

### MAIN FEATURES

Miniaturized  $\varnothing$  30 mm encoder series for application in small devices.  
Recommended when a minimal size is required even providing excellent performances.

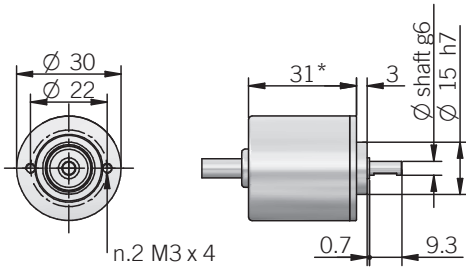
- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 220 kHz output frequency
- Cable output, connector available on cable end
- Solid shaft diameter up to 6 mm
- Mounting by clamping or threaded flange



### ORDERING CODE

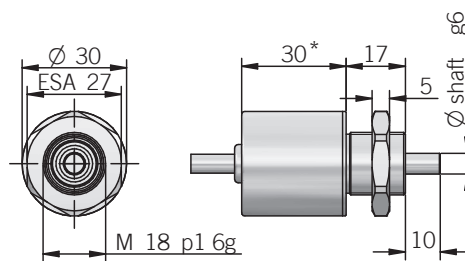
EL	30E	50	S	5/28	C	4	X	3	PA	.XXX
<b>SERIES</b>										
incremental encoder series <b>EL</b>										
incremental encoder series <b>ER</b>										
<b>MODEL</b>										
clamping flange $\varnothing$ 15 mm <b>30E</b>										
M18 threaded flange <b>30H</b>										
<b>RESOLUTION</b>										
ppr from <b>1</b> to <b>2500</b>										
see table for pulses availability										
<b>ZERO PULSE</b>										
without zero pulse <b>S</b>										
with zero pulse <b>Z</b>										
<b>POWER SUPPLY</b>										
(with L electrical interface) 5 V DC <b>5</b>										
5 ... 28 V DC <b>5/28</b>										
<b>ELECTRICAL INTERFACE</b>										
NPN open collector <b>C</b>										
push-pull <b>P</b>										
line driver <b>L</b>										
power supply 5/28V - output RS-422 <b>RS</b>										
<b>SHAFT DIAMETER</b>										
(mod. E) mm <b>4</b>										
mm <b>6</b>										
<b>ENCLOSURE RATING</b>										
IP 54 <b>X</b>										
<b>MAX ROTATION SPEED</b>										
3000 rpm <b>3</b>										
<b>OUTPUT TYPE</b>										
axial cable (standard length 0,5 m) <b>PA</b>										
radial cable (standard length 0,5 m) <b>PR</b>										
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)										
<b>VARIANT</b>										
custom version <b>XXX</b>										

30 E (axial output)



dimensions in mm

30 H (axial output)



\* radial output + 2,3

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 1 to 2500 ppr
<b>Power supply</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>Output type*</b>	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)
<b>Max output frequency</b>	100 kHz EL series 220 kHz ER series
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

MECHANICAL SPECIFICATIONS

<b>Shaft diameter</b>	ø 4 / 6 mm
<b>Enclosure rating</b>	IP 54 (IEC 60529)
<b>Max rotation speed</b>	3000 rpm
<b>Max shaft load</b>	5 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>	0,05 x 10 <sup>-6</sup> kgm <sup>2</sup> (1,2 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,005 Nm (0,71 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	PA66 glass fiber reinforced
<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 -25° ... +85°C (-13° ... +185°F) ER series
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Weight</b>	70 g (2,47 oz)

CONNECTIONS

Function	Cable C / P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊕	shield	shield

EL SERIES RESOLUTIONS

1 - 10 - 20 - 25 - 50 - 60 - 64 - 150

ER SERIES RESOLUTIONS

100 - 128 - 200 - 250 - 256 - 300 - 360 - 400 - 500 - 512 - 600 - 625 - 720 - 800 - 1000 - 1024 - 1200 - 1250 - 1440 - 1600 - 2000 - 2048 - 2500

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

### MAIN FEATURES

Miniaturized  $\varnothing$  38 mm encoder series for application in small devices.  
Recommended when a minimal size is required even providing excellent performances.

- 3 channel encoder (A / B / Z) up to 1024 ppr
- Power supply up to +24 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- Cable output, connector available on cable end
- Solid shaft diameter up to 6 mm
- Mounting by clamping or centering square flange



### ORDERING CODE

**EH 38A 500 S 8/24 P 6 X 3 PR .XXX**

**SERIES**  
incremental encoder series **EH**

**MODEL**  
clamping flange  $\varnothing$  20 mm **38A**  
square flange  $\square$  36,5 mm **38B**  
square flange  $\square$  32 mm **38D**

**RESOLUTION**  
ppr from **50** to **1024**  
see table for pulses availability

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

**POWER SUPPLY**  
5 V DC **5**  
8 ... 24 V DC **8/24**

**ELECTRICAL INTERFACE**  
NPN open collector **C**  
push-pull **P**  
line driver **L**  
power supply 8/24V - output RS-422 **RS**

**SHAFT DIAMETER**  
mm **6**

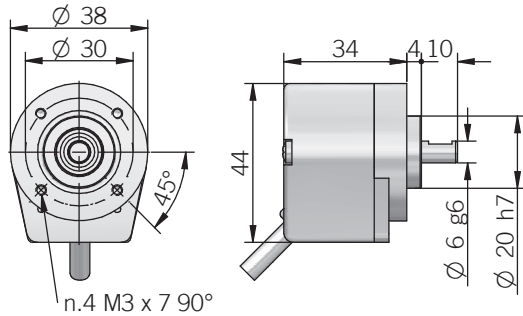
**ENCLOSURE RATING**  
IP 54 **X**

**MAX ROTATION SPEED**  
3000 rpm **3**

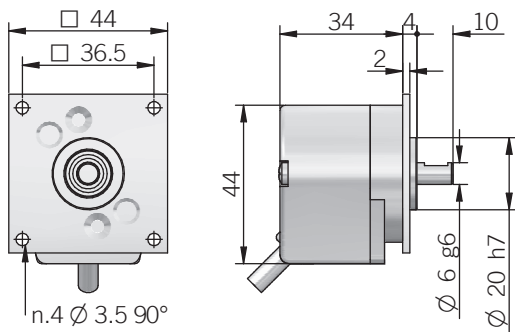
**OUTPUT TYPE**  
radial cable (standard length 0,5 m) **PR**  
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)

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

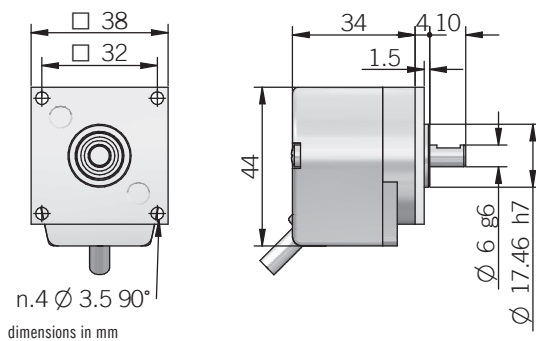
38 A



38 B



38 D



n.4 Ø 3.5 90°  
dimensions in mm

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 50 to 1024 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC (reverse polarity protection)
<b>Current consumption without load</b>	100 mA max
<b>Max load current</b>	C / P = 50 mA / channel L = 20 mA / channel
<b>Output type*</b>	NPN open collector (pull-up max +30V DC) push-pull line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	105 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

MECHANICAL SPECIFICATIONS

<b>Shaft diameter</b>	Ø 6 mm
<b>Enclosure rating</b>	IP 54 (IEC 60529)
<b>Max rotation speed</b>	3000 rpm
<b>Max shaft load</b>	5 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>	0,05 x 10 <sup>-6</sup> kgm <sup>2</sup> (1,2 x 10 <sup>-6</sup> lbft <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin)
<b>Bearing stage material</b>	aluminum UNI 5076
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	PA66 glass fiber reinforced
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-20° ... +70°C (-4° ... +158°F)
<b>Storage temperature</b>	-20° ... +70°C (-4° ... +158°F)
<b>Weight</b>	150 g (5,29 oz)

CONNECTIONS

Function	Cable C / P	Cable L
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊖	shield	shield

RESOLUTIONS

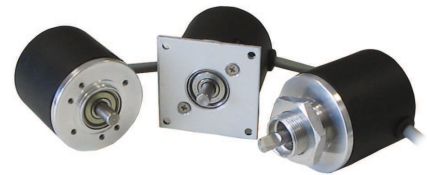
50\* - 100 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 1000 - 1024

please directly contact our offices for other pulses, preferred resolutions in bold  
\*available only without zero pulse

#### MAIN FEATURES

Miniaturized  $\varnothing$  42 mm encoder series for general factory automation applications.

- 3 channel encoder (A / B / Z) up to 14400 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable output, connector available on cable end
- Solid shaft diameter up to 8 mm
- Mounting by clamping, threaded or synchronous flange



#### ORDERING CODE

ER 40A 100 S 5/28 P 6 X 6 P R .XXX

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

**MODEL**  
 clamping flange  $\varnothing$  20 mm 40A  
 square flange  $\square$  36,5 mm 40B  
 clamping flange  $\varnothing$  17,46 mm 40C  
 M18 threaded flange 40H  
 M20 threaded flange 40I  
 synchronous flange  $\varnothing$  21 mm 40N  
 synchronous flange  $\varnothing$  30 mm 40X

**RESOLUTION**  
 (mod. A / B) ppr from 1 to 14400  
 (mod. C / H / I / N / X) ppr from 1 to 2500  
 see table for pulses availability

**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**  
 (mod. C) mm 4  
 (mod. A / B / C / H / I / N) mm 6  
 (mod. X) mm 8

**ENCLOSURE RATING**  
 IP 54 X  
 (mod. A / B) IP 66 S

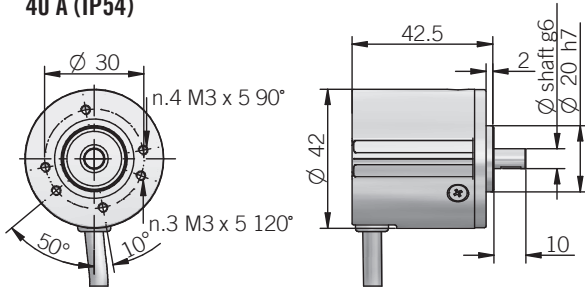
**MAX ROTATION SPEED**  
 (IP 66) 3000 rpm 3  
 (IP 54) 6000 rpm 6

**OUTPUT TYPE**  
 cable (standard length 0,5 m) P  
 preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)

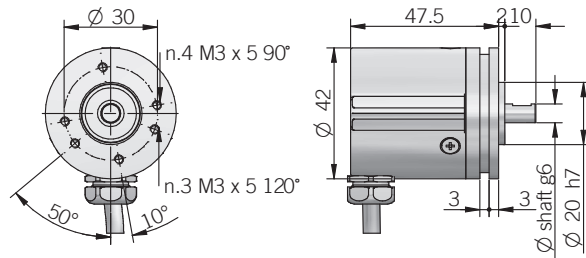
**DIRECTION TYPE**  
 (mod. A / B / C / H / I / N) axial A  
 radial R

**VARIANT**  
 custom version XXX

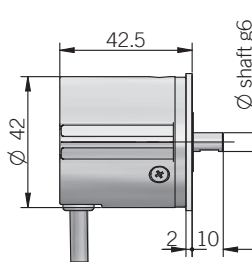
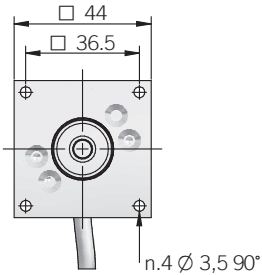
40 A (IP54)



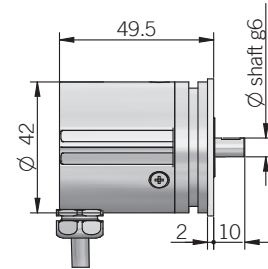
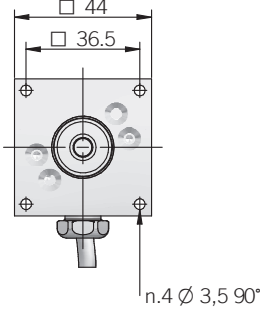
40 A (IP 66)



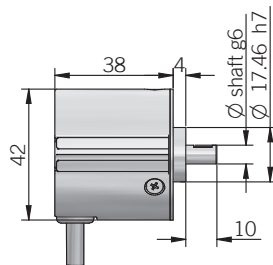
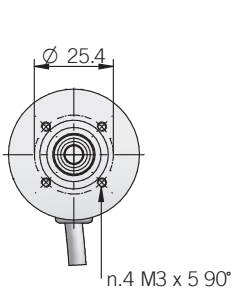
40 B (IP54)



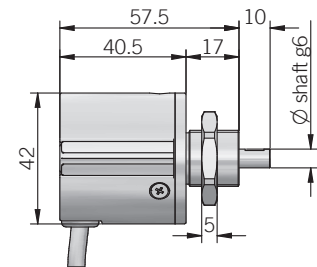
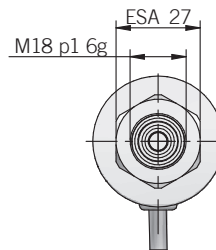
40 B (IP 66)



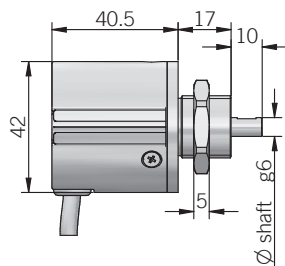
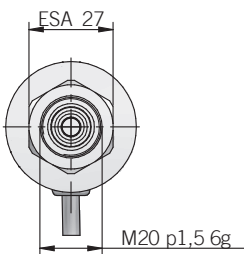
40 C



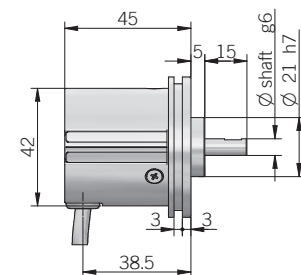
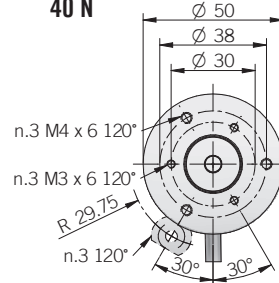
40 H



40 I

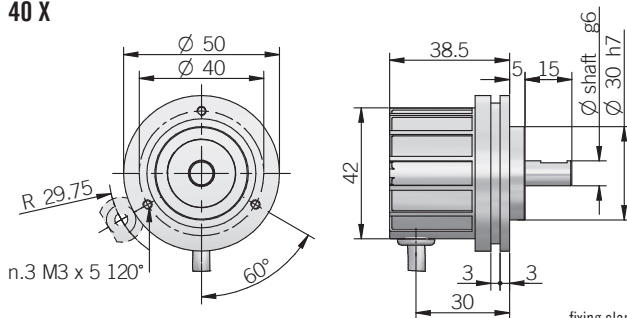


40 N



fixing clamps not included, please refer to Accessories section

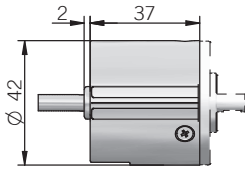
40 X



fixing clamps not included, please refer to Accessories section

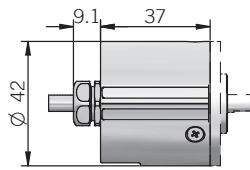
dimensions in mm

40 (axial output)



dimensions in mm

40 (IP 66 axial output)



**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 1 to 14400 ppr (mod. A / B) from 1 to 2500 ppr (mod. C / H / I / N / X)
<b>Power supply</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>Output type*</b>	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)
<b>Max output frequency</b>	EL series 150 kHz EL series ER series 250 kHz up to 3600 ppr 500 kHz from 4000 ppr
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**EL SERIES RESOLUTIONS**

1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 30 - 32 - 40 - 50 - 70 - 80 - 90 - 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 - 10000 - 12000 - 14400

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

**MECHANICAL SPECIFICATIONS**

<b>Shaft diameter</b>	ø 4 / 6 / 8 mm
<b>Enclosure rating</b>	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
<b>Max rotation speed</b>	IP 54 - 6000 rpm IP 66 - 3000 rpm
<b>Max shaft load</b>	5 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>	0,1 x 10 <sup>-6</sup> kgm <sup>2</sup> (2,4 x 10 <sup>-6</sup> lbfft <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin) IP 54 < 0,05 Nm (7,10 Ozin) IP 66
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	PA66 glass fiber reinforced
<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 -25° ... +85°C (-13° ... +185°F) ER series
<b>Storage temperature</b>	-25° ... +70°C (-13° ... +158°F)
<b>Weight</b>	100 g (3,52 oz)

**CONNECTIONS**

Function	Cable C / P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊖	shield	shield

### MAIN FEATURES

Standard  $\varnothing$  58 mm encoder series for industrial applications with high mechanical resistance requirements. These encoders are designed to support high radial and axial shaft load and they can be mounted by means of flanges or fixing clamps.

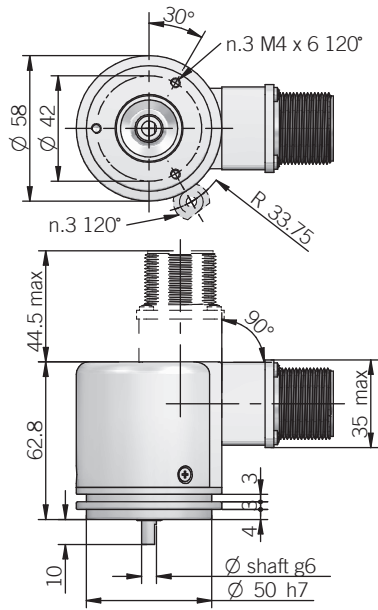
- 3 channel encoder (A / B / Z) up to 24000 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Solid shaft diameter up to 12 mm
- Mounting by synchronous, clamping or coupling flange



### ORDERING CODE

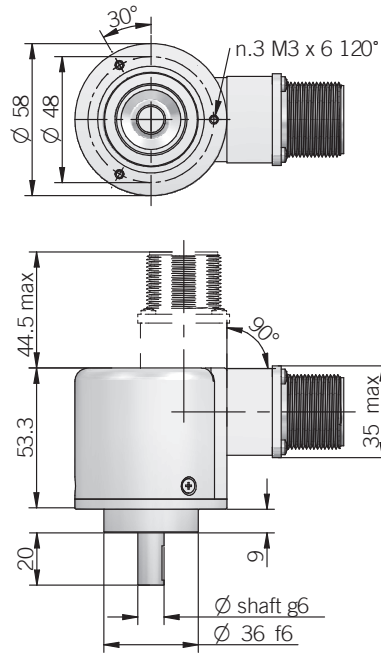
ER	58C	M*	500	S	5/28	P	8	X	6	P	R	.XXX
<p><b>SERIES</b>            incremental encoder series <b>EL</b>            incremental encoder series <b>ER</b></p> <p><b>MODEL</b>            synchronous flange <math>\varnothing</math> 50 mm <b>58B</b>            clamping flange <math>\varnothing</math> 36 mm <b>58C</b>            clamping flange <math>\varnothing</math> 50 mm <b>58H</b>            coupling flange <math>\varnothing</math> 40 mm <b>58T</b></p> <p><b>METAL COVER</b>            * add for metal cover <b>M</b></p> <p><b>RESOLUTION</b>            ppr from 1 to 24000            see table for pulses availability</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 5/28V - output RS-422 <b>RS</b></p> <p><b>SHAFT DIAMETER</b>            (mod. B) mm <b>6</b>            (mod. C) mm <b>8</b>            (mod. B / C / H) (3/8") 9,52 mm <b>9</b>            mm <b>10</b>            (mod. T) mm <b>12</b></p> <p><b>ENCLOSURE RATING</b>            IP 54 <b>X</b>            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 connector <b>M</b>            JIS-C-5432 connector <b>J</b>            M12 connector <b>M12</b>            M23 connector <b>H</b>            IP40 IEC 60130-9 connector <b>C</b>            female connector included, without female please add 162 as variant code</p> <p><b>DIRECTION TYPE</b>            axial <b>A</b>            radial <b>R</b></p> <p><b>VARIANT</b>            custom version <b>XXX</b></p>												

**58 B**

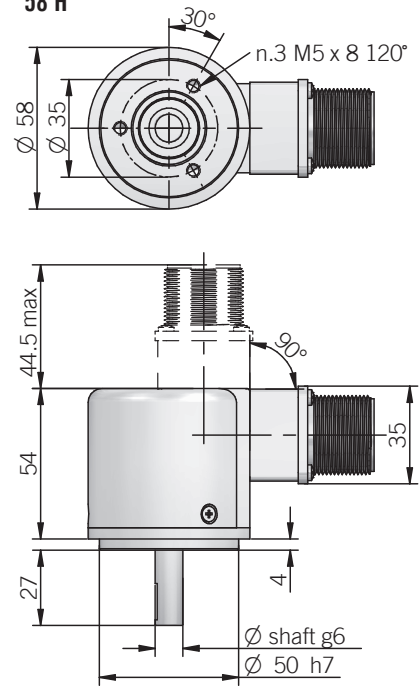


fixing clamps not included, please refer to Accessories section

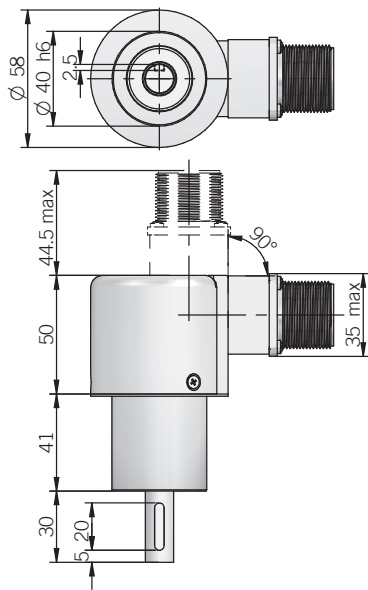
**58 C**



**58 H**

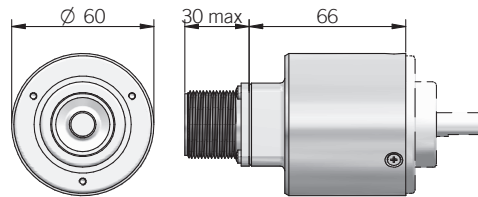


**58 T**

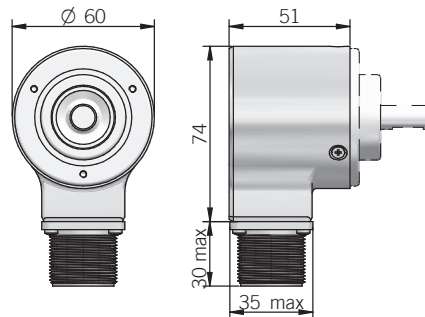


dimensions in mm

**Dimension with metal cover and axial output**



**Dimension with metal cover and radial output**



**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 1 to 24000 ppr
<b>Power supply</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>Output type*</b>	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)
<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>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**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

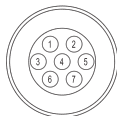
**MECHANICAL SPECIFICATIONS**

<b>Shaft diameter</b>	ø 6 / 8 / 9,52 (3/8") / 10 / 12 mm
<b>Enclosure rating</b>	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
<b>Max rotation speed</b>	IP 54 - 6000 rpm IP 66 - EL 3000 rpm / 60° C ER 3000 rpm / 70° C - 2000 rpm / 85° C
<b>Max shaft load</b>	10 N axial / 20 N radial with ø6 mm shaft 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>	1,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (36 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,02 Nm (2,83 Ozin) IP 54 < 0,06 Nm (8,50 Ozin) IP 66
<b>Bearing stage 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 -25° ... +85°C (-13° ... +185°F) ER series
<b>Storage temperature</b>	-25° ... +70°C (-13° ... +158°F)
<b>Weight</b>	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

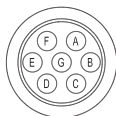
**CONNECTIONS**

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
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	/	/

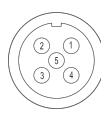
J connector (7 pin)  
JIS-C-5432 Size 16  
solder side view FV



M connector (7 pin)  
Amphenol MS3102-E-16-S  
solder side view FV



M12 connector (5 pin)  
M12 A coded  
solder side view FV



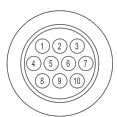
C connector (5 pin)  
IEC 60130-9  
solder side view FV



H connector (12 pin) - M23 CCW  
Hummel 7.410.000000 -  
7.002.912.603  
solder side view FV



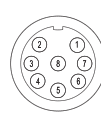
J connector (10 pin)  
JIS-C-5432 Size 16  
solder side view FV



M connector (10 pin)  
Amphenol MS3102-E-18-1  
solder side view FV



M12 connector (8 pin)  
M12 A coded  
solder side view FV



C connector (8 pin)  
IEC 60130-9  
solder side view FV



### MAIN FEATURES

Standard  $\varnothing$  63 mm encoder series for industrial applications with high mechanical resistance requirements. These encoders are designed to support high radial and axial shaft load and they can be mounted by means of flanges or fixing clamps.

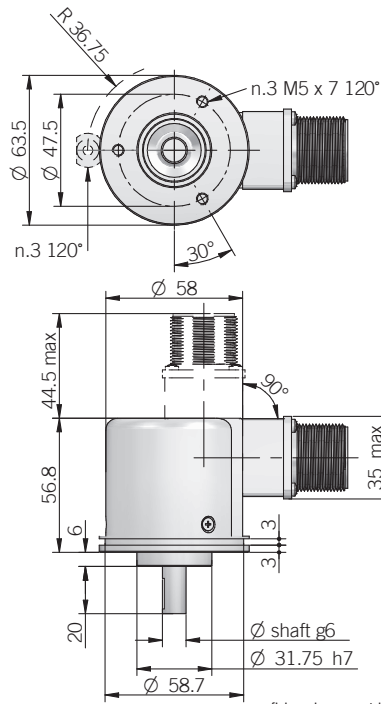
- 3 channel encoder (A / B / Z) up to 24000 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Solid shaft diameter up to 10 mm
- Mounting by synchronous or centering 2,5" square flange



### ORDERING CODE

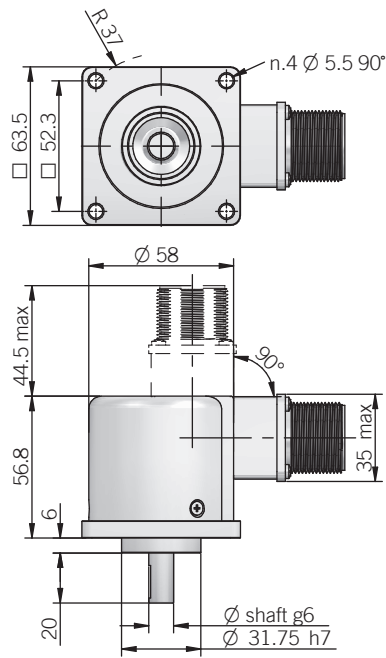
ER	63A	M*	500	S	5/28	P	8	X	6	P	R	.XXX
<p><b>SERIES</b> incremental encoder series <b>EL</b> incremental encoder series <b>ER</b></p> <p><b>MODEL</b> synchronous flange <math>\varnothing</math> 31,75 mm <b>63A</b> centering square flange <math>\varnothing</math> 31,75 mm <b>63D</b> centering square flange <math>\varnothing</math> 50 mm <b>63E</b></p> <p><b>METAL COVER</b> * add for metal cover <b>M</b></p> <p><b>RESOLUTION</b> ppr from 1 to 24000 see table for pulses availability</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 5/28V - output RS-422 <b>RS</b></p> <p><b>SHAFT DIAMETER</b> mm <b>8</b> (3/8") 9,52 mm <b>9</b> mm <b>10</b></p> <p><b>ENCLOSURE RATING</b> IP 54 <b>X</b> 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 connector <b>M</b> JIS-C-5432 connector <b>J</b> M12 connector <b>M12</b> M23 connector <b>H</b> IP40 IEC 60130-9 connector <b>C</b> female connector included, without female please add 162 as variant code</p> <p><b>DIRECTION TYPE</b> axial <b>A</b> radial <b>R</b></p> <p><b>VARIANT</b> custom version <b>XXX</b></p>												

63 A

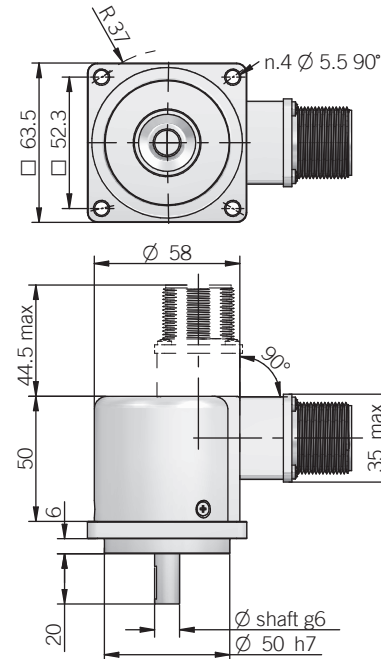


fixing clamps not included, please refer to Accessories section

63 D

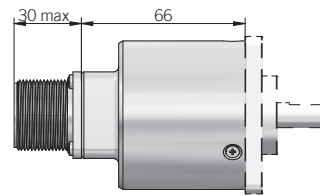


63 E

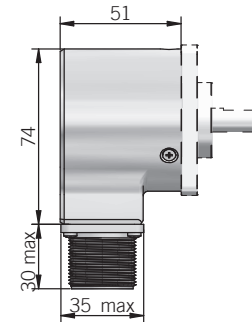


dimensions in mm

Dimension with metal cover and axial output



Dimension with metal cover and radial output



**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 1 to 24000 ppr
<b>Power supply</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>Output type*</b>	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)
<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>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**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

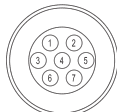
**MECHANICAL SPECIFICATIONS**

<b>Shaft diameter</b>	ø 8 / 9,52 (3/8") / 10 mm
<b>Enclosure rating</b>	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
<b>Max rotation speed</b>	IP 54 - 6000 rpm IP 66 - EL 3000 rpm / 60° C 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>	1,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (36 x 10 <sup>-6</sup> lbfm <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,02 Nm (2,83 Ozin) IP 54 < 0,06 Nm (8,50 Ozin) IP 66
<b>Bearing stage 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 -25° ... +85°C (-13° ... +185°F) ER series
<b>Storage temperature</b>	-25° ... +70°C (-13° ... +158°F)
<b>Weight</b>	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

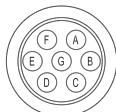
**CONNECTIONS**

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
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	/	/

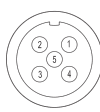
J connector (7 pin)  
JIS-C-5432 Size 16  
solder side view FV



M connector (7 pin)  
Amphenol MS3102-E-16-S  
solder side view FV



M12 connector (5 pin)  
M12 A coded  
solder side view FV



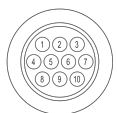
C connector (5 pin)  
IEC 60130-9  
solder side view FV



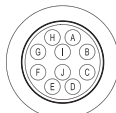
H connector (12 pin) - M23 CCW  
Hummel 7.410.000000 -  
7.002.912.603  
solder side view FV



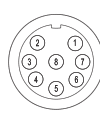
J connector (10 pin)  
JIS-C-5432 Size 16  
solder side view FV



M connector (10 pin)  
Amphenol MS3102-E-18-1  
solder side view FV



M12 connector (8 pin)  
M12 A coded  
solder side view FV



C connector (8 pin)  
IEC 60130-9  
solder side view FV



### 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 60079-1:2007
- EN 60079-31:2014

Declaration of conformity and CE declaration are available for download from Eltra website [www.eltra.it](http://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**  
see table for pulses availability

**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**

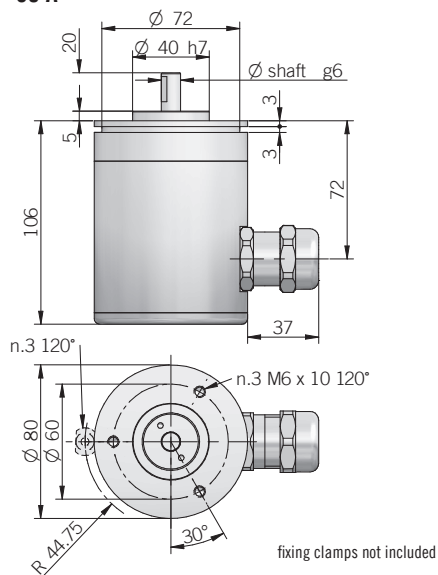
**ENCLOSURE RATING**  
IP **65 X**

**MAX ROTATION SPEED**  
3000 rpm **3**

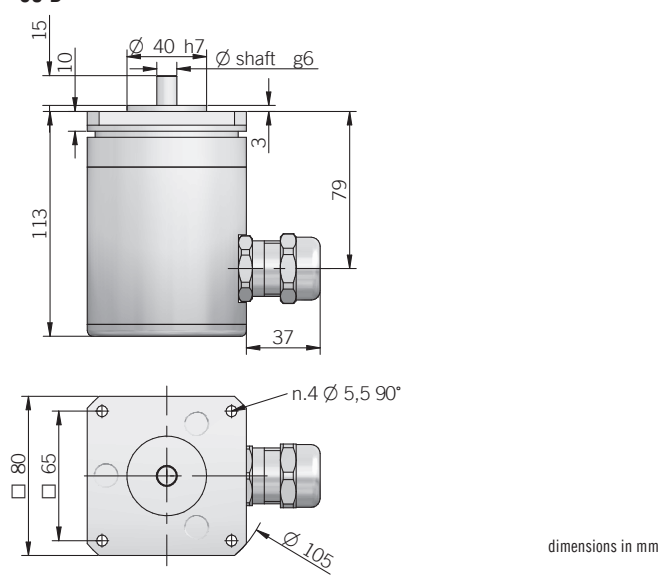
**OUTPUT TYPE**  
radial cable (standard length 1,5 m) **PR**  
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)

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

## 80 A



## 80 D



## ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 100 to 10000 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
<b>Current consumption without load</b>	80 mA max
<b>Max load current</b>	C / P = 50 mA / channel L / RS = 20 mA / channel
<b>Output type*</b>	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)
<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>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

## MECHANICAL SPECIFICATIONS

<b>Shaft diameter</b>	Ø 10 mm
<b>Enclosure rating</b>	IP 65 (IEC 60529)
<b>Max rotation speed</b>	3000 rpm
<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>	1,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (36 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,03 Nm (4,25 Ozin) (4,25 Ozin)
<b>Bearing stage material</b>	anodized aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	anodized aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-20° ... +50°C (-4° ... +122°F)
<b>Storage temperature</b>	-20° ... +70°C (-4° ... +158°F)
<b>Weight</b>	1200 g (42,33 oz)

## ATEX MARKING

**II 2GD**  
 Ex d IIC T6 Gb  
 Ex tb IIIC T85°C Db  
 IP 65

## II 2GD

II: group II: different than mines  
 2: category 2: high level of protection  
 GD: areas containing gas (G) and dust (D)

## Ex d IIC T6 Gb

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 IIIC T85°C Db

Ex tb: flameproof enclosure safety type  
 IIIC: group of dust combustibles IIIC  
 T85°C: max surface temperature +85°C of the device in the presence of dust  
 Db: product with a high level of protection

## CONNECTIONS

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

## RESOLUTIONS

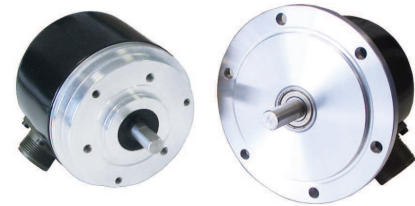
100 - 200 - 360 - 400 - 500 - 1000 - 1024 - 1440 - 2000 - 2048 - 2500 - 3000 - 3600 - 4000 - 4096 - 5000 - 6000 - 7200 - 8000 - 8192 - 9000 - 10000

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 with double electronics 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

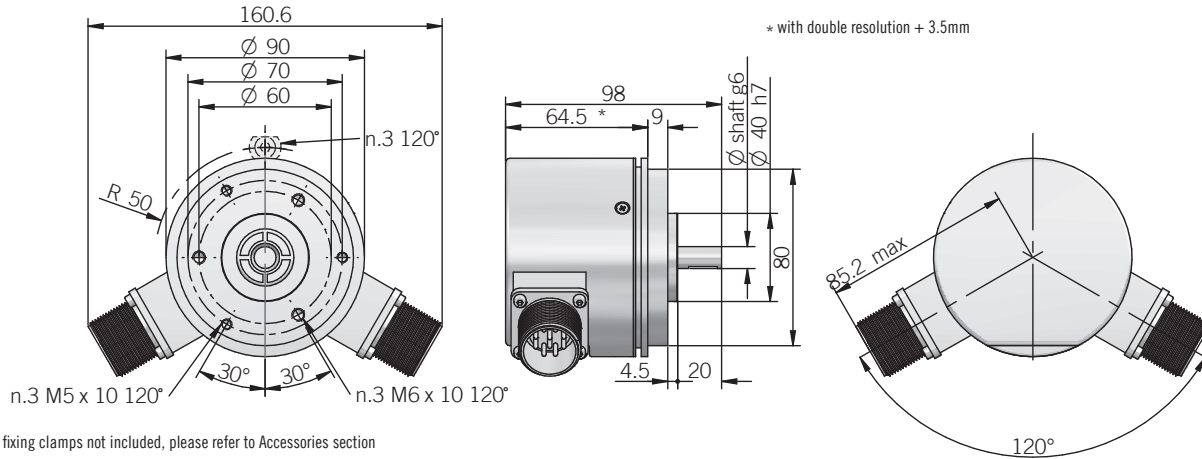


ORDERING CODE	EH	90A	500	S	8/24	P	1000	Z	8/24	P	8	X	6	P	R	.XXX + 2000
<b>SERIES</b> incremental encoder series <b>EH</b>																
<b>MODEL</b> synchronous flange $\varnothing$ 40 mm <b>90A</b> flange REO-444 <b>115A</b> flange REO-444 with centrifugal relay <b>115R</b>																
<b>RESOLUTION</b> ppr from <b>200</b> to <b>2048</b> see table for pulses availability																
<b>ZERO PULSE</b> without zero pulse <b>S</b> with zero pulse <b>Z</b>																
<b>POWER SUPPLY</b> (with L electrical interface) 5 V DC <b>5</b> 8 ... 24 V DC <b>8/24</b>																
<b>ELECTRICAL INTERFACE</b> NPN open collector <b>C</b> push-pull <b>P</b> line driver <b>L</b>																
<b>RESOLUTION</b>																
<b>ZERO PULSE</b>																
<b>POWER SUPPLY</b>																
<b>ELECTRICAL INTERFACE</b>																
<b>SHAFT DIAMETER</b> (mod. 90A) mm <b>8</b> (mod. 90A) (3/8") 9,52 mm <b>9</b> mm <b>10</b> (mod. 115A - 115R) mm <b>11</b>																
<b>ENCLOSURE RATING</b> IP 54 <b>X</b> (mod. 90) IP 66 <b>S</b>																
<b>MAX ROTATION SPEED</b> (IP 66) 3000 rpm <b>3</b> (IP 54) 6000 rpm <b>6</b>																
<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 connector <b>M</b> JIS-C-5432 connector <b>J</b> female connector included, without female please add 162 as variant code																
<b>DIRECTION TYPE</b> axial <b>A</b> radial <b>R</b>																
<b>VARIANT</b> custom version <b>XXX</b>																
<b>RELAY INTERVENTION SPEED</b> (mod. 115R) from <b>600</b> to <b>4300</b> for other speeds please contact our offices directly																

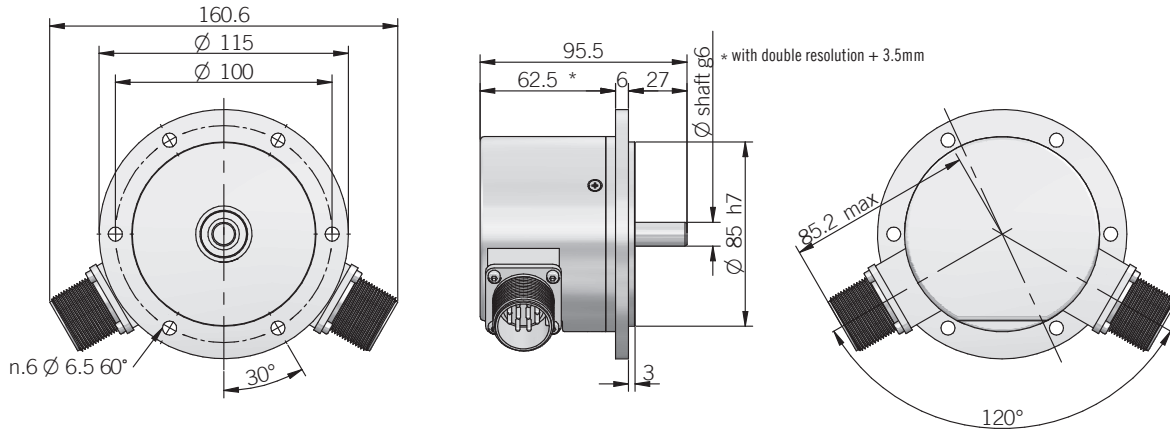
To be indicated only in the models 90A - 115A for double electronics and double resolution  
 See examples:

- Double resolution and double electronics: **EH90A1024Z5L-2048Z8/24L10X...**
- Double resolution and same electronics: **EH90A1024-2048Z5L10X...**
- Same resolution and double electronics: **EH90A1024Z5L-Z8/24L10X...**

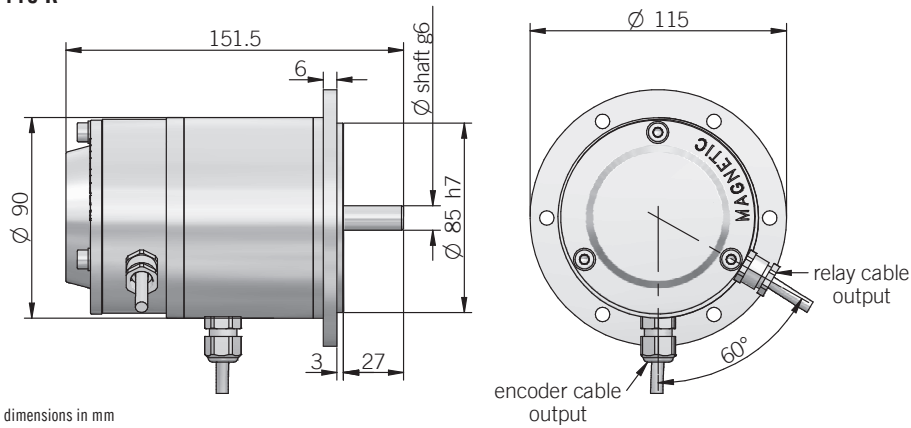
**90 A with double electronics / resolutions**



**115 A with double electronics / resolutions**



**115 R**



**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 200 to 2048 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC (reverse polarity protection)
<b>Current consumption without load</b>	100 mA max
<b>Max load current</b>	C / P = 50 mA / channel L = 20 mA / channel
<b>Output type*</b>	NPN open collector (pull-up max +30V DC) push-pull line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	105 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**RESOLUTIONS**

200 - 250 - 500 - 512 - **1000** - **1024** - **2000** - **2048**

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

**RELAY CHARACTERISTICS**

<b>Intervention speed</b>	from 600 to 4300 rpm
<b>Accuracy</b>	± 3 %
<b>Contact capacity</b>	2 A / 250 V AC 3,3 A / 125 V AC
<b>Type of contact</b>	Normally Closed (NC)

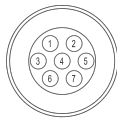
**MECHANICAL SPECIFICATIONS**

<b>Shaft diameter</b>	ø 8 / 9,52 (3/8") / 10 / 11 mm
<b>Enclosure rating</b>	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
<b>Max rotation speed</b>	IP 54 - 6000 rpm IP 66 - 3000 rpm
<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> (83 x 10 <sup>-6</sup> lbft <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,02 Nm (2,8 OzIn) IP 54 < 0,06 Nm (8,5 OzIn) IP 66
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	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)
<b>Storage temperature</b>	-25° ... +70°C (-13° ... +158°F)
<b>Weight</b>	750 g (26,46 oz) 1050 g (37,04 oz) with relay

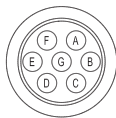
**CONNECTIONS**

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

J connector (7 pin)  
JIS-C-5432 Size 16  
solder side view FV



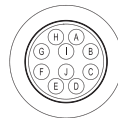
M connector (7 pin)  
Amphenol MS3102-E-16-S  
solder side view FV



J connector (10 pin)  
JIS-C-5432 Size 16  
solder side view FV



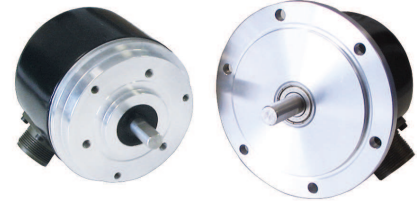
M connector (10 pin)  
Amphenol MS3102-E-18-1  
solder side view FV



### 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 P R .XXX

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

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

**RESOLUTION**  
ppr from **1** to **10000**  
see table for pulses availability

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

**ENCLOSURE RATING**  
IP 54 **X**  
(mod. 90) IP 66 **S**

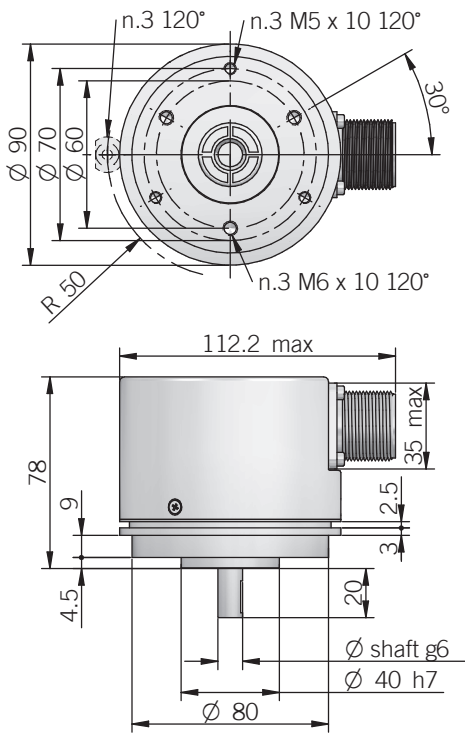
**MAX ROTATION SPEED**  
(IP 66) 3000 rpm **3**  
(IP 54) 6000 rpm **6**

**OUTPUT TYPE**  
cable (standard length 1.5 m) **P**  
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

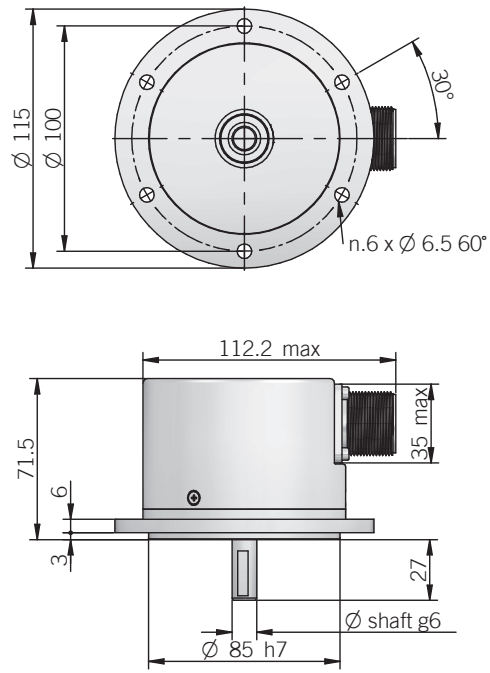
**DIRECTION TYPE**  
axial **A**  
radial **R**

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

90 A

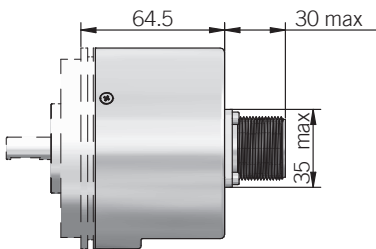


115 A

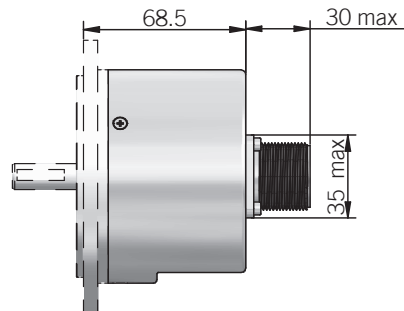


fixing clamps not included, please refer to Accessories section

90 A axial output



115 A axial output



dimensions in mm

**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 1 to 10000 ppr
<b>Power supply</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
<b>Max load current</b>	C / P = 50 mA / channel L / RS = 20 mA / channel
<b>Output type*</b>	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)
<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>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**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**

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

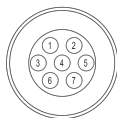
**MECHANICAL SPECIFICATIONS**

<b>Shaft diameter</b>	ø 8 / 9,52 (3/8") / 10 / 11 mm
<b>Enclosure rating</b>	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
<b>Max rotation speed</b>	IP 54 - 6000 rpm IP 66 - EL 3000 rpm / 60° C 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> (83 x 10 <sup>-6</sup> lbfm <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,02 Nm (2,83 Ozin) IP 54 < 0,06 Nm (8,50 Ozin) IP 66
<b>Bearing stage 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 -25° ... +85°C (-13° ... +185°F) ER series
<b>Storage temperature</b>	-25° ... +70°C (-13° ... +158°F)
<b>Weight</b>	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

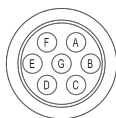
**CONNECTIONS**

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
Ch. A	green	green	3	1	C	A	1	A
Ch. A-	/	brown	/	3	/	C	7	G
Ch. B	yellow	yellow	5	2	E	B	2	B
Ch. B-	/	orange	/	5	/	E	8	H
Ch. Z	blue	blue	4	/	D	/	3	C
Ch. Z-	/	white	/	/	/	/	9	I
⊕	shield	shield	7	7	G	G	10	J

J connector (7 pin)  
JIS-C-5432 Size 16  
solder side view FV



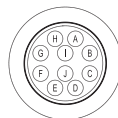
M connector (7 pin)  
Amphenol MS3102-E-16-S  
solder side view FV



J connector (10 pin)  
JIS-C-5432 Size 16  
solder side view FV



M connector (10 pin)  
Amphenol MS3102-E-18-1  
solder side view FV



### MAIN FEATURES

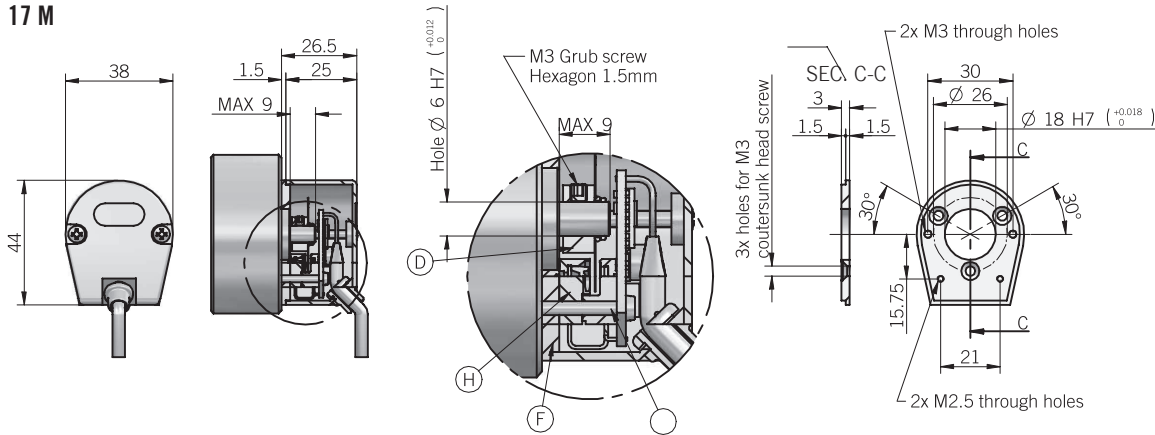
Series of miniaturized encoders for integration on small size AC/DC motors, stepper motors or for limited size applications.

- 3 channel encoder (A / B / Z) up to 1024 ppr
- Power supply up to +24 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- No wear due to absence of bearings
- Easy assembly
- Compact size



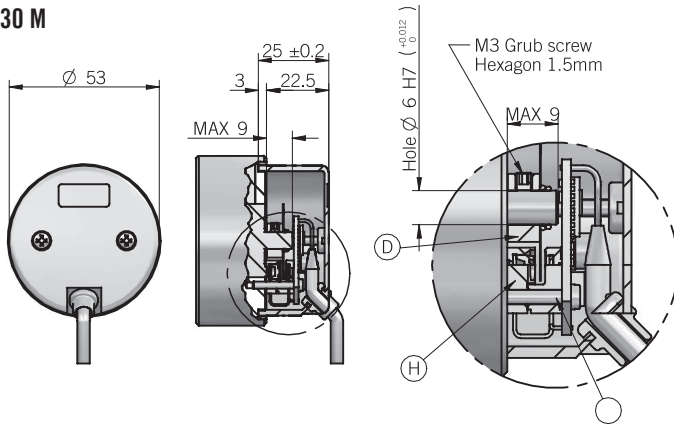
ORDERING CODE	EH	30M	500	S	8/24	P	6	X	6	PR	.XXX
<b>SERIES</b> incremental encoder series <b>EH</b>											
<b>MODEL</b> kit encoder with flange <b>17M</b> kit encoder <b>30M</b>											
<b>RESOLUTION</b> ppr from <b>50</b> to <b>1024</b> see table for pulses availability											
<b>ZERO PULSE</b> without zero pulse <b>S</b> with zero pulse <b>Z</b>											
<b>POWER SUPPLY</b> 5 V DC <b>5</b> 8 ... 24 V DC <b>8/24</b>											
<b>ELECTRICAL INTERFACE</b> NPN open collector <b>C</b> push-pull <b>P</b> line driver <b>L</b> power supply 8/24V - output RS-422 <b>RS</b>											
<b>BORE DIAMETER</b> mm <b>6</b> (1/4") mm <b>6,35</b>											
<b>ENCLOSURE RATING</b> (mod. 17M) IP40 - (mod. 30M) IP 54 <b>X</b>											
<b>MAX ROTATION SPEED</b> 6000 rpm <b>6</b>											
<b>OUTPUT TYPE</b> radial cable (standard length 0,5 m) <b>PR</b> preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
<b>VARIANT</b> custom version <b>XXX</b>											

17 M



HS

30 M



HS

dimensions in mm

ELECTRICAL SPECIFICATIONS	
<b>Resolution</b>	from 50 to 1024 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC
<b>Current consumption without load</b>	50 mA bidirectional 100 mA bidirectional with zero
<b>Max load current</b>	C / P = 50 mA / channel L = 20 mA / channel
<b>Output type*</b>	NPN open collector (pull-up max +30V DC) push-pull line driver HTL (AEC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	105 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

RESOLUTIONS
50* - 100 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 1000 - 1024

\*available only without zero pulse  
please directly contact our offices for other pulses, preferred resolutions in bold

CONNECTIONS

Function	Cable C / P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	ø 6 / 6,35 (1/4") mm
<b>Enclosure rating</b>	mod. 17M IP 40 (IEC 60529) mod. 30M IP 54 (IEC 60529) when properly installed with oring (not supplied)
<b>Max rotation speed</b>	6000 rpm (limited by output frequency)
<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>	0,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (12 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Flange material (mod. 17)</b>	aluminium
<b>Hub material</b>	EN-AW 2011 aluminium
<b>Cover material</b>	PA66 glass fiber reinforced
<b>Operating temperature</b>	-20° ... +60°C (-4° ... +140°F)
<b>Storage temperature</b>	-25° ... +70°C (-13° ... +158°F)
<b>Shaft axial play</b>	± 0,1 mm
<b>Shaft eccentricity (plus radial play)</b>	± 0,04 mm
<b>Fixing torque for grub screws</b>	40 cNm (57 Ozin) max
<b>Weight</b>	50 g (1,76 oz)

### MAIN FEATURES

Series of miniaturized encoders with high resolution for integration on small size AC/DC motors, stepper motors or for limited size applications.

- 3 channel encoder (A / B / Z) up to 5000 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- No wear due to absence of bearings
- Easy assembly
- Compact size

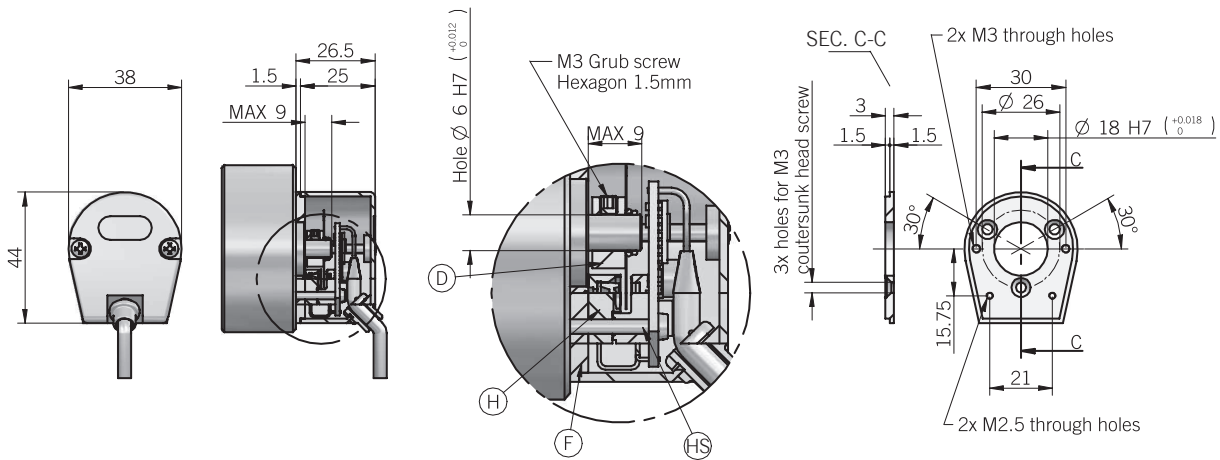


### ORDERING CODE

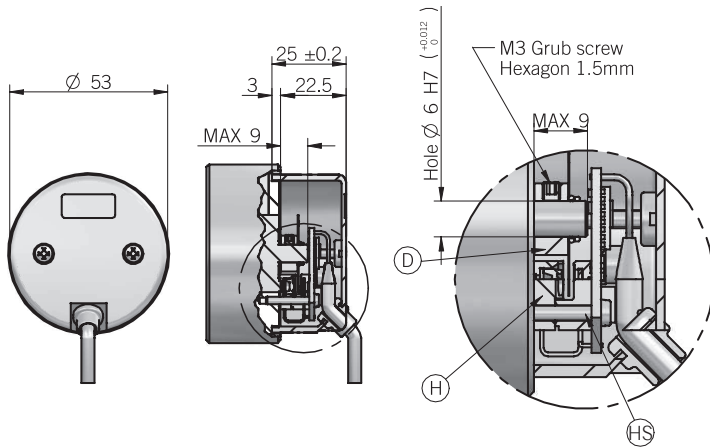
**EH 30MH 2000 S 5/30 P 6 X X PR .XXX**

	<b>SERIES</b>		<b>TYPE</b>		<b>RESOLUTION</b>		<b>ZERO PULSE</b>		<b>POWER SUPPLY</b>		<b>ELECTRICAL INTERFACE</b>		<b>BORE DIAMETER</b>		<b>ENCLOSURE RATING</b>		<b>OPTION</b>		<b>OUTPUT TYPE</b>		<b>VARIANT</b>
	incremental encoder series <b>EH</b>		high resolution kit encoder with flange <b>17MH</b> high resolution kit encoder <b>30MH</b>		ppr <b>2000 / 2048 / 2500 / 4096 / 5000</b>		without zero pulse <b>S</b> with zero pulse <b>Z</b>		5 ...30 V DC <b>5/30</b>		push-pull <b>P</b> line driver <b>L</b> power supply 5/30V - output RS-422 <b>RS</b>		mm <b>6</b> (1/4") mm <b>6,35</b>		(mod. 17MH) IP40 - (mod. 30MH) IP 54 <b>X</b>		to be reported <b>X</b>		radial cable (standard length 0,5 m) <b>PR</b> preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)		custom version <b>XXX</b>

17 MH



30 MH



dimensions in mm

CONNECTIONS

Function	Cable P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	2000 - 2048 - 2500 - 4096 - 5000 ppr
<b>Power supply</b>	4,5 ... 30 V DC (reverse polarity protection)
<b>Current consumption without load</b>	60 mA max
<b>Max load current</b>	20 mA / channel
<b>Output type*</b>	push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	500 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	ø 6 / 6,35 (1/4") mm
<b>Enclosure rating</b>	mod. 17MH IP 40 (IEC 60529) mod. 30MH IP 54 (IEC 60529) when properly installed with oring (not supplied)
<b>Max rotation speed</b>	6000 prm
<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>	0,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (12 x 10 <sup>-6</sup> lbfm <sup>2</sup> )
<b>Flange material (mod. 17)</b>	aluminium
<b>Hub material</b>	EN-AW 2011 aluminium
<b>Cover material</b>	PA66 glass fiber reinforced
<b>Operating temperature</b>	-20° ... +85°C (-4° ... +185°F)
<b>Storage temperature</b>	-20° ... +85°C (-4° ... +185°F)
<b>Shaft axial play</b>	± 0,1 mm
<b>Shaft eccentricity (plus radial play)</b>	± 0,04 mm
<b>Fixing torque for grub screws</b>	40 cNm (57 Ozin) max
<b>Weight</b>	50 g (1,76 oz)

### MAIN FEATURES

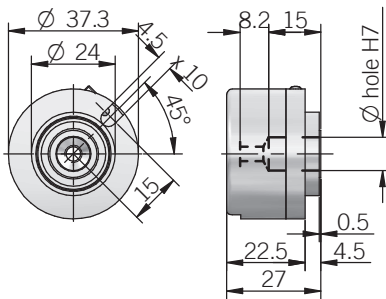
∅ 36 mm encoder series recommended in feedback control systems on AC servomotors, interchangeable with size 15 Resolver in the back of the motor.

- 6 channels encoder with optical generation of “Hall effect phases” (commutation signals)
- Signal transmission by bit parallel bus
- Easy mechanical mounting
- Small dimensions
- Wide range of resolutions available
- High temperature resistance



ORDERING CODE	EF	36K	4	L	512	S	5	L	8	X	6	PR	.XXX
<b>SERIES</b> incremental encoder with Hall phases	EF												
<b>MODEL</b> blind hollow shaft with rear fixing		36K											
<b>MOTOR POLES</b> 4 poles (2 poles pair) 6 poles (3 poles pair) 8 poles (4 poles pair)			4 6 8										
<b>ELECTRICAL INTERFACE FOR COMMUTATION SIGNALS</b> NPN open collector line driver RS-422				C L									
<b>INCREMENTAL RESOLUTION</b> ppr from see table for pulses availability					500 to 1024								
<b>ZERO PULSE</b> without zero pulse with zero pulse						S Z							
<b>POWER SUPPLY</b> 5 V DC							5						
<b>ELECTRICAL INTERFACE FOR INCREMENTAL SIGNALS</b> line driver RS-422								L					
<b>BORE DIAMETER</b> mm (3/8") mm mm									8 9,52 9 10				
<b>ENCLOSURE RATING</b> IP										40			
<b>MAX ROTATION SPEED</b> rpm											6		
<b>OUTPUT TYPE</b> radial cable (standard length 0,3 m) preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)												PR	
<b>VARIANT</b> custom version													XXX

## 36 K



for size 15 Resolver flange please refer to Accessories section  
dimensions in mm

## ELECTRICAL SPECIFICATIONS

<b>Incremental resolution</b>	from 500 to 1024 ppr
<b>Power supply</b>	4,5 ... 5,5 V DC
<b>Current consumption without load</b>	150 mA max
<b>Max load current</b>	20 mA / channel (line driver RS-422) 30 mA / channel (NPN open collector)
<b>Output type for incremental signals</b>	line driver RS-422 (AELT-5000 or equivalent)
<b>Output type for Hall phases</b>	NPN open collector (pull-up max +30V DC) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	150 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

## CONNECTIONS

Function	Cable
+V DC	red
0 V	black
Ch. A	green
Ch. B	yellow
Ch. Z	blue
Ch. A-	brown
Ch. B-	orange or pink
Ch. Z-	white
Ch. U	grey
Ch. V	violet
Ch. W	grey-pink
Ch. U-	red-blue
Ch. V-	white-green
Ch. W-	brown-green
⊕	shield

## MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	ø 8 / 9,52 (3/8") / 10 mm
<b>Enclosure rating</b>	IP 40 (IEC 60529)
<b>Max rotation speed</b>	6000 rpm
<b>Shock</b>	50 G, 11 ms (IEC 60068-2-27)
<b>Vibration</b>	5 G, 10 ... 500 Hz (IEC 60068-2-6)
<b>Moment of inertia</b>	0,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (12 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	EN-AW 2011 aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-10° ... +85°C (+14° ... +185°F)
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Fixing torque for shaft fixing</b>	1,5 Nm max
<b>Weight</b>	150 g (5,29 oz)

## RESOLUTIONS

500 4 / 6 poles  
512 4 / 6 poles  
1000 6 / 8 poles  
1024 4 / 6 / 8 poles

please directly contact our offices for other pulses

### MAIN FEATURES

Miniaturized encoder series for general factory automation applications, small AC motors and gearmotors.

- 3 channel encoder (A / B / Z) up to 14400 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable output, connector available on cable end
- Metal cover for high IP enclosure rating
- Blind hollow shaft diameter up to 10 mm
- Mounting by stator coupling or torque pin

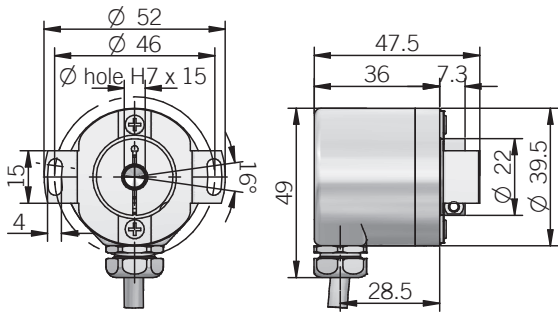


### ORDERING CODE

**ER 38F 500 S 5/30 P 10 X X PR .XXX**

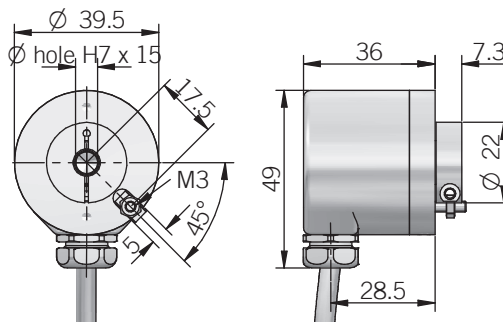
<b>SERIES</b> incremental encoder series <b>EM</b> incremental encoder series <b>ER</b>												
<b>MODEL</b> blind hollow shaft with stator coupling <b>38F</b> blind hollow shaft with torque pin <b>38G</b>												
<b>RESOLUTION</b> ppr from <b>1 ... 14400</b> see table for pulses availability												
<b>ZERO PULSE</b> without zero pulse <b>S</b> with zero pulse <b>Z</b>												
<b>POWER SUPPLY</b> (with L electrical interface) 5 V DC <b>5</b> 5 ... 30 V DC <b>5/30</b>												
<b>ELECTRICAL INTERFACE</b> NPN open collector <b>C</b> push-pull <b>P</b> line driver <b>L</b> power supply 5/30V - output RS-422 <b>RS</b>												
<b>BORE DIAMETER</b> mm <b>6</b> mm <b>8</b> mm <b>10</b>												
<b>ENCLOSURE RATING</b> IP 65 <b>X</b>												
<b>OPTION</b> to be reported <b>X</b>												
<b>OUTPUT TYPE</b> radial cable (standard length 0,5 m) <b>PR</b> preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)												
<b>VARIANT</b> custom version <b>XXX</b>												

38 F



dimensions in mm

38 G



torque pin is included, for mounting instruction please refer to product installation notes

ELECTRICAL SPECIFICATIONS

<b>Sensing principle</b>	magnetic Asic (EM) / reflective OptoAsic (ER)
<b>Resolution</b>	from 1 to 14400 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
<b>Power draw without load</b>	5 = 200 mW typical 5/30 = 800 mW typical
<b>Max load current</b>	C / P = 50 mA / channel L / RS = 20 mA / channel
<b>Output type*</b>	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)
<b>Max output frequency</b>	250 kHz up to 3600 ppr / 500 kHz from 4000 ppr
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Startup time</b>	150 ms
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	Ø 6* / 8* / 10 mm * with supplied adapter shaft
<b>Enclosure rating</b>	IP 65 (IEC 60529)
<b>Max rotation speed</b>	6000 rpm
<b>Max shaft load</b>	5 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>	0,8 x 10 <sup>-6</sup> kgm <sup>2</sup> (19 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	painted aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Fixing torque for collar clamping</b>	0,6 Nm (85 Ozin) recommended
<b>Weight</b>	150 g (5,29 oz)

CONNECTIONS

Function	Cable C / P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

EM SERIES RESOLUTIONS

1 - 2 - 4 - 5 - 6 - 10 - 15 - 16 - 20 - 30 - 32 - 40 - 50 - 70 - 80 - 90

ER SERIES RESOLUTIONS

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

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

### MAIN FEATURES

Hollow shaft  $\varnothing$  48 mm encoder series recommended for motor feedback.

- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +24 V DC with several electrical interfaces available
- Up to 150 kHz output frequency
- Cable output, connector available on cable end
- Through hollow shaft diameter up to 8 mm
- Mounting by stator coupling



### ORDERING CODE

EL 48C 500 S 5 L 8 X 6 PR .XXX

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

**MODEL**  
blind hollow shaft **48C**  
through hollow shaft **48P**

**RESOLUTION**  
ppr from **100** to **2048**  
see table for pulses availability

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

**POWER SUPPLY**  
(with L electrical interface) 5 V DC **5**  
8 ... 24 V DC **8/24**

**ELECTRICAL INTERFACE**  
NPN open collector **C**  
push-pull **P**  
line driver **L**

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

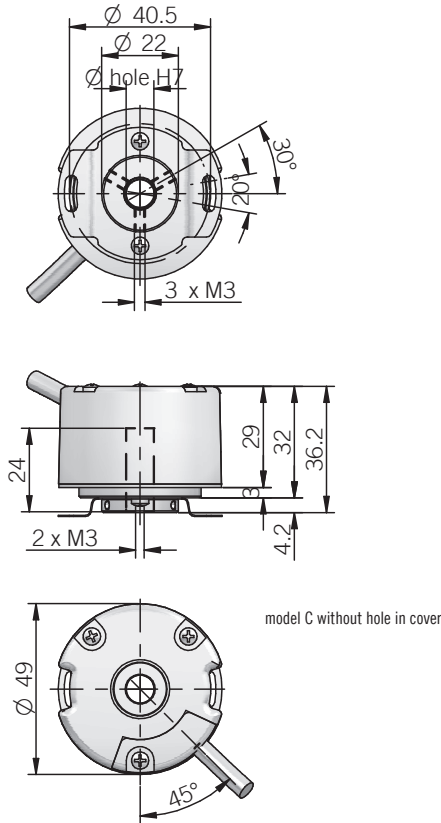
**ENCLOSURE RATING**  
IP **40 X**

**MAX ROTATION SPEED**  
6000 rpm **6**

**OUTPUT TYPE**  
radial cable (standard length 0,3 m) **PR**  
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)

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

48 C / P



dimensions in mm

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 100 to 2048 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC
<b>Current consumption without load</b>	100 mA max
<b>Max load current</b>	C / P = 30 mA / channel L = 20 mA / channel
<b>Output type*</b>	NPN open collector (pull-up max +30V DC) push-pull / line driver HTL (AELC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	150 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	ø 6 / 8 mm
<b>Enclosure rating</b>	IP 40 (IEC 60529)
<b>Max rotation speed</b>	6000 rpm
<b>Shock</b>	50 G, 11 ms (IEC 60068-2-27)
<b>Vibration</b>	10 G, 10 ... 500 Hz (IEC 60068-2-6)
<b>Moment of inertia</b>	2,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (59 x 10 <sup>-6</sup> lbft <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	PA 66 glass fiber reinforced
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-20° ... +85 °C (-4° ... +185°F)
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Weight</b>	100 g (3,53 oz)

CONNECTIONS

Function	Cable C / P	Cable L
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
≡	shield	shield

RESOLUTIONS

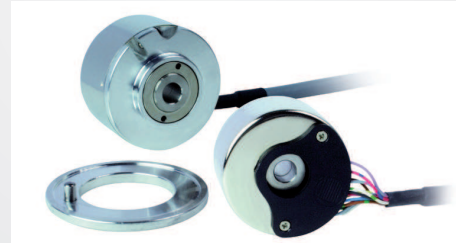
100 - 200 - 360 - 400 - 500 - 512 - 1000 - 1024 - 2000 - 2048

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

### MAIN FEATURES

∅ 49 mm encoder recommended in feedback control systems on AC servomotors,

- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +24 V DC with several electrical interfaces available
- Up to 150 kHz output frequency
- Cable output, connector available on cable end
- Through hollow shaft diameter up to 12,7 mm (1/2")
- Interchangeable with size 19 Resolver



### ORDERING CODE

EL 49C 500 S 5 L 8 X 6 PR .XXX

**SERIES**  
incremental encoder EL

**MODEL**  
blind hollow shaft 49C  
through hollow shaft 49P

**RESOLUTION**  
ppr from 100 to 2048  
see table for pulses availability

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

**POWER SUPPLY**  
(with L electrical interface) 5 V DC 5  
8 ... 24 V DC 8/24

**ELECTRICAL INTERFACE**  
NPN open collector C  
push-pull P  
line driver L

**BORE DIAMETER**  
mm 6  
mm 8  
(3/8") 9,52 mm 9  
mm 10  
mm 12  
(1/2") mm 12,7

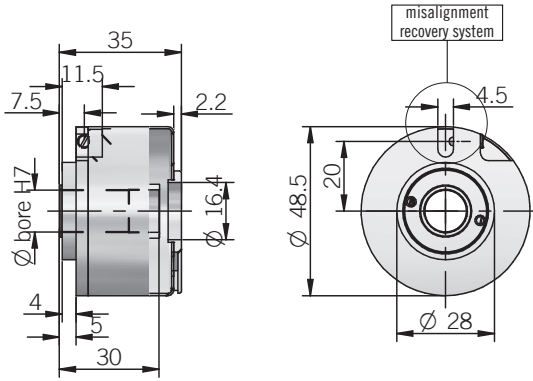
**ENCLOSURE RATING**  
IP 40 X

**MAX ROTATION SPEED**  
6000 rpm 6

**OUTPUT TYPE**  
radial cable (standard length 0,3 m) PR  
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)

**VARIANT**  
custom version XXX

49 C / P



dimensions in mm

ELECTRICAL SPECIFICATIONS	
<b>Resolution</b>	from 100 to 2048 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC
<b>Current consumption without load</b>	100 mA max
<b>Max load current</b>	20 mA / channel
<b>Output type*</b>	NPN open collector (pull-up max +30V DC) push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	150 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS		
Function	Cable C / P	Cable L
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊕	shield	shield

MECHANICAL SPECIFICATIONS	
<b>Bore diameter</b>	ø 6 / 8 / 9,52 (3/8") / 10 / 12 / 12,7 (1/2") mm
<b>Enclosure rating</b>	IP 40 (IEC 60529)
<b>Max rotation speed</b>	6000 rpm
<b>Shock</b>	50 G, 11 ms (IEC 60068-2-27)
<b>Vibration</b>	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
<b>Moment of inertia</b>	2 x 10 <sup>-6</sup> kgm <sup>2</sup> (47 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	nickel plated brass
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-20° ... +85 °C (-4° ... +185°F) -10° ... +100°C (+14° ... +212°F) on demand
<b>Storage temperature</b>	-25° ... +85 °C (-13° ... +185°F)
<b>Weight</b>	150 g (5,29 oz)

RESOLUTIONS
100 - 200 - 500 - 512 - 1000 - 1024 - 2000 - 2048
please directly contact our offices for other pulses

### MAIN FEATURES

∅ 49 mm encoder series recommended in feedback control systems on AC servomotors. They include a traditional incremental encoder and commutation signals (Hall effect phases).

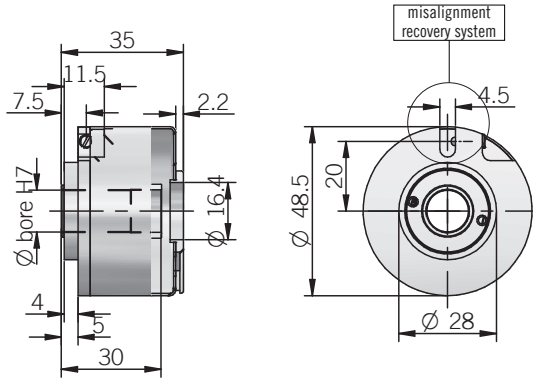
- Easy mechanical mounting
- Small dimensions
- Wide range of resolutions available
- High temperature resistance
- 6 channels encoder with optical generation of “Hall effect phases” (commutation signals)
- Signal transmission by bit parallel bus



ORDERING CODE	EF	49C	6	L	500	S	5	L	8	X	6	PR	.XXX
---------------	----	-----	---	---	-----	---	---	---	---	---	---	----	------

<b>SERIES</b> incremental encoder with Hall phases <b>EF</b>													
<b>MODEL</b> blind hollow shaft <b>49C</b> through hollow shaft <b>49P</b>													
<b>MOTOR POLES</b> 4 poles (2 poles pair) <b>4</b> 6 poles (3 poles pair) <b>6</b> 8 poles (4 poles pair) <b>8</b>													
<b>ELECTRICAL INTERFACE FOR COMMUTATION SIGNALS</b> NPN open collector <b>C</b> line driver RS-422 <b>L</b>													
<b>INCREMENTAL RESOLUTION</b> ppr from <b>100</b> to <b>2048</b> see table for pulses availability													
<b>ZERO PULSE</b> without zero pulse <b>S</b> with zero pulse <b>Z</b>													
<b>POWER SUPPLY</b> 5 V DC <b>5</b>													
<b>ELECTRICAL INTERFACE FOR INCREMENTAL SIGNALS</b> line driver <b>L</b>													
<b>BORE DIAMETER</b> mm <b>6</b> mm <b>8</b> (3/8") 9,52 mm <b>9</b> mm <b>10</b> mm <b>12</b> (1/2") mm <b>12,7</b>													
<b>ENCLOSURE RATING</b> IP 40 <b>X</b>													
<b>MAX ROTATION SPEED</b> 6000 rpm <b>6</b>													
<b>OUTPUT TYPE</b> radial cable (standard length 0,3 m) <b>PR</b> preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)													
<b>VARIANT</b> custom version <b>XXX</b>													

49 C / P



dimensions in mm

**ELECTRICAL SPECIFICATIONS**

<b>Incremental resolution</b>	from 100 to 2048 ppr
<b>Power supply</b>	4,5 ... 5,5 V DC
<b>Current consumption without load</b>	150 mA max
<b>Max load current</b>	20 mA / channel
<b>Output type for incremental signals *</b>	line driver RS-422 (AELT-5000 or equivalent)
<b>Output type for Hall phases*</b>	NPN open collector (pull-up max +30V DC) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	150 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHs</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**CONNECTIONS**

Function	Cable
+V DC	red
0 V	black
Ch. A	green
Ch. B	yellow
Ch. Z	blue
Ch. A-	brown
Ch. B-	orange or pink
Ch. Z-	white
Ch. U	grey
Ch. V	violet
Ch. W	grey-pink
Ch. U-	red-blue
Ch. V-	white-green
Ch. W-	brown-green
⊕	shield

**MECHANICAL SPECIFICATIONS**

<b>Bore diameter</b>	ø 6 / 8 / 9,52 / 10 / 12 / 12,7 mm
<b>Enclosure rating</b>	IP 40 (IEC 60529)
<b>Max rotation speed</b>	6000 rpm
<b>Shock</b>	50 G, 11 ms (IEC 60068-2-27)
<b>Vibration</b>	5 G, 10 ... 500 Hz (IEC 60068-2-6)
<b>Moment of inertia</b>	2 x 10 <sup>-6</sup> kgm <sup>2</sup> (47 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	nickel plated brass
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-20° ... +85 °C (-4° ... +185°F) -10° ... +100°C (+14° ... +212°F) on demand
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Weight</b>	150 g (5,29 oz)

**RESOLUTIONS**

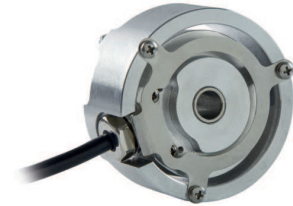
- 100 4 / 6 poles
- 200 4 / 6 poles
- 500 4 / 6 / 8 poles
- 512 4 / 6 / 8 poles
- 1000 4 / 6 / 8 poles
- 1024 4 / 6 / 8 poles
- 2000 4 / 6 / 8 poles
- 2048 4 / 6 / 8 poles

please directly contact our offices for other pulses

### MAIN FEATURES

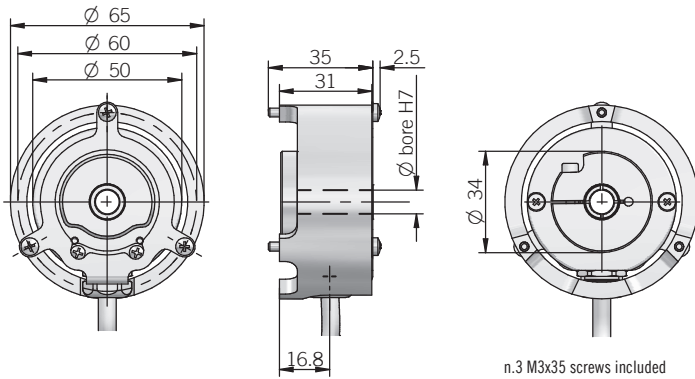
∅ 50 mm encoder recommended for motor feedback. Suitable for small size motors due to its compact dimensions.

- 3 channel encoder (A / B / Z) up to 1024 ppr
- Highly integrated optical ASIC
- Wide power supply up to +30 V DC
- Through hollow shaft up to 10 mm diameter
- Mounting by coupling flange or stator coupling (front or rear fixing)
- IP 65 as protection grade
- Wide temperature range -40 ... + 100°C



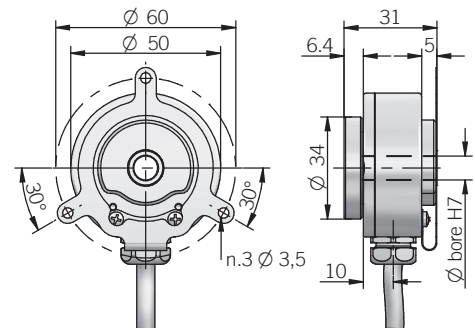
ORDERING CODE	EH	50FP	1024	S	5/30	P	6	X	6	PR	.XXX
<p><b>SERIES</b> incremental encoder series <b>EH</b></p> <p><b>MODEL</b> through hollow shaft with front fixing <b>50FA</b> through hollow shaft with rear fixing <b>50FP</b></p> <p><b>RESOLUTION</b> ppr from <b>100</b> to <b>1024</b> see table for pulses availability</p> <p><b>ZERO PULSE</b> without zero pulse <b>S</b> with zero pulse <b>Z</b></p> <p><b>POWER SUPPLY</b> 5 ... 30 V DC <b>5/30</b></p> <p><b>ELECTRICAL INTERFACE</b> push-pull <b>P</b> line driver <b>L</b> power supply 5/30V - output RS-422 <b>RS</b></p> <p><b>BORE DIAMETER</b> mm <b>6</b> mm <b>8</b> 9,52 mm (3/8") <b>9</b> 10 mm <b>10</b></p> <p><b>ENCLOSURE RATING</b> IP <b>65 X</b></p> <p><b>MAX ROTATION SPEED</b> 6000 rpm <b>6</b></p> <p><b>OUTPUT TYPE</b> radial cable (standard length 0,5 m) <b>PR</b> preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)</p> <p style="text-align: right;"><b>VARIANT</b> custom version <b>XXX</b></p>											

50 FA



dimensions in mm

50 FP



n.3 M3x35 screws included

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 100 to 1024 ppr
<b>Power supply</b>	4,5 ... 30 V DC (with reverse polarity protection)
<b>Power draw without load</b>	800 mW max
<b>Max load current</b>	20 mA / channel
<b>Output type*</b>	push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	105 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS

Function	Cable P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	grey or brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
≡	shield	shield

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	ø 6 / 8 / 9,52 (3/8") / 10 mm
<b>Enclosure rating</b>	IP 65 (IEC 60529)
<b>Max rotation speed</b>	6000 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>	0,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (12 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	EN-AW 2011 aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-40° ... +100 °C (-40° ... +212°F)
<b>Storage temperature</b>	-40° ... +100 °C (-40° ... +212°F)
<b>Fixing torque for collar clamping</b>	1 Nm (142 Ozin) recommended
<b>Weight</b>	150 g (5,29 oz) mod.FP 200 g (7,05 oz) mod.FA

RESOLUTIONS

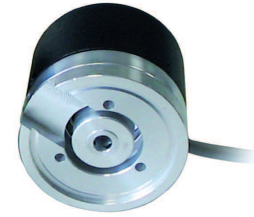
100 - 200 - 256 - **360** - 400 - 500 - **1000** - **1024** ppr

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

### MAIN FEATURES

Encoder series for direct mounting on motors; integrated elastic coupling allows radial and axial shaft play.

- 3 channel encoder (A / B / Z) up to 1024 ppr
- Power supply up to +24 V DC with several electrical interfaces available
- Up to 150 kHz output frequency
- Cable output, connector available on cable end
- Up to 10 mm bore diameter
- Integrated elastic couplig



### ORDERING CODE

**EH 53A 500 S 8/24 P 8 X 6 PR.N XXX**

**SERIES**  
incremental encoder series **EH**

**MODEL**  
adjustable flange model **53A**  
adjustable flange model **53B**

**RESOLUTION**  
ppr from **50** to **1024**  
see table for pulses availability

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

**POWER SUPPLY**  
(with L electrical interface) 5 V DC **5**  
8 ... 24 V DC **8/24**

**ELECTRICAL INTERFACE**  
NPN open collector **C**  
push-pull **P**  
line driver **L**

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

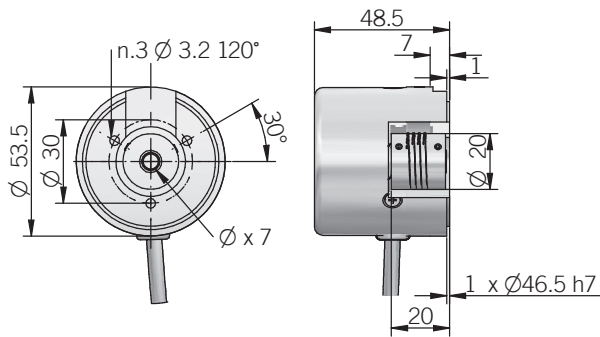
**ENCLOSURE RATING**  
IP 54 **X**

**MAX ROTATION SPEED**  
6000 rpm **6**

**OUTPUT TYPE**  
radial cable (standard length 0,5 m) **PR.N**  
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)

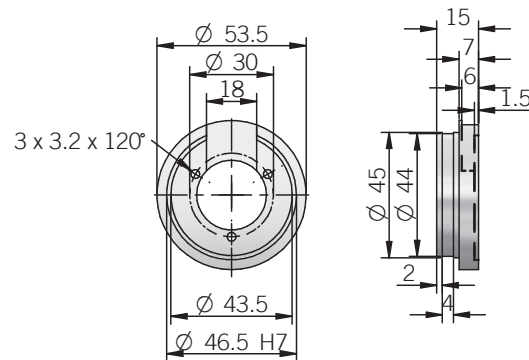
**VARIANT**  
custom version **XXX**

53 A



dimensions in mm

53 B flange



ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 100 to 1024 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC (reverse polarity protection)
<b>Current consumption without load</b>	100 mA max
<b>Max load current</b>	C / P = 50 mA / channel L = 20 mA / channel
<b>Output type*</b>	NPN open collector (pull-up max +30V DC) push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	150 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS

Function	Cable C / P	Cable L
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊕	shield	shield

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	ø 6 / 8 / 10 mm
<b>Enclosure rating</b>	IP 54 (IEC 60529)
<b>Max rotation speed</b>	6000 rpm
<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>	1 x 10 <sup>-6</sup> kgm <sup>2</sup> (24 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	PA66 glass fiber reinforced
<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)
<b>Storage temperature</b>	-25° ... +70°C (-13° ... +158°F)
<b>Weight</b>	150 g (5,29 oz)

RESOLUTIONS

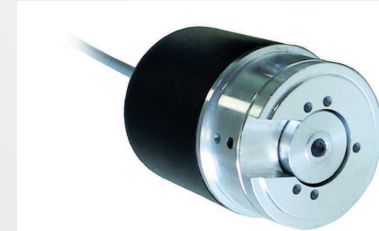
50 - 100 - 120 - 125 - 128 - 150 - 180 - 200 - 250 - 256 - 300 - 360 - 400 - 500 - 512 - 600 - 720 - 1000 - 1024

please directly contact our offices for other pulses

### MAIN FEATURES

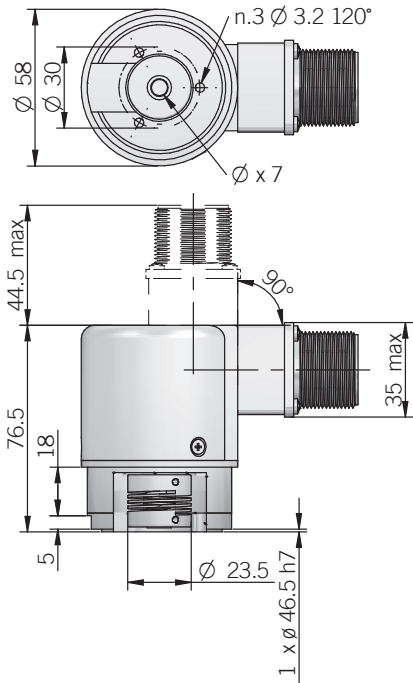
Encoder series for direct mounting on motors; integrated elastic coupling allows radial and axial shaft play.

- 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
- Available with metal cover for heavy duty applications
- Integrated elastic couplig up to 10 mm bore diameter

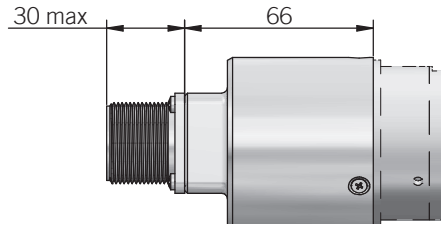


ORDERING CODE	ER	53A	M*	500	S	5/28	P	8	X	6	P	R	XXX
<b>SERIES</b> incremental encoder series <b>EL</b> incremental encoder series <b>ER</b>													
<b>MODEL</b> adjustable flange model <b>53A</b> adjustable flange model <b>53B</b>													
<b>METAL COVER</b> * add for metal cover <b>M</b>													
<b>RESOLUTION</b> ppr from <b>1</b> to <b>10000</b> see table for pulses availability													
<b>ZERO PULSE</b> without zero pulse <b>S</b> with zero pulse <b>Z</b>													
<b>POWER SUPPLY</b> (with L electrical interface) <b>5 V DC 5</b> <b>5 ... 28 V DC 5/28</b>													
<b>ELECTRICAL INTERFACE</b> NPN open collector <b>C</b> push-pull <b>P</b> line driver <b>L</b> power supply 5/28V - output RS-422 <b>RS</b>													
<b>BORE DIAMETER</b> mm <b>6</b> mm <b>8</b> mm <b>10</b>													
<b>ENCLOSURE RATING</b> IP 54 <b>X</b> IP 64 <b>S</b>													
<b>MAX ROTATION SPEED</b> (IP 64) 3000 rpm <b>3</b> (IP 54) 6000 rpm <b>6</b>													
<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 connector <b>M</b> JIS-C-5432 connector <b>J</b> M12 connector <b>M12</b> M23 connector <b>H</b> IP40 IEC 60130-9 connector <b>C</b> female connector included, without female please add 162 as variant code													
<b>DIRECTION TYPE</b> axial <b>A</b> radial <b>R</b>													
<b>VARIANT</b> custom version <b>XXX</b>													

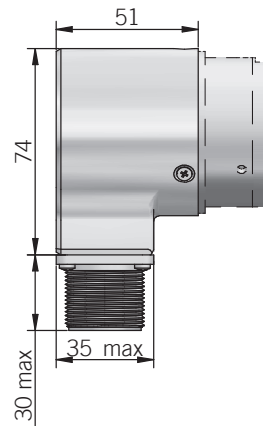
53 A



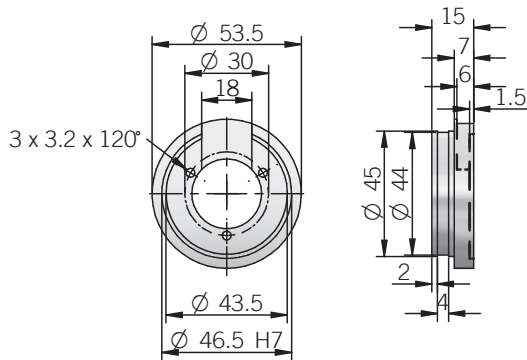
Dimensions with metal cover and axial output



Dimensions with metal cover and radial output



53 B flange



dimensions in mm

**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 1 to 10000 ppr
<b>Power supply</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
<b>Max load current</b>	C / P = 50 mA / channel L / RS = 20 mA / channel
<b>Output type*</b>	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)
<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>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**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**

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

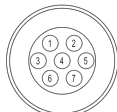
**MECHANICAL SPECIFICATIONS**

<b>Bore diameter</b>	ø 6 / 8 / 10 mm
<b>Enclosure rating</b>	X = IP 54 (IEC 60529) S = IP 64 (IEC 60529)
<b>Max rotation speed</b>	IP 64 - 3000 rpm IP 54 - 6000 rpm
<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>	1 x 10 <sup>-6</sup> kgm <sup>2</sup> (24 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin)
<b>Bearing stage 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) -25° ... +85°C (-13° ... +185°F) ER series
<b>Storage temperature</b>	-25° ... +70°C (-13° ... +158°F)
<b>Weight</b>	350 g (12,35 oz)

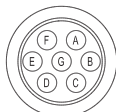
**CONNECTIONS**

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
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	/	/

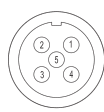
J connector (7 pin)  
JIS-C-5432 Size 16  
solder side view FV



M connector (7 pin)  
Amphenol MS3102-E-16-S  
solder side view FV



M12 connector (5 pin)  
M12 A coded  
solder side view FV



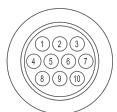
C connector (5 pin)  
IEC 60130-9  
solder side view FV



H connector (12 pin) - M23 CCW  
Hummel 7.410.000000 -  
7.002.912.603  
solder side view FV



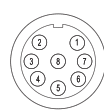
J connector (10 pin)  
JIS-C-5432 Size 16  
solder side view FV



M connector (10 pin)  
Amphenol MS3102-E-18-1  
solder side view FV



M12 connector (8 pin)  
M12 A coded  
solder side view FV



C connector (8 pin)  
IEC 60130-9  
solder side view FV



### 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, spring or torque pin

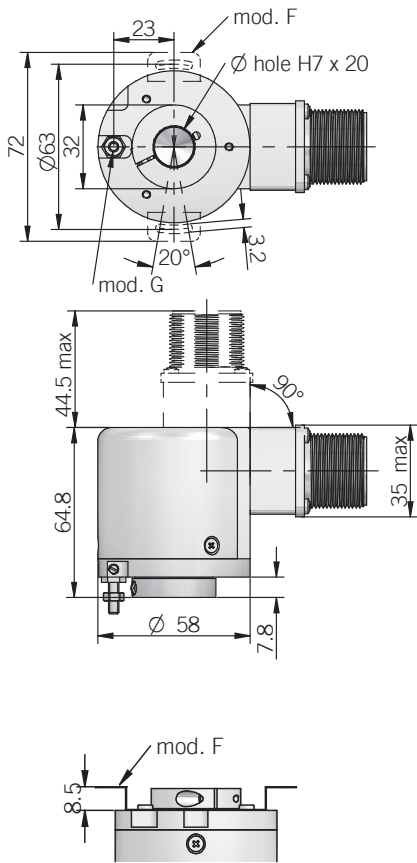


### ORDERING CODE

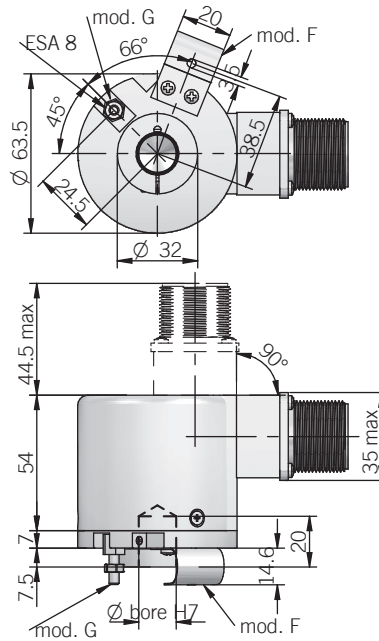
ER 58G M\* 500 S 5/28 P 8 X 3 P R .XXX

ORDERING CODE	ER	58G	M*	500	S	5/28	P	8	X	3	P	R	.XXX
<b>SERIES</b> incremental encoder series <b>EL</b> incremental encoder series <b>ER</b>													
<b>MODEL</b> blind hollow shaft with stator coupling <b>58F</b> blind hollow shaft with torque pin <b>58G</b> blind hollow shaft with spring <b>63F</b> blind hollow shaft with torque pin <b>63G</b>													
<b>METAL COVER</b> * add for metal cover <b>M</b>													
<b>RESOLUTION</b> ppr from <b>1</b> to <b>24000</b> see table for pulses availability													
<b>ZERO PULSE</b> without zero pulse <b>S</b> with zero pulse <b>Z</b>													
<b>POWER SUPPLY</b> (with L electrical interface) <b>5 V DC 5</b> <b>5 ... 28 V DC 5/28</b>													
<b>ELECTRICAL INTERFACE</b> NPN open collector <b>C</b> push-pull <b>P</b> line driver <b>L</b> power supply 5/28V - output RS-422 <b>RS</b>													
<b>BORE DIAMETER</b> mm <b>8</b> mm <b>10</b> mm <b>12</b> mm <b>14</b> mm <b>15</b>													
<b>ENCLOSURE RATING</b> IP <b>54 X</b> IP <b>66 S</b>													
<b>MAX ROTATION SPEED</b> 3000 rpm <b>3</b>													
<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 connector <b>M</b> JIS-C-5432 connector <b>J</b> M12 connector <b>M12</b> M23 connector <b>H</b> IP40 IEC 60130-9 connector <b>C</b> female connector included, without female please add 162 as variant code													
<b>DIRECTION TYPE</b> axial <b>A</b> radial <b>R</b>													
<b>VARIANT</b> custom version <b>XXX</b>													

58 F / G

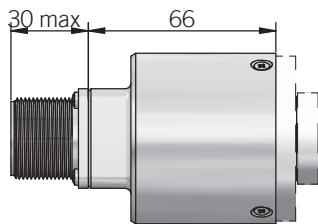


63 F / G

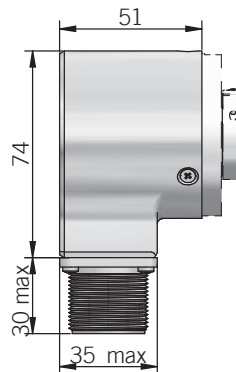


torque pin is included in model G, for mounting instruction please refer to product installation notes

Dimensions with metal cover and axial output



Dimensions with metal cover and radial output



dimensions in mm

**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 1 to 2500 ppr (58 G) from 1 to 24000 ppr (58 F - 63 F / G)
<b>Power supply</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>Output type*</b>	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)
<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>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**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

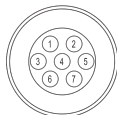
**MECHANICAL SPECIFICATIONS**

<b>Bore diameter</b>	ø 8* / 10* / 12* / 14 / 15 mm * with supplied adapter shaft (valid for resolutions ≥ 3000 ppr)
<b>Enclosure rating</b>	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
<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) IP 54 < 0,06 Nm (8,50 Ozin) IP 66
<b>Bearing stage 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 -20° ... +70°C (-4° ... +158°F) ER series
<b>Storage temperature</b>	-25° ... +70°C (-13° ... +158°F)
<b>Fixing torque for collar clamping</b>	1,5 Nm (212 Ozin) recommended
<b>Weight</b>	350 g (12,35 oz)

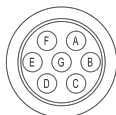
**CONNECTIONS**

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
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	/	/

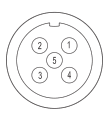
J connector (7 pin)  
JIS-C-5432 Size 16  
solder side view FV



M connector (7 pin)  
Amphenol MS3102-E-16-S  
solder side view FV



M12 connector (5 pin)  
M12 A coded  
solder side view FV



C connector (5 pin)  
IEC 60130-9  
solder side view FV



H connector (12 pin) - M23 CCW  
Hummel 7.410.000000 -  
7.002.912.603  
solder side view FV



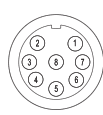
J connector (10 pin)  
JIS-C-5432 Size 16  
solder side view FV



M connector (10 pin)  
Amphenol MS3102-E-18-1  
solder side view FV



M12 connector (8 pin)  
M12 A coded  
solder side view FV



C connector (8 pin)  
IEC 60130-9  
solder side view FV



### MAIN FEATURES

Hollow shaft encoder series for small AC motors, thanks to compact size (only 35mm height).

- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 300 kHz output frequency
- Cable output, connector available on cable end
- Through or blind hollow shaft diameter up to 15 mm
- Shaft fixing by collar clamping

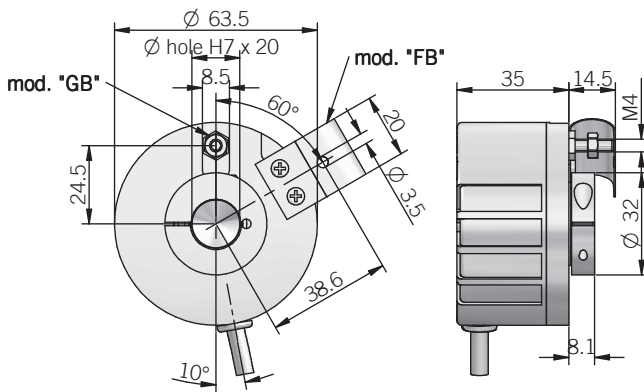


### ORDERING CODE

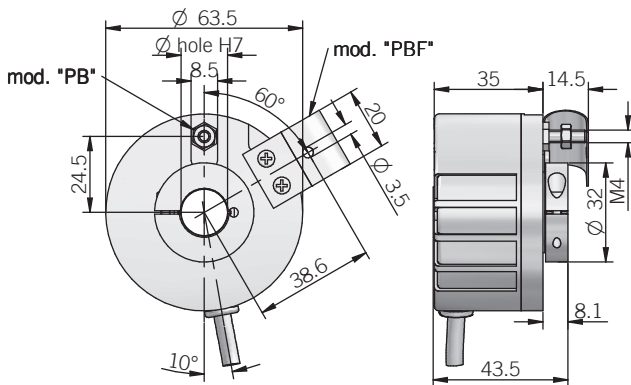
EL 63GB 500 S 5/28 P 8 X 3 PR .XXX

<b>SERIES</b> incremental encoder <b>EL</b>												
<b>MODEL</b> blind hollow shaft with spring <b>63FB</b> blind hollow shaft with torque pin <b>63GB</b> through hollow shaft with torque pin <b>63PB</b> through hollow shaft with spring <b>63PBF</b> rear fixing shaft with torque pin <b>63PC</b> rear fixing shaft with spring <b>63PCF</b>												
<b>RESOLUTION</b> ppr from <b>1</b> to <b>2500</b> see table for pulses availability												
<b>ZERO PULSE</b> without zero pulse <b>S</b> with zero pulse <b>Z</b>												
<b>POWER SUPPLY</b> (with L electrical interface) 5 V DC <b>5</b> 5 ... 28 V DC <b>5/28</b>												
<b>ELECTRICAL INTERFACE</b> NPN open collector <b>C</b> push-pull <b>P</b> line driver <b>L</b> power supply 5/28V - output RS-422 <b>RS</b>												
<b>BORE DIAMETER</b> mm <b>8</b> mm <b>10</b> mm <b>12</b> mm <b>14</b> mm <b>15</b>												
<b>ENCLOSURE RATING</b> IP 54 <b>X</b>												
<b>MAX ROTATION SPEED</b> 3000 rpm <b>3</b>												
<b>OUTPUT TYPE</b> radial cable (standard length 1,5 m) <b>PR</b> preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)												
<b>VARIANT</b> custom version <b>XXX</b>												

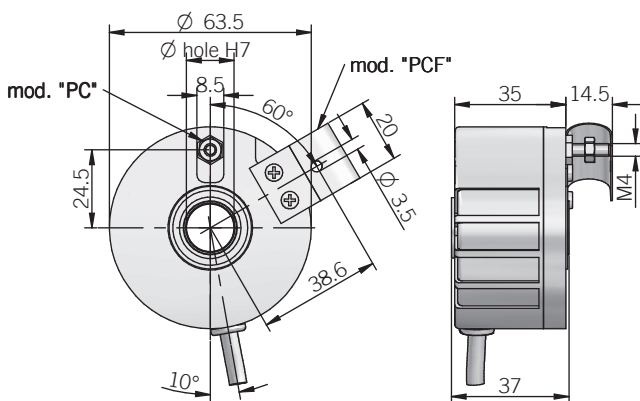
63 FB / GB



63 PB / PBF



63 PC / PCF



torque pin is included in model GB / PB / PC, for mounting instruction please refer to product installation notes  
dimensions in mm

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 1 to 2500 ppr
<b>Power supply</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>Output type*</b>	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)
<b>Max output frequency</b>	300 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	ø 8 / 10 / 12 / 14 / 15 mm
<b>Enclosure rating</b>	IP 54 (IEC 60529)
<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>	< 0,04 Nm (5,66 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	PA 66 glass fiber reinforced
<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)
<b>Storage temperature</b>	-25° ... +70 °C (-13° ... +158°F)
<b>Fixing torque for collar clamping</b>	1,5 Nm (212 Ozin) recommended
<b>Weight</b>	350 g (12,35 oz)

CONNECTIONS

Function	Cable C / P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

RESOLUTIONS

1 - 2 - 5 - **20** - 25 - **32** - 50 - 60 - 100 - 128 - **200** - 250 - 256 - **360** - 400 - 500 - 512 - 600 - 720 - 1000 - **1024** - 1440 - 1800 - **2000** - 2048 - 2500

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

### 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 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
- 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**   **P**   **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 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 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**

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

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

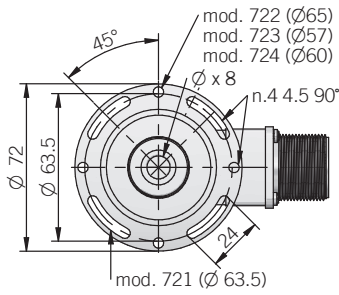
**MAX ROTATION SPEED**  
 (IP 66) 3000 rpm **3**  
 (IP 54) 6000 rpm **6**

**OUTPUT TYPE**  
 cable (standard length 1,5 m) **P**  
 preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)  
 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

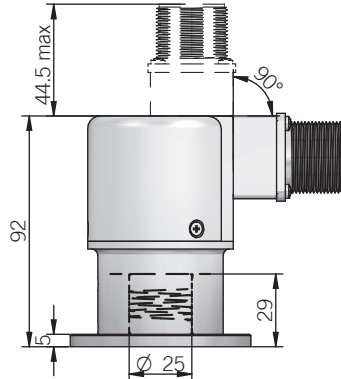
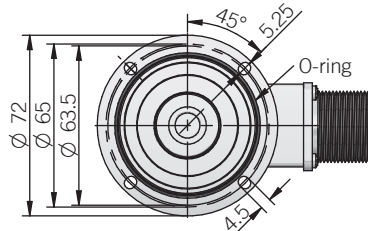
**DIRECTION TYPE**  
 axial **A**  
 radial **R**

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

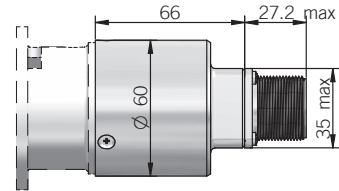
721 A



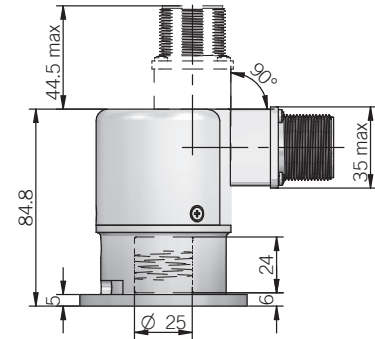
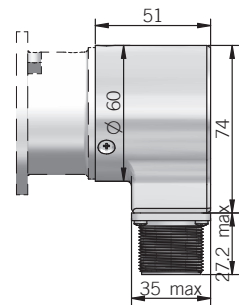
721 A IP 66



Dimensions with metal cover axial output

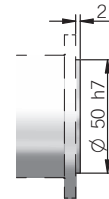


Dimensions with metal cover radial output



dimensions in mm

72 B flange version



ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 1 to 24000 ppr
<b>Power supply</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>Output type*</b>	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)
<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>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS 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 - 750 - 900\* - 1000\* - 1024\* - 1250\* - 1300\* - 1500 - 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** - 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

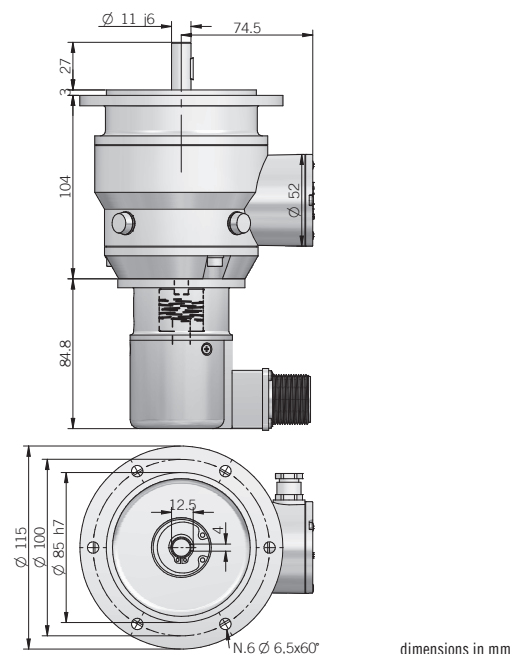
please directly contact our offices for other pulses, preferred resolutions in bold

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	Ø 6 / 8 / 10 mm
<b>Enclosure rating</b>	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
<b>Max rotation speed</b>	IP 54 - 6000 rpm IP 66 - EL 3000 rpm / 60° C 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> (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) IP 54 < 0,04 Nm (5,66 Ozin) IP 66
<b>Bearing stage 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 -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	≤ 1 %	
Effective value ripple	≤ 0,4 %	
Linearity error	≤ 0,2 %	
Reversibility error	± 0,1 %	
Voltage tolerance	± 3 %	
Voltage variation with temperature	-0,02 % / °C	
Insulation class	B	
N. of poles	4	
N. of slots	33	
N. of laminas	33	
Field excitation by magnets	Alnico	
Winding	60 V / 1000 rpm	20 V / 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°C	240 Ω	26 Ω
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 x 10 <sup>-6</sup> kgm <sup>2</sup> (47 x 10 <sup>-6</sup> lbf <sup>2</sup> )	

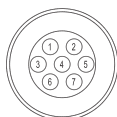
**Application with tachometric dynamo**

**ACCESSORIES**

Description	P/N
Dynamo 60 V / 1000 rpm	94990011
Dynamo 20 V / 1000 rpm	94990012

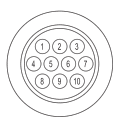
**CONNECTIONS**

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
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	/	/

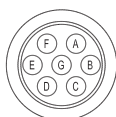
J connector (7 pin)  
JIS-C-5432 Size 16  
solder side view FV



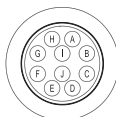
J connector (10 pin)  
JIS-C-5432 Size 16  
solder side view FV



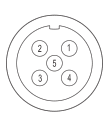
M connector (7 pin)  
Amphenol MS3102-E-16-S  
solder side view FV



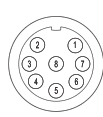
M connector (10 pin)  
Amphenol MS3102-E-18-1  
solder side view FV



M12 connector (5 pin)  
M12 A coded  
solder side view FV



M12 connector (8 pin)  
M12 A coded  
solder side view FV



C connector (5 pin)  
IEC 60130-9  
solder side view FV



C connector (8 pin)  
IEC 60130-9  
solder side view FV



H connector (12 pin) - M23 CCW  
Hummel 7.410.000000 -  
7.002.912.603  
solder side view FV



### MAIN FEATURES

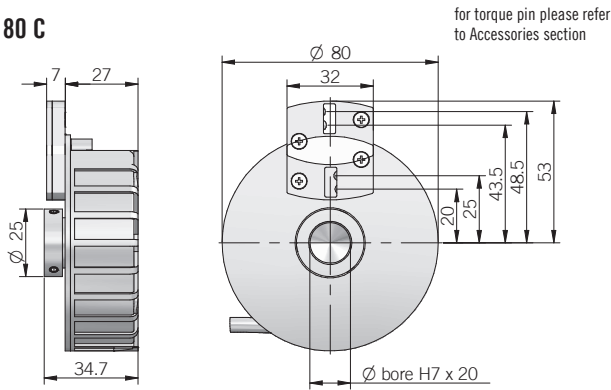
∅ 80 mm encoder series recommended in feedback control systems on AC servomotors.

- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +30 V DC with several electric interfaces available
- Up to 105 kHz output frequency
- Cable output, connector available on cable end
- Through or blind hollow shaft diameter up to 15 mm
- Shaft fixing by grain or collar clamping

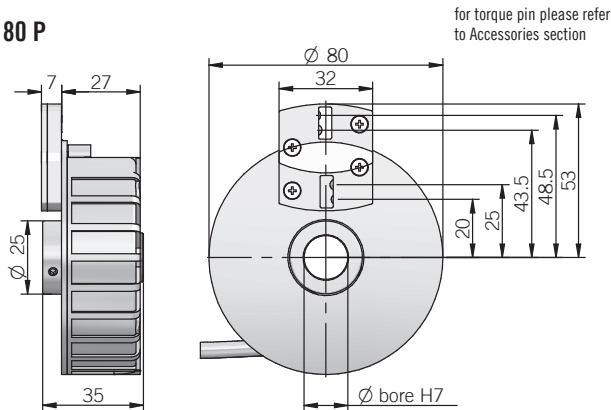


ORDERING CODE	EH80	C	500	S	5	L	8	X	6	PR	.XXX
<p><b>SERIES</b> incremental encoder <b>EH80</b></p> <p><b>MODEL</b> blind hollow shaft <b>C</b> through hollow shaft <b>P</b> through hollow shaft with collar clamping <b>PG</b> blind hollow shaft with rear fixing <b>K</b></p> <p><b>RESOLUTION</b> ppr from <b>1</b> to <b>2048</b> see table for pulses availability</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 5/28V - output RS-422 <b>RS</b></p> <p><b>BORE DIAMETER</b> (mod. C - P) mm <b>8</b> mm <b>10</b> (mod. C - P) mm <b>12</b> (mod. C - P - PG) mm <b>14</b> (mod. C - P - PG) mm <b>15</b></p> <p><b>ENCLOSURE RATING</b> IP 54 <b>X</b></p> <p><b>MAX ROTATION SPEED</b> (mod. P - PG) 3000 rpm <b>3</b> (mod. C - K) 6000 rpm <b>6</b></p> <p><b>OUTPUT TYPE</b> radial (standard length 0,3 m) <b>PR</b> preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)</p> <p style="text-align: right;"><b>VARIANT</b> custom version <b>XXX</b></p>											

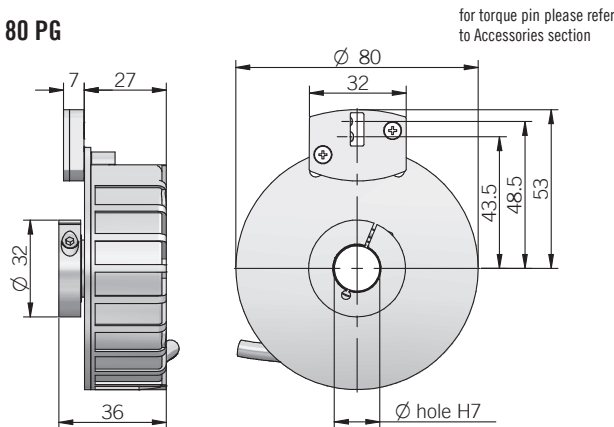
**80 C**



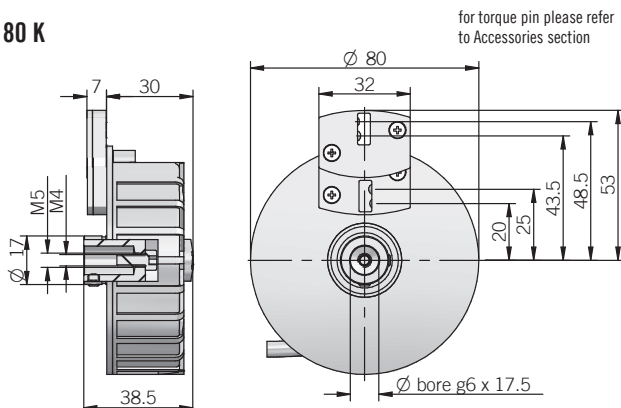
**80 P**



**80 PG**



**80 K**



dimensions in mm

**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 1 to 2048 ppr
<b>Power supply</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>	20 mA / channel
<b>Output type*</b>	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)
<b>Max output frequency</b>	105 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**MECHANICAL SPECIFICATIONS**

<b>Bore diameter</b>	Ø 8 / 10 / 12 / 14 / 15 mm
<b>Enclosure rating</b>	IP 54 (IEC 60529)
<b>Max rotation speed</b>	3000 rpm (mod.P / PG) 6000 rpm (mod.C / K)
<b>Shock</b>	50 G, 11 ms (IEC 60068-2-27)
<b>Vibration</b>	20 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> lbft <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,04 Nm (5,66 Ozin)
<b>Bearing stage material</b>	PA66 glass fiber reinforced
<b>Shaft material</b>	EN-AW 2011 aluminum (mod. C / K) 1.4305 / AISI 303 stainless steel (mod.P / PG)
<b>Housing material</b>	PA66 glass fiber reinforced
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-20° ... +85 °C (-4° ... +185°F) -20° ... +100°C (-4° ... +212°F) on demand
<b>Storage temperature</b>	-25° ... +85 °C (-13° ... +185°F)
<b>Fixing torque for grub screws</b>	max 0,75 Nm (106 Ozin)
<b>Fixing torque for collar clamping</b>	1 Nm recommended (142 Ozin)
<b>Weight</b>	250 g (8,82 oz)

**CONNECTIONS**

Function	Cable C / P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

**RESOLUTIONS**

1 - 2 - 4 - 5 - 10 - 25 - 30 - 50 - 60 - 100\* - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 600 - 1000 - 1024 - 2000 - 2048

\*available only without zero pulse  
please directly contact our offices for other pulses, preferred resolutions in bold

### MAIN FEATURES

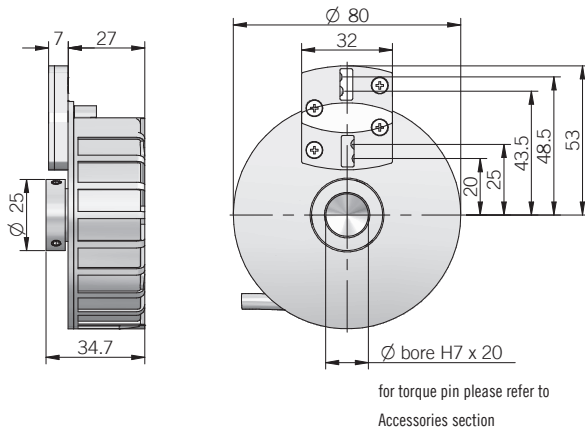
∅ 80 mm encoder series recommended in feedback control systems on AC servomotors. They include a traditional incremental encoder and commutation signals (Hall effect phases).

- Easy mechanical mounting
- Small dimensions
- Wide range of resolutions available
- High temperature resistance
- 6 channels encoder with optical generation of “Hall effect phases” (commutation signals)
- Signal transmission by bit parallel bus

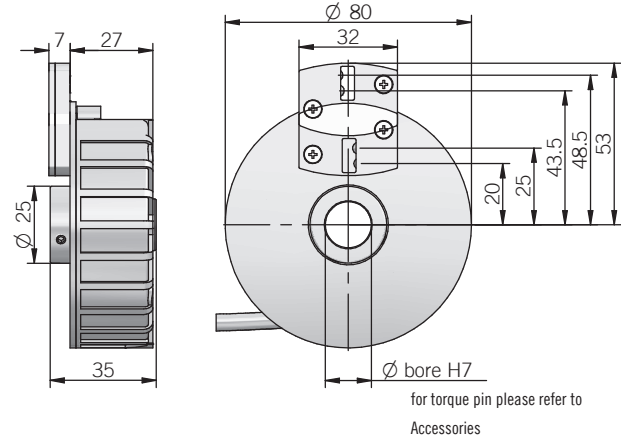


ORDERING CODE	EF80	C	6	L	500	S	5	L	8	X	3	PR	.XXX
<b>SERIES</b> incremental encoder with Hall phases	EF80												
<b>MODEL</b> blind hollow shaft through hollow shaft		C P											
<b>MOTOR POLES</b> 4 poles (2 poles pair) 6 poles (3 poles pair) 8 poles (4 poles pair)			4 6 8										
<b>ELECTRICAL INTERFACE FOR COMMUTATION SIGNALS</b> NPN open collector line driver RS-422				C L									
<b>INCREMENTAL RESOLUTION</b> ppr from see table for pulses availability					200 to 2048								
<b>ZERO PULSE</b> without zero pulse with zero pulse						S Z							
<b>POWER SUPPLY</b> 5 V DC							5						
<b>ELECTRICAL INTERFACE FOR INCREMENTAL SIGNALS</b> line driver RS-422								L					
<b>BORE DIAMETER</b> mm mm mm mm									8 10 14 15				
<b>ENCLOSURE RATING</b> IP										54	X		
<b>MAX ROTATION SPEED</b> (mod. P) (mod. C)											3000 rpm 6000 rpm	3 6	
<b>OUTPUT TYPE</b> radial (standard length 0,3 m) preferred cable lengths 1 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)													PR
<b>VARIANT</b> custom version													XXX

EF 80 C



EF 80 P



dimensions in mm

ELECTRICAL SPECIFICATIONS

<b>Incremental resolution</b>	from 200 to 2048 ppr
<b>Power supply</b>	4,5 ... 5,5 V DC
<b>Current consumption without load</b>	200 mA max
<b>Max load current</b>	20 mA / channel
<b>Output type for incremental signals *</b>	line driver RS-422 (AELT-5000 or equivalent)
<b>Output type for Hall phases*</b>	NPN open collector (pull-up max +30V DC) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	105 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS

Function	Cable
+V DC	red
0 V	black
Ch. A	green
Ch. B	yellow
Ch. Z	blue
Ch. A-	brown
Ch. B-	orange or pink
Ch. Z-	white
Ch. U	grey
Ch. V	violet
Ch. W	grey-pink
Ch. U-	red-blue
Ch. V-	white-green
Ch. W-	brown-green
≡	shield

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	ø 8 / 10 / 14 / 15 mm
<b>Enclosure rating</b>	IP 54 (IEC 60529)
<b>Max rotation speed</b>	3000 rpm (mod.P) 6000 rpm (mod.C)
<b>Shock</b>	50 G, 11 ms (IEC 60068-2-27)
<b>Vibration</b>	20 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>	< 0,04 Nm (5,66 Ozin)
<b>Bearing stage material</b>	PA66 glass fiber reinforced
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	PA66 glass fiber reinforced
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-20° ... +85 °C (-4° ... +185°F)
<b>Storage temperature</b>	-25° ... +85 °C (-13° ... +185°F)
<b>Fixing torque for grub screws</b>	max 0,75 Nm (106 Ozin)
<b>Weight</b>	250 g (8,82 oz)

RESOLUTIONS

200 6 poles	1000 4 / 6 poles
250 6 poles	1024 4 / 6 / 8 poles
500 4 / 6 / 8 poles	2000 6 poles
512 6 poles	2048 6 poles

### MAIN FEATURES

∅ 88 mm through hollow shaft encoder designed for middle size asynchronous motors.

- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- Cable output, connector available on cable end
- Sturdy mechanic
- 25 or 30 mm bore diameter, others on request
- Shaft fixing with grub screws



### ORDERING CODE

**EH 88P 1024 S 5/28 P 30 S 3 PR .XXX**

**SERIES**  
 incremental encoder series **EH**  
 incremental encoder series **EL**

**MODEL**  
 through hollow shaft with spring **88P**

**RESOLUTION**  
 (mod. EH) max ppr **2500**  
 (mod. EL) max ppr **2048**  
 see table for pulses availability

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

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

**ELECTRICAL INTERFACE**  
 NPN open collector **C**  
 push-pull **P**  
 line driver **L**  
 (mod. EH) power supply 5/28V - output RS-422 **RS**

**SHAFT DIAMETER**  
 mm **25**  
 mm **30**  
 please directly contact our offices for other diameters

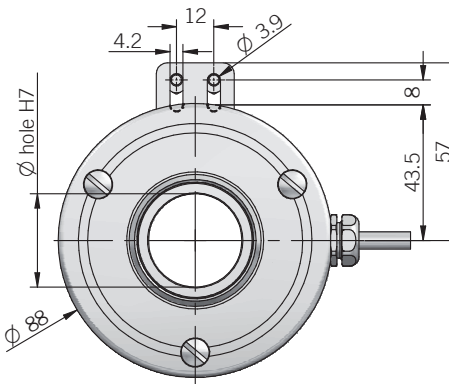
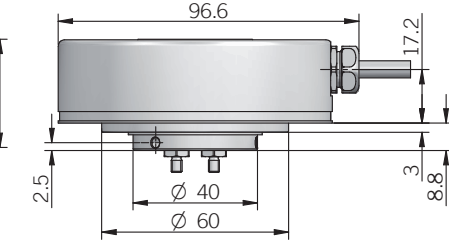
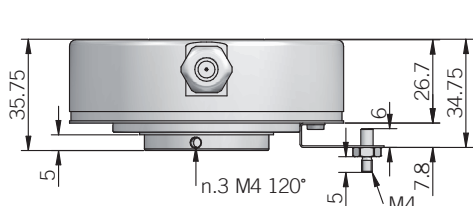
**ENCLOSURE RATING**  
 IP 65 **S**

**MAX ROTATION SPEED**  
 3000 rpm **3**

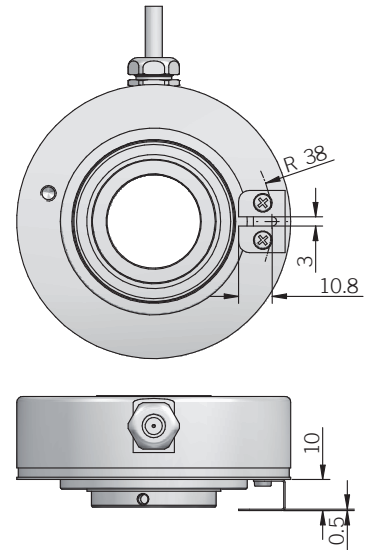
**OUTPUT TYPE**  
 radial cable (standard length 0,5 m) **PR**  
 preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)

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

88 P



OPTIONAL TORQUE STOP



for torque stop please refer to Accessories section

dimensions in mm

n.2 torque pins included

**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 250 to 2500 ppr (EH series) from 2 to 2048 ppr (EL series)
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 5/28 = 4,75 ... 29,4 V DC 8/24 = 7,6 ... 25,2 (reverse polarity protection)
<b>Current consumption without load</b>	100 mA max
<b>Max load current</b>	C / P = 50 mA / channel L / RS = 20 mA / channel
<b>Output type*</b>	NPN open collector (pullup max +30V DC) push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	105 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**CONNECTIONS**

Function	Cable C / P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊕	shield	shield

**MECHANICAL SPECIFICATIONS**

<b>Shaft diameter</b>	ø 25 / 30 mm
<b>Enclosure rating</b>	IP 65 (IEC 60529)
<b>Max rotation speed</b>	3000 rpm
<b>Shock</b>	50 G, 11 ms (IEC 60068-2-27)
<b>Vibration</b>	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
<b>Moment of inertia</b>	45 x 10 <sup>-6</sup> kgm <sup>2</sup> (10,68 x 10 <sup>-4</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,1 Nm (14,16 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	EN-AW 2011 aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-10° ... +70°C (+14° ... +158°F)
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Fixing torque for grub screws</b>	max 0,75 Nm (106 Ozin)
<b>Weight</b>	350 g (12,35 oz)

**EH SERIES RESOLUTIONS**

250 - 256 - 500 - **512** - 700 - 720 - **1000** - **1024** - 1440 - 2500

**EL SERIES RESOLUTIONS**

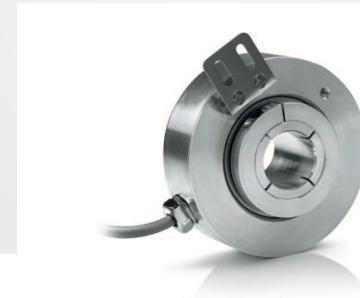
**2** - 5 - 90 - 100 - 200 - **360** - 400 - 600 - 900 - **2000** - 2048

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

### MAIN FEATURES

Cost effective encoder for asynchronous motors, suitable for elevators and stage machinery.

- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- Cable output, connector available on cable end
- Sturdy mechanic
- Up to 40 mm bore diameter
- Shaft fixing by collar clamping

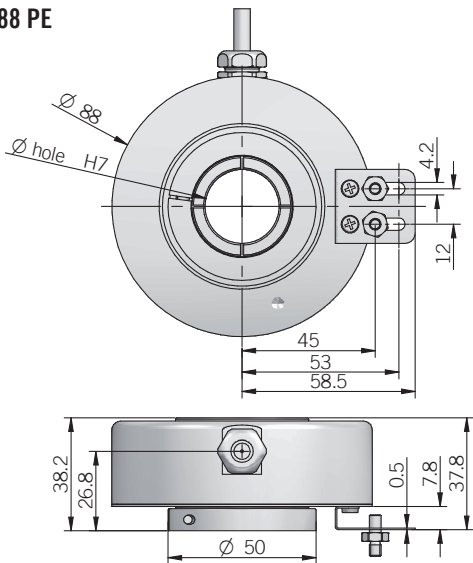


### ORDERING CODE

**EH 88PE 1024 S 5/28 P 30 X 3 PR .XXX**

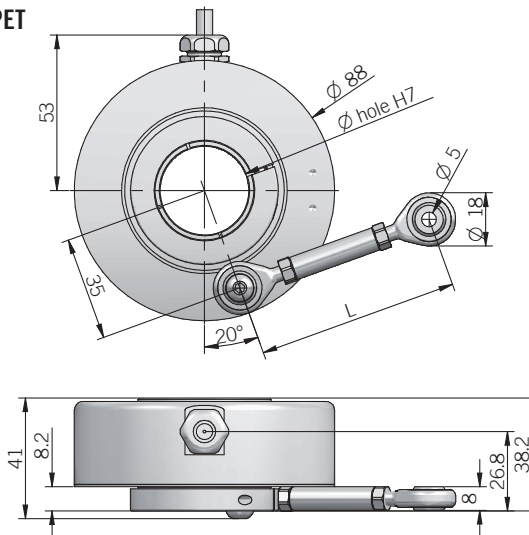
	<b>SERIES</b>		<b>MODEL</b>		<b>RESOLUTION</b>		<b>ZERO PULSE</b>		<b>POWER SUPPLY</b>		<b>ELECTRICAL INTERFACE</b>		<b>BORE DIAMETER</b>		<b>ENCLOSURE RATING</b>		<b>MAX ROTATION SPEED</b>		<b>OUTPUT TYPE</b>		<b>VARIANT</b>
	incremental encoder series <b>EH</b>		through hollow shaft with spring <b>88PE</b> through hollow shaft for torque arm fixing <b>88PET</b> please refer to Accessories section for torque arm		ppr from <b>500</b> to <b>2500</b> see table for pulses availability		without zero pulse <b>S</b> with zero pulse <b>Z</b>		(with L electrical interface) 5 V DC <b>5</b> 5 ... 28 V DC <b>5/28</b>		push-pull <b>P</b> line driver <b>L</b> power supply 5/28V - output RS-422 <b>RS</b>		mm <b>25</b> mm <b>30</b> (mod. PE) mm <b>35</b> (mod. PE) mm <b>38</b> (mod. PE) mm <b>40</b>		IP 54 <b>X</b>		3000 rpm <b>3</b>		radial cable (standard length 0,5 m) <b>PR</b> preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)		custom version <b>XXX</b>

88 PE



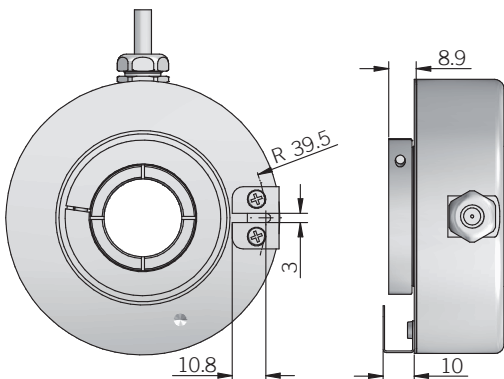
for torque pin please refer to Accessories section

88 PET



torque arm not included, please refer to Accessories section

OPTIONAL TORQUE STOP



dimensions in mm

for torque stop please refer to Accessories section

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 500 to 2500 ppr
<b>Power supply</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
<b>Max load current</b>	20 mA / channel
<b>Output type*</b>	push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	105 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

MECHANICAL SPECIFICATIONS

<b>Bore diameter</b>	ø 25 / 30 / 35 / 38 / 40 mm
<b>Enclosure rating</b>	IP 54 (IEC 60529)
<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>	45 x 10 <sup>-6</sup> kgm <sup>2</sup> (10,68 x 10 <sup>-4</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,02 Nm (2,83 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	up to ø 38 mm: EN-AW 2011 aluminum ø 40 mm: 1.4305/AISI 303 stainless steel
<b>Housing material</b>	EN-AW 2011 aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-30° ... +85°C (-22° ... +185°F)
<b>Storage temperature</b>	-30° ... +85°C (-22° ... +185°F)
<b>Fixing torque for collar clamping</b>	1 Nm recommended (142 Ozin)
<b>Weight</b>	350 g (12,35 oz)

RESOLUTIONS

500 - 512 - 720 - 1000 - 1024 - 1440 - 2500

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

CONNECTIONS

Function	Cable P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊕	shield	shield

### MAIN FEATURES

∅ 120 mm through hollow shaft encoder designed for medium / big size motors.

- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +24 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- Cable output, connector available on cable end
- Through hollow shaft diameter up to 60 mm
- Shaft fixing by grub screws



### ORDERING CODE

**EL 120P 1024 S 5/28 P 50 X 3 PR .XXX**

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

**MODEL**  
through hollow shaft with spring **120P**

**RESOLUTION**  
ppr from **400** to **2048**  
see table for pulses availability

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

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

**ELECTRICAL INTERFACE**  
NPN open collector **C**  
push-pull **P**  
line driver **L**

**BORE DIAMETER**  
mm **40**  
mm **50**  
mm **60**

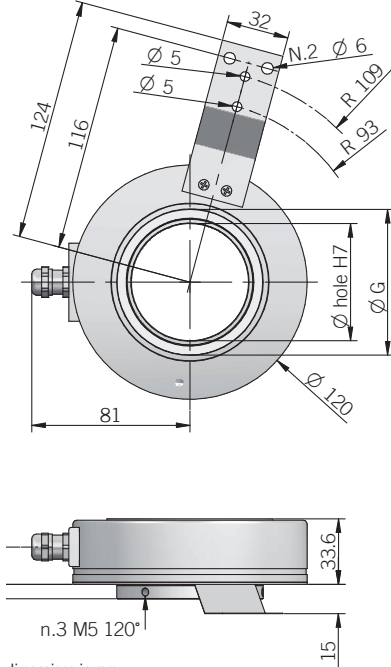
**ENCLOSURE RATING**  
IP 54 **X**

**MAX ROTATION SPEED**  
3000 rpm **3**

**OUTPUT TYPE**  
radial cable (standard length 0,5 m) **PR**  
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)

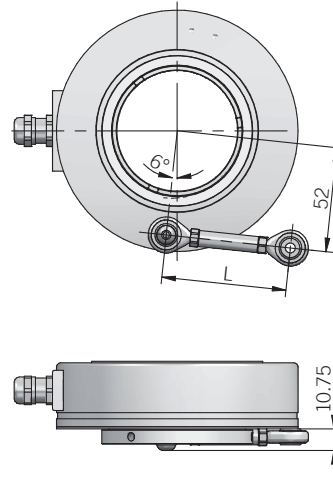
**VARIANT**  
custom version **XXX**

120 P



dimensions in mm

WITH TORQUE ARM



for torque arm please refer to Accessories section

ELECTRICAL SPECIFICATIONS	
<b>Resolution</b>	from 400 to 2048 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 5/28 = 4,75 ... 29,4 V DC 8/24 = 7,6 ... 25,2 V DC (reverse polarity protection)
<b>Current consumption without load</b>	100 mA max
<b>Max load current</b>	C / P = 50 mA / channel L = 20 mA / channel
<b>Output type*</b>	NPN open collector (pullup max +30V DC) push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	105 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHs</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS		
Function	Cable C / P	Cable L
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊕	shield	shield

SHAFT DIAMETER	G
∅ 40	∅ 65
∅ 50	∅ 65
∅ 60	∅ 75

MECHANICAL SPECIFICATIONS	
<b>Bore diameter</b>	∅ 40 / 50 / 60 mm
<b>Enclosure rating</b>	IP 54 (IEC 60529)
<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>	approx 215 x 10 <sup>-6</sup> kgm <sup>2</sup> (51 x 10 <sup>-4</sup> lbft <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,05 Nm (7 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	EN-AW 2011 aluminum
<b>Housing material</b>	EN-AW 2011 aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	0° ... +60 °C (+32° ... +140°F)
<b>Storage temperature</b>	-25° ... +70 °C (-13° ... +158°F)
<b>Fixing torque for grub screws</b>	max 0,75 Nm (106 Ozin)
<b>Weight</b>	750 g (26,46 oz)

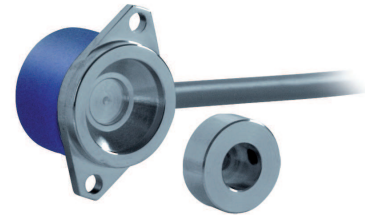
RESOLUTIONS
400 - 800 - 1000 - 1024 - 1440 - 1600 - 2000 - 2048

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

### MAIN FEATURES

EMI series encoders are suitable for several application fields like electric motors marine industry, iron and steel industry, textile machines, wood-working, paper-working, glass working, marble-working machinery and, more generally, automation and process control fields.

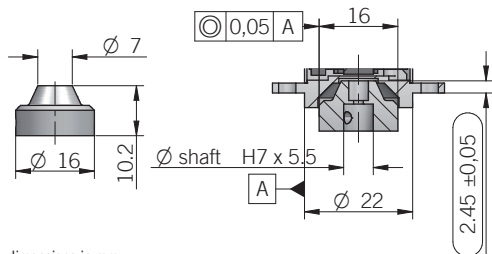
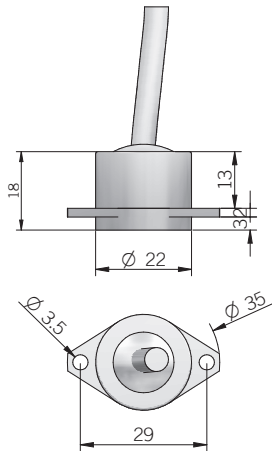
- 3 channel encoder (A / B / Z) up to 2048 ppr
- Cable output, connector available on cable end
- Compact dimensions
- No wear due to no contact magnetic technology
- Bore shaft diameter up to 10 mm
- IP 67 enclosure rating
- Wide operating temperature -40° ... +125°C (-40° ... +257°F)



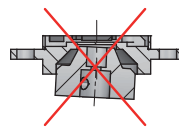
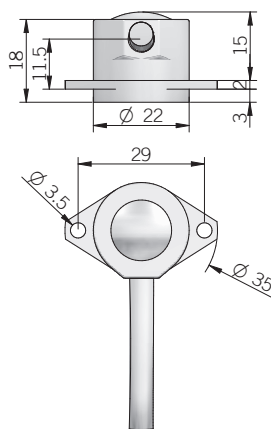
### ORDERING CODE

EMI	22A	1024	Z	5	P	6	S	10	P	R	.XXX
<b>SERIES</b>											
magnetic incremental encoder series <b>EMI</b>											
<b>MODEL</b>											
clamping flange ø 22 mm <b>22A</b>											
for anodized version please directly contact our offices											
<b>RESOLUTION</b>											
ppr from <b>2</b> to <b>2048</b>											
see table for pulses availability											
<b>ZERO PULSE</b>											
without zero pulse <b>S</b>											
with zero pulse <b>Z</b>											
<b>POWER SUPPLY</b>											
5 V DC <b>5</b>											
<b>ELECTRICAL INTERFACE</b>											
push-pull <b>P</b>											
line driver RS-422 <b>L</b>											
<b>MAGNET-ACTUATOR BORE DIAMETER</b>											
mm <b>6</b>											
mm <b>8</b>											
(3/8") 9,52 mm <b>9</b>											
mm <b>10</b>											
<b>ENCLOSURE RATING</b>											
IP 67 <b>S</b>											
<b>MAX ROTATION SPEED</b>											
10000 rpm <b>10</b>											
<b>OUTPUT TYPE</b>											
cable (standard length 0,5 m) <b>P</b>											
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)											
<b>DIRECTION TYPE</b>											
axial <b>A</b>											
radial <b>R</b>											
<b>VARIANT</b>											
custom version <b>XXX</b>											

22 A axial cable output



22 A radial cable output



dimensions in mm

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 2 to 2048 ppr
<b>Power supply</b>	4,5 ... 5,5 V DC
<b>Current consumption without load</b>	100 mA max
<b>Max load current</b>	15 mA / channel
<b>Output type*</b>	push pull / line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	205 kHz
<b>Counting direction</b>	A leads B with clockwise rotation (magnet-actuator view)
<b>Accuracy</b>	± 0,35° typical / ± 0,50° max
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHs</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS

Function	Cable P	Cable L
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

MECHANICAL SPECIFICATIONS

<b>Bore diameter (magnet-actuator)</b>	∅ 6 / 8 / 9,52 (3/8") / 10 mm
<b>Enclosure rating</b>	IP 67 (IEC 60529)
<b>Max rotation speed</b>	10000 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 (magnet-actuator)</b>	0,1 x 10 <sup>-6</sup> kgm <sup>2</sup> (2,4 x 10 <sup>-6</sup> lbft <sup>2</sup> )
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Housing material</b>	EN-AW 2011 aluminum
<b>Magnet-actuator material</b>	EN-AW 2011 aluminum
<b>Operating temperature</b>	-40° ... +125°C (-40° ... +257°F)
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Weight</b>	30 g (1,06 oz)
<b>Magnet actuator mounting tolerances (to get best electrical performances)</b>	± 0,2 mm (axial) ± 0,1 mm (radial)

RESOLUTIONS

2 - 4 - 8 - 10 - 16 - 20 - 32 - 40 - 64 - 80 - 100 - 125 - 128 - 200 - 250 - 256 - 400 - 500 - 512 - 1024 - 2048

### MAIN FEATURES

Series of miniaturized encoders for integration on small size AC/DC motors, stepper motors or for limited size applications.

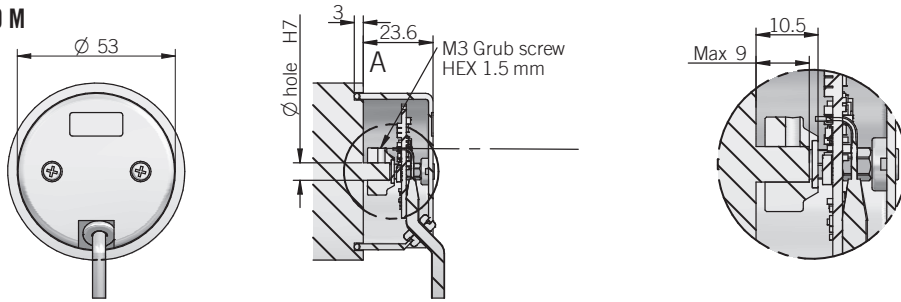
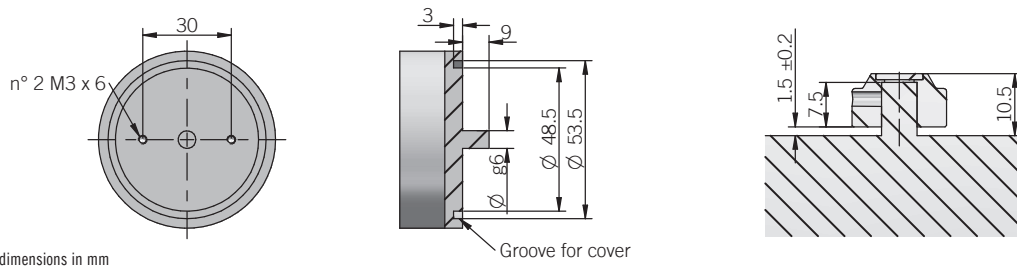
- 3 channel encoder (A / B / Z) up to 90 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Cable output, connector available on cable end
- Compact dimensions (only 23,6 mm height)
- No wear due to no contact magnetic technology
- Bore shaft diameter up to 10 mm
- Wide operating temperature -20° ... +100°C (-4° ... +212°F)
- OEM version without cover available



### ORDERING CODE

EMI	30M	*S	50	Z	5/30	P	6	X	X	PR	.XXX
<b>SERIES</b> magnetic incremental encoder series EMI											
<b>MODEL</b> kit encoder 30M											
<b>COVER</b> * add if without cover S											
<b>RESOLUTION</b> ppr from 1 to 90											
<b>ZERO PULSE</b> without zero pulse S with zero pulse Z											
<b>POWER SUPPLY</b> 5 V DC 5 5 ... 30 V DC 5/30											
<b>ELECTRICAL INTERFACE</b> NPN open collector C push-pull P line driver L power supply 5/30V - output RS-422 RS											
<b>BORE DIAMETER</b> mm 6 (1/4") mm 6,35 mm 8 mm 10											
<b>ENCLOSURE RATING</b> IP 54 X											
<b>OPTION</b> to be reported X											
<b>OUTPUT TYPE</b> radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
<b>VARIANT</b> custom version XXX											

30 M


**RECOMMENDED INTERFACE FLANGE DESIGN**


dimensions in mm

Groove for cover

**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 1 to 90 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
<b>Power draw without load</b>	5 = 200 mW typical 5/30 = < 400 mW
<b>Max load current</b>	C / P = 50 mA for channel L / RS = 20 mA per channel
<b>Output type*</b>	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)
<b>Max output frequency</b>	15 kHz
<b>Counting direction</b>	A leads B clockwise (magnet actuator view)
<b>Accuracy</b>	± 0,35° typical / ± 0,90° max according to mounting tolerances and temperature range
<b>Startup time</b>	150 ms
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHs</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**MECHANICAL SPECIFICATIONS**

<b>Bore diameter</b>	ø 6 / 6,35 (1/4") / 8 / 10 mm
<b>Enclosure rating</b>	IP 54 (IEC 60529) when properly installed with supplied oring
<b>Max rotation speed</b>	limited only by output frequency
<b>Shock</b>	50 G, 11 ms (IEC 60068-2-27)
<b>Vibration</b>	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
<b>Moment of inertia</b>	0,1 x 10 <sup>-6</sup> kgm <sup>2</sup> (2,4 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Magnet-actuator material</b>	EN-AW 2011 aluminium
<b>Cover material</b>	PA66 glass fiber reinforced
<b>Operating temperature</b>	-20° ... +100°C (-4° ... +212°F)
<b>Storage temperature</b>	-20° ... +100°C (-4° ... +212°F)
<b>Nominal airgap + shaft axial play</b>	0,75 mm ± 0,5 mm (including mounting tolerances)
<b>PCB fixing holes / shaft eccentricity tolerance</b>	± 0,5 mm
<b>Fixing torque for grub screws</b>	40 cN (57 Ozin) max
<b>Weight</b>	100 g approx (3,5 oz)

**CONNECTIONS**

Function	Cable C / P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊕	shield	shield

### MAIN FEATURES

Thanks to the magnetic technology, the EMI 38 series is suitable for harsh environment applications such as marble and glass working machines, washing systems and generally for industrial automation.

- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Cable output, connector available on cable end
- Compact dimensions
- Blind hollow shaft diameter up to 10 mm with shaft fixing by collar clamping
- Sturdy construction due to separated chambers design
- Wide operating temperature -25° ... +100°C (-13° ... +212°F)



### ORDERING CODE

EMI 38F 1024 Z 5 L 6 X 6 PR .XXX

**SERIES**  
magnetic incremental encoder series EMI

**MODEL**  
blind hollow shaft with stator coupling 38F  
blind hollow shaft with torque pin 38G

**RESOLUTION**  
ppr from 2 to 2048  
see table for pulses availability

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

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

**ELECTRICAL INTERFACE**  
push-pull P  
line driver L

**SHAFT DIAMETER**  
mm 6  
mm 8  
(3/8") 9,52 mm 9  
mm 10

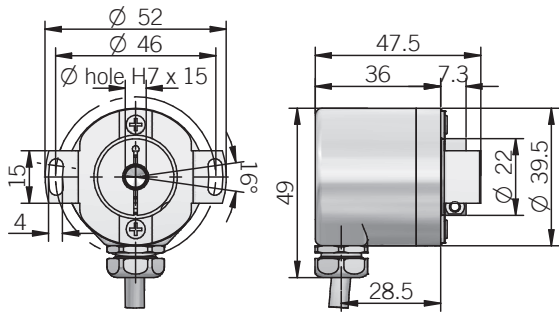
**ENCLOSURE RATING**  
IP 64 X  
IP 66 S

**MAX ROTATION SPEED**  
(IP 66) 3000 rpm 3  
(IP 64) 6000 rpm 6

**OUTPUT TYPE**  
radial cable (standard length 0,5 m) PR  
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)

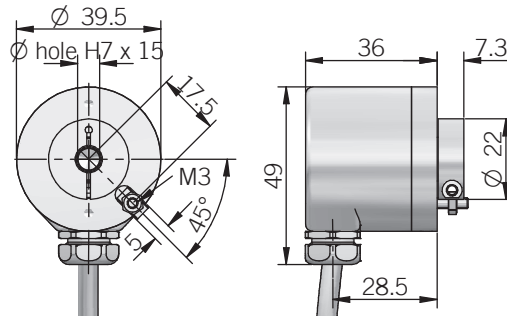
**VARIANT**  
custom version XXX

38 F



dimensions in mm

38 G



torque pin is included, for mounting instruction please refer to product installation notes

**ELECTRICAL SPECIFICATIONS**

<b>Resolution</b>	from 2 to 2048 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 5/28 = 4,75 ... 29,4 V DC 8/24 = 7,6 ... 25,2 V DC (reverse polarity protection)
<b>Current consumption without load</b>	80 mA max
<b>Max load current</b>	15 mA / channel
<b>Output type*</b>	push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	205 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Accuracy</b>	± 0,35° typical / ± 0,50° max
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHs</b>	according to 2011/65/EU directive

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

**RESOLUTIONS**

2 - 4 - 8 - 10 - 16 - 20 - 32 - 40 - 64 - 80 - 100 - 125 - 128 - 200 - 250 - 256 - 400 - 500 - 512 - 1024 - 2048

**CONNECTIONS**

Function	Cable P	Cable L
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

**MECHANICAL SPECIFICATIONS**

<b>Shaft diameter</b>	∅ 6* / 8* / 9,52 (3/8") / 10 mm * with supplied adapter shaft
<b>Enclosure rating</b>	X = IP 64 (IEC 60529) S = IP 66 (IEC 60529)
<b>Max rotation speed</b>	IP 66 - 3000 rpm IP 64 - 6000 rpm
<b>Max shaft load</b>	5 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>	0,25 x 10 <sup>-6</sup> kgm <sup>2</sup> (6 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,02 Nm (2,83 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	painted aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearing lifetime</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-25° ... +100°C (-13° ... +212°F)
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Fixing torque for collar clamping</b>	0,6 Nm (85 Ozin) recommended
<b>Weight</b>	150 g (5,29 oz)

### MAIN FEATURES

Thanks to the magnetic technology, EMI 40 series is suitable for harsh environment applications such as marble and glass working machines, washing systems and generally for industrial automation.

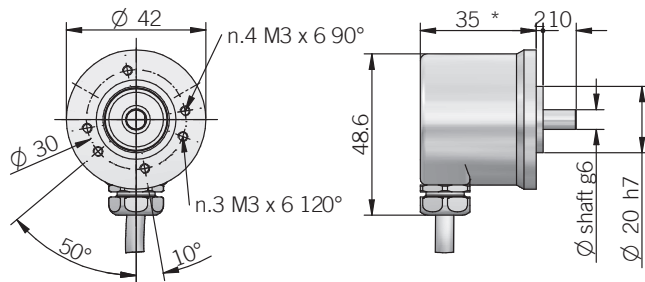
- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Cable output, connector available on cable end
- Compact dimensions
- Solid shaft diameter up to 6 mm
- Sturdy construction due to separated chambers design
- Wide operating temperature -25° ... +100°C (-13° ... +212°F)



### ORDERING CODE

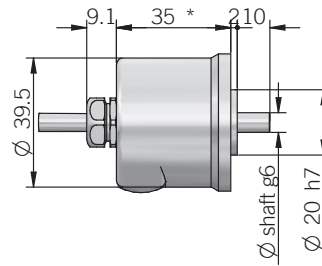
EMI	40A	1024	Z	5	L	6	X	3	P	R	.XXX
<b>SERIES</b>											
magnetic incremental encoder series <b>EMI</b>											
<b>MODEL</b>											
clamping flange ø 20 mm <b>40A</b>											
<b>RESOLUTION</b>											
ppr from <b>2</b> to <b>2048</b> <i>see table for pulses availability</i>											
<b>ZERO PULSE</b>											
without zero pulse <b>S</b> with zero pulse <b>Z</b>											
<b>POWER SUPPLY</b>											
(with L electrical interface) 5 V DC <b>5</b> (with L or PC electrical interface) 8 ... 24 V DC <b>8/24</b> 5 ... 28 V DC <b>5/28</b>											
<b>ELECTRICAL INTERFACE</b>											
push-pull <b>P</b> line driver <b>L</b>											
<b>SHAFT DIAMETER</b>											
mm <b>4</b> mm <b>6</b>											
<b>ENCLOSURE RATING</b>											
IP 64 <b>X</b> IP 66 <b>S</b>											
<b>MAX ROTATION SPEED</b>											
(IP 66) 3000 rpm <b>3</b> (IP 64) 6000 rpm <b>6</b>											
<b>OUTPUT TYPE</b>											
cable (standard length 0,5 m) <b>P</b> preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)											
<b>DIRECTION TYPE</b>											
axial <b>A</b> radial <b>R</b>											
<b>VARIANT</b>											
custom version <b>XXX</b>											

40 A radial cable output



dimensions in mm

40A axial cable output



\* IP66 + 7mm

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 2 to 2048 ppr
<b>Power supply</b>	5 = 4,5 ... 5,5 V DC 5/28 = 4,75 ... 29,4 V DC 8/24 = 7,6 ... 25,2 V DC (reverse polarity protection)
<b>Current consumption without load</b>	80 mA max
<b>Max load current</b>	15 mA / channel
<b>Output type*</b>	push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	205 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Accuracy</b>	± 0,35° typical / ± 0,50° max
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS

Function	Cable P	Cable L
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊕	shield	shield

MECHANICAL SPECIFICATIONS

<b>Shaft diameter</b>	Ø 4 / 6 mm
<b>Enclosure rating</b>	X = IP 64 (IEC 60529) S = IP 66 (IEC 60529)
<b>Max rotation speed</b>	IP 66 - 3000 rpm IP 64 - 6000 rpm
<b>Max shaft load</b>	5 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>	0,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (12 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,02 Nm (2,83 Ozin)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	painted aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearing lifetime</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-25° ... +100°C (-13° ... +212°F)
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Weight</b>	150 g (5,29 oz)

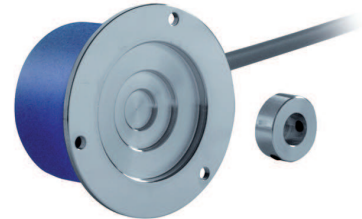
RESOLUTIONS

2 - 4 - 8 - 10 - 16 - 20 - 32 - 40 - 64 - 80 - 100 - 125 - 128 - 200 - 250 - 256 - 400 - 500 - 512 - 1024 - 2048

### MAIN FEATURES

EMI series encoders are suitable for several application fields like electric motors marine industry, iron and steel industry, textile machines, wood-working, paper-working, glass working, marble-working machinery and, more generally, automation and process control fields.

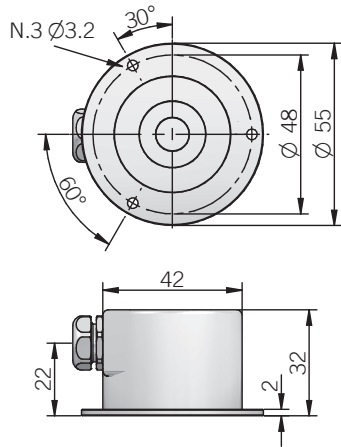
- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Cable or M12 connector output, other connector available on cable end
- Compact dimensions
- No wear due to no contact magnetic technology
- Bore shaft diameter up to 10 mm
- IP 67 Enclosure rating
- Wide operating temperature -40° ... +125°C (-40° ... +257°F)



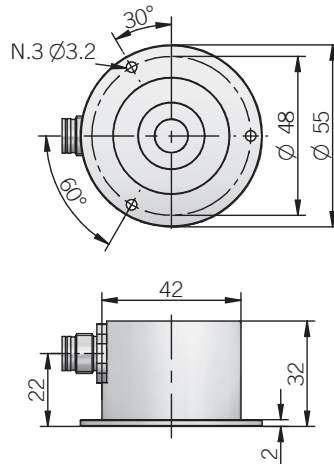
### ORDERING CODE

	EMI	55A	512	Z	5/28	P	10	X	10	P	R	.XXX
<b>SERIES</b> magnetic incremental encoder series	EMI											
<b>MODEL</b> fixing holes ø 48 mm	55A											
fixing holes ø 48 mm anodized	55AY											
<b>RESOLUTION</b> ppr from	2 to 2048											
see table for pulses availability												
<b>ZERO PULSE</b> without zero pulse	S											
with zero pulse	Z											
<b>POWER SUPPLY</b> (with L electrical interface) 5 V DC	5											
5 ... 28 V DC	5/28											
<b>ELECTRICAL INTERFACE</b> push-pull	P											
line driver	L											
power supply 5/28 V - output RS-422	RS											
<b>MAGNET ACTUATOR BORE DIAMETER</b> mm	6											
mm	8											
(3/8")	9,52 mm											
mm	10											
<b>ENCLOSURE RATING</b> IP 64	X											
IP 67	S											
<b>MAX ROTATION SPEED</b> 10000 rpm	10											
<b>OUTPUT TYPE</b> cable (standard length 0,5 m)	P											
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)												
M12 connector	M12											
female connector included, without female please add 162 as variant code												
<b>DIRECTION TYPE</b> axial	A											
radial	R											
<b>VARIANT</b> custom version	XXX											

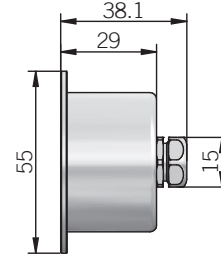
55 A radial cable output



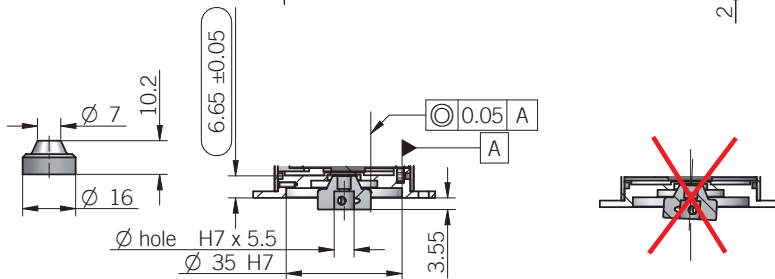
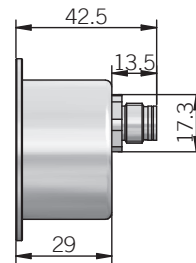
55 A radial M12 output



55 A axial cable output



55 A axial M12 output



dimensions in mm

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 2 to 2048 ppr
<b>Power supply</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>	15 mA / channel
<b>Output type*</b>	push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	205 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Accuracy</b>	± 0,35° typical / ± 0,50° max
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS

Function	Cable P / L / RS	5 pin M12 P	8 pin M12 L / RS
0 V	black	4	1
+V DC	red	2	7
Ch. A	green	3	6
Ch. B	yellow	1	4
Ch. Z	blue	5	2
Ch. A-	brown	/	5
Ch. B-	orange	/	3
Ch. Z-	white	/	8
⊥	shield	housing	housing

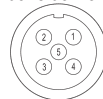
MECHANICAL SPECIFICATIONS

<b>Bore diameter (magnet-actuator)</b>	ø 6 / 8 / 9,52 (3/8") / 10 mm
<b>Enclosure rating</b>	X = IP 64 (IEC 60529) S = IP 67 (IEC 60529)
<b>Max rotation speed</b>	10000 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 (magnet actuator)</b>	0,1 x 10 <sup>-6</sup> kgm <sup>2</sup> (2,4 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Housing material</b>	painted aluminum
<b>Magnet-actuator material</b>	EN-AW 2011 aluminum
<b>Operating temperature</b>	-40°... +125°C (-40°... +257°F) (with + 5 V DC) -40°... +100°C (-40°... +212°F)
<b>Storage temperature</b>	-40°... +125°C (-40°... +257°F)
<b>Weight</b>	150 g (5,29 oz)
<b>Magnet actuator mounting tolerances (to get best electrical performances)</b>	± 0,2 mm (axial) ± 0,1 mm (radial)

RESOLUTIONS

2 - 4 - 8 - 10 - 16 - 20 - 32 - 40 - 64 - 80 - 100 - 125 - 128 - 200 - 250 - 256 - 400 - 500 - 512 - 1024 - 2048

M12 connector (5 pin)  
M12 A coded  
solder side view FV



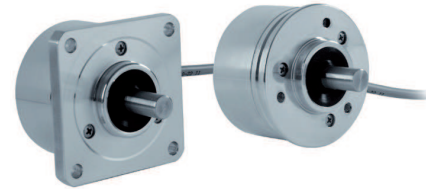
M12 connector (8 pin)  
M12 A coded  
solder side view FV



### MAIN FEATURES

Thanks to the magnetic technology, the EMI 63 series is suitable for harsh environment applications such as marble and glass working machines, washing systems, metal working machines and all the applications where high temperature resistance is required.

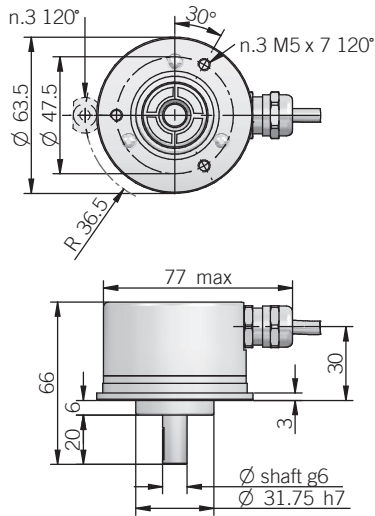
- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 300 kHz output frequency
- Cable or M12 connector output, other connector available on cable end
- Solid shaft diameter up to 10 mm
- Mounting by synchronous or centering 2,5" square flange
- Sturdy construction due to separated chambers design
- Wide operating temperature -25° ... +100°C (-13° ... +212°F)



### ORDERING CODE

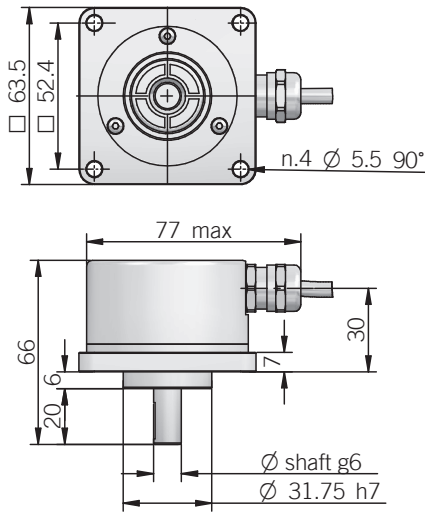
EMI	63A	1024	Z	5	L	10	X	6	P	R	.XXX
<b>SERIES</b> magnetic incremental encoder series <b>EMI</b>											
<b>MODEL</b> synchronous flange ø 31,75 mm <b>63A</b> centering square flange ø 31,75 mm <b>63D</b>											
<b>RESOLUTION</b> ppr from <b>2</b> to <b>2048</b> see table for pulses availability											
<b>ZERO PULSE</b> without zero pulse <b>S</b> with zero pulse <b>Z</b>											
<b>POWER SUPPLY</b> (with L electrical interface) 5 V DC <b>5</b> 5 ... 28 V DC <b>5/28</b>											
<b>ELECTRICAL INTERFACE</b> push-pull <b>P</b> line driver <b>L</b> power supply 5/28 V - output RS-422 <b>RS</b>											
<b>SHAFT DIAMETER</b> (3/8") 9,52 mm <b>9</b> mm <b>10</b>											
<b>ENCLOSURE RATING</b> IP 64 <b>X</b> IP 66 <b>S</b>											
<b>MAX ROTATION SPEED</b> (IP 66) 3000 rpm <b>3</b> (IP 64) 6000 rpm <b>6</b>											
<b>OUTPUT TYPE</b> cable (standard length 0,5 m) <b>P</b> preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) M12 connector <b>M12</b> female connector included, without female please add 162 as variant code											
<b>DIRECTION TYPE</b> axial <b>A</b> radial <b>R</b>											
<b>VARIANT</b> custom version <b>XXX</b>											

63 A

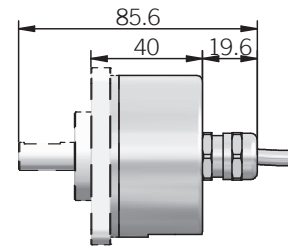


fixing clamps not included, please refer to Accessories section

63 D



Dimensions with axial output



dimensions in mm

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 2 to 2048 ppr
<b>Power supply</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>	15 mA / channel
<b>Output type*</b>	push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	205 kHz
<b>Counting direction</b>	A leads B clockwise (shaft view)
<b>Accuracy</b>	± 0,35° typical / ± 0,50° max
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS

Function	Cable P / L / RS	5 pin M12 P	8 pin M12 L / RS
0 V	black	4	1
+V DC	red	2	7
Ch. A	green	3	6
Ch. B	yellow	1	4
Ch. Z	blue	5	2
Ch. A-	brown	/	5
Ch. B-	orange	/	3
Ch. Z-	white	/	8
⊥	shield	housing	housing

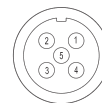
MECHANICAL SPECIFICATIONS

<b>Shaft diameter</b>	∅ 9,52 (3/8") / 10 mm
<b>Enclosure rating</b>	X = IP 64 (IEC 60529) S = IP 66 (IEC 60529)
<b>Max rotation speed</b>	IP 66 - 3000 rpm IP 64 - 6000 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>	0,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (12 x 10 <sup>-6</sup> lbf <sup>2</sup> )
<b>Starting torque (at +20°C / +68°F)</b>	< 0,01 Nm (1,42 Ozin) (IP 64) < 0,08 Nm (11,33 Ozin) (IP 66)
<b>Bearing stage material</b>	EN-AW 2011 aluminum
<b>Shaft material</b>	1.4305 / AISI 303 stainless steel
<b>Housing material</b>	EN-AW 2011 aluminum
<b>Bearings</b>	2 ball bearings
<b>Bearing lifetime</b>	10 <sup>9</sup> revolutions
<b>Operating temperature</b>	-25° ... +100°C (-13° ... +212°F)
<b>Storage temperature</b>	-25° ... +85°C (-13° ... +185°F)
<b>Weight</b>	350 g (12,35 oz)

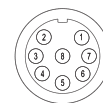
RESOLUTIONS

2 - 4 - 8 - 10 - 16 - 20 - 32 - 40 - 64 - 80 - 100 - 125 - 128 - 200 - 250 - 256 - 400 - 500 - 512 - 1024 - 2048

M12 connector (5 pin)  
M12 A coded  
solder side view FV



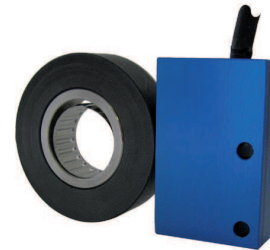
M12 connector (8 pin)  
M12 A coded  
solder side view FV



**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 with star-ring
- Wide operating temperature -20° ... +85°C (-4° ... +185°F)


**ORDERING CODE**
**ETM R 4096 S 5 L 9 S 8 PR .XXX**

**SERIES**  
magnetic incremental encoder series **ETM**

**MODEL**  
through hollow ring **R**

**RESOLUTION**  
ppr from **64** to **4096**  
see table for pulses availability

**ZERO PULSE**  
without zero pulse **S**

**POWER SUPPLY**  
(with L electrical interface) 5 V DC **5**  
5 ... 28 V DC **5/28**

**ELECTRICAL INTERFACE**  
push-pull **P**  
line driver **L**  
power supply 5/28 V - output RS-422 **RS**

**BORE DIAMETER**  
mm **9**  
(3/8") mm **9,52**  
mm **10**  
mm **11**  
mm **14**  
mm **19**  
mm **24**  
mm **28**

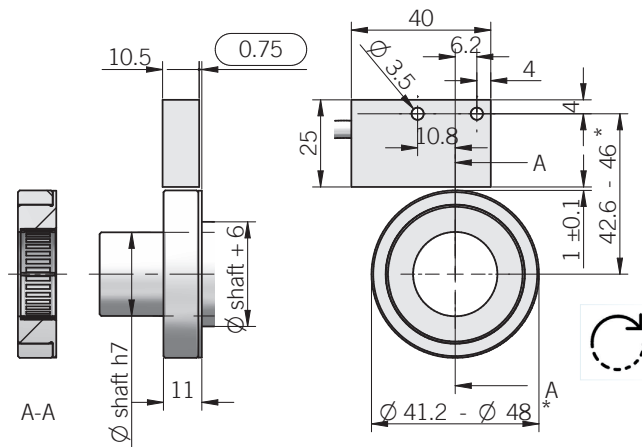
**ENCLOSURE RATING**  
IP **67 S**

**MAX ROTATION SPEED**  
8000 rpm **8**

**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)

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

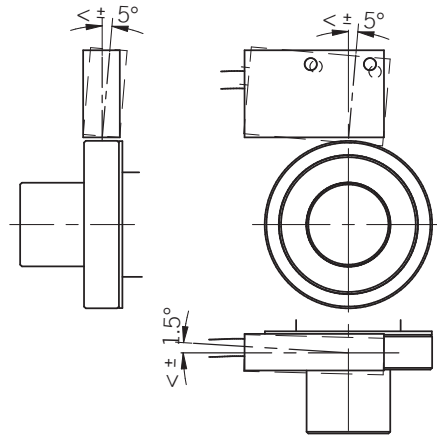
ETMR



\* 42,6 / 41,2 for shaft up to Ø 19 mm  
46 / 48 for shaft from Ø 24 / 28 mm

dimensions in mm

Mounting tolerances



for mounting instruction please refer to product installation notes

ELECTRICAL SPECIFICATIONS

<b>Resolution</b>	from 64 to 4096 ppr (powers of 2)
<b>Power supply</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>	20 mA / channel
<b>Output type*</b>	push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
<b>Max output frequency</b>	350 kHz
<b>Counting direction</b>	A leads B clockwise
<b>Accuracy</b>	± 0,35° typical / ± 0,50° max
<b>Electromagnetic compatibility</b>	according to 2014/30/EU directive
<b>RoHS</b>	according to 2011/65/EU directive
<b>UL / CSA</b>	certificate n. E212495

\* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

CONNECTIONS

Function	Cable P	Cable L / RS
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
⏏	shield	shield

MECHANICAL SPECIFICATIONS

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

RESOLUTIONS

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

\* available with shaft Ø 24 / 28 mm; please directly contact our offices for other pulses