



INCREMENTAL ENCODERS

Designed in order to control the position and the angular speed of moving mechanical axes

The main application fields for ELTRA brand encoders include wood-working machinery, textile machines, and CNC machinery.

The encoders offer a complete range of options with resolutions up to 24000 pulses per turn (ppr), a variety of flange choices, and various electrical interfaces. They are available in shaft, blind hollow shaft, and through hollow shaft options with diameters up to 60 mm (2.36").



OPTICAL SOLID SHAFT INCREMENTAL ENCODER

ER 30 E / H		38
EH 38 A / B / D		40
ER 40 A / B / C / H / I / N / X		42
ER 58 B / C / H / T		45
ER 63 A / D / E		49
EX 80 A / D	explosion proof ATEX	53
EH 90 A - 115 A / R		56
ER 90 A - 115 A		59

OPTICAL HOLLOW SHAFT INCREMENTAL ENCODER

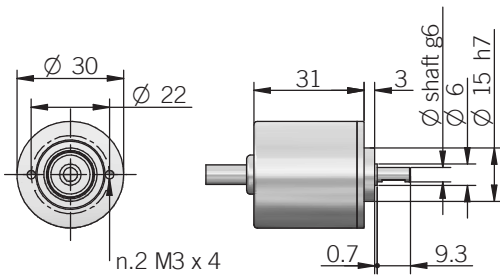
EH 17 - 30 M	kit encoder	62
EH 17 - 30 MH	kit encoder	64
EF* 36 K		66
ER 38 F / G		68
EL 48 C / P		70
EL 49 C / P		72
EF* 49 C / P		74
EH 50 FA / FP		76
EH 53 A / B		78
EL - ER 53 A / B		80
ER 58 F - 63 F / G		83
EL 63 FB / GB / PB / PBF / PC / PCF		86
ER 72 A / B		89
EH 80 C / K / P / PG		92
EH - EL 88 P		95
EH 88 PE / PET		97
EL 120 P		99

MAGNETIC INCREMENTAL ENCODER

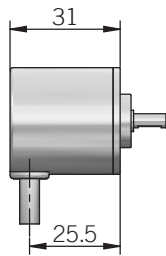
EMI 30 E / H	solid shaft	102
EMI 40 A / B / C / H / I	solid shaft	104
EMI 58 B / C / H / T	solid shaft	107
EMIP 58 B / C	solid shaft programmable	110
EMI 63 A / D / E	solid shaft	113
EMI 90 A - 115 A	solid shaft	116
EMI 30 M	kit encoder	119
EMI 38 F / G	blind hollow shaft	121
EMI 55 M	kit encoder	123
EMI 58 F - 63 F / G	blind hollow shaft	125
EMIP 58 F - 63 G	blind hollow shaft programmable	128
EMI 72 A / B	blind hollow shaft	131
ETMR A / B	kit encoder	134

models marked with * are available with Hall phases
(commutation signals)

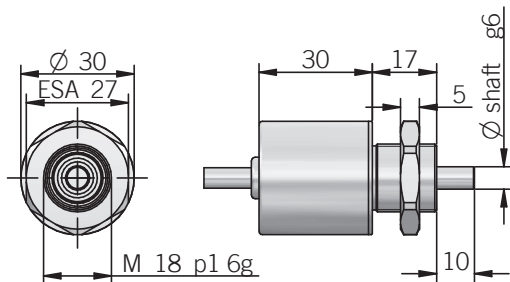
30E AXIAL CABLE OUTPUT



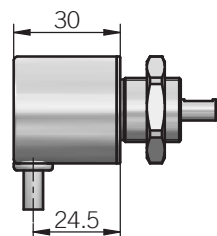
30E RADIAL CABLE OUTPUT



30H AXIAL CABLE OUTPUT



30H RADIAL CABLE OUTPUT



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 2500 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	220 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	250 years
Mission time (T_m)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 4 / 6 mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load⁴	5 N (1,12 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,05 x 10 ⁻⁶ kgm ² (1,2 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,005 Nm (0,71 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁶	-25° ... +85°C (-13° ... +185°F)
Weight	70 g (2,47 oz)

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

RESOLUTIONS

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

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

CONNECTIONS

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

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INCREMENTAL INDEX

EH 38 A / B / D

SOLID SHAFT INCREMENTAL ENCODER

MAIN FEATURES

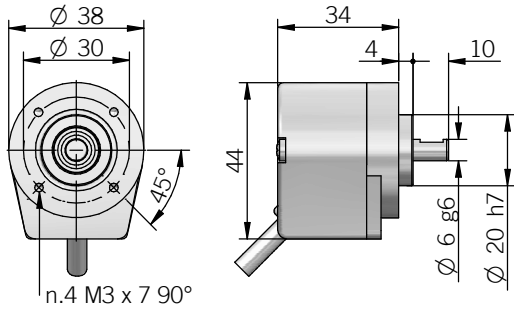
Miniaturised ø 38 mm encoders designed to fit in small devices.
Recommended when minimum size is required, while still offering excellent performance.

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

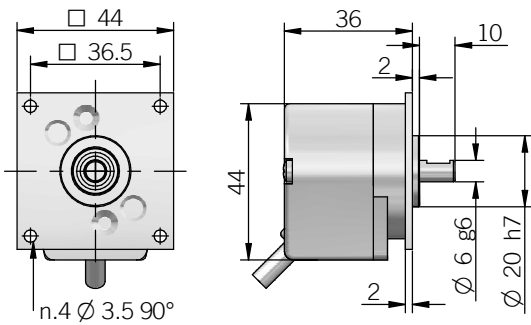


ORDERING CODE	EH	38A	500	S	5/28	P	6	X	3	PR	.XXX
SERIES incremental encoder series EH											
MODEL clamping flange ø 20 mm 38A square flange □ 36,5 mm 38B square flange □ 32 mm 38D											
RESOLUTION ppr from 50 to 1024 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY 5 V DC 5 5 ... 28 V DC 5/28											
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS											
SHAFT DIAMETER mm 6											
ENCLOSURE RATING IP 54 X											
MAX ROTATION SPEED 3000 rpm 3											
OUTPUT TYPE radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

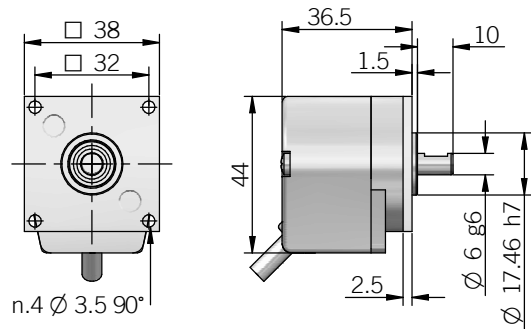
38A



38B



38D



recommended mating shaft tolerance H7
dimensions in mm

CONNECTIONS

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

ELECTRICAL SPECIFICATIONS

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

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

RESOLUTIONS

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

*available only without zero pulse

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

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INCREMENTAL INDEX

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

SOLID SHAFT INCREMENTAL ENCODER

MAIN FEATURES

Miniaturised ø 42 mm range of encoders for general factory automation applications.

- 3 channel encoder (A / B / Z) up to 14400 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 500 kHz
- Cable output, connectors available at cable end
- Solid shaft diameter 6 mm or 8 mm
- Mounting by clamping, threaded or synchronous flange



ORDERING CODE

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

SERIES
(mod. A / B / C / H / I / N / X) incremental encoder series ER

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

RESOLUTION
(mod. A / B) ppr from 100 to 14400
(mod. C / H / I / N / X) ppr from 100 to 2500
refer to the available pulses list

ZERO PULSE
without zero pulse S
with zero pulse Z

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

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

SHAFT DIAMETER
(mod. A / B / C / H / I / N) mm 6
(mod. X) mm 8

ENCLOSURE RATING
IP 54 X
(mod. A / B / H) IP 66 shaft side / IP 67 cover side S

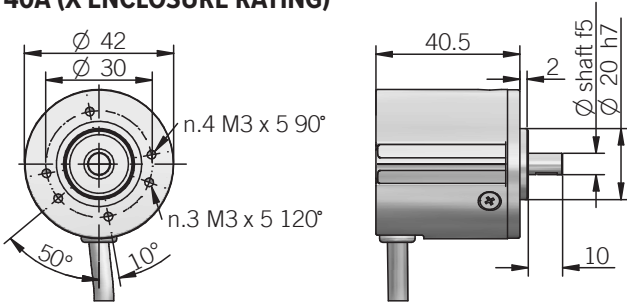
MAX ROTATION SPEED
(IP 66) 3000 rpm 3
(IP 54) 6000 rpm 6

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

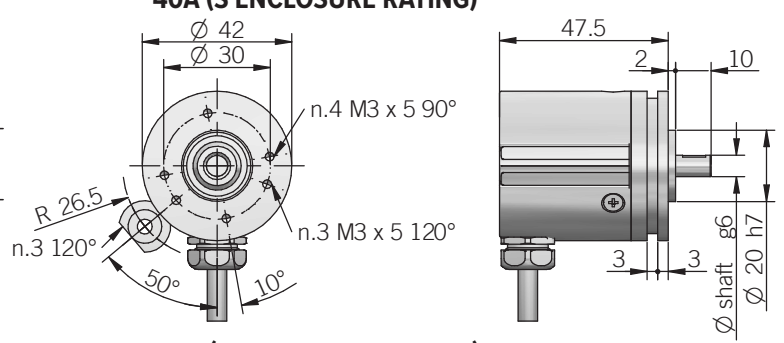
DIRECTION TYPE
(mod. A / B / C / H / I / N) axial A
radial R

VARIANT
custom version XXX

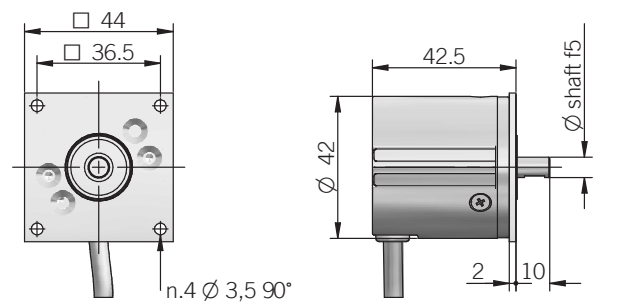
40A (X ENCLOSURE RATING)



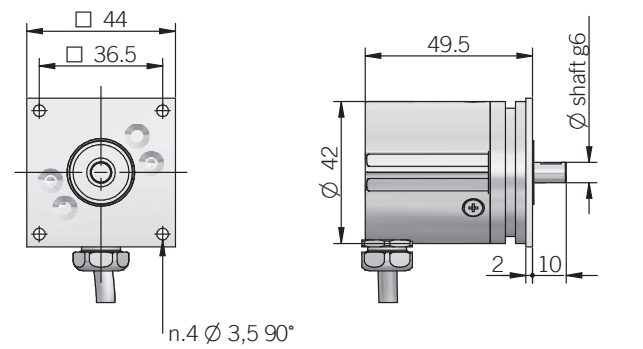
40A (S ENCLOSURE RATING)



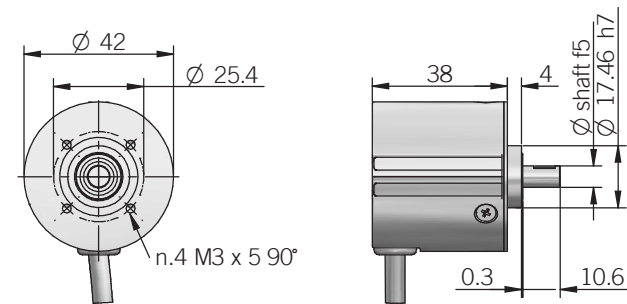
40B (X ENCLOSURE RATING)



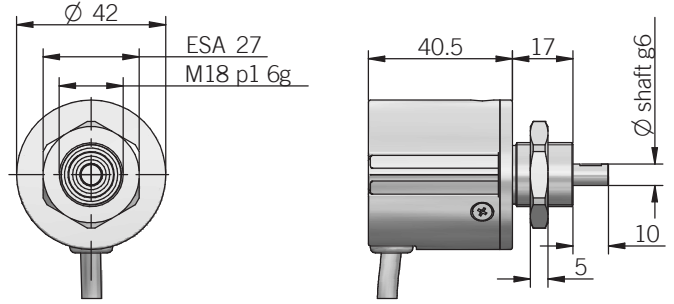
40B (S ENCLOSURE RATING)



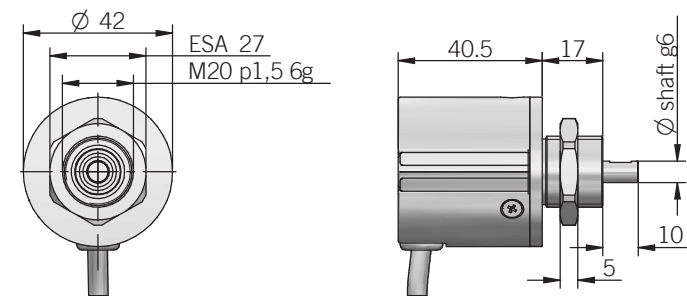
40C



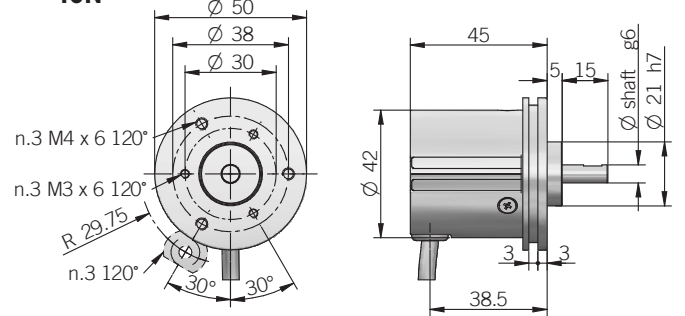
40H



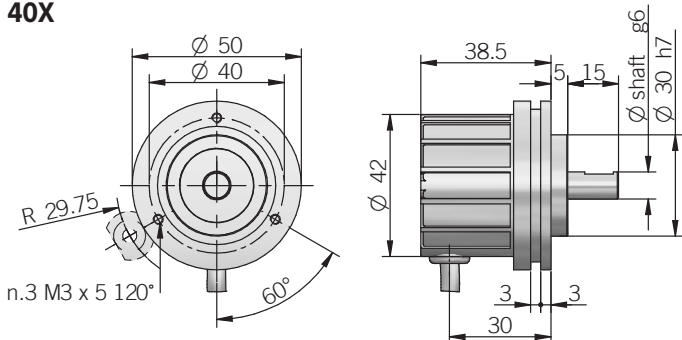
40I



40N

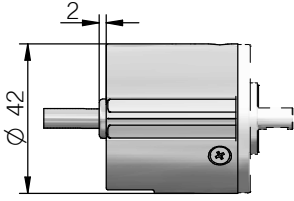


40X



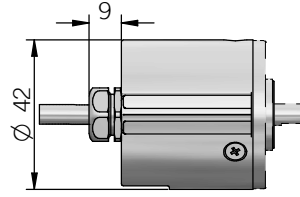
fixing clamps not included, please refer to the Accessories
recommended mating shaft tolerance H7
dimensions in mm

DIMENSIONS WITH AXIAL OUTPUT WITH X ENCLOSURE RATING



dimensions in mm

DIMENSIONS WITH AXIAL OUTPUT WITH S ENCLOSURE RATING



ELECTRICAL SPECIFICATIONS	
Resolution	from 100 to 14400 ppr (mod. A / B) from 100 to 2500 ppr (mod. C / H / I / N / X)
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 3600 ppr 500 kHz from 4000 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	263 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS	
Shaft diameter	ø 6 / 8 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66 shaft side / IP 67 cover side
Max rotation speed	6000 rpm with X enclosure rating 3000 rpm with S enclosure rating
Max shaft load⁴	30 N (6,74 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,1 x 10 ⁻⁶ kgm ² (2,4 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin) with X enclosure rating < 0,05 Nm (7,10 Ozin) with S enclosure rating
Bearing stage material	aluminum aluminium / stainless steel (mod. B)
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	100 g (3,52 oz)

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

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

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

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

ER 58 B / C / H / T

SOLID SHAFT INCREMENTAL ENCODER

MAIN FEATURES

Standard ø 58 mm encoder series for industrial applications with high mechanical resistance requirements. These encoders are designed to withstand high radial and axial shaft loads and can be mounted by flanges or fixing clamps.

- 3 channel encoder (A / B / Z) up to 24000 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 500 kHz
- Cable or connector output
- Metal cover available for heavy duty applications
- Solid shaft diameter up to 12 mm
- Mounting by synchronous, clamping or coupling flange



ORDERING CODE

ER 58C M* 500 S 5/28 P 8 X 6 M R .162 +XXX

SERIES
incremental encoder series **ER**

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

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

RESOLUTION
ppr from **100** to **24000**
refer to the available pulses list

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

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

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

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

ENCLOSURE RATING
IP 54 shaft side / IP67 cover side **X**
(mod. B / C / T) IP 66 shaft side / IP67 cover side **S**

MAX ROTATION SPEED
(S enclosure rating) 3000 rpm **3**
(X enclosure rating) 6000 rpm **6**

OUTPUT TYPE
cable (standard length 1,5 m) **P**
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
MIL plug connector **M**
JIS-C-5432 IP40 plug connector **J**
M12 plug connector **M12**
M23 plug connector **H**
M16 IP40 plug connector **C**

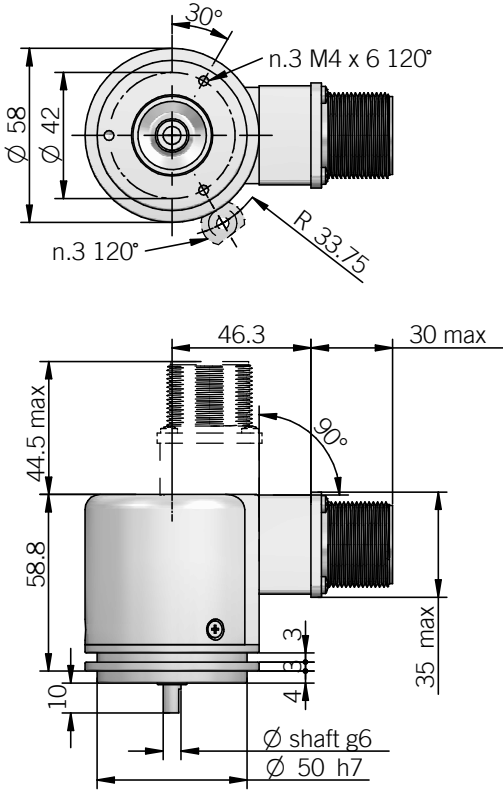
DIRECTION TYPE
axial **A**
radial **R**

SOCKET
socket not included **.162**

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

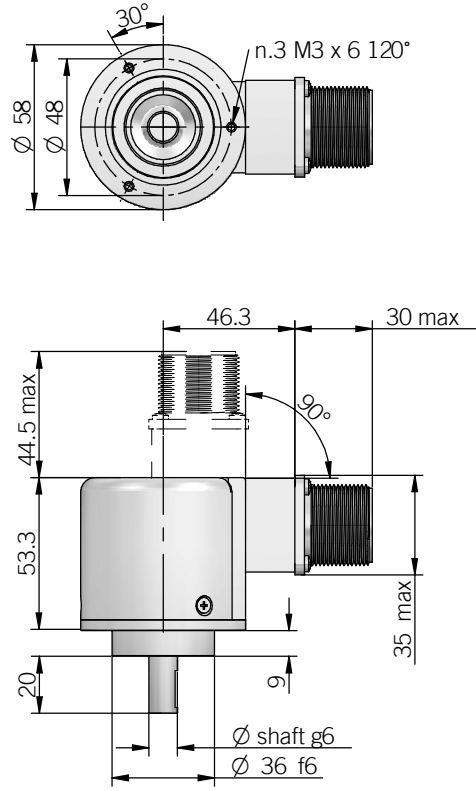
VARIANT
custom version **XXX**

58B

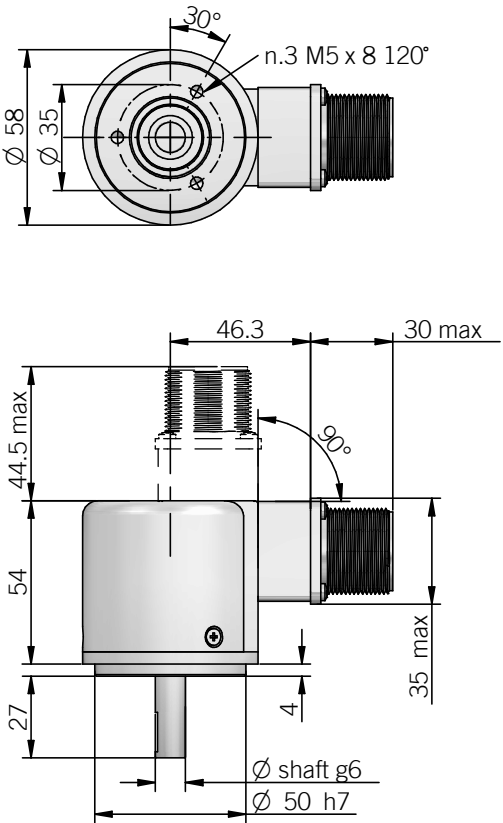


fixing clamps not included, please refer to Accessories

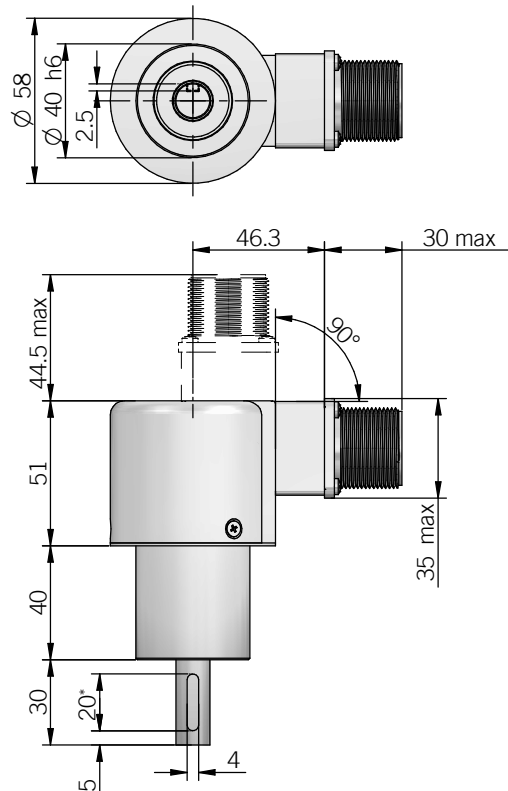
58C



58H

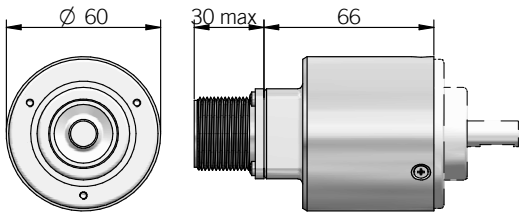


58T

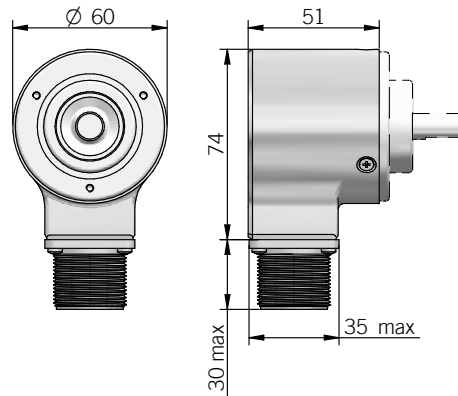


* slot only with 12mm shaft diameter

DIMENSION WITH METAL COVER AND AXIAL OUTPUT



DIMENSION WITH METAL COVER AND RADIAL OUTPUT



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 100 to 24000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	263 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS	
Shaft diameter	ø 6 / 8 / 9,52 (3/8") / 10 / 12 mm
Enclosure rating IEC 60529	X = IP 54 shaft side / IP 67 cover side S = IP 66 shaft side / IP 67 cover side
Max rotation speed	6000 rpm with X enclosure rating 3000 rpm / 70° C ER series with S enclosure rating 2000 rpm / 85° C ER series with S enclosure rating
Max shaft load⁴	10 N (2,25 lbs) axial with ø 6 mm shaft 20 N (4,45 lbs) radial with ø 6 mm shaft 200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

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

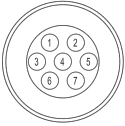
please directly contact our offices for other pulses, preferred resolutions in bold

CONNECTIONS

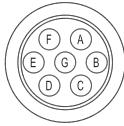
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6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

¹only with metal cover

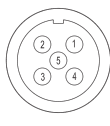
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (5 pin)
M12 A coded
front view



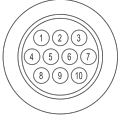
C connector (5 pin)
Amphenol C091 M16 IP40
front view



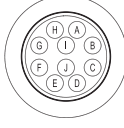
H connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view



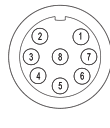
J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



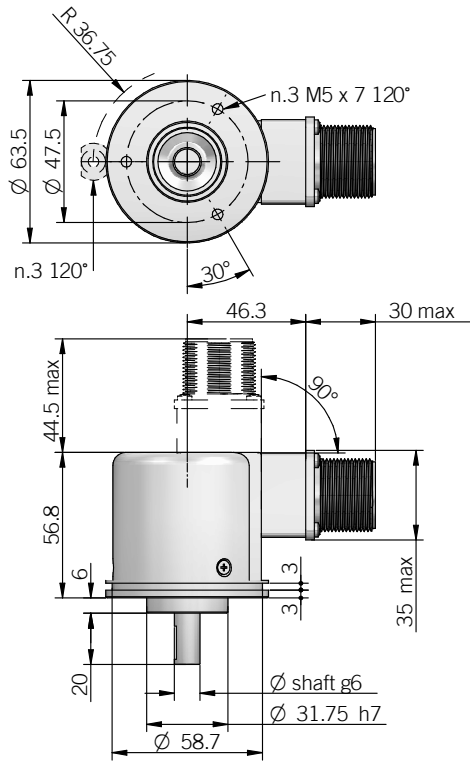
M12 connector (8 pin)
M12 A coded
front view



C connector (8 pin)
Amphenol C091 IP40 IEC 60130-9
front view

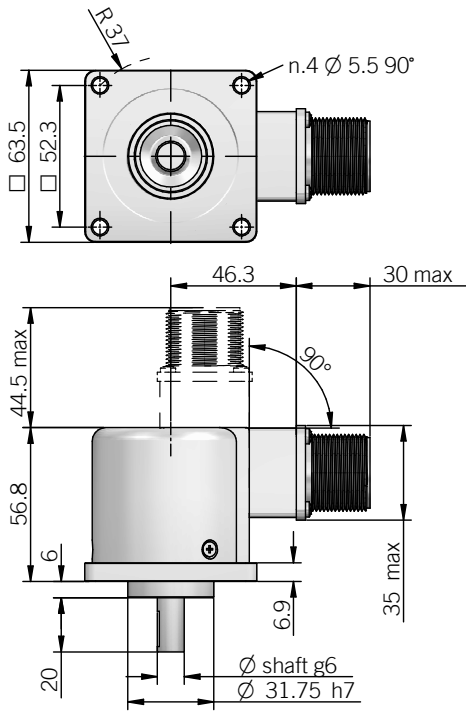


63A

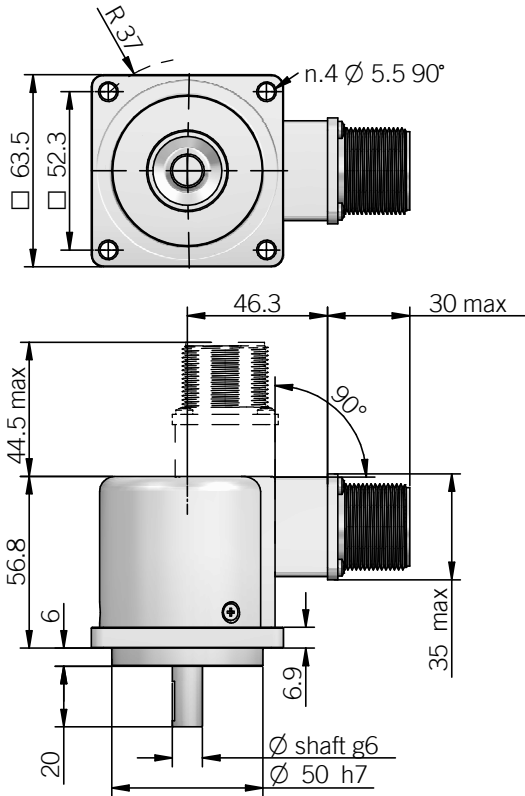


fixing clamps not included, please refer to the Accessories

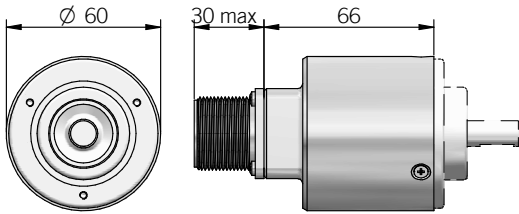
63D



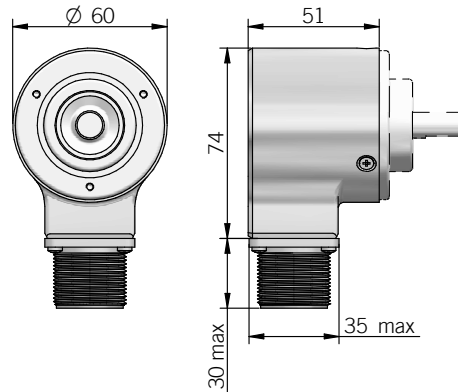
63E



DIMENSION WITH METAL COVER AND AXIAL OUTPUT



DIMENSION WITH METAL COVER AND RADIAL OUTPUT



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 100 to 24000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	263 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

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

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

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

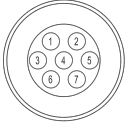
please directly contact our offices for other pulses, preferred resolutions in bold

CONNECTIONS

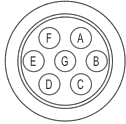
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6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

¹only with metal cover

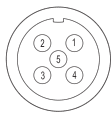
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



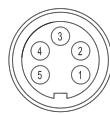
M connector (7 pin)
Amphenol MS3102-E-16-S
front view



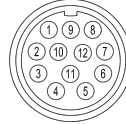
M12 connector (5 pin)
M12 A coded
front view



C connector (5 pin)
Amphenol C091 M16 IP40
front view



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



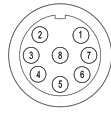
J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (8 pin)
M12 A coded
front view



C connector (8 pin)
Amphenol C091 IP40 IEC 60130-9
front view



DOWNLOAD CATALOGUE

INCREMENTAL INDEX

EX 80 A / D

EXPLOSION PROOF ATEX INCREMENTAL ENCODER

MAIN FEATURES

Explosion proof encoders designed to operate in hazardous and explosive environments.

- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 500 kHz
- 10 mm solid shaft diameter
- Mounting by synchronous or centering square flange

EX CLASSIFICATION

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

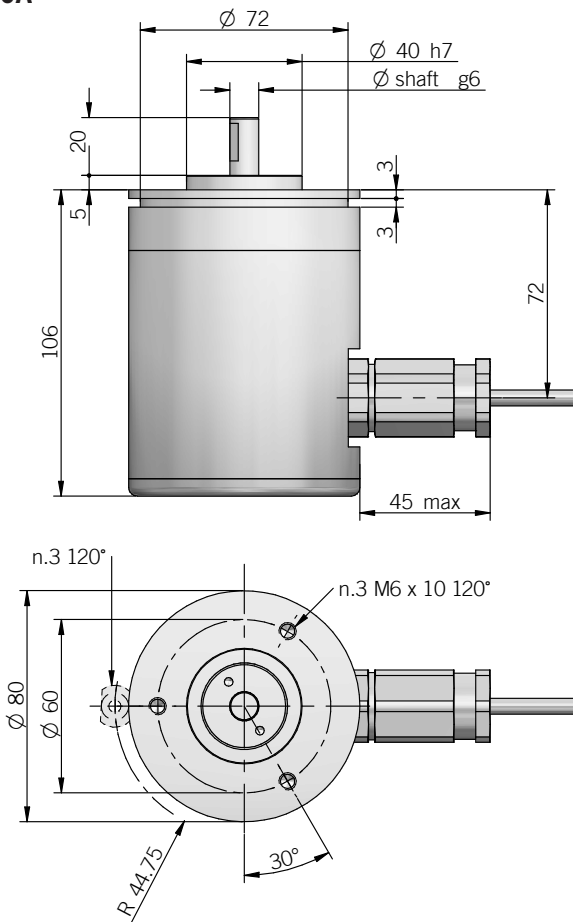
- EN IEC 60079-0:2018
- EN 60079-1:2014
- EN 60079-31:2014

The UE declaration is available on www.eltra.it



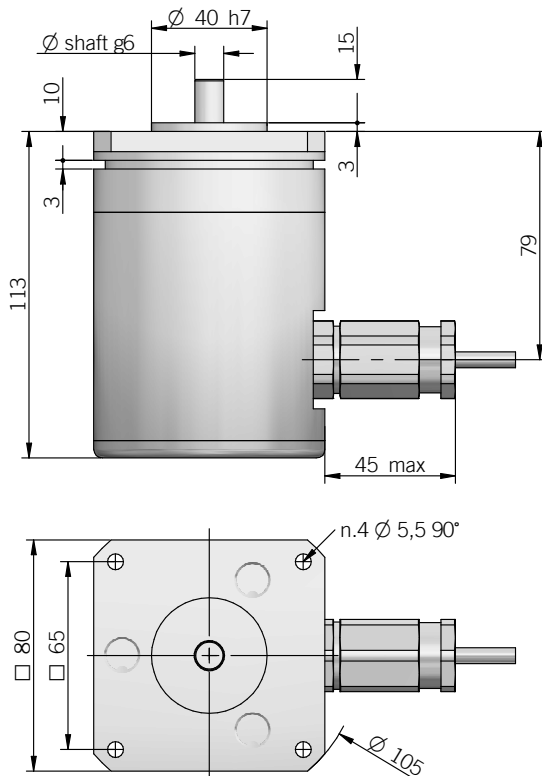
ORDERING CODE	EX	80A	500	S	5/28	P	10	X	3	PR	.XXX
SERIES explosion proof encoder series EX											
MODEL synchronous flange ø 40 mm 80A centering square flange ø 40 mm 80D											
RESOLUTION ppr from 100 to 10000 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28											
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS											
SHAFT DIAMETER mm 10											
ENCLOSURE RATING IP 65 X											
MAX ROTATION SPEED 3000 rpm 3											
OUTPUT TYPE radial cable (standard length 1,5 m) PR preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

80A



fixing clamps not included, please refer to the Accessories

80D



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

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

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

RESOLUTIONS

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

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

EPL MARKING


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

II 2GD

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

Ex db IIC T6 Gb

Ex db: flameproof enclosure for explosive atmospheres with gases, vapours and mists

IIC: group of gas IIC

T6: max surface temperature +85°C of the device for atmospheres with gas

Gb: product with a high level of protection

Ex tb IIIC T85°C Db

Ex tb: flameproof enclosure safety type

IIIC: group of dust combustibles IIIC

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

Db: product with a high level of protection

CONNECTIONS

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

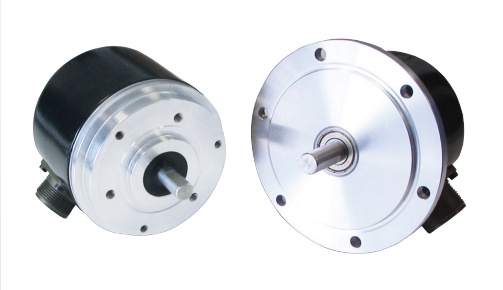
EH 90 A - EH 115 A / R

SOLID SHAFT INCREMENTAL ENCODER

MAIN FEATURES

Encoder series designed for use in harsh environments with high mechanical resistance requirements. The model 90A can be mounted by flanges or fixing clamps, while the model 115A has a tachometer generator REO-444 type compatible flange with optional centrifugal relay.

- 3 channel encoder (A / B / Z) up to 2048 ppr
- Redundancy encoder with double output and / or double resolutions
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 105 kHz
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange
- Model 115R available with centrifugal relay

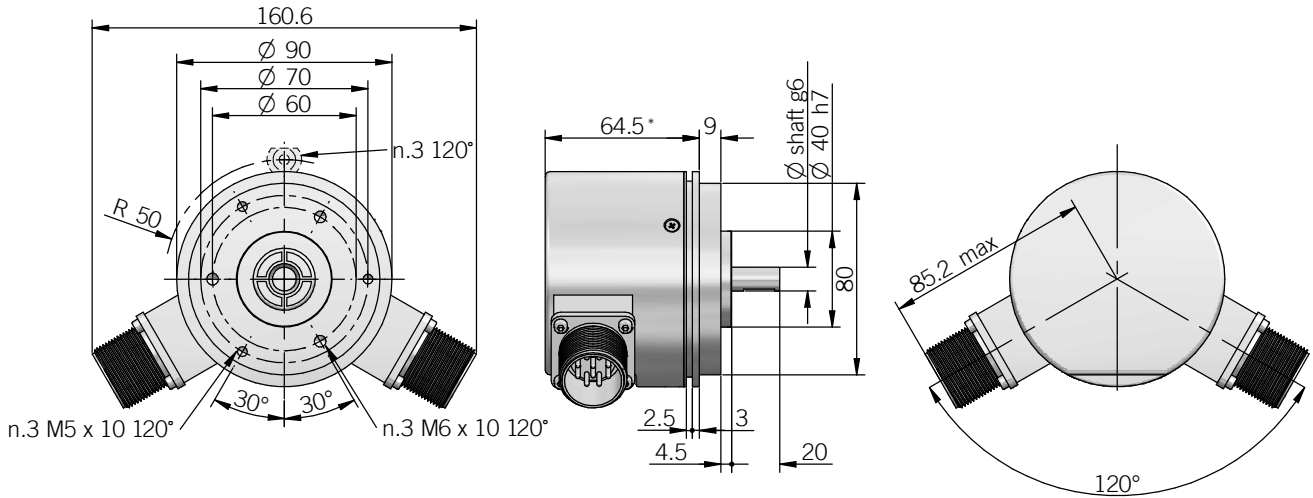


ORDERING CODE	EH	90A	500	S	5/30	P	1000	Z	5/30	P	8	X	6	M	R	.162	+XXX	+2000	
SERIES	incremental encoder series EH																		
MODEL	synchronous flange ø 40 mm 90A flange REO-444 115A flange REO-444 with centrifugal relay 115R																		
RESOLUTION	ppr from 200 to 2048 refer to the available pulses list																		
ZERO PULSE	without zero pulse S with zero pulse Z																		
POWER SUPPLY	(with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30																		
ELECTRICAL INTERFACE	NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS																		
RESOLUTION																			
ZERO PULSE																			
POWER SUPPLY																			
ELECTRICAL INTERFACE																			
SHAFT DIAMETER	(mod. 90A) mm 8 (mod. 90A) (3/8") mm 9,52 mm 10 (mod. 115A - 115R) mm 11																		
ENCLOSURE RATING	IP 54 X (mod. 90) IP 66 S																		
MAX ROTATION SPEED	(IP 66) 3000 rpm 3 (IP 54) 6000 rpm 6																		
OUTPUT TYPE	cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 IP40 plug connector J																		
DIRECTION TYPE	axial A radial R																		
SOCKET	socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories																		
VARIANT	custom version XXX																		
RELAY INTERVENTION SPEED	(mod. 115R) from 600 to 4300 for other speeds please contact our offices directly																		

To be indicated in the models 90A - 115A for double electronics and double resolution.
With different double resolution please add 250 as variant, see examples:

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

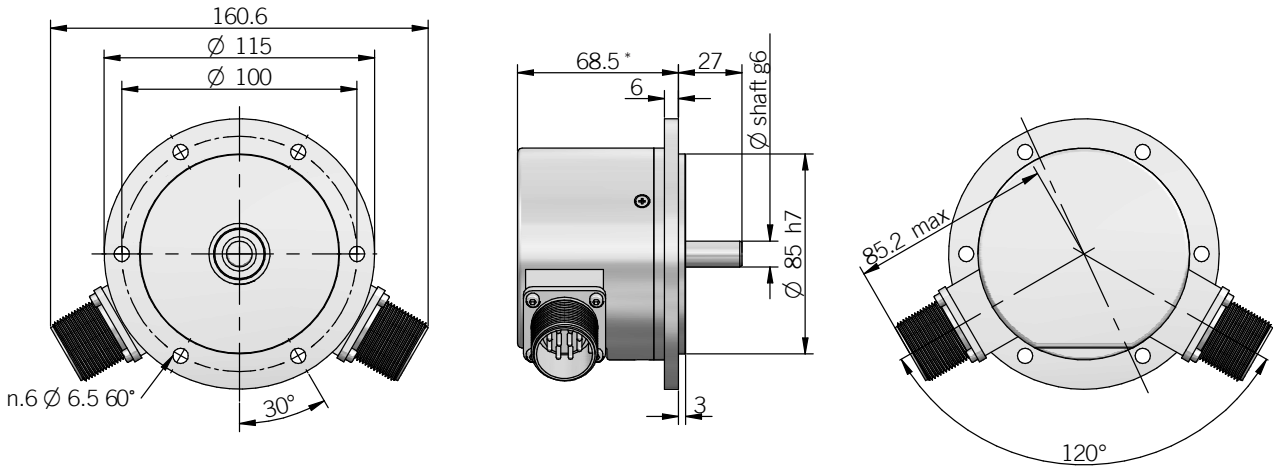
90A WITH DOUBLE OUTPUT / RESOLUTION



fixing clamps not included, please refer to the Accessories

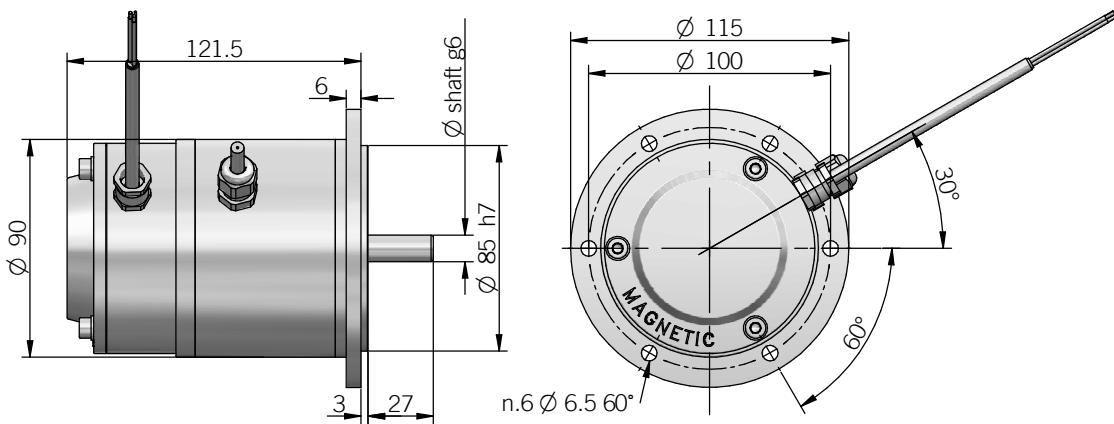
* with double resolution + 3.5mm

115A WITH DOUBLE OUTPUT / RESOLUTION



* with double resolution + 3.5mm

115R



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

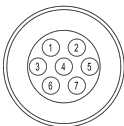
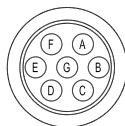
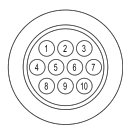
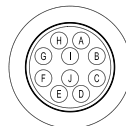
Resolution	from 200 to 2048 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	C / P = 50 mA / channel L = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	244 years / encoder
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

RELAY CHARACTERISTICS

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

CONNECTIONS

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

 J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view

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

 J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view

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

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

RESOLUTIONS

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

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

DOWNLOAD CATALOGUE

INCREMENTAL INDEX

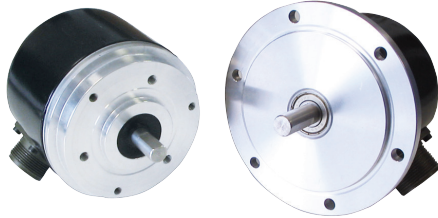
ER 90 A / 115 A

SOLID SHAFT INCREMENTAL ENCODER

MAIN FEATURES

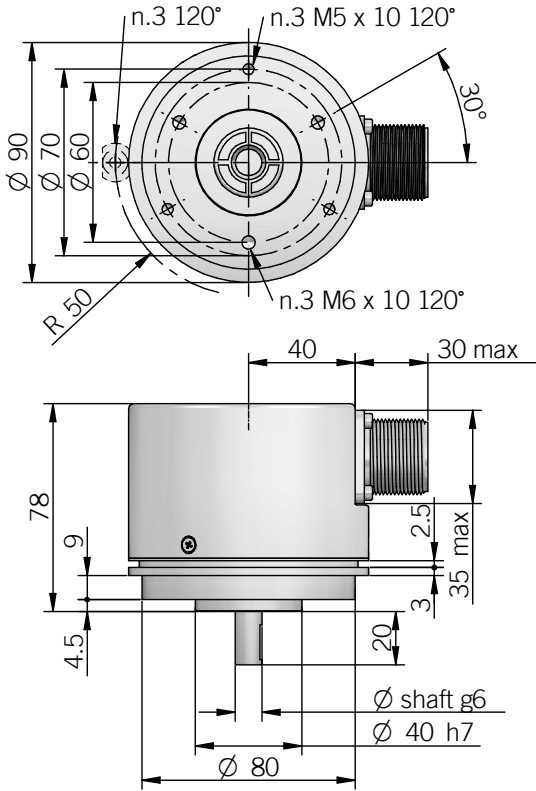
Encoder series designed for use in harsh environments with high mechanical resistance requirements. The model 90A can be mounted by flanges or fixing clamps, while the model 115A has a tachometer generator REO-444 type compatible flange.

- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 500 kHz
- Cable or connector output
- Metal cover for heavy duty applications
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange

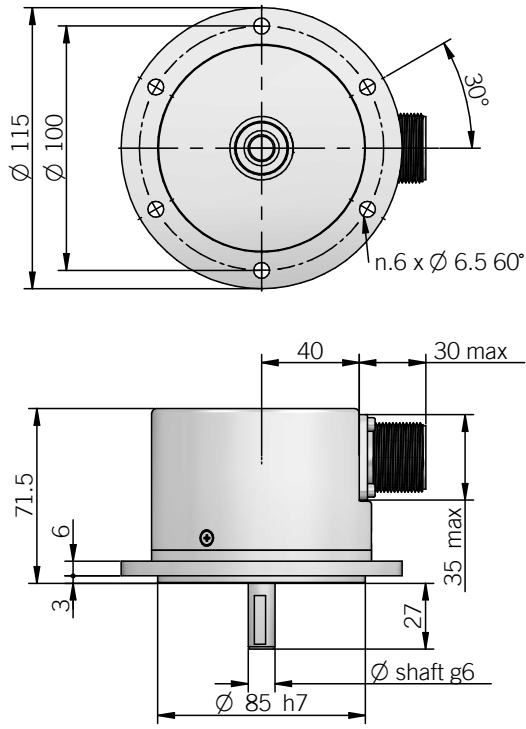


ORDERING CODE	ER	90A	500	S	5/28	P	8	X	6	M	R	.162	+XXX
SERIES incremental encoder series ER													
MODEL synchronous flange ø 40 mm 90A flange REO-444 115A													
RESOLUTION ppr from 100 to 10000 refer to the available pulses list													
ZERO PULSE without zero pulse S with zero pulse Z													
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28													
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS													
SHAFT DIAMETER (mod. 90A) mm 8 (mod. 90A) (3/8") mm 9,52 mm 10 (mod. 115A) mm 11													
ENCLOSURE RATING IP 54 shaft side / IP 67 cover side X IP 66 shaft side (mod. 90A) - IP 65 shaft side (mod. 115A) / IP 67 cover side S													
MAX ROTATION SPEED (S enclosure rating) 3000 rpm 3 (X enclosure rating) 6000 rpm 6													
OUTPUT TYPE cable (standard length 1.5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 IP40 plug connector J													
DIRECTION TYPE axial A radial R													
SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories													
VARIANT custom version XXX													

90A

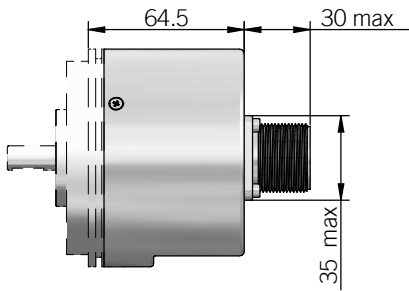


115A

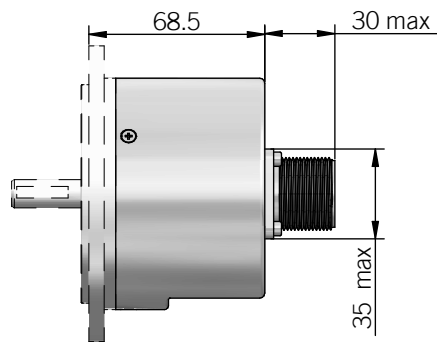


fixing clamps not included, please refer to Accessories

90A WITH AXIAL OUTPUT



115A WITH AXIAL OUTPUT



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	263 years ER series
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 8 / 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 54 shaft side / IP 67 cover side S = IP 66 shaft side / IP 67 cover side (mod. 90A) S = IP 65 shaft side / IP 67 cover side (mod. 115A)
Max rotation speed	6000 rpm with X enclosure rating EL 3000 rpm / 60° C with S enclosure rating ER 3000 rpm / 70° C with S enclosure rating ER 2000 rpm / 85° C with S enclosure rating
Max shaft load⁴	200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	3,5 x 10 ⁻⁶ kgm ² (83 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

RESOLUTIONS

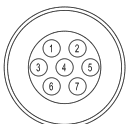
100 - 120 - 128 - 150 - 200 - 240 - 250 - 256 - 300 - **360** - 400 - 480 - **500** - **512** - **600** - 625 - **720** - 800 - 900 - **1000** - **1024** - 1200 - 1250 - 1440 - 1600 - 1800 - **2000** - **2048** - **2500** - 3000 - **3600** - 4000 - 4096 - **5000** - 6000 - **7200** - 8000 - 8192 - 9000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

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

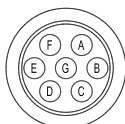
CONNECTIONS

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

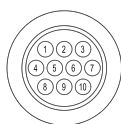
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



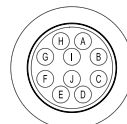
M connector (7 pin)
Amphenol MS3102-E-16-S
front view



J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



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INCREMENTAL INDEX

EH 17 - 30 M

INCREMENTAL KIT ENCODER

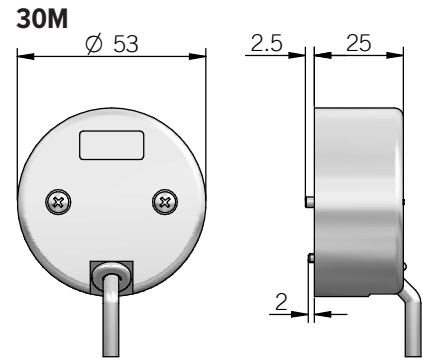
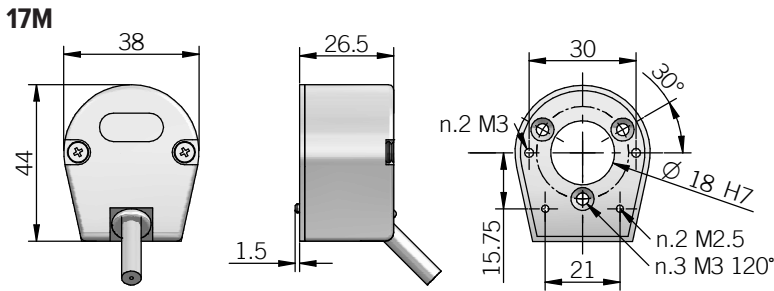
MAIN FEATURES

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

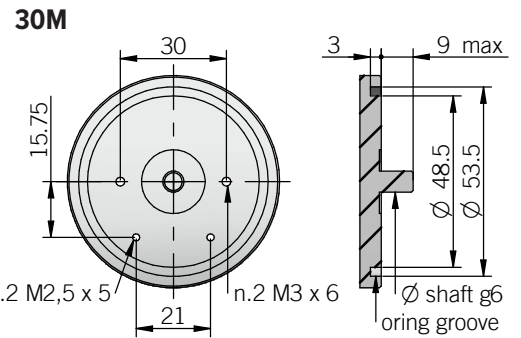
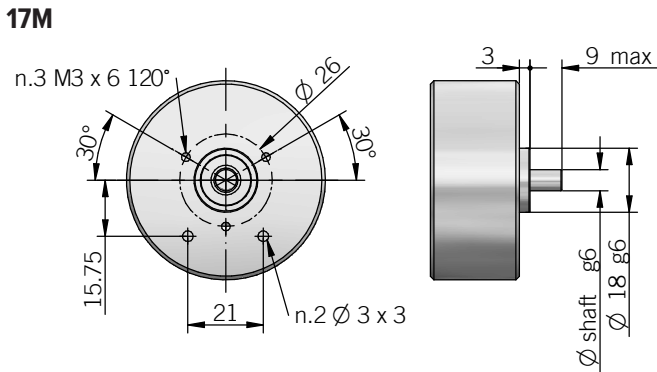
- 3 channel encoder (A / B / Z) up to 1024 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 105 kHz
- No wear due to absence of bearings
- Easy mounting
- Compact size



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



RECOMMENDED INTERFACE FLANGE DESIGN



dimensions in mm

ELECTRICAL SPECIFICATIONS

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

RESOLUTIONS

50* - **100** - **200** - 250 - 256 - 360 - 400 - **500** - 512 - **1000** - 1024
^{*}available only without zero pulse
 please directly contact our offices for other pulses, preferred resolutions in bold

MECHANICAL SPECIFICATIONS

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

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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

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INCREMENTAL INDEX

EH 17 - 30 MH

INCREMENTAL KIT ENCODER

MAIN FEATURES

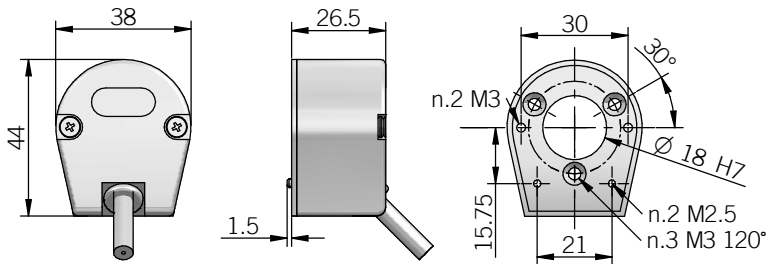
Series of miniaturised encoders for integration on small size AC/DC motors, stepper motors or for applications with limited dimensions.

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

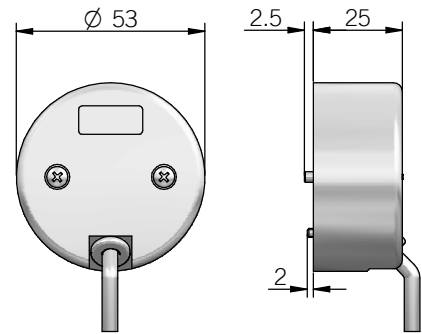


ORDERING CODE	EH 30MH 2000	S	5/30	P	6	X	X	PR	.XXX
SERIES incremental encoder series EH									
TYPE high resolution kit encoder with flange 17MH high resolution kit encoder 30MH									
RESOLUTION ppr 2000 / 2048 / 2500 / 4096 / 5000									
ZERO PULSE without zero pulse S with zero pulse Z						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

17MH

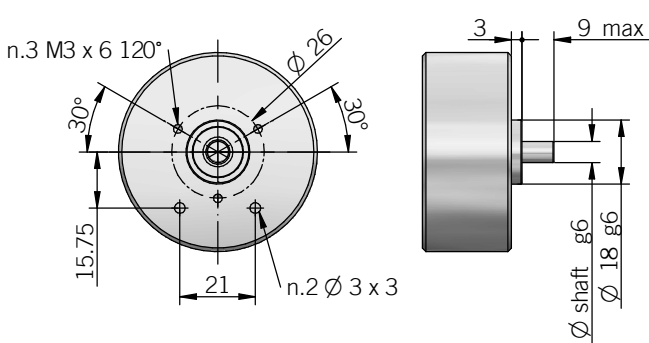


30MH

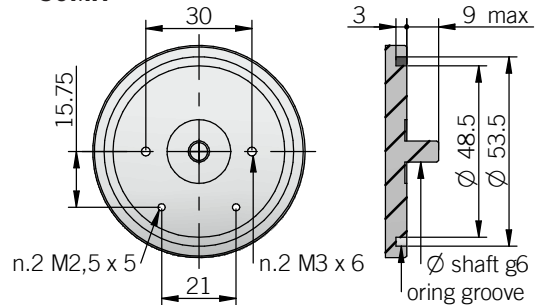


RECOMMENDED INTERFACE FLANGE DESIGN

17MH



30MH



dimensions in mm

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

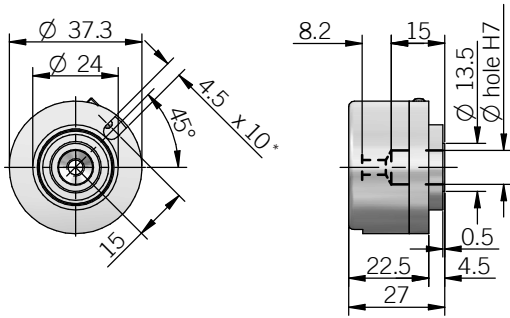
MECHANICAL SPECIFICATIONS	
Bore diameter	ø 6 / 6,35 (1/4") mm
Enclosure rating IEC 60529	mod. 17 IP 40 mod. 30 IP 40 or 54*
Max rotation speed	6000 rpm limited by output frequency
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,5 x 10 ⁻⁶ kgm ² (12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

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

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



36K



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

for size 15 Resolver flange please refer to Accessories

recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

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

RESOLUTIONS

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

please directly contact our offices for other pulses

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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

DOWNLOAD CATALOGUE

INCREMENTAL INDEX

ER 38 F / G

BLIND HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

Miniaturised range of encoders for general factory automation applications, small AC motors and gearmotors and geared motors.

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

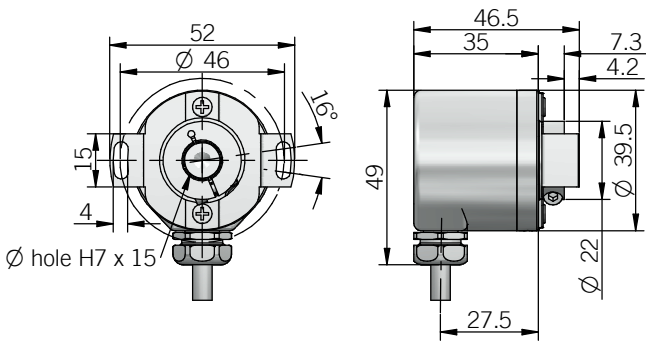


ORDERING CODE

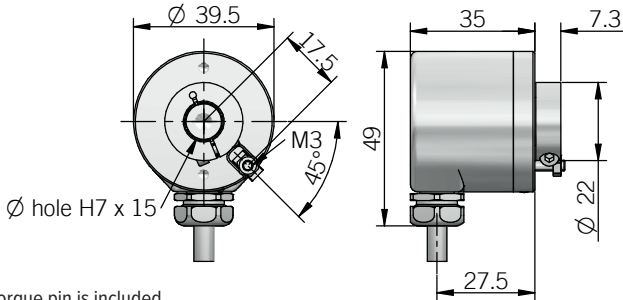
ER 38F 500 S 5/30 P 10 X X PR .XXX

SERIES incremental encoder series ER											
MODEL blind hollow shaft with stator coupling 38F blind hollow shaft with torque pin 38G											
RESOLUTION ppr from 100 to 14400 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30											
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS											
BORE DIAMETER mm 4 mm 5 mm 6 (1/4") mm 6,35 mm 8 mm 10											
ENCLOSURE RATING IP 66 shaft side / IP67 cover side X											
OPTION to be reported X											
OUTPUT TYPE radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

38F



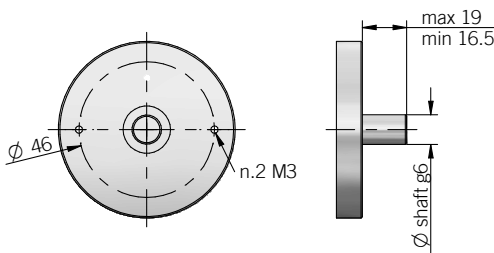
38G



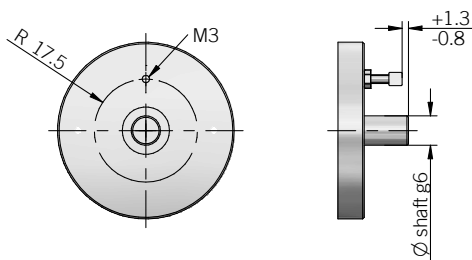
torque pin is included

RECOMMENDED INTERFACE FLANGE DESIGN

38F



38G



dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 14400 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 3600 ppr / 500 kHz from 4000 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	263 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

RESOLUTIONS

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

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

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INCREMENTAL INDEX

EL 48 C / P

THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

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

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

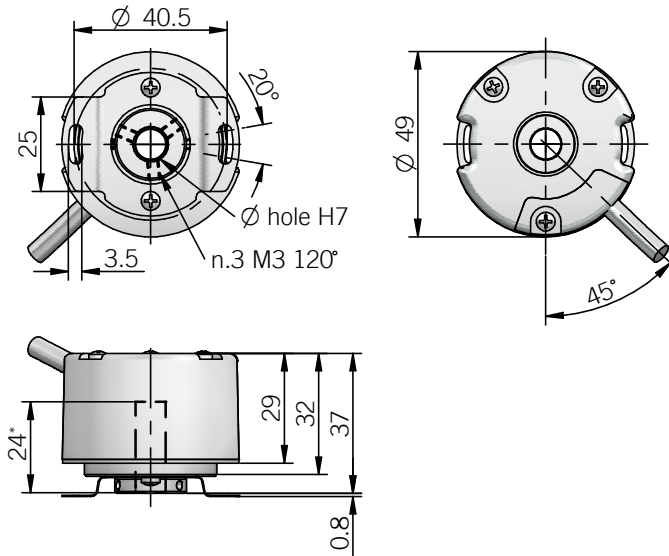


ORDERING CODE

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

SERIES incremental encoder series EL												
MODEL blind hollow shaft 48C through hollow shaft 48P												
RESOLUTION ppr from 100 to 2048 refer to the available pulses list												
ZERO PULSE without zero pulse S with zero pulse Z												
POWER SUPPLY (with L electrical interface) 5 V DC 5 8 ... 24 V DC 8/24												
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L												
BORE DIAMETER mm 6 mm 8												
ENCLOSURE RATING IP 30 X												
MAX ROTATION SPEED 6000 rpm 6												
OUTPUT TYPE radial cable (standard length 0,3 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)												
VARIANT custom version XXX												

48C / P



model C without hole on cover

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

ELECTRICAL SPECIFICATIONS	
Resolution	from 100 to 2048 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC
Current consumption without load	100 mA max
Max load current	C / P = 30 mA / channel L = 20 mA / channel
Electrical interface²	NPN open collector (pull-up max +30V DC) push-pull / line driver HTL (AEC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	330 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

CONNECTIONS

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

MECHANICAL SPECIFICATIONS

Bore diameter	ø 6 / 8 mm
Enclosure rating	IP 30 (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 500 Hz (IEC 60068-2-6)
Moment of inertia	2,5 x 10 ⁻⁶ kgm ² (59 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA 66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-20° ... +85 °C (-4° ... +185°F)
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	100 g (3,53 oz)

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

RESOLUTIONS

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

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

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INCREMENTAL INDEX

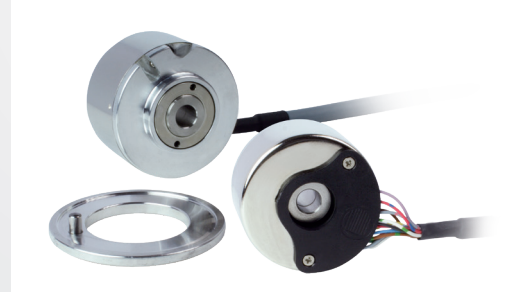
EL 49 C / P

THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

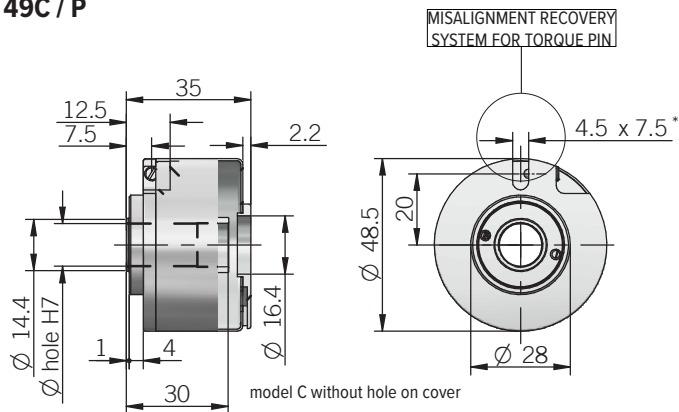
ø 49 mm encoder recommended for feedback control systems on AC servomotors,

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



ORDERING CODE	EL	49C	500	S	5	L	8	X	6	PR	.XXX
SERIES incremental encoder EL											
MODEL blind hollow shaft 49C through hollow shaft 49P											
RESOLUTION ppr from 100 to 2048 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY (with L electrical interface) 5 V DC 5 8 ... 24 V DC 8/24											
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L											
BORE DIAMETER mm 6 mm 8 (3/8") mm 9,52 mm 10 mm 12 (1/2") mm 12,7											
ENCLOSURE RATING IP 40 X											
MAX ROTATION SPEED 6000 rpm 6											
OUTPUT TYPE radial cable (standard length 0,3 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

49C / P



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

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

recommended mating shaft tolerance g6
dimensions in mm

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

CONNECTIONS

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

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

RESOLUTIONS

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

please directly contact our offices for other pulses

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INCREMENTAL INDEX

EF 49 C / P

THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

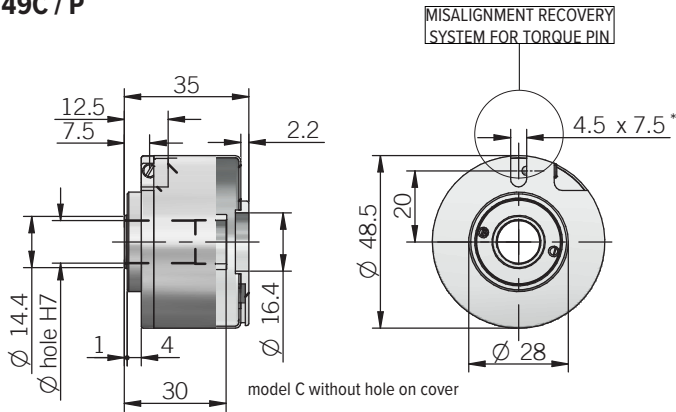
MAIN FEATURES

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

- Easy mechanical mounting
- Small dimensions
- Wide range of resolutions available
- High temperature resistance
- 6 channel encoder with optical generation of "Hall effect phases" (commutation signals)



ORDERING CODE	EF	49C	6	L	500	S	5	L	8	X	6	PR	.XXX
SERIES incremental encoder with Hall phases EF													
MODEL blind hollow shaft 49C through hollow shaft 49P													
MOTOR POLES 4 poles (2 poles pair) 4 6 poles (3 poles pair) 6 8 poles (4 poles pair) 8													
ELECTRICAL INTERFACE FOR COMMUTATION SIGNALS NPN open collector C line driver RS-422 L													
INCREMENTAL RESOLUTION ppr from 100 to 2048 refer to the available pulses list													
ZERO PULSE without zero pulse S with zero pulse Z													
POWER SUPPLY 5 V DC 5													
ELECTRICAL INTERFACE FOR INCREMENTAL SIGNALS line driver L													
BORE DIAMETER mm 6 mm 8 (3/8") mm 9,52 mm 10 mm 12 (1/2") mm 12,7													
ENCLOSURE RATING IP 40 X													
MAX ROTATION SPEED 6000 rpm 6													
OUTPUT TYPE radial cable (standard length 0,3 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)													
VARIANT custom version XXX													

49C / P


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

recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

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

RESOLUTIONS

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

please directly contact our offices for other pulses

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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

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INCREMENTAL INDEX

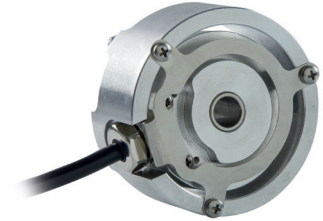
EH 50 FA / FP

THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

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

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

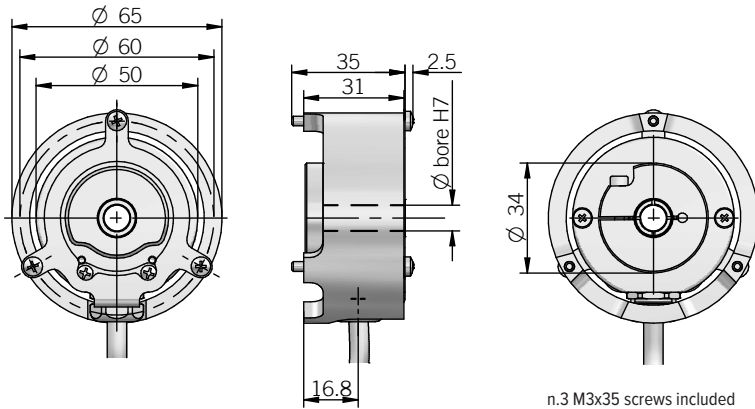


ORDERING CODE

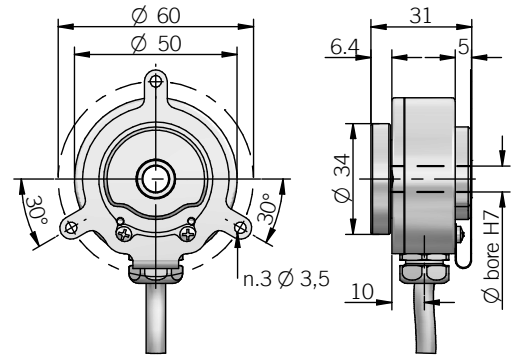
EH 50FP 1024 S 5/30 P 6 X 6 PR .XXX

SERIES incremental encoder series EH											
MODEL through hollow shaft with front fixing 50FA through hollow shaft with rear fixing 50FP											
RESOLUTION ppr from 100 to 1024 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY 5 ... 30 V DC 5/30											
ELECTRICAL INTERFACE push-pull P line driver L power supply 5/30 V DC - output RS-422 RS											
BORE DIAMETER mm 8 mm 10											
ENCLOSURE RATING IP 65 X											
MAX ROTATION SPEED 6000 rpm 6											
OUTPUT TYPE radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

50FA



50FP



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 100 to 1024 ppr
Power supply¹	4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	20 mA / channel
Electrical interface²	push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	54 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

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

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

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

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

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INCREMENTAL INDEX

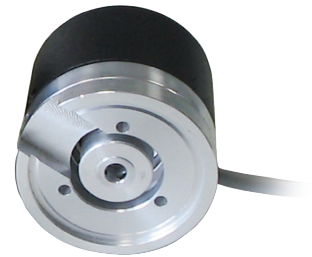
EH 53 A / B

BLIND HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

Series of encoders for direct mounting on motors; integrated elastic coupling allows radial and axial shaft play.

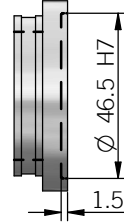
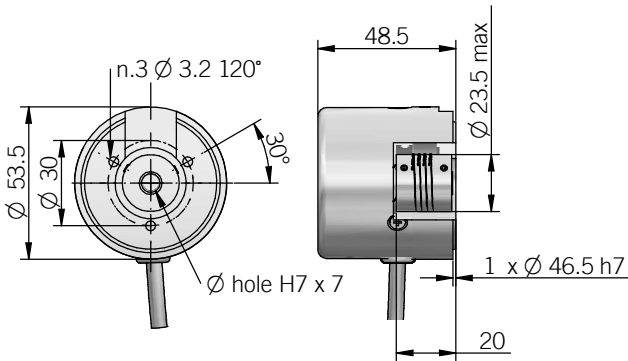
- 3 channel encoder (A / B / Z) up to 1024 ppr
- Power supply up to +24 V DC with various electrical interfaces available
- Output frequency up to 150 kHz
- Cable output, connectors available on cable end
- Up to 10 mm bore diameter
- Integrated elastic coupling



ORDERING CODE	EH	53A	500	S	8/24	P	8	X	6	PR.N	.XXX
SERIES incremental encoder series EH											
MODEL adjustable flange model 53A adjustable flange model 53B											
RESOLUTION ppr from 50 to 1024 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY (with L electrical interface) 5 V DC 5 8 ... 24 V DC 8/24											
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L											
BORE DIAMETER mm 6 mm 8 mm 10											
ENCLOSURE RATING IP 54 X											
MAX ROTATION SPEED 6000 rpm 6											
OUTPUT TYPE radial cable (standard length 0,5 m) PR.N preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

53A

53B INTERFACE



recommended mating shaft tolerance g6
dimensions in mm

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

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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

RESOLUTIONS

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

please directly contact our offices for other pulses

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INCREMENTAL INDEX

EL - ER 53 A / B

BLIND HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

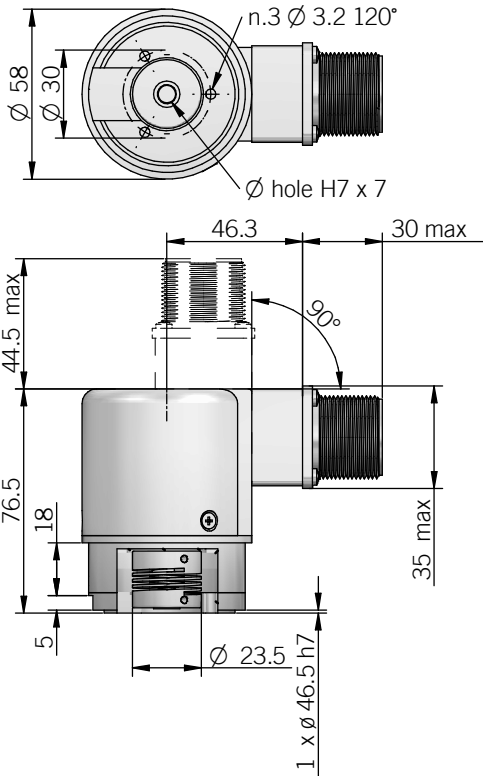
Series of encoders for direct mounting on motors; integrated elastic coupling allows radial and axial shaft play.

- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 500 kHz
- Cable or connector output
- Metal cover available for heavy duty applications
- Integrated elastic coupling up to 10 mm bore diameter



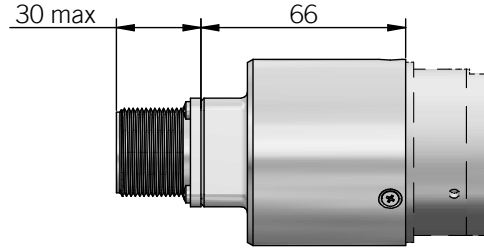
ORDERING CODE	ER	53A	M*	500	S	5/28	P	8	X	6	M	R	.162	+XXX
<p>SERIES incremental encoder series EL incremental encoder series ER</p> <p>MODEL adjustable flange model 53A adjustable flange model 53B</p> <p>METAL COVER * add for metal cover M</p> <p>RESOLUTION ppr from 1 to 10000 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28</p> <p>ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS</p> <p>BORE DIAMETER mm 6 mm 8 mm 10</p> <p>ENCLOSURE RATING IP 54 X IP 64 S</p> <p>MAX ROTATION SPEED (IP 64) 3000 rpm 3 (IP 54) 6000 rpm 6</p> <p>OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 IP40 plug connector J M12 plug connector M12 M23 plug connector H M16 IP40 plug connector C</p> <p>DIRECTION TYPE axial A radial R</p> <p>SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories</p> <p>VARIANT custom version XXX</p>														

53A

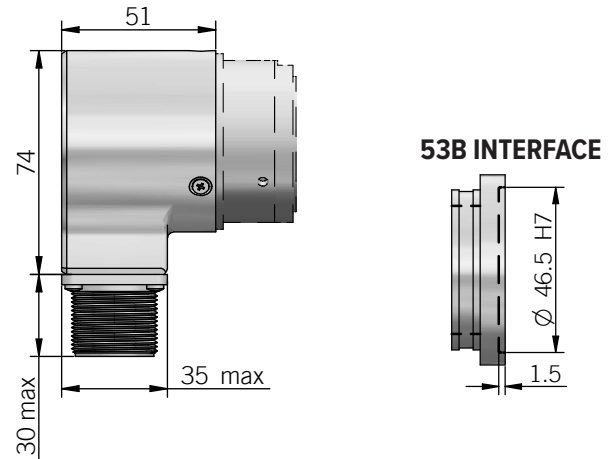


recommended mating shaft tolerance g6
dimensions in mm

DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	200 years EL series 263 years ER series
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ER SERIES RESOLUTIONS

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

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

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

EL SERIES RESOLUTIONS

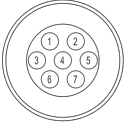
1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 25 - 30 - 32 - 40 - 50 - 60 - 70 - 80 - 90 - 160 - 180 - 350 - 450 - 660 - 700 - 750 - 1500

CONNECTIONS

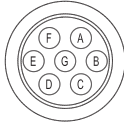
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6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

¹only with metal cover

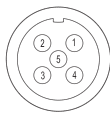
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



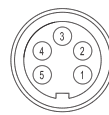
M connector (7 pin)
Amphenol MS3102-E-16-S
front view



M12 connector (5 pin)
M12 A coded
front view



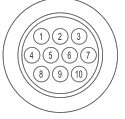
C connector (5 pin)
Amphenol C091 M16 IP40
front view



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



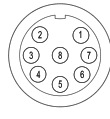
J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



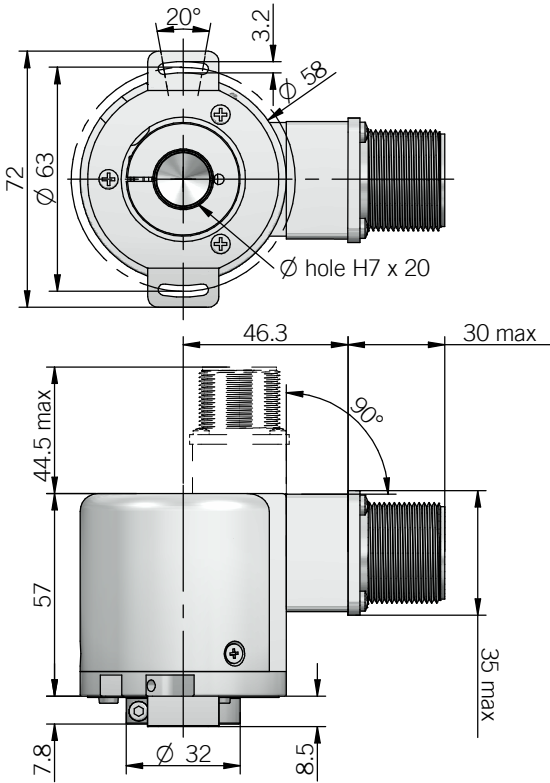
M12 connector (8 pin)
M12 A coded
front view



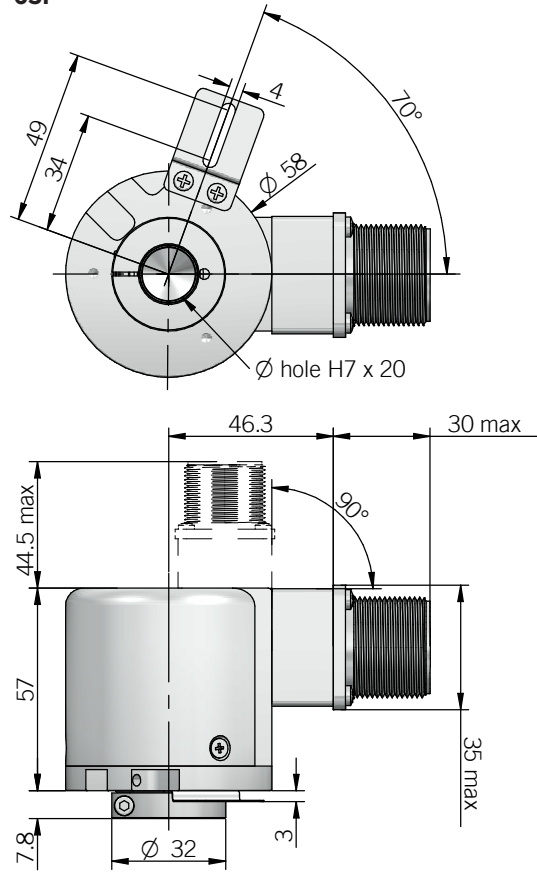
C connector (8 pin)
Amphenol C091 IP40 IEC 60130-9
front view



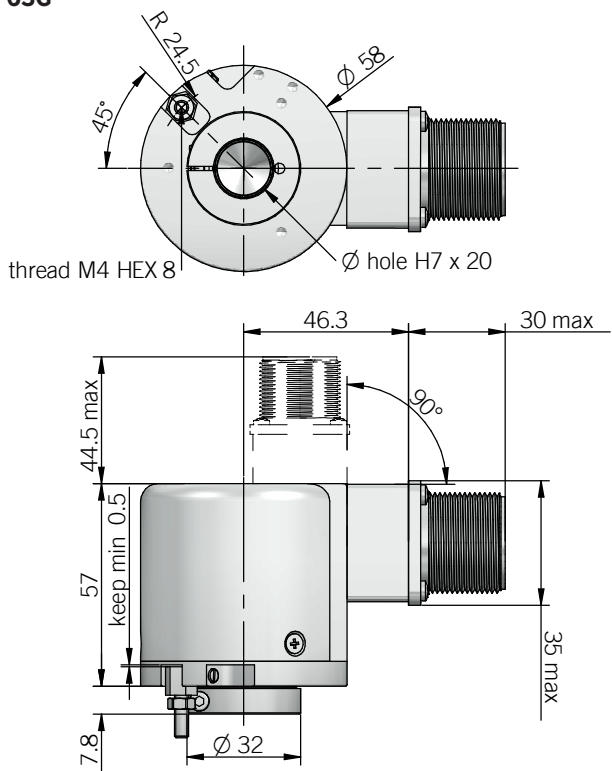
58F



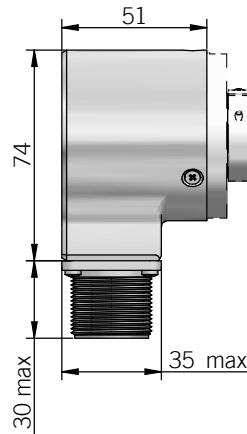
63F



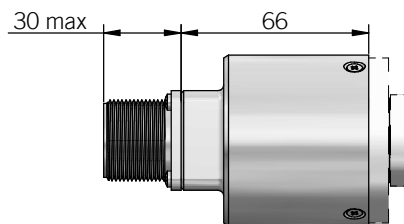
63G



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



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

ELECTRICAL SPECIFICATIONS

Resolution	from 100 to 24000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	263 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

RESOLUTIONS

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

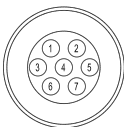
please directly contact our offices for other pulses, preferred resolutions in bold

CONNECTIONS

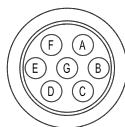
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6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

¹ only with metal cover

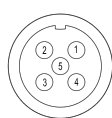
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



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



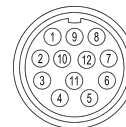
M12 connector (5 pin)
M12 A coded
front view



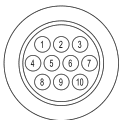
C connector (5 pin)
Amphenol C091 M16 IP40
front view



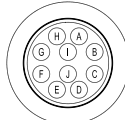
H connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view



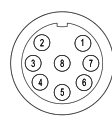
J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (8 pin)
M12 A coded
front view



C connector (8 pin)
Amphenol C091 IP40 IEC 60130-9
front view



MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

DOWNLOAD CATALOGUE

INCREMENTAL INDEX

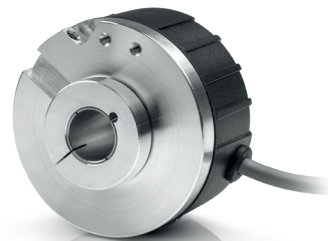
EL 63 FB / GB / PB / PBF / PC / PCF

BLIND / THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

Series of hollow shaft encoders for small AC motors, thanks to their compact size (only 35 mm height).

- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 300 kHz
- Cable output, connectors available on cable end
- Through or blind hollow shaft up to 15 mm diameter
- Shaft fixing by collar clamping

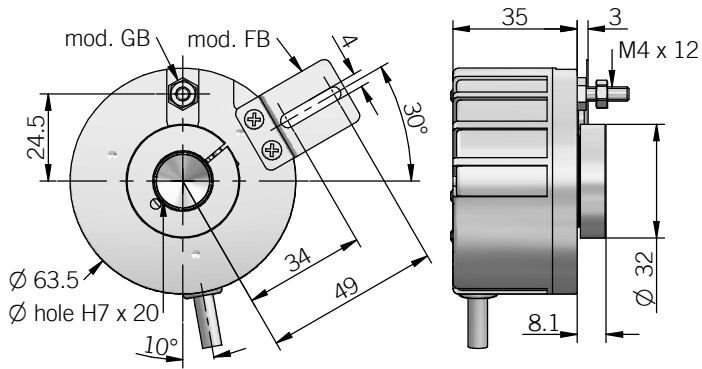


ORDERING CODE

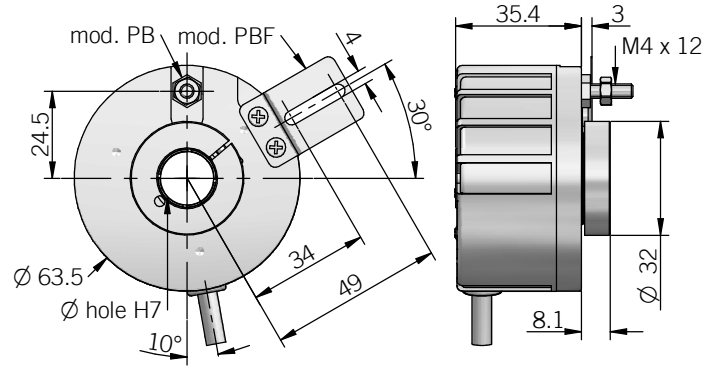
EL 63GB 500 S 5/28 P 8 X 3 PR .XXX

SERIES incremental encoder EL											
MODEL blind hollow shaft with torque stop slot 63FB blind hollow shaft with torque pin 63GB through hollow shaft with torque pin 63PB through hollow shaft with torque stop slot 63PBF rear fixing shaft with torque pin 63PC rear fixing shaft with torque stop slot 63PCF											
RESOLUTION ppr from 1 to 2500 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28											
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS											
BORE DIAMETER mm 8 mm 10 mm 12 mm 14 mm 15											
ENCLOSURE RATING IP 54 X											
MAX ROTATION SPEED 3600 rpm 3											
OUTPUT TYPE radial cable (standard length 1,5 m) PR preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

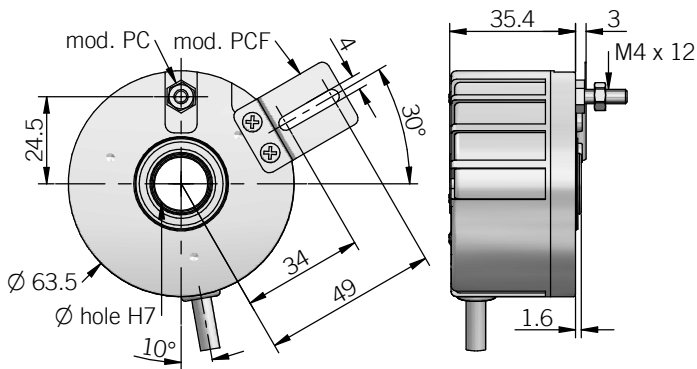
63FB / GB



63PB / PBF



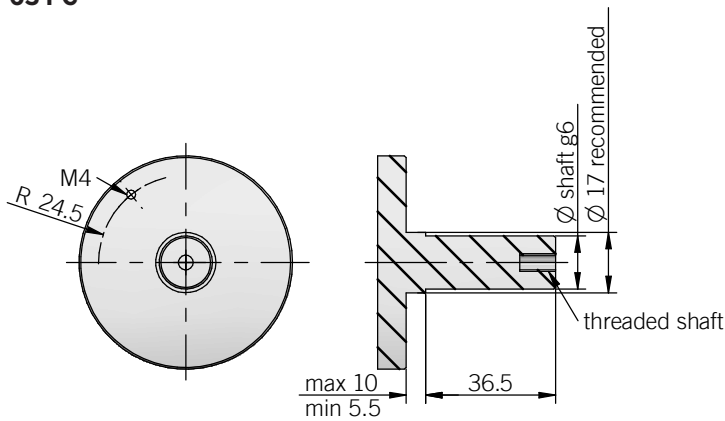
63PC / PCF



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

recommended mating shaft tolerance g6

**RECOMMENDED INTERFACE FLANGE DESIGN
63 PC**



dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 2500 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	300 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	200 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

RESOLUTIONS

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

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

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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



ER 72 A / B

BLIND HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

Standard encoder series for industrial environments with high mechanical resistance requirements. Specially designed for direct mounting on motors or tachometric dynamos thanks to integrated elastic coupling that allows radial and / or axial play on the motor shafty.

- 3 channel encoder (A / B / Z) up to 24000 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 500 kHz
- Cable or connector output
- Metal cover available for heavy duty applications
- Integrated elastic coupling up to 10 mm bore diameter



ORDERING CODE **ER** **721** **A** **M*** **500** **S** **5/28** **P** **8** **X** **6** **M** **R** **.162** **+XXX**

SERIES
incremental encoder series ER

MODEL
fixing holes ø 63,5 mm **721**
fixing holes ø 65 mm **722**
fixing holes ø 57 mm **723**
fixing holes ø 60 mm **724**

FLANGE TYPE
flange type **A**
flange type **B**

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

RESOLUTION
ppr from **100** to **24000**
refer to the available pulses list

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

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

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

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

ENCLOSURE RATING
IP 54 **X**
(mod. 721 / 722 max 2500 ppr) IP 66 **S**

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

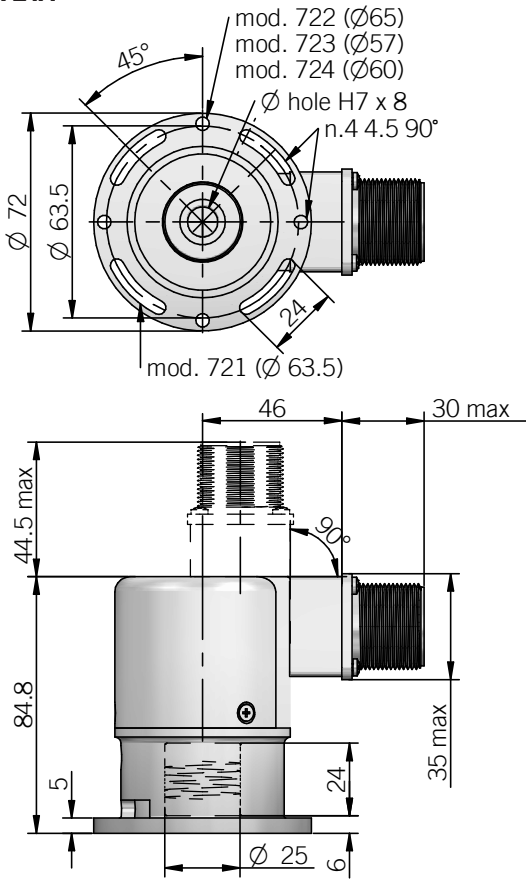
OUTPUT TYPE
cable (standard length 1,5 m) **P**
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
MIL plug connector **M**
JIS-C-5432 IP40 plug connector **J**
M12 plug connector **M12**
M23 plug connector **H**
M16 IP40 plug connector **C**

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

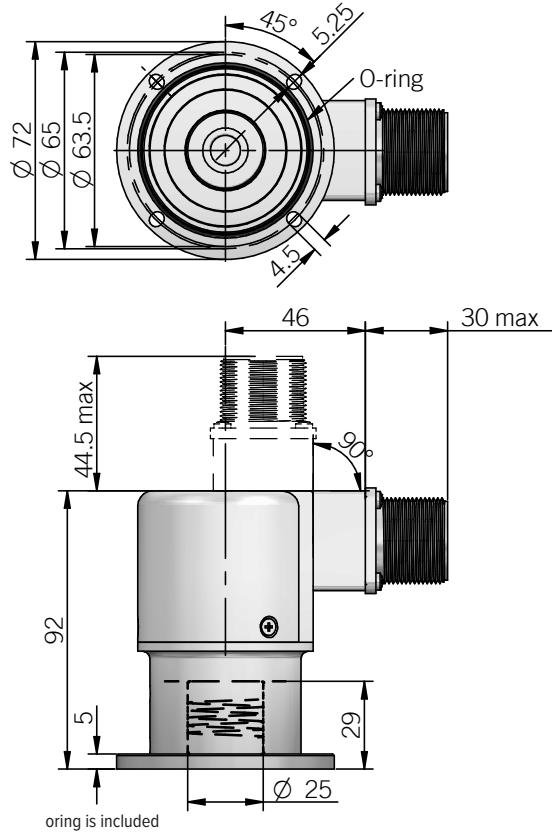
SOCKET
socket not included **.162**
to be reported only with connector output (eg. MR.162), for socket see Accessories

VARIANT
custom version **XXX**

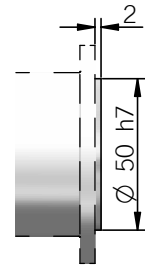
721A



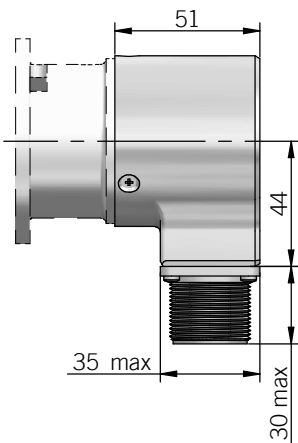
721A (S ENCLOSURE RATING)



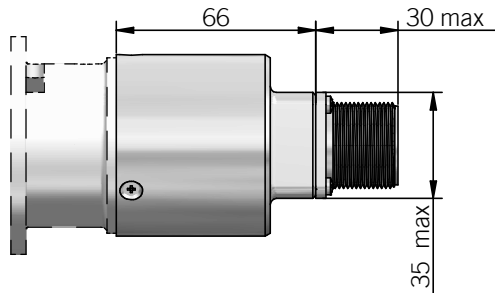
72B FLANGE



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 100 to 24000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	250 kHz up to 6000 ppr / 500 kHz from 7200 ppr
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	263 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

MECHANICAL SPECIFICATIONS	
Bore diameter	ø 6 / 8 / 10 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm with X enclosure rating 3000 rpm / 70° C with S enclosure rating 2000 rpm / 85° C with S enclosure rating
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	3,5 x 10 ⁻⁶ kgm ² (83 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,04 Nm (5,66 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Elastic coupling material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁵	-25° ... +70°C (-13° ... +158°F)
Weight	400 g (14,11 oz) 500 g (17,64 oz) with metal cover

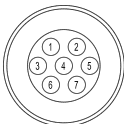
RESOLUTIONS
100 - 120 - 128 - 150 - 200 - 240 - 250 - 256 - 300 - 360 - 400 - 480 - 500 - 512 - 600 - 625 - 720 - 800 - 900 - 1000 - 1024 - 1200 - 1250 - 1440 - 1600 - 1800 - 2000 - 2048 - 2500 - 3000 - 3600 - 4000 - 4096 - 5000 - 6000 - 7200 - 8000 - 8192 - 9000 - 10000 - 10240 - 12000 - 14400 - 16000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

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

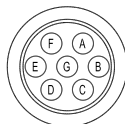
CONNECTIONS													
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7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

¹ only with metal cover

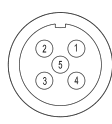
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



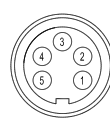
M connector (7 pin)
Amphenol MS3102-E-16-S
front view



M12 connector (5 pin)
M12 A coded
front view



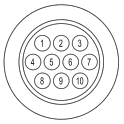
C connector (5 pin)
Amphenol C091 M16 IP40
front view



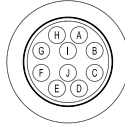
H connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view



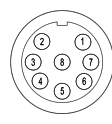
J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (8 pin)
M12 A coded
front view



C connector (8 pin)
Amphenol C091 IP40 IEC 60130-9
front view



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INCREMENTAL INDEX

EH 80 C / K / P / PG

BLIND / THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

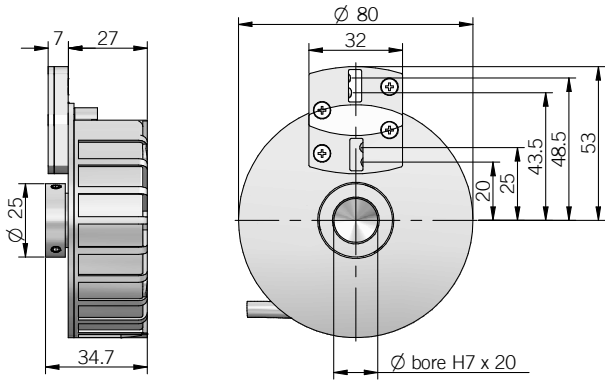
Series of encoders \varnothing 80 mm with very high resistance to shock and vibration recommended for feedback control systems on AC servomotors.

- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 105 kHz
- Cable output, connectors available at cable end
- Through or blind hollow shaft diameter up to 15 mm
- Shaft mounting by grub screws or collar clamping

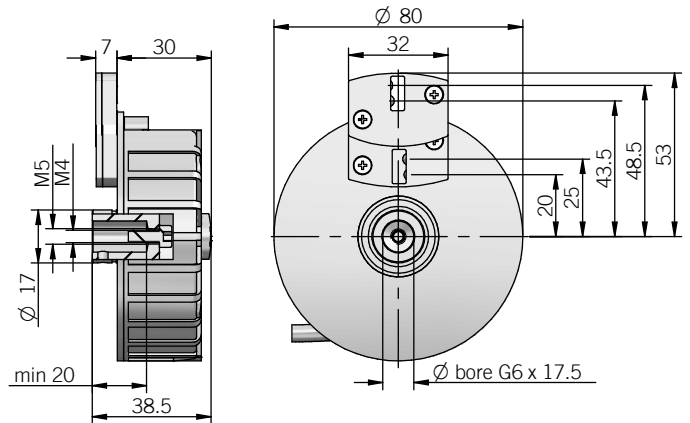


ORDERING CODE	EH	80C	500	S	5	L	8	X	6	PR	.XXX
SERIES incremental encoder EH											
MODEL blind hollow shaft 80C blind hollow shaft with rear fixing 80K through hollow shaft 80P through hollow shaft with collar clamping 80PG											
RESOLUTION ppr from 100 to 2048 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28											
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS											
BORE DIAMETER (mod. C - P) mm 8 mm 10 (mod. C - P) mm 12 (mod. C - P - PG) mm 14 (mod. C - P - PG) mm 15											
ENCLOSURE RATING (mod. C - P - PG) IP 64 shaft side / IP 65 cover side X (mod. K) IP 64											
MAX ROTATION SPEED (mod. P - PG) 3500 rpm 3 (mod. C - K) 6000 rpm 6											
OUTPUT TYPE radial (standard length 0,3 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

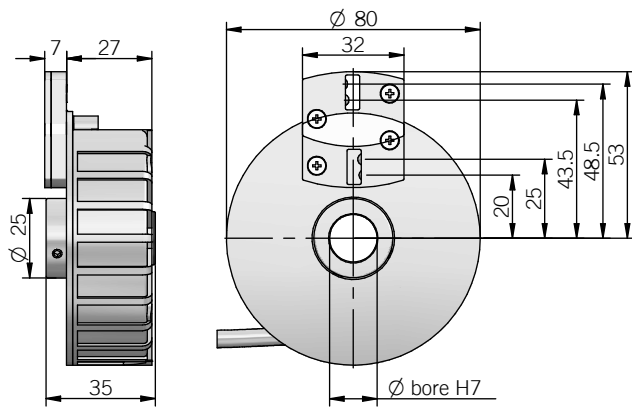
80C



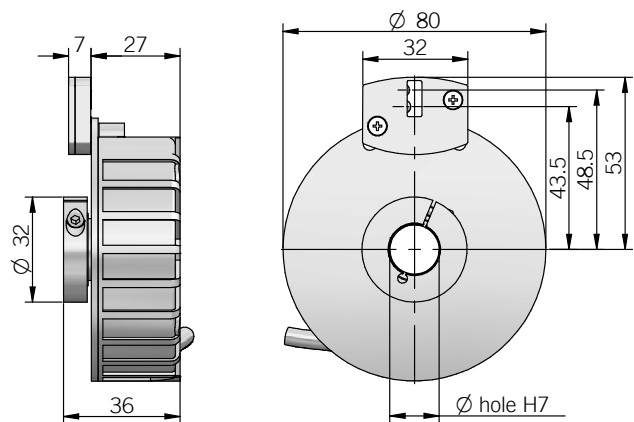
80K



80P



80PG



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

ELECTRICAL SPECIFICATIONS	
Resolution	from 100 to 2048 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	207 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS	
Bore diameter	ø 8 / 10 / 12 / 14 / 15 mm
Enclosure rating IEC 60529	IP 64 shaft side / IP 65 cover side (mod.C / P / PG) IP 64 (mod.K)
Max rotation speed	3500 rpm (mod.P / PG) 6000 rpm (mod.C / K)
Shock	70 G, 11 ms (IEC 60068-2-27)
Vibration	30 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10 ⁻⁶ kgm ² (95 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,04 Nm (5,66 Ozin)
Bearing stage material	PA66 or PPS glass fiber reinforced
Shaft material	aluminum (mod. C / K) stainless steel (mod.P / PG)
Housing material	PA66 or PPS glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-20° ... +85 °C (-4° ... +185°F) -20° ... +100°C (-4° ... +212°F) on demand
Storage temperature⁵	-25° ... +85 °C (-13° ... +185°F)
Weight	250 g (8,82 oz)

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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

RESOLUTIONS

100* - **200** - 250 - 256 - 360 - 400 - **500** - 512 - 600 - **1000** - **1024** - **2000** - **2048**

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

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INCREMENTAL INDEX

EH - EL 88 P

THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

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

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



ORDERING CODE	EH	88P	1024	S	5/28	P	30	S	3	PR	.XXX
SERIES incremental encoder series EH incremental encoder series EL											
MODEL through hollow shaft with torque stop slot 88P											
RESOLUTION (mod. EH) max ppr 2500 (mod. EL) max ppr 2048 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28											
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS											
SHAFT DIAMETER mm 25 mm 30 please directly contact our offices for other diameters											
ENCLOSURE RATING IP 65 S											
MAX ROTATION SPEED 3000 rpm 3											
OUTPUT TYPE radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

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INCREMENTAL INDEX

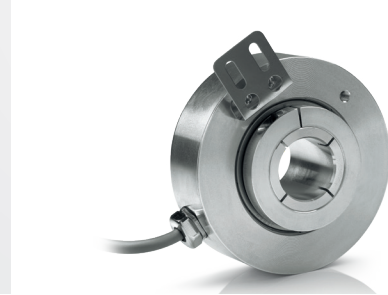
EH 88 PE / PET

THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

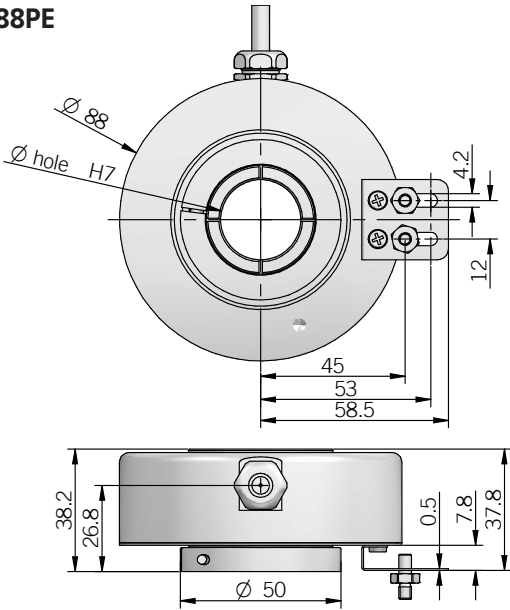
Cost effective encoder for asynchronous motors, suitable for elevators and stage machinery.

- 3 channel encoder (A / B / Z) up to 2500 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 105 kHz
- Cable output, connectors available on cable end
- Sturdy mechanic
- Up to 40 mm bore diameter
- Shaft fixing by collar clamping



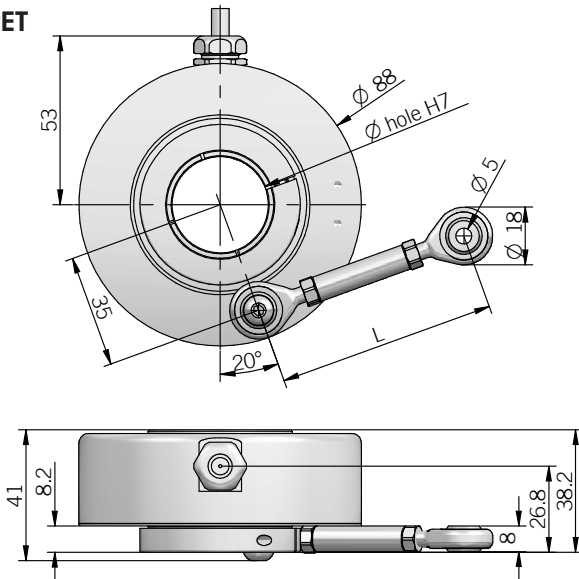
ORDERING CODE	EH	88PE	1024	S	5/28	P	30	X	3	PR	.XXX
SERIES incremental encoder series EH											
MODEL through hollow shaft with torque stop slot 88PE through hollow shaft for torque arm fixing 88PET please refer to Accessories for torque arm											
RESOLUTION ppr from 500 to 2500 refer to the available pulses list											
ZERO PULSE without zero pulse S with zero pulse Z											
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28											
ELECTRICAL INTERFACE push-pull P line driver L power supply 5/28 V DC - output RS-422 RS											
BORE DIAMETER mm 25 mm 30 (mod. PE) mm 35 (mod. PE) mm 38 (mod. PE) mm 40											
ENCLOSURE RATING IP 54 X											
MAX ROTATION SPEED 3000 rpm 3											
OUTPUT TYPE radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

88PE



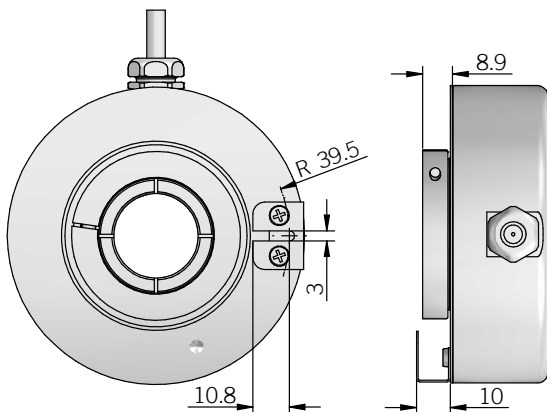
for torque pin please refer to Accessories

88PET



torque arm not included, please refer to Accessories

OPTIONAL TORQUE STOP SLOT



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

ELECTRICAL SPECIFICATIONS

Resolution	from 500 to 2500 ppr
Power supply ¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	20 mA / channel
Electrical interface ²	push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	90°e (gated A&B)
Mean time to dangerous failure (MTTF)_d ³ according to EN ISO 13849-1	220 years
Mission time (Tm) ³	20 years
Diagnostic coverage (DC) ³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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

RESOLUTIONS

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

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

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INCREMENTAL INDEX

EL 120 P

THROUGH HOLLOW SHAFT INCREMENTAL ENCODER

MAIN FEATURES

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

- 3 channel encoder (A / B / Z) up to 2048 ppr
- Power supply up to +28 V DC with various electrical interfaces available
- Output frequency up to 105 kHz
- Cable output, connectors available at cable end
- Through hollow shaft up to 60 mm diameter
- Shaft fixing by grub screws

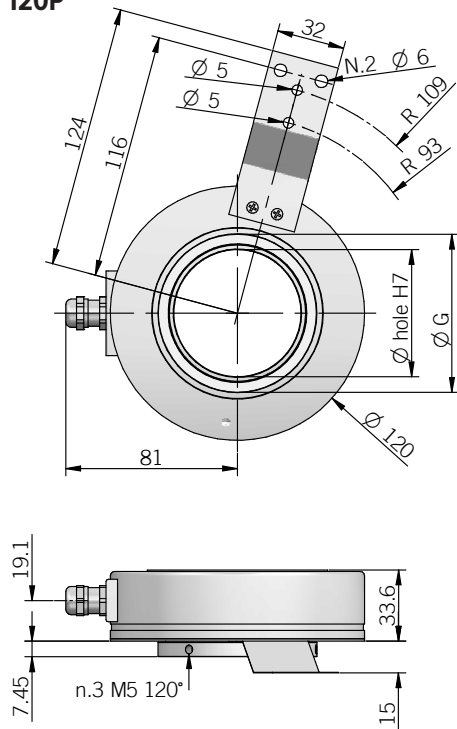


ORDERING CODE

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

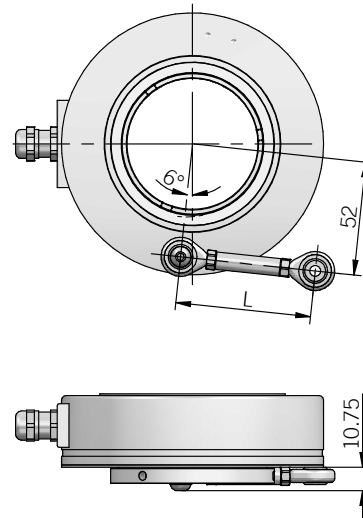
SERIES incremental encoder series EL												
MODEL through hollow shaft with spring 120P												
RESOLUTION ppr from 400 to 2048 refer to the available pulses list												
ZERO PULSE without zero pulse S with zero pulse Z												
POWER SUPPLY (with L electrical interface) 5 V DC 5 (with L electrical interface) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28												
ELECTRICAL INTERFACE push-pull P line driver L												
BORE DIAMETER mm 40 mm 50 mm 60												
ENCLOSURE RATING IP 54 X												
MAX ROTATION SPEED 3000 rpm 3												
OUTPUT TYPE radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)												
VARIANT custom version XXX												

120P



recommended mating shaft tolerance g6
dimensions in mm

INSTALLATION WITH TORQUE ARM



for torque arm please refer to Accessories

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

ELECTRICAL SPECIFICATIONS

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

RESOLUTIONS

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

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

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

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



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INCREMENTAL INDEX

EMI 30 E / H

SOLID SHAFT MAGNETIC INCREMENTAL ENCODER

MAIN FEATURES

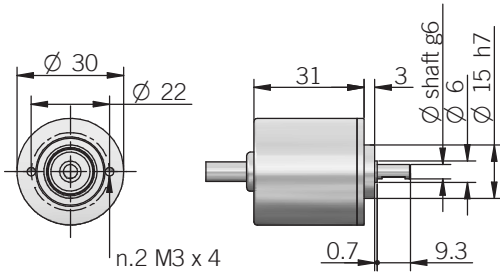
Miniaturised \varnothing 30 mm encoder series for use in small devices.
Recommended when a minimum size is required while still offering excellent performance.

- Innovative proprietary magnetic ASIC
- 3 channel encoder (A / B / Z) up to 20000 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 800 kHz
- Cable output, connectors available at cable end
- Solid shaft diameter up to 6 mm
- Mounting by clamping or threaded flange

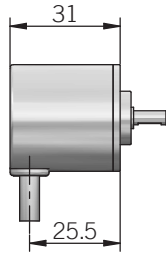


ORDERING CODE	EMI	30E	100	S	5/30	C	4	X	X	P	A	.XXX
SERIES incremental encoder series EMI												
MODEL clamping flange \varnothing 15 mm 30E M18 threaded flange 30H												
RESOLUTION ppr from 1 to 20000 please refer to the preferred resolutions list												
ZERO PULSE without zero pulse S with zero pulse Z												
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30												
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/28 V DC - output RS-422 RS												
SHAFT DIAMETER (mod. E) mm 4 mm 6												
ENCLOSURE RATING IP 54 X												
OPTION to be reported X												
OUTPUT TYPE cable (standard length 0,5 m) P preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)												
DIRECTION TYPE axial A radial R												
VARIANT custom version XXX												

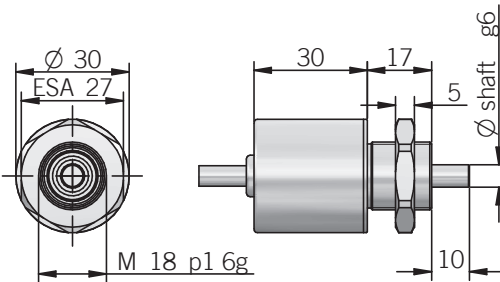
30E AXIAL CABLE OUTPUT



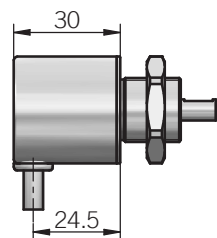
30E RADIAL CABLE OUTPUT



30H AXIAL CABLE OUTPUT



30H RADIAL CABLE OUTPUT



recommended mating shaft tolerance H7
dimensions in mm

CONNECTIONS

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

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 20000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	± 0,1° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 20000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	385 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 4 / 6 mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load⁴	5 N (1,12 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,05 x 10 ⁻⁶ kgm ² (1,2 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,005 Nm (0,71 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁶	-25° ... +85°C (-13° ... +185°F)
Weight	70 g (2,47 oz)

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

PREFERRED RESOLUTIONS

1 - 2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 - 3600 - 4096 - 5000 - 7200 - 10000 - 14400 - 20000

please directly contact our offices for other pulses

DOWNLOAD CATALOGUE

INCREMENTAL INDEX

EMI 40 A / B / C / H / I

SOLID SHAFT MAGNETIC INCREMENTAL ENCODER

MAIN FEATURES

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

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



ORDERING CODE

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

SERIES
magnetic incremental encoder series EMI

MODEL
clamping flange \varnothing 20 mm 40A
square flange \square 36,5 mm 40B
clamping flange \varnothing 17,46 mm 40C
M18 threaded flange 40H
M20 threaded flange 40I

RESOLUTION
ppr from 1 to 10000
please refer to the preferred resolutions list

ZERO PULSE
without zero pulse S
with zero pulse Z

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

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

SHAFT DIAMETER
mm 6

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

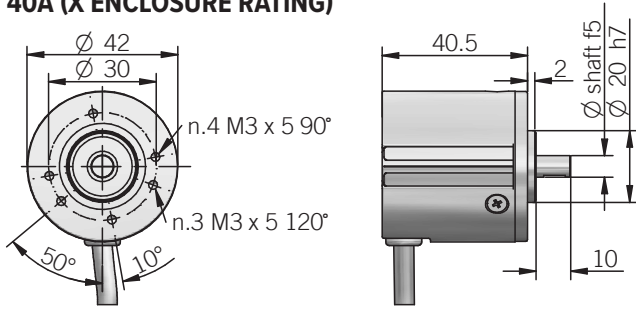
OPTION
to be reported X

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

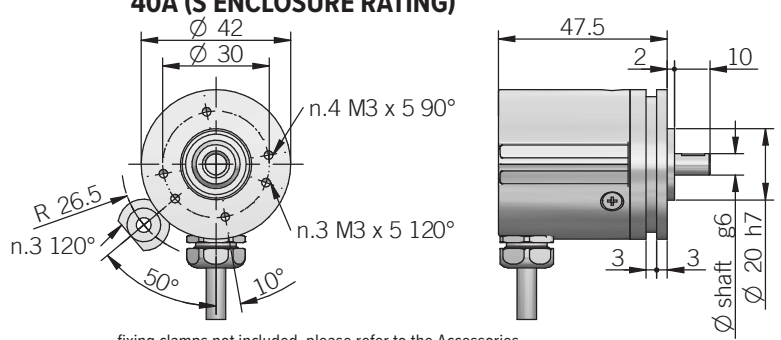
DIRECTION TYPE
(mod. A / B / C / H / I) axial A
radial R

VARIANT
custom version XXX

40A (X ENCLOSURE RATING)

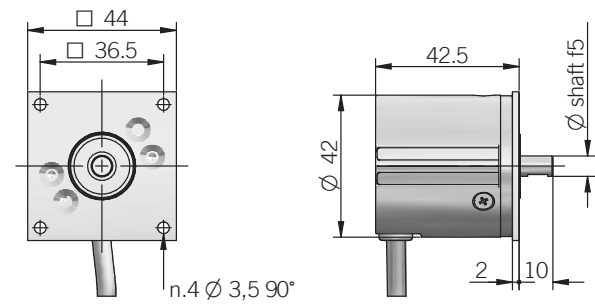


40A (S ENCLOSURE RATING)

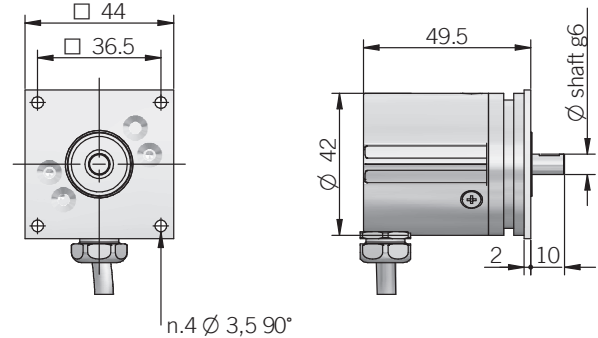


fixing clamps not included, please refer to the Accessories

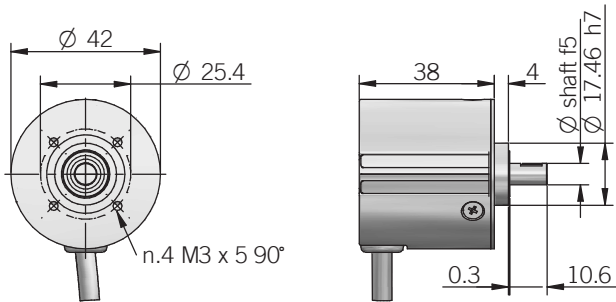
40B (X ENCLOSURE RATING)



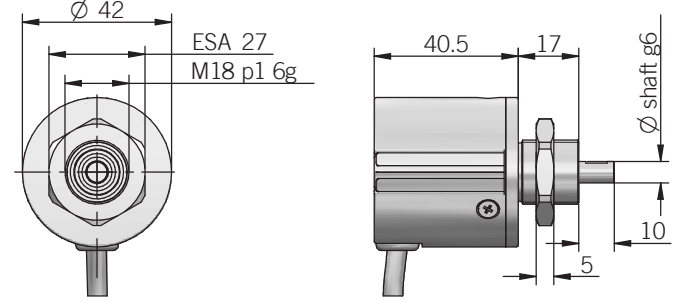
40B (S ENCLOSURE RATING)



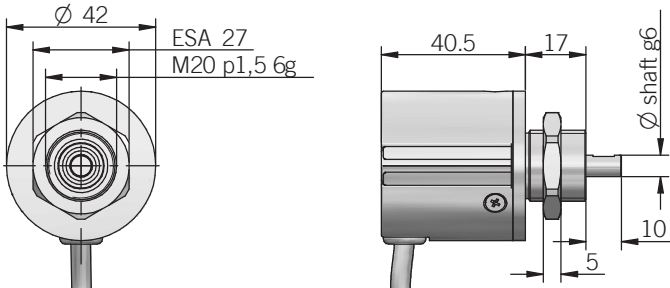
40C



40H

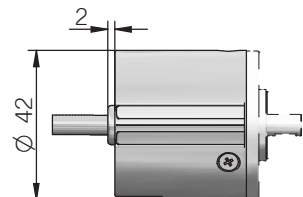


40I

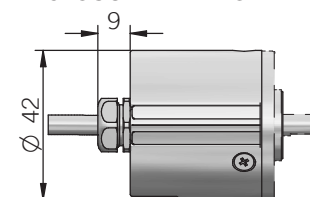


recommended mating shaft tolerance H7

DIMENSIONS WITH AXIAL OUTPUT WITH X ENCLOSURE RATING



DIMENSIONS WITH AXIAL OUTPUT WITH S ENCLOSURE RATING



dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	< 0,2° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

CONNECTIONS

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

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

PREFERRED RESOLUTIONS

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

please directly contact our offices for other pulses

DOWNLOAD CATALOGUE

INCREMENTAL INDEX

EMI 58 B / C / H / T

SOLID SHAFT MAGNETIC INCREMENTAL ENCODER

MAIN FEATURES

Standard \varnothing 58 mm encoder series for industrial applications with high mechanical resistance requirements. Based on a proprietary magnetic sensor these encoders are designed to withstand high radial and axial shaft loads and can be mounted by flanges or fixing clamps.

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



ORDERING CODE

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

SERIES
magnetic incremental encoder series EMI

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

METAL COVER
* add for metal cover M

RESOLUTION
ppr from 1 to 10000
please refer to the preferred resolutions list

ZERO PULSE
without zero pulse S
with zero pulse Z

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

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

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

ENCLOSURE RATING
IP 54 X
(mod. B / C / T) IP 66 S

OPTION
to be reported X

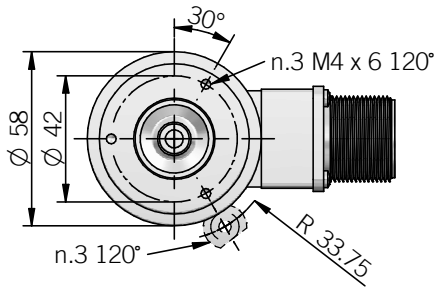
OUTPUT TYPE
cable (standard length 1,5 m) P
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
MIL plug connector M
JIS-C-5432 IP40 plug connector J
M12 plug connector M12
M23 plug connector H
M16 IP40 plug connector C

DIRECTION TYPE
axial A
radial R

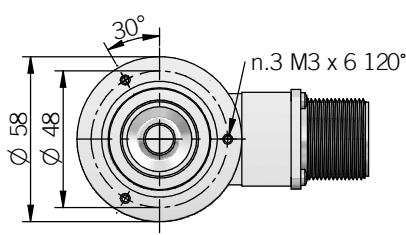
SOCKET
socket not included .162
to be reported only with connector output (eg. MR.162), for socket see Accessories

VARIANT
custom version XXX

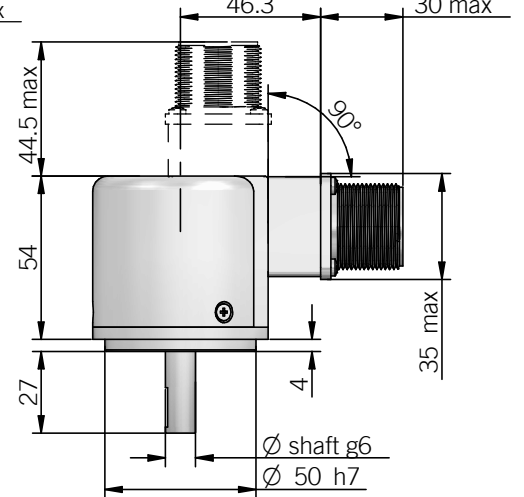
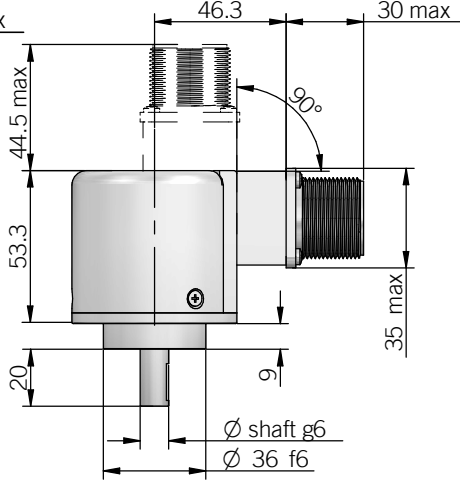
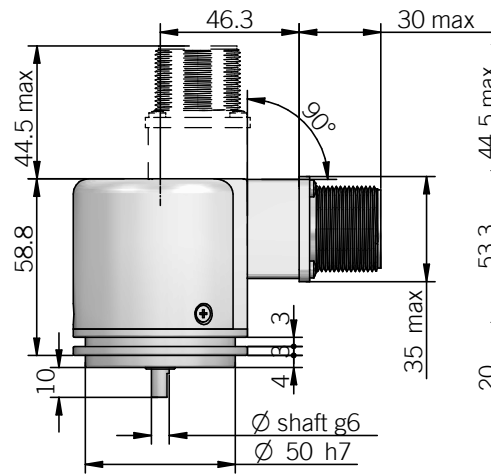
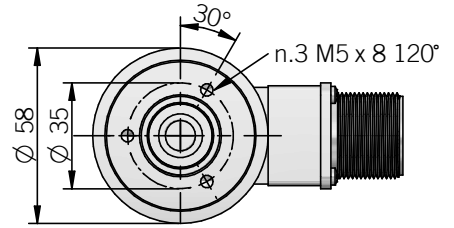
58B



58C

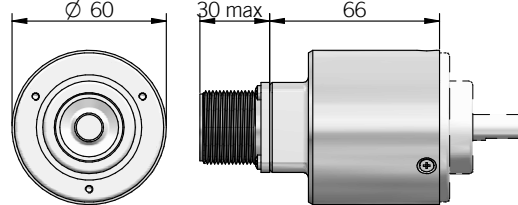
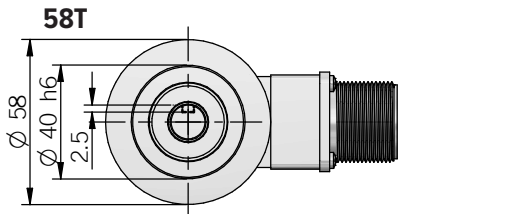


58H

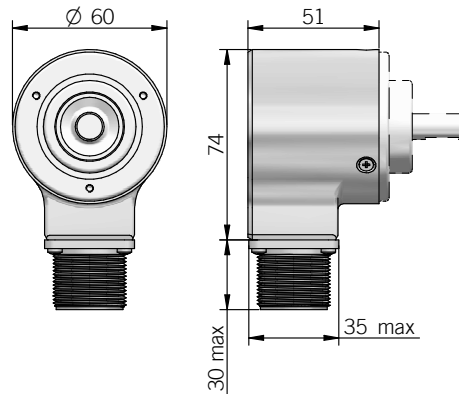
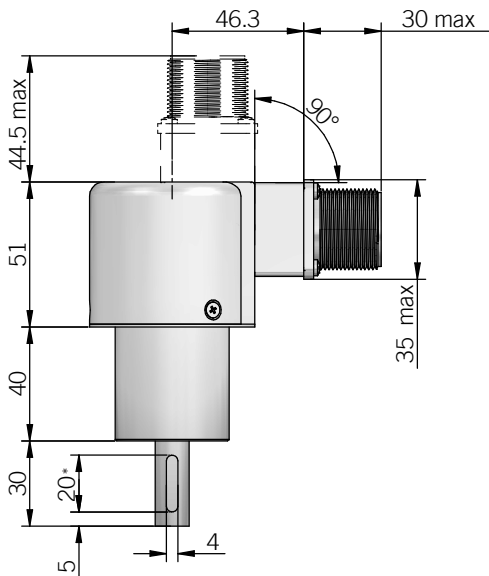


fixing clamps not included, please refer to Accessories

DIMENSION WITH METAL COVER AND AXIAL OUTPUT



DIMENSION WITH METAL COVER AND RADIAL OUTPUT



* slot only with 12 mm shaft diameter
recommended mating shaft tolerance H7
dimensions in mm



ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	< 0,2° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresys	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

PREFERRED RESOLUTIONS

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

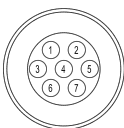
please directly contact our offices for other pulses

CONNECTIONS

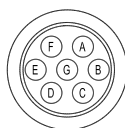
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6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

¹ only with metal cover

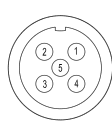
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (5 pin)
M12 A coded
front view



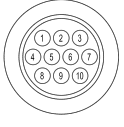
C connector (5 pin)
Amphenol C091 M16 IP40
front view



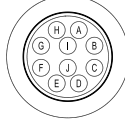
H connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view



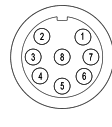
J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (8 pin)
M12 A coded
front view



C connector (8 pin)
Amphenol C091 IP40 IEC 60130-9
front view



DOWNLOAD CATALOGUE

INCREMENTAL INDEX

EMIP 58 B / C

SOLID SHAFT PROGRAMMABLE MAGNETIC INCREMENTAL ENCODER

MAIN FEATURES

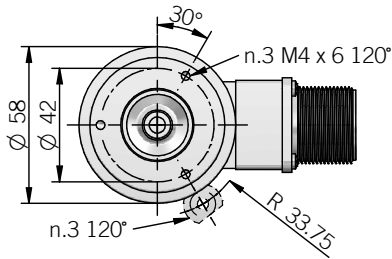
Solid shaft encoder series for industrial applications with high mechanical resistance requirements. The proprietary state of the art magnetic sensor offers a wide range of options (resolution, electrical output, index width, index length) programmable by the end user

- 3 channel encoder (A / B / Z) up to 20000 ppr
- Power supply up to +30 V DC with differential (TTL or HTL) as electrical interface
- Output frequency up to 800 kHz
- Cable or connector output, available with metal cover for heavy duty applications
- Solid shaft diameter up to 10 mm
- Mounting by synchronous or clamping flange

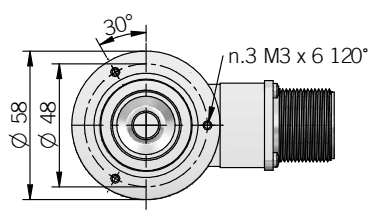


ORDERING CODE	EMI	P	58C	M* 20000	Z	5/30	L	15	X	X	M	R	.162	+XXX
SERIES magnetic incremental encoder EMI														
FEATURE user programmable P														
MODEL synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C														
METAL COVER * add for metal cover M														
RESOLUTION ppr 20000 user programmable from 1 to 20000 ppr														
ZERO PULSE with zero pulse Z														
POWER SUPPLY 5 ... 30 V DC 5/30														
ELECTRICAL INTERFACE line driver L TTL / HTL user programmable														
SHAFT DIAMETER (mod. B) mm 6 (mod. C) mm 8 (3/8") mm 9,52 mm 10														
ENCLOSURE RATING IP 54 X IP 66 S														
OPTION to be reported X														
OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M M12 plug connector M12 M23 plug connector H														
DIRECTION TYPE axial A radial R														
SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories														
VARIANT custom version XXX														

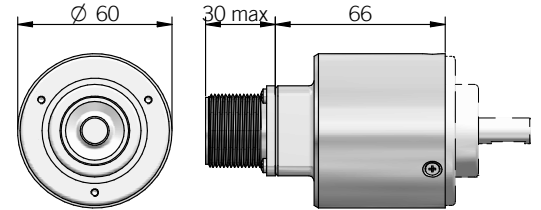
58 B



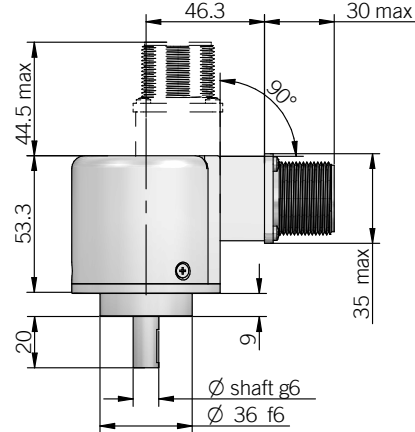
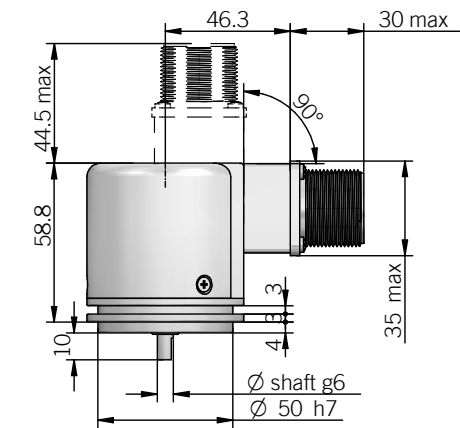
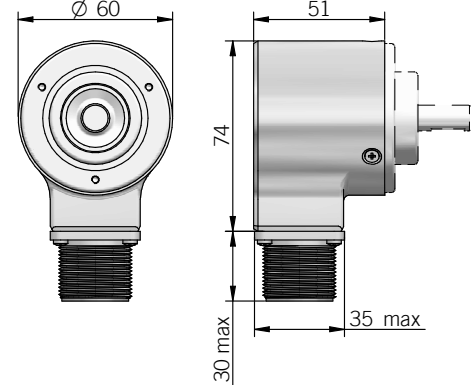
58 C



DIMENSION WITH METAL COVER AND AXIAL OUTPUT



DIMENSION WITH METAL COVER AND RADIAL OUTPUT



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	user programmable from 1 to 20000 ppr default 1024 ppr
Power supply¹	4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	20 mA / channel
Electrical interface²	line driver TTL / HTL (AEIC-7272 or similar) user programmable / default TTL
Max output frequency	800 kHz
Counting direction	user programmable default A leads B clockwise (shaft view)
Index length	user programmable default 180°e (gated A)
Accuracy	± 0,10°
Hysteresis	user programmable from 0° to 0,70° default 0,17°
Start-up time	500 ms
Mean time to dangerous failure (MTTF_d)³ according to EN ISO 13849-1	173 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

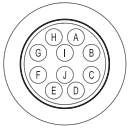
MECHANICAL SPECIFICATIONS	
Shaft diameter	ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm
Max shaft load⁴	10 N (2,25 lbs) axial with ø 6 mm shaft 20 N (4,45 lbs) radial with ø 6 mm shaft 200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)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

CONNECTIONS

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

¹ only with metal cover

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



M12 connector (8 pin)
M12 A coded
front view



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



DOWNLOAD CATALOGUE

INCREMENTAL INDEX

EMI 63 A / D / E

SOLID SHAFT MAGNETIC INCREMENTAL ENCODER

MAIN FEATURES

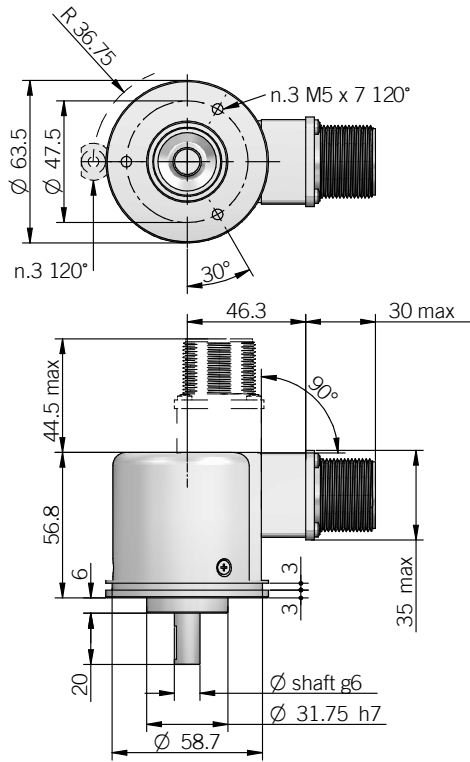
Standard \varnothing 63 mm encoder series for industrial applications with high mechanical resistance requirements. Based on a proprietary magnetic sensor these encoders are designed to withstand high radial and axial shaft loads and can be mounted by flanges or fixing clamps.

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



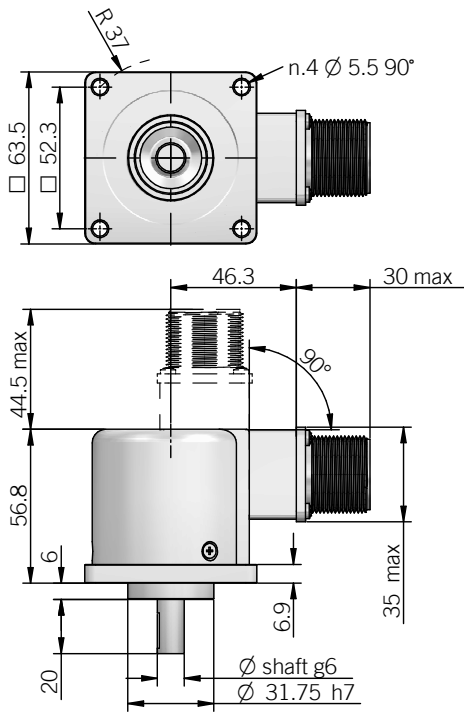
ORDERING CODE	EMI	63A	M*	500	S	5/30	P	8	X	X	M	R	.162	+XXX
SERIES magnetic incremental encoder series EMI														
MODEL synchronous flange \varnothing 31,75 mm 63A centering square flange \varnothing 31,75 mm 63D centering square flange \varnothing 50 mm 63E														
METAL COVER * add for metal cover M														
RESOLUTION ppr from 1 to 10000 please refer to the preferred resolutions list														
ZERO PULSE without zero pulse S with zero pulse Z														
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30														
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS														
SHAFT DIAMETER mm 8 (3/8") mm 9,52 mm 10														
ENCLOSURE RATING IP 54 X IP 66 S														
OPTION to be reported X														
OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 IP40 plug connector J M12 plug connector M12 M23 plug connector H M16 IP40 plug connector C														
DIRECTION TYPE axial A radial R														
SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories														
VARIANT custom version XXX														

63A

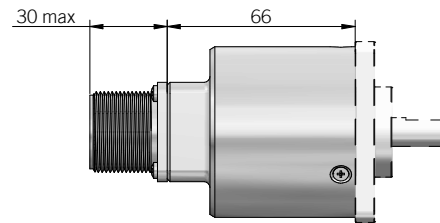


fixing clamps not included, please refer to the Accessories

63D

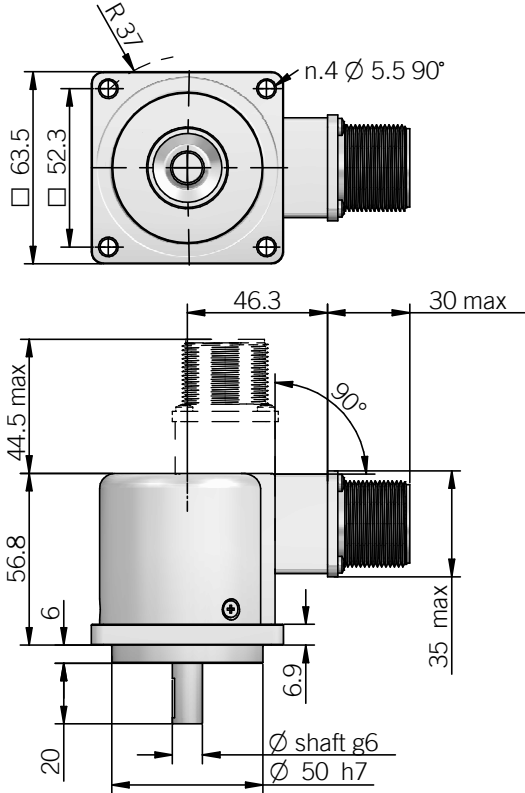


DIMENSION WITH METAL COVER AND AXIAL OUTPUT

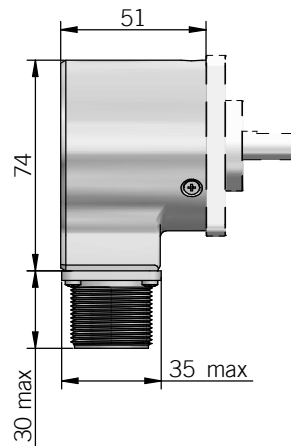


DIMENSION WITH METAL COVER AND RADIAL OUTPUT

63 E



recommended mating shaft tolerance H7
dimensions in mm





ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	< 0,2° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

PREFERRED RESOLUTIONS

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

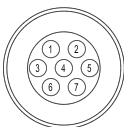
please directly contact our offices for other pulses

CONNECTIONS

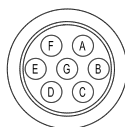
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6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

¹ only with metal cover

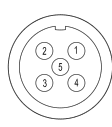
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (5 pin)
M12 A coded
front view



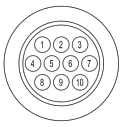
C connector (5 pin)
Amphenol C091 M16 IP40
front view



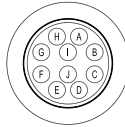
H connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view



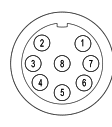
J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (8 pin)
M12 A coded
front view



C connector (8 pin)
Amphenol C091 IP40 IEC 60130-9
front view



DOWNLOAD CATALOGUE

INCREMENTAL INDEX

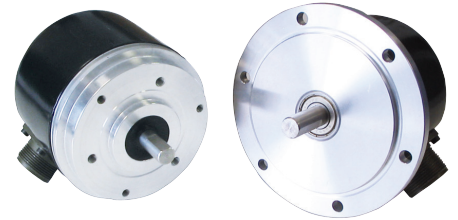
EMI 90 A - 115 A

SOLID SHAFT MAGNETIC INCREMENTAL ENCODER

MAIN FEATURES

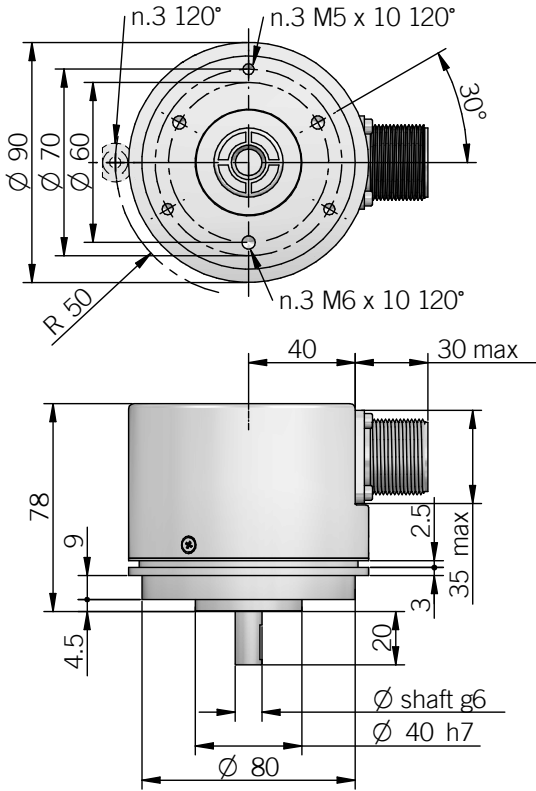
Encoder series designed for use in harsh environments with high mechanical resistance requirements. The model 90A can be mounted synchronous flange and fixing clamps while the model 115A has a tachometer generator REO-444 type compatible flange.

- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 800 kHz
- Cable or connector output
- Metal cover for heavy duty applications
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange

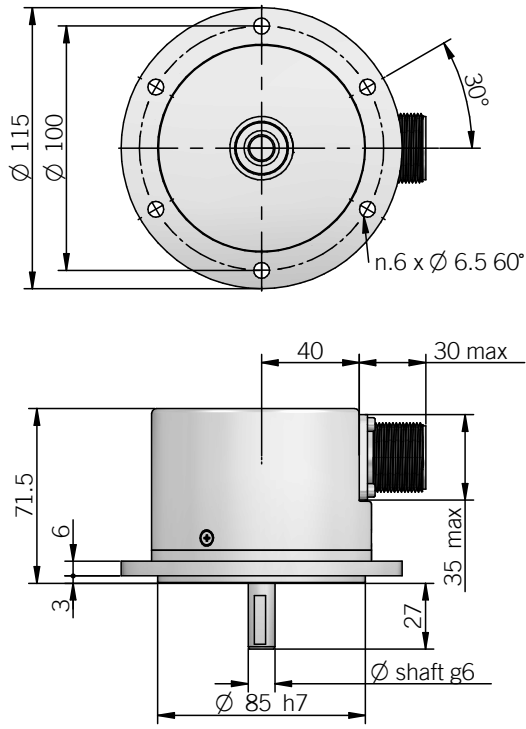


ORDERING CODE	EMI	90A	500	S	5/30	P	8	X	X	M	R	.162	+XXX
SERIES magnetic incremental encoder series EMI													
MODEL synchronous flange ø 40 mm 90A flange REO-444 115A													
RESOLUTION ppr from 1 to 10000 refer to the available pulses list													
ZERO PULSE without zero pulse S with zero pulse Z													
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30													
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS													
SHAFT DIAMETER (mod. 90A) mm 8 (mod. 90A) (3/8") mm 9,52 mm 10 (mod. 115A) mm 11													
ENCLOSURE RATING IP 54 shaft side / IP 67 cover side X IP 66 shaft side (mod. 90A) - IP 65 shaft side (mod. 115A) / IP 67 cover side S													
OPTION to be reported X													
OUTPUT TYPE cable (standard length 1.5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 IP40 plug connector J													
DIRECTION TYPE axial A radial R													
SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories													
VARIANT custom version XXX													

90A

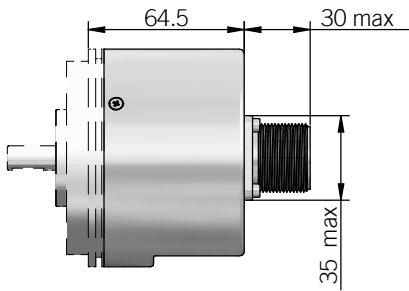


115A

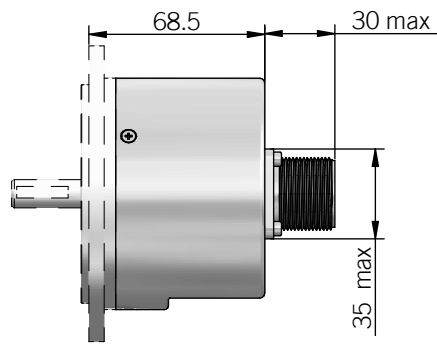


fixing clamps not included, please refer to Accessories

90A WITH AXIAL OUTPUT



115A WITH AXIAL OUTPUT



recommended mating shaft tolerance H7
dimensions in mm



ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	< 0,2° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 8 / 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 54 shaft side / IP 67 cover side S = IP 66 shaft side / IP 67 cover side (mod. 90A) S = IP 65 shaft side / IP 67 cover side (mod. 115A)
Max rotation speed	6000 rpm
Max shaft load⁴	200 N (45 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	3,5 x 10 ⁻⁶ kgm ² (83 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,06 Nm (8,50 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{5,6}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁶	-25° ... +70°C (-13° ... +158°F)
Weight	350 g (12,35 oz) 450 g (15,87 oz) with metal cover

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

PREFERRED RESOLUTIONS

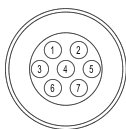
2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 -
200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 -
3600 - 4096 - 5000 - 7200 - 10000

please directly contact our offices for other pulses

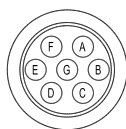
CONNECTIONS

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

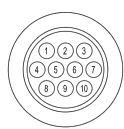
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



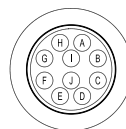
M connector (7 pin)
Amphenol MS3102-E-16-S
front view



J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



DOWNLOAD CATALOGUE

INCREMENTAL INDEX

EMI 30 M

MAGNETIC INCREMENTAL KIT ENCODER

MAIN FEATURES

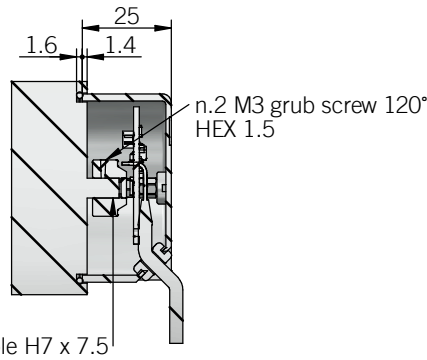
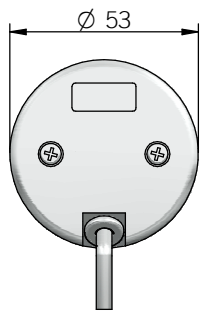
Series of miniaturised encoders with innovative proprietary magnetic sensor for integration on small size AC/DC motors, stepper motors or for applications of limited size.

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

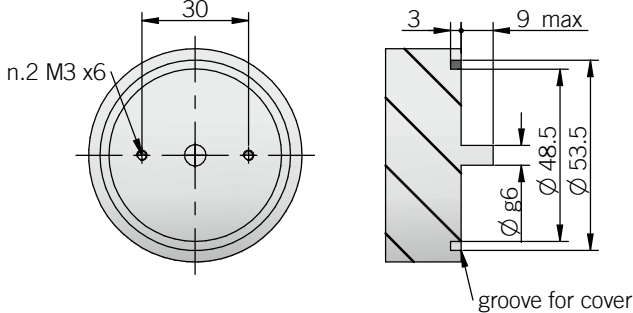


ORDERING CODE	EMI	30M	*S	50	Z	5/30	P	6	X	X	PR	.XXX
SERIES magnetic incremental encoder series EMI												
MODEL kit encoder 30M												
COVER * add if without cover S												
RESOLUTION ppr from 1 to 10000 please refer to the preferred resolutions list												
ZERO PULSE without zero pulse S with zero pulse Z												
POWER SUPPLY 5 V DC 5 5 ... 30 V DC 5/30												
ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS												
BORE DIAMETER mm 6 (1/4") mm 6,35 mm 8 mm 10												
ENCLOSURE RATING IP 54 X												
OPTION to be reported X												
OUTPUT TYPE radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)												
VARIANT custom version XXX												

30M

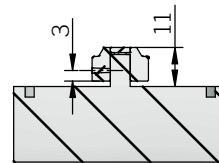


RECOMMENDED INTERFACE FLANGE DESIGN



dimensions in mm

MAGNET-ACTUATOR INSTALLATION



ELECTRICAL SPECIFICATIONS	
Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	< 0,2° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	253 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

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

please directly contact our offices for other pulses

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

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

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INCREMENTAL INDEX

EMI 38 F / G

BLIND HOLLOW SHAFT MAGNETIC INCREMENTAL ENCODER

MAIN FEATURES

Thanks to its magnetic technology, the EMI 38 series is suitable for applications in harsh environment such as marble and glass processing machines, washing machines and industrial automation in general.

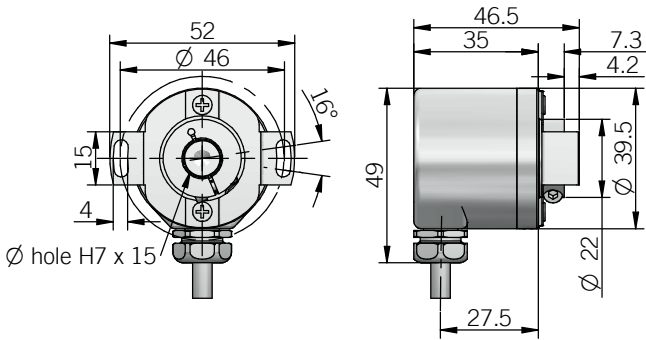
- Innovative proprietary magnetic ASIC
- 3 channel encoder (A / B / Z) with resolution up to 10000 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Cable output, connectors available at cable end
- Blind hollow shaft up to 10 mm diameter with shaft fixing by collar clamping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



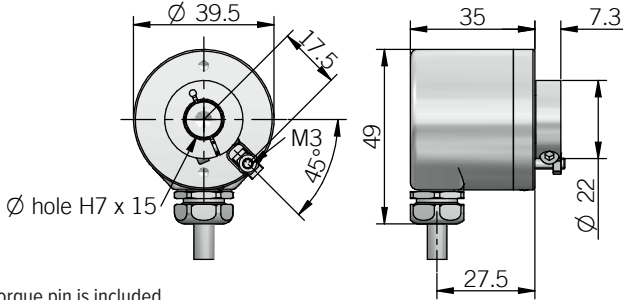
ORDERING CODE

EMI	38F	500	S	5/30	P	10	X	X	PR	.XXX
SERIES										
magnetic incremental encoder series EMI										
MODEL										
blind hollow shaft with stator coupling 38F										
blind hollow shaft with torque pin 38G										
RESOLUTION										
ppr from 1 to 10000										
please refer to the preferred resolutions list										
ZERO PULSE										
without zero pulse S										
with zero pulse Z										
POWER SUPPLY										
(with L electrical interface) 5 V DC 5										
5 ... 30 V DC 5/30										
ELECTRICAL INTERFACE										
NPN open-collector C										
push-pull P										
line driver L										
power supply 5/30 V DC - output RS-422 RS										
SHAFT DIAMETER										
mm 4										
mm 5										
mm 6										
(1/4") mm 6,35										
mm 8										
mm 10										
ENCLOSURE RATING										
IP 66 shaft side / IP67 cover side X										
OPTION										
to be reported X										
OUTPUT TYPE										
radial cable (standard length 0,5 m) PR										
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)										
VARIANT										
custom version XXX										

38F



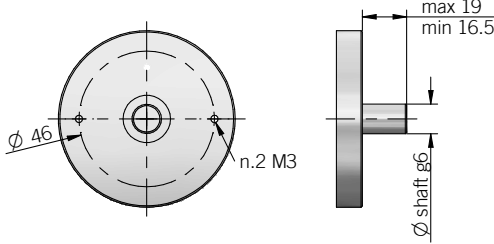
38G



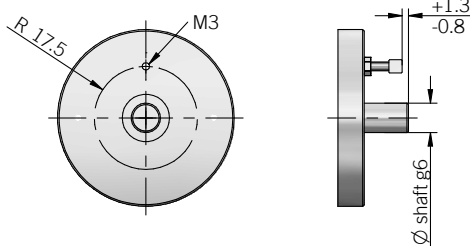
torque pin is included

RECOMMENDED INTERFACE FLANGE DESIGN

38F



38G



dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	< 0,2° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 4* / 5* / 6* / 6,35* (1/4") / 8* / 10 mm * with supplied shaft adapter
Enclosure rating IEC 60529	IP 66 shaft side / IP 67 cover side
Max rotation speed	6000 rpm
Max shaft load⁴	5 N (1,12 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,8 x 10 ⁻⁶ kgm ² (19 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Shaft adapter material	bronze
Housing material	painted aluminum
Bearings	n.2 ball bearings
Bearing lifetime	10 ⁹ revolutions
Operating temperature^{5, 6}	-25° ... +100°C (-13° ... +212°F)
Storage temperature⁶	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences

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

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

⁴ maximum load for static usage

⁵ measured on the transducer flange

⁶ condensation not allowed

PREFERRED RESOLUTIONS

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

please directly contact our offices for other pulses

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INCREMENTAL INDEX

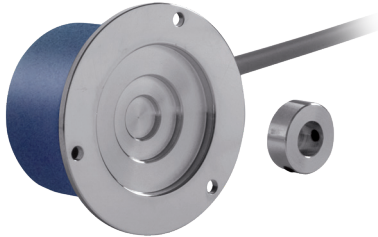
EMI 55 M

MAGNETIC INCREMENTAL KIT ENCODER

MAIN FEATURES

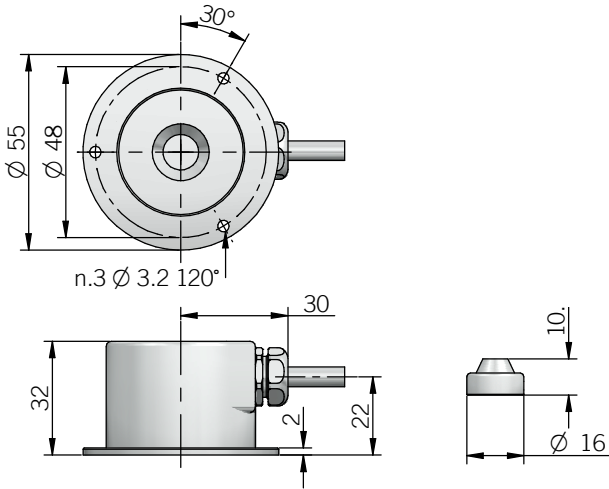
EMI series encoders are suitable for a wide range of applications such as electric motors, marine industry, iron and steel industry, textile machines, wood, paper, glass and marble working machines and more generally for automation and process control.

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

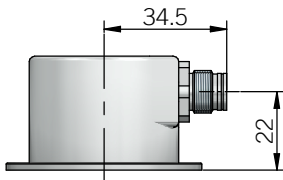


ORDERING CODE	EMI	55M	512	Z	5/30	P	10	X	X	M12	R	.162	+XXX
SERIES magnetic incremental encoder series EMI													
MODEL kit encoder ø 55 mm		55M											
RESOLUTION ppr from 1 to 10000 please refer to the preferred resolutions list													
ZERO PULSE without zero pulse with zero pulse						S	Z						
POWER SUPPLY (with L electrical interface) 5 V DC 5 ... 30 V DC						5	5/30						
ELECTRICAL INTERFACE NPN open-collector push-pull line driver power supply 5/30 V DC - output RS-422						C	P	L	RS				
MAGNET ACTUATOR BORE DIAMETER mm mm (3/8") mm mm							6	8	9,52	10			
ENCLOSURE RATING IP 67								X					
OPTION to be reported									X				
OUTPUT TYPE cable (standard length 0,5 m) preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) M12 plug connector										P	M12		
DIRECTION TYPE radial											R		
SOCKET socket not included to be reported only with connector output (eg. M12.162), for socket see Accessories												.162	
VARIANT custom version													XXX

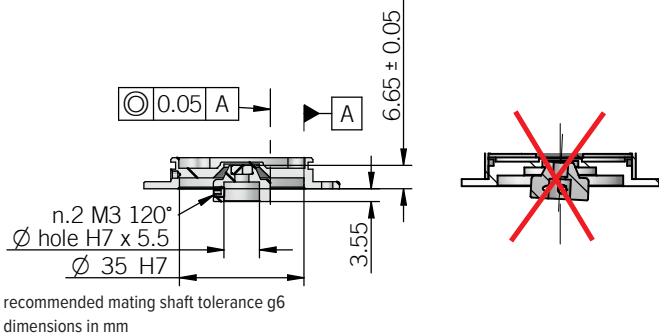
EMI55 M WITH CABLE OUTPUT



DIMENSIONS WITH M12 CONNECTOR



MAGNET ACTUATOR INSTALLATION



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	< 0,2° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

PREFERRED RESOLUTIONS

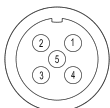
2 - 4 - 5 - 6 - 8 - 10 - 12 - 16 - 20 - 30 - 40 - 50 - 60 - 80 - 90 - 100 - 125 - 128 - 200 - 250 - 256 - 360 - 400 - 500 - 512 - 720 - 1000 - 1024 - 1440 - 2000 - 2048 - 3600 - 4096 - 5000 - 7200 - 10000

please directly contact our offices for other pulses

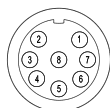
CONNECTIONS

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

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view



DOWNLOAD CATALOGUE

INCREMENTAL INDEX

EMI 58 F - 63 F / G

BLIND HOLLOW SHAFT MAGNETIC INCREMENTAL ENCODER

MAIN FEATURES

Hollow shaft encoder series for industrial applications with high mechanical resistance requirements. Based on a proprietary magnetic sensor these encoders are designed to withstand high radial and axial shaft loads.

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



ORDERING CODE

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

SERIES
magnetic incremental encoder series **EMI**

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

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

RESOLUTION
ppr from 1 to 10000
please refer to the preferred resolutions list

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

POWER SUPPLY
(with L electrical interface) 5 V DC **5**
5 ... 30 V DC **5/30**

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

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

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

OPTION
to be reported **X**

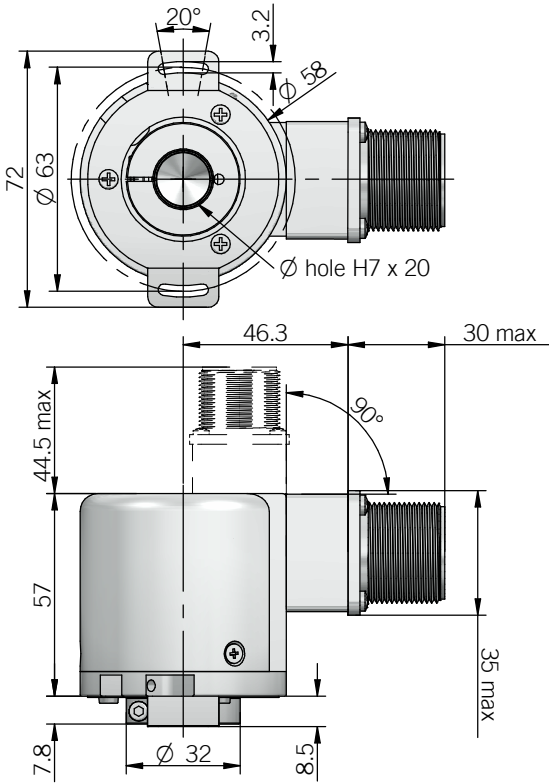
OUTPUT TYPE
cable (standard length 1,5 m) **P**
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
MIL plug connector **M**
JIS-C-5432 IP40 plug connector **J**
M12 plug connector **M12**
M23 plug connector **H**
M16 IP40 plug connector **C**

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

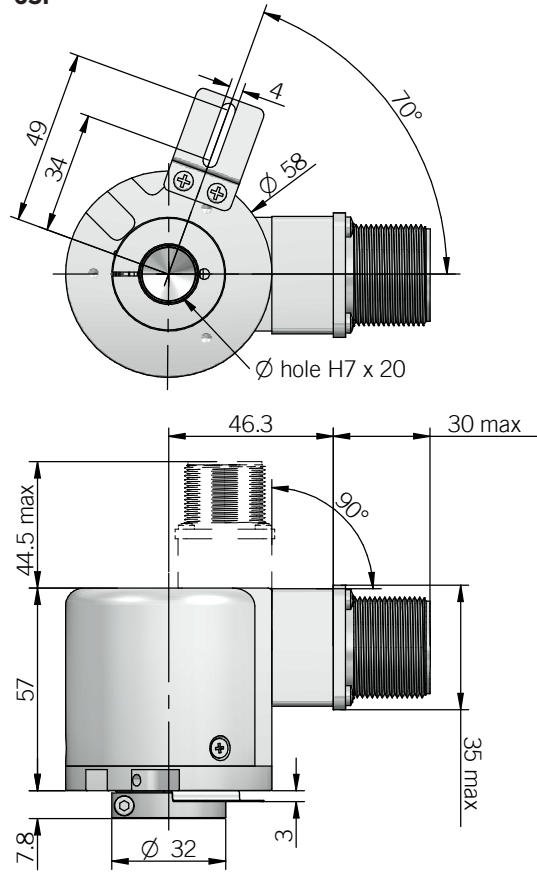
SOCKET
socket not included **.162**
to be reported only with connector output (eg. MR.162), for socket see Accessories

VARIANT
custom version **XXX**

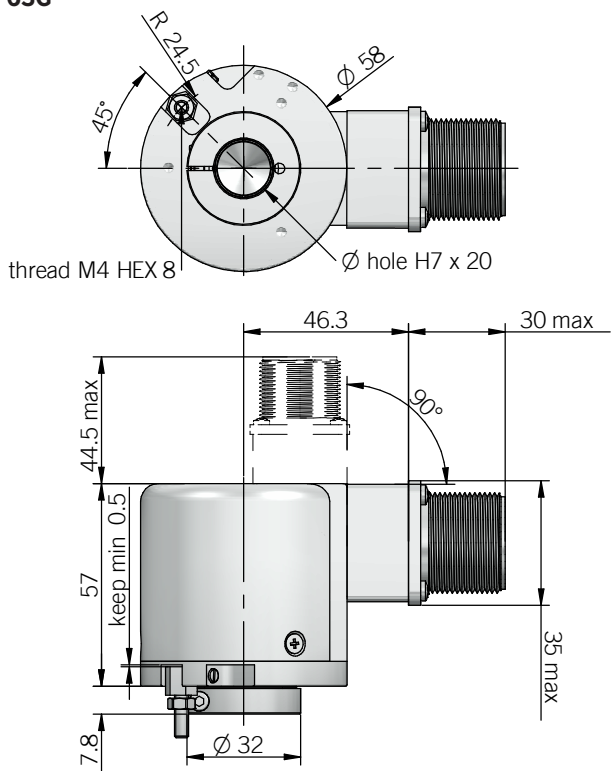
58F



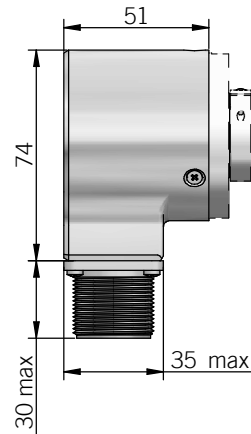
63F



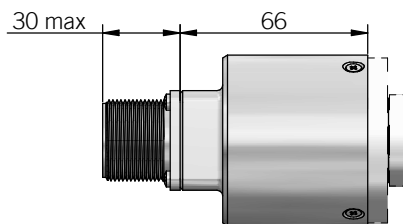
63G



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



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



ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	< 0,2° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

PREFERRED RESOLUTIONS

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

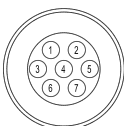
please directly contact our offices for other pulses

CONNECTIONS

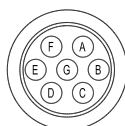
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6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

¹ only with metal cover

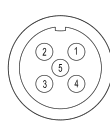
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (5 pin)
M12 A coded
front view



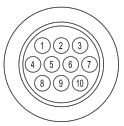
C connector (5 pin)
Amphenol C091 M16 IP40
front view



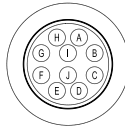
H connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view



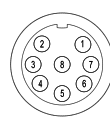
J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (8 pin)
M12 A coded
front view



C connector (8 pin)
Amphenol C091 IP40 IEC 60130-9
front view



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INCREMENTAL INDEX

EMIP 58 F - 63 G

BLIND HOLLOW SHAFT PROGRAMMABLE MAGNETIC INCREMENTAL ENCODER



MAIN FEATURES

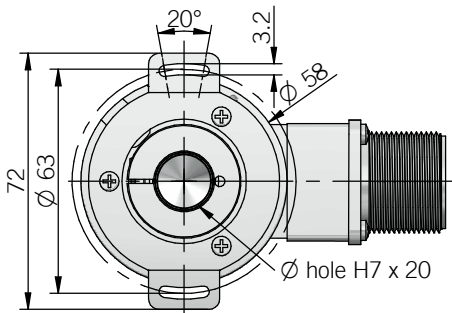
Hollow shaft encoder series for industrial applications with high mechanical resistance requirements. The proprietary state of the art magnetic sensor provides wide options (resolution, electrical output, index width) programmable by the end user.

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

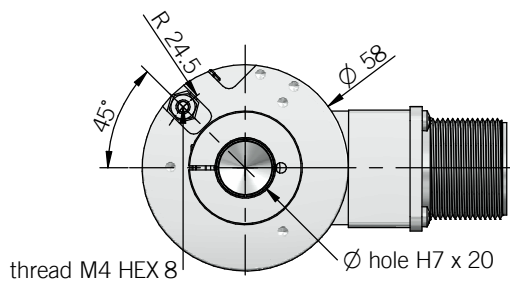


ORDERING CODE	EMI	P	58F	M* 20000	Z	5/30	L	15	X	X	M	R	.162	+XXX
SERIES magnetic incremental encoder EMI														
FEATURE user programmable P														
MODEL blind hollow shaft with stator coupling 58F blind hollow shaft with torque pin 63G														
METAL COVER * add for metal cover M														
RESOLUTION ppr 20000 user programmable from 1 to 20000 ppr														
ZERO PULSE with zero pulse Z														
POWER SUPPLY 5 ... 30 V DC 5/30														
ELECTRICAL INTERFACE line driver L RS-422 / HTL user programmable														
BORE DIAMETER mm 15 other diameters with optional shaft adapter, see Accessories														
ENCLOSURE RATING IP 54 X IP 66 S														
OPTION to be reported X														
OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M M12 plug connector M12 M23 plug connector H														
DIRECTION TYPE axial A radial R														
SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories														
VARIANT custom version XXX														

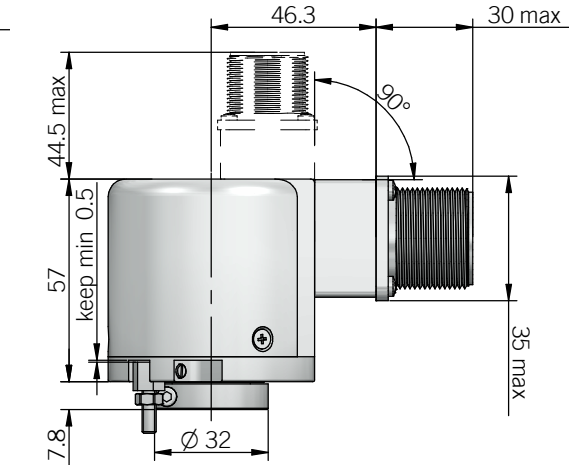
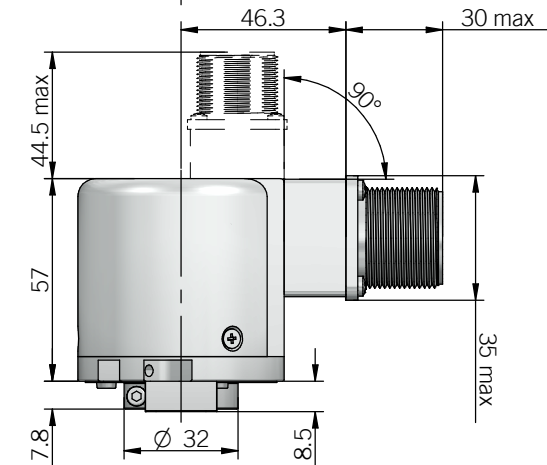
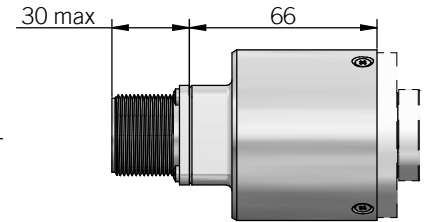
58 F



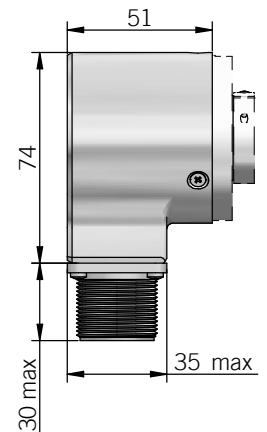
63 G



DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



recommended mating shaft tolerance g6
dimensions in mm

torque pin is included in model G

ELECTRICAL SPECIFICATIONS

Resolution	user programmable from 1 to 20000 ppr default 1024 ppr
Power supply¹	4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	20 mA / channel
Electrical interface²	line driver TTL / HTL (AEC-7272 or similar) user programmable / default TTL
Max output frequency	800 kHz
Counting direction	user programmable default A leads B clockwise (shaft view)
Index length	user programmable default 180°e (gated A)
Accuracy	± 0,10°
Hysteresis	user programmable from 0° to 0,70° default 0,17°
Start-up time	500 ms
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	173 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

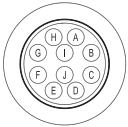


CONNECTIONS

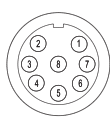
Function	Cable	10 pin M	8 pin M12	12 pin H
+V DC	red	D - E	7	12
0 V	black	F	1	10
A+	green	A	6	5
A-	brown or grey	G	5	6
B+	yellow	B	4	8
B-	orange	H	3	1
Z+	blue	C	2	3
Z-	white	I	8	4
	shield	J	housing ¹	9

¹only with metal cover

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



M12 connector (8 pin)
M12 A coded
front view



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



DOWNLOAD CATALOGUE

INCREMENTAL INDEX

EMI 72 A / B

BLIND HOLLOW SHAFT MAGNETIC INCREMENTAL ENCODER

MAIN FEATURES

Standard encoder series for industrial environments with high mechanical resistance requirements. Specially designed for direct mounting on motors or tachometric dynamos thanks to integrated elastic coupling that allows radial and / or axial play on the motor shafty.

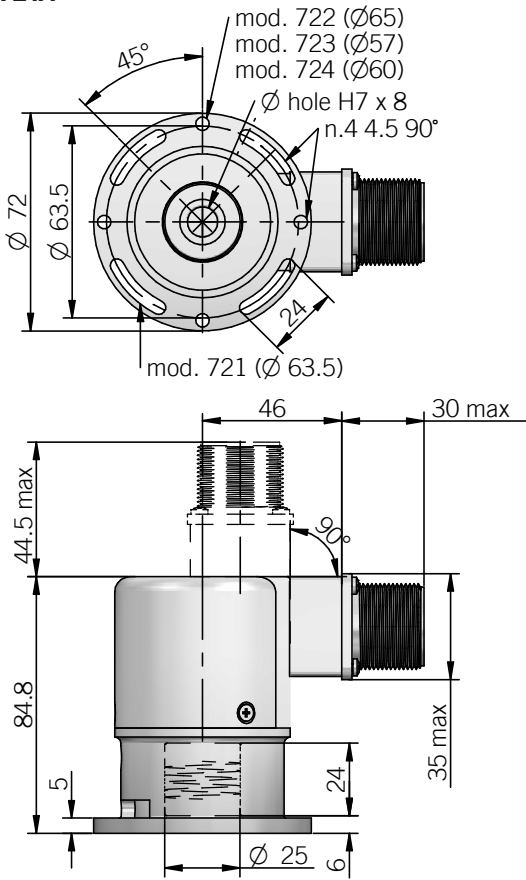
- 3 channel encoder (A / B / Z) up to 10000 ppr
- Power supply up to +30 V DC with RS-422 or HTL as electrical interface
- Up to 800 kHz output frequency
- Cable or connector output
- Metal cover available for heavy duty applications
- Integrated elastic coupling up to 10 mm bore diameter



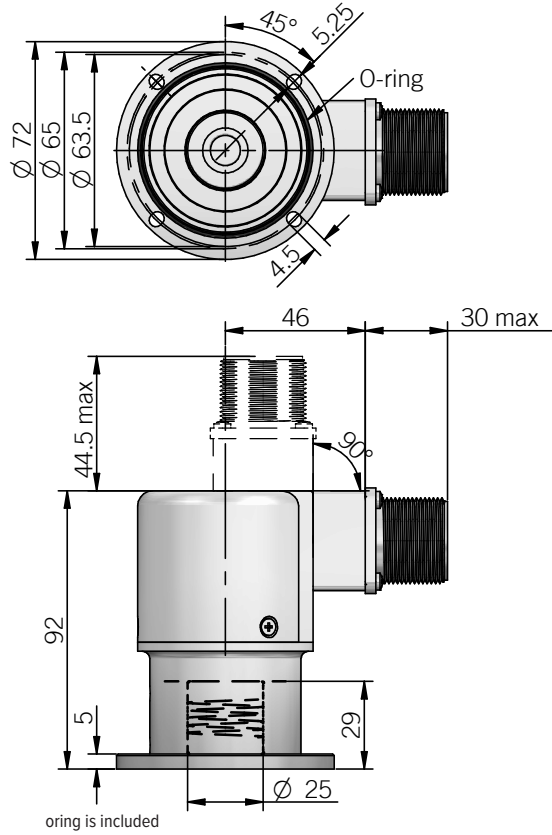
ORDERING CODE **EMI** **721** **A** **M*** **500** **S** **5/30** **P** **8** **X** **X** **M** **R** **.162** **+XXX**

<p>SERIES incremental encoder series ER</p> <p>MODEL fixing holes ø 63,5 mm 721 fixing holes ø 65 mm 722 fixing holes ø 57 mm 723 fixing holes ø 60 mm 724</p> <p>FLANGE TYPE flange type A flange type B</p> <p>METAL COVER * add for metal cover M</p> <p>RESOLUTION ppr from 1 to 10000 refer to the available pulses list</p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 30 V DC 5/30</p> <p>ELECTRICAL INTERFACE NPN open collector C push-pull P line driver L power supply 5/30 V DC - output RS-422 RS</p> <p>BORE DIAMETER mm 6 mm 8 mm 10</p> <p>ENCLOSURE RATING IP 54 X (mod. 721 / 722 max 2500 ppr) IP 66 S</p> <p>OPTION to be reported X</p> <p>OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) MIL plug connector M JIS-C-5432 IP40 plug connector J M12 plug connector M12 M23 plug connector H M16 IP40 plug connector C</p> <p>DIRECTION TYPE axial A radial R</p> <p>SOCKET socket not included .162 to be reported only with connector output (eg. MR.162), for socket see Accessories</p>	<p>VARIANT custom version XXX</p>
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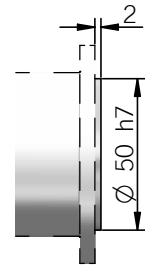
721A



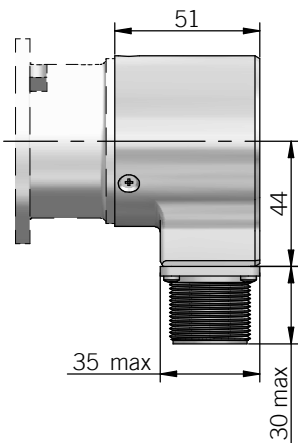
721A (S ENCLOSURE RATING)



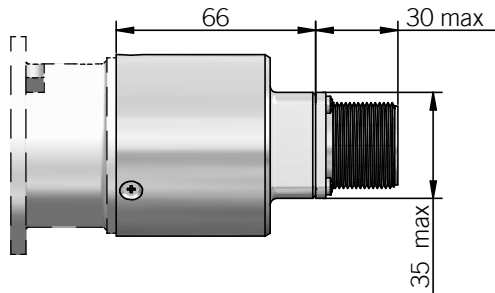
72B FLANGE



DIMENSIONS WITH METAL COVER AND RADIAL OUTPUT



DIMENSIONS WITH METAL COVER AND AXIAL OUTPUT



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 10000 ppr
Power supply¹	5 = 4,5 ... 5,5 V DC 5/30 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	C / P = 50 mA / channel L / RS = 20 mA / channel
Electrical interface²	NPN open collector (AEIC-7273, pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	800 kHz
Counting direction	A leads B clockwise (shaft view)
Index signal	180°e (gated A)
Startup time typical	20 ms
Accuracy	< 0,2° at +20°C (+68°F) ± 0,5° in the operating temperature range
Hysteresis	0,70° up to 256 ppr 0,35° from 257 ppr to 10000 ppr
Mean time to dangerous failure (MTTF)³ according to EN ISO 13849-1	275 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,22 mm ² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 6 / 8 / 10 mm
Enclosure rating IEC 60529	X = IP 54 S = IP 66
Max rotation speed	6000 rpm with X enclosure rating 3000 rpm / 70° C with S enclosure rating 2000 rpm / 85° C with S enclosure rating
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	3,5 x 10 ⁻⁶ kgm ² (83 x 10 ⁻⁶ lbfm ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) with X enclosure rating < 0,04 Nm (5,66 Ozin) with S enclosure rating
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	PA66 glass fiber reinforced / painted aluminum
Elastic coupling material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁵	-25° ... +70°C (-13° ... +158°F)
Weight	400 g (14,11 oz) 500 g (17,64 oz) with metal cover

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation not allowed

PREFERRED RESOLUTIONS

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

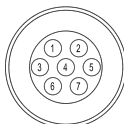
please directly contact our offices for other pulses

CONNECTIONS

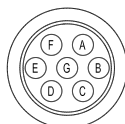
Function	Cable C / P	Cable L / RS	7 pin J C / P	7 pin J L / RS no Zero	7 pin M C / P	7 pin M L / RS no Zero	10 pin J L / RS with Zero	10 pin M L / RS with Zero	5 pin M12 C / P	8 pin M12 L / RS	12 pin H	5 pin C C / P	8 pin C L / RS
+V DC	red	red	6	4	F	D	4 - 5	D - E	2	7	12	5	7
0 V	black	black	1	6	A	F	6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

¹ only with metal cover

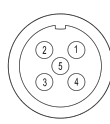
J connector (7 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (5 pin)
M12 A coded
front view



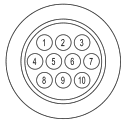
C connector (5 pin)
Amphenol C091 M16 IP40
front view



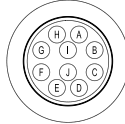
H connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view



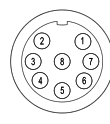
J connector (10 pin)
JIS-C-5432 IP40 Size 16
front view



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



M12 connector (8 pin)
M12 A coded
front view



C connector (8 pin)
Amphenol C091 IP40 IEC 60130-9
front view



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INCREMENTAL INDEX

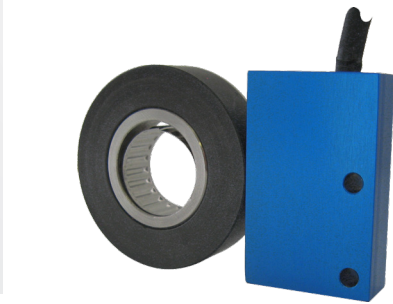
ETMR A / B

MAGNETIC INCREMENTAL KIT ENCODER

MAIN FEATURES

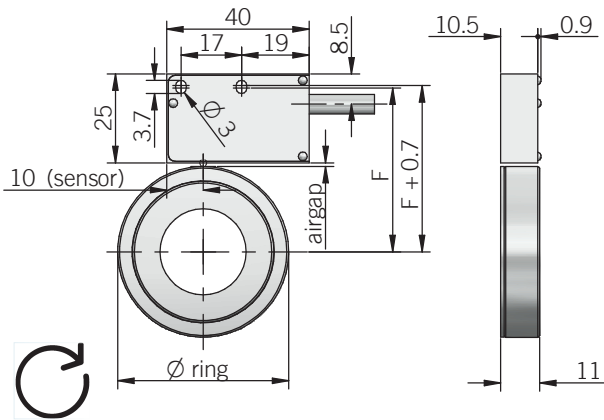
Contactless encoder with through hollow shaft up to 28 mm. The compact size (only 11 mm thick), high IP rating and vibration resistance make this product an excellent solution for heavy duty applications.

- 2 channel encoder (A / B) up to 4096 ppr
- Power supply up to +30 V DC with various electrical interfaces available
- Output frequency up to 350 kHz
- Cable output, connectors available at cable end
- Through hollow shaft up to 28 mm diameter
- Tolerance ring for shaft mounting
- Wide operating temperature range -20° ... +85°C (-4° ... +185°F)



ORDERING CODE	ETMR	A	4096	S	5	L	9	S	8	PR	.XXX
SERIES incremental encoder with magnetic ring ETMR											
MODEL bore diameter from 9 ... 19 mm A bore diameter 24 / 28 mm B											
RESOLUTION ppr from 64 to 4096 refer to the available pulses list											
ZERO PULSE without zero pulse S											
POWER SUPPLY (with L electrical interface) 5 V DC 5 5 ... 28 V DC 5/28											
ELECTRICAL INTERFACE push-pull P line driver L power supply 5/28 V DC - output RS-422 RS											
BORE DIAMETER mm 9 (3/8") mm 9,52 mm 10 mm 11 mm 14 mm 19 mm 24 mm 28											
ENCLOSURE RATING IP 67 S											
MAX ROTATION SPEED 8000 rpm 8											
OUTPUT TYPE cable (standard length 1,5 m) PR preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)											
VARIANT custom version XXX											

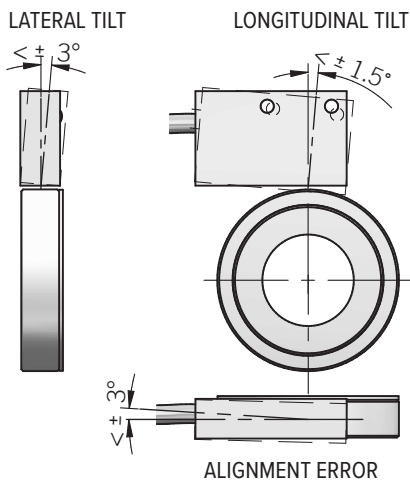
ETMRA / B



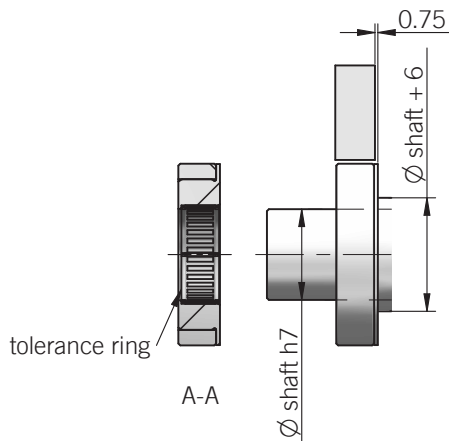
Model	A	B
Ø ring	41,2	48
Fixing (F)	41,9	46
Airgap	0,3 ± 0,1	1 ± 0,1

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

MOUNTING TOLERANCES



RECOMMENDED INTERFACE DESIGN



dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 64 to 4096 ppr (powers of 2)
Pole pitch	model A = 2 mm model B = 5 mm
Power supply¹	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	0,8 W max
Max load current	20 mA / channel
Electrical interface²	push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Max output frequency	350 kHz
Counting direction	A leads B clockwise (front view)
Accuracy	± 0,35° typical / ± 0,50° max
Mean time to dangerous failure (MTTF)_d³ according to EN ISO 13849-1	318 years
Mission time (Tm)³	20 years
Diagnostic coverage (DC)³	0%
Cable type	shielded - fixed installation conductors section 0,14 mm ² / AWG 26 min bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

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

¹ as measured at the transducer without cable influences

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

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

⁴ measured on the transducer flange

⁵ condensation allowed

CONNECTIONS

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

RESOLUTIONS

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

* available with mod.B; please directly contact our offices for other pulses