

### MAIN FEATURES

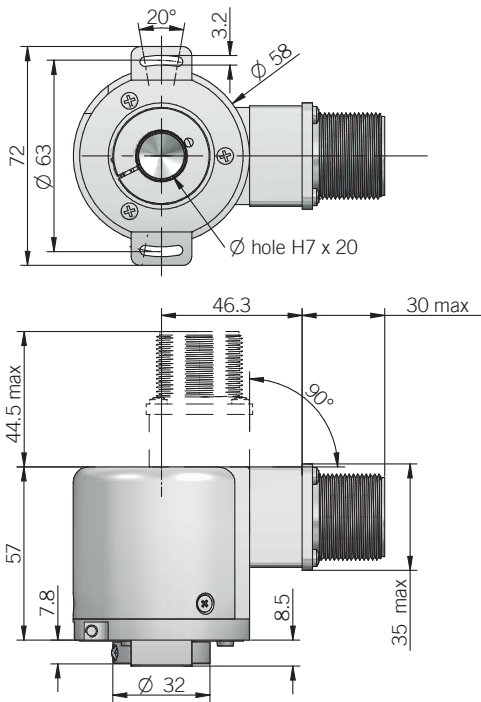
Hollow shaft encoder series for industrial applications with high mechanical resistance requirements. These encoders are designed to withstand high radial and axial shaft loads.

- 3 channel encoder (A / B / Z) up to 24000 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Blind hollow shaft diameter up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin

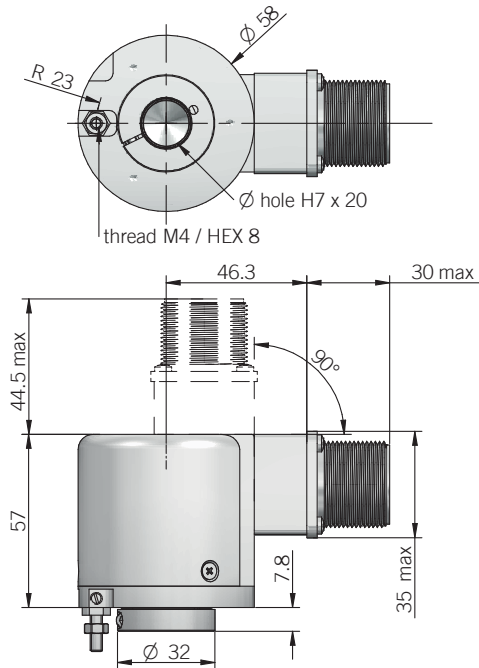


| ORDERING CODE  | ER | 58F | M* | 500 | S | 5/28 | P | 8 | X | 3 | M | R | .162 | +XXX |
|--|----|-----|----|-----|---|------|---|---|---|---|---|---|------|------|
| <b>SERIES</b><br>incremental encoder series <b>EL</b><br>incremental encoder series <b>ER</b>  |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>MODEL</b><br>blind hollow shaft with stator coupling <b>58F</b><br>blind hollow shaft with torque pin <b>58G</b><br>blind hollow shaft with torque stop slot <b>63F</b><br>blind hollow shaft with torque pin <b>63G</b>  |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>METAL COVER</b><br>* add for metal cover <b>M</b>   |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>RESOLUTION</b><br>ppr from <b>1</b> to <b>24000</b><br>refer to the available pulses list   |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>ZERO PULSE</b><br>without zero pulse <b>S</b><br>with zero pulse <b>Z</b>   |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>POWER SUPPLY</b><br>(with L electrical interface) <b>5 V DC 5</b><br><b>5 ... 28 V DC 5/28</b>  |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>ELECTRICAL INTERFACE</b><br>NPN open collector <b>C</b><br>push-pull <b>P</b><br>line driver <b>L</b><br>power supply 5/28 V DC - output RS-422 <b>RS</b>   |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>BORE DIAMETER</b><br>mm <b>8</b><br>mm <b>10</b><br>mm <b>12</b><br>mm <b>14</b><br>mm <b>15</b>  |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>ENCLOSURE RATING</b><br>IP 54 <b>X</b><br>IP 66 <b>S</b>  |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>MAX ROTATION SPEED</b><br>3000 rpm <b>3</b>   |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>OUTPUT TYPE</b><br>cable (standard length 1.5 m) <b>P</b><br>preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)<br>MIL plug connector <b>M</b><br>JIS-C-5432 plug connector <b>J</b><br>M12 plug connector <b>M12</b><br>M23 plug connector <b>H</b><br>M16 plug connector <b>C</b> |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>DIRECTION TYPE</b><br>axial <b>A</b><br>radial <b>R</b>   |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>SOCKET</b><br>socket not included <b>.162</b><br>to be reported only with connector output (eg. MR.162), for socket see Accessories   |    |     |    |     |   |      |   |   |   |   |   |   |      |      |
| <b>VARIANT</b><br>custom version <b>XXX</b>  |    |     |    |     |   |      |   |   |   |   |   |   |      |      |

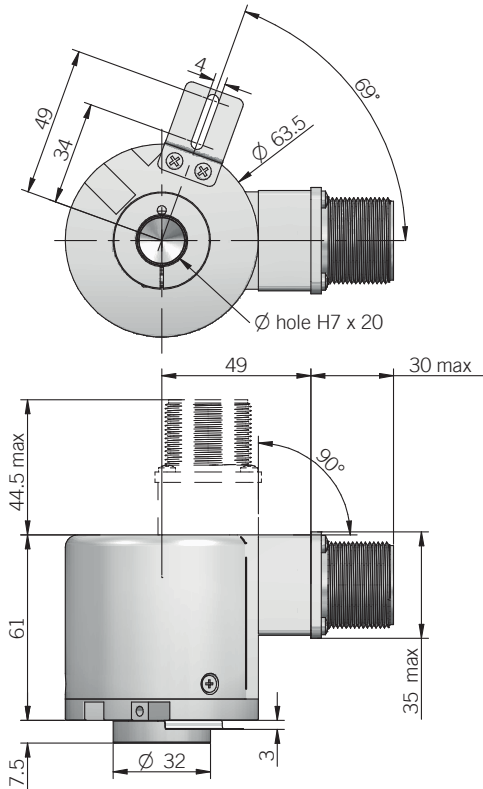
58F



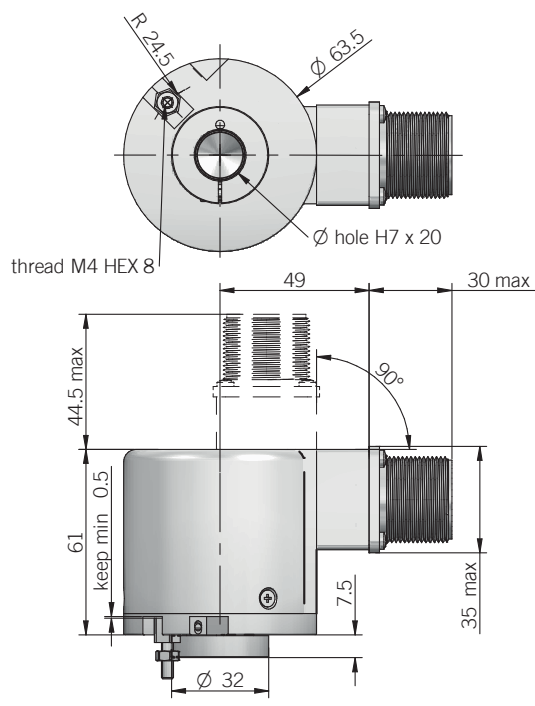
58G



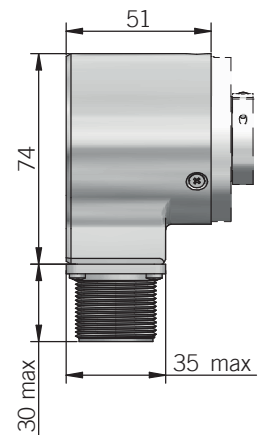
63F



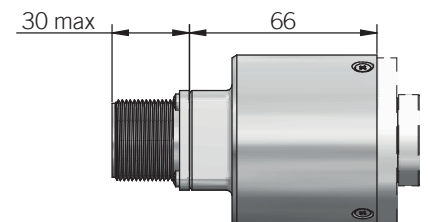
63G



**DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT**



**DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT**



torque pin is included in model G, for model F please refer to Accessories  
recommended mating shaft tolerance g6  
dimensions in mm

| ELECTRICAL SPECIFICATIONS   |   |
|---|---|
| <b>Resolution</b>   | from 1 to 2500 ppr (58 G)<br>from 1 to 24000 ppr (58 F - 63 F / G)  |
| <b>Power supply<sup>1</sup></b>   | 5 = 4,5 ... 5,5 V DC<br>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<br>L / RS = 20 mA / channel   |
| <b>Electrical interface<sup>2</sup></b>   | 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)<sup>3</sup></b><br>according to EN ISO 13849-1 | 200 years EL series<br>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<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   |

| MECHANICAL SPECIFICATIONS                  |  |
|--|--|
| <b>Bore diameter</b>                       | ø 8* / 10* / 12* / 14 / 15 mm<br>* with supplied shaft adapter (valid for resolution ≥ 3000 ppr) |
| <b>Enclosure rating IEC 60529</b>          | X = IP 54<br>S = IP 66   |
| <b>Max rotation speed</b>                  | 3000 rpm   |
| <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>                   | 4 x 10 <sup>-6</sup> kgm <sup>2</sup> (95 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<br>< 0,06 Nm (8,50 Ozin) with S enclosure rating   |
| <b>Bearing stage material</b>              | aluminum   |
| <b>Shaft material</b>                      | stainless steel  |
| <b>Shaft adapter material</b>              | bronze   |
| <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>4,5</sup></b> | -10° ... +60°C (+14° ... +140°F) EL series<br>-20° ... +70°C (-4° ... +158°F) ER series          |
| <b>Storage temperature<sup>5</sup></b>     | -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> measured on the transducer flange  
<sup>5</sup> condensation not allowed

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

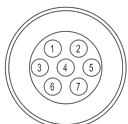
please directly contact our offices for other pulses, preferred resolutions in bold

| 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 |  |

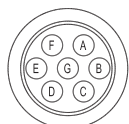
| CONNECTIONS |             |               |               |                        |               |                        |                           |                           |                      |                      |          |                      |                      |
|-------------|-------------|---------------|---------------|------------------------|---------------|------------------------|---------------------------|---------------------------|----------------------|----------------------|----------|----------------------|----------------------|
| 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 <sup>1</sup> | housing <sup>1</sup> | 9        | housing <sup>1</sup> | housing <sup>1</sup> |

<sup>1</sup> only with metal cover

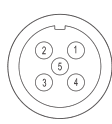
J connector (7 pin)  
JIS-C-5432 Size 16  
front view



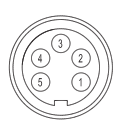
M connector (7 pin)  
Amphenol MS3102-E-16-S  
front view



M12 connector (5 pin)  
M12 A coded  
front view



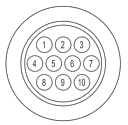
C connector (5 pin)  
Amphenol C091 M16  
front view



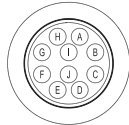
H connector (12 pin) - M23 CCW  
Hummel 7.410.000000 - 7.002.912.603  
front view



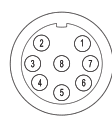
J connector (10 pin)  
JIS-C-5432 Size 16  
front view



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



M12 connector (8 pin)  
M12 A coded  
front view



C connector (8 pin)  
Amphenol C091 IEC 60130-9  
front view

