

# EAM580-SC - SSI

Solid shaft with clamping flange

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

## Overview

- 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



## Technical data

### 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)
Interface	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	EN 61000-6-2

### Technical data - electrical ratings

Emitted interference	EN 61000-6-4
Diagnostic function	DATAVALID (on request)
Approval	UL approval / E217823
<b>Technical data - mechanical design</b>	
Size (flange)	$\varnothing 58$ mm
Shaft type	$\varnothing 10 \times 20$ mm, solid shaft with flat
Flange	Clamping flange
Protection 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)
Moment of inertia	15.38 gcm <sup>2</sup>
Admitted shaft load	$\leq 40$ N axial $\leq 80$ N radial
Material	Housing: steel zinc-coated Flange: aluminium Shaft: stainless steel
Operating temperature	-40...+85 $^\circ$ C (see general information)
Relative humidity	95 %
Resistance	EN 60068-2-6 Vibration 30 g, 10-2000 Hz 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

## Optional

- Protection against corrosion CX (C5-M)

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## 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 3 K (IP 65 protection) respectively 8 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.

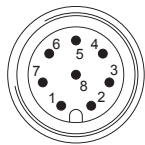
## Terminal assignment

### 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



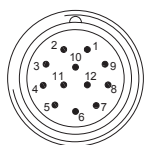
Male, A-coded

### 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

## Terminal assignment

### 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

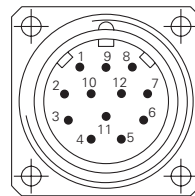
Cable data: 4 x 2 x 0.14 mm<sup>2</sup>, twisted in pairs

### 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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Solid shaft with clamping flange

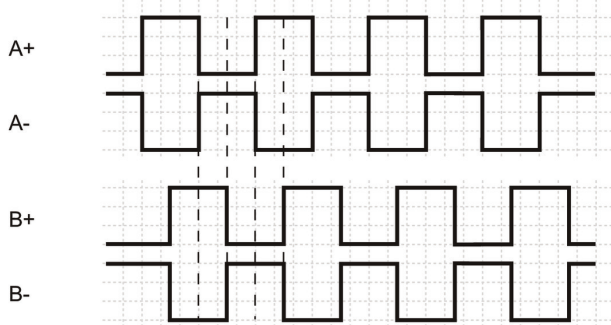
Magnetic single- or multiturn encoders 14 bit ST / 18 bit MT

## 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. The input is standard on high. For maximum interference immunity connect to +Vs respectively 0 V depending on counting direction. CW HIGH - CCW LOW (Version with DATAVALID does not include the counting direction input).

## Output signals

Incremental signals: clockwise rotating direction when looking at flange.



## 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

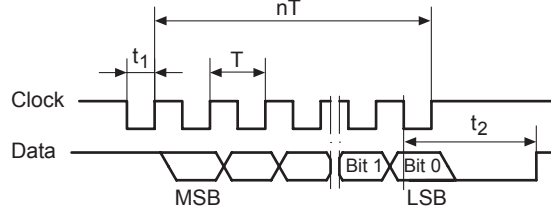
## Push-pull

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.

## Data transfer

### Output signal



$$T = 0.5 \dots 10 \mu\text{s}$$

$$t_1 = 0.25 \dots 5 \mu\text{s}$$

$$t_2 = 20 \pm 2 \mu\text{s}$$

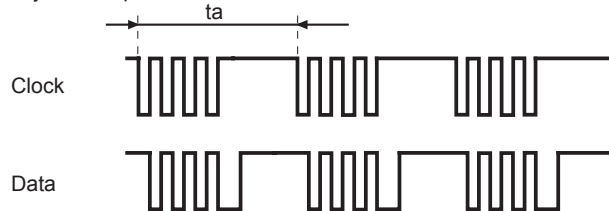
$$f \text{ max.} = 2 \text{ MHz}$$

### 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  $\mu\text{s}$ .

$t_a < 5000 \mu\text{s}$

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

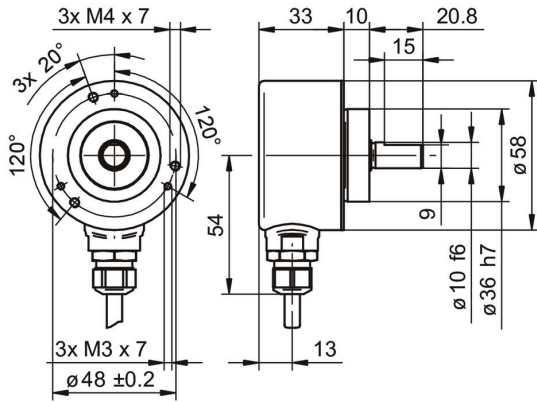


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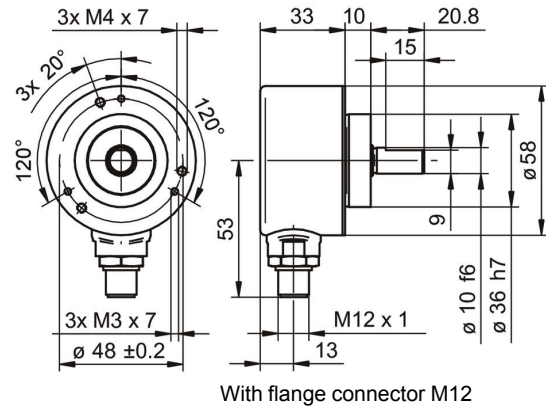
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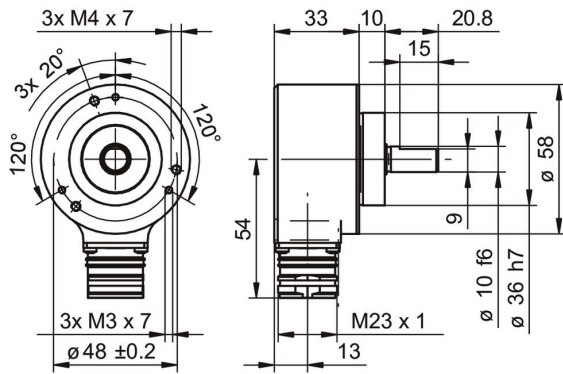
## Dimensions



With cable



With flange connector M12



EAM580-SC with flange connector M23

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**Ordering reference**

	EAM580	-	S	C	0	.	#	#	##	.	##	##	#	.	A
<b>Product</b>	EAM580														
<b>Shaft type</b>	Solid shaft		S												
<b>Flange (shaft)</b>	Clamping flange, centering collar ø36 x 10 mm, pitch circle diameter 48 mm - 3xM3/3xM4			C											
<b>Shaft</b>	ø10 x 20 mm, with flat				0										
<b>Protection class</b>	IP 65														5
	IP 67														7
<b>Connection</b>	Flange socket radial, M12, 8-pin, male contacts, CCW														B
	Flange socket radial, M23, 12-pin, male contacts, CCW														F
	Flange socket radial, M12, 12-pin, male contacts, CCW														K
	Cable radial, 2 m														L
<b>Voltage supply / interface</b>	4.5...30 VDC, SSI binary														4B
	4.5...30 VDC, SSI gray														4G
<b>Resolution Singleturn</b>	10 Bit														10
	12 Bit														12
	13 Bit														13
	14 Bit														14
<b>Resolution Multiturn</b>	No option														00
	12 Bit														12
	13 Bit														13
	16 Bit														16
	18 Bit														18
<b>Resolution supplement</b>	No option														0
	4096 ppr TTL (RS422), 4 channels														H
	2048 ppr TTL (RS422), 4 channels														8
	1024 ppr TTL (RS422), 4 channels														5
<b>Operating temperature</b>	-40...+85 °C														A

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### Accessories

#### Mounting accessories

11101781	Double loops coupling (D1=10 / D2=10)
11050507	Bellows coupling (D1=06 / D2=10)
11065923	Coupling CPS25 (L=19, D1=10 / D2=10)
11065922	Coupling CPS25 (L=19, D1=10 / D2=06)
10141132	Spring washer coupling (D1=6 / D2=10)
10141133	Spring washer coupling (D1=10 / D2=10)
11069337	Coupling CPS37 (L=24, D1=10 / D2=06)
11069340	Coupling CPS37 (L=24, D1=10 / D2=10)
11053277	Bellows coupling (D1=10 / D2=10)
11101893	Spring encoder arm
10125051	Mounting adaptor