

# Incremental encoders

## Solid shaft with square flange

1...65536 pulses per revolution programmable (interpolated system)



RAD ELECTRIC Int.  
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### EIL580P-SQ - OptoPulse®



EIL580P-SQ with square flange

#### Features

- Size  $\varnothing 58$  mm
- Precise optical sensing (interpolated)
- Output signal level programmable (TTL or HTL)
- Square flange 2.5" (63.5 mm)
- Connection axial, radial or tangential
- Pulses per revolution 1...65536, programmable
- High protection up to IP 67
- High resistance to shock and vibrations

#### Technical data - electrical ratings

Voltage supply	4.75...30 VDC
Reverse polarity protection	Yes
Short-circuit proof	Yes
Consumption w/o load	$\leq 70$ mA
Initializing time	$\leq 30$ ms after power on
Pulses per revolution	1...65536
Duty cycle	45...55 % typical at 1024, 2048 ppr (further see table Duty cycle)
Reference signal	Zero pulse $90^\circ$ or $180^\circ$
Sensing method	Optical
Output frequency	$\leq 300$ kHz (TTL) $\leq 160$ kHz (HTL)
Output signals	A+, B+, R+, A-, B-, R-
Output stages	TTL/RS422 HTL/push-pull
Programmable parameters	Output level TTL/HTL Pulse number 1...65536 Zero pulse width $90^\circ/180^\circ$ Zero pulse position Signal sequence
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-3
Approval	UL 508 / CSA 22.2

#### Technical data - mechanical design

Size (flange)	2.5 x 2.5" (63.5 x 63.5 mm)
Shaft type	$\varnothing 10$ x 20 mm, solid shaft with flat $\varnothing 3/8$ " x $4/5$ " ( $\varnothing 9.525$ x 20.32 mm), solid shaft with flat
Admitted shaft load	$\leq 40$ N axial $\leq 80$ N radial
Flange	Square flange 2.5" (63.5 mm)
Protection DIN EN 60529	IP 65 (without shaft seal), IP 67 (with shaft seal)
Operating speed	$\leq 6000$ rpm (+20 °C, IP 67) $\leq 12000$ rpm (+20 °C, IP 65)
Starting torque	$\leq 0.015$ Nm (+20 °C, IP 65) $\leq 0.02$ Nm (+20 °C, IP 67)
Materials	Housing: aluminium die-cast Flange: aluminium Solid shaft: stainless steel
Operating temperature	-40...+100 °C
Relative humidity	90 % non-condensing
Resistance	DIN EN 60068-2-6 Vibration 30 g, 10-2000 Hz DIN EN 60068-2-27 Shock 300 g, 6 ms
Connection	Flange connector M12, 8-pin Flange connector M23, 12-pin Cable
Weight approx.	370 g



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## Part number

EIL580P-S Q . . F . 01024 . B

Operating temperature

B -40...+100 °C

Pulses programmable

01024 1...65536 programmable (factory setting: 1024)

Voltage supply / output stages

F 4.75...30 VDC, TTL/RS422, 6 channel (Vout = 5 VDC) - Factory setting  
HTL/push-pull 6 channel (Vout = Vin) - programmable by customer

Connection

- R Cable radial, 1 m
- L Cable radial, 2 m
- F Flange connector M23, 12-pin, radial, male contacts, CCW
- B Flange connector M12, 8-pin, radial, male, CCW
- T Cable axial, 1 m
- U Cable axial, 2 m
- D Flange connector M23, 12-pin, axial, male, CCW
- A Flange connector M12, 8-pin, axial, male, CCW
- P Cable tangential, 1 m
- Q Cable tangential, 2 m

Protection

- 5 IP 65
- 7 IP 67

Specification solid shaft

- U3  $\varnothing 3/8 \times 4/5$  inch ( $\varnothing 9.525 \times 20.32$  mm), with flat
- 10  $\varnothing 10 \times 20$  mm, with flat

Flange

- Q Square flange

(Factory setting: 1024 ppr, Vout = 5 VDC TTL, signal sequence A leading B (CW), zero pulse 90° A&B high)

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#### Accessories

##### Connectors and cables

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)
11212849	Connection cable 1 m shielded with female connector M23, 12-pin - EIL580P
11212870	Connection cable 2 m shielded with female connector M23, 12-pin - EIL580P
11212871	Connection cable 5 m shielded with female connector M23, 12-pin - EIL580P
11212872	Connection cable 10 m shielded with female connector M23, 12-pin - EIL580P
11119280	Connection cable connector M12 / connector D-SUB, 0.2 m
11119720	Connection cable connector M12 / connector D-SUB, 1 m
11119257	Connection cable connector M23 / connector D-SUB, 0.2 m (S2BG12/K4SG9)
11119723	Connection cable connector M23 / connector D-SUB, 1 m (S2BG12/K4SG9)

##### Mounting accessories

11065915	Coupling CPS25 L=19 d1=04/d2=10
11065918	Coupling CPS25 L=19 d1=07/d2=10
11065920	Coupling CPS25 L=19 d1=08/d2=10
11065921	Coupling CPS25 L=19 d1=09/d2=10
11065922	Coupling CPS25 L=19 d1=10/d2=06
11065923	Coupling CPS25 L=19 d1=10/d2=10
11065924	Coupling CPS25 L=19 d1=10/d2=11
11065925	Coupling CPS25 L=19 d1=10/d2=12
10141132	Spring washer coupling D1=6 / D2=10 (Z 121.C01)
10141133	Spring washer coupling D1=10 / D2=10 (Z 121.C03)
11034138	Spring washer coupling D1=10 / D2=16 (Z 121.C04)

##### Mounting accessories

11034140	Spring washer coupling D1=10 / D2=14 (Z 121.C06)
11034141	Spring washer coupling D1=10 / D2=12 (Z 121.C07)
11050507	Bellows coupling aluminium/stainless steel D1=06 / D2=10
11101781	Double loops coupling D1=10 / D2=10

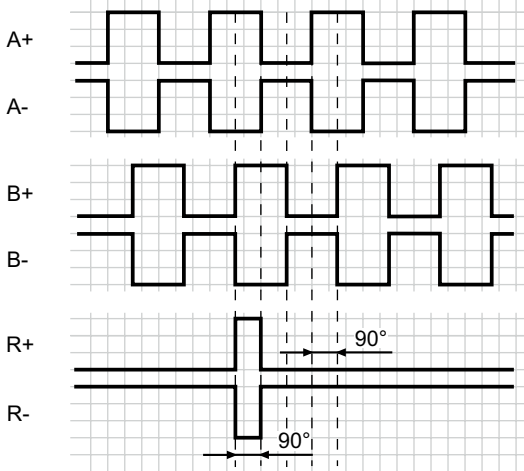
##### Programming accessories

11120657	Handheld Programming Tool Z-PA-EI-H
11120547	PC Programming Tool Z-PA-EI-P

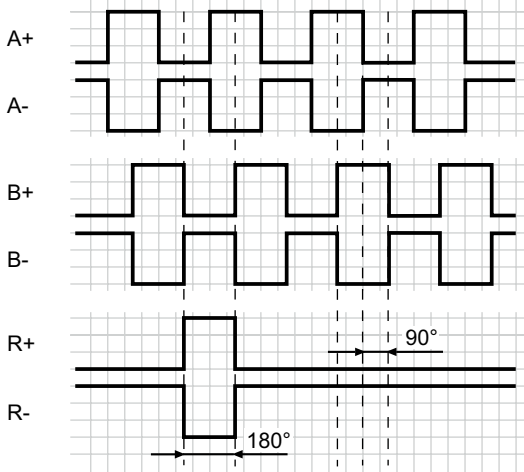


#### Output signals

Zero pulse electrical 90° A&B high  
(Factory setting at clockwise rotation (CW)  
in view of the encoder flange)



Zero pulse electrical 180° B low  
(at clockwise rotation (CW)  
in view of the encoder flange)



#### Trigger level

Outputs	TTL/RS422
Output level High	≥2.5 V
Output level Low	≤0.5 V
Load	≤20 mA

Outputs	HTL/Push-pull
Output level High	≥UB -3 V
Output level Low	≤1.5 V
Load	≤20 mA

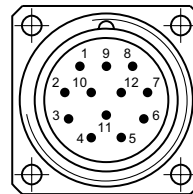
#### Terminal assignment

##### Flange connector M23, 12-pin / cable

Pin	Core color	Assignment
1	pink	B-
2	–	–
3	blue	R+
4	red	R-
5	green	A+
6	yellow	A-
7	–	R-Set <sup>1)</sup>
8	grey	B+
9	–	–
10	white	GND
11	–	–
12	brown	UB

Screen: Connected to housing

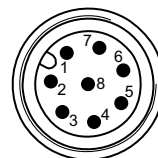
Cable data: PUR, [4x2x0,14 mm<sup>2</sup>], bending radius >45,8 mm, outer diameter 6.1 mm



<sup>1)</sup> The R-Set input is used to set the reference pulse (zero pulse) on the current shaft position.  
R-Set = UB ≥ 200 ms

##### Flange connector M12, 8-pin

Pin	Assignment
1	GND
2	UB
3	A+
4	A-
5	B+
6	B-
7	R+
8	R-



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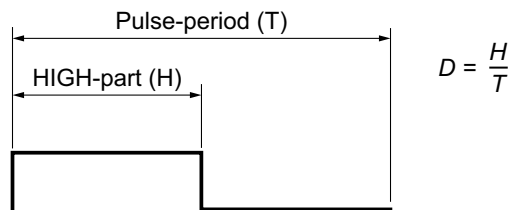
## EIL580P-SQ - OptoPulse®

### Duty cycle

The duty cycle (D) is defined as the time ratio between the HIGH pulse duration (H) and the pulse period (T).

System-induced and depending on the pulse number, the measured values may vary which has an impact on speed and position acquisition.

Binary pulse numbers are recommended for speed feedback.



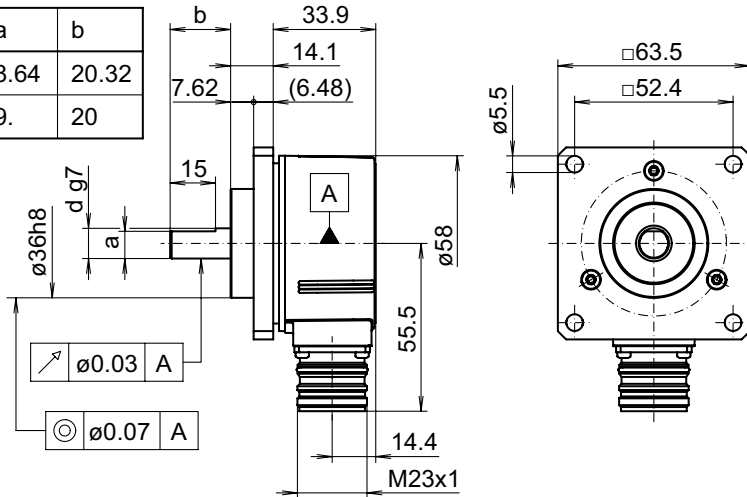
Programmed pulse number	Scan ratio (D) (maximum)	Jitter (+/-) (maximum)
1...1023	45...55 %	5%
1024, 2048	45...55 %	5%
1025...5000	40...60 %	10%
8192, 16384	35...85 %	15%
5001...10000	22...78 %	28%
32768	25...75 %	25%
65536	15...85 %	35%
all other	Jitter[%]=(programmed pulse number -10000)*0,0007%+28%	



#### Dimensions

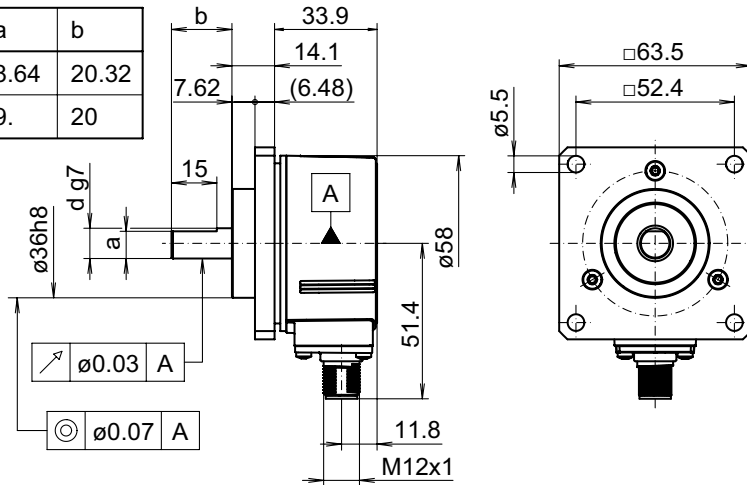
##### Square flange, flange connector M23, radial

d g7	a	b
ø9.525	8.64	20.32
ø10	9.	20



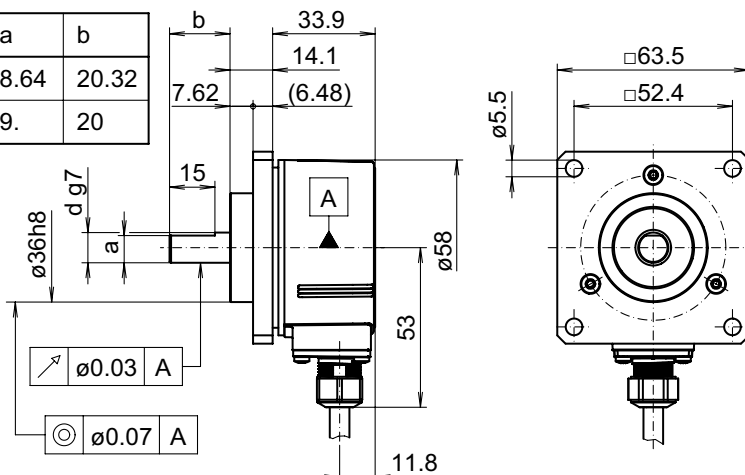
##### Square flange, flange connector M12, radial

d g7	a	b
ø9.525	8.64	20.32
ø10	9.	20



##### Square flange, cable radial

d g7	a	b
ø9.525	8.64	20.32
ø10	9.	20



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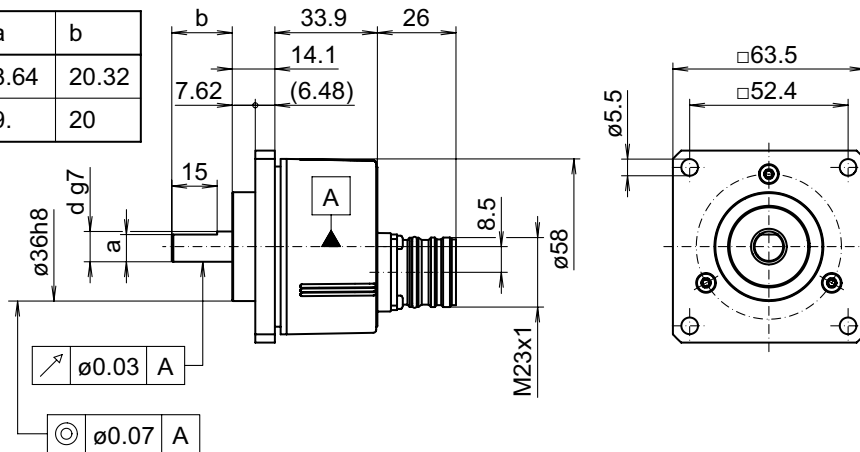
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### Dimensions

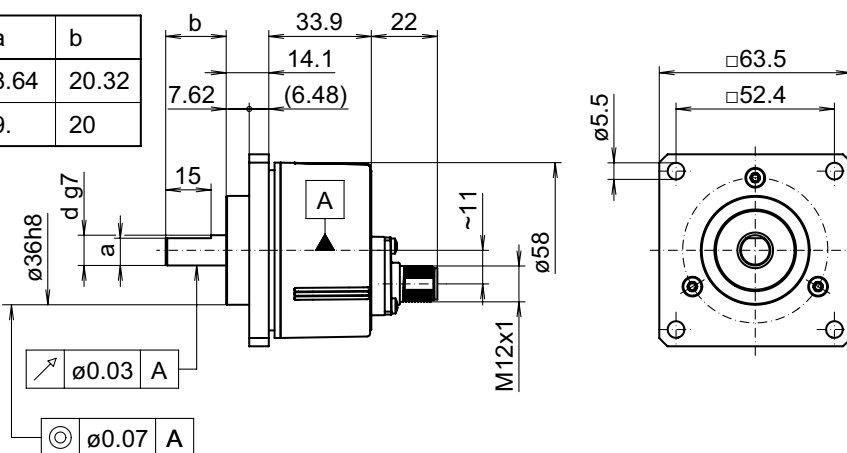
#### Square flange, flange connector M23, axial

d g7	a	b
ø9.525	8.64	20.32
ø10	9.	20



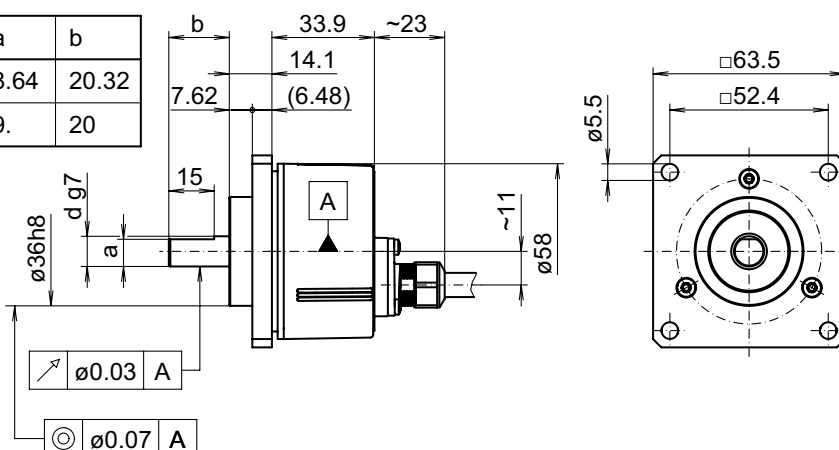
#### Square flange, flange connector M12, axial

d g7	a	b
ø9.525	8.64	20.32
ø10	9.	20



#### Square flange, cable axial

d g7	a	b
ø9.525	8.64	20.32
ø10	9.	20





#### Dimensions

Square flange, cable tangential

