



INCREMENTAL ENCODER

**DESIGNED IN ORDER TO CONTROL THE POSITION
AND THE ANGULAR SPEED OF MOVING MECHANICAL AXES**

Main application field are: wood-working machinery, textile machines, CNC machinery, and so forth.

ELTRA brand encoders offers a complete range of encoders with resolution up to 24000 pulses per turn (ppr) with a wide flange choice and several electrical

interfaces. Shaft, blind hollow shaft and through hollow shaft up to a diameter of 60 mm (2.36") are available.

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 24000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
Max output frequency	250 kHz up to 6000 ppr 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2015/863/EU directive
UL / CSA	certificate n. E212495

EL SERIES RESOLUTIONS

1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 25 - 30 - 32 - 40 - 50 - 60 - 70 - 80 - 90 - 160 - 180 - 350 - 450 - 660 - 700 - 750 - 1500

ER SERIES RESOLUTIONS

100 - 120 - 128 - 150 - 200 - 240 - 250 - 256 - 300 - **360** - 400 - 480 - **500** - **512** - 600 - 625 - **720** - 800 - 900 - **1000** - **1024** - 1200 - 1250 - 1440 - 1600 - 1800 - **2000** - **2048** - **2500** - 3000 - **3600** - 4000 - 4096 - **5000** - 6000 - **7200** - 8000 - 8192 - 9000 - **10000** - 10240 - 12000 - **14400** - 16000 - 16384 - 18000 - **20000** - 20480 - 24000

please directly contact our offices for other pulses, preferred resolutions in bold

CONNECTIONS

Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6	F	4	1	10	1	8
A+	green	green	3	1	C	A	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	C	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	B	2	B	1	4	8	4	3
B-	/	orange	/	5	/	E	8	H	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
≡	shield	shield	7	7	G	G	10	J	housing	housing	9	/	/

<p>J connector (7 pin) JIS-C-5432 Size 16 solder side view FV</p>	<p>M connector (7 pin) Amphenol MS3102-E-16-S solder side view FV</p>	<p>M12 connector (5 pin) M12 A coded solder side view FV</p>	<p>C connector (5 pin) IEC 60130-9 solder side view FV</p>	<p>H connector (12 pin) - M23 CCW Hummel 7.410.000000 - 7.002.912.603 solder side view FV</p>
<p>J connector (10 pin) JIS-C-5432 Size 16 solder side view FV</p>	<p>M connector (10 pin) Amphenol MS3102-E-18-1 solder side view FV</p>	<p>M12 connector (8 pin) M12 A coded solder side view FV</p>	<p>C connector (8 pin) IEC 60130-9 solder side view FV</p>	

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 8 / 9,52 (3/8") / 10 mm
Enclosure rating	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
Max rotation speed	IP 54 - 6000 rpm IP 66 - EL 3000 rpm / 60° C ER 3000 rpm / 70° C - 2000 rpm / 85° C
Max shaft load³	200 N axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) IP 54 < 0,06 Nm (8,50 Ozin) IP 66
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series
Storage temperature⁵	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed

MAIN FEATURES

Explosion proof encoder for applications within explosive and hazardous areas.

- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- 10 mm solid shaft diameter
- Mounting by synchronous or centering square flange

EX CLASSIFICATION

It has been assured with EC-TYPE Examination Certificate CESI 04 ATEX 082 that the EX 80 comply with essential health and safety requirements according to

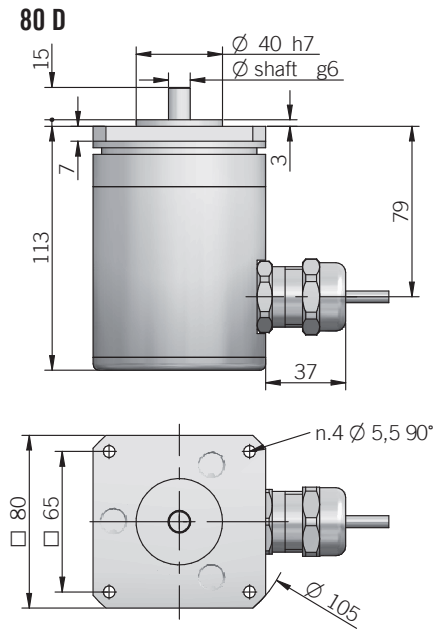
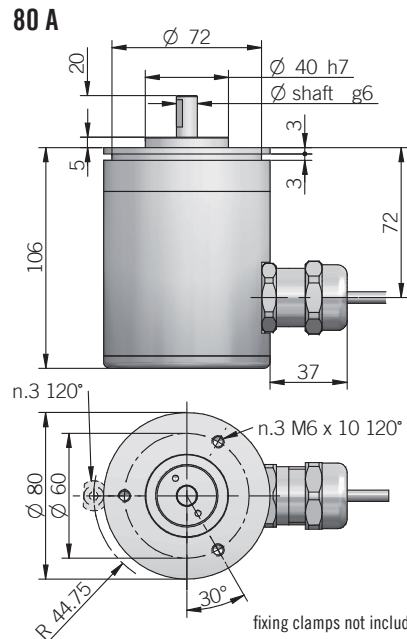
- EN 60079-0:2012+A11:2013
- EN 60079-1:2014
- EN 60079-31:2014

The UE declaration is available on www.eltra.it



ORDERING CODE

EX	80A	500	S	5/28	P	10	X	3	PR	.XXX
SERIES explosion proof encoder series EX										
MODEL synchronous flange ø 40 mm 80A centering square flange ø 40 mm 80D										
RESOLUTION ppr from 100 to 10000 refer to the available pulses list										
ZERO PULSE without zero pulse S with zero pulse Z										
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28										
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28V - output RS-422 RS										
SHAFT DIAMETER mm 10										
ENCLOSURE RATING IP 65 X										
MAX ROTATION SPEED 3000 rpm 3										
OUTPUT TYPE radial cable (standard length 1,5 m) PR preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)										
VARIANT custom version XXX										



dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 100 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Current consumption without load	80 mA max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
Max output frequency	250 kHz up to 6000 ppr 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2015/863/EU directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed

EPL MARKING	
II 2GD	II: group II: different than mines
Ex d IIC T6 Gb	2: category 2: high level of protection
Ex tb IIIC T85°C Db	GD: areas containing gas (G) and dust (D)
IP 65	Ex d: flameproof enclosure for explosive atmospheres with gases, vapours and mists
	IIC: group of gas IIC
	T6: max surface temperature +85°C of the device for atmospheres with gas
	Gb: product with a high level of protection
	Ex tb: flameproof enclosure safety type
	IIIC: group of dust combustibles IIC
	T85°C: max surface temperature +85°C of the device in the presence of dust
	Db: product with a high level of protection

MECHANICAL SPECIFICATIONS	
Shaft diameter	Ø 10 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load³	200 N axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,06 Nm (8,50 Ozin)
Bearing stage material	anodized aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	anodized aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-20° ... +50°C (-4° ... +122°F)
Storage temperature⁵	-20° ... +70°C (-4° ... +158°F)
Weight	1200 g (42,33 oz)

CONNECTIONS		
Function	Cable C / P	Cable L / RS
+V DC	brown	brown
0 V	gray	gray
A+	green	green
A-	/	red
B+	yellow	yellow
B-	/	pink
Z+	white	blue
Z-	/	white
⊥	shield	shield

RESOLUTIONS	
100 - 200 - 360 - 400 - 500 - 1000 - 1024 - 1440 - 2000 - 2048 - 2500 - 3000 - 3600 - 4000 - 4096 - 5000 - 6000 - 7200 - 8000 - 8192 - 9000 - 10000	
please directly contact our offices for other pulses, preferred resolutions in bold	

MAIN FEATURES

Encoder series for harsh environments with high mechanical resistance requirements. Model 90 can be mounted by flanges or fixing clamps; model 115 has a tachometer generator REO-444 type compatible plug with optional centrifugal relay.

- 3 channel encoder (A / B / Z) up to 2048 ppr
- Redundancy encoder with double output and / or double resolutions
- Power supply up to +24 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange
- Model 115R available with centrifugal relay



ORDERING CODE	EH	90A	500	S	8/24	P	1000	Z	8/24	P	8	X	6	P	R	.XXX	+ 2000
<p>SERIES incremental encoder series EH</p> <p>MODEL synchronous flange Ø 40 mm 90A flange REO-444 115A flange REO-444 with centrifugal relay 115R</p> <p>RESOLUTION ppr from 200 to 2048 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY (with L electrical interface) 5 V DC 5 8 ... 24 V DC 8/24</p> <p>ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L</p> <p>RESOLUTION</p> <p>ZERO PULSE</p> <p>POWER SUPPLY</p> <p>ELECTRICAL INTERFACE</p> <p>SHAFT DIAMETER (mod. 90A) mm 8 (mod. 90A) (3/8") mm 9.52 mm 10 (mod. 115A - 115R) mm 11</p> <p>ENCLOSURE RATING IP 54 X (mod. 90) IP 66 S</p> <p>MAX ROTATION SPEED (IP 66) 3000 rpm 3 (IP 54) 6000 rpm 6</p> <p>OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL connector M JIS-C-5432 connector J female connector included, without female please add 162 as variant code</p> <p>DIRECTION TYPE axial A radial R</p> <p>VARIANT custom version XXX</p> <p>RELAY INTERVENTION SPEED (mod. 115R) from 600 to 4300 for other speeds please contact our offices directly</p>																	
<p>To be indicated only in the models 90A - 115A for double electronics and double resolution See examples:</p> <p>Double resolution and double electronics: EH90A1024Z5L-2048Z8/24L10X... Double resolution and same electronics: EH90A1024-2048Z5L10X... Same resolution and double electronics: EH90A1024Z5L-Z8/24L10X...</p>																	

MAIN FEATURES

Contactless encoder with through hollow shaft up to 28 mm. The compact size (only 11 mm thickness), the high IP grade and resistance to vibrations make this product an excellent solutions for heavy duty applications.

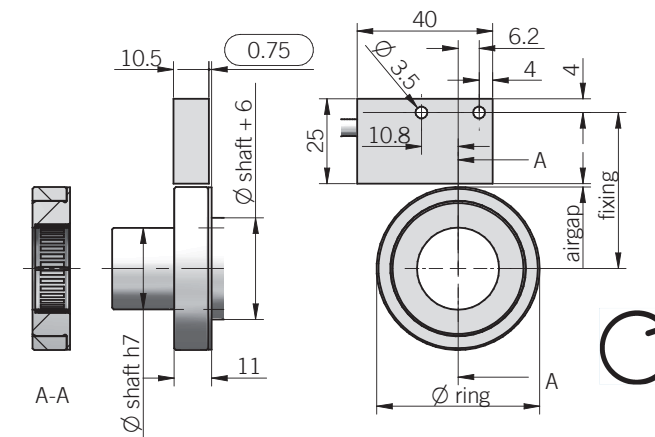
- 2 channel encoder (A / B) up to 4096 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 350 kHz output frequency
- Cable output, connector available on cable end
- Through hollow shaft diameter up to 28 mm
- Shaft mounting by tolerance ring
- Wide operating temperature -20° ... +85°C (-4° ... +185°F)



ORDERING CODE

ETMR	A	4096	S	5	L	9	S	8	PR	.XXX
<p>SERIES incremental encoder with magnetic ring ETMR</p> <p>MODEL bore diameter from 9 ... 19 mm A bore diameter 24 / 28 mm B</p> <p>RESOLUTION ppr from 64 to 4096 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S</p> <p>POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28</p> <p>ELECTRICAL INTERFACE push-pull P line driver L power supply 5/28 V - output RS-422 RS</p> <p>BORE DIAMETER mm 9 (3/8") mm 9,52 mm 10 mm 11 mm 14 mm 19 mm 24 mm 28</p> <p>ENCLOSURE RATING IP 67 S</p> <p>MAX ROTATION SPEED 8000 rpm 8</p> <p>OUTPUT TYPE cable (standard length 1,5 m) PR preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)</p> <p>VARIANT custom version XXX</p>										

ETMR



Model	A	B
ø ring	41,2	48
Fixing with 1 mm airgap	42,6	46
Airgap	1 ± 0,1	1 ± 0,1

dimensions in mm

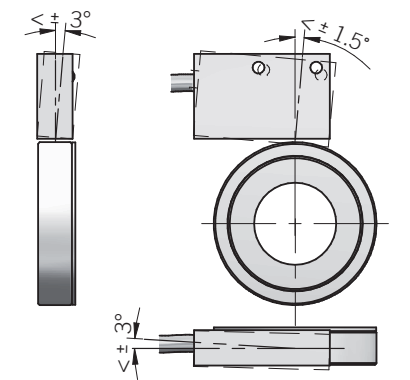
ELECTRICAL SPECIFICATIONS

Resolution	from 64 to 4096 ppr (powers of 2)
Pole pitch	model A = 2 mm model B = 5 mm
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	20 mA / channel
Electrical interface²	push-pull / line driver HTL (AELC-7272) line driver RS-422 (AELT-5000 or equivalent)
Max output frequency	350 kHz
Counting direction	A leads B clockwise
Accuracy	± 0,35° typical / ± 0,50° max
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2015/863/EU directive
UL / CSA	certificate n. E212495

CONNECTIONS

Function	Cable P	Cable L / RS
+V DC	red	red
0 V	black	black
A+	green	green
A-	/	brown or grey
B+	yellow	yellow
B-	/	orange
⊖	shield	shield

Mounting tolerances



for mounting instruction please refer to product installation notes

MECHANICAL SPECIFICATIONS

Bore diameter	ø 9 / 9,52 (3/8") / 10 / 11 / 14 / 19 / 24 / 28 mm
Enclosure rating	IP 67 (IEC 60529)
Max rotation speed	8000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	115 x 10 ⁻⁶ kgm ² (27,29 x 10 ⁻⁴ lbf ²)
Sensor body material	anodized aluminum
Magnet-actuator material	1.4305 / AISI 303 stainless steel
Operating temperature^{3,4}	-20° ... +85°C (-4° ... +185°F)
Storage temperature⁴	-20° ... +85°C (-4° ... +185°F)
Weight	100 g (3,53 oz)
Magnet-actuator mounting tolerances	± 1 mm (axial) ± 0.1 mm (radial)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ measured on the transducer flange

⁴ condensation allowed

RESOLUTIONS

64* - 128 - 256 - 512 - 1024 - 2048 - 4096

* available with mod.B; please directly contact our offices for other pulses