

Rotary Measuring Technology

Absolute Singleturn Encoder shaft

MICRONOR
automation components

Ex-proof ESA 70EX with ATEX

- Our ATEX encoders now also carry approval for Dust
- 'Flameproof-enclosure' type of construction with approval for Zone 1 and 21
- ExII2GExdIICT6 and ExII2DIP6xT85°C
- Shaft $\varnothing$ 12 mm

One type for every situation:

- Zone 1, 2 and 21, 22:
Ex II 2G EEx d II C T6 and
Ex II 2D IP6x T85°C
- SSI, Parallel and Analogue output versions

Compact:

- Installation depth of only 94 mm
for minimal installation depth



Safe:

- Short-circuit proof outputs
- Reverse connection protection on inputs
- Over-voltage protection

Mechanical characteristics:

Speed:	max. 6000 min ⁻¹
Rotor moment of inertia:	approx. 8×10^{-6} kgm ²
Starting torque:	< 0.05 Nm
Radial load capacity of shaft*:	20 N
Axial load capacity of shaft*:	10 N
Weight:	approx. 0.9 kg
Protection acc. to EN 60 529:	IP 65
Working temperature:	-20° C ... +60 °C ¹⁾
Operating temperature:	-20° C ... +70 °C ¹⁾
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27	1000 m/s ² , 6 ms
Vibration resistance acc. to DIN-IEC 68-2-6:	100 m/s ² , 10...2000 Hz

*) Shaft version: end of the shaft ¹⁾ Non-condensing

Pulse rates 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)

Electrical characteristics:

Interface type:	Synchronous Serial (SSI)	Synchronous Serial (SSI)	Parallel	Parallel
Supply voltage (U _B):	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:	type. 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	typ. 1.3 V	–	–
(I _{Load} = 10 mA):	–	–	max. 1.5 V	max. 1.8 V
(I _{Load} = 1 mA):	–	–	max. 0.3 V	–
Rise time t _r (without cable):	max. 100 ns	max. 100 ns	max. 0.2 μ s	max. 1 μ s
Fall time t _f (without cable):	max. 100 ns	max. 100 ns	max. 0.2 μ s	max. 1 μ s
Short circuit proof outputs ¹⁾ :	yes	yes ²⁾	yes	yes
Reverse connection protection at U _B :	no	yes	no	yes
Conforms to CE requirements acc. to EN 61000-6-1, EN 61000-6-4 and EN 61000-6-3				

¹⁾ If supply voltage correctly applied

²⁾ 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)

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.

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

Sensor part		
Interface type:	4 ... 20 mA	4 ... 20 mA
Supply voltage (U _B):	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	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

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. If 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 delivers decreasing code/current values while counter-clockwise rotation delivers 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 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.

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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Terminal assignment (SSI interface):

Sig.:	0V	+UB	+T	-T	+D	-D	ST	VR						
Col.:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY PK	RD BU	PH	

- T: Clock signal
D: Data signal
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.
PH: Plug housing
Insulate unused outputs before initial start-up.

Terminal assignment (Parallel interface, up to 14 bits and max. 2 options):

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	PH

- 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
Insulate unused outputs before initial start-up.

Terminal assignment (Current interface 4..20 mA):

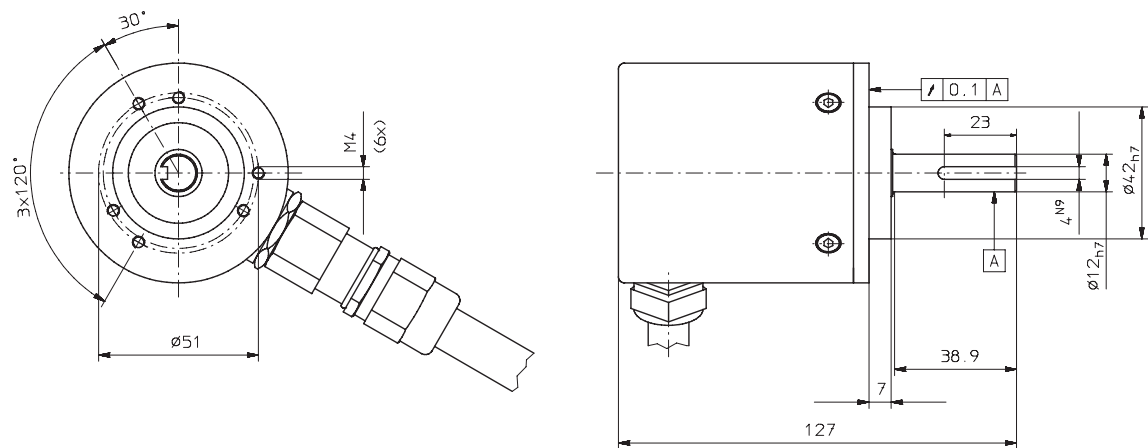
Sig.	0V	+UB	I+	I-	ST	VR		
Col.:	WH	BN	GN	YE	GY	PK		PH

- I+: Input of the current loop
I-: Output of the current loop
ST: SET input. The output current is set to 4 mA.
VR: Up/down input. As long as this input is active, decreasing current values are transmitted when shaft turning clockwise.
PH: Plug housing
Insulate unused outputs before initial start-up.

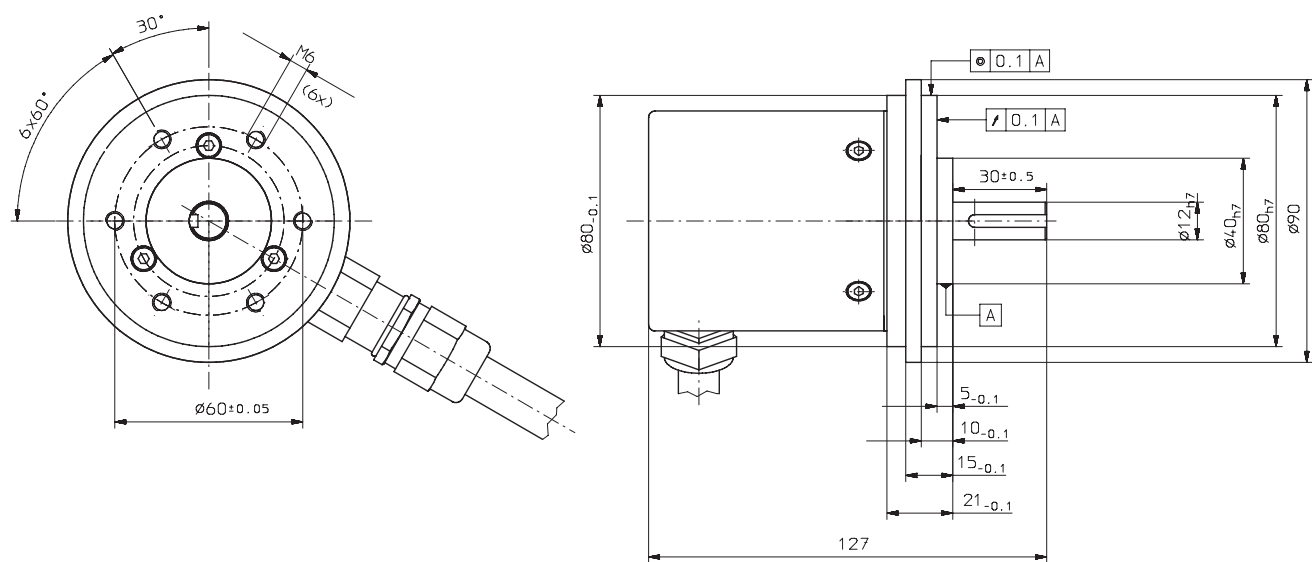
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Dimensions:

Clamping bracket with shaft $\varnothing 12$



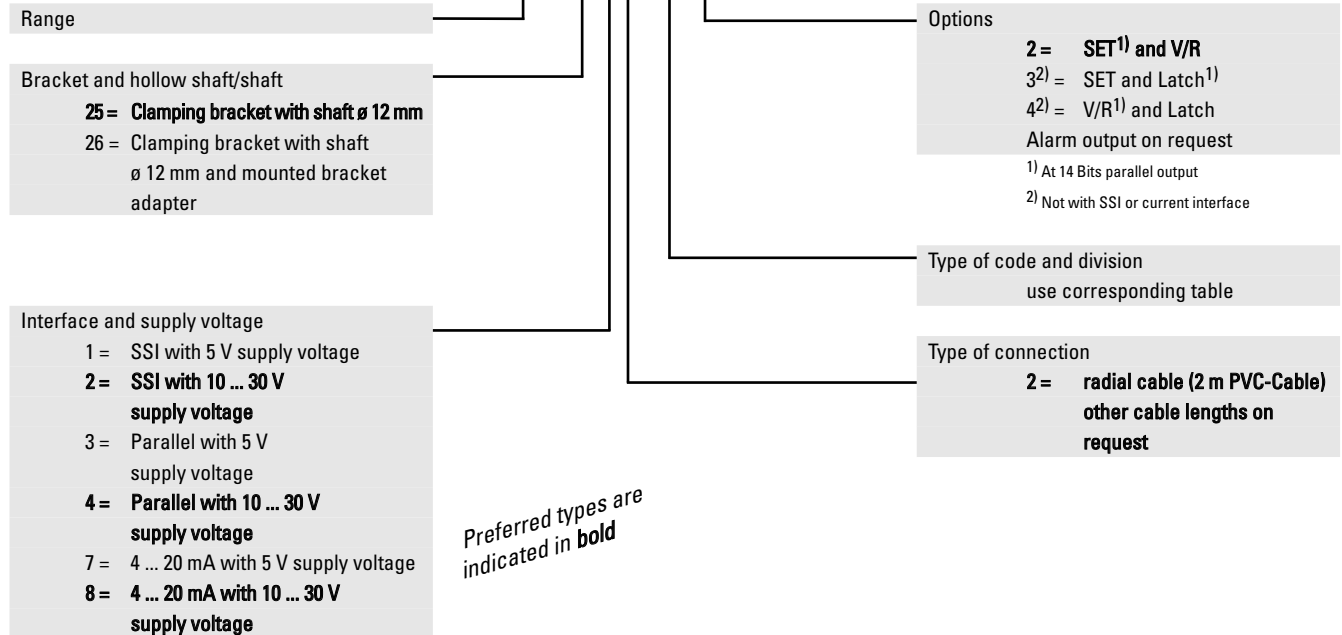
Clamping bracket with bracket adapter and shaft $\varnothing 12$



Ex-proof ESA 70EX with ATEX

Order code:

ESA 70EX.XXXX.XXXX



Code type and division

Interface and supply voltage, version 3 or 4:

Division	Order code Gray/Gray-Excess	Order code Binary	Order code BCD
250	E02	B02	D02
360	E03	B03	D03
500	E05	B05	D05
720	E07	B07	D07
900	E09	B09	D09
1000	E01	B01	D01
1024 (10 Bit)	G10	B10	D10
1250	E12	BA2	DA2
1440	E14	BA1	DA1
1800	E18	B18	D18
2000	E20	B20	D20
2500	E25	B25	
2880	E28	B28	
3600	E36	B36	
4000	E40	B40	
4096 (12 Bit)	G12	B12	
5000	E50	B50	
7200	E72	B72	
8192 (13 Bit)	G13	B13	
16384 (14 Bit)	G14	B14	

Preferred divisions are bold

Code type and division for encoder with SSI-output

Interface and supply voltage, version 1 or 2:

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

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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