

**MAIN FEATURES**

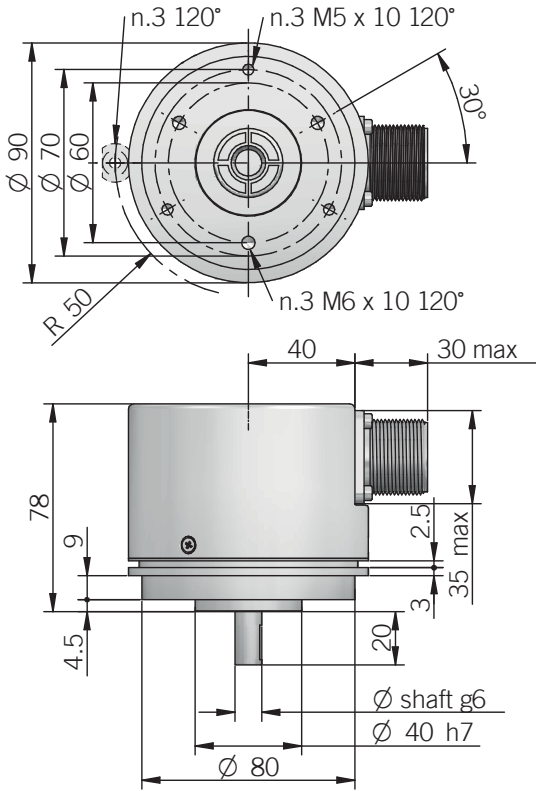
Encoder series for harsh environments with high mechanical resistance requirements.  
 Model 90 can be mounted by flanges or fixing clamps; model 115 has a tachometer generator REO-444 type compatible plug.

- 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
- Cable or connector output
- Metal cover for heavy duty applications
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange

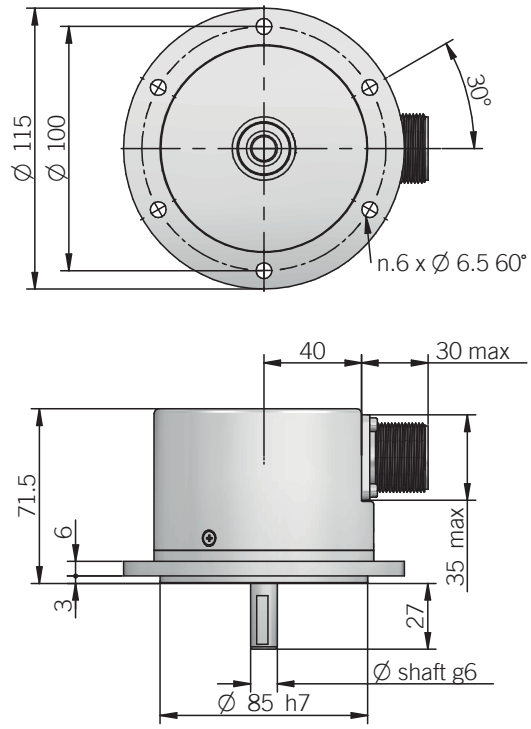


ORDERING CODE	ER	90A	500	S	5/28	P	8	X	6	M	R	.162	+XXX
<p><b>SERIES</b>                      incremental encoder series <b>EL</b>                      incremental encoder series <b>ER</b></p> <p><b>MODEL</b>                      synchronous flange <math>\varnothing</math> 40 mm <b>90A</b>                      flange REO-444 <b>115A</b></p> <p><b>RESOLUTION</b>                      ppr from 1 to 10000                      refer to the available pulses list</p> <p><b>ZERO PULSE</b>                      without zero pulse <b>S</b>                      with zero pulse <b>Z</b></p> <p><b>POWER SUPPLY</b>                      (with L electrical interface) 5 V DC <b>5</b>                      5 ... 28 V DC <b>5/28</b></p> <p><b>ELECTRICAL INTERFACE</b>                      NPN open collector <b>C</b>                      push-pull <b>P</b>                      line driver <b>L</b>                      power supply 5/28 V DC - output RS-422 <b>RS</b></p> <p><b>SHAFT DIAMETER</b>                      (mod. 90) mm <b>8</b>                      (mod. 90) (3/8") mm <b>9,52</b>                      mm <b>10</b>                      (mod. 115) mm <b>11</b></p> <p><b>ENCLOSURE RATING</b>                      IP 54 <b>X</b>                      (mod. 90) IP 66 <b>S</b></p> <p><b>MAX ROTATION SPEED</b>                      (IP 66) 3000 rpm <b>3</b>                      (IP 54) 6000 rpm <b>6</b></p> <p><b>OUTPUT TYPE</b>                      cable (standard length 1.5 m) <b>P</b>                      preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)                      MIL plug connector <b>M</b>                      JIS-C-5432 plug connector <b>J</b></p> <p><b>DIRECTION TYPE</b>                      axial <b>A</b>                      radial <b>R</b></p> <p><b>SOCKET</b>                      socket not included <b>.162</b>                      to be reported only with connector output (eg. MR.162), for socket see Accessories</p> <p><b>VARIANT</b>                      custom version <b>XXX</b></p>													

90A

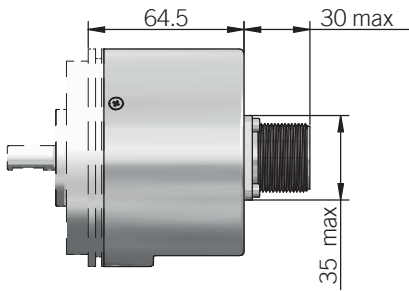


115A

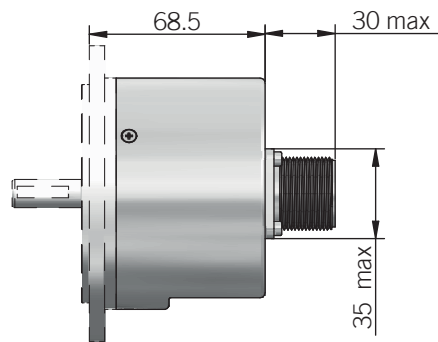


fixing clamps not included, please refer to Accessories

90A WITH AXIAL OUTPUT



115A WITH AXIAL OUTPUT



recommended mating shaft tolerance H7  
dimensions in mm

ELECTRICAL SPECIFICATIONS	
<b>Resolution</b>	from 1 to 10000 ppr
<b>Power supply<sup>1</sup></b>	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
<b>Power draw without load</b>	800 mW max
<b>Max load current</b>	C / P = 50 mA / channel L / RS = 20 mA / channel
<b>Electrical interface<sup>2</sup></b>	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
<b>Max output frequency</b>	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Index signal</b>	180°e (gated A)
<b>Mean time to dangerous failure (MTTF)<sub>d</sub><sup>3</sup></b> according to EN ISO 13849-1	200 years EL series 263 years ER series
<b>Mission time (Tm)<sup>3</sup></b>	20 years
<b>Diagnostic coverage (DC)<sup>3</sup></b>	0%
<b>Cable type</b>	shielded - fixed installation conductors section 0,22 mm <sup>2</sup> /AWG 24 bending radius min 60 mm
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	file 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

MECHANICAL SPECIFICATIONS	
<b>Shaft diameter</b>	ø 8 / 9,52 (3/8") / 10 / 11 mm
<b>Enclosure rating IEC 60529</b>	X = IP 54 S = IP 66
<b>Max rotation speed</b>	6000 rpm with X enclosure rating EL 3000 rpm / 60° C with S enclosure rating ER 3000 rpm / 70° C with S enclosure rating ER 2000 rpm / 85° C with S enclosure rating
<b>Max shaft load<sup>4</sup></b>	200 N (45 lbs) axial / radial
<b>Shock</b>	50 G, 11 ms (IEC 60068-2-27)
<b>Vibration</b>	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
<b>Moment of inertia</b>	3,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (83 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
<b>Bearing stage material</b>	aluminum
<b>Shaft material</b>	stainless steel
<b>Housing material</b>	PA66 glass fiber reinforced / painted aluminum
<b>Bearings</b>	n.2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature<sup>5, 6</sup></b>	-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series
<b>Storage temperature<sup>6</sup></b>	-25° ... +70°C (-13° ... +158°F)
<b>Weight</b>	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

<sup>1</sup> as measured at the transducer without cable influences

<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

<sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> maximum load for static usage

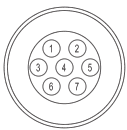
<sup>5</sup> measured on the transducer flange

<sup>6</sup> condensation not allowed

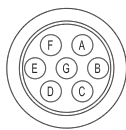
### CONNECTIONS

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
+V DC	red	red	6	4	F	D	4 - 5	D - E
0 V	black	black	1	6	A	F	6	F
A+	green	green	3	1	C	A	1	A
A-	/	brown or grey	/	3	/	C	7	G
B+	yellow	yellow	5	2	E	B	2	B
B-	/	orange	/	5	/	E	8	H
Z+	blue	blue	4	/	D	/	3	C
Z-	/	white	/	/	/	/	9	I
≡	shield	shield	7	7	G	G	10	J

J connector (7 pin)  
JIS-C-5432 Size 16  
front view



M connector (7 pin)  
Amphenol MS3102-E-16-S  
front view



J connector (10 pin)  
JIS-C-5432 Size 16  
front view



M connector (10 pin)  
Amphenol MS3102-E-18-1  
front view

