

**AFS60E-TEAC016384**

AFS/AFM60 SSI

**ABSOLUTE ENCODERS**

**SICK**  
Sensor Intelligence.



Illustration may differ



## Ordering information

Type	part no.
AFS60E-TEAC016384	1090560

Other models and accessories → [www.sick.com/AFS\\_AFM60\\_SSI](http://www.sick.com/AFS_AFM60_SSI)

## Detailed technical data

## Performance

<b>Number of steps per revolution (max. resolution)</b>	16,384 (14 bit)
<b>Error limits G</b>	0.2° <sup>1)</sup>
<b>Repeatability standard deviation <math>\sigma_r</math></b>	0.002° <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>	SSI
<b>Initialization time</b>	50 ms <sup>1)</sup>
<b>Position forming time</b>	< 1 $\mu$ s
<b>Code type</b>	Gray
<b>Code sequence parameter adjustable</b>	CW/CCW (V/R) parameter adjustable
<b>Clock frequency</b>	$\leq 1$ MHz <sup>2)</sup>
<b>Set (electronic adjustment)</b>	H-active (L = 0 - 3 V, H = 4,0 - U <sub>s</sub> V)
<b>CW/CCW (counting sequence when turning)</b>	L-active (L = 0 - 1,5 V, H = 2,0 - U <sub>s</sub> V)

<sup>1)</sup> Valid positional data can be read once this time has elapsed.

<sup>2)</sup> Minimum, LOW level (Clock +): 250 ns.

## Electrical data

<b>Connection type</b>	Male connector, M12, 8-pin, radial
<b>Supply voltage</b>	4.5 ... 32 V
<b>Power consumption</b>	$\leq 0.7$ W (without load)
<b>Reverse polarity protection</b>	✓

<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.

MTTFd: mean time to dangerous failure	250 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

Mechanical design	Through hollow shaft
Shaft diameter	12 mm
Weight	0.2 kg <sup>1)</sup>
Shaft material	Stainless steel
Flange material	Aluminum
Housing material	Aluminum die cast
Start up torque	< 0.8 Ncm (+20 °C)
Operating torque	< 0.6 Ncm (+20 °C)
Permissible movement static	± 0.5 mm (axial) ± 0.3 mm (radial)
Permissible movement dynamic	± 0.2 mm (axial) ± 0.1 mm (radial)
Operating speed	≤ 9,000 min <sup>-1</sup> <sup>2)</sup>
Moment of inertia of the rotor	40 gcm <sup>2</sup>
Bearing lifetime	3.0 x 10 <sup>9</sup> revolutions
Angular acceleration	≤ 500,000 rad/s <sup>2</sup>

<sup>1)</sup> Based on devices with male connector.  
<sup>2)</sup> Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3 <sup>1)</sup>
Enclosure rating	IP65, shaft side (IEC 60529) IP67, housing side (IEC 60529) <sup>2)</sup>
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	0 °C ... +85 °C
Storage temperature range	-40 °C ... +100 °C, without package
Resistance to shocks	50 g, 6 ms (EN 60068-2-27)
Resistance to vibration	20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

<sup>1)</sup> EMC according to the standards quoted is achieved if shielded cables are used.  
<sup>2)</sup> For devices with male connector: with mounted mating connector.

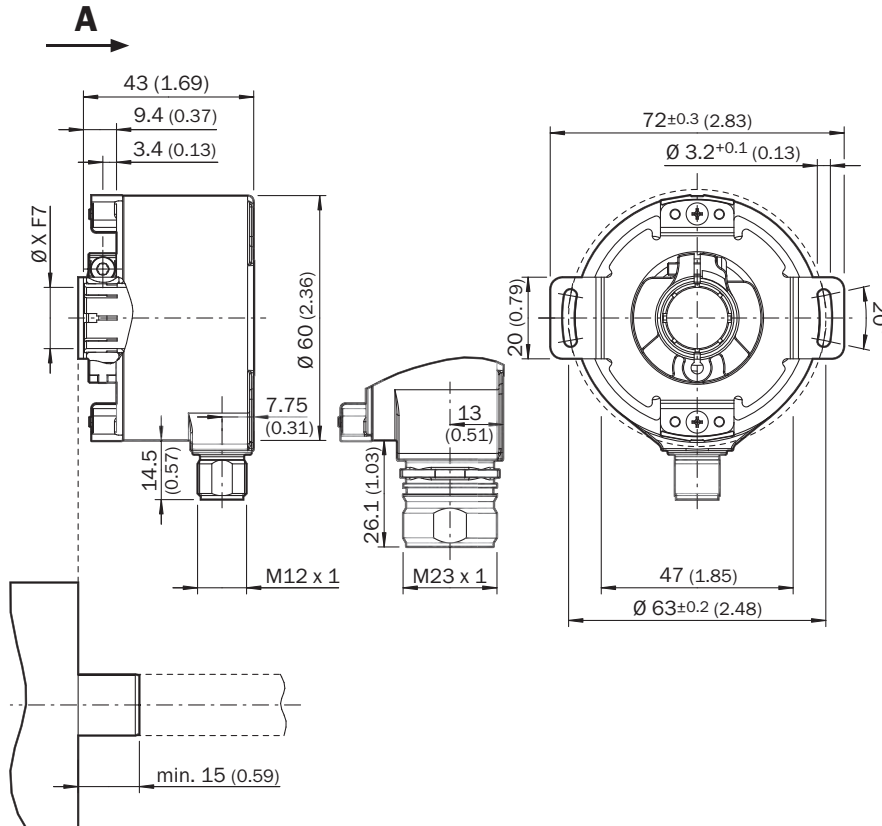
Certificates

EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China-RoHS	✓
cULus certificate	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

### Classifications

<b>ECLASS 5.0</b>	27270502
<b>ECLASS 5.1.4</b>	27270502
<b>ECLASS 6.0</b>	27270590
<b>ECLASS 6.2</b>	27270590
<b>ECLASS 7.0</b>	27270502
<b>ECLASS 8.0</b>	27270502
<b>ECLASS 8.1</b>	27270502
<b>ECLASS 9.0</b>	27270502
<b>ECLASS 10.0</b>	27270502
<b>ECLASS 11.0</b>	27270502
<b>ECLASS 12.0</b>	27270502
<b>ETIM 5.0</b>	EC001486
<b>ETIM 6.0</b>	EC001486
<b>ETIM 7.0</b>	EC001486
<b>ETIM 8.0</b>	EC001486
<b>UNSPSC 16.0901</b>	41112113

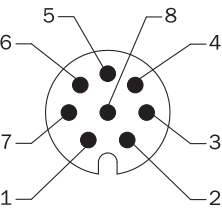
### Dimensional drawing



Dimensions in mm (inch)

① cable diameter = 5.6 mm +/- 0.2 mm bend radius = 30 mm

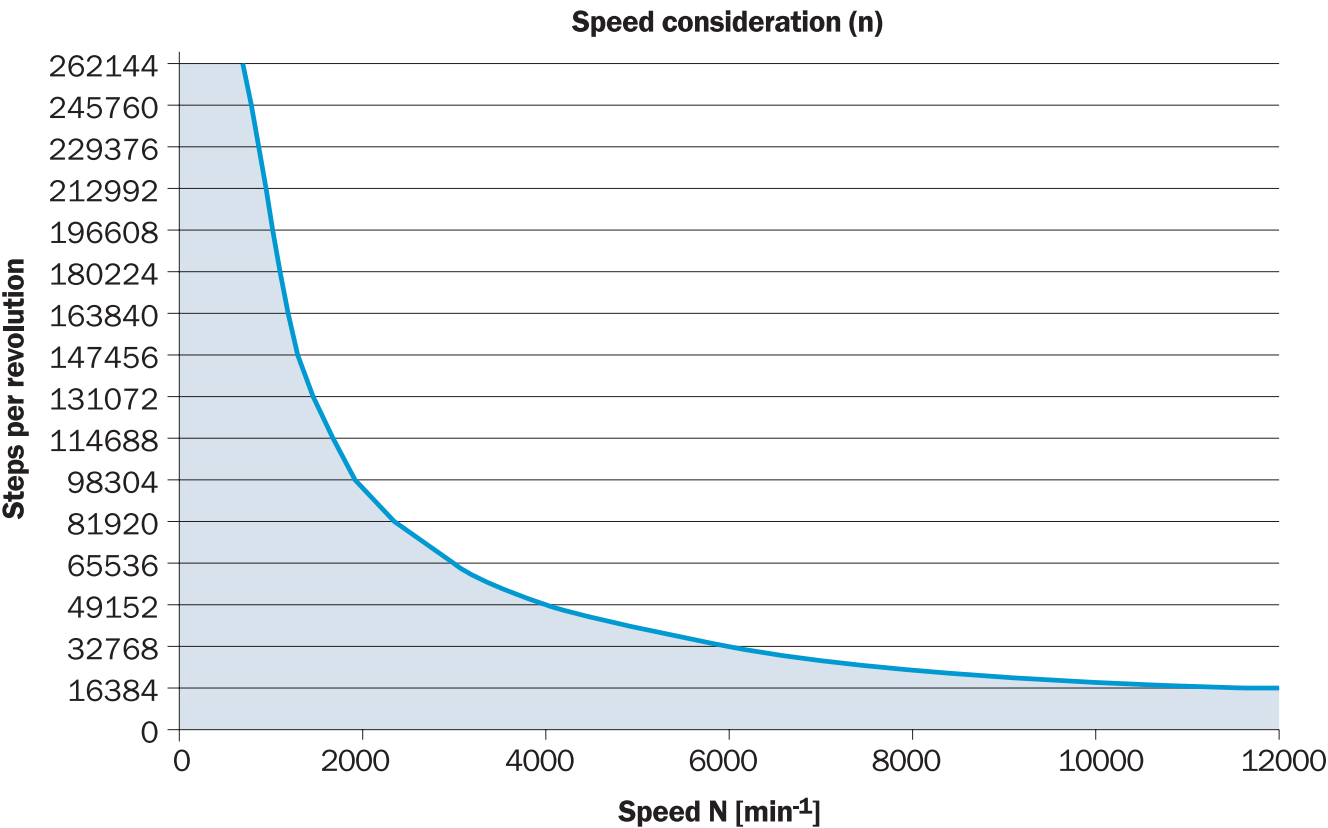
PIN assignment M12 male connector, 8-pin and cable, 8-wire, SSI/Gray



view of M12 male device connector on encoder

PIN	Wire colors (cable connection)	Signal	Explanation
1	Brown	Data -	Interface signals
2	White	Data +	Interface signals
3	Black	V/R	Sequence in direction of rotation
4	Pink	SET	Electronic adjustment-Interface signals
5	Yellow	Clock +	Interface signals
6	Purple	Clock -	Interface signals
7	Blue	GND	Ground connection
8	Red	U <sub>S</sub>	Operating voltage
-	-	Screen	Screen connected to housing on encoder side. Connected to ground on control side.

Diagrams



The maximum speed is also dependent on the shaft type.

Recommended accessories

Other models and accessories → [www.sick.com/AFS\\_AFM60\\_SSI](http://www.sick.com/AFS_AFM60_SSI)

	Brief description	Type	part no.
connectors and cables			
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Flying leads</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> SSI, Incremental, HIPERFACE®</li><li>• <b>Items supplied:</b> By the meter</li><li>• <b>Cable:</b> 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> SSI, shielded, Incremental, HIPERFACE®</li></ul>	LTG-2308-MWENC	6027529
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 2 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>	DOL-1208-G02MAC1	6032866
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 5 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>	DOL-1208-G05MAC1	6032867
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 10 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>	DOL-1208-G10MAC1	6032868
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 20 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>	DOL-1208-G20MAC1	6032869
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 25 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>	DOL-1208-G25MAC1	6067859
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> CAT5, CAT5e</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> IDC quick connection</li><li>• <b>Permitted cross-section:</b> 0.14 mm² ... 0.34 mm²</li></ul>	DOS-1208-GA01	6045001

## 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.”

## WORLDWIDE PRESENCE:

Contacts and other locations –[www.sick.com](http://www.sick.com)