

### MAIN FEATURES

Standard encoder series for industrial environments with high mechanical resistance requirements. Specifically designed for direct mounting on motors or tachometric dynamos thanks to integrated elastic coupling which allows radial and / or axial motor shaft play.

- 3 channel encoder (A / B / Z) up to 24000 ppr
- Power supply up to +28 VDC with several electronic interfaces available
- Up to 500 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Integrated elastic couplig up to 10 mm bore diameter
- Encoder can be mounted on tachometric dynamo



### ORDERING CODE

ER 721 A M\* 500 S 5/28 N 8 X 6 P R .XXX

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

**MODEL**  
 fixing holes ø 63,5 mm **721**  
 fixing holes ø 65 mm **722**  
 fixing holes ø 57 mm **723**  
 fixing holes ø 60 mm **724**

**FLANGE TYPE**  
 flange type **A**  
 flange type **B**

**METAL COVER**  
 \* add for the metal cover **M**

**RESOLUTION**  
 ppr from **1** to **24000**  
 see table for pulses availability

**ZERO PULSE**  
 without zero pulse **S**  
 with zero pulse **Z**

**POWER SUPPLY**  
 (with L electronic interface) 5 V DC **5**  
 (with L or PC electronic interface) 8 ... 24 V DC **8/24**  
 5 ... 28 V DC **5/28**

**ELECTRONIC INTERFACE**  
 NPN **N**  
 NPN open collector **C**  
 push-pull **P**  
 push-pull protected (AEIC-7272) **PC**  
 line driver **L**  
 power supply 5/28V - output RS-422 **RS**

**BORE DIAMETER**  
 mm **6**  
 mm **8**  
 mm **10**

**ENCLOSURE RATING**  
 IP 54 **X**  
 (mod. EL721 / EL722) IP 66 **S**

**MAX ROTATION SPEED**  
 (IP 66) 3000 rpm **3**  
 (IP 54) 6000 rpm **6**

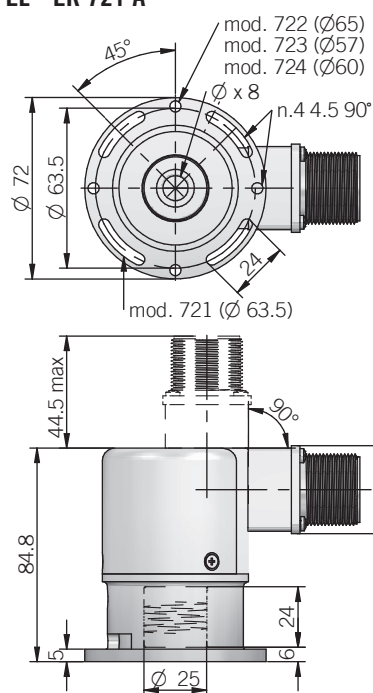
**OUTPUT TYPE**  
 cable (standard length 1,5 m) **P**  
 MIL connector **M**  
 JIS-C-5432 connector **J**  
 M12 connector **M12**  
 M23 connector **H**  
 IP40 IEC 60130-9 connector **C**

female connector included, without female please add 162 as variant code

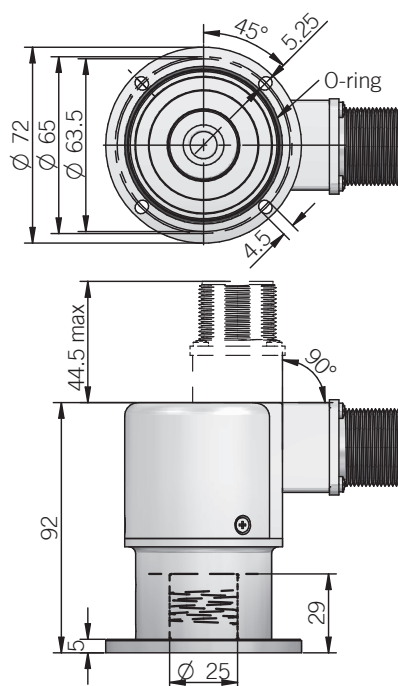
**DIRECTION TYPE**  
 axial **A**  
 radial **R**

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

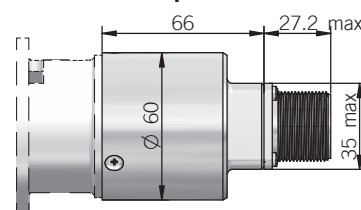
## EL - ER 721 A



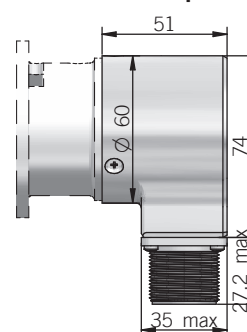
## EL - ER 721 A IP 66 version



## Dimensions with metal cover axial output



## Dimensions with metal cover radial output



dimensions in mm

## ELECTRICAL SPECIFICATIONS

|                                      |                                                                                                             |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Resolution</b>                    | from 1 to 24000 ppr                                                                                         |
| <b>Power supply</b>                  | 5 = 4,5 ... 5,5 V DC<br>5/28 = 4,75 ... 29,4 V DC<br>8/24 = 7,6 ... 25,2 V DC (reverse polarity protection) |
| <b>Power draw without load</b>       | 800 mW                                                                                                      |
| <b>Max load current</b>              | N / C / P / PC = 50 mA / channel<br>L / RS = 20 mA / channel                                                |
| <b>Output type*</b>                  | NPN / NPN open collector / push-pull / line driver                                                          |
| <b>Max output frequency</b>          | 250 kHz up to 6'000 ppr<br>500 kHz from 7'200 ppr                                                           |
| <b>Counting direction</b>            | A leads B clockwise (shaft view)                                                                            |
| <b>Electromagnetic compatibility</b> | IEC 61000-6-2<br>IEC 61000-6-4                                                                              |

\*output levels according to power supply, for further details please see under Technical basics section

## EL SERIES RESOLUTIONS

1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 25 - 30 - 32 - 40 - 50 - 60 - 70 - 80 - 90 - 100\*  
 - 160 - 180 - 240\* - 250\* - 350 - 450 - 500\* - 660 - 700 - 900\* - 1000\* - 1024\*  
 - 1250\* - 1300\* - 1800\* - 2000\* - 2048\* - 2500\*

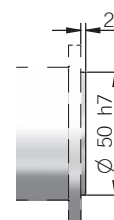
\*only with model EL721 / EL722 with "S" enclosure rating

## ER SERIES RESOLUTIONS

100 - 120 - 128 - 150 - 200 - 240 - 250 - 256 - 300 - **360** - 400 - 480 - **500** - **512**  
 - **600** - 625 - **720** - 750 - 800 - 900 - **1000** - **1024** - 1200 - 1250 - 1440 - 1500  
 - 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

## 72 B flange version



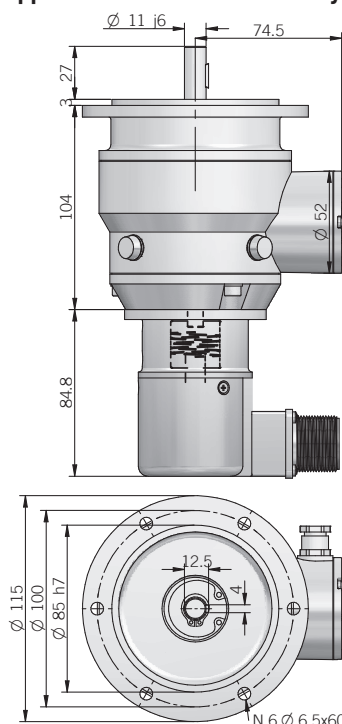
## MECHANICAL SPECIFICATIONS

|                                           |                                                                                          |
|-------------------------------------------|------------------------------------------------------------------------------------------|
| <b>Bore diameter</b>                      | Ø 6 / 8 / 10 mm                                                                          |
| <b>Enclosure rating</b>                   | X = IP 54 (IEC 60529)<br>S = IP 66 (IEC 60529)                                           |
| <b>Max rotation speed</b>                 | X = 6000 rpm<br>S = EL 3000 rpm / 60° C<br>ER 3000 rpm / 70° C - 2000 rpm / 85° C        |
| <b>Max shaft load</b>                     | 200 N 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>                                                  |
| <b>Starting torque (at +20°C / +68°F)</b> | < 0,02 Nm (IP 54)<br>< 0,04 Nm (IP 66)                                                   |
| <b>Body material</b>                      | EN-AW 2011 aluminum                                                                      |
| <b>Shaft material</b>                     | 1.4305 / AISI 303 stainless steel                                                        |
| <b>Housing material</b>                   | PA66 glass fiber reinforced / painted aluminum                                           |
| <b>Bearings</b>                           | 2 ball bearings                                                                          |
| <b>Bearings life</b>                      | 10 <sup>9</sup> revolutions                                                              |
| <b>Operating temperature</b>              | -10° ... +60°C (+14° ... +140°F) EL series<br>-25° ... +85°C (-13° ... +185°F) ER series |
| <b>Storage temperature</b>                | -25° ... +70°C (-13° ... +158°F)                                                         |
| <b>Weight</b>                             | 400 g (14,11 oz)                                                                         |

## TECHNICAL SPECIFICATIONS FOR TACHOMETRIC DYNAMO

|                                             |                                  |                |
|---------------------------------------------|----------------------------------|----------------|
| Peak to peak ripple                         | $\leq 1\%$                       |                |
| Effective value ripple                      | $\leq 0,4\%$                     |                |
| Linearity error                             | $\leq 0,2\%$                     |                |
| Reversibility error                         | $\pm 0,1\%$                      |                |
| Voltage tolerance                           | $\pm 3\%$                        |                |
| Voltage variation with temperature          | $-0,02\%$ for $^{\circ}\text{C}$ |                |
| Insulation class                            | B                                |                |
| N. of poles                                 | 4                                |                |
| N. of slots                                 | 33                               |                |
| N. of laminas                               | 33                               |                |
| Field excitation by magnets                 | ALNICO                           |                |
| Winding                                     | 60V / 1000 rpm                   | 20V / 1000 rpm |
| Nominal voltage at 1000 rpm                 | 60 V                             | 20 V           |
| Load - free voltage at 1000 rpm             | 61,2 V                           | 20,3 v         |
| Max current admitted                        | 70 mA                            | 200 mA         |
| Nom. current                                | 5 mA                             | 10 mA          |
| Max speed                                   | 5000 rpm                         | 6000 rpm       |
| Armature resistance at $25^{\circ}\text{C}$ | 240 $\Omega$                     | 26 $\Omega$    |
| Electric time constant                      | 0,7 ms                           | 0,7 ms         |
| Enclosure rating                            | IP 55 (IEC 60529)                |                |
| Weight                                      | 2,35 Kg (82,89 oz)               |                |
| Moment of inertia                           | $2 \times 10^{-6} \text{ kgm}^2$ |                |

## Application with tachometric dynamo



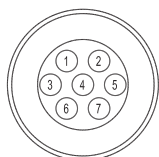
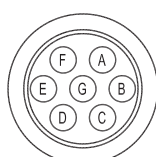
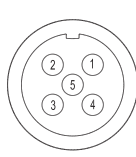
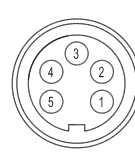
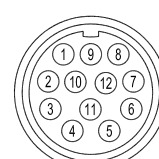
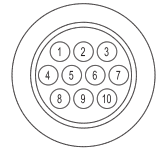
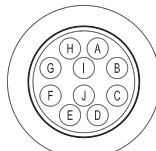
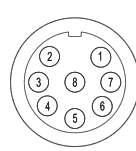
dimensions in mm

## ACCESSORIES

| Description            | P/N      |
|------------------------|----------|
| Dynamo 60 V / 1000 rpm | 22130001 |
| Dynamo 20 V / 1000 rpm | 22130002 |

## CONNECTIONS

| Function | Cable output   | Cable output | 7 pin J output | 7 pin J output      | 7 pin M output | 7 pin M output      | 10 pin J output       | 10 pin M output       | 5 pin M12 output | 8 pin M12 output | 12 pin H output | 5 pin C output | 8 pin C output |
|----------|----------------|--------------|----------------|---------------------|----------------|---------------------|-----------------------|-----------------------|------------------|------------------|-----------------|----------------|----------------|
|          | N / C / P / PC | Line driver  | N / C / P / PC | Line Driver no Zero | N / C / P / PC | Line Driver no Zero | Line Driver with Zero | Line Driver with Zero | N / C / P / PC   | Line Driver      | CCW             | N / C / P / PC | Line Driver    |
| +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              |
| Ch. A    | green          | green        | 3              | 1                   | C              | A                   | 1                     | A                     | 3                | 6                | 5               | 2              | 1              |
| Ch. A-   | /              | brown        | /              | 3                   | /              | C                   | 7                     | G                     | /                | 5                | 6               | /              | 2              |
| Ch. B    | yellow         | yellow       | 5              | 2                   | E              | B                   | 2                     | B                     | 1                | 4                | 8               | 4              | 3              |
| Ch. B-   | /              | orange       | /              | 5                   | /              | E                   | 8                     | H                     | /                | 3                | 1               | /              | 4              |
| Ch. Z    | blue           | blue         | 4              | /                   | D              | /                   | 3                     | C                     | 5                | 2                | 3               | 3              | 5              |
| Ch. Z-   | /              | white        | /              | /                   | /              | /                   | 9                     | I                     | /                | 8                | 4               | /              | 6              |
| ⏏        | shield         | shield       | 7              | 7                   | G              | G                   | 10                    | J                     | housing          | housing          | 9               | /              | /              |

J connector (7 pin)  
JIS-C-5432 Size 16  
solder side view FVM connector (7 pin)  
Amphenol MS3102-E-16-S  
solder side view FVM12 connector (5 pin)  
M12 A coded  
solder side view FVC connector (5 pin)  
IEC 60130-9  
solder side view FVH connector (12 pin) - M23 CCW  
Hummel 7.410.000000 -  
7.002.912.603  
solder side view FVJ connector (10 pin)  
JIS-C-5432 Size 16  
solder side view FVM connector (10 pin)  
Amphenol MS3102-E-18-1  
solder side view FVM12 connector (8 pin)  
M12 A coded  
solder side view FVC connector (8 pin)  
IEC 60130-9  
solder side view FV