



AFS/AFM60 INOX

RESISTANT, PRECISE, PROGRAMMABLE

Absolute encoders

SICK
Sensor Intelligence.

RESISTANT, PRECISE, PROGRAMMABLE



Product description

With a high resolution of 18 bits (AFS60 Inox) or 30 bits (AFM60 Inox) and a large selection of programmable parameters, the AFS60 Inox absolute singleturn encoder and the AFM60 Inox absolute multiturn encoder set new standards when it comes to stainless-steel encoders. The high resolution, the high IP enclosure rating, and the stainless-steel housing enable use in applications

under harsh ambient conditions. The encoders are equipped with the SSI interface while the AFM60 Inox is also available with the SSI + Incremental and SSI + Sin/Cos combined interfaces. Both encoders can be programmed using the PC-based programming device PGT-08-S or the hand-held programming device PGT-10-Pro.

At a glance

- Housing, flange, and shaft made from stainless steel
- Face mount, servo, or square flange with solid shaft and blind hollow shaft
- Enclosure rating: IP 67
- Resolution: up to 262,144 steps per revolution and 4,096 revolutions
- Electrical interfaces: SSI, SSI + Incremental, SSI + Sin/Cos
- Can be optionally programmed with PGT-08-S and PGT-10-Pro

Your benefits

- High resistance to environmental influences due to stainless-steel housing
- IP 67 enclosure rating and shaft sealing ring for optimum tightness
- High singleturn resolution up to 18 bits (AFS60 Inox) enables use in applications with demanding requirements for measurement accuracy
- The wide range of mechanical interfaces allows an optimal match between the encoder and the application-specific installation situation
- Simple mounting thanks to compact dimensions, even in confined spaces
- Reduces storage costs and downtimes since customers can program the encoder themselves with programming devices PGT-08-S and PGT-10-Pro



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→ www.sick.com/AFS_AFM60_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

- Applications with high resistance requirements against aggressive substances such as cleaning agents or salt
- Particularly suitable for use in the food and drink industry, for packaging machines, in medical technology, and in outdoor applications in ports or offshore plants

Detailed technical data

Performance

Max. number of steps per revolution	262,144 (SSI-Interface) ¹⁾
Max. number of revolutions	
Singleturn	1
Multiturn	4,096
Resolution	18 bit x 1 bit 18 bit x 12 bit
Error limits	± 0.03°
Repeat accuracy	≤ 0.002°
Initialization time	50 ms ²⁾
Position forming time	< 1 µs

¹⁾ See maximum viewing number of resolutions.

²⁾ Valid positional data can be read once this time has elapsed.

Interfaces

SSI

Electrical interface	SSI/Gray SSI/Gray, programmable
Code type	Gray
Code sequence parameter adjustable	CW/CCW
Measuring step	
360° / number of steps	0.0014°
Clock frequency	2 MHz ¹⁾
Set (electronic adjustment)	H-active (L ≡ 0 - 3 V, H ≡ 4.0 - Us V)
CW/CCW (counting sequence when turning)	L-active (L ≡ 0 - 1,5 V, H ≡ 2,0 - Us V)
Measuring step deviation (Range of pulses per revolution)	
1 ... 399	± 0.04°
400 ... 40,000	± 0.008°
> 40,000	± 0.002°
Interface signals	Clock +, Clock -, Data +, Data-
Signal offset	2.5 V ± 10 %

¹⁾ SSI max. clock frequency 2 MHz, and min. LOW level (Clock+): 500 ns.

SSI + incremental

Electrical interface	SSI/Gray + Incremental, HTL SSI/Gray + Incremental, TTL SSI/Gray + Incremental, TTL/HTL, programmable
Code type	Gray
Code sequence parameter adjustable	CW/CCW
Measuring step	
90° electronically / number of lines	0.0014°

¹⁾ SSI max. clock frequency 2 MHz, and min. LOW level (Clock+): 500 ns.

Clock frequency	2 MHz ¹⁾
Set (electronic adjustment)	H-active (L ≡ 0 - 3 V, H ≡ 4.0 - Us V)
CW/CCW (counting sequence when turning)	L-active (L ≡ 0 - 1,5 V, H ≡ 2,0 - Us V)
Measuring step deviation (Range of pulses per revolution)	
	1 ... 99 ± 0.04°
	100 ... 10,000 ± 0.008°
	> 10,000 ± 0.002°
Pulses per revolution	1/4 of number of SSI steps per revolution
Interface signals	A, A/, B, B/: digital differential
Maximum output frequency	≤ 820 kHz
Maximum load current	≤ 30 mA
Signal offset	2.5 V ± 10 %

¹⁾ SSI max. clock frequency 2 MHz, and min. LOW level (Clock+): 500 ns.

SSI + Sin/Cos

Electrical interface	SSI/Gray + Sin/Cos, 1.024 periods SSI/Gray + Sin/Cos, 1.024 periods, programmable
Code type	Gray
Code sequence parameter adjustable	CW/CCW
Measuring step	
	360° / number of steps 0.0014°
Clock frequency	2 MHz ¹⁾
Set (electronic adjustment)	H-active (L ≡ 0 - 3 V, H ≡ 4.0 - Us V)
CW/CCW (counting sequence when turning)	L-active (L ≡ 0 - 1,5 V, H ≡ 2,0 - Us V)
Measuring step deviation (Range of pulses per revolution)	
	1 ... 399 ± 0.04°
	400 ... 40,000 ± 0.008°
	> 40,000 ± 0.002°
Pulses per revolution	1,024
Min. load resistance	≥ 120 Ω
Interface signals	Sin +, Sin -, Cos +, Cos -: analog, differential
Maximum output frequency	≤ 200 kHz
Signal before differential generation	0.5 V _{pp} , ± 20 %, 120 Ω
Signal offset	2.5 V ± 10 %
Signal after differential generation	1 V _{pp} , ± 20 %, 120 Ω

¹⁾ SSI max. clock frequency 2 MHz, and min. LOW level (Clock+): 500 ns.

Electrical data

Connection type	Male connector M12, 8-pin, radial Cable, 8-wire, radial, 1.5 m Cable, 8-wire, radial, 3 m Cable, 8-wire, radial, 5 m Connector M12, 12-pin, radial Cable, 12-wire, radial, 1.5 m Cable, 12-wire, radial, 3 m Cable, 12-wire, radial, 5 m
Operating voltage range	4.5 V DC ... 32 V DC
Power consumption max. without load	≤ 0.5 W
Reverse polarity protection	✓
MTTFd: mean time to dangerous failure	250 years ¹⁾

¹⁾ 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

Shaft diameter	
Solid shaft, Servo flange	6 mm x 10 mm
Solid shaft, Face mount flange	10 mm x 19 mm
Solid shaft, Square flange	10 mm x 19 mm
Blind hollow shaft	8 mm 3/8" 10 mm 12 mm 1/2" 14 mm 15 mm 5/8" ¹⁾
Weight	0.5 kg ²⁾
Shaft material	Stainless steel
Flange material	Stainless steel
Housing material	Stainless steel
Start up torque	1 Ncm (+20 °C)
Operating torque	0.5 Ncm (+20 °C)
Permissible movement axial static/dynamic	
Blind hollow shaft	± 0.5 mm, ± 0.1 mm
Permissible movement radial static/dynamic	
Blind hollow shaft	± 0.3 mm, ± 0.1 mm
Permissible Load capacity of shaft	80 N / radial 40 N / axial
Moment of inertia of the rotor	
Solid shaft	6.2 gcm ²
Blind hollow shaft	40 gcm ²
Bearing lifetime	3.0 x 10 ⁹ revolutions
Max. angular acceleration	≤ 500,000 rad/s ²

¹⁾ 5/8" not available for multiturn.

²⁾ For an encoder with connector outlet.

³⁾ Self warming of 3.3 K per 1000 revolutions/min when applying note working temperature range.

Operating speed	Solid shaft	9,000 /min ³⁾
	Blind hollow shaft	6,000 /min ³⁾

¹⁾ 5/8" not available for multiturn.

²⁾ For an encoder with connector outlet.

³⁾ Self warming of 3.3 K per 1000 revolutions/min when applying note working temperature range.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3 ¹⁾
Enclosure rating	IP 67, shaft side IP 67, housing side, connector outlet ²⁾ IP 67, housing side, cable outlet
Permissible relative humidity	90 % (condensation of the optical scanning not permitted)
Working temperature range	-40 °C ... +100 °C ³⁾ -30 °C ... +100 °C ⁴⁾
Storage temperature range	-40 °C ... +100 °C, without package
Resistance to shocks	100 g, 6 ms (according to EN 60068-2-27)
Resistance to vibration	10 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)

¹⁾ EMC according to the standards quoted is achieved if shielded cables are used.

²⁾ With mating connector fitted.

³⁾ Stationary position of the cable.

⁴⁾ Flexible position of the cable.

Type code

Multiturn, solid shaft

Mechanical design

S	1	Servo flange, 6 x 10 mm (via flange adaptor)
S	4	Face mount flange, 10 x 19 mm
Q	4	Square flange, 10 x 19 mm (via flange adaptor)

Electrical interface

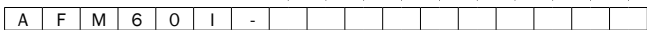
A	4.5 ... 32V, SSI, gray
P	4.5 ... 32V, SSI, gray, programmable
L	4.5 ... 32V, SSI, gray, Incremental HTL
T	4.5 ... 32V, SSI, gray, Incremental TTL
R	4.5 ... 32V, SSI, gray, Incremental programmable
K	4.5 ... 32V, SSI, gray, Sin/Cos 1,024 periods
S	4.5 ... 32V, SSI, gray, programmable, Sin/Cos 1.024 periods

Connection type

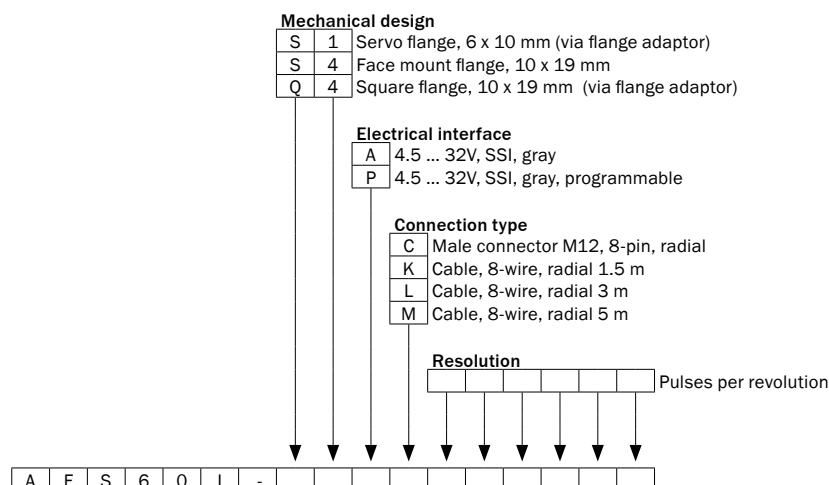
C	Male connector M12, 8-pin oder 12-pin, radial
K	Cable, 8-wire or 12-wire, radial 1.5 m
L	Cable, 8-wire or 12-wire, radial 3 m
M	Cable, 8-wire or 12-wire, radial 5 m

Resolution

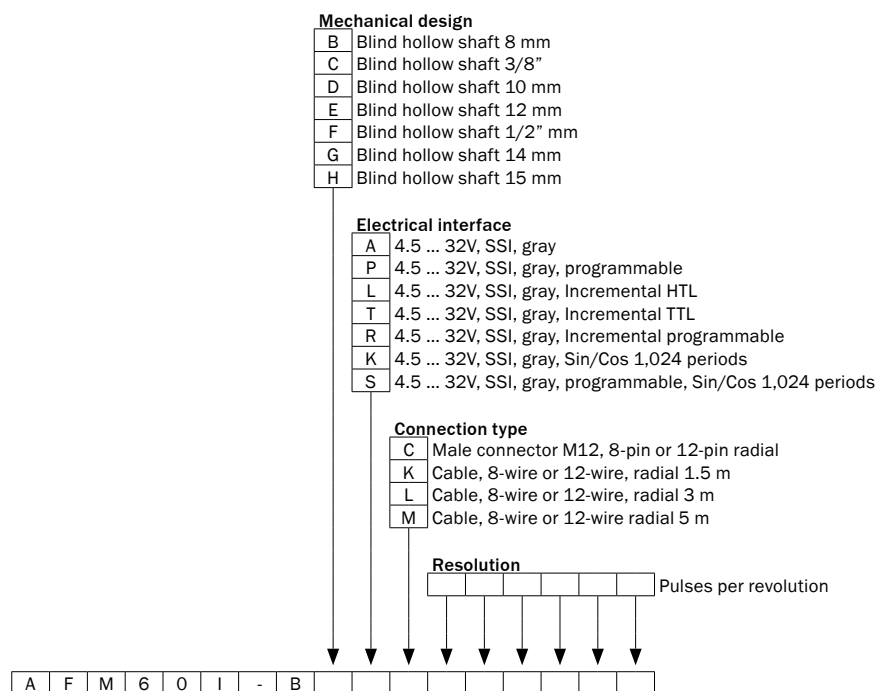
Resolution: [] [] [] [] [] [] [] [] [] [] Pulses per revolution



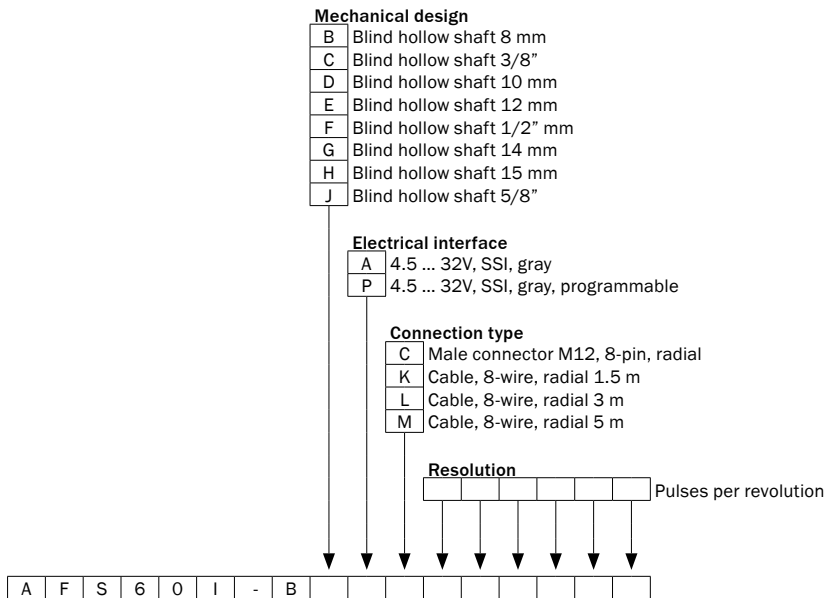
Singleturn, solid shaft



Multiturn, blind hollow shaft



Singleturn, blind hollow shaft



Ordering information

Blind hollow shaft

Shaft diameter	Connection type	Resolution	Programmable	Electrical interface	Type	Part no.
10 mm	Connector M12, 12-pin, radial	262,144 x 4,096	✓	SSI/Gray + Sin/Cos, 1.024 periods, programmable	AFM60I-BDSC262144	1083979
				SSI/Gray + Incremental, TTL/HTL, programmable	AFM60I-BDRC262144	1083989
	Male connector M12, 8-pin, radial	262,144 x 1	✓	SSI/Gray, programmable	AFS60I-BDPC262144	1084004
			✓	SSI/Gray, programmable	AFM60I-BDPC262144	1083996
12 mm	Connector M12, 12-pin, radial	262,144 x 4,096	-	SSI/Gray + Sin/Cos, 1.024 periods	AFM60I-BEKC262144	1082545
			✓	SSI/Gray + Sin/Cos, 1.024 periods, programmable	AFM60I-BESC262144	1083978
				SSI/Gray + Incremental, TTL/HTL, programmable	AFM60I-BERC262144	1083988
	Male connector M12, 8-pin, radial	262,144 x 1	✓	SSI/Gray, programmable	AFS60I-BEPC262144	1084002
			✓	SSI/Gray, programmable	AFM60I-BEPC262144	1083995
15 mm	Connector M12, 12-pin, radial	262,144 x 4,096	-	SSI/Gray + Sin/Cos, 1.024 periods	AFM60I-BH-KC262144	1079006

Solid shaft, Square flange

Shaft diameter	Connection type	Resolution	Programmable	Electrical interface	Type	Part no.
10 mm	Connector M12, 12-pin, radial	262,144 x 4,096	✓	SSI/Gray + Sin/Cos, 1.024 periods, programmable	AFM60I-Q4SC262144	1083980
				SSI/Gray + Incremental, TTL/HTL, programmable	AFM60I-Q4RC262144	1083991
	Male connector M12, 8-pin, radial	262,144 x 1	✓	SSI/Gray, programmable	AFS60I-Q4PC262144	1084005
		262,144 x 4,096	✓	SSI/Gray, programmable	AFM60I-Q4PC262144	1083997

Solid shaft, Face mount flange

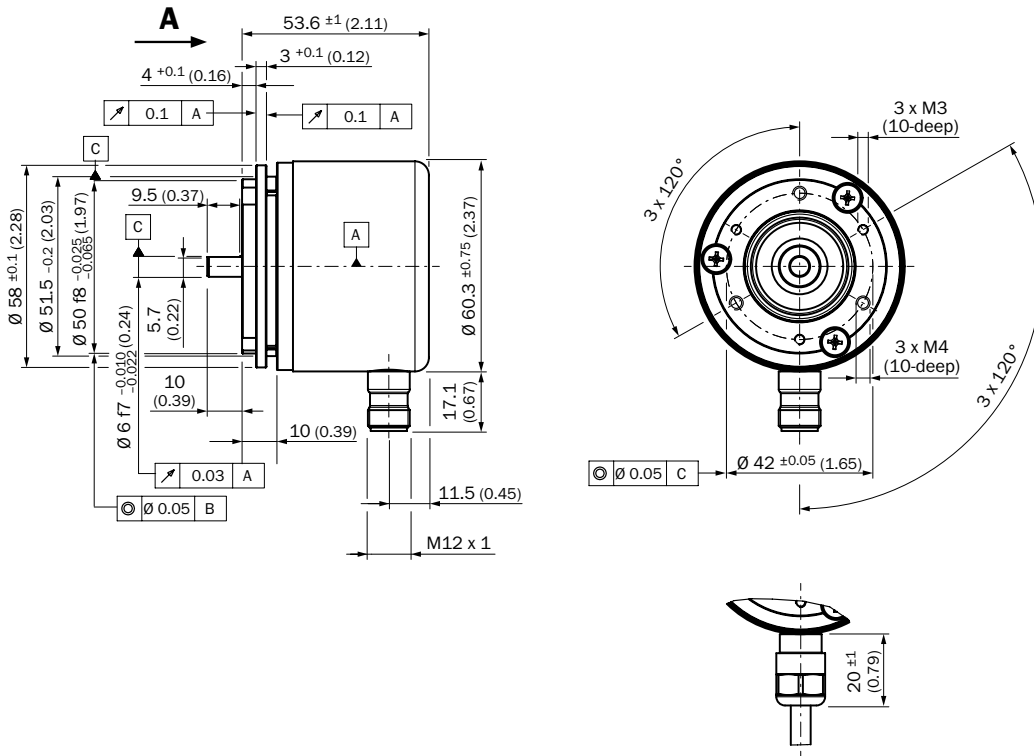
Shaft diameter	Connection type	Resolution	Programmable	Electrical interface	Type	Part no.
10 mm	Connector M12, 12-pin, radial	262,144 x 4,096	-	SSI/Gray + Sin/Cos, 1.024 periods	AFM60I-S4KC262144	1079003
	Cable, 12-wire, radial, 3 m	262,144 x 4,096	-	SSI/Gray + Sin/Cos, 1.024 periods	AFM60I-S4KL262144	1083742
	Connector M12, 12-pin, radial	262,144 x 4,096	✓	SSI/Gray + Sin/Cos, 1.024 periods, programmable	AFM60I-S4SC262144	1083986
	Cable, 12-wire, radial, 1.5 m	262,144 x 4,096	✓		AFM60I-S4SK262144	1083985
	Connector M12, 12-pin, radial	262,144 x 4,096	✓	SSI/Gray + Incremental, TTL/HTL, programmable	AFM60I-S4RC262144	1083994
	Cable, 12-wire, radial, 1.5 m	262,144 x 4,096	✓		AFM60I-S4RK262144	1083993
	Cable, 8-wire, radial, 1.5 m	262,144 x 1	✓	SSI/Gray, programmable	AFS60I-S4PK262144	1084008
		262,144 x 4,096	✓	SSI/Gray, programmable	AFM60I-S4PK262144	1084000
	Male connector M12, 8-pin, radial	262,144 x 1	✓	SSI/Gray, programmable	AFS60I-S4PC262144	1084009
		262,144 x 4,096	✓	SSI/Gray, programmable	AFM60I-S4PC262144	1084001

Solid shaft, Servo flange

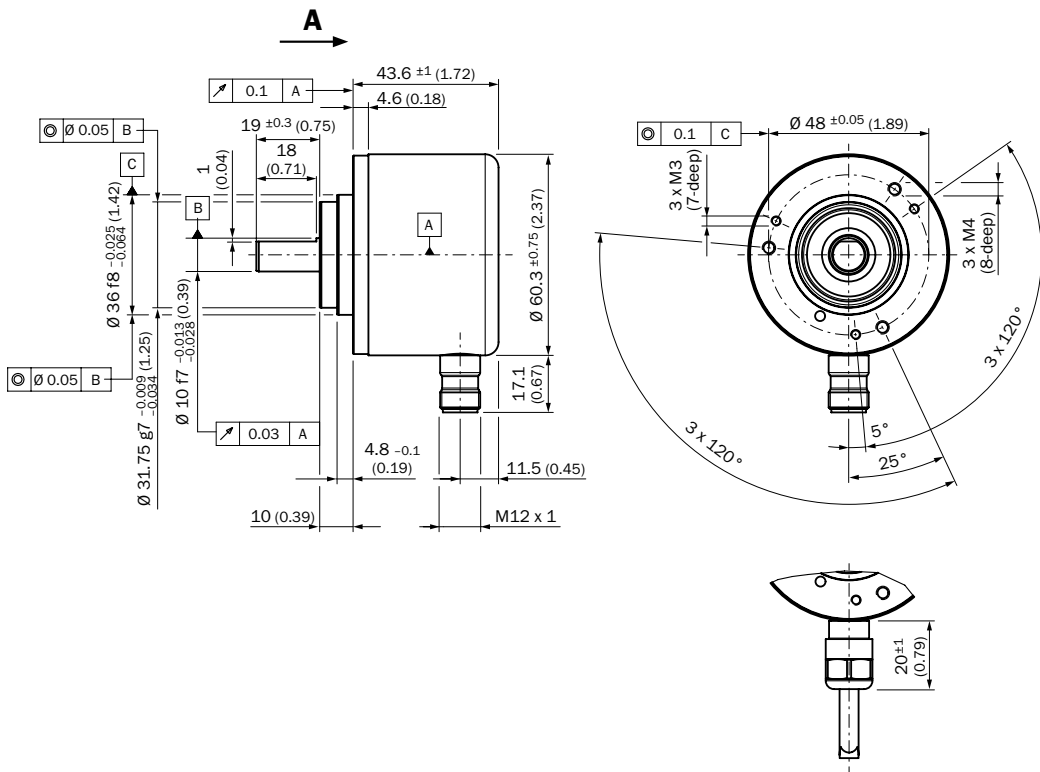
Shaft diameter	Connection type	Resolution	Programmable	Electrical interface	Type	Part no.
6 mm	Connector M12, 12-pin, radial	262,144 x 4,096	✓	SSI/Gray + Sin/Cos, 1.024 periods, programmable	AFM60I-S1SC262144	1083982
				SSI/Gray + Incremental, TTL/HTL, programmable	AFM60I-S1RC262144	1083992
	Cable, 8-wire, radial, 1.5 m	262,144 x 1	✓	SSI/Gray, programmable	AFS60I-S1PK262144	1084006
		262,144 x 4,096	✓	SSI/Gray, programmable	AFM60I-S1PK262144	1083998
	Male connector M12, 8-pin, radial	262,144 x 1	✓	SSI/Gray, programmable	AFS60I-S1PC262144	1084007
		262,144 x 4,096	✓	SSI/Gray, programmable	AFM60I-S1PC262144	1083999

Dimensional drawings (Dimensions in mm (inch))

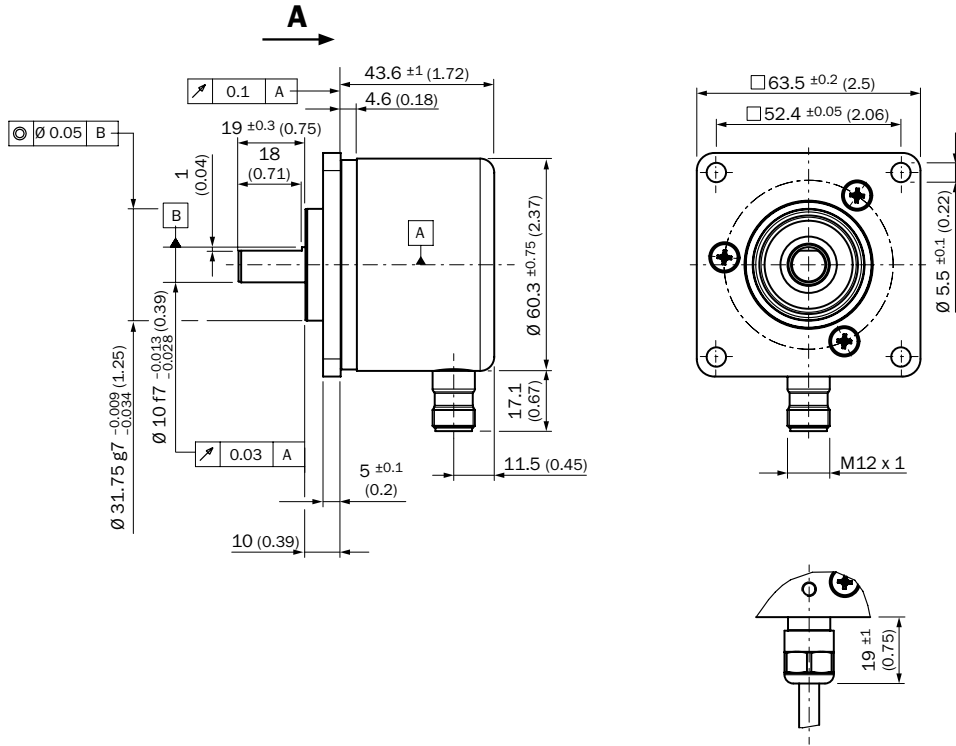
Solid shaft, servo flange



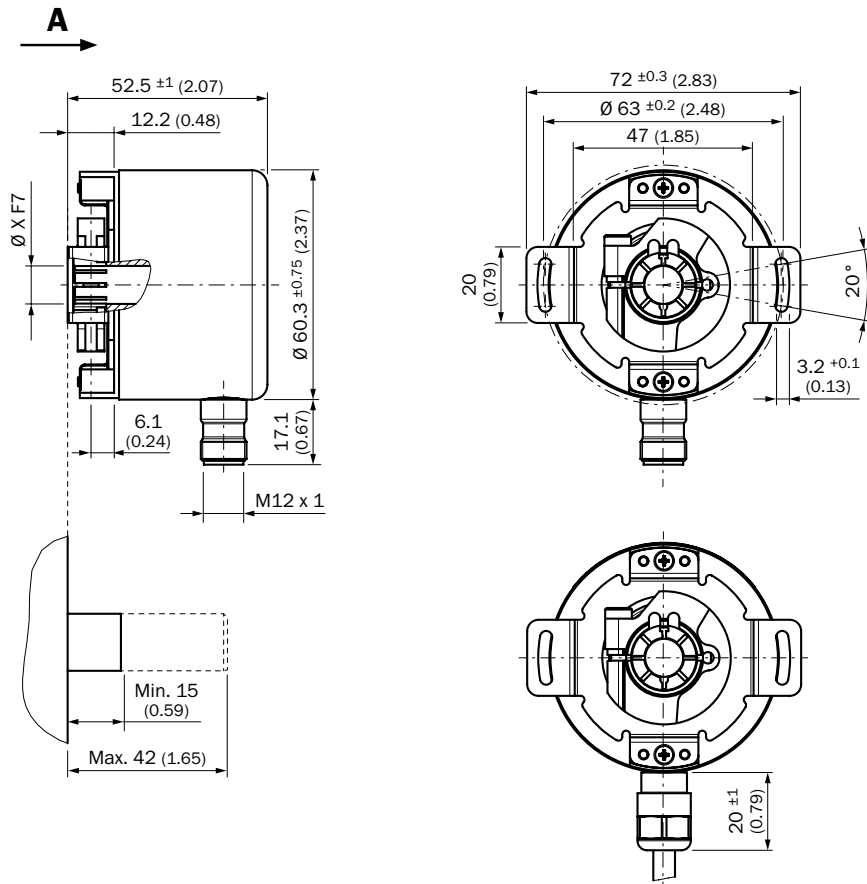
Solid shaft, face mount flange



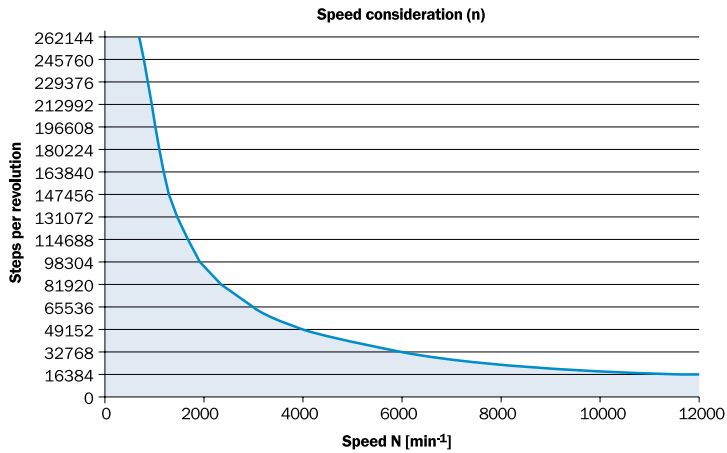
Solid shaft, square flange



Blind hollow shaft



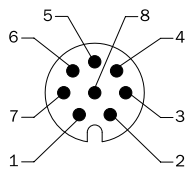
Maximum revolution range



The maximum speed is also dependent on the shaft type.

PIN assignment

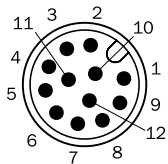
Male connector M12, 8-pin and cable outlet, cable 8-wire, SSI/Gray



View to the connector M12 8-pin fitted to the encoder body

PIN, 8-pin, M12 connector	Color of wires, cable outlet	Signal	Explanation
1	Brown	Data-	Interface signals
2	White	Data+	Interface signals
3	Black	CW/CCW	Counting sequence when turning
4	Pink	SET	Electronic adjustment
5	Yellow	Clock+	Interface signals
6	Lilac	Clock-	Interface signals
7	Blue	GND	Ground connection
8	Red	+U _s	Supply voltage
		Screen	Screen connected to housing on side of encoder. Connected to ground on side of control.

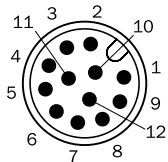
Male connector M12, 12-pin and cable outlet, cable 12-wire, SSI/Gray + Incremental



View to the connector M12 12-pin fitted to the encoder body

PIN, 12-pin, M12 connector	Color of wires, cable outlet	Signal	Explanation
1	Orange/black	CW/ $\overline{\text{CCW}}$	Counting sequence when turning
2	White	Data+	Interface signals
3	Brown	Data-	Interface signals
4	Violet	Clock-	Interface signals
5	Red	+U _s	Supply voltage
6	Gray	A	Signal line
7	Green	\overline{A}	Signal line
8	Pink	B	Signal line
9	Black	\overline{B}	Signal line
10	Orange	SET	Electronic adjustment
11	Yellow	Clock+	Interface signals
12	Blue	GND	Ground connection
		Screen	Screen connected to housing on side of encoder. Connected to ground on side of control.

Male connector M12, 12-pin and cable outlet, cable 12-wire, SSI/Gray + Sin/Cos

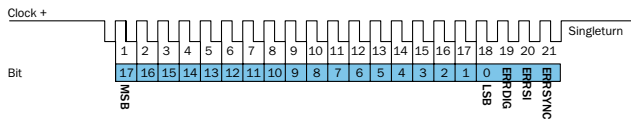


View to the connector M12 12-pin fitted to the encoder body

PIN, 12-pin, M12 connector	Color of wires, cable outlet	Signal	Explanation
1	Orange/black	CW/ $\overline{\text{CCW}}$	Counting sequence when turning
2	White	Data+	Interface signals
3	Brown	Data-	Interface signals
4	Violet	Clock-	Interface signals
5	Red	+U _s	Supply voltage
6	Gray	Cos+	Signal line
7	Green	Cos-	Signal line
8	Pink	Sin+	Signal line
9	Black	Sin-	Signal line
10	Orange	SET	Electronic adjustment
11	Yellow	Clock+	Interface signals
12	Blue	GND	Ground connection
		Screen	Screen connected to housing on side of encoder. Connected to ground on side of control.

Signal outputs

SSI data format singleturn



Bit 1–18: Position Bits

- LSB: Least significant Bit
- MSB: Most significant Bit

Bit 19–21: Error Bits

- ERRDIG: Failure message about speed. If this failure occurs during the position building procedure it will be indicated by the ERRDIG-Bit.
- ERRSI: Light source monitoring failure.
- ERRSYNC: Contamination of the disc or scanning system. During the determination of the position, an error has occurred since the last SSI transmission. The error bit will be deleted during the next data transmission.

The evaluation of the error bits has to be realized in the PLC.

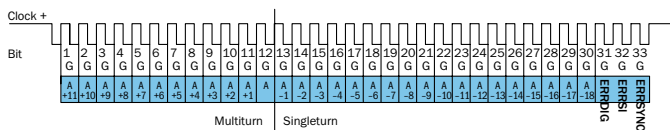
The provided error bits don't have to be used by the PLC compulsorily.

Example

If the resolution of the absolute encoder is set on 13 bits, 16 bits are provided by the encoder: 13 data bits and 3 error bits. If the PLC is not able to evaluate the error bits, the PLC has to be set on a resolution of 13 bits. Then the error bits have to be masked out by the PLC.

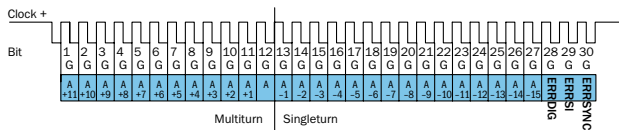
SSI data format multiturn

30 Bits



Bit 1–12: Position Bits multiturn
Bit 13–30: Position Bits singleturn
Bit 31–33: Error Bits

27 Bits



Bit 1–12: Position Bits multiturn
Bit 13–27: Position Bits singleturn
Bit 28–30: Error Bits

Error Bits

- ERRDIG: Failure message about speed. If this failure occurs during the position building procedure it will be indicated by the ERRDIG-Bit.
- ERRSI: Light source monitoring failure.
- ERRSYNC: Contamination of the disc or scanning system. During the determination of the position, an error has occurred since the last SSI transmission. The error bit will be deleted during the next data transmission.

The evaluation of the error bits has to be realized in the PLC.

The provided error bits don't have to be used by the PLC compulsorily. The multiturn resolution is fixed on 12 bits.

Example

If the resolution of the absolute encoder is set on 27 bits, 30 bits are provided by the encoder: 27 data bits and 3 error bits. If the PLC is not able to evaluate the error bits, the PLC has to be set on a resolution of 27 bits. Then the error bits have to be masked out by the PLC.

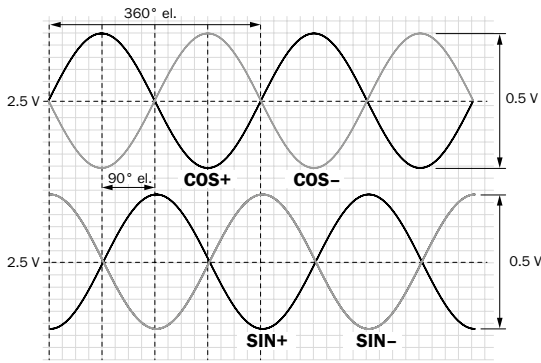
Interfaces

Electrical interfaces sine 0.5 V_{pp}

Power supply	Output
4.5 ... 5.5 V	Sine 0.5 V _{pp}

Signal before differential generation at load 120 Ω at U_s = 5 V

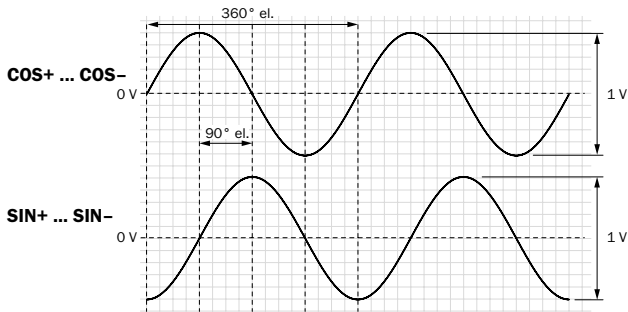
Signal diagram for clockwise rotation of the shaft looking in direction "A" (shaft)



Interface signals Sin, $\overline{\text{Sin}}$, Cos, $\overline{\text{Cos}}$	Signal before differential generation at load 120 Ω	Signal offset
Analog differential	0.5 V _{pp} ± 20 %	2.5 V ± 10 %

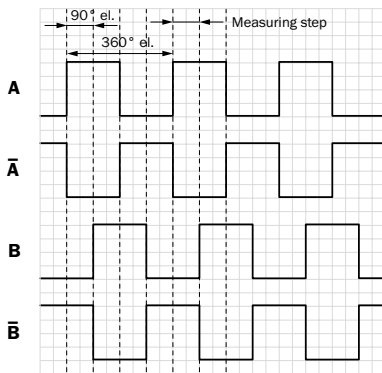
Signal after differential generation at load 120 Ω at U_s = 5 V

Signal diagram for clockwise rotation of the shaft looking in direction "A" (shaft)



Electrical interfaces HTL/TTL

Incremental pulse diagram for clockwise rotation of the shaft looking in direction "A", see dimensional drawing





Accessories

Mounting systems

Flanges

Bearing blocks

Figure	Brief description	Type	Part no.
	Bearing bracket for face mount flange and servo flange encoder. The Heavy Duty Bearing Block is intended for very large radial and axial shaft loads. Particularly for application on: Belt pulleys, Chain pinions, Friction wheels. The Bearing Block is suitable for mounting to Encoders with Servoflange.	BEF-FA-LB1210	2044591
	Bearing bracket for hollow shaft encoders, fastening screws included the Bearing Block is intended for very large radial and axial shaft loads. Particularly for application on: Belt pulleys, Chain pinions, Friction wheels. It is designed this way to enable fitting of encoder with blind hollow shaft with \varnothing 12 mm., fastening screws included	BEF-FA-B12-010	2042728

Dimensional drawings → [page 21](#)



Flange plates

Figure	Brief description	Type	Part no.
	Flange adapter, adaption of 36 mm spigot face mount flange to 58 mm square installation plate with shock-absorber, Aluminum	BEF-FA-036-060RSA	2029163
	Standard stator coupling	BEF-DS00XFX	2056812

Dimensional drawings → [page 21](#)

Mounting brackets and mounting plates

Mounting brackets

Figure	Brief description	Type	Part no.
	Mounting bracket for encoder with spigot 36 mm for face mount flange, mounting kit included	BEF-WF-36	2029164
	Mounting kit for servo flange encoder on bearing block, 1 cross-slotted coupling SKPS 1520 06/06 1 hexagon socket wrench SW1.5 DIN 911, 3 mounting eccentric BEMN 1242 49 3 screws M4 x 10 DIN 912, 1 hexagon socket wrench SW3 DIN 911, 1 bar coupling SKPS 1520 06/06 1 hexagon socket wrench SW1.5 DIN 911, 3 mounting eccentric BEMN 1242 49 3 screws M4 x 10 DIN 912, 1 hexagon socket wrench SW3 DIN 911	BEF-MK-LB	5320872
	Mounting angle spring-loaded, for flange with centerring collar 36 mm, working temperature range -40° ... $+120^{\circ}$ C, Aluminum	BEF-WF36F	4084775

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 10 mm solid shaft, circumference 200 mm	BEF-MR010020R	2055224
	Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm	BEF-MR010030R	2049278
	Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 500 mm	BEF-MR010050R	2055227
	Aluminium measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 200 mm	BEF-MR006020R	2055222
	Aluminium measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 300 mm	BEF-MR006030R	2055634
	Aluminium measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 500 mm	BEF-MR006050R	2055225
	Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 200 mm	BEF-MR10200AK	4084737
	Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 500 mm	BEF-MR10500AK	4084733
	Aluminum measuring wheel with cross-knurled surface for 6 mm solid shaft, circumference 200 mm	BEF-MR06200AK	4084745
	Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 200 mm	BEF-MR10200APG	4084740
	Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 500 mm	BEF-MR10500APG	4084736
	Aluminum measuring wheel with ridged polyurethane surface for 6 mm solid shaft, circumference 200 mm	BEF-MR06200APG	4084748
	Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 200 mm	BEF-MR10200AP	4084738
	Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 500 mm	BEF-MR10500AP	4084734
	Aluminum measuring wheel with smooth polyurethane surface for 6 mm solid shaft, circumference 200 mm	BEF-MR06200AP	4084746
	Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 200 mm	BEF-MR10200APN	4084739
	Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 500 mm	BEF-MR10500APN	4084735
	Aluminum measuring wheel with studded polyurethane surface for 6 mm solid shaft, circumference 200 mm	BEF-MR06200APN	4084747
	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
	Plastic measuring wheel with ridged plastic surface (Hytrel), for 10 mm solid shaft, circumference 200 mm	BEF-MR-010020G	5318678
	Plastic measuring wheel with smooth plastic surface (Hytrel), for 10 mm solid shaft, circumference 200 mm	BEF-MR-010020	5312988

Figure	Brief description	Type	Part no.
	Plastic measuring wheel with smooth plastic surface (Hytrel), for 10 mm solid shaft, circumference 500 mm	BEF-MR-010050	5312989


Dimensional drawings → [page 22](#)

Modular measuring wheel system

Figure	Brief description	Type	Part no.
	Measuring wheel System for face mount flange mechanical design S4 (solid shaft 10 x19 mm), e.g. DFS60-S4	BEF-MRS-10-U	2085714



Dimensional drawings → [page 24](#)

Mounting bells

Figure	Brief description	Type	Part no.
	Mounting bell for encoder with servo flange, 50 mm spigot, mounting kit included	BEF-MG-50	5312987

Dimensional drawings → [page 24](#)

Servo clamps

Figure	Brief description	Type	Part no.
	Half-shell servo clamp (2 pcs) for servo flange with 50 mm spigot	BEF-WG-SF050	2029165
	Servo clamps, large, for servo flange (clamping claws, mounting eccentric), 3 pcs, without mounting hardware, without mounting hardware	BEF-WK-SF	2029166

Dimensional drawings → [page 24](#)

Shaft adaptation

Shaft couplings





Figure	Brief description	Type	Part no.
	Bar coupling, shaft diameter 10 mm / 10 mm, max. shaft offset: radial ± 0.3 mm, axial ± 0.3 mm, angular ± 3°, max. speed 10,000 rpm, -10° to +80 °C, max. torque 80 Ncm; material: fiber-glass reinforced polyamide, aluminum hub	KUP-1010-S	2056408
	Bar coupling, shaft diameter 6 mm / 6 mm, max. shaft offset: radial ± 0.3 mm, axial ± 0.3 mm, angular ± 3°; max. speed 10,000 rpm, -10° to +80 °C, max. torque 80 Ncm; material: fiber-glass reinforced polyamide, aluminum hub	KUP-0606-S	2056406
	Bar coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radial ± 0,3 mm, axial ± 0,3 mm, angular ± 3°; max. speed 10.000 rpm, -10° to +80 °C, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub	KUP-0610-S	2056407
	Bar coupling, shaft diameter 6 mm / 8 mm, max. shaft offset: radial ± 0,3 mm, axial ± 0,3 mm, angular ± 3°; max. speed 10.000 rpm, -10° to +80 °C, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub	KUP-0608-S	5314179
	Bar coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radial ± 0,3 mm, axial ± 0,3 mm, angular ± 3°; max. speed 10.000 rpm, -10° to +80 °C, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub	KUP-0810-S	5314178



Figure	Brief description	Type	Part no.
	Bellows coupling, shaft diameter 10 mm / 10 mm, Maximum shaft offset: radial +/- 0.25 mm, axial +/- 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, -30° to +120 °C, max. torque 120 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 +/- 4°; max. speed 10,000 rpm, -30° to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub	KUP-1012-B	5312984
	Bellows coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial +/- 0.25 mm, axial +/- 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, -30° to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub	KUP-0610-B	5312982
	Bellows coupling, shaft diameter 6 mm / 6 mm, Maximum shaft offset: radial +/- 0.25 mm, axial +/- 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, -30° to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub	KUP-0606-B	5312981
	Double loop coupling, shaft diameter 10 mm / 10 mm, Maximum shaft offset: radial +/- 2.5 mm, axial +/- 3 mm, angular +/- 10°; max. speed 3,000 rpm, -30° to +80 °C, max. torque 1.5 Nm; material: polyurethane, galvanized steel flange	KUP-1010-D	5326703
	Double loop coupling, shaft diameter 10 mm / 12 mm, Maximum shaft offset: radial +/- 2.5 mm, axial +/- 3 mm, angular +/- 10°; max. speed 3,000 rpm, -30° to +80 °C, max. torque 1.5 Nm; material: polyurethane, galvanized steel flange	KUP-1012-D	5326702
	Double loop coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radially +/- 2,5 mm, axially +/-3 mm, angle +/- 10 degrees;max. speed 3.000 rpm, -30 to +80 degrees Celsius, torsional spring stiffness of 25 Nm/rad	KUP-0610-D	5326697
	Double loop coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radially +/- 0.25 mm, axially +/-0,4 mm, angle +/- 4 degrees;max. speed 10.000 rpm, -30 to +120 degrees Celsius, torsional spring stiffness of 150 Nm/rad	KUP-0810-D	5326704
	Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial ± 0.3 mm, axial ± 0.4 mm, angle ± 2.5°, torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin	KUP-1010-F	5312986
	Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial +/- 0.3 mm, axial +/- 0.4 mm, angular +/- 2.5°; max. speed 12,000 rpm, -10° to +80 °C, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin	KUP-0610-F	5312985

Dimensional drawings → [page 24](#)

Connection systems

Plug connectors and cables

Cables (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: cable Head B: cable Cable: SSI, drag chain use, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm ² , Ø 5.6 mm	LTG-2308-MWENC	6027529
	Head A: cable Head B: cable Cable: SSI, drag chain use, 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, UV and saltwater-resistant	LTG-2612-MW	6028516

Connecting cables with female connector






Figure	Brief description	Cable length	Type	Part no.
	Head A: female connector, M12, 8-pin, straight Head B: cable Cable: drag chain use, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm ² , Ø 7 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, M12, 12-pin, straight, A-coded Head B: cable Cable: SSI, PUR, shielded, 12 x 0.14 mm ² , Ø 8.5 mm	2 m	DOL-1212-G02MAC1	6053273
		5 m	DOL-1212-G05MAC1	6053274
		10 m	DOL-1212-G10MAC1	6053275
		20 m	DOL-1212-G20MAC1	6053276


Figure	Brief description	Cable length	Type	Part no.
	Head A: female connector, M12, 12-pin, angled, A-coded Head B: cable Cable: SSI, PUR, shielded, 12 x 0.14 mm ² , Ø 8.5 mm	2 m	DOL-1212-W02MAC1	6039824
		5 m	DOL-1212-W05MAC1	6039825
		10 m	DOL-1212-W10MAC1	6039826
		20 m	DOL-1212-W20MAC1	6039827

Dimensional drawings → [page 25](#)

Connection cables with female connector and male connector


Figure	Brief description	Cable length	Type	Part no.
	Head A: female connector, plug-in system, 8-pin, straight Head B: male connector, D-Sub, 9-pin, straight Cable: Incremental, PVC, shielded	0.5 m	DSL-0D08-G0M5AC3	2061739
	Head A: female connector, M12, 8-pin, straight Head B: male connector, D-Sub, 9-pin, straight Cable: SSI, PUR, halogen-free, shielded, 4 x 2 x 0.08 mm ²	0.5 m	DSL-2D08-G0M5AC2	2048439
	Head A: female connector, M12, 12-pin, straight Head B: male connector, D-Sub, 9-pin, straight Cable: SSI + incremental, SSI + Sin/Cos, Incremental, shielded, 12 x 0.14 mm ² , 8.5 mm	0.5 m	DSL-2D12-G0M5AC4	2088790

Female connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: female connector, M12, 8-pin, straight, A-coded Head B: - Cable: Incremental, SSI, shielded, CAT5, CAT5e	DOS-1208-GA01	6045001

Dimensional drawings → [page 25](#)



Male connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: male connector, M12, 8-pin, straight, A-coded Head B: - Cable: Incremental, shielded, CAT5, CAT5e	STE-1208-GA01	6044892

Dimensional drawings → [page 25](#)

Further accessories

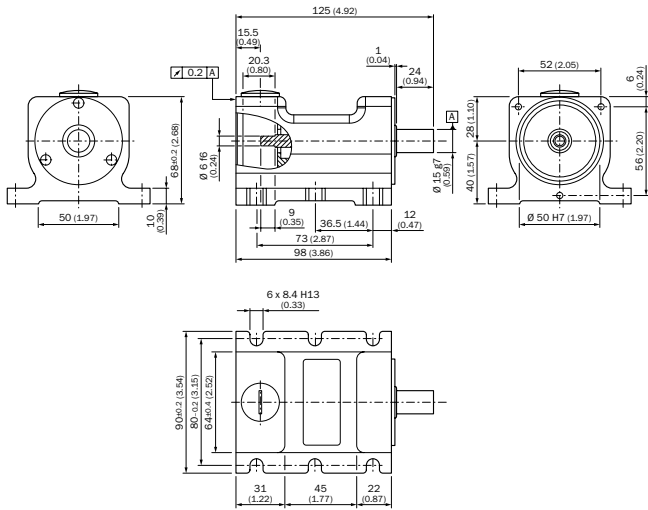
Programming and configuration tools

Figure	Brief description	Type	Part no.
	Programming Tool USB for programmable SICK encoders DFS60, VFS60, DFV60, AFS/AFM60 SSI, AFM60 SSI+Incremental, AFM60 SSI+Sin/Cos, AHS/AHM36 SSI and wire draw encoders with programmable DFS60, AFS/AFM60 SSI and AHS/AHM36 SSI.	PGT-08-S	1036616
	Display Programming Tool for programmable SICK encoders DFS60, DFV60, AFS/AFM60, AHS/AHM36 and wire draw encoders with DFS60, AFS/AFM60 and AHS/AHM36. Compact dimensions, low weight and intuitive to use.	PGT-10-Pro	1072254

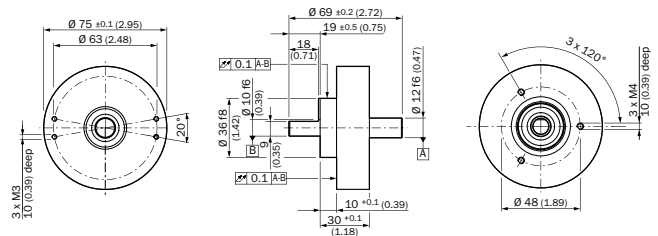
Dimensional drawings for accessories (Dimensions in mm (inch))

Flanges

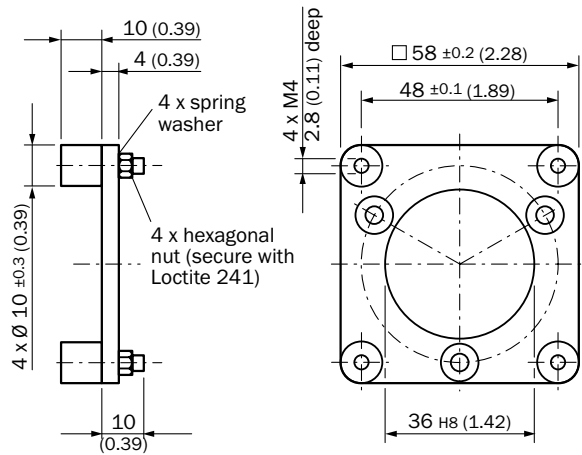
BEF-FA-LB1210



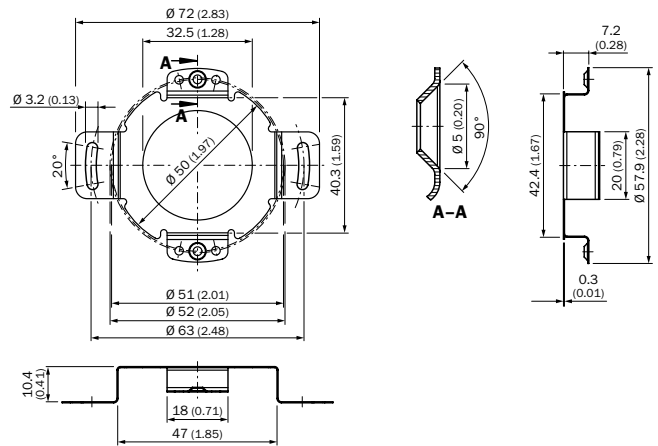
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BEF-FA-036-060RSA

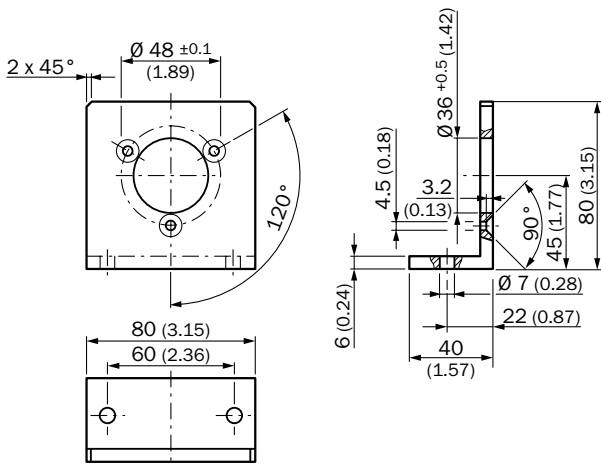


BEF-DS00XFX

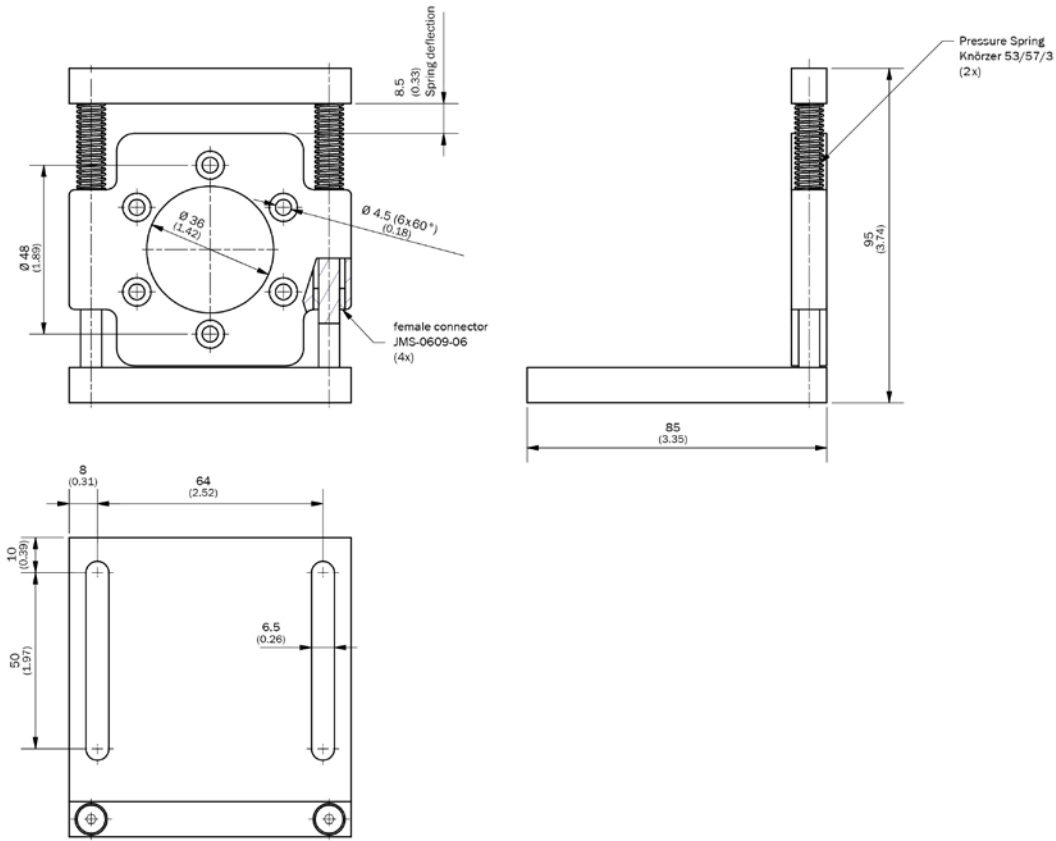


Mounting brackets and mounting plates

BEF-WF-36

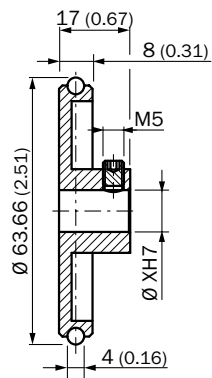


BEF-WF36F

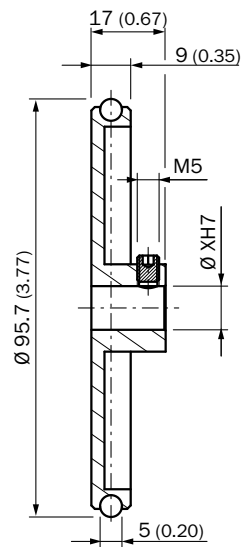


Other mounting accessories

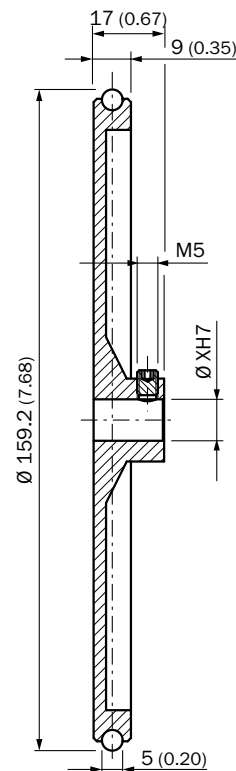
BEF-MR0xx020R



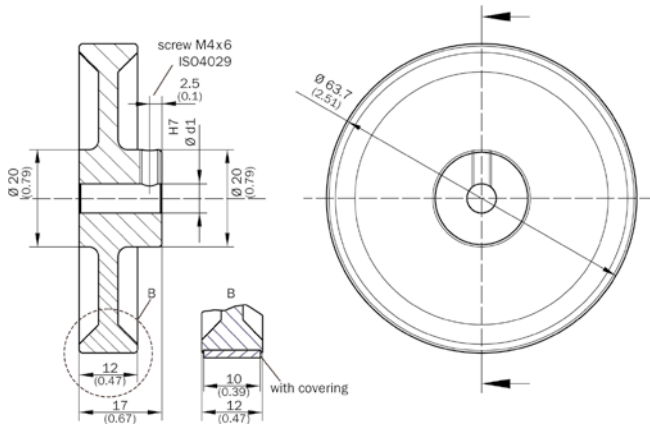
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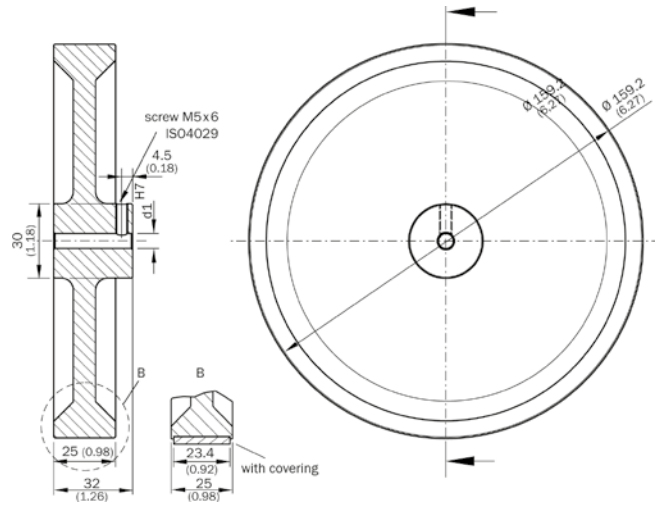
BEF-MR0xx050R



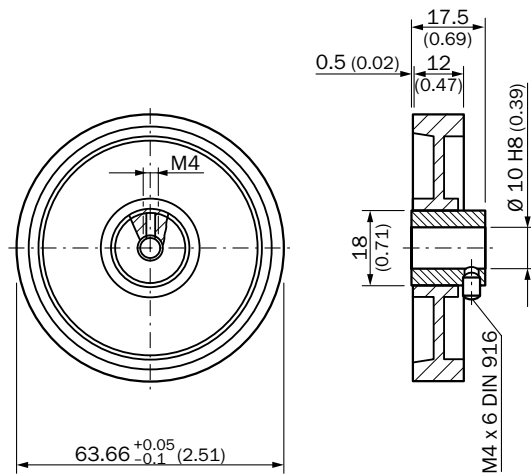
BEF-MR10200AK, BEF-MR06200AK, BEF-MR10200APG,
BEF-MR06200APG, BEF-MR10200AP, BEF-MR06200AP, BEF-
MR10200APN, BEF-MR06200APN



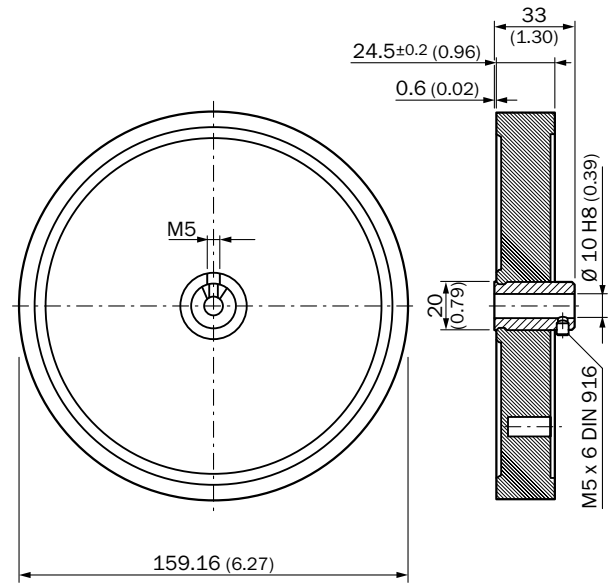
BEF-MR10500AK
BEF-MR10500APG
BEF-MR10500AP
BEF-MR10500APN



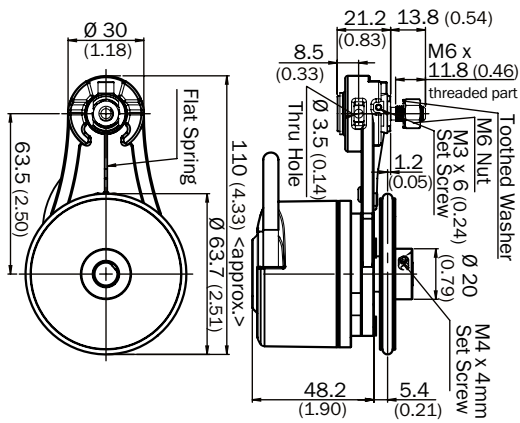
BEF-MR-010020G
BEF-MR-010020



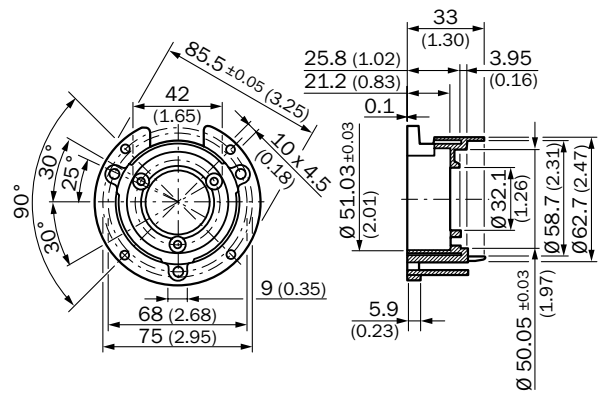
BEF-MR-010050



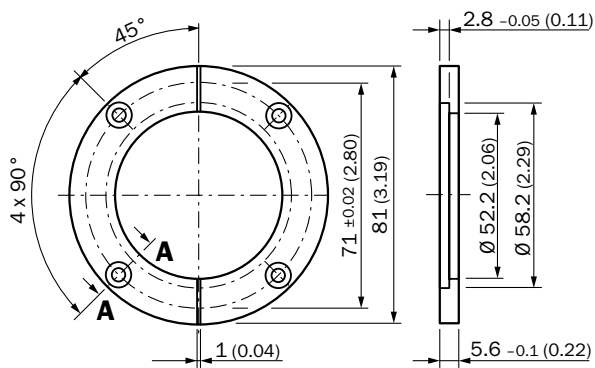
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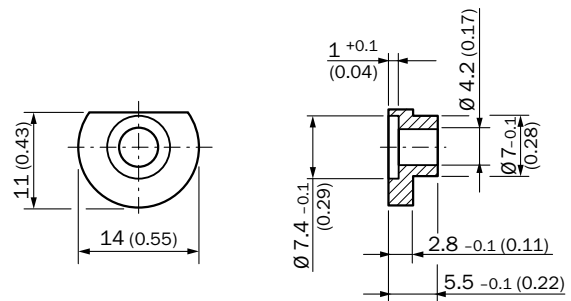
BEF-MG-50



BEF-WG-SF050

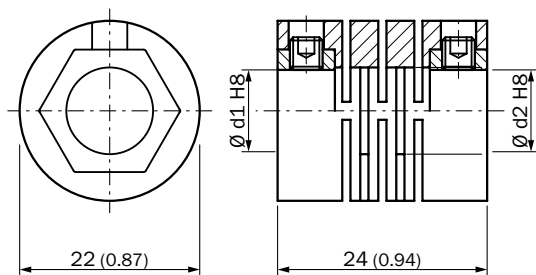


BEF-WK-SF

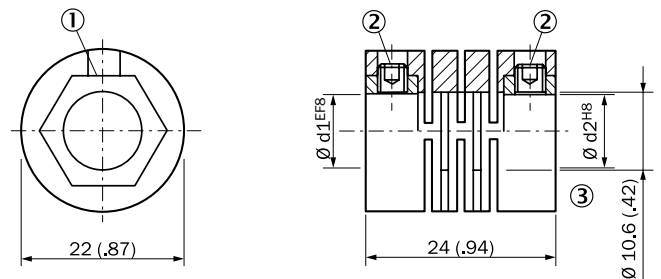


Shaft adaptation

KUP-xxxx-S

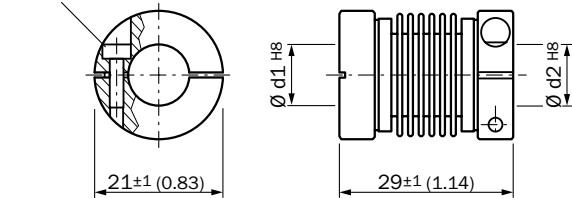


KUP-0xxx-S

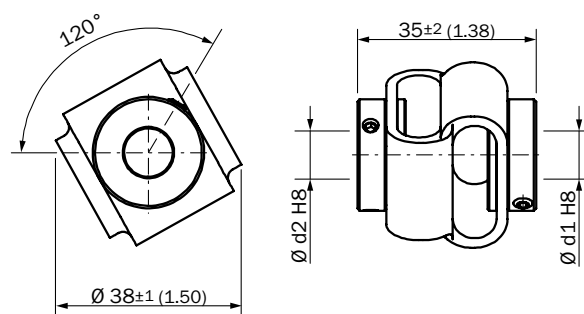


KUP-xxxx-B

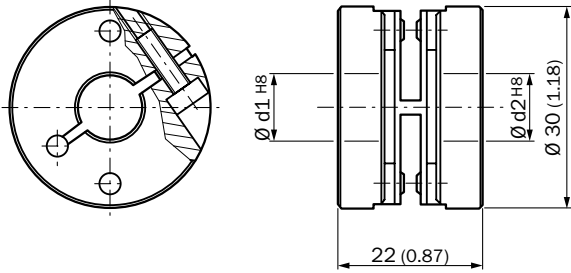
Cheese-head screw
M2.5 x 8, DIN 912 A2



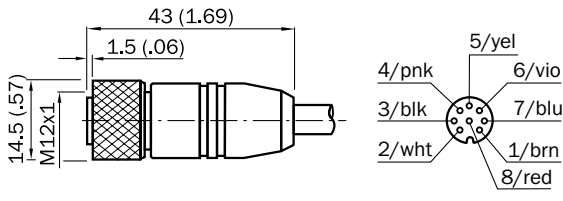
KUP-xx1x-D



KUP-xx10-F

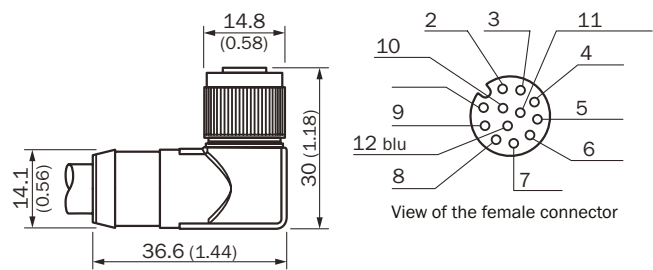


DOL-1208-GxxMAC1

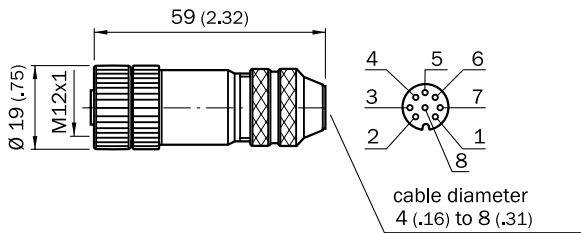


All dimensions in mm (inch)

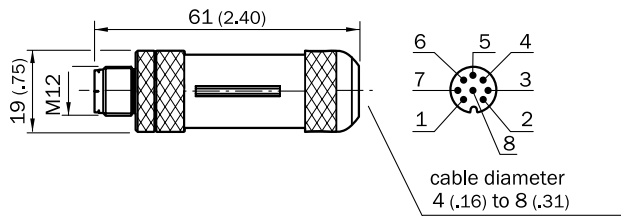
DOL-1212-WxxMAC1



DOS-1208-GA01

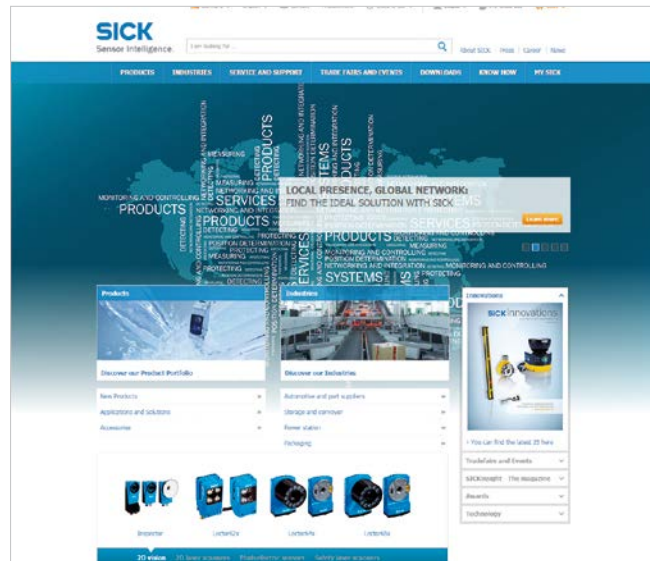


STE-1208-GA01



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