



## EL - ER 30 E / H SOLID SHAFT INCREMENTAL ENCODER

## MAIN FEATURES

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

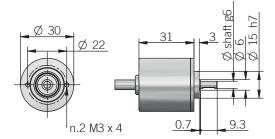
- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 220 kHz output frequency
- Cable output, connectors available on cable end
- Solid shaft diameter up to 6 mm
- Mounting by clamping or threaded flange



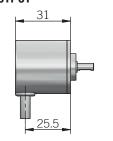


ORDERING CODE	EL	30E	50	S	5/28	C	4	Х	3	P	A	. XXX
	SERIES incremental encoder series EL incremental encoder series ER											
	clamping flange ø 15 M18 threaded fla	nge 30H										
	refer to the	ppr from 1	pulses list									
		V	vithout zer	o pulse Z								
		(wit	h L electrica	al interface) 5 28 V	DC 5/28							
						ollector C sh-pull P						
		powe	er supply 5	5/28 V DC	lin output R:							
							I. E) mm 4 mm 6					
						I	ENCLOSUR	IP 54 X				
							MA		ON SPEED 100 rpm 3			
		р	referred cal	ble lengths	1,5/2/3/	5 / 10 m, to			<b>OUTI</b> ndard lengt ION TYPE (e			
										DIRECT	on TYPE axial A radial R	

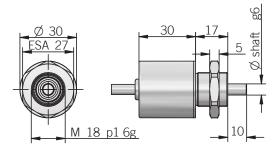
## **30E AXIAL CABLE OUTPUT**



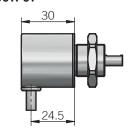
## **30E RADIAL CABLE OUTPUT**



## **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
<u>-</u>	shield	shield

## **ELECTRICAL SPECIFICATIONS** Resolution from 1 to 2500 ppr $5 = 4,5 \dots 5,5 \text{ V DC}$ Power supply<sup>1</sup> $5/28 = 4.5 \dots 30 \text{ V DC}$ (reverse polarity protection) Power draw without load 800 mW max C/P = 50 mA/channelMax load current L/RS = 20 mA/channelNPN open collector (AEIC-7273, pull-up max +30 V DC) Electrical interface<sup>2</sup> push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar) 100 kHz EL series Max output frequency 220 kHz ER series Counting direction | A leads B clockwise (shaft view) Index signal 180°e (gated A) Mean time to dangerous 220 years EL series failure (MTTF<sub>d</sub>)<sup>3</sup> 250 years ER series according to EN ISO 13849-1 Mission time (Tm)<sup>3</sup> 20 years Diagnostic coverage (DC)<sup>3</sup> 0% shielded - fixed installation Cable type | conductors section 0,22 mm<sup>2</sup>/AWG 24 bending radius min 60 mm Electromagnetic compatibility | according to 2014/30/EU directive **RoHS** according to 2011/65/EU directive

MECHANICAL SPECIFICATIONS							
Shaft diameter	ø 4 / 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 <sup>-6</sup> kgm <sup>2</sup> (1,2 x 10 <sup>-6</sup> lbft <sup>2</sup> )						
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	109 revolutions						
Operating temperature <sup>5,6</sup>	-10° +60°C (+14° +140°F) EL series -25° +85°C (-13° +185°F) ER series						
Storage temperature	-25° +85°C (-13° +185°F)						
Weight	70 g (2,47 oz)						

**UL / CSA** file n. E212495

as measured at the transducer without cable influences

<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

4 maximum load for static usage

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

<sup>6</sup> 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









VARIANT

custom version XXX

41



## EH 38 A / B / D SOLID SHAFT INCREMENTAL ENCODER

## MAIN FEATURES

Miniaturized ø 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

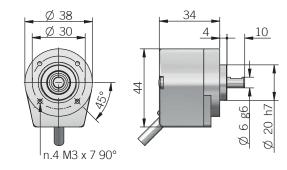




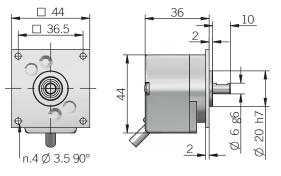


URDERING CODE	EH 38A	อบบ	2	5/28	ľ	b	X	5	PK	. XXX
SER incremental encoder series clamping flange	EH   MODEL									
square flange □ : square flange □	36,5 mm 38B									
		OLUTION 0 to 1024								
। ए। ए।		ZER	O PULSE							
	V	vithout zer with zer	o pulse S o pulse Z							
				R SUPPLY						
			5 28 V	5 V DC 5 / DC 5/28						
				TRICAL IN IPN open c						
			.,	pu	sh-pull P e driver L					
	pow	er supply 5	5/28 V DC		S-422 RS					
					SHAFT D	IAMETER mm 6				
					E	NCLOSUR	E RATING			
						MA	IP 54 X <b>Rotatio</b>	N SPEED		
							30	00 rpm 3	UIT TUB-	
							able (stand	lard length		
		preferred c	able length	s 1,5 / 2 / 3	/5/10 m,	to be added	after OUTP	UT TYPE (eg		VARIANT

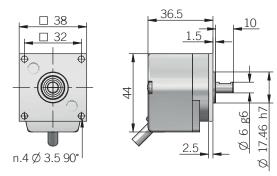
## 38A



## 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 $5 = 4.5 \dots 5.5 \text{ V DC}$ Power supply $5/28 = 4.5 \dots 30 \text{ V DC}$ (reverse polarity protection) **Current consumption** 100 mA max without load C/P = 50 mA/channelMax load current L = 20 mA / channelNPN 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<sub>d</sub>)<sup>3</sup> 244 years according to EN ISO 13849-1 Mission time (Tm)<sup>3</sup> 20 years Diagnostic coverage (DC)<sup>3</sup> 0% shielded - fixed installation

Cable type | conductors section 0,22 mm²/AWG 24 | bending radius min 60 mm

**RoHS** according to 2011/65/EU directive

Electromagnetic compatibility according to 2014/30/EU directive

**UL / CSA** file n. E212495

MECHANICAL SPECIFICATIONS							
Shaft diameter	ø 6 mm						
Enclosure rating	IP 54 (IEC 60529)						
Max rotation speed	3000 rpm						
Max shaft load <sup>4</sup>	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	$0.05 \times 10^{-6} \text{ kgm}^2 (1.2 \times 10^{-6} \text{ lbft}^2)$						
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)						
Bearing stage material	aluminum						
Shaft material	stainless steel						
Housing material	PA66 glass fiber reinforced						
Bearings	n.2 ball bearings						
Bearings life	109 revolutions						
Operating temperature <sup>5,6</sup>	-20° +70°C (-4° +158°F)						
Storage temperature <sup>6</sup>	-20° +70°C (-4° +158°F)						
Weight	150 g (5,29 oz)						

as measured at the transducer without cable influences

## RESOLUTIONS

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

\*available only without zero pulse

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







custom version XXX

 $<sup>^{\</sup>rm 2}$  for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section  $^{\rm 4}$  maximum load for static usage

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

<sup>6</sup> condensation not allowed



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

## MAIN FEATURES

Miniaturized ø 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

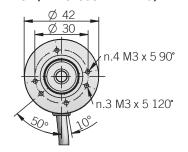


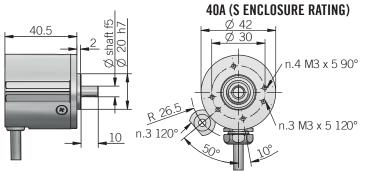


ORDERING CODE	R 40A	100	S	5/28	P	6	Х	6	P	R	. XXX
SER  (mod. A/B/C/H/I/X) incremental encoder series  (mod. A/B/C/H/I/N/X) incremental encoder series  clamping flange square flange 1  clamping flange ø 1  M18 threade  M20 thread  synchronous flange synchronous flange (mod. A/ (mod. C/H/I/N/ (mod. C/H/I/N/ (mod. C/H/I/N/	MODEL 5 20 mm 40A 6,5 mm 40B 4,46 mm 40C 40 flange 40H 5 30 mm 40X RE B) ppr from 1 7 /X) ppr from 1 0 o the available (wi	SOLUTION 1 to 14400 1 to 2500 00 to 2500 e pulses list ZEI without zer	RO PULSE o pulse S o pulse Z POWEF al interface) 5 28 V ELEC	R SUPPLY 5 V DC 5 V DC 5/28 STRICAL IN PN open c pu lin - output R	TERFACE ollector C sh-pull P e driver L S-422 RS SHAFT D 3/C/H/I/ (mod	IAMETER ( N) mm 6 . X) mm 8 NCLOSUR	E RATING IP 54 X	6	P	R	. XXX
					(m	nod. A / B / I	H) IP 66 <b>S</b> I <b>X ROTATIO</b> (IP 66) 30				
							(IP 54) 60	00 rpm 6 <b>OUTI</b>	PUT TYPE		
		preferred ca	ble lengths	1,5/2/3/	5 / 10 m, to	be added a	cable (sta after DIRECT	ndard lengt TION TYPE (e	g. PR5)	ION TYPE	
								(mod. A / B			

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

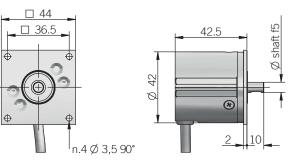
## **40A (X ENCLOSURE RATING)**



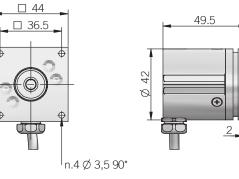


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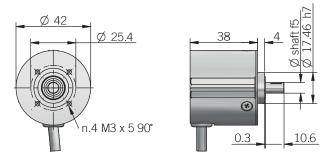
## **40B (X ENCLOSURE RATING)**

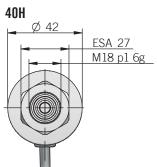


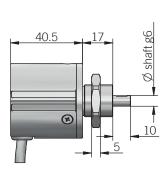


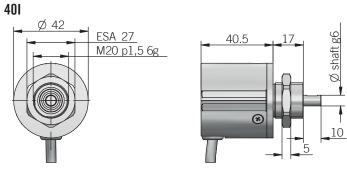


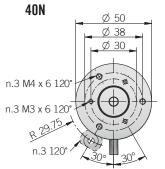


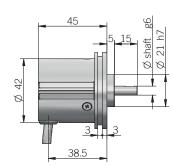


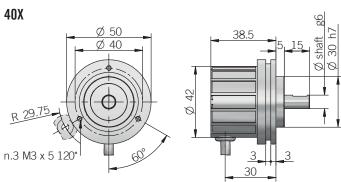












fixing clamps not included, please refer to the Accessories recommended mating shaft tolerance H7 dimensions in mm





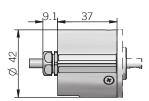
VARIANT custom version XXX



## DIMENSIONS WITH AXIAL OUTPUT WITH X ENCLOSURE RATING

dimensions in mm

## DIMENSIONS WITH AXIAL OUTPUT WITH S ENCLOSURE RATING



ELECTRICAL SPECIFICATION	)NS
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 supply <sup>1</sup>	$5 = 4,5 \dots 5,5 \text{ V DC}$ $5/28 = 4,5 \dots 30 \text{ V DC}$ (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 <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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							
<u></u>	shield	shield							

MECHANICAL SPECIFICATI	ONS
Shaft diameter	ø 6 / 8 mm
Enclosure rating	
IEC 60529	S = IP 66
Max rotation speed	6000 rpm with X enclosure rating
<u> </u>	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 <sup>-6</sup> kgm <sup>2</sup> (2,4 x 10 <sup>-6</sup> lbft <sup>2</sup> )
Starting torque	< 0,01 Nm (1,42 Ozin) with X enclosure rating
(at +20°C / +68°F)	< 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	109 revolutions
Operating temperature <sup>5,6</sup>	-10° +60°C (+14° +140°F) EL series
operating temperatures	-25° +85°C (-13° +185°F) ER series
Storage temperature <sup>6</sup>	-25° +70°C (-13° +158°F)
Weight	100 g (3,52 oz)

<sup>&</sup>lt;sup>1</sup> as measured at the transducer without cable influences

## **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



## EL - ER 58 B / C / H / T

## 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

ORDERING CODE

- Available with metal cover for heavy duty applications
- Solid shaft diameter up to 12 mm
- Mounting by synchronous, clamping or coupling flange





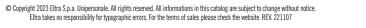




ORDERING CODE	ER	58C	M*	500	8	5/28	Р	8	X	6	M	R	. 162	+XXX
	RIES													
incremental encoder serie incremental encoder serie														
		MODEL												
synchronous flange clamping flange	e ø 50	mm 58B												
clamping flange	e ø 50	mm 58H												
coupling flang	e ø 40		L COVER											
	*	add for meta	I cover M											
		nr		to 24000										
		refer to the	available	pulses list										
			,	<b>ZEF</b> vithout zer	RO PULSE									
			,	with zer	ro pulse Z									
			(wit	h L electrica		R SUPPLY								
			(WIL	II L EIECLIICA	5 28 \	/ DC 5/28								
						<b>TRICAL IN</b> IPN open c								
						pι	ısh-pull P							
			pow	er supply 5	5/28 V DC	lin output R -	e driver L S-422 RS							
				,			SHAFT [	DIAMETER						
							(mod	l. B) mm 6 l. C) mm 8						
						(mod. B / C	/ H) (3/8")	mm 9,52 mm 10						
								T) mm 12						
							ı	ENCLOSUR	E RATING IP 54 X					
							(1	mod. B / C /	T) IP 66 S					
								MA	IP 66) 30	OO rpm 3				
									(IP 54) 60	000 rpm 6				
									cable (sta	OUTI Indard lengt	PUT TYPE th 1.5 m) P			
				preferi	red cable le	ngths 2 / 3 /	/ 5 / 10 m, t	o be added	after DIREC	TION TYPE ( IL plug cor	eg. PR5)			
									JIS-C-54	32 plug co	onnector J			
									M12 M2	plug conne 23 plug co	nnector H			
									M	16 plug co	nnector C			
											DIRECT	10N TYPE axial A		
												radial R		
											socke	et not inclu	SOCKET ided .162	
						to be re	eported only	with conne	ctor output	(eg. MR.162		t see Access		VADIANT
														VADIANT









VARIANT custom version +XXX

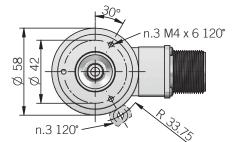
<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

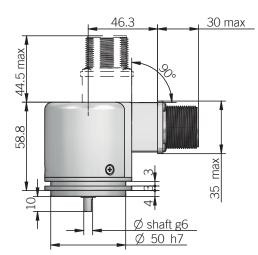
 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> maximum load for static usage

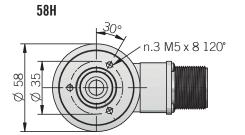
 $<sup>^{\</sup>rm 5}$  measured on the transducer flange <sup>6</sup> condensation not allowed

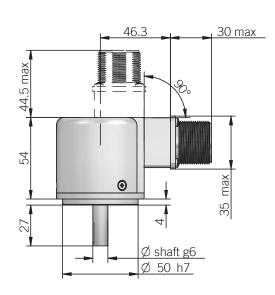
## 58B



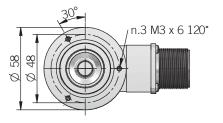


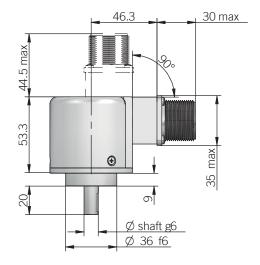
fixing clamps not included, please refer to Accessories



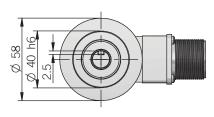


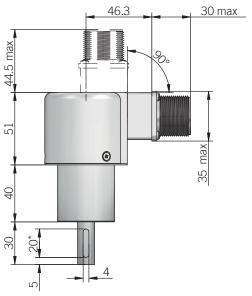
## 58C





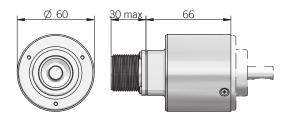
## 58T



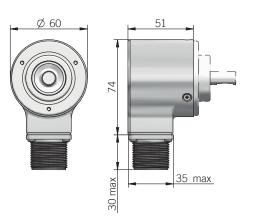


\* slot only with 12mm shaft diameter

## DIMENSION WITH METAL COVER AND AXIAL OUTPUT



## DIMENSION WITH METAL COVER AND RADIAL OUTPUT



recommended mating shaft tolerance H7 dimensions in mm

ELECTRICAL SPECIFICATION	)NS
Resolution	from 1 to 24000 ppr
Power supply <sup>1</sup>	$5 = 4,5 \dots 5,5 \text{ V DC}$ $5/28 = 4,5 \dots 30 \text{ V DC}$ (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 <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
lectromagnetic 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 | X = IP 54 IEC 60529 | 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 load <sup>4</sup>	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

SHUCK	30 G, 11 IIIS (IEC 00008-2-27)
Vibration	10 G, 10 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (36 x 10 <sup>-6</sup> lbft <sup>2</sup> )
	< 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 109 revolutions -10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series Operating temperature5,6 **Storage temperature**<sup>6</sup> -25° ... +70°C (-13° ... +158°F)

350 g (12,35 oz) **Weight**  $\begin{vmatrix} 350 & g & (12,35 & 02) \\ 450 & g & (15,87 & 0z) & with metal cover \end{vmatrix}$ as measured at the transducer without cable influences

<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section <sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section

4 maximum load for static usage

<sup>5</sup> measured on the transducer flange <sup>6</sup> condensation not allowed





## OPTICAL SOLID SHAFT INCREMENTAL ENCODERS | EL - ER 58 B / C / H / T

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

front view

CONNECT	TIONS												
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	Α	F	6	F	4	1	10	1	8
A+	green	green	3	1	С	А	1	А	3	6	5	2	1
A-	/	brown or grey	/	3	/	С	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	Е	В	2	В	1	4	8	4	3
B-	/	orange	/	5	/	E	8	Н	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	С	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
÷	shield	shield	7	7	G	G	10	J	housing <sup>1</sup>	housing <sup>1</sup>	9	housing <sup>1</sup>	housing <sup>1</sup>

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







## 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.

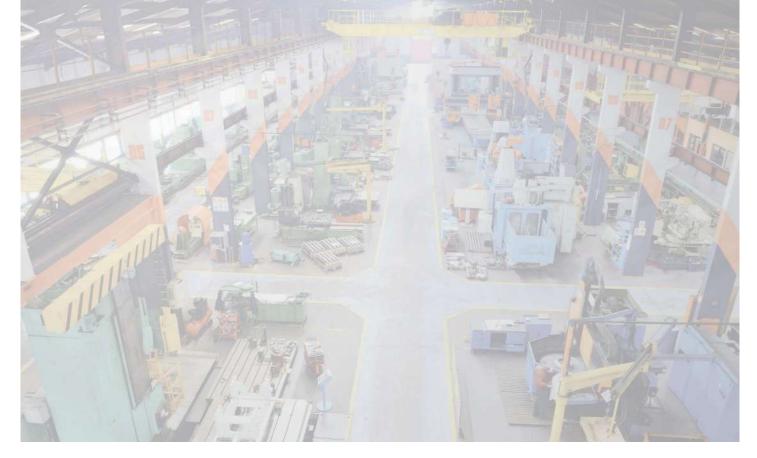
- 3 channel encoder (A / B / Z) up to 24000 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Solid shaft diameter up to 10 mm
- Mounting by synchronous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





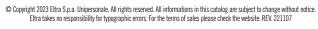


ORDERING CODE ER	63A	M*	500	S	5/28	Р	8	X	6	M	R	. 162	+XXX
SERIES incremental encoder series EL incremental encoder series ER synchronous flange ø 31,75 centering square flange ø 31,75 centering square flange ø 50	MODEL 6 mm 63A 6 mm 63D 7 mm 63E 7 meta	AL COVER al cover M RES opr from 1 e available v	OLUTION to 24000 pulses list ZER vithout zer with zer h L electrica	RO PULSE o pulse S o pulse Z POWEF di interface) 5 28 V ELEC N	R SUPPLY 5 V DC 5 OC 5/28 TRICAL IN PN open c pu lin - output R	ITERFACE Ollector C sh-pull P e driver L S-422 RS SHAFT D (3/8")	IAMETER mm 8 mm 9,52 mm 10 NCLOSUR	E RATING IP 54 X IP 66 S X ROTATIO (IP 66) 30 (IP 54) 60  cable (sta after DIRC M JIS-C-54	IN SPEED 00 rpm 3 00 rpm 6 OUTI ndard lengt 11 plug cou 32 plug cd	PUT TYPE h 1,5 m) P eg. PR5) nnector M	R	. 162	+XXX
								M12 <sub>M</sub> 2	plug conne 23 plug co	ector M12			
									F0 00		ION TYPE axial A radial R		
					to be re	ported only	with connec	ctor output (	eg. MR.162	socke ), for socket	et not inclu see Access	ories	WARLAN-
													VARIANT











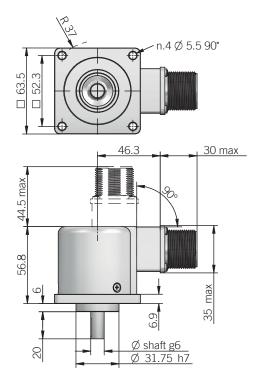
custom version +XXX

## 63A n.3 M5 x 7 120° 46.3 \_ 30 max Ø shaft g6 Ø 31.75 h7

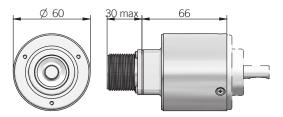
fixing clamps not included, please refer to the Accessories

## 63E n.4 Ø 5.5 90° 30 max Ø 50 h7

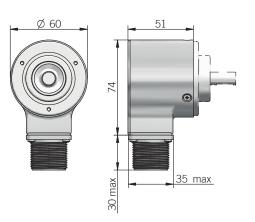
## 63D



## **DIMENSION WITH METAL COVER AND AXIAL OUTPUT**



## DIMENSION WITH METAL COVER AND RADIAL OUTPUT



recommended mating shaft tolerance H7 dimensions in mm

LECTRICAL SPECIFICATIONS							
Resolution	from 1 to 24000 ppr						
Power supply <sup>1</sup>	$5 = 4,5 \dots 5,5 \text{ V DC}$ $5/28 = 4,5 \dots 30 \text{ V DC}$ (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 <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	200 years EL series 263 years ER series						
Mission time (Tm) <sup>3</sup>	20 years						
Diagnostic coverage (DC) <sup>3</sup>	0%						
Cable type	shielded - fixed installation conductors section 0,22 mm²/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** X = IP 54 **IEC 60529** S = IP 66 6000 rpm with X enclosure rating EL 3000 rpm / 60° C with S enclosure rating Max rotation speed ER 3000 rpm / 70° C with S enclosure rating ER 2000 rpm / 85° C with S enclosure rating Max shaft load<sup>4</sup> 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<sup>-6</sup> kgm<sup>2</sup> (36 x 10<sup>-6</sup> lbft<sup>2</sup>) **Starting torque** < 0,02 Nm (2,83 Ozin) with X enclosure rating $(at +20^{\circ}C / +68^{\circ}F)$ < 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

-10° ... +60°C (+14° ... +140°F) EL series -25° ... +85°C (-13° ... +185°F) ER series

as measured at the transducer without cable influences

Operating temperature5,6

<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

Weight

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

**Storage temperature**<sup>6</sup> | -25° ... +70°C (-13° ... +158°F)

350 g (12,35 oz)

450 g (15,87 oz) with metal cover

Bearings life | 10° revolutions

4 maximum load for static usage

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

6 condensation not allowed





## OPTICAL SOLID SHAFT INCREMENTAL ENCODERS | EL - ER 63 A / D / E

H connector (12 pin) - M23 CCW

Hummel 7.410.000000 - 7.002.912.603

front view

CONNECT	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	А	F	6	F	4	1	10	1	8	
A+	green	green	3	1	С	А	1	А	3	6	5	2	1	
A-	/	brown or grey	/	3	/	С	7	G	/	5	6	/	2	
B+	yellow	yellow	5	2	Е	В	2	В	1	4	8	4	3	
B-	/	orange	/	5	/	Е	8	Н	/	3	1	/	4	
Z+	blue	blue	4	/	D	/	3	С	5	2	3	3	5	
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6	
<u>+</u>	shield	shield	7	7	G	G	10	J	housing <sup>1</sup>	housing <sup>1</sup>	9	housing <sup>1</sup>	housing <sup>1</sup>	

1 only with metal cover J connector (7 pin) JIS-C-5432 Size 16



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

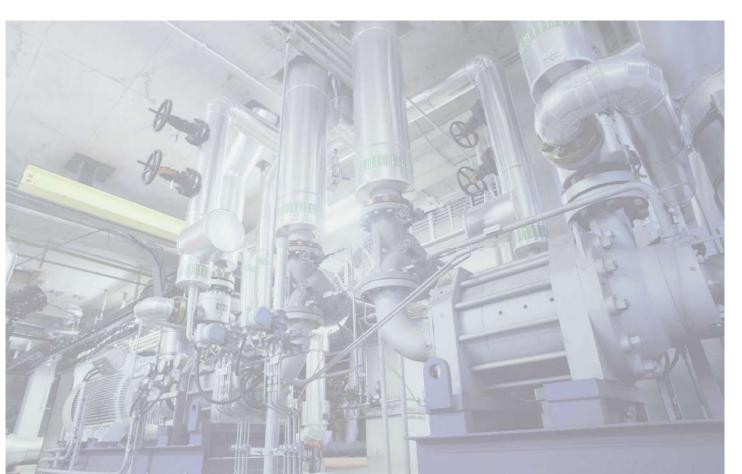


C connector (5 pin) Amphenol C091 M16 front view



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











## EX 80 A / D EXPLOSION PROOF ATEX INCREMENTAL ENCODER

## 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 syncronous 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



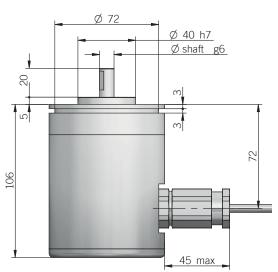


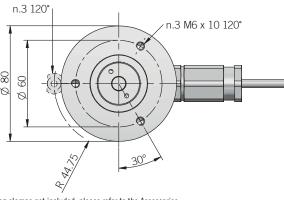
ORDERING CODE	EX	80A	500	S	5/28	P	10	X	3	PR	. XXX
explosion	SERIES proof encoder series EX syncronous flange ø 40 ering square flange ø 40 ppr	MODEL mm 80A mm 80D RES from 100 e available v	OLUTION to 10000 pulses IZEF vithout zer with zer	RO PULSE FO pulse S FO pulse Z POWEF al interface) 5 28 V	R SUPPLY 5 V DC 5 DC 5/28 TRICAL IN PN open c pu lin	TERFACE Ollector C Sle-tpull P e driver L		X	3	PR	. XXX
		·	117		·	SHAFT D	IAMETER mm 10 Enclosur				
							MA	X ROTATIO	N SPEED 00 rpm 3		
			prefe	rred cable le	engths 2 / 3	/5/10 m,		able (stand after OUTP)	ard length	. PR5)	
									(	custom ver	VARIANT sion XXX

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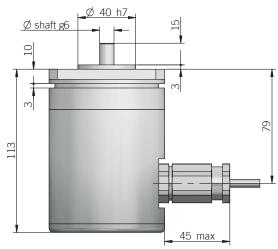


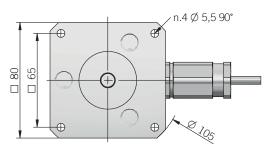




fixing clamps not included, please refer to the Accessories

80D





recommended mating shaft tolerance H7 dimensions in mm

ELECTRICAL SPECIFICATION	ELECTRICAL SPECIFICATIONS								
Resolution	from 100 to 10000 ppr								
Power supply <sup>1</sup>	$5 = 4.5 \dots 5.5 \text{ V DC}$ $5/28 = 4.5 \dots 30 \text{ V DC}$ (reverse polarity protection)								
Current consumption without load	80 mA max								
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel								
Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	263 years								
Mission time (Tm) <sup>3</sup>	20 years								
Diagnostic coverage (DC) <sup>3</sup>	0%								
Cable type	shielded - fixed or flexible installation conductors section min 0,14 mm²/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 SPECIFICATI	ONS					
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 <sup>-6</sup> kgm <sup>2</sup> (36 x 10 <sup>-6</sup> lbft <sup>2</sup> )					
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	109 revolutions					
Operating temperature <sup>5, 6</sup>	-20° +50°C (-4° +122°F)					
Storage temperature <sup>6</sup>	-20° +70°C (-4° +158°F)					
Weight	1200 g (42,33 oz)					
as measured at the transducer without	s measured at the transducer without cable influences					

## <sup>6</sup> 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

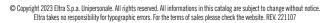
T85°C: max surface temperature +85°C of the device in the presence of dust

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								
<u>_L</u>	chiold	chiold								









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<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> maximum load for static usage

<sup>&</sup>lt;sup>5</sup> measured on the transducer flange



## EH 90 A - EH 115 A / R SOLID SHAFT INCREMENTAL ENCODER

## 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 syncronous or REO-444 flange Model 115R available with centrifugal relay







							,				- ,						
ORDERING CODE EH	90A	500	S	5/30	Р	1000	Z	5/30	P	8	X	6	M	R	. 162	<b>+XXX</b>	+ 20
SERIES																	
incremental encoder series EH	MODEL																
synchronous flange ø 40 i	mm 90A																
flange REO-44 ge REO-444 with centrifugal rela																	
	RESC	DLUTION															
ppr t refer to the a	from 200 available n																
10101 to the 0	·	ZERO	PULSE														
		hout zero with zero															
			POWER	SUPPLY													
	(with L	electrical i		5 V DC 5 DC 5/30													
				RICAL INT	ERFACE												
			NPI	N open co	llector C h-pull P												
				line	driver L												
	power su	ipply 5/30	VDC - (	output RS		I OLUTION											
					KLS		O PULSE										
								SUPPLY									
							ELECTI	RICAL INT									
									SHAFT DI (mod. 90	IAMETER (A) mm 8							
								(mod. 90A	ı) (3/8") ı	mm 9,52 mm 10							
								(mod. 11	5A - 115R	) mm 11							
									EN	ICLOSURE	RATING IP 54 X						
										(mod. 90	) IP 66 S						
												N SPEED 00 rpm 3					
												00 rpm 6					
										Ca	hla (oton	<b>OUTP</b> dard length	UT TYPE				
					pref	erred cable	e lengths 2	2/3/5/10	0 m, to be		er DIRECTI	ON TYPE (e	g. PR5)				
										I		. plug con 2 plug cor					
														ON TYPE			
														axial A radial R			
1															SOCKET		
To be indicated in the models 90A -	- 115A for	double elec	tronics ar	nd double r	esolution.		to he	renorted o	nly with co	nnnector o	utnut (ea	MR.162), fo		not inclu			
With different double resolution ple	ase add 2	50 as varia	nt, see ex	amples:			10 00	. oportou u	,		acput (og.		. Journal o			VARIANT	
Double different resolution and dou Double different resolution and san						.250										on +XXX TEDVENTI	UN CD
Same resolution and double electro					230											TERVENTI R) from 60	

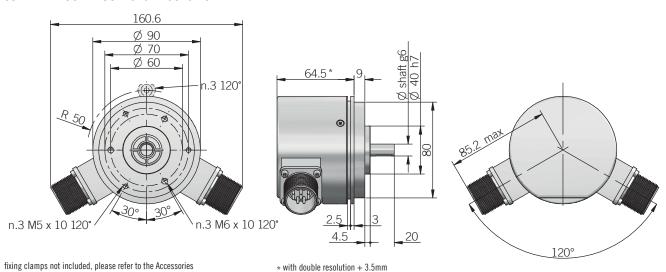




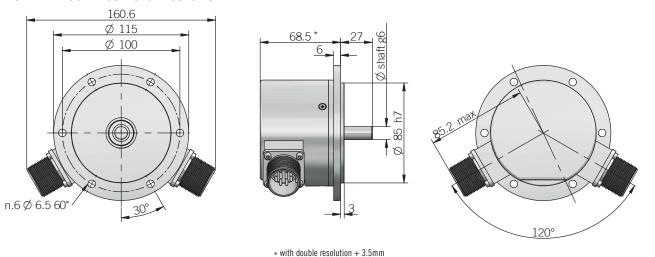
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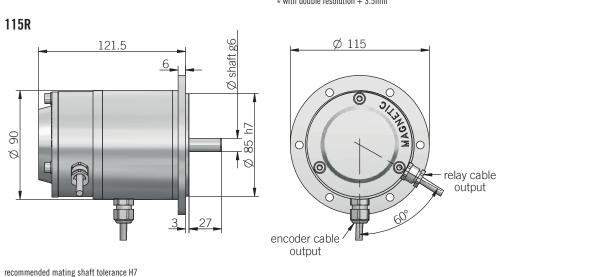
for other speeds please contact our offices directly

## 90A WITH DOUBLE OUTPUT / RESOLUTION



## 115A WITH DOUBLE OUTPUT / RESOLUTION









dimensions in mm

## OPTICAL SOLID SHAFT INCREMENTAL ENCODERS | EH 90 A - EH 115 A / R

ELECTRICAL SPECIFICATION	ONS
Resolution	from 200 to 2048 ppr
Power supply <sup>1</sup>	$5 = 4,5 \dots 5,5 \text{ V DC}$ $5/30 = 4,5 \dots 30 \text{ V DC}$ (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	C / P = 50 mA / channel L = 20 mA / channel
Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	244 years / encoder
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
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 / 11 mm			
Enclosure rating IEC 60529				
Max rotation speed	6000 rpm with X enclosure rating 3000 rpm with S enclosure rating			
Max shaft load <sup>4</sup>	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 <sup>-6</sup> kgm <sup>2</sup> (83 x 10 <sup>-6</sup> lbft <sup>2</sup> )			
Starting torque (at +20°C / +68°F)	, , , , , ,			
Bearing stage material	aluminum			
Shaft material	stainless steel			
Housing material	painted aluminum			
Bearings	n.2 ball bearings			
Bearings life	109 revolutions			
Operating temperature <sup>5,6</sup>	-10° +60°C (+14° +140°F)			
Storage temperature	-25° +70°C (-13° +158°F)			
Weight	750 g (26,46 oz) 1050 g (37,04 oz) with relay			

<sup>1</sup> as measured at the transducer without cable influences

<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $^{\rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

4 maximum load for static usage

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

<sup>6</sup> condensation not allowed

## **RESOLUTIONS**

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

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

CUNNECTIONS					1			1
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	А	F	6	F
A+	green	green	3	1	С	А	1	A
A-	/	brown or grey	/	3	/	С	7	G
B+	yellow	yellow	5	2	E	В	2	В
B-	/	orange	/	5	/	E	8	Н
Z+	blue	blue	4	/	D	/	3	С
Z-	/	white	/	/	/	/	9	I
÷	shield	shield	7	7	G	G	10	J

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

**RELAY CHARACTERISTICS** 

Intervention speed | from 600 to 4300 rpm

Type of contact | Normally Closed (NC)

Accuracy ±3%

Contact capacity 2 A / 250 V AC 3,3 A / 125 V AC



M connector (7 pin)

Amphenol MS3102-E-16-S

front view

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

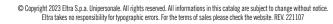


M connector (10 pin) Amphenol MS3102-E-18-1 front view











## EL - ER 90 A / 115 A

## 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	Р	8	X	6	M	R	. 162	+XXX
	incremental encoder series EL incremental encoder series ER synchronous flange ø 40 flange REO-4	44 115A	OLUTION to 10000										
		e available p	oulses list										
		W	ithout zer	ro pulse S ro pulse Z									
				POWE	R SUPPLY								
		(with	ı L electrica		DC 5/28								
					TRICAL IN								
					pu	sh-pull P e driver L							
		powe	r supply 5	5/28 V DC		S-422 RS	IAMETER						
					, ,	(mod.	90) mm 8						
					(moa.	90) (3/8")	mm 10						
							5) mm 11 E <b>nclosur</b>						
							(mod. 9	IP 54 X 0) IP 66 S					
							MA	X ROTATIO	ON SPEED 00 rpm 3				
									00 rpm 6	PUT TYPE			
						/F / 10 I	ca	ble (stand	ard length	1.5 m) P			
			preterr	'ed cable lei	igtns 2 / 3 /	75 / 10 m, to	o be added a	M	IL plug cor	nnector M			
								JIS-C-54	32 plug co	onnector J DIRECTI	ION TYPE		
											axial A radial R		
											et not inclu	SOCKET	
					to be re	ported only	with connec	ctor output (	eg. MR.162	), for socket			

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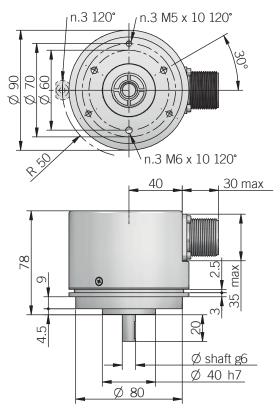
Eltra takes no responsibility for typographic errors. For the terms of sales please check the website. REV. 221107 61





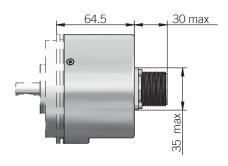
VARIANT custom version XXX

## 90A

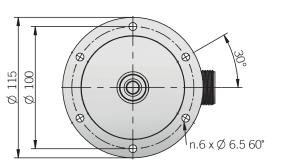


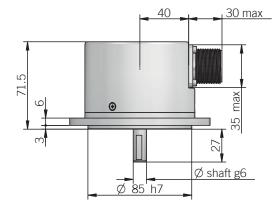
fixing clamps not included, please refer to Accessories

## **90A WITH AXIAL OUTPUT**

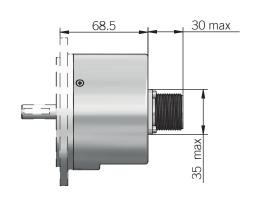


recommended mating shaft tolerance H7 dimensions in mm





## 115A WITH AXIAL OUTPUT



## 115A

ELECTRICAL SPECIFICATION	ONS
Resolution	from 1 to 10000 ppr
Power supply <sup>1</sup>	$5 = 4,5 \dots 5,5 \text{ V DC}$ $5/28 = 4,5 \dots 30 \text{ V DC}$ (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 <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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 SPECIFICATI	IECHANICAL SPECIFICATIONS					
Shaft diameter	ø 8 / 9,52 (3/8") / 10 / 11 mm					
Enclosure rating IEC 60529						
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 load <sup>4</sup>	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 <sup>-6</sup> kgm <sup>2</sup> (83 x 10 <sup>-6</sup> lbft <sup>2</sup> )					
Starting torque (at +20°C / +68°F)						
Bearing stage material	aluminum					
Shaft material	stainless steel					
Housing material	PA66 glass fiber reinforced / painted aluminum					
Bearings	n.2 ball bearings					
Bearings life	109 revolutions					
Operating temperature <sup>5, 6</sup>	-10° +60°C (+14° +140°F) EL series -25° +85°C (-13° +185°F) ER series					
Storage temperature <sup>6</sup>	-25° +70°C (-13° +158°F)					

450 g (15,87 oz) with metal cover <sup>1</sup> as measured at the transducer without cable influences

<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

Weight

 $^{\rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

350 g (12,35 oz)

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	А	F	6	F
A+	green	green	3	1	С	А	1	A
A-	/	brown or grey	/	3	/	С	7	G
B+	yellow	yellow	5	2	E	В	2	В
B-	/	orange	/	5	/	E	8	Н
Z+	blue	blue	4	/	D	/	3	С
Z-	/	white	/	/	/	/	9	I
<u>+</u>	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



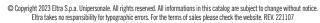
M connector (10 pin) Amphenol MS3102-E-18-1 front view















## 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 absense of bearings
- Easy assembly
- Compact size

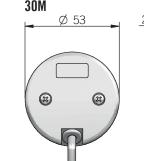




ORDERING CODE	EH	30M	500	S	5/30	P	6	X	6	PR	. XXX
incremental encoder se	SERIES ries EH	MODEL									
kit encode		nge 17M oder 30M									
		pr from 50	OLUTION O to 1024 pulses list								
			<b>ZEF</b> vithout zer	O PULSE							
				POWER	SUPPLY 5 V DC 5 DC 5/30						
				ELEC	<b>TRICAL IN</b> PN open c	TERFACE ollector C					
		powe	er supply 5	5/30 V DC -	lin	sh-pull P e driver L S-422 RS					
		·	117			BORE D	mm 6 mm 6,35				
					(mod.	E	NCLOSURI - (mod. 30M				
								X ROTATIOI	00 rpm 6		
			preferred o	able length	s 1,5 / 2 / 3	/5/10 m,			<b>OUTPU</b> ard length 0, IT TYPE (eg. 1		



## 30M

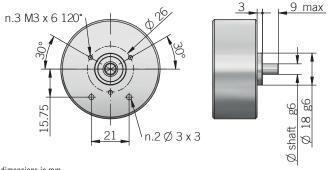




## 30M n.2 M3 x 6 ∫Ø shaft g6 n.2 M2,5 x 5 oring groove

## RECOMMENDED INTERFACE FLANGE DESIGN 17M

17M



dimensions in mm					
ELECTRICAL SPECIFICATIONS					
Resolution	from 50 to 1024 ppr				
Power supply <sup>1</sup>	$5=4,5\dots5,5$ V DC $5/30=4,5\dots30$ 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 interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	244 years				
Mission time (Tm)3	20 40000				

Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	244 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

## RESOLUTIONS

VARIANT

custom version XXX

eltra.it@broadcom.com

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

**UL / CSA** file n. E212495

\*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 mod. 17 IP 40 **IEC 60529** 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** $0.5 \times 10^{-6} \text{ kgm}^2 (12 \times 10^{-6} \text{ lbft}^2)$ 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**<sup>4, 5</sup> | -20° ... +85°C (-4° ... +185°F) **Storage temperature**<sup>5</sup> -25° ... +85°C (-13° ... +185°F) **Weight** 50 g (1,76 oz)

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

<sup>1</sup> as measured at the transducer without cable influences

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

<sup>4</sup> measured on the transducer flange

<sup>5</sup> condensation not allowed

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







<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section



## EH 17 - 30 MH Incremental kit encoder

## 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 absense of bearings
- Easy assembly

ORDERING CODE

Compact size

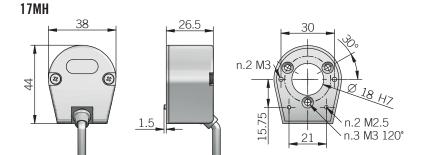




SERIES	
incremental encoder series EH	
TYPE	
high resolution kit encoder with flange 17MH	
high resolution kit encoder 30MH	
RESOLUTION	
ppr 2000 / 2048 / 2500 / 4096 / 5000	
ZERO PULSE	
without zero pulse S	
with zero pulse Z	
POWER SUPPLY 530 V DC 5/30	
ELECTRICAL INTERFACE	
push-pull P	
line driver 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 V	
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

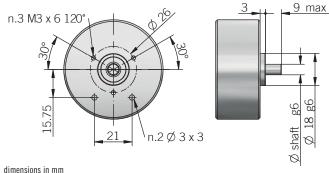
EH 30MH 2000

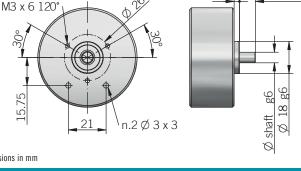
S 5/30



## RECOMMENDED INTERFACE FLANGE DESIGN

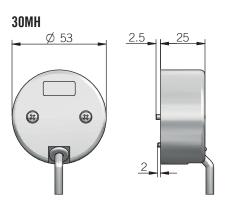
## 17MH

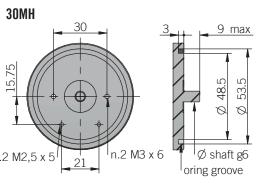




ELECTRICAL SPECIFICATION	DNS
Resolution	2000 - 2048 - 2500 - 4096 - 5000 ppr
Power supply <sup>1</sup>	4,5 30 V DC (reverse polarity protection)
Current consumption without load	60 mA max
Max load current	20 mA / channel
Electrical interface <sup>2</sup>	push-pull / line driver HTL (AEIC-7272 or similar) 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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	289 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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

- <sup>1</sup> as measured at the transducer without cable influences
- <sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
- $^{\rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section
- <sup>4</sup> measured on the transducer flange
- <sup>5</sup> condensation not allowed



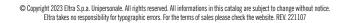


MECHANICAL SPECIFICATI	MECHANICAL SPECIFICATIONS					
Bore diameter	ø 6 / 6,35 (1/4") mm					
Enclosure rating	mod. 17 IP 40					
IEC 60529	mod. 30 IP 40 or 54*					
Max rotation speed	6000 rpm limited by output frequency					
Shock	50 G, 11 ms (IEC 60068-2-27)					
Vibration	10 G, 10 2000 Hz (IEC 60068-2-6)					
Moment of inertia	0,5 x 10 <sup>-6</sup> kgm <sup>2</sup> (12 x 10 <sup>-6</sup> lbft <sup>2</sup> )					
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 <sup>4, 5</sup>	-20° +85°C (-4° +185°F)					
Storage temperature <sup>5</sup>	-25° +85°C (-13° +185°F)					
Weight	50 g (1,76 oz)					
*when properly installed with oring kit (not supplied, please refer to Accessories)						

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
<del></del>	shield	shield









custom version XXX

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CONNECTIONS





## EF 36 K Blind Hollow Shaft incremental encoder

## 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.

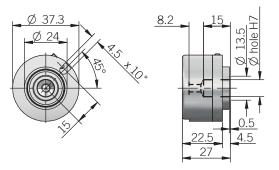
- 6 channels encoder with optical generation of "Hall effect phases" (commutation signals)
- · Signal transmission by bit parallel bus
- · Easy mechanical mounting
- · Small dimensions
- Wide range of resolutions available
- · High temperature resistance





RING CODE	EF	36K	4	L	512	S	5	L	8	X	6	PR	. XXX	
	SERIES													
incremental encoder with Hall pha	ses EF	MODEL												
blind hollow shaft wit	h rear fi	MODEL xing 36K												
	1		R POLES											
		les (2 pole: les (3 pole:												
ELECTRICAL INT	8 po	les (4 pole	s pair) 8											
ELECTRICAL INT	EKFAGE			ollector C										
			ne driver	RS-422 L										
				ENTAL RES										
				e available	pulses list									
				V	<b>ZEI</b> vithout zer	n nulse S								
						o pulse Z								
						POWEI	SUPPLY 5 V DC 5							
			ELI	CTRICAL I	INTERFACI		REMENTAL	SIGNALS						
							line driver		 Diameter					
									mm 8					
								(3/8")	mm 9,52 mm 10					
								ı	ENCLOSUR					
										IP 40 X				
									IVIA	<b>X ROTATIO</b> 60	00 rpm 6			
											OUTF	PUT TYPE		
					preferred of	able length	ıs 1,5 / 2 / 3	/5/10 m.			dard length UT TYPE (eg			
						8-	,	,			_	ouetom voi	VARIANT	





\* 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

ELECTRICAL SPECIFICATION	INS
Incremental resolution	from 500 to 1024 ppr
Power supply <sup>1</sup>	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 signals <sup>2</sup>	line driver RS-422 (AELT-5000 or similar)
Electrical interface for Hall phases <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	300 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Cable type	shielded - fixed installation conductors section 0,14 mm²/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 SPECIFICATI	ONS				
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 <sup>-6</sup> kgm <sup>2</sup> (12 x 10 <sup>-6</sup> lbft <sup>2</sup> )				
Starting torque (at +20°C / +68°F)	1 / 11 111 Nm (1 /1 / 1171n)				
Bearing stage material	aluminum				
Shaft material	stainless steel				
Housing material	aluminum				
Bearings	n.2 ball bearings				
Bearings life	109 revolutions				
Operating temperature <sup>4, 5</sup>	-10° +85°C (+14° +185°F)				
Storage temperature <sup>5</sup>	-25° +85°C (-13° +185°F)				
Weight	150 g (5,29 oz)				
	11.1.0				

<sup>&</sup>lt;sup>1</sup> as measured at the transducer without cable influences

<sup>&</sup>lt;sup>5</sup> condensation not allowed

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







custom version XXX

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<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

<sup>&</sup>lt;sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> measured on the transducer flange



## ER 38 F / (

## BLIND HOLLOW SHAFT INCREMENTAL ENCODER

## 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

**ORDERING CODE** 

- · 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

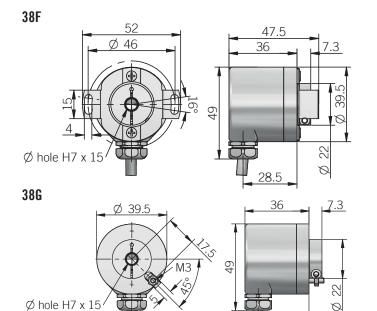


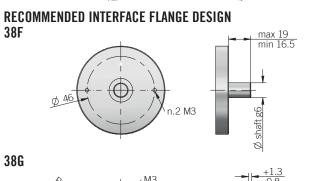


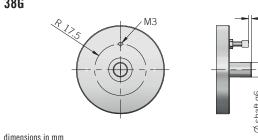
SERIES incremental encoder series ER  MO blind hollow shaft with stator coupling	<b>ODEL</b> g 38F								
blind hollow shaft with torque pin	n 38G								
,	RESOLUTION								
	m 100 to 14400 ailable pulses list								
Total to the avail		O PULSE							
	without zero								
	with zero		CHDDIA						
	(with L electrical		5 V DC 5						
			DC 5/30						
			TRICAL IN						
		N	PN open co	sh-pull P					
			line	e driver L					
	power supply 5/	/30 V DC -	output RS						
				BORE D	IAMETER				
					mm 4 mm 5				
					mm 6				
				(1/4")	mm 6,35				
					mm 8 mm 10				
				Е	NCLOSUR	ERATING			
			IP 66	shaft side	/ IP67 cov	er side X			
						1. 6	OPTION		
						to be r	eported X		
					radial c	able (stand	UUII lard length	O.5 m) PR	
	preferred ca	able lengths	s 1,5 / 2 / 3	/ 5 / 10 m,					

ER 38F 500

S 5/30







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
	chield	chield

ELECTRICAL SPECIFICATIONS				
ELECTRICAL SPECIFICATION	JN2			
Resolution	from 100 to 14400 ppr			
Power supply <sup>1</sup>	$5 = 4.5 \dots 5.5 \text{ V DC}$ $5/30 = 4.5 \dots 30 \text{ V DC}$ (reverse polarity protection)			
Power draw without load typical				
Max load current	C/P = 50  mA/channel L/RS = 20  mA/channel			
Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	263 years			
Mission time (Tm) <sup>3</sup>	20 years			
Diagnostic coverage (DC) <sup>3</sup>	0%			
Cable type	shielded - fixed installation conductors section 0,22 mm²/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 SPECIFICATI	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 <sup>-6</sup> kgm <sup>2</sup> (19 x 10 <sup>-6</sup> lbft <sup>2</sup> )					
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	109 revolutions					
Operating temperature <sup>5, 6</sup>	-25° +85°C (-13° +185°F)					
Storage temperature <sup>6</sup>	-25° +85°C (-13° +185°F)					
Weight	150 g (5,29 oz)					
Weight						

as measured at the transducer without cable influences

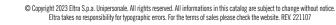
## RESOLUTIONS

**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

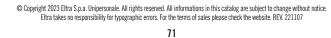
please directly contact our offices for other pulses, preferred resolutions in bold







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<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> maximum load for static usage

<sup>&</sup>lt;sup>5</sup> measured on the transducer flange <sup>6</sup> condensation not allowed



## THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

## MAIN FEATURES

Hollow shaft ø 48 mm encoder series recommended for motor feedback.

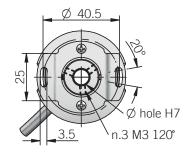
- · 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +24 V DC with several electrical interfaces available
- Up to 150 kHz output frequency
- Cable output, connectors available on cable end
- Through hollow shaft diameter up to 8 mm
- Mounting by stator coupling

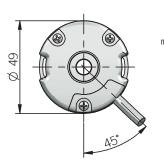




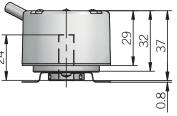
ORDERING CODE	EL	48C	500	S	5	L	8	X	6	PR	. XXX
incremental encode bli	SERIES r series EL ind hollow s igh hollow s	MODEL haft 48C shaft 48P RES r from 100 e available	SOLUTION to 2048 pulses list ZEF vithout zer	RO PULSE o pulse S o pulse Z POWEI al interface) 8 24 V ELEC	R SUPPLY 5 V DC 5 7 DC 8/24 :TRICAL IN PN open c pu	TERFACE Ollector C sh-pull P e driver L BORE D	PIAMETER mm 6 mm 8 enclosur			PR	. XXX
							MA	X ROTATIO	IN SPEED		
			preferred o	able length	s 1.5 / 2 / 3	/5/10 m	radial c	60 able (stanc	00 rpm 6	PUT TYPE 0,3 m) PR	
			p. 5.51100 0	auto tongen	0 1,0 / 2 / 0	, 5, 10 III,		. 4.10. 0011	0 (08		VARIANT







model C without hole on cover



 $\ensuremath{^{\star}}$  maximum protusion of the customer shaft in blind hollow shaft model recommended mating shaft tolerance g6 dimensions in mm

ELECTRICAL SPECIFICATION	ONS			
Resolution	from 100 to 2048 ppr			
Power supply <sup>1</sup>	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 <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	330 years			
Mission time (Tm) <sup>3</sup>	20 years			
Diagnostic coverage (DC) <sup>3</sup>	0%			
Cable type	shielded - fixed installation conductors section 0,22 mm²/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
+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 SPECIFICATI	ONS
Bore diameter	ø 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 <sup>-6</sup> kgm <sup>2</sup> (59 x 10 <sup>-6</sup> lbft <sup>2</sup> )
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 <sup>9</sup> revolutions
Operating temperature <sup>4, 5</sup>	-20° +85 °C (-4° +185°F)
Storage temperature <sup>5</sup>	-25° +85°C (-13° +185°F)
Weight	100 g (3,53 oz)

<sup>&</sup>lt;sup>1</sup> as measured at the transducer without cable influences

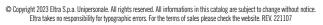
## RESOLUTIONS

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

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







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<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

<sup>&</sup>lt;sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> measured on the transducer flange

<sup>5</sup> condensation not allowed

## THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

## MAIN FEATURES

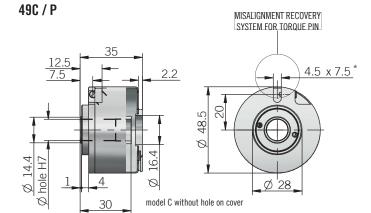
ø 49 mm encoder recommended in feedback control systems on AC servomotors,

- 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





ORDERING CODE	EL	49C	500	S	5	L	8	X	6	PR	. XXX
	SERIES										
	incremental encoder EL										
	blind hollow s	MODEL									
	through hollow s										
		RES	OLUTION								
		or from 100 e available									
	icici to tii	e available		O PULSE							
		V	vithout zer	o pulse S							
			with zer	o pulse Z	SUPPLY						
		(with	h L electrica	I interface)	5 V DC 5						
					DC 8/24						
					<b>TRICAL IN</b> PN open c						
					pu	sh-pull P					
					lin	e driver L	IAMETER				
						DUKL D	mm 6				
						(2/0")	mm 8 mm 9,52				
						(3/6 )	mm 10				
						(1/0")	mm 12				
							mm 12,7 NCLOSURE	PATING			
						-	MOLOGONE	IP 40 X			
							MAX	ROTATION			
								600	0 rpm 6	UT TYPE	
							radial ca	able (standa			
			preferred o	able length	s 1,5/2/3	/5/10 m,	to be added	after OUTPU	T TYPE (eg.	PR5)	



\* 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

ELECTRICAL SPECIFICATION	INS
Resolution	from 100 to 2048 ppr
Power supply <sup>1</sup>	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 interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	208 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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

CUNNECTIONS		
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
<u>+</u>	shield	shield

MECHANICAL SPECIFICATI	ONS
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	20 G, 10 2000 Hz (IEC 60068-2-6)
Moment of inertia	2 x 10 <sup>-6</sup> kgm <sup>2</sup> (47 x 10 <sup>-6</sup> lbft <sup>2</sup> )
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	109 revolutions
Operating temperature <sup>4, 5</sup>	-20° +85 °C (-4° +185°F) -10° +100°C (+14° +212°F) on demand
Storage temperature <sup>5</sup>	-25° +85 °C (-13° +185°F)
Weight	150 g (5,29 oz)

as measured at the transducer without cable influences

## RESOLUTIONS

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

please directly contact our offices for other pulses









VARIANT custom version XXX

<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{3}</sup>$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>&</sup>lt;sup>4</sup> measured on the transducer flange

<sup>&</sup>lt;sup>5</sup> condensation not allowed

## THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

## 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).

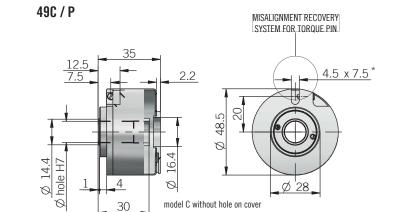
- Easy mechanical mounting
- Small dimensions

**ORDERING CODE** 

- Wide range of resolutions available
- High temperature resistance
- 6 channels encoder with optical generation of "Hall effect phases" (commutation signals)
- Signal transmission by bit parallel bus



ORDERING CODE		700			000				· ·	^	· ·	' ' '.'	. ////
	ERIES												
incremental encoder with Hall pha	ses EF	MODEL											
hlind	hallaw s	MODEL haft 49C											
		haft 49P											
			OR POLES										
	4 po	les (2 pol	es pair) 4										
	8 no	ies (3 poi les (4 not	es pair) 6 es pair) 8										
ELECTRICAL INTI				SIGNALS									
		N	PN open c	ollector C									
		ı	ine driver										
				ENTAL RES	0 to 2048								
					pulses list								
						RO PULSE							
				١	without zer	o pulse S o pulse Z							
					WILII ZEI		R SUPPLY						
							5 V DC 5						
			ELE	CTRICAL	INTERFACI	E FOR INC		SIGNALS e driver L					
								BORE D	IAMETER				
									mm 6				
								(3/8")	mm 8 mm 9,52				
								(0,0 )	mm 10				
								(1/2")	mm 12 mm 12,7				
									NCLOSUR	E DATING			
									MGLUSUN	IP 40 X			
									MA	X ROTATIO	N SPEED 00 rpm 6		
										001		OUT TYPE	
										able (stand	ard length	0,3 m) PR	
					preferred (	cable length	s 1,5/2/3	/5/10 m,	to be added	after OUTPI	JT TYPE (eg		VA DI ANT
													VARIANT



\* 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

ELECTRICAL SPECIFICATION	TRICAL SPECIFICATIONS						
Incremental resolution	from 100 to 2048 ppr						
Power supply <sup>1</sup>	4,5 5,5 V DC						
Current consumption without load	150 mA max						
Max load current	20 mA / channel						
Electrical interface for incremental signals <sup>2</sup>	line driver RS-422 (AELT-5000 or similar)						
Electrical interface for Hall phases <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	277 years						
Mission time (Tm) <sup>3</sup>	20 years						
Diagnostic coverage (DC) <sup>3</sup>	0%						
Cable type	shielded - fixed installation conductors section 0,14 mm²/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 SPECIFICATI	ONS
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 <sup>-6</sup> kgm <sup>2</sup> (47 x 10 <sup>-6</sup> lbft <sup>2</sup> )
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	109 revolutions
Operating temperature <sup>4, 5</sup>	-20° +85 °C (-4° +185°F)
Storage temperature <sup>5</sup>	-25° +85°C (-13° +185°F)
Weight	150 g (5,29 oz)

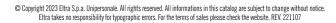
as measured at the transducer without cable influences <sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

<sup>&</sup>lt;sup>5</sup> 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









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 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>&</sup>lt;sup>4</sup> measured on the transducer flange

## **EH 50 FA / FP**

## THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

## 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
- Higly integrated optical ASIC
- Wide power supply up to +30 V DC
- Through hollow shaft up to 10 mm diameter
- Mounting by coupling flange or stator coupling (front or rear fixing)
- IP 65 as protection grade
- Wide temperature range -40 ... + 100°C

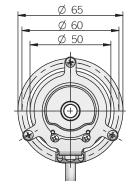




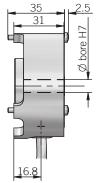
ORDERING CODE	EH	50FP	1024	S	5/30	Р	6	X	6	PR	. XXX
incremental enco through hollow sha through hollow sha	ft with front fi oft with rear fi	MODEL xing 50FA xing 50FP RES pr from 100 ne available	pulses list <b>ZEF</b> vithout zer	o pulse Z POWER	SUPPLY DC 5/30						
		pow	er supply 5		<b>TRICAL IN</b> pu lin	sh-pull P e driver L	<b>AMFTFR</b>				
						(3/8") m 10	mm 6 mm 8 nm 9,52 mm 10	RATING IP 65 X			
			preferred o	able length	s 1,5/2/3	/5/10 m, to	radial ca	ble (standa	0 rpm 6   OUTP ard length 0		

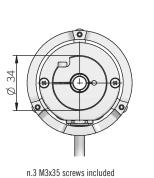
VARIANT custom version XXX

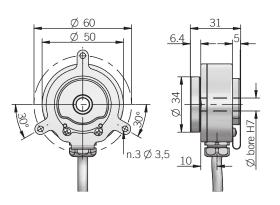
## 50FP



50FA







recommended mating shaft tolerance g6 dimensions in mm

ELECTRICAL SPECIFICATIONS									
Resolution	from 100 to 1024 ppr								
Power supply <sup>1</sup>	4,5 30 V DC (reverse polarity protection)								
Power draw without load	800 mW max								
Max load current	20 mA / channel								
Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	54 years								
Mission time (Tm) <sup>3</sup>	20 years								
Diagnostic coverage (DC) <sup>3</sup>	0%								
Cable type	shielded - fixed installation conductors section 0,22 mm²/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 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 SPECIFICATI	ONS
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 <sup>-6</sup> kgm <sup>2</sup> (12 x 10 <sup>-6</sup> lbft <sup>2</sup> )
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	109 revolutions
Operating temperature <sup>4, 5</sup>	-40° +100 °C (-40° +212°F)
Storage temperature <sup>5</sup>	-40° +100 °C (-40° +212°F)
Weight	150 g (5,29 oz) mod.FP 200 g (7.05 oz) mod.FA

<sup>&</sup>lt;sup>1</sup> as measured at the transducer without cable influences

## RESOLUTIONS

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





<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{3}</sup>$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>&</sup>lt;sup>4</sup> measured on the transducer flange <sup>5</sup> condensation not allowed

## **BLIND HOLLOW SHAFT INCREMENTAL ENCODER**

## MAIN FEATURES

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

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

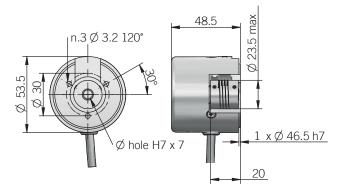




ORDERING CODE	EH 53A	500	S	8/24	P	8	X	6	PR.N	XXX
	SERIES al encoder series EH  MODEL adjustable flange model 53A adjustable flange model 53B RES ppr from 5 refer to the available	SOLUTION 0 to 1024 pulses list ZEF without zer with zer	RO PULSE so pulse So pulse Zo pulse Zo pulse Zo POWER al interface) 8 24 V ELEC	SUPPLY 5 V DC 5 DC 8/24 TRICAL IN	<b>TERFACE</b> Ollector C		*	•	rk.n	***
				pu lin	sh-pull P   e driver L   BORE DI	mm 6 mm 8 mm 10 NCLOSURE	RATING IP 54 X (ROTATION	SPFFN		
	ţ	oreferred cal	ble lengths 1	,5/2/3/		radial cab	6000 le (standard l ter OUTPUT TY	rpm 6 OUTP ength 0,5		

VARIANT custom version XXX

## 53A



recommended mating shaft tolerance g6 dimensions in mm

## **53B INTERFACE**



<b>ELECTRICAL SPECIFICATIO</b>	DNS
Resolution	from 100 to 1024 ppr
Power supply <sup>1</sup>	$5 = 4.5 \dots 5.5 \text{ V DC}$ 8/24 = 7,6 \dots 25,2 \text{ 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 interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	208 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

CONNECTIONS		1
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

**UL / CSA** file n. E212495

MECHANICAL SPECIFICATI	ONS
Bore diameter	ø6/8/10 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 <sup>-6</sup> kgm <sup>2</sup> (24 x 10 <sup>-6</sup> lbft <sup>2</sup> )
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	109 revolutions
Operating temperature <sup>4, 5</sup>	-10° +60°C (+14° +140°F)
Storage temperature <sup>5</sup>	-25° +70°C (-13° +158°F)
Weight	150 g (5,29 oz)

<sup>&</sup>lt;sup>1</sup> as measured at the transducer without cable influences

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









<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

<sup>&</sup>lt;sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> measured on the transducer flange

<sup>&</sup>lt;sup>5</sup> condensation not allowed

## 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

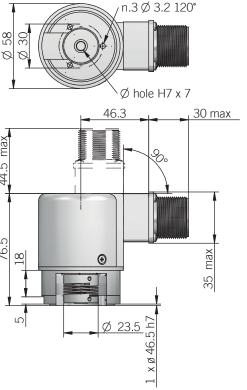
- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Integrated elastic couplig up to 10 mm bore diameter





ORDERING CODE	ER	53A	M*	500	S	5/28	P	8	X	6	M	R	.162	+XXX
incremental enco incremental enco	SERIES der series EL der series ER													
adjus adjus	table flange m table flange m	MODEL odel 53A odel 53B												
aujao			COVER											
	^ 6		RES	OLUTION										
		pp refer to the	or from 1											
		10101 10 1110		ZEF	RO PULSE									
			V	vithout zer with zer	o pulse Z									
			(witl	n L electrica	POWEI al interface)	5 V DC 5								
			(****	. 2 0.000.100	5 28 \	DC 5/28								
						<b>TRICAL IN</b> PN open c	ollector C							
						lin	sh-pull P e driver L							
			powe	er supply 5	5/28 V DC	output R		 Diameter						
							DONED	mm 6 mm 8						
								mm 10						
							E	ENCLOSUR	IP 54 X					
								M	IP 64 S AX ROTATION					
								IVI	(IP 64) 30	000 rpm 3				
									(IP 54) 60	000 rpm 6 <b>OUT</b>	I Put type			
				nreferi	red cable lei	ogths 2 / 3 /	'5/10 m to	o be added		andard lengt TION TYPE (	th 1,5 m) P			
				p.0.0	00 00010 101	.g = 7 0 7	o , 20 m, c	0 00 0000	V	IIL plug co 132 plug co	nnector M			
									M12	plug conn	ector M12			
									M	23 plug co 16 plug co	nnector H nnector C			
											DIRECT	ION TYPE axial A		
												radial R	00045-	
										/ MD 100		et not inclu	SOCKET ded .162	

53A



recommended mating shaft tolerance g6 dimensions in mm

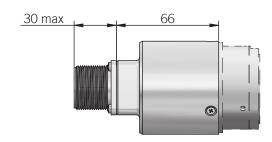
ONS
from 1 to 10000 ppr
$5 = 4.5 \dots 5.5 \text{ V DC}$ $5/28 = 4.5 \dots 30 \text{ V DC}$ (reverse polarity protection)
800 mW
C/P = 50 mA/channel L/RS = 20 mA/channel
NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
A leads B clockwise (shaft view)
180°e (gated A)
200 years EL series 263 years ER series
20 years
0%
shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
according to 2014/30/EU directive
according to 2011/65/EU directive
file n. E212495

## **ER SERIES RESOLUTIONS**

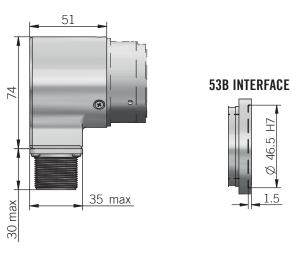
**100** - 120 - 128 - 150 - 200 - 240 - 250 - 256 - 300 - **360** - 400 - 480 - **500** - **512** - **600** -625 - **720** - 800 - 900 - **1000** - **1024** - 1200 - 1250 - 1440 - 1600 - 1800 - **2000** - **2048** - **2500** - 3000 - **3600** - 4000 - 4096 - **5000** - 6000 - **7200** - 8000 - 8192 - 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 SPECIFICATI	ONS
Bore diameter	ø6/8/10 mm
Enclosure rating IEC 60529	
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 <sup>-6</sup> kgm <sup>2</sup> (24 x 10 <sup>-6</sup> lbft <sup>2</sup> )
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	109 revolutions
Operating temperature <sup>4, 5</sup>	-10° +60°C (+14° +140°F) EL series -25° +85°C (-13° +185°F) ER series
Storage temperature <sup>5</sup>	-25° +70°C (-13° +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

as measured at the transducer without cable influences

## **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







custom version XXX

VARIANT

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

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<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>&</sup>lt;sup>4</sup> measured on the transducer flange

<sup>&</sup>lt;sup>5</sup> condensation not allowed

## OPTICAL HOLLOW SHAFT INCREMENTAL ENCODERS | EL - ER 53 A / B

H connector (12 pin) - M23 CCW

Hummel 7.410.000000 - 7.002.912.603

front view

CONNECT	TIONS												
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	А	F	6	F	4	1	10	1	8
A+	green	green	3	1	С	А	1	А	3	6	5	2	1
A-	/	brown or grey	/	3	/	С	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	Е	В	2	В	1	4	8	4	3
B-	/	orange	/	5	/	E	8	Н	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	С	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
÷	shield	shield	7	7	G	G	10	J	housing <sup>1</sup>	housing <sup>1</sup>	9	housing <sup>1</sup>	housing <sup>1</sup>

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) C connector (8 pin) Amphenol C091 IEC 60130-9 M12 A coded front view

C connector (5 pin)

Amphenol C091 M16

front view

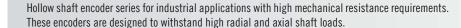


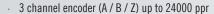


## EL - ER 58 F / G - 63 F / G

BLIND HOLLOW SHAFT INCREMENTAL ENCODER

## MAIN FEATURES





- 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





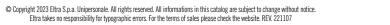




ORDERING CODE	ER 58F	M*	500	S	5/28	P	8	Х	3	M	R	. 162	+XXX
incremental en	SERIES coder series EL												
	coder series ER												
blind hollow shaft	MODEL with stator coupling 58F shaft with torque pin 58G												
blind hollow shaft	with torque stop slot 63F shaft with torque pin 63G												
billia liolion s	META	L COVER											
	* add for meta	RESO	LUTION										
		pr from 1 to e available p	ulses list										
		wi	thout zer	O PULSE o pulse S									
			with zer	o pulse Z <b>POWE</b> F	SUPPLY								
		(with	L electrica	l interface) 5 28 V	5 V DC 5 DC 5/28								
					<b>TRICAL IN</b> PN open c								
					pu lin	sh-pull P e driver L							
		power	supply 5	/28 V DC -	output R	S-422 RS   Bore D	IAMETER						
							mm 8 mm 10						
							mm 12 mm 14						
						E	mm 15 NCLOSUR	E RATING					
								IP 54 X IP 66 S					
							MA	AX ROTATION 30	ON SPEED 100 rpm 3				
										PUT TYPE			
			preferr	ed cable ler	igths 2 / 3 /	′ 5 / 10 m, to	be added	after DIREC	TION TYPE ( IL plug co	eg. PR5)			
								JIS-C-54	32 plug conne	nnector J			
								M2	23 plug co	nnector H nnector C			
									,		ION TYPE axial A		
											radial R	SOCKET	
					to be re	ported only	with coppo	otor output	log MD 169		et not inclu	ided .162	
					to be re	ported only	with come	cioi output	(cg. IWIK.10∠	,, iui sucket			VARIANT
											(	custom ve	rsion XXX

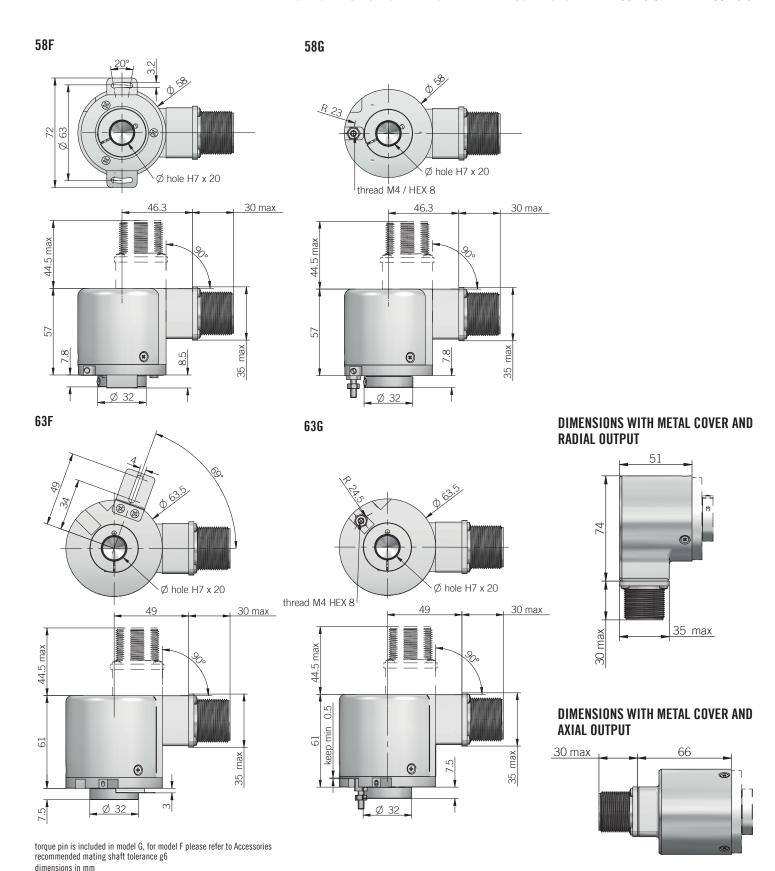








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LECTRICAL SPECIFICATION	DNS
Resolution	from 1 to 2500 ppr (58 G) from 1 to 24000 ppr (58 F - 63 F / G)
Power supply <sup>1</sup>	$5 = 4.5 \dots 5.5 \text{ V DC}$ $5/28 = 4.5 \dots 30 \text{ V DC}$ (reverse polarity protection)
Power draw without load	800 mW max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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** - 10240 - 12000 - **14400** - 16000 - 16384 - 18000 - **20000** -20480 - 24000

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

MECHANICAL SPECIFICATIONS									
MEGHANICAL SPECIFICATI	UNS								
Bore diameter	$\emptyset$ 8* / 10* / 12* / 14 / 15 mm * with supplied shaft adapter (valid for resolution $\geq$ 3000 ppr)								
Enclosure rating 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	4 x 10 <sup>-6</sup> kgm <sup>2</sup> (95 x 10 <sup>-6</sup> lbft <sup>2</sup> )								
Starting torque (at +20°C / +68°F)	, , , , , , , , , , , , , , , , , , , ,								
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	109 revolutions								
Operating temperature <sup>4, 5</sup>	-10° +60°C (+14° +140°F) EL series -20° +70°C (-4° +158°F) ER series								
Storage temperature <sup>5</sup>	-25° +70°C (-13° +158°F)								
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover								

as measured at the transducer without cable influences

<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $^{\rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> measured on the transducer flange

<sup>5</sup> condensation not allowed

## **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

CONNECT	TIONS												
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	Α	F	6	F	4	1	10	1	8
A+	green	green	3	1	С	А	1	А	3	6	5	2	1
A-	/	brown or grey	/	3	/	С	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	Е	В	2	В	1	4	8	4	3
B-	/	orange	/	5	/	Е	8	Н	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	С	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
<u></u>	shield	shield	7	7	G	G	10	J	housing <sup>1</sup>	housing <sup>1</sup>	9	housing <sup>1</sup>	housing <sup>1</sup>

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

www.eltra.it



M connector (7 pin)

Amphenol MS3102-E-16-S

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









## 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).

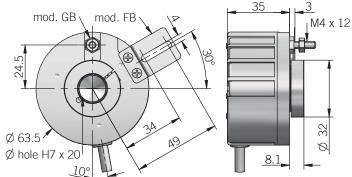
- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- · Up to 300 kHz output frequency
- Cable output, connectors available on cable end
- Through or blind hollow shaft diameter up to 15 mm
- · Shaft fixing by collar clamping



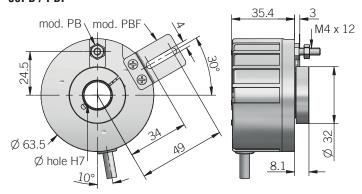


ORDERING CODE	EL	63GB	500	S	5/28	P	8	X	3	PR	. XXX
blind hollo blind through through hollow re:		pin 63GB pin 63PB ot 63PBF pin 63PC ot 63PCF RES ppr from a e available	SOLUTION 1 to 2500 pulses list ZEI without zer with zer	ro pulse S ro pulse S ro pulse Z POWEI al interface) 5 28 \ ELEC	DC 5/28 TRICAL IN PN open c pu	ollector C sh-pull P					
		pow	er supply (	5/28 V DC		e driver L S-422 RS					
					•	BORE D	mm 8 mm 10 mm 12 mm 14 mm 15	DATINO			
						ı	ENCLOSURE	IP 54 X			
							MAX	<b>ROTATION</b> 360	O rpm 3		
							radial ca	ıhle (standa	<b>OUTP</b> ard length 1	JT TYPE 5 m) PR	
			prefe	erred cable l	engths 2 / 3	/5/10 m,	to be added				

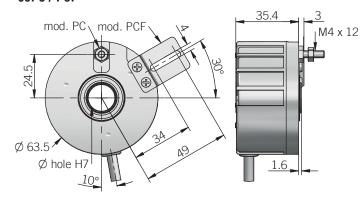
## 63FB / GB



## 63PB / PBF

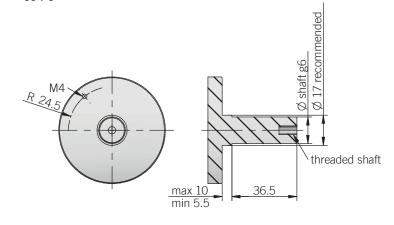


## 63PC / PCF



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

## RECOMMENDED INTERFACE FLANGE DESIGN 63 PC





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VARIANT custom version XXX

## OPTICAL HOLLOW SHAFT INCREMENTAL ENCODERS | EL 63 GB / FB / PB / PBF / PC / PCF

ELECTRICAL SPECIFICATIONS									
Resolution	from 1 to 2500 ppr								
Power supply <sup>1</sup>	$5 = 4.5 \dots 5.5 \text{ V DC}$ $5/28 = 4.5 \dots 30 \text{ V DC}$ (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 <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	200 years								
Mission time (Tm) <sup>3</sup>	20 years								
Diagnostic coverage (DC) <sup>3</sup>	0%								
Cable type	shielded - fixed installation conductors section 0,22 mm²/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									
MEGHANICAL SI EGH IGATI	UNS								
Bore diameter	ø8/10/12/14/15 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 <sup>-6</sup> kgm <sup>2</sup> (95 x 10 <sup>-6</sup> lbft <sup>2</sup> )								
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 <sup>9</sup> revolutions								
Operating temperature <sup>4, 5</sup>	-10° +60 °C (+14° +140°F)								
Storage temperature <sup>5</sup>	-25° +70 °C (-13° +158°F)								

as measured at the transducer without cable influences

Weight 350 g (12,35 oz)

<sup>&</sup>lt;sup>5</sup> 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



## **BLIND HOLLOW SHAFT INCREMENTAL ENCODER**

## 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.

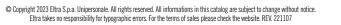
- · 3 channel encoder (A / B / Z) up to 24000 ppr
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 500 kHz output frequency
- Cable or connector output
- Available with metal cover for heavy duty applications
- Integrated elastic couplig up to 10 mm bore diameter





ORDERING CODE	ER	721	A	M*	500	S	5/28	P	8	Х	6	M	R	.162	+XXX
incremental encoder incremental encoder fixing h fixing fixing	SERIES series EL	MODEL omm 721 omm 722 omm 723 omm 724 FLAN flan	NGE TYPE ge type A ge type B MET/ add for met	AL COVER al cover M RES opr from 1 le available V (wit	SOLUTION to 24000 pulses list ZEF without zer with zer h L electrica	RO PULSE TO pulse S TO pulse Z POWEI al interface) 5 28 V ELEC N	R SUPPLY 5 V DC 5 2 DC 5/28 TRICAL IN PN open c pu lin - output R	ITERFACE Ollector C Ish-pull P e driver L S-422 RS BORE D	DIAMETER mm 6 mm 8 mm 10 ENCLOSUR L721 / EL72	IE RATING IP 54 X 2) IP 66 S AX ROTATIO (IP 56) 3C (IP 54) 6C cable (sta after DIREC M JIS-C-54 M12	DN SPEED 000 rpm 3 000 rpm 6	PUT TYPE h 1,5 m) P eg. PR5) nnector M poncector H pnector C			
							to be re	eported only	with conne	ctor output	(eg. MR.162		et not inclu t see Access		
								. ,			-				VADIANT











VARIANT custom version XXX

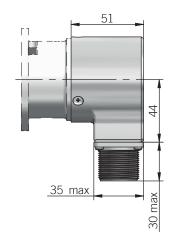
<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{3}</sup>$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>&</sup>lt;sup>4</sup> measured on the transducer flange

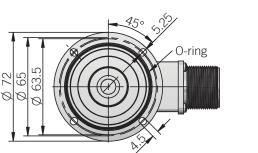
## 721A mod. 722 (Ø65) mod. 723 (Ø57) mod. 724 (Ø60) $/\emptyset$ hole H7 x 8 n.4 4.5 90° mod. 721 (Ø 63.5) 30 max **①**

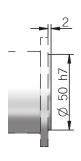
## DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT

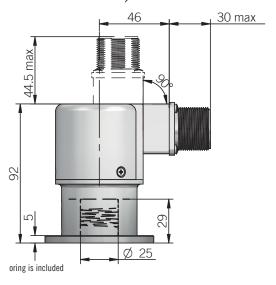


recommended mating shaft tolerance g6 dimensions in mm

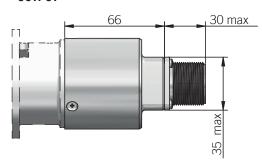
## 721A (S ENCLOSURE RATING)







## DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



## **72B FLANGE**

ELECTRICAL SPECIFICATIONS									
Resolution	from 1 to 10000 ppr								
Power supply <sup>1</sup>	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 <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	200 years EL series 263 years ER series								
Mission time (Tm) <sup>3</sup>	20 years								
Diagnostic coverage (DC) <sup>3</sup>	0%								
Cable type	shielded - fixed installation conductors section 0,22 mm²/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								

as measured at the transducer without cable influences

## **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 SPECIFICATI	ONS
Bore diameter	ø6/8/10 mm
Enclosure rating IEC 60529	
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 <sup>-6</sup> kgm <sup>2</sup> (83 x 10 <sup>-6</sup> lbft <sup>2</sup> )
Starting torque (at +20°C / +68°F)	, , , , , , , , , , , , , , , , , , , ,
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	109 revolutions
Operating temperature <sup>4, 5</sup>	-10° +60°C (+14° +140°F) EL series -25° +85°C (-13° +185°F) ER series
Storage temperature <sup>5</sup>	-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

COMMED	HUNS												
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	Α	F	6	F	4	1	10	1	8
A+	green	green	3	1	С	Α	1	A	3	6	5	2	1
A-	/	brown or grey	/	3	/	С	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	В	2	В	1	4	8	4	3
B-	/	orange	/	5	/	Е	8	Н	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	С	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
<u></u>	shield	shield	7	7	G	G	10	J	housing1	housing1	9	housing1	housing1

only with metal cover J connector (7 pin) JIS-C-5432 Size 16 front view

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



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



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



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















<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>&</sup>lt;sup>4</sup> measured on the transducer flange

<sup>&</sup>lt;sup>5</sup> condensation not allowed



## EH 80 C / K / P / PG BLIND / THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

## MAIN FEATURES

Encoder series Ø 80 mm with very high resistance to shock and vibrations recommended in feedback control systems on AC servomotors.

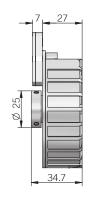
- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +30 V DC with several electric interfaces available
- Up to 105 kHz output frequency
- Cable output, connectors available on cable end
- Through or blind hollow shaft diameter up to 15 mm
- Shaft fixing by grain or collar clamping

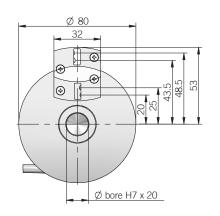




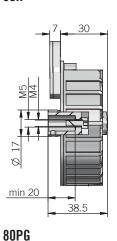
ORDERING CODE	EH	80C	500	S	5	L	8	X	6	PR	. XXX
blind	SERIES cremental encoder EH  blind hollow sh nollow shaft with rear fix through hollow sh shaft with collar clampir  ppr refer to the	king 80K haft 80P ng 80PG RES from 100 available v	pulses list ZER vithout zer with zer	POWER POWER I interface) 5 28 V	DC 5/28 TRICAL IN PN open co pu lin	TERFACE ollector C sh-pull P e driver L S-422 RS BORE D (mod. C -	IAMETER P) mm 8 mm 10				
						(mod. C - I d. C - P - P( d. C - P - P(	P) mm 12				
						E	NCLOSURE	RATING IP 64 X			
							(mod.	<b>ROTATIO</b> P - PG) 30	00 rpm 3 00 rpm 6		
			preferred c	able lengths	s 1,5/2/3	/5/10 m,	rao to be added		lard length		

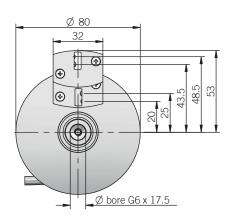




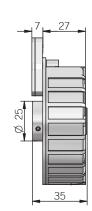


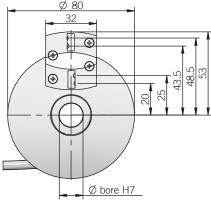
## 80K





80P





**(** Ø hole H7

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

ELECTRICAL SPECIFICATION	)NS						
Resolution	from 100 to 2048 ppr						
Power supply <sup>1</sup>	$5 = 4,5 \dots 5,5 \text{ V DC}$ $5/28 = 4,5 \dots 30 \text{ V DC}$ (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 <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	207 years						
Mission time (Tm) <sup>3</sup>	20 years						
Diagnostic coverage (DC) <sup>3</sup>	0%						
Cable type	shielded - fixed installation conductors section 0,22 mm²/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	ø8/10/12/14/15 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 <sup>-6</sup> kgm <sup>2</sup> (95 x 10 <sup>-6</sup> lbft <sup>2</sup> )						
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	109 revolutions						
Operating temperature <sup>4, 5</sup>	-20° +85 °C (-4° +185°F) -20° +100°C (-4° +212°F) on demand						
Storage temperature <sup>5</sup>	-25° +85 °C (-13° +185°F)						
Weight	250 g (8,82 oz)						

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









VARIANT custom version XXX

<sup>5</sup> condensation not allowed

Cable L / RS

red

black

green

brown or grey

yellow

orange blue

white

shield

Cable

C / P

red

black

green

yellow

blue

shield

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



## EH - EL 88 P THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

## MAIN FEATURES

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

3 channel encoder (A / B / Z) up to 2500 ppr

Power supply up to +28 V DC with several electrical interfaces available





ORDERING CODE	EH	88P	1024	S	5/28	Р	30	S	3	PR	. XXX
increm	SERIES ental encoder series EH										
	nental encoder series EL										
through holl	ow shaft with torque stop s	MODEL									
tillough hom	ow shart with torque stop s		OLUTION								
		EH) max p	pr 2500								
	(mod. refer to the	EL) max   available									
			ZER	O PULSE							
		W	ithout zer/ with zer	o pulse S o pulse Z							
				POWER	SUPPLY						
		(with	ı L electrica	I interface) 5 28 V	5 V DC 5 DC 5/28						
				ELEC	TRICAL IN						
				N	PN open c	ollector C sh-pull P					
					İin	e driver L					
		powe	er supply 5	5/28 V DC -	output R	S-422 RS   Shaft D	IAMETED				
						SHAFT D	mm 25				
			h azcaln	lirectly cont	act our offic	es for other	mm 30				
			рісазе ц	incotty conte	act our onic		NCLOSUR	E RATING			
								IP 65 S			
							MA	X ROTATIO 300	N SPEED 00 rpm 3		
									OUT	PUT TYPE	
			nreferred o	ahle length	s15/2/3	/5/10 m ±		able (stand I after OUTPI			
			p. 0101100 0	asio longtili	2,01210	, 5 , 10 111,			(08		VARIANT



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



CONNECTIONS

**Function** 

+V DC

0 V

A+

B+

B-

Z+

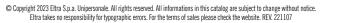
Z-

÷

RESOLUTIONS



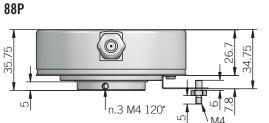


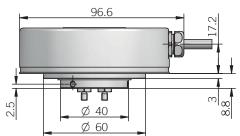


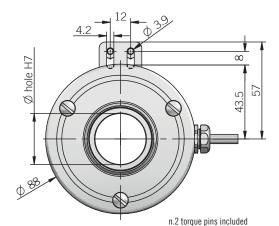


custom version XXX

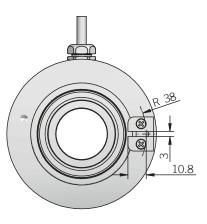
## OPTICAL HOLLOW SHAFT INCREMENTAL ENCODERS | EH - EL 88 P







OPTIONAL TORQUE STOP SLOT





for torque stop slot and torque pin please refer to

recommended mating shaft tolerance g6 dimensions in mm

ELECTRICAL SPECIFICATION	DNS
Resolution	from 250 to 2500 ppr EH series from 2 to 2048 ppr EL series
Power supply <sup>1</sup>	$5 = 4.5 \dots 5.5$ V DC $5/28 = 4.5 \dots 30$ 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 interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	220 years EH series 331 years EL series
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

## **EH SERIES RESOLUTIONS**

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

**UL / CSA** file n. E212495

## **EL SERIES RESOLUTIONS**

**2** - 5 - 100 - 200 - **360** - 400 - **2000** - 2048

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

MECHANICAL SPECIFICATI	ONS
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 <sup>-6</sup> kgm² (10,68 x 10 <sup>-4</sup> lbft²)
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 <sup>9</sup> revolutions
Operating temperature <sup>4, 5</sup>	-10° +70°C (+14° +158°F)
Storage temperature <sup>5</sup>	-25° +85°C (-13° +185°F)
Weight	0.7, .

as measured at the transducer without cable influences

<sup>&</sup>lt;sup>5</sup> 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
<u></u>	shield	shield







## THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

## 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	FH	88PF	1024	S	5/28	Р	30	Х	3	PR	. XXX
		00	.02.	<u> </u>	0, 20	-					
inoromon	SERIES tal encoder series EH										
incremen		MODEL									
through hollows	haft with torque stop sl										
	aft for torque arm fixing										
please	e refer to Accessories for tor										
			OLUTION								
	ppr refer to the		) to 2500								
	Total to the	available		O PULSE							
		V	vithout zer	o pulse S							
			with zer	o pulse Z							
		(i+l	h I alaatriaa	<b>POWER</b> (interface	SUPPLY						
		(WILL	II L electrica		DC 5/28						
				ELEC	TRICAL IN	ITERFACE					
						sh-pull P					
		nowe	er sunnly 5	3/28 V DC .	lin R hutnut R	e driver L S-422 RS					
		powe	or supply s	720 V DO	output it		IAMETER				
						DONED	mm 25				
							mm 30				
							E) mm 35 E) mm 38				
							E) mm 40				
						E	NCLOSUR				
								IP 54 X			
							MA	X ROTATIO			
								300	00 rpm 3	UT TYPE	
							radial o	able (stand			
			preferred c	able length	s 1,5 / 2 / 3	/5/10 m,		l after OUTPI			





VARIANT

custom version XXX

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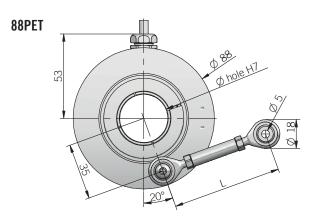
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<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>&</sup>lt;sup>4</sup> measured on the transducer flange

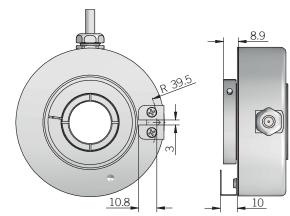
for torque pin please refer to Accessories





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 SPECIFICATION	ONS
Resolution	from 500 to 2500 ppr
Power supply <sup>1</sup>	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 <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	220 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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 <sup>-6</sup> kgm <sup>2</sup> (10,68 x 10 <sup>-4</sup> lbft <sup>2</sup> )				
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	109 revolutions				
Operating temperature <sup>4, 5</sup>	-30° +85°C (-22° +185°F)				
Storage temperature <sup>5</sup>	-30° +85°C (-22° +185°F)				
Weight	350 g (12,35 oz)				

as measured at the transducer without cable influences

<sup>&</sup>lt;sup>5</sup> 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							
<u></u>	shield	shield							

## RESOLUTIONS

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

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





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EL 120 P
THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

## 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 EI	. 120P	1024	S	5/28	P	50	X	3	PR	. XXX
SERIE										
incremental encoder series E										
	MODEL									
through hollow shaft with s										
	<b>RES</b> opr from 40	O to 2049								
	the available									
			RO PULSE							
	١	without zer	o pulse S							
		WILII ZEI		R SUPPLY						
	(wit	h L electrica								
(	with L electri	cal interface	e) 8 24 \	/ DC 8/24						
				/ DC 5/28 Ctrical in						
			LLLC		ish-pull P					
					e driver L					
					BORE D	DIAMETER				
						mm 40 mm 50				
						mm 60				
					- 1	ENCLOSUR				
							IP 54 X			
						IVIA	<b>X ROTATIO</b> 30	00 rpm 3		
							00		PUT TYPE	
		, .		15/0/0				dard length		
		preterred o	able length	s 1,5 / 2 / 3	/ 5 / 10 m,	to be added	atter OUTP	UI IYPŁ (eg		VARIANT
								(	custom vei	



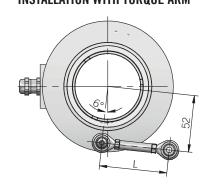


<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

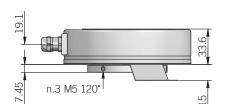
<sup>&</sup>lt;sup>4</sup> measured on the transducer flange

## INSTALLATION WITH TORQUE ARM





for torque arm please refer to Accessories



recommended mating shaft tolerance g6

120P

dimensions in mm	
ELECTRICAL SPECIFICATION	DNS
Resolution	from 400 to 2048 ppr
Power supply <sup>1</sup>	$5 = 4,5 \dots 5,5 \text{ V DC}$ $5/28 = 4,75 \dots 29,4 \text{ V DC}$ $8/24 = 7,6 \dots 25,2 \text{ V DC}$ (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	C/P = 50  mA/channel L = 20 mA/channel
Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	429 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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

D	ESO	Ш	ITI	UV	C
ш	LJU	Lu	ш	UΙ	J.

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

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

G
ø 65
ø 65
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 <sup>-6</sup> kgm <sup>2</sup> (51 x 10 <sup>-4</sup> lbft <sup>2</sup> )						
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	109 revolutions						
Operating temperature <sup>4, 5</sup>	0° +60 °C (+32° +140°F)						
Storage temperature <sup>5</sup>	-25° +70 °C (-13° +158°F)						
Weight	750 g (26,46 oz)						

<sup>&</sup>lt;sup>1</sup> as measured at the transducer without cable influences

5 condensation not allowed

CONNECTIONS

Function	Cable C / P	Cable L		
+V DC	red	red		
0 V	black	black		
A+	green	green		
A-	1	brown or grey		
B+	yellow	yellow		
B-	/	orange		
Z+	blue	blue		
Z-	/	white		
<u></u>	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	*\$	50	Z	5/30	P	6	X	Х	PR	. XXX
m	SERIES nagnetic incremental encoder series EMI kit enc	<b>MODEL</b> oder 30M										
	* ad	d if withou	COVER ut cover S									
	au		RES	OLUTION								
	please ref		opr from 1 eferred resol									
			V	rithout zer	ro pulse S ro pulse Z							
				WIEH 201	POWER	SUPPLY 5 V DC 5						
					5 30 V	DC 5/30						
						TRICAL IN PN open co pu						
			powe	er supply 5	5/30 V DC -	output R	S-422 RS					
								mm 6 mm 6,35 mm 8				
								mm 10				
							I	ENCLOSUR	E RATING IP 54 X			
										OPTION eported X		
								radial c	able (stand	<b>OUTF</b> dard length	O 5 m) PR	
				preferred o	able length	s 1,5 / 2 / 3	/5/10 m,			UT TYPE (eg		

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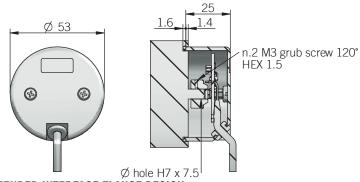




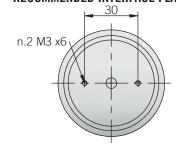
 $<sup>^{\</sup>rm 2}$  for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

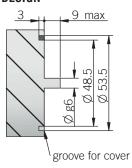
 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> measured on the transducer flange

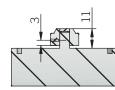


## RECOMMENDED INTERFACE FLANGE DESIGN





## **MAGNET-ACTUATOR INSTALLATION**



dimensions in mm	
ELECTRICAL SPECIFICATION	ONS
Resolution	from 1 to 10000 ppr
Power supply <sup>1</sup>	$5 = 4.5 \dots 5.5 \text{ V DC}$ $5/30 = 4.5 \dots 30 \text{ V DC}$ (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 <sup>2</sup>	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	$<0.3^{\circ}$ at +20°C (+68°F) $\pm~0.5^{\circ}$ 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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	253 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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

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 <sup>-6</sup> kgm² (2,4 x 10 <sup>-6</sup> lbft²)					
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 <sup>4, 5</sup>	-20° +100°C (-4° +212°F)					
Storage temperature <sup>5</sup>	-20° +100°C (-4° +212°F)					
Weight	100 g approx (3,5 oz)					

<sup>&</sup>lt;sup>1</sup> as measured at the transducer without cable influences

<sup>5</sup> 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
<u>÷</u>	shield	shield











## MAGNETIC INCREMENTAL BLIND HOLLOW SHAFT ENCODER

## 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)





MODEL blind hollow shaft with stator coupling 38F blind hollow shaft with torque pin 386  RESOLUTION ppr from 1 to 10000 please refer to the preferred resolutions list  ZERO PULSE without zero pulse S with zero pulse S with zero pulse S with zero pulse S SHOPPLY (with L electrical interface) 5 V DC 5 5 30 V DC 5/30  ELECTRICAL INTERFACE NPN open-collector C pulsh-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 (e.g. PRS)	ORDERING CODE	EMI	38F	500	S	5/30	P	10	X	X	PR	. XXX
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)	magnetic	SERIES incremental encoder series EMI lind hollow shaft with stator cou blind hollow shaft with torqu	MODEL upling 38F ee pin 38G RES ppr from 1 referred reso	SOLUTION to 10000 lutions list ZEF vithout zer with zer	RO PULSE o pulse S o pulse Z POWEF al interface) 5 30 V ELEC	R SUPPLY 5 V DC 5 7 DC 5/30 TRICAL IN PN open-cc pu lin: - output R:	TERFACE Ollector C Se druver L S-422 RS SHAFT C (1/4")	DIAMETER mm 4 mm 5 mm 6,35 mm 8 mm 10	E <b>RATING</b> per side X	OPTION	PR	. XXX
				preferred o	cable length	s 1,5 / 2 / 3	/5/10 m,		able (stand	<b>OUTF</b> dard length	0,5 m) PR . PR5)	VARIANT



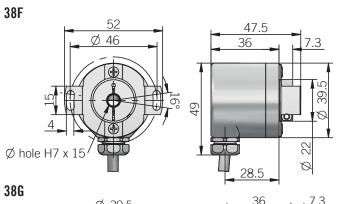


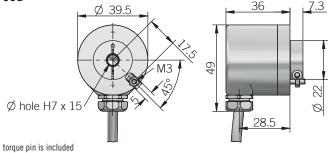
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<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

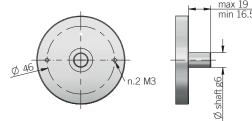
<sup>&</sup>lt;sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section

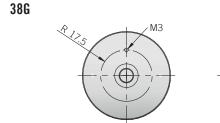
<sup>&</sup>lt;sup>4</sup> measured on the transducer flange





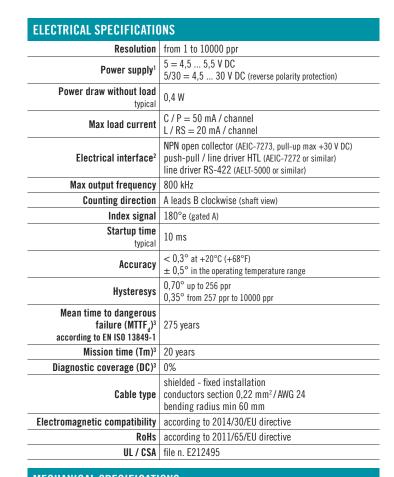
## RECOMMENDED INTERFACE FLANGE DESIGN







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 SPECIFICATI	ONS					
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 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 <sup>-6</sup> kgm <sup>2</sup> (19 x 10 <sup>-6</sup> lbft <sup>2</sup> )					
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 <sup>9</sup> revolutions					
Operating temperature <sup>5, 6</sup>	-25° +100°C (-13° +212°F)					
Storage temperature	-25° +85°C (-13° +185°F)					
Weight	150 g (5,29 oz)					

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



## EMI 40 A / B / C / H / I / N

## 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





			100		- 10.0							
ORDERING CODE	EMI	40A	100	S	5/30	P	6	X	Х	Р	R	. XXX
	SERIES magnetic incremental encoder series EMI  clamping flange ø 20 square flange in 17,46 M18 threaded fla M20 threaded fla synchronous flange ø 21  p	mm 40B mm 40C inge 40H ange 40I mm 40N RES pr from 1 ferred resol	to 10000 lutions list ZEI vithout zer with zer	RO PULSE TO pulse S TO pulse Z POWEF al interface) 5 30 V	<b>R SUPPLY</b> 5 V DC 5 OC 5/30 TRICAL IN PN open c	ITERFACE						
					pu	sh-pull P e driver L						
		powe	er supply 5	5/30 V DC -		S-422 RS	IAMETER					
							mm 6 ENCLOSURE	IP 54 X				
								to be re	OPTION eported X			
		p	oreferred ca	ble lengths	1,5/2/3/	5 / 10 m, to		cable (sta	<b>OUTPU</b> ndard length ( ION TYPE (eg.	PR5)		
									(mod. A / B / 0	C/H/I/N	ON TYPE I) axial A radial R	







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MECHANICAL SPECIFICATIONS

## Shaft diameter ø 6 mm **Enclosure rating** X = IP 54**IEC 60529** S = IP 66 6000 rpm with X enclosure rating Max rotation speed 4000 rpm with S enclosure rating Max shaft load<sup>4</sup> 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** $0.1 \times 10^{-6} \text{ kgm}^2 (2.4 \times 10^{-6} \text{ lbft}^2)$ **Starting torque** < 0.01 Nm (1,42 Ozin) with X enclosure rating $(at +20^{\circ}C /+68^{\circ}F)$ < 0,05 Nm (7,10 Ozin) with S enclosure rating

Weight 100 g (3,52 oz) 1 as measured at the transducer without cable influences

Bearing stage material aluminum

Shaft material stainless steel

**Housing material** PA66 glass fiber reinforced

**Bearings** n.2 ball bearings

Operating temperature<sup>5, 6</sup> | -25° ... +100°C (-13° ... +212°F)

**Storage temperature**<sup>6</sup> | -25° ... +70°C (-13° ... +158°F)

**Bearings life** 10<sup>9</sup> revolutions

- <sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
- <sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section
- 4 maximum load for static usage
- <sup>5</sup> measured on the transducer flange
- <sup>6</sup> 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

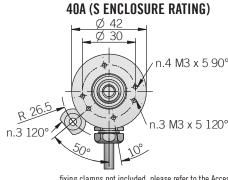
please directly contact our offices for other pulses

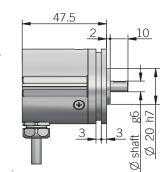
## MAGNETIC INCREMENTAL ENCODERS | EMI 40 A / B / C / H / I / N

## **40A (X ENCLOSURE RATING)** n.4 M3 x 5 90°

3 M3 x 5 120°







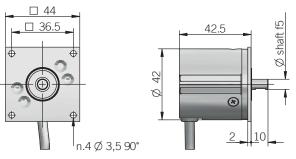
fixing clamps not included, please refer to the Accessories

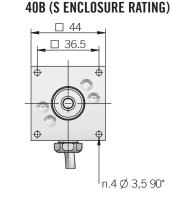
## **40B (X ENCLOSURE RATING)**

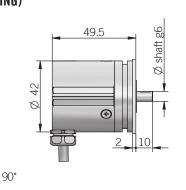
**40C** 

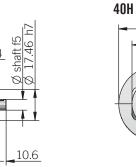
401

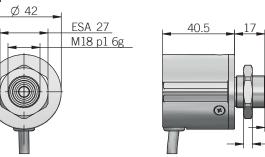
Ø 42



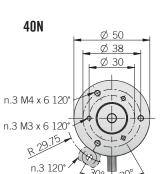


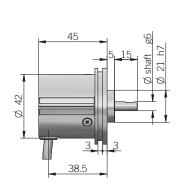






DIMENSIONS WITH AXIAL OUTPUT WITH S ENCLOSURE RATING

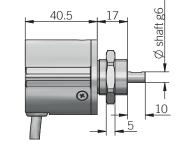




fixing clamps not included, please refer to the Accessories

ESA 27

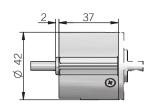
M20 p1,5 6g

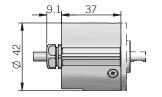




recommended mating shaft tolerance H7

## DIMENSIONS WITH AXIAL OUTPUT WITH X ENCLOSURE RATING





dimensions in mm

**ELECTRICAL SPECIFICATIONS** 

Power draw without load

Power supply<sup>1</sup>

Max load current

Max output frequency | 800 kHz

Startup time

typical

Accuracy

Hysteresys

Mission time (Tm)<sup>3</sup> 20 years

failure (MTTF<sub>d</sub>)<sup>3</sup> 275 years

**Electromagnetic compatibility** according to 2014/30/EU directive

**UL / CSA** file n. E212495

Mean time to dangerous

according to EN ISO 13849-1

CONNECTIONS

Function

+V DC

0 V

A+

Α-

B+

B-

7+

7-

÷

Diagnostic coverage (DC)<sup>3</sup> 0%

typical

Resolution from 1 to 10000 ppr

Counting direction | A leads B clockwise (shaft view)

10 ms

Index signal 180°e (gated A)

5 = 4,5 ... 5,5 V DC

C/P = 50 mA/channel

L/RS = 20 mA/channel

Electrical interface<sup>2</sup> push-pull / line driver HTL (AEIC-7272 or similar)

 $< 0.3^{\circ}$  at  $+20^{\circ}$ C ( $+68^{\circ}$ F)

0,35° from 257 ppr to 10000 ppr

shielded - fixed installation

bending radius min 60 mm

**RoHs** according to 2011/65/EU directive

Cable

C: / P

red

black

green

vellow

blue

shield

Cable

L/RS

red

black

green

brown or grey

vellow

orange blue

white

shield

Cable type | conductors section 0,22 mm<sup>2</sup>/AWG 24

0,70° up to 256 ppr

 $5/30 = 4.5 \dots 30 \text{ V DC}$  (reverse polarity protection)

NPN open collector (AEIC-7273, pull-up max +30 V DC)

line driver RS-422 (AELT-5000 or similar)

 $\pm~0.5^{\circ}$  in the operating temperature range







## MAGNETIC INCREMENTAL KIT ENCODER

## 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.

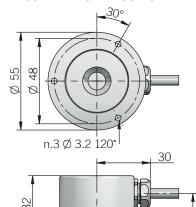
- 3 channel encoder (A / B / Z) with resolution up to 10000 ppr
- Power supply up to +30 V DC with several electrical interfaces available
- Cable or M12 connector output, other connectors available on cable end
- Compact dimensions
- No wear due to no contact magnetic technology
- Bore shaft diameter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

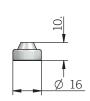




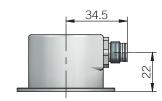
ORDERING CODE	EMI	55M	512	Z	5/30	P	10	X	X	M12	R	.162	+XXX
manakta kecamatak	SERIES												
magnetic incremental e	ncoder series EIVII	MODEL											
	kit encoder ø 55	MODEL mm 55M											
	init officeast p co		OLUTION										
	р	pr from 1	to 10000										
	please refer to the pre	ferred resol											
		v	<b>ZEF</b> vithout zer	RO PULSE									
		v		o pulse Z									
					R SUPPLY								
		(wit	h L electrica	al interface)	5 V DC 5 / DC 5/30								
					TRICAL IN								
					PN open-co	ollector C							
					pu	ish-pull P							
		nowe	er supply 5	5/30 V DC		e driver L S-422 RS							
		powe	o. Juppiy c			OR BORE D	IAMETER						
							mm 6						
						(2/9"\	mm 8 mm 9,52						
						(3/6 )	mm 10						
						E	NCLOSUR						
								IP 67 X					
								to bo =	OPTION				
								to be r	eported X	PUT TYPE			
								cable (sta					
		I	preferred ca	ble lengths	1,5/2/3/	/ 5 / 10 m, to		after DIREC	TION TYPE (	eg. PR5)			
								M12	plug conne	ector M12	ION TVDE		
										DIKEGI	radial R		
											.auiui It i	SOCKET	
											t not inclu	ded .162	
					to be rep	orted only w	vith connect	or output (e	g. M12.162	), for socket	see Accesso		VADIANT
													VARIANT

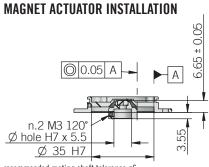
## **EMI55 M WITH CABLE OUTPUT**





## **DIMENSIONS WITH M12 CONNECTOR**







recommended mating shaft tolerance g6  $\ dimensions\ in\ mm$ 

CONNE	CTION	S			
Func	tion	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-	ŀ	green	green	3	6
A	-	/	brown or grey	/	5
B-	+	yellow	yellow	1	4
В	-	/	orange	/	3
Z-	+	blue	blue	5	2
Z	-	/	white	/	8
	=	shield	shield	housing	housing

M12 connector (5 pin) M12 A coded front view



M12 connector (8 pin) M12 A coded front view

ELECTRICAL SPECIFICATION	ONS
Resolution	from 1 to 10000 ppr
Power supply <sup>1</sup>	$5 = 4,5 \dots 5,5 \text{ V DC}$ $5/30 = 4,5 \dots 30 \text{ V DC}$ (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 <sup>2</sup>	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	$<0.3^{\circ}$ at +20°C (+68°F) $\pm~0.5^{\circ}$ 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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	275 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive

MECHANICAL SPECIFICATI	ONS
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 <sup>-6</sup> kgm <sup>2</sup> (2,4 x 10 <sup>-6</sup> lbft <sup>2</sup> )
Flange material	aluminum
Housing material	painted aluminum
Magnet-actuator material	aluminum
Magnet actuator	± 0,2 mm (axial)
allowable play	$\pm$ 0,1 mm (radial)
Operating temperature <sup>4, 5</sup>	-40° +100°C (-40° +212°F) -25° +85°C (-13° +185°F) with M12 connector
Storage temperature <sup>5</sup>	-25° +85°C (-13° +185°F)
Weight	150 g (5,29 oz)
1 1 1 1 1 1 1 1 1	

**UL / CSA** file n. E212495

<sup>1</sup> as measured at the transducer without cable influences

<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

4 measured on the transducer flange

<sup>5</sup> 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









custom version XXX

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## EMI 58 B / C / H / T

## SOLID SHAFT MAGNETIC INCREMENTAL ENCODER

## 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 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

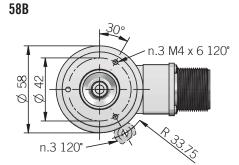


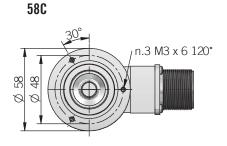


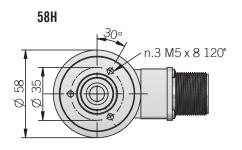


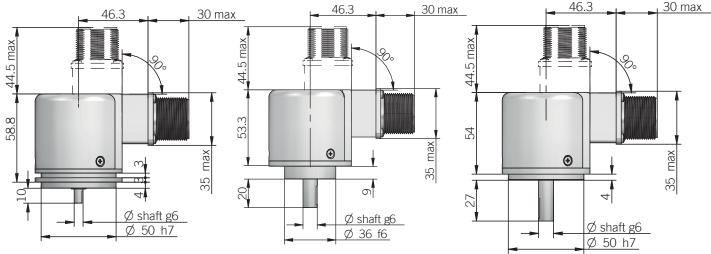
ORDERING CODE	EMI	58C	M*	500	S	5/30	P	8	X	X	M	R	. 162	+XXX
magnetic incremental enc		MODEL												
clam clam	nous flange ø 50 r ping flange ø 36 r ping flange ø 50 r pling flange ø 40 i	nm 58B nm 58C nm 58H												
		METAL	COVER											
	^ a(	dd for metal		OLUTION										
	please refe		or from 1 erred resol											
	F			ZEI	RO PULSE									
			W	ithout zei with zei	ro pulse S ro pulse Z									
			(with	a Lalactric	POWEI al interface)	S V DC 5								
			(WILI	I L GIGGLIIG	5 30 \	DC 5/30								
						TRICAL IN PN open c								
						pu	sh-pull P e driver L							
			powe	er supply 5	5/30 V DC	- output R	S-422 RS							
							(mod	IAMETER B) mm 6						
						mod. B / C	(mod. (3/8") (H)	. C) mm 8 mm 9.52						
								mm 10 T) mm 12						
								NCLOSUR	E RATING					
							(n	nod. B / C /	IP 54 X T) IP 66 S					
										OPTION				
									to be n	eported X <b>OUT</b>	PUT TYPE			
				nreferi	red cable lei	ngths 2 / 3 /	/5/10 m to	n he added	cable (sta after DIREC					
				protott	00 00010 101	.8 2 , 0 ,	0 / 20 m, c	0 00 0000	MI JIS-C-54	L plug coi	nnector M			
									M12 I	olug conne	ector M12			
									M2 M1	23 plug co .6 plug co	nnector H nnector C			
											DIRECT	ION TYPE axial A		
												radial R		
											socke	t not inclu	SOCKET ided .162	
						to be re	ported only	with conne	ctor output (	eg. MR.162			ories	VADIANT

VARIANT custom version +XXX









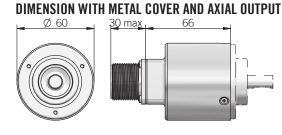
fixing clamps not included, please refer to Accessories

## **58T**

**(4)** 

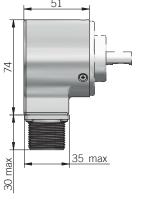


30 max



## DIMENSION WITH METAL COVER AND RADIAL OUTPUT







recommended mating shaft tolerance H7 dimensions in mm







## SOLID SHAFT PROGRAMMABLE MAGNETIC INCREMENTAL ENCODER

Rohs ( E c Susus

## 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.

- Solid shaft diameter up to 10 mm
- Mounting by synchronous or clamping flange



1	
	The same
9	9

ORDERING CODE	EMI	P	58C	M*	20000	Z	5/30	L	8	Х	Х	M	R	. 162	+XXX
magnetic incremental	SERIES encoder EMI	FEATURE nmable P lange ø 50 lange ø 36	MODEL mm 58B mm 58C MET/ add for met	AL COVER al cover M RE:	SOLUTION Opr 20000 20000 ppr ZEF with zer	RO PULSE TO pulse Z POWE 5 30 V	R SUPPLY V DC 5/30 CTRICAL IN	ITERFACE e driver L grammable SHAFT I (mod (mod (3/8")		E RATING IP 54 X IP 66 S			R	. 162	+XX)
					preferi	red cable le	ngths 2 / 3 /	/5/10 m,t	o be added	cable (sta after DIREC M M12	OUT indard lengt TION TYPE ( IL plug co plug conn	PUT TYPE th 1,5 m) P (eg. PR5) nnector M ector M12 nnector H DIRECT	axial A radial R	SOCKET	
							to be re	eported only	with conne	ctor output	(eg. MR.162		et not inclu t see Access		

- 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



## **ELECTRICAL SPECIFICATIONS** Resolution from 1 to 10000 ppr 5 = 4,5 ... 5,5 V DC Power supply<sup>1</sup> $5/30 = 4.5 \dots 30 \text{ V DC}$ (reverse polarity protection) Power draw without load 0 4 W typical C/P = 50 mA/channelMax load current | C/T = 30 mA / channelNPN open collector (AEIC-7273, pull-up max +30 V DC) **Electrical interface** 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 10 ms typical $< 0.3^{\circ}$ at $+20^{\circ}$ C ( $+68^{\circ}$ F) 0,70° up to 256 ppr Hysteresys 0,70 up to 230 pp. 0,35° from 257 ppr to 10000 ppr Mean time to dangerous failure (MTTF<sub>d</sub>)<sup>3</sup> 275 years according to EN ISO 13849-1 Mission time (Tm)<sup>3</sup> 20 years Diagnostic coverage (DC)<sup>3</sup> 0% shielded - fixed installation Cable type | conductors section 0,22 mm<sup>2</sup>/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

- **Shaft diameter** | Ø 6 / 8 / 9,52 (3/8") / 10 / 12 mm **Enclosure rating** | X = IP 54 |**IEC 60529** S = IP 66 Max rotation speed | 6000 rpm 10 N (2,25 lbs) axial with ø 6 mm shaft Max shaft load<sup>4</sup> 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<sup>-6</sup> kgm<sup>2</sup> (36 x 10<sup>-6</sup> lbft<sup>2</sup>) **Starting torque** < 0,02 Nm (2,83 Ozin) with X enclosure rating  $(at +20^{\circ}C / +68^{\circ}F)$  < 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 | 109 revolutions -25° ... +100°C (-13° ... +212°F) Operating temperature5,6 -25° ... +85°C (-13° ... +185°F) with M12 connector **Storage temperature**<sup>6</sup> -25° ... +70°C (-13° ... +158°F) 350 g (12,35 oz) Weight 450 g (15,87 oz) with metal cover
- <sup>1</sup> as measured at the transducer without cable influences

MECHANICAL SPECIFICATIONS

- <sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
- <sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section
- 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

housing1

please directly contact our offices for other pulses

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	Α	F	6	F	4	1	10	1	8
A+	green	green	3	1	С	Α	1	А	3	6	5	2	1
A-	/	brown or grey	/	3	/	С	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	В	2	В	1	4	8	4	3
B-	/	orange	/	5	/	Е	8	Н	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	С	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6

only with metal cover J connector (7 pin) JIS-C-5432 Size 16 front view

shield

CONNECTIONS



shield

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



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



M12 connector (8 pin) M connector (10 pin) Amphenol MS3102-E-18-1 M12 A coded front view



G

M12 A coded

front view

M12 connector (5 pin) 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

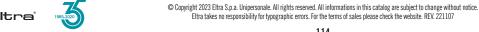
Hummel 7.410.000000 - 7.002.912.603

front view

9

housing1







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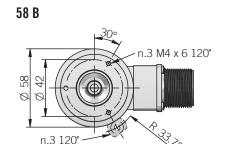
housing<sup>1</sup> housing<sup>1</sup>

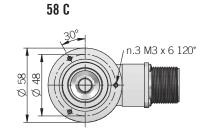
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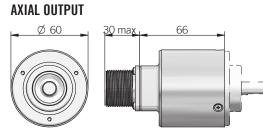




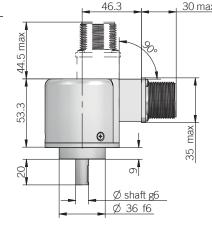
VARIANT custom version +XXX DIMENSION WITH METAL COVER AND

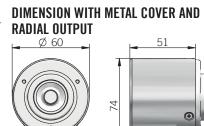


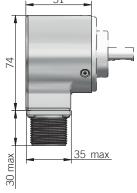




# 30 max







recommended mating shaft tolerance H7 dimensions in mm

ELECTRICAL SPECIFICATION	DNS
Resolution	user programmable from 1 to 20000 ppr default 1024 ppr
Power supply <sup>1</sup>	4,5 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	20 mA / channel
Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	173 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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	m	easui	red	at	the	trans	ducer	without	cable	inf	lue	enc	es
		-					_							

 $<sup>^{\</sup>rm 2}$  for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

MECHANICAL SPECIFICATI	ONS
Shaft diameter	ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	
Max rotation speed	6000 rpm
Max shaft load <sup>4</sup>	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 <sup>-6</sup> kgm <sup>2</sup> (36 x 10 <sup>-6</sup> lbft <sup>2</sup> )
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	109 revolutions
Operating temperature <sup>5, 6</sup>	-25° +100°C (-13° +212°F) -25° +85°C (-13° +185°F) with M12 connector
Storage temperature	-25° +70°C (-13° +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

CONNECTION	\$			
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	Α	6	5
A-	brown or grey	G	5	6
B+	yellow	В	4	8
B-	orange	Н	3	1
Z+	blue	С	2	3
Z-	white	l	8	4
÷	shield	J	housing <sup>1</sup>	9

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











<sup>&</sup>lt;sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> maximum load for static usage

<sup>&</sup>lt;sup>5</sup> measured on the transducer flange

<sup>&</sup>lt;sup>6</sup> condensation not allowed



## EMI 63 A / D / E SOLID SHAFT MAGNETIC INCREMENTAL ENCODER

## 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 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







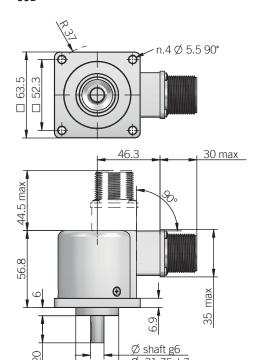
63A

n.3 120°

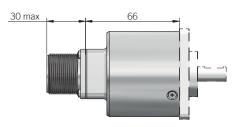
ORDERING CODE	EMI	63A	M*	500	S	5/30	P	8	X	Х	M	R	. 162	+XXX
magnetic incremental encoder		MODEL												
synchronous fla centering square fla centering square	nge ø 31,75	mm 63D mm 63E	IL COVER											
	*	add for met	al cover M											
	please ret	p fer to the pre	pr from 1	utions list										
			٧	ithout zer	o pulse Z									
			(with	ı L electrica	al interface)	R SUPPLY 5 V DC 5 / DC 5/30								
					ELEC	CTRICAL IN IPN open c	ITERFACE ollector C							
			powe	er supply 5	5/30 V DC		e driver L S-422 RS							
							SHAFT [	DIAMETER mm 8						
								mm 9,52 mm 10						
								ENCLOSUR	IP 54 X IP 66 S					
									to be r	OPTION reported X				
											PUT TYPE			
				preferr	ed cable lei	ngths 2 / 3 /	/ 5 / 10 m, t	o be added	after DIREC M	TION TYPE ( IL plug cor	eg. PR5) nnector M			
									M12	32 plug co plug conne	ector M12			
										23 plug co 16 plug co				
											DIRECT	ON TYPE axial A		
												radial R	SOCKET	
						4- 6-				/ MD 100		t not inclu	ded .162	
						to be re	ported only	with conne	cor output	(eg. IVIK.162	), for socket	see accesso		VADIANT

VARIANT custom version +XXX

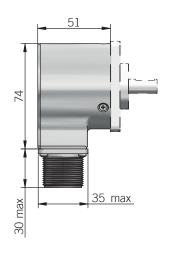
## 63D



## DIMENSION WITH METAL COVER AND AXIAL OUTPUT



## DIMENSION WITH METAL COVER AND RADIAL OUTPUT



n.3 M5 x 7 120°

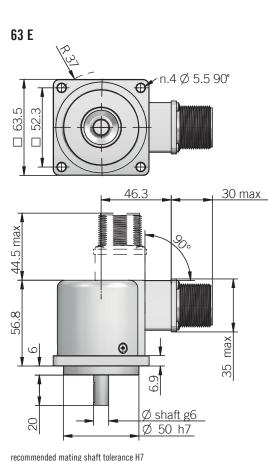
Ø shaft g6

Ø 31.75 h7

fixing clamps not included, please refer to the Accessories

\_\_ 30 max

46.3



recommended mating shaft tolerance H7 dimensions in mm





## EMI 58 - 63 F / G BLIND HOLLOW SHAFT MAGNETIC INCREMENTAL ENCODER

## 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





Rohs ( E c SU'us

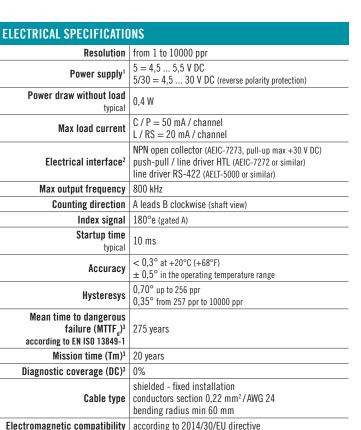
+X)	. 162	R	M	X	X	8	P	5/30	S	500	M*	58F	EMI	ORDERING CODE
+XX	. 162	R	M	X			ITERFACE Ollector C sh-pull P e driver L S-422 RS BORE D	R SUPPLY 5 V DC 55 7 DC 5/30 1 TRICAL IN PN open c.	RO PULSE o pulse S o pulse Z POWEI al interface) 5 30 V ELEC	SOLUTION to 10000 lutions list ZEF vithout zer with zer	AL COVER al cover M RES opr from 1 eferred reso v	MODEL Dling 58F pin 58G slot 63F pin 63G METAL add for metal	SERIES mental encoder series EMI ollow shaft with stator coup ind hollow shaft with torque ollow shaft with torque stop ind hollow shaft with torque * 6	magnetic incre blind h bli blind h
	SOCKET	I <b>ON TYPE</b> axial A radial R	PUT TYPE th 1,5 m) P teg. PR5) nnector M onnector J ector M12 nnector H nnector C DIRECTI	ndard lengt	to be r cable (sta after DIREC M JIS-C-54 M12	to be added	/5/10 m, t	ngths 2 / 3 /	red cable lei	preferr				

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

VARIANT

custom version +XXX





**RoHs** according to 2011/65/EU directive

**UL / CSA** file n. E212495

MECHANICAL SPECIFICATI	ONS
Shaft diameter	ø 8 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	
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 <sup>-6</sup> kgm <sup>2</sup> (36 x 10 <sup>-6</sup> lbft <sup>2</sup> )
Starting torque (at +20°C / +68°F)	, , , , ,
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	109 revolutions
Operating temperature <sup>5, 6</sup>	-25° +100°C (-13° +212°F) -25° +85°C (-13° +185°F) with M12 connector
Storage temperature <sup>6</sup>	-25° +70°C (-13° +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

as measured at the transducer without cable influences

## 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

CUNNEC	IIUN2												
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	А	F	6	F	4	1	10	1	8
A+	green	green	3	1	С	А	1	А	3	6	5	2	1
A-	/	brown or grey	/	3	/	С	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	В	2	В	1	4	8	4	3
B-	/	orange	/	5	/	E	8	Н	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	С	5	2	3	3	5
7-	/	white	/	/	/	1	9	1	1	8	Δ	1	6

only with metal cover J connector (7 pin) JIS-C-5432 Size 16 front view

÷



shield

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



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

shield



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



M12 connector (5 pin) M12 A coded front view

G



M12 connector (8 pin) M12 A coded front view





housing1



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

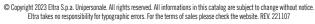












9

H connector (12 pin) - M23 CCW

Hummel 7.410.000000 - 7.002.912.603

front view

housing<sup>1</sup>

housing<sup>1</sup>

housing<sup>1</sup>





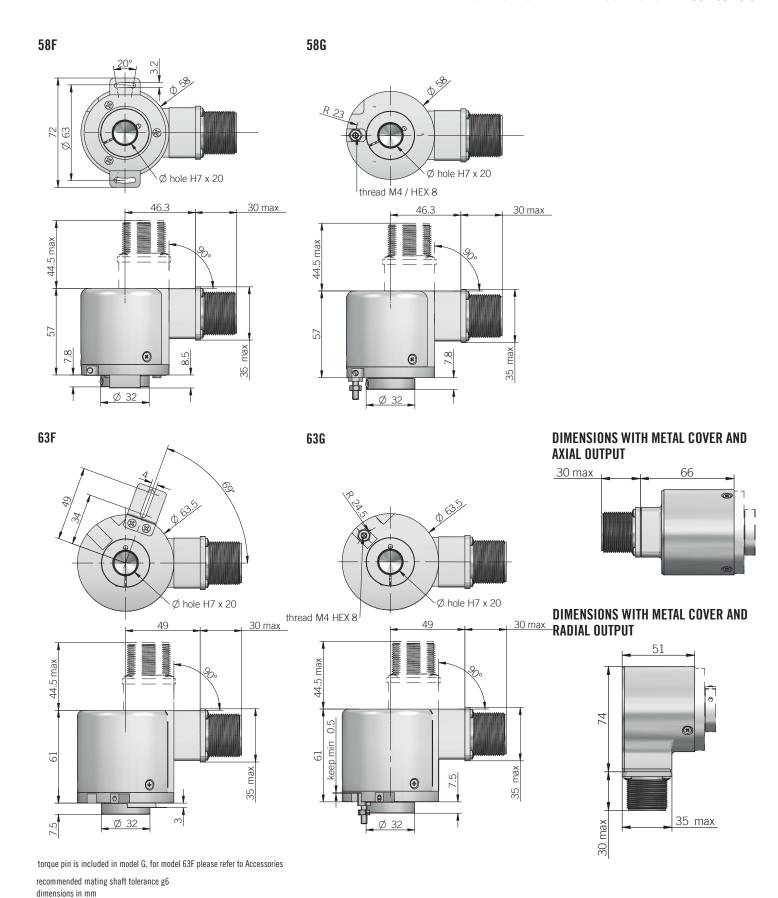
<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

<sup>&</sup>lt;sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> maximum load for static usage

<sup>&</sup>lt;sup>5</sup> measured on the transducer flange

<sup>&</sup>lt;sup>6</sup> condensation not allowed



ELECTRICAL SPECIFICATION	INS
Resolution	from 1 to 10000 ppr
Power supply <sup>1</sup>	$5 = 4,5 \dots 5,5 \text{ V DC}$ $5/30 = 4,5 \dots 30 \text{ V DC}$ (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 <sup>2</sup>	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	$< 0.3^{\circ}$ 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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	275 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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

<b>MECHANICAL SPECIFICATI</b>	ONS
Bore diameter	ø8/10/12/14/15 mm
Enclosure rating 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	4 x 10 <sup>-6</sup> kgm <sup>2</sup> (95 x 10 <sup>-6</sup> lbft <sup>2</sup> )
Starting torque (at +20°C / +68°F)	, , , , , ,
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	109 revolutions
Operating temperature <sup>4, 5</sup>	-25° +100°C (-13° +212°F) -25° +85°C (-13° +185°F) with M12 connector
Storage temperature <sup>5</sup>	-25° +70°C (-13° +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover
as measured at the transducer without	cable influences

<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $^{\rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>4</sup> measured on the transducer flange

<sup>5</sup> condensation not allowed

## 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

CUNNEC	IIUN2												
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	Α	F	6	F	4	1	10	1	8
A+	green	green	3	1	С	А	1	А	3	6	5	2	1
A-	/	brown or grey	/	3	/	С	7	G	/	5	6	/	2
B+	yellow	yellow	5	2	E	В	2	В	1	4	8	4	3
B-	/	orange	/	5	/	E	8	Н	/	3	1	/	4
Z+	blue	blue	4	/	D	/	3	C	5	2	3	3	5
Z-	/	white	/	/	/	/	9	I	/	8	4	/	6
÷	shield	shield	7	7	G	G	10	J	housing <sup>1</sup>	housing <sup>1</sup>	9	housing <sup>1</sup>	housing <sup>1</sup>

only with metal cover J connector (7 pin) JIS-C-5432 Size 16 front view

COMMERTIONS



JIS-C-5432 Size 16

front view

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



M connector (7 pin)

Amphenol MS3102-E-16-S

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



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









## BLIND HOLLOW SHAFT PROGRAMMABLE MAGNETIC INCREMENTAL ENCODER

## 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.

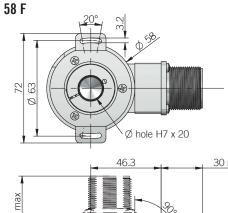
- 3 channel encoder (A / B / Z) up to 20000 ppr
- Power supply up to +30 V DC with RS-422 or HTL as electrical interface
- Up to 800 kHz output frequency
- Cable or connector output, available with metal cover for heavy duty applications
- Blind hollow shaft diameter up to 15 mm
- Mounting by stator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

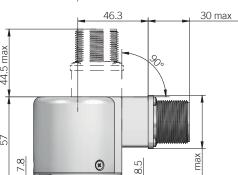


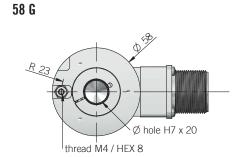




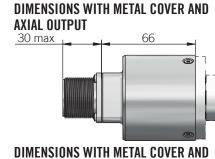
ORDERING CODE	EMI	Р	58F	M*	20000	Z	5/30	L	8	X	X	M	R	. 162	+XXX
	SERIES														
magnetic incremental er		   Feature													
U	ıser prograi														
blind hollow	shaft with	stator cou	MODEL nling 58F												
	ollow shaft		e pin 58G												
		*	MET/ add for met	AL COVER al cover M											
				RE	SOLUTION										
		user p	rogrammab	۽ Ie from 1 to	pr 20000 20000 ppr										
						RO PULSE To pulse Z									
					WILII ZEI	POWE	R SUPPLY								
							/ DC 5/30								
								ie driver L							
						RS-422 / H	TL user prog	grammable RNRF N	IAMETER						
				سدالمسالم					mm 15						
			(	otner dian	ieters with	optional s	sпатт адар	oter, see Ac <b>E</b>	cessories E <b>nclosur</b>						
										IP 54 X IP 66 S					
											OPTION				
										to be r	eported X	 Put type			
										cable (sta	ndard lengt	th 1,5 m) P			
					preferr	red cable le	ngths 2 / 3 /	/ 5 / 10 m, t	o be added	M	IL plug cor	nnector M			
										M12 I	olug conne	ector M12 nnector H			
										1112	o piug oo		ON TYPE		
													axial A radial R		
												1		SOCKET	
							to be re	eported only	with connec	ctor output (	eg. MR.162	SOCKE ), for socket	t not inclu see Access		
															VARIANT







torque pin is included in model G



35 max

30 max RADIAL OUTPUT

recommended mating shaft tolerance g6 dimensions in mm

ELECTRICAL SPECIFICATION	DNS
Resolution	user programmable from 1 to 20000 ppr default 1024 ppr
Power supply <sup>1</sup>	4,5 30 V DC (reverse polarity protection)
Power draw without load	800 mW max
Max load current	20 mA / channel
Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	173 years
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/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

as measured at the transducer without cable influences



	ø 15 mm
Bore diameter	ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12*
	* with optional shaft adapter, please refer to Accessories
Enclosure rating	X = IP 54
IEC 60529	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 <sup>-6</sup> kgm <sup>2</sup> (95 x 10 <sup>-6</sup> lbft <sup>2</sup> )
Starting torque	< 0,02 Nm (2,83 Ozin) with X enclosure rating
(at +20°C / +68°F)	< 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	109 revolutions
Operating temperature <sup>3, 4</sup>	-25° +100°C (-13° +212°F)
Operating temperature	-25° +85°C (-13° +185°F) with M12 connector
Storage temperature⁴	-25° +70°C (-13° +158°F)
Waisht	350 g (12,35 oz)
Weight	450 g (15,87 oz) with metal cover













custom version XXX

<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>&</sup>lt;sup>4</sup> measured on the transducer flange

<sup>&</sup>lt;sup>5</sup> condensation not allowed

## **MAGNETIC INCREMENTAL KIT ENCODER**

CE c Rus

## MAIN FEATURES

Contactless encoder with through hollow shaft up to 28 mm. The compact size (only 11 mm for heavy duty applications.

- 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
	SERIES incremental encoder with magnetic ring ETMR										
	bore diameter from 9 bore diameter 24 /										
		opr from 6	4 to 4096 pulses list								
			without zer	POWER	SUPPLY						
		(wit	h L electrica	5 28 V	/ DC 5/28 Trical in	TERFACE					
		pow	er supply 5	5/28 V DC	lin						
							mm 9 mm 9,52 mm 10				
							mm 11 mm 14 mm 19				
						ı	mm 24 mm 28 ENCLOSURE I	RATING			
								IP 67 S   <b>Rotation</b> 8000	SPEED ) rpm 8		
			prefe	rred cable le	engths 2 / 3	/5/10 m,	cat to be added at	ole (standar fter OUTPUT	rd length 1	PR5)	
											VARIANT

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127



thickness), the high IP grade and resistance to vibrations make this product an excellent solutions

- 2 channel encoder (A / B) up to 4096 ppr



For the second s



CONNECTIONS

**Function** 

+V DC

0 V

A+

A-

B+

B-

Z+

Z-

ᆂ

 $^{\rm 1}$  only with metal cover

M connector (10 pin)

Amphenol MS3102-E-18-1

front view

Cable

red

black

green

brown or grey

yellow

orange

blue

white

shield

8 pin M12

6

5

4

2

8

housing1

12 pin H

12

10

4

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

front view

10 pin M

D - E

M12 connector (8 pin)

M12 A coded

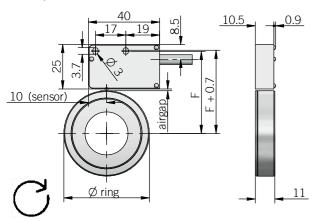






custom version XXX

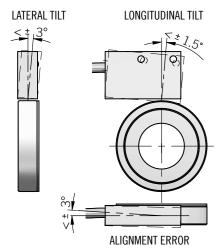
## ETMRA / B



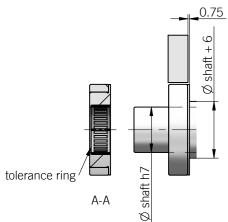
Model	A	В
ø ring	41,2	48
Fixing (F)	41,9	46
Airgap	$0.3 \pm 0.1$	$1 \pm 0,1$

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 supply <sup>1</sup>	$5 = 4,5 \dots 5,5$ V DC $5/28 = 4,5 \dots 30$ V DC (reverse polarity protection)	
Power draw without load	800 mW max	
Max load current	20 mA / channel	
Electrical interface <sup>2</sup>	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 <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	318 years	
Mission time (Tm) <sup>3</sup>	20 years	
Diagnostic coverage (DC) <sup>3</sup>	0%	
Cable type	shielded - fixed installation conductors section 0,14 mm²/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 <sup>-6</sup> kgm <sup>2</sup> (27,29 x 10 <sup>-4</sup> lbft <sup>2</sup> )	
Sensor body material	anodized aluminum	
Magnet-actuator material	stainless steel	
Operating temperature <sup>4, 5</sup>	-20° +85°C (-4° +185°F)	
Storage temperature <sup>5</sup>	-20° +85°C (-4° +185°F)	
Weight	100 g (3,53 oz)	

as measured at the transducer without cable influences

<sup>&</sup>lt;sup>5</sup> condensation allowed

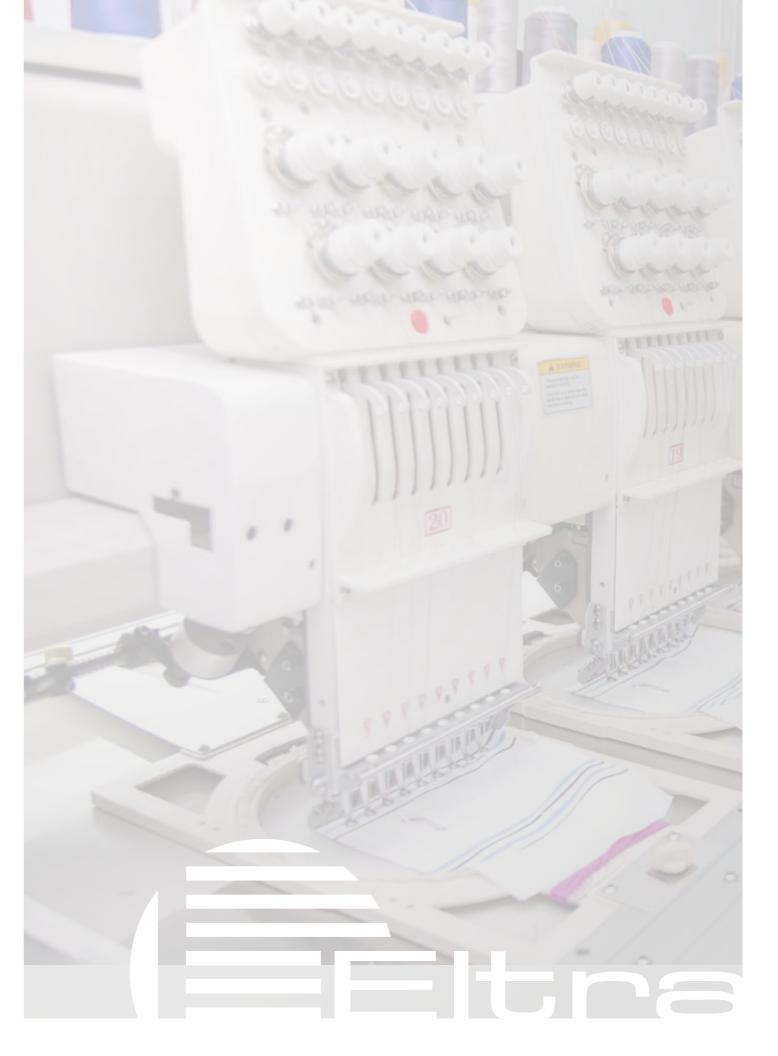
CONNECTIONS		
Function	Cable P	Cable L / RS
+V DC	red or brown	red
0 V	black or grey	black
A+	green	green
A-	1	brown or grey
B+	yellow	yellow
B-	1	orange
÷	shield	shield

## RESOLUTIONS

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







<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $<sup>^{\</sup>rm 3}$  this product is not a safety component, for further details refer to TECHNICAL BASICS section

<sup>&</sup>lt;sup>4</sup> measured on the transducer flange

<sup>\*</sup> available with mod.B; please directly contact our offices for other pulses