

zero point.

Thanks to these specifications and the possibility to transfer data over a field

Max singleturn resolution 25 bit (33'554'432 ppr)

**Max number of turns** 40 bit (1'099'511'627'776 turns)

Supported output interfaces are: Bit parallel, Analogue, SSI, Profibus, Profinet and Ethercat.





### EAR 58 B / C - 63 A / D / E BIT PARALLEL - SSI

**SOLID SHAFT SINGLETURN ABSOLUTE ENCODER** 

### MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (propietary OptoASIC)
- Resolution up to 25 bit
- Power supply up to +30 VDC with Bit Parallel or SSI as electrical interface
- Cable or connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5" square flange





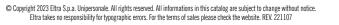




ORDERING CODE BIT PARALLEL	EAR 63A	12	G	8/30	P	P	Х	10	X	MA	R	.162	+XXX
ainglatura absoluta ana	SERIES												
singleturn absolute enc	MODEL												
	ge ø 31.75 mm <mark>63</mark> A												
synchronous fla clamping fl	ange ø 50 mm 58B ange ø 36 mm 58C												
centering square flang	ge ø 31.75 mm 63D ange ø 50 mm 63E												
		OLUTION											
(multiples and submultiple		m 1 to 13 0 to 3600											
			<b>DE TYPE</b> binary B										
			gray G										
(no po	wers of 2) binary offs powers of 2) gray offs	set code (0- set code (0-	-XXX) BC										
(III)	powers of 27 gray orre	oct code (o		SUPPLY									
				DC 8/30	TERE405								
			ELEG	TRICAL IN pu	sh-pull P								
						LOGIC							
					n I	egative N positive P							
					to be re	ported if n	OPTIONS of used X						
					latch w	ith extern	al input L						
						binary code th external							
		,			reset with	external ir	iputs LZE						
		TTIW)	i binary cod	e) Strope /	reset with	i externar i		DIAMETER					
							(mod. 58	8 B) mm 6					
						(mod. 63 A (mod. 58 C		E) mm 10					
								ENCLOSURE					
						IP 65	shatt side	e / IP67 cov	er side X IP 67 S				
									OUTI	PUT TYPE			
						(withou		cable (stand cable (stand					
			preferred	cable lengtl	hs 2 / 3 / 5 /		e added aft	er DIRECTION	TYPE (eg.	PDR5)			
						(without re	eset option)	19 pin MIL	plug conr		ON TYPE		
										DIVERI	radial R		
										0001:-	t not inclu	SOCKET	
					to be rep	orted only v	vith connect	tor output (eg	. MAR.162		t not inclu see Accesso		
													VARIANT







132



custom version XXX







R .162 +XXX

synchronous flange ø 31.75 mm 63A synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C centering square flange ø 31.75 mm 63D centering square flange ø 50 mm 63E RESOLUTION bit 13 / 16 / 17 / 18 / 21 / 25 ppr 360 / 720 / 1440 / 2880 / 3600 CODE TYPE (no powers of 2) binary offset code (0-XXX) B (no powers of 2) gray offset code (0-XXX) G POWER SUPPLY 8 ... 30 V DC 8/30 ELECTRICAL INTERFACE Serial Synchronous Interface - SSI S to be reported if not used X reset with external input ZE reset on cover or with external input ZP INCREMENTAL RESOLUTION (powers of 2) ppr from 128 to 8192 INCREMENTAL ELECTRICAL INTERFACE available with PD or HA output type line driver HTL L push pull P line driver RS-422 RS SHAFT DIAMETER (mod. 58 B) mm 6 (mod. 63 A / D) 3/8"- mm 9,52 (mod. 58 C - 63 A / D / E) mm 10 ENCLOSURE RATING IP 65 shaft side / IP67 cover side X IP 67 S **OUTPUT TYPE** cable (standard length 1,5 m) PO preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5) cable (standard length 1,5 m) PD preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5) (without reset option) 7 pin MIL plug connector MC (with reset option) 10 pin MIL plug connector MD 12 pin M23 plug connector HA 8 pin M12 plug connector M12 DIRECTION TYPE radial R SOCKET socket not included .162 to be added with incremental output

to be reported only with connector output (eg. HAR.162), for socket see Accessories VARIANT custom version XXX

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SSI ORDERING CODE

EAR 63A

MODEL

SERIES

singleturn absolute encoder EAR

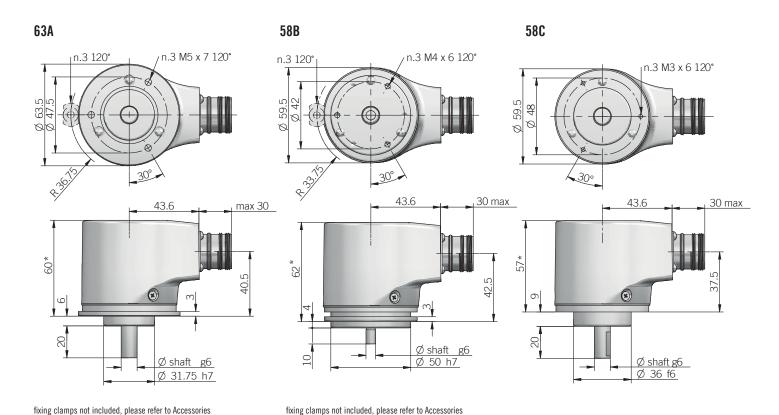
13

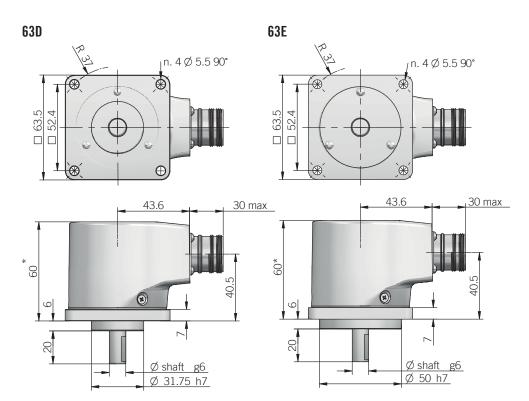
G 8/30

X 2048

RS

10





 $^{\star}$  with option ZP +1,5 mm recommended mating shaft tolerance H7 dimensions in mm





CONNECTION	NS .						
Function	Cable PC	Cable PD	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	red	G	G	8	8	8
0 V	black	black	F	F	1	1	5
DATA +	green	green	С	С	2	2	3
DATA -	brown	brown	D	D	10	10	2
CLOCK +	yellow	yellow	Α	A	3	3	4
CLOCK -	orange or pink	orange or pink	В	В	11	11	6
A+	/	grey	/	/	/	6	/
A-	/	blue	/	/	/	7	/
B+	/	purple	/	/	/	9	/
B-	/	white / green	/	/	/	12	/
U / D	red / blue	red / blue	E	E	5	5	7
RESET	white	white	/	Н	4	4	1
<u></u>	shield	shield	housing	housing	q	housing	housing

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

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

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

M12 connector (8 pin) M12 A coded front view

MA connector (19 pin) Amphenol 62IN 12E 14-19 P front view











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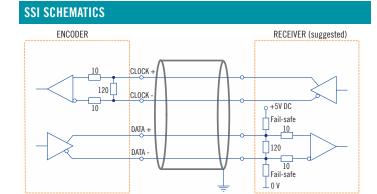
### OPTICAL SINGLETURN ABSOLUTE ENCODERS | EAR 58 B / C - 63 A / D / E PAR - SSI

ELECTRICAL SPECIFICATION	ONS					
Resolution	P = from 90 ppr to 13 bit					
Kesolution	S = from 360 ppr to 25 bit					
Power supply <sup>1</sup>	7,6 30 V DC (reverse polarity protection)					
Power draw without load	< 1 W					
Max load current	20 mA / channel					
Absolute	P = push pull (iC-DL)					
electrical interface <sup>2</sup>	S = RS-422 (THVD1451 or similar)					
Incremental	L = HTL differential (AEIC-7272 or similar) P = Push-Pull (AEIC-7272 or similar)					
electrical interface <sup>2</sup>	RS = RS-422 (AELT-5000 or similar)					
Max incremental output frequency	128 kHz					
Auxiliary inputs	active high (+V DC)					
(U/D - RESET - LATCH)	connect to 0 V if not used / RESET - LATCH t <sub>min</sub> 150 ms					
Max frequency	50 kHz LSB (Bit Parallel)					
	clock input 100 kHz 1 MHz (SSI)					
Code type	binary or gray					
Logic	SSI = positive					
	Bit parallel = positive or negative					
SSI monostable time (Tm)	20 µs					
SSI pause time (Tp)	> 35 µs					
	left aligned format MSB LSB					
SSI frame	up to 13 bit = length 13 bit from 14 to 21 bit = length 21 bit					
	from 22 to 25 bit = length 25 bit					
SSI status and parity bit	on request					
Counting direction	decreasing clockwise (shaft view)					
Start-up time	700 ms					
Accuracy	± 0,069°					
Mean time to dangerous	173 years with BIT PARALLEL output					
failure (MTTF <sub>d</sub> ) <sup>3</sup>	214 years with SSI/INCREMENTAL output					
according to EN ISO 13849-1	,					
Mission time (Tm) <sup>3</sup>	20 years					
Diagnostic coverage (DC) <sup>3</sup>	0,70					
Cable type	shielded - fixed installation conductors section 0,22 mm²/AWG 24					
PC	bending radius min 60 mm					
Cabla tuna	shielded - fixed installation					
Cable type PD	conductors section 0,14 mm <sup>2</sup> /AWG 26					
	bending radius min 50 mm					
Cable type	shielded - fixed installation conductors section 0.14 mm²/AWG 26					
PE	bending radius min 50 mm					
Electromagnetic compatibility	according to 2014/30/EU directive					
RoHS	according to 2011/65/EU directive					
W / 00A	CL. F01040F					

MECHANICAL SPECIFICATI	IONS
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load⁴	200 N (45 lbs) axial / 70 N (15,74 lbs) 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)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminium
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	109 revolutions
Operating temperature Bit parallel <sup>5, 6</sup>	-20° +85°C (-4 +185°F)
Operating temperature SSI <sup>5, 6</sup>	-40° +100°C (-40° +212°F) -20° +100°C (-4° +212°F) with PC cable output -20° +85°C (-4° +185°F) with PD cable output -25° +85°C (-13° +185°F) with M12 connector
Storage temperature	-20° +85°C (-4° +185°F)
Weight	approx 300 g (10,58 oz)
as measured at the transducer without	cable influences

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

ROTATION SPEED DERATING	G TABLE	
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 +85 (+158 +185)	8000	5000
+85 +100 (+185 +212)	5000	3000



**UL / CSA** file n. E212495









as measured at the transducer without cable influences
 for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
 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



## EAR 58 F - 63 F / G BIT PARALLEL - SSI

### **BLIND HOLLOW SHAFT SINGLETURN ABSOLUTE ENCODER**

### MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (propietary OptoASIC)
- Resolution up to 25 bit
- Power supply up to +30 VDC with Bit Parallel or SSI as electrical interface
- Cable or connector output
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin











ORDERING CODE EAR BIT PARALLEL	58F	12	G	8/30	P	P	Х	15	X	MA	R	.162	+XXX
SERIES singleturn absolute encoder EAR													
blind hollow shaft with stator coup blind hollow shaft with torque stop	slot 63F												
blind hollow shaft with torque	RESO	LUTION											
(multiples and submultiples of 360) p	bit from opr from 90	to 3600	DE TYPE										
/ f 0 \	hinanı affacı		binary B gray G										
(no powers of 2) (no powers of 2	gray offse	t code (0- t code (0-	-XXX) GC	R SUPPLY									
			8 30 V	/ DC 8/30 Ctrical in	TERFACE								
				pu	sh-pull P	LOGIC							
					n I	egative N positive P	OPTIONS						
					latch w	ported if n vith extern	ot used X al input L						
				latch /		binary code th external external ir	input ZE						
		(with	binary cod	le) strobe /	reset with	external i	nput SZE	 Diameter					
	diameters 6 /	8/952(3	3/8") / 10 /	' 11 / 12 mm	ı with ontior	nal shaft ad	lanter see A	mm 14 mm 15					
	urumotoro o 7	07 0,02 (	570 77 107	117 12 1111	i mili optioi			E <b>NCLOSUR</b> e / IP67 co	E RATING ver side X				
										PUT TYPE			
			preferred	cable lengt	hs 2 / 3 / 5 /		(	cable (stan	dard length dard length N TYPE (eg.	1,5 m) PE			
				J					plug conr	ector MA	ION TYPE		
										sucks	radial R   et not inclu	SOCKET	
					to be rep	orted only v	vith connect	or output (e	g. MAR.162		see Accesso	ories	VARIANT

ELECTRICAL INTERFACE Serial Synchronous Interface - SSI S reset on cover or with external input ZP diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories to be added with incremental output

**ORDERING CODE** 

EAR 58F

MODEL

bit 13 / 16 / 17 / 18 / 21 / 25 ppr 360 / 720 / 1440 / 2880 / 3600

gray ( (no powers of 2) binary offset code (0-XXX) BC (no powers of 2) gray offset code (0-XXX) GC

RESOLUTION

binary

POWER SUPPLY 8 ... 30 V DC 8/30

SERIES

singleturn absolute encoder EAR

blind hollow shaft with stator coupling 58F blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G G 8/30

X 2048

OPTION

INCREMENTAL RESOLUTION (powers of 2) ppr from 128 to 8192

INCREMENTAL ELECTRICAL INTERFACE available with PD or HA output type

line driver HTL L push pull P line driver RS-422 RS

preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5)

preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5)
(without reset option) 7 pin MIL plug connector MC

BORE DIAMETER mm 14 mm 15

IP 65 shaft side / IP67 cover side X

**ENCLOSURE RATING** 

(with reset option) 10 pin MIL plug connector MD

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

cable (standard length 1,5 m) PC

cable (standard length 1,5 m) PD

12 pin M23 plug connector HA 8 pin M12 plug connector M12

**OUTPUT TYPE** 

to be reported if not used X reset with external input ZE RS 15





custom version XXX

socket not included .162

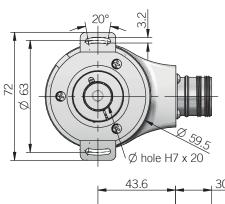
SOCKET

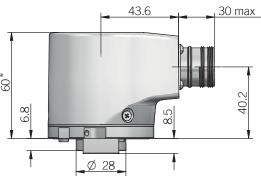
VARIANT custom version XXX

**DIRECTION TYPE** radial R

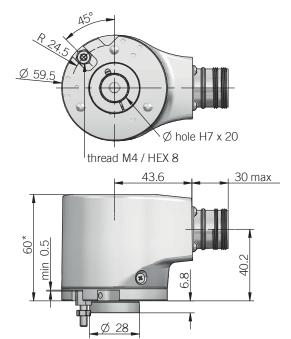
R .162 +XXX

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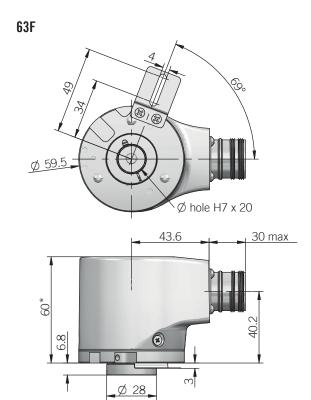








torque pin is included



for torque pin please refer to Accessories

RALLEL CONNECTION	S			
Function	Binary / Gray	Cable PD	Cable PE	19 pin MA
bit 1 (LSB)	B <sup>0</sup> / G <sup>0</sup>	green	green	А
bit 2	B1 / G1	yellow	yellow	В
bit 3	B <sup>2</sup> / G <sup>2</sup>	blue	blue	С
bit 4	B <sup>3</sup> / G <sup>3</sup>	brown	brown	D
bit 5	B <sup>4</sup> / G <sup>4</sup>	orange or pink	orange or pink	E
bit 6	B <sup>5</sup> / G <sup>5</sup>	white	white	F
bit 7	B <sup>6</sup> / G <sup>6</sup>	grey	grey	G
bit 8	B <sup>7</sup> / G <sup>7</sup>	purple	purple	Н
bit 9	B <sup>8</sup> / G <sup>8</sup>	grey / pink	grey / pink	J
bit 10	B <sup>9</sup> / G <sup>9</sup>	white / green	white / green	K
bit 11	B <sup>10</sup> / G <sup>10</sup>	brown / green	brown / green	L
bit 12	B <sup>11</sup> / G <sup>11</sup>	white / yellow	white / yellow	M
bit 13	B <sup>12</sup> / G <sup>12</sup>	yellow / brown	yellow / brown	N
STROBE	/	/	green / blue	Р
LATCH	/	/	yellow / grey	R
0 V	/	black	black	T
U / D	/	red / blue	red / blue	U
RESET	/	/	pink / green	/
+ V DC	/	red	red	٧
÷	/	shield	shield	S

I CONNECTION	IS						
Function	Cable PC	Cable PD	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	red	G	G	8	8	8
0 V	black	black	F	F	1	1	5
DATA +	green	green	С	С	2	2	3
DATA -	brown	brown	D	D	10	10	2
CLOCK +	yellow	yellow	A	A	3	3	4
CLOCK -	orange or pink	orange or pink	В	В	11	11	6
A+	/	grey	/	/	/	6	/
A-	/	blue	/	/	/	7	/
B+	/	purple	/	/	/	9	/
B-	/	white / green	/	/	/	12	/
U/D	red / blue	red / blue	E	E	5	5	7
RESET	white	white	/	Н	4	4	1
<u>+</u>	shield	shield	housing	housing	9	housing	housing

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

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

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

M12 connector (8 pin) M12 A coded front view

MA connector (19 pin) Amphenol 62IN 12E 14-19 P front view















 $<sup>^{*}</sup>$  with option ZP +1,5 mm recommended mating shaft tolerance g6 dimensions in mm

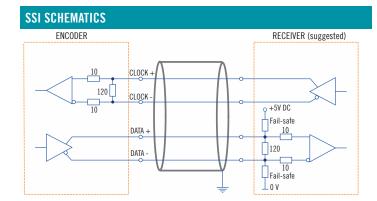
### OPTICAL SINGLETURN ABSOLUTE ENCODERS | EAR 58 F - 63 F / G PAR - SSI

ELECTRICAL SPECIFICATION	DNS
Resolution	P = from 90 ppr to 13 bit S = from 360 ppr to 25 bit
Power supply <sup>1</sup>	7,6 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Max load current	20 mA / channel
Absolute	P = push pull (iC-DL)
electrical interface <sup>2</sup>	S = RS-422 (THVD1451 or similar)
Incremental	L = HTL differential (AEIC-7272 or similar) P = Push-Pull (AEIC-7272 or similar)
electrical interface <sup>2</sup>	RS = RS-422 (AELT-5000 or similar)
Max incremental output frequency	128 kHz
Auxiliary inputs	active high (+V DC)
(U/D - RESET - LATCH)	connect to 0 V if not used / RESET - LATCH t <sub>min</sub> 150 ms
Max frequency	50 kHz LSB (Bit Parallel) clock input 100 kHz 1 MHz (SSI)
Code type	binary or gray
Logic	SSI = positive Bit parallel = positive or negative
SSI monostable time (Tm)	20 μs
SSI pause time (Tp)	> 35 µs
SSI frame	left aligned format MSB LSB up to 13 bit = length 13 bit from 14 to 21 bit = length 21 bit from 22 to 25 bit = length 25 bit
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 0,069°
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	173 years with BIT PARALLEL output 214 years with SSI/INCREMENTAL output
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type PC	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
Cable type PD	shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm
Cable type PE	shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive
D 110	I' I 0011/05/5H I' I'

HANICAL SPECIFICATI	ONS
Bore diameter	ø 14 / 15 mm ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12* * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side $S = IP 67$
Max rotation speed	see table
Max shaft load⁴	200 N (45 lbs) axial / 60 N (13,49 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 10 <sup>-6</sup> kgm <sup>2</sup> (119 x 10 <sup>-6</sup> lbft <sup>2</sup> )
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 <sup>9</sup> revolutions
Operating temperature Bit parallel <sup>5, 6</sup>	-20° +85°C (-4 +185°F)
Operating temperature SSI <sup>5, 6</sup>	-40° +85°C (-40° +185°F) -20° +85°C (-4° +185°F) with cable output -25° +85°C (-13° +185°F) with M12 connector
Storage temperature	-20° +85°C (-4° +185°F)
Weight	approx 300 g (10,58 oz)

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

ROTATION SPEED	DERATING TABLE				
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)		
	up to +70 (+158)	9000	6000		
IP65	+70 85 (+158 +185)	6000	3000		
	up to +70 (+158)	8000	6000		
IP67	+70 +85 (+158 +185)	4000	2000		



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

**UL / CSA** file n. E212495





<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



# EAR 90 - 115 A BIT PARALLEL - SSI

### **SOLID SHAFT SINGLETURN ABSOLUTE ENCODER**

### MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (propietary OptoASIC)
- Resolution up to 25 bit
- Power supply up to +30 VDC with Bit Parallel or SSI as electrical interface
- Cable or connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange









ORDERING CODE BIT PARALLEL	EAR	90A	12	G	8/30	P	Р	X	10	X	MA	R	. 162	+XXX
singleturn absoli	SERIES ute encoder EAR													
_		MODEL												
synchro	nous flange ø 40 REO-444 flan	ge 115A												
			OLUTION 1 to 13											
(multiples and sub	multiples of 360) pp	or from 90		DE TYPE										
				binary B gray G										
	(no powers of 2) b (no powers of 2)	inary offse	et code (0-	XXX) BC										
	(no powers or 2)	gray urrst	et code (o-	POWER	SUPPLY									
					DC 8/30 Trical in	TERFACE								
						sh-pull P	LOGIC							
						n	egative N							
								OPTIONS						
						latch w	ported if n vith extern	al input L						
						reset wit	binary code th external	input ZE						
			(with	binary cod	latch / le) strobe /	reset with reset with	external ir ı external i	iputs LZE						
							(mod	SHAFT D . 90) 3/8"-	mm 9,52					
									mm 10 5) mm 11					
							IP 65	1	ENCLOSURI e / IP67 cov					
							11 03	SHAIL SIUC	,, 11 07 600	IP 67 S	NIT TVD5			
							(withou		able (stand	lard length				
				preferred	cable lengtl	ns 2 / 3 / 5 /		e added afte	cable (stander DIRECTION	N TYPE (eg.	PDR5)			
							(without re	eset option)	19 pin MIL	plug conn		ON TYPE		
												radial R	SOCKET	
						to be ren	ortod only y	uith connect	or output (e;	α MAD 160		t not inclu	ded .162	
						ro ne reh	orica only v	vitii coiiileci	or output (e;	g. WAIN.102)	, IUI SUUNEL			VARIANT

**SERIES** singleturn absolute encoder EAR MODEL synchronous flange ø 40 mm 90A REO-444 flange 115A RESOLUTION bit 13 / 16 / 17 / 18 / 21 / 25 ppr 360 / 720 / 1440 / 2880 / 3600 hinary gray G (no powers of 2) binary offset code (0-XXX) BC (no powers of 2) gray offset code (0-XXX) GC POWER SUPPLY 8 ... 30 V DC 8/30 ELECTRICAL INTERFACE Serial Synchronous Interface - SSI S to be reported if not used X reset with external input ZE reset on cover or with external input ZP INCREMENTAL RESOLUTION (powers of 2) ppr from 128 to 8192 INCREMENTAL ELECTRICAL INTERFACE available with PC or HA output type line driver HTL L push pull P line driver RS-422 RS SHAFT DIAMETER (mod. 90) 3/8"- mm 9,52 mm 10 (mod. 115) mm 11 **ENCLOSURE RATING** IP 65 shaft side / IP67 cover side X **OUTPUT TYPE** cable (standard length 1,5 m) P( preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5) cable (standard length 1,5 m) PD preferred cable lengths 2/3/5/10 m, to be added after DIRECTION TYPE (eg. PCR5)

(without reset option) 7 pin MIL plug connector MC

(with reset option) 10 pin MIL plug connector MD 12 pin M23 plug connector HA 8 pin M12 plug connector M12 **DIRECTION TYPE** radial R SOCKET socket not included .162 to be reported only with connector output (eg. HAR.162), for socket see Accessories VARIANT to be added with incremental output

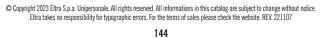
G 8/30

X 2048

RS 10

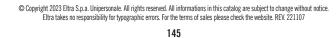








custom version XXX







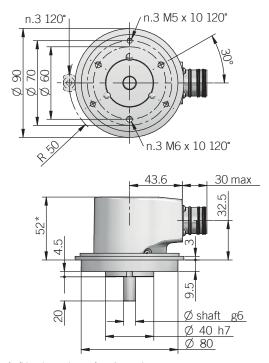
custom version XXX

R .162 +XXX

ORDERING CODE

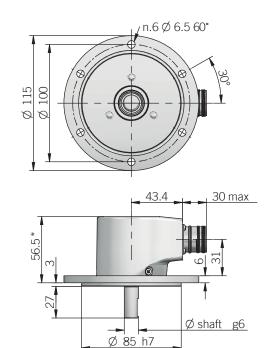
EAR 90A

90A



for fixing clamps please refer to Accessories  $^{\ast}$  with option ZP  $+1,5~\mathrm{mm}$ recommended mating shaft tolerance H7 dimensions in mm

### 115A







SSI CONNECTIONS									
Function	Cable PC	Cable PD	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12		
+ V DC	red	red	G	G	8	8	8		
0 V	black	black	F	F	1	1	5		
DATA +	green	green	С	С	2	2	3		
DATA -	brown	brown	D	D	10	10	2		
CLOCK +	yellow	yellow	А	А	3	3	4		
CLOCK -	orange or pink	orange or pink	В	В	11	11	6		
A+	/	grey	/	/	/	6	/		
A-	/	blue	/	/	/	7	/		
B+	/	purple	/	/	/	9	/		
B-	/	white / green	/	/	/	12	/		
U/D	red / blue	red / blue	E	E	5	5	7		
RESET	white	white	/	Н	4	4	1		
<del>-</del>	shield	shield	housing	housing	9	housing	housing		

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

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

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

M12 connector (8 pin) M12 A coded front view

MA connector (19 pin) Amphenol 62IN 12E 14-19 P front view



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### OPTICAL SINGLETURN ABSOLUTE ENCODERS | EAR 90 - 115 A PAR - SSI

ELECTRICAL SPECIFICATION	ONS
Resolution	P = from 90 ppr to 13 bit
Kesolution	S = from 360 ppr to 25 bit
Power supply <sup>1</sup>	7,6 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Max load current	20 mA / channel
Absolute	P = push pull (iC-DL)
electrical interface <sup>2</sup>	S = RS-422 (THVD1451 or similar)
Incremental	L = HTL differential (AEIC-7272 or similar) P = Push-Pull (AEIC-7272 or similar)
electrical interface <sup>2</sup>	RS = RS-422 (AELT-5000 or similar)
Max incremental output frequency	128 kHz
Auxiliary inputs	active high (+V DC)
(U/D - RESET - LATCH)	connect to 0 V if not used / RESET - LATCH tmin 150 ms
Max frequency	50 kHz LSB (Bit Parallel) clock input 100 kHz 1 MHz (SSI)
Code type	binary or gray
Logic	SSI = positive
Logic	Bit parallel = positive or negative
SSI monostable time (Tm)	20 μs
SSI pause time (Tp)	> 35 µs
SSI frame	left aligned format MSB LSB up to 13 bit = length 13 bit
	from 14 to 21 bit = length 21 bit from 22 to 25 bit = length 25 bit
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 0,069°
Mean time to dangerous	172 weeks with DIT DADALLEL output
failure (MTTF <sub>d</sub> ) <sup>3</sup>	173 years with BIT PARALLEL output 214 years with SSI/INCREMENTAL output
according to EN ISO 13849-1	
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
PC	bending radius min 60 mm
Cable time	shielded - fixed installation
Cable type PD	conductors section 0,14 mm <sup>2</sup> /AWG 26
	bending radius min 50 mm
Cable type	shielded - fixed installation conductors section 0.14 mm²/AWG 26
PE	bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive

### ENCODER RECEIVER (suggested) o +5V DC Fail-safe DATA + 10 120

10 Fail-safe

RoHS | according to 2011/65/EU directive

**UL / CSA** file n. E212495

MECHANICAL SPECIFICATIONS					
Shaft diameter	ø 9,52 (3/8") / 10 / 11 mm				
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67				
Max rotation speed	see table				
Max shaft load⁴	200 N (45 lbs) axial / 70 N (15,74 lbs) 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)	< 0,03 Nm (4,25 Ozin)				
Bearing stage material	aluminum				
Shaft material	stainless steel				
Housing material	painted aluminium				
Bearings	n.2 ball bearings				
Bearings life	109 revolutions				
Operating temperature Bit parallel <sup>5, 6</sup>	-20° +85°C (-4 +185°F)				
Operating temperature SSI <sup>5, 6</sup>	-40° +100°C (-40° +212°F) -20° +100°C (-4° +212°F) with PC cable output -20° +85°C (-4° +185°F) with PD cable output -25° +85°C (-13° +185°F) with M12 connector				
Storage temperature	-20° +85°C (-4° +185°F)				
Weight	approx 300 g (10,58 oz)				

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

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

ROTATION SPEED DERATING TABLE								
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)						
up to +70 (+158)	10000	8000						
+70 +85 (+158 +185)	8000	5000						
+85 +100 (+185 +212)	5000	3000						



## EAL 58 B / C - 63 A / D / E

**SOLID SHAFT SINGLETURN ABSOLUTE ENCODER** 

### MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5" square flange







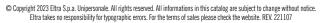
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0 0

ORDERING CODE EAL	63A	16B	12/30	V	05	X	10	X	M12	R	. 162	+XXX
SERIES  analogue singleturn absolute encoder EAL  synchronous flange ø 31.7  synchronous flange ø 5  clamping flange ø 3  centering square flange ø 31.7  centering square flange ø 5	MODEL 5 mm 63A 0 mm 58B 6 mm 58C 5 mm 63D 0 mm 63E UT DAC RES	OLUTION 6 bit 16B POWEI 2 30 V ELEC	R SUPPLY DC 12/30 CTRICAL IN	ITERFACE voltage V current I 0 2 4 2 put / 3 win 4 win	JT RANGE 5 V 05 10 V 010 0 mA 020 0 mA 420 res current (mod. 63 A (mod. 58 C - IP 65	OPTIONS Output X Output Q SHAFT D (mod. 58 / D) 3/8" 63 A / D / I E shaft side	IAMETER B) mm 6 mm 9,52 E) mm 10 NCLOSUR / IP67 cor cable (stater DIRECTI	E RATING ver side X IP 67 SUTF ndard lengti ON TYPE (eg	PUT TYPE h 1,5 m) P . PR5)	R	. 162	+XXX
		present	u canie ielig	,uio	, , 10 III, tU I	oc auucu ai		plug conne	ctor M12	ION TYPE		
										radial R	SOCKET	
				to be repo	rted only wi	th connecto	r output (eg	. M12R.162)		et not inclu see Accesso		W.B
										(	custom ve	VARIANT rsion XXX



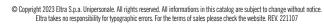
SSI SCHEMATICS





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

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

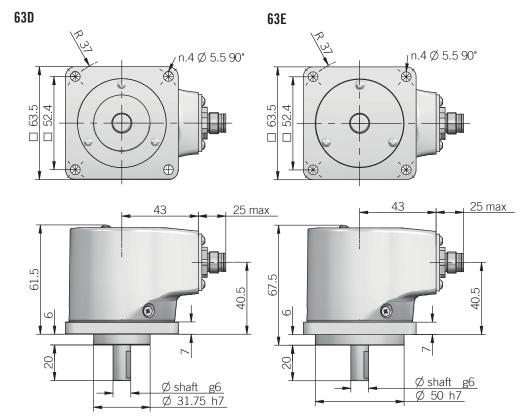
<sup>4</sup> maximum load for static usage

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

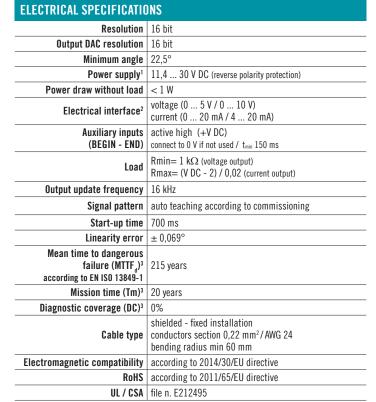
63A 58B 58C , n.3 M5 x 7 120° , n.3 M4 x 6 120° n.3 120° n.3 120° ın.3 M3 x 6 120° 25 max 25 max 61. Ø 50 h7 Ø shaft g6 Ø shaft g6 Ø 31.75 h7 Ø 36 f6

for fixing clamps please refer to Accessories

for fixing clamps please refer to Accessories

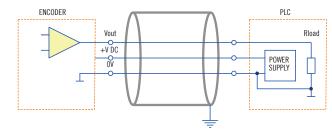


recommended mating shaft tolerance H7 dimensions in mm



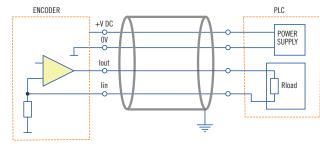
### **ELECTRICAL INTERFACE**

### **VOLTAGE OUTPUT**



### **CURRENT OUTPUT**

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with 3 wires interface lin is internally connected to 0V

MECHANICAL SPECIFICATIONS					
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm				
Enclosure rating IEC 60529					
Max rotation speed	see table				
Max shaft load⁴	200 N (45 lbs) axial / 70 N (15,74 lbs) 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)	< 0,03 Nm (4,25 Ozin)				
Bearing stage material	aluminum				
Shaft material	stainless steel				
Housing material	painted aluminium				
Bearings	n.2 ball bearings				
Bearings life	109 revolutions				
Operating temperature <sup>5, 6</sup>	<sup>6</sup> -20° +85°C (-4° +185°F)				
Storage temperature <sup>6</sup>	erature <sup>6</sup> -20° +85°C (-4° +185°F)				
<b>Weight</b> approx 350 g (12,35 oz)					
as measured at the transducer without cable influences					

as measured at the transducer without cable influences

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

ROTATION SPEED / TEMPERATURE TABLE								
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)						
up to +70 (+158)	10000	8000						
+70 +85 (+158 +185)	8000	5000						

CONNECTIONS			
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
lin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
÷	shield	housing	housing

<sup>\*</sup> with Q current ouput

M12 connector (5 pin) M12 A coded front view



M12 connector (8 pin) M12 A coded front view (2) 3 8 7







<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



# EAL 58 F - 63 F / G Analogue

### **BLIND HOLLOW SHAFT SINGLETURN ABSOLUTE ENCODER**

### MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin

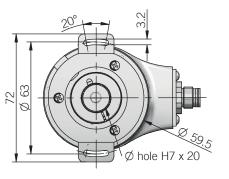


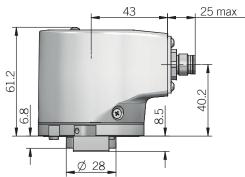


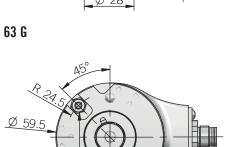


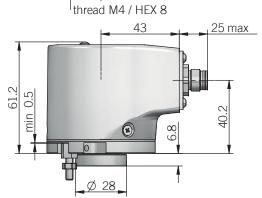
RDERING CODE	EAL	58F	16B	12/30	V	05	X	15	X	M12	R	. 162	+XXX
analogue singleturn absolute enco blind hollow shaft with st blind hollow shaft with tor	ator coup												
blind hollow shaft wi	th torque		NI IITINN										
	0011 01		bit 16B										
		1:		R SUPPLY DC 12/30									
			ELEC	TRICAL IN									
					voltage V current I								
						IT RANGE							
						5 V 05 10 V 010							
						0 mA 020							
					4 2	0 mA 420							
	t	o be repor	ted with v	oltage out	put / 3 wii	es current							
					4 wir	es current		IAMETER					
							DUKL	mm 14					
4:	amatara C	1010501	)/0"\ / 10 /	11 / 10 mm	n with option	al abaft ad	lantar asa 1	mm 15					
ŭ!	anneters o	/ 6 / 9,52 (3	0/6 ) / 10 /	11 / 12 11111	i with option	iai siiait au		ENCLOSUR	F RATING				
						IP 65		P67 co	ver side X				
									IP 67 S	OUT TYPE			
								cable (sta	ndard lengt				
			preferred	d cable leng	ths 2 / 3 / 5	/ 10 m, to I	be added at		ON TYPE (eg				
								IVIIZ	plug conne		ON TYPE		
										DINEON	radial R		
										00010	t not inclu	SOCKET	
					to be repo	rted only wi	th connecto	r output (eg	. M12R.162				

58F





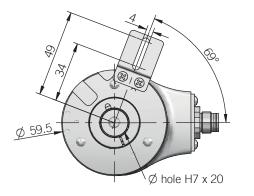


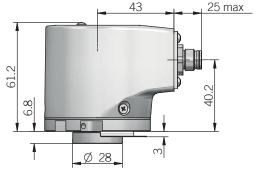


ï hole H7 x 20

torque pin is included recommended mating shaft tolerance g6 dimensions in mm

### 63F





for torque pin please refer to Accessories







VARIANT

custom version XXX

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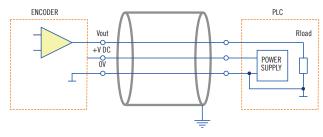
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### OPTICAL SINGLETURN ABSOLUTE ENCODERS | EAL 58 F - 63 F / G ANALOGUE

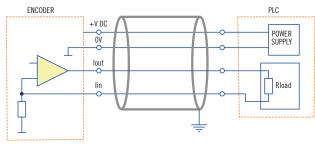
ELECTRICAL SPECIFICATIONS					
16 bit					
16 bit					
22,5°					
11,4 30 V DC (reverse polarity protection)					
< 1 W					
voltage (0 5 V / 0 10 V) current (0 20 mA / 4 20 mA)					
active high (+V DC) connect to 0 V if not used / $t_{min}$ 150 ms					
$\begin{array}{l} \text{Rmin}{=}~1~\text{k}\Omega~\text{(voltage output)} \\ \text{Rmax}{=}~\text{(V DC - 2) / 0,02 (current output)} \end{array}$					
16 kHz					
auto teaching according to commissioning					
700 ms					
± 0,069°					
215 years					
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					

### ELECTRICAL INTERFACE

### **VOLTAGE OUTPUT**



### **CURRENT OUTPUT**



3 / 4 wire source with 3 wires interface lin is internally connected to OV

MECHANICAL SPECIFICATIONS					
Bore diameter	Ø 14 / 15 mm Ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12* mm * with optional shaft adapter, please refer to Accessories				
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side $S = IP 67$				
Max rotation speed	see table				
Max shaft load <sup>4</sup>	200 N (45 lbs) axial / 60 N (13,49 lbs) radial				
Shock	50 G, 11 ms (IEC 60068-2-27)				
Vibration	10 G, 10 2000 Hz (IEC 60068-2-6)				
Moment of inertia	5 x 10 <sup>-6</sup> kgm <sup>2</sup> (119 x 10 <sup>-6</sup> lbft <sup>2</sup> )				
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)				
Bearing stage material	aluminum				
Shaft material	stainless steel				
Housing material	painted aluminium				
Bearings	n.2 ball bearings				
Bearings life	109 revolutions				
Operating temperature <sup>5, 6</sup>	-20° +85°C (-4° +185°F)				
Storage temperature	-20° +85°C (-4° +185°F)				
Weight	approx 350 g (12,35 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
- -- 5 measured on the transducer flange
  - <sup>6</sup> condensation not allowed

RO'	ROTATION SPEED / TEMPERATURE TABLE											
		Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)								
IP65	IDCE	up to +70 (+158)	9000	6000								
	IFOJ	+70 +85 (+158 +185)	6000	3000								
IP67	up to +70 (+158)	8000	4000									
	1F0 <i>1</i>	+70 +85 (+158 +185)	4000	2000								

CONNECTIONS			
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / lout	green	1	1
lin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
÷	shield	housing	housing

\* with Q current ouput

M12 connector (5 pin) M12 A coded front view

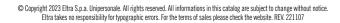


M12 connector (8 pin) M12 A coded front view











### EAL 90 - 115 A

**SOLID SHAFT SINGLETURN ABSOLUTE ENCODER** 

### MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange







ORDERING CODE	EAL	90A	16B	12/30	٧	05	Х	10	Х	M12	R	. 162	+XXX
analogue singleturn absolute e	SERIES ncoder EAL												
	s flange ø 40 REO-444 flan	ge 115A											
	OUTPUT	DAC RES	6 bit 16B	R SUPPLY									
		1		DC 12/30 Ctrical in	TERFACE voltage V								
					current I OUTPL	JT RANGE							
					0 0 2	5 V 05 10 V 010 0 mA 020							
	t	o be repor	ted with v	oltage out			OPTIONS						
					4 wir	es current		DIAMETER					
						(00	(mod. 11	mm 10 5) mm 11	F DATING				
						IP 65		ENCLOSUR e / IP67 cov	ver side X IP 67 S				
			preferre	d cable leng	ths 2 / 3 / 5	i / 10 m, to		fter DIRECTI	ndard lengt ON TYPE (eg	. PR5)			
				socket con	inector incli	uded, witho	ut socket pl		plug conne 2 as variant	code	ON TYPE		
											radial R	SOCKET	
					to be repo	rted only wi	th connecto	r output (eg	. M12R.162				



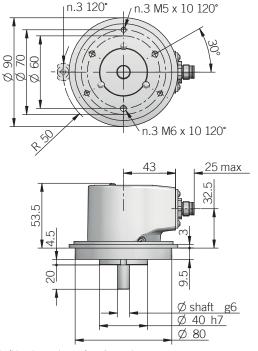


VARIANT

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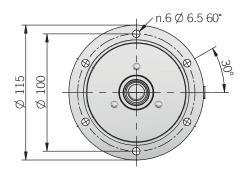
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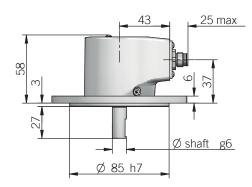
### 90A



for fixing clamps please refer to Accessories recommended mating shaft tolerance H7 dimensions in mm

### 115A



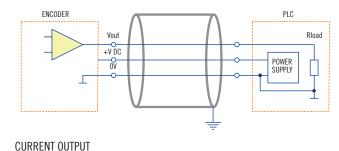




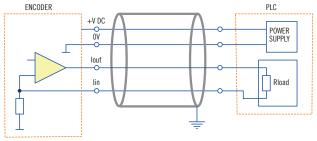
### **ELECTRICAL SPECIFICATIONS** Resolution 16 bit Output DAC resolution 16 bit Minimum angle 22,5° Power supply<sup>1</sup> 11,4 ... 30 V DC (reverse polarity protection) Power draw without load |< 1 W|voltage (0 ... 5 V / 0 ... 10 V) Electrical interface<sup>2</sup> current (0 ... 20 mA / 4 ... 20 mA) **Auxiliary inputs** active high (+V DC) (BEGIN - END) connect to 0 V if not used / t<sub>min</sub> 150 ms $\begin{array}{c|c} \textbf{Load} & \mathsf{Rmin}{=} \ 1 \ \mathsf{k}\Omega \ (\mathsf{voltage} \ \mathsf{output}) \\ \mathsf{Rmax}{=} \ (\mathsf{V} \ \mathsf{DC} \ - \ 2) \ / \ 0,02 \ (\mathsf{current} \ \mathsf{output}) \\ \end{array}$ Output update frequency 16 kHz Signal pattern | auto teaching according to commissioning Start-up time 700 ms Linearity error ± 0,069° Mean time to dangerous failure (MTTF<sub>d</sub>)<sup>3</sup> 215 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

### ELECTRICAL INTERFACE

### **VOLTAGE OUTPUT**



**UL / CSA** file n. E212495



with 3 wires interface lin is internally connected to OV

MECHANICAL SPECIFICATI	MECHANICAL SPECIFICATIONS					
Shaft diameter	ø 6 / 9,52 (3/8") / 10 / 11 mm					
Enclosure rating IEC 60529						
Max rotation speed	see table					
Max shaft load⁴	200 N (45 lbs) axial / 70 N (15,74 lbs) 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)	< 0,03 Nm (4,25 Ozin)					
Bearing stage material	aluminum					
Shaft material	stainless steel					
Housing material	painted aluminium					
Bearings	n.2 ball bearings					
Bearings life	109 revolutions					
Operating temperature <sup>5, 6</sup>	-20° +85°C (-4° +185°F)					
Storage temperature	-20° +85°C (-4° +185°F)					
Weight	approx 350 g (12,35 oz)					

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

ROTATION SPEED / TEMPERATURE TABLE									
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)							
up to +70 (+158)	10000	8000							
+70 +85 (+158 +185)	8000	5000							

CONNECTIONS				
Function	Cable	5 pin M12	8 pin M12*	
+ V DC	red	2	2	
0 V	black	3	3	
Vout / lout	green	1	1	
lin	yellow	/	6	
BEGIN	white	4	4	
END	brown or grey	5	5	
÷	shield	housing	housing	

\* with Q current ouput

M12 connector (5 pin) M12 A coded front view

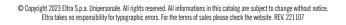


M12 connector (8 pin) M12 A coded front view













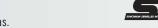


### **EAX 80 A / D**

### **EXPLOSION PROOF ATEX SINGLETURN ABSOLUTE ENCODER**

### MAIN FEATURES

Explosion proof encoder for applications within hazardous areas.









- Optical sensor technology (OptoASIC) Resolution up to 13 bit (8192 ppr)
- Power supply up +28 V DC with SSI as electrical interface
- Code reset for easy setup
- 10mm solid shaft diameter
- Cable output
- Mounting by syncronous or centering square flange

### EX CLASSIFICATION

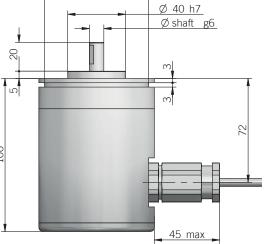
It has been assured with EC-TYPE Examination Certificate CESI 04 ATEX 082 that the EAX 80 is compliant with essential health and safety requirements according to

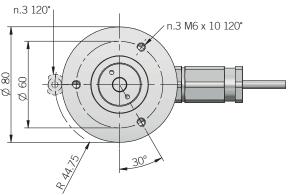
- EN IEC 60079-0:2018
- EN 60079-1:2014
- EN 60079-31:2014

The UE declaration is available on www.eltra.it



ORDERING CODE	EAX	80A	256	G	8/28	S	X	X	10	X	3	PR	. XXX
ainglatura absoluta fl	SERIES												
Siligletuili absolute li	ameproof encoder EAX												
9	vnchronous flange ø 40												
р	lease directly contact our	offices for ot		DE TUDE									
			U										
	SERIES  singleturn absolute flameproof encoder EAX  MODEL  synchronous flange § 40 mm 80D  centering square flange § 40 mm 80D  ppr 360 / 720 / 1440 / 2880 / 3600 / 4096 / 8192  please directly contact our offices for other pulses  CODE TYPE  binary B  gray G  (no powers of 2) binary offset code (0-XXX) BC  (no powers of 2) gray offset code (												
	(no powers of 2	2) gray offs	et code (U										
			Serial										
						to be r	eported X						
						to bo ro	norted if n						
						reset wi	th externa	I input ZE					
									IAMETER				
									mm 10				
								E	NCLOSUR				
											N CDEED		
									IVIF				
										00			
											dard length	1,5 m) PR	
					preferr	red cable lei	ngths 2 / 3 /	/ 5 / 10 m, to	be added	after OUTPU	T TYPE (eg.		
													VARIANT

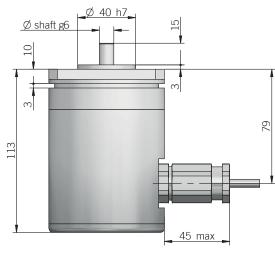


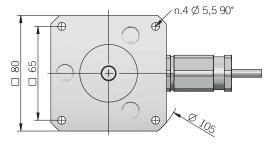


fixing clamps not included, please refer to the Accessories

80D

80A





recommended mating shaft tolerance H7 dimensions in mm

www.eltra.it

ELECTRICAL SPECIFICATION	DNS
Resolution	from 360 to 8192 ppr
Power supply <sup>1</sup>	7,6 29,4 V DC (reverse polarity protection)
Current consumption without load	100 mA
Electrical interface <sup>2</sup>	RS-422 compatible
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Clock frequency	100 kHz 1 MHz
SSI monostable time (Tm)	18 µs
SSI pause time (Tp)	> 35 µs
SSI frame	MSB LSB 13 bit data length
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 1/2 LSB
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 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	UNS
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	10 <sup>9</sup> revolutions
Operating temperature <sup>5, 6</sup>	0° +50°C (+32° +122°F)
Storage temperature <sup>6</sup>	-15° +70°C (+5° +158°F)
Weight	1200 g (42,33 oz)

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





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> 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

### OPTICAL SINGLETURN ABSOLUTE ENCODERS | EAX 80 A / D

### **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 

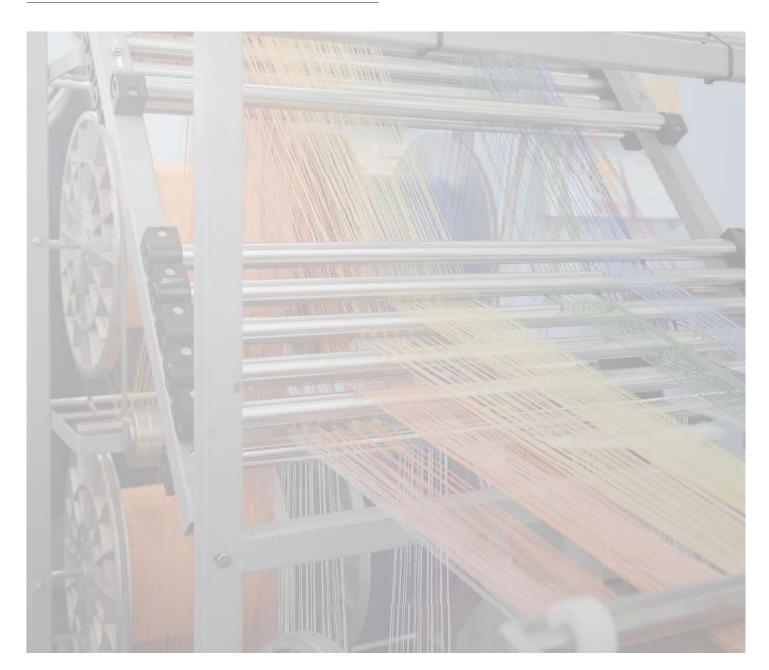
Ex tb IIIC T85°C Db

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
+ V DC	red
0 V	grey
DATA +	green
DATA -	brown
CLOCK +	yellow
CLOCK -	pink
U / D	blue
<u></u>	shield











## **EMA 36 B**

### SOLID SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

### MAIN FEATURES

Miniaturized singleturn absolute encoder for limited size applications.

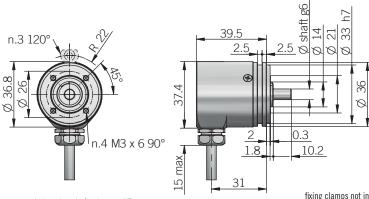
- Magnetic sensor technology without contact (Magnetic ASIC)
- Up to 15 bit as singleturn resolution
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- 6 mm diameter solid shaft
- Mounting by syncronous flange





URDERING CODE EMA	36B	13	G	8/30	5	P	X	б	Х	8	MIZK	. 162	+XXX
SERIES magnetic singleturn absolute encoder EMA													
syncronous flange ø 33	MODEL mm 36B												
, , ,	RES0	LUTION											
please directly contact our offi	from 1 to ses for othe												
		C	ODE TYPE binary B										
			gray G										
				SUPPLY 5 V DC 5									
				/ DC 8/30 Strical in									
		Serial	Synchrono										
					ı	LOGIC positive P							
							OPTIONS						
					to be re reset wit	ported if n th externa	ot used X input ZE						
							SHAFT D	IAMETER					
							E	mm 6 Enclosur					
						IP 67		/ IP 65 sh	aft side X				
								MA	<b>X ROTATIO</b> 80	OO rpm 8			
										OUTI	PUT TYPE		
				preferred o	cable length	s 1,5/2/3	/5/10 m,	to be added	able (stand d after OUTP	UT TYPE (eg	g. PR5)		
								8 pin M1	2 radial pl	ug connec	tor M12R	SOCKET	
											et not inclu	ded .162	
					to be repo	rted only wi	th connecto	r output (eg	g. M12R.162	), for socket	see Access		VARIANT
											(	custom ver	

36B



recommended mating shaft tolerance H7 dimensions in mm

fixing clamps not included, please refer to Accessories

ECTRICAL S	SPECIF	ICATIO	INS	
	_			Т

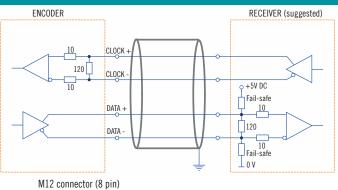
ELECTRICAL SPECIFICATION	ONS				
Resolution	from 1 to 15 bit				
Power supply <sup>1</sup>	$5 = 4,75 \dots 5,25 \text{ V DC}$ 8/30 = 7,6 \dots 30 \text{ V DC (reverse polarity protection)}				
Power draw without load	< 400 mW				
Electrical interface <sup>2</sup>	RS-422 (THVD1451 or similar)				
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET t <sub>min</sub> 150 ms				
Clock frequency	100 kHz 1 MHz				
Code type	binary or gray				
SSI monostable time (Tm)	20 µs				
SSI pause time (Tp)	> 35 µs				
SSI frame	MSB LSB up to 13 bit = length 13 bit 14 to 15 bit = length 15 bit				
SSI status and parity bit	on request				
Counting direction	decreasing clockwise (shaft view)				
Start-up time	150 ms				
Accuracy	± 0,35° max				
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	317 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 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	8 pin M12			
+ V DC	red	8			
0 V	black	5			
DATA +	green	3			
DATA -	brown or grey	2			
CLOCK +	yellow	4			
CLOCK -	orange	6			
U/D	red / blue	7			
RESET	white	1			
÷	shield	housing			

MECHANICAL SPECIFICATIONS						
Shaft diameter	ø 6 mm					
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)					
Rotation speed	8000 rpm continuous / 10000 rpm max					
Max shaft load⁴	20 N (4,5 lbs) axial / radial					
Shock	50 G, 11 ms (IEC 60068-2-27)					
Vibration	20 G, 10 2000 Hz (IEC 60068-2-6)					
Moment of inertia	0,001 x 10 <sup>-6</sup> kgm <sup>2</sup> (0,02 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	chrome plated steel					
Bearings	n.2 ball bearings					
Bearings life	10 <sup>9</sup> revolutions					
Operating temperature <sup>5, 6</sup>	-30° +100°C (-22° +212°F) -25° +85°C (-13° +185°F) with M12 connector					
Storage temperature <sup>6</sup>	-25° +85°C (-13° +185°F)					
Weight	150 g (5,29 oz)					
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						

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

SSI SCHEMATICS

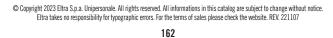


M12 A coded front view

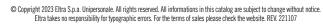
















<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

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

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



### **EMA 36 F/G**

### BLIND HOLLOW SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

### MAIN FEATURES

Miniaturized singleturn absolute encoder for limited size applications.

- Magnetic sensor technology without contact (Magnetic ASIC)
- Up to 15 bit as singleturn resolution
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup

**ORDERING CODE** 

- Cable or M12 output, other connectors available on cable end
- Blind hollow shaft up to 10 mm diameter
- Mounting by stator coupling or torque pin





magnetic singleturn absolute encoder EMA  MODEL blind hollow shaft with stator coupling 36F										
blind hollow shaft with torque pin 36G   RESOLUTION										
from 1 to 15 bit										
please directly contact our offices for other pulses										
	DE TYPE									
ľ	binary B gray G									
	POWER SUPPLY									
	5 V DC 5									
	8 30 V DC 8/30									
Sarial S	ELECTRICAL IN Synchronous Interfa									
ociiai o	ynchronous interra	06 - 331 3	LOGIC							
		1	positive P							
				OPTIONS						
			ported if neternal							
		ieset mi	ili externar		IAMETER					
					mm 9,52					
					mm 10					
diameters 4 / 5 /	6 / 6,35 (1/4") / 8 mr	n with option	nal shaft ad							
			IP 67		NCLOSUR / IP 66 sha					
			11 07	oover side		X ROTATIO	N SPEED			
							00 rpm 8			
								PUT TYPE		
	preferred ca	ahla lanathe	15/2/2/	5 / 10 m +		able (stand				
	preferred co	anie ieligilis	1,372737	3 / 10 III, t		2 radial pl				
						•			SOCKET	
								t not inclu		
		to be repo	rted only wi	th connecto	r output (eg	. M12R.162)	, tor socket	see Accesso		VADIAN
										VARIAN'

G 8/30

### 36F 50 Ø 42.7 Ø hole H7 x 15

recommended mating shaft tolerance g6 dimensions in mm

### 36G Ø hole H7 x 15 thread M3

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

ELECTRICAL SPECIFICATIONS				
Resolution	from 1 to 15 bit			
Power supply <sup>1</sup>	$5 = 4,75 \dots 5,25 \text{ V DC}$ $8/30 = 7,6 \dots 30 \text{ V DC}$ (reverse polarity protection)			
Power draw without load	< 400 mW			
Electrical interface <sup>2</sup>	RS-422 (THVD1451 or similar)			
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET t <sub>min</sub> 150 ms			
Clock frequency	100 kHz 1 MHz			
Code type	binary or gray			
SSI monostable time (Tm)	20 μs			
SSI pause time (Tp)	> 35 µs			
SSI frame	MSB LSB up to 13 bit = length 13 bit 14 to 15 bit = length 15 bit			
SSI status and parity bit	on request			
Counting direction	decreasing clockwise (shaft view)			
Start-up time	150 ms			
Accuracy	± 0,35° max			
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	317 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 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	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
÷	shield	housing

MECHANICAL SPECIFICATIONS					
Bore diameter	Ø 9,52 (3/8") / 10 mm Ø 4* / 5* / 6* / 6,35 (1/4")* / 8* mm * with optional shaft adapter, please refer to Accessories				
Enclosure rating	IP 67 cover side / IP 66 shaft side (IEC 60529)				
Rotation speed	8000 rpm continuous / 10000 rpm max				
Max shaft load⁴	20 N (4,5 lbs) axial / radial				
Shock	50 G, 11 ms (IEC 60068-2-27)				
Vibration	20 G, 10 2000 Hz (IEC 60068-2-6)				
Moment of inertia	0,001 x 10 <sup>-6</sup> kgm <sup>2</sup> (0,02 x 10 <sup>-6</sup> lbft <sup>2</sup> )				
Starting torque (at +20°C / +68°F)	< 11 111 Nm (1 47 171n)				
Bearing stage material	aluminum				
Shaft material	stainless steel				
Housing material	chrome plated steel				
Bearings	n.2 ball bearings				
Bearings life	109 revolutions				
Operating temperature <sup>5, 6</sup>	-30° +100°C (-22° +212°F) -25° +85°C (-13° +185°F) with M12 connector				
Storage temperature <sup>6</sup>	-25° +85°C (-13° +185°F)				
Weight	150 g (5,29 oz)				

as measured at the transducer without cable influences

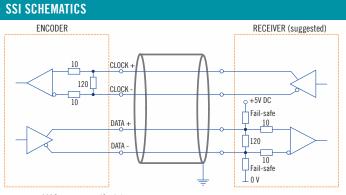
<sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

<sup>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



M12 connector (8 pin) M12 A coded front view













custom version XXX



# EMA 50 A / B Bit parallel - SSI

### SOLID SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

### MAIN FEATURES

Singleturn absolute magnetic encoder size 50 mm with solid shaft

- Resolution up to 13 bit (8192 ppr)
- Power supply up to +30 V DC with SSI or Bit Parallel as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Sturdy construction
- Solid shaft diameter up to 10 mm
- IP 67 enclosure rating
- Mounting by syncronous flange

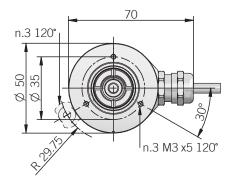


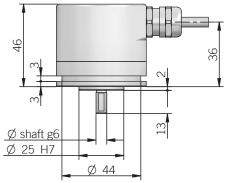


ORDERING CODE	EMA	50B	1024	G	8/30	N	N	X	6	Х	3	M12	R	. 162	+XXX
magnetic singleturn absolute	SERIES e encoder EMA														
synchron	ous flange ø 25	MODEL mm 50A													
synchrone for anodized version please	ous flange ø 30	mm 50B our offices													
(N / C / R	/ U / P interface)	ppr from 2													
	(S interface)	ppr trom 2		DE TYPE											
	(no powers of 2) b	inoni offo	at aada (N	gray G											
	(no powers of 2)			-XXX) GC	R SUPPLY										
					5 V DC 5 / DC 8/30										
					TRICAL IN										
				N	PN open c	ollector C PNP R									
				Р	NP open c										
			Serial	Synchrono	us Interfa		LOGIC								
						n:	egative N positive P								
							ported if n								
			(with hi	nani aada) i	atroho and		th external	strobe S							
			(WILLI DI	nary code) :	stione allu	IESEL MILI	i externar i	SHAFT D							
								(mod. 50	OA) mm 6 OB) mm 8 OB) mm 10						
									NCLOSURI	E RATING IP 65 X					
									МА	IP 67 S	ON SPEED				
									IIIA		000 rpm 3	PUT TYPE			
				n,	oforrod cab	la langthe 1	5/2/2/5	5 / 10 m, to b			ndard lengt	h 0,5 m) P			
				рі	elelled cap	ie ieligtiis 1	,3/2/3/3	7 7 10 III, to t			plug conne	ector M12	ION TYPE		
												DIVECT	axial A radial R		
												sucks	et not inclu	SOCKET	
							to be repo	rted only wit	h connector	r output (eg	g. M12R.162				VADIANT

VARIANT custom version XXX

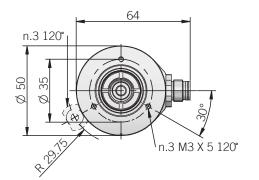
### **50A WITH RADIAL CABLE** OUTPUT

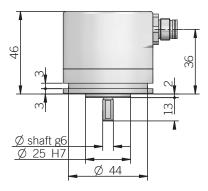




fixing clamps not included, please refer to Accessories

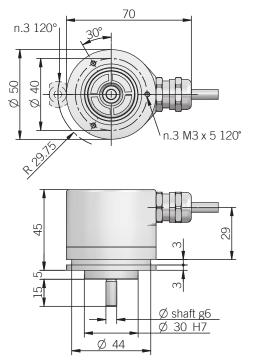
### **50A WITH RADIAL M12** OUTPUT





fixing clamps not included, please refer to Accessories

### **50B WITH RADIAL CABLE** OUTPUT

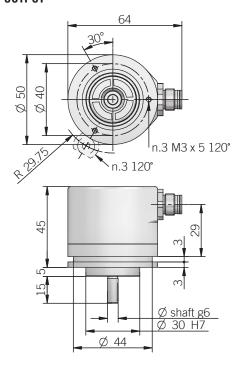


fixing clamps not included, please refer to Accessories

recommended mating shaft tolerance H7  $\ dimensions \ in \ mm$ 

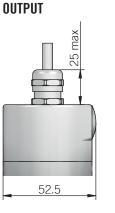
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### **50B WITH RADIAL M12** OUTPUT



fixing clamps not included, please refer to Accessories

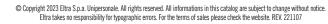
### **DIMENSIONS WITH AXIAL**













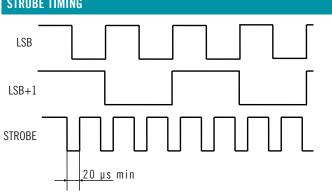
### MAGNETIC SINGLETURN ABSOLUTE ENCODERS | EMA 50 A / B

ELECTRICAL SPECIFICATIONS					
Resolution	from 2 to 4096 ppr (N / C / P / R / U interface) from 2 to 8192 ppr (S interface)				
Power supply <sup>1</sup>	$5 = 4.5 \dots 5.5 \text{ V DC}$ $8/30 = 7.6 \dots 31.5 \text{ V DC}$ (reverse polarity protection)				
Current consumption without load	< 100 mA				
Max load current	P = 20 mA / channel N / C / R / U = 40 mA / channel				
Electrical interface <sup>2</sup>	NPN / NPN open collector (ULN2003A) PNP / PNP open collector (TD62783) push pull (iC-DL) RS-422 (LTC1690 or similar)				
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms				
Max frequency	output 25 kHz LSB (Bit parallel) clock input 100 kHz 1 MHz (SSI)				
Code type	binary or gray				
SSI monostable time (Tm)	20 μs				
SSI pause time (Tp)	) > 35 μs				
Strobe time	20 μs				
SSI frame	MSB LSB 13 bit data length				
Counting direction	decreasing clockwise (shaft view)				
Start-up time	150 ms				
Accuracy	± 0,35° typical				
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	149 years with BIT PARALLEL output 160 years with SSI output				
Mission time (Tm) <sup>3</sup>	20 years				
Diagnostic coverage (DC) <sup>3</sup>	0%				
Cable type SSI	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm				
Cable type Bit Parallel	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				

MECHANICAL SPECIFICATI	ONS				
Shaft diameter	ø6/8/10 mm				
Enclosure rating IEC 60529					
Max rotation speed	3000 rpm continuous / 5000 rpm istantaneous				
Max shaft load⁴	30 N (6,74 lbs) axial / 50 N (11,24 lbs) radial				
Shock	50 G, 11 ms (IEC 60068-2-27)				
Vibration	20 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)	< 0,03 Nm (4,25 Ozin)				
Bearing stage material	aluminum				
Shaft material	stainless steel				
Housing material	painted aluminum				
Bearings	n.2 ball bearings				
Bearings life	10 <sup>9</sup> 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	t 200 g (7,05 oz)				
as measured at the transducer without cable influences for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section this product is not a safety component, for further details refer to TECHNICAL BASICS section maximum load for static usage measured on the transducer flange					

•	measur	eu on	uie	uan	suucei
ċ					

### STROBE TIMING



BIT PARALLEL CONNECTIONS						
Function	Gray / Binary	Cable				
bit 1 (LSB)	G <sup>0</sup> / B <sup>0</sup>	green				
bit 2	G1/B1	yellow				
bit 3	G <sup>2</sup> / B <sup>2</sup>	blue				
bit 4	G <sup>3</sup> / B <sup>3</sup>	brown				
bit 5	G <sup>4</sup> / B <sup>4</sup>	orange or pink				
bit 6	G <sup>5</sup> / B <sup>5</sup>	white				
bit 7	G <sup>6</sup> / B <sup>6</sup>	grey				
bit 8	G <sup>7</sup> / B <sup>7</sup>	violet				
bit 9	G8 / B8	grey / pink				
bit 10	G <sup>9</sup> / B <sup>9</sup>	white / green				
bit 11	G <sup>10</sup> / B <sup>10</sup>	brown / green				
bit 12	G11/ B11	white / yellow				
0 V	/	black				
+ V DC	/	red				
U / D	/	red / blue				
RESET	/	yellow / brown				
STROBE	/	white / grey				

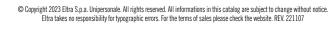
SSI CONNECTIONS		
Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange or pink	6
U/D	red / blue	7
RESET	white	1
÷	shield	housing

M12 connector (8 pin) M12 A coded front view



÷





shield





# EMA 50 F / G BIT PARALLEL - SSI

### BLIND HOLLOW SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

### MAIN FEATURES

Singleturn absolute magnetic encoder size 50 mm with blind hollow shaft

- Resolution up to 13 bit (8192 ppr)
- Power supply up to +30 V DC with SSI or Bit Parallel as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Sturdy construction
- Blind hollow shaft diameter up to 15 mm
- IP 67 enclosure rating
- Mounting by stator coupling or torque pin









ORDERING CODE	EMA	50F	1024	G	8/30	N	N	X	15	X	3	M12	R	. 162	+XXX
magnetic singleturn absolute	SERIES encoder EMA														
blind hollow shaft w															
blind hollow sh	aft with torque		OLUTION												
(N / C / R /	U / P interface) ¡ (S interface) ¡														
(	no powers of 2) b	inary offs		binary B gray G -XXX) BC											
V	(no powers of 2)	gray offs	et code (0-	-XXX) GC	R SUPPLY										
					5 V DC 5 DC 8/30										
					TRICAL IN										
				N	PN open c										
					NP open c	ollector U ush pull P									
			Serial S	Synchrono	us Interfa	ce - SSI S	LOGIC								
						ne	egative N								
								OPTIONS							
						reset wit (with	h external	input ZE ) strobe S							
			(with bir	nary code) S	strobe and	reset with	external i	input SZE	IAMETER						
									mm 14 mm 15						
			diameter	s 5 / 6 / 8 /	10 / 12 mn	n with option	nal shaft ad	lapter, see A	ccessories NCLOSUR	F RATING					
								_		IP 65 X IP 67 S					
									MA	X ROTATIO					
												PUT TYPE			
				pr	eferred cab	le lengths 1	,5/2/3/5	5 / 10 m, to b	oe added af	ter DIRECTI		. PR5)			
									(O III(CII	IGOU) WITE	piug coillic		ION TYPE axial A		
													radial R	COOKET	
							to be rese	rted only wit	h connocto	r output /o	M10D 100		t not inclu		
							то пе теро	nicu olliy Wil	n connecto	ı vurput (eg	. IVI 1 2 17. 10 2	i, iui sucket			VARIANT



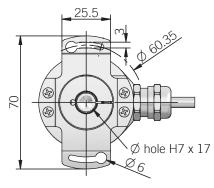


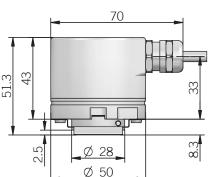
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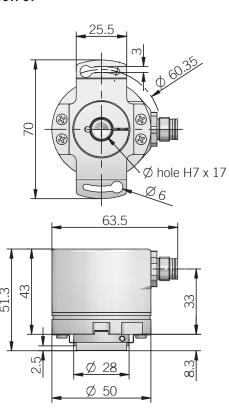
<sup>&</sup>lt;sup>6</sup> condensation not allowed

### **50F WITH RADIAL CABLE** OUTPUT

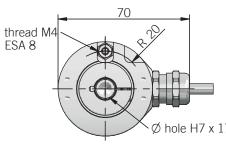


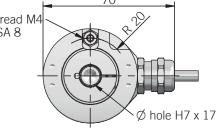


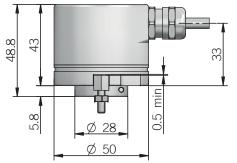
### 50F WITH RADIAL M12 OUTPUT



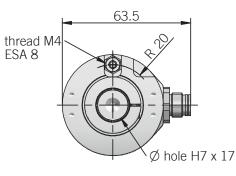
### **50G WITH RADIAL CABLE** OUTPUT

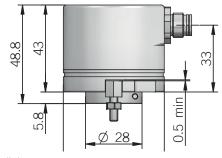






**50G WITH RADIAL M12** OUTPUT

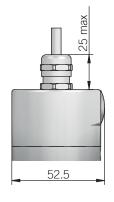




torque pin is included in model G, for mounting instruction please refer to product installation notes

recommended mating shaft tolerance g6 dimensions in mm

### **DIMENSIONS WITH AXIAL** OUTPUT



	11 1
Power supply <sup>1</sup>	5 = 4,5 5,5 V DC 8/30 = 7,6 31,5 V DC (reverse polarity protection)
Current consumption without load	< 100 mA
Max load current	P = 20 mA / channel N / C / R / U = 40 mA / channel
Electrical interface <sup>2</sup>	NPN / NPN open collector (ULN2003A) PNP / PNP open collector (TD62783) push pull (iC-DL) RS-422 (LTC1690 or similar)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Max frequency	output 25 kHz LSB (Bit parallel) clock input 100 kHz 1 MHz (SSI)
Code type	binary or gray
SSI monostable time (Tm)	20 μs
SSI pause time (Tp)	> 35 µs
Strobe time	20 μs
SSI frame	MSB LSB 13 bit data length
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy	± 0,35° typical
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	149 years with BIT PARALLEL output 160 years with SSI output
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type SSI	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
Cable type Bit Parallel	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

Resolution from 2 to 4096 ppr (N / C / P / R / U interface) from 2 to 8192 ppr (S interface)

**ELECTRICAL SPECIFICATIONS** 

BIT PARALLEL CONNECTI	ONS	
Function	Gray / Binary	Cable
bit 1 (LSB)	Gº / Bº	green
bit 2	G1 / B1	yellow
bit 3	G <sup>2</sup> / B <sup>2</sup>	blue
bit 4	G <sup>3</sup> / B <sup>3</sup>	brown
bit 5	G <sup>4</sup> / B <sup>4</sup>	orange or pink
bit 6	G <sup>5</sup> / B <sup>5</sup>	white
bit 7	G <sup>6</sup> / B <sup>6</sup>	grey
bit 8	G <sup>7</sup> / B <sup>7</sup>	violet
bit 9	G8 / B8	grey / pink
bit 10	G <sup>9</sup> / B <sup>9</sup>	white / green
bit 11	G10/ B10	brown / green
bit 12	G11/ B11	white / yellow
0 V	/	black
+ V DC	/	red
U/D	/	red / blue
RESET	/	yellow / brown
STROBE	/	white / grey
÷	/	shield

MECHANICAL SPECIFICATI	MECHANICAL SPECIFICATIONS						
Bore diameter	ø 14 / 15 mm ø 5 / 6* / 8* / 10* / 12* mm * with optional shaft adapter, please refer to Accessories						
Enclosure rating IEC 60529							
Max rotation speed	3000 rpm continuous						
Max shaft load⁴	30 N (6,74 lbs) axial / 50 N (11,24 lbs) radial						
Shock	50 G, 11 ms (IEC 60068-2-27)						
Vibration	20 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 $+20^{\circ}\text{C}$ / $+68^{\circ}\text{F}$ )	< 0,03 Nm (4,25 Ozin)						
Bearing stage material	aluminum						
Shaft material	stainless steel						
Housing material	painted aluminum						
Bearings	n.2 ball bearings						
Bearings life	10 <sup>9</sup> 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	200 g (7,05 oz)						
as measured at the transducer without cable influences							

1 as measured at the transducer without cable influences

2 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

## STROBE TIMING LSB LSB+1 **STROBE**

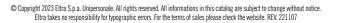
SSI CONNECTIONS		
Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange or pink	6
U / D	red / blue	7
RESET	white	1
÷	shield	housing

M12 connector (8 pin) M12 A coded front view











# EML 50 A / B ANALOGUE

### **SOLID SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER**

### MAIN FEATURES

Singleturn absolute magnetic encoder size 50 mm with solid shaft

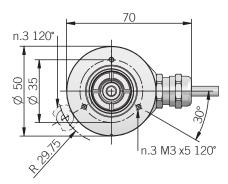
- Resolution 12 bit
- Power supply up to +28 V DC with analogue (voltage or current) electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Sturdy construction
- Solid shaft diameter up to 10 mm
- IP 67 enclosure rating
- Mounting by syncronous flange

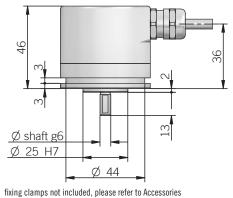




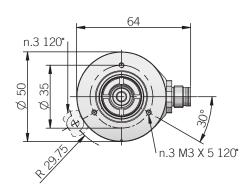
ORDERING CODE	EML	50A	360	X	12/28	٧	05	X	6	X	3	M12	R	. 162	+XXX
magnetic singleturn absolute synchronoi synchronoi for anodized version please o	us flange ø 25 us flange ø 30	mm 50B our offices  ACTIV  degr degr degr degr	E ANGLE rees 360 rees 270 rees 180 grees 90 orted if no n external	input <mark>ZE</mark> <b>POWEI</b> 2 28 V	R SUPPLY DC 12/28 Ctrical in	TERFACE voltage V current I OUTPU	<b>IT RANGE</b> <b>5 V</b> 05								
						0 0 20 4 20	10 V 010 0 mA 020 0 mA 420	OPTIONS							
		t	o be repor	ted with v	oltage out	put / 3 wir 4 wir	es current es current	output X output Q							
								(mod. 50 (mod. 50B	0A) mm 6 0B) mm 8	IP 65 X					
									MA)		IN SPEED 00 rpm 3				
				pr	referred cab	le lengths 1	,5 / 2 / 3 / 5	i / 10 m, to b		er DIRECTI	ndard lengt	ector M12			
												DIRECT	axial A radial R	SOCKET	
							to be res-	rtad anlu uit	h oonreet	output /s =	M12D 1C0		et not inclu	ded .162	
							то пе теро	rted only wit	n connector	output (eg	. IVI1217.102	, iui suckei	SEE ACCESS		VARIANT

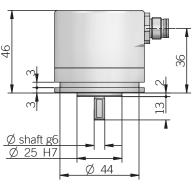
### **50A WITH RADIAL CABLE** OUTPUT





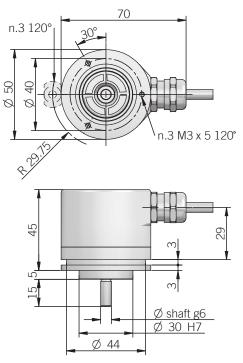
**50A WITH RADIAL M12** OUTPUT





fixing clamps not included, please refer to Accessories

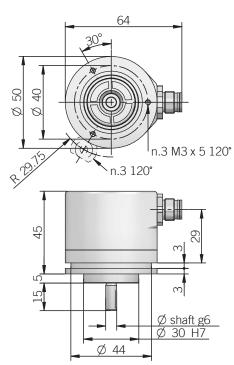
### **50B WITH RADIAL CABLE** OUTPUT



fixing clamps not included, please refer to Accessories

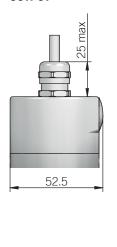
recommended mating shaft tolerance H7 dimensions in mm

### **50B WITH RADIAL M12** OUTPUT



### fixing clamps not included, please refer to Accessories

### **DIMENSIONS WITH AXIAL** OUTPUT











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### MAGNETIC SINGLETURN ABSOLUTE ENCODERS | EML 50 A / B

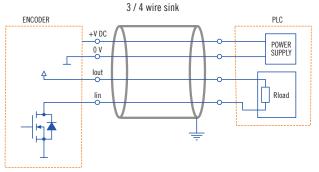
FLEATRIAN AREALEIGATI	2110
ELECTRICAL SPECIFICATION	JN2
Resolution	12 bit
Output DAC resolution	12 bit
Active angle	90 360 mechanical degrees
Power supply <sup>1</sup>	11,4 29,4 V DC (reverse polarity protection)
Current consumption without load	40 mA max
Electrical interface <sup>2</sup>	voltage (0 5 V / 0 10 V) current (0 20 mA / 4 20 mA)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Load	$\begin{array}{l} R_{\text{min}} = 1 \text{ k}\Omega \text{ (voltage output)} \\ R_{\text{max}} = \text{ (V DC - 2) / 0,02 (current output)} \end{array}$
Output update frequency	100 kHz
Signal pattern	decreasing clockwise (shaft view)
Start-up time	150 ms
Linearity error	< 1 %
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	153 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

ECHANICAL SPECIFICATIONS					
Shaft diameter	ø6/8/10 mm				
Enclosure rating IEC 60529					
Max rotation speed	3000 rpm continuous / 5000 rpm istantaneous				
Max shaft load⁴	30 N (6,74 lbs) axial / 50 N (11,24 lbs) radial				
Shock	50 G, 11 ms (IEC 60068-2-27)				
Vibration	20 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)	< 0,03 Nm (4,25 Ozin)				
Bearing stage material	aluminum				
Shaft material	stainless steel				
Housing material	painted aluminum				
Bearings	n.2 ball bearings				
Bearings life	10 <sup>9</sup> revolutions				
Operating temperature <sup>5, 6</sup>	-25° +85°C (-13° +185°F)				
Storage temperature	-25° +85°C (-13° +185°F)				
Weight	200 g (7,05 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
- $^{\rm 3}$  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

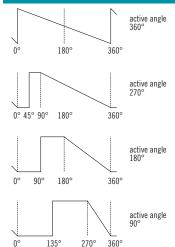
### **ELECTRICAL INTERFACE**

**CURRENT OUTPUT** 

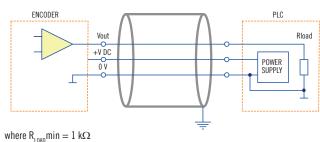


with 3 wires interface  $I_{\text{out}}$  is internally connected to +V DC where  $R_{1000}$  max =  $(V_{pc} - 2) / 0.02$ 

### SIGNAL PATTERN (decreasing CW)



### **VOLTAGE OUTPUT**



CONNECTION	CONNECTIONS											
Function	Cable (voltage)	Cable (current)	5 pin M12	8 pin M12*								
+ V DC	red	red	2	8								
0 V	black	black	4	5								
V <sub>out</sub>	green	/	3	/								
I <sub>in</sub>	/	yellow	3	3								
l <sub>out</sub>	/	green	/	2								
U/D	blue	blue	5	7								
RESET	white	white	1	1								
	shield	shield	housing	housing								

\* with Q current ouput M12 connector (5 pin)

M12 A coded front view

M12 connector (8 pin) M12 A coded front view











### **EML 50 F / G**

### BLIND HOLLOW SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

### MAIN FEATURES

Singleturn absolute magnetic encoder size 50 mm with blind hollow shaft

- Resolution 12 bit
- Power supply up to +28 V DC with analogue (voltage or current) electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Sturdy construction
- Blind hollow shaft diameter up to 15 mm
- IP 67 enclosure rating
- Mounting by stator coupling or torque pin







ORDERING CODE	EML	50F	360	Х	12/28	٧	05	Х	15	X	3	M12	R	. 162	+XXX
magnetic singleturn absolute	SERIES encoder EML														
		MODEL													
blind hollow shaft w blind hollow sh	rith stator coup aft with torque	oling 50F													
		degr	ees 360												
		degr	rees 270 rees 180 grees 90												
		to be rep		OPTION											
		reset with		input <b>ZE</b>	R SUPPLY										
			1	.2 28 V	DC 12/28	    terface									
				LLL		voltage V current I									
						0	JT RANGE 5 V 05								
						0 2	10 V 010 0 mA 020								
		+,	n ha ranai	tod with v	oltago out		0 mA 420 res current	OPTIONS							
		ι	o ne repoi	ileu willi v	onage out	iput / 5 wii 1 wir	res current	output Q	IAMETER						
								DOKLD	mm 14 mm 15						
			diameter	rs 5 / 6 / 8 /	10 / 12 mm	n with optio	nal shaft ad	apter, see A		E RATING					
										IP 65 X IP 67 S					
									MA	AX ROTATIO 30	00 rpm 3				
				_		l- l	F / 2 / 2 / 5	. / 10 +		cable (sta	ndard lengt				
				рі	ererred cap	ne lengths 1	,5/2/3/3	i / 10 m, to b	e audeu a	M12	olug conne	ector M12	ION TYPE		
												DIKEGI	axial A radial R		
												socke	et not inclu	SOCKET ded .162	
							to be repo	rted only wit	th connecto	or output (eg	. M12R.162	), for socket	see Accesso		VARIANT

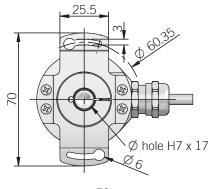


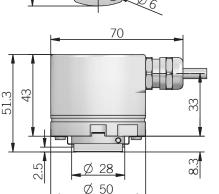


custom version XXX

175

### **50F WITH RADIAL CABLE** OUTPUT





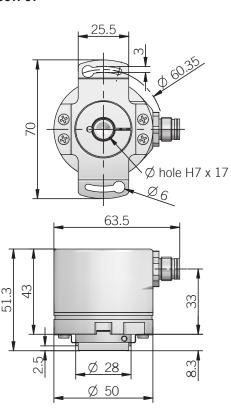
### **50F WITH RADIAL M12** OUTPUT

**50G WITH RADIAL M12** 

OUTPUT

thread M4

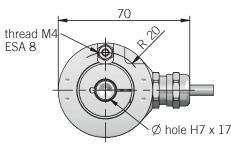
ESA 8

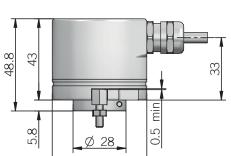


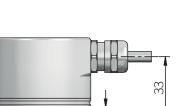
63.5

ï hole H7 x 17

### **50G WITH RADIAL CABLE** OUTPUT







 $\infty$ ₩. 5.8

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

recommended mating shaft tolerance g6 dimensions in mm

### **DIMENSIONS WITH AXIAL** OUTPUT



### **ELECTRICAL SPECIFICATIONS** Resolution 12 bit Output DAC resolution | 12 bit Active angle 90 ... 360 mechanical degrees Power supply<sup>1</sup> 11,4 ... 29,4 V DC (reverse polarity protection) **Current consumption** without load Electrical interface<sup>2</sup> voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA) Auxiliary inputs | active high (+V DC) (U/D - RESET) | connect to 0 V if not used / RESET tmin 150 ms Load $R_{\text{min}} = 1 \text{ k}\Omega$ (voltage output) $R_{\text{max}} = (\text{V DC} - 2) / 0,02$ (current output) Output update frequency | 100 kHz Signal pattern | decreasing clockwise (shaft view) Start-up time 150 ms Linearity error | < 1 % Mean time to dangerous failure (MTTF<sub>d</sub>)<sup>3</sup> 153 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

MECHANICAL SPECIFICATI	MECHANICAL SPECIFICATIONS					
Bore diameter	ø 14 / 15 mm ø 5 / 6* / 8* / 10* / 12* mm * with optional shaft adapter, please refer to Accessories					
Enclosure rating IEC 60529						
Max rotation speed	3000 rpm continuous					
Max shaft load <sup>4</sup>	30 N (6,74 lbs) axial / 50 N (11,24 lbs) radial					
Shock	50 G, 11 ms (IEC 60068-2-27)					
Vibration	20 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)	< 0,03 Nm (4,25 Ozin)					
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>	-25° +85°C (-13° +185°F)					
Storage temperature	-25° +85°C (-13° +185°F)					
Weight	200 g (7,05 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

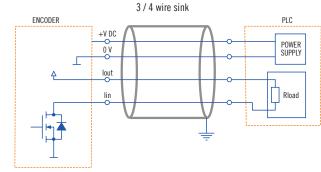
<sup>3</sup> this product is not a safety component, for further details refer to TECHNICAL BASICS section

4 maximum load for static usage

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

### **ELECTRICAL INTERFACE**

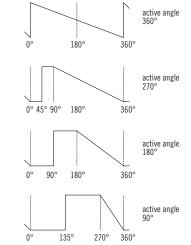
**CURRENT OUTPUT** 



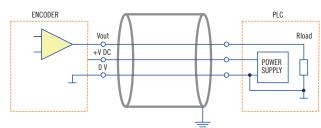
UL / CSA file n. E212495

with 3 wires interface  $I_{out}$  is internally connected to +V DC where  $R_{1000}$  max =  $(V_{pc} - 2) / 0.02$ 

### SIGNAL PATTERN (decreasing CW)



### **VOLTAGE OUTPUT**



where  $R_{\text{LOAD}} \text{min} = 1 \text{ k}\Omega$ 

#### CONNECTIONS **Function** Cable Cable 5 pin (voltage) (current) M12 + V DC red red 0 V black black $V_{\rm out}$ green vellow green U/D blue blue RESET white white ÷ shield shield

\* with Q current ouput

M12 connector (5 pin) M12 A coded front view



M12 connector (8 pin) M12 A coded front view







## **AAM 38 F**

### **BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER**

### MAIN FEATURES

Miniaturized optical multiturn absolute encoder for high end application. Thanks to BiSS-C interface and high resolution it can be used in robotics, motor feedback and CNC machines.

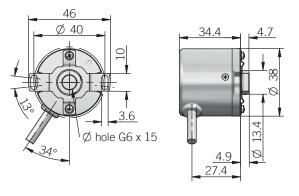
- Optical sensor technology (OptoASIC + Energy Harvesting)
- 39 bit total resolution (23 bit single turn + 16 bit multiturn)
- Power supply +5 VDC with BiSS-C as electrical interface
- Cable output
- Blind hollow shaft diameter up to 8 mm
- Mounting by stator coupling
- Operating temperature -20° ... +105°C (-4° ... +221°F)

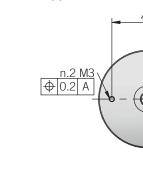


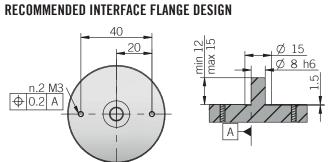


ORDERING CODE AAN	38F	16	1	23	В	5	В	8	X	X	PR	.XXX
SERIES absolute multiurn encoder AAN	1											
blind hollow shaft with stator co <b>MUL</b>	MODEL upling 38F TITURN RES											
	SINGLI			OLUTION bit 23								
				C	DDE TYPE binary B							
						SUPPLY 5 V DC 5						
					ELEC	TRICAL IN	BiSS-C B					
								mm 6 mm 6,35				
							E	mm 8 INCLOSUR	E RATING IP 50 X			
										OPTIONS eported X		
								radial	cable (stan	<b>OUT!</b> dard length	PUT TYPE 0,2m) PR	
												VARIANT

### AAM 38F







dimensions in mm

<b>ELECTRICAL SPECIFICATIO</b>	DNS
Multiturn resolution	16 bit
Singleturn resolution	23 bit
Fault status	8 bit
CRC	8 bit
Power supply <sup>1</sup>	4,75 5,25 V DC
Current consumption without load	< 120 mA
Output type <sup>2</sup>	BiSS-C (SN65LBC179Q or similar)
Code type	binary
Clock frequency (MA)	80 kHz 10 MHz
<b>Position calculation Time</b>	Refer to BiSS-C T <sub>busy time</sub>
Counting direction	decreasing clockwise (shaft view)
Start-up time	500 ms
Accuracy	± 80 arc-sec
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	481 years
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

CONNECTIONS					
Function	Cable				
+ V DC	red				
GROUND	black				
SERIAL DATA (SLO) +	orange				
SERIAL DATA (SLO) -	blue				
SERIAL CLOCK (MA)+	brown				
SERIAL CLOCK (MA) -	white				

MECHANICAL SPECIFICATI	ONS
Shaft diameter	ø 6 / 6,35 (1/4") / 8 mm
Enclosure rating	IP 50 (IEC 60529)
Max rotation speed	6000 rpm continuous
Shock	200 G, 6 ms (IEC 60068-2-27)
Vibration	10 G, 10 2000 Hz (IEC 60068-2-6)
Shaft material	brass
Housing material	steel
Bearing stage material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 <sup>9</sup> revolutions
Operating temperature <sup>4, 5</sup>	-20° +105°C (-4° +221°F)
Storage temperature <sup>5</sup>	-20° +105°C (-4° +221°F)
Shaft radial play allowed	± 0,05 mm
Shaft axial play allowed	± 0,1 mm
Fixing torque for shaft grains	1 Nm (142 Ozin) recommended
Fixing torque for	0,35 Nm (49,5 Ozin) recommended for
spring screws	M3 screws (not provided)
Weight	150 g (5,29 oz)

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









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 $<sup>^{\</sup>rm 2}$  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



### EAMR 58 B / C - 63 A / D / E BIT PARALLEL - SSI

**SOLID SHAFT MULTITURN ABSOLUTE ENCODER** 

### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (proprietary OptoASIC + Energy Harvesting)
- Resolution up to 65 bit (25 bit single turn + 40 bit multiturn)
- Power supply up to +30 VDC with Bit Parallel or SSI as electrical interface
- Cable or connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5" square flange





ORDERING CODE Bit Parallel	EAMR	63A	12 /	12	G	8/30	P	P	X	10	X	MA	R	.162	+XXX
multitura abaduta	SERIES														
multiturn absolute	encoder EAWK I	MODEL													
	s flange ø 31.75 i ous flange ø 50 i														
clamp centering square	ing flange ø 36 i	mm 58C													
centering squ	ıare flange ø 50 i	mm 63E													
	MULTITU	RN RESUL bit from 1													
	SI	NGLETURI b	N RESOL it from 1												
					DE TYPE binary B										
					gray G										
						R SUPPLY DC 8/30									
					ELEC	TRICAL IN	TERFACE sh-pull P								
						P.		LOGIC							
							ne F	egative N positive P							
							to be rep	ported if n	<b>OPTIONS</b> ot used X						
								th external	latch L						
						latch /	reset with		nputs LZE	DIAMETER					
									(mod. 58	8 B) mm 6					
										E) mm 10					
								IP 65		<b>ENCLOSUR</b> e / IP67 cov	er side X				
											IP 67 S	PUT TYPE			
				(up to 1	3 bit as tot	al resolution	n, without re	eset option)	16 cores o	cable (stand	dard length	1,5 m) PD			
				(1	preferred	cable lengtl	hs 2 / 3 / 5 /	/ 10 m, to b	e added aft	er DIRECTIO	N TYPE (eg.	PDR5)			
					(up to 1	3 bit as tota (fro	al resolution om 14 to 25	i, without re bit as total	resolution)	19 pin MIL 32 pin MIL	. plug conr . plug conr	nector ME			
												DIRECT	radial R		
												20010	et not inclu	SOCKET	
							to be rep	orted only v	vith connect	tor output (e	g. MAR.162			ories	
															VARIANT





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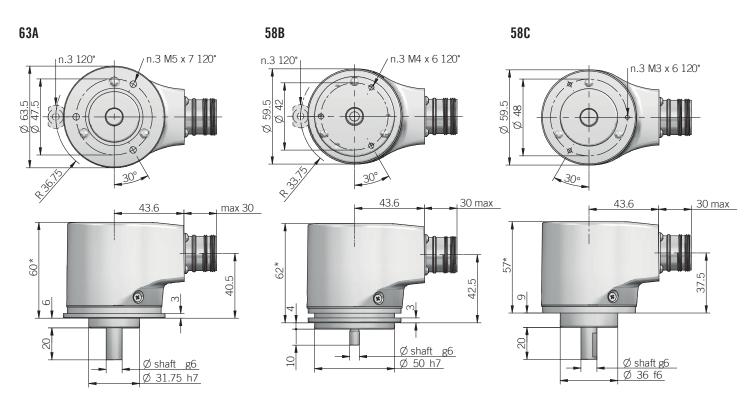
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VARIANT custom version XXX

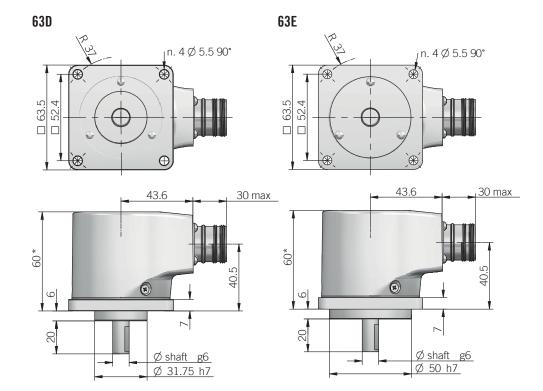
**ORDERING CODE** EAMR 63A 12 / 13 G 8/30 X 2048 R . 162 +XXX SERIES multiturn absolute encoder EAMR MODEL synchronous flange ø 31.75 mm 63A synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C centering square flange ø 31.75 mm 63D centering square flange ø 50 mm 63E MULTITURN RESOLUTION bit 12 / 14 / 15 see table for preferred combinations SINGLETURN RESOLUTION bit 13 / 18 / 25 see table for preferred combinations CODE TYPE binary POWER SUPPLY 8 ... 30 V DC 8/30 ELECTRICAL INTERFACE Serial Synchronous Interface - SSI S to be reported if not used Xreset with external input ZE reset on cover or with external input ZP INCREMENTAL RESOLUTION (powers of 2) ppr from 128 to 8192 INCREMENTAL ELECTRICAL INTERFACE available with PD or HA output type line driver HTL push pull P line driver RS-422 RS SHAFT DIAMETER (mod. 58 B) mm 6 (mod. 63 A / D) 3/8"- mm 9,52 (mod. 58 C - 63 A / D / E) mm 10 **ENCLOSURE RATING** IP 65 shaft side / IP67 cover side X **OUTPUT TYPE** cable (standard length 1,5 m) PC preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5) cable (standard length 1,5 m) PI preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5) (without reset option) 7 pin MIL plug connector MC (without reset option) 7 pm MIL plug connector MC
(with reset option) 10 pin MIL plug connector MD
12 pin M23 plug connector M12
8 pin M12 plug connector M12 DIRECTION TYPE SOCKET socket not included .162 to be reported only with connector output (eg. HAR.162), for socket see Accessories

only with additional incremental output



for fixing clamps please refer to Accessories

for fixing clamps please refer to Accessories



\* with option ZP +1.5 mm recommended mating shaft tolerance H7 dimensions in mm







SSI CONNECTION	S						
Function	Cable PC	Cable PD	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	red	G	G	8	8	8
0 V	black	black	F	F	1	1	5
DATA +	green	green	С	С	2	2	3
DATA -	brown	brown	D	D	10	10	2
CLOCK +	yellow	yellow	A	A	3	3	4
CLOCK -	orange or pink	orange or pink	В	В	11	11	6
A+	/	grey	/	/	/	6	/
A-	/	blue	/	/	/	7	/
B+	/	purple	/	/	/	9	/
B-	/	white / green	/	/	/	12	/
U / D	red / blue	red / blue	E	E	5	5	7
RESET	white	white	/	Н	4	4	1
÷	shield	shield	housing	housing	9	housing	housing

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

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

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

MA connector (19 pin) Amphenol 62IN 12E 14-19 P front view front view

ME connector (32 pin) Glenair IPT 02 A 18-32 P F6 front view



M12 connector (8 pin) M12 A coded front view











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### OPTICAL MULTITURN ABSOLUTE ENCODERS | EAMR 58 B/C - 63 A/D/E PAR - SSI

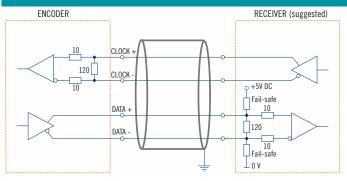
ELECTRICAL SPECIFICATION	JN2					
Multiturn resolution	12 / 14 / 15 bit					
Multiturii resolutioii	please directly contact our offices for other pulses					
	P = from 1 to 13 bit					
	S = preferred combinations					
Singleturn resolution	12 multiturn / 13 singleturn					
omgrotarii roosiation	14 multiturn / 18 singleturn					
	15 multiturn / 25 singleturn please directly contact our offices for other pulses					
Dower cumului						
Power supply <sup>1</sup> Power draw without load	7,6 30 V DC (reverse polarity protection)					
Max load current	20 mA / channel					
Absolute electrical interface <sup>2</sup>	P = push pull (iC-DL) S = RS-422 (THVD1451 or similar)					
-	L = HTL differential (AEIC-7272 or similar)					
Incremental	P = Push-Pull (AEIC-7272 or similar)					
electrical interface <sup>2</sup>	RS = RS-422 (AELT-5000 or similar)					
Max incremental	128 kHz					
output frequency						
Auxiliary inputs	active high (+V DC)					
(U/D - RESET - LATCH)	connect to 0 V if not used / RESET - LATCH t <sub>min</sub> 150 ms					
Max frequency	50 kHz LSB (Bit Parallel) clock input 100 kHz 1 MHz (SSI)					
Code type	binary or gray					
	SSI = positive					
Logic	Bit parallel = positive or negative					
SSI monostable time (Tm)	20 µs					
SSI pause time (Tp)	> 35 µs					
	tree format MSB LSB					
CCI frame	up to 12 bit multiturn = length 25 bit (12MT + 13ST)					
SSI frame	14 bit multiturn = length 32 bit (14MT + 18ST)					
	, -					
SSI status and parity bit	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request					
SSI status and parity bit Counting direction	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view)					
SSI status and parity bit Counting direction Start-up time	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms					
SSI status and parity bit Counting direction Start-up time Accuracy	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view)					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF,) <sup>3</sup>	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1 Mission time (Tm) <sup>3</sup>	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF_d) <sup>3</sup> according to EN ISO 13849-1 Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup>	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0%					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF_d) <sup>3</sup> according to EN ISO 13849-1 Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup> Cable type	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0% shielded - fixed installation					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF_d) <sup>3</sup> according to EN ISO 13849-1 Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup>	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0%					
SSI status and parity bit  Counting direction  Start-up time  Accuracy  Mean time to dangerous  failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1  Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup> Cable type  PC	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0% shielded - fixed installation conductors section 0,22 mm²/AWG 24					
SSI status and parity bit  Counting direction  Start-up time  Accuracy  Mean time to dangerous  failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1  Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup> Cable type  PC	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0% shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm shielded - fixed installation conductors section 0,14 mm²/AWG 26					
SSI status and parity bit  Counting direction  Start-up time  Accuracy  Mean time to dangerous  failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1  Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup> Cable type  PC	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0% shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1 Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup> Cable type PC Cable type PD	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0% shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm shielded - fixed installation					
SSI status and parity bit  Counting direction  Start-up time  Accuracy  Mean time to dangerous  failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1  Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup> Cable type  PC	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0% shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm shielded - fixed installation conductors section 0,14 mm²/AWG 26					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1 Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup> Cable type PC Cable type PD	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0% shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1 Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup> Cable type PC Cable type PD Cable type PE	14 bit multitum = length 32 bit (14MT + 18ST) 15 bit multitum = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0% Shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 60 mm shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 50 mm shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 50 mm shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 50 mm according to 2014/30/EU directive					
SSI status and parity bit Counting direction Start-up time Accuracy Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1 Mission time (Tm) <sup>3</sup> Diagnostic coverage (DC) <sup>3</sup> Cable type PC Cable type PD	14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) on request decreasing clockwise (shaft view) 700 ms ± 0,069°  156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output 20 years 0% shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm					

ROTATION SPEED DERATING TABLE							
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)					
up to +70 (+158)	10000	8000					
+70 +85 (+158 +185)	8000	5000					
+85 +100 (+185 212)	5000	3000					

MECHANICAL SPECIFICATI	ONS			
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm			
Enclosure rating IEC 60529				
Max rotation speed	see table			
Max shaft load <sup>4</sup>	200 N (45 lbs) axial / 70 N (15,74 lbs) 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)	< 0,03 Nm (4,25 Ozin)			
Bearing stage material	aluminium			
Shaft material	stainless steel			
Housing material	painted aluminium			
Bearings	n.2 ball bearings			
Bearings life	10 <sup>9</sup> revolutions			
Operating temperature Bit parallel <sup>5, 6</sup>	-20° +85°C (-4 +185°F)			
Operating temperature SSI <sup>5, 6</sup>	-40° +100°C (-40° +212°F) -20° +100°C (-4° +212°F) with PC cable output -20° +85°C (-4° +185°F) with PD cable output -25° +85°C (-13° +185°F) with M12 connector			
Storage temperature <sup>6</sup>	-20° +85°C (-4° +185°F)			
Weight	approx 300 g (10,58 oz)			

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

### SSI SCHEMATICS



### BIT PARALLEL CONNECTOR OR CABLE CHOICE

According to the resolution and the chosen number of turns is possible to calculate the connections required by the connector or the cable. See below examples:

Singleturn = 8 bit = 8 connections Multiturn = 5 bit = 5 connectionsTotal connections 13

Singleturn = 12 bit = 12 connections
Multiturn = 12 bit = 12 connections
Total connections 24

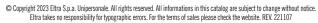
From 1 to 13 connections a 16 cores cable (PD) or a 19 pin connector (MA) is required. From 14 to 25 connections a 32 cores cable (PE) or a 32 pin connector (ME) is required.

With LATCH option a 32 cores cable (PE) or a 19 pin connector (MA) or a 32 pin connector

With RESET option a 32 cores cable (PE) or a 32 pin connector (ME) is required.







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

RS 15 X HA

R .162 +XXX



## EAMR 58 F - 63 F / G BIT PARALLEL - SSI

### BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (proprietary OptoASIC + Energy Harvesting)
- Resolution up to 65 bit (25 bit single turn + 40 bit multiturn) Power supply up to +30 VDC with Bit Parallel or SSI as electrical interface
- Cable or connector output
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin







ORDERING CODE BIT PARALLEL	EAMR 5	8F	12	/ 12	G	8/30	Р	P	Х	15	Х	MA	R	.162	+XXX
BIT PARALLEL  multiturn absolu  blind hollow sha blind hollow sha	SERIES te encoder EAMR  M0 ft with stator coupling ft with torque stop slot v shaft with torque pin  MULTITURN I  Bit  SINGL	SEE CONTRACTOR OF THE PROPERTY	UTION to 12 I RESOI t from	LUTION 1 to 13 CC 52 (3/8	DDE TYPE binary B gray G POWEI 8 30 \ ELEC ") / 10 / 1:	R SUPPLY / DC 8/30 TRICAL IN pu  latch /   1 / 12 mm; al resolution 5 bit as tota cable length 3 bit as tot	to be relatch wreset with option in (without real resolution in (2/3/5/a) are solution in (2/3/5/a) are solution	LOGIC egative N positive P ported if n with external ir external ir all shaft and IP 65 eset option) or options) 10 m, to bi, without re	OPTIONS of used X al input L input SE puts LZE BORE I shaft side 16 cores of 32 cores of 33 cores of 34 cores of 35 cores of 35 cores of 36 cores of 3	DIAMETER mm 14 mm 15 Accessories ENCLOSUR e / IP67 co	<b>E RATING</b> ver side X IP 67 S	PUT TYPE 1,5 m) PD 1,5 m) PE PDR5) lector MA lector ME	R ON TYPE radial R	.162	+XXX
							to be rep	orted only v	vith connec	tor output (e	eg. MAR.162)		t not inclu see Accesso		VARIANT
															VARIANT

blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G MULTITURN RESOLUTION bit 12 / 14 / 15 see table for preferred combinations SINGLETURN RESOLUTION bit 13 / 18 / 25 see table for preferred combinations CODE TYPE gray G POWER SUPPLY 8 ... 30 V DC 8/30 **ELECTRICAL INTERFACE** Serial Synchronous Interface - SSI \$ to be reported if not used X reset with external input ZE reset on cover or with external input ZP INCREMENTAL RESOLUTION (powers of 2) ppr from 128 to 8192 INCREMENTAL ELECTRICAL INTERFACE available with PD or HA output type line driver HTL L push pull P line driver RS-422 RS **BORE DIAMETER** diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories ENCLOSURE RATING IP 65 shaft side / IP67 cover side X **OUTPUT TYPE** cable (standard length 1,5 m) P( preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5) cable (standard length 1,5 m) PD preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5) (without reset option) 7 pin MIL plug connector MC (with reset option) 10 pin MIL plug connector MD 12 pin M23 plug connector HA 8 pin M12 plug connector M12 DIRECTION TYPE radial R SOCKET socket not included .162 to be added with incremental output to be reported only with connector output (eg. HAR.162), for socket see Accessories VARIANT







custom version XXX

custom version +XXX

187

**ORDERING CODE** 

multiturn absolute encoder EAMR

blind hollow shaft with stator coupling 58F

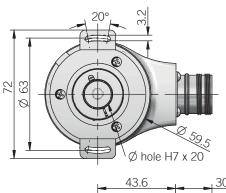
EAMR 58F 12 / 12

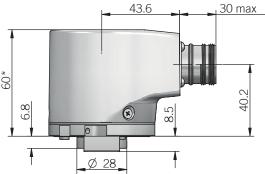
MODEL

SERIES

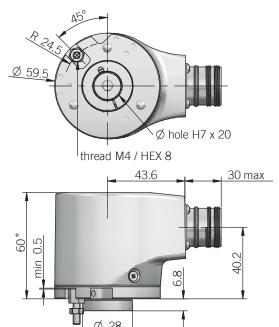
G 8/30

X 2048

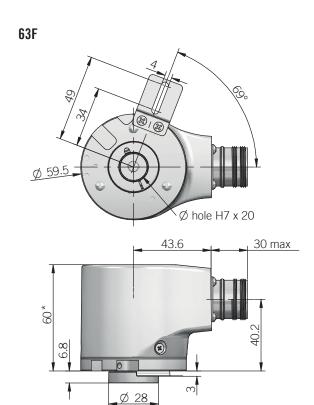




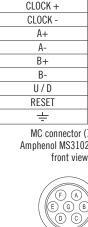
63G

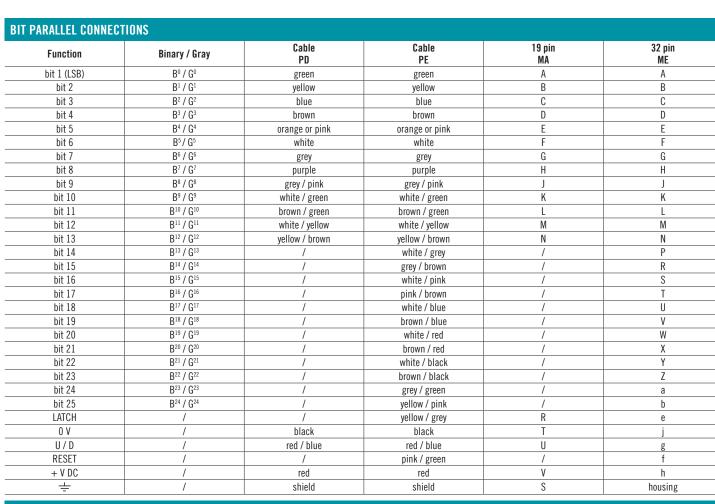


torque pin is included



for torque pin please refer to Accessories





SSI CONNECTION	S						
Function	Cable PC	Cable PD	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	red	G	G	8	8	8
0 V	black	black	F	F	1	1	5
DATA +	green	green	С	С	2	2	3
DATA -	brown	brown	D	D	10	10	2
CLOCK +	yellow	yellow	A	A	3	3	4
CLOCK -	orange or pink	orange or pink	В	В	11	11	6
A+	/	grey	/	/	/	6	/
A-	/	blue	/	/	/	7	/
B+	/	purple	/	/	/	9	/
B-	/	white / green	/	/	/	12	/
U/D	red / blue	red / blue	E	E	5	5	7
RESET	white	white	/	Н	4	4	1
<u></u>	shield	shield	housing	housing	9	housing	housing

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

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

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

MA connector (19 pin) Amphenol 62IN 12E 14-19 P front view

ME connector (32 pin) Glenair IPT 02 A 18-32 P F6 front view



M12 connector (8 pin) M12 A coded front view



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<sup>\*</sup> with option ZP + 1,5 mmrecommended mating shaft tolerance g6 dimensions in mm

### OPTICAL MULTITURN ABSOLUTE ENCODERS | EAMR 58 F - 63 F / G PAR - SSI

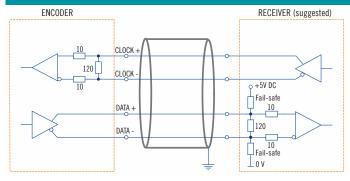
<b>ELECTRICAL SPECIFICATIO</b>	INS
Multiturn resolution	12 / 14 / 15 bit
Multiturii resolutioii	please directly contact our offices for other pulses
	P = from 1 to 13 bit
	S = preferred combinations
Singleturn resolution	12 multiturn / 13 singleturn
· ·	14 multiturn / 18 singleturn 15 multiturn / 25 singleturn
	please directly contact our offices for other pulses
Power supply <sup>1</sup>	7,6 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Max load current	20 mA / channel
Absolute	P = push pull (iC-DL)
electrical interface <sup>2</sup>	S = RS-422 (THVD1451 or similar)
In consensated	L = HTL differential (AEIC-7272 or similar)
Incremental electrical interface <sup>2</sup>	P = Push-Pull (AEIC-7272 or similar)
electrical interrace	RS = RS-422 (AELT-5000 or similar)
Max incremental	128 kHz
output frequency	
Auxiliary inputs (U/D - RESET - LATCH)	active high (+V DC) connect to 0 V if not used / RESET - LATCH t <sub>min</sub> 150 ms
-	50 kHz LSB (Bit Parallel)
Max frequency	clock input 100 kHz 1 MHz (SSI)
Code type	binary or gray
	SSI = positive
Logic	Bit parallel = positive or negative
SSI monostable time (Tm)	20 μs
SSI pause time (Tp)	> 35 µs
	tree format MSB LSB
SSI frame	up to 12 bit multiturn = length 25 bit (12MT + 13ST)
	14 bit multiturn = length 32 bit (14MT + 18ST)
CCI status and navity hit	15 bit multiturn = lenght 40 bit (15MT + 25ST)
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 0,069°
Mean time to dangerous	156 years with BIT PARALLEL output
failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	186 years with SSI/INCREMENTAL output
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
PC	bending radius min 60 mm
Cable type	shielded - fixed installation
PD	conductors section 0,14 mm²/AWG 26
	bending radius min 50 mm
Cable type	shielded - fixed installation conductors section 0.14 mm²/AWG 26
PE	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
UL / USA	IIIG II. LC1C4JJ

ROTATION SPEED DERATING TABLE												
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)									
	up to +70 (+158)	9000	6000									
IP65	+70 85 (+158 +185)	6000	3000									
	up to +70 (+158)	8000	6000									
IP67	+70 +85 (+158 +185)	4000	2000									

MECHANICAL SPECIFICATI	ONS
Bore diameter	ø 14 / 15 mm ø 6 / 8* / 9,52 (3/8")* / 10* / 11* / 12* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side $S = IP 67$
Max rotation speed	see table
Max shaft load⁴	200 N (45 lbs) axial / 60 N (13,49 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 10 <sup>-6</sup> kgm <sup>2</sup> (119 x 10 <sup>-6</sup> lbft <sup>2</sup> )
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	109 revolutions
Operating temperature Bit parallel <sup>5, 6</sup>	-20° +85°C (-4° +185°F)
Operating temperature SSI <sup>5, 6</sup>	-40° +85°C (-40° +185°F) -20° +85°C (-4° +185°F) with cable output -25° +85°C (-13° +185°F) with M12 connector
Storage temperature	-20° +85°C (-4° +185°F)
Weight	approx 350 g (12,35 oz)

- 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 maximum load for static usage
- <sup>5</sup> measured on the transducer flange
- <sup>6</sup> condensation not allowed

### SSI SCHEMATICS



### BIT PARALLEL CONNECTOR OR CABLE CHOICE

According to the resolution and the chosen number of turns is possible to calculate the connections required by the connector or the cable. See below examples:

EXAMPLE 1 Singleturn = 8 bit = 8 connections Multiturn = 5 bit = 5 connectionsTotal connections 13

EXAMPLE 2 Singleturn = 12 bit = 12 connectionsMultiturn = 12 bit = 12 connectionsTotal connections 24

From 1 to 13 connections a 16 cores cable (PD) or a 19 pin connector (MA) is required. From 14 to 25 connections a 32 cores cable (PE) or a 32 pin connector (ME) is required.

With LATCH option a 32 cores cable (PE) or a 19 pin connector (MA) or a 32 pin connector (ME) is required.

With RESET option a 32 cores cable (PE) or a 32 pin connector (ME) is required.







·-----

RS

R . 162 +XXX

X 2048



### EAMR 90 - 115 A BIT PARALLEL - SSI

### SOLID SHAFT MULTITURN ABSOLUTE ENCODER

### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (proprietary OptoASIC + Energy Harvesting)
- Resolution up to 65 bit (25 bit single turn + 40 bit multiturn)
- Power supply up to +30 VDC with Bit Parallel or SSI as electrical interface
- · Cable or connector output
- · Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange





EAMR	90A	12	1	12	G	8/30	P	Р	X	10	X	MA	R	. 162	+XXX
SERIES FAME															
niultiturn absolute encoder EAMR	MODEL														
synchronous flange ø 40 REO-444 fla	) mm 90A														
	URN RESO	LUTION													
	bit from SINGLETUR			TION											
		bit fror													
				C	ODE TYPE binary B										
					gray G										
					POWER 8 30 V	R SUPPLY DC 8/30									
						TRICAL IN									
						pu	sh-pull P	10010							
								<b>LOGIC</b> egative N							
							ļ	oositive P	OPTIONS						
								ported if n	ot used X						
								rith extern th externa							
						latch /	reset with		nputs LZE						
								(mod		mm 9,52					
										mm 10 5) mm 11					
										ENCLOSUR	E RATING				
								IP 65	shaft side	e / IP67 cov	ver side X IP 67 S				
												PUT TYPE			
			(	up to	13 bit as tot	al resolution	n, without re	set option)	16 cores o	cable (stand cable (stand	dard length	1,5 m) PD			
				(1	preferred	cable lengtl	ns 2 / 3 / 5 /	' 10 m, to b	e added aft	er DIRECTIOI	N TYPE (eg.	PDR5)			
					(up to 1	3 bit as tota fro)	al resolution m 14 to 25	ı, without re bit as total	eset option) resolution)	19 pin MIL 32 pin MIL	. plug con . plug con	nector MA nector ME			
						,							ION TYPE		
													radial R	SOCKET	
											MAD 100		t not inclu	ded .162	
							to be rep	ortea only v	VILLI CONNEC	tor output (ê	g. WAK.162	), for socket	see access		VARIANT

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DIRECTION TYPE radial R

socket not included .162

SOCKET

custom version XXX

custom version XXX

to be added with incremental output

**ORDERING CODE** 

multiturn absolute encoder EAMR

EAMR 90A 12 / 13

MULTITURN RESOLUTION bit 12 / 14 / 15

> SINGLETURN RESOLUTION bit 13 / 18 / 25

see table for preferred combinations

see table for preferred combinations

SERIES

synchronous flange ø 40 mm 90A REO-444 flange 115A G 8/30

**ELECTRICAL INTERFACE**Serial Synchronous Interface - SSI S

to be reported if not used X reset with external input ZE reset on cover or with external input ZP

INCREMENTAL RESOLUTION (powers of 2) ppr from 128 to 8192

INCREMENTAL ELECTRICAL INTERFACE available with PD or HA output type

line driver HTL L push pull P line driver RS-422 RS

preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5)

preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5)

SHAFT DIAMETER (mod. 90) 3/8"- mm 9,52

IP 65 shaft side / IP67 cover side X

mm 10 (mod. 115) mm 11

(without reset option) 7 pin MIL plug connector MC (with reset option) 10 pin MIL plug connector ME

ENCLOSURE RATING

IP 67 S

cable (standard length 1,5 m) PC

cable (standard length 1,5 m) PD

12 pin M23 plug connector HA

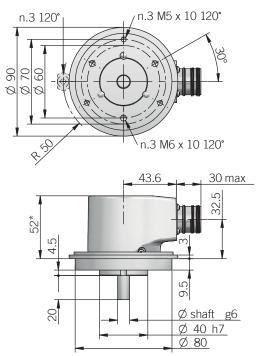
8 pin M12 plug connector M12

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

**OUTPUT TYPE** 

code type
binary B
gray G

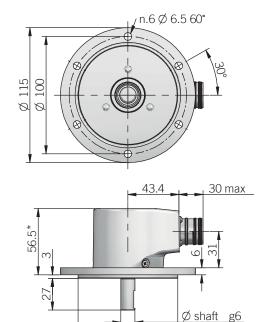
POWER SUPPLY
8 ... 30 V DC 8/30



for fixing clamps please refer to Accessories  $^{*}$  with option ZP +1,5 mm recommended mating shaft tolerance H7 dimensions in mm

Eltra 1985-2020

### 115A



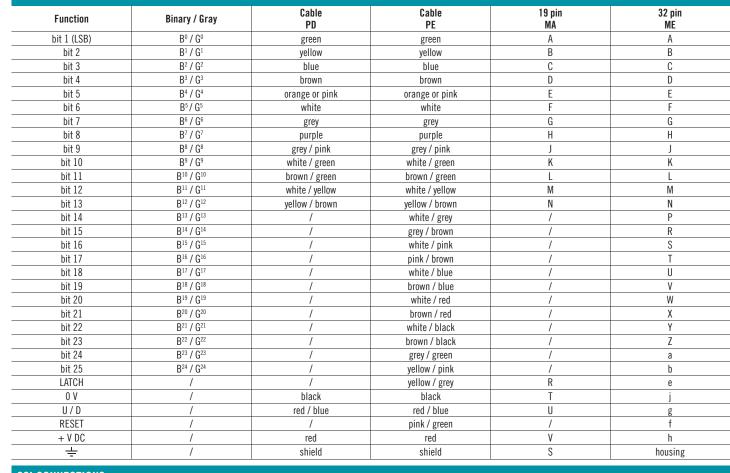
Ø 85 h7





M12 connector (8 pin) M12 A coded front view





SSI CONNECTION	S						
Function	Cable PC	Cable PD	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	red	G	G	8	8	8
0 V	black	black	F	F	1	1	5
DATA +	green	green	С	С	2	2	3
DATA -	brown	brown	D	D	10	10	2
CLOCK +	yellow	yellow	Α	A	3	3	4
CLOCK -	orange or pink	orange or pink	В	В	11	11	6
A+	/	grey	/	/	/	6	/
A-	/	blue		/	/	7	/
B+	/	purple	/	/	/	9	/
B-	/	white / green	/	/	/	12	/
U / D	red / blue	red / blue	E	E	5	5	7
RESET	white	white		Н	4	4	1
÷	shield	shield	housing	housing	9	housing	housing

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

BIT PARALLEL CONNECTIONS

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

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

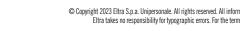
MA connector (19 pin) Amphenol 62IN 12E 14-19 P front view

ME connector (32 pin) Glenair IPT 02 A 18-32 P F6 front view



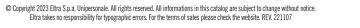
















### OPTICAL MULTITURN ABSOLUTE ENCODERS | EAMR 90 - 115 A PAR - SSI

ELECTRICAL SPECIFICATION	INS
Multiturn resolution	12 / 14 / 15 bit please directly contact our offices for other pulses
Singleturn resolution	P = from 1 to 13 bit S = preferred combinations 12 multiturn / 13 singleturn 14 multiturn / 18 singleturn 15 multiturn / 25 singleturn please directly contact our offices for other pulses
Power supply <sup>1</sup>	7,6 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Max load current	20 mA / channel
Absolute electrical interface <sup>2</sup>	P = push pull (iC-DL) S = RS-422 (THVD1451 or similar)
Incremental electrical interface <sup>2</sup>	L = HTL differential (AEIC-7272 or similar) P = Push-Pull (AEIC-7272 or similar) RS = RS-422 (AELT-5000 or similar)
Max incremental output frequency	128 kHz
Auxiliary inputs (U/D - RESET - LATCH)	active high (+V DC) connect to 0 V if not used / RESET - LATCH t <sub>min</sub> 150 ms
Max frequency	50 kHz LSB (Bit Parallel) clock input 100 kHz 1 MHz (SSI)
Code type	binary or gray
Logic	SSI = positive Bit parallel = positive or negative
SSI monostable time (Tm)	20 μs
SSI pause time (Tp)	> 35 µs
SSI frame	tree format MSB LSB up to 12 bit multiturn = length 25 bit (12MT + 13ST) 14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST)
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 0,069°
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	156 years with BIT PARALLEL output 186 years with SSI/INCREMENTAL output
Mission time (Tm) <sup>3</sup>	20 years
Diagnostic coverage (DC) <sup>3</sup>	0%
Cable type PC	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
Cable type PD	shielded - fixed installation conductors section 0,14 mm²/AWG 26 bending radius min 50 mm
Cable type PE	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
111 / 004	CI 5010405

ROTATION SPEED DERATING TABLE										
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)								
up to +70 (+158)	10000	8000								
+70 +85 (+158 +185)	8000	5000								
+85 +100 (+185 212)	5000	3000								

**UL / CSA** file n. E212495

MECHANICAL SPECIFICATI	IONS
Shaft diameter	ø 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load⁴	200 N (45 lbs) axial / 70 N (15,74 lbs) 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)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 <sup>9</sup> revolutions
Operating temperature Bit parallel <sup>5, 6</sup>	-20° +85°C (-4 +185°F)
Operating temperature SSI <sup>5, 6</sup>	-40° +100°C (-40° +212°F) -20° +100°C (-4° +212°F) with PC cable output -20° +85°C (-4° +185°F) with PD cable output -25° +85°C (-13° +185°F) with M12 connector
Storage temperature	-20° +85°C (-4° +185°F)
Weight	approx 350 g (12,35 oz)
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

### SSI SCHEMATICS ENCODER RECEIVER (suggested) CLOCK CLOCK +5V DC Fail-safe DATA -120 DATA Fail-safe ⊥ 0 V

### **BIT PARALLEL CONNECTOR OR CABLE CHOICE**

According to the resolution and the chosen number of turns is possible to calculate the connections required by the connector or the cable. See below examples:

EXAMPLE 1 EXAMPLE 2 Singleturn = 8 bit = 8 connections

Singleturn = 12 bit = 12 connections
Multiturn = 12 bit = 12 connections Multiturn = 5 bit = 5 connectionsTotal connections 13 Total connections 24

From 1 to 13 connections a 16 cores cable (PD) or a 19 pin connector (MA) is required. From 14 to 25 connections a 32 cores cable (PE) or a 32 pin connector (ME) is required.

With LATCH option a 32 cores cable (PE) or a 19 pin connector (MA) or a 32 pin connector (ME) is required.

With RESET option a 32 cores cable (PE) or a 32 pin connector (ME) is required.



## EAML 58 B / C - 63 A / D / E

**SOLID SHAFT MULTITURN ABSOLUTE ENCODER** 

### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + Energy Harvesting)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5" square flange









ORDERING CODE	EAML	63A	16B	12/30	V	05	X	10	X	M12	R	. 162	+XX
analogue multiturn absolute e synchronous f synchronou	SERIES ncoder EAML lange ø 31.75 s flange ø 50 g flange ø 36 lange ø 31.75 re flange ø 50	MODEL mm 63A mm 58B mm 58C mm 63D mm 63E	OLUTION 6 bit 16B POWEI 2 30 V	R SUPPLY DC 12/30 Strical in	ITERFACE Voltage V current I OUTPU 0 0	IT RANGE 5 V 05 10 V 010 0 mA 020	X	10	X	MIZ	K	. 162	+**
	t	o be repor	ted with v	voltage out	put / 3 wir 4 wir	res current res current (mod. 63 A (mod. 58 C	output Q SHAFT D (mod. 58 / D) 3/8"- - 63 A / D / I	IAMETER (B) mm 6 mm 9,52 (E) mm 10	e rating ver side X IP 67 S	PUT TYPE			
			preferre	d cable leng	ths 2 / 3 / 5	i / 10 m, to		ter DIRECTI	ndard lengtl ON TYPE (eg plug conne	. PR5) ctor M12 DIRECTI	ON TYPE radial R	SOCKET	

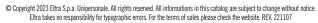
socket not included .162 to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT

custom version XXX











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58C

### , n.3 M5 x 7 120° , n.3 M4 x 6 120° n.3 120° n.3 120° n.3 M3 x 6 120° 25 max 25 max 61. Ø 50 h7 Øshaft g6 Ø shaft g6 Ø 31.75 h7 Ø 36 f6 for fixing clamps please refer to Accessories for fixing clamps please refer to Accessories

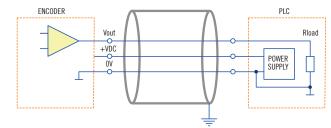
### 63D 63E n.4 Ø 5.5 90° n.4 Ø 5.5 90° $\oplus$ 25 max 61.5 Ø shaft Ø shaft g6 Ø 50 h7 Ø 31.75 h7

58B

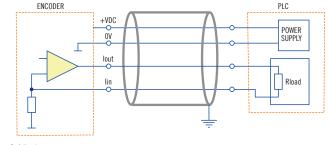
**ELECTRICAL SPECIFICATIONS** Multiturn resolution 16 bit max Singleturn resolution | 16 bit max Output DAC resolution | 16 bit Minimum angle | 22,5° Power supply<sup>1</sup> 11,4 ... 30 V DC (reverse polarity protection) Power draw without load < 1 Wvoltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA) Electrical interface<sup>2</sup> **Auxiliary inputs** active high (+V DC) (BEGIN - END) connect to 0 V if not used / t<sub>min</sub> 150 ms Load  $R_{max}^{min} = 1 \text{ k}\Omega$  (voltage output)  $R_{max}^{min} = (\text{V DC - 2}) / 0.02$  (current output) Output update frequency | 16 kHz Signal pattern | auto teaching according to commissioning Start-up time | 700 ms Linearity error  $\pm 0.069^{\circ}$ Mean time to dangerous failure (MTTF<sub>d</sub>)<sup>3</sup> 186 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 **Electromagnetic compatibility** | according to 2014/30/EU directive **RoHS** according to 2011/65/EU directive **UL / CSA** file n. E212495

### **ELECTRICAL INTERFACE**

### **VOLTAGE OUTPUT**



### **CURRENT OUTPUT**



3 / 4 wire source with 3 wires interface lin is internally connected to OV

MECHANICAL SPECIFICATIONS						
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm					
Enclosure rating IEC 60529						
Max rotation speed	see table					
Max shaft load⁴	200 N (45 lbs) axial / 70 N (15,74 lbs) 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)	< 0,03 Nm (4,25 Ozin)					
Bearing stage material	aluminum					
Shaft material	stainless steel					
Housing material	painted aluminium					
Bearings	n.2 ball bearings					
Bearings life	109 revolutions					
Operating temperature <sup>5, 6</sup>	-20° +85°C (-4 +185°F)					
Storage temperature	-20° +85°C (-4° +185°F)					
Weight	approx 350 g (12,35 oz)					
I as massured at the transducer without	anhla influences					

as measured at the transducer without cable influences

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

ROTATION SPEED / TEMPE	RATURE TABLE	
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 +85 (+158 +185)	8000	5000

CONNECTIONS			
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V <sub>out</sub> / I <sub>out</sub>	green	1	1
I <sub>in</sub>	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
÷	shield	housing	housing

<sup>\*</sup> with Q current ouput

M12 connector (5 pin) M12 A coded front view







dimensions in mm

recommended mating shaft tolerance H7

63A



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



# EAML 58 F - 63 F / G Analogue

### **BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER**

### MAIN FEATURES

ORDER

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + Energy Harvesting)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin

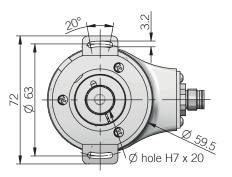


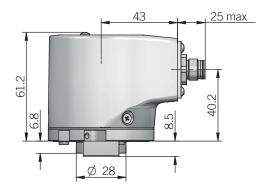




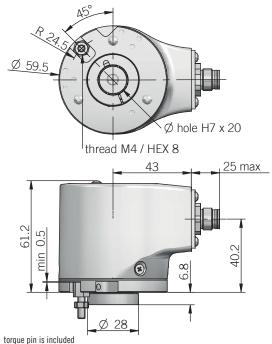
RING CODE	EAML	58F	16B	12/30	V	05	X	15	X	M12	R	. 162	+XXX
analogue multiturn absolute enco blind hollow shaft with blind hollow shaft with blind hollow shaft	stator coup torque stop with torque	slot 63F pin 63G DAC RESO 16	bit 16B POWER	R SUPPLY									
		12		DC 12/30 Trical in	TEDEACE								
			ELEU		voltage V								
					current	IT DANCE							
					0	IT RANGE 5 V 05							
						10 V 010 0 mA 020							
						0 mA 420							
	t	be report	ed with v	oltage out		es current	OPTIONS t output X c output Q						
							BORE D	IAMETER					
								mm 14 mm 15					
	diameters 6	/ 8 / 9,52 (3	/8") / 10 /	11 / 12 mm	with option	nal shaft ad		ccessories					
						IP 65	shaft side	NCLOSUR / IP67 co					
										PUT TYPE			
			preferre	d cable leng	ths 2 / 3 / 5	/ 10 m, to	be added af		ndard lengt ON TYPE (eg				
								M12	plug conne	ector M12	=./==		
											ON TYPE radial R		
												SOCKET	
					to be reno	rted only wi	th connector	output (eg	. M12R.162	socke <sup>.</sup> , for socket	t not inclu see Accesso		
					po	,		P (0B		.,	,		VARIANT

58F



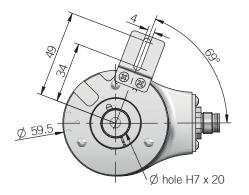


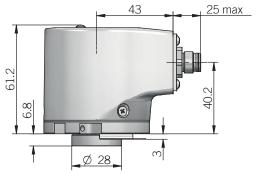




recommended mating shaft tolerance g6 dimensions in mm

### 63F





for torque pin please refer to Accessories





custom version XXX

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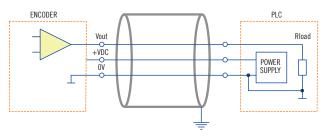
Eltra takes no responsibility for typographic errors. For the terms of sales please check the website. REV. 221107

#### OPTICAL MULTITURN ABSOLUTE ENCODERS | EAML 58 F - 63 F / G ANALOGUE

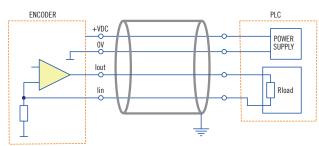
ELECTRICAL SPECIFICATION	ONS
Multiturn resolution	16 bit max
Singleturn resolution	16 bit max
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply <sup>1</sup>	11,4 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface <sup>2</sup>	voltage (0 5 V / 0 10 V) current (0 20 mA / 4 20 mA)
Auxiliary inputs (BEGIN - END)	active high (+V DC) connect to 0 V if not used / t <sub>min</sub> 150 ms
Load	$R_{\text{min}} = 1 \text{ k}\Omega$ (voltage output) $R_{\text{max}} = (\text{V DC} - 2) \ / \ 0.02$ (current output)
Output update frequency	16 kHz
Signal pattern	auto teaching according to commissioning
Start-up time	700 ms
Linearity error	± 0,069°
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	186 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

#### **ELECTRICAL INTERFACE**

#### VOLTAGE OUTPUT



#### **CURRENT OUTPUT**



3 / 4 wire source with 3 wires interface lin is internally connected to OV

MECHANICAL SPECIFICATI	MECHANICAL SPECIFICATIONS				
Bore diameter	Ø 14 / 15 mm Ø 6 / 8* / 9,52 (3/8")* / 10* / 11* / 12* mm * with optional shaft adapter, please refer to Accessories				
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side $S = IP 67$				
Max rotation speed	see table				
Max shaft load <sup>4</sup>	200 N (45 lbs) axial / 60 N (13,49 lbs) radial				
Shock	50 G, 11 ms (IEC 60068-2-27)				
Vibration	10 G, 10 2000 Hz (IEC 60068-2-6)				
Moment of inertia	5 x 10 <sup>-6</sup> kgm² (119 x 10 <sup>-6</sup> lbft²)				
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)				
Bearing stage material	aluminum				
Shaft material	stainless steel				
Housing material	painted aluminium				
Bearings	n.2 ball bearings				
Bearings life	109 revolutions				
Operating temperature 5, 6	-20° +85°C (-4° +185°F)				
Storage temperature	-20° +85°C (-4° +185°F)				
Weight	approx 350 g (12,35 oz)				

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

<sup>6</sup> condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE						
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)				
up to +70 (+158)	10000	8000				
+70 +85 (+158 +185)	8000	5000				

CONNECTIONS			
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V <sub>out</sub> / I <sub>out</sub>	green	1	1
l <sub>in</sub>	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
<u>+</u>	shield	housing	housing

<sup>\*</sup> with Q current ouput

M12 connector (5 pin) M12 A coded front view

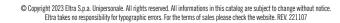


M12 connector (8 pin) M12 A coded front view











# EAML 90 - 115 A ANALOGUE

**SOLID SHAFT MULTITURN ABSOLUTE ENCODER** 

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + Energy Harvesting)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange







ORDERING CODE	EAML	90A	16B	12/30	V	05	Х	10	Х	M12	R	. 162	+XXX
analogue multiturn absolute	SERIES encoder FAMI												
analogue mutitum absolute	CHOUGH EAWL	MODEL											
synchrono	ous flange ø 40 REO-444 flan	mm 90A ige 115A											
	OUTPUT	DAC RES	OLUTION 6 bit 16B										
		10		R SUPPLY									
		1		DC 12/30									
			ELEC	TRICAL IN	TERFACE voltage V								
					current I								
						IT RANGE 5 V 05							
					0	10 V 010 0 mA 020							
						0 mA 420							
		a ha ranar	tod with v	oltage out	nut / 2 wir		OPTIONS						
	ι	o ne repor	tea with v	onage out	put / 3 wir 4 wir	es current	output Q						
						/mad	SHAFT 0 . 90) 3/8"-	IAMETER					
						(IIIOU.		mm 10					
								5) mm 11 E <b>nclosur</b>	E DATING				
						IP 65	shaft side		ver side X				
									IP 67 S	NIT TYPE			
								cable (sta	ndard lengt	PUT TYPE n 1,5 m) P			
			preferre	d cable leng	ths 2 / 3 / 5	/ 10 m, to	be added at	ter DIRECTI	ON TYPE (eg plug conne	. PR5)			
								IVIIZ	piug coiiiie		ION TYPE		
											radial R		
										socke	t not inclu	SOCKET ded .162	
					to be repo	rted only wi	th connecto	r output (eg	. M12R.162				





VARIANT

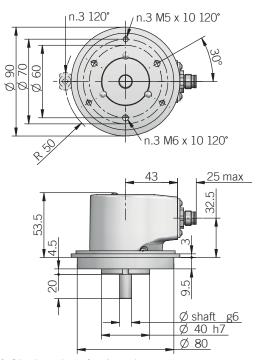
<sup>&</sup>lt;sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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

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

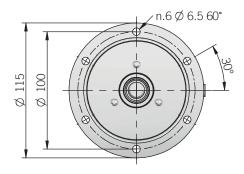
<sup>5</sup> measured on the transducer flange

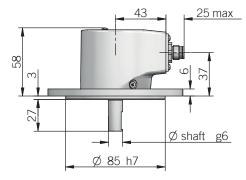
#### 90A



for fixing clamps please refer to Accessories recommended mating shaft tolerance H7 dimensions in mm

#### 115A



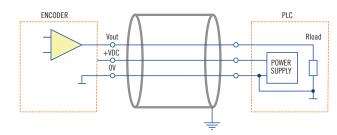




#### **ELECTRICAL SPECIFICATIONS** Multiturn resolution 16 bit max Singleturn resolution 16 bit max Output DAC resolution | 16 bit Minimum angle 22,5° Power supply<sup>1</sup> | 11,4 ... 30 V DC (reverse polarity protection) Power draw without load < 1 Wvoltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA) Electrical interface<sup>2</sup> **Auxiliary inputs** active high (+V DC) (BEGIN - END) connect to 0 V if not used / t<sub>min</sub> 150 ms $\begin{array}{c|c} \textbf{Load} & R_{\text{min}} = 1 \text{ k}\Omega \text{ (voltage output)} \\ R_{\text{max}} = \text{(V DC - 2) / 0,02 (current output)} \end{array}$ Output update frequency 16 kHz Signal pattern | auto teaching according to commissioning Start-up time 700 ms Linearity error $\pm 0.069^{\circ}$ Mean time to dangerous failure (MTTF<sub>d</sub>)<sup>3</sup> 186 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 **Electromagnetic compatibility** according to 2014/30/EU directive **RoHS** according to 2011/65/EU directive

#### ELECTRICAL INTERFACE

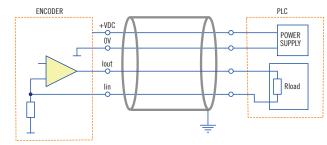
#### **VOLTAGE OUTPUT**



**UL / CSA** file n. E212495

#### **CURRENT OUTPUT**

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3 / 4 wire source with 3 wires interface lin is internally connected to OV

MECHANICAL SPECIFICATI	ONS		
Shaft diameter	ø 9,52 (3/8") / 10 / 11 mm		
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67		
Max rotation speed	see table		
Max shaft load⁴	200 N (45 lbs) axial / 70 N (15,74 lbs) 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)	< 0,03 Nm (4,25 Ozin)		
Bearing stage material	aluminum		
Shaft material	stainless steel		
Housing material	painted aluminium		
Bearings	n.2 ball bearings		
Bearings life	109 revolutions		
Operating temperature <sup>5, 6</sup>	-20° +85°C (-4 +185°F)		
Storage temperature	-20° +85°C (-4° +185°F)		
Weight	approx 350 g (12,35 oz)		
l as massured at the transducer without soble influence			

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> maximum load for static usage <sup>5</sup> measured on the transducer flange

<sup>6</sup> condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE							
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)					
up to +70 (+158)	10000	8000					
+70 +85 (+158 +185)	8000	5000					

CONNECTIONS			
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V <sub>out</sub> / I <sub>out</sub>	green	1	1
l <sub>in</sub>	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
<u></u>	shield	housing	housing

\* with Q current ouput

M12 connector (5 pin) M12 A coded front view

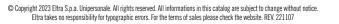


M12 connector (8 pin) M12 A coded front view











58C



# EAM 58 B / C - 63 A / D / E PROFIBUS

#### **SOLID SHAFT MULTITURN ABSOLUTE ENCODER**

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

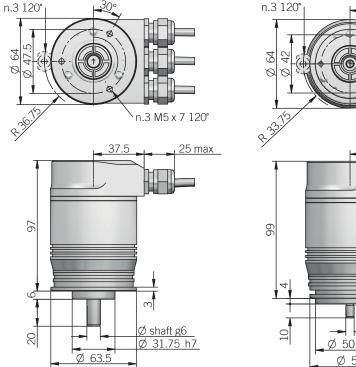
- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn (8192 ppr) + 12 bit multiturn (4096 turns)) Power supply up to +28 V DC with Profibus DP as electrical interface
- Intelligent status leds
- Terminal box or M12 connector for fast setup
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5" square flange



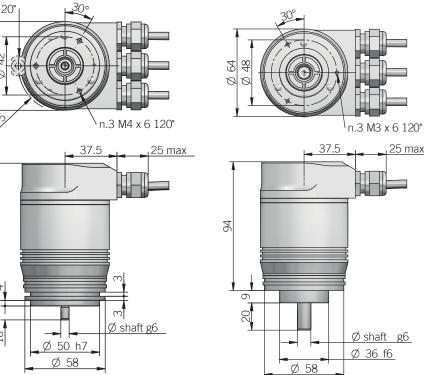


ORDERING CODE	EAM	63A	R	4096	/ 4096	В	12/28	FXX	10	X	6	M12R	. 162	+XXX
multiturn absolute enc synchronous flan synchronous fl clamping f centering square flan centering square f	SERIES oder EAM ge ø 31.75 ange ø 50 lange ø 36 ge ø 31.75	MODEL mm 63A mm 58B mm 58C mm 63D mm 63E	rev. 2.0 R ITURN RES tu	COLUTION rns 4096	<b>SOLUTION</b> 96 / 8192 <b>C</b> 0	DDE TYPE binary B POWEI .2 28 V ELEC PROFIBUS	R SUPPLY	ITERFACE \SS 2 FXX SHAFT IC (mod. 58 )) (3/8") 9 - 63 A / D /	DIAMETER BB) mm 9 B) mm 10 E) mCLOSUR			M12R	. 162	+XXX
									IVIA	(IP 66) 30				
									terminal	box - radia	OUTI	ors M12R	0004570	
					1	to he renorte	ed only with	connectors	nutnut (ea	M12R 162)		s not inclu		
						to be reporte	ou only with	001111001013	output (0g.		, 101 0000013	300 1100033	01100	

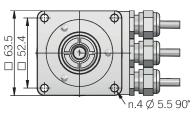
#### 63A 58B



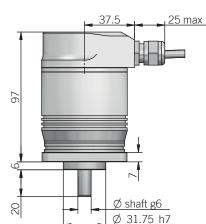
fixing clamps not included, please refer to Accessories



63D



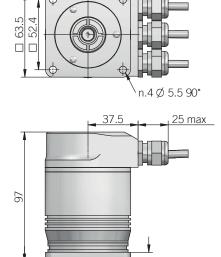
fixing clamps not included, please refer to Accessories



recommended mating shaft tolerance H7

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63E



Ø 50 h7

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Ø shaft g6

Ø 31.75 h7 dimensions in mm







VARIANT custom version XXX

#### OPTICAL MULTITURN ABSOLUTE ENCODERS | EAM 58 B / C - 63 A / D / E PROFIBUS

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CONNECTIONS			
Function	POWER	BUS OUT	BUS IN
+ V DC	2		
0 V	4		
A		2	
В		4	
A			2
В			4
POWER connector (5 pin)	BUS OUT - socket		N - plug (5 pin)





M12 B coded



M12 B coded

MECHANICAL SPECIFICATIONS				
Shaft diameter	ø 6 / 9,52 (3/8") / 10 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> 10 N (2,25 lbs) axial with Ø 6 mm shaft 20 N (4,45 lbs) radial with Ø 6 mm shaft 100 N (22,48 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 $+20^{\circ}$ C / $+68^{\circ}$ 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	painted aluminium			
Bearings	n.2 ball bearings			
Bearings life	10 <sup>9</sup> revolutions			
Operating temperature <sup>5, 6</sup>	0° +60°C (+32° +140°F)			
Storage temperature <sup>6</sup>	-15° +70°C (+5° +158°F)			
Weight	650 g (22,93 oz)			

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



# EAM 58 F - 63 F / G PROFIBUS

#### BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn (8192 ppr) + 12 bit multiturn (4096 turns))
- Power supply up to +28 V DC with Profibus DP as electrical interface
- Intelligent status leds
- Terminal box or M12 connector for fast setup
- Blind hollow shaft up to 15 mm diameter

Mounting by stator coupling, torque stop slot or torque pin







ORDERING CODE	EAM	63F	R	4096	/ 4096	В	12/28	FXX	15	X	3	M12R	. 162	+XXX
multiturn absolute encod	SERIES der EAM													
blind hollow shaft with st blind hollow shaft with to blind hollow shaft wi	rque stop	slot 63F pin 63G												
			ev. 2.0 R l	OLUTION rns 4096										
				TURN RES	<b>OLUTION</b> 96 / 8192									
					CC	DE TYPE binary B								
					1	2 28 V	R SUPPLY DC 12/28	TEDEAGE						
					I		DP VO CLA	ASS 2 FXX	DIAMETER					
									mm 14 mm 15					
	d	iameters 6	/ 8 / 9,52 (	3/8") / 10 /	11 / 12 mm	with option	nal shaft ad		ccessories ENCLOSUR					
									MA	IP 54 X I <b>X Rotatio</b>				
									terminal	box - radia	<b>OUT</b> al cable gl	PUT TYPE		
						a ha rancot	od anly with	oonnooters	output (c~		socket			
					τ	о ретеропо	eu Olliy WITN	CONNECTORS	output (eg.	W11∠K.10∠)	, iui suckets			VARIANT rsion XXX









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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

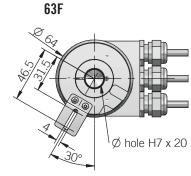
<sup>&</sup>lt;sup>5</sup> measured on the transducer flange

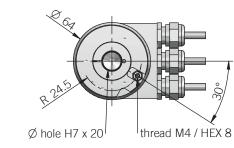
<sup>&</sup>lt;sup>6</sup> condensation not allowed

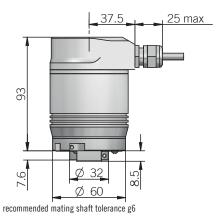
#### OPTICAL MULTITURN ABSOLUTE ENCODERS | EAM 58 F - 63 F / G PROFIBUS

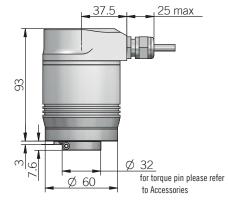
63G

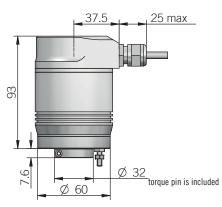
# 58F







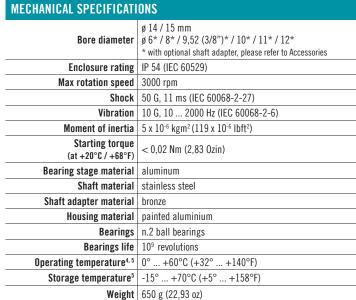




#### **ELECTRICAL SPECIFICATIONS**

Multiturn resolution	2 4096 turns
	programmable during commissioning
Singleturn resolution	2 4096 / 2 8192 ppr
Singleturii resolution	programmable during commissioning
Power supply <sup>1</sup>	11,4 29,4 V DC (reverse polarity protection)
Current consumption without load	300 mA
Electrical interface <sup>2</sup>	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm please refer to installation manual for more informations
Max frequency	max 25 kHz LSB
Code type	binary
Counting direction	programmable during commissioning
Start-up time	500 ms
Accuracy	± 1/2 LSB
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	years
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

CONNECTIONS			
Function	POWER	BUS OUT	BUS IN
+ V DC	2		
0 V	4		
A		2	
В		4	
A			2
В			4



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















## EAM 90 A -115 A

**SOLID SHAFT MULTITURN ABSOLUTE ENCODER** 

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn (8192 ppr) + 12 bit multiturn (4096 turns))
- Power supply up to +28 V DC with Profibus DP as electrical interface
- Intelligent status leds
- Terminal box or M12 connector for fast setup
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange







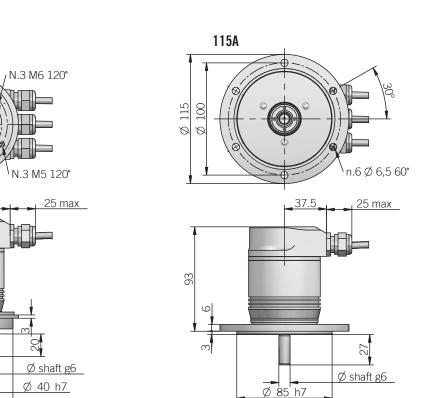
ORDERING CODE	EAM	90A	R	4096	/ 4096	В	12/28	FXX	10	X	6	M12R	.162	+XXX
multiturn absolut	SERIES e encoder EAM													
synchron	ous flange ø 40 REO444 flar	nge 115A												
			rev. 2.0 R I <b>TURN RES</b> tu	SOLUTION rns 4096										
			SINGLE	ppr 409	96 / 8192	DE TVDE								
							R SUPPLY							
						ELEC	DC 12/28 Ctrical in DP VO CLA							
							(mod. 90	<b>SHAFT D</b> (3/8") 9,	IAMETER 52 mm 9 mm 10					
									5) mm 11 ENCLOSUR	E RATING IP 54 X				
										0) IP 66 S I <b>X Rotatio</b>				
										(IP 66) 300 (IP 54) 600	00 rpm 6 <b>0UTI</b>	PUT TYPE		
									terminal	box - radia radial M1:		ors M12R	SOCKETS	
					t	o be reporte	ed only with	connectors	output (eg.	M12R.162),		s not inclu	ded .162	





VARIANT

#### OPTICAL MULTITURN ABSOLUTE ENCODERS | EAM 90 -115 A PROFIBUS



fixing clamps not included, please refer to Accessories

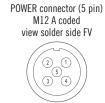
recommended mating shaft tolerance H7 dimensions in mm

ELECTRICAL SPECIFICATION	DNS
Resolution	2 4096 / 2 8192 ppr programmable during commissioning
Power supply <sup>1</sup>	11,4 29,4 V DC (reverse polarity protection)
Current consumption without load	300 mA
Electrical interface <sup>2</sup>	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm please refer to installation manual for more informations
Max frequency	max 25 kHz LSB
Code type	binary
Counting direction	programmable during commissioning
Start-up time	500 ms
Accuracy	± 1/2 LSB
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	years
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

CUNNECTIONS			
Function	POWER	BUS OUT	BUS IN
+ V DC	2		
0 V	4		
А		2	
В		4	
А			2
В			4

MECHANICAL SPECIFICATI	ONS
Shaft diameter	ø 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>	100 N (22,48 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°C / +68°F)	< 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10° revolutions
Operating temperature <sup>5, 6</sup>	0° +60°C (+32° +140°F)
Storage temperature	-15° +70°C (+5° +158°F)
Weight	750 g (26,46 oz)

- <sup>1</sup> as measured at the transducer without cable influences
- $^{\rm 2}$  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



BUS OUT - socket (5 pin) M12 B coded front view





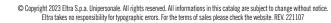


90A

n.3 120°

8







#### AAM 58 B / C Profinet

#### **SOLID SHAFT MULTITURN ABSOLUTE ENCODER**

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- · 25 bit total resolution (13 bit single turn + 12 bit multiturn )
- Power supply up to +30 V DC with Profinet IO as electrical interface
- · Intelligent status leds
- · M12 connector for fast setup
- · Solid shaft diameter up to 10 mm
- Mounting by synchronous or clamping flange
   Operating temperature -40° ... +80°C (-40° ... +176°F)









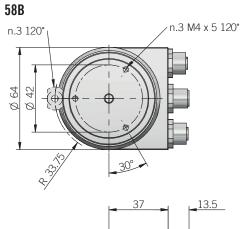


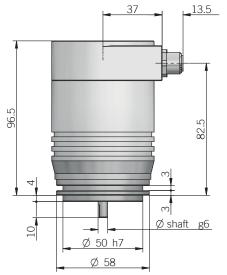
UKDEKING GUDE AA	M DRI	5 12	/ 13	В	10/30	PFN	Ь	X	X	WIIZK	.162
SERI absolute multiurn encoder Av synchronous flange ø clamping flange ø	MODE 50 mm 58 36 mm 58	L B	SOLUTION bit 13 C	ODE TYPE binary B POWEI 10 30 V	R SUPPLY DC 10/30 TRICAL IN	TERFACE ET IO PFN SHAFT D (mod. 58				WIZK	.162
									OPTIONS eported X		
								radial M1		PUT TYPE ors M12R	
								i auidi Wil	z connect		SOCKETS
									socket	s not inclu	





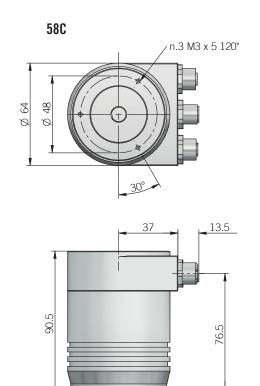
for sockets see Accessories





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

ELECTRICAL SPECIFICATION	ONS
Multiturn resolution	1 12 bit programmabile during commissioning
Singleturn resolution	1 13 bit programmabile during commissioning
Power supply <sup>1</sup>	10 30 V DC (reverse polarity protection)
Current consumption without load	< 200 mA
Electrical interface <sup>2</sup>	PROFINET IO RT Class 1 / Conformance Class B
Hardware features	Ertec 200 auto-negotiation auto-polarity auto-crossover diagnostic LEDs
Code type	binary
Max bus frequency	100 Mbit/s
Cycle time	$\leq 1 \text{ ms}$
Accuracy	± 0,04°
Start-up time	500 ms
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive



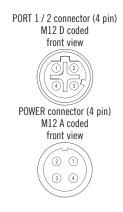
Ø 36 h7

MECHANICAL SPECIFICATI	ONS
Shaft diameter	ø 6 mm (mod. 58B) ø 10 mm (mod. 58C)
Enclousure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load <sup>3</sup>	80 N (17,98 lbs) radial / 40 N (9 lbs) axial
Starting torque (at +20°C / +68°F)	< 0,05 Nm (7 Ozin)
Moment of inertia	approx 1,8 x 10 <sup>-6</sup> kgm <sup>2</sup>
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 2000 Hz (IEC 60068-2-6)
Bearings life	109 revolutions
Bearings	n.2 ball bearings
Shaft material	stainless steel
Bearing stage / cover material	aluminium
Housing material	painted aluminium
Operating temperature <sup>4, 5</sup>	-40° +80°C (-40° +176°F)
Storage temperature <sup>5</sup>	-40° +85°C (-40° +185°F)
Weight	600 g (21 oz)

Ø shaft g6

	Pin	Function
	1	Tx D+
DODT 1 Connector	2	Rx D+
POWER connector	3	Tx D-
	4	Rx D-
	1	+V DC
DOWED and and a	2	/
PORT 1 Connector  POWER connector  PORT 2 Connector  connectors not included, please re	3	0 V
	4	/
	1	Tx D+
DODT 2 Commenter	2	Rx D+
PUKI Z CONNECTOR	3	Tx D-
	4	Rx D-











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#### AAM 58 F Profinet

#### BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- · 25 bit total resolution (13 bit single turn + 12 bit multiturn )
- Power supply up to +30 V DC with Profinet IO as electrical interface
- · Intelligent status leds
- · M12 connector for fast setup
- · Blind hollow shaft diameter up to 15 mm
- · Mounting by stator coupling
- Operating temperature -40° ... +80°C (-40° ... +176°F)

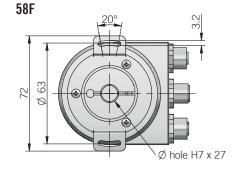


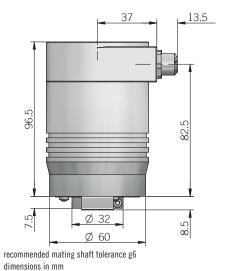






SERIES absolute multiurn encoder AAM  MODEL blind hollow shaft with stator coupling 58F  MULTITURN RESOLUTION	62
blind hollow shaft with stator coupling 58F	
bit 12   SINGLETURN RESOLUTION bit 13	
CODE TYPE   binary B	
POWER SUPPLY 10 30 V DC 10/30	
ELECTRICAL INTERFACE   PROFINET 10 PFN	
BORE DIAMETER mm 15	
diameters 10 / 12 mm with optional shaft adapter, see Accessories	
ENCLOSURE RATING   IP 65 X	
OPTIONS to be reported X	
OUTPUT TYPE radial M12 connectors M12R	
SOCK sockets not included .	





CONNECTIONS		
	Pin	Function
	1	Tx D+
PORT 1 Connector	2	Rx D+
FUNT I CONNECTOR	3	Tx D-
	4	Rx D-
	1	+V DC
POWER connector	2	1
POWER Connector	3	0 V
	4	1
	1	Tx D+
DODT O O	2	Rx D+
PORT 2 Connector	3	Tx D-
	4	Rx D-

PORT 1 / 2 connector (4 pin) M12 D coded front view

POWER connector (4 pin) M12 A coded front view

socket connectors not included, please refer to Accessories



socket connectors not included, please refer to Accessories

#### OPTICAL MULTITURN ABSOLUTE ENCODERS | AAM 58 F PROFINET

ELECTRICAL SPECIFICATION	ELECTRICAL SPECIFICATIONS					
Multiturn resolution	1 12 bit programmabile during commissioning					
Singleturn resolution	1 13 bit programmabile during commissioning					
Power supply <sup>1</sup>	10 30 V DC (reverse polarity protection)					
Current consumption without load	< 200 mA					
Electrical interface <sup>2</sup>	PROFINET IO RT Class 1 / Conformance Class B					
Hardware features	Ertec 200 auto-negotiation auto-polarity auto-crossover diagnostic LEDs					
Code type	binary					
Max bus frequency	100 Mbit/s					
Cycle time	$\leq 1 \text{ ms}$					
Accuracy	± 0,04°					
Start-up time	500 ms					
Electromagnetic compatibility	according to 2014/30/EU directive					
RoHs	according to 2011/65/EU directive					

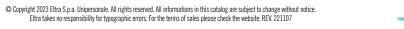
Bore diameter	Ø 15 mm Ø 12* / 10* mm * with optional shaft adapter, please refer to Accessories				
Enclousure rating	IP 65 (IEC 60529)				
Max rotation speed	6000 rpm				
Max shaft load <sup>3</sup>	80 N (17,98 lbs) radial / 40 N (9 lbs) axial				
Starting torque (at +20°C / +68°F)	< 0,05 Nm (7 Ozin)				
Moment of inertia	approx 1,8 x 10 <sup>-6</sup> kgm <sup>2</sup>				
Shock	50 G, 11 ms (IEC 60068-2-27)				
Vibrations	10 G, 10 2000 Hz (IEC 60068-2-6)				
Bearings life	10° revolutions				
Bearings	n.2 ball bearings				
Shaft material	stainless steel				
Bearing stage / cover material	aluminium				
Housing material	painted aluminium				
Operating temperature <sup>4, 5</sup>	-40° +80°C (-40° +176°F)				
Storage temperature <sup>5</sup>	-40° +85°C (-40° +185°F)				
Weight	600 g (21 oz)				

as measured at the transducer without cable influences

MECHANICAL SPECIFICATIONS







for sockets see Accessories

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

<sup>&</sup>lt;sup>3</sup> maximum load for static usage

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

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



# **AAM 58 B / C**

#### **SOLID SHAFT MULTITURN ABSOLUTE ENCODER**

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn + 12 bit multiturn )
- Power supply up to +30 V DC with EtherCAT as electrical interface
- Intelligent status leds
- M12 connector for fast setup
- Solid shaft diameter up to 10 mm
- Mounting by synchronous or clamping flange
- Operating temperature -40° ... +80°C (-40° ... +176°F)





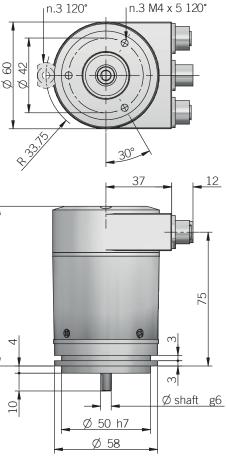




UNDERING GODE AAN	JOD	IV.	14 .	/ 13	ъ	10/30	EIG	U	^	^	WIIZR	.102
SERIES	;											
absolute multiurn encoder AAN												
	MODEL											
synchronous flange ø 5 clamping flange ø 3	0 mm 58B 6 mm 58C											
		REVISION										
		eported R										
	MULT	ITURN RES										
			bit 12									
		SINGLE	TURN RE	SOLUTION bit 13								
					ODE TYPE							
					binary B							
						R SUPPLY						
					10 30 V	DC 10/30						
					ELEC	TRICAL IN ETHE	TERFACE RCAT ETC					
							SHAFT D	IAMETER				
								8B) mm 6				
								C) mm 10				
							I	ENCLOSUR	E <b>RATING</b> IP 65 X			
										OPTIONS eported X		
											PUT TYPE	
									radial M1	2 connect	ors M12R	

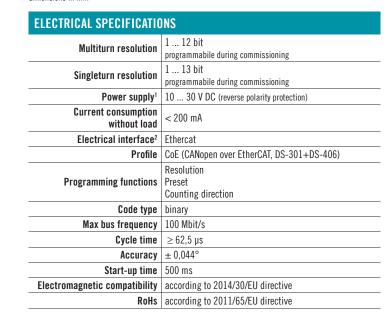
SOCKETS sockets not included .162 for sockets see Accessories

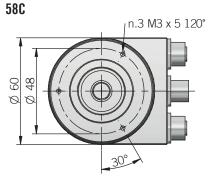
58B

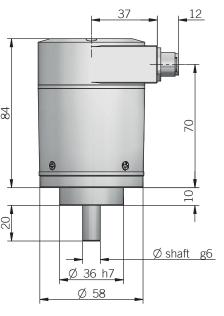


for fixing clamps please refer to Accessories

recommended mating shaft tolerance H7 dimensions in mm







MECHANICAL SPECIFICA	ATIONS
Shaft diameter	ø 6 mm (mod. 58B) ø 10 mm (mod. 58C)
Enclousure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load <sup>3</sup>	80 N (17,98 lbs) radial / 40 N (9 lbs) axial
Starting torque (at +20°C / +68°F)	< 0,05 Nm (7 Ozin)
Moment of inertia	approx 1,8 x 10 <sup>-6</sup> kgm <sup>2</sup>
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 2000 Hz (IEC 60068-2-6)
Bearings life	10 <sup>9</sup> revolutions
Bearings	2 ball bearings
Shaft material	stainless steel
Bearing stage / cover material	aluminium
Housing material	aluminium
Operating temperature <sup>4, 5</sup>	-40° +80°C (-40° +176°F)
Storage temperature <sup>5</sup>	-40° +85°C (-40° +185°F)
Weight	600 g (21 oz)

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









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

<sup>&</sup>lt;sup>3</sup> maximum load for static usage

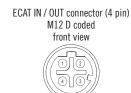
<sup>4</sup> measured on encoder flange

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

#### OPTICAL MULTITURN ABSOLUTE ENCODERS | AAM 58 B / C ETHERCAT

#### CONNECTIONS Pin **Function** Tx D+ Rx D+ ECAT IN connector Tx D-4 Rx D-+V DC **POWER** connector 0 V Tx D+ Rx D+ ECAT OUT connector Tx D-Rx Dsocket connectors not included, please refer to Accessories





POWER connector (4 pin) M12 A coded front view

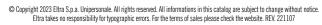


EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.













#### **BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER**

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn + 12 bit multiturn )
- Power supply up to +30 V DC with EtherCAT as electrical interface
- Intelligent status leds
- M12 connector for fast setup
- Blind hollow shaft diameter up to 15 mm
- Mounting by stator coupling
- Operating temperature -40° ... +80°C (-40° ... +176°F)









ORDERING CODE	AAM	58F	R	12	1	13	В	10/30	ETC	15	X	X	M12R	.162
	SERIES absolute multiurn encoder AAM													
	blind hollow shaft with stator coup													
		to be r	eported R ITURN RES	OLUTION										
			SINGLE	bit 12 Turn re		LUTION bit 13								
						C	ODE TYPE binary B	R SUPPLY						
							10 30 V	DC 10/30 Ctrical in	ITERFACE					
								ETHE	RCAT ETC Bore D	DIAMETER mm 15				
				diameter	s 10	) / 12 mr	n with optio	nal shaft ad						
												OPTIONS eported X		
												OUT	PUT TYPE ors M12R	
												socket	s not inclu	SOCKETS ded .162

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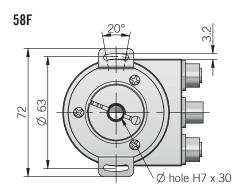
Eltra takes no responsibility for typographic errors. For the terms of sales please check the website. REV. 221107

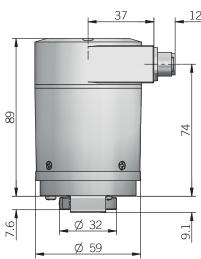




for sockets see Accessories

#### OPTICAL MULTITURN ABSOLUTE ENCODERS | AAM 58 F ETHERCAT





recommended mating shaft tolerance g6 dimensions in mm

CONNECTIONS		
	Pin	Function
	1	Tx D+
ECAT IN	2	Rx D+
connector	3	Tx D-
	4	Rx D-
	1	+V DC
POWER	2	/
connector	3	0 V
	4	1
	1	Tx D+
ECAT OUT	2	Rx D+
connector	3	Tx D-
	4	Rx D-

socket connectors not included, please refer to Accessories

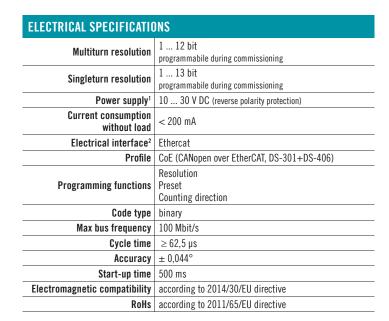


ECAT IN / OUT connector (4 pin) M12 D coded front view



POWER connector (4 pin) M12 A coded front view





MECHANICAL SPECIFICATI	ONS
Bore diameter	ø 15 mm ø 12* / 10* mm * with optional shaft adapter, please refer to Accessories
Enclousure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load <sup>3</sup>	80 N (17,98 lbs) radial / 40 N (9 lbs) axial
Starting torque (at +20°C / +68°F)	< 0,05 Nm (7 Ozin)
Moment of inertia	approx 1,8 x 10 <sup>-6</sup> kgm <sup>2</sup>
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 2000 Hz (IEC 60068-2-6)
Bearings life	10 <sup>9</sup> revolutions
Bearings	n° 2 ball bearings
Shaft material	stainless steel
Bearing stage / cover material	aluminium
Housing material	aluminium
Operating temperature <sup>4, 5</sup>	-40° +80°C (-40° +176°F)
Storage temperature <sup>5</sup>	-40° +85°C (-40° +185°F)
Fixing torque for collar clamping	1,5 Nm (212 Ozin) recommended
Weight	600 g (21 oz)
l as measured at the encoder without ca	hlo influences

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













### **EAMX 80 A / D**

#### **EXPLOSION PROOF ATEX MULTITURN ABSOLUTE ENCODER**

#### MAIN FEATURES



- Optical sensor technology (OptoASIC + gears)
- Resolution up to 27 bit (13 bit single turn (8192 ppr) + 14 bit multiturn (16384 turns))
- Power supply up to +28 V DC with SSI as electrical interface
- Cable output
- Solid shaft diameter up to 10 mm
- Mounting with syncronous or centering square flange

#### **EX CLASSIFICATION**

It has been assured with EC-TYPE Examination Certificate CESI 04 ATEX 082 that the EAMX 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	EAMX	80A	4096	/ 4096	G	8/28	S	X	X	10	X	3	PR	. XXX
multiturn absolute explosion proof	SERIES encoder EAMX nous flange ø 40 i	MODEL mm 80A mm 80D TURN RESO s from 2 t	DLUTION o 16384 furn res	COLUTION 96 / 8192 Co	DDE TYPE binary B gray G POWEF 8 28 V ELEC		ITERFACE ce - SSI S	<b>LOGIC</b> eported X	OPTION eported X SHAFT D		E RATING		PR	. XXX
										MA	IP 65 X <b>X rotatic</b>	IN SPEED		
											30	000 rpm 3 <b>OUTI</b>	PUT TYPE	
						prefe	rred cable le	engths 2 / 3	/5/10 m,	radial o to be added	cable (stand d after OUTP	dard length PUT TYPE (eg	1,5 m) PR	
														VARIANT



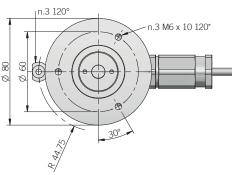


<sup>&</sup>lt;sup>2</sup> for further details refer to TECHNICAL BASICS section 3 maximum load for static usage

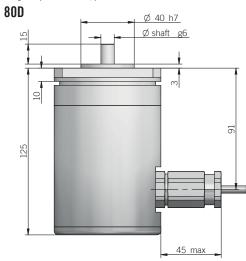
<sup>4</sup> measured on encoder flange

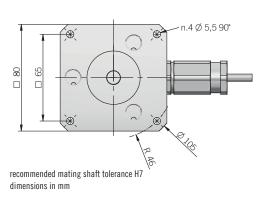
<sup>&</sup>lt;sup>5</sup> condensation not allowed

# 80A Ø 40 h7 Ø shaft g6 45 max



fixing clamps not included, please refer to Accessories





ELECTRICAL SPECIFICATION	DNS					
Multiturn resolution	from 2 to 16384 turns					
Singleturn resolution	4096 / 8192 ppr					
Power supply <sup>1</sup>	7,6 29,4 V DC (reverse polarity protection)					
Current consumption without load	100 mA					
Electrical interface <sup>2</sup>	RS-422 compatible					
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms					
Clock frequency	100 kHz 1 MHz					
SSI monostable time (Tm)	18 μs					
SSI pause time (Tp)	> 35 µs					
SSI frame	MSB LSB 13 bit data length					
Counting direction	decreasing clockwise (shaft view)					
Start-up time	700 ms					
Accuracy	± 1/2 LSB					
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	71 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	IECHANICAL SPECIFICATIONS				
Shaft diameter	ø 10 mm				
Enclosure rating	IP 65 (IEC 60529)				
Max rotation speed	3000 rpm				
Max shaft load⁴	200 N (45 lbs) axial / radial				
Shock	50 G, 11 ms (IEC 60068-2-27)				
Vibration	10 G, 10 2000 Hz (IEC 60068-2-6)				
Moment of inertia	$1.5 \times 10^{-6} \text{ kgm}^2 (36 \times 10^{-6} \text{ lbft}^2)$				
Starting torque (at +20°C / +68°F)	< 0,06 Nm (8,50 Ozin)				
Bearing stage material	anodized aluminum				
Shaft material	stainless steel				
Housing material	anodized aluminum				
Bearings	n.2 ball bearings				
Bearings life	10 <sup>9</sup> revolutions				
Operating temperature <sup>5, 6</sup>	0° +50°C (+32° +122°F)				
Storage temperature <sup>6</sup>	-15° +70°C (+5° +158°F)				
Weight	<b>9ht</b> 1200 g (42,33 oz)				

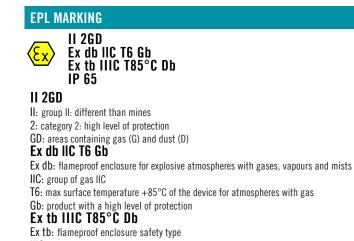
<sup>1</sup> as measured at the transducer without cable influences <sup>2</sup> for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

 $^{\rm 3}$  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



Db: product with a high level of protection

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

CONNECTIONS							
Function	Cable						
+ V DC	red						
0 V	grey						
DATA +	green						
DATA -	brown						
CLOCK +	yellow						
CLOCK -	pink						
U / D	blue						
<del>-</del>	shield						











# **EAM 36 B**

#### SOLID SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

**S C C S U**S

#### MAIN FEATURES

**ORDERING CODE** 

Miniaturized multiturn absolute encoder for limited size applications.

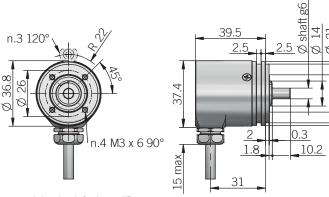
- Magnetic sensor technology without contact (Magnetic ASIC + Patented Energy Harvesting)
- Up to 55 bit as total resolution (15 bit single turn + 40 bit multiturn)
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- 6 mm diameter solid shaft
- Mounting by syncronous flange



ONDERING GODE	LAIII	000	12 /		u	0/00	· ·		^	U	^	· ·	III I ZIV	. 102	IAAA
	SERIES														
magnetic multiturn absolute e															
-		MODEL													
syncronou	s flange ø 33	mm 36B													
		URN RESOI													
		s from 1 to													
	;	SINGLETUR 1	i <b>n KESUI</b> from 1 to												
					DDE TYPE										
					binary B										
					gray G	R SUPPLY									
					FUWL	5 V DC 5									
						/ DC 8/30									
				Serial		CTRICAL IN Ous Interfa									
				Julian	Sylicilion	in cira	0010	LOGIC							
							1	positive P							
							4- 6		OPTIONS						
								ported if n th external							
									-	DIAMETER					
										mm 6					
								IP 67		ENCLOSUR / IP 65 sh					
								11 07	cover side		X ROTATIO				
												00 rpm 8			
										radiala	abla (-t		PUT TYPE		
						preferred o	able length	s 1,5/2/3	/5/10 m,	to be added	able (standal) I after OUTP	uaru iengin 'UT TYPE (eg	0,5 III) FR g. PR5)		
							3-		,	8 pin M1	2 radial pl	ug connec	ctor M12R		
												cock	et not inclu	SOCKET	
							to be repo	rted only wi	th connecto	r output (eg	. M12R.162		t see Access		
															VARIANT
														custom vei	rsion XXX

EAM 36B 12 / 13 G 8/30 S P X

36B



recommended mating shaft tolerance H7 dimensions in mm

fixing clamps not included, please refer to Accessories

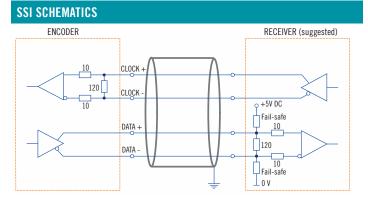
ELECTRICAL SPECIFICATION	DNS			
Multiturn resolution	1 to 17 bit for multiturn resolution > 17 bit please contact our offices			
Singleturn resolution	1 to 15 bit			
Power supply <sup>1</sup>	5 = 4,75 5,25 V DC 8/30 = 7,6 30 V DC (reverse polarity protection)			
Power draw without load	< 400 mW			
Electrical interface <sup>2</sup>	RS-422 (THVD1451 or similar)			
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET t <sub>min</sub> 150 ms			
Clock frequency	100 kHz 1 MHz			
Code type	binary or gray			
SSI monostable time (Tm)	20 μs			
SSI pause time (Tp)	) > 35 μs			
SSI frame	tree format MSB LSB up to 12 bit multiturn = length 25 bit (12MT + 13ST) 13 to 14 bit multiturn = length 27 bit (14MT + 13ST) 15 to 17 bit multiturn = length 32 bit (17MT + 15ST)			
SSI status and parity bit	on request			
Counting direction	decreasing clockwise (shaft view)			
Start-up time	150 ms			
Accuracy	± 0,35° max			
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	271 years			
Mission time (Tm) <sup>3</sup>	<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 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	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange	6
U/D	red / blue	7
RESET	white	1
÷	shield	housing

MECHANICAL SPECIFICATIONS					
Shaft diameter	ø 6 mm				
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)				
Rotation speed	8000 rpm continuous / 10000 rpm max				
Max shaft load⁴	20 N (4,5 lbs) axial / radial				
Shock	50 G, 11 ms (IEC 60068-2-27)				
Vibration	20 G, 10 2000 Hz (IEC 60068-2-6)				
Moment of inertia	0,001 x 10 <sup>-6</sup> kgm <sup>2</sup> (0,02 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	chrome plated steel				
Bearings	n.2 ball bearings				
Bearings life	10 <sup>9</sup> revolutions				
Operating temperature <sup>5, 6</sup>	-30° +100°C (-22° +212°F) -25° +85°C (-13° +185°F) with M12 connector				
Storage temperature <sup>6</sup>	-25° +85°C (-13° +185°F)				
Weight 150 g (5,29 oz)					

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

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

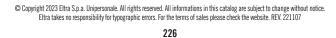


M12 connector (8 pin) M12 A coded front view











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

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



## **EAM 36 F/G**

8 M12R . 162 +XXX

#### BLIND HOLLOW SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

#### MAIN FEATURES

Miniaturized multiturn absolute encoder for limited size applications.

Magnetic sensor technology without contact (Magnetic ASIC + Patented Energy Harvesting)

36F 12 / 13

Up to 55 bit as total resolution (15 bit single turn + 40 bit multiturn)

SERIES

- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup

**ORDERING CODE** 

- Cable or M12 output, other connectors available on cable end
- Blind hollow shaft up to 10 mm diameter
- Mounting by stator coupling or torque pin

magnetic multiturn absolute encoder EAM

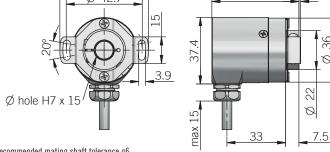




blind hollow shaft with stator coupling 36F blind hollow shaft with torque pin 36G  MULTITURN RESOLUTION turns from 1 to 17 bit										
SINGLETURN RESOLUTION										
from 1 to 15 bit										
CODE TY										
binary gray										
	WER SUPPLY									
<b>Q</b>	5 V DC 5 30 V DC 8/30									
	LECTRICAL INT	ERFACE								
	onous Interface									
		,	LOGIC positive P							
		ŀ		OPTIONS						
		to be re	ported if n	ot used X						
		reset wit	h external							
					mm 9,52					
					mm 10					
diameters 4 / 5 / 6 / 6,3	35 (1/4") / 8 mm v	with optior	nal shaft ad		ccessories   Enclosure	DATING				
			IP 67 (		/ IP 66 sha					
					MAX	X ROTATIO				
						800	00 rpm 8	UT TVDE		
					radial ca	able (stand		O.5 m) PR		
	preferred cabl	le lengths	1,5/2/3/	5 / 10 m, to	be added a	fter OUTPUT	TYPE (eg. 1	PCR5)		
					8 pin M12	z radial pli	ig connect	tor M12R	SOCKET	
							socke	t not inclu		
	f	to be repo	rted only wit	th connecto	r output (eg.	M12R.162)	, for socket	see Accesso		
								ſ	ustom ver	VARIANT sion XXX
								,		3.311 /0//(

G 8/30





recommended mating shaft tolerance g6

# 36G Ø hole H7 x 15

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

#### **ELECTRICAL SPECIFICATIONS** 1 to 17 bit Multiturn resolution for multiturn resolution > 17 bit please contact our offices Singleturn resolution 1 to 15 bit 5 = 4,75 ... 5,25 V DC Power supply<sup>1</sup> $8/30 = 7.6 \dots 30 \text{ V DC}$ (reverse polarity protection) Power draw without load < 400 mW Electrical interface<sup>2</sup> RS-422 (THVD1451 or similar) **Auxiliary inputs** active high (+V DC) (U/D - RESET) connect to 0 V if not used / RESET $t_{min}$ 150 ms Clock frequency | 100 kHz ... 1 MHz Code type | binary or gray SSI monostable time (Tm) 20 µs SSI pause time (Tp) $> 35 \mu s$ tree format MSB ... LSB SSI frame up to 12 bit multitum = length 25 bit (12MT + 13ST) 13 to 14 bit multiturn = length 27 bit (14MT + 13ST) 15 to 17 bit multiturn = length 32 bit (17MT + 15ST) SSI status and parity bit on request Counting direction decreasing clockwise (shaft view) Start-up time 150 ms Accuracy ± 0,35° max Mean time to dangerous failure (MTTF<sub>a</sub>)<sup>3</sup> 271 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 0,14 mm<sup>2</sup>/AWG 26

CONNECTIONS		
Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange	6
U/D	red / blue	7
RESET	white	1
÷	shield	housing

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					
Bore diameter	Ø 9,52 (3/8") / 10 mm Ø 4* / 5* / 6* / 6,35 (1/4")* / 8* mm * with optional shaft adapter, please refer to Accessories				
Enclosure rating	IP 67 cover side / IP 66 shaft side (IEC 60529)				
Rotation speed	8000 rpm continuous / 10000 rpm max				
Max shaft load⁴	20 N (4,5 lbs) axial / radial				
Shock	50 G, 11 ms (IEC 60068-2-27)				
Vibration	20 G, 10 2000 Hz (IEC 60068-2-6)				
Moment of inertia	0,001 x 10 <sup>-6</sup> kgm <sup>2</sup> (0,02 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	chrome plated steel				
Bearings	n.2 ball bearings				
Bearings life	109 revolutions				
Operating temperature <sup>5, 6</sup>	-30° +100°C (-22° +212°F) -25° +85°C (-13° +185°F) with M12 connector				
Storage temperature <sup>6</sup>	-25° +85°C (-13° +185°F)				
Weight	150 g (5,29 oz)				

as measured at the transducer without cable influences

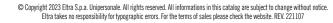
#### ENCODER RECEIVER (suggested) CLOCK -120 → +5V DC Fail-safe DATA + 120 DATA -10 Fail-safe

M12 connector (8 pin) M12 A coded front view

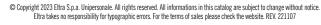














⊥ 0 V

<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>6</sup> condensation not allowed SSI SCHEMATICS



#### SOLID SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Magnetic sensor technology without contact (magnetic ASIC + Energy Harvesting)
- Sturdy construction thanks to separated chambers
- Power supply up to +32 VDC with CANopen interface
- Cable or M12 connector axial output
- 6 mm diameter solid shaft

Mounting by syncronous flange



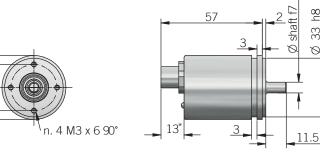






ORDERING CODE AAM	36B	24	/ 1	14	В	10/30	CNP	6	X	X	M12A	. 162	+XXX
SERIES magnetic multiturn absolute encoder series AAM													
syncronous flange ø 33 <b>MULTIT</b>	MODEL mm 36B URN RESO												
	SINGLETUR		LUTI	<b>ON</b> 14									
					DE TYPE binary B								
				1	0 30 V	R SUPPLY DC 10/30	TEDEAGE						
					ELEU	CTRICAL IN CAN	open CNP						
							SHAFT D	IAMETER mm 6					
						IP67 (		NCLOSUR / IP 65 sha					
										OPTIONS eported X			
								المثناء		OUTI	PUT TYPE		
									cable (stan 12 axial pl		tor M12A		
										socke	t not inclu	SOCKET ded .162	
					to be repo	orted only wi	th connecto	r output (eg	. M12A.162)	), for socket	see Accesso		VARIANT

36B



recommended mating shaft tolerance H7 dimensions in mm

*	with	cable	output	+	7mn
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ELECTRICAL SPECIFICATION	ONS
	24 bit
Multiturn resolution	programmable during commissioning
Cinalatura vasalutian	14 bit
Singleturn resolution	programmable during commissioning
Power supply <sup>1</sup>	10 32 V DC (reverse polarity protection)
Power draw without load	0,5 W
Electrical interface <sup>2</sup>	CAN
Protocol	CANopen Communication profile CiA 301 Encoder profile CiA 406 V3.2 class C2
Node number	1 127 (default 127) programmable during commissioning
Baud rate	10 kBaud 1 Mbaud
	with automatic bit rate detection
LSS protocol	according to CiA 305
CAN transmission modes	programmable (Synchronous and Asynchronous)
LED error messages	according to CiA 303-3
Code type	binary
Position update rate	≤ 600 µs
Start-up time	< 1,5 s
Accuracy	± 0,35°
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	1000 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 0,25 mm²/AWG 24 bending radius min 35 mm (fixed installation) bending radius min 95 mm (flexible installation)
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

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

MECHANICAL SPECIFICATI	ON			
Shaft diameter	ø 6 mm			
Enclosure rating IEC 60529	IP 67 cover side / IP65 shaft side			
Max rotation speed	12000 rpm			
Max shaft load <sup>3</sup>	80 N (17,98 lbs) radial / 50 N (11,24 lbs) axial			
Shock	100 G, 6 ms (IEC 60068-2-27)			
Vibrations	30 G, 10 2000 Hz (IEC 60068-2-6)			
Starting torque (at +20°C / +68°F)	< 0,002 Nm (0,28 Ozin)			
Bearing stage material	aluminium			
Shaft material	stainless steel			
Housing material	chromium plated steel			
Bearings	2 ball bearings			
Bearings life	109 revolutions			
Operating temperature <sup>4, 5</sup>	-40° +85°C (-40° +185°F)			
Storage temperature <sup>5</sup>	-40° +100°C (-40 +212°F)			
Weight	110 g (3,88 oz) approx			

CONNECTIONS	
Function	5 pin M12
+ V DC	2
0 V	3
CAN_H	4
CAN_L	5
CAN_GND (shield)	1
<u></u>	shield connected to encoder housing

M12 connector (5 pin) M12 A coded front view











 $<sup>^{\</sup>rm 2}$  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> 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



#### BLIND HOLLOW SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

#### MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

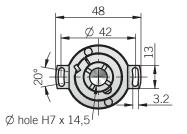
- Magnetic sensor technology without contact (magnetic ASIC + Energy Harvesting)
- Sturdy construction thanks to separated chambers
- Power supply up to +32 VDC with CANopen interface
- Cable or M12 connector axial output
- 8 or 10 mm blind hollow shaft
- Mounting by stator coupling

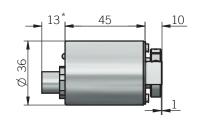




NG CODE	AAM	36F	24	/ 14	В	10/30	CNP	10	X	X	M12A	. 162	+XXX
magnetic multiturn absolute encoder se	SERIES ries AAM												
		MODEL											
blind hollow shaft with s	stator coup	ling 36F											
	MULTITU	RN RESOI											
	SI	INGLETUR	bit 24 N RESO										
				C	ODE TYPE								
					binary B	R SUPPLY							
					10 30 V	DC 10/30							
						TRICAL IN							
						CAN	open CNP						
							BORE D	IAMETER					
								mm 8 mm 10					
							E	NCLOSUR					
						IP67	cover side	/ IP 65 sha					
										OPTIONS			
									to be i	eported X	PUT TYPE		
								axial	cable (stan				
								5 pin M	12 axial pl	lug connec	ctor M12A		
										ماموم	et not inclu	SOCKET	
					to be repo	rted only wi	th connecto	r output (eg	. M12A.162		t see Access		
						,		,					VARIANT
											(	custom vei	rsion XXX

#### AAM 36F





\* with cable output + 7mm

recommended mating shaft tolerance g6 dimensions in mm

ELECTRICAL SPECIFICATION	DNS
Multiturn resolution	24 bit programmable during commissioning
Singleturn resolution	14 bit programmable during commissioning
Power supply <sup>1</sup>	10 32 V DC (reverse polarity protection)
Power draw without load	0,5 W
Electrical interface <sup>2</sup>	CAN
Protocol	CANopen Communication profile CiA 301 Encoder profile CiA 406 V3.2 class C2
Node number	1 127 (default 127) programmable during commissioning
Baud rate	10 kBaud 1 Mbaud with automatic bit rate detection
LSS protocol	according to CiA 305
CAN transmission modes	programmable (Synchronous and Asynchronous)
LED error messages	according to CiA 303-3
Code type	binary
Position update rate	≤ 600 µs
Start-up time	< 1,5 s
Accuracy	± 0,35°
Mean time to dangerous failure (MTTF <sub>d</sub> ) <sup>3</sup> according to EN ISO 13849-1	1000 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 0,25 mm²/AWG 24 bending radius min 35 mm (fixed installation) bending radius min 95 mm (flexible installation)
Electromagnetic compatibility	according to 2014/30/EU directive

as measured at the transducer without cable influences

MECHANICAL SPECIFICATION			
Bore diameter	ø 8 / 10 mm		
Enclosure rating IEC 60529	IP 67 cover side / IP65 shaft side		
Max rotation speed	6000 rpm		
Max shaft load <sup>3</sup>	80 N (17,98 lbs) radial / 50 N (11,24 lbs) axial		
Shock	100 G, 6 ms (IEC 60068-2-27)		
Vibrations	30 G, 10 2000 Hz (IEC 60068-2-6)		
Starting torque (at +20°C / +68°F)	< 0,002 Nm (0,28 Ozin)		
Bearing stage material	aluminium		
Shaft material	stainless steel		
Housing material	chromium plated steel		
Bearings	2 ball bearings		
Bearings life	10 <sup>9</sup> revolutions		
Operating temperature <sup>4, 5</sup>	-40° +85°C (-40° +185°F)		
Storage temperature <sup>5</sup>	-40° +100°C (-40 +212°F)		
Weight	110 g (3,88 oz) approx		

CONNECTIONS	
Function	5 pin M12
+ V DC	2
0 V	3
CAN_H	4
CAN_L	5
CAN_GND (shield)	1
<u></u>	shield connected to encoder housing

M12 connector (5 pin) M12 A coded front view













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 $<sup>^{\</sup>rm 2}$  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