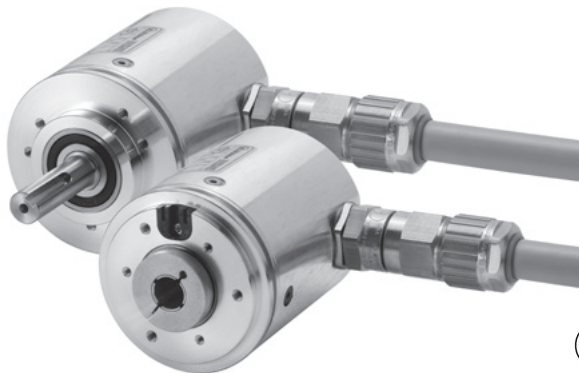


Absolute Encoders - Singleturn

ATEX, optical	7031 (Shaft / Hollow shaft)	SSI, Parallel, Analogue
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The singleturn encoder 7031 with parallel, 4 ... 20 mA or SSI interface and optical sensor technology is available in both shaft and hollow shaft versions.

It offers a maximum resolution of 14 bits, divided over 360°.

Ex approval	Temperature -20° + 60°	Shock / vibration resistant	Short-circuit proof	Reverse polarity protection

Safe

- Version "flameproof-enclosure": approval zones 1, 2 and 21, 22
- Zones 1, 2 and 21, 22:

Adaptable

- Parallel, 4 ... 20 mA or SSI interface
- Gray, Binary or BCD code for parallel interface
- Various input options

Absolute Encoders Singleturn

Order code	8.7031	. XX X 2 . XXX X
Shaft / Hollow shaft	Type	<div style="display: flex; justify-content: space-around; font-size: small;"> a b c d e </div>

a Flange and hollow shaft or shaft
 14 = synchro flange with hollow shaft ø 12 mm
 25 = clamping flange with shaft ø 12 mm
 26 = clamping flange with shaft ø 12 mm and screwed-on adapter

b Output circuit / Power supply
 1 = SSI / 5 V DC
 2 = SSI / 10 ... 30 V DC
 3 = Parallel / 5 V DC
 4 = Parallel / 10 ... 30 V DC
 7 = Analog 4 ... 20 mA / 5 V DC
 8 = Analog 4 ... 20 mA / 10 ... 30 V DC

c Cable length
 2 = radial cable (2 m PVC cable)
 other cable lengths on request

d Code type and Division
 see table 1 (for interface 3 and 4, Parallel)
 see table 2 (for interface 1 and 2, SSI)
 see table 3 (for interface 7 and 8, Analogue 4 ... 20 mA)

e Options
 2 = SET ¹⁾ and V/R
 3²⁾ = SET and Latch ¹⁾
 4²⁾ = V/R ¹⁾ and Latch

Table 1: Code type and divisions for encoders with parallel output																			Interface and Supply Voltage, version 3 or 4 (Parallel)			
Division	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 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

Table 3: Code type and Analogue output	
Interface / Power supply 7 or 8	
Division	8192 13 bit
Order code	G13

1) For parallel version, 14 bit and pin connector
 2) Not with SSI interface

Absolute Encoders - Singleturn

ATEX, optical	7031 (Shaft / Hollow shaft)	SSI, Parallel, Analogue
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Mounting accessory for shaft encoders

Coupling	Bellows coupling ø 19 mm for shaft 12 mm	8.0000.1101.1212
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Further accessories can be found in the Accessories section of our main catalogue or in the Accessories area of our website at: www.kuebler.com/accessories.
 Additional connectors can be found in the Connection Technology section of our main catalogue or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

Mechanical characteristics				
Speed	max. 6000 min ⁻¹		Protection acc. to EN 60 529	IP65
Rotor moment of inertia	approx. 8 x 10 ⁻⁶ kgm ²		Working temperature range	-20°C ... +60°C ²⁾
Starting torque	< 0.05 Nm		Material	shaft stainless steel
Load capacity of shaft ¹⁾	radial	80 N	Shock resistance acc. EN 60068-2-27	5000 m/s ² , 6 ms
	axial	40 N		
Weight	approx. 0.9 kg		Vibration resistance acc. EN 60068-2-6	100 m/s ² , 10...2000 Hz

Electrical characteristics				
Interface type	Synchronous serial (SSI)	Synchronous serial (SSI)	Parallel	Parallel
Power supply (U_B)	5 V DC (± 5 %)	10 ... 30 V DC	5 V DC (± 5%)	10 ... 30 V DC
Output driver	RS485	RS485	Push-Pull	Push-Pull
Power consumption (no load)	typ. 89 mA	89 mA	109 mA	109 mA
	max. 138 mA	138 mA	169 mA	169 mA
Permissible load / channel	max. +/- 20 mA	max. +/- 20 mA	max. +/- 10 mA	max. +/- 10 mA
Update rate	max. 15.000/s	max. 15.000/s	40.000/s	40.000/s
SSI clock 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 _B - 2.8 V
Signal level low	(I _{Load} = 20 mA)	typ. 1.3 V	–	–
	(I _{Load} = 10 mA)	–	–	max. 1.8 V
	(I _{Load} = 1 mA)	–	–	max. 0.3 V
Rising edge time t_r (without cable)	max. 100 ns	max. 100 ns	max. 0.2 µs	max. 1 µs
Falling edge time t_f (without cable)	max. 100 ns	max. 100 ns	max. 0.2 µs	max. 1 µs
Short circuit proof outputs ³⁾	yes	yes ⁴⁾	yes	yes
Reverse connection of the supply voltage	no	yes	no	yes
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3			
RoHS compliant acc. to	EU guideline 2002/95/EG			

Electrical characteristics current loop interface 4 ... 20 mA

Sensor component	Current Loop	
Interface type	4 ... 20 mA	4 ... 20 mA
Supply voltage (U_B)	0 ... 30 V DC	5 V DC
Power consumption (no load)	typ. 70 mA	70 mA
	max. 84 mA	84 mA
Update rate	max. 15.000/s	max. 15.000/s

Note:
 All current standards for the installation of electrical systems in hazardous environments must be observed!
 Any manipulation of the encoder (opening, mechanical treatment etc.) will lead to the loss of the EX certification and warranty claims will not be accepted!
 The installer will be responsible for any consequential damages.

Power supply (current loop)	10 ... 30 V DC	10 ... 30 V DC
Analogue signal	4 ... 20 mA	4 ... 20 mA
max. input resistance of the input circuit	200 W	200 W
Measuring range	0 ... 360°	0 ... 360°
Max. error (25°C)	0.2°	0.2°
Resolution	13 bit	13 bit
Setting time	max. 2 ms	max. 2 ms
Temperature coefficient	0.1°/10 K	0.1°/10 K
Current with scan error	≤ 3 mA	≤ 3 mA
Sensor component and current loop are galvanically isolated		
CE compliant acc. to EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3		
RoHS compliant acc. to EU guideline 2002/95/EG		

1) For parallel version, 14 bit and 17pin connector
 2) Not with SSI interface
 3) If supply voltage U_B correctly applied.
 4) Only one channel allowed to be shorted-out:
 If U_B = 5 V short circuit to channel, 0 V, or +U_B is permitted.
 If U_B = 5 ... 30 V short circuit to channel or 0 V is permitted.

Absolute Encoders - Singleturn

ATEX, optical	7031 (Shaft / Hollow shaft)	SSI, Parallel, Analogue
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Control inputs

Switching levels of the control inputs

Supply voltage	5 V DC	10 ... 30 V DC
Switching level	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. 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 (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.

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

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 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 remains active (high).

The response time is :

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

Terminal assignment SSI - Synchronous serial interface

Signal	0V	+U _B	+T	-T	+D	-D	ST	VR					⊥
Cable colour	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY PK	RD BU	PH

Terminal assignment parallel interface 14 bit and max. 2 options

Signal	0V	+U _B	1	2	3	4	5	6	7	8	9	10	11	12	13	ST/VR	VR/LH	14	
Cable colour	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	PH

Terminal assignment analogue interface 4 ... 20 mA

Signal	0V	+U _B	I+	I-	ST	VR	⊥
Cable colour	WH	BN	GN	YE	GY	PK	PH

- T: Clock signal
- D: Data signal
- ST: SSI / Parallel interface: the current position value is stored as new zero position.
Analogue interface: measured value set to 4 mA
- VR: Up/down input. As long as this input is active, decreasing code values are transmitted when shaft turning clockwise.
- Signal: 1 =MSB; 2 = MSB-1; 3 = MSB-2 etc.
- LH: LATCH input. Active HIGH. The current position is saved and is statically available at the output.
- +I: Current loop input
- I: Current loop output
- PH: Plug housing

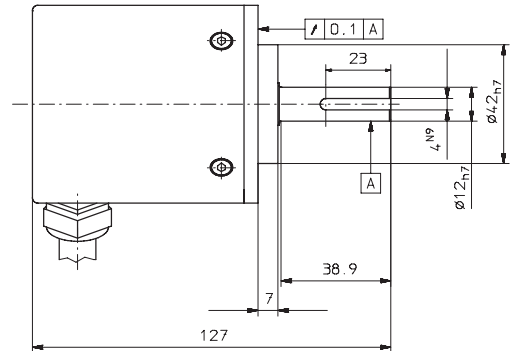
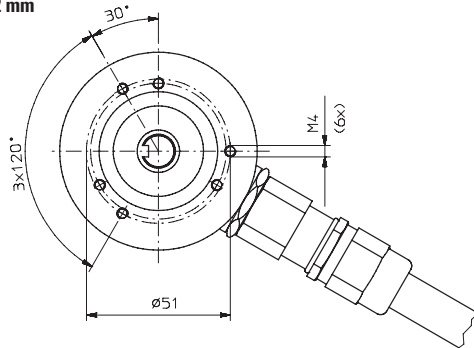
Isolate unused outputs before initial start-up.

Absolute Encoders - Singleturn

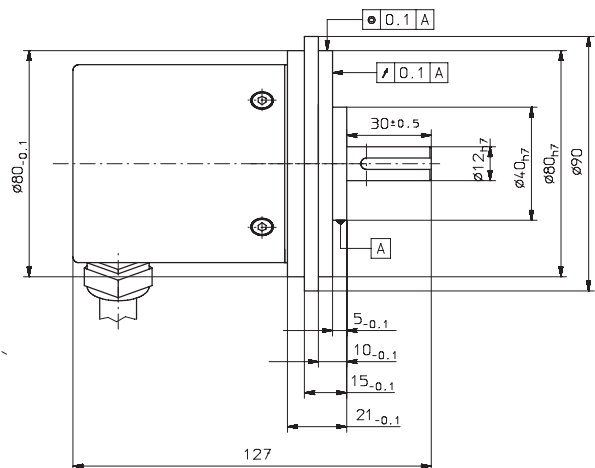
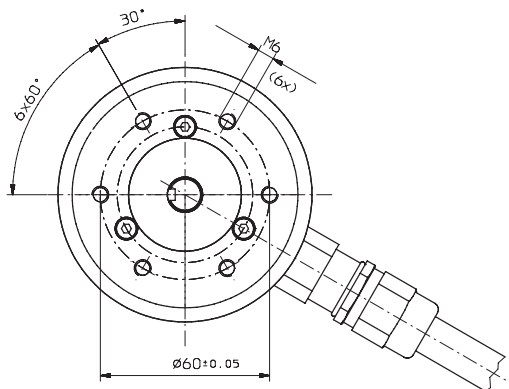
ATEX, optical	7031 (Shaft / Hollow shaft)	SSI, Parallel, Analogue
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Dimensions shaft version

Clamping flange with shaft \varnothing 12 mm

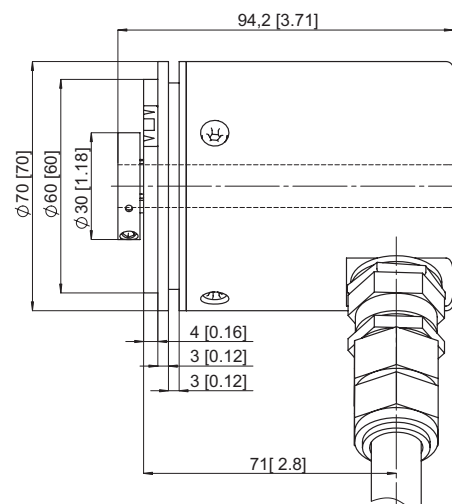
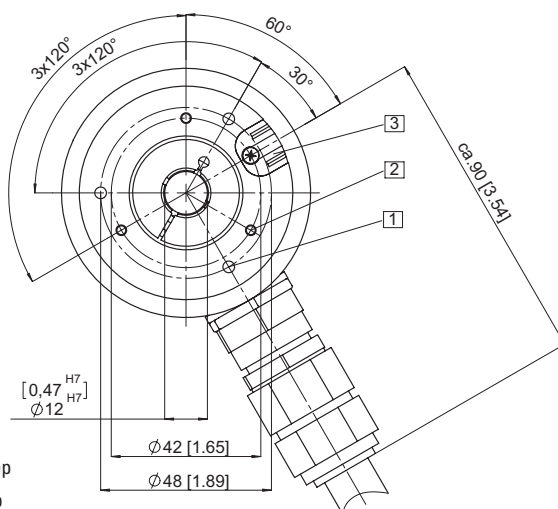


Clamping flange with shaft \varnothing 12 mm and screwed-on flange adapter



Dimensions hollow shaft version

Synchronous flange with hollow shaft \varnothing 12 mm



1 3 x M4, 6 [0.24] deep

2 3 x M3, 5 [0.2] deep

3 Torque stop slot,

Recommendation: Cylindrical pin DIN7, \varnothing 4 mm