

## EAM360-S - SSI

Solid shaft with synchro flange

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

### Overview

- Encoder single- or multiturn / SSI
- Precise magnetic sensing
- Angular accuracy up to  $\pm 0.15^\circ$
- 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



### 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

#### Technical data - electrical ratings

Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-4
Diagnostic function	DATAVALID (on request)
Approval	UL approval / E217823

#### Technical data - mechanical design

Size (flange)	$\varnothing 36$ mm
Shaft type	$\varnothing 10 \times 16$ mm, solid shaft with flat
Flange	Synchro 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...+65 $^\circ$ 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.	170 g
Connection	Flange connector M12, 8-pin Flange connector M12, 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.

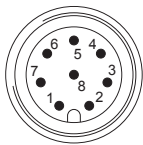
### Terminal assignment

**Cable / Flange connector M12, 8-pin**  
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



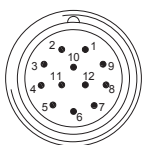
Male, A-coded

**Cable / Flange connector M12, 12-pin**  
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

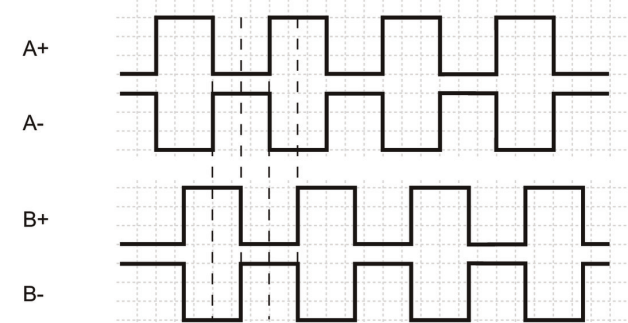
\* Not applicable by option: DATAVALID

### 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	≥+Vs -2.2 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.

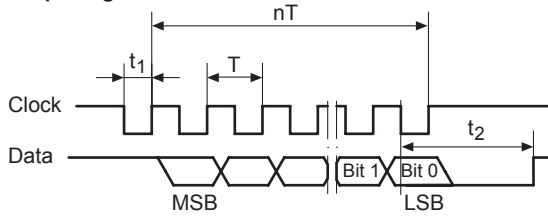
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### Data transfer

#### Output signal



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

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

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

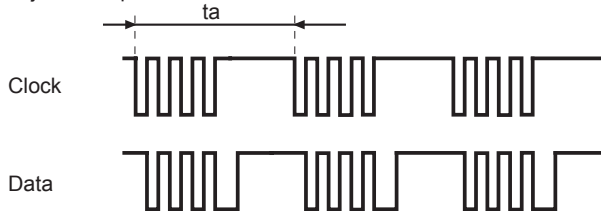
$$f_{\text{max.}} = 2 \text{ MHz}$$

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

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

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

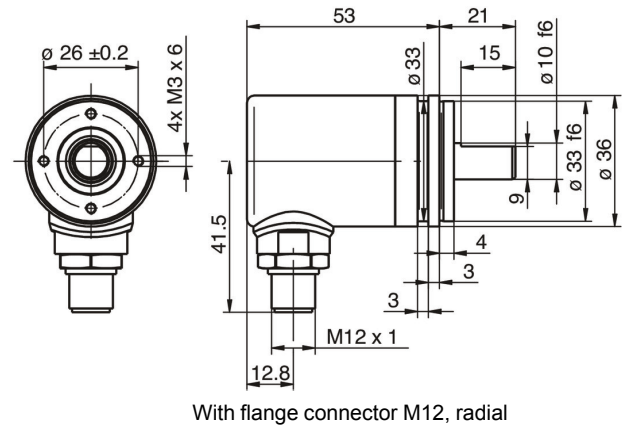
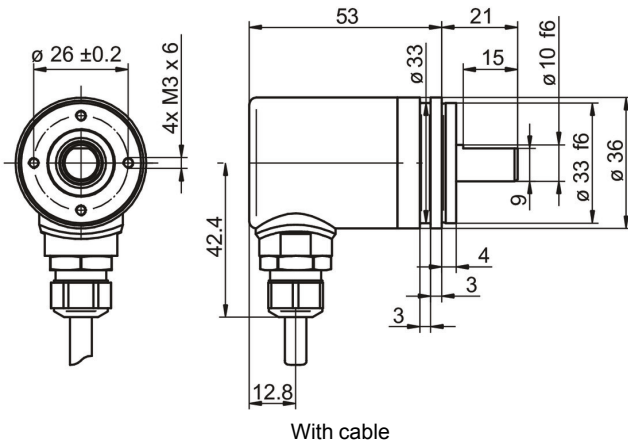


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## Dimensions



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### Ordering reference

	EAM360	-	S	W	A	.	#	#	##	.	##	##	#	.	A
<b>Product</b>	EAM360														
<b>Shaft type</b>															
Solid shaft			S												
<b>Flange (shaft)</b>															
Synchro flange, ø33 mm, M3				W											
<b>Shaft</b>															
ø10 x 16 mm, with flat					A										
<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, 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

### Accessories

#### Mounting accessories

10106004      Clamp set ø10 mm