

# Rotary Measuring Technology

## Absolute singleturn encoder hollow shaft version

### Universal Type 5870



- SSI or parallel interface
- Highest shock resistance on the market ( $\geq 2500 \text{ m/s}^2$ , 6 ms acc. to DIN IEC 68-2-27)
- Divisions: up to 16384 (14 bits), singleturn
- Housing  $\varnothing$  58 mm
- IP 66
- Various options (e.g. LATCH, SET...)
- Gray, Binary or BCD code
- Temperature and ageing compensation
- Short-circuit proof outputs

- Integrativ Technology®  
Patented new type of construction integrates all components; use of an opto-asic and 6-layer multilayer technology now on just a single PCB
- resolution up to 14 bits.
- available as explosion proof zone 2 and 22

#### Mechanical characteristics:

Speed without sealing:	max. 12000 min <sup>-1</sup>
Speed with sealing <sup>1)</sup> :	max. 6000 min <sup>-1</sup>
Rotor moment of inertia:	appr. $6 \times 10^{-6} \text{ kgm}^2$
Starting torque with sealing:	< 0,05 Nm
Weight:	appr. 0,4 kg
Protection acc. to EN 60 529 with sealing:	IP 66
Working temperature without sealing:	-20° C ... +85 °C <sup>2)3)</sup>
Working temperature with sealing:	-20° C ... +80 °C <sup>2)3)</sup>
Operating temperature without sealing:	-20° C ... +90 °C <sup>2)4)</sup>
Operating temperature with sealing:	-20° C ... +85 °C <sup>2)4)</sup>
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27	2500 m/s <sup>2</sup> , 6 ms
Vibration resistance acc. to DIN-IEC 68-2-6:	100 m/s <sup>2</sup> , 10...2000 Hz

<sup>1)</sup>for continuous operation max. 1500 min<sup>-1</sup>  
<sup>2)</sup>non-condensing  
<sup>3)</sup>70 °C with cable  
<sup>4)</sup>80 °C with cable

#### Electrical characteristics:

Interface type:	Synchronous-Serial (SSI)	Synchronous-Serial (SSI)	Parallel	Parallel
Supply voltage (U <sub>B</sub> ):	5 V DC ( $\pm 5 \%$ )	10 ... 30 V DC	5 V DC ( $\pm 5 \%$ )	10 ... 30 V DC
Output driver:	RS 485	RS 485	Push-pull	Push-pull
Current consumption typ.:	89 mA	89 mA	109 mA	109 mA
(no load) max.:	138 mA	138 mA	169 mA	169 mA
Permissible load/channel:	max. +/- 20 mA	max. +/- 20 mA	max. +/- 10 mA	max. +/- 10 mA
Word change frequency	max. 15.000/s	max. 15.000/s	40.000/s	40.000/s
SSI pulse rate min./max.:	100 kHz/500 kHz	100 kHz/500 kHz	-	-
Signal level high:	typ. 3,8 V	typ. 3,8 V	min. 3,4 V	min. U <sub>B</sub> - 2,8 V
Signal level low (I <sub>Load</sub> = 20 mA):	typ. 1,3 V	typ. 1,3 V	-	-
(I <sub>Load</sub> = 10 mA):	-	-	max. 1,5 V	max. 1,8 V
(I <sub>Load</sub> = 1 mA):	-	-	max. 0,3 V	-
Rise time t <sub>r</sub> (without cable):	max. 100 ns	max. 100 ns	max. 0,2 $\mu$ s	max. 1 $\mu$ s
Fall time t <sub>f</sub> (without cable):	max. 100 ns	max. 100 ns	max. 0,2 $\mu$ s	max. 1 $\mu$ s
Short circuit proof outputs: <sup>1)</sup>	yes	yes <sup>2)</sup>	yes	yes
Reverse connection protection at U <sub>B</sub> :	no	yes	no	yes
Conforms to CE requirements acc. to EN 61000-6-1, EN 61000-6-4 and EN 61000-6-3				

<sup>1)</sup>When supply voltage correctly applied U<sub>B</sub>  
<sup>2)</sup>Only one channel at a time: When U<sub>B</sub> = 5 V DC, short-circuit to channel, 0 V or U<sub>B</sub> is permitted.  
 When U<sub>B</sub> = 10 ... 30 V DC short-circuit to channel or 0 V is permitted.

#### Divisions and code types available at short notice

Gray/Binary  
 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)

BCD  
 250, **360**, 500, **720**, 900, **1000**, **1024** (10 Bit), 1250, 1440, 1800, 2000  
 Other on request

**Preferred divisions are bold**  
 (reduced delivery time)

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#### Control Inputs

##### 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 values while counter-clockwise rotation will deliver increasing code values.

The response time is :       for 5 V DC supply voltage, 0.4 ms  
   for 10 ... 30 V DC supply voltage, 2 ms.

##### SET input

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

##### Note :

before activating the SET input after supplying the encoder with the supply voltage, a counting direction (cw or ccw) must be defined univocally on the Up/down input!

The response time is :       for 5 V DC supply voltage, 0.4 ms  
   for 10 ... 30 V DC supply voltage, 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 will remain active (high).

The response time is :       for 5 V DC supply voltage, 140 µs,  
   for 10 ... 30 V DC supply voltage, 200 µs.

#### Switching level of the control inputs:

Supply voltage	5 V DC	10 ... 30 V DC
low	≤1,7 V	≤ 4,5 V
high	≥3,4 V	≥8,7 V

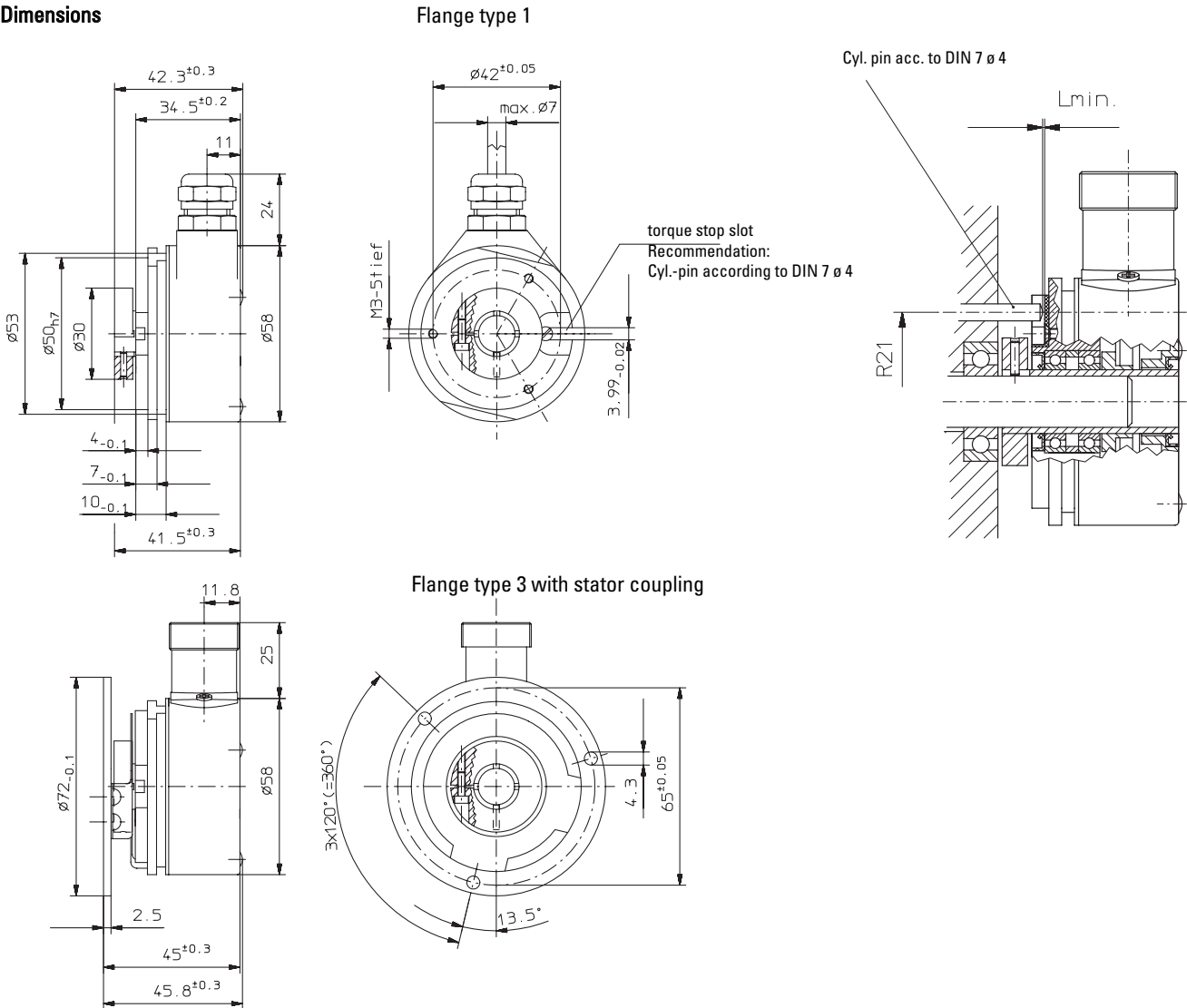


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#### Dimensions



#### Mounting advice:

- 1) Do not connect encoder and drive rigidly to one another at shafts and flanges!
- 2) To mount a hollow shaft encoder, we recommend to use a torque stop pin that fits into the torque stop slot or a stator coupling.
- 3) When mounting the encoder ensure that Lmin. is larger than the axial play of the drive.

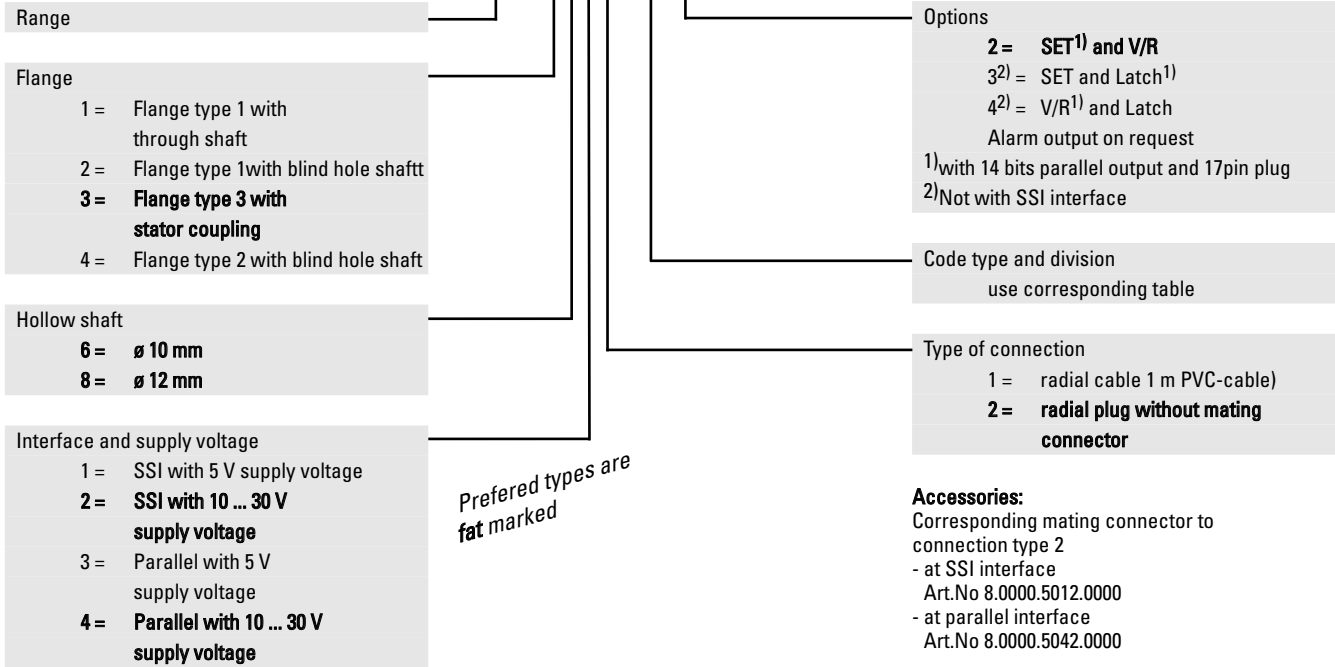
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Order code:

8.5870.XXXX.XXXX



### Code type and division with parallel output

Interface and supply voltage, version 3 or 4 (Parallel):

Division	Order code Gray/Gray-Excess	Order code Binary	Order code BCD
250	E02	B02	D02
<b>360<sup>1)</sup></b>	<b>E03</b>	B03	D03
500	E05	B05	D05
<b>720<sup>1)</sup></b>	<b>E07</b>	B07	D07
900	E09	B09	D09
<b>1000<sup>1)</sup></b>	<b>E01</b>	B01	D01
<b>1024 (10 Bit)</b>	<b>G10</b>	<b>B10</b>	D10
1250	E12	BA2	DA2
1440	E14	BA1	DA1
1800	E18	B18	D18
2000	E20	B20	D20
2500	E25	B25	
2880	E28	B28	
36001)	E36	B36	
4000	E40	B40	
<b>4096 (12 Bit)</b>	<b>G12</b>	<b>B12</b>	
5000	E50	B50	
7200	E72	B72	
<b>8192 (13 Bit)</b>	<b>G13</b>	<b>B13</b>	
<b>16384 (14 Bit)</b>	<b>G14</b>	<b>B14</b>	

Preferred divisions are bold

### Code type and division for encoder with SSI-Output

Interface and supply voltage, version 1 or 2 (SSI):

Division	Order code Gray	Order code Binary
1024 (10 Bit)	G10	B10
4096 (12 Bit)	G12	B12
8192 (13 Bit)	G13	B13
16384 (14 Bit)	G14	B14