

RUGGED, VERSATILE INCREMENTAL ENCODERS FOR INDUSTRIAL APPLICATIONS



Product description

The DBS60 Core is a rugged incremental encoder with a 58 mm diameter and compact installation depth. It offers a large range of mechanical and electrical interfaces. The solid shaft models are available with face mount flange and servo flange. The hollow shaft design is available as a blind hollow shaft and as a through hollow shaft and can receive shafts up to 5/8" (15.875 mm). The optional shaft insulation and the shaft clamping on the back of the encoder are unique to the hollow shafts. In addition

to the standard interfaces 5 V and 24 V TTL/RS422 and 24 V HTL/Push-Pull, the DBS60 Core offers a flexible universal interface which combines the 5 V TTL and 24 V HTL in one product. The high enclosure rating IP 65 and the large ball bearing distance ensure high robustness and reliability, even in the case of high shaft loads. With a resolution of up to 5,000 pulses, the DBS60 Core is the ideal product for standard use in various different industries.

At a glance

- Face mount flange, servo flange, blind and through hollow shaft
- Housing: Ø 58 mm; compact installation depth, large bearing distance
- Flange and stator couplings enable diverse mounting options
- Number of lines: up to 5,000 pulses
- Cable outlet, radial M23 or M12 male connector
- TTL/RS-422 and HTL/Push-Pull, universal interface TTL/HTL with 4.5 V DC to 30 V DC
- Hollow shafts: metal up to Ø 5/8", isolated up to Ø 15 mm; clamping at the front and back

Your benefits

- Diverse installation options due to different flange and shaft designs
- Universal cable outlet and radial connector allow use in tight spaces and make flexible cable routing possible
- Compact housing dimensions save valuable space Optional hollow shaft clamp on the back facilitates mounting
- Protects the encoder against high shaft temperatures and currents through optional isolated shafts
- Flanges and stator couplings with different mounting holes allow diverse mounting options with one encoder variant
- Rugged design with large bearing distance allows high shaft loads and a longer service life
- The TTL/HTL combination interface enables less product variety and reduces storage costs



Additional information

Fields of application	F-121
Detailed technical data.	F-121
Type code.	F-124
Ordering information.	F-128
Mounting suggestion for servo flange.	F-129
Dimensional drawings	F-130
Connection type	F-153
Viewing number of resolutions.	F-153
Zero declaration	F-154
Signal outputs	F-154
Recommended accessories.	F-156

F

Fields of application

Measuring of position, speed and distance in applications with low to medium requirements on the encoder.

Developed for applications in factory and logistics automation, e.g., in

- Asynchronous motors
- Elevators
- Packaging machines
- Warehousing and transport logistics

Detailed technical data

Performance

Pulses per revolution	4 ... 5,000 ¹⁾
Measurement step	90° electrical/pulses per revolution
Measurement step deviation	
< 3,600 pulses per revolution	± 18°/pulses per revolution
≥ 3,600 pulses per revolution	± 36°/pulses per revolution
Error limits	Measurement step deviation x 3
Duty cycle	
< 3,600 pulses per revolution	≤ 0.5 ± 5%
≥ 3,600 pulses per revolution	≤ 0.5 ± 10 %
Initialization time	< 5 ms ²⁾

¹⁾ For available pulses per revolution see type code.

²⁾ After this period valid signals can be read.

Mechanical data

	Solid shaft	Blind hollow shaft	Through hollow shaft
Mechanical design	Solid shaft, servo flange Solid shaft, face mount flange	Blind hollow shaft	Through hollow shaft clamping at the back Through hollow shaft
Shaft diameter	6 mm x 10 mm ¹⁾ 10 mm x 19 mm ¹⁾	6 mm 8 mm 3/8" 10 mm 12 mm 1/2" 14 mm 15 mm 5/8" 6 mm (shaft isolated) 8 mm (shaft isolated) 3/8" (shaft isolated) 10 mm (shaft isolated) 12 mm (shaft isolated) 1/2" mm (shaft isolated) 14 mm (shaft isolated) 15 mm (shaft isolated)	
Mass	0.3 kg ²⁾	0.25 kg ²⁾	
Shaft material	Stainless steel	Stainless steel Stainless steel with plastic collar	
Flange material	Aluminum		
Housing material	Aluminum		

¹⁾ Other on request.

²⁾ Based on an encoder with a connector outlet or a cable with a connector outlet.

³⁾ Higher values possible by limiting the overall service life.

⁴⁾ Take into account self-heating of 3.2 K per 1,000 revolutions/min when designing the working temperature range.

⁵⁾ Take into account self-heating of 2.6 K per 1,000 revolutions/min when designing the operating temperature range.

⁶⁾ Maximum speed which does not lead to any harm to the encoder. Impact on the service life and signal quality is possible. Please note the maximum output frequency.

	Solid shaft	Blind hollow shaft	Through hollow shaft
Cable material	PVC		
Start up torque	1.2 Ncm (+20 °C)	0.5 Ncm (+20 °C)	
Operating torque	1.1 Ncm (+20 °C)	0.4 Ncm (+20 °C)	
Permissible shaft movement, axial static/dynamic	–	± 0.5 mm, ± 0.2 mm	
Permissible shaft movement, radial static/dynamic	–	± 0.3 mm, ± 0.1 mm	
Permissible shaft load, radial/axial	100 N (radial) ³⁾ 50 N (axial) ³⁾	–	
Operating speed	6,000 / min ⁴⁾	6,000 / min ⁵⁾	
Maximum operating speed	9,000 /min ⁶⁾		
Rotor moment of inertia	33 gcm ²	50 gcm ²	
Bearing lifetime	3.6 x 10 ⁹ revolutions		
Max. angular acceleration	500,000 rad/s ²	500,000 rad/s ² 200,000 rad/s ² (shaft isolated)	

¹⁾ Other on request.

²⁾ Based on an encoder with a connector outlet or a cable with a connector outlet.

³⁾ Higher values possible by limiting the overall service life.

⁴⁾ Take into account self-heating of 3.2 K per 1000 revolutions/min when designing the working temperature range.

⁵⁾ Take into account self-heating of 2.6 K per 1,000 revolutions/min when designing the operating temperature range.

⁶⁾ Maximum speed which does not lead to any harm to the encoder. Impact on the service life and signal quality is possible. Please note the maximum output frequency.

Electrical data

	Solid shaft	Blind hollow shaft	Through hollow shaft
Electrical interface	4.5 V ... 5.5 V, TTL/RS422 ¹⁾ 10 V ... 30 V, TTL/RS422 ¹⁾ 10 V ... 27 V, HTL/Push Pull ¹⁾ 4.5 V ... 30 V, TTL/HTL universal ^{1) 2)}		
Connection type	M23 male connector, 12-pin, radial M12 male connector, 8-pin, radial Cable, 8-wire, universal, 0.5 m ³⁾ Cable, 8-wire, universal, 1.5 m ³⁾ Cable, 8-wire, universal, 3 m ³⁾ Cable, 8-wire, universal, 5 m ³⁾ Cable, 8-wire, universal, 10 m ³⁾ Cable with male connector M12, 8-pin, universal, 0.5 m ³⁾ Cable with male connector M23, 12-pin, universal, 0.5 m ^{3) 4)}		
Operating current without load 4.5 V...5.5 V, TTL/RS422	≤ 50 mA		
Max. power consumption without load 10 V ... 30 V, TTL/RS422	≤ 0.5 W		
10 V ... 27 V, HTL/Push Pull	≤ 1 W		
4.5 V ... 30 V, TTL/HTL universal	≤ 0.5 W		
Load current	≤ 30 mA per channel		
Maximum output frequency	300 kHz ⁵⁾		

¹⁾ 6 channels unless otherwise specified.

²⁾ Output level depends on the supply voltage.

³⁾ The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

⁴⁾ M23 male connector with central mounting

⁵⁾ Up to 450 kHz on request.

⁶⁾ Short-circuit of another channel or GND permissible for a maximum of 60 s. No protection in the case of a short-circuit channel of U_G.

⁷⁾ Short-circuit of another channel US or GND permissible for a maximum of 30 s.

⁸⁾ This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of devices, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.



	Solid shaft	Blind hollow shaft	Through hollow shaft
Reference signal, number	1		
Reference signal, position	90° electric, logically gated with A and B		
Reverse polarity protection	✓		
Short-circuit protection of the outputs			
4.5 V–5.5 V, TTL/RS422	✓ ⁶⁾		
10 V ... 30 V, TTL/RS422	✓ ⁷⁾		
10 V ... 27 V, HTL/Push Pull	✓ ⁷⁾		
4.5 V ... 30 V, TTL/HTL universal	✓ ⁷⁾		
MTTFd: mean time to dangerous failure ⁸⁾	500 years (EN ISO 13849-1)		

¹⁾ 6 channels unless otherwise specified.

²⁾ Output level depends on the supply voltage.

³⁾ The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

⁴⁾ M23 male connector with central mounting

⁵⁾ Up to 450 kHz on request.

⁶⁾ Short-circuit of another channel or GND permissible for a maximum of 60 s. No protection in the case of a short-circuit channel of U_S.

⁷⁾ Short-circuit of another channel US or GND permissible for a maximum of 30 s.

⁸⁾ This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of devices, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

Ambient data

	Solid shaft	Blind hollow shaft	Through hollow shaft
EMC	According to EN 61000-6-2 and EN 61000-6-3		
Enclosure rating	IP 67 on housing side (acc. to IEC 60529) ¹⁾ IP 65 on shaft side (acc. to IEC 60529)		IP 65 on housing side (acc. to IEC 60529) ¹⁾ IP 65 on shaft side (acc. to IEC 60529)
Permissible relative humidity	90% (condensation of optical surfaces not permitted)		
Operating temperature range			
4.5 V–5.5 V, TTL/RS422	–20 °C ... +85 °C		
10 V ... 30 V, TTL/RS422	–30 °C ... +100 °C, at a maximum of 3,000 pulses per revolution –30 °C ... +85 °C, at more than 3,000 pulses per revolution		
10 V ... 27 V, HTL/Push Pull	–20 °C ... +85 °C		
4.5 V ... 30 V, TTL/HTL universal	–30 °C ... +100 °C, at a maximum of 3,000 pulses per revolution –30 °C ... +85 °C, at more than 3,000 pulses per revolution		
Storage temperature range	–40 °C ... +100 °C, without packaging		
Resistance to shocks	250 g, 3 ms (according to EN 60068-2-27)	250 g, 3 ms (according to EN 60068-2-27) 200 g, 3 ms, shaft isolated (according to EN 60068-2-27)	
Resistance to vibrations	30 g/10 Hz ... 2,000 Hz (according to EN 60068-2-6)		

¹⁾ In an assembled male connector.

Type code

Solid shaft

Mechanical design

- 1 Servo flange, solid shaft, Ø 6 mm, length 10 mm
- 3 Face mount flange, solid shaft, Ø 6 mm, length 10 mm
- 4 Face mount flange, solid shaft, Ø 10 mm, length 19 mm

Electrical interface

- A 4.5 ... 5.5 V, TTL/RS-422, 6 channel
- C 10 ... 30 V, TTL/RS-422, 6 channel
- E 10 ... 27 V, HTL/Push Pull, 6 channel
- F 4.5 ... 30 V, TTL/HTL universal, 6 channel

Connection type

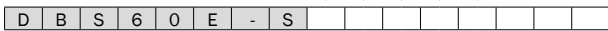
- A Male connector M23, 12-pin, radial
- C Male connector M12, 8-pin, radial
- J Cable, 8-wire universal, 0.5 m
- K Cable, 8-wire, universal, 1.5 m
- L Cable, 8-wire, universal, 3 m
- N Cable, 8-wire, universal, 10 m
- P Cable, 8-wire universal, 0.5 m, with male connector M12
- Q Cable, 8-wire, universal, 0.5 m, with male connector M23

Stator coupling/flange design

- O Flange with 3 x M3 3 x M4

Resolution

- 0004 ... 5,000 pulses per revolution possible. For pulses see "Pulses per revolution" ¹⁾



¹⁾ Other pulse on request.



Through hollow shaft

Mechanics/flange

T	Through hollow shaft
R	Through hollow shaft clamping at the back (B side)

Mechanical design

B	Through hollow shaft, metal, Ø 8 mm
C	Through hollow shaft, metal, Ø 3/8"
D	Through hollow shaft, metal, Ø 10 mm
E	Through hollow shaft, metal, Ø 12 mm
F	Through hollow shaft, metal, Ø 1/2"
G	Through hollow shaft, metal, Ø 14 mm
H	Through hollow shaft, metal, Ø 15 mm
J	Through hollow shaft, metal, Ø 5/8" ¹⁾
2	Through hollow shaft, Ø 8 mm, isolated
3	Through hollow shaft, Ø 3/8", isolated
4	Through hollow shaft, Ø 10 mm, isolated
5	Through hollow shaft, Ø 1/2", isolated
6	Through hollow shaft, Ø 12 mm, isolated
7	Through hollow shaft, Ø 14 mm, isolated
8	Through hollow shaft, Ø 15 mm, isolated

Electrical interface

A	4.5 ... 5.5 V, TTL/RS-422, 6 channel
C	10 ... 30 V, TTL/RS-422, 6 channel
E	10 ... 27 V, HTL/Push Pull, 6 channel
F	4.5 ... 30 V, TTL/HTL universal, 6 channel

Connection type

A	Male connector M23, 12-pin, radial
C	Male connector M12, 8-pin, radial
J	Cable, 8-wire, universal, 0.5 m
K	Cable, 8-wire, universal, 1.5 m
L	Cable, 8-wire, universal, 3 m
N	Cable, 8-wire, universal, 10 m
P	Cable, 8-wire universal, 0.5 m, with male connector M12
Q	Cable, 8-wire, universal, 0.5 m, with male connector M23

Stator coupling/flange design

O	Two-sided stator coupling, slot, screw hole circle 63 mm - 83 mm
A	Without stator coupling, flange with 4 x M2.5
C	Locating pin assembly
D	Stator coupling, 1-sided, slot, bolt circle 33 mm - 48.5 mm

Resolution

0004 ... 5,000 pulses per revolution possible. For pulses see "Pulses per revolution"



¹⁾ Order collets for 6 mm (only plastic) 8 mm, 3/8", 10 mm, 12 mm, 1/2", 14 mm and 15 mm separately as accessories (see recommended accessories). No collets are necessary for 5/8" shaft diameter. Also available as isolated design on request.



Blind hollow shaft

Mechanical design

B	Blind hollow shaft, metal, Ø 8 mm
C	Blind hollow shaft, metal, Ø 3/8"
D	Blind hollow shaft, metal, Ø 10 mm
E	Blind hollow shaft, metal, Ø 12 mm
F	Blind hollow shaft, metal, Ø 1/2"
G	Blind hollow shaft, metal, Ø 14 mm
H	Blind hollow shaft, metal, Ø 15 mm
J	Blind hollow shaft, metal, Ø 5/8" ¹⁾
2	Blind hollow shaft, Ø 8 mm, isolated
3	Blind hollow shaft, Ø 3/8", isolated
4	Blind hollow shaft, Ø 10 mm, isolated
5	Blind hollow shaft, Ø 1/2", isolated
6	Blind hollow shaft, Ø 12 mm, isolated
7	Blind hollow shaft, Ø 14 mm, isolated
8	Blind hollow shaft, Ø 15 mm, isolated

Electrical interface

A	4.5 ... 5.5 V, TTL/RS-422, 6 channel
C	10 ... 30 V, TTL/RS-422, 6 channel
E	10 ... 27 V, HTL/Push Pull, 6 channel
F	4.5 ... 30 V, TTL/HTL universal, 6 channel

Connection type

A	Male connector M23, 12-pin, radial
C	Male connector M12, 8-pin, radial
J	Cable, 8-wire, universal, 0.5 m
K	Cable, 8-wire, universal, 1.5 m
L	Cable, 8-wire, universal, 3 m
N	Cable, 8-wire, universal, 10 m
P	Cable, 8-wire universal, 0.5 m, with male connector M12
Q	Cable, 8-wire, universal, 0.5 m, with male connector M23

Stator coupling/flange design

O	Two-sided stator coupling, slot, screw hole circle 63 mm - 83 mm
A	Without stator coupling, flange with 4 x M2.5
C	Locating pin assembly
D	Stator coupling, 1-sided, slot, bolt circle 33 mm - 48.5 mm

Resolution

0004 ... 5,000 pulses per revolution possible. For pulses see "Pulses per revolution"

D	B	S	6	0	E	-	B												
---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--

¹⁾ Order collets for 6 mm (only plastic) 8 mm, 3/8", 10 mm, 12 mm, 1/2", 14 mm and 15 mm separately as accessories (see recommended accessories). No collets are necessary for 5/8" shaft diameter. Also available as isolated design on request.

F

Pulses per revolution

	E
Pulses per revolution	0004
	0005
	0010
	0020
	0048
	0050
	0060
	0100
	0125
	0128
	0180
	0250
	0360
	0500
	0512
	0600
	1000
	1024
	1200
	1500
	2000
	2048
	2400
	2500
	3000
	3600
	4096
5000	

F

Ordering information

Blind hollow shaft

- **Shaft diameter:** 5/8"
- **Connection type:** cable, 8-wire, universal, 1.5 m

Through hollow shaft

- **Shaft diameter:** 5/8"

Electrical interface	Voltage range	Connection type	Pulses per revolution	Type	Part no.
TTL/RS422	4.5 V ... 5.5 V	Cable with male connector M23, 12-pin, universal, 0.5 m	1,024	DBS60E-TJAQ01024	1069756
			2,048	DBS60E-TJAQ02048	1069757
		Cable, 8-wire, universal, 1.5 m	1,024	DBS60E-TJAK01024	1069746
	2,048		DBS60E-TJAK02048	1069747	
	4,096		DBS60E-TJAK04096	1069748	
	10 V ... 30 V	Cable, 8-wire, universal, 1.5 m	1,024	DBS60E-TJCK01024	1070615
2,048			DBS60E-TJCK02048	1070616	
HTL/Push Pull	10 V ... 27 V	Cable, 8-wire, universal, 1.5 m	1,024	DBS60E-TJEK01024	1069758
			2,048	DBS60E-TJEK02048	1069759
			4,096	DBS60E-TJEK04096	1069760
TTL/HTL universal	4.5 V ... 30 V	Cable, 8-wire, universal, 1.5 m	1,024	DBS60E-TJFK01024	1070748
			2,048	DBS60E-TJFK02048	1070749
			4,096	DBS60E-TJFK04096	1070750

F

Through hollow shaft clamping at the back

- **Shaft diameter:** 5/8"
- **Connection type:** cable, 8-wire, universal, 1.5 m

Electrical interface	Voltage range	Pulses per revolution	Type	Part no.
TTL/RS422	4.5 V ... 5.5 V	1,024	DBS60E-RJAK01024	1069710
		2,048	DBS60E-RJAK02048	1069711
		4,096	DBS60E-RJAK04096	1069712
	10 V ... 30 V	1,024	DBS60E-RJCK01024	1070609
		2,048	DBS60E-RJCK02048	1070610
		1,024	DBS60E-RJEK01024	1069713
HTL/Push Pull	10 V ... 27 V	2,048	DBS60E-RJEK02048	1069714
		1,024	DBS60E-RJFK01024	1070744
TTL/HTL universal	4.5 V ... 30 V	2,048	DBS60E-RJFK02048	1070745

Solid shaft, servo flange

- **Shaft diameter:** 6 mm (other diameters available on request)

Electrical interface	Voltage range	Connection type	Pulses per revolution	Type	Part no.
TTL/RS422	4.5 V ... 5.5 V	Cable, 8-wire, universal, 1.5 m	1,000	DBS60E-S1AK01000	1069715
			2,000	DBS60E-S1AK02000	1069716
	10 V ... 30 V	Cable, 8-wire, universal, 1.5 m	1,000	DBS60E-S1CK01000	1070611
			2,000	DBS60E-S1CK02000	1070612
HTL/Push Pull	10 V ... 27 V	Cable, 8-wire, universal, 1.5 m	1,000	DBS60E-S1EK01000	1069717
			2,000	DBS60E-S1EK02000	1069718

Solid shaft, face mount flange

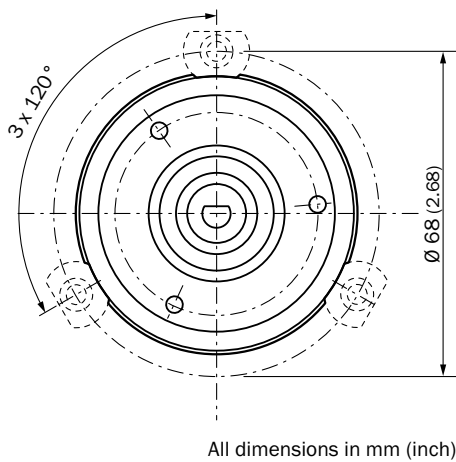
- **Shaft diameter:** 10 mm (other diameters available on request)
- **Connection type:** cable, 8-wire, universal, 1.5 m

Electrical interface	Voltage range	Pulses per revolution	Type	Part no.
TTL/RS422	4.5 V ... 5.5 V	1,000	DBS60E-S4AK01000	1069719
		2,000	DBS60E-S4AK02000	1069720
		5,000	DBS60E-S4AK05000	1069721
	10 V ... 30 V	1,000	DBS60E-S4CK01000	1070613
		2,000	DBS60E-S4CK02000	1070614
		5,000	DBS60E-S4CK05000	1070615
HTL/Push Pull	10 V ... 27 V	1,000	DBS60E-S4EK01000	1069722
		2,000	DBS60E-S4EK02000	1069723
		5,000	DBS60E-S4EK05000	1069724
TTL/HTL universal	4.5 V ... 30 V	1,000	DBS60E-S4FK01000	1070746
		2,000	DBS60E-S4FK02000	1070747

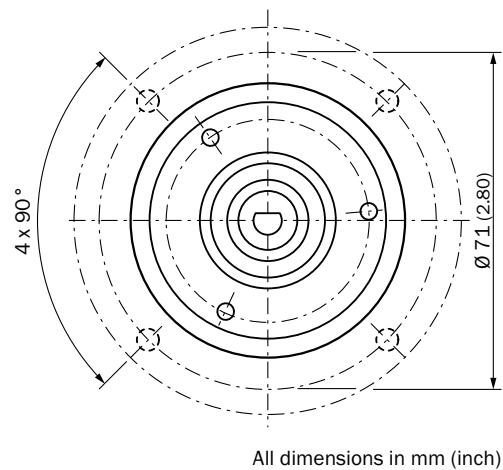
F

Mounting suggestion for servo flange

Mounting suggestion for small servo clamp (part number 2029166)

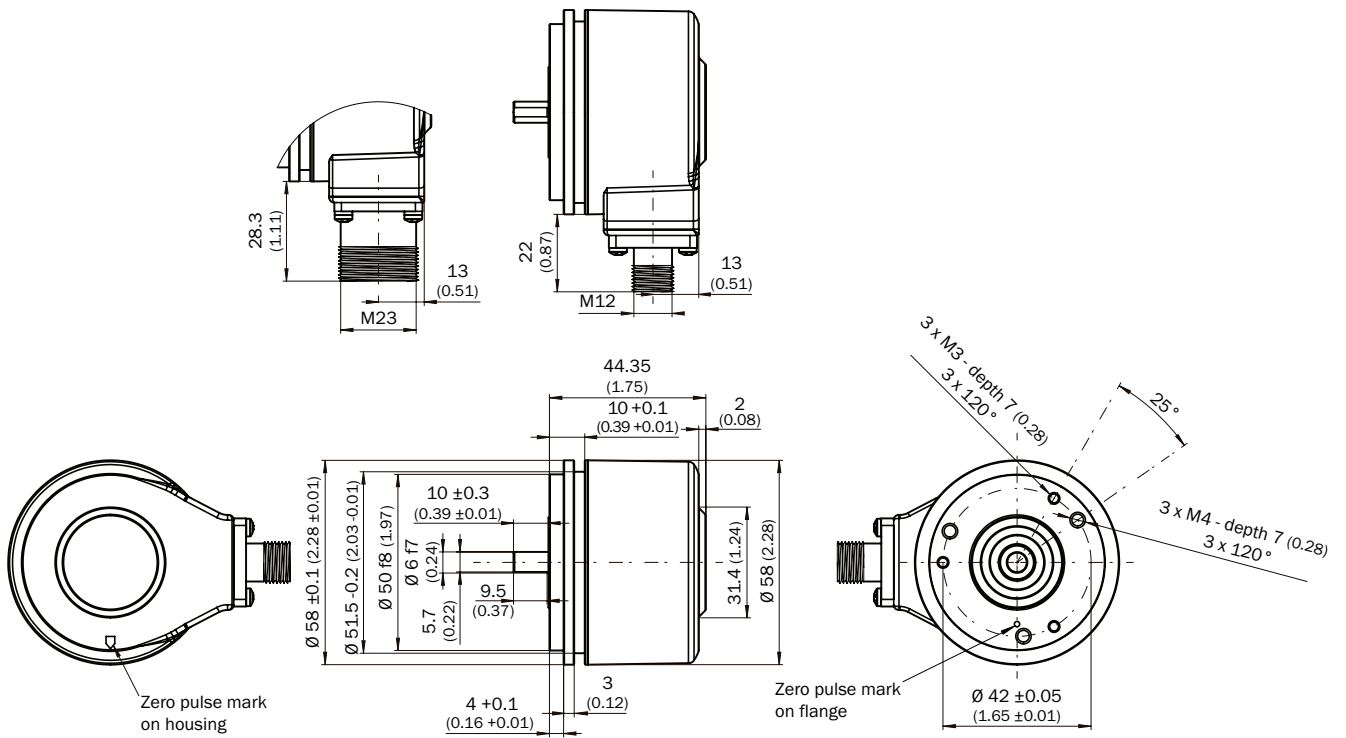


Mounting suggestion for half-shell servo clamp (part number 2029165)

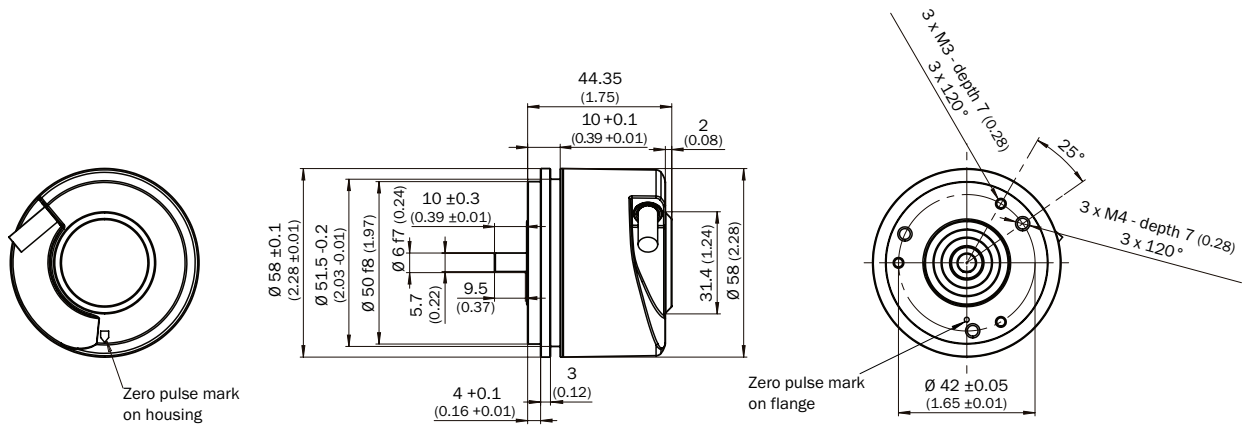


Dimensional drawings (dimensions in mm)

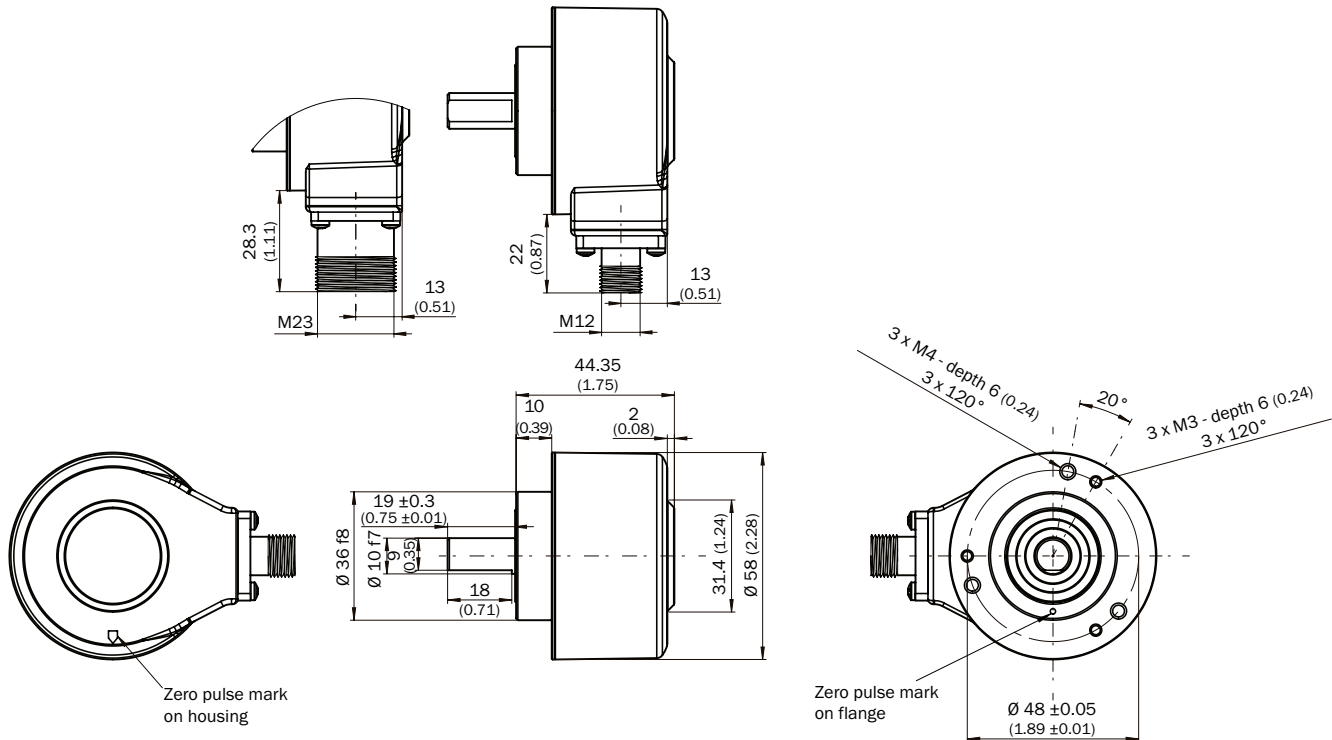
Solid shaft $\varnothing 6$ mm, servo flange, male connector connection (S1)



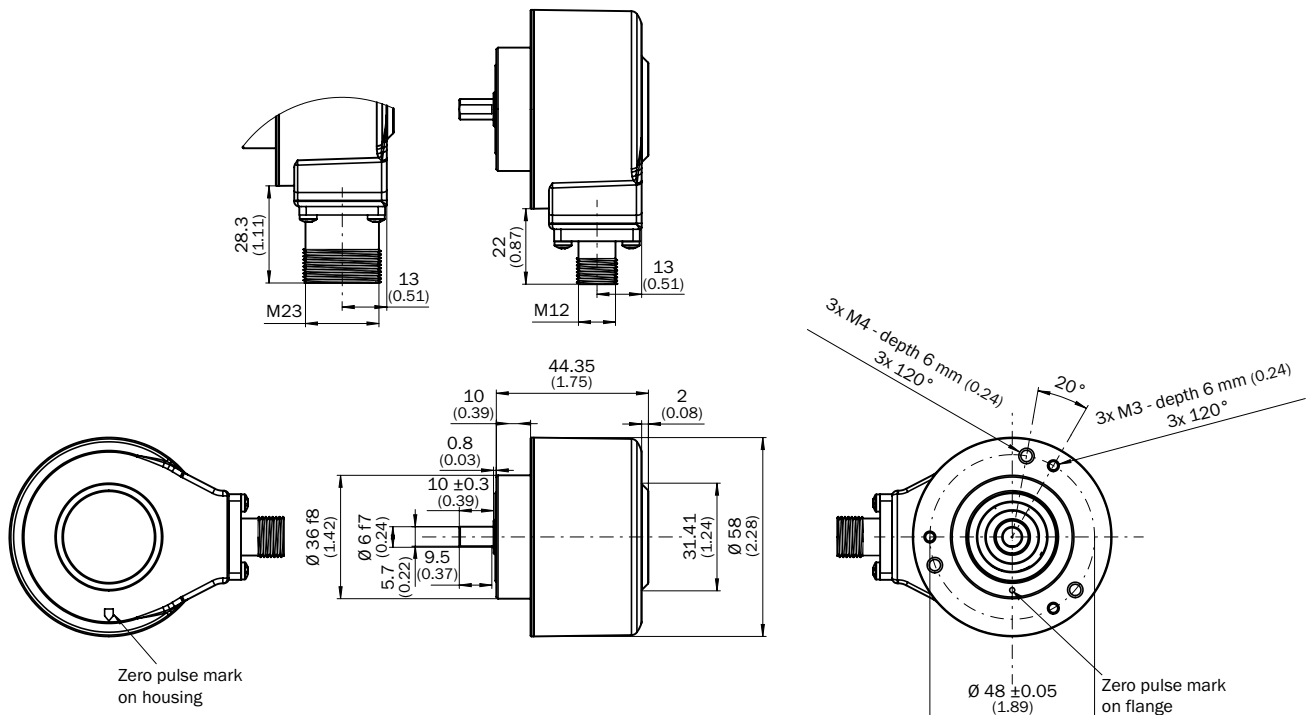
F Solid shaft $\varnothing 6$ mm, servo flange, cable connection



Solid shaft \varnothing 10 mm, face mount flange, male connector connection (S4)

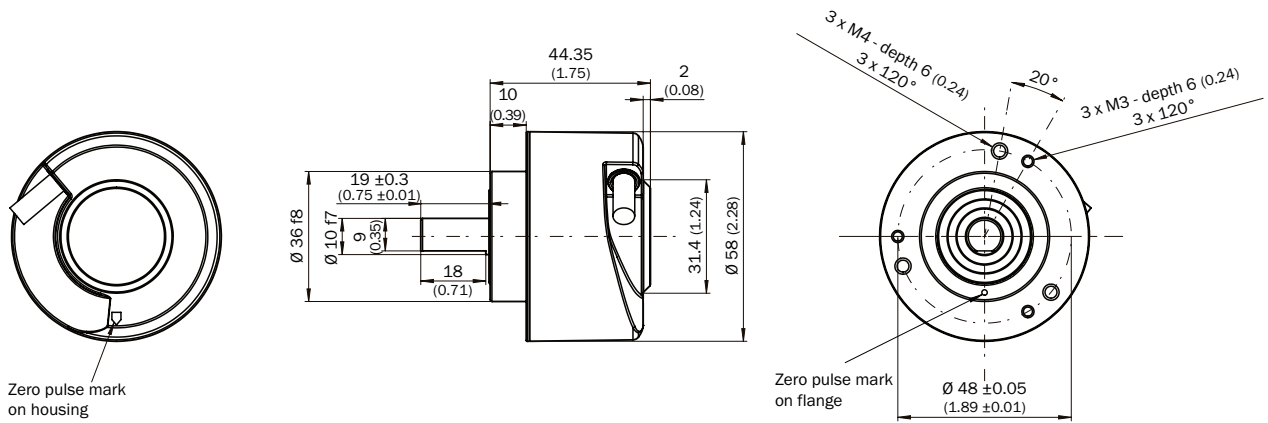


Solid shaft \varnothing 6 mm, face mount flange, male connector connection (S3)

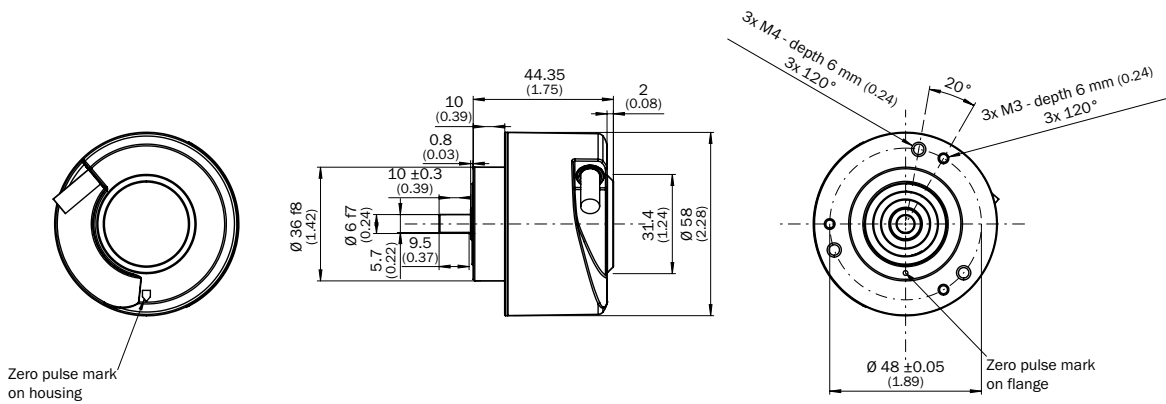


F

Solid shaft \varnothing 10 mm, face mount flange, cable connection (S4)

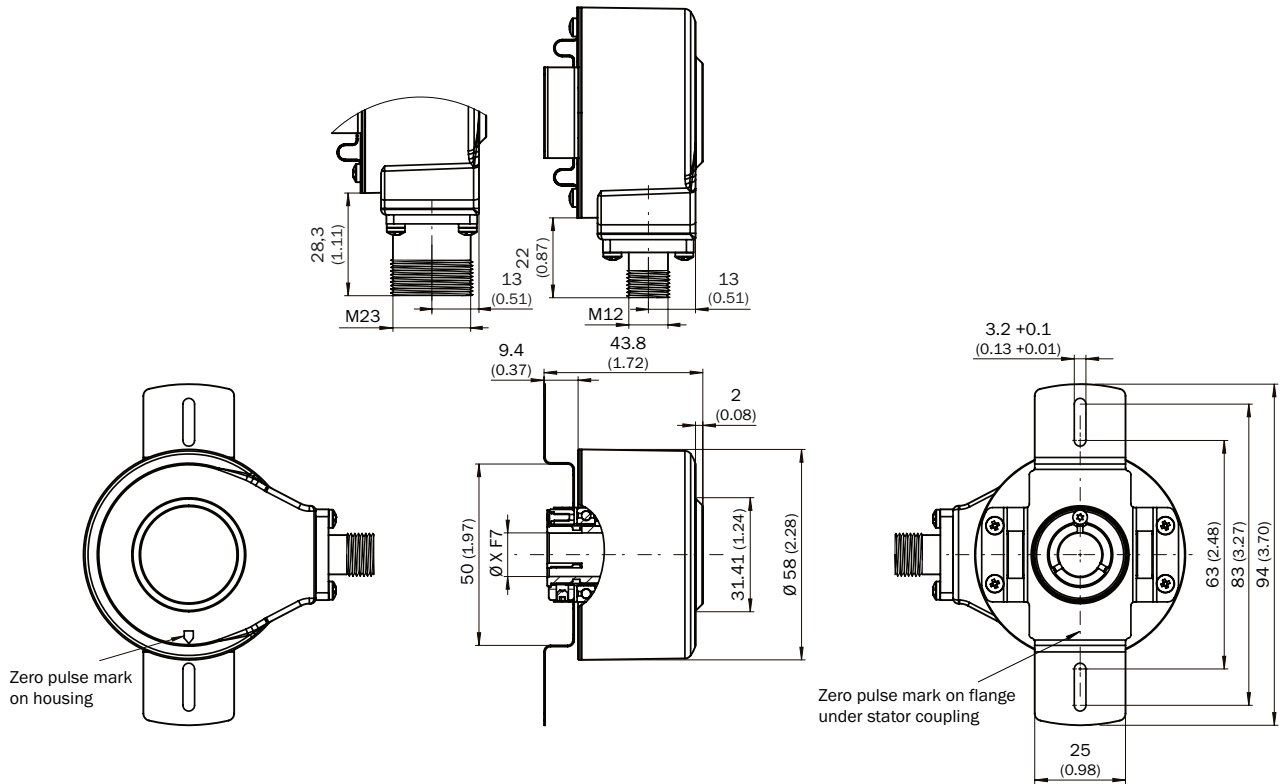


Solid shaft \varnothing 6 mm, face mount flange, cable connection (S3)

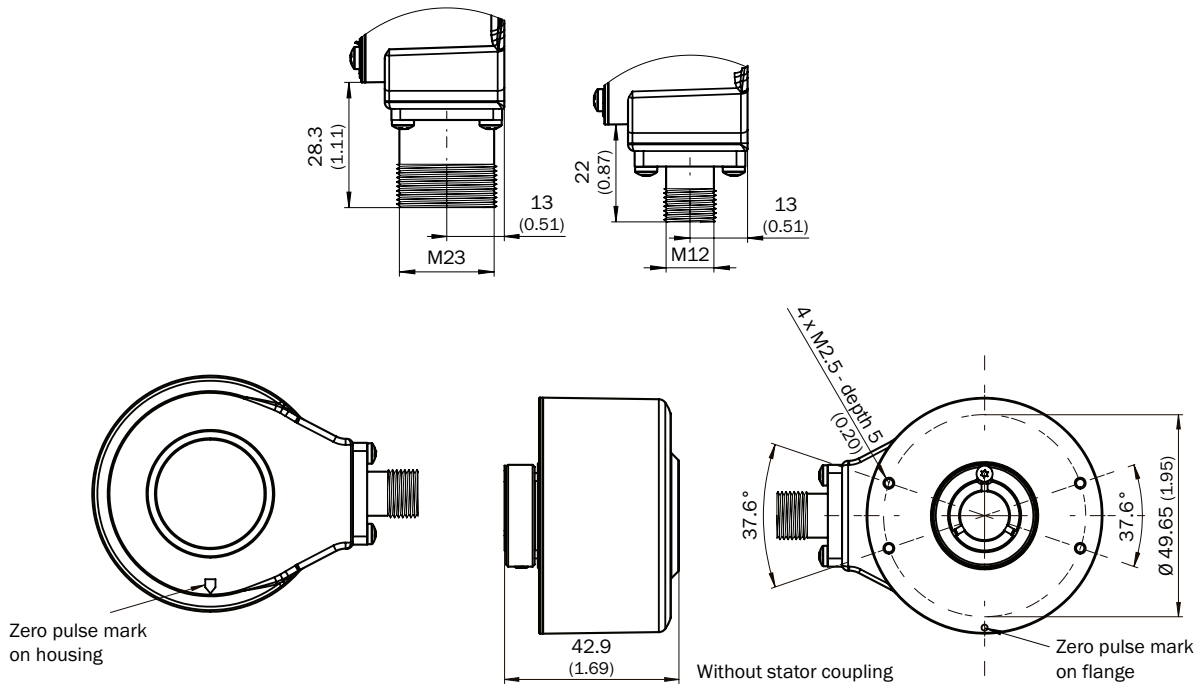


F

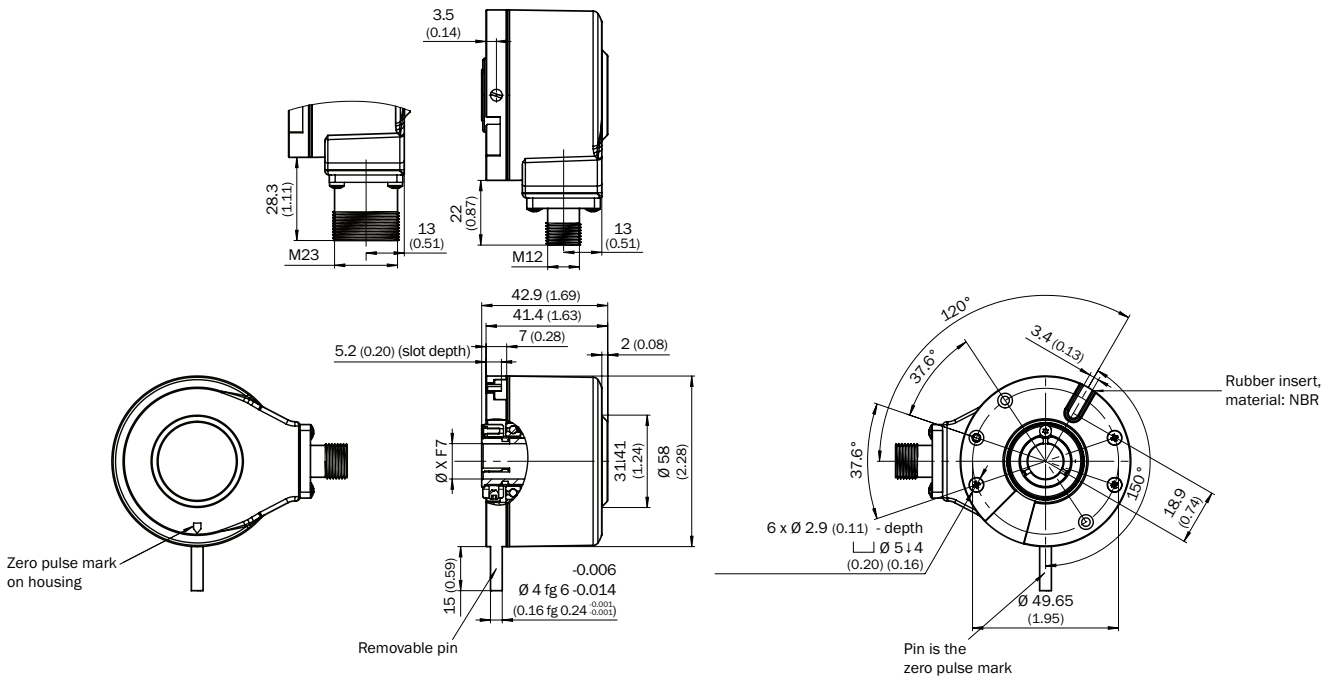
Blind hollow shaft, male connector connection, two-sided stator coupling, slot, screw hole circle 63 mm – 83 mm



Blind hollow shaft, male connector connection, no stator coupling

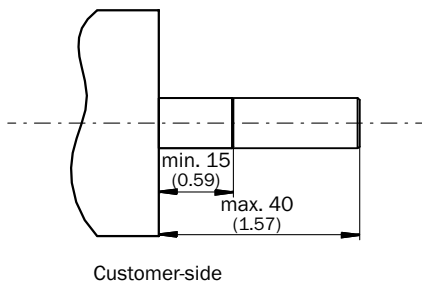


Blind hollow shaft, male connector connection, with locating pin assembly

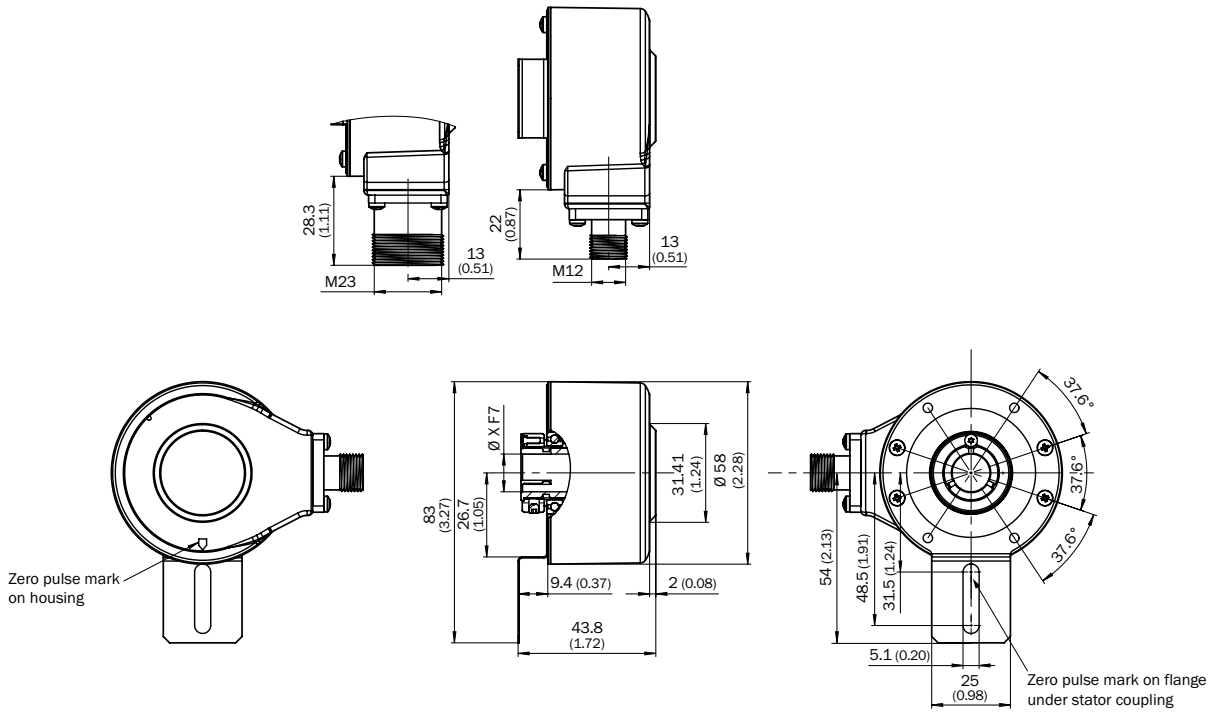


Installation example for blind hollow shaft

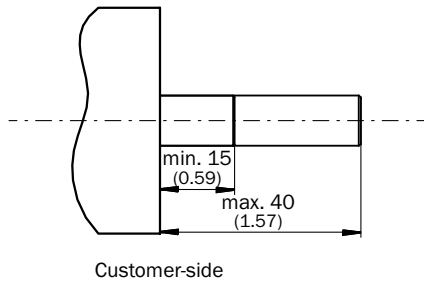
F



Blind hollow shaft, male connector connection, stator coupling, 1-sided, slot, bolt circle 33 mm – 48.5 mm

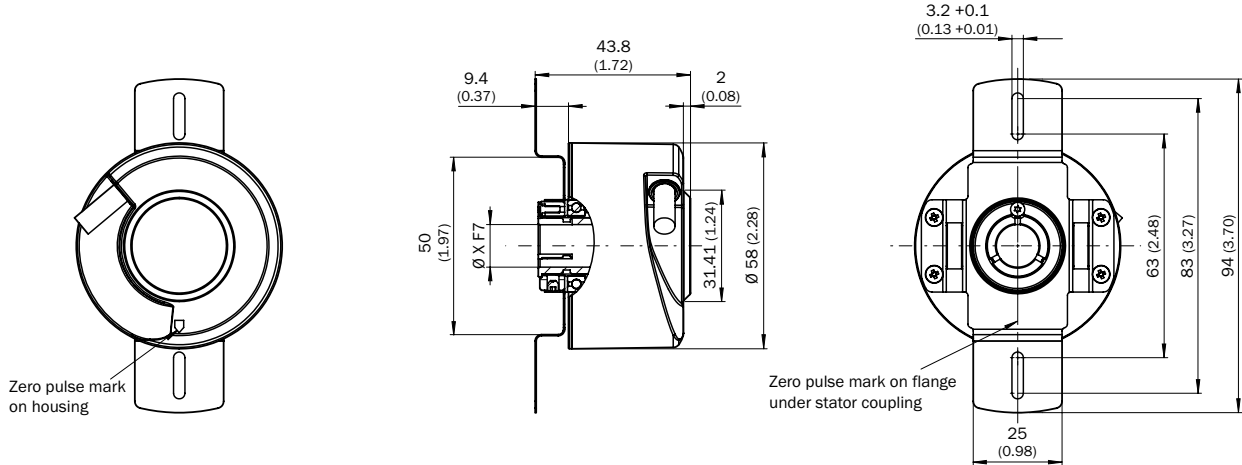


Installation example for blind hollow shaft

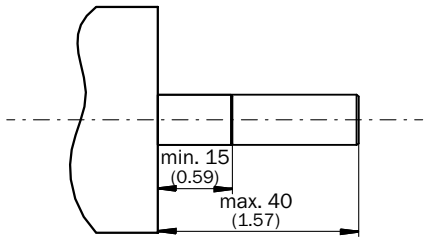


F

Blind hollow shaft, cable connection, two-sided stator coupling, slot, screw hole circle 63 mm – 83 mm



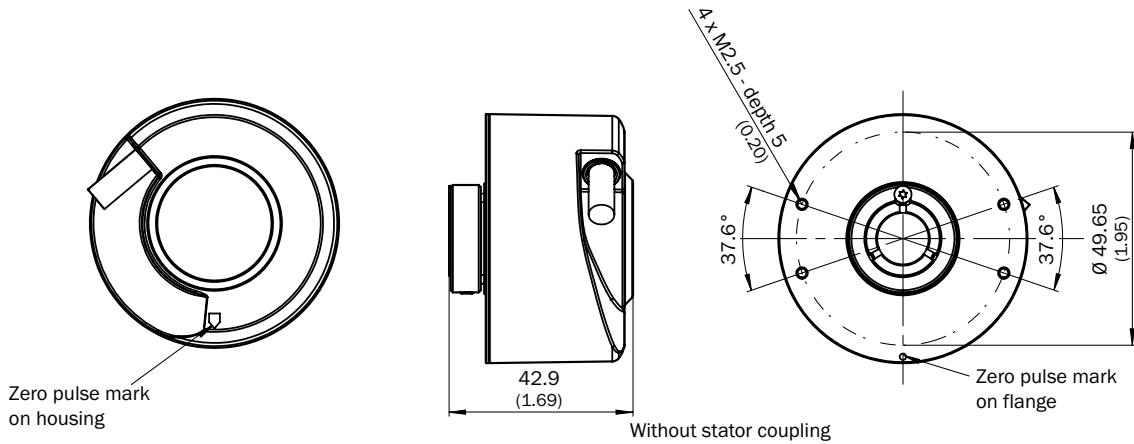
Installation example for blind hollow shaft



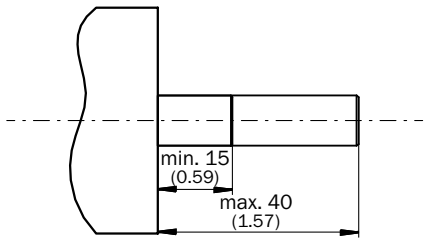
Customer-side

F

Blind hollow shaft, cable connection, no stator coupling

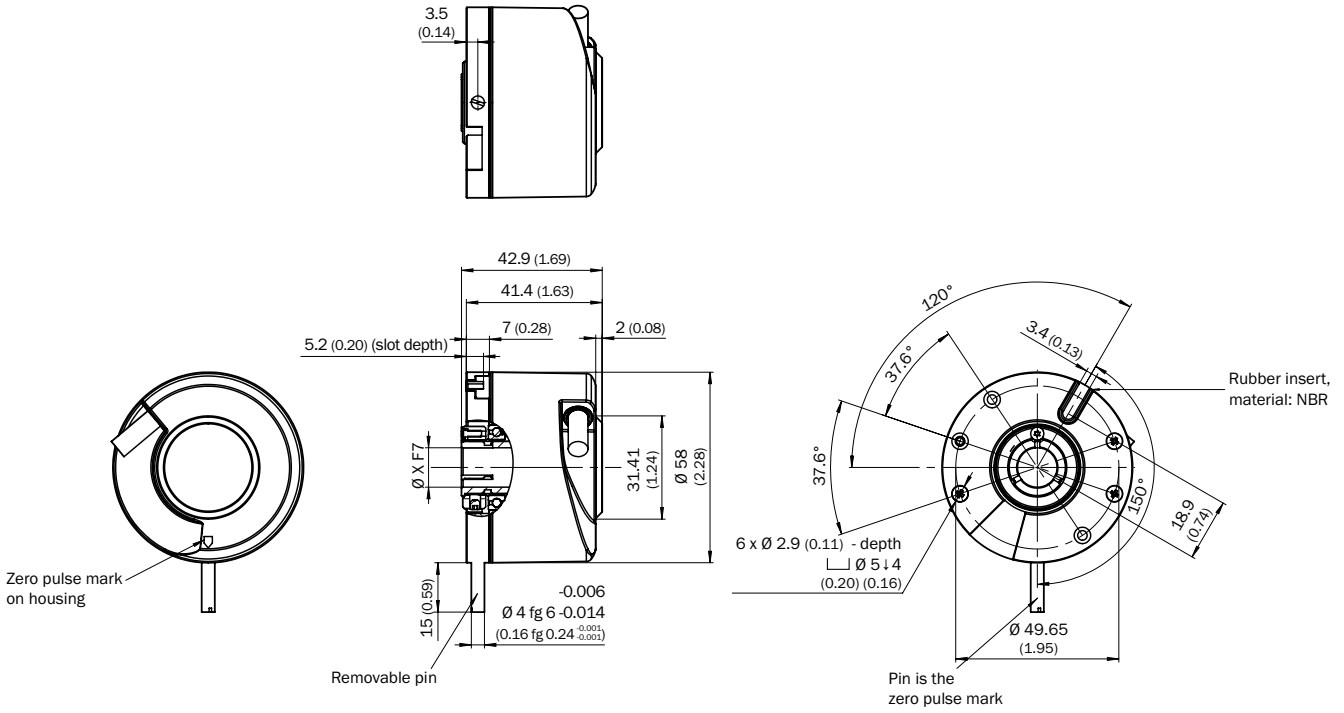


Installation example for blind hollow shaft

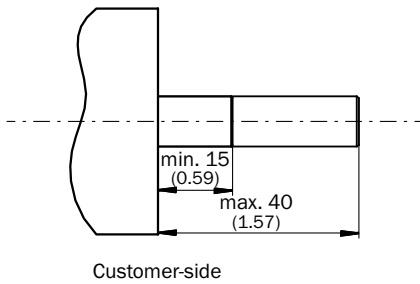


Customer-side

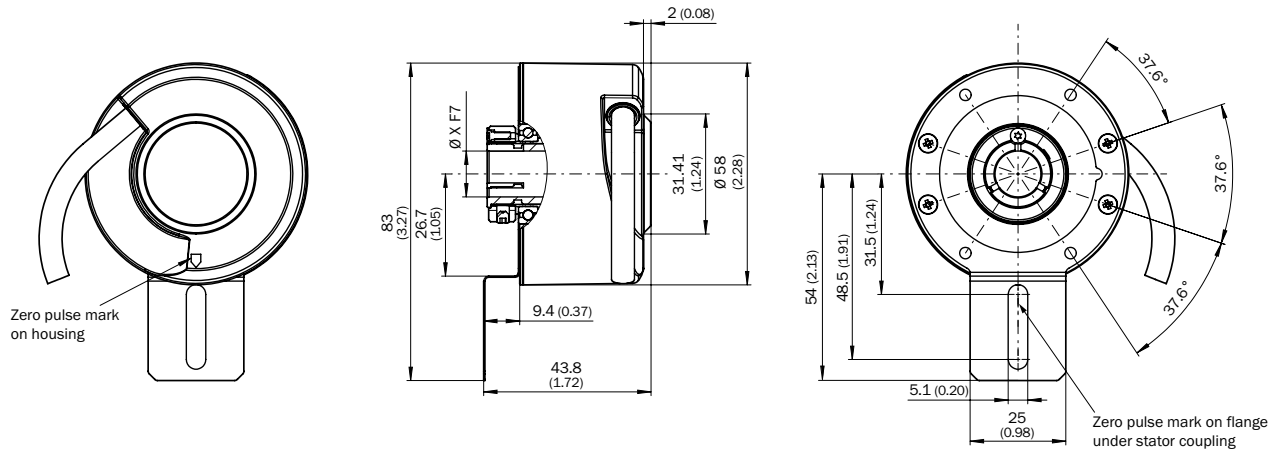
Blind hollow shaft, cable connection, with locating pin assembly



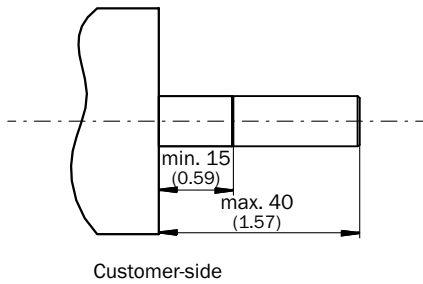
Installation example for blind hollow shaft



Blind hollow shaft, cable connection, stator coupling, 1-sided, slot, bolt circle 33 mm – 48.5 mm

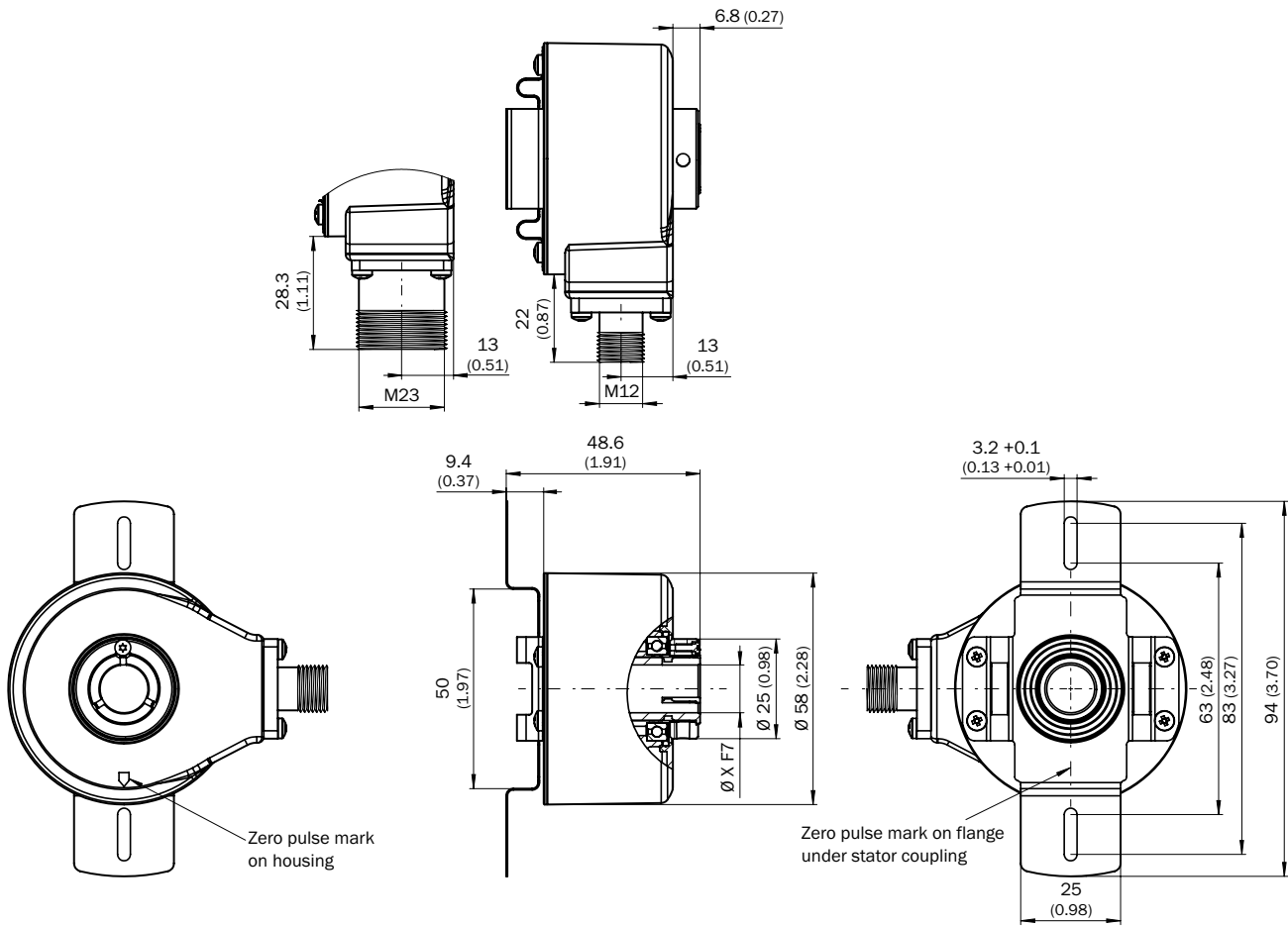


Installation example for blind hollow shaft

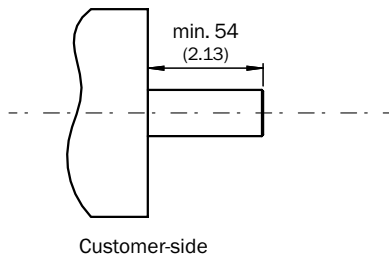


F

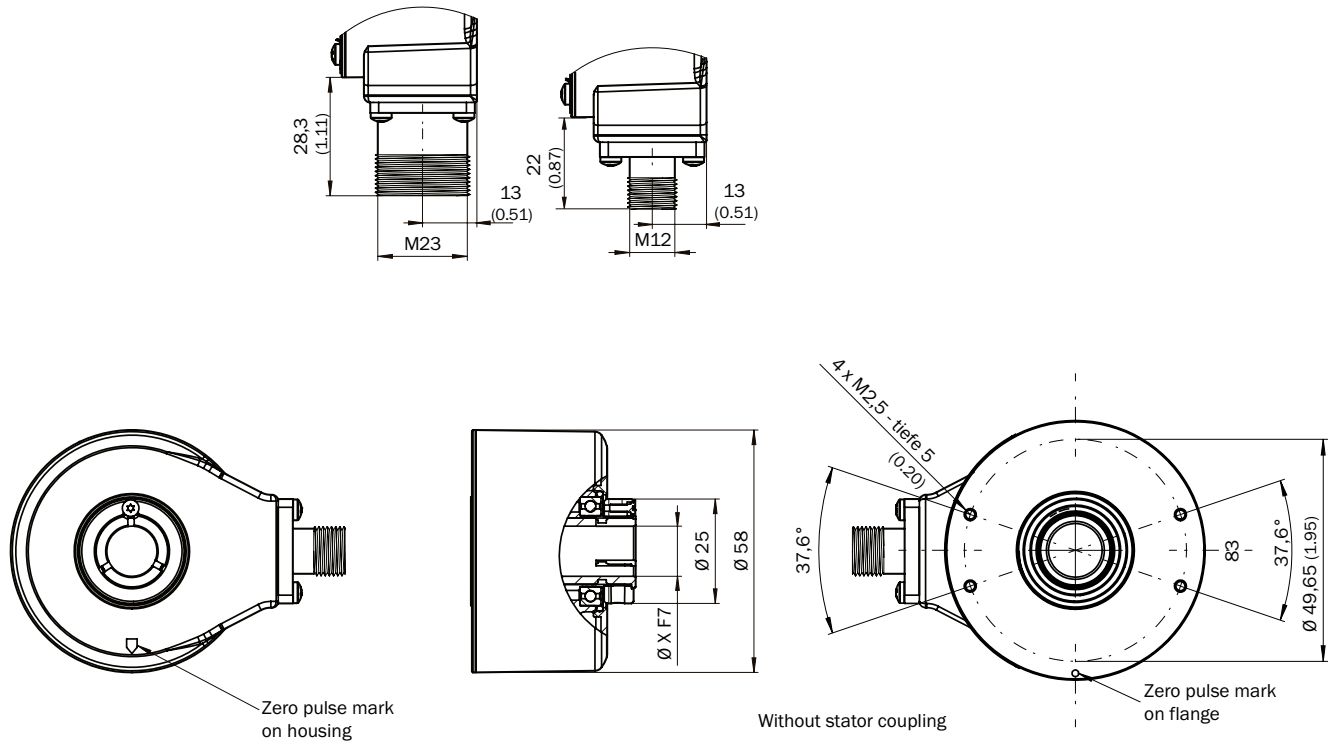
Through hollow shaft clamping at the back, male connector connection, two-sided stator coupling, slot, screw hole circle 63 mm – 83 mm



Installation example for through hollow shaft

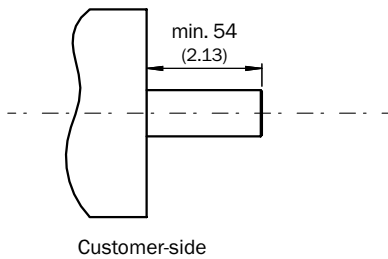


Through hollow shaft clamping at the back, male connector connection, no stator coupling

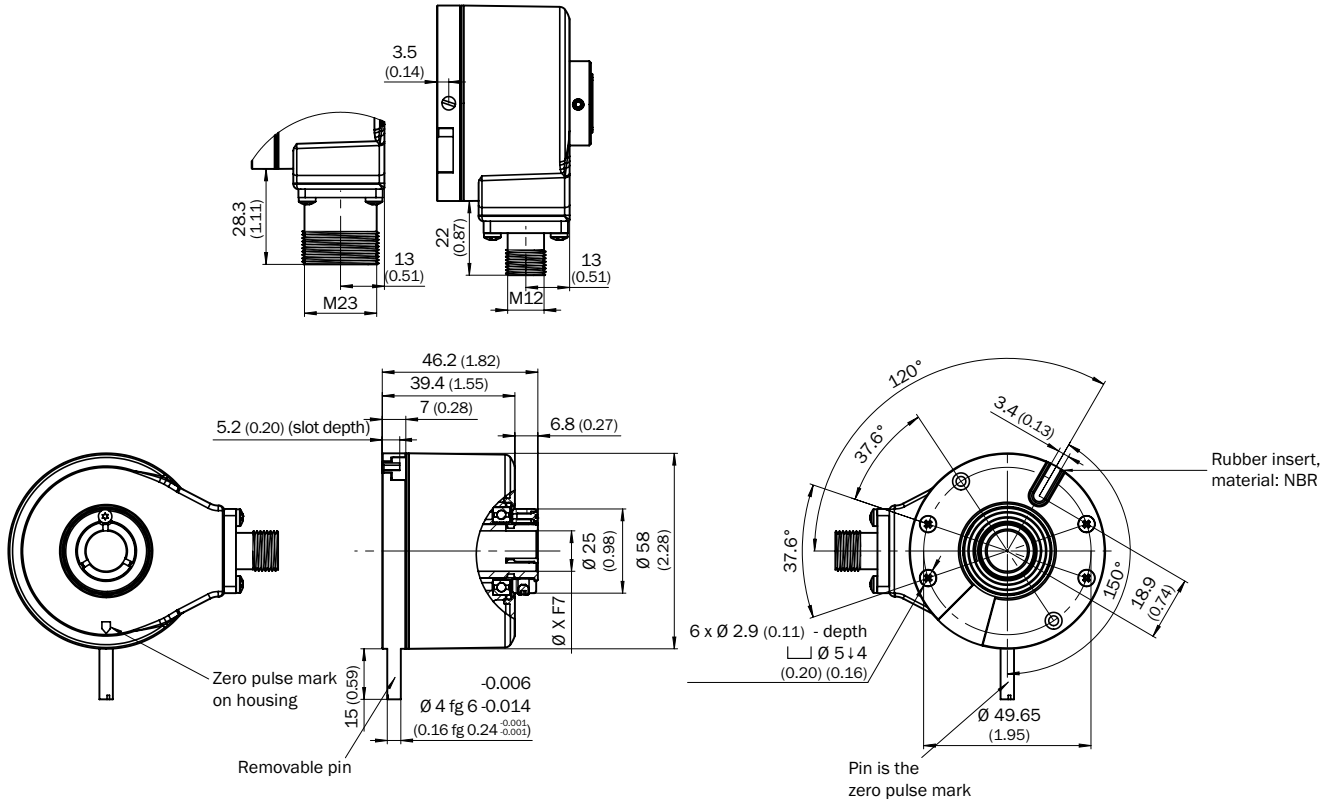


Installation example for through hollow shaft

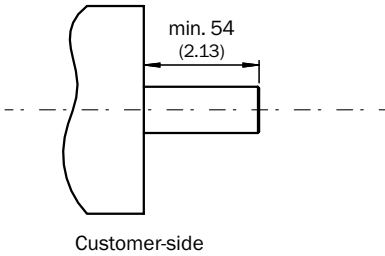
F



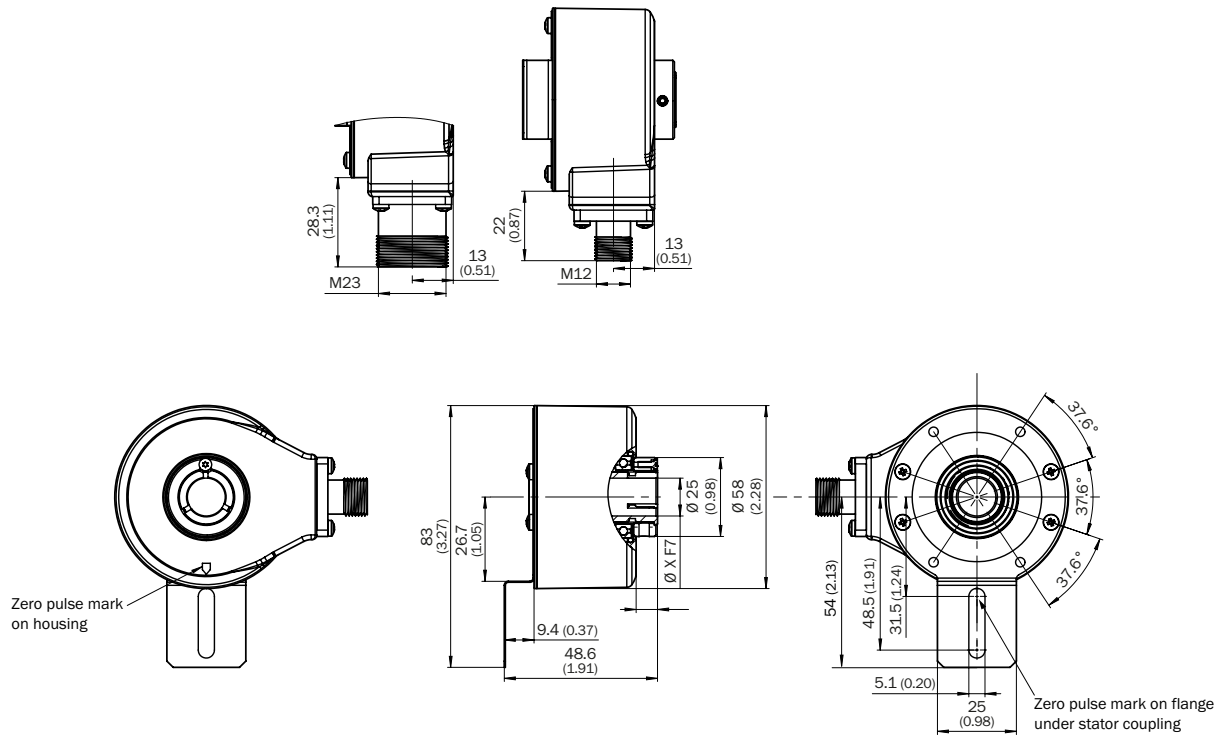
Through hollow shaft clamping at the back, male connector connection, with locating pin assembly



Installation example for through hollow shaft

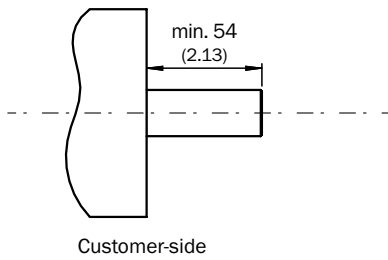


Through hollow shaft clamping at the back, male connector connection, one-sided stator coupling, slot, screw hole circle 33 mm – 48.5 mm

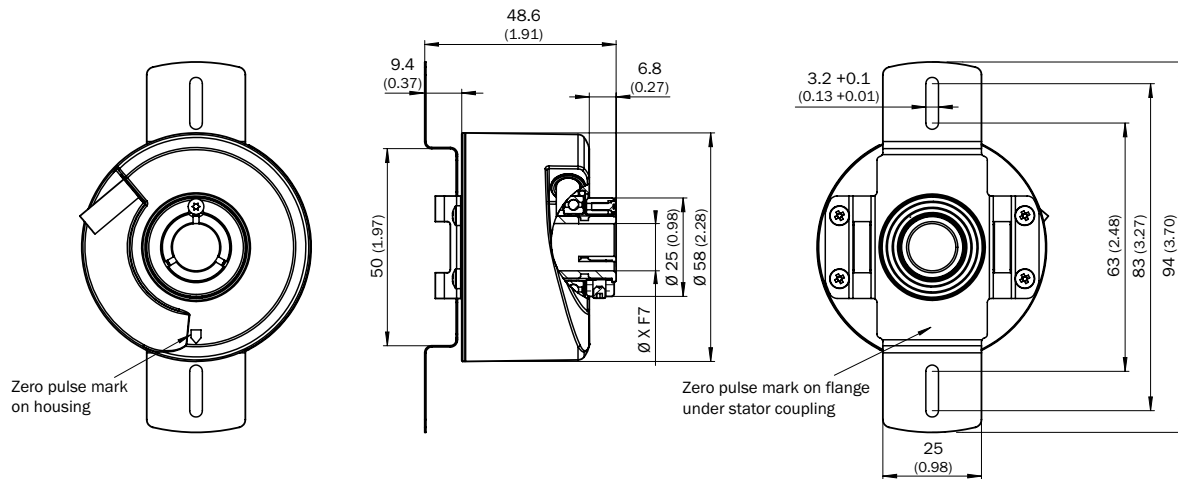


F

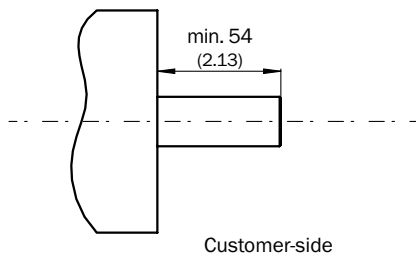
Installation example for through hollow shaft



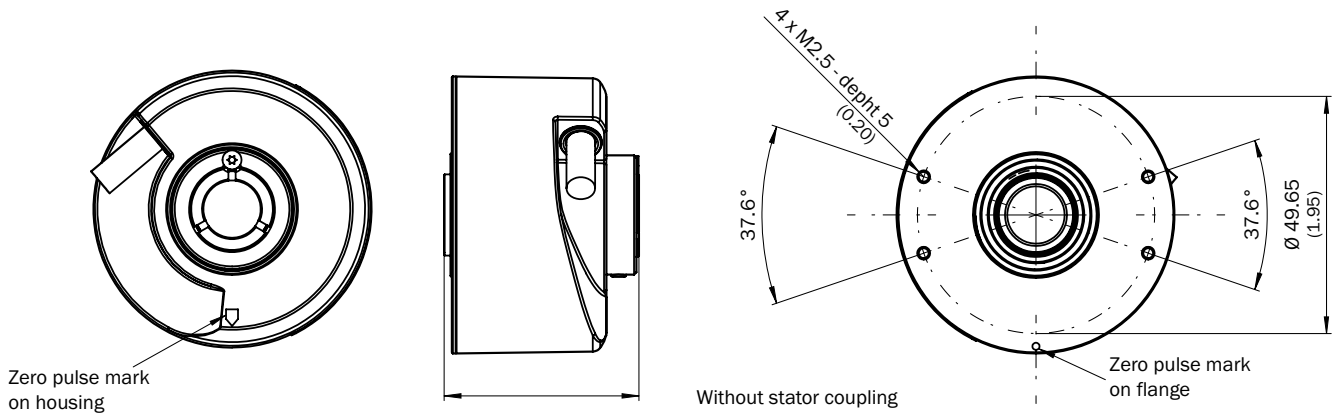
Through hollow shaft clamping at the back, cable connection, two-sided stator coupling, slot, screw hole circle 63 mm – 83 mm



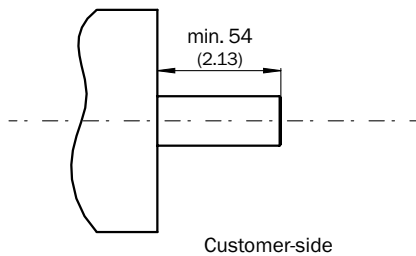
Installation example for through hollow shaft



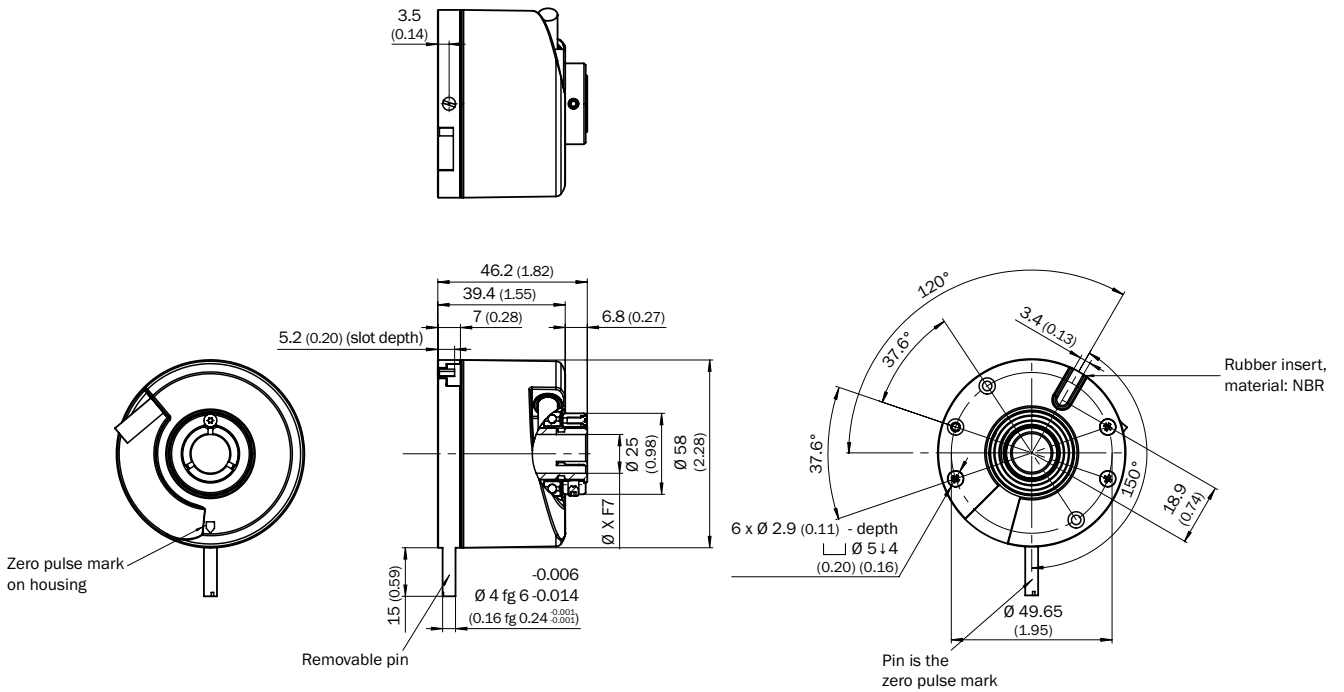
Through hollow shaft clamping at the back, cable connection, no stator coupling



Installation example for through hollow shaft

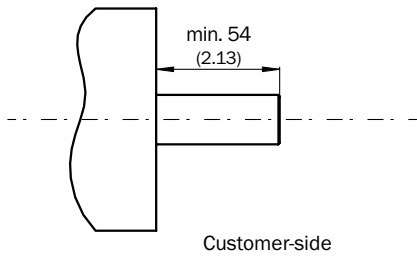


Through hollow shaft clamping at the back, cable connection, with locating pin assembly

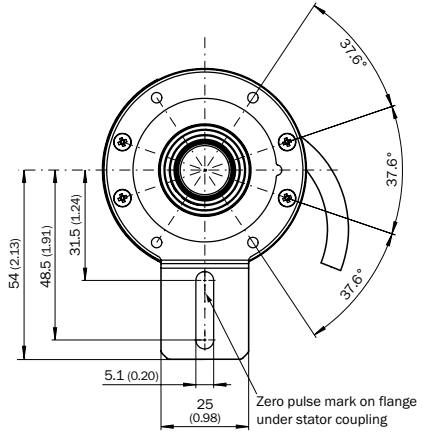
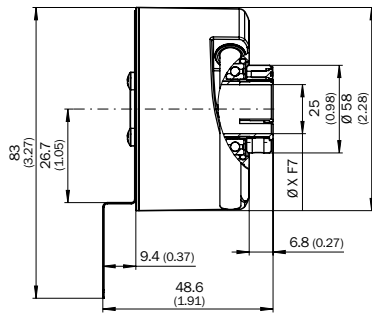
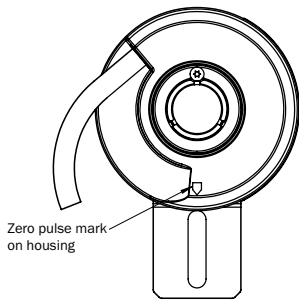
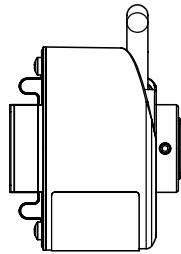


Installation example for through hollow shaft

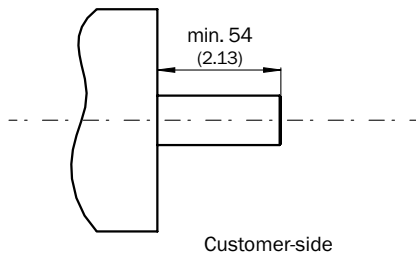
F



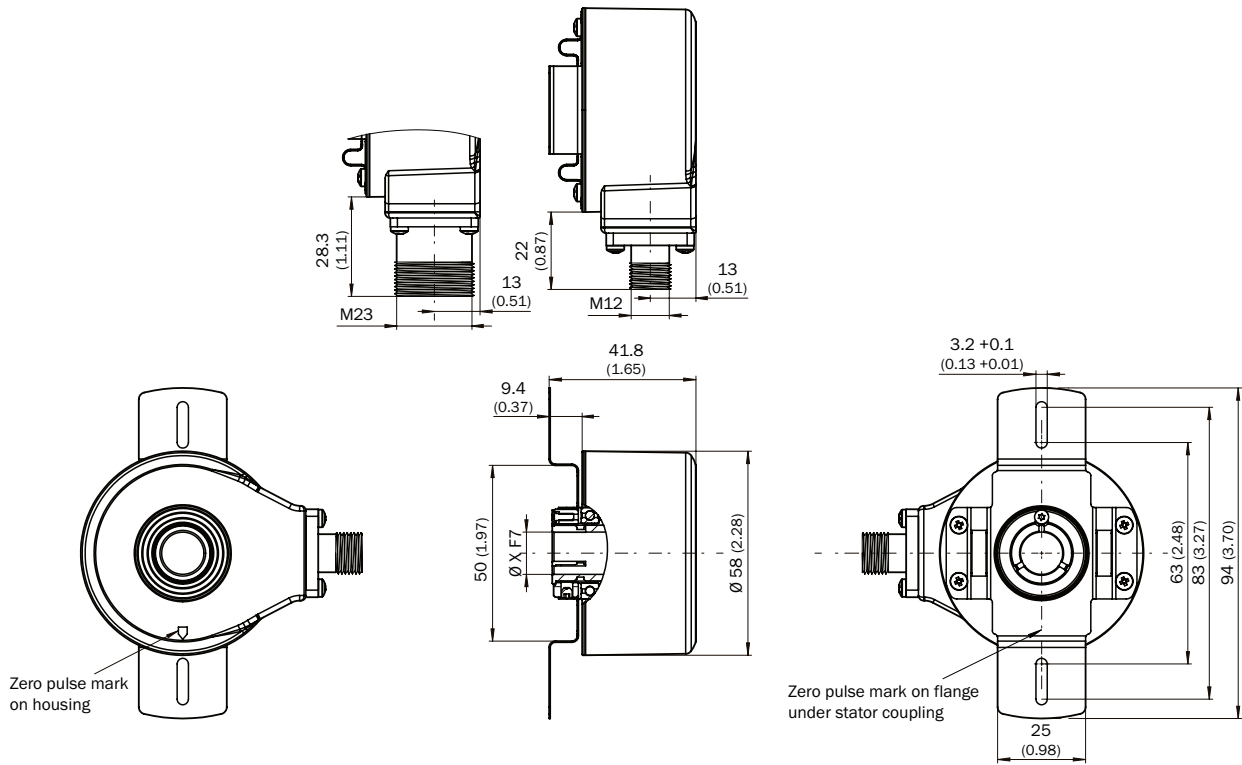
Through hollow shaft clamping at the back, cable connection, one-sided stator coupling, slot, screw hole circle 33 mm – 48.5 mm



Installation example for through hollow shaft

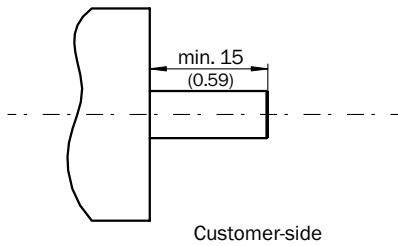


Through hollow shaft clamping at the front, male connector connection, two-sided stator coupling, slot, screw hole circle 63 mm – 83 mm

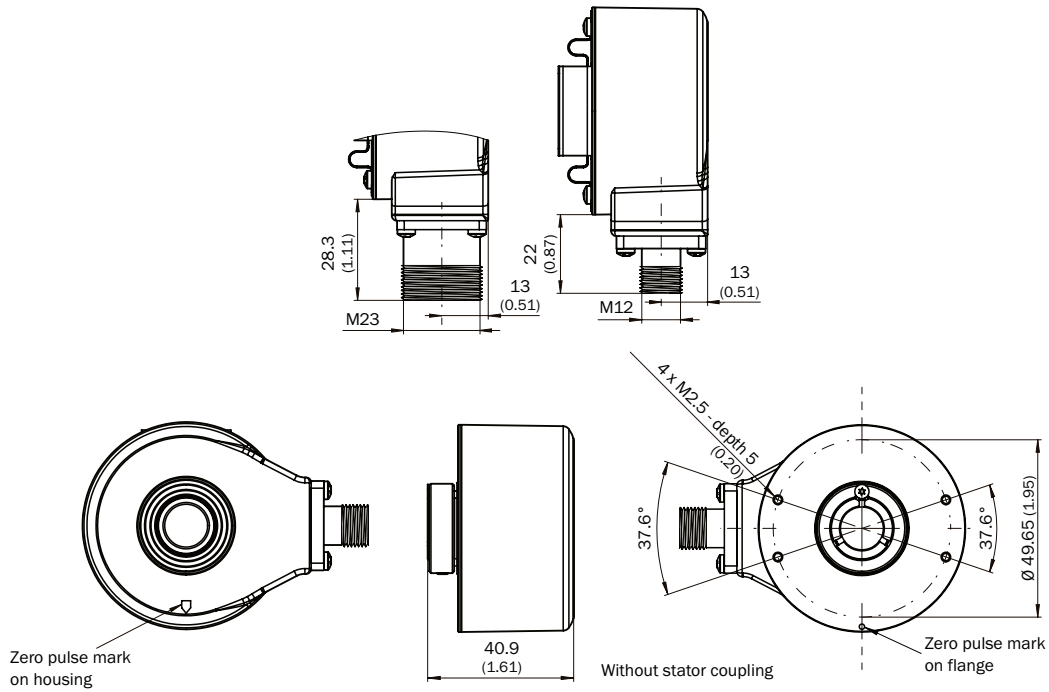


F

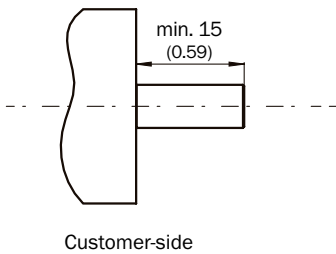
Installation example for through hollow shaft



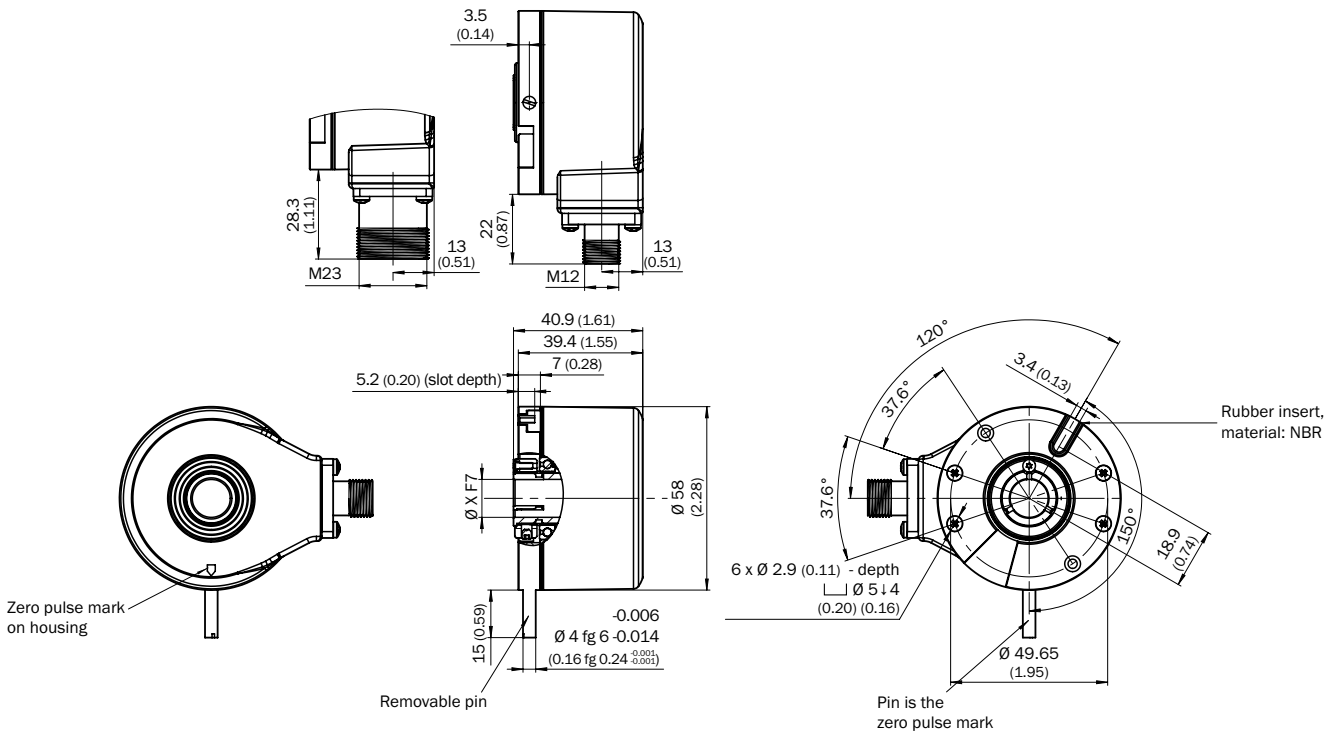
Through hollow shaft clamping at the front, male connector connection, no stator coupling



Installation example for through hollow shaft

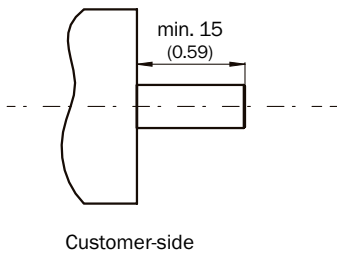


Through hollow shaft, male connector connection, with locating pin assembly

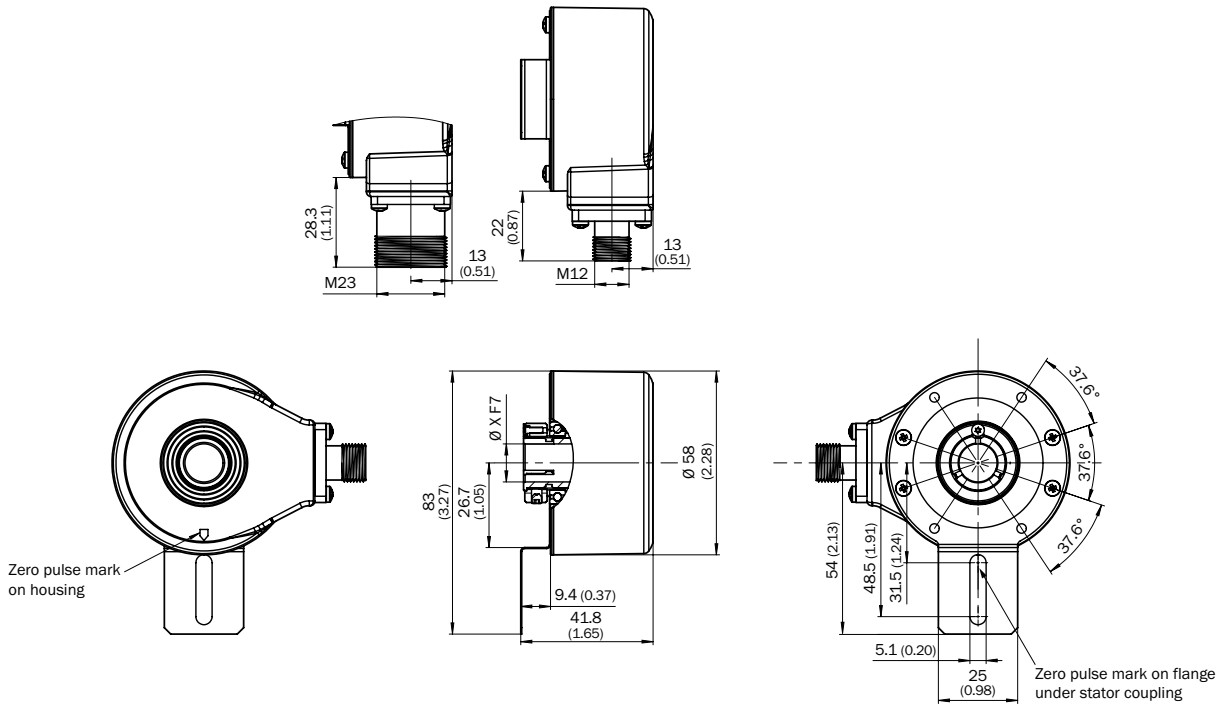


Installation example for through hollow shaft

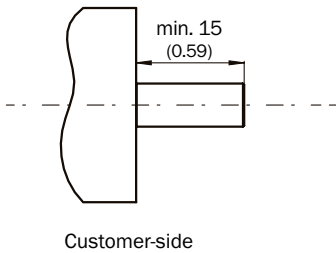
F



Through hollow shaft, male connector connection, stator coupling, 1-sided, slot, bolt circle 33 mm – 48.5 mm

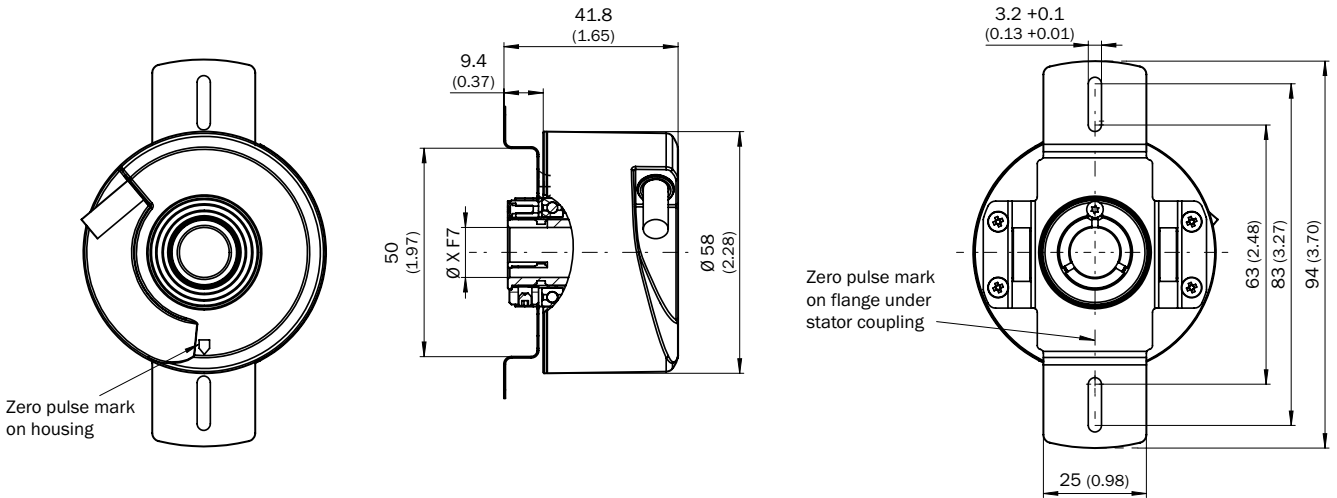


Installation example for through hollow shaft

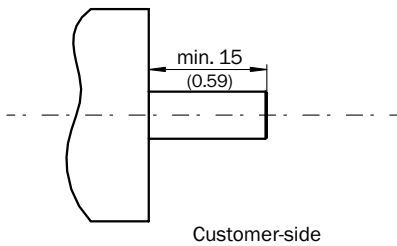


F

Through hollow shaft clamping at the front, cable connection, two-sided stator coupling, slot, screw hole circle 63 mm – 83 mm

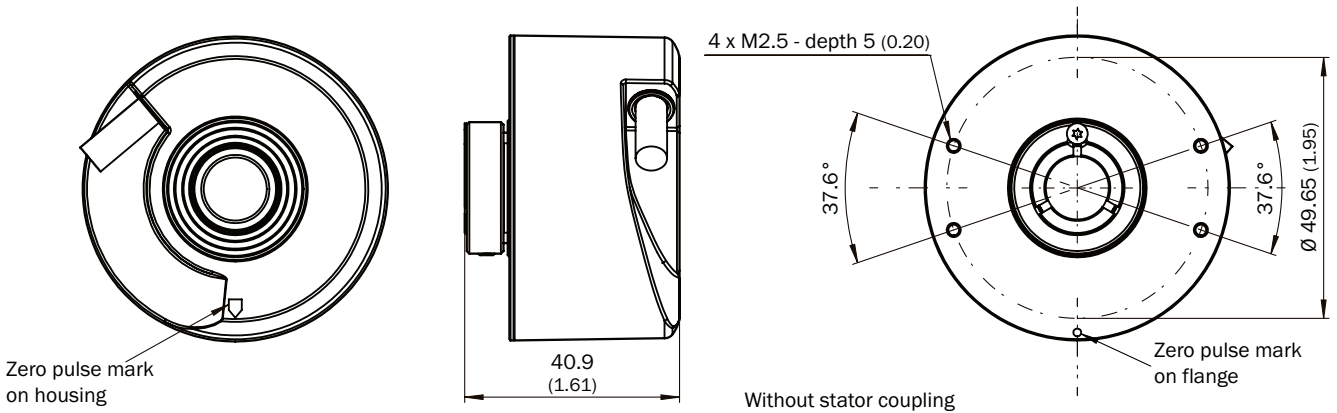


Installation example for through hollow shaft

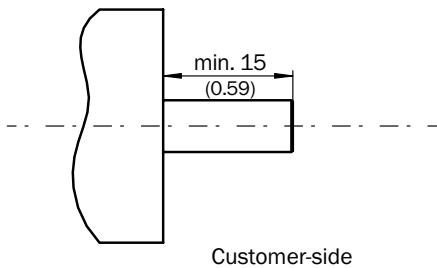


F

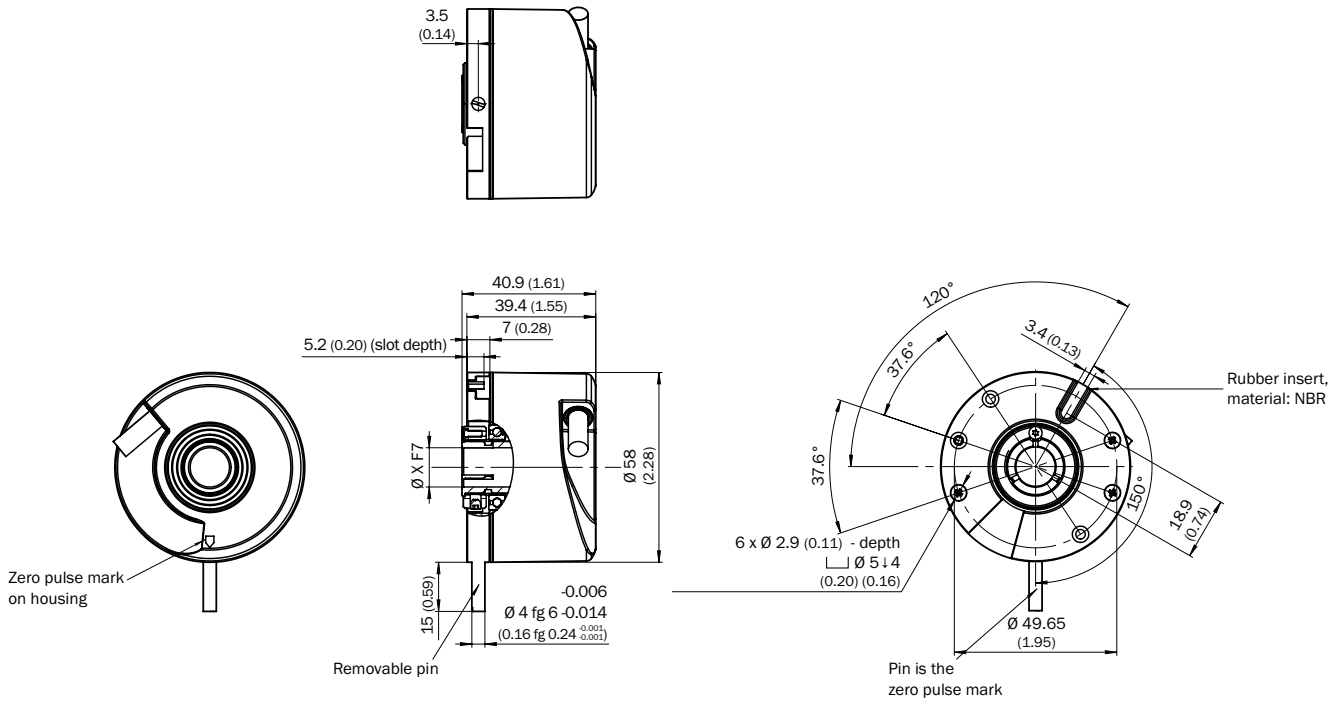
Through hollow shaft clamping at the front, cable connection, no stator coupling



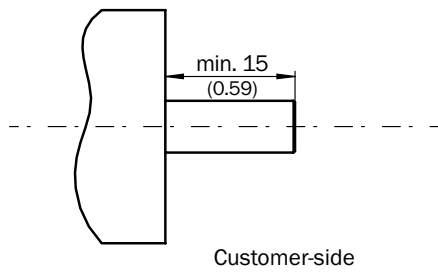
Installation example for through hollow shaft



Through hollow shaft, cable connection, with locating pin assembly

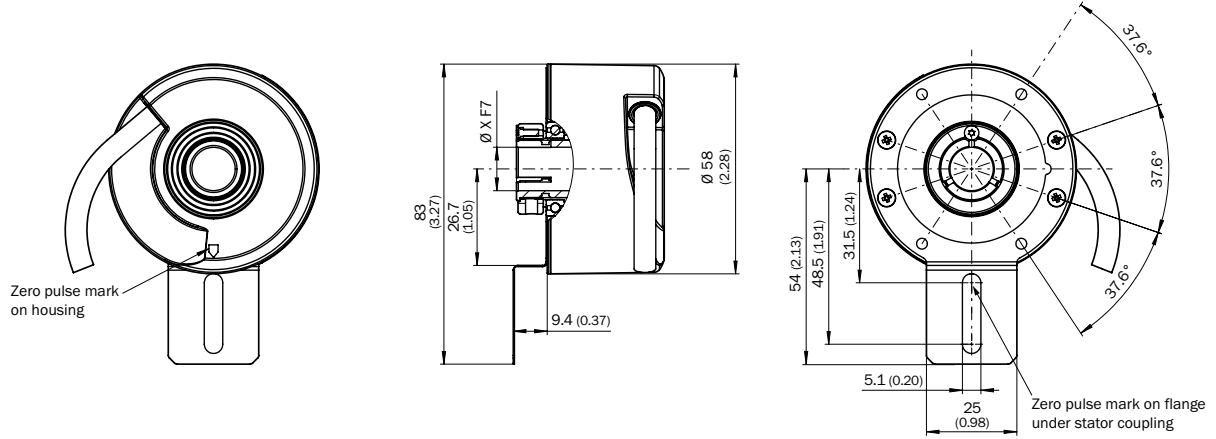


Installation example for through hollow shaft

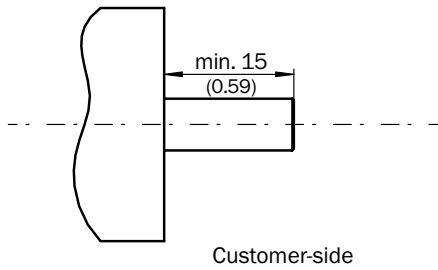


F

Through hollow shaft, cable connection, stator coupling, 1-sided, slot, bolt circle 33 mm – 48.5 mm



Installation example for through hollow shaft

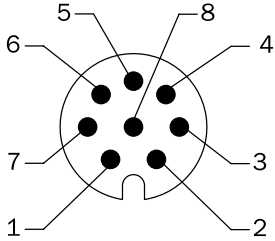


F

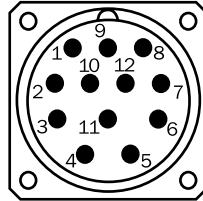
Connection type

8-core cable

View of M12 device connector on cable/housing



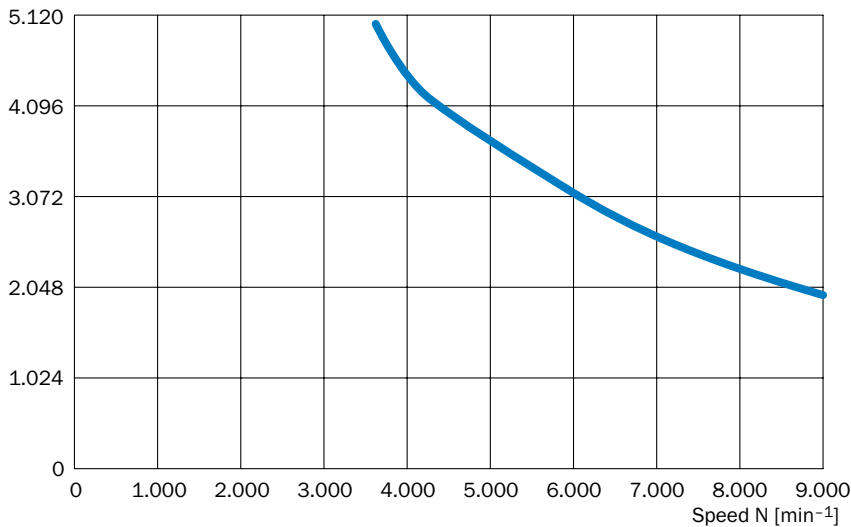
View of M23 device connector on cable/housing



Colour of wires	Pin 12-pole in M12	Pin 12-pole in M23	Signal OC	Signal TTL; HTL	Explanation
Brown	1	6	Not connected	A-	Signal line
White	2	5	A	A	Signal line
Black	3	1	Not connected	B-	Signal line
Pink	4	8	B	B	Signal line
Yellow	5	4	Not connected	Z-	Signal line
Lilac	6	3	Z	Z	Signal line
Blue	7	10	GND	GND	Ground connection of the Encoder
Red	8	12	+Us	+Us	Supply voltage
-	-	9	Not connected	Not connected	Not connected
-	-	2	Not connected	Not connected	Not connected
-	-	11	Not connected	Not connected	Not connected
-	-	7	Not connected	Not connected	Not connected
Screen	Screen	Screen	Screen	Screen	Screen (Screen connected to Encoder housing.)

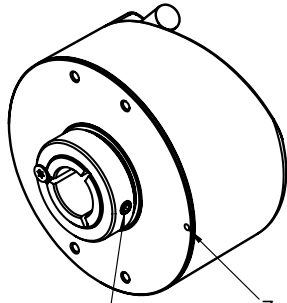
Viewing number of resolutions

Pulses/Revolution



Zero declaration

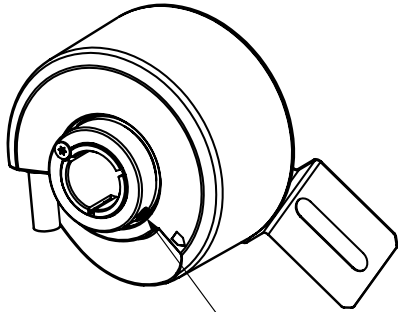
Hollow shaft, clamping at front



Zero pulse mark on flange
Attention!
If stator coupling is mounted,
the zero pulse mark can be
hidden by the stator coupling

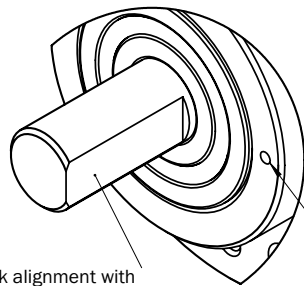
Zero pulse is active when
screw of clamping is in
line with zero pulse
mark on flange or
housing mark

Hollow shaft, clamping at back



Zero pulse is active when
screw of clamping is in
line with zero pulse
mark on flange or
housing mark

Solid shaft

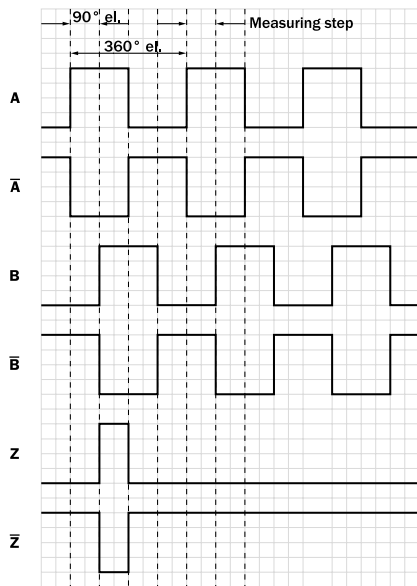


use shaft flat for zero mark alignment with
zero mark on flange or housing

F

Signal outputs

Signal outputs for electrical interfaces TTL and HTL



Supply voltage	Output
4.5 ... 5.5 V	TTL
10 ... 30 V	TTL
10 ... 27 V	HTL
4.5 ... 30 V	TTL/HTL universal

CW with view on the encoder shaft in direction "A", compare dimensional drawing.

Recommended accessories

Mounting systems











Mounting brackets and plates

Mounting bracket

Figure	Brief description	Type	Part no.
	Mounting bracket for encoder with centering hub 36 mm, including mounting kit for face mount flange	BEF-WF-36	2029164

Flanges

Flange plate

Figure	Brief description	Type	Part no.
	Two-sided stator coupling, screw hole circle diameter 63 mm, slot width 3.2 mm	BEF-DS-09	2076214
	Two-sided stator coupling, slot, slot radius 63 mm – 83 mm, slot width 3.2 mm	BEF-DS-10	2076215
	One-sided stator coupling, slots, slot radius 32.75 mm – 142.65 mm, slot width 4.5 mm	BEF-DS-11	2076216
	One-sided stator coupling, slot, slot radius 33 mm – 48.5 mm, slot width 5.1 mm	BEF-DS-12	2076217
	Flange adapter (for hollow shaft) for locating pin assembly (PIN 4 mm)	BEF-DS-13	2076218
	One-sided stator coupling, slot, slot radius 32.1 mm – 37.6 mm, slot width 4.5 mm	BEF-DS-14	2076678
	Flange adapter, adaptation of face mount flange with 36 mm centering hub to 50 mm servo flange, aluminum, including 3 flat head screws M4 x 10	BEF-FA-036-050	2029160
	Flange adapter, adaptation of face mount flange with 36 mm centering hub to 60 mm square mounting plate, aluminum, including 3 flat head screws M4 x 10	BEF-FA-036-060REC	2029162
	Flange adapter, adaptation of face mount flange with 36 mm centering hub to 58 mm square mounting plate with shock absorbers, aluminum	BEF-FA-036-060RSA	2029163
	Flange adapter, adaptation of face mount flange with 36 mm centering hub to 63 mm square mounting plate, aluminum, including 3 flat head screws M4 x 10	BEF-FA-036-063REC	2034225


F

Other mounting accessories



Measuring wheels and measuring wheel systems

Figure	Brief description	Type	Part no.
	Measuring wheel with smooth plastic surface (Hytrel) for 10 mm solid shaft, circumference 200 mm	BEF-MR-010020	5312988
	Measuring wheel with ridged plastic surface (Hytrel) for 10 mm solid shaft, circumference 200 mm	BEF-MR-010020G	5318678
	Measuring wheel with smooth plastic surface (Hytrel) for 10 mm solid shaft, circumference 500 mm	BEF-MR-010050	5312989
	Measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 200 mm	BEF-MR006020R	2055222
	Measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 300 mm	BEF-MR006030R	2055634
	Measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 500 mm	BEF-MR006050R	2055225
	Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 200 mm	BEF-MR010020R	2055224
	Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm	BEF-MR010030R	2049278
	Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 500 mm	BEF-MR010050R	2055227
	O-ring for measuring wheels (circumference 200 mm)	BEF-OR-053-040	2064061
	O-ring for measuring wheels (circumference 300 mm)	BEF-OR-083-050	2064076
	O-ring for measuring wheels (circumference 500 mm)	BEF-OR-145-050	2064074

Mounting bell

Figure	Brief description	Type	Part no.
	Mounting bell for encoders with a servo flange, centering hub 50 mm, including mounting kit	BEF-MG-50	5312987

Servo clamps

Figure	Brief description	Type	Part no.
	Half-shell servo clamps (2 pcs.) for servo flanges with a 50 mm centering hub	BEF-WG-SF050	2029165
	Servo clamps, large, for servo flanges (clamps, eccentric fastener), 3 pcs., without mounting material	BEF-WK-SF	2029166

Shaft adaptation

Collets and clamping rings








Figure	Brief description	Type	Part no.
	Metal collet for hollow shaft, shaft diameter 8 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-008-M	2076219
	Metal collet for hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-38Z-M	2076224
	Metal collet for hollow shaft, shaft diameter 10 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-010-M	2076220
	Metal collet for hollow shaft, shaft diameter 12 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-012-M	2076221
	Metal collet for hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-12Z-M	2076225
	Metal collet for hollow shaft, shaft diameter 14 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-014-M	2076222

Figure	Brief description	Type	Part no.
	Metal collet for hollow shaft, shaft diameter 15 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-015-M	2076223
	Plastic isolated collet for hollow shaft, shaft diameter 6 mm, outer diameter 5/8" (15.875 mm), plastic	SPZ-58Z-006-P	2076228
	Plastic isolated collet for hollow shaft, shaft diameter 8 mm, outer diameter 5/8" (15.875 mm), plastic	SPZ-58Z-008-P	2076229
	Plastic isolated collet for hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 5/8" (15.875 mm), plastic	SPZ-58Z-38Z-P	2076226
	Plastic isolated collet for hollow shaft, shaft diameter 10 mm, outer diameter 5/8" (15.875 mm), plastic	SPZ-58Z-010-P	2076230
	Plastic isolated collet for hollow shaft, shaft diameter 12 mm, outer diameter 5/8" (15.875 mm), plastic	SPZ-58Z-012-P	2076231
	Plastic isolated collet for hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 5/8" (15.875 mm), plastic	SPZ-58Z-12Z-P	2076227
	Plastic isolated collet for hollow shaft, shaft diameter 14 mm, outer diameter 5/8" (15.875 mm), plastic	SPZ-58Z-014-P	2076232
	Plastic isolated collet for hollow shaft, shaft diameter 15 mm, outer diameter 5/8" (15.875 mm), plastic	SPZ-58Z-015-P	2076233

Shaft couplings




Figure	Brief description	Type	Part no.
	Bellows coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular $\pm 4^\circ$; max. speed 10,000 rpm, -30°C to $+120^\circ\text{C}$, max. torque 80 Ncm; material: stainless steel bellows, aluminum hub	KUP-0606-B	5312981
	Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular $\pm 4^\circ$; max. speed 10,000 rpm, -30°C to $+120^\circ\text{C}$, max. torque 80 Ncm; material: stainless steel bellows, aluminum hub	KUP-0610-B	5312982
	Bellows coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular $\pm 4^\circ$; max. speed 10,000 rpm, -30°C to $+120^\circ\text{C}$, max. torque 80 Ncm; material: stainless steel bellows, aluminum hub	KUP-1010-B	5312983
	Bellows coupling, shaft diameter 10 mm/12 mm; maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular $\pm 4^\circ$; max. speed 10,000 rpm, -30°C to $+120^\circ\text{C}$, max. torque 80 Ncm; material: stainless steel bellows, aluminum clamping hubs	KUP-1012-B	5312984
	Bar coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial ± 0.3 mm, axial ± 0.2 mm, angle $\pm 3^\circ$; max. speed 10,000 rpm, -10°C to $+80^\circ\text{C}$, max. torque 80 Ncm; material: fiber-glass reinforced polyamide, aluminum hub	KUP-0606-S	2056406
	Bar coupling, shaft diameter 6 mm / 8 mm, maximum shaft offset radial ± 0.3 mm, axial ± 0.2 mm, angle $\pm 3^\circ$; max. speed 10,000 rpm, torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub	KUP-0608-S	5314179
	Bar coupling, shaft diameter 6 mm/10 mm, maximum shaft offset: radial ± 0.3 mm, axial ± 0.2 mm, angular $\pm 3^\circ$; max. speed 10,000 rpm, -10°C to $+80^\circ\text{C}$, max. torque 80 Ncm; material: fiber-glass reinforced polyamide, aluminum hub	KUP-0610-S	2056407
	Bar coupling, shaft diameter 8 mm / 10 mm, maximum shaft offset: radial ± 0.3 mm, axial ± 0.2 mm, angular $\pm 3^\circ$; torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub	KUP-0810-S	5314178
	Bar coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset radial ± 0.3 mm, axial ± 0.2 mm, angle $\pm 3^\circ$; max. speed 10,000 rpm, torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub	KUP-1010-S	2056408
	Spring washer coupling, shaft diameter 6 mm/10 mm, maximum shaft offset: radial ± 0.3 mm, axial ± 0.4 mm, angular $\pm 2.5^\circ$; max. speed 12,000 rpm, -10°C to $+80^\circ\text{C}$, max. torque 60 Ncm; material: aluminum flange, fiber-glass reinforced polyamide membrane and tempered steel coupling pin	KUP-0610-F	5312985
	Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset: radial ± 0.3 mm, axial ± 0.4 mm, angular $\pm 2.5^\circ$; max. speed 12,000 rpm, -10°C to $+80^\circ\text{C}$, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin	KUP-1010-F	5312986

F

Connectors

Plug connectors and cables



Connecting cables with female connector

Figure	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm ² , Ø 7.0 mm	2 m	DOL-1208-G02MAC1	6032866
		5 m	DOL-1208-G05MAC1	6032867
		10 m	DOL-1208-G10MAC1	6032868
		20 m	DOL-1208-G20MAC1	6032869
	Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm ² + 2 x 0.5 mm ² + 1 x 0.14 mm ² , Ø 7.8 mm ¹⁾	2 m	DOL-2312-G02MLA3	2030682
		7 m	DOL-2312-G07MLA3	2030685
		10 m	DOL-2312-G10MLA3	2030688
		15 m	DOL-2312-G15MLA3	2030692
		20 m	DOL-2312-G20MLA3	2030695
		25 m	DOL-2312-G25MLA3	2030699
	Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, suitable for drag chain, PUR, shielded, 4 x 2 x 0.25 mm ² + 2 x 0.5 mm ² + 1 x 0.14 mm ² , Ø 7.8 mm ¹⁾	1.5 m	DOL-2312-G1M5MA3	2029212
		3 m	DOL-2312-G03MMA3	2029213
		5 m	DOL-2312-G05MMA3	2029214
		10 m	DOL-2312-G10MMA3	2029215
		20 m	DOL-2312-G20MMA3	2029216
		30 m	DOL-2312-G30MMA3	2029217





¹⁾ Warning! Only in combination with electrical interfaces A, C, E and P.

F



Female connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: female connector, M12, 8-pin, straight, A encoded, shielded, for cable diameter 4 mm ... 8 mm Head B: - Operating temperature: -40 °C ... +85 °C	DOS-1208-GA01	6045001
	Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: - Operating temperature: -20 °C ... +130 °C	DOS-2312-G	6027538

Cables (ready to assemble)

Figure	Brief description	Length of cable	Type	Part no.
	Head A: cable Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm ² , Ø 5.6 mm	By the meter	LTG-2308-MWENC	6027529
	Head A: cable Head B: cable Cable: PUR, shielded, 4 x 2 x 0.25 mm ² + 2 x 0.5 mm ² + 1 x 0.14 mm ² , Ø 7.5 mm		LTG-2411-MW	6027530
	Head A: cable Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm ² + 2 x 0.5 mm ² + 2 x 0.14 mm ² , Ø 7.8 mm		LTG-2512-MW	6027531
	Head A: cable Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, UV and saltwater resistant, 4 x 2 x 0.25 mm ² + 2 x 0.5 mm ² + 2 x 0.14 mm ² , Ø 7.8 mm		LTG-2612-MW	6028516

Male connector (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: male connector, M12, 8-pin, straight, A encoded, shielded, for cable diameter 4 mm ... 8 mm Head B: - Operating temperature: -40 °C ... +85 °C	STE-1208-GA01	6044892
	Head A: male connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: Operating temperature: -20 °C ... +130 °C	STE-2312-G	6027537

→ For additional accessories, please see page K-668 onwards

F

F