

# Rotary Measuring Technology

## Absolute Singleturn Encoder shaft or hollow shaft

### Ex-proof Type 7031 with ATEX



- EEx d IIC T6 approval
- Very compact design, housing  $\varnothing 70$  mm
- Hollow shaft or shaft  $\varnothing 12$  mm
- Divisions: up to 16384 (14 bits)
- Various options (e.g. LATCH, SET...)
- Gray, Binary or BCD code
- SSI, parallel or current (4...20 mA) interface
- Temperature and ageing compensation
- 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.

- **New: 4 ... 20 mA output**

#### Mechanical characteristics:

Speed:	max. 6000 min <sup>-1</sup>
Rotor moment of inertia:	appr. $8 \times 10^{-6}$ kgm <sup>2</sup>
Starting torque:	< 0,05 Nm
Radial load capacity of shaft*:	20 N
Axial load capacity of shaft*:	10 N
Weight:	appr. 0,9 kg
Protection acc. to EN 60 529:	IP 64
Working temperature:	-20° C ... +60 °C
Operating temperature:	-20° C ... +70 °C
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27	1000 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

\*)shaft version: end of the shaft

#### Electrical characteristics:

Interface type:	Synchronous-Serial (SSI)	Synchronous-Serial (SSI)	Parallel	Parallel
Supply voltage (U <sub>B</sub> ):	5 V DC (± 5 %)	10 ... 30 V DC	5 V DC (± 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:	type. 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 μs	max. 1 μs
Fall time t <sub>f</sub> (without cable):	max. 100 ns	max. 100 ns	max. 0,2 μs	max. 1 μs
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

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

#### Note:

All standards for installation of electrical systems in hazardous environment have to be observed.

Manipulations (opening, mechanical treatment etc.) cause the loss of the EX- license, warranty claims will not be accepted and the installer will be responsible for any consequential damages.

### Ex-proof Type 7031 with ATEX

#### Electrical characteristics, current interface 4 ... 20 mA:

Sensor part		
Interface type:	4 ... 20 mA	4 ... 20 mA
Supply voltage (U <sub>B</sub> ):	10 ... 30 V DC	5 V DC
Current consumption typ.:	70 mA	70 mA
(no load) max.:	84 mA	84 mA
Word change frequency	max. 15.000/s	max. 15.000/s

Current loop		
Supply voltage:	10 ... 30 V DC	10 ... 30 V DC
Analogue signal	4 ... 20 mA	4 ... 20 mA
Max. input resistance of the input circuit:	200 Ω	200 Ω
Measuring range:	0 ... 360 °	0 ... 360 °
Max. failure (25 °C):	0,2 °	0,2 °
Resolution	13 Bit	13 Bit
Building up time:	max. 2 ms	max. 2 ms
Temperature coefficient	0,1°/10 K	0,1°/10 K
Current if detector error:	≤ 3 mA	≤ 3 mA
Sensor and current loop are galvanically insulated		
Conforms to CE requirements acc. to EN 61000-6-1, EN 61000-6-4 and EN 61000-6-3		

#### 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. 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.

##### 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 analog 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.

#### 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



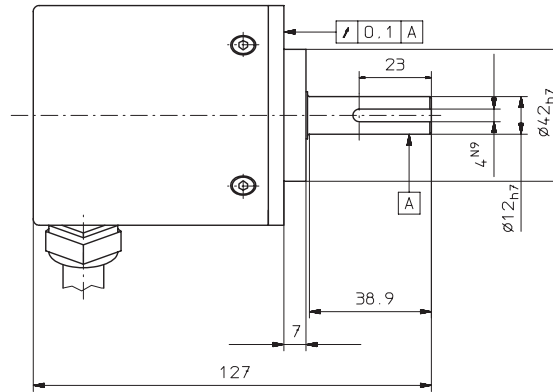
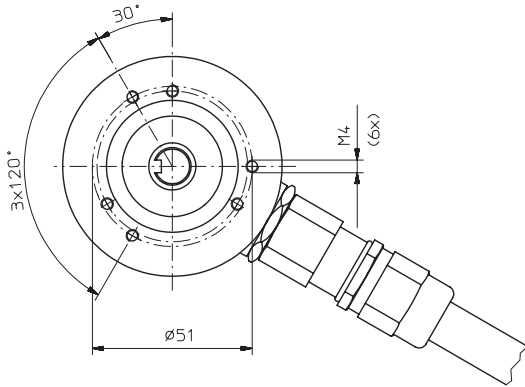
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## Absolute Singleturn Encoder shaft or hollow shaft

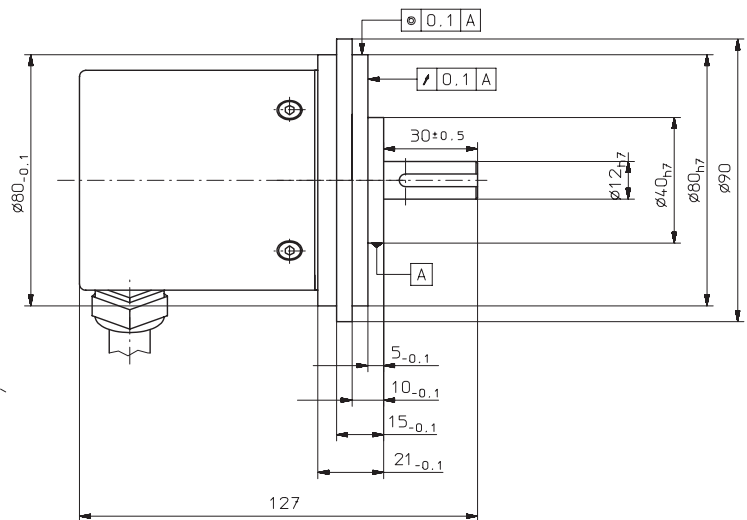
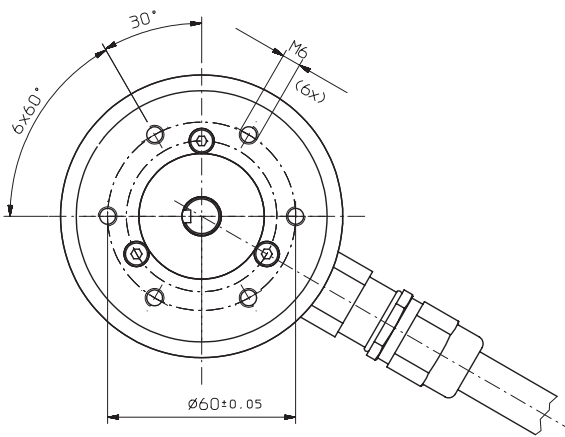
### Ex-proof Type 7031 with ATEX

#### Dimensions:

#### Clamping flange with shaft $\varnothing 12$



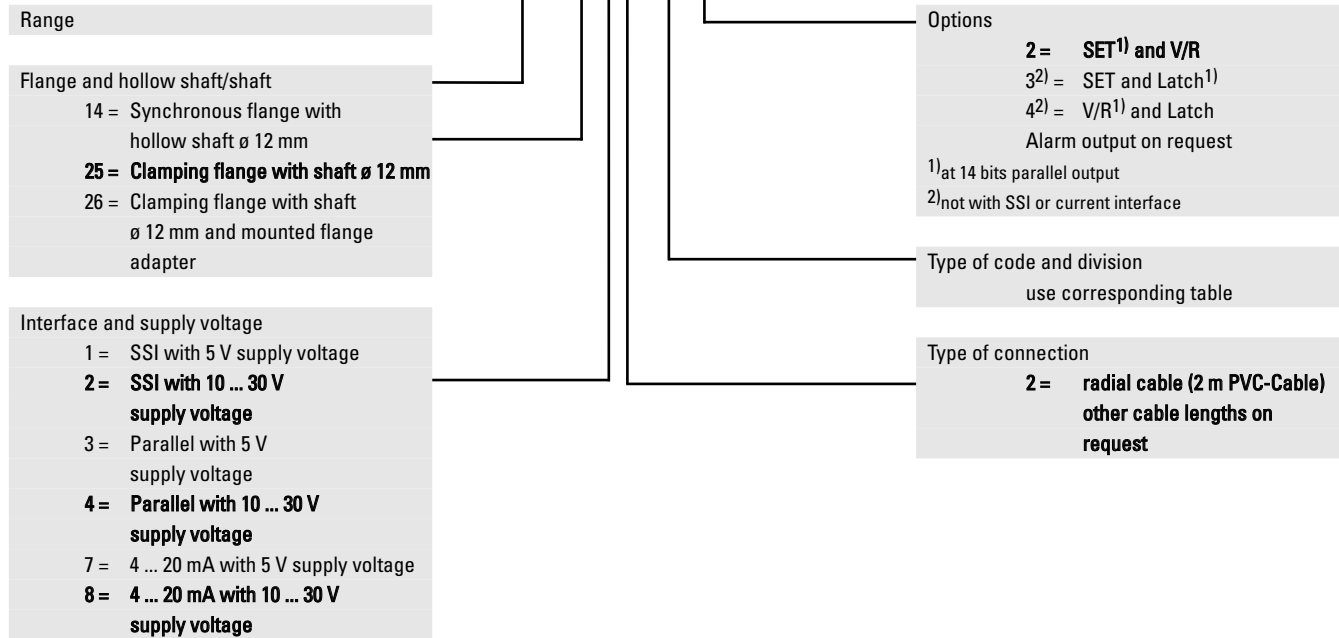
#### Clamping flange with flange adapter and shaft $\varnothing 12$



### Ex-proof Type 7031 with ATEX

Order code:

8.7031.XXXX.XXXX



#### Code type and division

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</b> (10 Bit)	<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</b> (12 Bit)	<b>G12</b>	<b>B12</b>	
5000	E50	B50	
7200	E72	B72	
<b>8192</b> (13 Bit)	<b>G13</b>	<b>B13</b>	
<b>16384</b> (14 Bit)	<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:

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

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

Interface and supply voltage, version 7 or 8:

8192 (13 Bit)	G13
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