

# Absolute encoders - singleturn

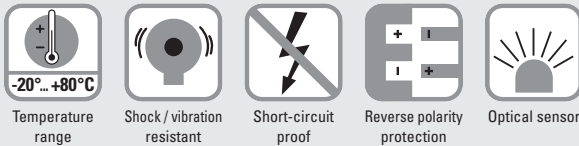
**Standard stainless steel, optical**

**5876 (hollow shaft)**

**SSI, parallel**



The singleturn encoder 5876 with SSI or parallel interface and optical sensor technology boasts a hollow shaft of up to 12 mm. It offers a maximum resolution of 14 bits, divided over 360°.



## Safe

- A protection level of IP67 as well as the wide temperature range of -20°C to +80°C allow error-free operation even under the toughest working conditions.
- The stainless-steel (1.4305) housing withstands even the most extreme external influences.

## Adaptable

- Available with a choice of M12 connector or as cable version.
- Gray, binary or BCD code for parallel interface.
- Wide range of possible applications thanks to numerous input options.

## Order code hollow shaft

**8.5876** . **XXXX** . **XXXX**  
Type      a b c d      e f

### a Flange

- 1 = with through hollow shaft,  $\varnothing$  58 mm [2.28"]
- 2 = with blind hollow shaft,  $\varnothing$  58 mm [2.28"]

### b Hollow shaft

- (insertion depth blind hollow shaft with flange 2 max. 30 mm [1.18"])
- 6 =  $\varnothing$  10 mm [0.39"]
  - 8 =  $\varnothing$  12 mm [0.47"]

### c Interface / power supply

- 1 = SSI / 5 V DC
- 2 = SSI / 10 ... 30 V DC
- 3 = parallel / 5 V DC
- 4 = parallel / 10 ... 30 V DC

### d Type of connection

- 1 = radial cable, 1 m [3.28] PVC
- 2 = radial M12 connector, 8-pin, without mating connector<sup>1)</sup>

### e Code type and division

- see table 1 (at interface 3 and 4, parallel)
- see table 2 (at interface 1 and 2, SSI)

### f Options

- 2 = SET and V/R
- 3 = SET and Latch<sup>2)</sup>
- 4 = V/R and Latch<sup>2)</sup>

Optional on request  
 - Ex 2/22<sup>3)</sup>

**Table 1: Code type and divisions for encoders with parallel output**

Division	Interface and power supply, version 3 or 4 (parallel)																			
	250	360	500	720	900	1000	1024 10 bit	1250	1440	1800	2000	2500	2880	3600	4000	4096 12 bit	5000	7200	8192 13 bit	16384 14 bit
Order code gray / gray-excess	E02	E03	E05	E07	E09	E01	G10	E12	E14	E18	E20	E25	E28	E36	E40	G12	E50	E72	G13	G14
Order code binary	B02	B03	B05	B07	B09	B01	B10	BA2	BA1	B18	B20	B25	B28	B36	B40	B12	B50	B72	B13	B14
Order code BCD	D02	D03	D05	D07	D09	D01	D10	DA2	DA1	D18	D20									

**Table 2: Code type and SSI output**

Interface / power supply, version 1 or 2				
Division	1024 10 bit	4096 12 bit	8192 13 bit	16384 14 bit
Order code gray	G10	G12	G13	G14
Order code binary	B10	B12	B13	B14

1) Only in conjunction with SSI output.  
 2) Not with SSI interface.  
 3) For the cable connection type, cable material PUR.

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## Technical data

### Mechanical characteristics

<b>Maximum speed</b> <sup>1)</sup>	6000 min <sup>-1</sup>	<b>Working temperature range</b>	-20°C ... +80°C <sup>2)</sup> [-4°F ... +176°F] <sup>2)</sup>
<b>Mass moment of inertia</b>	approx. 6 x 10 <sup>-6</sup> kgm <sup>2</sup>	<b>Material</b>	shaft / housing stainless steel
<b>Starting torque</b> - at 20°C [68°F]	< 0.05 Nm	<b>Shock resistance</b> acc. to EN 60068-2-27	2500 m/s <sup>2</sup> , 6 ms
<b>Weight</b>	approx. 0.6 kg [21.16 oz]	<b>Vibration resistance</b> acc. to EN 60068-2-6	100 m/s <sup>2</sup> , 10 ... 2000 Hz
<b>Protection</b> acc. to EN 60529	IP67		

### Electrical characteristics

Interface type	Synchronous serial (SSI)	Synchronous serial (SSI)	Parallel	Parallel
<b>Power supply (+V)</b>	5 V DC (±5 %)	10 ... 30 V DC	5 V DC (±5 %)	10 ... 30 V DC
<b>Output driver</b>	RS485	RS485	Push-pull	Push-pull
<b>Power consumption</b> (no load)	typ. 89 mA max. 138 mA	89 mA 138 mA	109 mA 169 mA	109 mA 169 mA
<b>Permissible load / channel</b>	max. +/- 20 mA	max. +/- 20 mA	max. +/- 10 mA	max. +/- 10 mA
<b>Update rate</b>	max. 15000/s	max. 15000/s	40000/s	40000/s
<b>SSI clock rate min./max.</b>	100 kHz / 500 kHz	100 kHz / 500 kHz	–	–
<b>Signal level HIGH</b>	typ. 3.8 V	typ. 3.8 V	min. 3.4 V	min. +V - 2.8 V
<b>Signal level LOW</b>	(I <sub>Load</sub> = 20 mA) typ. 1.3 V (I <sub>Load</sub> = 10 mA) – (I <sub>Load</sub> = 1 mA) –	typ. 1.3 V – –	– max. 1.5 V max. 0.3 V	– max. 1.8 V –
<b>Rising edge time</b> t <sub>r</sub> (without cable)	max. 100 ns	max. 100 ns	max. 0.2 μs	max. 1 μs
<b>Falling edge time</b> t <sub>f</sub> (without cable)	max. 100 ns	max. 100 ns	max. 0.2 μs	max. 1 μs
<b>Short circuit proof outputs</b> <sup>3)</sup>	yes	yes <sup>4)</sup>	yes	yes
<b>Reverse polarity protection of the power supply</b>	no	yes	no	yes
<b>UL approval</b>	file 224618			
<b>CE compliant</b> acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU			

## Control inputs

### Switching levels of the control inputs

Power supply	5 V DC	10 ... 30 V DC
<b>Switching level</b>	LOW ≤ 1.7 V HIGH ≥ 3.4 V	≤ 4.5 V ≥ 8.7 V

### Up/Down input to switch the counting direction

As a standard, absolute encoders deliver increasing code values when the shaft rotates clockwise (cw), when looking from the shaft side. When the shaft rotates counter-clockwise (ccw), the output delivers accordingly decreasing code values.

As long as the Up/Down input receives the corresponding signal (HIGH), this feature is reversed. Clockwise rotation will deliver decreasing code/current values while counter-clockwise rotation will deliver increasing code/current values.

The response time is :

for 5 V DC power supply	0.4 ms
for 10 ... 30 V DC power supply	2 ms

### SET input

This input is used to reset (zero) the encoder. A control pulse (HIGH) sent to this input allows the current position value to be saved as the new zero position in the encoder.

Note : After applying power to the encoder and before activating the SET input, a count direction (cw or ccw) must be clearly defined on the Up/Down input!

The response time is :

for 5 V DC power supply	0.4 ms
for 10 ... 30 V DC power supply	2 ms

### LATCH input

This input is used to "freeze" the current position value. The position value will be statically available on the parallel output as long as this input remains active (HIGH).

The response time is :

for 5 V DC power supply	140 μs
for 10 ... 30 V DC power supply	200 μs

1) For continuous operation max. 1500 min<sup>-1</sup>.

2) 70°C [158°F] cable version.

3) If power supply +V correctly applied.

4) Only one channel allowed to be shorted-out:  
at +V = 5 V DC short circuit to channel, 0 V, or +V is permitted.  
at +V = 10 ... 30 V DC short circuit to channel or 0 V is permitted.

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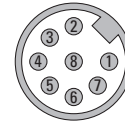
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## Terminal assignment

### SSI interface

Interface	Type of connection	Cable (isolate unused wires individually before initial start-up)									
		Signal	0V	+V	C+	C-	D+	D-	ST	VR	
1, 2	1	Cable color:	WH	BN	GN	YE	GY	PK	BU	RD	

Top view of mating side, male contact base



M12 connector, 8-pin

Interface	Type of connection	M12 connector, 8-pin									
		Signal	0V	+V	C+	C-	D+	D-	ST	VR	
1, 2	2	Pin:	1	2	3	4	5	6	7	8	

### Parallel interface up to max. 14 bit and max. 2 options

Interface	Type of connection	Cable (isolate unused wires individually before initial start-up)																			
		Signal	0V	+V	1	2	3	4	5	6	7	8	9	10	11	12	13	ST/VR	VR/LH	14	⊥
3, 4	1	Cable color:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY	RD	WH	BN	WH	YE	WH	GY	PH

- +V: Encoder power supply +V DC
- 0 V: Encoder power supply ground GND (0 V)
- Sig.: 1 =MSB; 2 = MSB-1; 3 = MSB-2 etc.
- C+, C-: Clock signal
- D+, D-: Data signal
- ST: Set input. The current position becomes defined as position zero.
- VR: Up/down input. As long as this input is active, decreasing code values are transmitted when shaft turning.
- LH: LATCH input. Active HIGH. The current position is saved and is statically available at the output.
- PH ⊥: Plug connector housing (shield)

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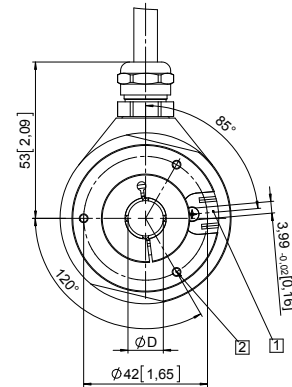
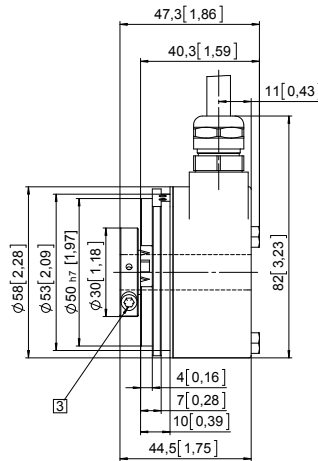
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## Dimensions

Dimensions in mm [inch]

### Flange with through hollow shaft, $\varnothing$ 58 [2.28"] Flange type 1

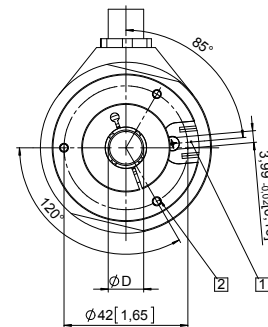
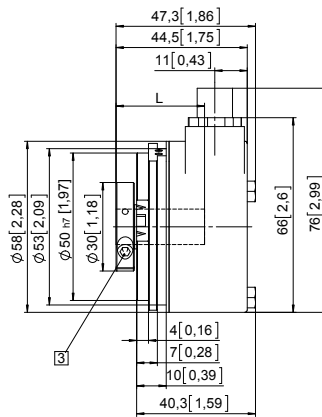
- 1 Slot spring element recommendation: cylindrical pin DIN 7,  $\varnothing$  4 [0.16]
- 2 3 x M3, 5 [0.2] deep
- 3 Recommended torque for the clamping ring shaft version 6: 0.7 Nm shaft version 8: 1.0 Nm



D	Fit
10 [0.39]	H7
12 [0.47]	H7

### Flange with blind hollow shaft, $\varnothing$ 58 [2.28"] Flange type 2

- 1 Slot spring element recommendation: cylindrical pin DIN 7,  $\varnothing$  4 [0.16]
- 2 3 x M3, 5 [0.2] deep
- 3 Recommended torque for the clamping ring shaft version 6: 0.7 Nm shaft version 8: 1.0 Nm



D	Fit	L
10 [0.39]	H7	30 [1.18]
12 [0.47]	H7	30 [1.18]

L = insertion depth max. blind hollow shaft

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