

### MAIN FEATURES

Encoder series designed for use in harsh environments with high mechanical resistance requirements. The model 90A can be mounted by flanges or fixing clamps, while the model 115A has a tachometer generator REO-444 type compatible flange.

- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 500 kHz
- Cable or connector output
- Metal cover for heavy duty applications
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 type compatible flange



### ORDERING CODE

ER 90A 500 S 5/28 P 8 X 6 M R .162 +XXX

**SERIES**  
incremental encoder series **ER**

**MODEL**  
synchronous flange ø 40 mm **90A**  
flange REO-444 **115A**

**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 5/28 V DC - output RS-422 **RS**

**SHAFT DIAMETER**  
(mod. 90A) mm **8**  
(mod. 90A) (3/8") mm **9,52**  
mm **10**  
(mod. 115A) mm **11**

**ENCLOSURE RATING**  
IP 54 shaft side / IP 67 cover side **X**  
IP 66 shaft side (mod. 90A) - IP 65 shaft side (mod. 115A) / IP 67 cover side **S**

**MAX ROTATION SPEED**  
(S enclosure rating) 3000 rpm **3**  
(X enclosure rating) 6000 rpm **6**

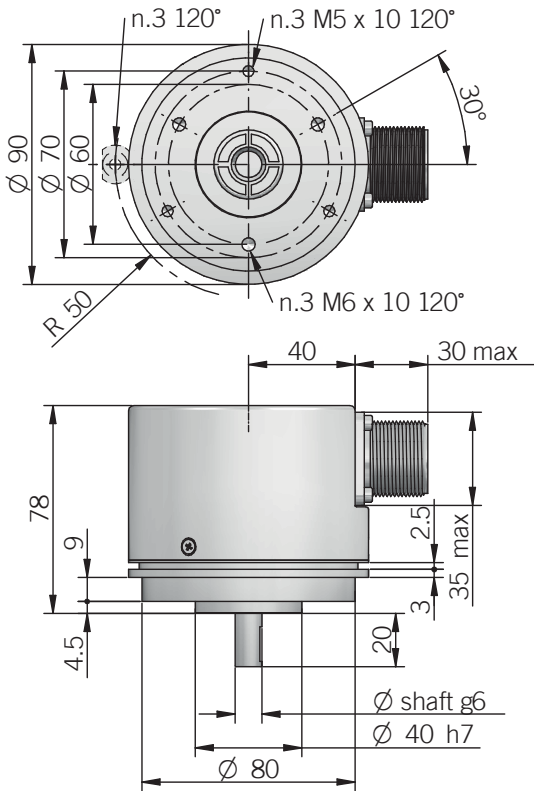
**OUTPUT TYPE**  
cable (standard length 1.5 m) **P**  
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)  
MIL plug connector **M**  
JIS-C-5432 IP40 plug connector **J**

**DIRECTION TYPE**  
axial **A**  
radial **R**

**SOCKET**  
socket not included **.162**  
to be reported only with connector output (eg. MR.162), for socket see Accessories

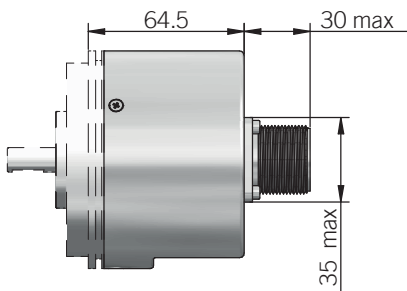
**VARIANT**  
custom version **XXX**

## 90A



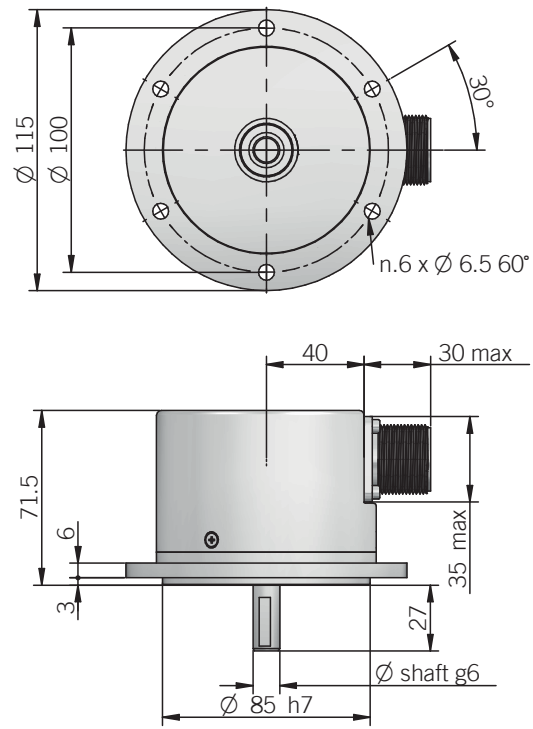
fixing clamps not included, please refer to Accessories

## 90A WITH AXIAL OUTPUT

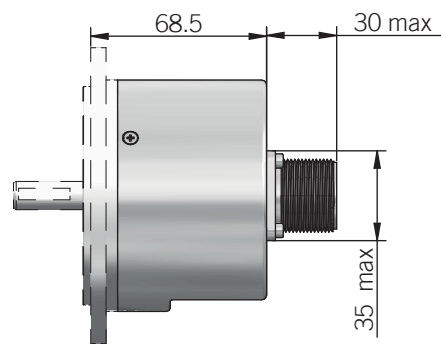


recommended mating shaft tolerance H7  
dimensions in mm

## 115A



## 115A WITH AXIAL OUTPUT



## ELECTRICAL SPECIFICATIONS

|                                                                                                      |                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Resolution</b>                                                                                    | from 100 to 10000 ppr                                                                                                                                   |
| <b>Power supply</b> <sup>1</sup>                                                                     | 5 = 4,5 ... 5,5 V DC<br>5/28 = 4,5 ... 30 V DC (reverse polarity protection)                                                                            |
| <b>Power draw without load</b>                                                                       | 0,8 W max                                                                                                                                               |
| <b>Max load current</b>                                                                              | C / P = 50 mA / channel<br>L / RS = 20 mA / channel                                                                                                     |
| <b>Electrical interface</b> <sup>2</sup>                                                             | NPN open collector (AEIC-7273, pull-up max +30 V DC)<br>push-pull / line driver HTL (AEIC-7272 or similar)<br>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>)</b> <sup>3</sup><br>according to EN ISO 13849-1 | 263 years ER series                                                                                                                                     |
| <b>Mission time (Tm)</b> <sup>3</sup>                                                                | 20 years                                                                                                                                                |
| <b>Diagnostic coverage (DC)</b> <sup>3</sup>                                                         | 0%                                                                                                                                                      |
| <b>Cable type</b>                                                                                    | shielded - fixed installation<br>conductors section 0,22 mm <sup>2</sup> / AWG 24<br>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                                                                                                                                         |

## 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 shaft side / IP 67 cover side<br>S = IP 66 shaft side / IP 67 cover side (mod. 90A)<br>S = IP 65 shaft side / IP 67 cover side (mod. 115A)                          |
| <b>Max rotation speed</b>                    | 6000 rpm with X enclosure rating<br>EL 3000 rpm / 60° C with S enclosure rating<br>ER 3000 rpm / 70° C with S enclosure rating<br>ER 2000 rpm / 85° C with S enclosure rating |
| <b>Max shaft load</b> <sup>4</sup>           | 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</b><br>(at +20°C / +68°F) | < 0,02 Nm (2,83 Ozin) with X enclosure rating<br>< 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>                      | painted aluminum                                                                                                                                                              |
| <b>Bearings</b>                              | n.2 ball bearings                                                                                                                                                             |
| <b>Bearings life</b>                         | 10 <sup>9</sup> revolutions                                                                                                                                                   |
| <b>Operating temperature</b> <sup>5,6</sup>  | -25° ... +85°C (-13° ... +185°F)                                                                                                                                              |
| <b>Storage temperature</b> <sup>6</sup>      | -25° ... +70°C (-13° ... +158°F)                                                                                                                                              |
| <b>Weight</b>                                | 350 g (12,35 oz)<br>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

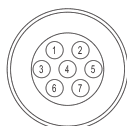
<sup>5</sup> measured on the transducer flange

<sup>6</sup> condensation not allowed

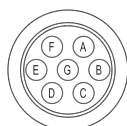
## CONNECTIONS

| 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 IP40 Size 16  
front view



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



J connector (10 pin)  
JIS-C-5432 IP40 Size 16  
front view



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

