

## EIL576S-S

Solid shaft with clamping or synchro flange

SIL2 certified

### Overview

- Encoder with solid shaft  $\varnothing 10$  mm or  $\varnothing 6$  mm
- Max. 2500 pulses per revolution
- Optical sensing method
- Clamping or synchro flange
- High rotation speed up to 10000 rpm
- Compact design
- For safety-relevant applications in compliance with SIL2 (Safety Integrity Level 2)



### Technical data

#### Technical data - electrical ratings

Voltage supply	24 VDC +20/-50 %
Reverse polarity protection	Yes
Consumption w/o load	$\leq 30$ mA
Pulses per revolution	1000 ... 2500
Reference signal	Zero pulse 70...720° electr.
Sensing method	Optical
Output frequency	$\leq 150$ kHz
Output signals	A 90° B + inverted
Output stages	Linedriver/RS422 Push-pull short-circuit proof
Safety operating figures	Encoder operating life: 20 years PFH: 1.16E-08 1/h SFF: >90 %
Interference immunity	EN 61000-6-2 IEC 61326-3-1
Emitted interference	EN 61000-6-4
Approval	UL approval / E63076 SIL2 approval according to EN 61508

#### Technical data - mechanical design

Size (flange)	$\varnothing 58$ mm
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#### Technical data - mechanical design

Shaft type	$\varnothing 6$ mm solid shaft (synchro flange) $\varnothing 10$ mm solid shaft (clamping flange)
Admitted shaft load	$\leq 20$ N axial $\leq 40$ N radial
Flange	Clamping or synchro flange
Protection EN 60529	IP 54 (without shaft seal) IP 65 (with shaft seal)
Operating speed	$\leq 10000$ rpm
Starting torque	$\leq 0.015$ Nm (+25 °C, IP 54) $\leq 0.03$ Nm (+25 °C, IP 65)
Rotor moment of inertia	14.5 gcm <sup>2</sup>
Material	Housing: aluminium Flange: aluminium
Operating temperature	-25...+85 °C
Relative humidity	95 % non-condensing
Resistance	EN 60068-2-6 Vibration 10 g, 16-2000 Hz EN 60068-2-27 Shock 100 g, 6 ms
Connection	Flange connector M12, 8-pin Flange connector M23, 12-pin
Weight approx.	250 g

### Optional

- Additional zero pulse (not safety related)

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## Functional safety remarks

The safety function in the master PLC must detect the following events in order to uncover dangerous errors and, in case of error, actuate appropriate safety precautions:

### Non-equivalence Monitoring

The non-inverted and inverted signal lines of each safety track (A+ vs. A- and B+ vs. B-) must have non-equivalent signal levels at all times. In state transition, very short periods of time (some microseconds) are permissible in which both lines have same logical signal level. A dangerous error occurs when this short period of time is exceeded.

### Line break detection

Make sure none of the signal cables (A+, A-, B+, B-) is high-impedant. The encoder will utilize the high-impedant status of the safety tracks (A+, A-, B+, B-) to output an error message.

### Safe rotational speed

In the event of a predefined speed limit, the master control will require identical speed frequencies on both safety tracks. If not, it is a fatal error.

### Safe rotational direction

The phase shift of the safety relevant incremental signals (A+ vs. B+ and A- vs. B-) has to be monitored. A dangerous error occurs when exceeding the given tolerances. Compliance to the defined rotational direction has to be monitored as well.

### Safe stop

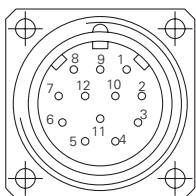
In case of missing state changes in at least one of the signals (A+, A-, B+, B-), the customer has to ensure shaft standstill by means of a second, independent safety precaution within an acceptable amount of time depending on the facility.

Zero pulse as well as the test output are not part of the SIL2 approval and must not be used to fulfill safety functions.

## Terminal assignment

### Flange connector M23

Pin	Assignment without zero pulse	Assignment with zero pulse
1	B-	B-
2	-	-
3	Test Out	Test Out
4	-	Zero pulse
5	A+	A+
6	A-	A-
7	-	-
8	B+	B+
9	-	-
10	GNDB	GNDB
11	-	n.c. <sup>1)</sup>
12	UB	UB



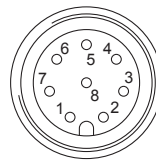
Please use cores twisted in pairs (for example A+ / A-) for extension cables of more than 10 m length.

<sup>1)</sup> Do not use. Pin is internally assigned and must not be connected externally.

## Terminal assignment

### Flange connector M12

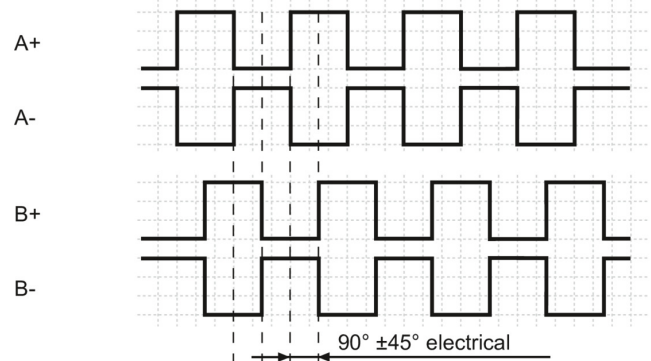
Pin	Assignment without zero pulse
1	A+
2	B+
3	A-
4	B-
5	-
6	Test Out
7	GNDB
8	UB



Please use cores twisted in pairs (for example A+ / A-) for extension cables of more than 10 m length.

## Output signals

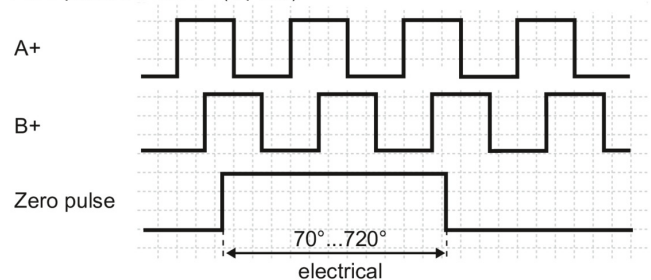
Clockwise rotating direction when looking at flange.



Pulse number 2500/1024/1000 - 360° mechanically



Zero pulse 70°...720° (Option)



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**Trigger level**

<b>Outputs</b>	<b>Linedriver RS422</b>
Output level High	>2.5 V (I = -20 mA)
Output level Low	<0.5 V (I = 20 mA)
Load High	<20 mA
Load Low	<20 mA

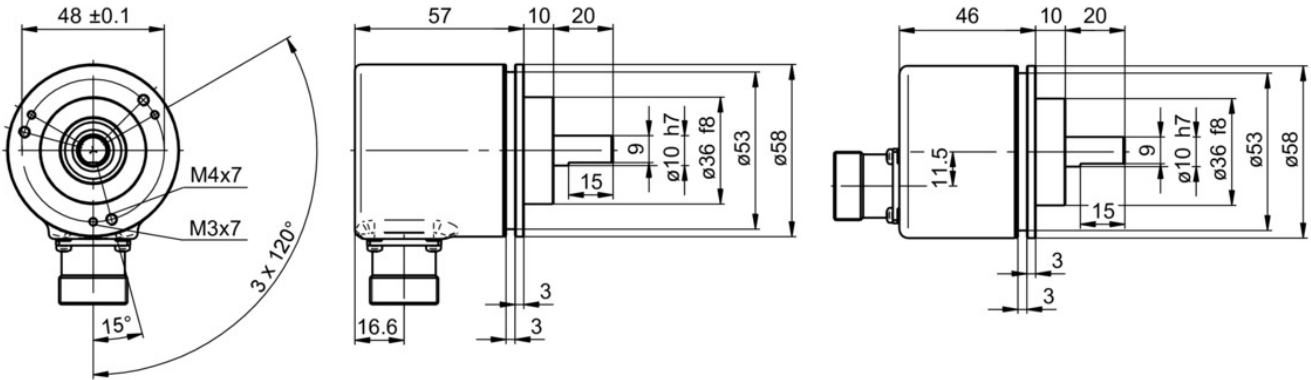
<b>Outputs</b>	<b>Push-pull short-circuit proof</b>
Output level High	>UB -3 V (I = -20 mA)
Output level Low	<0.5 V (I = 20 mA)
Load High	<20 mA
Load Low	<20 mA

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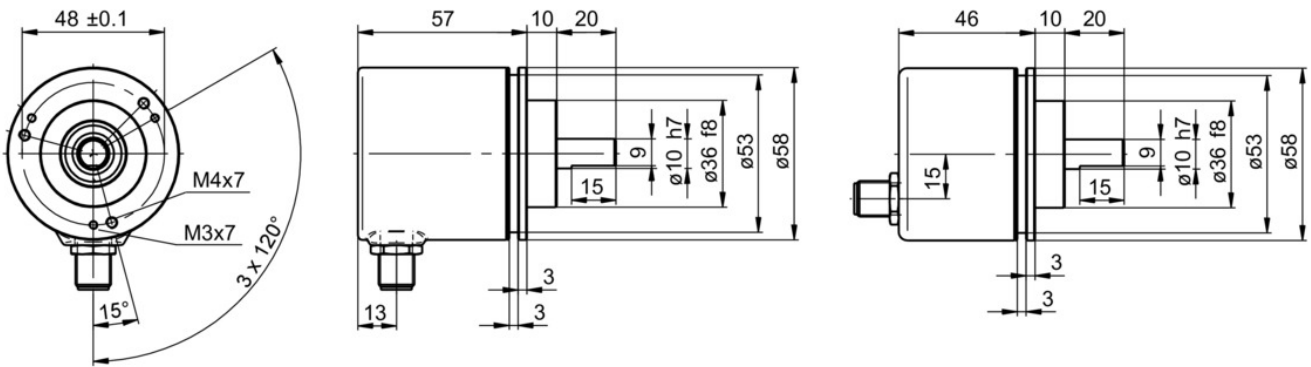
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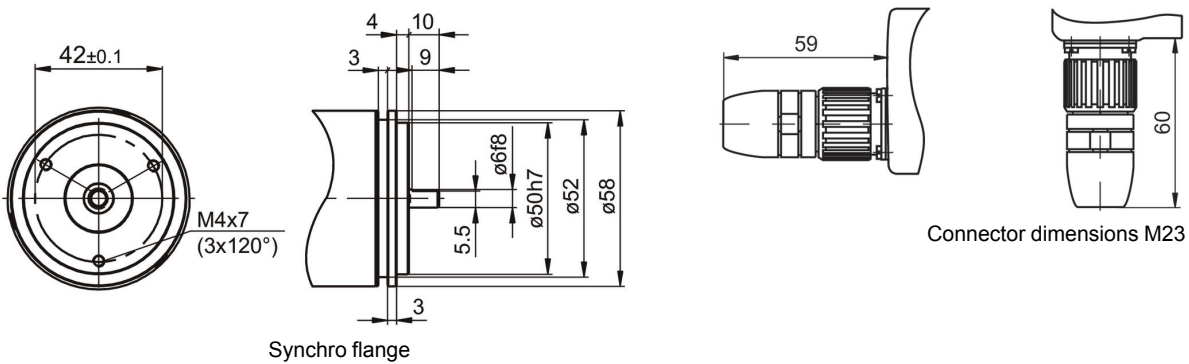
## Dimensions



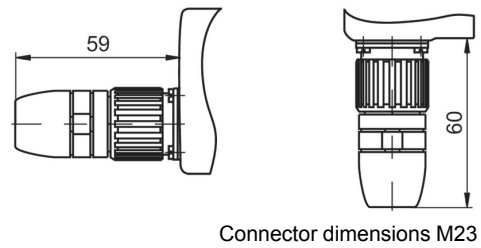
Clamping flange, flange connector M23



Clamping flange, flange connector M12



Synchro flange



Connector dimensions M23

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## Ordering reference

		EIL576S	-	S	#	##	.	#	#	#	.	#####	.	H
<b>Product</b>		EIL576S												
<b>Shaft type</b>	Solid shaft			S										
<b>Flange</b>														
	Clamping flange, ø36 mm, M3/M4													D
	Synchro flange, ø50 mm, M4													V
<b>Specification solid shaft</b>														
	ø6 x 10 mm, with flat (synchro flange)													06
	ø10 x 20 mm, with flat (clamping flange)													10
<b>Protection</b>														
	IP 54													4
	IP 65													5
<b>Connection</b>														
	Flange connector M12, 8-pin, axial, male contacts, CCW													A
	Flange connector M12, 8-pin, radial, male contact, CCW													B
	Flange connector M23, 12-pin, axial, male contacts, CW													C
	Flange connector M23, 12-pin, radial, male contact, CW													E
<b>Voltage supply / output stages</b>														
	24 VDC / push-pull, 6 channel, with zero pulse <sup>(1)</sup>													V
	24 VDC / linedriver RS422, 4 channel, without zero pulse													W
	24 VDC / push-pull, 4 channel, without zero pulse													X
<b>Pulse number<sup>(2)</sup></b>														
	1000													01000
	1024													01024
	2500													02500
<b>Operating temperature</b>														
	-25...+85 °C													H

(1) Version with zero pulse: Only with connector M23, 24 VDC / push-pull and 1024 pulses (zero pulse not safety related).

(2) Other pulse numbers on request.

## Accessories

### Mounting accessories

10117669	Eccentric fixing, single (Z 119.006)
10141255	Adaptor plate for clamping flange for modification into synchro flange (Z 119.013)
10117667	Mounting adaptor for encoders with synchro flange (Z 119.015)
10125051	Mounting adaptor for encoders with clamping flange (M3) (Z 119.017)
11034088	Adaptor plate for clamping flange, mounting by eccentric fixings (order separately) (Z 119.025)
10158124	Bearing flange for encoders with synchro flange (Z 119.035)