

### Universal Type 5850 (Shaft) / 5870 (Hollow shaft), analogue, parallel



- Highest shock resistance on the market ( $\geq 2500 \text{ m/s}^2$ , 6 ms acc. to DIN IEC 68-2-27)
- Parallel interface
- Divisions: up to 16384 (14 bits), singleturn
- Housing  $\varnothing$  58 mm
- Shaft version: IP 65  
Hollow shaft version: IP 66
- Various options (e.g. LATCH, SET...)
- Gray, Binary or BCD code
- Short-circuit proof outputs

- Patented new type of construction integrates all components; use of an opto-asic and 6-layer multilayer technology now on just a single PCB with resolution of up to 14 bits.
- Shaft version: Current interface 4 ... 20 mA

#### Mechanical characteristics:

Speed:	Shaft version: max. 12000 min <sup>-1</sup> Hollow shaft version <sup>1)</sup> : max. 6000 min <sup>-1</sup>
Rotor moment of inertia:	Shaft version: approx. $1.8 \times 10^{-6} \text{ kgm}^2$ Hollow shaft version: approx. $6 \times 10^{-6} \text{ kgm}^2$
Starting torque:	Shaft version: < 0.01 Nm Hollow shaft version: < 0.05 Nm
Radial load capacity of shaft:	80 N
Axial load capacity of shaft:	40 N
Weight:	approx. 0.4 kg
Protection acc. to EN 60 529:	Shaft version: IP 65 Hollow shaft version: IP 66
EX approval for hazardous areas:	optional zone 2 and 22
Working temperature:	-20° C ... +85 °C <sup>2)3)</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 1500 min<sup>-1</sup>

<sup>2)</sup> 80 °C, shaft version and cable connection

<sup>3)</sup> 70 °C, hollow shaft version and cable connection

#### Electrical characteristics SSI or parallel interface:

Interface type:	Parallel	Parallel
Supply voltage (U <sub>B</sub> ):	5 V DC ( $\pm 5 \%$ )	10 ... 30 V DC
Output driver:	Push-pull	Push-pull
Current consumption typ.:	109 mA	109 mA
(no load) max.:	169 mA	169 mA
Permissible load/channel:	max. +/- 10 mA	max. +/- 10 mA
Signal level high:	min. 3.4 V	min. U <sub>B</sub> - 2.8 V
Signal level low (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. 0.2 $\mu$ s	max. 1 $\mu$ s
Fall time t <sub>f</sub> (without cable):	max. 0.2 $\mu$ s	max. 1 $\mu$ s
Short circuit proof outputs: <sup>1)</sup>	yes	yes
Reverse connection protection at U <sub>B</sub> :	no	yes
UL certified	File 224618	
Conforms to CE requirements acc. to EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3		
RoHS compliant acc. to EU guideline 2002/95/EG		

<sup>1)</sup> If supply voltage is correctly applied

### Universal Type 5850 (Shaft) / 5870 (Hollow shaft), analogue, parallel

#### Terminal assignment (Parallel interface, up to 13 bits and max. 2 options, 17 pin plug):

Sig.:	0V	+UB	1	2	3	4	5	6	7	8	9	10	11	12	13	ST/ VR	VR/ LH		⏏	
Col.:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY PK	RD BU	WH GN	BN GN	WH YE	YE BN	WH GY			
Pin:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		PH	

#### Terminal assignment (Parallel interface, 14 bits and max. 2 options, cable version):

Sig.:	0V	+UB	1	2	3	4	5	6	7	8	9	10	11	12	13	ST/ VR	VR/ LH	14	⏏	
Col.:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY PK	RD BU	WH GN	BN GN	WH YE	YE BN	WH GY	GY BN		

#### Terminal assignment (Parallel interface, 14 bits, 1 option, 17 pin plug):

Sig.:	0 V	+UB	1	2	3	4	5	6	7	8	9	10	11	12	13	ST/ VR/ LH	14	⏏	
Pin:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	PH	

Sig.: 1 = MSB; 2 = MSB-1; 3 = MSB-2 etc.

ST: SET input. The current position value is stored as new zero position.

VR: Up/down input. As long as this input is active, decreasing code values are transmitted when shaft turning clockwise.

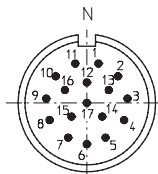
LH: LATCH input. High active. The current position is „frozen“. It is statically available at the parallel output.

PH: Plug housing

Isolate unused outputs before initial start-up.

#### Top view of mating side, male contact base:

17 pin plug



#### Control inputs:

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

By default, if glancing at the shaft side, absolute encoders deliver increasing code values when shaft rotates clockwise (cw). When the shaft rotates counter-clockwise (ccw), the output delivers accordingly decreasing code values. The same applies to models with current interfaces. When the shaft rotates clockwise, the output delivers increasing current values, and decreasing values when it rotates counter-clockwise.

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 supply voltage, 0.4 ms  
for 10-30 V DC supply voltage, 2 ms.

##### 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

##### 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.

For models equipped with a current interface, the analogue output (4 ... 20 mA) will be set accordingly to the value 4 mA.

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.



### Universal Type 5850 (Shaft) / 5870 (Hollow shaft), analogue, parallel

Order code shaft version:

8.5850.XXXX.XXXX

**Type**

**Flange**  
 1 = Clamping flange  
 2 = **Synchronous flange**

**Shaft (ø x L)**  
 1 = ø 6 mm x 10 mm  
 2 = ø 10 mm x 20 mm

**Interface and supply voltage**  
 3 = Parallel with 5 V supply voltage  
 4 = Parallel with 10 ... 30 V supply voltage  
 7 = 4 ... 20 mA with 5 V supply voltage  
 8 = **4 ... 20 mA with 10 ... 30 V supply voltage**

**Options**  
 2 = **SET and V/R**  
 3 = SET and Latch<sup>1)</sup>  
 4 = V/R<sup>1)</sup> and Latch  
 ALARM output on request  
<sup>1)</sup> for version with 14 bits parallel output and 17pin plug

**Code type and division**  
 Gray/Binary  
 250, 360<sup>1)</sup>, 500, 720<sup>1)</sup>, 900, 1000<sup>1)</sup>,  
 1024 (10 Bit)<sup>1)</sup>, 1250, 1440, 1800,  
 2000, 2500, 2880, 3600<sup>1)</sup>, 4000,  
 4096 (12 Bit)<sup>1)</sup>, 5000, 7200,  
 8192 (13 Bit)<sup>1)</sup>, 16384 (14 Bit)<sup>1)</sup>  
 BCD  
 250, 360<sup>1)</sup>, 500, 720<sup>1)</sup>, 900, 1000<sup>1)</sup>,  
 1024 (10 Bit)<sup>1)</sup>, 1250, 1440, 1800, 2000  
 Others on request  
<sup>1)</sup>Preferred types  
 use corresponding table

**Type of connection**  
 1 = Cable axial (1 m PVC-cable)  
 2 = Cable radial(1 m PVC-cable)  
 3 = axial plug without mating connector  
**5 = radial plug without mating connector**

**Accessories:**  
 Corresponding mating connector  
 - with parallel interface, 17 pin  
 Art.No 8.0000.5042.0000

*Preferred types are indicated in bold*

#### Code type and division for encoder with parallel output (Interface and supply voltage, version 3 or 4)

Division	Order code	Order code	Order code
	Gray/Gray-Excess	Binary	BCD
250	E02	B02	D02
<b>360</b>	<b>E03</b>	B03	D03
500	E05	B05	D05
<b>720</b>	<b>E07</b>	B07	D07
900	E09	B09	D09
<b>1000</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	
<b>3600</b>	<b>E36</b>	<b>B36</b>	
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 indicated in bold

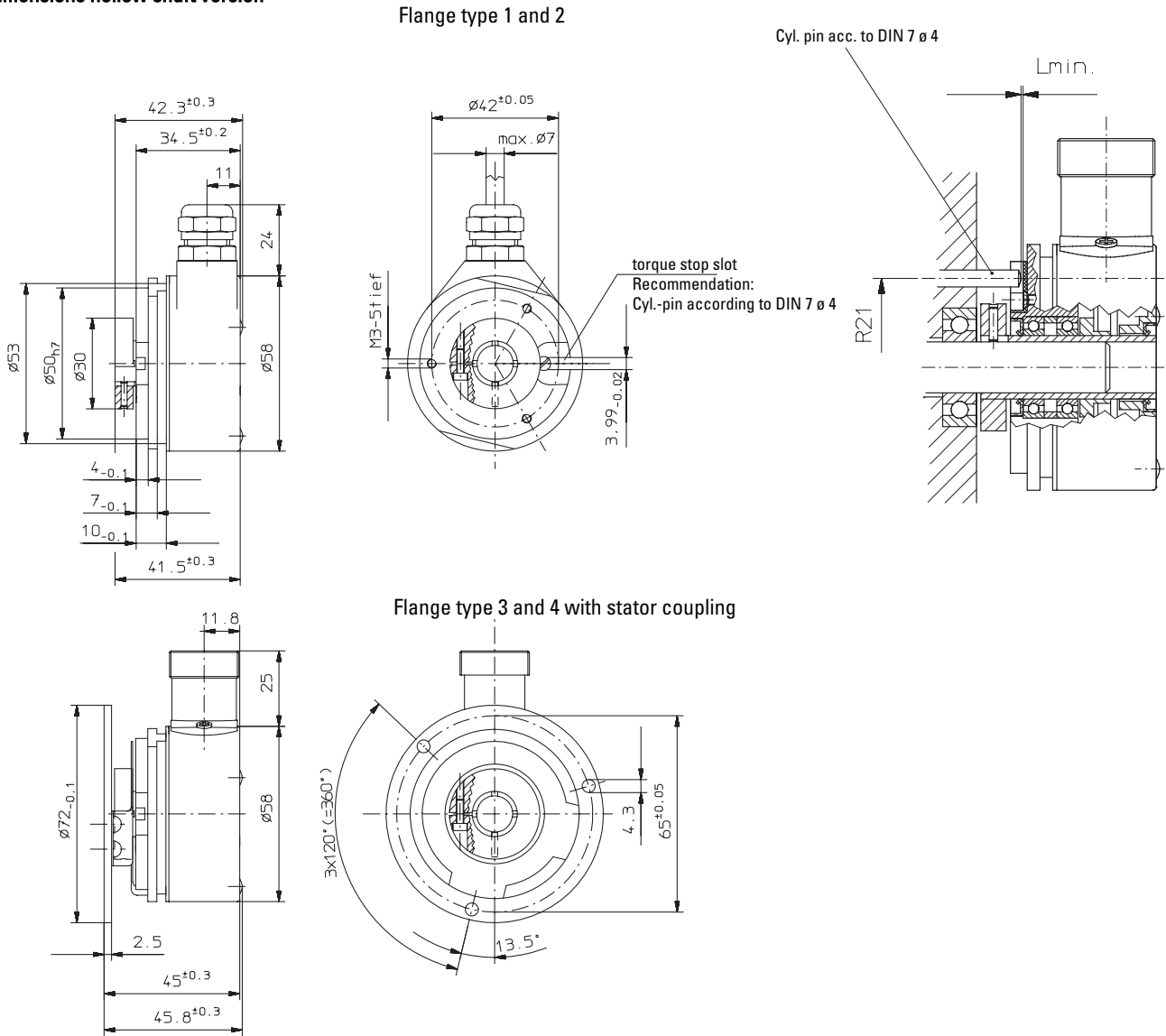
#### Code type and division for encoder with analogue output

Interface and supply voltage, version 7 or 8  
 (4 ... 20 mA)

8192 (13 Bit)	G13
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### Universal Type 5850 (Shaft) / 5870 (Hollow shaft), analogue, parallel

#### Dimensions hollow shaft version



Note: minimum insertion depth 1.5 x D<sub>hollow shaft</sub>

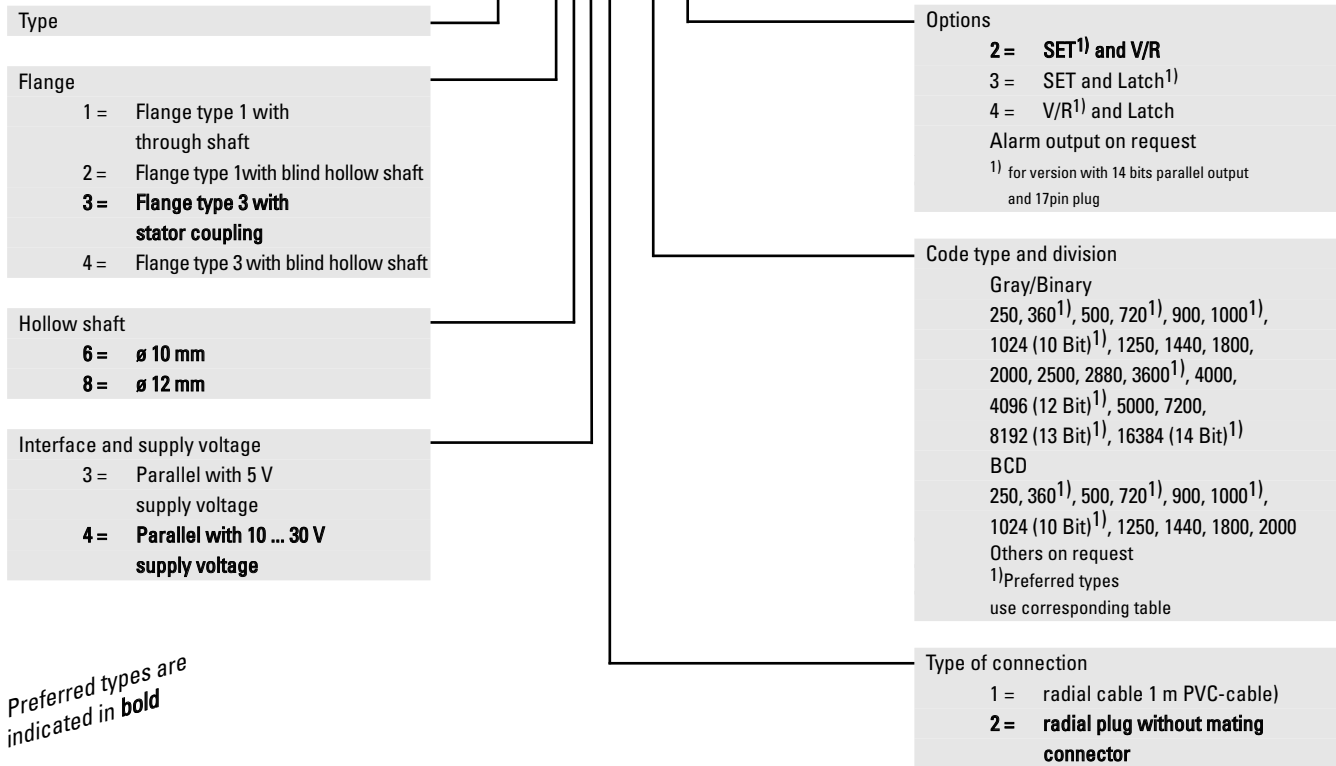
#### Mounting advice:

- 1) The flanges and shafts of the encoder and drive should not both be rigidly coupled together at the same time.
- 2) When mounting a hollow shaft encoder, we recommend using a torque stop pin or a stator coupling.
- 3) When mounting the encoder ensure that the dimension Lmin. is larger than the maximum axial play of the drive. Otherwise there is a danger that the device could mechanically seize up.

### Universal Type 5850 (Shaft) / 5870 (Hollow shaft), analogue, parallel

Order code hollow shaft version:

8.5870.XXXX.XXXX



Preferred types are indicated in **bold**

### Code type and division with parallel output

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

Division	Order code		
	Gray/Gray-Excess	Binary	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</b> (10 Bits)	<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</b> (12 Bits)	<b>G12</b>	<b>B12</b>	
5000	E50	B50	
7200	E72	B72	
<b>8192</b> (13 Bits)	<b>G13</b>	<b>B13</b>	
<b>16384</b> (14 Bit)	<b>G14</b>	<b>B14</b>	

Preferred divisions are indicated in **bold**

### Accessories:

Corresponding mating connector  
- with parallel interface, 17 pin  
Art.No 8.0000.5042.0000

### Mounting set:

Ord.-No. 8.0010.4600.0000  
Stator coupling two wings  
for high dynamic application  
Order-No.: 8.0010.4D00.0000  
Tether arm short  
Order-No.: 8.0010.4R00.0000