

# Rotary Measuring Technology

## Incremental shaft encoders



### Heavy duty Type 9000 / 9000 stainless steel



- Highly flexible, chemical resistant PUR cable (stands up to constant flexing at -20 °C ... + 70 °C)
- Temperature and ageing compensation
- Large temperature range
- Short-circuit proof outputs

#### Type heavy duty:

- Designed for heavy duty
  - Sealed connector
- Applications: steel industry, forestry, road construction and wood industry

#### Type stainless steel:

- Stainless steel housing and shaft
  - Precision graduation at high resolution
- Applications: Food- and pharmaceutical industry, automatic packaging machines, bottling plants, chemical process technology

#### Mechanical characteristics:

Speed:	max. 6000 min <sup>-1</sup>
Rotor moment of inertia:	approx. 15 x 10 <sup>-6</sup> kgm <sup>2</sup>
Starting torque:	< 0.05 Nm
Radial load capacity of shaft*:	140 N
Axial load capacity of shaft*:	70 N
Weight:	approx. 1.2 kg stainless steel: 2.8 kg

Protection acc. to EN 60 529:	IP 66
EX approval for hazardous areas:	optional zone 2 and 22
Working temperature:	-20° C ... +85 °C <sup>1)2)</sup>
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-7	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

<sup>1)</sup> 80 °C with cable

<sup>2)</sup> Non-condensing

#### Electrical characteristics:

Output circuit:	RS 422 (TTL-compatible)	Push-pull
Supply voltage:	5 V (±5 %) or 10 ... 30 V DC	10 ... 30 V DC
Power consumption (no load) without inverted signal:	-	typ. 55 mA / max. 125 mA
Power consumption (no load) with inverted signals:	typ. 40 mA / max. 90 mA	typ. 80 mA / max. 150 mA
Permissible load/channel:	max. ±20 mA	max. ±30 mA
Pulse frequency:	max. 300 kHz	max. 300 kHz
Signal level high:	min. 2.5 V	min. U <sub>B</sub> -2.5 V
Signal level low:	max. 0.5 V	max. 2.0 V
Rise time t <sub>r</sub> :	max. 200 ns	max. 1 µs
Fall time t <sub>f</sub> :	max. 200 ns	max. 1 µs
Short circuit proof outputs: <sup>1)</sup>	yes <sup>2)</sup>	yes
Reverse connection protection at U <sub>B</sub> :	5 V: no, 10 ... 30 V: yes	yes

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 correctly applied

<sup>2)</sup> Only one channel allowed to be shorted-out:

(If U<sub>B</sub>=5 V, short-circuit to channel, 0 V, or +U<sub>B</sub> is permitted)

(If U<sub>B</sub>=5-30 V, short-circuit to channel or 0 V is permitted)

#### Terminal assignment

Signal:	0V	0V Sensor <sup>2)</sup>	+U <sub>B</sub>	+U <sub>B</sub> Sensor <sup>2)</sup>	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	Shield
Colour:	WH	WH BN	0,5 mm <sup>2</sup>	BN	GN	YE	GY	PK	BU	RD	

<sup>1)</sup> PH = Shield is attached to connector housing

<sup>2)</sup> Sensor cables are connected to the supply voltage internally if long feeder cables are involved they can be used to adjust or control the voltage at the encoder

- If sensor cables are not in use, they have to be isolated or 0 V Sensor has to be connected to 0 V and U<sub>B</sub>Sensor has to be connected to U<sub>B</sub>

- Using RS 422 outputs and long cable distances, a wave impedance has to be applied at each cable end.

Isolate unused outputs before initial startup.

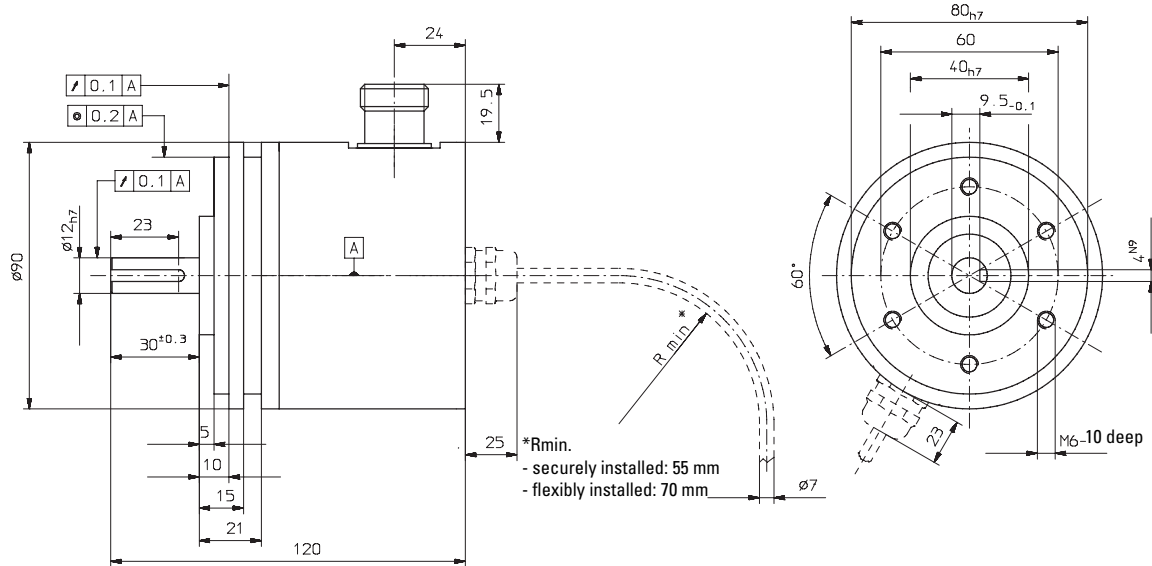
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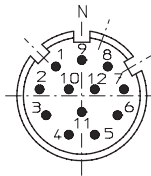
Dimensions:



Incremental Encoders

Top view of mating side, male contact base:

12 pin plug



Order code:

8.9000.11X1.XXXX.XXXX

<p>Type</p>	<p>Version</p> <p>0000 = Standard 5007 = Stainless steel version</p>
<p>Output circuit and voltage display</p> <p><b>4 = RS 422 (with inverted signal)</b> 5 V supply voltage</p> <p>5 = RS 422 (with inverted signal) 10 ... 30 V supply voltage</p> <p><b>6 = Push-pull (with inverted signal)</b> 10 .. 30 V supply voltage</p> <p>7 = Push-pull (without inverted signal) 10 ... 30 V supply voltage</p>	<p>Pulse rate</p> <p>50, 500, 1000, 1024, 2000, 2048, 2500, 3000, 4096, 5000 (e.g. 250 pulses=&gt; 0250) Other pulse rates on request</p>
	<p>Type of connection</p> <p>1 = Cable axial (1 m PUR-cable)</p> <p><b>2* = Cable radial (1 m PUR-cable)</b></p> <p>3* = axial 12 pin plug axial without mating connector</p> <p><b>5* = radial 12 pin plug without mating connector</b></p>

**Accessories:**

Cables and connectors, also pre-assembled, can be found in the chapter Connection Technology  
Mounting attachments and couplings can be found in the chapter Accessories

*Preferred types are indicated in bold*

\*not with stainless steel version

**Accessories:**

Corresponding mating connector to connection type of 3 or 5  
Order No. 8.0000.5012.0000