

Absolute encoders - SSI

Blind hollow shaft

Magnetic single- or multiturn encoders 14 bit ST / 18 bit MT

EAM360-B - SSI - MAGRES



EAM360 with hollow shaft

Technical data - electrical ratings

Voltage supply	4.5...30 VDC (SSI, SSI + TTL/ RS422) 5.5...30 VDC (SSI + HTL/ Push-pull)
Consumption typ.	60 mA (5 VDC, w/o load) 20 mA (24 VDC, w/o load)
Initializing time	≤170 ms after power on
Data currency	Typ. 2 μs (cyclic request)
Interfaces	SSI, SSI + incremental
Function	Multiturn, Singleturn
Operating mode	Linear feedback shift register (on request)
Steps per revolution	≤16384 / 14 bit
Number of revolutions	≤262144 / 18 bit
Absolute accuracy	±0.15 ° (+20 ±15 °C) ±0.25 ° (-40...+85 °C)
Sensing method	Magnetic
Code	Gray or binary
Code sequence	CW: ascending values with clockwise sense of rotation; looking at flange
Inputs	SSI clock: Linereceiver RS422 Zero setting input Counting direction
Output stages	SSI data: Linedriver RS422 Incremental: linedriver RS422 or push-pull (option)
Incremental output	1024, 2048, 4096 ppr (other on request)
Output signals	A+, A-, B+, B-
Output frequency	≤350 kHz
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Diagnostic function	DATAVALID (on request)

Features

- Encoder single- or multiturn / SSI
- Precise magnetic sensing
- Angular accuracy up to ±0.15°
- Resolution max. 32 bit (14 bit ST, 18 bit MT)
- Additional incremental signals
- Clock frequency up to 2 MHz
- High protection up to IP 67
- High resistance to shock and vibrations

Optional

- Protection against corrosion C5-M

Technical data - mechanical design

Size (flange)	ø36 mm
Shaft type	ø10...15 mm (blind hollow shaft)
Protection DIN EN 60529	IP 65 (without shaft seal), IP 67 (with shaft seal)
Operating speed	≤6000 rpm
Starting torque	≤2 Ncm (+20 °C, IP 65) ≤2.5 Ncm (+20 °C, IP 67)
Moment of inertia	46.75 gcm ²
Materials	Housing: steel zinc-coated Flange: aluminium Hollow shaft: stainless steel
Operating temperature	-40...+85 °C (see general information)
Relative humidity	95 %
Resistance	DIN EN 60068-2-6 Vibration 30 g, 10-2000 Hz DIN EN 60068-2-27 Shock 500 g, 1 ms
Weight approx.	170 g
Connection	Flange connector M12, 8-pin Flange connector M12, 12-pin Cable 2 m

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Part number

EAM360-B

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Resolution incremental signals

- 0 Without incremental signals
- H 4096 pulses, TTL (RS422)
- 8 2048 pulses, TTL (RS422)
- 5 1024 pulses, TTL (RS422)

Resolution multiturn

- 00 No option
- 12 12 bit
- 13 13 bit
- 16 16 bit
- 18 18 bit

Resolution singleturn

- 12 12 bit
- 13 13 bit
- 14 14 bit

Voltage supply / signals

- 4B 4.5...30 VDC / SSI binary
- 4G 4.5...30 VDC / SSI gray

Connection

- B Flange connector M12, 8-pin, radial, male contact, CCW
- K Flange connector M12, 12-pin, radial, male contact, CCW*
- L Cable 2 m, radial

Protection

- 5 IP 65
- 7 IP 67

Specification hollow shaft

- A \varnothing 10 mm, clamping ring at A side
- C \varnothing 12 mm, clamping ring at A side
- E \varnothing 14 mm, clamping ring at A side
- F \varnothing 15 mm, clamping ring at A side

Flange

- N Without stator coupling
- D With stator coupling \varnothing 41 mm
- P Torque pin 3 mm, axial/radial

* Only available for SSI with incremental signals

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Accessories

Connectors and cables

10146775	Female connector M12, 8-pin, straight, without cable
11170528	Female connector M12, 8-pin, straight, shielded, 5 m cable (ESG 34FH0500GVS)
11177375	Female connector M12, 8-pin, straight, shielded, 10 m cable (ESG 34FH1000GVS)
11091511	Female connector M12, 8-pin, straight, shielded, 20 m cable
11078614	Female connector M12, 12-pin, straight, without cable
11048452	Female connector M12, 12-pin, straight, shielded, 2 m cable (ESG 34JP0200G)
11043780	Female connector M12, 12-pin, straight, shielded, 5 m cable (ESG 34JP0500G)
11048455	Female connector M12, 12-pin, straight, shielded, 10 m cable (ESG 34JP1000G)

Mounting accessories

10106004	Clamp set \varnothing 10 mm
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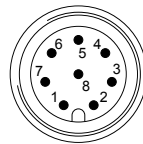
Terminal assignment

Cable / Flange connector M12, 8-pin for connection reference -L and -B

Pin	Core color	Signals	Description
1	white	0 V	Supply voltage
2	brown	+Vs	Supply voltage
3	green	Clock+	Clock signal
4	yellow	Clock-	Clock signal
5	grey	Data+	Data signal
6	pink	Data-	Data signal
7	blue	SET	Zero setting input
8	red	DIR	Counting direction input*

Screen connected to housing

Cable data: 4 x 2 x 0.14 mm², twisted in pairs



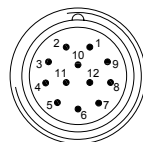
Male, A-coded

Cable / Flange connector M12, 12-pin for connection reference -L and -K

Pin	Core color	Signals	Description
1	brown	+Vs	Supply voltage
2	blue	SET	Zero setting input
3	white	0 V	Supply voltage
4	green	Clock+	Clock signal
5	pink	Data-	Data signal
6	yellow	Clock-	Clock signal
7	black	A+	Incremental signal
8	grey	Data+	Data signal
9	red	DIR	Counting direction input*
10	violet	A-	Incremental signal
11	grey/pink	B+	Incremental signal
12	red/blue	B-	Incremental signal

Screen connected to housing

Cable data: 6 x 2 x 0.14 mm², twisted in pairs



Male, A-coded

* Not applicable by option: DATAVALID

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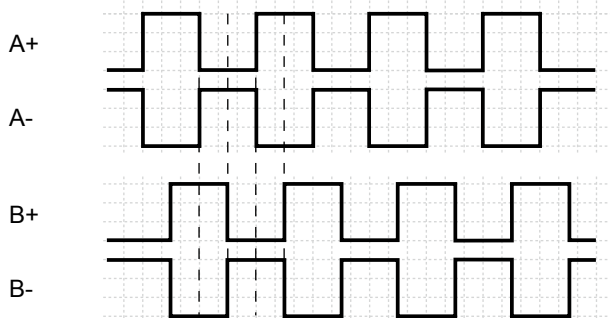
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Terminal significance

SET	Zero setting. Input for zero setting at any position. The zero setting operation is triggered by a high pulse and has to be in line with the selected direction of rotation (DIR). Impulse duration >100 ms. Connect to 0 V after zero setting for maximum interference immunity.
DIR	Counting direction input. CW HIGH - CCW LOW The input is standard on high. For maximum interference immunity connect to +Vs respectively 0 V depending on counting direction. (Version with DATAVALID does not include the counting direction input).

Output signals

Incremental signals: clockwise rotating direction when looking at flange.

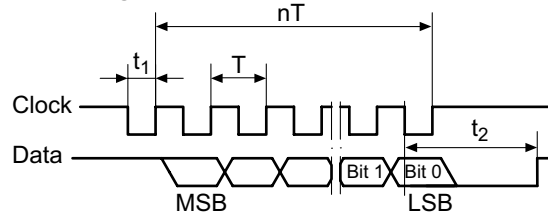


General information

Self-heating interrelated to speed, protection, attachment method and ambient conditions as well electronics and supply voltage must be considered for precise thermal dimensioning. Self-heating is supposed to approximate 6 K (IP 65 protection) respectively 12 K (IP 67 protection) per 1000 rpm. Operating the encoder close to the maximum limits requires measuring the real prevailing temperature at the encoder flange.

Data transfer

Output signal

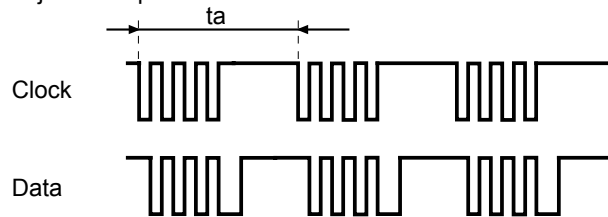


$T = 0.5 \dots 10 \mu\text{s}$	$t_1 = 0.25 \dots 5 \mu\text{s}$
$t_2 = 20 \pm 2 \mu\text{s}$	$f \text{ max.} = 2 \text{ MHz}$

Data acquisition time t_a

Following timing of the SSI Masters is the requirement for a data refresh rate of typ. 2 μs . If this is not fulfilled the data refresh rate is <50 μs .

$t_a < 5000 \mu\text{s}$
 $t_a \text{ jitter} < \pm 2 \mu\text{s}$



Trigger level

Control inputs	Input circuit
Maximal	0...+Vs
Input level Low	<1 V
Input level High	>2.1 V

RS422

Output level High	>2.3 V
Output level Low	<0.5 V
Load	<20 mA

Push-pull

Output level High	$\geq +V_S - 2.2 \text{ V}$
Output level Low	<0.7 V
Load	<20 mA

Applies to standard cable lengths up to 2 m, for longer cables the voltage drop must be taken into account.

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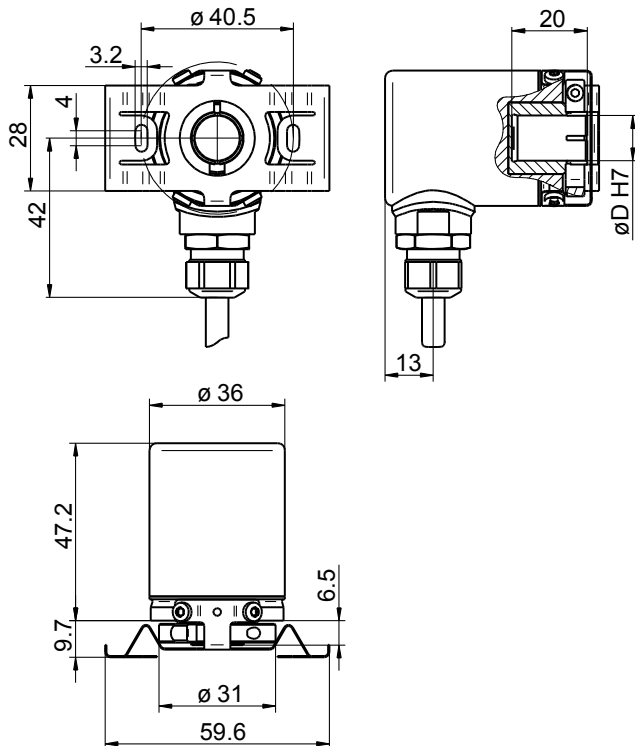
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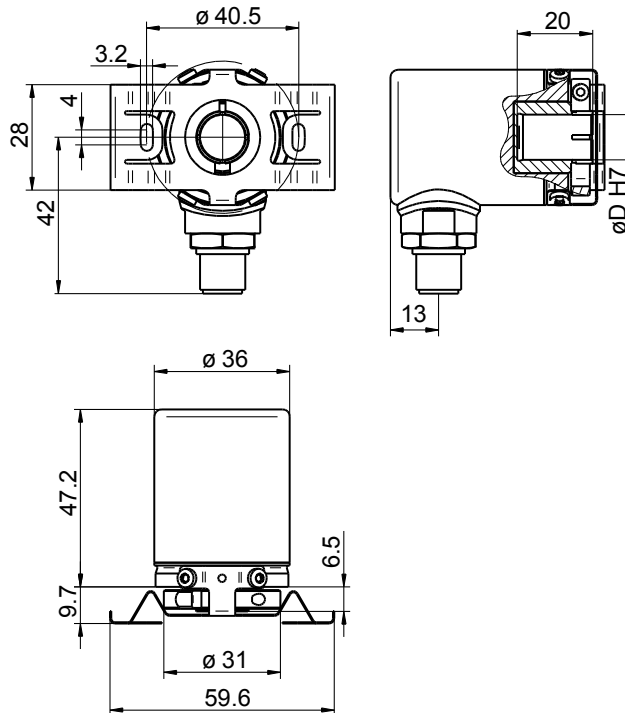
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Dimensions

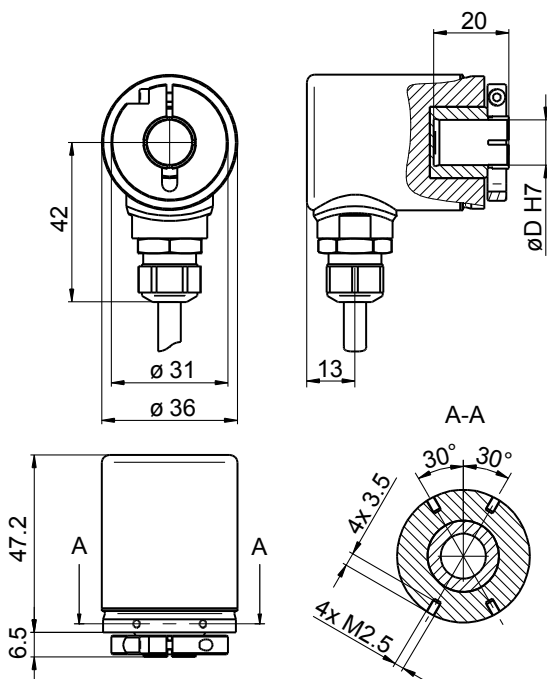
EAM360, cable with stator coupling



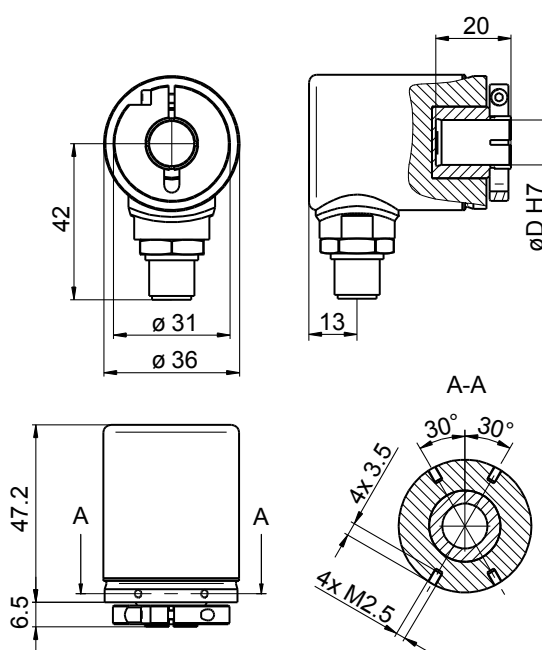
EAM360, M12 with stator coupling



EAM360, cable w/o stator coupling



EAM360, M12 w/o stator coupling



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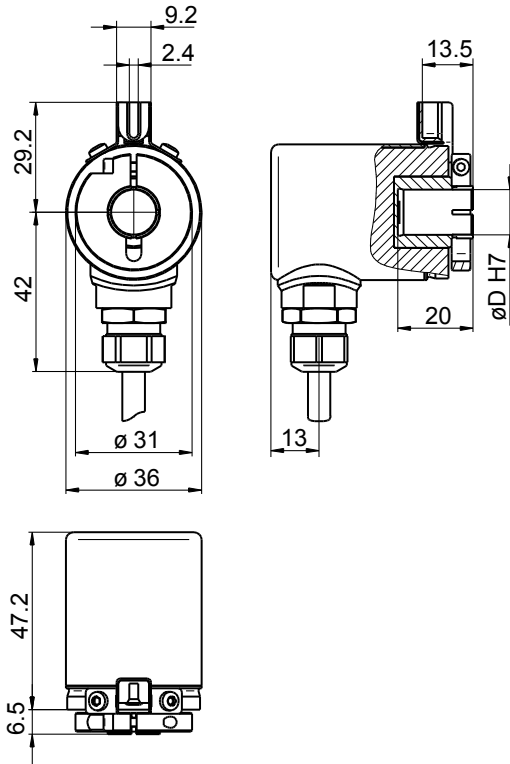
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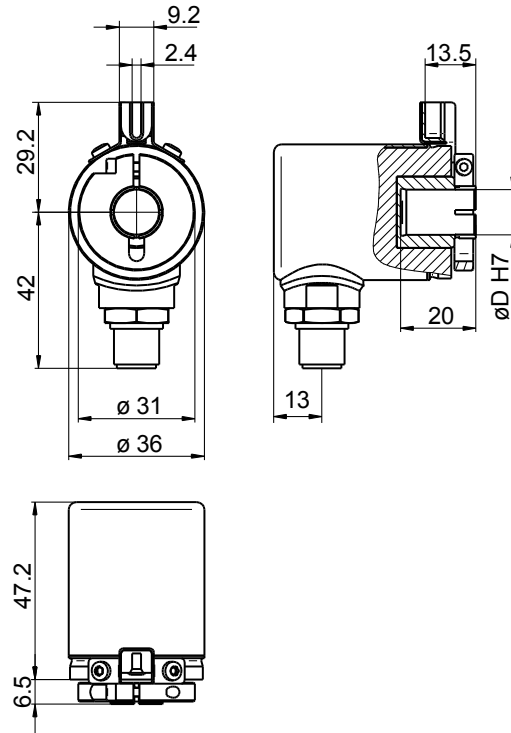
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Dimensions

EAM360, cable with torque pin



EAM360, M12 with torque pin



EAM360, torque pin

