



INCREMENTAL ENCODER

**DESIGNED IN ORDER TO CONTROL THE POSITION
AND THE ANGULAR SPEED OF MOVING MECHANICAL AXES**

Main application field are: wood-working machinery, textile machines, CNC machinery, and so forth.

ELTRA brand encoders offers a complete range of encoders with resolution up to 24000 pulses per turn (ppr) with a wide flange choice and several electrical

interfaces. Shaft, blind hollow shaft and through hollow shaft up to a diameter of 60 mm (2.36") are available.

EL - ER 30 E / H

SOLID SHAFT INCREMENTAL ENCODER

MAIN FEATURES

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

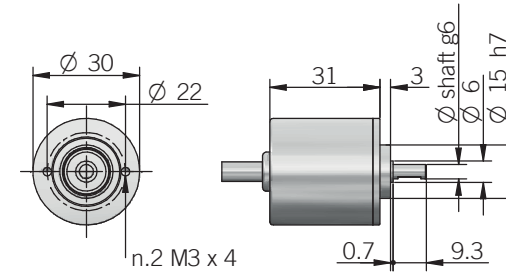
- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 220 kHz output frequency
- Cable output, connectors available on cable end
- Solid shaft diameter up to 6 mm
- Mounting by clamping or threaded flange



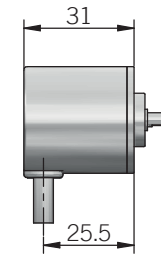
ORDERING CODE

EL	30E	50	S	5/28	C	4	X	3	P	A	.XXX
<p>SERIES incremental encoder series EL incremental encoder series ER</p> <p>MODEL clamping flange $\varnothing 15$ mm 30E M18 threaded flange 30H</p> <p>RESOLUTION ppr from 1 to 2500 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28</p> <p>ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS</p> <p>SHAFT DIAMETER (mod. E) mm 4 mm 6</p> <p>ENCLOSURE RATING IP 54 X</p> <p>MAX ROTATION SPEED 3000 rpm 3</p> <p>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)</p> <p>DIRECTION TYPE axial A radial R</p> <p>VARIANT custom version XXX</p>											

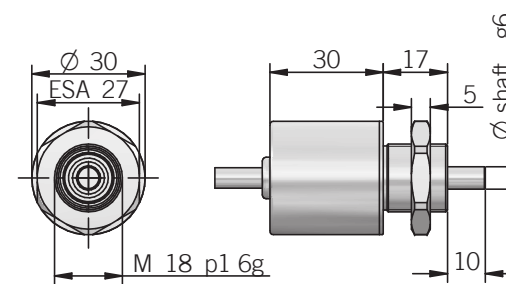
30E AXIAL CABLE OUTPUT



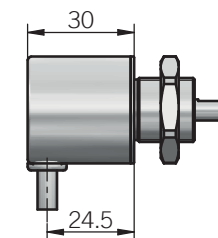
30E RADIAL CABLE OUTPUT



30H AXIAL CABLE OUTPUT



30H RADIAL CABLE OUTPUT



recommended mating shaft tolerance H7
dimensions in mm

CONNECTIONS

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

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 2500 ppr
Power supply ¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface ²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	100 kHz EL series 220 kHz ER series
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF) ³ according to EN ISO 13849-1	220 years EL series 250 years ER series
Mission time (Tm) ³	20 years
Diagnostic coverage (DC) ³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	$\varnothing 4 / 6$ mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load ⁴	5 N (1,12 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,05 x 10 ⁻⁶ kgm ² (1,2 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,005 Nm (0,71 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{5,6}	-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series
Storage temperature ⁶	-25° ... +85°C (-13° ... +185°F)
Weight	70 g (2,47 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

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.

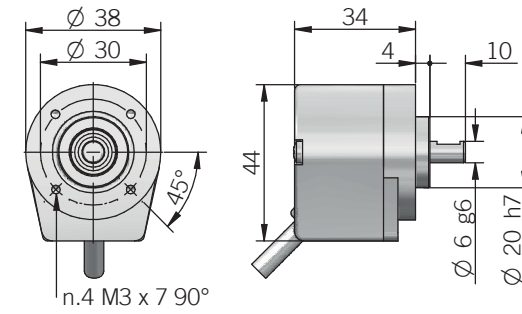
- 3 channel encoder (A / B / Z) up to 1024 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- Cable output, connectors available on cable end
- Solid shaft diameter up to 6 mm
- Mounting by clamping or centering square flange



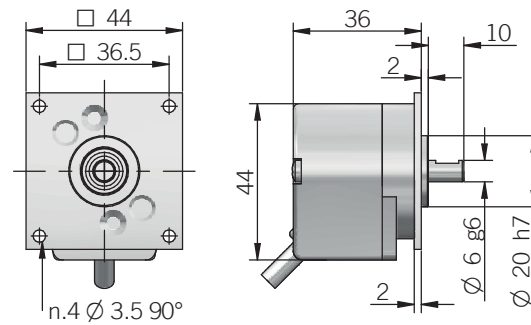
ORDERING CODE

EH	38A	500	S	5/28	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 refer to the available pulses list										
ZERO PULSE without zero pulse S with zero pulse Z										
POWER SUPPLY 5 V DC 5 5 ... 28 V DC 5/28										
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS										
SHAFT DIAMETER 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										

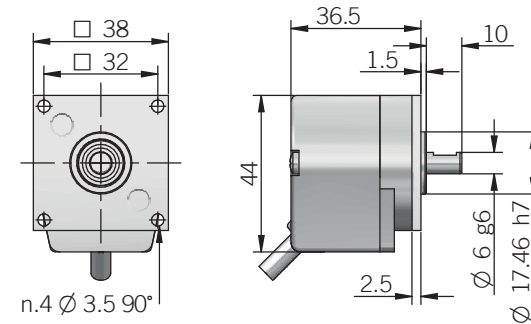
38A



38B



38D



recommended mating shaft tolerance H7
dimensions in mm

CONNECTIONS

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

ELECTRICAL SPECIFICATIONS

Resolution	from 50 to 1024 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	C / P = 50 mA / channel L = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	244 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	$\varnothing 6$ mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load⁴	5 N (1,12 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,05 x 10 ⁻⁶ kgm ² (1,2 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-20° ... +70°C (-4° ... +158°F)
Storage temperature⁶	-20° ... +70°C (-4° ... +158°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ maximum load for static usage
⁵ measured on the transducer flange
⁶ condensation not allowed

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

EL - ER 40 A / B / C / H / I / N / X

SOLID SHAFT INCREMENTAL ENCODER

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, connectors available on cable end
- Solid shaft diameter 6 mm or 8 mm
- Mounting by clamping, threaded or synchronous flange

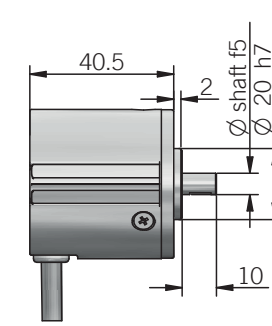
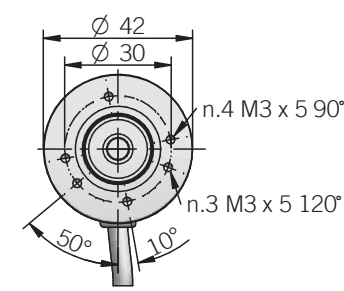


ORDERING CODE

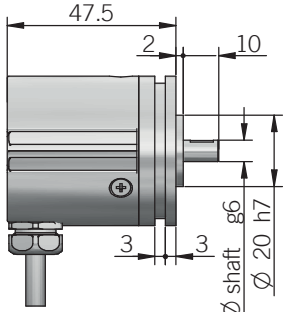
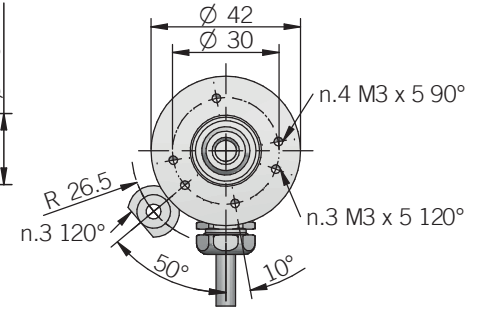
ER	40A	100	S	5/28	P	6	X	6	P	R	.XXX
<p>SERIES (mod. A / B / C / H / I / X) incremental encoder series EL (mod. A / B / C / H / I / N / X) incremental encoder series ER</p> <p>MODEL clamping flange $\varnothing 20$ mm 40A square flange $\square 36,5$ mm 40B clamping flange $\varnothing 17,46$ mm 40C M18 threaded flange 40H M20 threaded flange 40I synchronous flange $\varnothing 21$ mm 40N synchronous flange $\varnothing 30$ mm 40X</p> <p>RESOLUTION (mod. A / B) ppr from 1 to 14400 (mod. C / H / I / N / X) ppr from 1 to 2500 (mod. N) ppr from 100 to 2500 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28</p> <p>ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS</p> <p>SHAFT DIAMETER (mod. A / B / C / H / I / N) mm 6 (mod. X) mm 8</p> <p>ENCLOSURE RATING IP 54 X (mod. A / B / H) IP 66 S</p> <p>MAX ROTATION SPEED (IP 66) 3000 rpm 3 (IP 54) 6000 rpm 6</p> <p>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)</p> <p>DIRECTION TYPE (mod. A / B / C / H / I / N) axial A radial R</p> <p>VARIANT custom version XXX</p>											

OPTICAL SOLID SHAFT INCREMENTAL ENCODERS | EL - ER 40 A / B / C / H / I / N / X

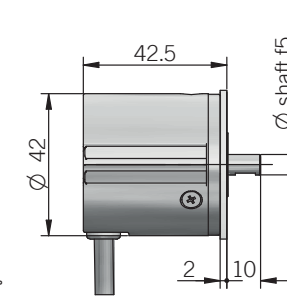
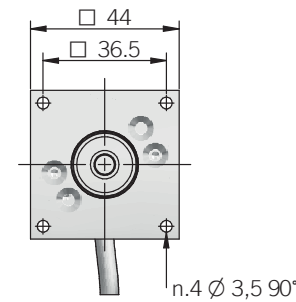
40A (X ENCLOSURE RATING)



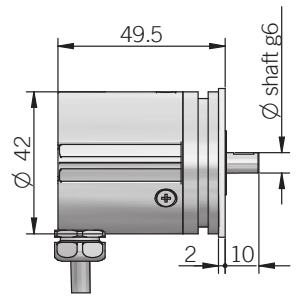
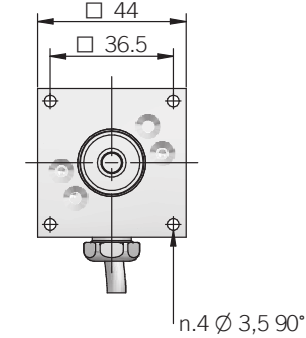
40A (S ENCLOSURE RATING)



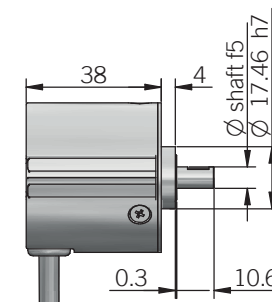
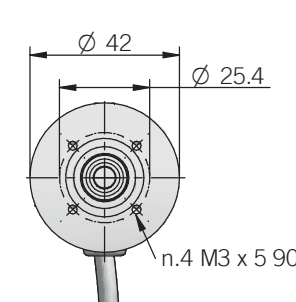
40B (X ENCLOSURE RATING)



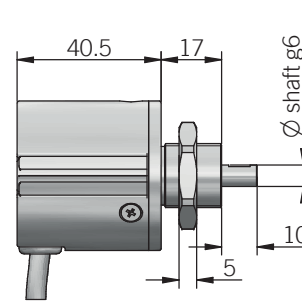
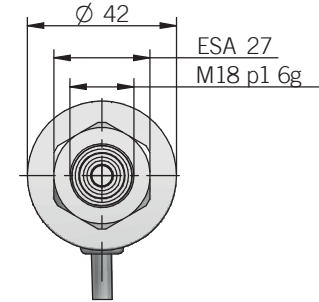
40B (S ENCLOSURE RATING)



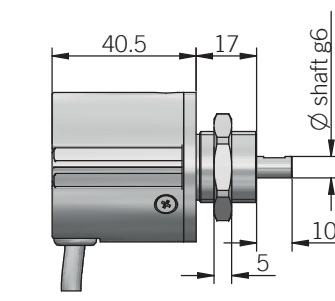
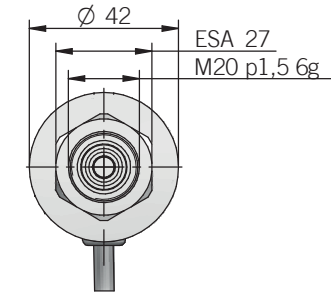
40C



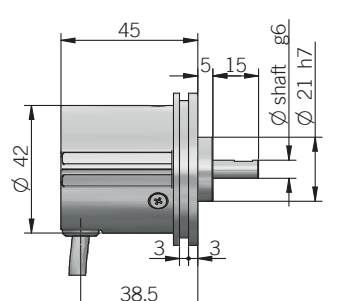
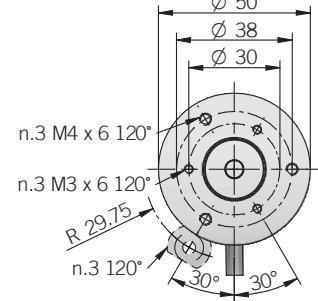
40H



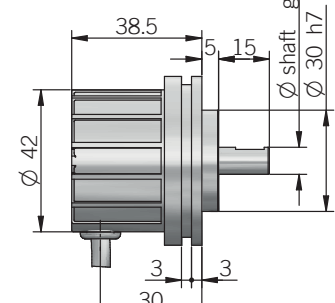
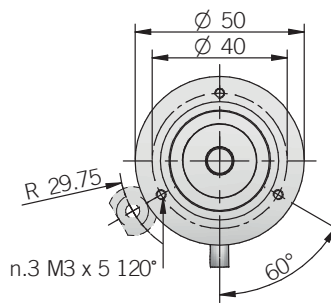
40I



40N



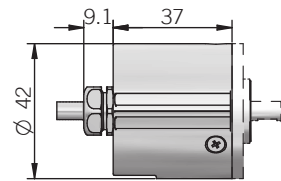
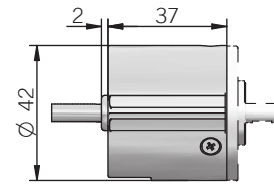
40X



fixing clamps not included, please refer to the Accessories recommended mating shaft tolerance H7 dimensions in mm

DIMENSIONS WITH AXIAL OUTPUT WITH X ENCLOSURE RATING

DIMENSIONS WITH AXIAL OUTPUT WITH S ENCLOSURE RATING



dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 14400 ppr (mod. A / B) from 1 to 2500 ppr (mod. C / H / I / X) from 100 to 2500 ppr (mod. N)
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	150 kHz EL series 250 kHz up to 3600 ppr ER series 500 kHz from 4000 ppr ER series
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

CONNECTIONS

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

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 8 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm with X enclosure rating 3000 rpm with S enclosure rating
Max shaft load⁴	30 N (6,74 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,1 x 10 ⁻⁶ kgm ² (2,4 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin) with X enclosure rating < 0,05 Nm (7,10 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	100 g (3,52 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ maximum load for static usage
⁵ measured on the transducer flange
⁶ condensation not allowed

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

MAIN FEATURES

Standard ø 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 M R .162 +XXX

SERIES
incremental encoder series EL
incremental encoder series ER

MODEL
synchronous flange ø 50 mm 58B
clamping flange ø 36 mm 58C
clamping flange ø 50 mm 58H
coupling flange ø 40 mm 58T

METAL COVER
* add for metal cover M

RESOLUTION
ppr from 1 to 24000
refer to the available pulses list

ZERO PULSE
without zero pulse S
with zero pulse Z

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

ELECTRICAL INTERFACE
NPN open collector C
push-pull P
line driver L
power supply 5/28 V DC - output RS-422 RS

SHAFT DIAMETER
(mod. B) mm 6
(mod. C) mm 8
(mod. B / C / H) (3/8") mm 9,52
mm 10
(mod. T) mm 12

ENCLOSURE RATING
IP 54 X
(mod. B / C / T) 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 plug connector M
JIS-C-5432 plug connector J
M12 plug connector M12
M23 plug connector H
M16 plug connector C

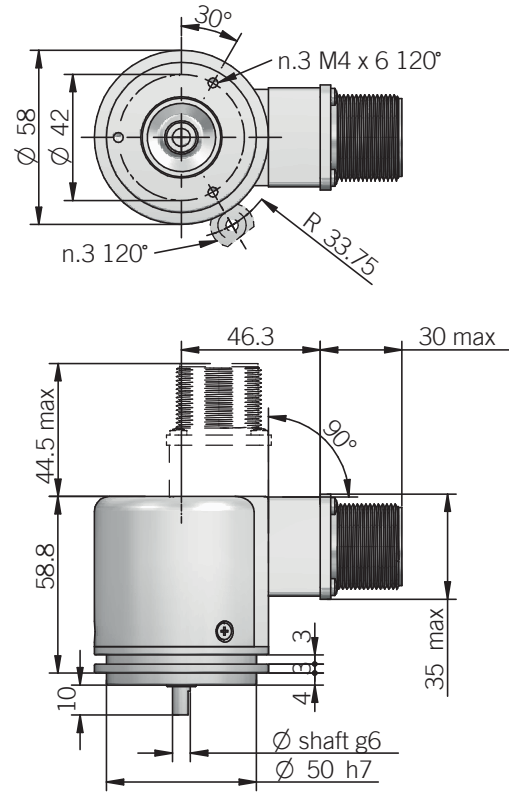
DIRECTION TYPE
axial A
radial R

SOCKET
socket not included .162

to be reported only with connector output (eg. MR.162), for socket see Accessories

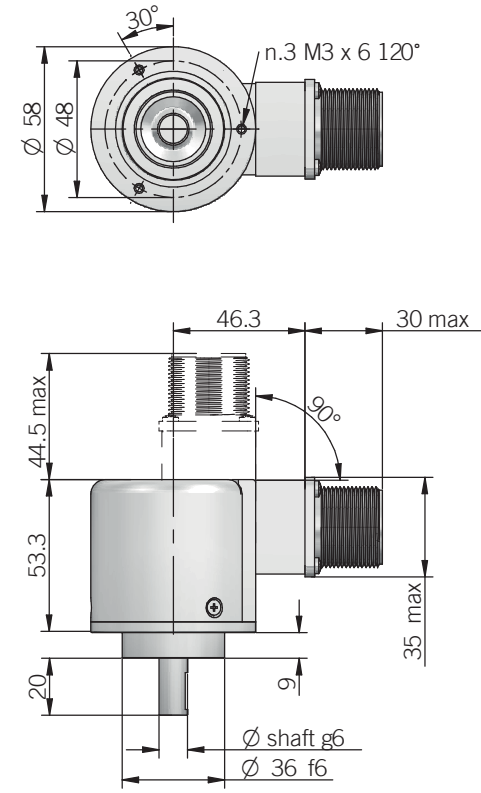
VARIANT
custom version +XXX

58B

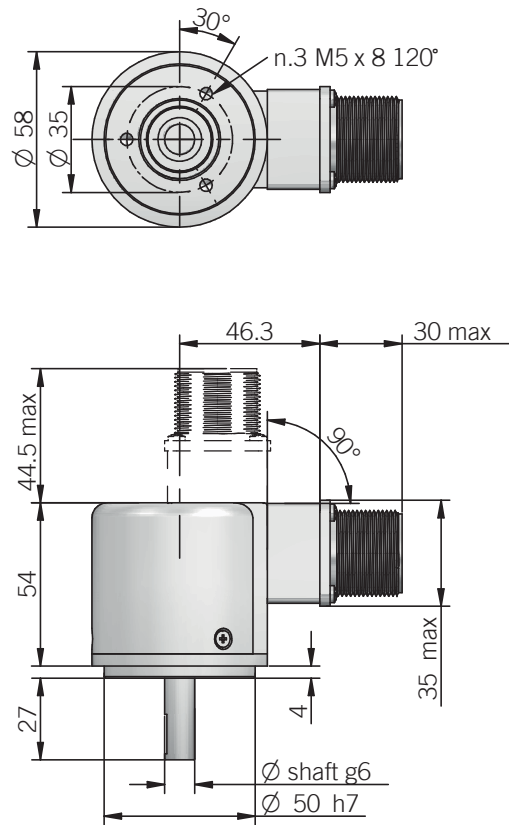


fixing clamps not included, please refer to Accessories

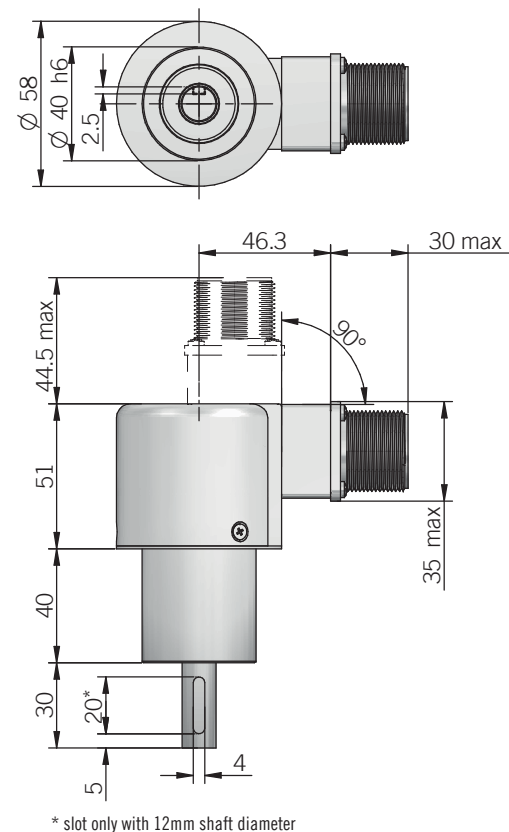
58C



58H

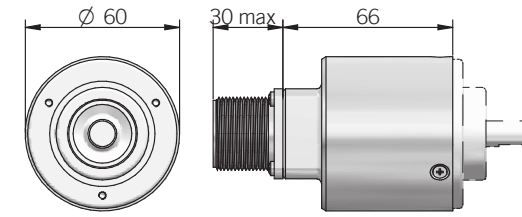


58T

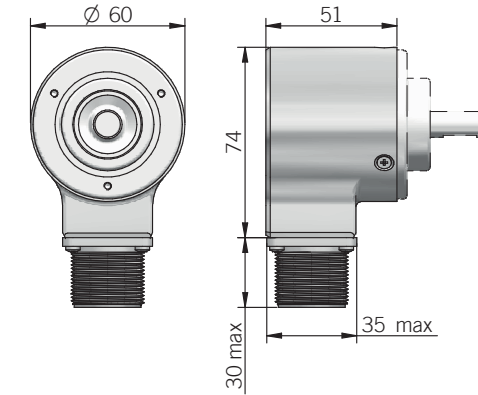


* slot only with 12mm shaft diameter

DIMENSION WITH METAL COVER AND AXIAL OUTPUT



DIMENSION WITH METAL COVER AND RADIAL OUTPUT



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 1 to 24000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

EL SERIES RESOLUTIONS	
1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 25 - 30 - 32 - 40 - 50 - 60 - 70 - 80 - 90 - 160 - 180 - 350 - 450 - 660 - 700 - 750 - 1500	

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

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

MECHANICAL SPECIFICATIONS	
Shaft diameter	ø 6 / 8 / 9,52 (3/8") / 10 / 12 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm with X enclosure rating 3000 rpm / 60° C EL series with S enclosure rating 3000 rpm / 70° C ER series with S enclosure rating 2000 rpm / 85° C ER series with S enclosure rating
Max shaft load⁴	10 N (2,25 lbs) axial with ø 6 mm shaft 20 N (4,45 lbs) radial with ø 6 mm shaft 200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

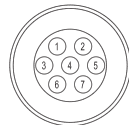
¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ maximum load for static usage
⁵ measured on the transducer flange
⁶ condensation not allowed

CONNECTIONS

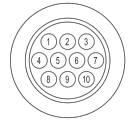
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6	F	4	1	10	1	8
A+	green	green	3	1	C	A	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	C	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	B	2	B	1	4	8	4	3
B-	/	orange	/	5	/	E	8	H	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
⊕	shield	shield	7	7	G	G	10	J	housing ¹	housing ¹	9	housing ¹	housing ¹

¹ only with metal cover

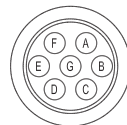
J connector (7 pin)
JIS-C-5432 Size 16
front view



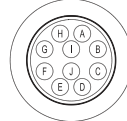
J connector (10 pin)
JIS-C-5432 Size 16
front view



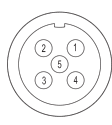
M connector (7 pin)
Amphenol MS3102-E-16-S
front view



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



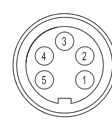
M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view



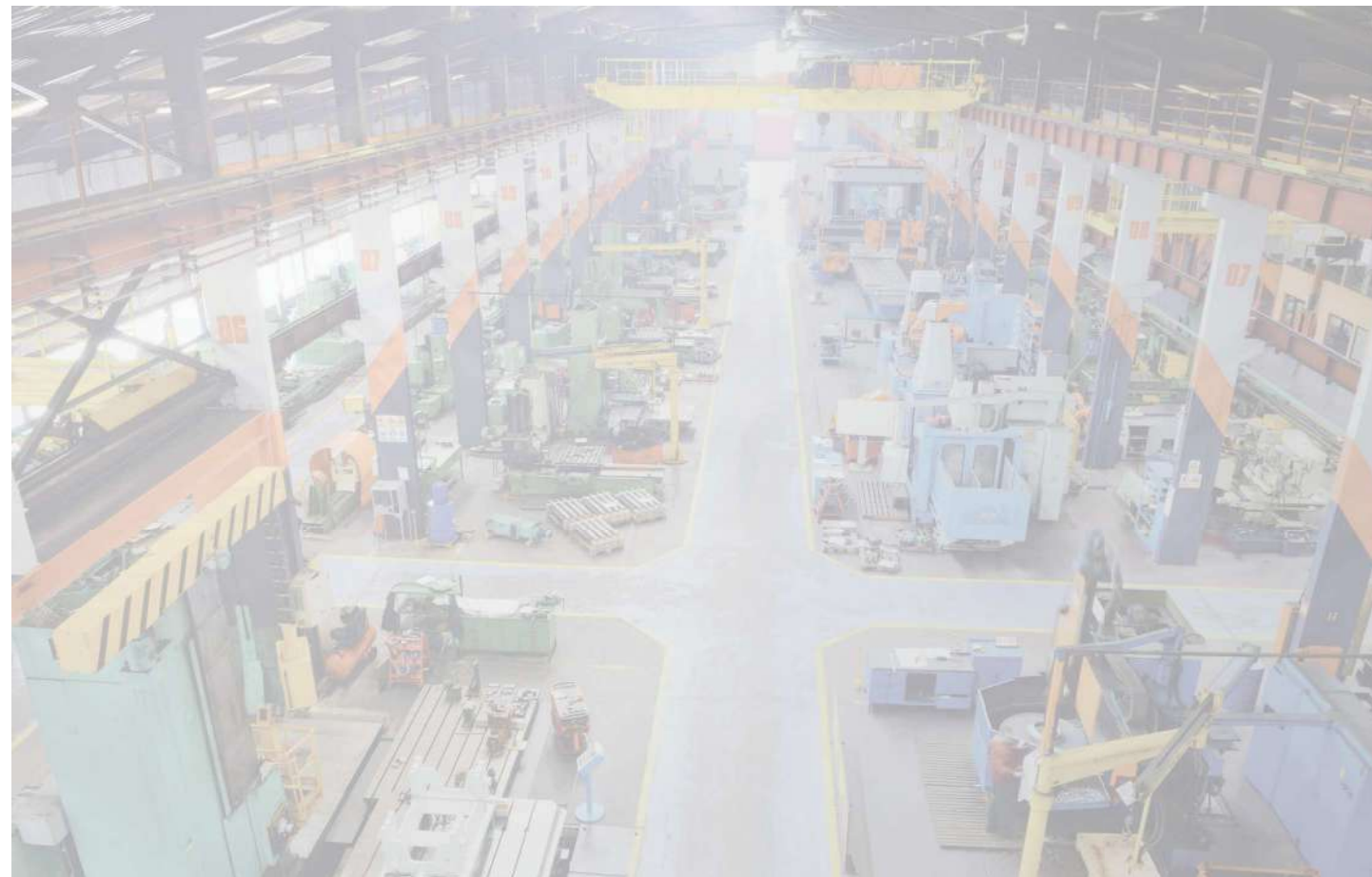
C connector (5 pin)
Amphenol C091 M16
front view



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



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



MAIN FEATURES

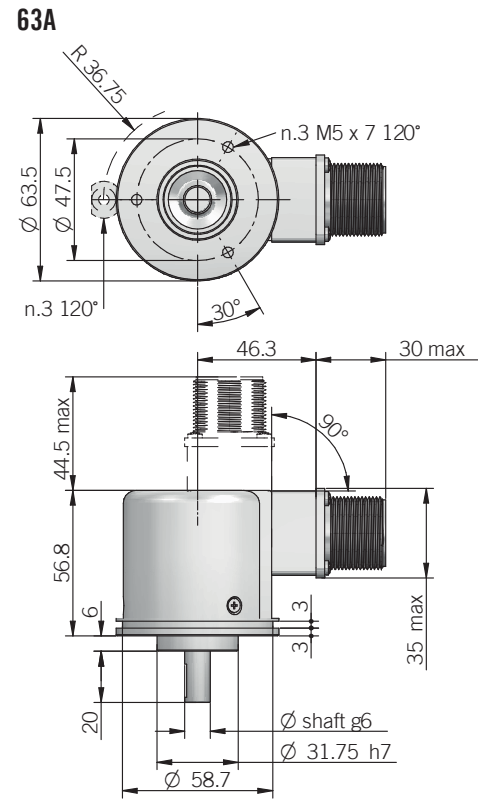
Standard ø 63 mm encoder series for industrial applications with high mechanical resistance requirements. These encoders are designed to support high radial and axial shaft load and they can be mounted by means of flanges or fixing clamps.

- 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

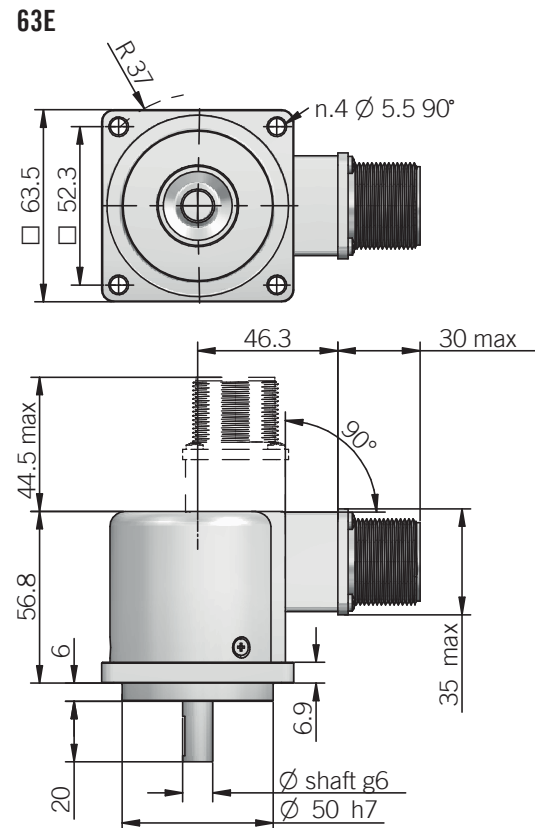
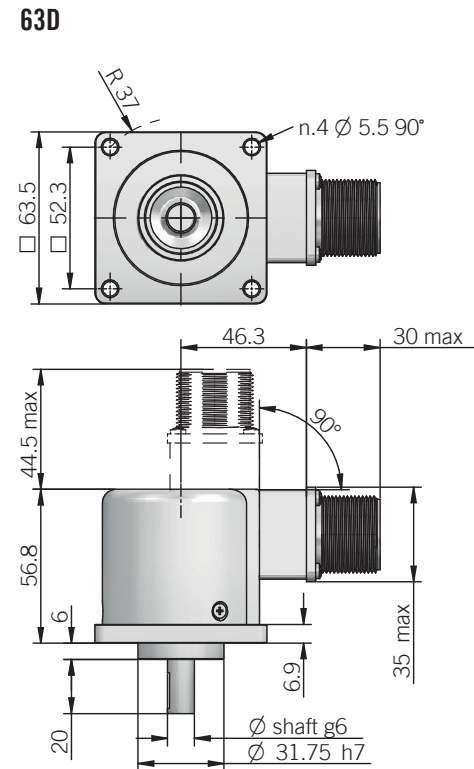


ORDERING CODE

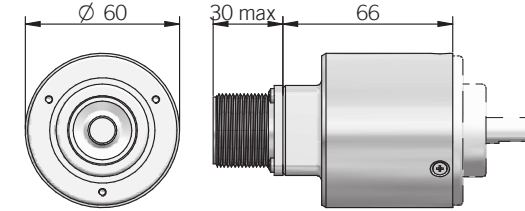
ER	63A	M*	500	S	5/28	P	8	X	6	M	R	.162	+XXX
<p>SERIES incremental encoder series EL incremental encoder series ER</p> <p>MODEL synchronous flange ø 31,75 mm 63A centering square flange ø 31,75 mm 63D centering square flange ø 50 mm 63E</p> <p>METAL COVER * add for metal cover M</p> <p>RESOLUTION ppr from 1 to 24000 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28</p> <p>ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS</p> <p>SHAFT DIAMETER mm 8 (3/8") mm 9,52 mm 10</p> <p>ENCLOSURE RATING IP 54 X IP 66 S</p> <p>MAX ROTATION SPEED (IP 66) 3000 rpm 3 (IP 54) 6000 rpm 6</p> <p>OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 plug connector J M12 plug connector M12 M23 plug connector H M16 plug connector C</p> <p>DIRECTION TYPE axial A radial R</p> <p>SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories</p> <p>VARIANT custom version +XXX</p>													



fixing clamps not included, please refer to the Accessories

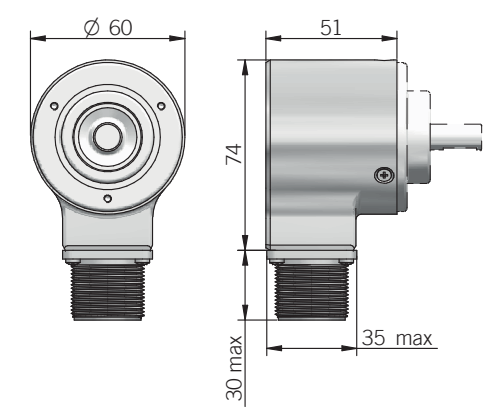


DIMENSION WITH METAL COVER AND AXIAL OUTPUT



recommended mating shaft tolerance H7
dimensions in mm

DIMENSION WITH METAL COVER AND RADIAL OUTPUT



ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 24000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTF)_d³ according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

EL SERIES RESOLUTIONS

1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 25 - 30 - 32 - 40 - 50 - 60 - 70 - 80 - 90 - 160 - 180 - 350 - 450 - 660 - 700 - 750 - 1500

ER SERIES RESOLUTIONS

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

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

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 8 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm with X enclosure rating EL 3000 rpm / 60° C with S enclosure rating ER 3000 rpm / 70° C with S enclosure rating ER 2000 rpm / 85° C with S enclosure rating
Max shaft load⁴	200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

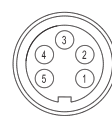
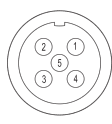
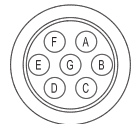
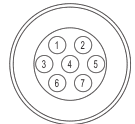
⁶ condensation not allowed

CONNECTIONS

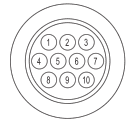
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6	F	4	1	10	1	8
A+	green	green	3	1	C	A	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	C	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	B	2	B	1	4	8	4	3
B-	/	orange	/	5	/	E	8	H	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
⊖	shield	shield	7	7	G	G	10	J	housing ¹	housing ¹	9	housing ¹	housing ¹

¹only with metal cover

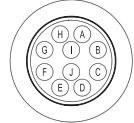
J connector (7 pin) JIS-C-5432 Size 16 front view
 M connector (7 pin) Amphenol MS3102-E-16-S front view
 M12 connector (5 pin) M12 A coded front view
 C connector (5 pin) Amphenol C091 M16 front view
 H connector (12 pin) - M23 CCW Hummel 7.410.000000 - 7.002.912.603 front view



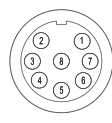
J connector (10 pin) JIS-C-5432 Size 16 front view



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



M12 connector (8 pin) M12 A coded front view



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



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 is compliant with essential health and safety requirements according to

- EN IEC 60079-0:2018
- EN 60079-1:2014
- EN 60079-31:2014

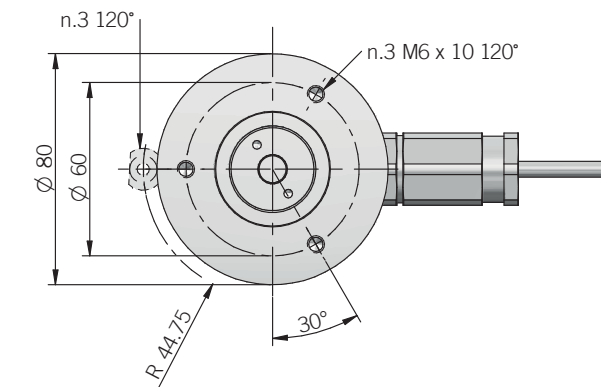
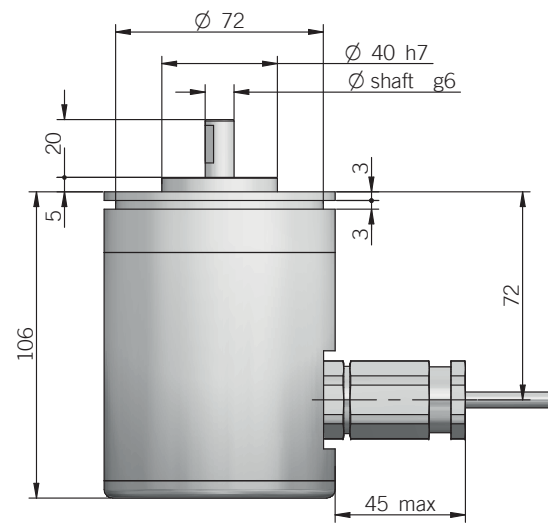
The UE declaration is available on www.eltra.it



ORDERING CODE

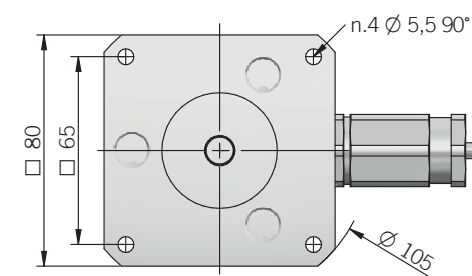
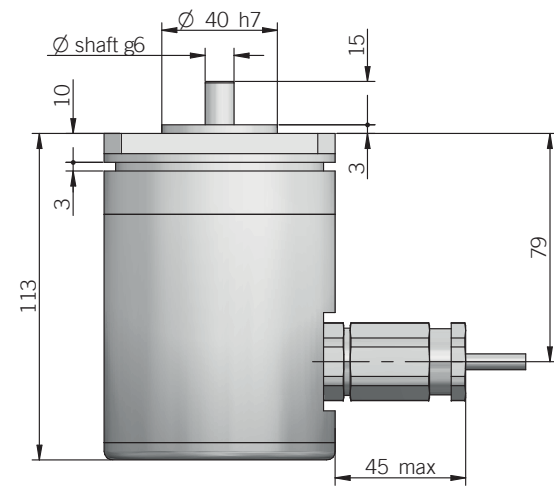
EX	80A	500	S	5/28	P	10	X	3	PR	.XXX
SERIES explosion proof encoder series EX										
MODEL synchronous flange ø 40 mm 80A centering square flange ø 40 mm 80D										
RESOLUTION ppr from 100 to 10000 refer to the available pulses list										
ZERO PULSE without zero pulse S with zero pulse Z										
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28										
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS										
SHAFT DIAMETER 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										

80A



fixing clamps not included, please refer to the Accessories

80D



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 100 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Current consumption without load	80 mA max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	263 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed or flexible installation conductors section min 0,14 mm ² / AWG 26 bending radius min 35 mm (fixed) / min 60 mm (flexible)
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS	
Shaft diameter	Ø 10 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load⁴	200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,06 Nm (8,50 Ozin)
Bearing stage material	anodized aluminum
Shaft material	stainless steel
Housing material	anodized aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-20° ... +50°C (-4° ... +122°F)
Storage temperature⁶	-20° ... +70°C (-4° ... +158°F)
Weight	1200 g (42,33 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ maximum load for static usage
⁵ measured on the transducer flange
⁶ condensation not allowed

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	

EPL MARKING	
	II 2GD Ex db 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 db IIC T6 Gb Ex db: 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
A+	green	green
A-	/	red
B+	yellow	yellow
B-	/	pink
Z+	white	blue
Z-	/	white
⏏	shield	shield



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 encoder with double output 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



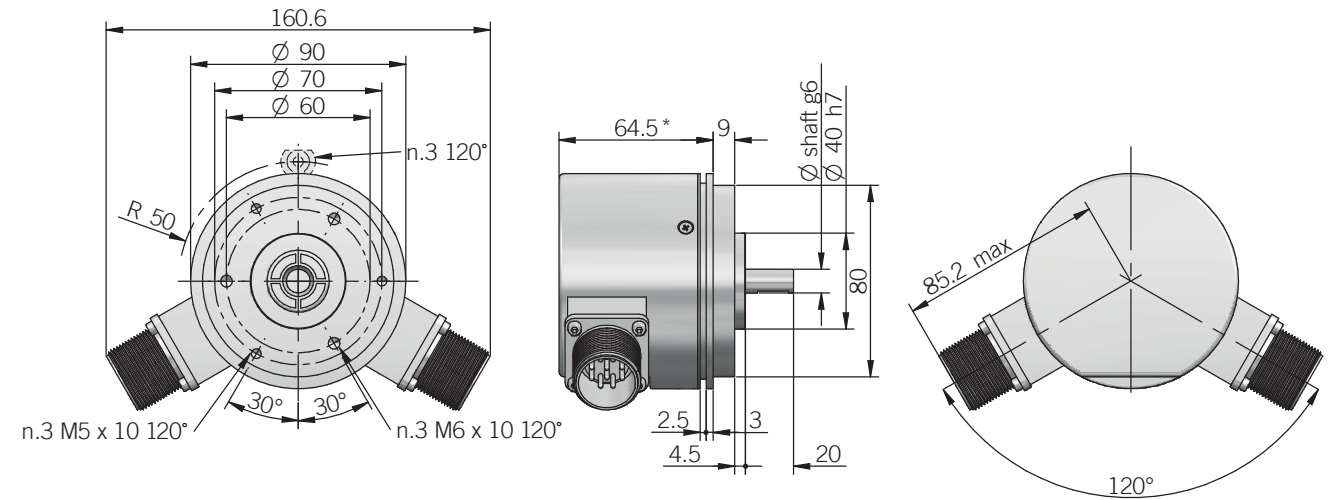
ORDERING CODE EH 90A 500 S 5/30 P 1000 Z 5/30 P 8 X 6 M R .162 +XXX +2000

SERIES incremental encoder series EH	MODEL synchronous flange ø 40 mm 90A flange REO-444 115A flange REO-444 with centrifugal relay 115R	RESOLUTION ppr from 200 to 2048 refer to the available pulses list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30	ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS	RESOLUTION	ZERO PULSE	POWER SUPPLY	ELECTRICAL INTERFACE	SHAFT DIAMETER (mod. 90A) mm 8 (mod. 90A) (3/8") mm 9,52 mm 10 (mod. 115A - 115R) 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 plug connector M JIS-C-5432 plug connector J	DIRECTION TYPE axial A radial R	SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories	VARIANT custom version +XXX	RELAY INTERVENTION SPEED (mod. 115R) from 600 to 4300 for other speeds please contact our offices directly
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To be indicated in the models 90A - 115A for double electronics and double resolution. With different double resolution please add 250 as variant, see examples:

- Double different resolution and double electronics: EH90A1024Z5L-2048Z5/30L10X250
- Double different resolution and same electronics: EH90A1024-2048Z5L10X250
- Same resolution and double electronics: EH90A1024Z5L-Z5/30L10X ...

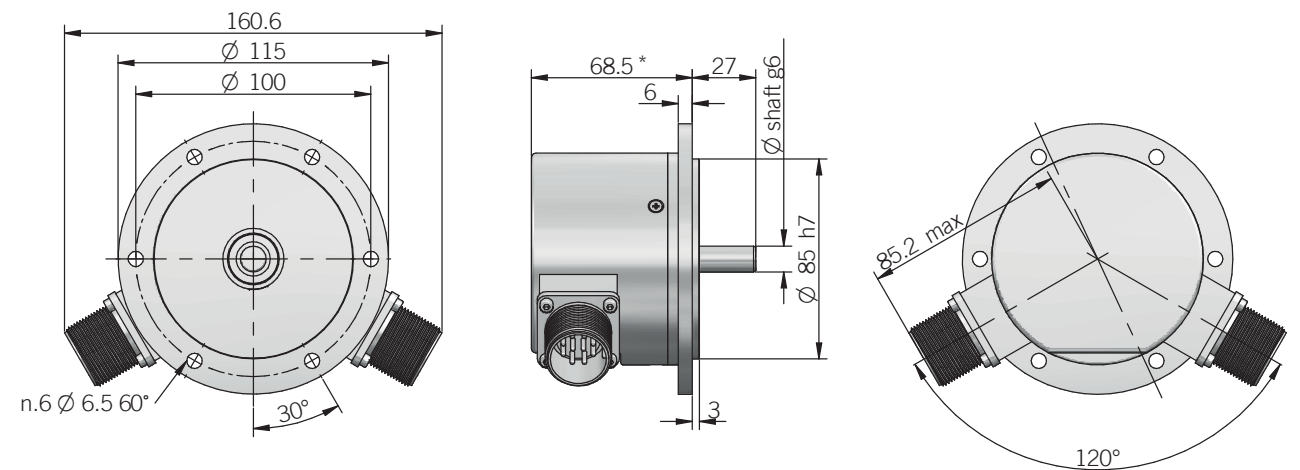
90A WITH DOUBLE OUTPUT / RESOLUTION



fixing clamps not included, please refer to the Accessories

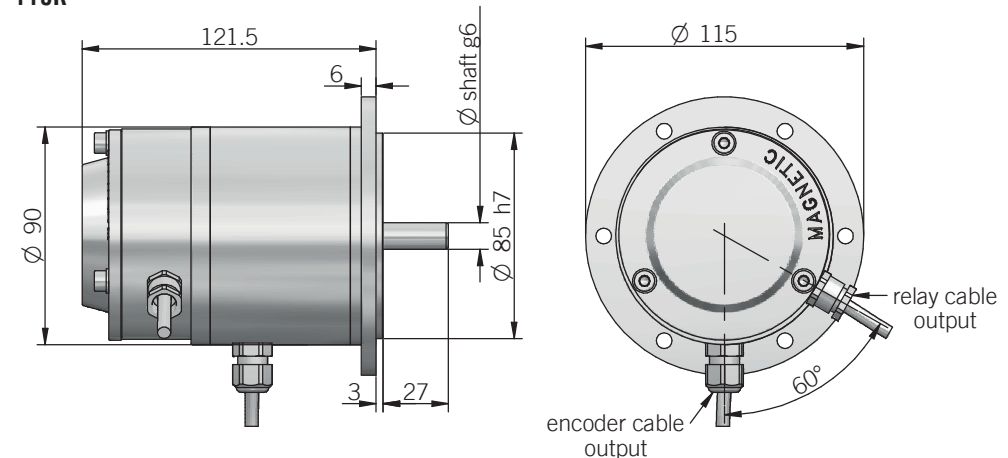
* with double resolution + 3.5mm

115A WITH DOUBLE OUTPUT / RESOLUTION



* with double resolution + 3.5mm

115R



recommended mating shaft tolerance H7 dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 200 to 2048 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	C / P = 50 mA / channel L = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	244 years / encoder
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

RELAY CHARACTERISTICS

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

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 8 / 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm with X enclosure rating 3000 rpm with S enclosure rating
Max shaft load⁴	200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	3,5 x 10 ⁻⁶ kgm ² (83 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,8 Ozin) with X enclosure rating < 0,06 Nm (8,5 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painting aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-10° ... +60°C (+14° ... +140°F)
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	750 g (26,46 oz) 1050 g (37,04 oz) with relay

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ maximum load for static usage
⁵ measured on the transducer flange
⁶ condensation not allowed

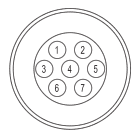
RESOLUTIONS

200 - 250 - 500 - 512 - **1000** - **1024** - **2000** - 2048
 please directly contact our offices for other pulses, preferred resolutions in bold

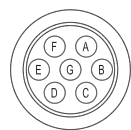
CONNECTIONS

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

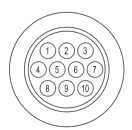
J connector (7 pin)
JIS-C-5432 Size 16
front view



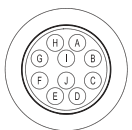
M connector (7 pin)
Amphenol MS3102-E-16-S
front view



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



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



MAIN FEATURES

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

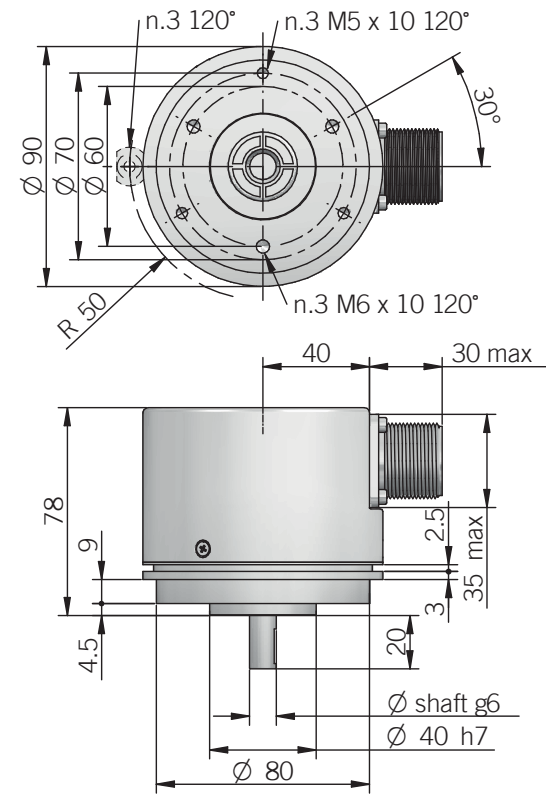
- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable or connector output
- Metal cover for heavy duty applications
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange



ORDERING CODE

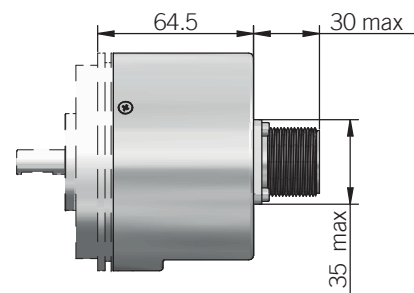
ER	90A	500	S	5/28	P	8	X	6	M	R	.162	+XXX
<p>SERIES incremental encoder series EL incremental encoder series ER</p> <p>MODEL synchronous flange ø 40 mm 90A flange REO-444 115A</p> <p>RESOLUTION ppr from 1 to 10000 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S with zero pulse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

90A



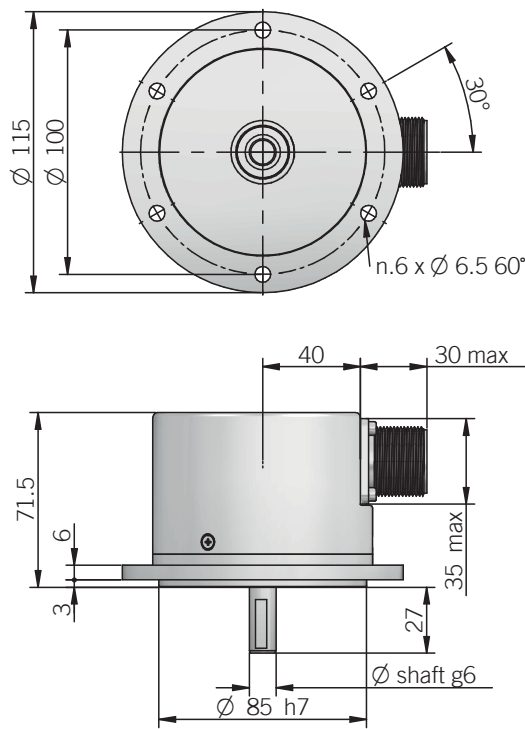
fixing clamps not included, please refer to Accessories

90A WITH AXIAL OUTPUT

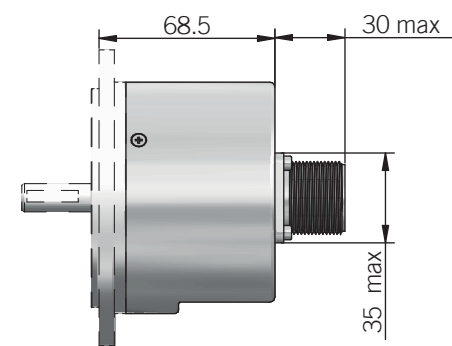


recommended mating shaft tolerance H7
dimensions in mm

115A



115A WITH AXIAL OUTPUT



ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

EL SERIES RESOLUTIONS

1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 25 - 30 - 32 - 40 - 50 - 60 - 70 - 80 - 90 - 160 - 180 - 350 - 450 - 660 - 700 - 750 - 1500

ER SERIES RESOLUTIONS

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

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

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 8 / 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm with X enclosure rating EL 3000 rpm / 60° C with S enclosure rating ER 3000 rpm / 70° C with S enclosure rating ER 2000 rpm / 85° C with S enclosure rating
Max shaft load⁴	200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	3,5 x 10 ⁻⁶ kgm ² (83 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ maximum load for static usage

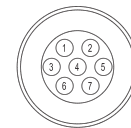
⁵ measured on the transducer flange

⁶ condensation not allowed

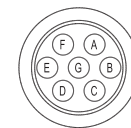
CONNECTIONS

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

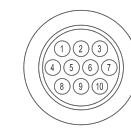
J connector (7 pin)
JIS-C-5432 Size 16
front view



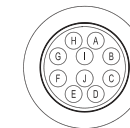
M connector (7 pin)
Amphenol MS3102-E-16-S
front view



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



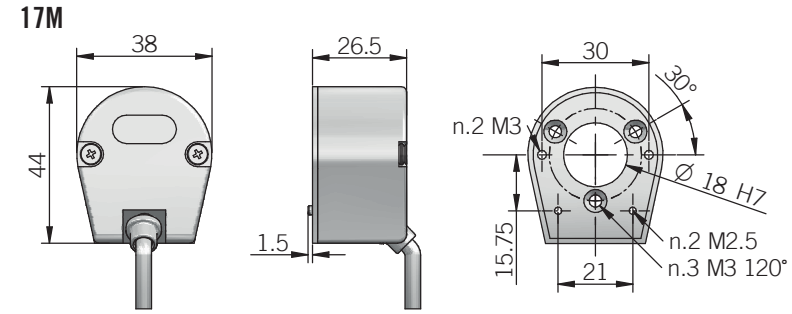
M connector (10 pin)
Amphenol MS3102-E-18-1
front view



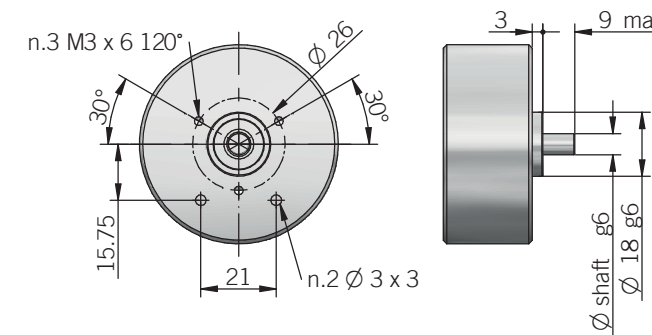
MAIN FEATURES

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 +30 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- No wear due to absence of bearings
- Easy assembly
- Compact size



RECOMMENDED INTERFACE FLANGE DESIGN
17M

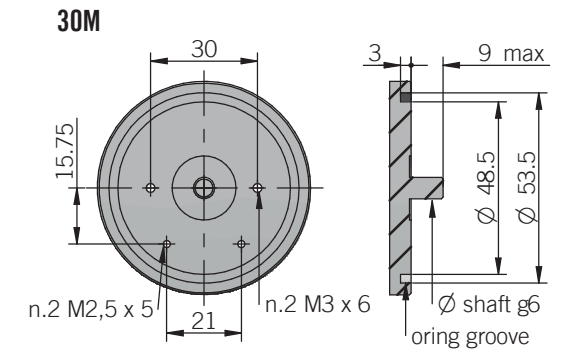
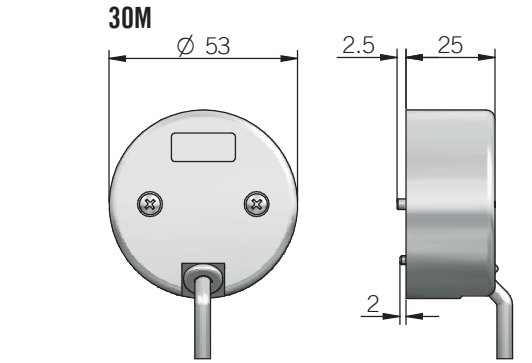


dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 50 to 1024 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	C / P = 50 mA / channel L = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF)_d³	244 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

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

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



MECHANICAL SPECIFICATIONS	
Bore diameter	ø 6 / 6,35 (1/4") mm
Enclosure rating IEC 60529	mod. 17 IP 40 mod. 30 IP 40 or 54*
Max rotation speed	6000 rpm limited by output frequency
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,5 x 10 ⁻⁶ kgm ² (12 x 10 ⁻⁶ lbf ²)
Flange material (mod. 17)	aluminium
Hub material	aluminium
Cover material	PA66 / PA6 glass fiber reinforced
Shaft radial play allowed	± 0,04 mm
Shaft axial play allowed	± 0,1 mm
Operating temperature^{4,5}	-20° ... +85°C (-4° ... +185°F)
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	50 g (1,76 oz)

*when properly installed with oring kit (not supplied, please refer to Accessories)
¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

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

ORDERING CODE

EH	30M	500	S	5/30	P	6	X	6	PR	.XXX
<p>SERIES incremental encoder series EH</p> <p>MODEL kit encoder with flange 17M kit encoder 30M</p> <p>RESOLUTION ppr from 50 to 1024 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY 5 V DC 5 5 ... 30 V DC 5/30</p> <p>ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS</p> <p>BORE DIAMETER mm 6 (1/4") mm 6,35</p> <p>ENCLOSURE RATING (mod. 17M) IP40 - (mod. 30M) IP 54 X</p> <p>MAX ROTATION SPEED 6000 rpm 6</p> <p>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)</p> <p>VARIANT custom version XXX</p>										

MAIN FEATURES

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

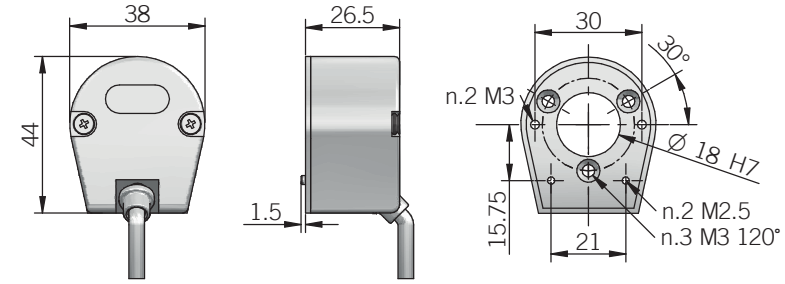
- 3 channel encoder (A / B / Z) up to 5000 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- No wear due to absence of bearings
- Easy assembly
- Compact size



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

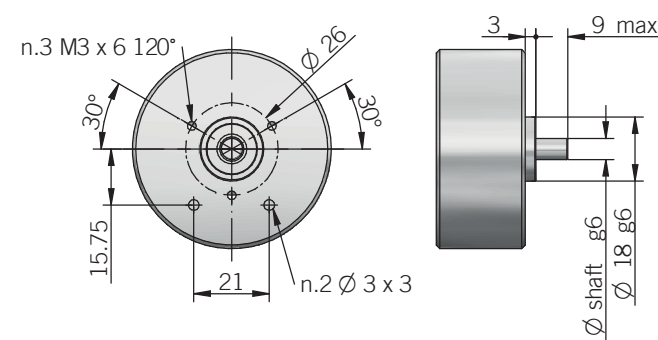
SERIES incremental encoder series EH	TYPE high resolution kit encoder with flange 17MH high resolution kit encoder 30MH	RESOLUTION ppr 2000 / 2048 / 2500 / 4096 / 5000	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY 5 ... 30 V DC 5/30	ELECTRICAL INTERFACE push-pull P line driver L power supply 5/30 V DC - output RS-422 RS	BORE DIAMETER mm 6 (1/4") mm 6,35	ENCLOSURE RATING (mod. 17MH) IP40 - (mod. 30MH) IP 54 X	OPTION to be reported X I	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
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17MH



RECOMMENDED INTERFACE FLANGE DESIGN

17MH



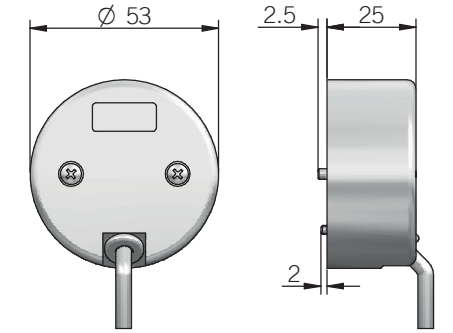
dimensions in mm

ELECTRICAL SPECIFICATIONS

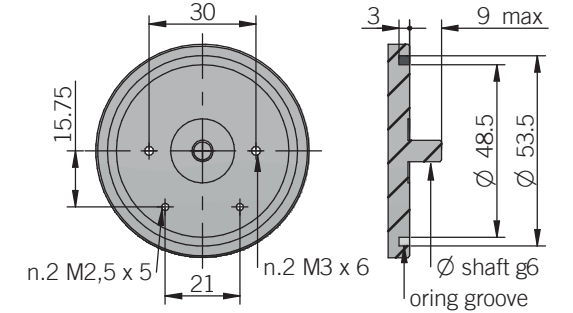
Resolution	2000 - 2048 - 2500 - 4096 - 5000 ppr
Power supply¹	4,5 ... 30 V DC (reverse polarity protection)
Current consumption without load	60 mA max
Max load current	20 mA / channel
Electrical interface²	push-pull / line driver HTL (AEC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	500 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	289 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

30MH



30MH



MECHANICAL SPECIFICATIONS

Bore diameter	Ø 6 / 6,35 (1/4") mm
Enclosure rating IEC 60529	mod. 17 IP 40 mod. 30 IP 40 or 54*
Max rotation speed	6000 rpm limited by output frequency
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,5 x 10 ⁻⁶ kgm ² (12 x 10 ⁻⁶ lbfm ²)
Flange material (mod. 17)	aluminium
Hub material	aluminium
Cover material	PA66 / PA6 glass fiber reinforced
Shaft radial play allowed	± 0,04 mm
Shaft axial play allowed	± 0,1 mm
Operating temperature^{4,5}	-20° ... +85°C (-4° ... +185°F)
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	50 g (1,76 oz)

*when properly installed with oring kit (not supplied, please refer to Accessories)

CONNECTIONS

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

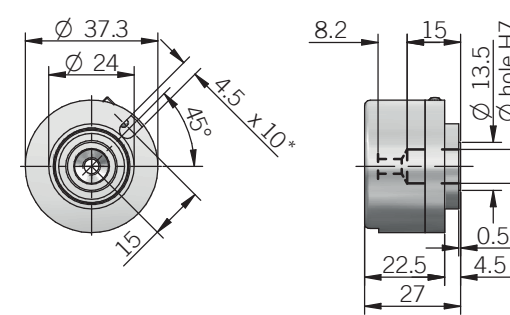
MAIN FEATURES

ø 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



36K



* ø 4 mm torque pin min 0.5mm from bottom end

for size 15 Resolver flange please refer to Accessories
recommended mating shaft tolerance g6
dimensions in mm

ORDERING CODE	EF	36K	4	L	512	S	5	L	8	X	6	PR	.XXX
SERIES incremental encoder with Hall phases EF													
MODEL blind hollow shaft with rear fixing 36K													
MOTOR POLES 4 poles (2 poles pair) 4 6 poles (3 poles pair) 6 8 poles (4 poles pair) 8													
ELECTRICAL INTERFACE FOR COMMUTATION SIGNALS NPN open collector C line driver RS-422 L													
INCREMENTAL RESOLUTION ppr from 500 to 1024 refer to the available pulses list													
ZERO PULSE without zero pulse S with zero pulse Z													
POWER SUPPLY 5 V DC 5													
ELECTRICAL INTERFACE FOR INCREMENTAL SIGNALS line driver RS-422 L													
BORE DIAMETER mm 8 (3/8") mm 9,52 mm 10													
ENCLOSURE RATING IP 40 X													
MAX ROTATION SPEED 6000 rpm 6													
OUTPUT TYPE radial cable (standard length 0,3 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)													
VARIANT custom version XXX													

ELECTRICAL SPECIFICATIONS	
Incremental resolution	from 500 to 1024 ppr
Power supply¹	4,5 ... 5,5 V DC
Current consumption without load	150 mA max
Max load current	20 mA / channel (line driver RS-422) 30 mA / channel (NPN open collector)
Electrical interface for incremental signals²	line driver RS-422 (AELT-5000 or similar)
Electrical interface for Hall phases²	NPN open collector (pull-up max +30V DC) line driver RS-422 (AELT-5000 or similar)
Max output frequency	150 kHz
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	300 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Cable type	shielded - fixed installation conductors section 0,14 mm ² / AWG 26 bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

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

MECHANICAL SPECIFICATIONS	
Bore diameter	ø 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 40 (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	5 G, 10 ... 500 Hz (IEC 60068-2-6)
Moment of inertia	0,5 x 10 ⁻⁶ kgm ² (12 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-10° ... +85°C (+14° ... +185°F)
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

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

MAIN FEATURES

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

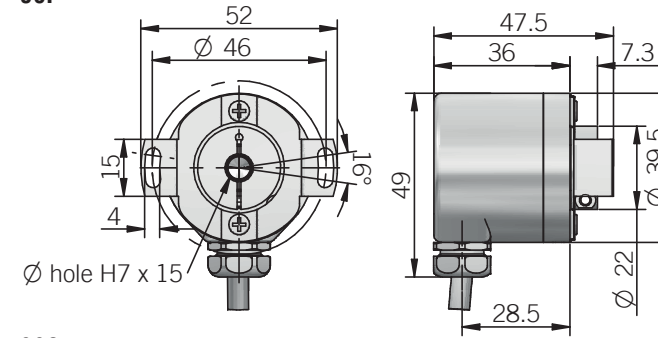
- 3 channel encoder (A / B / Z) with resolution up to 14400 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable output, connectors available on cable end
- Metal cover for high IP enclosure rating
- Blind hollow shaft diameter up to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



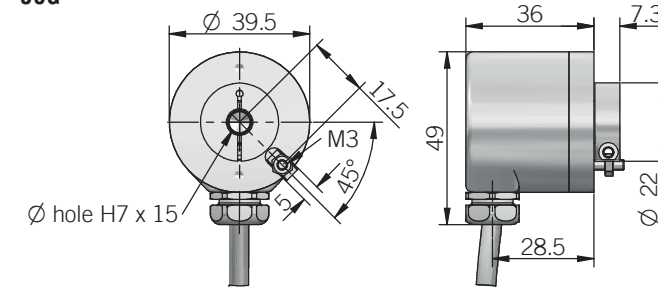
ORDERING CODE

ER	38F	500	S	5/30	P	10	X	X	PR	.XXX
SERIES incremental encoder series ER										
MODEL blind hollow shaft with stator coupling 38F blind hollow shaft with torque pin 38G										
RESOLUTION ppr from 100 to 14400 refer to the available pulses list										
ZERO PULSE without zero pulse S with zero pulse Z										
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30										
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS										
BORE DIAMETER mm 4 mm 5 mm 6 (1/4") mm 6,35 mm 8 mm 10										
ENCLOSURE RATING IP 66 shaft side / IP67 cover side X										
OPTION to be reported X										
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										

38F

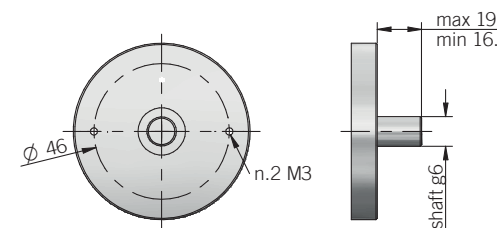


38G

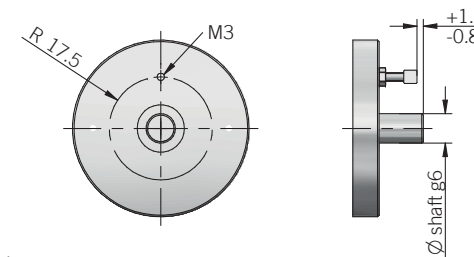


RECOMMENDED INTERFACE FLANGE DESIGN

38F



38G



dimensions in mm

CONNECTIONS

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

ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 14400 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load typical	5 = 200 mW 5/30 = 800 mW
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 3600 ppr / 500 kHz from 4000 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	263 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 4* / 5* / 6* / 6,35* (1/4") / 8* / 10 mm * with supplied shaft adapter
Enclosure rating IEC 60529	IP 66 shaft side / IP 67 cover side
Max rotation speed	6000 rpm
Max shaft load⁴	5 N (1,12 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,8 x 10 ⁻⁶ kgm ² (19 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Shaft adapter material	bronze
Housing material	painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁶	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

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

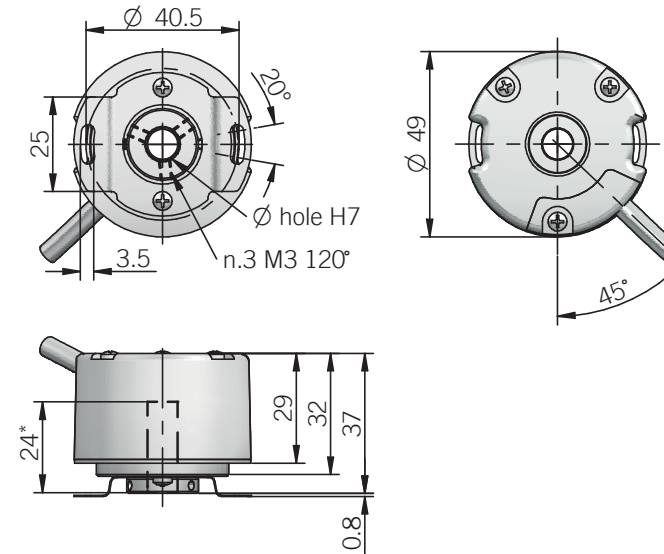
MAIN FEATURES

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, connectors available on cable end
- Through hollow shaft diameter up to 8 mm
- Mounting by stator coupling



48C / P



model C without hole on cover

* maximum protrusion of the customer shaft in blind hollow shaft model
recommended mating shaft tolerance g6
dimensions in mm

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 refer to the available pulses list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY (with L electrical interface) 5 V DC 5 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 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)	VARIANT custom version XXX
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ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 2048 ppr
Power supply ¹	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC
Current consumption without load	100 mA max
Max load current	C / P = 30 mA / channel L = 20 mA / channel
Electrical interface ²	NPN open collector (pull-up max +30V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)_d ³ according to EN ISO 13849-1	330 years
Mission time (Tm) ³	20 years
Diagnostic coverage (DC) ³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

RESOLUTIONS

100 - 200 - 360 - 400 - 500 - 512 - 1000 - 1024 - 2000 - 2048
please directly contact our offices for other pulses, preferred resolutions in bold

CONNECTIONS

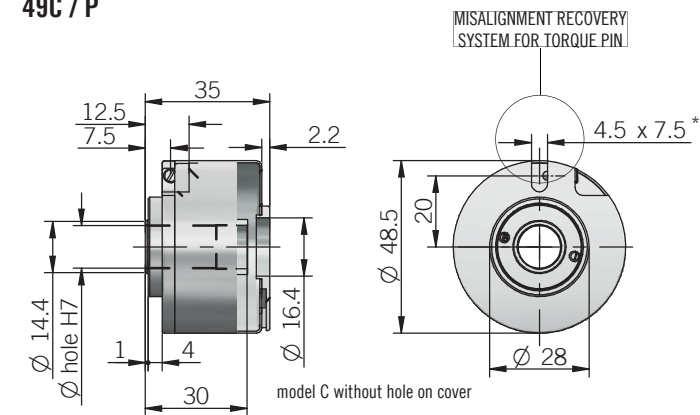
Function	Cable C / P	Cable L
+V DC	red	red
0 V	black	black
A+	green	green
A-	/	brown or grey
B+	yellow	yellow
B-	/	orange
Z+	blue	blue
Z-	/	white
⊖	shield	shield

MAIN FEATURES

- \varnothing 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, connectors available on cable end
- Through hollow shaft diameter up to 12,7 mm (1/2")
- Interchangeable with size 19 Resolver



49C / P



* \varnothing 4 mm torque pin min 0.5 mm from bottom end

for size 19 (version 01 or 14) resolver flange please refer to Accessories

recommended mating shaft tolerance g6
dimensions in mm

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 refer to the available pulses list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY (with L electrical interface) 5 V DC 5 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") mm 9,52 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 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)	VARIANT custom version XXX
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ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 2048 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC
Current consumption without load	100 mA max
Max load current	20 mA / channel
Electrical interface²	NPN open collector (pull-up max +30V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	208 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	\varnothing 6 / 8 / 9,52 (3/8") / 10 / 12 / 12,7 (1/2") mm
Enclosure rating	IP 40 (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	2 x 10 ⁻⁶ kgm ² (47 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	nickel plated brass
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-20° ... +85 °C (-4° ... +185°F) -10° ... +100°C (+14° ... +212°F) on demand
Storage temperature⁵	-25° ... +85 °C (-13° ... +185°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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

RESOLUTIONS

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

please directly contact our offices for other pulses

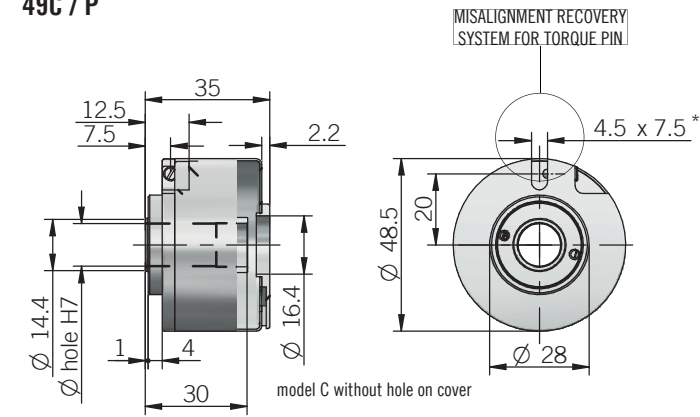
MAIN FEATURES

ø 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



49C / P



* ø 4 mm torque pin min 0.5 mm from bottom end for size 19 (version 01 or 14) resolver flange please refer to Accessories

recommended mating shaft tolerance g6 dimensions in mm

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

SERIES incremental encoder with Hall phases EF	MODEL blind hollow shaft 49C through hollow shaft 49P	MOTOR POLES 4 poles (2 poles pair) 4 6 poles (3 poles pair) 6 8 poles (4 poles pair) 8	ELECTRICAL INTERFACE FOR COMMUTATION SIGNALS NPN open collector C line driver RS-422 L	INCREMENTAL RESOLUTION ppr from 100 to 2048 refer to the available pulses list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY 5 V DC 5	ELECTRICAL INTERFACE FOR INCREMENTAL SIGNALS line driver L	BORE DIAMETER mm 6 mm 8 (3/8") mm 9,52 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 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)	VARIANT custom version XXX
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ELECTRICAL SPECIFICATIONS

Incremental resolution	from 100 to 2048 ppr
Power supply¹	4,5 ... 5,5 V DC
Current consumption without load	150 mA max
Max load current	20 mA / channel
Electrical interface for incremental signals²	line driver RS-422 (AELT-5000 or similar)
Electrical interface for Hall phases²	NPN open collector (pull-up max +30V DC) line driver RS-422 (AELT-5000 or similar)
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	277 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,14 mm ² / AWG 26 bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

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

MECHANICAL SPECIFICATIONS

Bore diameter	ø 6 / 8 / 9,52 (3/8") / 10 / 12 / 12,7 (1/2") mm
Enclosure rating	IP 40 (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	5 G, 10 ... 500 Hz (IEC 60068-2-6)
Moment of inertia	2 x 10 ⁻⁶ kgm ² (47 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	nickel plated brass
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-20° ... +85 °C (-4° ... +185°F)
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

CONNECTIONS

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

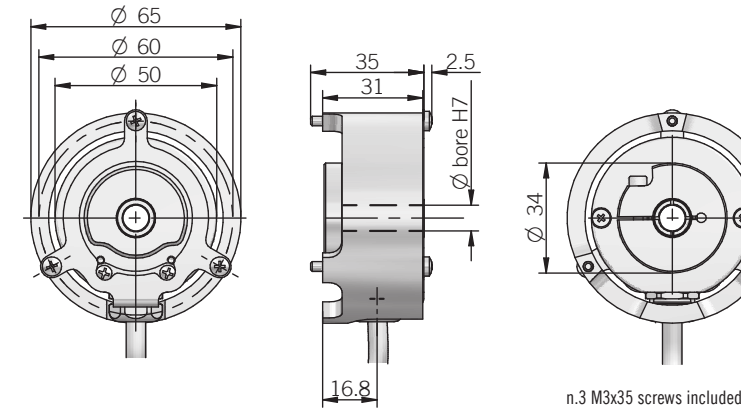
MAIN FEATURES

ø 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

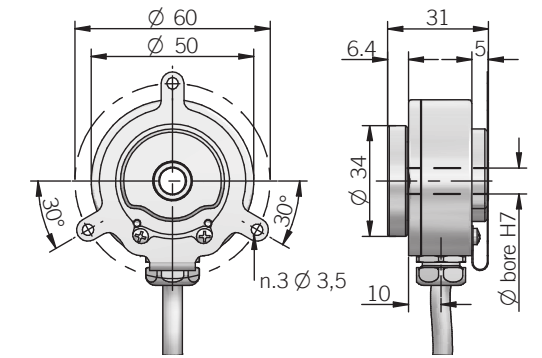


50FA



recommended mating shaft tolerance g6
dimensions in mm

50FP



ORDERING CODE EH 50FP 1024 S 5/30 P 6 X 6 PR .XXX

SERIES incremental encoder series EH	MODEL through hollow shaft with front fixing 50FA through hollow shaft with rear fixing 50FP	RESOLUTION ppr from 100 to 1024 refer to the available pulses list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY 5 ... 30 V DC 5/30	ELECTRICAL INTERFACE push-pull P line driver L power supply 5/30 V DC - output RS-422 RS	BORE DIAMETER mm 6 mm 8 (3/8") mm 9,52 10 mm 10	ENCLOSURE RATING IP 65 X	MAX ROTATION SPEED 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
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ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 1024 ppr
Power supply¹	4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	20 mA / channel
Electrical interface²	push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	54 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,5 x 10 ⁻⁶ kgm ² (12 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Shaft material	stainless steel
Housing material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-40° ... +100 °C (-40° ... +212°F)
Storage temperature⁵	-40° ... +100 °C (-40° ... +212°F)
Weight	150 g (5,29 oz) mod.FP 200 g (7,05 oz) mod.FA

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

CONNECTIONS

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

RESOLUTIONS

100 - 200 - 256 - **360** - 400 - 500 - **1000** - **1024**
please directly contact our offices for other pulses, preferred resolutions in bold

EH 53 A / B

BLIND HOLLOW SHAFT INCREMENTAL ENCODER

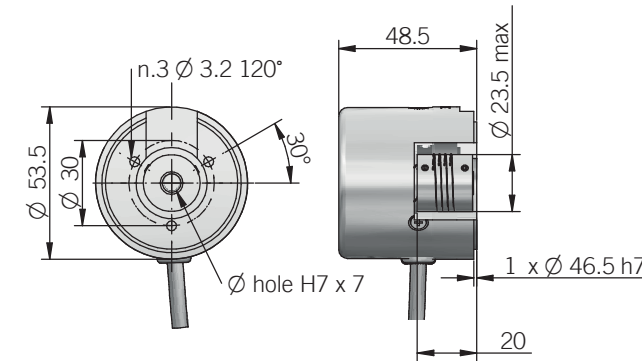
MAIN FEATURES

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, connectors available on cable end
- Up to 10 mm bore diameter
- Integrated elastic couplig

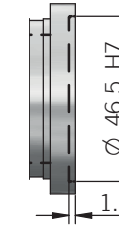


53A



recommended mating shaft tolerance g6
dimensions in mm

53B INTERFACE



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 refer to the available pulses list										
ZERO PULSE without zero pulse S with zero pulse Z										
POWER SUPPLY (with L electrical interface) 5 V DC 5 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										

ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 1024 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	C / P = 50 mA / channel L = 20 mA / channel
Electrical interface²	NPN open collector (pull-up max +30V DC) push-pull / line driver HTL (AEC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	208 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 6 / 8 / 10 mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1 x 10 ⁻⁶ kgm ² (24 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-10° ... +60°C (+14° ... +140°F)
Storage temperature⁵	-25° ... +70°C (-13° ... +158°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

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

CONNECTIONS

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

EL - ER 53 A / B

BLIND HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

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

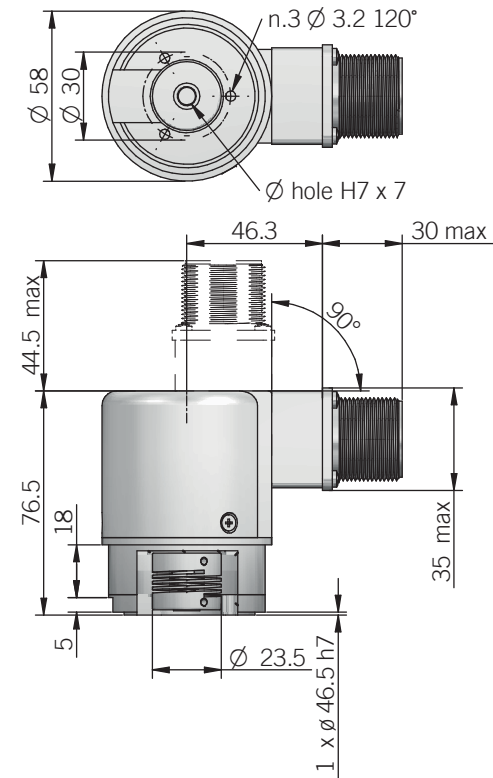
- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Integrated elastic couplig up to 10 mm bore diameter



ORDERING CODE

ER	53A	M*	500	S	5/28	P	8	X	6	M	R	.162	+XXX
<p>SERIES incremental encoder series EL incremental encoder series ER</p> <p>MODEL adjustable flange model 53A adjustable flange model 53B</p> <p>METAL COVER * add for metal cover M</p> <p>RESOLUTION ppr from 1 to 10000 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28</p> <p>ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS</p> <p>BORE DIAMETER mm 6 mm 8 mm 10</p> <p>ENCLOSURE RATING IP 54 X IP 64 S</p> <p>MAX ROTATION SPEED (IP 64) 3000 rpm 3 (IP 54) 6000 rpm 6</p> <p>OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 plug connector J M12 plug connector M12 M23 plug connector H M16 plug connector C</p> <p>DIRECTION TYPE axial A radial R</p> <p>SOCKET socket not included. .162 to be reported only with connector output (eg. MR.162), for socket see Accessories</p> <p>VARIANT custom version XXX</p>													

53A



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

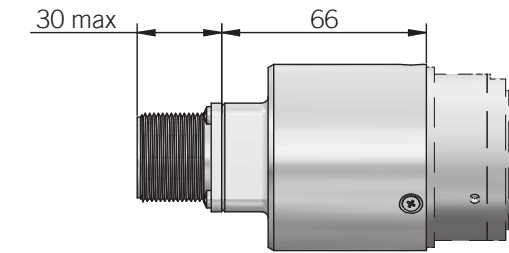
Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³	200 years EL series 263 years ER series
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ER SERIES RESOLUTIONS

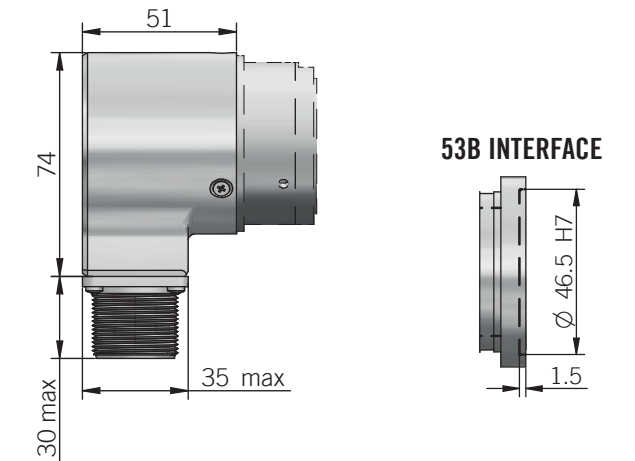
100 - 120 - 128 - 150 - 200 - 240 - 250 - 256 - 300 - **360** - 400 - 480 - 500 - 512 - 600 - 625 - 720 - 800 - 900 - **1000** - **1024** - 1200 - 1250 - 1440 - 1600 - 1800 - **2000** - **2048** - 2500 - 3000 - **3600** - 4000 - 4096 - **5000** - 6000 - **7200** - 8000 - 8192 - 9000 - **10000**

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

DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



MECHANICAL SPECIFICATIONS

Bore diameter	Ø 6 / 8 / 10 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 64
Max rotation speed	6000 rpm with X enclosure rating 3000 rpm with S enclosure rating
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1 x 10 ⁻⁶ kgm ² (24 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series
Storage temperature⁵	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ measured on the transducer flange

⁵ condensation not allowed

EL SERIES RESOLUTIONS

1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 25 - 30 - 32 - 40 - 50 - 60 - 70 - 80 - 90 - 160 - 180 - 350 - 450 - 660 - 700 - 750 - 1500

CONNECTIONS

Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6	F	4	1	10	1	8
A+	green	green	3	1	C	A	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	C	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	B	2	B	1	4	8	4	3
B-	/	orange	/	5	/	E	8	H	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
⊥	shield	shield	7	7	G	G	10	J	housing ¹	housing ¹	9	housing ¹	housing ¹

¹ only with metal cover

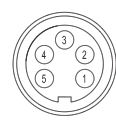
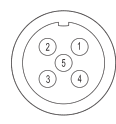
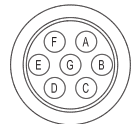
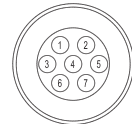
J connector (7 pin) JIS-C-5432 Size 16 front view

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

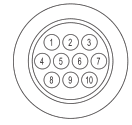
M12 connector (5 pin) M12 A coded front view

C connector (5 pin) Amphenol C091 M16 front view

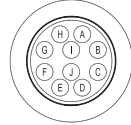
H connector (12 pin) - M23 CCW Hummel 7.410.000000 - 7.002.912.603 front view



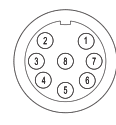
J connector (10 pin) JIS-C-5432 Size 16 front view



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



M12 connector (8 pin) M12 A coded front view



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



MAIN FEATURES

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

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



ORDERING CODE

ER 58F M* 500 S 5/28 P 8 X 3 M R .162 +XXX

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

MODEL
blind hollow shaft with stator coupling **58F**
blind hollow shaft with torque pin **58G**
blind hollow shaft with torque stop slot **63F**
blind hollow shaft with torque pin **63G**

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

RESOLUTION
ppr from **1** to **24000**
refer to the available pulses list

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

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

ELECTRICAL INTERFACE
NPN open collector **C**
push-pull **P**
line driver **L**
power supply 5/28 V DC - output RS-422 **RS**

BORE DIAMETER
mm **8**
mm **10**
mm **12**
mm **14**
mm **15**

ENCLOSURE RATING
IP **54 X**
IP **66 S**

MAX ROTATION SPEED
3000 rpm **3**

OUTPUT TYPE
cable (standard length 1,5 m) **P**
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
MIL plug connector **M**
JIS-C-5432 plug connector **J**
M12 plug connector **M12**
M23 plug connector **H**
M16 plug connector **C**

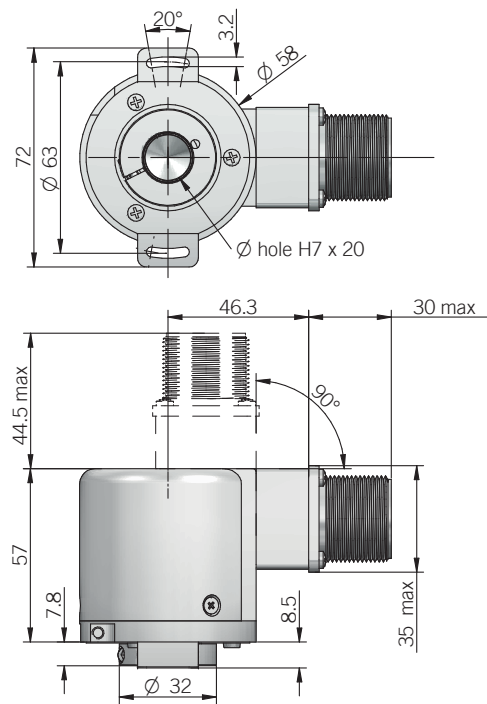
DIRECTION TYPE
axial **A**
radial **R**

SOCKET
socket not included **.162**

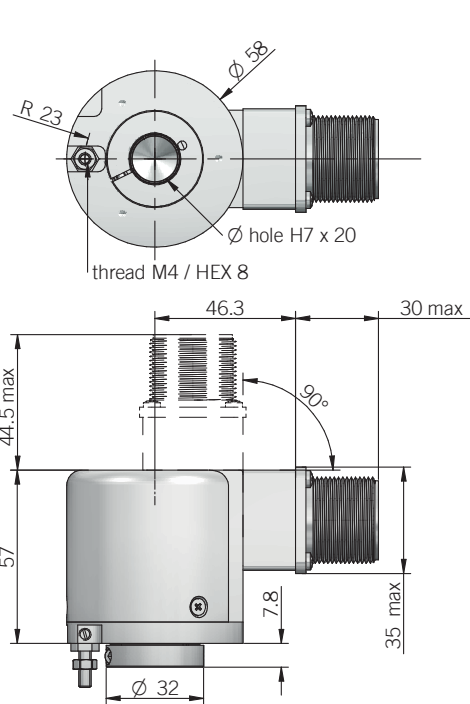
to be reported only with connector output (eg. MR.162), for socket see Accessories

VARIANT
custom version **XXX**

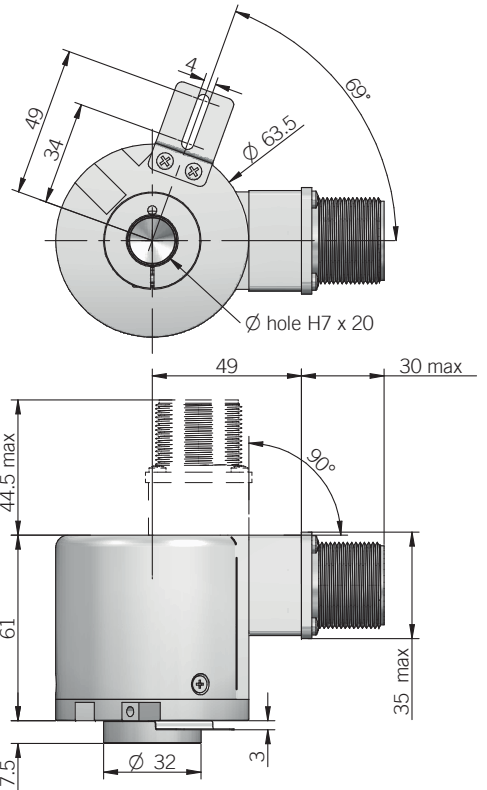
58F



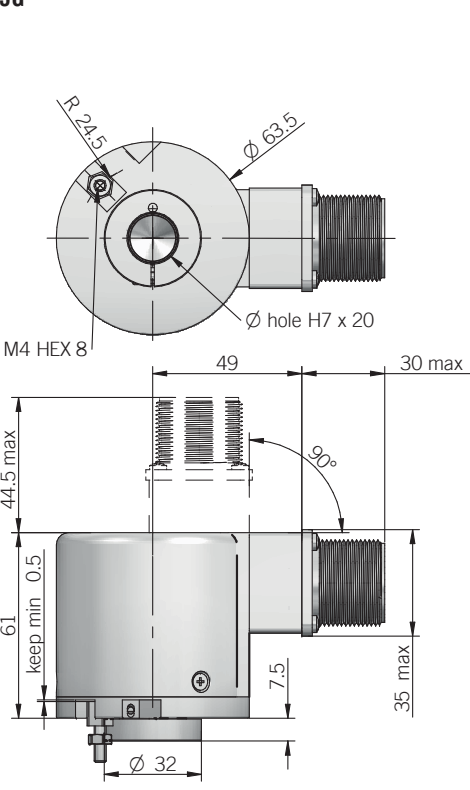
58G



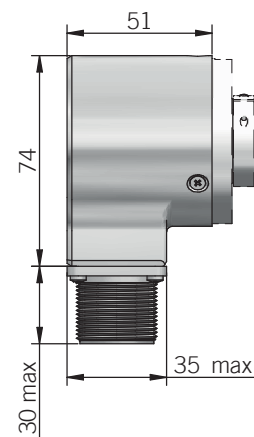
63F



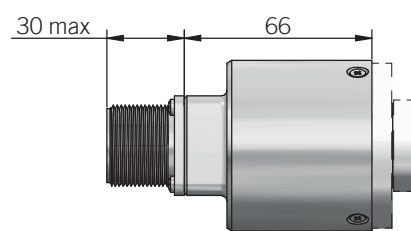
63G



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



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

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 2500 ppr (58 G) from 1 to 24000 ppr (58 F - 63 F / G)
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 8* / 10* / 12* / 14 / 15 mm * with supplied shaft adapter (valid for resolution ≥ 3000 ppr)
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10 ⁻⁶ kgm ² (95 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Shaft adapter material	bronze
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-10° ... +60°C (+14° ... +140°F) EL series -20° ... +70°C (-4° ... +158°F) ER series
Storage temperature⁵	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

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

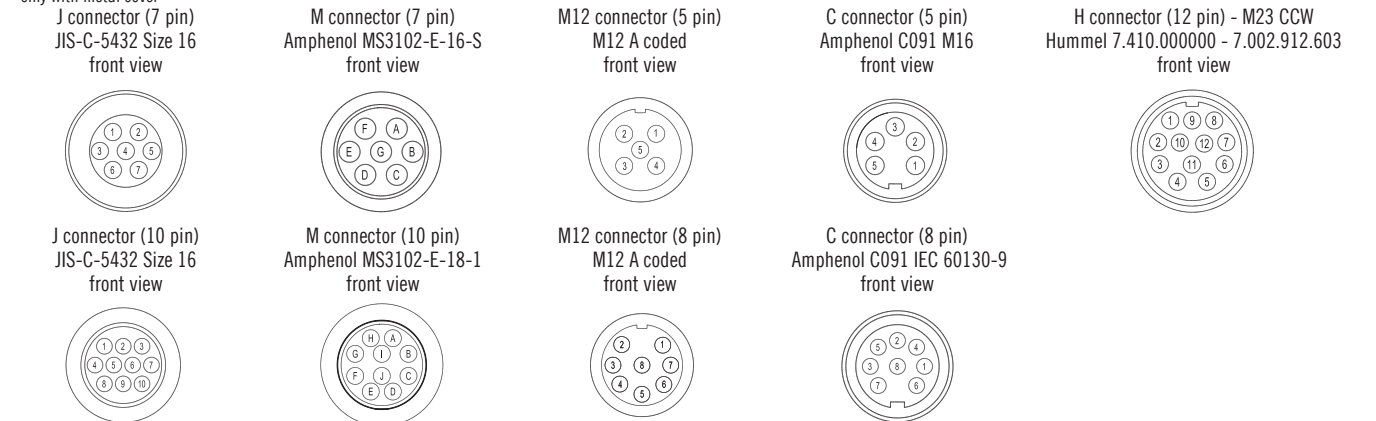
EL SERIES RESOLUTIONS

1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 25 - 30 - 32 - 40 - 50 - 60 - 70 - 80 - 90 - 160 - 180 - 350 - 450 - 660 - 700 - 750 - 1500

CONNECTIONS

Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6	F	4	1	10	1	8
A+	green	green	3	1	C	A	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	C	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	B	2	B	1	4	8	4	3
B-	/	orange	/	5	/	E	8	H	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
⊖	shield	shield	7	7	G	G	10	J	housing ¹	housing ¹	9	housing ¹	housing ¹

¹ only with metal cover



EL 63 FB / GB / PB / PBF / PC / PCF

BLIND / THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

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

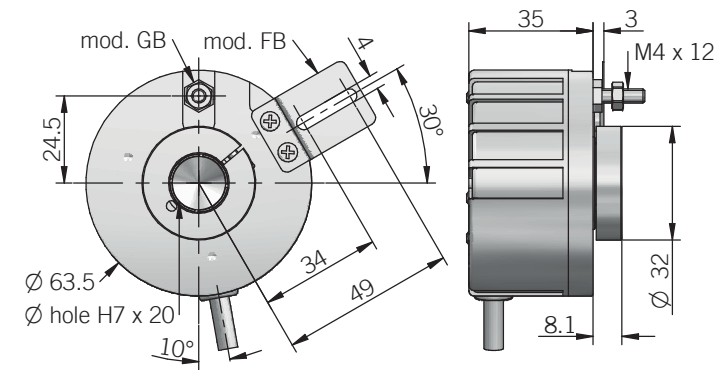
- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 300 kHz output frequency
- Cable output, connectors available on cable end
- Through or blind hollow shaft diameter up to 15 mm
- Shaft fixing by collar clamping



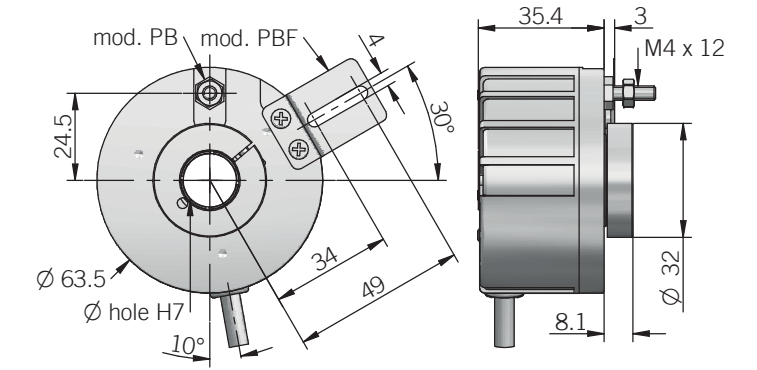
ORDERING CODE

ORDERING CODE	EL 63GB	500	S	5/28	P	8	X	3	PR	.XXX
SERIES	incremental encoder EL									
MODEL	blind hollow shaft with torque stop slot 63FB blind hollow shaft with torque pin 63GB through hollow shaft with torque pin 63PB through hollow shaft with torque stop slot 63PBF rear fixing shaft with torque pin 63PC rear fixing shaft with torque stop slot 63PCF									
RESOLUTION	ppr from 1 to 2500 refer to the available pulses list									
ZERO PULSE	without zero pulse S with zero pulse Z									
POWER SUPPLY	(with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28									
ELECTRICAL INTERFACE	NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS									
BORE DIAMETER	mm 8 mm 10 mm 12 mm 14 mm 15									
ENCLOSURE RATING	IP 54 X									
MAX ROTATION SPEED	3600 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									

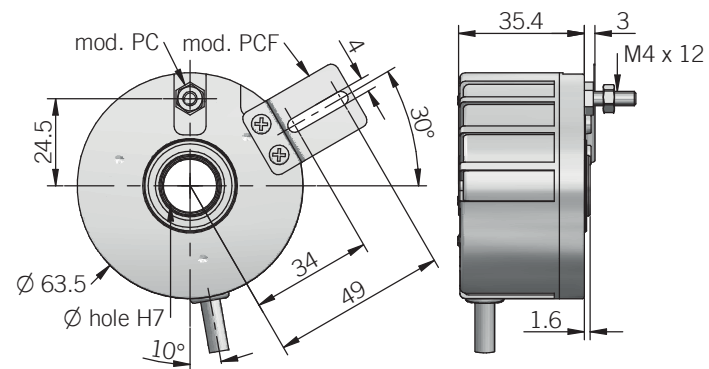
63FB / GB



63PB / PBF

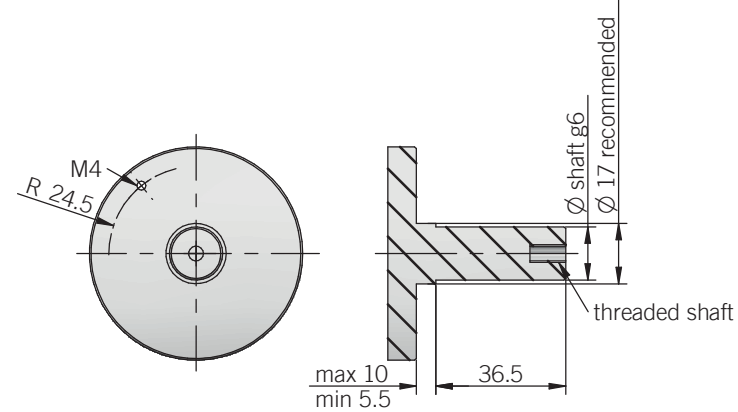


63PC / PCF



torque pin is included in model GB / PB / PC, for model FB / PBF / PCF please refer to Accessories

RECOMMENDED INTERFACE FLANGE DESIGN 63 PC



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 2500 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	300 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	200 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

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

MECHANICAL SPECIFICATIONS

Bore diameter	ø 8 / 10 / 12 / 14 / 15 mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3600 rpm continuous / 4000 rpm peak
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10 ⁻⁶ kgm ² (95 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,04 Nm (5,66 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA 66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-10° ... +60 °C (+14° ... +140°F)
Storage temperature⁵	-25° ... +70 °C (-13° ... +158°F)
Weight	350 g (12,35 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

CONNECTIONS

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

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



ORDERING CODE ER 721 A M* 500 S 5/28 P 8 X 6 M R .162 +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**
refer to the available pulses list

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

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

ELECTRICAL INTERFACE
NPN open collector **C**
push-pull **P**
line driver **L**
power supply 5/28 V DC - output RS-422 **RS**

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**

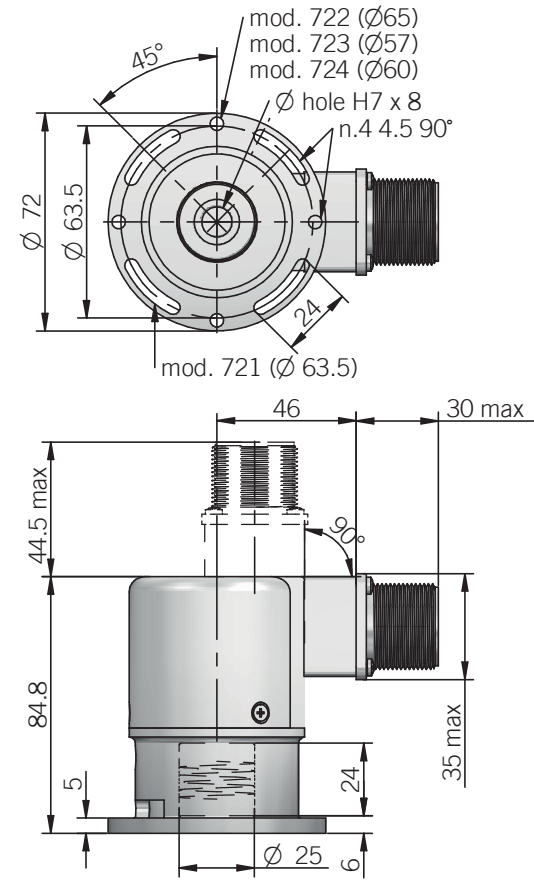
OUTPUT TYPE
cable (standard length 1,5 m) **P**
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
MIL plug connector **M**
JIS-C-5432 plug connector **J**
M12 plug connector **M12**
M23 plug connector **H**
M16 plug connector **C**

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

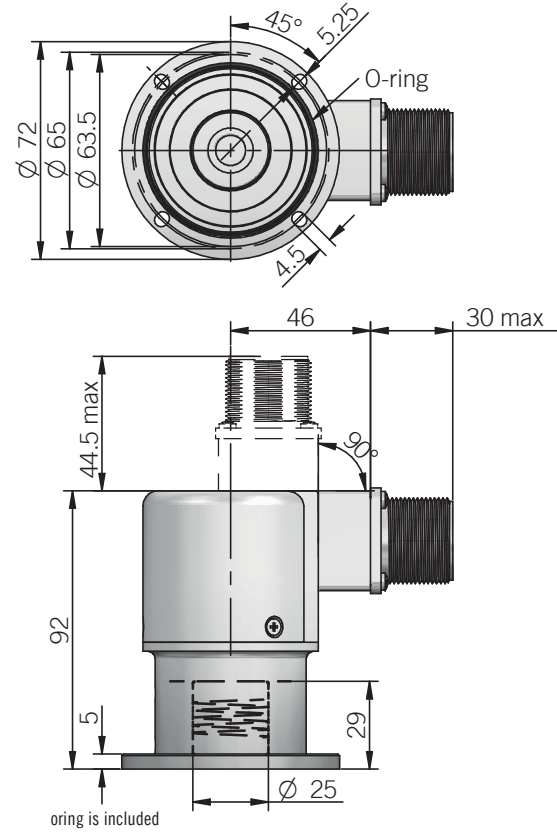
SOCKET
socket not included **.162**
to be reported only with connector output (eg. MR.162), for socket see Accessories

VARIANT
custom version **XXX**

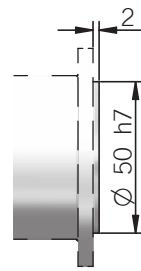
721A



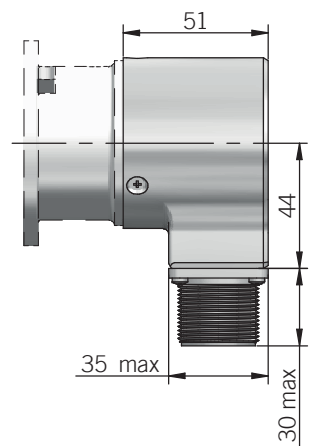
721A (S ENCLOSURE RATING)



72B FLANGE

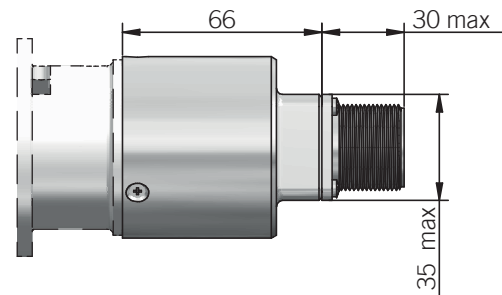


DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



recommended mating shaft tolerance g6 dimensions in mm

DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply ¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface ²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF) _d ³ according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm) ³	20 years
Diagnostic coverage (DC) ³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ measured on the transducer flange

⁵ condensation not allowed

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

MECHANICAL SPECIFICATIONS

Bore diameter	Ø 6 / 8 / 10 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm with X enclosure rating EL 3000 rpm / 60° C with S enclosure rating ER 3000 rpm / 70° C with S enclosure rating ER 2000 rpm / 85° C with S enclosure rating
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	3,5 x 10 ⁻⁶ kgm ² (83 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,04 Nm (5,66 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Elastic coupling material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series
Storage temperature ⁵	-25° ... +70°C (-13° ... +158°F)
Weight	400 g (14,11 oz) 500 g (17,64 oz) with metal cover

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

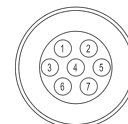
please directly contact our offices for other pulses, preferred resolutions in bold

CONNECTIONS

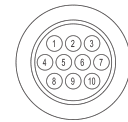
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6	F	4	1	10	1	8
A+	green	green	3	1	C	A	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	C	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	B	2	B	1	4	8	4	3
B-	/	orange	/	5	/	E	8	H	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
Shield	shield	shield	7	7	G	G	10	J	housing ¹	housing ¹	9	housing ¹	housing ¹

¹ only with metal cover

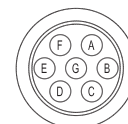
J connector (7 pin)
JIS-C-5432 Size 16
front view



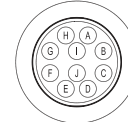
J connector (10 pin)
JIS-C-5432 Size 16
front view



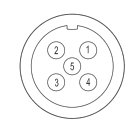
M connector (7 pin)
Amphenol MS3102-E-16-S
front view



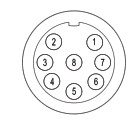
M connector (10 pin)
Amphenol MS3102-E-18-1
front view



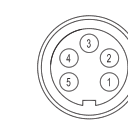
M12 connector (5 pin)
M12 A coded
front view



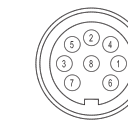
M12 connector (8 pin)
M12 A coded
front view



C connector (5 pin)
Amphenol C091 M16
front view



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



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



EH 80 C / K / P / PG

BLIND / THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

Encoder series \varnothing 80 mm with very high resistance to shock and vibrations 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, connectors available on cable end
- Through or blind hollow shaft diameter up to 15 mm
- Shaft fixing by grain or collar clamping

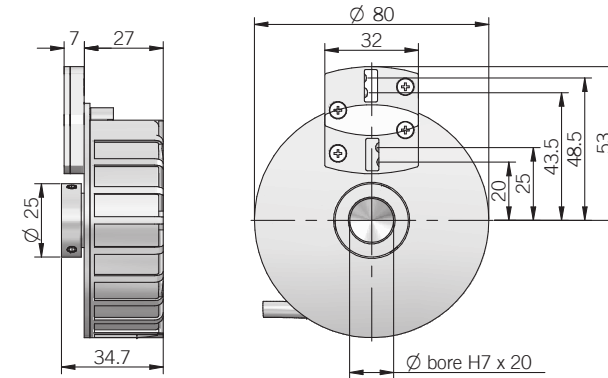


ORDERING CODE

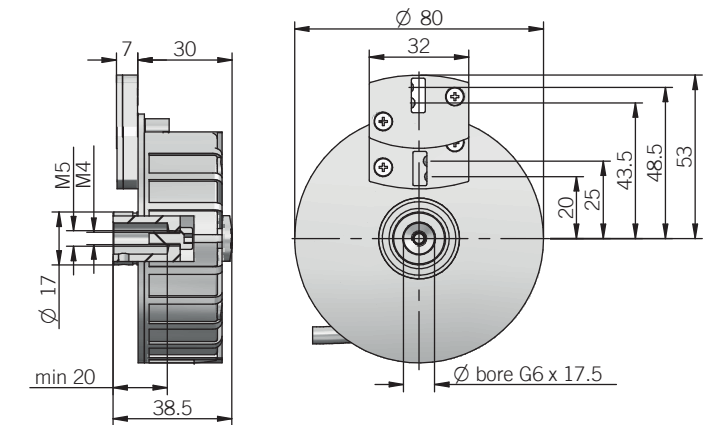
EH 80C 500 S 5 L 8 X 6 PR .XXX

SERIES incremental encoder EH	MODEL blind hollow shaft 80C blind hollow shaft with rear fixing 80K through hollow shaft 80P through hollow shaft with collar clamping 80PG	RESOLUTION ppr from 100 to 2048 refer to the available pulses list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28	ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS	BORE DIAMETER (mod. C - P) mm 8 mm 10 (mod. C - P) mm 12 (mod. C - P - PG) mm 14 (mod. C - P - PG) mm 15	ENCLOSURE RATING IP 64 X	MAX ROTATION SPEED (mod. P - PG) 3000 rpm 3 (mod. C - K) 6000 rpm 6	OUTPUT TYPE radial (standard length 0,3 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)	VARIANT custom version XXX
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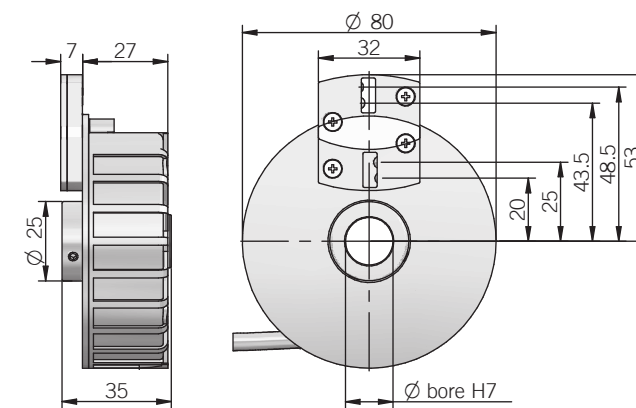
80C



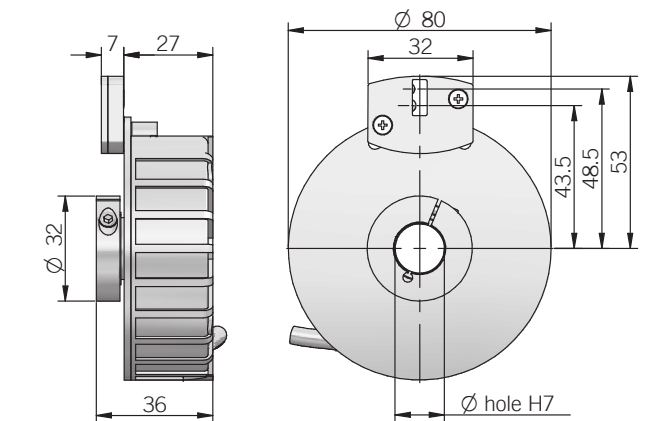
80K



80P



80PG



recommended mating shaft tolerance g6, model 80K mating shaft tolerance h7
for torque pin please refer to Accessories
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 2048 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF_d)³	207 years
Mission time (T_m)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	\varnothing 8 / 10 / 12 / 14 / 15 mm
Enclosure rating	IP 64 (IEC 60529)
Max rotation speed	3000 rpm (mod.P / PG) 6000 rpm (mod.C / K)
Shock	70 G, 11 ms (IEC 60068-2-27)
Vibration	30 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10 ⁻⁶ kgm ² (95 x 10 ⁻⁶ lbft ²)
Starting torque (at +20°C / +68°F)	< 0,04 Nm (5,66 Ozin)
Bearing stage material	PA66 or PPS glass fiber reinforced
Shaft material	aluminum (mod. C / K) stainless steel (mod.P / PG)
Housing material	PA66 or PPS glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-20° ... +85 °C (-4° ... +185°F) -20° ... +100°C (-4° ... +212°F) on demand
Storage temperature⁵	-25° ... +85 °C (-13° ... +185°F)
Weight	250 g (8,82 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ measured on the transducer flange

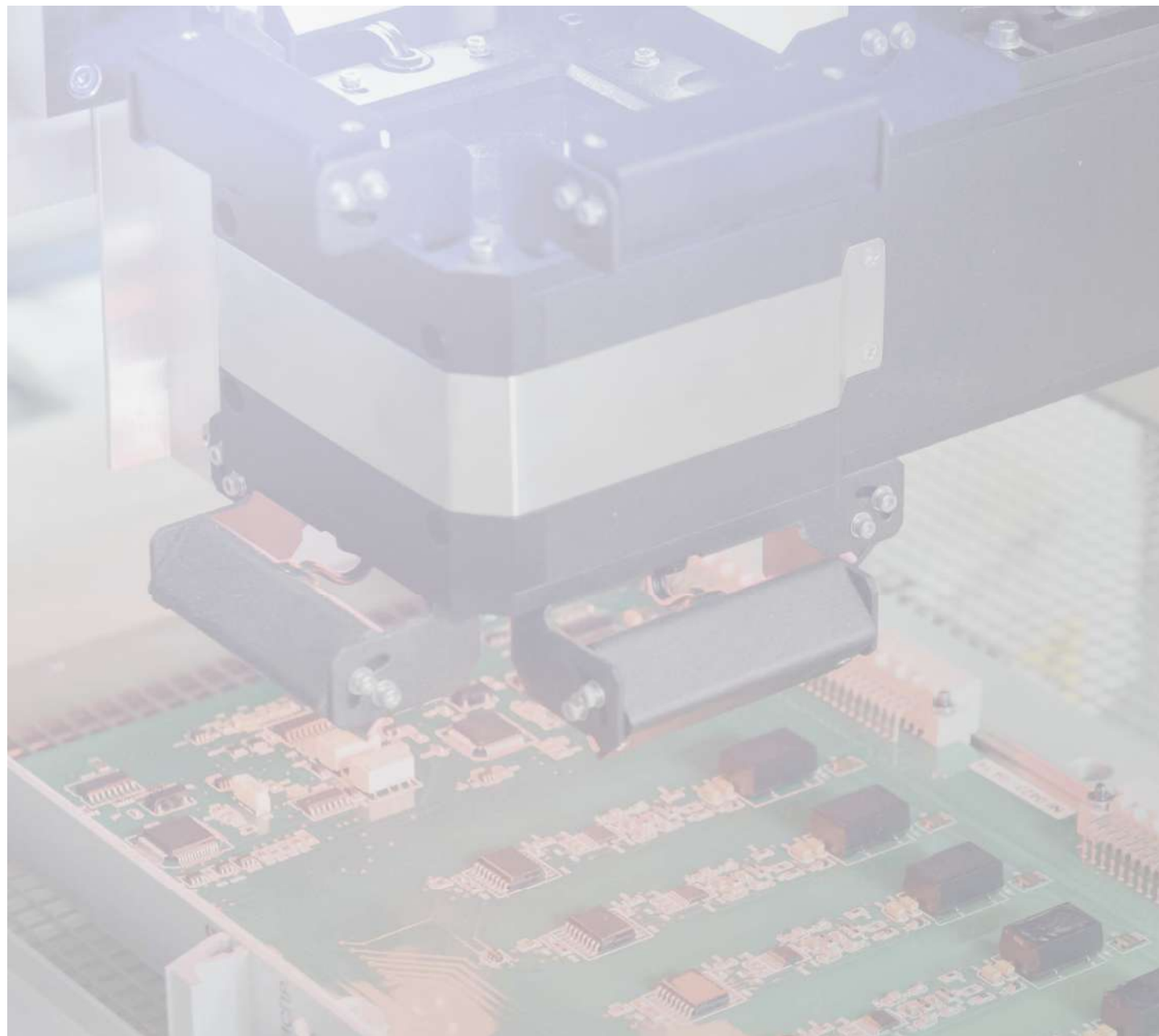
⁵ condensation not allowed

CONNECTIONS

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

RESOLUTIONS

100* - **200** - 250 - 256 - 360 - 400 - **500** - 512 - 600 - **1000** - **1024** - **2000** - **2048**
 *available without zero pulse, please directly contact our offices for other pulses, preferred resolutions in bold



MAIN FEATURES

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

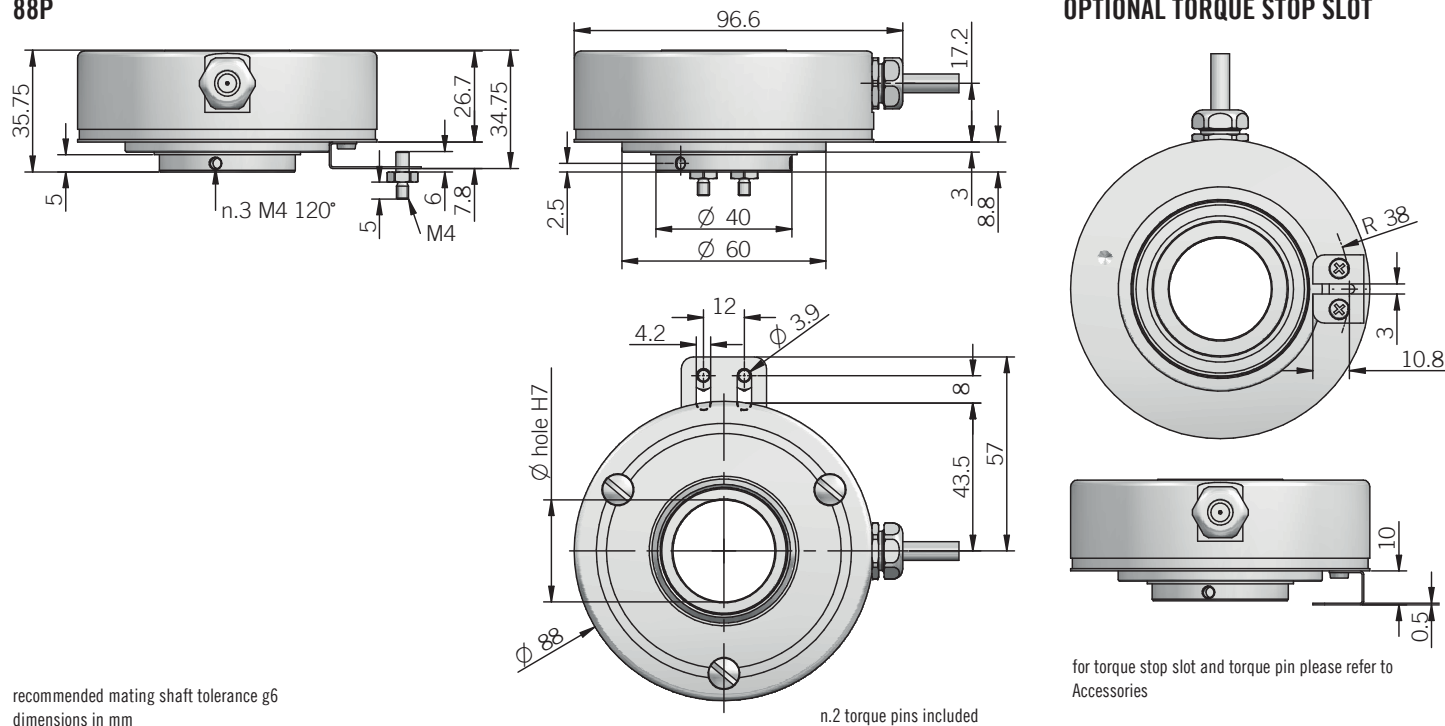
- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- Cable output, connectors available on cable end
- Sturdy mechanic
- 25 or 30 mm bore diameter, others on request
- Shaft fixing with grub screws



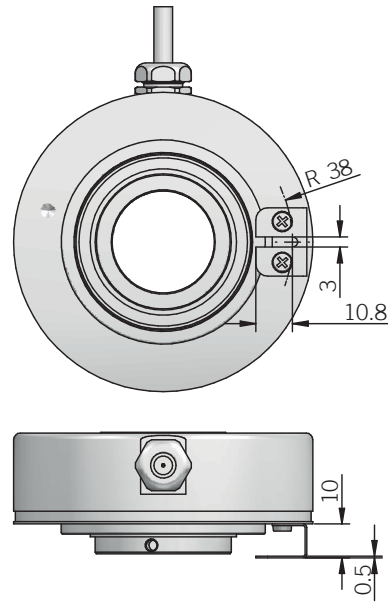
ORDERING CODE

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 torque stop slot 88P										
RESOLUTION (mod. EH) max ppr 2500 (mod. EL) max ppr 2048 refer to the available pulses list										
ZERO PULSE without zero pulse S with zero pulse Z										
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28										
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS										
SHAFT DIAMETER 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										

88P



OPTIONAL TORQUE STOP SLOT



for torque stop slot and torque pin please refer to Accessories

recommended mating shaft tolerance g6 dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 250 to 2500 ppr EH series from 2 to 2048 ppr EL series
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Index signal	90°e (gated A&B) EH series 180°e (gated A) EL series
Counting direction	A leads B clockwise (shaft view)
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	220 years EH series 331 years EL series
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS	
Shaft diameter	Ø 25 / 30 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27) EL series 70 G, 11 ms (IEC 60068-2-27) EH series
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6) EL series 30 G, 10 ... 2000 Hz (IEC 60068-2-6) EH series
Moment of inertia	45 x 10 ⁻⁶ kgm ² (10,68 x 10 ⁻⁴ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,1 Nm (14,16 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-10° ... +70°C (+14° ... +158°F)
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	350 g (12,35 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

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

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, connectors available on cable end
- Sturdy mechanic
- Up to 40 mm bore diameter
- Shaft fixing by collar clamping



ORDERING CODE

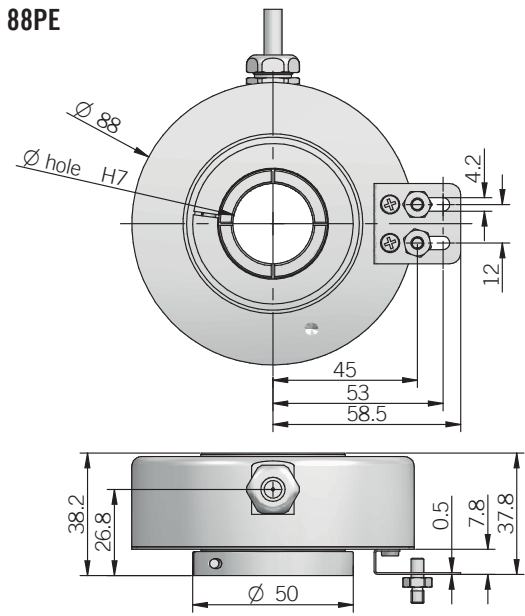
EH	88PE	1024	S	5/28	P	30	X	3	PR	.XXX
SERIES incremental encoder series EH										
MODEL through hollow shaft with torque stop slot 88PE through hollow shaft for torque arm fixing 88PET please refer to Accessories for torque arm										
RESOLUTION ppr from 500 to 2500 refer to the available pulses list										
ZERO PULSE without zero pulse S with zero pulse Z										
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28										
ELECTRICAL INTERFACE push-pull P line driver L power supply 5/28 V DC - output RS-422 RS										
BORE DIAMETER mm 25 mm 30 (mod. PE) mm 35 (mod. PE) mm 38 (mod. PE) mm 40										
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										

EH SERIES RESOLUTIONS
250 - 256 - 500 - 512 - 700 - 720 - 1000 - 1024 - 1440 - 2500

EL SERIES RESOLUTIONS
2 - 5 - 100 - 200 - 360 - 400 - 2000 - 2048

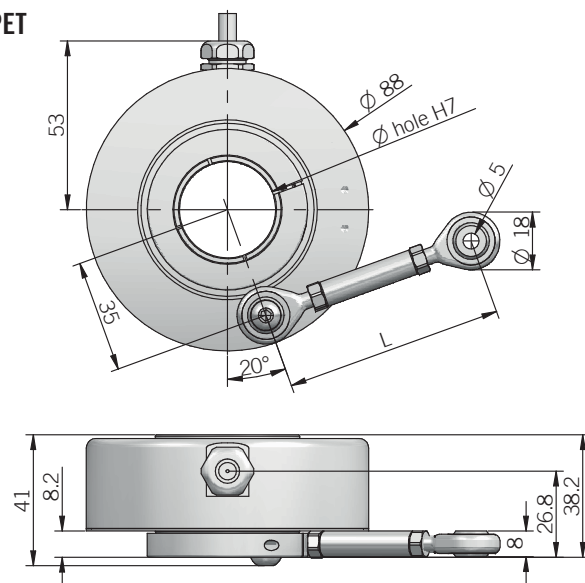
please directly contact our offices for other pulses, preferred resolutions in bold

88PE



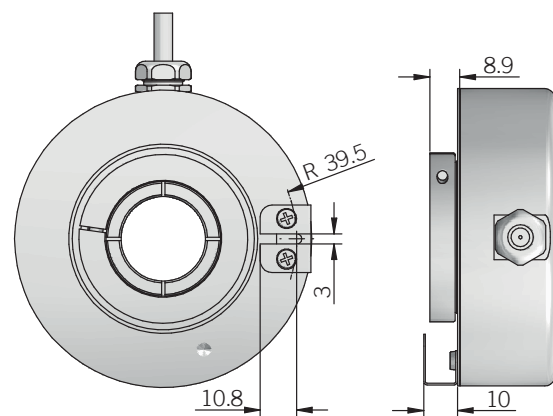
for torque pin please refer to Accessories

88PET



torque arm not included, please refer to Accessories

OPTIONAL TORQUE STOP SLOT



for torque stop slot and torque pin please refer to Accessories
recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 500 to 2500 ppr
Power supply ¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW
Max load current	20 mA / channel
Electrical interface ²	push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF) _d ³ according to EN ISO 13849-1	220 years
Mission time (Tm) ³	20 years
Diagnostic coverage (DC) ³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	Ø 25 / 30 / 35 / 38 / 40 mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	45 x 10 ⁻⁶ kgm ² (10,68 x 10 ⁻⁴ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin)
Bearing stage material	aluminum
Shaft material	up to Ø 38 mm aluminum Ø 40 mm stainless steel
Housing material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-30° ... +85°C (-22° ... +185°F)
Storage temperature ⁵	-30° ... +85°C (-22° ... +185°F)
Weight	350 g (12,35 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

CONNECTIONS

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

RESOLUTIONS

500 - 512 - 720 - **1000** - **1024** - 1440 - 2500
please directly contact our offices for other pulses, preferred resolutions in bold

MAIN FEATURES

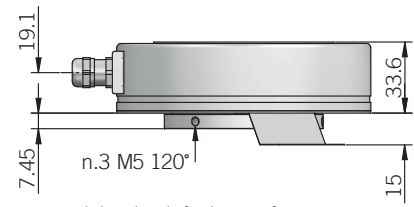
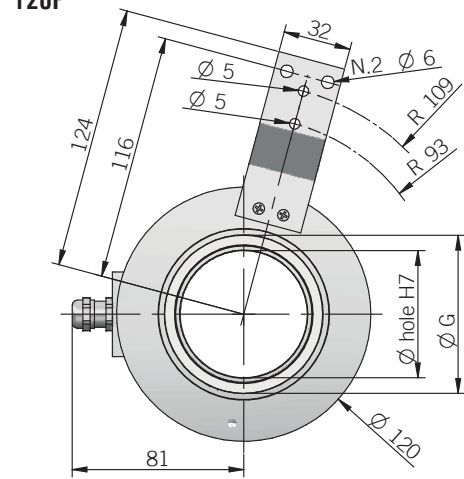
- Ø 120 mm through hollow shaft encoder designed for medium / big size motors.
- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +24 V DC with several electrical interfaces available
- Up to 105 kHz output frequency
- Cable output, connectors available on cable end
- Through hollow 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 refer to the available pulses list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY (with L electrical interface) 5 V DC 5 (with L electrical interface) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28	ELECTRICAL INTERFACE 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
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120P



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

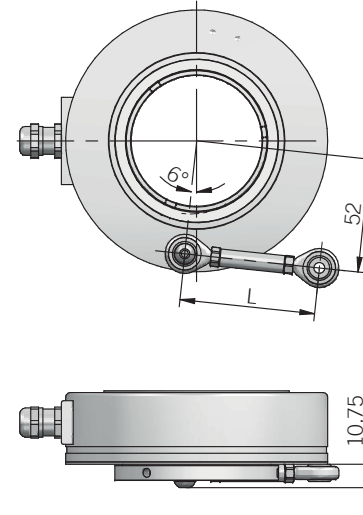
Resolution	from 400 to 2048 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,75 ... 29,4 V DC 8/24 = 7,6 ... 25,2 V DC (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	C / P = 50 mA / channel L = 20 mA / channel
Electrical interface²	push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	429 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

RESOLUTIONS

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

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

INSTALLATION WITH TORQUE ARM



for torque arm please refer to Accessories

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

MECHANICAL SPECIFICATIONS

Bore diameter	Ø 40 / 50 / 60 mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	approx 215 x 10 ⁻⁶ kgm ² (51 x 10 ⁻⁴ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,05 Nm (7 Ozin)
Bearing stage material	aluminum
Shaft material	aluminum
Housing material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	0° ... +60 °C (+32° ... +140°F)
Storage temperature⁵	-25° ... +70 °C (-13° ... +158°F)
Weight	750 g (26,46 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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



MAIN FEATURES

Series of miniaturized encoders with innovative proprietary magnetic sensor for integration on small size AC/DC motors, stepper motors or for limited size applications.

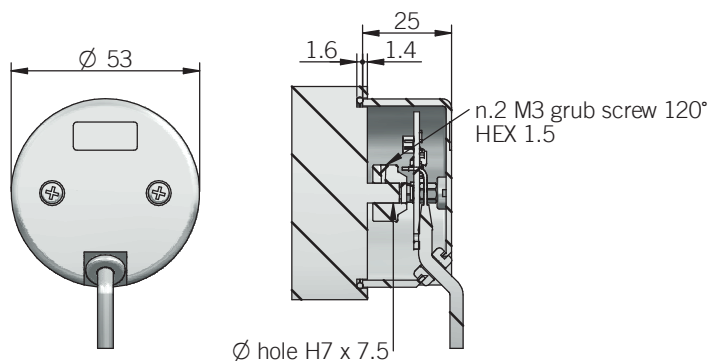
- 3 channel encoder (A / B / Z) with resolution up to 10000 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Cable output, connectors available on cable end
- Compact dimensions (height < 25 mm)
- No wear due to non contact magnetic technology
- Bore shaft diameter up to 10 mm
- Wide operating temperature -20° ... +100°C (-4° ... +212°F)
- OEM version without cover available



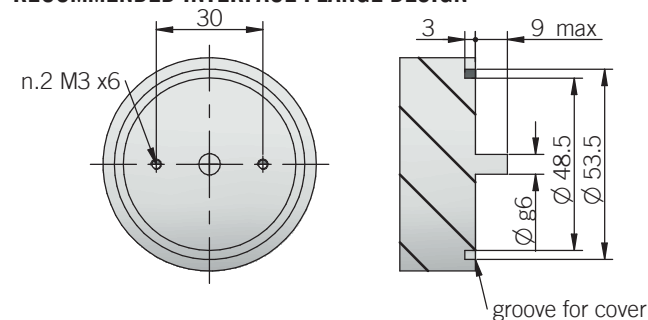
ORDERING CODE

EMI	30M	*S	50	Z	5/30	P	6	X	X	PR	.XXX
SERIES											
magnetic incremental encoder series EMI											
MODEL											
kit encoder 30M											
COVER											
* add if without cover S											
RESOLUTION											
ppr from 1 to 10000											
please refer to the preferred resolutions list											
ZERO PULSE											
without zero pulse S											
with zero pulse Z											
POWER SUPPLY											
5 V DC 5											
5 ... 30 V DC 5/30											
ELECTRICAL INTERFACE											
NPN open collector C											
push-pull P											
line driver L											
power supply 5/30 V DC - output RS-422 RS											
BORE DIAMETER											
mm 6											
(1/4") mm 6,35											
mm 8											
mm 10											
ENCLOSURE RATING											
IP 54 X											
OPTION											
to be reported X											
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											

30M



RECOMMENDED INTERFACE FLANGE DESIGN



dimensions in mm

ELECTRICAL SPECIFICATIONS

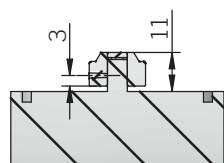
Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load typical	0,4 W
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	10 ms
Accuracy	< 0,3° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	253 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

PREFERRED RESOLUTIONS

2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 - 3600 - 4096 - 5000 - 7200 - 10000

please directly contact our offices for other pulses

MAGNET-ACTUATOR INSTALLATION



MECHANICAL SPECIFICATIONS

Bore diameter	ø 6 / 6,35 (1/4") / 8 / 10 mm
Enclosure rating	IP 54 (IEC 60529) when properly installed with supplied oring kit
Max rotation speed	limited only by output frequency
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,1 x 10 ⁻⁶ kgm ² (2,4 x 10 ⁻⁶ lbft ²)
Magnet-actuator material	aluminium
Cover material	PA66 glass fiber reinforced
Shaft radial play allowed	± 0,25 mm
Shaft axial play allowed	± 0,5 mm
Operating temperature^{4,5}	-20° ... +100°C (-4° ... +212°F)
Storage temperature⁵	-20° ... +100°C (-4° ... +212°F)
Weight	100 g approx (3,5 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

CONNECTIONS

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

- Innovative proprietary magnetic Asic
- 3 channel encoder (A / B / Z) with resolution up to 10000 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Cable output, connectors available on cable end
- Compact dimensions
- Blind hollow shaft diameter up to 10 mm with shaft fixing by collar clamping
- Wide operating temperature -25° ... +100°C (-13° ... +212°F)

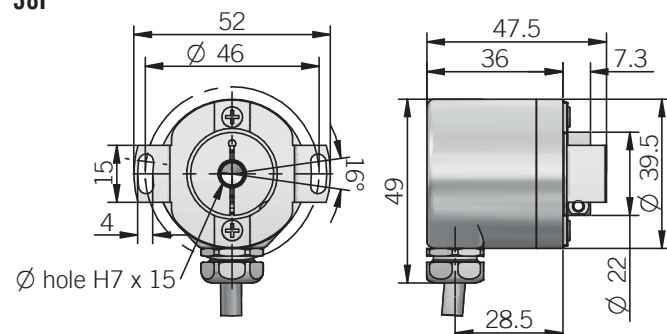


ORDERING CODE

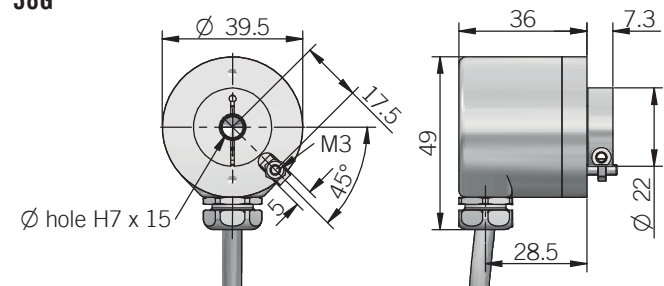
EMI	38F	500	S	5/30	P	10	X	X	PR	.XXX
SERIES magnetic incremental encoder series EMI										
MODEL blind hollow shaft with stator coupling 38F blind hollow shaft with torque pin 38G										
RESOLUTION ppr from 1 to 10000 please refer to the preferred resolutions list										
ZERO PULSE without zero pulse S with zero pulse Z										
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30										
ELECTRICAL INTERFACE NPN open-collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS										
SHAFT DIAMETER mm 4 mm 5 mm 6 (1/4") mm 6,35 mm 8 mm 10										
ENCLOSURE RATING IP 66 shaft side / IP67 cover side X										
OPTION to be reported X										
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										



38F



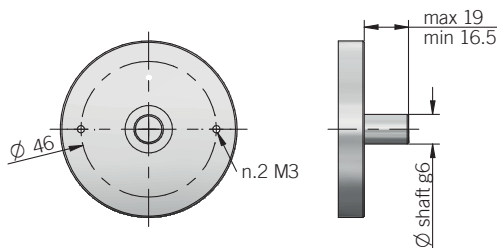
38G



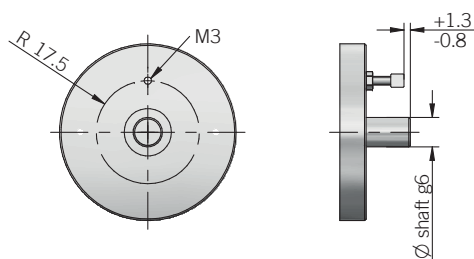
torque pin is included

RECOMMENDED INTERFACE FLANGE DESIGN

38F



38G



dimensions in mm

CONNECTIONS

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

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply ¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load typical	0,4 W
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface ²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	10 ms
Accuracy	< 0,3° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresys	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF) ³ according to EN ISO 13849-1	275 years
Mission time (Tm) ³	20 years
Diagnostic coverage (DC) ³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	Ø 4* / 5* / 6* / 6,35 (1/4") / 8* / 10 mm * with supplied shaft adapter
Enclosure rating IEC 60529	IP 66 shaft side / IP 67 cover side
Max rotation speed	6000 rpm
Max shaft load ⁴	5 N (1,12 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,8 x 10 ⁻⁶ kgm ² (19 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Shaft adapter material	bronze
Housing material	painted aluminum
Bearings	n.2 ball bearings
Bearing lifetime	10 ⁹ revolutions
Operating temperature ^{5,6}	-25° ... +100°C (-13° ... +212°F)
Storage temperature ⁶	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

PREFERRED RESOLUTIONS

2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 -
200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 -
3600 - 4096 - 5000 - 7200 - 10000

please directly contact our offices for other pulses

MAIN FEATURES

Miniaturized Ø 42 mm encoder series for general factory automation applications.



- Innovative proprietary magnetic Asic
- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Cable output, connectors available on cable end
- Solid shaft diameter 6 mm
- Mounting by clamping, square, threaded or synchronous flange



ORDERING CODE

EMI 40A 100 S 5/30 P 6 X X P R . XXX

SERIES

magnetic incremental encoder series EMI

MODEL

- clamping flange Ø 20 mm 40A
- square flange □ 36,5 mm 40B
- clamping flange Ø 17,46 mm 40C
- M18 threaded flange 40H
- M20 threaded flange 40I
- synchronous flange Ø 21 mm 40N

RESOLUTION

ppr from 1 to 10000

please refer to the preferred resolutions list

ZERO PULSE

- without zero pulse S
- with zero pulse Z

POWER SUPPLY

- (with L electrical interface) 5 V DC 5
- 5 ... 30 V DC 5/30

ELECTRICAL INTERFACE

- NPN open collector C
- push-pull P
- line driver L
- power supply 5/30 V DC - output RS-422 RS

SHAFT DIAMETER

mm 6

ENCLOSURE RATING

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

OPTION

to be reported X

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)

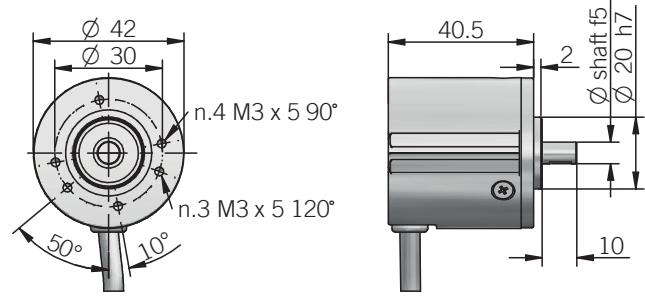
DIRECTION TYPE

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

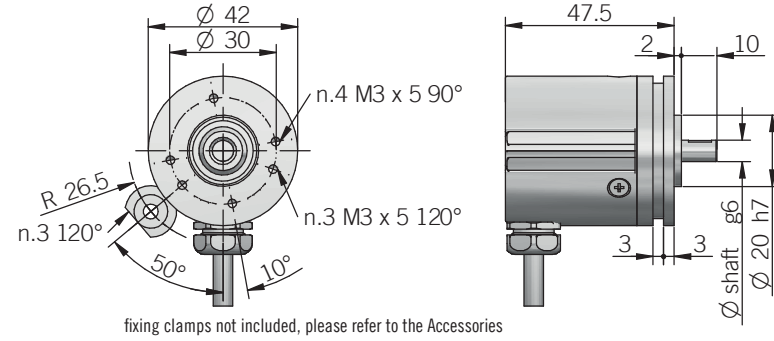
VARIANT

custom version XXX

40A (X ENCLOSURE RATING)

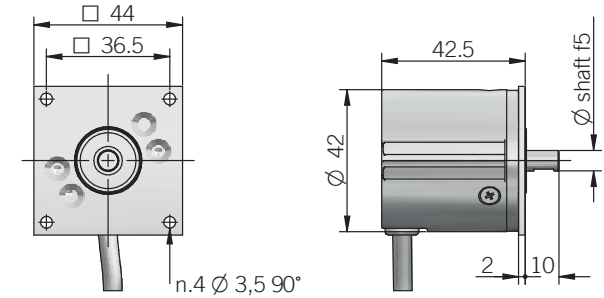


40A (S ENCLOSURE RATING)

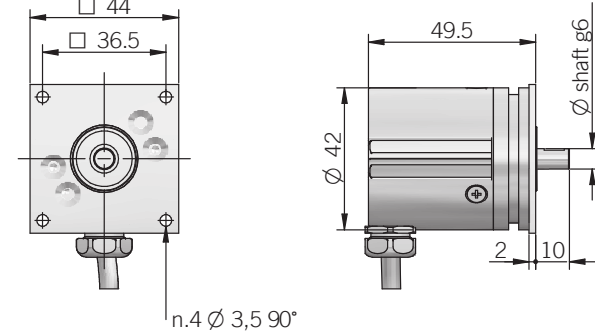


fixing clamps not included, please refer to the Accessories

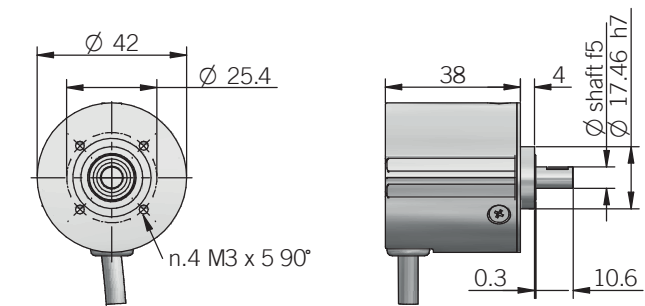
40B (X ENCLOSURE RATING)



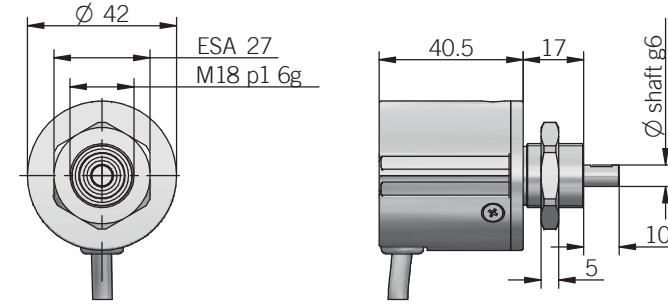
40B (S ENCLOSURE RATING)



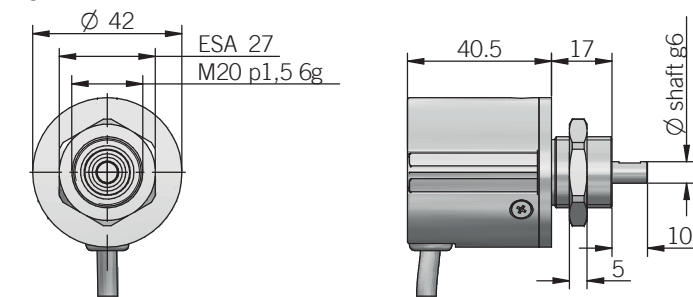
40C



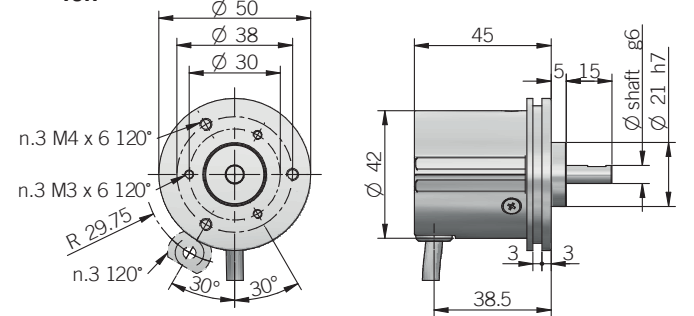
40H



40I



40N

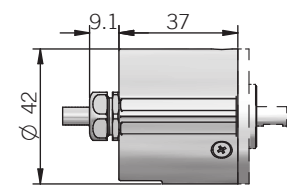
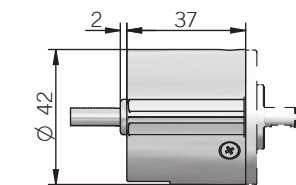


fixing clamps not included, please refer to the Accessories

recommended mating shaft tolerance H7

DIMENSIONS WITH AXIAL OUTPUT WITH X ENCLOSURE RATING

DIMENSIONS WITH AXIAL OUTPUT WITH S ENCLOSURE RATING



dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load typical	0,4 W
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	10 ms
Accuracy	< 0,3° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

CONNECTIONS

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

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm with X enclosure rating 4000 rpm with S enclosure rating
Max shaft load⁴	30 N (6,74 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,1 x 10 ⁻⁶ kgm ² (2,4 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin) with X enclosure rating < 0,05 Nm (7,10 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +100°C (-13° ... +212°F)
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	100 g (3,52 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ maximum load for static usage
⁵ measured on the transducer flange
⁶ condensation not allowed

PREFERRED RESOLUTIONS

2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 - 3600 - 4096 - 5000 - 7200 - 10000

please directly contact our offices for other pulses

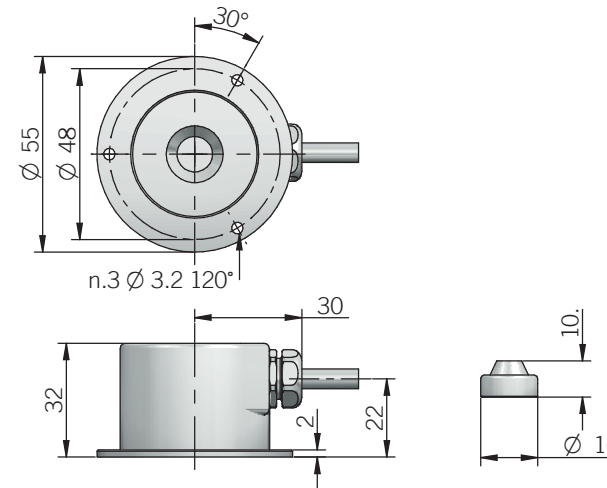
MAIN FEATURES

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.

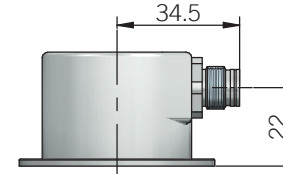
- 3 channel encoder (A / B / Z) with resolution up to 10000 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Cable or M12 connector output, other connectors available on cable end
- Compact dimensions
- No wear due to no contact magnetic technology
- Bore shaft diameter up to 10 mm
- IP 67 enclosure rating
- Wide operating temperature -40° ... +100°C (-40° ... +212°F)



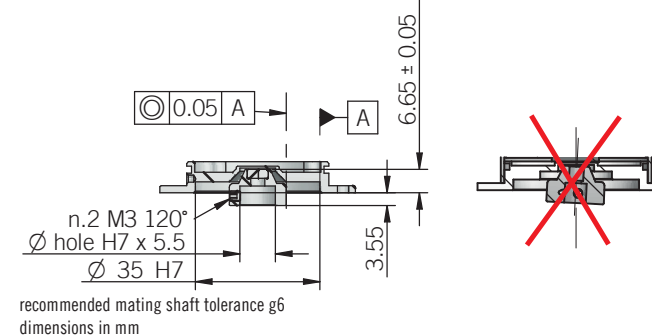
EMI55 M WITH CABLE OUTPUT



DIMENSIONS WITH M12 CONNECTOR



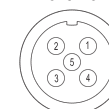
MAGNET ACTUATOR INSTALLATION



CONNECTIONS

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

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view



ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load typical	0,4 W
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	10 ms
Accuracy	< 0,3° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	275 years
Mission time (T_m)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter (magnet-actuator)	ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 67 (IEC 60529)
Max rotation speed	10000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia (magnet actuator)	0,1 x 10 ⁻⁶ kgm ² (2,4 x 10 ⁻⁶ lbft ²)
Flange material	aluminum
Housing material	painted aluminum
Magnet-actuator material	aluminum
Magnet actuator allowable play	± 0,2 mm (axial) ± 0,1 mm (radial)
Operating temperature^{4,5}	-40° ... +100°C (-40° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

PREFERRED RESOLUTIONS

2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 - 3600 - 4096 - 5000 - 7200 - 10000

please directly contact our offices for other pulses

ORDERING CODE EMI 55M 512 Z 5/30 P 10 X X M12 R .162 +XXX

SERIES magnetic incremental encoder series EMI	MODEL kit encoder ø 55 mm 55M	RESOLUTION ppr from 1 to 10000 please refer to the preferred resolutions list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30	ELECTRICAL INTERFACE NPN open-collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS	MAGNET ACTUATOR BORE DIAMETER mm 6 mm 8 (3/8") mm 9,52 mm 10	ENCLOSURE RATING IP 67 X	OPTION to be reported X	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) M12 plug connector M12	DIRECTION TYPE radial R	SOCKET socket not included .162 to be reported only with connector output (eg. M12.162), for socket see Accessories	VARIANT custom version XXX
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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.

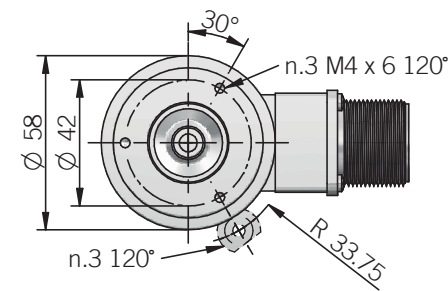
- 3 channel encoder (A / B / Z) up to 10000 ppr based on innovative magnetic ASIC
- Power supply up to +30 V DC with several electrical interfaces available
- Up to 800 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Solid shaft diameter up to 12 mm
- Mounting by synchronous, clamping or coupling flange



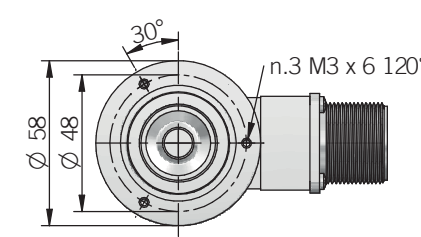
ORDERING CODE EMI 58C M* 500 S 5/30 P 8 X X M R .162 +XXX

SERIES magnetic incremental encoder series EMI	MODEL synchronous flange \varnothing 50 mm 58B clamping flange \varnothing 36 mm 58C clamping flange \varnothing 50 mm 58H coupling flange \varnothing 40 mm 58T	METAL COVER * add for metal cover M	RESOLUTION ppr from 1 to 10000 please refer to the preferred resolutions list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30	ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS	SHAFT DIAMETER (mod. B) mm 6 (mod. C) mm 8 (mod. B / C / H) (3/8") mm 9,52 mm 10 (mod. T) mm 12	ENCLOSURE RATING IP 54 X (mod. B / C / T) IP 66 S	OPTION to be reported X	OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 plug connector J M12 plug connector M12 M23 plug connector H M16 plug connector C	DIRECTION TYPE axial A radial R	SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories	VARIANT custom version +XXX
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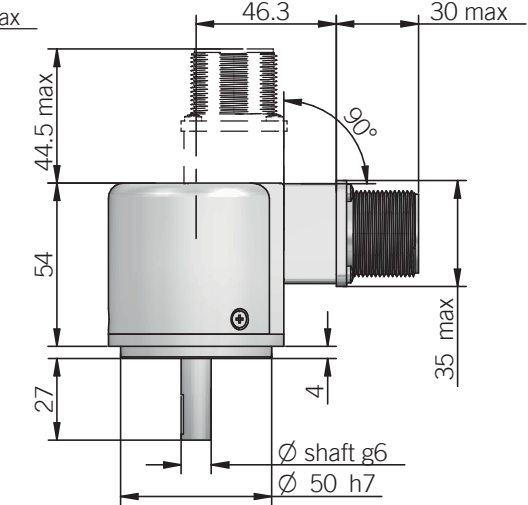
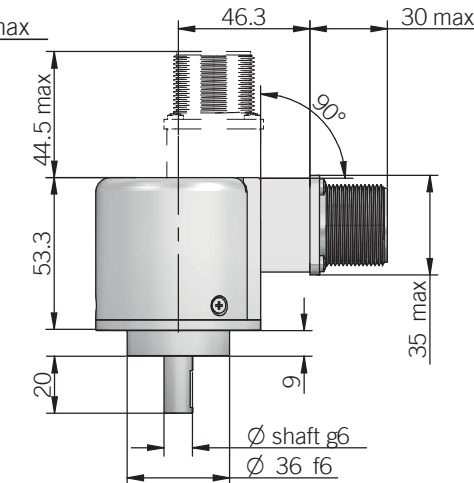
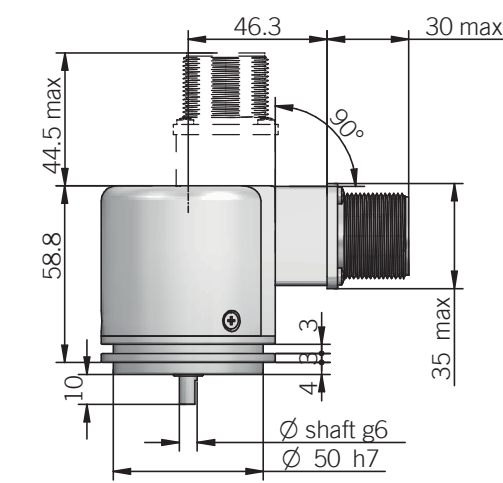
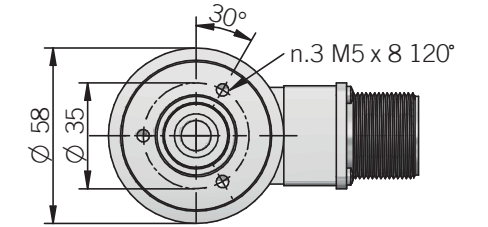
58B



58C

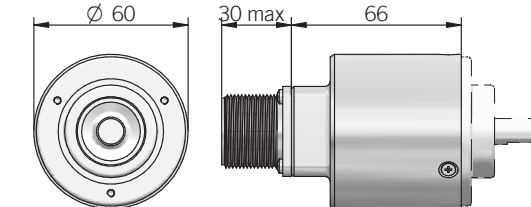


58H

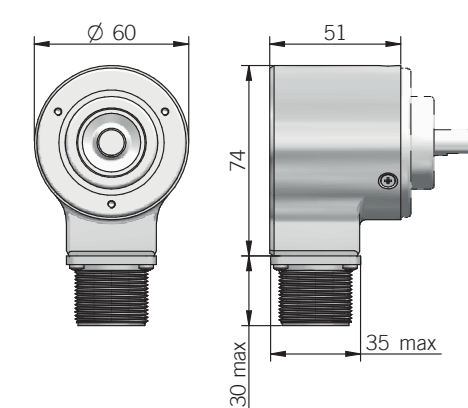


fixing clamps not included, please refer to Accessories

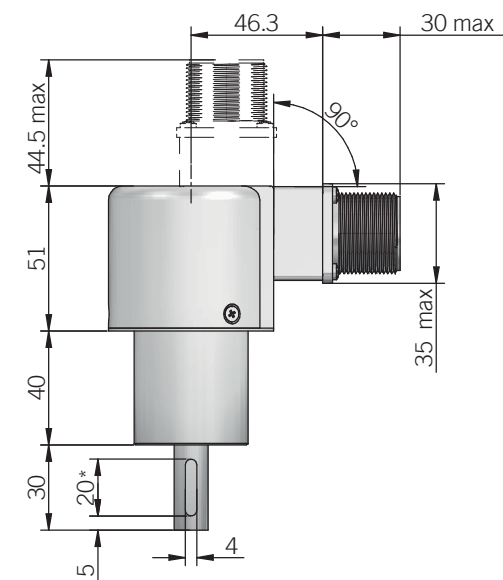
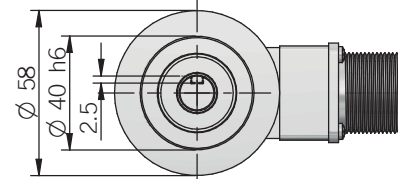
DIMENSION WITH METAL COVER AND AXIAL OUTPUT



DIMENSION WITH METAL COVER AND RADIAL OUTPUT



58T



* slot only with 12 mm shaft diameter

recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load typical	0,4 W
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	10 ms
Accuracy	< 0,3° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 8 / 9,52 (3/8") / 10 / 12 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm
Max shaft load⁴	10 N (2,25 lbs) axial with ø 6 mm shaft 20 N (4,45 lbs) radial with ø 6 mm shaft 200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +100°C (-13° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ maximum load for static usage
⁵ measured on the transducer flange
⁶ condensation not allowed

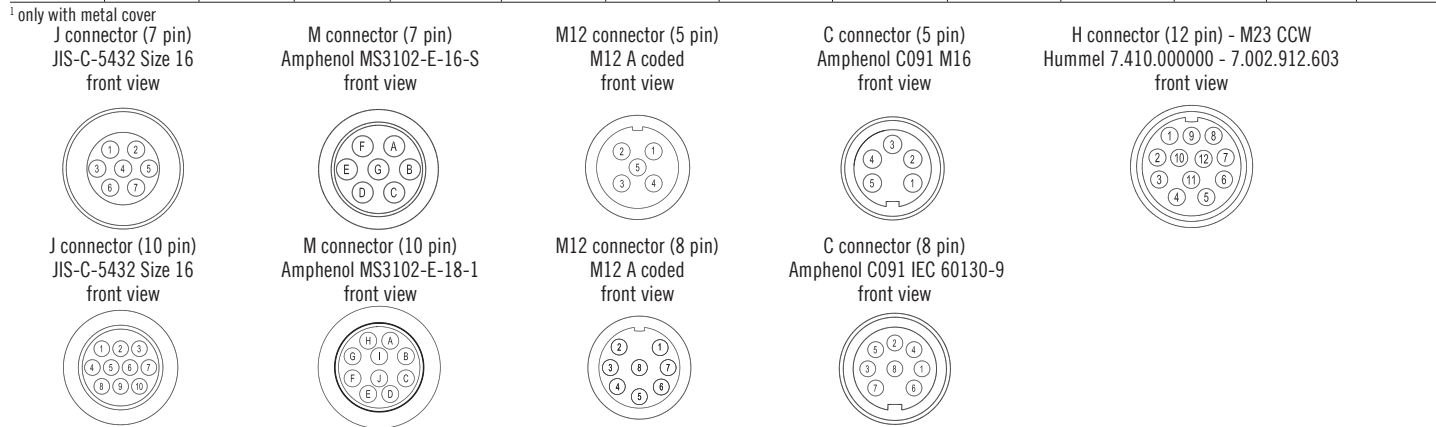
PREFERRED RESOLUTIONS

2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 - 3600 - 4096 - 5000 - 7200 - 10000

please directly contact our offices for other pulses

CONNECTIONS

Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6	F	4	1	10	1	8
A+	green	green	3	1	C	A	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	C	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	B	2	B	1	4	8	4	3
B-	/	orange	/	5	/	E	8	H	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
≡	shield	shield	7	7	G	G	10	J	housing ¹	housing ¹	9	housing ¹	housing ¹



MAIN FEATURES

Solid shaft encoder series for industrial applications with high mechanical resistance requirements. The proprietary state of the art magnetic sensor provides wide options (resolution, electrical output, index width, index length) programmable by the end user.

- 3 channel encoder (A / B / Z) up to 20000 ppr
- Power supply up to +30 V DC with RS-422 or HTL as electrical interface
- Up to 800 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 clamping flange

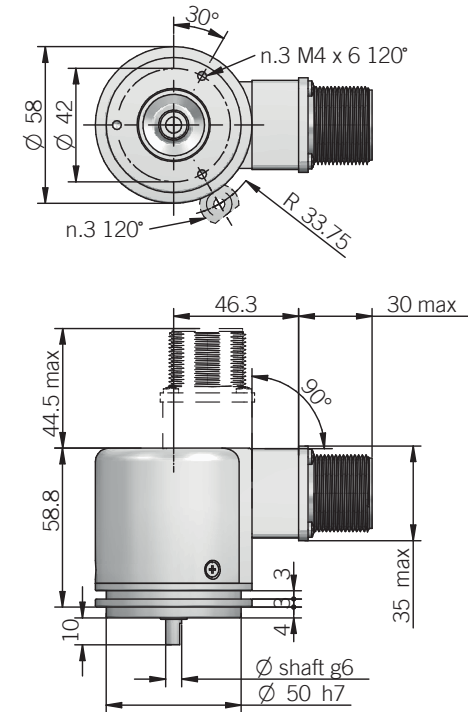


ORDERING CODE EMI P 58C M* 20000 Z 5/30 L 8 X X M R .162 +XXX

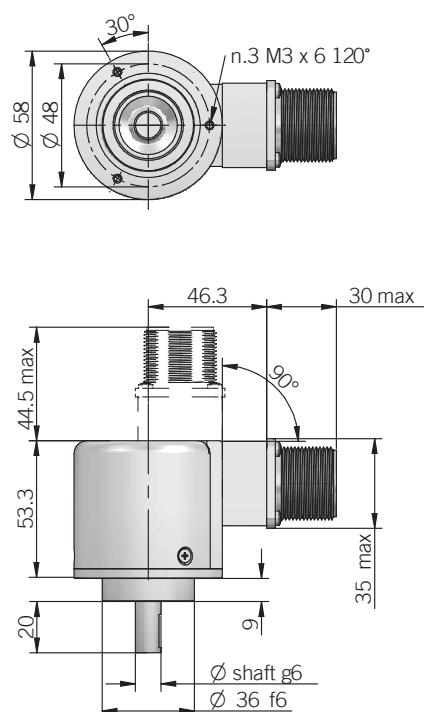
SERIES magnetic incremental encoder EMI	FEATURE user programmable P	MODEL synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C	METAL COVER * add for metal cover M	RESOLUTION ppr 20000 user programmable from 1 to 20000 ppr	ZERO PULSE with zero pulse Z	POWER SUPPLY 5 ... 30 V DC 5/30	ELECTRICAL INTERFACE line driver L RS-422 / HTL user programmable	SHAFT DIAMETER (mod. B) mm 6 (mod. C) mm 8 (3/8") mm 9,52 mm 10	ENCLOSURE RATING IP 54 X IP 66 S	OPTION to be reported X	OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M M12 plug connector M12 M23 plug connector H	DIRECTION TYPE axial A radial R	SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories
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VARIANT
custom version +XXX

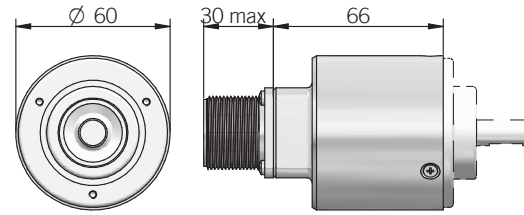
58 B



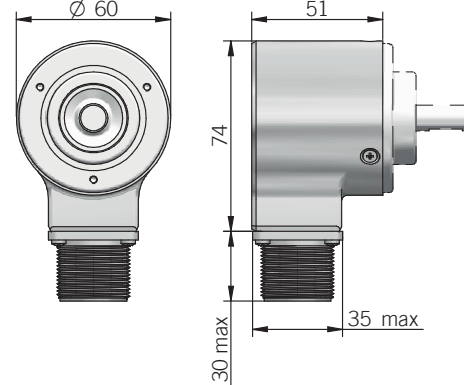
58 C



DIMENSION WITH METAL COVER AND AXIAL OUTPUT



DIMENSION WITH METAL COVER AND RADIAL OUTPUT



CONNECTIONS

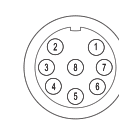
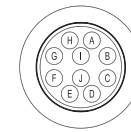
Function	Cable	10 pin M	8 pin M12	12 pin H
+V DC	red	D - E	7	12
0 V	black	F	1	10
A+	green	A	6	5
A-	brown or grey	G	5	6
B+	yellow	B	4	8
B-	orange	H	3	1
Z+	blue	C	2	3
Z-	white	I	8	4
Shield	shield	J	housing ¹	9

¹ only with metal cover

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

M12 connector (8 pin)
M12 A coded front view

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



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	user programmable from 1 to 20000 ppr default 1024 ppr
Power supply¹	4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	20 mA / channel
Electrical interface²	line driver RS-422 / HTL (AEIC-7272 or similar) user programmable / default RS-422
Max output frequency	800 kHz
Counting direction	user programmable default A leads B clockwise (shaft view)
Index length	user programmable default 180°e (gated A)
Accuracy	± 0,10°
Hysteresis	user programmable from 0° to 0,70° default 0,17°
Start-up time	500 ms
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	173 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

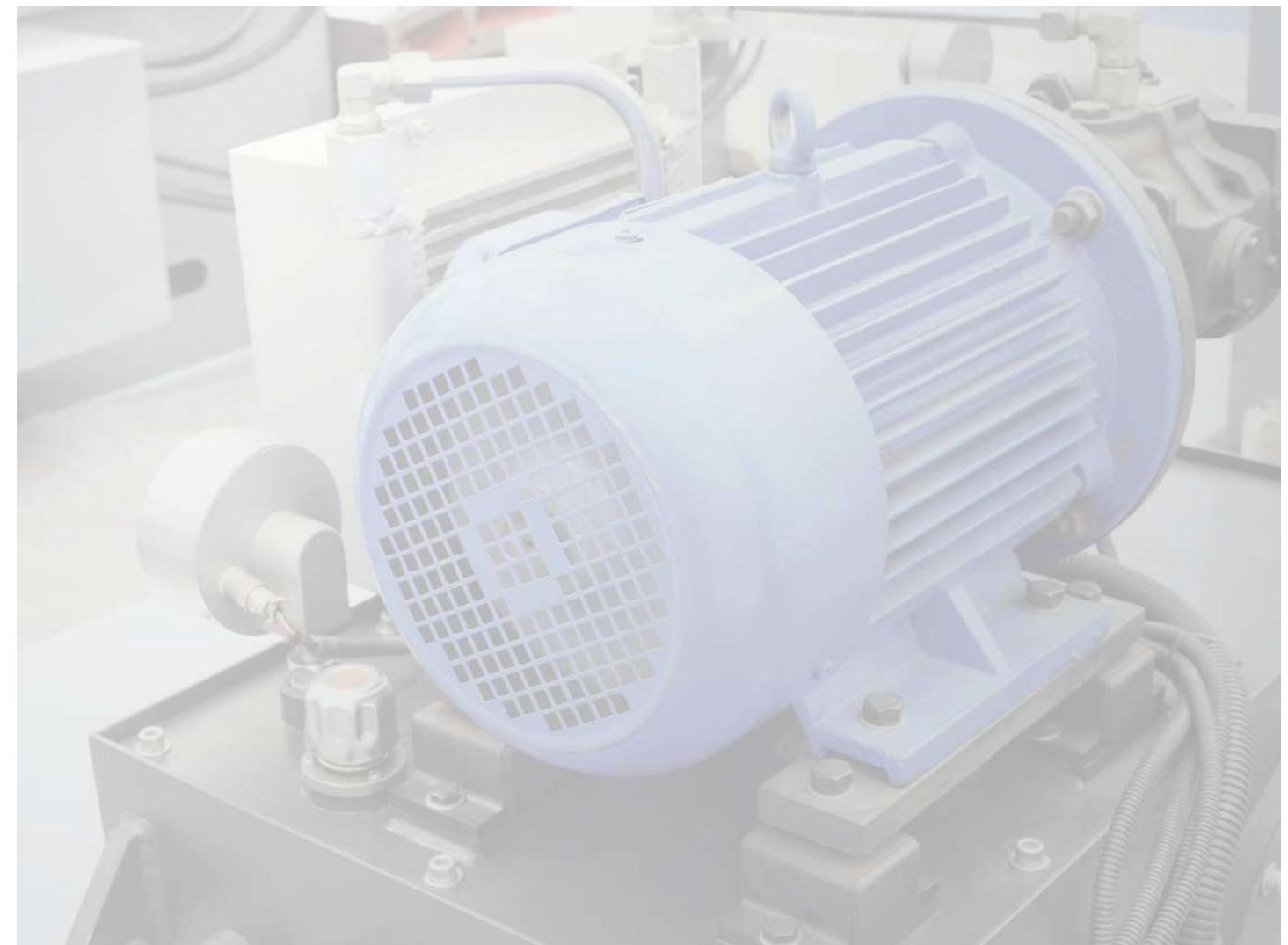
⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

MECHANICAL SPECIFICATIONS

Shaft diameter	Ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm
Max shaft load⁴	10 N (2,25 lbs) axial with Ø 6 mm shaft 20 N (4,45 lbs) radial with Ø 6 mm shaft 200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +100°C (-13° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover



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.

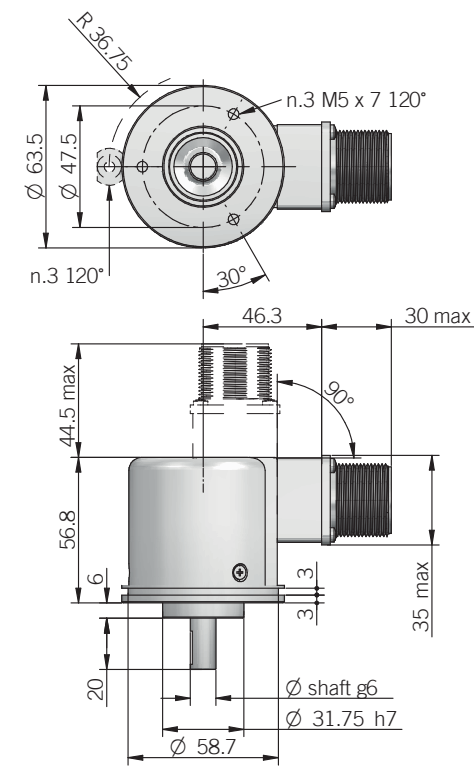
- 3 channel encoder (A / B / Z) up to 10000 ppr based on innovative magnetic ASIC
- Power supply up to +30 V DC with several electrical interfaces available
- Up to 800 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Solid shaft diameter up to 10 mm
- Mounting by synchronous or centering 2,5" square flange



ORDERING CODE EMI 63A M* 500 S 5/30 P 8 X X M R .162 +XXX

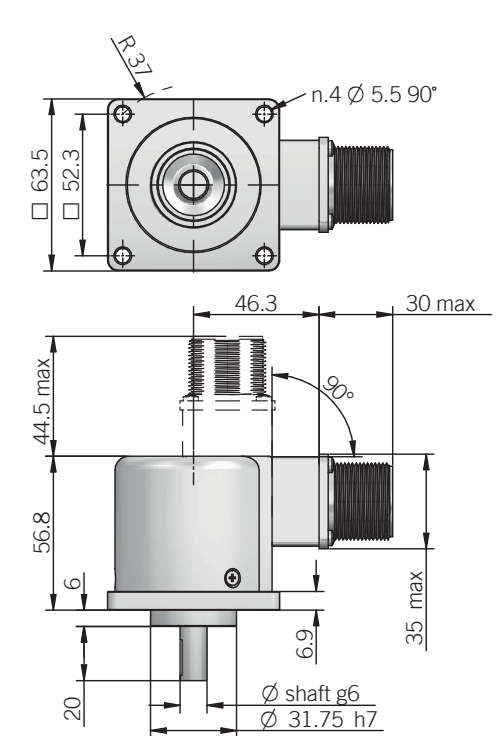
SERIES magnetic incremental encoder series EMI	MODEL synchronous flange \varnothing 31,75 mm 63A centering square flange \varnothing 31,75 mm 63D centering square flange \varnothing 50 mm 63E	METAL COVER * add for metal cover M	RESOLUTION ppr from 1 to 10000 please refer to the preferred resolutions list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30	ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS	SHAFT DIAMETER mm 8 (3/8") mm 9,52 mm 10	ENCLOSURE RATING IP 54 X IP 66 S	OPTION to be reported X	OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 plug connector J M12 plug connector M12 M23 plug connector H M16 plug connector C	DIRECTION TYPE axial A radial R	SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories	VARIANT custom version +XXX
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63A

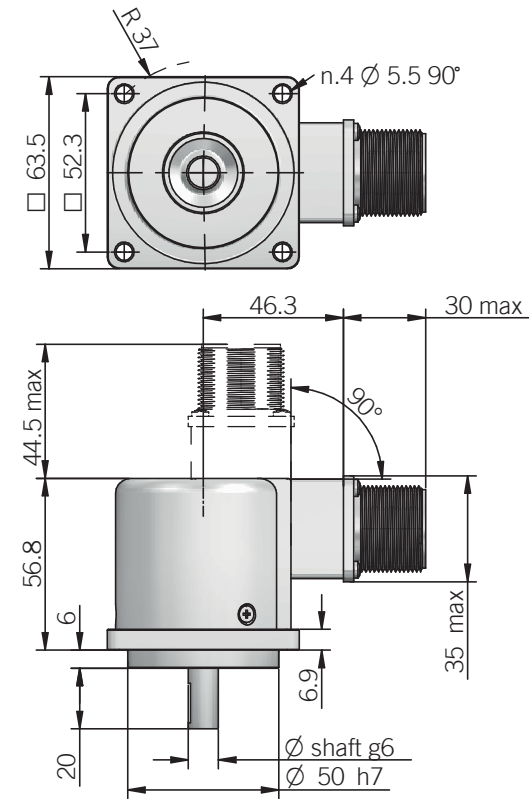


fixing clamps not included, please refer to the Accessories

63D

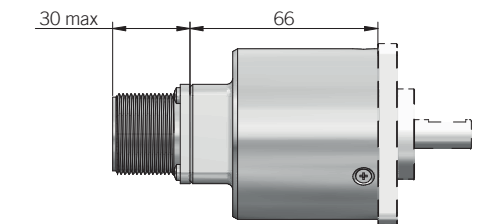


63 E

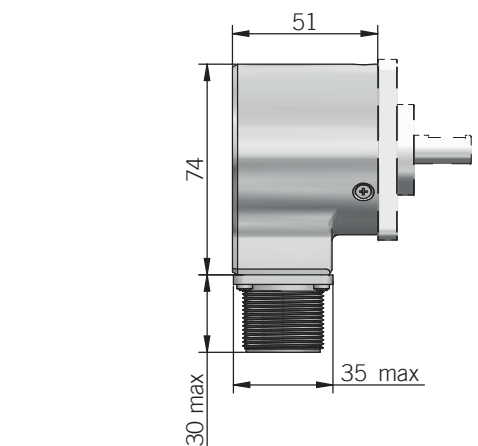


recommended mating shaft tolerance H7
dimensions in mm

DIMENSION WITH METAL COVER AND AXIAL OUTPUT



DIMENSION WITH METAL COVER AND RADIAL OUTPUT



ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load typical	0,4 W
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	10 ms
Accuracy	< 0,3° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 8 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm
Max shaft load⁴	200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +100°C (-13° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ maximum load for static usage
⁵ measured on the transducer flange
⁶ condensation not allowed

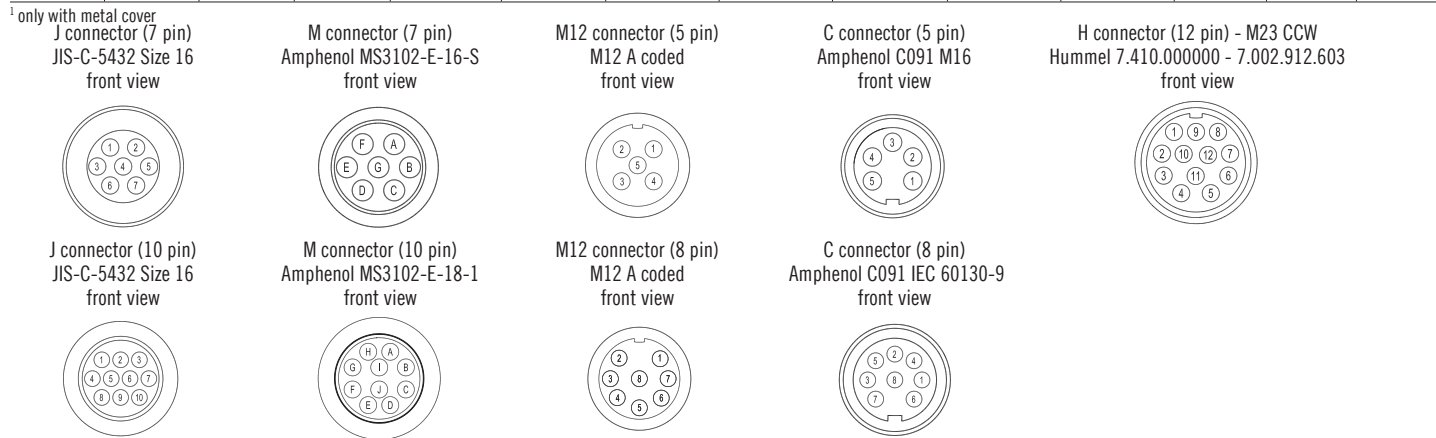
PREFERRED RESOLUTIONS

2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 - 3600 - 4096 - 5000 - 7200 - 10000

please directly contact our offices for other pulses

CONNECTIONS

Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6	F	4	1	10	1	8
A+	green	green	3	1	C	A	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	C	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	B	2	B	1	4	8	4	3
B-	/	orange	/	5	/	E	8	H	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
⊥	shield	shield	7	7	G	G	10	J	housing ¹	housing ¹	9	housing ¹	housing ¹



MAIN FEATURES

Blind hollow shaft encoder ø 58 - 63 mm for industrial applications with high mechanical resistance requirements. The various types of assembly guarantee safety and flexibility of use.

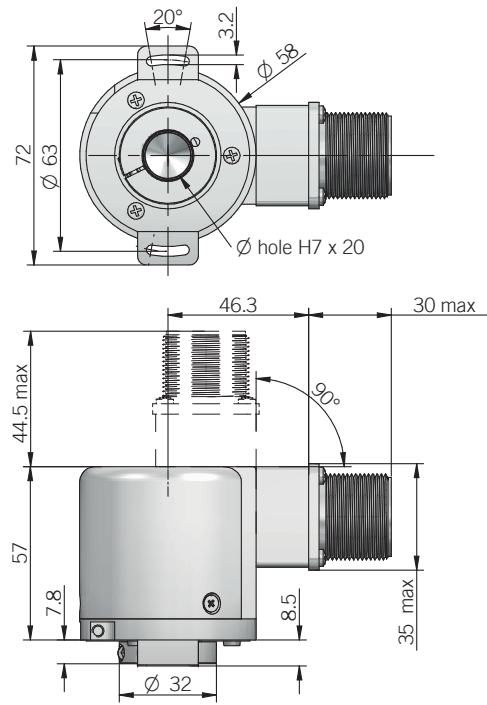
- 3 channel encoder (A / B / Z) up to 10000 ppr based on innovative magnetic ASIC
- Power supply up to +30 V DC with several electrical interfaces available
- Up to 800 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Blind hollow shaft diameter up to 15 mm
- Mounting by stator coupling, torque slot stop or torque pin



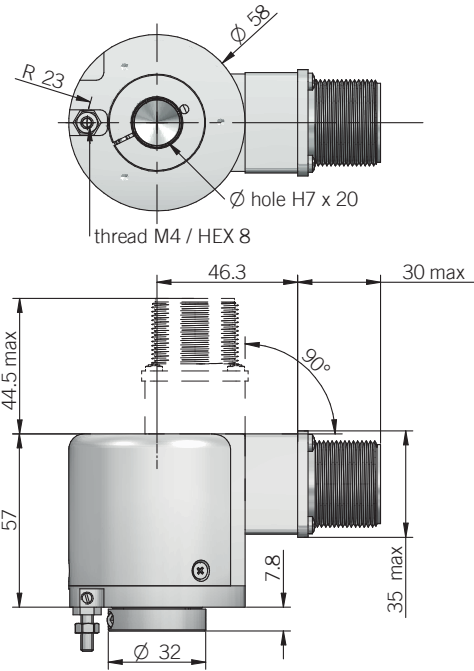
ORDERING CODE EMI 58F M* 500 S 5/30 P 8 X X M R .162 +XXX

SERIES magnetic incremental encoder series EMI	MODEL blind hollow shaft with stator coupling 58F blind hollow shaft with torque pin 58G blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G	METAL COVER * add for metal cover M	RESOLUTION ppr from 1 to 10000 please refer to the preferred resolutions list	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30	ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS	BORE DIAMETER mm 8 mm 10 mm 12 mm 14 mm 15	ENCLOSURE RATING IP 54 X IP 66 S	OPTION to be reported X	OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 plug connector J M12 plug connector M12 M23 plug connector H M16 plug connector C	DIRECTION TYPE axial A radial R	SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories	VARIANT custom version +XXX
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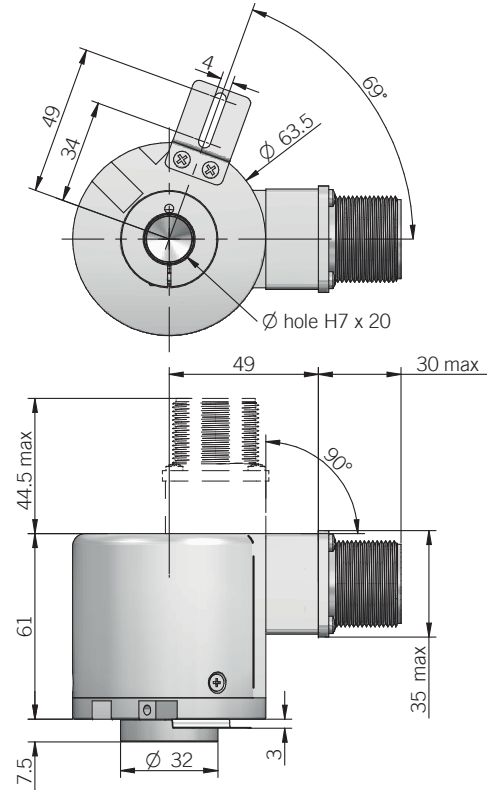
58F



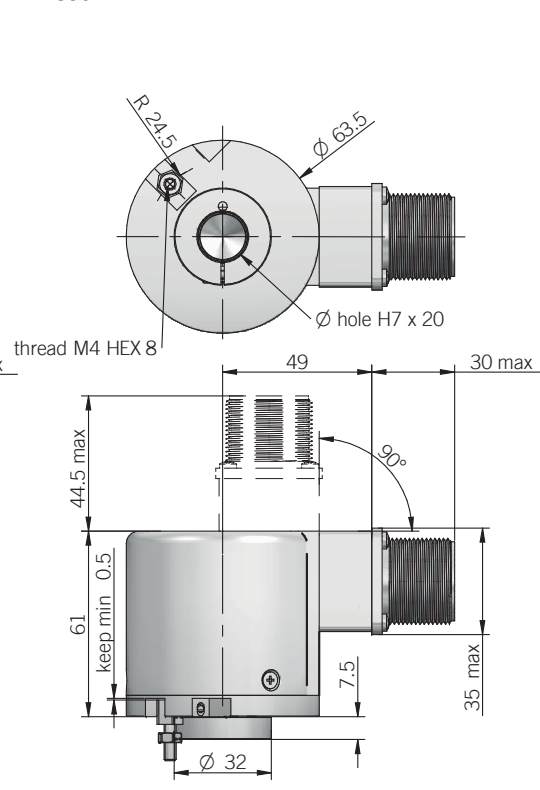
58G



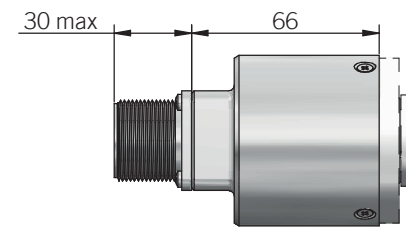
63F



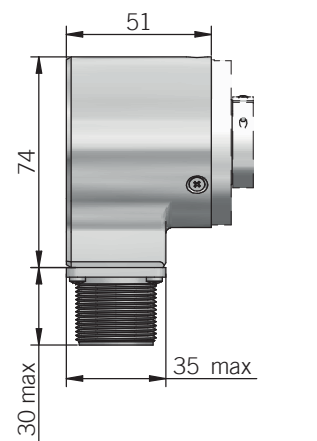
63G



DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



torque pin is included in model G, for model 63F please refer to Accessories
recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load typical	0,4 W
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	10 ms
Accuracy	< 0,3° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 8 / 10 / 12 / 14 / 15 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10 ⁻⁶ kgm ² (95 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-25° ... +100°C (-13° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁵	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation not allowed

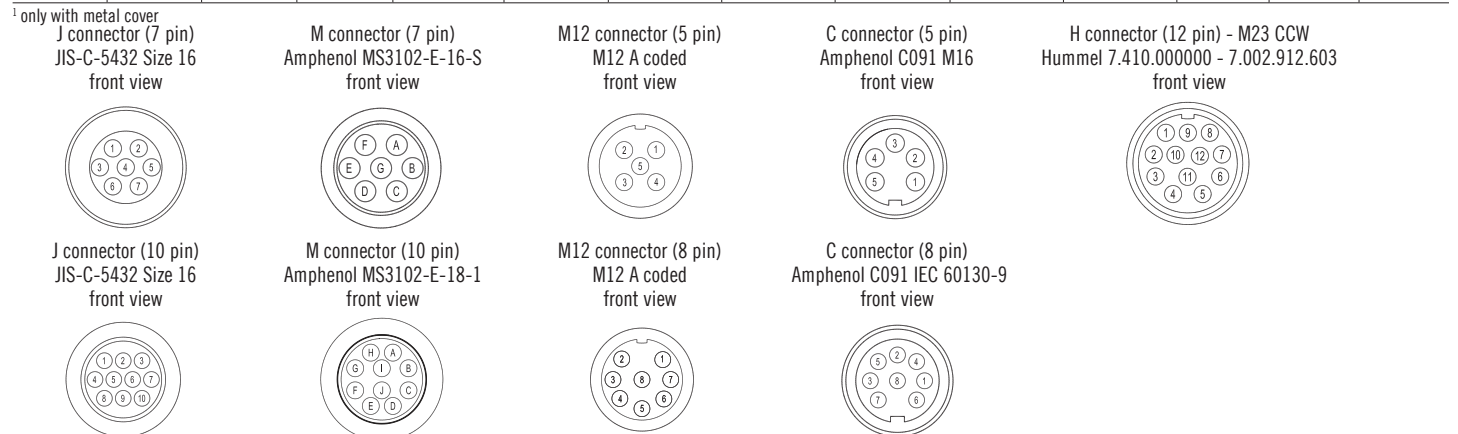
PREFERRED RESOLUTIONS

2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 - 3600 - 4096 - 5000 - 7200 - 10000

please directly contact our offices for other pulses

CONNECTIONS

Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6	F	4	1	10	1	8
A+	green	green	3	1	C	A	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	C	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	B	2	B	1	4	8	4	3
B-	/	orange	/	5	/	E	8	H	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
Shield	shield	shield	7	7	G	G	10	J	housing ¹	housing ¹	9	housing ¹	housing ¹



MAIN FEATURES

Hollow shaft encoder series for industrial applications with high mechanical resistance requirements. The proprietary state of the art magnetic sensor provides wide options (resolution, electrical output, index width) programmable by the end user.

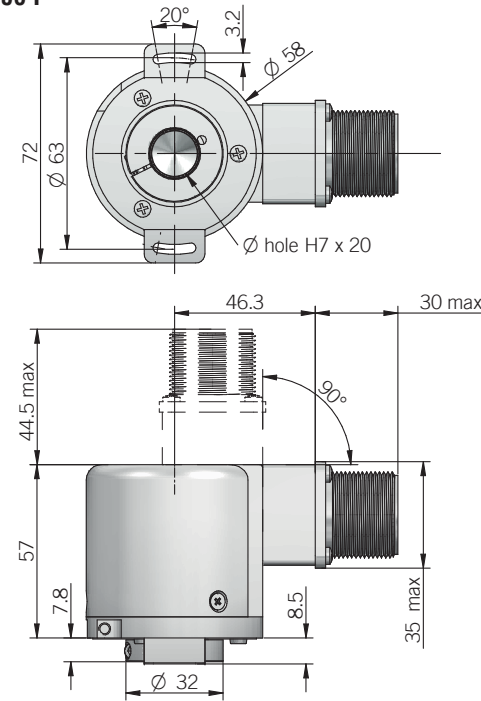
- 3 channel encoder (A / B / Z) up to 20000 ppr
- Power supply up to +30 V DC with RS-422 or HTL as electrical interface
- Up to 800 kHz output frequency
- Cable or connector output, available with metal cover for heavy duty applications
- Blind hollow shaft diameter up to 15 mm
- Mounting by stator coupling or with torque pin



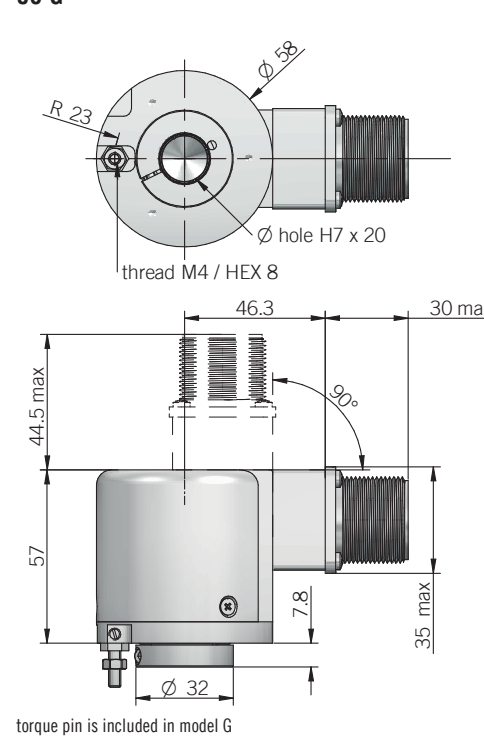
ORDERING CODE EMI P 58F M* 20000 Z 5/30 L 8 X X M R .162 +XXX

SERIES magnetic incremental encoder EMI	FEATURE user programmable P	MODEL blind hollow shaft with stator coupling 58F blind hollow shaft with torque pin 58G	METAL COVER * add for metal cover M	RESOLUTION ppr 20000 user programmable from 1 to 20000 ppr	ZERO PULSE with zero pulse Z	POWER SUPPLY 5 ... 30 V DC 5/30	ELECTRICAL INTERFACE line driver L RS-422 / HTL user programmable	BORE DIAMETER mm 15 other diameters with optional shaft adapter, see Accessories	ENCLOSURE RATING IP 54 X IP 66 S	OPTION to be reported X	OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M M12 plug connector M12 M23 plug connector H	DIRECTION TYPE axial A radial R	SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories	VARIANT custom version XXX
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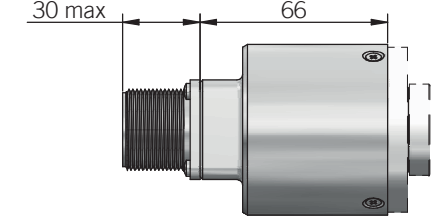
58 F



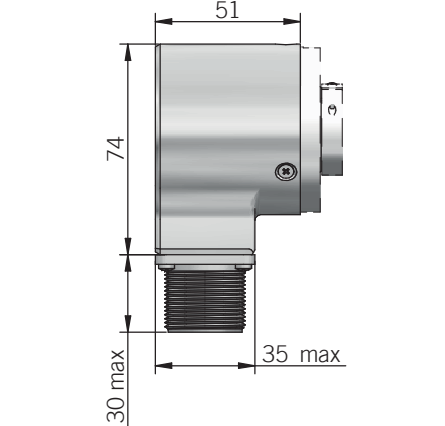
58 G



DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	user programmable from 1 to 20000 ppr default 1024 ppr
Power supply¹	4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	20 mA / channel
Electrical interface²	line driver RS-422 / HTL (AEIC-7272 or similar) user programmable / default RS-422
Max output frequency	800 kHz
Counting direction	user programmable default A leads B clockwise (shaft view)
Index length	user programmable default 180°e (gated A)
Accuracy	± 0,10°
Hysteresis	user programmable from 0° to 0,70° default 0,17°
Start-up time	500 ms
Mean time to dangerous failure (MTTF)_d³	173 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	Ø 15 mm Ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12* * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10 ⁻⁶ kgm ² (95 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{3,4}	-25° ... +100°C (-13° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁴	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

⁴ measured on the transducer flange

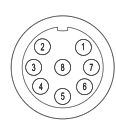
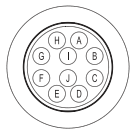
⁵ condensation not allowed

CONNECTIONS

Function	Cable	10 pin M	8 pin M12	12 pin H
+V DC	red	D - E	7	12
0 V	black	F	1	10
A+	green	A	6	5
A-	brown or grey	G	5	6
B+	yellow	B	4	8
B-	orange	H	3	1
Z+	blue	C	2	3
Z-	white	I	8	4
⏏	shield	J	housing ¹	9

¹ only with metal cover

M connector (10 pin) Amphenol MS3102-E-18-1 front view
 M12 connector (8 pin) M12 A coded front view
 H connector (12 pin) - M23 CCW Hummel 7.410.000000 - 7.002.912.603 front view



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.

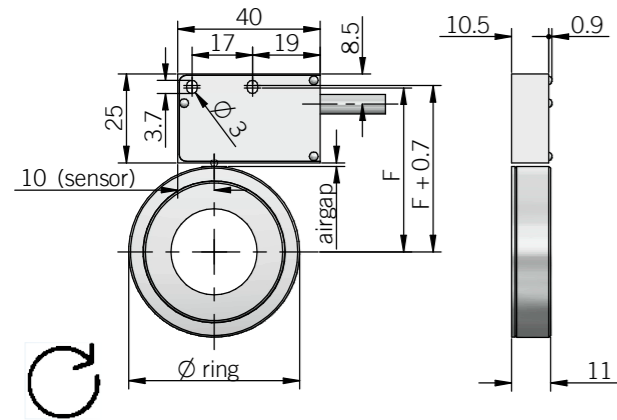
- 2 channel encoder (A / B) up to 4096 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 350 kHz output frequency
- Cable output, connectors available on cable end
- Through hollow shaft diameter up to 28 mm
- Shaft mounting by tolerance ring
- Wide operating temperature -20° ... +85°C (-4° ... +185°F)



ORDERING CODE

ETMR	A	4096	S	5	L	9	S	8	PR	.XXX
<p>SERIES incremental encoder with magnetic ring ETMR</p> <p>MODEL bore diameter from 9 ... 19 mm A bore diameter 24 / 28 mm B</p> <p>RESOLUTION ppr from 64 to 4096 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S</p> <p>POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28</p> <p>ELECTRICAL INTERFACE push-pull P line driver L power supply 5/28 V DC - output RS-422 RS</p> <p>BORE DIAMETER mm 9 (3/8") mm 9,52 mm 10 mm 11 mm 14 mm 19 mm 24 mm 28</p> <p>ENCLOSURE RATING IP 67 S</p> <p>MAX ROTATION SPEED 8000 rpm 8</p> <p>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)</p> <p>VARIANT custom version XXX</p>										

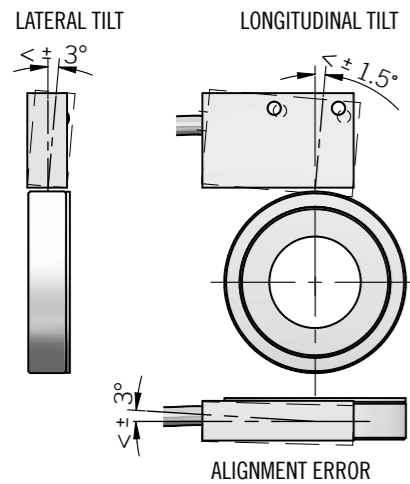
ETMRA / B



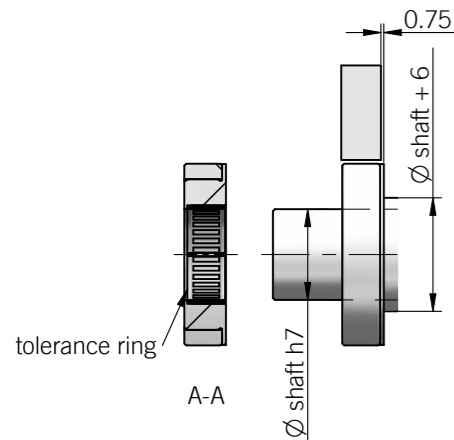
Model	A	B
Ø ring	41,2	48
Fixing (F)	41,9	46
Airgap	0,3 ± 0,1	1 ± 0,1

tolerance ring is included
for mounting instruction please refer to product installation notes

MOUNTING TOLERANCES



RECOMMENDED INTERFACE DESIGN



dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 64 to 4096 ppr (powers of 2)
Pole pitch	model A = 2 mm model B = 5 mm
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	20 mA / channel
Electrical interface²	push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	350 kHz
Counting direction	A leads B clockwise (front view)
Accuracy	± 0,35° typical / ± 0,50° max
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	318 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,14 mm ² / AWG 26 min bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS	
Bore diameter	Ø 9 / 9,52 (3/8") / 10 / 11 / 14 / 19 / 24 / 28 mm
Enclosure rating	IP 67 (IEC 60529)
Max rotation speed	8000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	115 x 10 ⁻⁶ kgm ² (27,29 x 10 ⁻⁴ lbf ²)
Sensor body material	anodized aluminum
Magnet-actuator material	stainless steel
Operating temperature^{4,5}	-20° ... +85°C (-4° ... +185°F)
Storage temperature⁵	-20° ... +85°C (-4° ... +185°F)
Weight	100 g (3,53 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ this product is not a safety component, for further details refer to TECHNICAL BASICS section
⁴ measured on the transducer flange
⁵ condensation allowed

CONNECTIONS		
Function	Cable P	Cable L / RS
+V DC	red or brown	red
0 V	black or grey	black
A+	green	green
A-	/	brown or grey
B+	yellow	yellow
B-	/	orange
⊕	shield	shield

RESOLUTIONS	
64* - 128 - 256 - 512 - 1024 - 2048 - 4096	
* available with mod.B; please directly contact our offices for other pulses	

