



## AHS/AHM36 SAE J1939 Inox

RESISTANT, SMART, COMPACT:  
ENCODERS FOR HARSH ENVIRONMENTS

Absolute encoders

**SICK**  
Sensor Intelligence.

# RESISTANT, SMART, COMPACT: ENCODERS FOR HARSH ENVIRONMENTS



## Product description

The AHS/AHM36 SAE J1939 Inox absolute encoders set standards in resistance to environmental influences and SAE J1939 communication in mobile automation. Due to the stainless-steel design and enclosure rating IP69K, the encoders are suitable for use in very harsh ambient conditions. With various mounting hole patterns and adapter flanges, the AHS/AHM36 SAE J1939 Inox absolute encoders fit into nearly

every application. The configuration can be individually adjusted when integrating into the SAE J1939 network. The rugged, reliable, fully magnetic sensor system achieves a maximum resolution of 14 bits for the singleturn variant and maximum 26 bits for the multiturn variant.

## At a glance

- Compact 36 mm absolute encoder with maximum 26 bits (AHM36) or 14 bits (AHS36)
- Housing, flange, shaft made of stainless steel 1.4305
- IP69K enclosure rating
- Face mount flange, servo flange, blind hollow shaft
- M12 male connector or cable connection
- SAE J1939 interface with configurable parameterization
- Operating temperature range: -40 °C ... +85 °C

## Your benefits

- High resistance to environmental influences due to stainless-steel design
- Enclosure rating IP69K and shaft sealing ring for optimal tightness
- Simple network installation with various configuration options
- Quick and easy mechanical installation with various mounting hole patterns and many different shafts
- Rugged, reliable, fully-magnetic sensors which can also be used in harsh environments



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→ [www.sick.com/AHS\\_AHM36\\_SAE\\_J1939\\_Inox](http://www.sick.com/AHS_AHM36_SAE_J1939_Inox)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



## Fields of application

Measurement of absolute position and speed in various mobile automation applications, such as agricultural and forestry machines, construction and mining machines, special and municipal vehicles.

Applications with high demands on the protection class as well as the resistance to aggressive media

## Detailed technical data

### Performance

	Singleturn	Multiturn
<b>Number of steps per revolution (max. resolution)</b>	16,384 (14 bit)	–
<b>Max. resolution (number of steps per revolution x number of revolutions)</b>	–	14 bit x 12 bit (16,384 x 4,096)
<b>Error limits G</b>	0.35° (at 20 °C) <sup>1)</sup>	
<b>Repeatability standard deviation <math>\sigma_r</math></b>	0.2° (at 20 °C) <sup>2)</sup>	

<sup>1)</sup> In accordance with DIN ISO 1319-1, position of the upper and lower error limit depends on the installation situation, specified value refers to a symmetrical position, i.e. deviation in upper and lower direction is the same.

<sup>2)</sup> In accordance with DIN ISO 55350-13; 68.3% of the measured values are inside the specified area.

## Interfaces

<b>Communication interface</b>	SAE J1939	
<b>Address setting</b>	0 ... 253, (Address Claiming: 0...240) default: 224	
<b>Data transmission rate (baud rate)</b>	125 kbit/s 250 kbit/s 500 kbit/s, default: 250 kbit/s	
<b>Process data</b>	Position, speed, temperature	
<b>Parameterising data</b>	Singleturn	Number of steps per revolution PRESET Counting direction Sampling rate for speed calculation Unit for output of the speed value
	Multiturn	Number of steps per revolution Number of revolutions PRESET Counting direction Sampling rate for speed calculation Unit for output of the speed value
<b>Status information</b>	CAN status via status LED	
<b>Bus termination</b>	Via external terminator <sup>1)</sup>	
<b>Initialization time</b>	2 s <sup>2)</sup>	

<sup>1)</sup> See accessories.

<sup>2)</sup> Valid positional data can be read once this time has elapsed.

Electrical data

<b>Connection type</b>	Male connector, M12, 5-pin, universal Cable, 5-wire, universal, 0.5 m Cable, 5-wire, universal, 1.5 m Cable, 5-wire, universal, 3 m Cable, 5-wire, universal, 5 m
<b>Supply voltage</b>	10 ... 30 V
<b>Power consumption</b>	≤ 1.5 W (without load)
<b>Reverse polarity protection</b>	✓
<b>MTTFd: mean time to dangerous failure</b>	270 years (EN ISO 13849-1) <sup>1)</sup>

<sup>1)</sup> 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 components, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

Mechanical data

<b>Shaft diameter</b>	6 mm 8 mm 10 mm 1/4" 3/8" 6 mm <sup>1)</sup> 10 mm <sup>2)</sup>
<b>Shaft length</b>	
Solid shaft, Servo flange	12 mm
Solid shaft, face mount flange	12 mm 24 mm
<b>Weight</b>	0.2 kg <sup>3)</sup>
<b>Shaft material</b>	Stainless steel 1,4305
<b>Flange material</b>	Stainless steel 1,4305
<b>Housing material</b>	Stainless steel 1,4305
<b>Material, cable</b>	PUR
<b>Start up torque</b>	1 Ncm, +20 °C
<b>Operating torque</b>	< 1 Ncm, +20 °C
<b>Permissible shaft movement, static (for hollow shafts only)</b>	± 0.3 mm (radial) ± 0.3 mm (axial)
<b>Permissible shaft movement, dynamic (for hollow shafts only)</b>	± 0.1 mm (radial) ± 0.1 mm (axial)
<b>Permissible shaft movement (for solid shafts only)</b>	40 N / radial 20 N / axial
<b>Moment of inertia of the rotor</b>	2.5 gcm <sup>2</sup>
<b>Bearing lifetime</b>	3.6 x 10 <sup>8</sup> revolutions
<b>Angular acceleration</b>	≤ 500,000 rad/s <sup>2</sup>
<b>Operating speed</b>	≤ 6,000 min <sup>-1</sup> <sup>4)</sup>

<sup>1)</sup> For adapting to 1.25 m Ecoline wire draw mechanism; only available for multiturn variants.

<sup>2)</sup> For use with the adapters 2072298 and 2072295.

<sup>3)</sup> Based on devices with male connector.

<sup>4)</sup> Allow for self-heating of 3.5 K per 1,000 rpm when designing the operating temperature range.

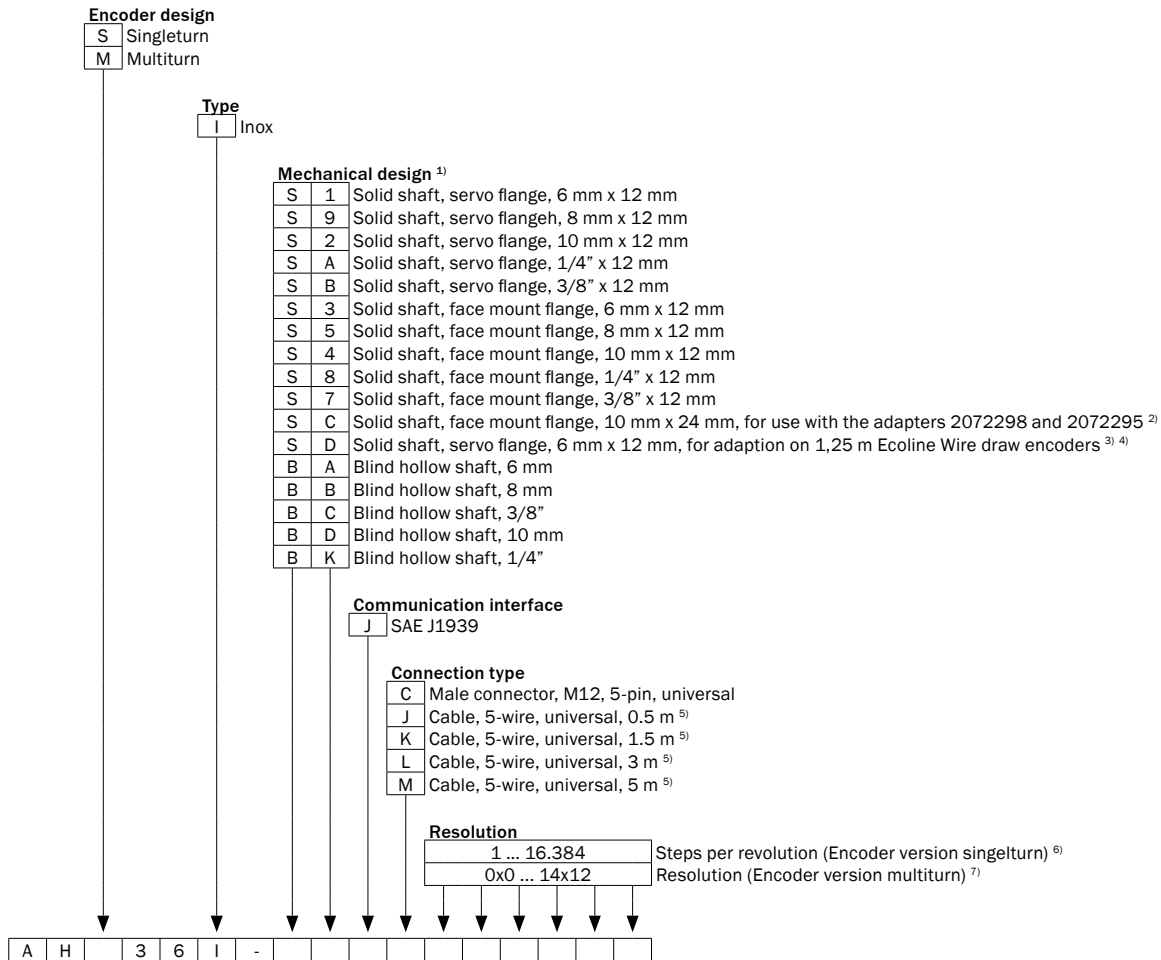
Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3
<b>Enclosure rating</b>	IP67 (according to IEC 60529) IP69K (according to IEC 60529)
<b>Permissible relative humidity</b>	90 % (Condensation not permitted)
<b>Operating temperature range</b>	-40 °C ... +85 °C
<b>Storage temperature range</b>	-40 °C ... +100 °C, without package
<b>Resistance to shocks</b>	100 g, 6 ms (according to EN 60068-2-27)
<b>Resistance to vibration</b>	
Solid shaft Servo flange	20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)
Solid shaft face mount flange	20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)
Blind hollow shaft	20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6) <sup>1) 2)</sup>

<sup>1)</sup> With additional mechanical cable mounting.

<sup>2)</sup> For side-mounted encoders (horizontal encoder shaft, vertical stator coupling), additional damping measures may be required in some cases as resonances can arise. Furthermore, the cable must be fastened with the shortest possible distance to the encoder.

Type code



<sup>1)</sup> By using flange adapters, additional mechanical interfaces can be realized. See proposed fittings.

<sup>2)</sup> Permissible shaft load is lower than mentioned in technical data.

<sup>3)</sup> Only with encoder version multiturn.

<sup>4)</sup> Enclosure rating on shaft side always IP65.

<sup>5)</sup> The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

<sup>6)</sup> Steps per revolution programmable via control unit or via PGT-12-Pro.

<sup>7)</sup> Resolution programmable via control unit or via PGT-12-Pro.

## Ordering information

### Singleturn

- **Programmable/configurable:** ✓

Mechanical interface	Shaft diameter	Shaft length	Connection type	Number of steps per revolution	Type	Part no.
Solid shaft, Servo flange	6 mm	12 mm	Male connector, M12, 5-pin, universal	16,384 (14 bit)	AHS36I-S1JC016384	1117926

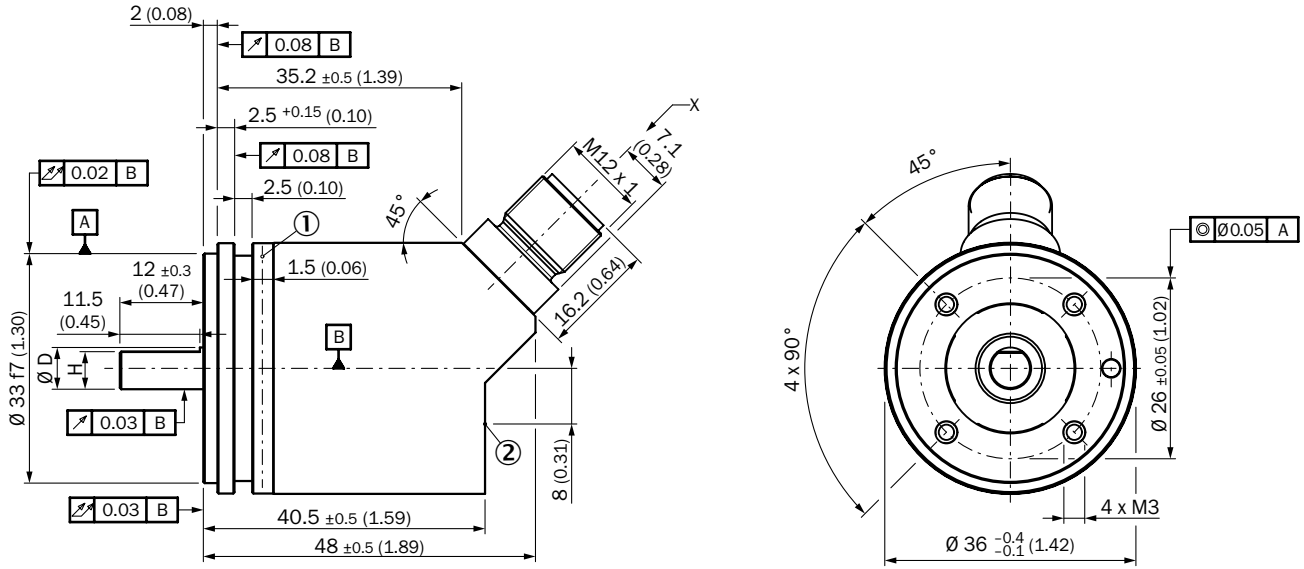
### Multiturn

- **Programmable/configurable:** ✓

Mechanical interface	Shaft diameter	Shaft length	Connection type	Max. resolution	Type	Part no.
Solid shaft, Servo flange	8 mm	12 mm	Male connector, M12, 5-pin, universal	14 bit x 12 bit (16,384 x 4,096)	AHM36I-S9JC014X12	1117930
Solid shaft, face mount flange	6 mm	12 mm			AHM36I-S3JC014X12	1120030
Blind hollow shaft	10 mm	-			AHM36I-BDJC014X12	1120029

Dimensional drawings (Dimensions in mm (inch))

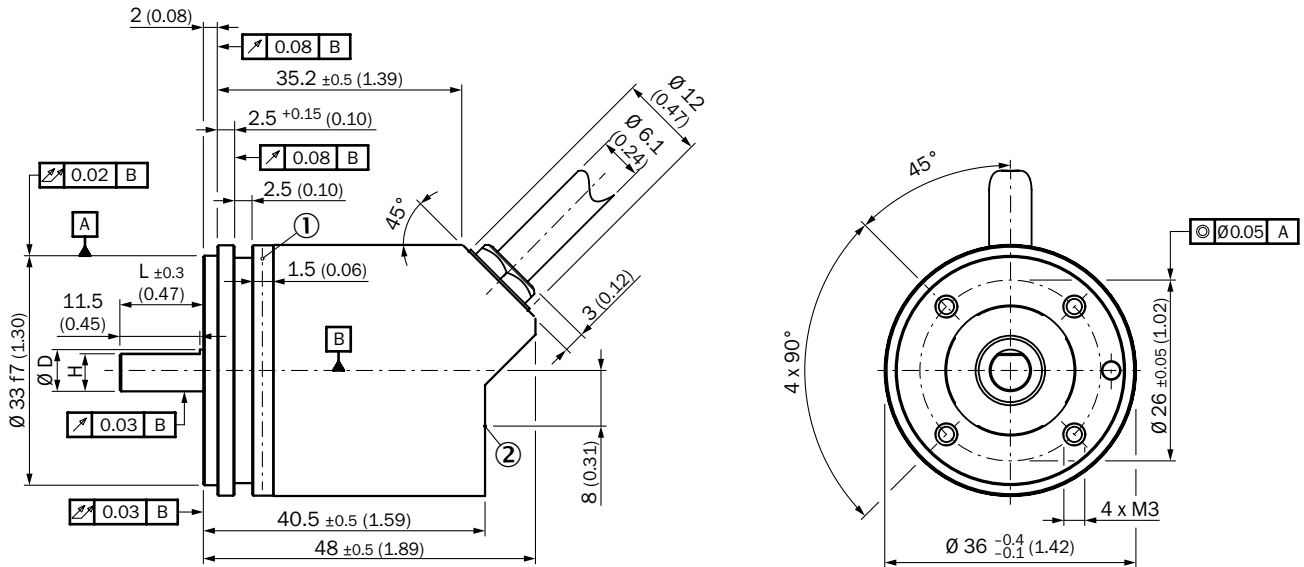
Solid shaft, servo flange, male connector



Non-tolerated dimensions according to DIN-ISO 2768-mk

- ① Measuring point for operating temperature
- ② Measuring point for vibrations

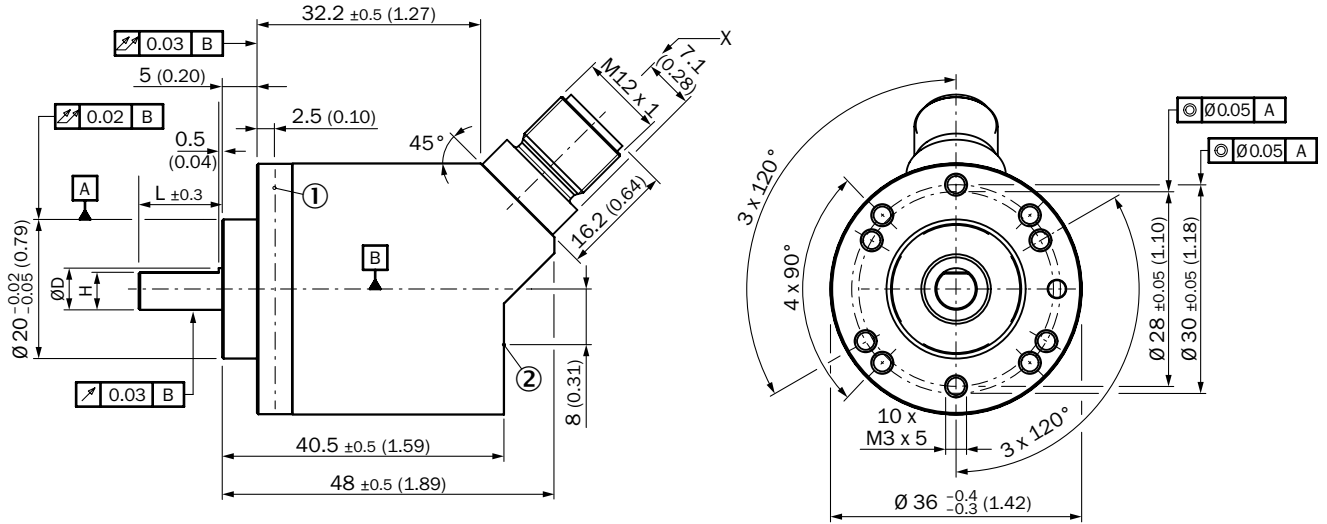
Solid shaft, servo flange, cable



Non-tolerated dimensions according to DIN-ISO 2768-mk

- ① Measuring point for operating temperature
- ② Measuring point for vibrations

Solid shaft, face mount flange, male connector

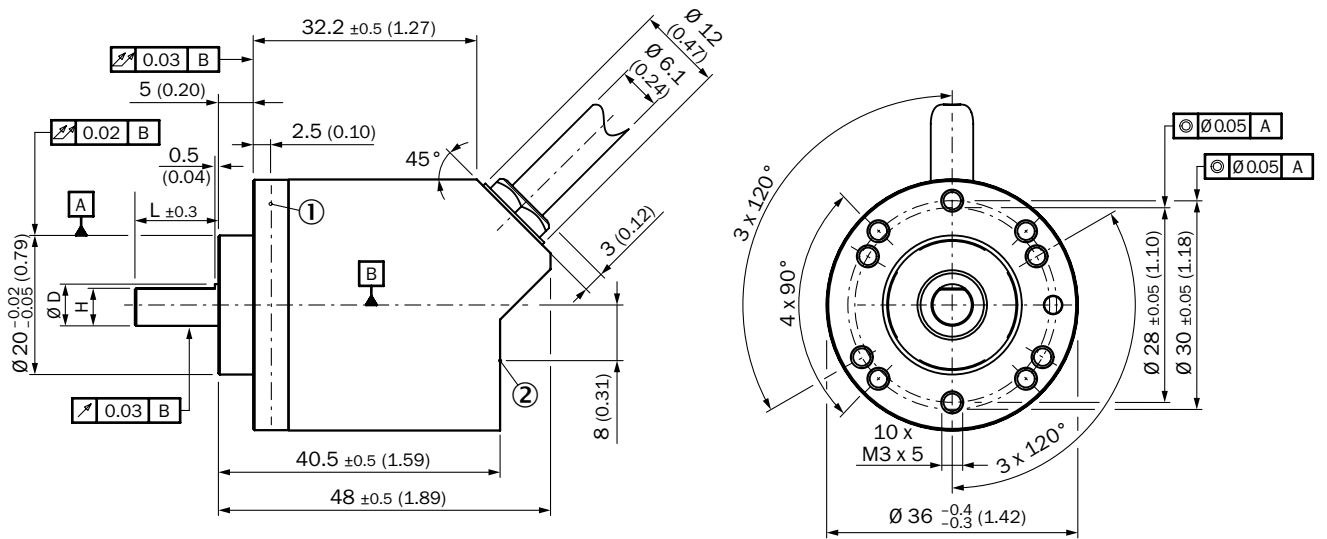


Non-tolerated dimensions according to DIN-ISO 2768-mk

① Measuring point for operating temperature

② Measuring point for vibrations

Solid shaft, face mount flange, cable



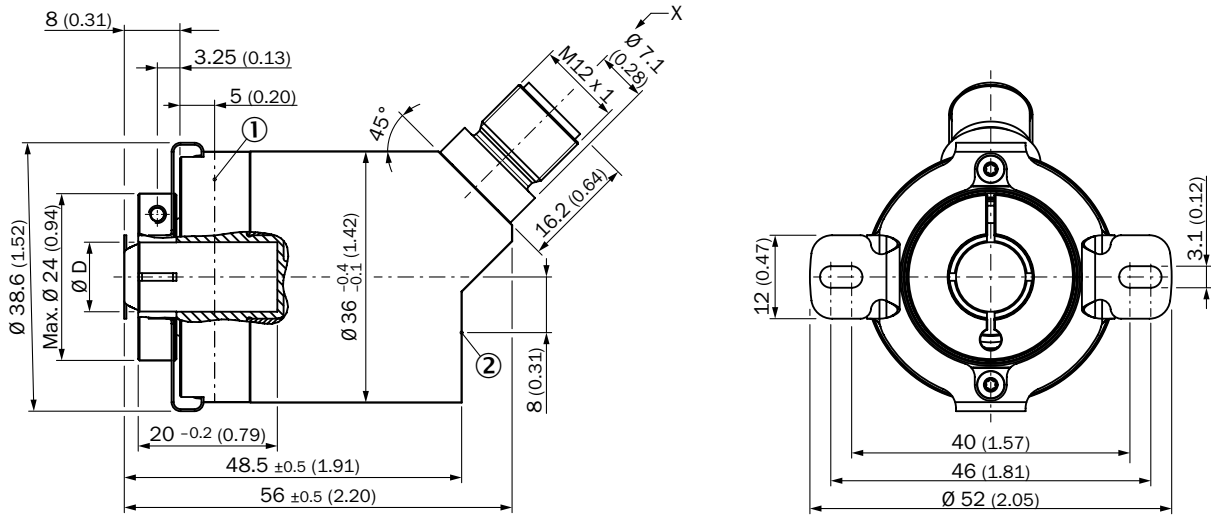
Non-tolerated dimensions according to DIN-ISO 2768-mk

① Measuring point for operating temperature

② Measuring point for vibrations



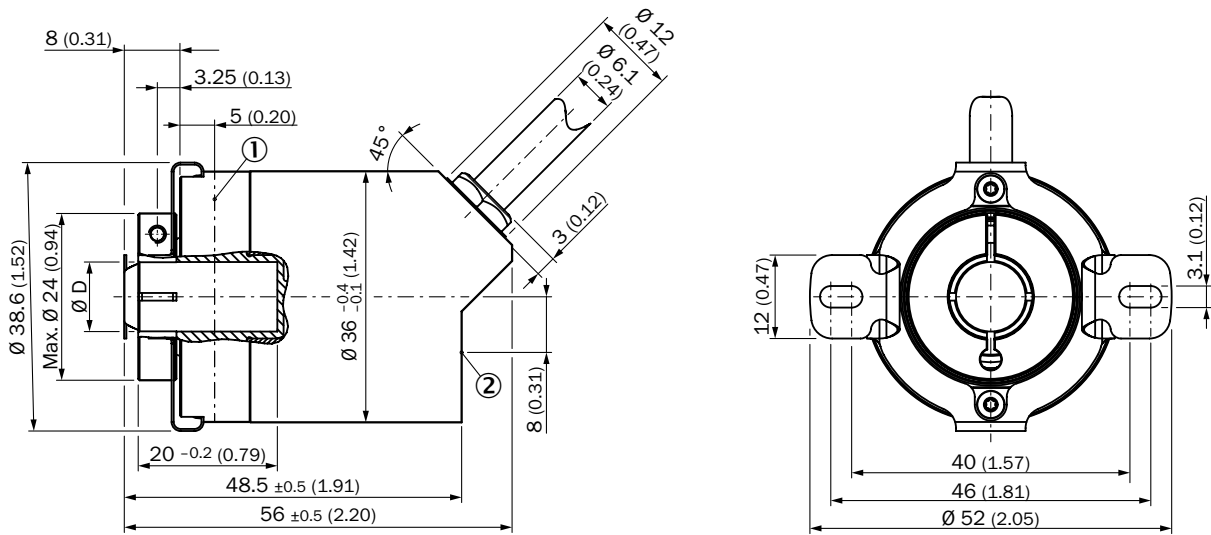
Blind hollow shaft, male connector



Non-tolerated dimensions according to DIN-ISO 2768-mk

- ① Measuring point for operating temperature
- ② Measuring point for vibrations

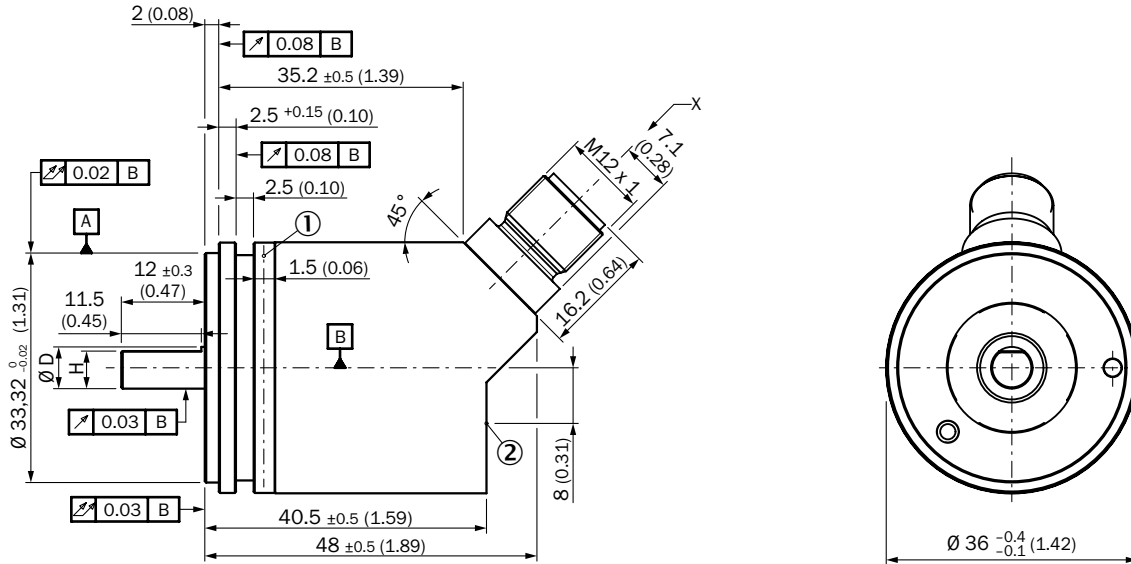
Blind hollow shaft, cable



Non-tolerated dimensions according to DIN-ISO 2768-mk

- ① Measuring point for operating temperature
- ② Measuring point for vibrations

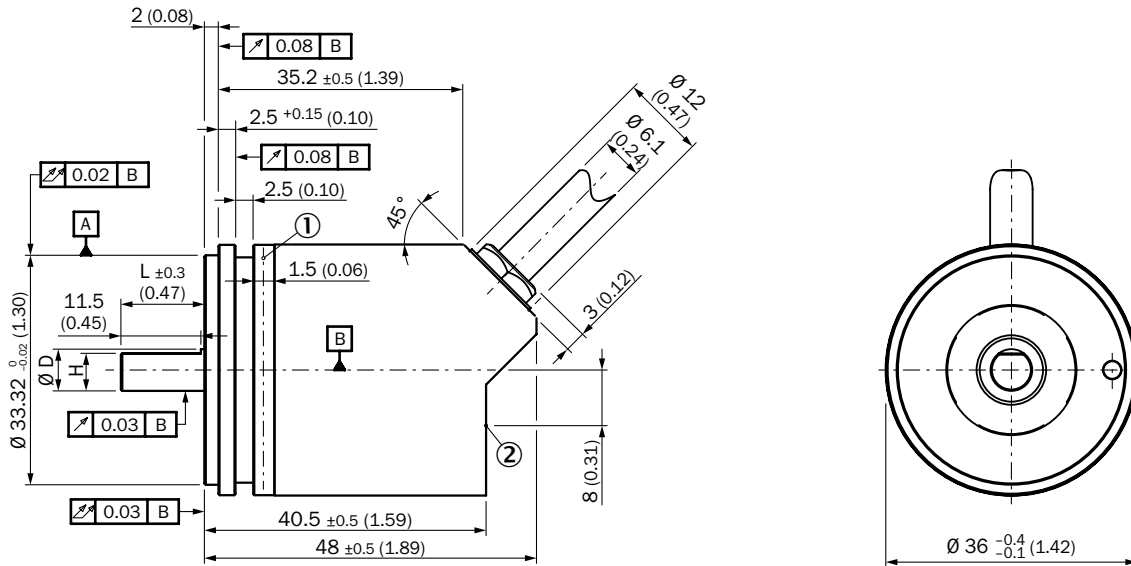
Solid shaft, servo flange, male connector



Non-tolerated dimensions according to DIN-ISO 2768-mk

- ① Measuring point for operating temperature
- ② Measuring point for vibrations

Solid shaft, servo flange, cable

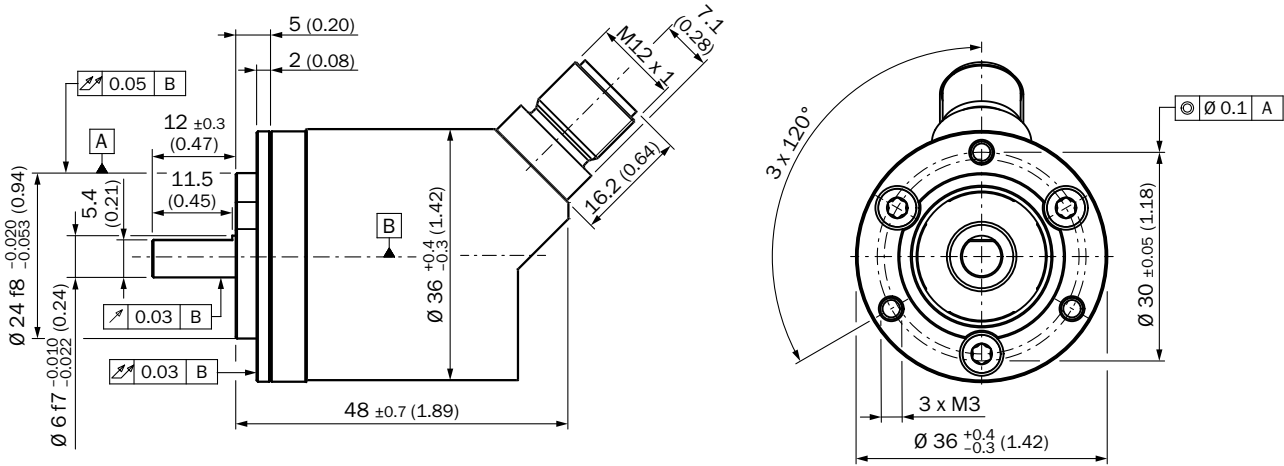


Non-tolerated dimensions according to DIN-ISO 2768-mk

- ① Measuring point for operating temperature
- ② Measuring point for vibrations

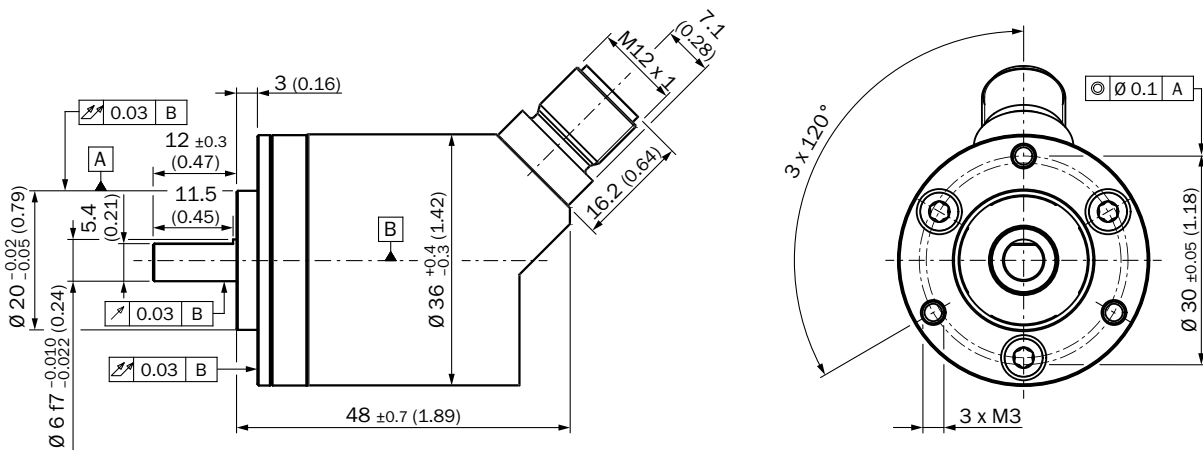
Attachment specifications

Solid shaft, face mount flange with flange adapter, centering collar D20 on D24 (BEF-FA-020-024-I, 2103982)



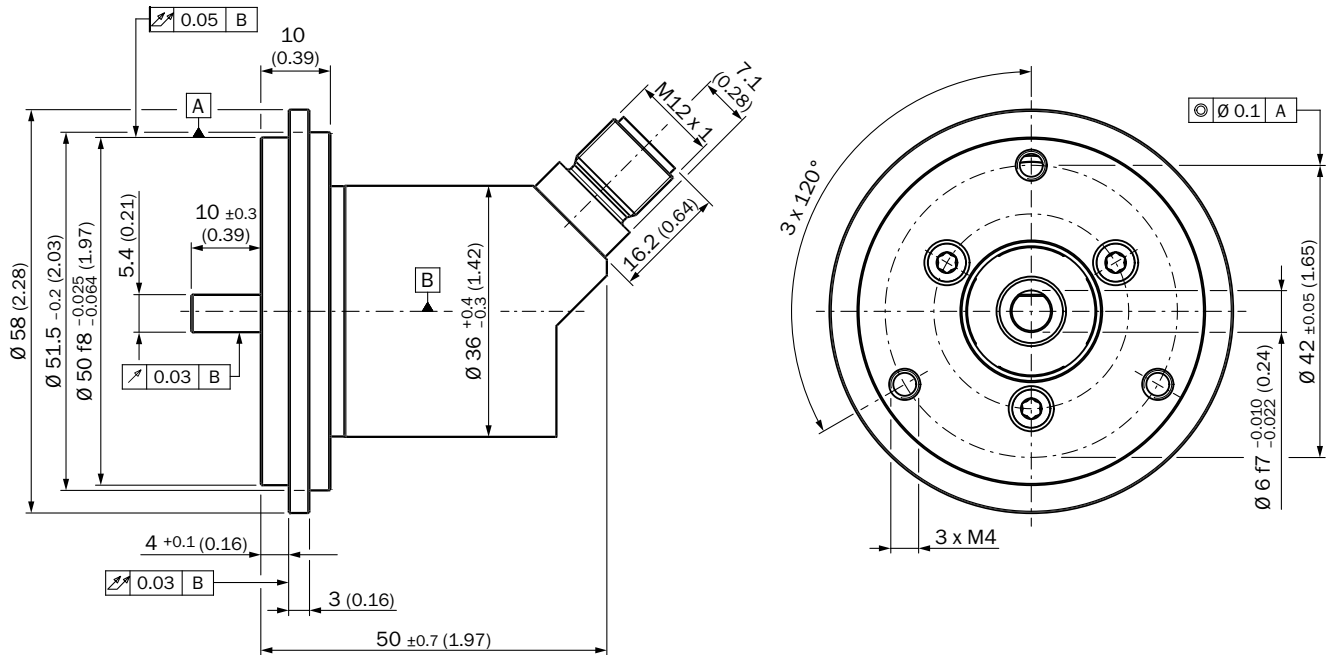
Order example for 6 mm shaft diameter: AHx36I-S3xx0xxxxx + BEF-FA-020-024-I (adapter is not pre-assembled)

Solid shaft, face mount flange with flange adapter, centering collar D20 on D36, 2 mm high (BEF-FA-020-036-2-I, 2103984)



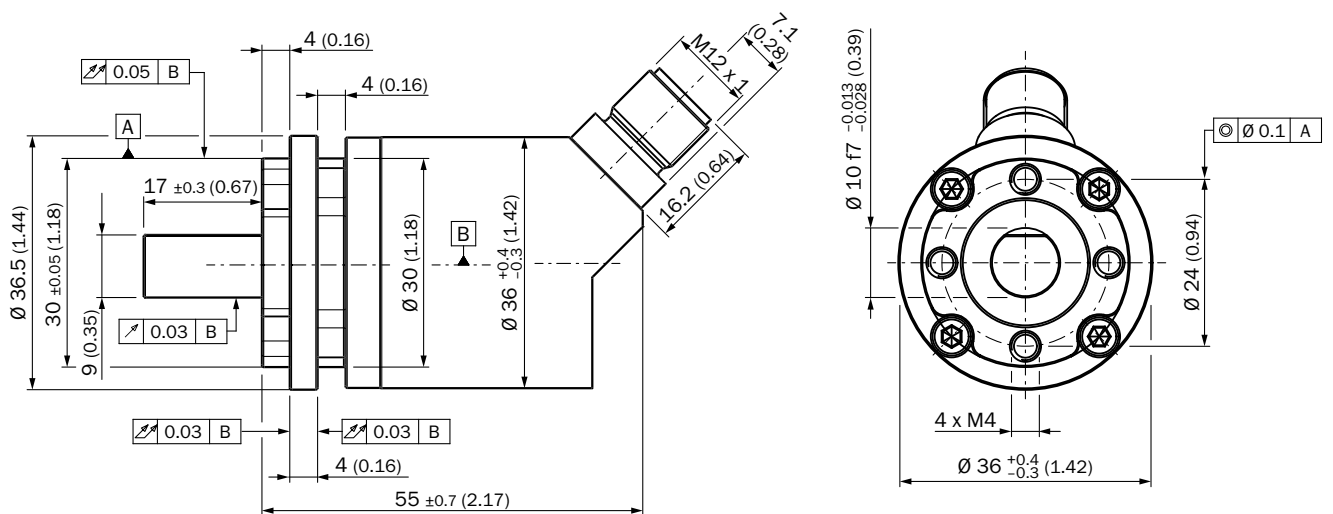
Order example for 6 mm shaft diameter: AHx36I-S3xx0xxxxx + BEF-FA-020-036-2-I (adapter is not pre-assembled)

Solid shaft, face mount flange with flange adapter, centering collar D20 on D50 (BEF-FA-020-050-I, 2103985)



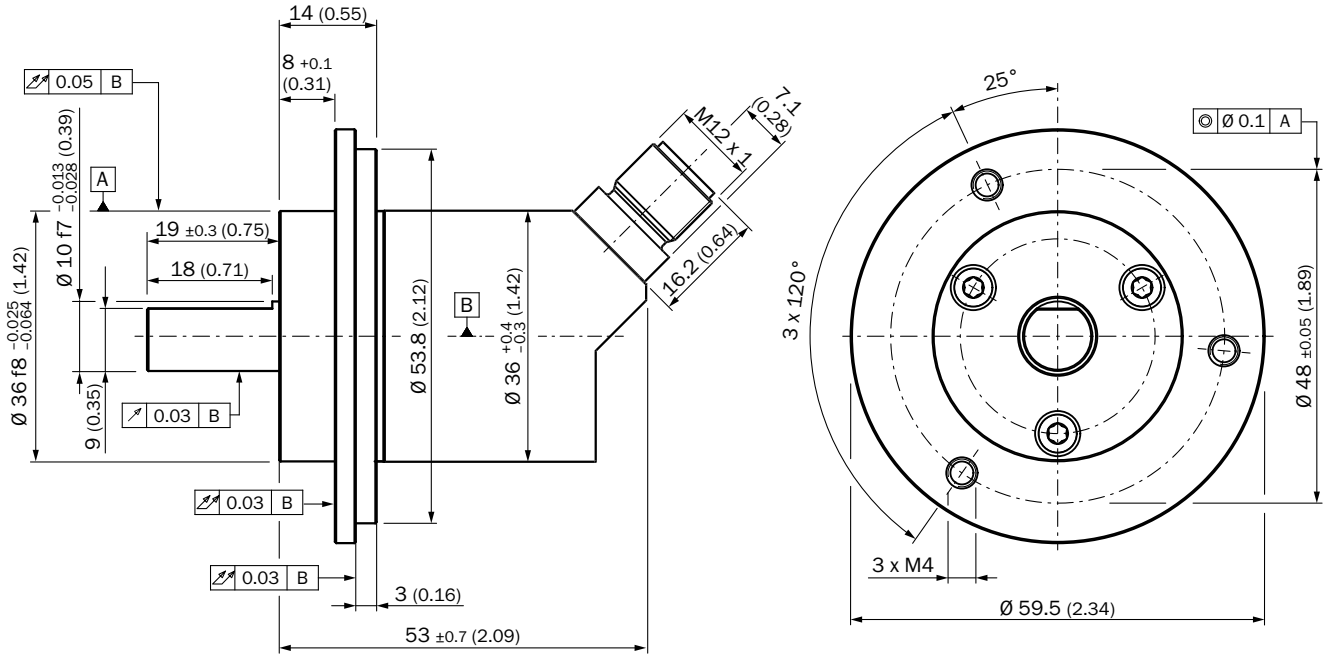
Order example for 6 mm shaft diameter: AHx36I-S3xx0xxxxx + BEF-FA-020-050-I (adapter is not pre-assembled)

Solid shaft, face mount flange with flange adapter, centering collar D20 on D30 (BEF-FA-020-030-I, 2103983)



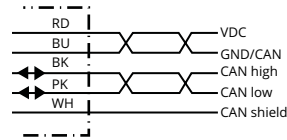
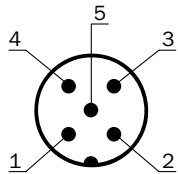
Order example for 10 mm shaft diameter: AHx36I-SCxx0xxxxx + BEF-FA-020-030-I (adapter is not pre-assembled)

Solid shaft, face mount flange with flange adapter, centering collar D20 on D36 (BEF-FA-020-036-I, 2103986)



Order example for 10 mm shaft diameter: AHx36I-SCxx0xxxxx + BEF-FA-020-036-I (adapter is not pre-assembled)

**PIN assignment**










PIN	Signal	Wire colors (cable connection)	Function
1	CAN Shield	White	Screen
2	VDC	Red	Supply voltage Encoder 10 V DC ... 30 V DC
3	GND/CAN GND	Blue	0 V (GND)
4	CAN high	Black	CAN signal
5	CAN low	Pink	CAN signal
Housing	-	-	Screen

Accessories

Mounting systems

Flanges


Flange plates

Figure	Brief description	Type	Part no.
	Stator coupling on hole circle 63 mm	BEF-DS08	2072206
	Standard stator coupling, AHS/AHM36	BEF-DS16-AHX	2108615
	Flange adapter centering collar D20 on D24, material: stainless steel	BEF-FA-020-024-I	2103982
	Flange adapter centering collar D20 on D30, material: stainless steel, stainless steel	BEF-FA-020-030-I	2103983
	Flange adapter centering collar D20 on D36, 2 mm high, material: stainless steel, stainless steel	BEF-FA-020-036-2-I	2103984
	Flange adapter centering collar D20 on D36, material: stainless steel, stainless steel	BEF-FA-020-036-I	2103986
	Flange adapter centering collar D20 on D50, material: stainless steel, stainless steel	BEF-FA-020-050-I	2103985

Dimensional drawings → [page 18](#)

Mounting brackets and plates


Mounting brackets

Figure	Brief description	Type	Part no.
	Mounting bracket for encoder with centering hub 20 mm, including mounting kit for face mount flange, mounting kit for face mount flange included	BEF-WF-20	2066393

Dimensional drawings → [page 21](#)

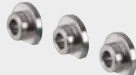
Other mounting accessories

Measuring wheels and measuring wheel systems

Figure	Brief description	Type	Part no.
	Aluminium 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
	O-ring for measuring wheels (circumference 200 mm)	BEF-OR-053-040	2064061
	O-ring for measuring wheels (circumference 300 mm), 2x O-ring	BEF-OR-083-050	2064076

Dimensional drawings → [page 21](#)











## Servo clamps

Figure	Brief description	Type	Part no.
	Servo clamps, small, for servo flange (clamping claws, mounting eccentric), 3 pcs, without mounting hardware, without mounting hardware	BEF-WK-RESOL	2039082

Dimensional drawings → [page 21](#)

## Shaft adaptation


## Shaft couplings

Figure	Brief description	Type	Part no.
	Bellows coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial $\pm 0.25$ mm, axial $\pm 0.4$ mm, angular $\pm 4^\circ$ ; max. speed 10,000 rpm, $-30^\circ\text{C}$ to $+120^\circ\text{C}$ , max. torque 80 Ncm; material: stainless steel bellows, aluminum hub	KUP-0606-B	5312981
	Double-loop coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial $\pm 2.5$ mm, axial $\pm 3$ mm, angular $\pm 10^\circ$ ; max. speed 3,000 rpm, $-30^\circ\text{C}$ to $+80^\circ\text{C}$ , max. torque 1.5 Nm; material: polyurethane, galvanized steel flange	KUP-0606-D	5340152
	Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial $\pm 0.25$ mm, axial $\pm 0.4$ mm, angular $\pm 4^\circ$ ; max. speed 10,000 rpm, $-30^\circ\text{C}$ to $+120^\circ\text{C}$ , max. torque 80 Ncm; material: stainless steel bellows, aluminum hub	KUP-0610-B	5312982
	Double loop coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radially $\pm 2.5$ mm, axially $\pm 3$ mm, angle $\pm 10$ degrees; max. speed 3.000 rpm, $-30$ to $+80$ degrees Celsius, torsional spring stiffness of 25 Nm/rad	KUP-0610-D	5326697
	Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial $\pm 0.3$ mm, axial $\pm 0.4$ mm, angular $\pm 2.5^\circ$ ; max. speed 12,000 rpm, $-10^\circ$ to $+80^\circ\text{C}$ , max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin	KUP-0610-F	5312985
	Double loop coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radially $\pm 0.25$ mm, axially $\pm 0.4$ mm, angle $\pm 4$ degrees; max. speed 10.000 rpm, $-30$ to $+120$ degrees Celsius, torsional spring stiffness of 150 Nm/rad	KUP-0810-D	5326704
	Bellows coupling, shaft diameter 10 mm/10 mm; maximum shaft offset: radial $\pm 0.25$ mm, axial $\pm 0.4$ mm, angular $\pm 4^\circ$ ; max. revolutions 10,000 rpm, $-30^\circ$ to $+120^\circ\text{C}$ , max. torque 80 Ncm; material: stainless steel bellows, aluminum clamping hubs	KUP-1010-B	5312983
	Double loop coupling, shaft diameter 10 mm / 10 mm, Maximum shaft offset: radial $\pm 2.5$ mm, axial $\pm 3$ mm, angular $\pm 10^\circ$ ; max. speed 3,000 rpm, $-30^\circ$ to $+80^\circ\text{C}$ , max. torque 1.5 Nm; material: polyurethane, galvanized steel flange	KUP-1010-D	5326703
	Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial $\pm 0.3$ mm, axial $\pm 0.4$ mm, angle $\pm 2.5^\circ$ , torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin	KUP-1010-F	5312986
	10 mm / 12 mm; maximum shaft offset: radial $\pm 0.25$ mm, axial $\pm 0.4$ mm, angular $\pm 4^\circ$ ; max. revolutions 10,000 rpm, $-30^\circ$ to $+120^\circ\text{C}$ , max. torque 80 Ncm; material: stainless steel bellows, aluminum clamping hubs	KUP-1012-B	5312984
	Double loop coupling, shaft diameter 10 mm / 12 mm, Maximum shaft offset: radial $\pm 2.5$ mm, axial $\pm 3$ mm, angular $\pm 10^\circ$ ; max. speed 3,000 rpm, $-30^\circ$ to $+80^\circ\text{C}$ , max. torque 1.5 Nm; material: polyurethane, galvanized steel flange	KUP-1012-D	5326702

Dimensional drawings → [page 22](#)

## Further accessories


## Programming and configuration tools

Figure	Brief description	Type	Part no.
	Hand-held programming device for the programmable SICK AHS/AHM36 CANopen encoders, TMS/TMM61 CANopen inclination sensors, TMS/TMM88 CANopen, TMS/TMM88 Analog, and wire draw encoders with AHS/AHM36 CANopen. Compact dimensions, low weight, and intuitive operation.	PGT-12-Pro	1076313

## Plug connectors and cables


Distributors

T-junctions

Figure	Brief description	Type	Part no.
 <p>Illustration may differ</p>	Head A: female connector, M12, 5-pin, A-coded Head B: male connector, M12, 5-pin, A-coded Details: 5-pin	DSC-1205T000025KMO	6030664

Dimensional drawings → [page 22](#)

Y-junctions

Figure	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M12, 5-pin, straight, A-coded Head B: female connector, M12, 5-pin, straight, A-coded Male connector, M12, 5-pin, straight, A-coded Cable: CAN, Power Signalart: CAN, Power	0.5 m	Y-CAN cable	6027647

Dimensional drawings → [page 23](#)

## Plug connectors and cables

Plug connectors and cables

Connecting cables

Figure	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M12, 5-pin, straight, A-coded Cable: Fieldbus, PUR, halogen-free, shielded, 2 x 0.25 mm <sup>2</sup> + 2 x 0.34 mm <sup>2</sup> , 6.9 mm Signalart: Fieldbus	2 m	YF2A55-020C1BX-LEAX	2107874
	Head A: female connector, M12, 5-pin, angled, A-coded Cable: Fieldbus, PUR, halogen-free, shielded, 2 x 0.25 mm <sup>2</sup> + 2 x 0.34 mm <sup>2</sup> , 6.9 mm Signalart: Fieldbus	2 m	YG2A55-020C1BX-LEAX	2107899

Dimensional drawings → [page 23](#)

Connection cables





Figure	Brief description	Length of cable	Type	Part no.
	Head A: female connector, terminal box, 8-pin, straight Head B: female connector, D-Sub, 9-pin, straight Cable: CANopen, shielded, 4 x 2 x 0.08 mm <sup>2</sup> , Ø 5 mm Signal type: CANopen	0,4 m	DDL-0D04-G0M-5BC9	2083355
	Head A: female connector, M12, 5-pin, straight Head B: female connector, D-Sub, 9-pin, straight Cable: CANopen, shielded, 5 x 0.34 mm <sup>2</sup> , 5.9 mm Signal type: CANopen Details: programming adapter cable for programming tool PGT-12-Pro	-	DDL-2D05-G0M-5BC9	2083805



Figure	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M12, 5-pin, straight, A-coded Head B: male connector, M12, 5-pin, straight, A-coded Cable: Fieldbus, PUR, halogen-free, shielded, 2 x 0.25 mm <sup>2</sup> + 2 x 0.34 mm <sup>2</sup> , 6.9 mm Signalart: Fieldbus	2 m	YF2A55-020C1B-M2A65	2107898
	Head A: female connector, M12, 5-pin, angled, A-coded Head B: male connector, M12, 5-pin, straight, A-coded Cable: Fieldbus, PUR, halogen-free, shielded, 2 x 0.25 mm <sup>2</sup> + 2 x 0.34 mm <sup>2</sup> , 6.9 mm Signalart: Fieldbus	2 m	YG2A55-020C1B-M2A55	2107901

Dimensional drawings → [page 23](#)

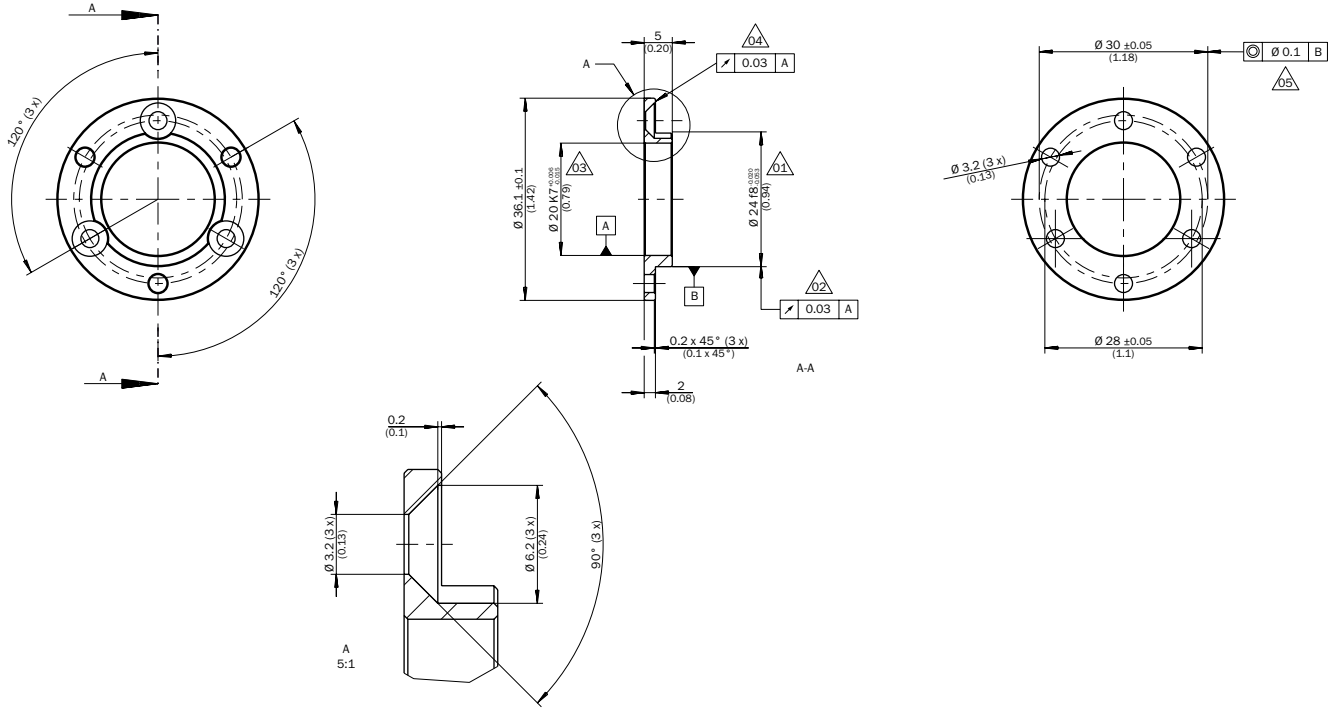
#### Field-attachable connectors

Figure	Brief description	Type	Part no.
	Head A: female connector, M12, 5-pin, straight, A-coded Cable: shielded	YF12ES5-0075S5586A	2097335
	Head A: male connector, M12, 5-pin, straight, A-coded Cable: shielded	YM12ES5-0075S5586A	2097336

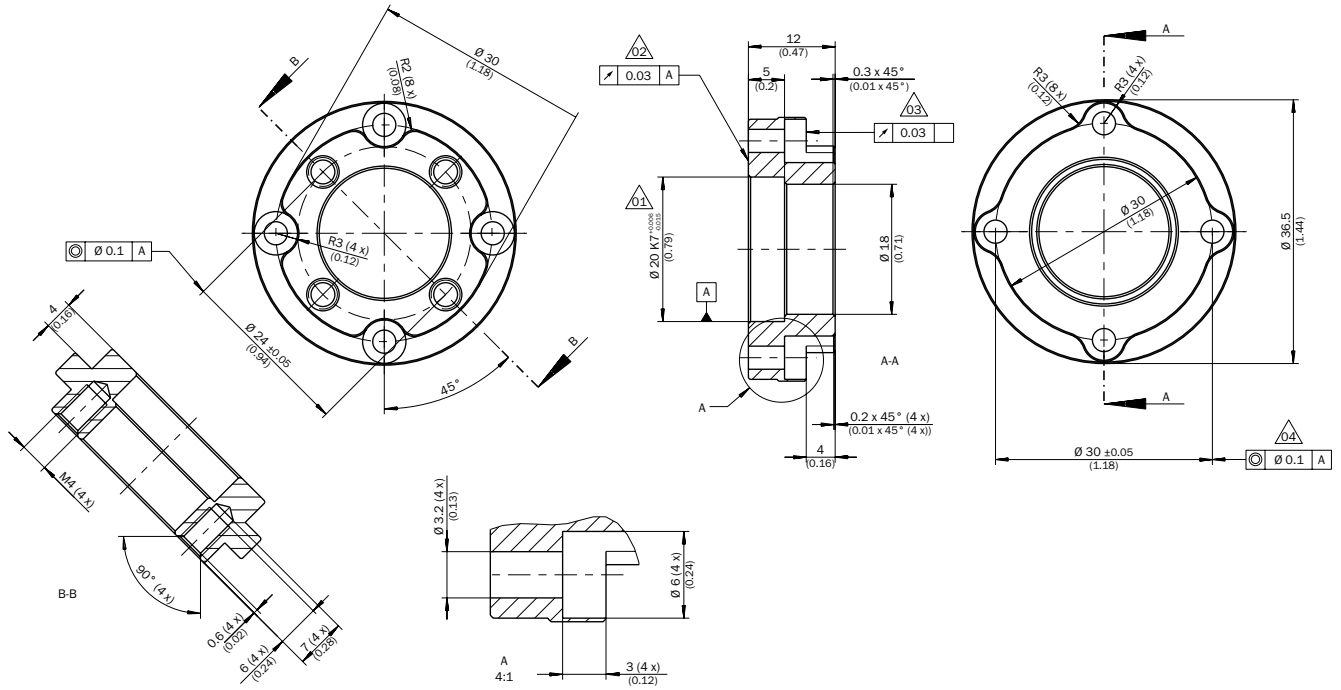
Dimensional drawings → [page 23](#)



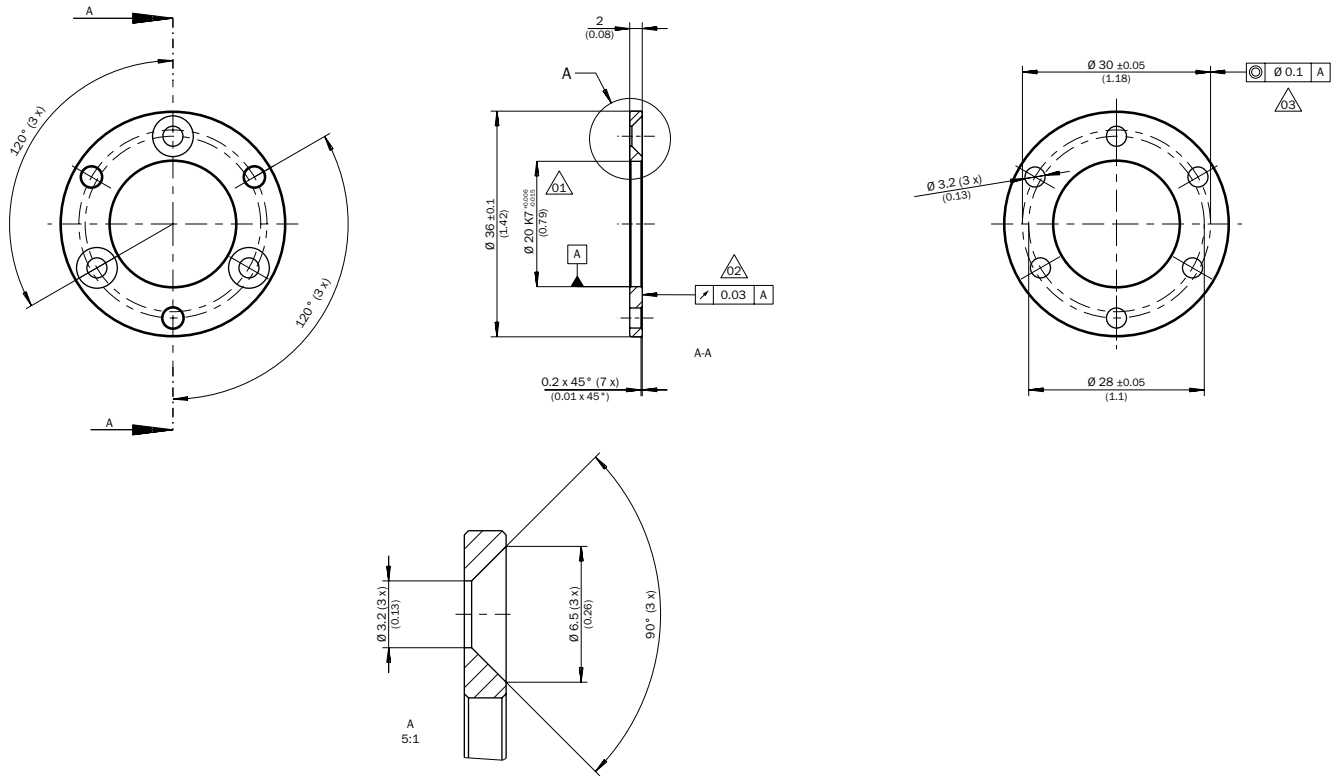
BEF-FA-020-024-I



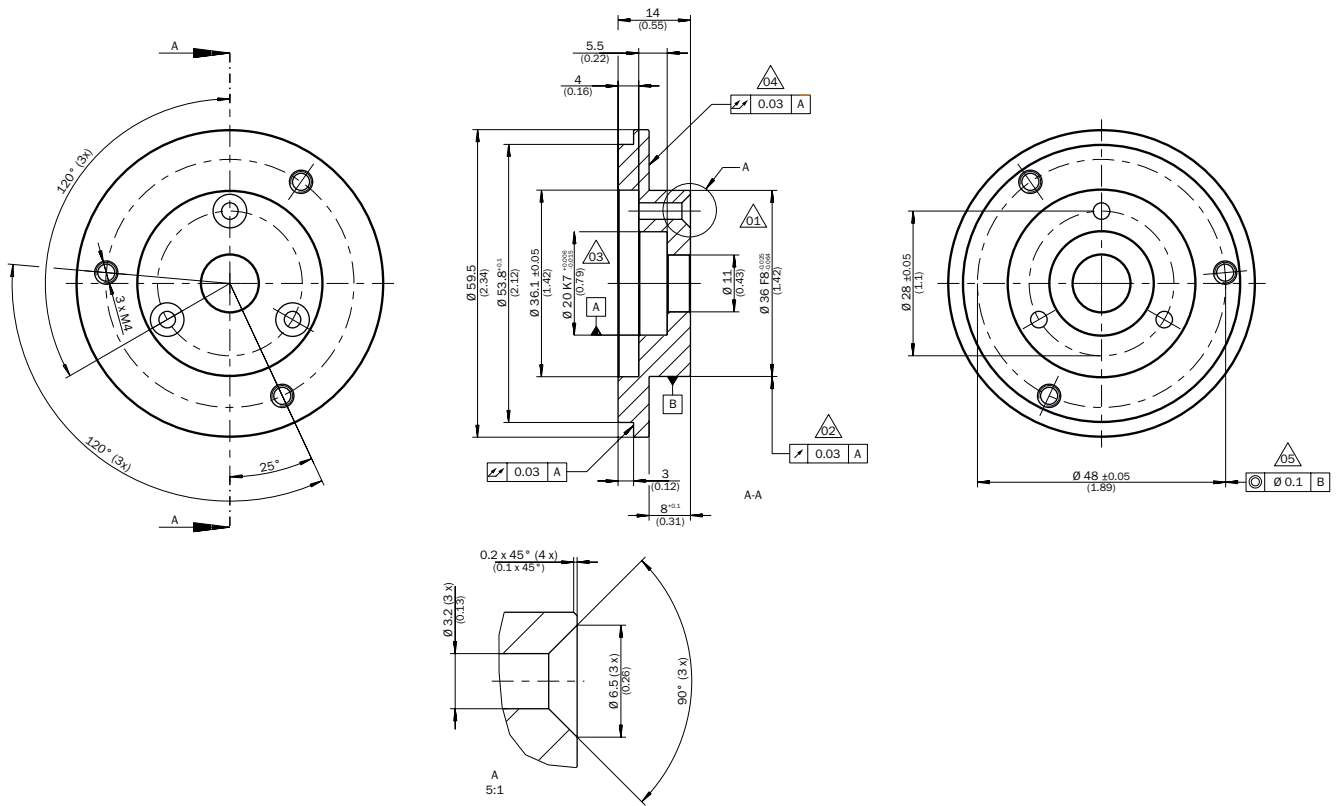
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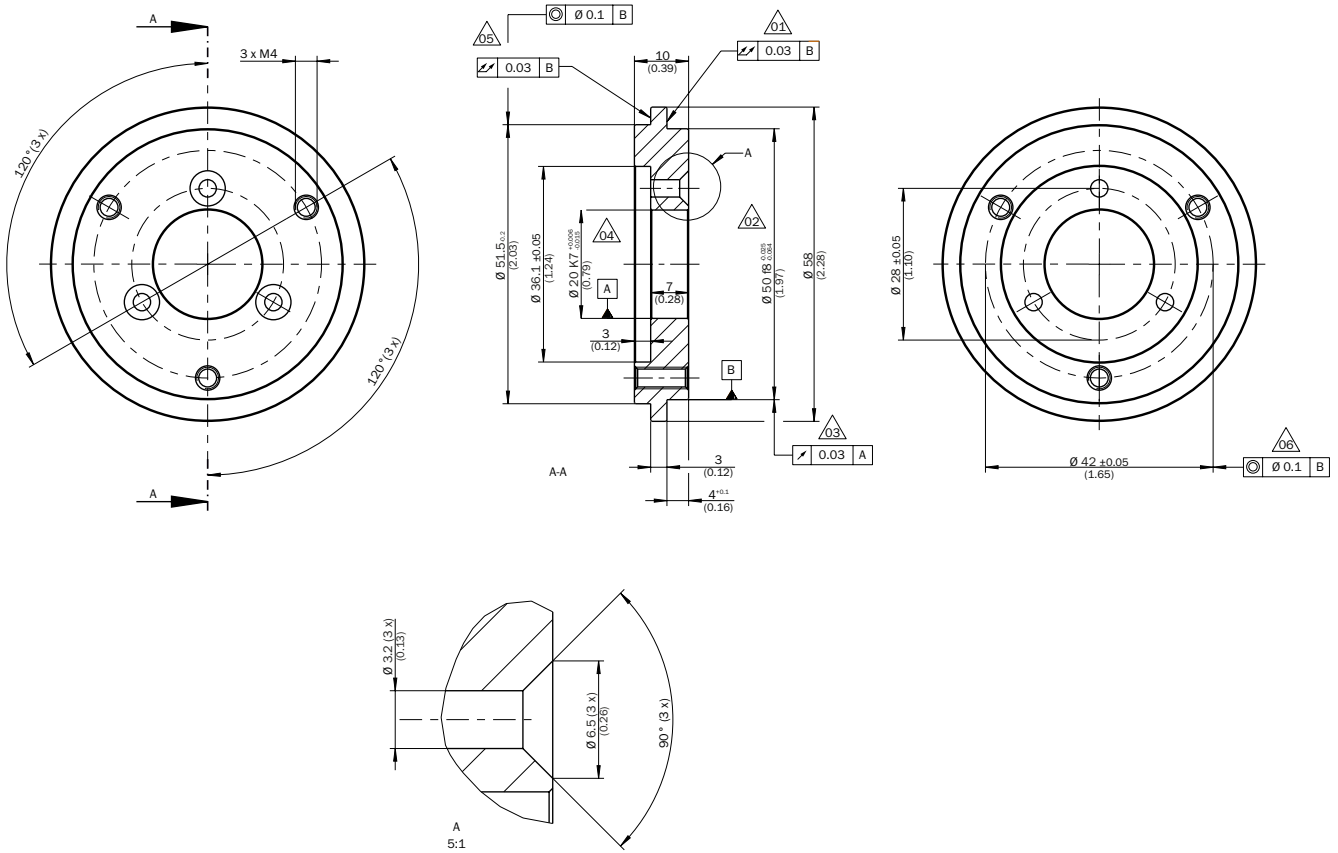
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BEF-FA-020-036-I

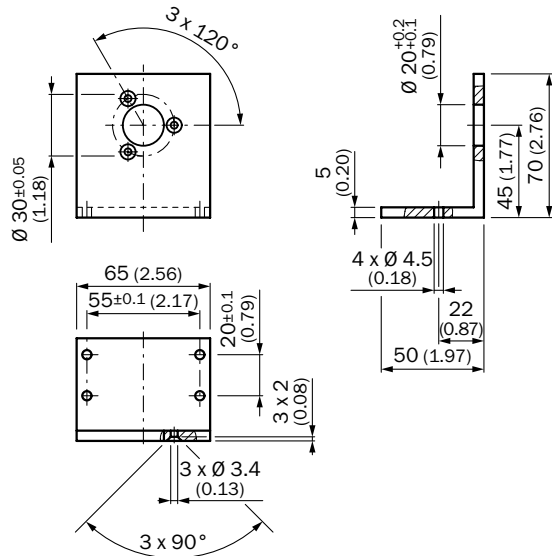


BEF-FA-020-050-I



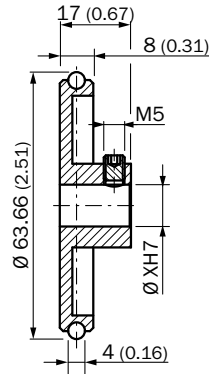
Mounting brackets and plates

BEF-WF-20

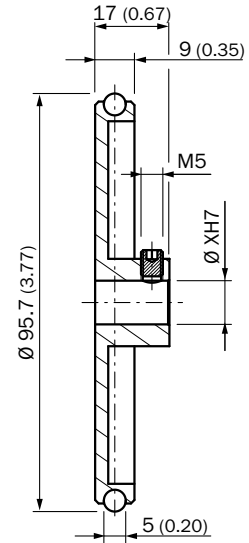


Other mounting accessories

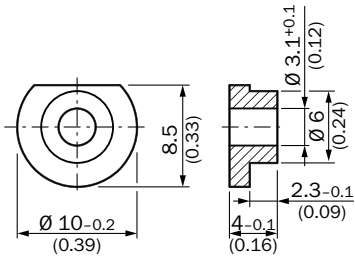
BEF-MR006020R



BEF-MR006030R



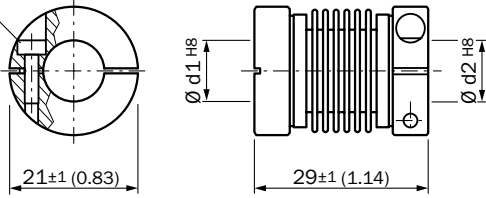
BEF-WK-RESOL



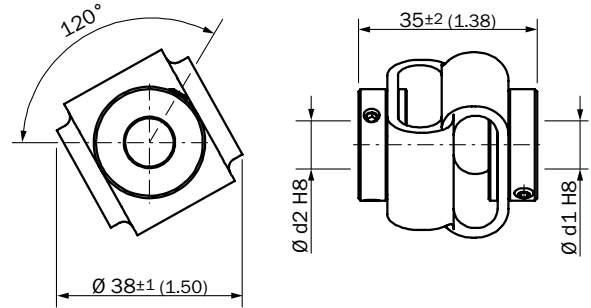
Shaft adaptation

KUP-xxxx-B

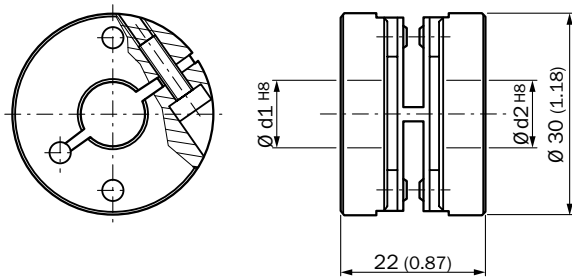
Cheese-head screw  
M2.5 x 8, DIN 912 A2



KUP-xxxx-D

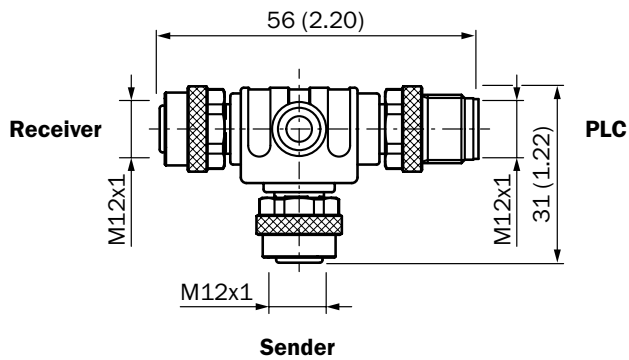


KUP-xx10-F

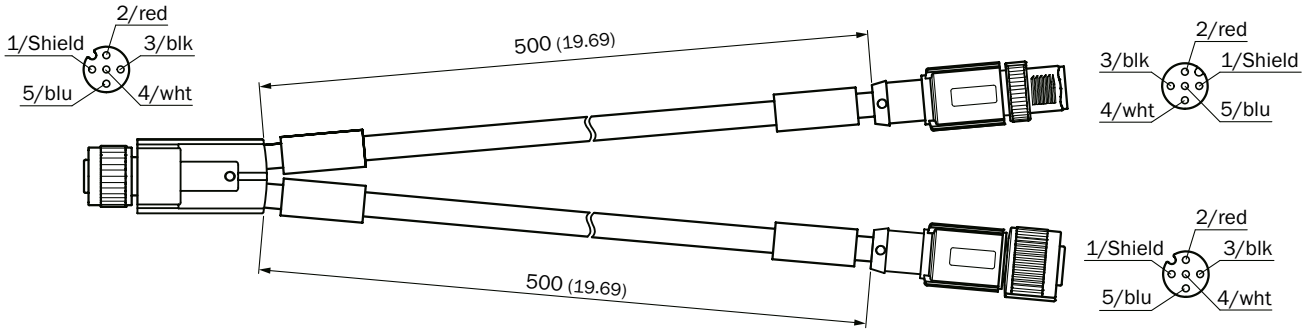


Distributors

DSC-1205T000025KM0

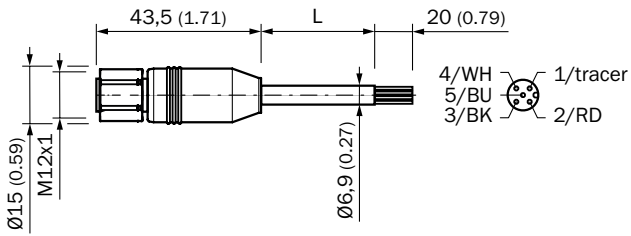


Y-CAN cable

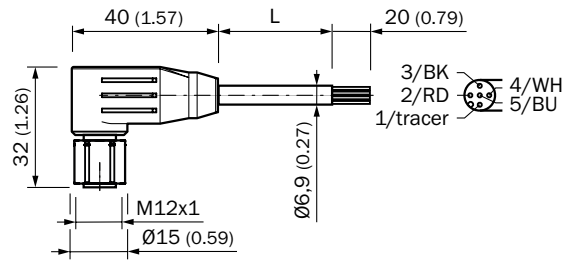


Plug connectors and cables

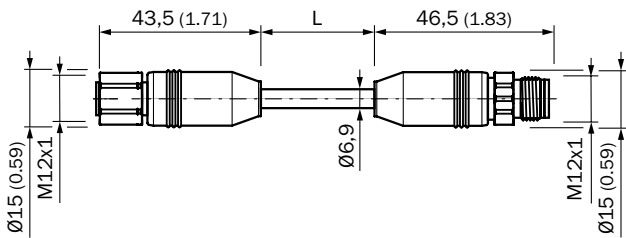
YF2A55-020C1BXLEAX



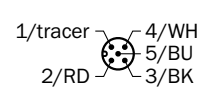
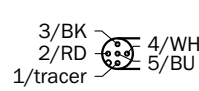
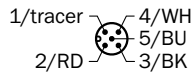
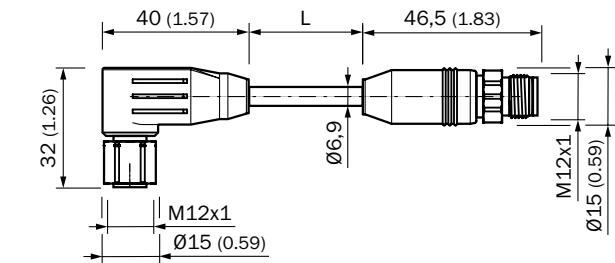
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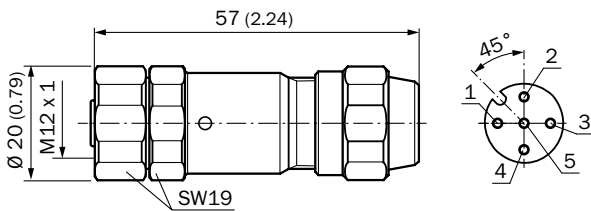
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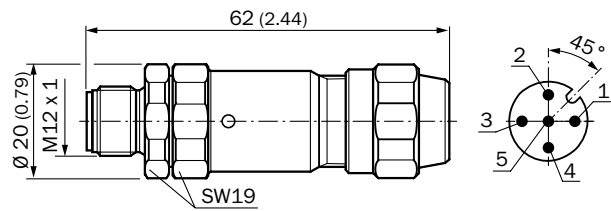
YG2A55-020C1BM2A55



YF12ES5-0075S5586A



YM12ES5-0075S5586A



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