

# Absolute encoders - SSI

Blind hollow shaft

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

## EAM580-B - SSI - MAGRES



EAM580 with hollow shaft

### Features

- Encoder single- or multiturn / SSI
- Precise magnetic sensing
- Resolution max. 32 bit (14 bit ST, 18 bit MT)
- Angular accuracy up to  $\pm 0.15^\circ$
- Additional incremental signals
- High protection up to IP 67
- High resistance to shock and vibrations

### Optional

- Protection against corrosion C5-M

### 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	$\leq 170$ ms after power on
Data currency	Typ. 2 $\mu$ s (cyclic request)
Interfaces	SSI, SSI + incremental
Function	Multiturn, Singleturn
Operating mode	Linear feedback shift register (on request)
Steps per revolution	$\leq 16384$ / 14 bit
Number of revolutions	$\leq 262144$ / 18 bit
Absolute accuracy	$\pm 0.15^\circ$ (+20 $\pm 15^\circ$ C) $\pm 0.25^\circ$ (-40...+85 $^\circ$ 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	$\leq 350$ kHz
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Diagnostic function	DATAVALID (on request)

### Technical data - mechanical design

Size (flange)	$\varnothing 58$ mm
Shaft type	$\varnothing 10...15$ mm (blind hollow shaft)
Protection DIN EN 60529	IP 65 (without shaft seal), IP 67 (with shaft seal)
Operating speed	$\leq 6000$ rpm
Starting torque	$\leq 2$ Ncm (+20 $^\circ$ C, IP 65) $\leq 2.5$ Ncm (+20 $^\circ$ C, IP 67)
Materials	Housing: steel zinc-coated Flange: aluminium Hollow shaft: stainless steel
Operating temperature	-40...+85 $^\circ$ 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.	250 g
Connection	Flange connector M12, 8-pin Flange connector M12, 12-pin Flange connector M23, 12-pin Cable 2 m

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## Part number

EAM580-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
- F Flange connector M23, 12-pin, radial, male, CCW
- L Cable 2 m, radial

### Protection

- 5 IP 65
- 7 IP 67

### Specification hollow shaft

- A ø10 mm, clamping ring at A side
- C ø12 mm, clamping ring at A side
- E ø14 mm, clamping ring at A side
- F ø15 mm, clamping ring at A side

### Flange

- N Without stator coupling
- A With stator coupling ø68 mm
- E Torque pin 5 mm, axial

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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
10116717	Female connector M23, 12-pin, straight, without 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)

##### 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.

##### 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).

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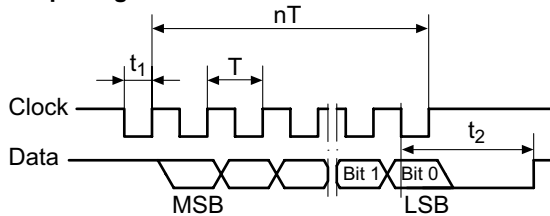
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## Data transfer

### Output signal

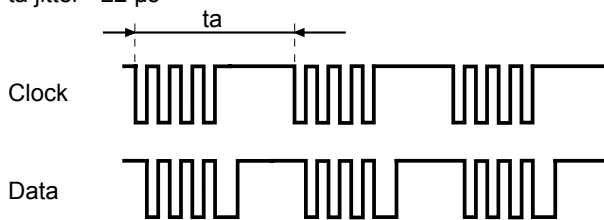


$T = 0.5 \dots 10 \mu\text{s}$        $t_1 = 0.25 \dots 5 \mu\text{s}$   
 $t_2 = 20 \pm 2 \mu\text{s}$        $f_{\text{max.}} = 2 \text{ MHz}$

### Data acquisition time $t_a$

Following timing of the SSI Masters is the requirement for a data refresh rate of typ.  $2 \mu\text{s}$ . If this is not fulfilled the data refresh rate is  $< 50 \mu\text{s}$ .

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



## Trigger level

Control inputs	Input circuit
Maximal	$0 \dots +V_s$
Input level Low	$< 1 \text{ V}$
Input level High	$> 2.1 \text{ V}$

## RS422

Output level High	$> 2.3 \text{ V}$
Output level Low	$< 0.5 \text{ V}$
Load	$< 20 \text{ mA}$

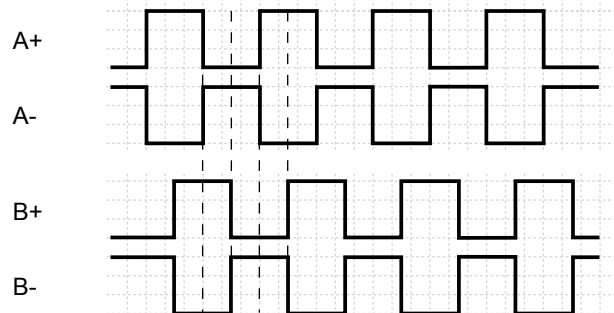
## Push-pull

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

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

## Output signals

Incremental signals: clockwise rotating direction when looking at flange.



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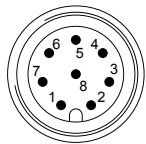
##### Terminal assignment

##### Cable / Flange connector M12, 8-pin / w/o incremental 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 mm<sup>2</sup>, twisted in pairs



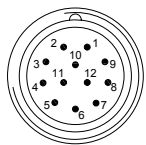
Male, A-coded

##### Cable / Flange connector M12, 12-pin / with incremental 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 mm<sup>2</sup>, twisted in pairs



Male, A-coded

##### Flange connector M23, 12-pin / w/o incremental for connection reference -F

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

Screen connected to housing

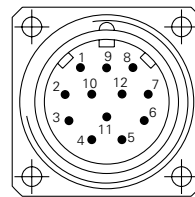
Cable data: 4 x 2 x 0.14 mm<sup>2</sup>, twisted in pairs

##### Flange connector M23, 12-pin / with incremental for connection reference -F

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

Screen connected to housing

Cable data: 6 x 2 x 0.14 mm<sup>2</sup>, twisted in pairs



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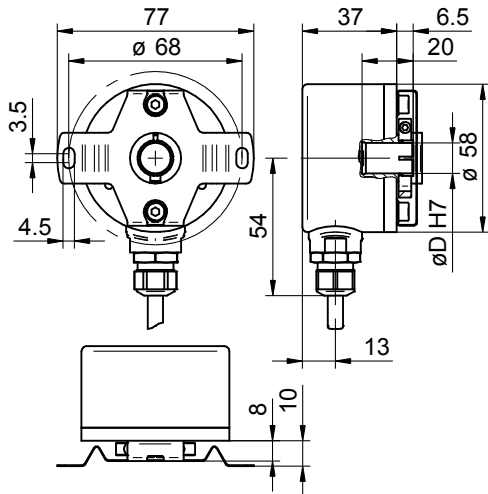
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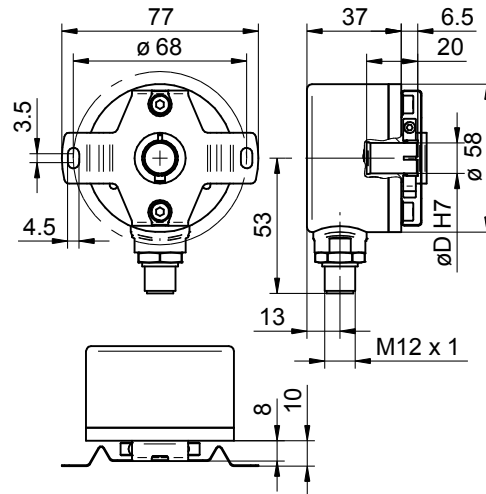
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## Dimensions

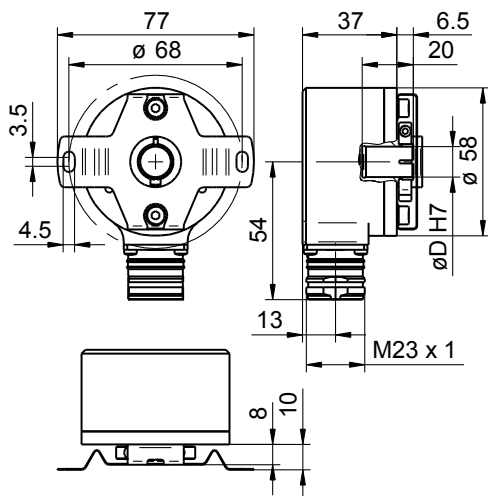
EAM580, cable with stator coupling



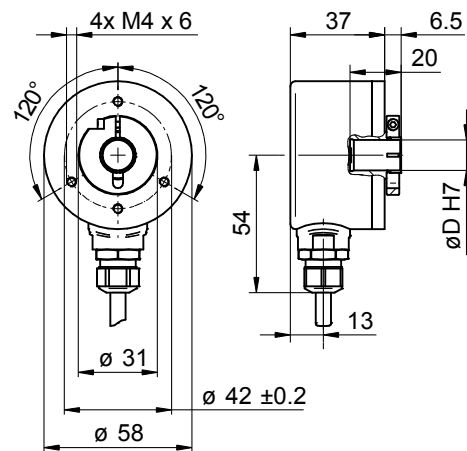
EAM580, M12 with stator coupling



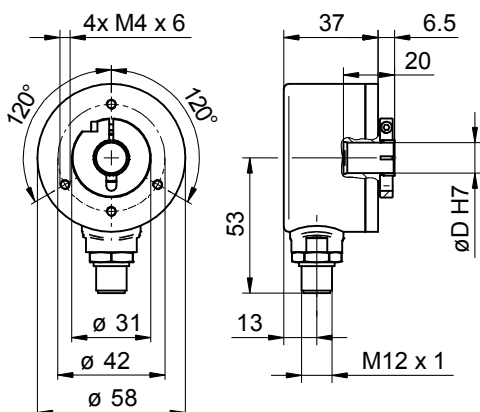
EAM580, M23 with stator coupling



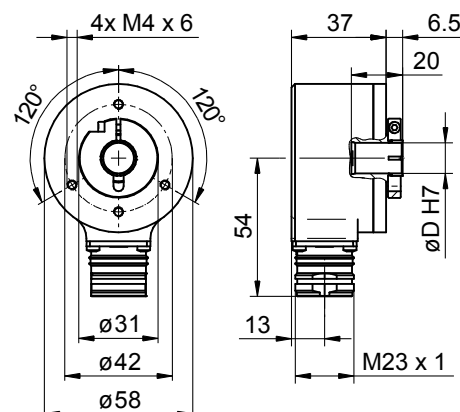
EAM580, cable w/o stator coupling



EAM580, M12 w/o stator coupling



EAM580, M23 w/o stator coupling



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## EAM580-B - SSI - MAGRES

### Dimensions

EAM580, torque pin

