



Enkoder absolutne AFS/AFM60 SSI

AFM60A-S1SA262144



Nazwa modelu > **AFM60A-S1SA262144**

Numer części > **1054219**

At a glance

- High-resolution absolute encoders with up to 30 bits (AFM60) or up to 18 bits (AFS60)
- Face mount flange, servo flange, blind or through hollow shaft
- SSI, SSI + Incremental or SSI + Sin/Cos interface
- Programmable resolution and offset (dependent on type)
- Connection system: M12, M23 connector or cable outlet
- Enclosure rating: IP 67 (housing), IP 65 (shaft)
- Operating temperature: -30 °C to +100 °C (depends on type)

Your benefits

- Programmability of the encoders means less storage, greater machine availability and easy installation
- Precise positioning due to high resolutions
- Large selection of mechanical interfaces and electrical contacting possibilities: Suitable for all applications
- Suitable for applications with limited space requirements (extremely short installation depth of 30 mm)
- Very good rotation accuracy due to increased bearing distance
- One programming tool and software with automatic encoder detection for AFS60/AFM60/DFS60



Produkt może różnić się od ilustracji



Wydajność

Maks. liczba kroków na obrót:	262.144
Maks. liczba obrotów:	4.096
Resolution power:	262.144 x 4.096
Rozdzielczość:	18 bit x 12 bit
Granice błędu:	± 0,03 °
Dokładność powtarzania:	0,002 °
Odchylenie kroku pomiarowego:	± 0,002 °
Initialization time:	50 ms ¹⁾

¹⁾ Valid positional data can be read once this time has elapsed

!Mechanical data!

Mechanical interface:	Walek, Kołnierz serwowymotoru
Średnica wałka:	6 mm
Mass:	0,26 kg

Moment rozruchowy:	0,5 Ncm (+20 °C)
Roboczy moment obrotowy:	0.3 Ncm (+20 °C)
Permissible Load capacity of shaft:	40 N (osiowa), 80 N (kątowe)
Maximum operating speed:	9.000 /min ¹⁾
Moment bezwładności wirnika:	6.2 gcm ²
Żywotność łożyska:	3.0 x 10 ⁹ revolutions
Maks. przyspieszenie kątowe:	500.000 rad/s ²

¹⁾ Self warming of 3.3 K per 1000 revolutions/min when applying note working temperature range

!Electrical data!

Pobór mocy:	0.5 W (without load)
Operating voltage range:	4,5 V DC ... 32 V DC
Maximum output frequency:	200 kHz
Load resistance min.:	120 Ω
MTTFd: mean time to dangerous failure:	250 a (EN ISO 13849-1) ¹⁾
Sposób przyłączenia:	Connector M23, 12-pin, kątowe
Typ kodu:	Gray
Sekwencja kodu:	CW/CCW, parameter adjustable
Zabezpieczenie przed zmianą biegunowości:	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.

Interfejsy

Electrical interface:	SSI/Gray + Sin/Cos, 1.024 Perioden, programmable
Sygnały interfejsu:	Clock +, Clock -, Data +, Data-, Sin +, Sin -, Cos +, Cos -: analog, differential ¹⁾
Clock frequency:	2 MHz ¹⁾
SET (electronic adjustment):	H-active (L ≡ 0 - 1,5 V, H ≡ 2,0 - Us V)
CW/CCW (counting sequence when turning):	L-active (L ≡ 0 - 1,5 V, H ≡ 2,0 - Us V)
Signal before differential generation:	± 20 %
Signal offset:	2.5 V ± 10 %

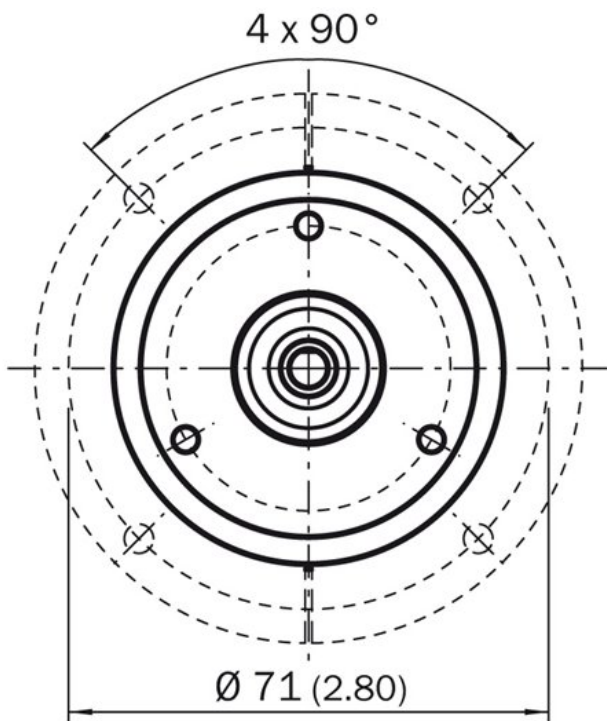
¹⁾

Dane otoczenia

Kompatybilność elektromagnetyczna:	(according to EN 61000-6-2 and EN 61000-6-3) ¹⁾
Rodzaj zabezpieczenia:	IP 65 (according to IEC 60529), shaft side, IP 67 (according to IEC 60529), housing side ²⁾
Dopuszczalna wilgotność względna:	90 % (condensation of the optical scanning not permitted)
Working temperature range:	-30 °C ... +100 °C
Storage temperature range:	-40 °C ... +100 °C, without package
Odporność na uderzenie:	60 g, 6 ms (according to EN 60068-2-27)
Odporność na drgania:	20 g, 10 Hz ... 2.000 Hz (according to EN 60068-2-6)

¹⁾ ²⁾ With mating connector fitted

Rysunek techniczny



PIN assignment

Connector M23, 12 pin			
SSI/Gray			
Pin	Signal	Explanation	
1	GND	Ground connection	
2	Data+	Interface signals	
3	Clock+	Interface signals	
4	N. C.	Not connected	
5	N. C.	Not connected	
6	N. C.	Not connected	
7	N. C.	Not connected	
8	U ₁	Supply voltage	
9	SET	Electronic adjustment	
10	Data-	Interface signals	
11	Clock-	Interface signals	
12	CW/CCW	Counting sequence when turning	
	Screen	Screen on the encoder side connected to the housing. On the control side connected to earth.	

Connector M23, 12 pin and cable outlet, cable 12 core			
SSI/Gray • Incremental			
Pin	Color wires	Signal	Explanation
1	Red	+U ₁	Supply voltage
2	Blue	GND	Ground connection
3	Yellow	Clock+	Interface signal
4	White	Data+	Interface signal
5	Orange	SET	Electronic adjustment
6	Brown	Data-	Interface signal
7	Violet	Clock-	Interface signal
8	Black	— B	Signal line
9	Orange/black	CW/CCW	Counting sequence when turning
10	Green	— A	Signal line
11	Gray	A	Signal line
12	Pink	B	Signal line
	Screen	Screen on the encoder side connected to the housing. On the control side connected to earth.	

Connector M23, 12 pin and cable outlet, cable 12 core			
SSI/Gray • Sin/Cos			
Pin	Color wires	Signal	Explanation
1	Red	+U ₁	Supply voltage
2	Blue	GND	Ground connection
3	Yellow	Clock+	Interface signal
4	White	Data+	Interface signal
5	Orange	SET	Electronic adjustment
6	Brown	Data-	Interface signal
7	Violet	Clock-	Interface signal
8	Black	Sin-	Signal line
9	Orange/black	CW/CCW	Counting sequence when turning
10	Green	Cos-	Signal line
11	Gray	Cos+	Signal line
12	Pink	Sin+	Signal line
	Screen	Screen on the encoder side connected to the housing. On the control side connected to earth.	

Signalausgänge

SSI data format singleturn

Bit 1-13: Position Bits

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

Bit 14-16: Error Bits

- ERROIG: Failure message about speed. If this failure occurs during the position building procedure it will be indicated by the ERROIG-Bit.
- ERRSL: 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 13-25: Position Bits singleturn
Bit 26-28: Error Bits

27 Bits

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

Error Bits

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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.

Drehzahlbetrachtung



The maximum speed is also dependent on the shaft type.

Signalausgänge

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- MSB: Most significant Bit

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27 Bits

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Bit 13-27: Position Bits singleturn
Bit 28-30: Error Bits

Error Bits

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- ERRSL: Light source monitoring failure.
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Interfejsy

Electrical interfaces size 0.5 V_{CC}

Power supply	Output
5V _{CC} - 5.5 V	5mA 0.5 V _{CC}

Signal before differential generation at load 120 Ω at U_{CC} = 5 V
Signal diagram for absolute relation of the shaft looking in direction "A" (shaft)

Signal after differential generation at load 120 Ω at U_{CC} = 5 V
Signal diagram for absolute relation of the shaft looking in direction "A" (shaft)

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

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