Incremental encoders

Solid shaft with clamping or synchro flange

SIL2 certified

EIL576S-S



EIL576S with clamping flange

Features

- **Encoder with solid shaft ø10 mm or ø6 mm**
- **Max. 5000 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 - electrical ratings

Voltage supply	24 VDC +20/-50 %
Reverse polarity protection	Yes
Consumption w/o load	≤30 mA
Pulses per revolution	5...5000
Reference signal	Zero pulse 70...720° electr.
Sensing method	Optical
Output frequency	≤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	DIN EN 61000-6-2 IEC 61326-3-1
Emitted interference	DIN EN 61000-6-4
Approvals	UL approval / E63076, SIL2 approval according to DIN EN 61508

Technical data - mechanical design

Size (flange)	ø58 mm
Shaft type	ø6 mm solid shaft (synchro flange) ø10 mm solid shaft (clamping flange)
Admitted shaft load	≤20 N axial ≤40 N radial
Flange	Clamping or synchro flange
Protection DIN EN 60529	IP 54 (without shaft seal), IP 65 (with shaft seal)
Operating speed	≤10000 rpm
Starting torque	≤0.015 Nm (+25 °C, IP 54) ≤0.03 Nm (+25 °C, IP 65)
Rotor moment of inertia	14.5 gcm²
Materials	Housing: aluminium Flange: aluminium
Operating temperature	-25...+85 °C
Relative humidity	95 % non-condensing
Resistance	DIN EN 60068-2-6 Vibration 10 g, 16-2000 Hz DIN EN 60068-2-27 Shock 100 g, 6 ms
Connection	Connector M12, 8-pin Connector M23, 12-pin
Weight approx.	250 g

· Subject to modification in technic and design. Errors and omissions excepted.

11/3/2019 · Version 01 ·

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Part number

EIL576S-S [ ][ ] . [ ][ ][ ] **.0** [ ] **.H**

Pulse number - see table

Voltage supply / output stages
- V 24 VDC / push-pull, 6 channel, with zero pulse*
- W 24 VDC / linedriver RS422, 4 channel, without zero pulse
- X 24 VDC / push-pull, 4 channel, without zero pulse

Connection
- A Flange connector M12, 8-pin, axial, male contacts, CCW
- B Flange connector M12, 8-pin, radial, male contacts, CCW
- D Flange connector M23, 12-pin, axial, male contacts, CCW
- F Flange connector M23, 12-pin, radial, male contacts, CCW

Protection
- 4 IP 54
- 5 IP 65

Specification solid shaft
- 06 ø6 x 10 mm, with flat
- 10 ø10 x 20 mm, with flat

Flange
- D Clamping flange, ø36 mm, M3/M4
- V Synchro flange, ø50 mm, M4

Part number (pulse number)

1000	1024	2500

Other pulse numbers on request.

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

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Accessories

Connectors and cables

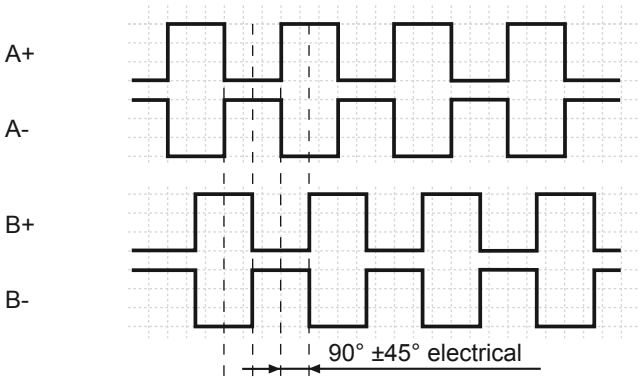
10127371	Female connector M23, 12-pin, without cable (Z 141.001)
10166044	Female connector M23, 12-pin, 2 m cable (Z 141.003)
10124780	Female connector M23, 12-pin, 5 m cable (Z 141.005)
11034204	Female connector M23, 12-pin, 10 m cable (Z 141.007)
10127844	Connection cable 2 m shielded with female connector M12, 8-pin, straight (ESG 34FH0200G)
10129332	Connection cable 5 m shielded with female connector M12, 8-pin, straight (ESG 34FH0500G)
10129333	Connection cable 10 m shielded with female connector M12, 8-pin, straight (ESG 34FH1000G)
11053961	Connection cable 2 m shielded with female connector M12, 8-pin, angled (ESW 33FH0200G)
11053962	Connection cable 5 m shielded with female connector M12, 8-pin, angled (ESW 33FH0500G)
10170054	Connection cable 10 m shielded with female connector M12, 8-pin, angled (ESW 33FH1000G)

Mounting accessories

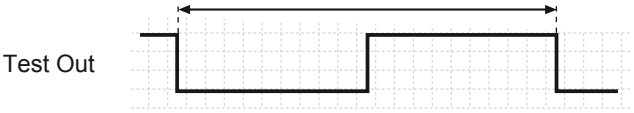
10117669	Eccentric fixing, single (Z 119.006)
10141255	Adaptor plate for clamping flange for modification into synchro flange (Z 119.013)
10117667	Mounting adaptor for encoders with synchro flange (Z 119.015)
10125051	Mounting adaptor for encoders with clamping flange (M3) (Z 119.017)
11034088	Adaptor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

Output signals

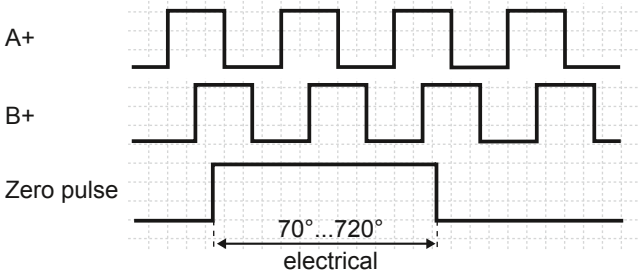
Clockwise rotating direction when looking at flange.



Pulse number 2500/1024/1000 - 360° mechanically



Zero pulse 70°...720° (Option)



Trigger level

Outputs	**Linedriver RS422**
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

Outputs	**Push-pull** short-circuit proof
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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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.

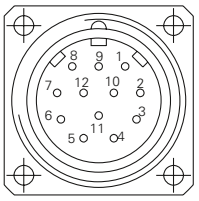
Safe stop
In case of missing state changes in at least one of the signals (A+, A-, B+, B-), the customer has to ensure shaft standstill by means of a second, independent safety precaution within an acceptable amount of time depending on the facility.

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

Connector M23

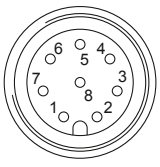
Pin	Assignment without zero pulse	Assignment with zero pulse
1	B-	B-
2	–	–
3	Test Out	Test Out
4	–	Zero pulse
5	A+	A+
6	A-	A-
7	–	–
8	B+	B+
9	–	–
10	GNDB	GNDB
11	–	GND Sense
12	UB	UB



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

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.

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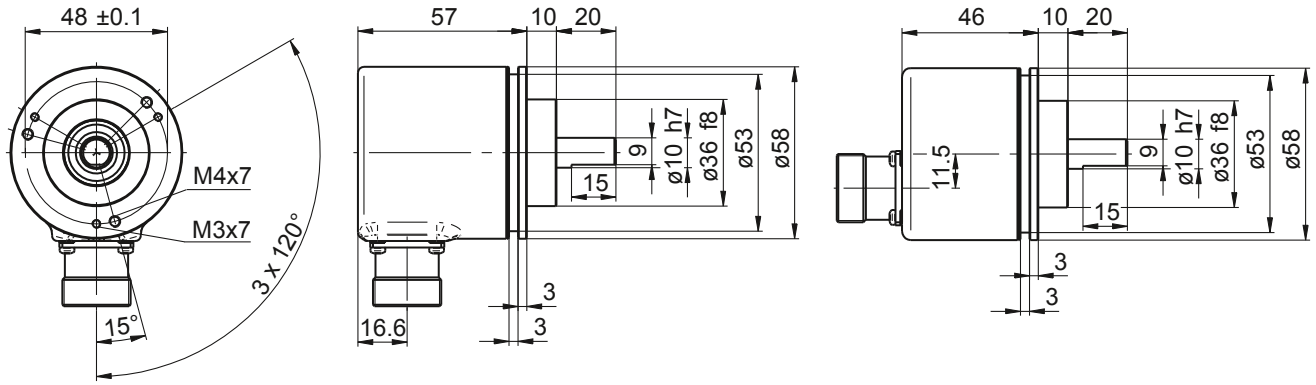
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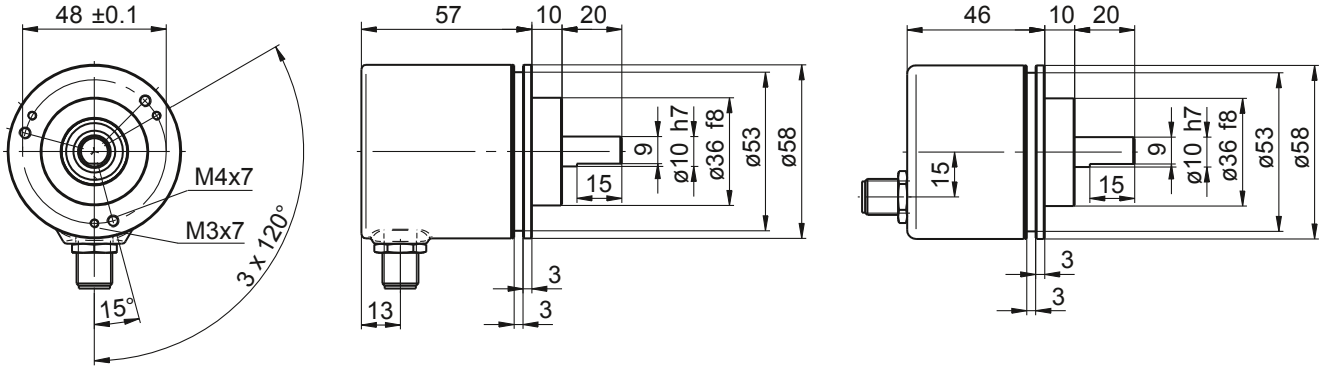
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Dimensions

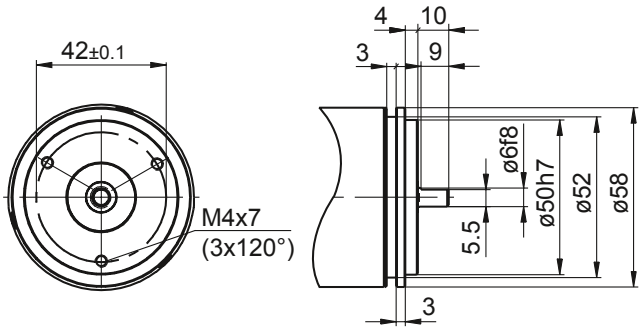
Clamping flange / connector M23



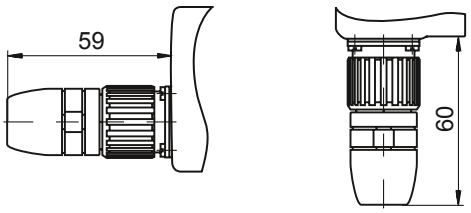
Clamping flange / connector M12



Synchro flange



Connector dimensions



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