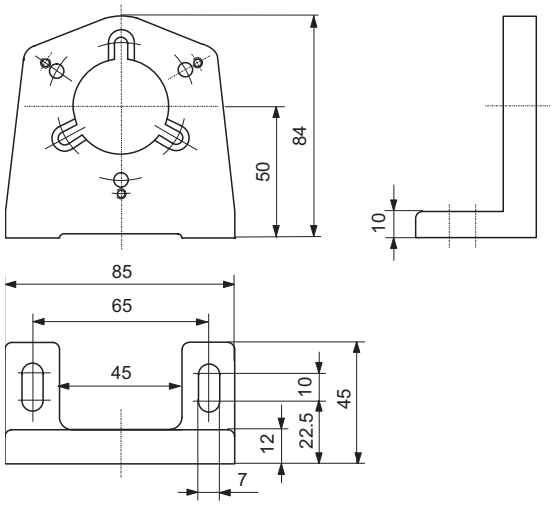
Clamping elements KL200 (3 pcs)	Metal coupling MK12
	

Plastic bushing RH23501–3

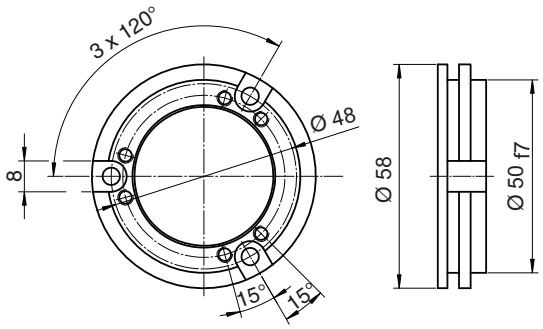


Type	D
RH 23501	8 mm
RH 23502	10 mm
RH 23503	12 mm

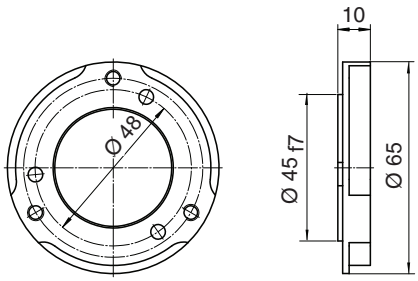
Mounting bracket MW52



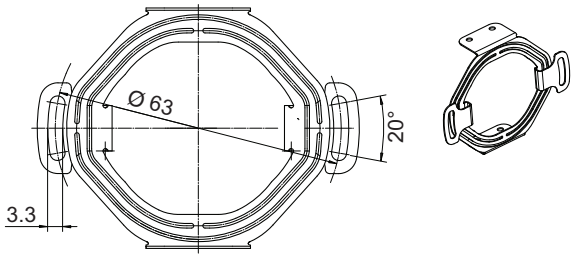
Adaptor flange MF23501



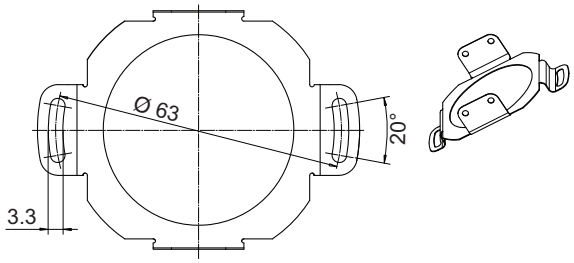
Adaptor flange MF23502



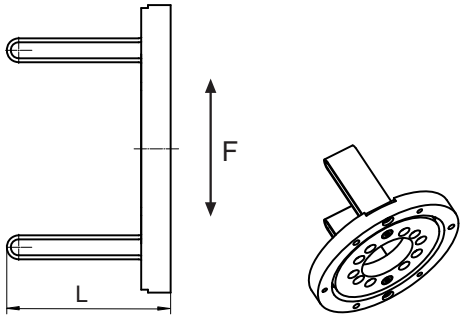
Soft torque support FB23505



Hard torque support FB23504



Flex flange FB23507 / FB23508 (nur GEL 203x)



F: Spring deflection 3 mm, max. force 160 / 300 N

L = 61.5 / 51.5 mm

9.4 Manufacturer's declaration

You can find the manufacturer's declaration according to EMC Directive 2004/108/EU on our website www.lenord.de.