

# AFM60A-TETA262144

AFS/AFM60 SSI

**ABSOLUTE ENCODERS** 





#### **Ordering information**

Туре	part no.
AFM60A-TETA262144	1064201

Other models and accessories → www.sick.com/AFS\_AFM60\_SSI

Illustration may differ



#### Detailed technical data

## Safety-related parameters

MTTF <sub>D</sub> (mean time to dangerous failure) 250	50 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.

#### Performance

Number of steps per revolution (max. resolution)	262,144 (18 bit)
Number of revolutions	4,096 (12 bit)
$\label{eq:max} \begin{tabular}{ll} \textbf{Max. resolution (number of steps per revolution x number of revolutions)} \end{tabular}$	18 bit x 12 bit (262,144 x 4,096)
Error limits G	0.03° <sup>1)</sup>
Repeatability standard deviation $\boldsymbol{\sigma_r}$	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.

#### Interfaces

Communication interface	SSI
Communication Interface detail	SSI + incremental / TTL
Initialization time	50 ms <sup>1)</sup>
Position forming time	< 1 µs
Code type	Gray
Code sequence parameter adjustable	CW/CCW (V/R) parameter adjustable
Clock frequency	≤ 2 MHz <sup>2)</sup>
Set (electronic adjustment)	H-active (L = $0 - 3 \text{ V}$ , H = $4.0 - U_s \text{ V}$ )

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

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

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

CW/CCW (counting sequence when turning)	L-active (L = 0 - 1,5 V, H = 2,0 - Us V)
Pulses per revolution	1/4 of number of SSI steps per revolution
Output frequency	≤ 820 kHz
Load current	≤ 30 mA

 $<sup>^{1)}\,\</sup>mathrm{Valid}$  positional data can be read once this time has elapsed.

#### **Electronics**

Connection type	Male connector, M23, 12-pin, radial	
Supply voltage	4.5 32 V	
Power consumption	≤ 0.7 W (without load)	
Reverse polarity protection	✓	

#### Mechanics

Mechanical design	Through hollow shaft
Shaft diameter	12 mm
Characteristics of the shaft	Front clamp
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	± 0.3 mm (radial) ± 0.5 mm (axial)
Permissible movement dynamic	± 0.05 mm (radial) ± 0.1 mm (axial)
Operating speed	≤ 9,000 min <sup>-1 2)</sup>
Moment of inertia of the rotor	40 gcm <sup>2</sup>
Bearing lifetime	3.0 x 10^9 revolutions
Angular acceleration	≤ 500,000 rad/s²

 $<sup>^{1)}</sup>$  Based on devices with male connector.

#### 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	-40 °C +100 °C <sup>3)</sup>	
Storage temperature range	-40 °C +100 °C, without package	

 $<sup>^{1)}</sup>$  EMC according to the standards quoted is achieved if shielded cables are used.

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

<sup>&</sup>lt;sup>2)</sup> Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

<sup>2)</sup> For devices with male connector: with mounted mating connector.

<sup>3)</sup> Stationary position of the cable.

# AFM60A-TETA262144 | AFS/AFM60 SSI

## **ABSOLUTE ENCODERS**

Resistance to shocks	60 g, 6 ms (EN 60068-2-27)	
Resistance to vibration	20 g, 10 Hz 2,000 Hz (EN 60068-2-6)	

 $<sup>^{1)}\,\</sup>mathrm{EMC}$  according to the standards quoted is achieved if shielded cables are used.

#### 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)	✓

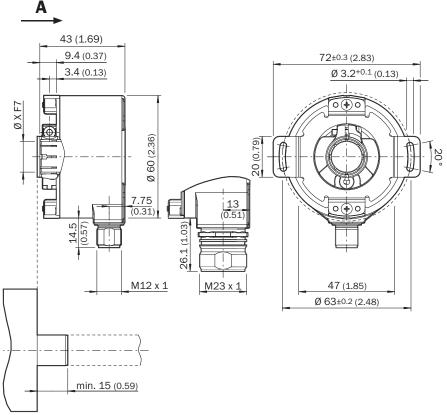
## Classifications

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

 $<sup>^{\</sup>rm 2)}$  For devices with male connector: with mounted mating connector.

<sup>3)</sup> Stationary position of the cable.

## **Dimensional drawing**



Dimensions in mm (inch)

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

## Anschlussbelegung M23 male connector, 12-pin and cable, 12-wire, SSI/Gray + incremental

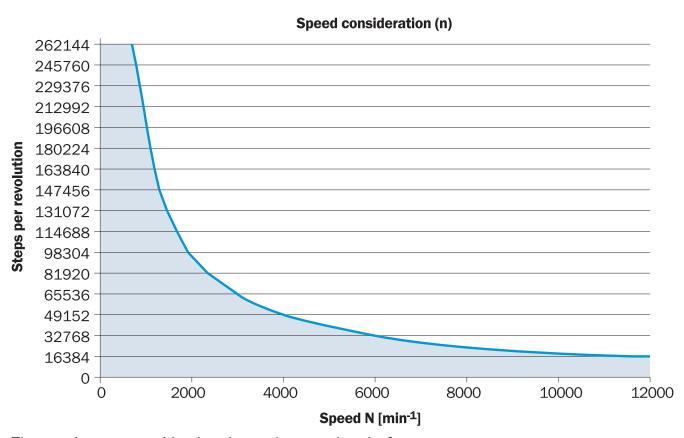


view of M23 male device connector on encoder

PIN	Wire colors (cable connection)	SignalSin/Cos	Explanation
1	Red	U <sub>S</sub>	Operating voltage
2	Blue	GND	Ground connection
3	Yellow	Clock +	Interface signals
4	White	Data +	Interface signals
5	Orange	SET	Electronic adjustment
6	Brown	Data -	Interface signals
7	Violet	Clock -	Interface signals
8	Black	_В	Signal wire
9	Orange-black	CW/CCW (V/R)	Sequence in direction of rotation

PIN	Wire colors (cable connection)	SignalSin/Cos	Explanation	
10	Green	_A	Signal wire	
11	Gray	Α	Signal wire Signal wire	
12	Pink	В		
-	-	Shielding	Screen connected to hous- ing on encoder side. Connect- ed 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

	Brief description	Туре	part no.
connectors ar	nd cables		
(H=0)	Connection type head A: Female connector, M23, 12-pin, angled, A-coded Signal type: HIPERFACE <sup>®</sup> , SSI, Incremental Description: HIPERFACE <sup>®</sup> , shieldedSSIIncremental Connection systems: Solder connection	DOS-2312-W01	2072580
	Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE <sup>®</sup> , SSI, Incremental Description: HIPERFACE <sup>®</sup> , shieldedSSIIncremental Connection systems: Solder connection	DOS-2312-G02	2077057
	Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE <sup>®</sup> , SSI, Incremental Description: HIPERFACE <sup>®</sup> , shieldedSSIIncremental Connection systems: Solder connection	DOS-2312-G	6027538
-	<ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Cable: 3 m, 12-wire</li> <li>Description: Shielded</li> </ul>	DOL-2312- G03MMD2	2062300
-	<ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Cable: 5 m, 12-wire</li> <li>Description: Shielded</li> </ul>	DOL-2312- G05MMD2	2062301
	<ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Cable: 1.5 m, 12-wire</li> <li>Description: Unshielded</li> </ul>	DOL-2312- G1M5MD2	2062284
	<ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Cable: 10 m, 12-wire</li> <li>Description: Shielded</li> </ul>	DOL-2312- G10MMD2	2062302
-	<ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Cable: 20 m, 12-wire</li> <li>Description: Shielded</li> </ul>	DOL-2312- G20MMD2	2062303
-	<ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Cable: 30 m, 12-wire</li> <li>Description: Shielded</li> </ul>	DOL-2312- G30MMD2	2062304
	Connection type head A: Female connector, M23, 9-pin, straight, A-coded Signal type: HIPERFACE <sup>®</sup> , SSI, Incremental Description: HIPERFACE <sup>®</sup> , shieldedSSIIncremental Connection systems: Solder connection	DOS-2309-G	6028533

# 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

