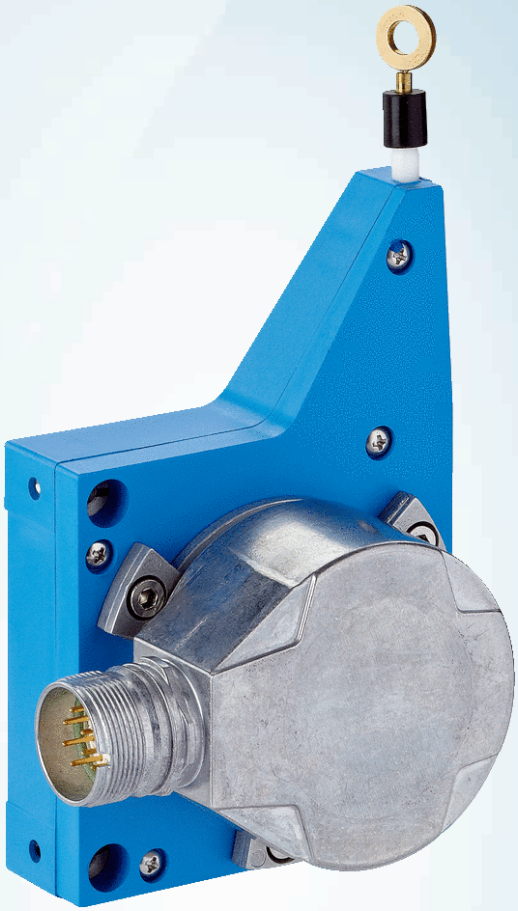
Online data sheet



BCG08-A1AM0318

EcoLine

WIRE DRAW ENCODERS

SICK
Sensor Intelligence.

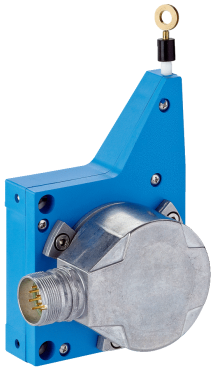


Illustration may differ

Ordering information

Type	Part no.
BCG08-A1AM0318	1061025

Other models and accessories ➜ www.sick.com/EcoLine

Detailed technical data

Performance

Measurement range	0 m ... 3 m
Reproducibility	≤ 0.2 mm [1]
Linearity	≤ ± 2 mm [1]
Hysteresis	≤ 0.4 mm [1]
Resolution (wire draw + encoder)	0.06 mm [2] [3]

[1] Value applies to wire draw mechanism.
[2] The values shown have been rounded.
[3] Example calculation based on the BCG08 with PROFINET: 230 mm (wire draw length per revolution - see Mechanical data): 262,144 (number of steps per revolution) = 0.001 mm (resolution of wire draw + encoder combination).

Interfaces

Encoder	Absolute encoders
Electrical interface	SSI
Connection type	Male connector M23, 12-pin, radial
Clock frequency	1 MHz 2 MHz
Set (electronic adjustment)	Via SET cable
Type of code for the absolute value	Gray

Electrical data

Initialization time	[1]
Supply voltage	4.5 V ... 32 V
Power consumption	0.7 W
MTTFd: mean time to dangerous failure	250 years [2] [3]

[1] Valid positional data can be read once this time has elapsed.
[2] 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.
[3] The value applies to the mounted encoder.

Mechanical data

Weight (including encoder)	510 g
Weight (mechanics)	250 g
Measuring wire material	Highly flexible stranded steel 1.4401 stainless steel V4A
Weight (measuring wire)	1.2 g/m
Housing material, wire draw mechanism	Plastic, Noryl
Length of wire pulled out per revolution	230 mm
Spring return force	Approx. 5 N ... approx. 6.3 N [1]
Life of wire draw mechanism	Typ. 1 million cycles [2] [3]
Actual wire draw length	3.2 m
Measuring wire diameter	0.55 mm
Wire acceleration	10 m/s²
Operating speed	4 m/s
Mounted encoder	AFM60 SSI
Number of steps per revolution	4,096
Part number encoder	1037438
Mounted mechanic	MRA-G080-103D3
Part number mechanic	5322778

[1] These values were measred at an ambient temperature of 25 °C. There may be variations at other temperatures.
[2] A cycle consists of the wire being pulled out and drawn in.
[3] The service life depends on the type of load. This is influenced by environmental conditions, the installation location, the measuring range in use, the traversing speed, and acceleration.

Ambient data

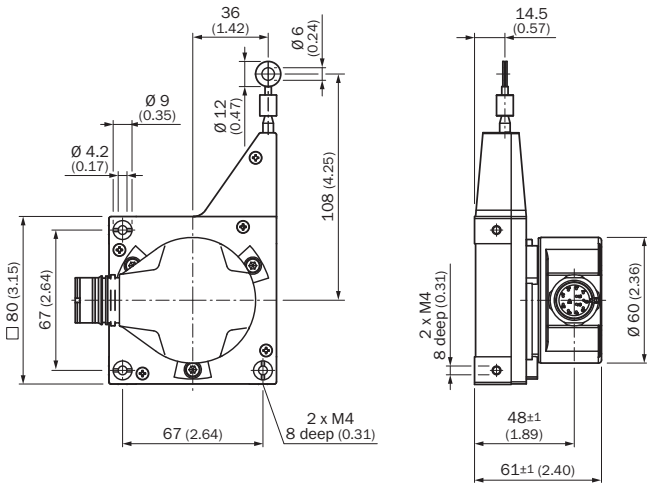
EMC	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating encoder	IP67
Enclosure rating mechanic	IP50
Resistance to shocks	50 g, 6 ms (according to EN 60068-2-27)
Frequency range of resistance to vibrations	20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)
Working temperature range (encoder)	0 °C ... +70 °C, with AFM60E –20 °C ... +70 °C, with AFM60B
Working temperature range (mechanics)	–30 °C ... +70 °C
Working temperature range (combination)	Defined by the higher minimum and lower maximum value of the operating temperature of the encoder and the mechanism
Relative humidity/condensation	90 % (condensation of the optical scanning not permitted)

Classifications

ECl@ss 5.0	27270590
ECl@ss 5.1.4	27270590
ECl@ss 6.0	27270590
ECl@ss 6.2	27270590
ECl@ss 7.0	27270590
ECl@ss 8.0	27270590
ECl@ss 8.1	27270590

ECl@ss 9.0	27270590
ETIM 5.0	EC001486
ETIM 6.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing (Dimensions in mm (inch))



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_s	Supply voltage
9	SET	Electronic adjustment
10	Data–	Interface signals
11	Clock–	Interface signals
12	CW/$\overline{\text{CCW}}$	Counting sequence when turning
	Screen	Screen on the encoder side connected to the housing. On the control side connected to earth.

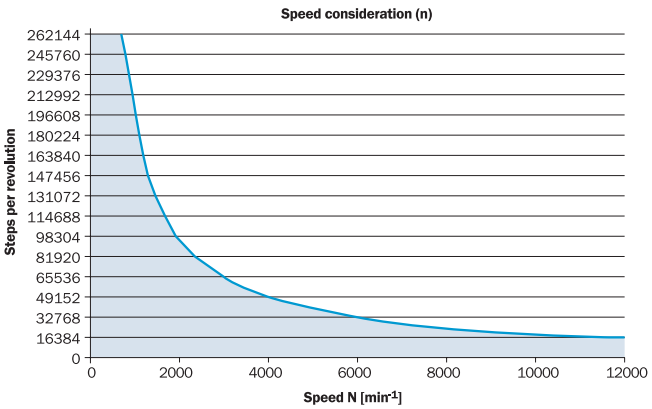
Connector M23, 12-pin and cable outlet, cable 12-core
SSI/Gray + Incremental

Pin	Color wires	Signal	Explanation
1	Red	$+U_s$	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	$\overline{\ }$ B	Signal line
9	Orange/black	CW/$\overline{\text{CCW}}$	Counting sequence when turning
10	Green	$\overline{\ }$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	$+U_s$	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/$\overline{\text{CCW}}$	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.

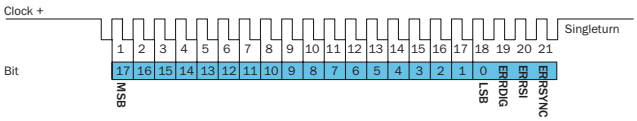
Maximum revolution range



The maximum speed is also dependent on the shaft type.

Diagrams

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.

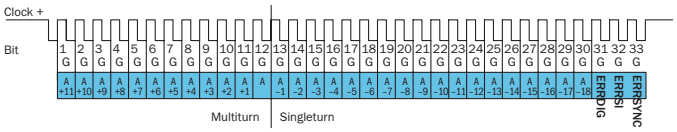
The provided error bits don't have to be used by the PLC compulsorily.

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.

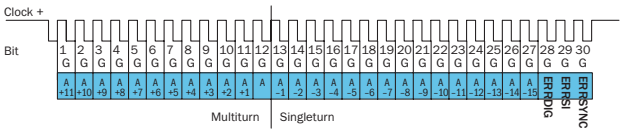
SSI data format multiturn

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

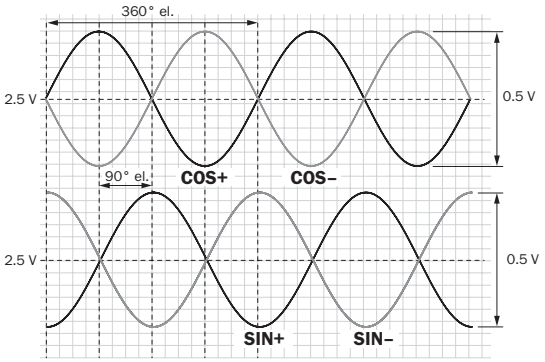
If the resolution of the absolute encoder is set on 27 bits, 30 bits are provided by the encoder: 27 data bits and 3 error bits.
If the PLC is not able to evaluate the error bits, the PLC has to be set on a resolution of 27 bits. Then the error bits have to be masked out by the PLC.

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

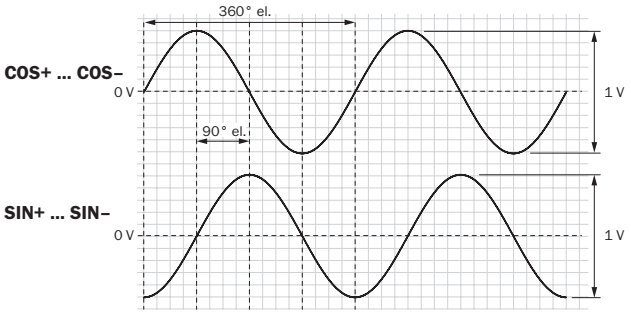
Signal diagram for clockwise rotation of the shaft looking in direction “A” (shaft)



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 %

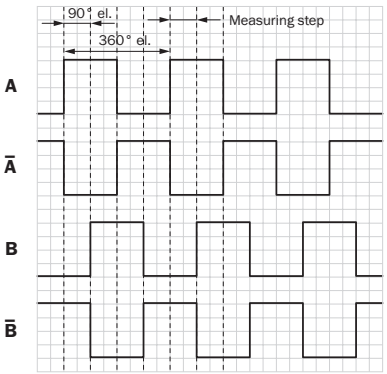
Signal **after** differential generation at load 120 Ω at U_S = 5 V

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



Recommended accessories

Other models and accessories ➜ www.sick.com/EcoLine

	Brief description	Type	Part no.
Plug connectors and cables			
	Head A: cable Head B: open cable ends Cable: SSI, PUR, halogen-free, shielded	LTG-2612-MW	6028516
	Head A: female connector, M23, 12-pin, straight Head B: open cable ends Cable: SSI, SSI, PUR, shielded, 3 m	DOL-2308-G03MAA6	2048597
	Head A: female connector, M23, 12-pin, straight Head B: open cable ends Cable: SSI, SSI, PUR, shielded, 5 m	DOL-2308-G05MAA6	2048598
	Head A: female connector, M23, 12-pin, straight Head B: open cable ends Cable: SSI, SSI, PUR, shielded, 0.5 m	DOL-2308-G0M5AA6	2048595
	Head A: female connector, M23, 12-pin, straight Head B: open cable ends Cable: SSI, SSI, PUR, shielded, 10 m	DOL-2308-G10MAA6	2048599
	Head A: female connector, M23, 12-pin, straight Head B: open cable ends Cable: SSI, SSI, PUR, shielded, 1.5 m	DOL-2308-G1M5AA6	2048596
	Head A: female connector, M23, 12-pin, straight Head B: open cable ends Cable: Incremental, PUR, shielded, 30 m	DOL-2312-G30MLA3 DOL-2312-G30MMA3	2030702 2029217
Wire draw mechanism			
	EcoLine wire draw mechanism for servo flange with 6 mm shaft, measuring range 0 m ... 3 m	MRA-G080-103D3	5322778

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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