

# AFM60A-BDNB018X12

AFS/AFM60 PROFINET

**ABSOLUTE ENCODERS**

**SICK**  
Sensor Intelligence.

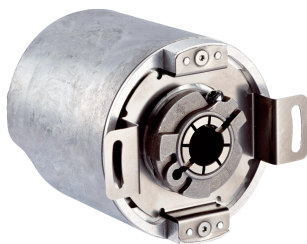


Illustration may differ



## Ordering information

Type	Part no.
AFM60A-BDNB018X12	1059035

Other models and accessories → [www.sick.com/AFS\\_AFM60\\_PROFINET](http://www.sick.com/AFS_AFM60_PROFINET)

## Detailed technical data

## Performance

<b>Max. number of steps per revolution</b>	262,144
<b>Max. number of revolutions</b>	4,096
<b>Resolution power</b>	262,144 x 4,096
<b>Resolution</b>	18 bit x 12 bit
<b>Error limits</b>	≤ 0.03°
<b>Repeat accuracy</b>	≤ 0.002°
<b>Measuring step deviation</b>	± 0.002°
<b>Initialization time</b>	6 s

## Interfaces

<b>Electrical interface</b>	PROFINET
<b>Bus interface</b>	PROFINET IO/ RT Class B <sup>1)</sup>
<b>Encoder profile</b>	V4.1 class3
<b>Data transmission rate (baud rate)</b>	10 Mbit/s 100 Mbit/s
<b>Transmission medium</b>	CAT-5e cable
<b>RPI (requested packet interval)</b>	2 ms ... 750 ms
<b>Round axis functionality</b>	✓

<sup>1)</sup> PROFINET.

## Electrical data

<b>Connection type</b>	Male connector, axial
<b>Operating voltage range</b>	10 V DC ... 30 V DC
<b>MTTFd: mean time to dangerous failure</b>	80 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>Mechanical interface</b>	Blind hollow shaft
<b>Shaft diameter</b>	10 mm

<b>Weight</b>	0.2 kg
<b>Shaft material</b>	Stainless steel
<b>Flange material</b>	Aluminum
<b>Start up torque</b>	0.8 Ncm (+20 °C)
<b>Operating torque</b>	0.6 Ncm (+20 °C)
<b>Permissible movement axial static/dynamic</b>	≤ 0.5 mm, ≤ 0.1 mm
<b>Permissible movement radial static/dynamic</b>	≤ 0.3 mm, ≤ 0.05 mm
<b>Moment of inertia of the rotor</b>	40 gcm <sup>2</sup>
<b>Bearing lifetime</b>	3.0 x 10 <sup>9</sup> revolutions
<b>Max. angular acceleration</b>	≤ 500,000 rad/s <sup>2</sup>

#### Ambient data

<b>EMC</b>	(according to EN 61000-6-2 and EN 61000-6-3) <sup>1)</sup>
<b>Enclosure rating</b>	IP 65, shaft side (according to IEC 60529) IP 67, housing side (according to IEC 60529) <sup>2)</sup>
<b>Permissible relative humidity</b>	90 % (condensation of the optical scanning not permitted)
<b>Working 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>	30 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)

<sup>1)</sup> The EMC according to the standards quoted is achieved if screened cables are used.

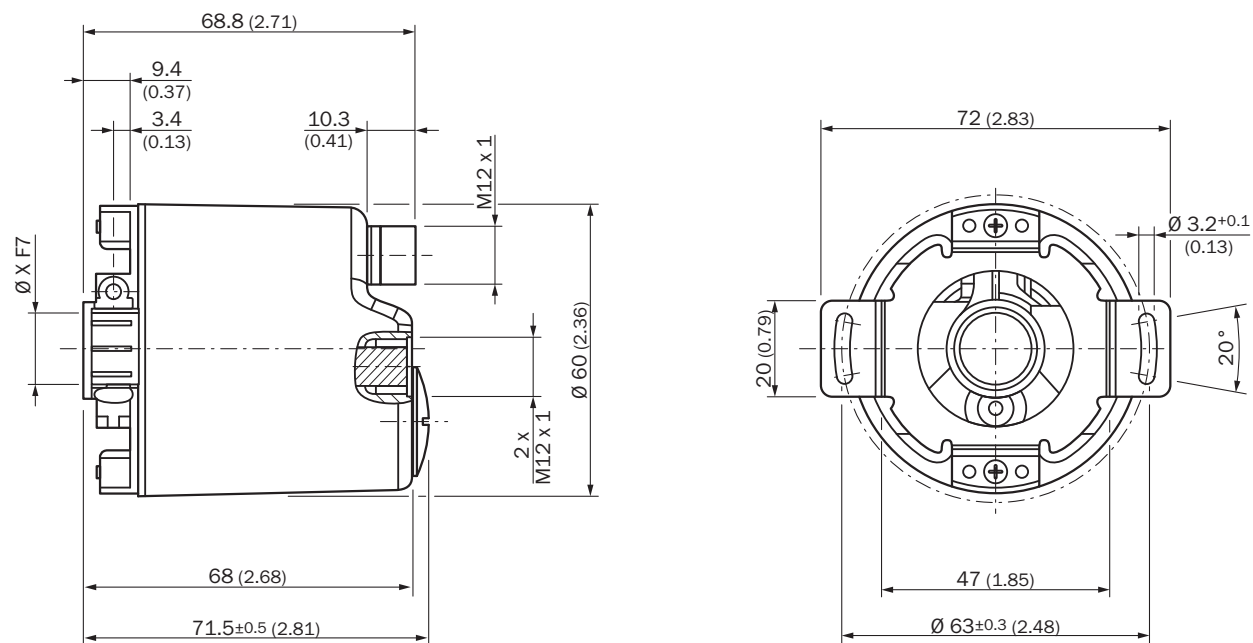
<sup>2)</sup> With mating connector inserted.

#### Classifications

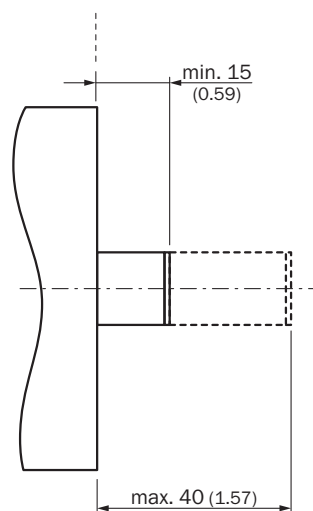
<b>ECI@ss 5.0</b>	27270502
<b>ECI@ss 5.1.4</b>	27270502
<b>ECI@ss 6.0</b>	27270590
<b>ECI@ss 6.2</b>	27270590
<b>ECI@ss 7.0</b>	27270502
<b>ECI@ss 8.0</b>	27270502
<b>ECI@ss 8.1</b>	27270502
<b>ECI@ss 9.0</b>	27270502
<b>ETIM 5.0</b>	EC001486
<b>ETIM 6.0</b>	EC001486
<b>UNSPSC 16.0901</b>	41112113

### Dimensional drawing (Dimensions in mm (inch))

Diameter x f7 corresponds to the shaft diameter



### Proposed fitting



All dimensions in mm (inch)

## PIN assignment

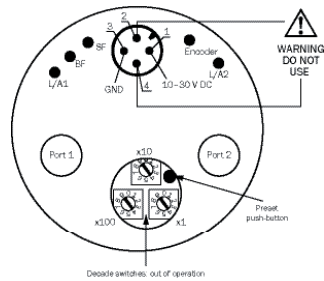
M12 - 4-pin (D coding)



Port 1				
Signal	T x D+	R x D+	T x D-	R x D-
Pin	1	2	3	4
Color wires	Yellow	White	Orange	Blue

Port 2				
Signal	T x D+	R x D+	T x D-	R x D-
Pin	1	2	3	4
Color wires	Yellow	White	Orange	Blue



M12 - 4-pin (A coding)












Power supply				
Signal	U <sub>s</sub> 10 ... 30 V	Not connected	GND	Not connected
Pin	1	2	3	4
Color wires	Brown	White	Blue	Black

## Recommended accessories

Other models and accessories → [www.sick.com/AFS\\_AFM60\\_PROFINET](http://www.sick.com/AFS_AFM60_PROFINET)

	Brief description	Type	Part no.
Flanges			
	One-sided stator coupling, slot, slot radius 33 mm to 48.5 mm, slot width 5.1 mm	BEF-DS01DFS/VFS	2047428
	Flange adapter, adaption of 36 mm spigot face mount flange to 50 mm servo flange, Aluminum, including 3 countersunk screws M4 x 10	BEF-FA-036-050	2029160
	Flange adapter, adaption of 36 mm spigot face mount flange to 60 mm square installation plate, Aluminum, including 3 countersunk screws M4 x 10	BEF-FA-036-060REC	2029162
	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
	Flange adapter, adaption of 36 mm spigot face mount flange to 63 mm square installation plate, Aluminum, including 3 countersunk screws M4 x 10	BEF-FA-036-063REC	2034225
Other mounting accessories			
	Measuring wheel with smooth plastic surface (Hytrel), for solid shaft 10 mm, circumference 200 mm, diameter 63.66 mm	BEF-MR-010020	5312988
	Measuring wheel with ridged plastic surface (Hytrel) for 10 mm solid shaft, circumference 200 mm	BEF-MR-010020G	5318678

	Brief description	Type	Part no.
	Measuring wheel with smooth plastic surface (Hytrel) for 10 mm solid shaft	BEF-MR-010050	5312989
	Measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 200 mm	BEF-MR006020R	2055222
	Measuring wheel, circumference 0.3 m, hole $\varnothing$ 6mm, NBR70 O-ring surface	BEF-MR006030R	2055634
	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, circumference 0.5 m, hole $\varnothing$ 10mm, NBR70 O-ring surface	BEF-MR010050R	2055227
	O-ring for measuring wheels (circumference 200 mm) with O-ring	BEF-OR-053-040	2064061
	Replacement O-ring set for measuring wheels (circumference 300 mm) with O-ring	BEF-OR-083-050	2064076
Shaft adaptation			
	Bellows coupling, shaft diameter 6 mm / 6 mm	KUP-0606-B	5312981
	Bellows coupling, shaft diameter 6 mm / 10 mm	KUP-0610-B	5312982
	Spring washer coupling, shaft diameter 6 mm / 10 mm	KUP-0610-F	5312985
	Bellows coupling, shaft diameter 10 mm / 10 mm	KUP-1010-B	5312983
	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
	Bellows coupling, shaft diameter 10 mm / 12 mm	KUP-1012-B	5312984
Plug connectors and cables			
 	Head A: female connector, M12, 4-pin, straight Head B: cable Cable: drag chain use, PUR, halogen-free, unshielded, 2 m	DOL-1204-G02MC	6025900
	Head A: female connector, M12, 4-pin, straight Head B: cable Cable: drag chain use, PUR, halogen-free, unshielded, 5 m	DOL-1204-G05MC	6025901
	Head A: female connector, M12, 4-pin, straight Head B: cable Cable: drag chain use, PUR, halogen-free, unshielded, 10 m	DOL-1204-G10MC	6025902
	Head A: female connector, M12, 4-pin, straight Head B: cable Cable: drag chain use, PUR, halogen-free, unshielded, 25 m	DOL-1204-G25MC	6034751
	Head A: female connector, M12, 4-pin, angled Head B: cable Cable: drag chain use, PUR, halogen-free, unshielded, 2 m	DOL-1204-W02MC	6025903
	Head A: female connector, M12, 4-pin, angled Head B: cable Cable: drag chain use, PUR, halogen-free, unshielded, 5 m	DOL-1204-W05MC	6025904
	Head A: female connector, M12, 4-pin, angled Head B: cable Cable: drag chain use, PUR, halogen-free, unshielded, 10 m	DOL-1204-W10MC	6025905

	Brief description	Type	Part no.
	Head A: female connector, M12, 4-pin, angled Head B: cable Cable: drag chain use, PUR, halogen-free, unshielded, 25 m	DOL-1204-W25MC	6034754
	Head A: male connector, M12, 4-pin, straight, D-coded Head B: cable Cable: PROFINET, PVC, shielded, 2 m	STL-1204-G02MZ90	6048247
	Head A: male connector, M12, 4-pin, straight, D-coded Head B: cable Cable: PROFINET, PVC, shielded, 5 m	STL-1204-G05MZ90	6048248
	Head A: male connector, M12, 4-pin, straight, D-coded Head B: cable Cable: PROFINET, PVC, shielded, 10 m	STL-1204-G10MZ90	6048249
	Head A: male connector, M12, 4-pin, angled, D-coded Head B: cable Cable: PROFINET, PVC, shielded, 5 m	STL-1204-W05MZ90	6048257
	Head A: male connector, M12, 4-pin, angled, D-coded Head B: cable Cable: PROFINET, PVC, shielded, 25 m	STL-1204-W25MZ90	6048259
	Head A: male connector, M12, 4-pin, angled, D-coded Head B: male connector, M12, 4-pin, angled, D-coded Cable: PROFINET, PUR, halogen-free, shielded, 2 m	SSL-1204-W02MZ	6050635
	Head A: male connector, M12, 4-pin, angled, D-coded Head B: male connector, M12, 4-pin, angled, D-coded Cable: PROFINET, PUR, halogen-free, shielded, 5 m	SSL-1204-W05MZ	6050636
	Head A: male connector, M12, 4-pin, angled, D-coded Head B: male connector, M12, 4-pin, angled, D-coded Cable: PROFINET, PUR, halogen-free, shielded, 10 m	SSL-1204-W10MZ	6050637
	Head A: male connector, RJ45, 4-pin, straight Head B: male connector, M12, 4-pin, angled, D-coded Cable: PROFINET, EtherCAT, PVC, shielded, 2 m	SSL-2J04-F02MZ	6048253
	Head A: male connector, RJ45, 4-pin, straight Head B: male connector, M12, 4-pin, angled, D-coded Cable: PROFINET, EtherCAT, PVC, shielded, 5 m	SSL-2J04-F05MZ	6048254
	Head A: male connector, RJ45, 4-pin, straight Head B: male connector, M12, 4-pin, angled, D-coded Cable: PROFINET, EtherCAT, PVC, shielded, 10 m	SSL-2J04-F10MZ	6048255
	Head A: male connector, RJ45, 4-pin, straight Head B: male connector, M12, 4-pin, angled, D-coded Cable: PROFINET, EtherCAT, PVC, shielded, 30 m	SSL-2J04-F30MZ	6059450
	Head A: female connector, M12, 4-pin, angled Head B: - Cable: unshielded	DOS-1204-W	6007303
	Head A: male connector, M12, 4-pin, angled, D-coded Cable: PROFINET, shielded	STE-1204-WZ	6048262
	Head A: female connector, M12, 4-pin, D-coded Head B: female connector, RJ45, 8-pin Cable: Ethernet, shielded Cabinet through	Feedthrough female connector Ethernet RJ45	6048180

## SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

**For us, that is “Sensor Intelligence.”**

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