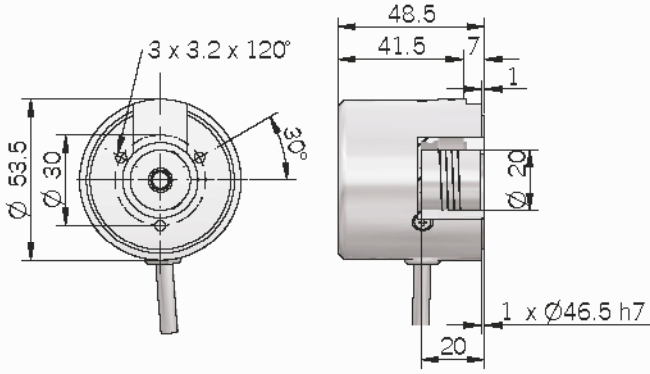
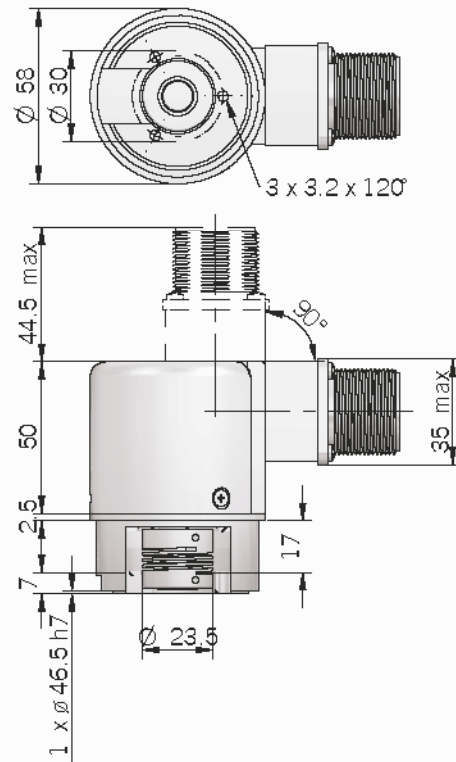


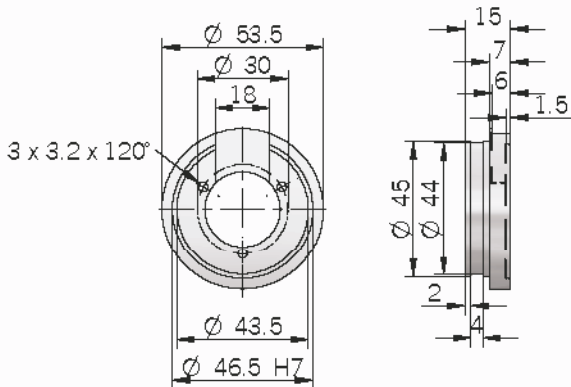
EH 53 A



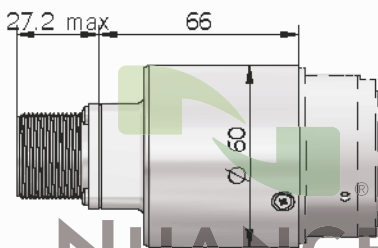
EL 53 A



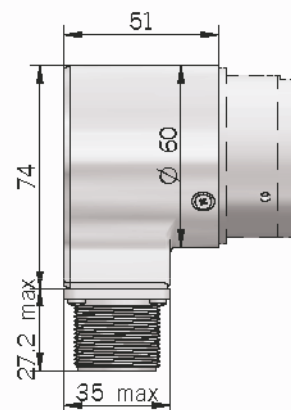
Flange version EH - EL 53 B



Dimensions with metal cover axial output



Dimensions with metal cover radial output



NUANCE

Electrical specifications (EL series)

Resolution	from 1 to 10000 ppr
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	50 mA for channel 20 mA for channel (line driver)
Output type	NPN / NPN open collector / push-pull / line driver
Max output frequency	300 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Electrical specifications (EH series)

Resolution	from 50 to 1024 ppr
Power supply	5 V DC \pm 10% 8 ... 24 V DC \pm 5%
Current consumption without load	100 mA max
Max load current	50 mA for channel 20 mA for channel (line driver)
Output type	NPN / NPN open collector / push-pull / line driver
Max output frequency	100 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Bore diameter	\varnothing 8 / 9,52 / 10 mm
Enclosure rating	IP 54 (IEC 60529) IP 64 (EL series) (IEC 60529)
Max rotation speed	3000 rpm 6000 rpm
Max shaft load	200 N (20 kp)
Shock	50 G, 11 ms up to 2500 ppr (IEC 60068-2-27) 20 G, 11 ms from 3000 ppr (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	PA 66 glass fiber reinforced / painted aluminum
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-25° ... +70°C
Weight	150 g (EH series) 350 g (EL series)

Connections

Function	N / C / P cable output	Line driver cable output	Output J7 N / C / P	Output J7 Line Driver without Zero	Output M7 N / C / P	Output M7 Line Driver without Zero	Output J10 Line Driver with Zero	Output M10 Line Driver with Zero
+V DC	red	red	6	4	F	D	4 - 5	D - E
0 V	black	black	1	6	A	F	6	F
Ch. A	green	green	3	1	C	A	1	A
Ch. A-	/	brown [®]	/	3	/	C	7	G
Ch. B	yellow	yellow	5	2	E	B	2	B
Ch. B-	/	orange	/	5	/	E	8	H
Ch. Z	blue	blue	4	/	D	/	3	C
Ch. Z-	/	white	/	/	/	/	9	I
\perp	shield	shield	7	7	G	G	10	J

MAIN FEATURES

Hollow shaft encoders used for medium size servo feedback.
 Electronic Sin / Cos output is compatible with 1Vpp standard.
 Single sine and cosine track can be used to track motor poles without index search upon power up.

- Compact dimensions
- Sin-Cos resolution: 2048 sin / turn
- Operating temperature: -20° ... +110 °C



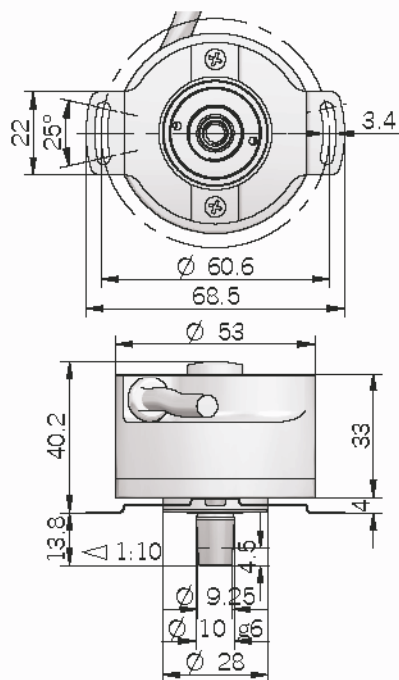
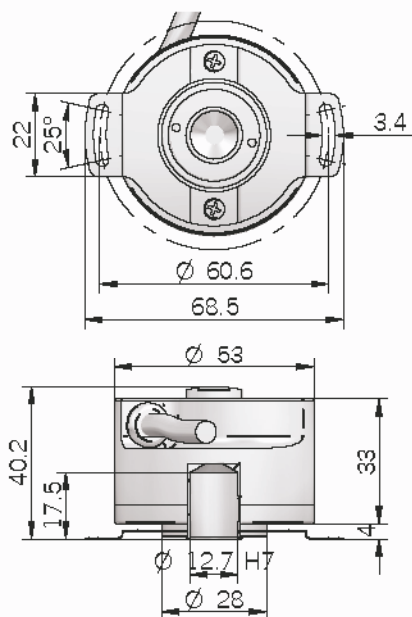
ORDERING CODE

<p>ES 53 K</p> <p>SERIES sin-cos encoder series ES</p> <p>DIMENSION mm 53</p> <p>FIXING TYPE rear fixing with screw K</p> <p>FIXING TYPE front spring FA</p> <p>RESOLUTION sin/cos 2048</p> <p>ZERO PULSE Ⓢ with zero pulse Z</p> <p>POWER SUPPLY 5 V DC 5</p>	<p>FA 2048 Z</p> <p>5</p> <p>S</p> <p>12,7 X</p> <p>6</p> <p>PR</p> <p>ENCLOSURE RATING X IP 40 S IP 64</p> <p>SHAFT DIAMETER 12,7 mm (blind hollow shaft) T9,52 mm (taper 1:10) S12 mm (solid)</p> <p>ELECTRONIC INTERFACE S sin/cos 1Vpp</p>	<p>6 PR . XXX</p> <p>VARIANT XXX custom version</p> <p>OUTPUT TYPE PR radial cable output (standard length 0.5 m)</p> <p>MAX ROTATION SPEED Ⓢ 6000 rpm</p>
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ES 53 KFA

ES 53 KFA with taper shaft



Electrical specifications

Resolution	2048 sin/cos (A/B) - 1 sin/cos (C/D) - Zero (Z)
Power supply	5V DC \pm 10%
Current consumption without load	130 mA max
Max output current	20 mA per channel
Electronic interface	A-B-C-D Amplitude 1 Vpp \pm 10% Offset 2,5V DC \pm 20% Z Amplitude > 0,4V Offset 2,5V DC \pm 20%
Max output frequency	205 kHz
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

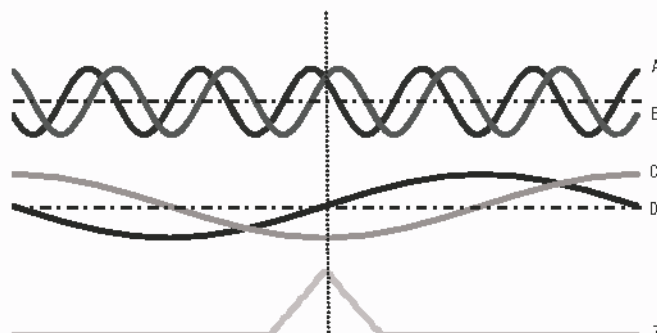
Connections and standard colours

Function	Wire colours
+V DC	red
0 V	black
Ch. A	green
Ch. A-	brown
Ch. B	yellow
Ch. B-	orange
Ch. C	grey
Ch. C-	red / blue
Ch. D	violet
Ch. D-	white / green
Ch. Z	blue
Ch. Z-	white
\equiv	shield

Mechanical specifications

Hollow shaft diameter	12,7 mm (blind hollow shaft) T9,52 (solid tapered shaft) S12 (solid shaft)
Enclosure rating	IP 40 (IEC 60529) IP 64 (IEC 60529) when installed
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10 ⁹ revolutions
Bearings	2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Body material	EN-AW 2011 aluminum
Cover material	EN-AW 2011 aluminum
Operating temperature	-20° ... +110 °C
Storage temperature	-20° ... +85 °C
Weight	300 g

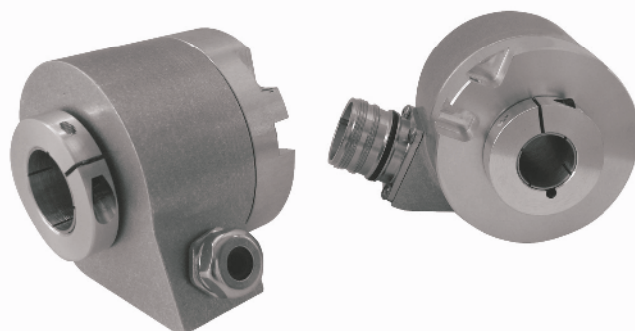
Sinusoidal interface



MAIN FEATURES

Through hollow shaft encoders series designed for industrial application and medium / big size motors with a bore size up to 20 mm diameter. The insulated bearing option prevents encoder damages that result from induced currents through the shaft.

- Insulated through hollow shaft option
- Compact design
- Resolution up to 5000 ppr
- Line driver, push-pull or NPN electronic interfaces
- Up to IP 66
- 6000 rpm max (IP 54)
- Cable or connector output
- Working temperature range: -20° ... +70 °



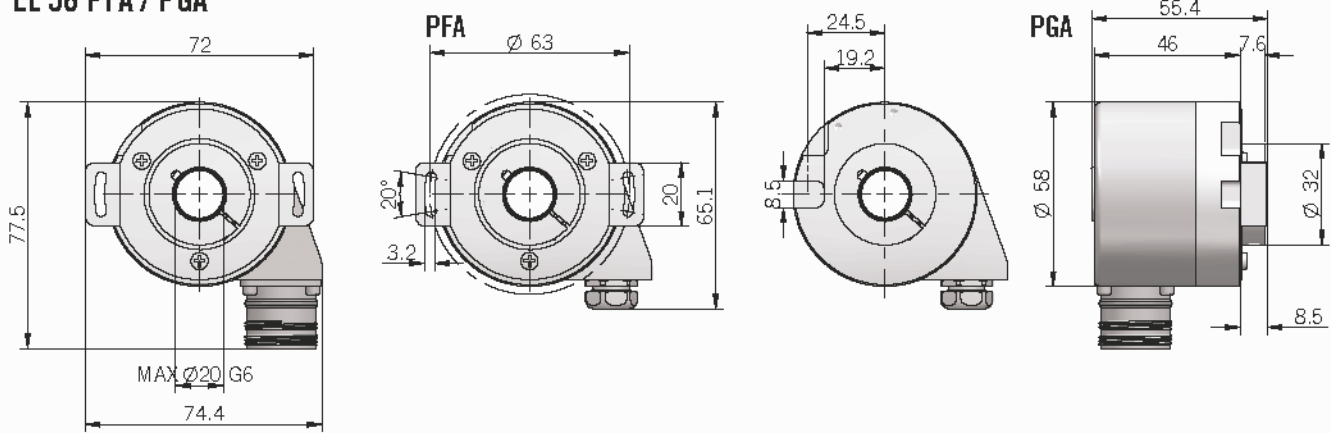
ORDERING CODE

EL 58 P FA 1024 Z 5/28 P 15 X 3 PR . XXX

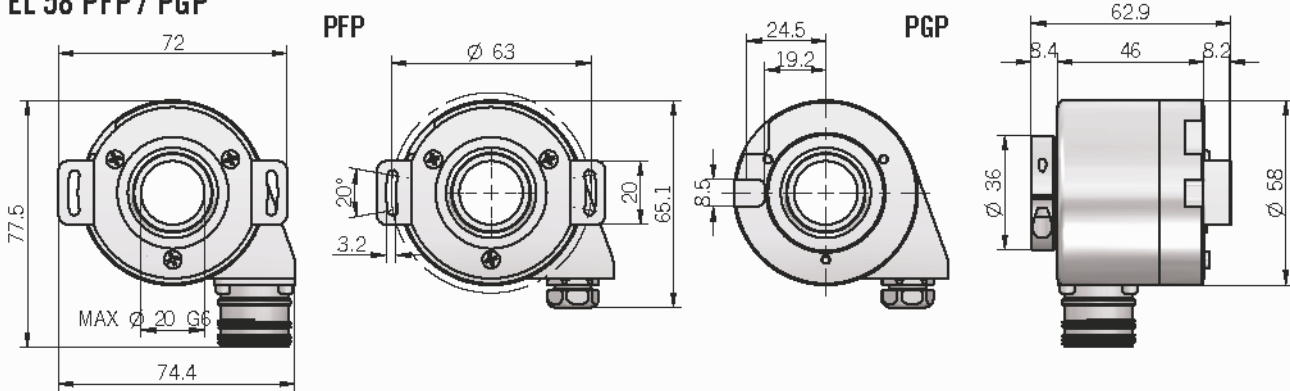
SERIES incremental encoder series EL	VARIANT XXX custom version
SIZE mm 58	OUTPUT TYPE PR cable output radial (standard length = 1.5 m) HR 12 poles M23 radial connector output
TYPE semiradial output P	MAX ROTATION SPEED 3 3000 rpm 6 6000 rpm (only IP 54)
FIXING front clamping ring, flexible spring mount FA rear clamping ring, flexible spring mount FP front clamping ring, pin mount GA rear clamping ring, pin mount GP	ENCLOSURE RATING X IP 54 S IP 66 (optional) T IP 66 (with insulated bearings)
RESOLUTION ppr from 1 to 5000 <i>N.B.: please directly contact our offices for pulses availability</i>	MAX BORE DIAMETER 15 mm 20 mm (from 2501 ppr to 5000 ppr)
ZERO PULSE without zero pulse S with zero pulse Z	ELECTRONIC INTERFACE N NPN C NPN open collector P push-pull PC protected push-pull (AEIC-7272) L line driver
POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28	

NUANCE

EL 58 PFA / PGA



EL 58 PFP / PGP



Electrical specifications

Resolution	from 1 to 5000 ppr
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Power draw without load	800 mW
Max load current	50 mA for channel 20 mA for channel (line driver)
Output type	NPN / NPN open collector / push-pull / line driver
Max output frequency	300 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Connections

Function	N / C / P cable output	Line driver cable output	Output H12
+VDC	red	red	12
0 V	black	black	10
Ch. A	green	green®	5
Ch. A-	/	brown	6
Ch. B	yellow	yellow	8
Ch. B-	/	orange	1
Ch. Z	blue	blue	3
Ch. Z-	/	white	4
⊥	shield	shield	9

Mechanical specifications

Shaft diameter	15 mm / 20 mm (from 2501 to 5000 ppr)
Enclosure rating	IP 54 (IEC 60529) IP 68 (optional) (IEC 60529)
Max rotation speed	3000 rpm 6000 rpm (only with IP 54)
Shock	50 G, 11 ms up to 2500 ppr (IEC 60068-2-27) 20 G, 11 ms from 3000 ppr (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	2 ball bearings (isolated T version)
Bearings life	10 ⁹ revolutions
Operating temperature	-20° ... +70°C
Storage temperature	-20° ... +70°C
Weight	300 g

MAIN FEATURES

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

- Up to 25000 ppr with zero signal
- Several output types available
- Up to 28 V DC power supply
- Up to 300 kHz output frequency
- Cable or connector output

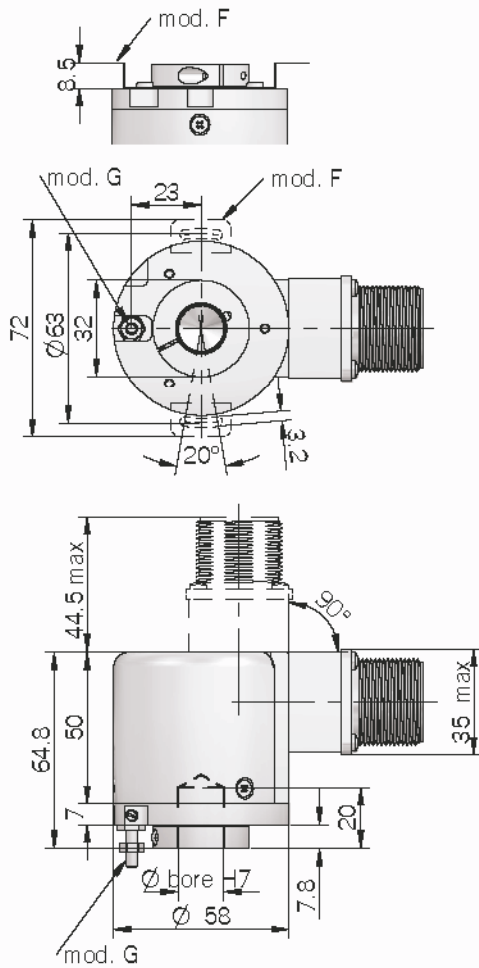


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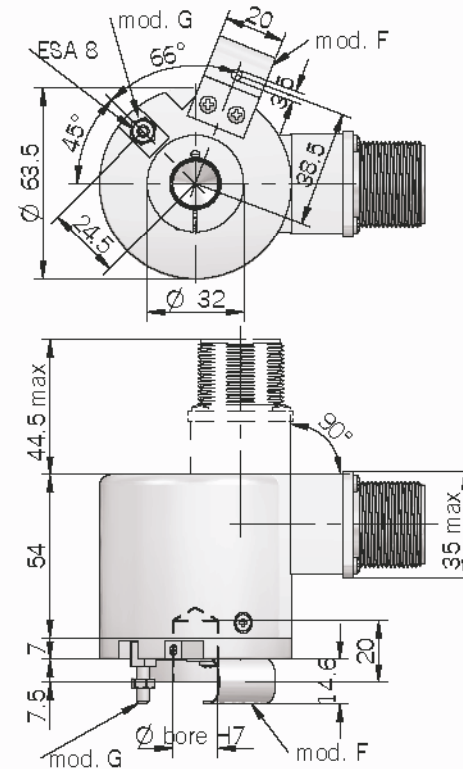
EL	63	G	M*	1000	Z	5/28	N	8	X	3	M	R	.	XXX
SERIES incremental encoder series EL												VARIANT XXX custom version		
SIZE mm 58 mm 63												DIRECTION TYPE A axial (only for EL 58 F / G, EL 63 F / G) R radial		
TYPE blind hollow shaft with spring F blind hollow shaft with anti-rotation pin G (only EL 63 P) through hollow shaft with anti-rotation pin P												OUTPUT TYPE P cable output (standard length 1.5 m) M M connector output (only for EL 58 F / G, EL 63 F / G) J J connector output (only for EL 58 F / G, EL 63 F / G)		
METAL COVER (only EL 58 F / G, EL 63 F / G) M * add for metal cover												MAX ROTATION SPEED 3 3000 rpm		
RESOLUTION (EL 58 G, EL 63 P) ppr from 1 to 2500 (EL 58 F, EL 63 F / G) ppr from 1 to 25000 <i>N.B.: please directly contact our offices for pulses availability</i>												ENCLOSURE RATING X IP 54 S IP 66 (optional for EL 58 F / G, EL 63 F / G)		
ZERO PULSE without zero pulse S with zero pulse Z												BORE DIAMETER 8 mm 10 mm 12 mm 14 mm 15 mm		
POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28												ELECTRONIC INTERFACE N NPN C NPN open collector P push-pull PC protected push-pull (AEIC-7272) L line driver		

NUANCE

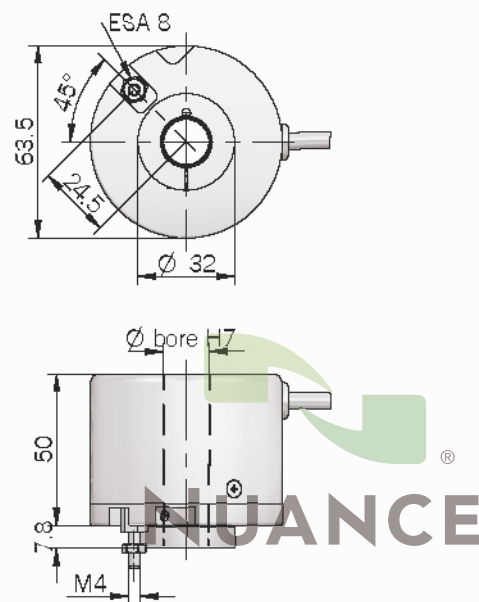
EL58 F / G



EL 63 F / G



EL 63 P



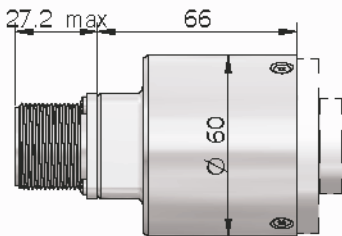
EL 58 F, EL 63 F mounting instructions

1. Couple encoder shaft with motor shaft
2. Fix spring to motor flange without tightening it
3. Fix encoder shaft on motor shaft
4. Turn encoder for electrical adjustment (phasing)
5. Fix spring

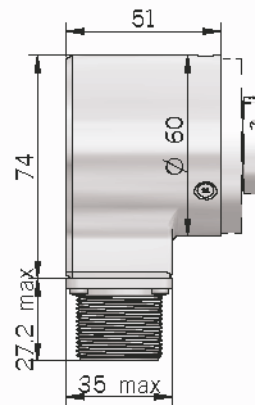
EL 58 G, EL 63 G, EL 63 P mounting instructions

1. Fix anti-rotation pin on motor flange
2. Couple encoder shaft with motor shaft, making sure pin is inserted in the hole on the front part of the encoder (maintaining a minimum distance of 0.5 mm).
3. Fix encoder shaft on motor shaft

Dimensions with metal cover axial output



Dimensions with metal cover radial output



Electrical specifications	
Resolution	from 1 to 2500 ppr (EL 58 G, EL 63 P) from 1 to 25000 ppr (EL 58 F, EL 63 F / G)
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Power draw without load	800 mW
Max load current	50 mA for channel 20 mA for channel (line driver)
Output type	NPN / NPN open collector / push-pull / line driver
Max output frequency	300 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications	
Shaft diameter	ϕ 8 / 10 / 12 / 14 / 15 mm
Enclosure rating	IP 54 (IEC 60529) IP 66 (optional) (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load	200 N (20 kp)
Shock	50 G, 11 ms up to 2500 ppr (IEC 60068-2-27) 20 G, 11 ms from 3000 ppr (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-8)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	PA 66 glass fiber reinforced / painted aluminum
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-25° ... +70°C
Weight	350 g

Connections								
Function	N / C / P cable output	Line driver cable output	Output J7 N / C / P	Output J7 Line Driver without Zero	Output M7 N / C / P	Output M7 Line Driver without Zero	Output J10 Line Driver with Zero	Output M10 Line Driver with Zero
+V DC	red	red	6	4	F	D	4 - 5	D - E
0 V	black	black	1	6	A	F	6	F
Ch. A	green	green	3	1	C	A	1	A
Ch. A-	/	brown	/	3	/	C	7	G
Ch. B	yellow	yellow	5	2	E	B	2	B
Ch. B-	/	orange	/	5	/	E	8	H
Ch. Z	blue	blue	4	/	D	/	3	C
Ch. Z-	/	white	/	/	/	/	9	I
⊕	shield	shield	7	7	G	G	10	J



EL 63

GB / FB / PB / PBF / PC / PCF

INCREMENTAL ENCODER



MAIN FEATURES

Hollow shaft encoder series for industrial applications with high mechanical resistance requirements.

- Up to 2500 ppr with zero signal
- Several output types available
- Up to 28 V DC power supply
- Up to 300 kHz output frequency
- Cable output or connector at cable end



HOLLOW SHAFT INCREMENTAL ENCODERS

ORDERING CODE

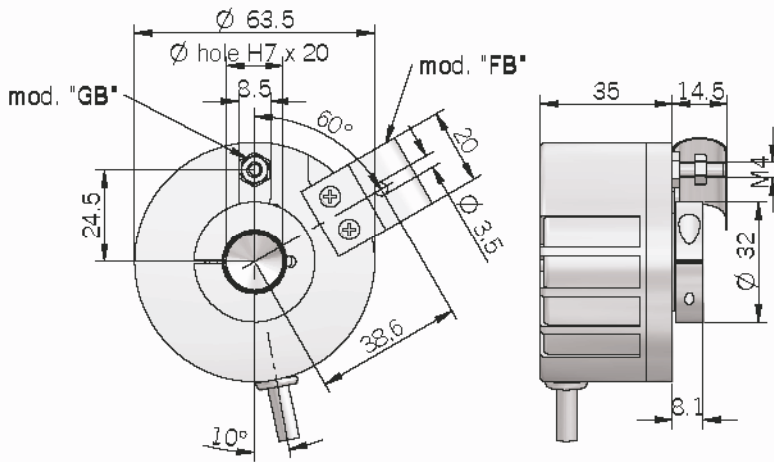
EL 63	GB 1000	Z	5/28	N	8	X	3	P	R	. XXX
SERIES incremental encoder series EL										VARIANT XXX custom version
	SIZE mm 63									DIRECTION TYPE R radial
		TYPE blind shaft with spring FB blind shaft with antirotation pin GB hollow shaft with antirotation pin PB hollow shaft with spring PBF shaft without metal ring with antirotation pin PC shaft without metal ring with spring PCF								OUTPUT TYPE P cable output (standard length 1.5 m)
										MAX ROTATION SPEED 3 3000 rpm
										ENCLOSURE RATING X IP 54
										BORE DIAMETER 8 mm 10 mm 12 mm 14 mm 15 mm
										ELECTRONIC INTERFACE N NPN C NPN open collector P push-pull PC protected push-pull (AEIC-7272) L line driver
			RESOLUTION ppr from 1 to 2500 <i>N.B.: please directly contact our offices for pulses availability</i>							
			ZERO PULSE without zero pulse S with zero pulse Z							
			POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28							

NUANCE

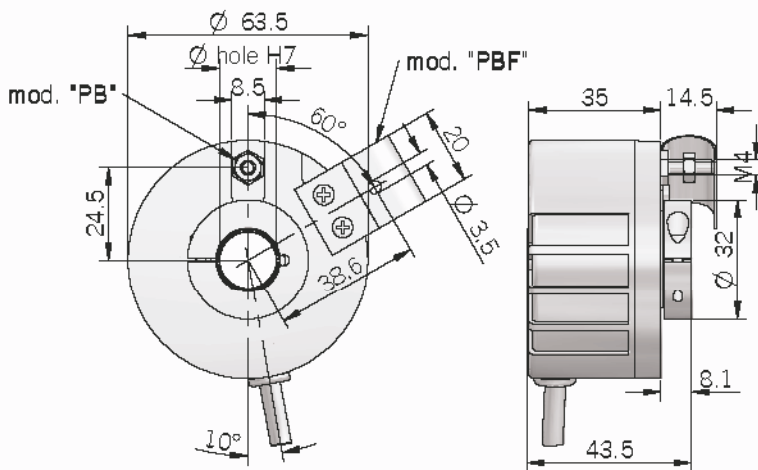
EL 63 FB / GB / PB / PBF / PC / PCF



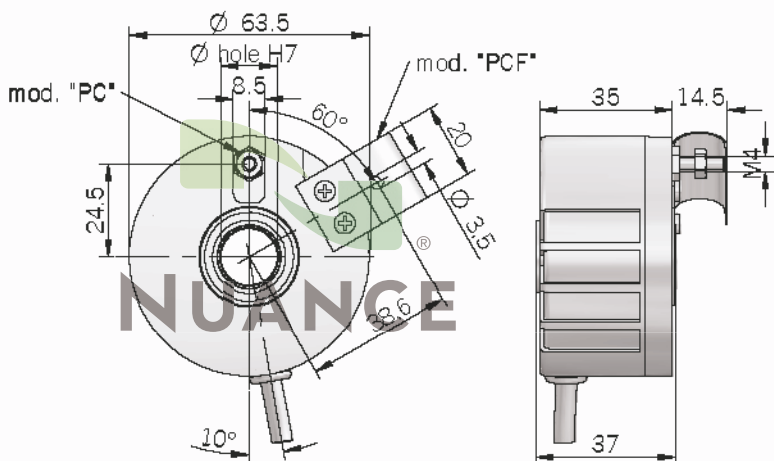
EL63 FB / GB



EL 63 PB / PBF



EL 63 PC / PCF



Mounting instructions

EL 63 FB / PBF / PCF models

1. Couple encoder shaft with motor shaft
2. Fix spring to motor flange without tightening it
3. Fix encoder shaft on motor shaft (FB - PBF models)
4. Fix encoder shaft packed with the motor shaft.
5. Place a washer at the end of the encoder shaft, under the screw that blocks the whole pack (PCF model)
6. Turn encoder for electrical adjustment (phasing)
7. Fix spring

EL 63 GB / PB / PC models

1. Fix anti-rotation pin on motor flange
2. Couple encoder shaft with motor shaft, making sure pin is inserted in the hole on the front part of the encoder (maintaining a minimum distance of 0.5 mm)
3. Fix encoder shaft on motor shaft (GB - PB models)
4. Fix encoder shaft packed with the motor shaft
5. Place a washer at the end of the encoder shaft, under the screw that blocks the whole pack (PC model)

Electrical specifications

Resolution	from 1 to 2500 ppr
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Power draw without load	800 mW
Max load current	50 mA for channel 20 mA for channel (line driver)
Output type	NPN NPN open collector push-pull line driver
Max output frequency	300 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Shaft diameter	\varnothing 8 / 10 / 12 / 14 / 15 mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load	200 N (20 kp)
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	PA 66 glass fiber reinforced
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-25° ... +70°C
Weight	350 g

Connections and standard colours

Function	Push pull / Npn / Npn open collector	Line driver
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
\equiv	shield	shield



MAIN FEATURES

Standard encoder series for industrial environments with high mechanical resistance requirements. These encoders are designed to withstand high radial and axial shaft loads and they can be mounted by means of flanges or servofasteners.

Specifically designed for direct mounting on motors or speedometer dynamos.

Our integrated elastic coupling allows radial and axial slack compensation.

- Up to 25000 ppr with zero signal
- Several output types available
- Up to 28 V DC power supply
- Up to 300 kHz output frequency
- Cable or connector output
- Several flanges available
- Up to 6000 RPM rotation speed
- Up to IP 66 sealing



ORDERING CODE

EL 72	1	A	M*	1000	Z	5/28	N	10	X	6	M	R	. XXX	
SERIES incremental encoder series EL												DIRECTION TYPE A axial R radial	VARIANT XXX custom version	
SIZE mm 72												OUTPUT TYPE P cable output (standard length 1,5 m) MM connector output JJ connector output		
DISTANCE BETWEEN HOLES ON FLANGE ∅ 63,5 mm 1 ∅ 65 mm 2 ∅ 57 mm 3 ∅ 60 mm 4												MAX ROTATION SPEED 3 3000 rpm 6 6000 rpm <i>N.B.: 3000 RPM max. with "S" enclosure rating</i>		
		TYPE A B										ENCLOSURE RATING X IP 54 S IP 66 (optional)		
			METAL COVER M <i>* add for metal cover</i>									SHAFT DIAMETER 6 mm 8 mm 10 mm		
				RESOLUTION ppr from 1 to 25000 <i>N.B.: please directly contact our offices for pulses availability</i>								ELECTRONIC INTERFACE N NPN C NPN open collector P push-pull PC protected push-pull (AEIC-7272) L line driver		
				ZERO PULSE without zero pulse S with zero pulse Z										
				POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 (available only with EL series) 5 ... 28 V DC 5/28										

Electrical specifications

Resolution	from 1 to 25000 ppr
Power supply	5 V DC \pm 10%
	5 ... 28 V DC \pm 5%
	8 ... 24 V DC \pm 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	50 mA for channel
	20 mA for channel (line driver)
Output type	NPN
	NPN open collector
	push-pull line driver
Max output frequency	300 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2
	IEC 61000-6-4

Mechanical specifications

Shaft diameter	\varnothing 6 / 8 / 10 mm
Enclosure rating	IP 54 (IEC 60529)
	IP 66 (optional) (IEC 60529)
Max rotation speed	3000 rpm
	6000 rpm (only with IP 54)
Max shaft load	200 N (20 kp)
Shock	50 G, 11 ms up to 2500 ppr (IEC 60068-2-27)
	20 G, 11 ms from 3000 ppr (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	PA 66 glass fiber reinforced / painted aluminum
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-25° ... +70°C
Weight	400 g
Accessories	Precision elastic couplings
	G25A6/10 - G25A8/10 - G25A/10

Technical specifications for DYNAMO 60V / 1000 rpm or 20V / 1000 rpm

Peak to peak ripple	\leq 1%	
Effective value ripple	\leq 0,4%	
Linearity error	\leq 0,2%	
Reversibility error	\pm 0,1%	
Voltage tolerance	\pm 3%	
Voltage variation with temperature	-0,02% for °C	
Insulation class	B	
N. of poles	4	
N. of slots	33	
N. of laminas	33	
Field excitation by magnets	ALNICO	
Winding	60V / 1000 rpm	20V / 1000 rpm
Nom. voltage at 1000 rpm	60 V	20 V
Load - free voltage at 1000 rpm	61,2 V	20,3 v
Max current admitted	70 mA	200 mA
Nom. current	5 mA	10 mA
Max speed	5000 rpm	6000 rpm
Armature resistance at 25°C	240 Ω	26 Ω
Electric time constant	0,7 ms	0,7 ms
Protection class	IP 55	
Weight	2,35 Kg	
Inertia	2 Kg cm ²	

Connections

Function	N / C / P cable output	Line driver cable output	Output J7 N / C / P	Output J7 Line Driver without Zero	Output M7 N / C / P	Output M7 Line Driver without Zero	Output J10 Line Driver with Zero	Output M10 Line Driver with Zero
+V DC	red	red	6	4	F	D	4 - 5	D - E
0 V	black	black	1	6	A	F	6	F
Ch. A	green	green	3	1	C	A	1	A
Ch. A-	/	brown	/	3	/	C	7	G
Ch. B	yellow	yellow	5	2	E	B	2	B
Ch. B-	/	orange	/	5	/	E	8	H
Ch. Z	blue	blue	4	/	D	/	3	C
Ch. Z-	/	white	/	/	/	/	9	I
⊕	shield	shield	7	7	G	G	10	J

EH - EF 80 C / P / K

INCREMENTAL ENCODER
MOTOR SERIES



MAIN FEATURES

ø 80 encoder series recommended in feedback control systems on AC servomotors. They include a traditional incremental encoder and the Hall effect phases.

- Small dimensions
- Wide resolution range available
- High temperature resistant
- Easy mounting

EH series

Basic version with incremental outputs.
Several output types available.

EF series

Optic generation of "Hall effect phases" added to the basic version.
Signal transmission by parallel bus.



HOLLOW SHAFT INCREMENTAL ENCODERS

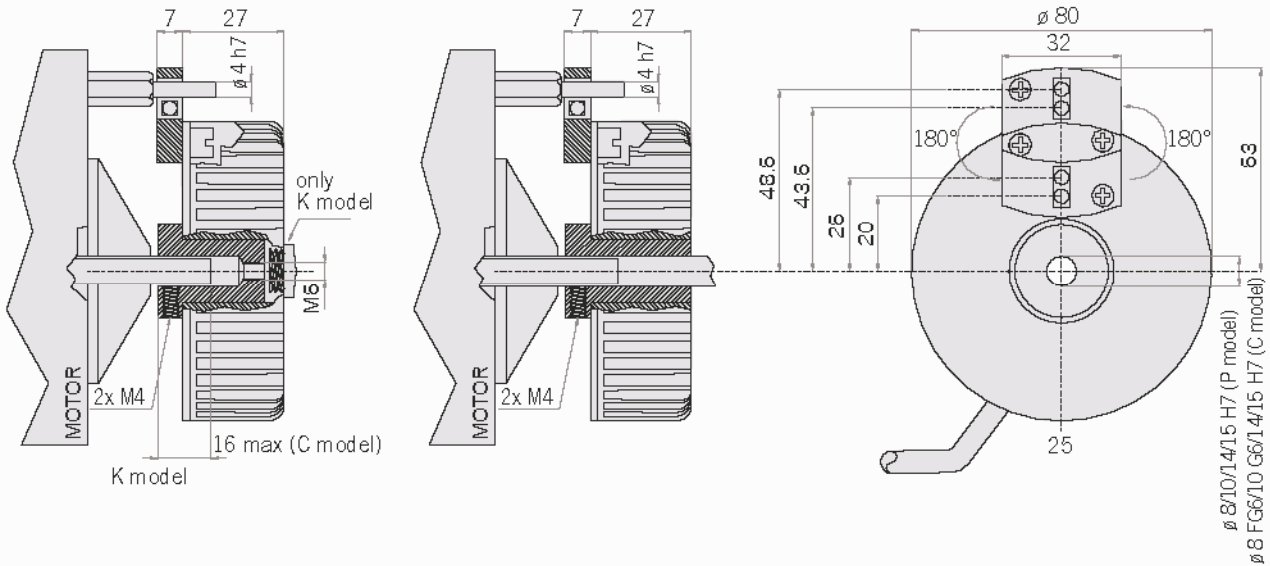
ORDERING CODE

EF	80	P	6	L	2000	Z	5	L	8	X	3	PR	.	XXX
SERIES	incremental encoder EH	incremental encoder EF with Hall phases												VARIANT XXX custom version
SIZE	mm 80													OUTPUT TYPE PR radial cable output (standard length 0.3 m)
TYPE	blind hollow shaft C	through hollow shaft P												MAX ROTATION SPEED 3 3000 rpm
POLES OF THE MOTOR (EF SERIES)	4 poles 4	6 poles 6												ENCLOSURE RATING X IP 54
OUTPUT TYPE FOR HALL PHASES (EF SERIES)	NPN open collector C	line driver L												BORE DIAMETER 8 ø 8 mm 10 ø 10 mm 14 ø 14 mm 15 ø 15 mm
RESOLUTION	ppr from 200 to 2048													OUTPUT TYPE FOR INCREMENTAL SIGNALS N NPN (EH series) C NPN open collector (EH series) P push pull (EH series) PC protected push-pull (AEIC-7272) L line driver
ZERO PULSE	without zero pulse S	with zero pulse Z												POWER SUPPLY 5 5 V DC (available only with L electronic output) 5/28 5 ... 28 V DC (EH series) 8/24 8 ... 24 V DC (available only with L / PC electronic output EH series)

N.B.: please directly contact our offices for pulses availability

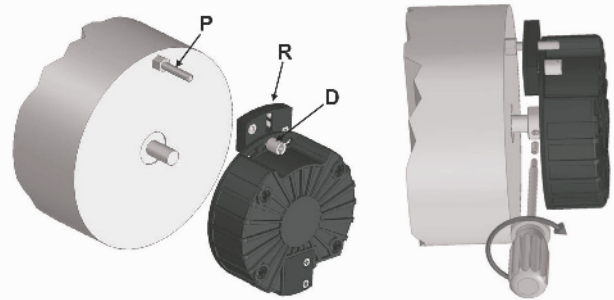
NUANCE

EH - EF 80 C / P / K



HOW TO MOUNT IT

- Fix the anti-rotation pin (P).
- Insert the encoder on the motor shaft with misalignment recovery system corresponding to the pin (P).
- Screw the nut (D) (don't tighten it if you need to phase zero signal).
- Couple the encoder shaft with the motor shaft, making sure the pin (P) is inserted in the hole of the misalignment recovery system (R).
- Fix the encoder shaft with the two M4 grub screws.
- For zero phasing turn the encoder (22° max.), then screw the nut (D).



Electrical specifications

Resolution	from 200 to 2048 ppr
Power supply	5 V DC $\pm 10\%$ 5 ... 28 V DC $\pm 5\%$ (only EH series) 8 ... 24 V DC $\pm 5\%$ (reverse polarity protection only EH series)
Current consumption without load	100 mA max (EH series) 200 mA max (EF series)
Max load current	15 mA for channel
Output type (EH series)	NPN NPN open collector push-pull line driver
Output type for incremental signals (EF series)	line driver
Output type for Hall phases (serie EF)	NPN open collector / line driver
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Bore diameter	$\varnothing 8 / 10 / 14 / 15$ mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms
Vibration	5 G, 10 ... 500 Hz
Body material	PA66 glass fiber reinforced
Shaft material	EN-AW 2011 aluminum
Housing material	PA66 glass fiber reinforced
Bearings	n° 2 ball bearings
Bearings life	10^9 revolutions
Operating temperature	-10° ... +85°C -10° ... +100°C on demand
Storage temperature	-25° ... +85°C
Weight	250 g

Connections

Function	EH Push pull / Npn / Npn open collector	EH Line driver	EF
+V DC	red	red	red
0 V	black	black	black
Ch. A	green	green	green
Ch. B	yellow	yellow	yellow
Ch. Z	blue	blue	blue
Ch. A-	/	brown	brown
Ch. B-	/	orange	orange
Ch. Z-	/	white	white
Ch. U	/	/	gray
Ch. V	/	/	violet
Ch. W	/	/	gray-pink
Ch. U-	/	/	red-blue
Ch. V-	/	/	white-green
Ch. W-	/	/	brown-green
\perp	shield	shield	shield



MAIN FEATURES

Sturdy encoder suitable for AC motor feedback, lift gears and heavy duty applications.

- Compact size
- Bidirectional signal with zero
- Up to 1024 ppr
- Line driver output
- 3000 rpm max
- Working temperature: -20° ... +85 °C



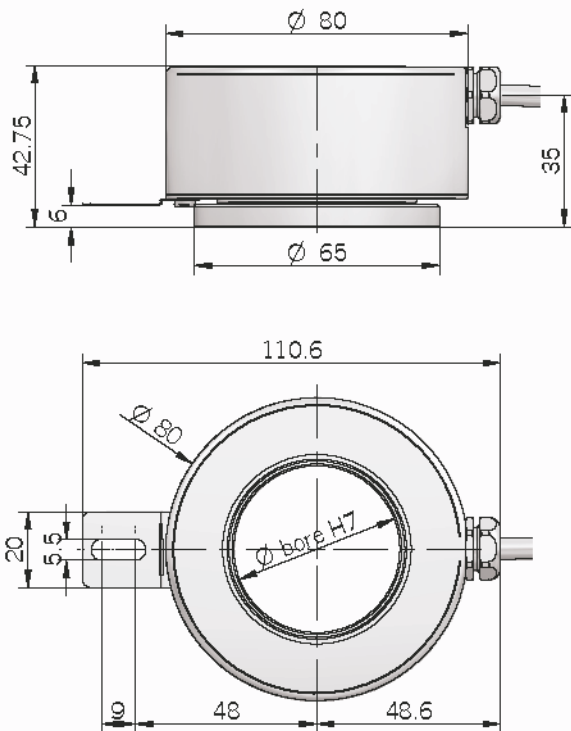
ORDERING CODE

<p>EH 80 PF P 1024 Z 5 L 30 X 3 PR . XXX</p> <p>SERIES incremental encoder series EH</p> <p>SIZE mm 80</p> <p>FIXING TYPE through hollow shaft and fixing with spring PF</p> <p>TYPE front fixing A rear fixing P</p> <p>RESOLUTION ppr 1000 / 1024</p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY (available only with L or PC electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28</p>	<p>VARIANT XXX custom version</p> <p>OUTPUT TYPE PR radial cable output (standard length 0.5 m)</p> <p>MAX ROTATION SPEED 3 3000 rpm</p> <p>ENCLOSURE RATING X IP 64</p> <p>HOLLOW SHAFT 30 mm 35 mm 40 mm 44 mm (available only with A type)</p> <p>ELECTRONIC INTERFACE P push pull PC protected push-pull (AEIC-7272) L line driver</p>
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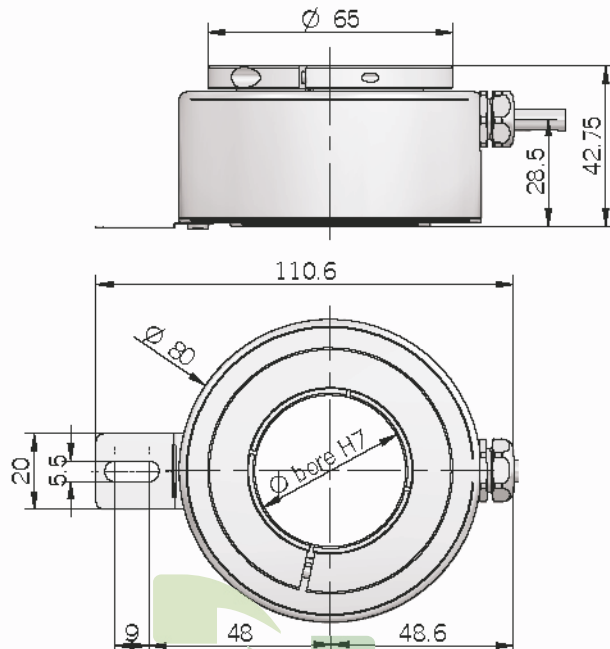
N.B.: please directly contact our offices for pulses availability

NUANCE

EH 80 PFA



EH 80 PFP



NUANCE

Electrical specifications

Resolution	1000 / 1024 ppr
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	20 mA for channel
Output type	push-pull line driver
Max output frequency	100 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Bore diameter	model PFA: ϕ 30 / 35 / 40 / 44 mm model PFP: ϕ 30 / 35 / 40 mm
Enclosure rating	IP 64 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10=2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	-20° ... +85 °C
Storage temperature	-20° ... +85 °C
Weight	800 g

Connections and standard colours

Function	Push pull / Npn / Npn open collector	Line driver
+VDC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
\equiv	shield	shield

MAIN FEATURES

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

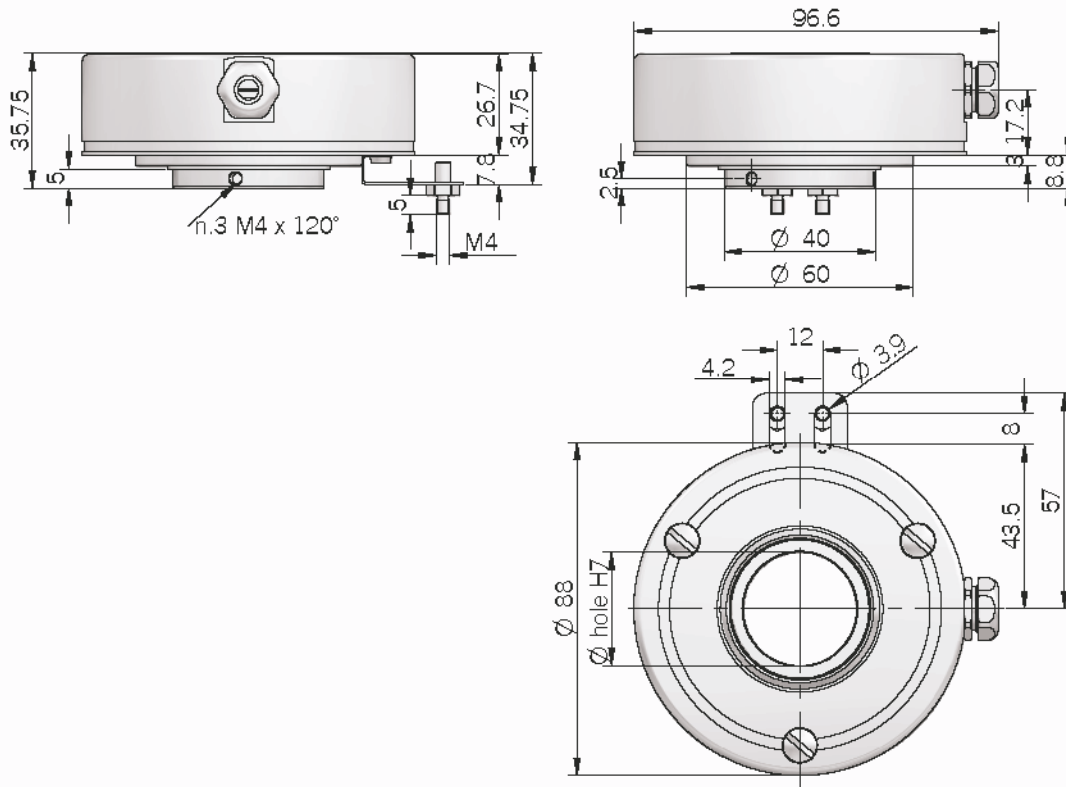
- Up to 30mm bore diameter
- Easy mounting
- Sturdy mechanic
- Resolution up to 2500 ppr with zero signal
- Several output electronics
- Power supply up to 28 V DC
- Max output frequency up to 105 KHz



ORDERING CODE

EH 88 P 1024 Z 5/28 P 30 S 3 PR . XXX	
<p>SERIES incremental encoder series EH incremental encoder series EL</p> <p>SIZE mm 88</p> <p>TYPE through hollow shaft with spring P</p> <p>RESOLUTION EH series ppr 250 / 256 / 500 / 512 / 700 / 720 / 1000 / 1024 / 1440 / 2500 EL series ppr from 1 to 2048 <i>N.B.: please directly contact our offices for pulses availability</i></p> <p>ZERO PULSE without zero pulse S with zero pulse Z</p> <p>POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28</p>	<p>VARIANT XXX custom version</p> <p>OUTPUT TYPE PR cable output radial with cable gland (standard length 0.5 m)</p> <p>MAX ROTATION SPEED 3 3000 rpm</p> <p>ENCLOSURE RATING S IP 65</p> <p>BORE DIAMETER 25 mm 30 mm <i>N.B.: please directly contact our offices for diameter availability</i></p> <p>ELECTRONIC INTERFACE N NPN C NPN open collector P push-pull PC protected push-pull (AEIC-7272) L line driver</p>

EH-EL 88 P



Electrical specifications	
Resolution	250 / 256 / 500 / 512 / 700 / 720 / 1000 / 1024 / 1440 / 2500 ppr EH series from 1 to 2048 ppr EL series
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	50 mA for channel 20 mA for channel (line driver)
Electronic interface for incremental signals	NPN / NPN open collector (only EL series) push-pull / line driver
Counting direction	A leads B clockwise (shaft view)
Max output frequency	105 kHz
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

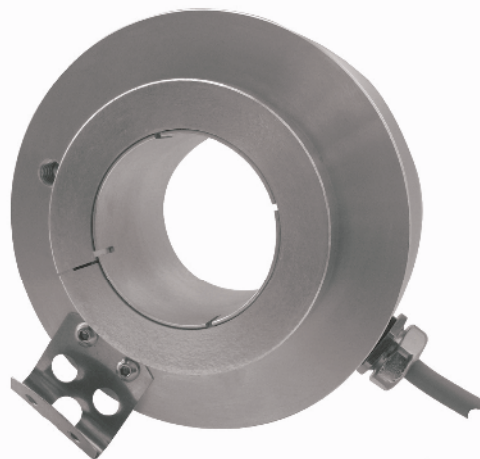
Mechanical specifications	
Bore diameter	\varnothing 25 / 30 mm
Enclosure rating	IP 65 (IEC 60529)
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10÷2000 Hz (IEC 60068-2-8)
Max rotation speed	3000 rpm
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	-10° ... +70 °C
Storage temperature	-25° ... +85 °C
Weight	350 g

Connections and standard colours		
Function	Push pull / Npn / Npn open collector	Line driver
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

MAIN FEATURES

Cost effective series for asynchronous motors.

- Suitable for elevators and stage machinery
- Sturdy frame
- Up to \varnothing 40 mm bore size
- Resolution up to 2500 ppr with Z reference signal
- Torque arm fixing available up to \varnothing 30mm through hollow shaft



ORDERING CODE

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

SERIES
incremental encoder series EH

SIZE
mm 88

TYPE
through hollow shaft with tether PE
through hollow shaft with torque arm PET
N.B.: please see accessories for torque arm ordering codes

RESOLUTION
ppr 500 / 512 / 720 / 1000 /
1024 / 1440 / 2500
N.B.: please directly contact our offices for pulses availability

ZERO PULSE
without zero pulse S
with zero pulse Z

POWER SUPPLY
(available only with L electronic output) 5 V DC 5
(available only with L or PC electronic output) 8 ... 24 V DC 8/24
5 ... 28 V DC 5/28

VARIANT
XXX custom version

OUTPUT TYPE
PR cable output radial with cable gland
(standard length 0.5 m)

MAX ROTATION SPEED
3 3000 rpm

ENCLOSURE RATING
X IP 54

BORE DIAMETER

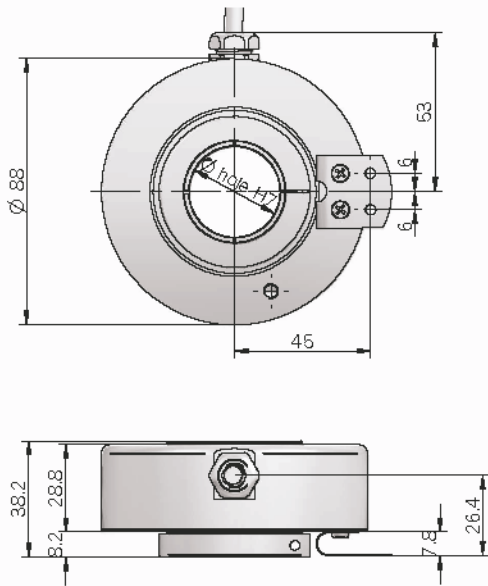
25 mm
30 mm
35 mm
38 mm
40 mm
K25 mm with key
K30 mm with key
K35 mm with key

N.B.: torque arm fixing available up to 30mm bore diameter

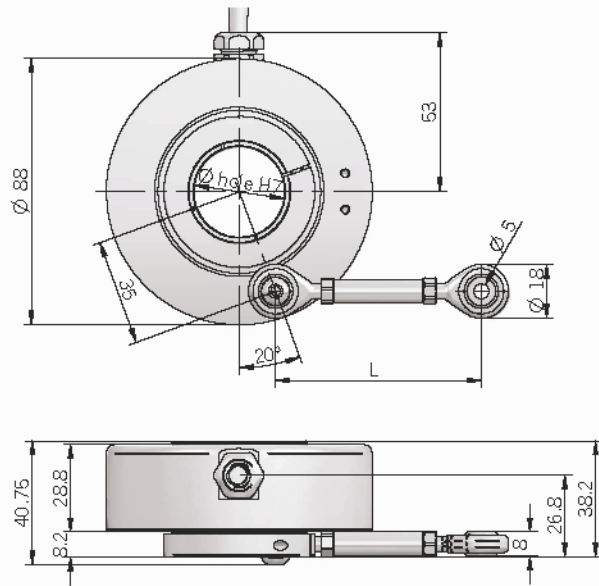
ELECTRONIC INTERFACE

P push-pull
PC protected push-pull (AEIC-7272)
L line driver

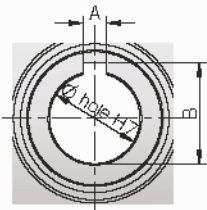
EH 88 PE



EH 88 PET



Hollow shaft with key



D	A	B
25 H7	8	28.3 ± 0.02
30 H7	8	33.3 ± 0.02
35 H7	10	38.3 ± 0.02

Key according to UNI 6604 / DIN 6885

Accessories - Torque arm

Length	Ordering code
L = 80 ± 10 mm	SN5A30
L = 110 ± 10 mm	SN5A60
L = 140 ± 10 mm	SN5A90

Torque arm **MUST** be ordered separately, n° 2 M5 x 12 UNI ISO 7380 are included

Electrical specifications

Resolution	500 / 512 / 720 / 1000 / 1024 / 1440 / 2500 ppr
Power supply	5 VDC ± 10% 5 ... 28 VDC ± 5% 8 ... 24 VDC ± 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	20 mA for channel
Output type	push-pull line driver
Max output frequency	100 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-3

Connections and standard colours

Function	Push pull	Line driver
+VDC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

Mechanical specifications

Bore diameter	25 / 30 / 35 / 38 / 40 mm 25 / 30 / 35 mm with key <i>PET maximum 30 mm bore diameter</i>
Enclosure rating	IP 54 (IEC 60529)
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10÷2000 Hz (IEC 60068-2-8)
Max rotation speed	3000 rpm
Body material	EN-AW 2011 aluminum
Shaft material	up to 38 mm: EN-AW 2011 aluminum K35 and 40 mm: 1.4305/AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	-30° ... +85 °C
Storage temperature	-30° ... +85 °C
Weight	300 g

MAIN FEATURES

Encoder suitable for heavy duty applications.

- Insulated bearings
- Bidirectional signal with zero
- Up to 3072 ppr
- 3000 rpm max
- Working temperature: -40° ... +85°C

Suitable for:

- windmill generators
- paper mills
- rubber machines
- cranes

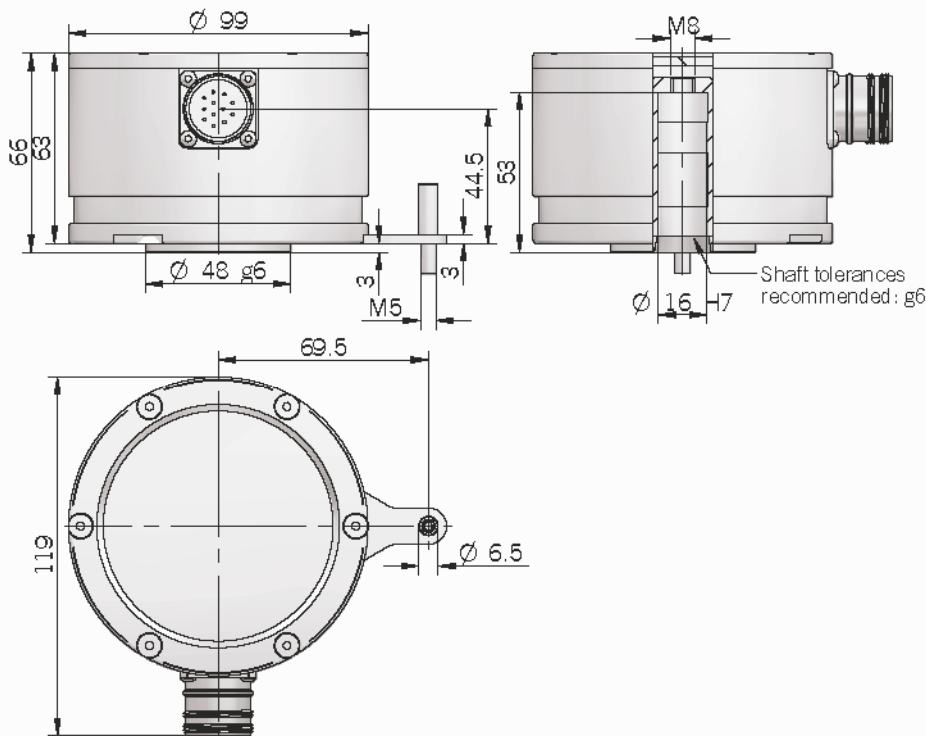


ORDERING CODE

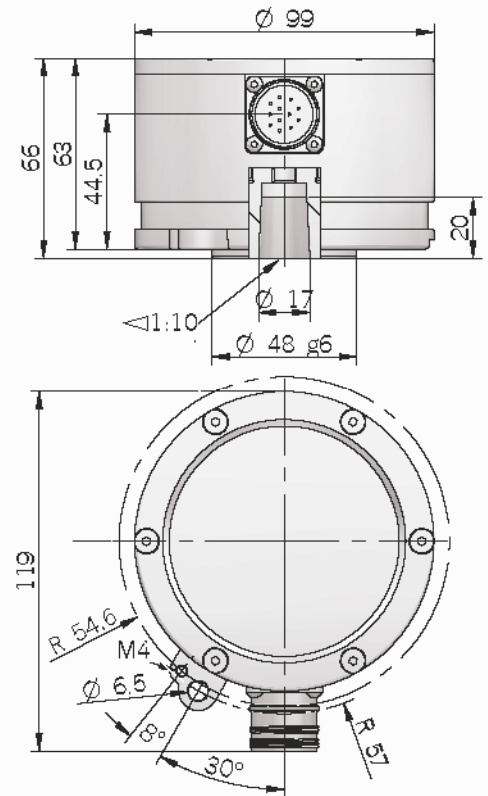
EH	99	P	F	1024	Z	5	L	16	X	3	PR	. XXX
SERIES incremental encoder series EH	SIZE mm 99	TYPE P	TYPE spring fixing F torque arm fixing T	RESOLUTION ppr 512 / 720 / 1000 / 1024 / 2048 / 3072	ZERO PULSE without zero pulse S with zero pulse Z	POWER SUPPLY 5 VDC 5 8 ... 30 VDC 8/30	VARIANT XXX custom version	OUTPUT TYPE PR radial cable (standard length 0.5 m) HR 12 poles H radial connector (M23) PGR radial cable gland (no cable)	MAX ROTATION SPEED 3 3000 rpm	ENCLOSURE RATING X IP 66 S IP 67 (optional)	HOLLOW SHAFT 12 mm (straight hollow shaft) 16 mm (straight hollow shaft) T17 mm (tapered hollow shaft)	ELECTRONIC INTERFACE P push pull L line driver



EH 99 PF



EH 99 PT



Mechanical specifications

Hollow shaft	12 / 16 / T17 (tapered hollow shaft) x 53 mm
Enclosure rating	IP 66 (IEC 60529) IP 67 (optional) (IEC 60529)
Max rotation speed	3000 rpm
Body material	EN-AW 6026 anodized anticorrosional aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 6026 anodized anticorrosional aluminum
Bearings	2 insulated ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	-40° ... +85°C
Storage temperature	-40° ... +85°C
Weight	about 1200 g

Electrical specifications

Resolution	512 / 720 / 1000 / 1024 / 2048 / 3072 ppr
Power supply	5 V DC ± 10% 8 ... 30 V DC -5% / +0%
Current consumption without load	100 mA max
Max load current	20 mA for channel
Electronic interface	push pull / line driver
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Electrical connections

Function	Cable output	Connector H12 poles (top view male connector CCW)
+VDC	red	12
0 V	gray	10
Ch. A	green	5
Ch. A-	brown	6
Ch. B	yellow	8
Ch. B-	pink	1
Ch. Z	blue	3
Ch. Z-	white	4
⊥	shield	9



NUANCE

MAIN FEATURES

∅ 120 through hollow shaft encoder series designed for motors with big shaft.

- Up to 60mm bore diameter
- Easy and steady fixing
- Sturdy mechanics
- Resolution up to 2048 ppr with zero signal
- Several output electronics
- Up to 28 V DC power supply
- Up to 105 KHz output frequency
- Up to 3000 rpm rotation speed
- Up to IP 54 sealing

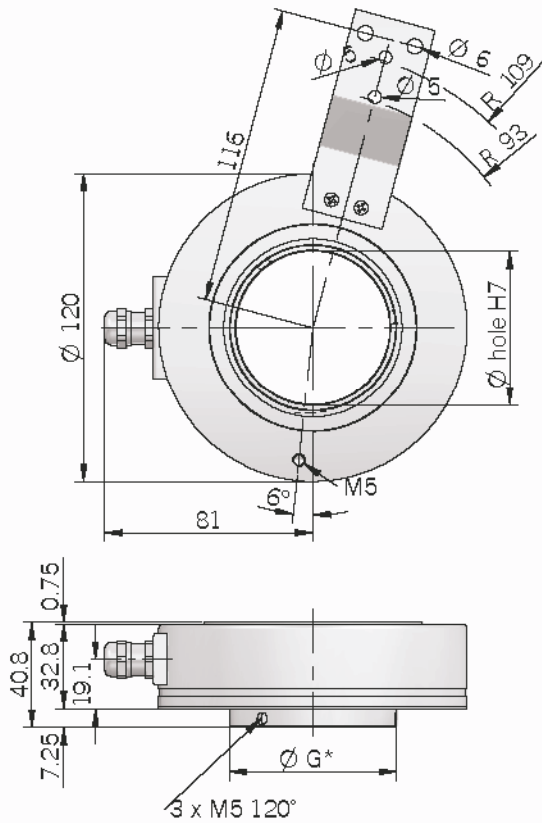


ORDERING CODE

EL 120 P 400 Z 5 N 50 X 3 PR . XXX	
SERIES	VARIANT
incremental encoder series EL	XXX custom version
SIZE	OUTPUT TYPE
mm 120	PR cable output radial with cable gland (standard length 0.5 m)
TYPE	MAX ROTATION SPEED
through hollow shaft P	3 3000 rpm
RESOLUTION	ENCLOSURE RATING
ppr 400 / 800 / 1000 / 1024 / 1440 / 1600 / 2000 / 2048	X IP 54
<i>N.B.: please directly contact our offices for pulses availability</i>	
ZERO PULSE	BORE DIAMETER
without zero pulse S	40 mm
with zero pulse Z	50 mm
	60 mm
POWER SUPPLY	ELECTRONIC INTERFACE
(available only with L electronic output) 5 V DC 5	N NPN
(available only with L or PC electronic output) 8 ... 24 V DC 8/24	C NPN open collector
5 ... 28 V DC 5/28	P push-pull
	PC protected push-pull (AEIC-7272)
	L line driver

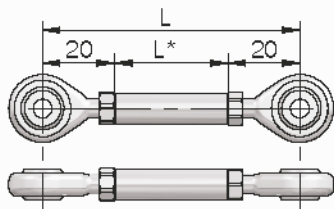
NUANCE

EL 120 P



*G	*G
∅ 40 H7	∅ 65
∅ 50 H7	∅ 65
∅ 60 H7	∅ 75

Accessories



Accessories - Torque arm

Length	Ordering code
L* = 80 mm	SN5A30
L* = 60 mm	SN5A60
L* = 90 mm	SN5A90

Torque arm MUST be ordered separately

Electrical specifications

Resolution	400/800/1000/1024/1440/1600/2000/2048 ppr
Power supply	5 V DC ± 10% 5 ... 28 V DC ± 5% 8 ... 24 V DC ± 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	50 mA for channel 20 mA for channel (line driver)
Output type	NPN / NPN open collector / push-pull / line driver
Max output frequency	105 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 81000-6-2 IEC 81000-6-4

Mechanical specifications

Bore diameter	∅ 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)
Shaft material	EN-AW 2011 aluminum
Housing material	EN-AW 2011 aluminum
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	0° ... +60 °C
Storage temperature	-25° ... +70 °C
Weight	750 g

Connections and standard colours

Function	Push pull / Npn / Npn open collector	Line driver
+VDC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

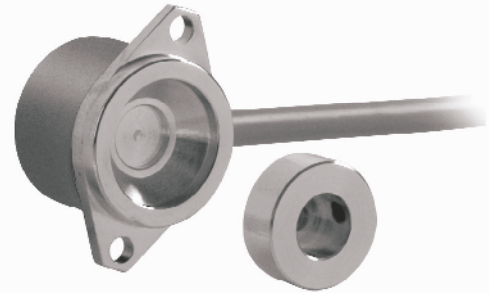
EL120P mounting instructions

1. Couple encoder shaft with motor shaft
2. Fix spring to motor flange without tightening it
3. Fix encoder shaft on motor shaft
4. Fix spring

MAIN FEATURES

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

- Compact dimensions
- Absence of physical contact between encoder and motor shaft
- High temperature resistant
- High resolution and precision
- High protection rating
- High operating speed
- Excellent mechanical sturdiness
- Very easy mounting

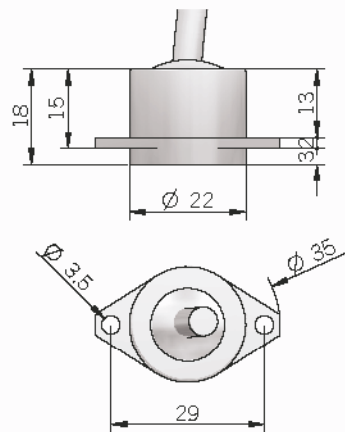


ORDERING CODE

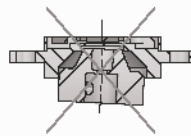
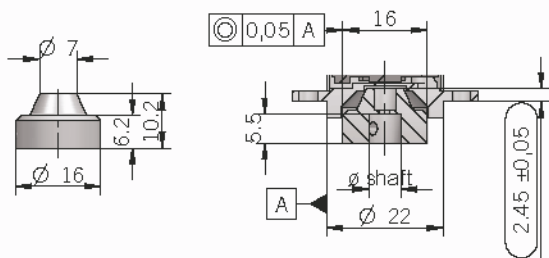
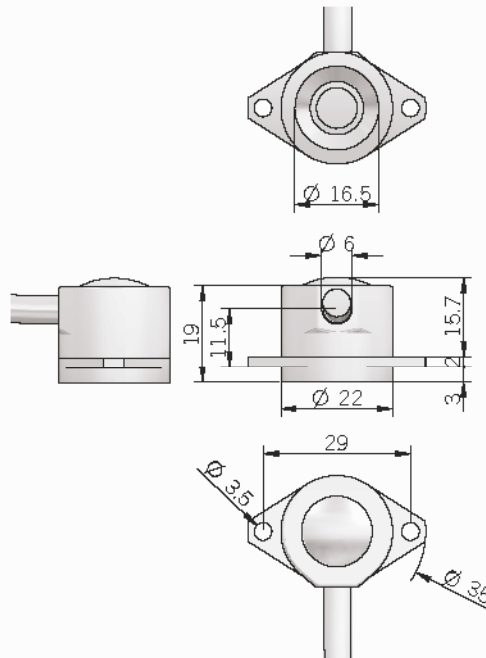
EMI 22	A	100	S	5	P	6	S	10	P	R	. XXX
SERIES magnetic incremental encoder EMI											VARIANT XXX custom version
SIZE mm 22											OUTPUT DIRECTION A axial R radial
TYPE flange type A aluminum A flange type A anodized aluminum AY											OUTPUT TYPE P cable output (standard length 0.5 m)
RESOLUTION (only powers of 2) ppr from 2 to 2048 ppr 10 / 20 / 25 / 40 / 50 / 80 / 100 / 125 / 200 / 250 / 400 / 500											MAX ROTATION SPEED 10 10000 rpm
<i>N.B.: please directly contact our offices for pulses availability</i>											ENCLOSURE RATING S IP 67
ZERO PULSE without zero pulse S with zero pulse Z											BORE DIAMETER 6 mm 8 mm 9.952 mm (3/8") 10 mm
POWER SUPPLY 5 VDC 5											ELECTRONIC INTERFACE P push-pull L line driver



EMI 22 axial cable output



EMI 22 radial cable output



Electrical specifications

Resolution	up to 2048 ppr
Power supply	5 VDC ±10%
Current consumption without load	100 mA max
Max load current	15 mA per channel
Signal pattern	B follows A with clockwise rotation (magnet-carrier view)
Electronic interface for incremental signals	push-pull line driver RS422
Max output frequency	205 kHz
Accuracy	± 0.35° max
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-3

Mechanical specifications

Bore diameter (magnet-carrier)	up to 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 60068-2-8)
Body material	EN-AW 2011 aluminum
Magnet-carrier material	EN-AW 2011 aluminum
Housing material	EN-AW 2011 aluminum
Operating temperature	-40° ... +125°C
Storage temperature	-25° ... +85°C
Weight	30 g
Magnet carrier mounting tolerances (to get best electrical performances)	± 0.2 mm (axial) ± 0.1 mm (radial)

Connections and standard colours

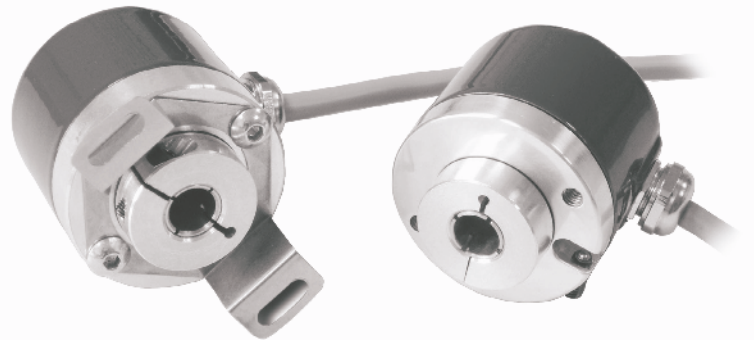
Function	Push pull	Line driver
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

NUANCE

MAIN FEATURES

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

- Up to 2048 ppr
- Several output types available
- Up to 100°C working temperature
- Radial cable output
- Up to IP 66 as protection grade

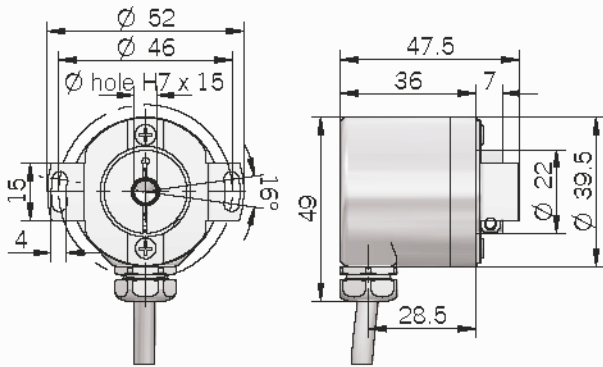


ORDERING CODE

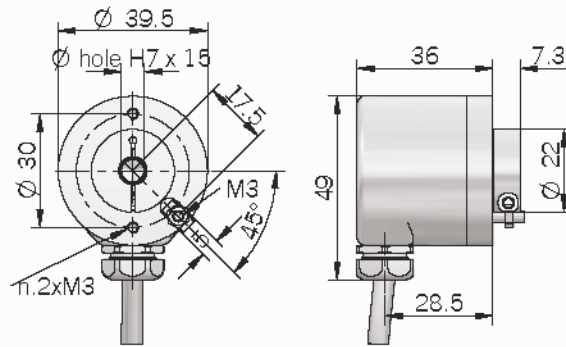
EMI 38	F	1024	Z	5	L	6	X	6	PR	.	XXX
SERIES magnetic incremental encoder EMI											VARIANT XXX custom version
SIZE mm 38											OUTPUT TYPE PR cable output radial with cable gland (standard length 0.5 m)
TYPE blind hollow shaft with spring F blind hollow shaft with antirotation pin G											MAX ROTATION SPEED 3 3000 rpm (with IP66) 6 6000 rpm (with IP64)
RESOLUTION (only powers of 2) ppr from 2 to 2048 ppr 10 / 20 / 25 / 40 / 50 / 80 / 100 / 125 / 200 / 250 / 400 / 500											ENCLOSURE RATING X IP 64 S IP 66 (optional)
<i>N.B.: please directly contact our offices for pulses availability</i>											SHAFT DIAMETER 6 mm 8 mm 9 mm ø 9,52 (3/8") 10 mm
ZERO PULSE without zero pulse S ® with zero pulse Z											ELECTRONIC INTERFACE P push-pull PC protected push-pull (AEIC-7272) L line driver
POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28											

NUANCE

EMI 38 F



EMI 38 G



EMI38F mounting instructions

1. Couple encoder shaft with motor shaft
2. Fix spring to motor flange without tightening it
3. Fix encoder shaft on motor shaft
4. Turn encoder for electrical adjustment (phasing)
5. Fix spring

EMI38G mounting instructions

1. Fix anti-rotation pin on motor flange
2. Couple encoder shaft with motor shaft, making sure pin is inserted in the hole on the front part of the encoder (maintaining a minimum distance of 0.5 mm).
3. Fix encoder shaft on motor shaft

Mechanical specifications

Shaft diameter	∅ 6 / 8 / 9,52 / 10 mm
Enclosure rating	IP 64 (IEC 60529) IP 66 (optional) (IEC 60529)
Max rotation speed	6000 rpm 3000 rpm with IP66
Max shaft load	5 N (0.5 kgf) axial 5 N (0.5 kgf) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painting aluminum
Bearings	2 ball bearings
Bearing lifetime	10 ⁹ revolutions
Operating temperature	-25° ... +100°C
Storage temperature	-25° ... +85°C
Weight	100 g

Electrical specifications

Resolution	up to 2048 ppr
Power supply	5 V DC ± 10% 5 ... 28 V DC ± 5% 8 ... 24 V DC ± 5% (reverse polarity protection)
Current consumption without load	80 mA max
Max load current	15 mA for channel
Electronic interface	push-pull line driver HTL / RS422
Max output frequency	205 kHz
Counting direction	A leads B clockwise (shaft view)
Accuracy	± 0.35° max
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Connections and standard colours

Function	Push pull	Line driver
+VDC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield



MAIN FEATURES

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

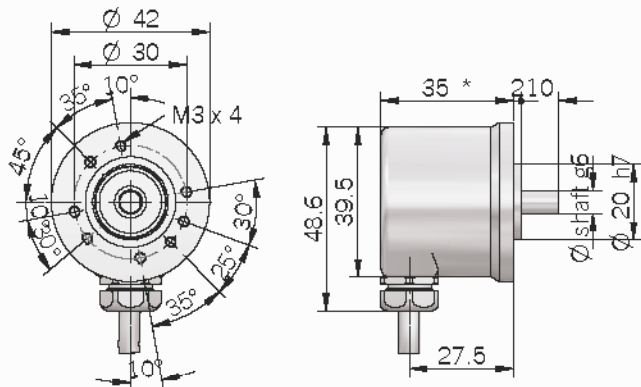
- Up to 2048 ppr
- Several output types available
- Up to 100°C working temperature
- Axial or radial cable output
- Up to IP 66 as protection grade



ORDERING CODE

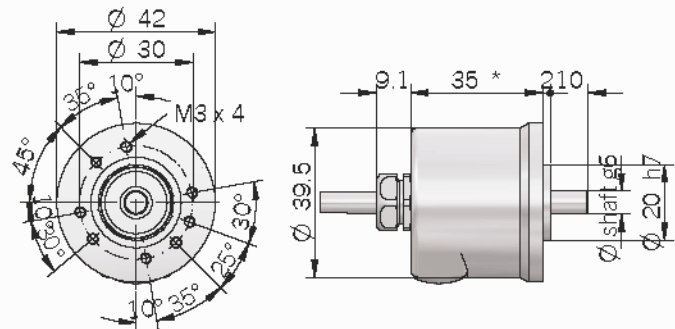
EMI	40	A	1024	Z	5	L	6	X	6	P	R	.	XXX
SERIES magnetic incremental encoder EMI													VARIANT XXX custom version
SIZE mm 40													OUTPUT DIRECTION A axial R radial
TYPE fixing flange ø 20 mm A													OUTPUT TYPE P cable output with cable gland (standard length 0.5 m)
RESOLUTION (only powers of 2) ppr from 2 to 2048 ppr 10 / 20 / 25 / 40 / 50 / 80 / 100 / 125 / 200 / 250 / 400 / 500													MAX ROTATION SPEED 3 3000 rpm (with IP66) 6 6000 rpm
<i>N.B.: please directly contact our offices for pulses availability</i>													ENCLOSURE RATING X IP 64 S IP 66 (optional)
ZERO PULSE without zero pulse S with zero pulse Z													SHAFT DIAMETER 4 mm 6 mm
POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28													ELECTRONIC INTERFACE P push-pull PC protected push-pull (AEIC-7272) L line driver

EMI 40 A radial cable output



* IP66 + 7mm

EMI 40 A axial cable output



* IP66 + 7mm

Mechanical specifications

Shaft diameter	ø 4 / 6 mm
Enclosure rating	IP 64 (IEC 60529) IP 66 (optional) (IEC 60529)
Max rotation speed	6000 rpm 3000 rpm with IP66
Max shaft load	5 N (0.5 kgf) axial 5 N (0.5 kgf) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painting aluminum
Bearings	2 ball bearings
Bearing lifetime	10 ⁹ revolutions
Operating temperature	-25° ... +100°C
Storage temperature	-25° ... +85°C
Weight	100 g

Electrical specifications

Resolution	up to 2048 ppr
Power supply	5 V DC ± 10% 5 ... 28 V DC ± 5% 8 ... 24 V DC ± 5% (reverse polarity protection)
Current consumption without load	80 mA max
Max load current	15 mA for channel
Electronic interface	push-pull line driver HTL / RS422
Max output frequency	205 kHz
Counting direction	A leads B clockwise (shaft view)
Accuracy	± 0.35° max
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Connections and standard colours

Function	Push pull	Line driver
+VDC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊥	shield	shield

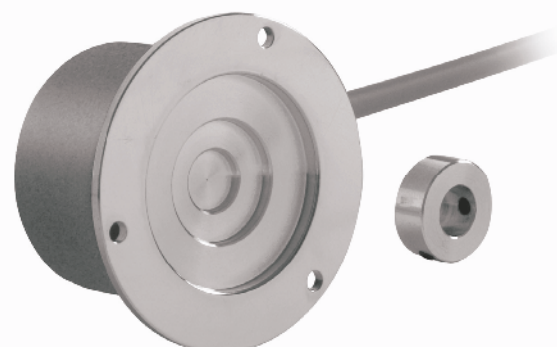


NUANCE

MAIN FEATURES

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

- Compact dimensions
- Absence of physical contact between encoder and motor shaft
- High temperature resistant
- High resolution and precision
- High protection rating
- High operating speed
- Excellent mechanical sturdiness
- Very easy mounting

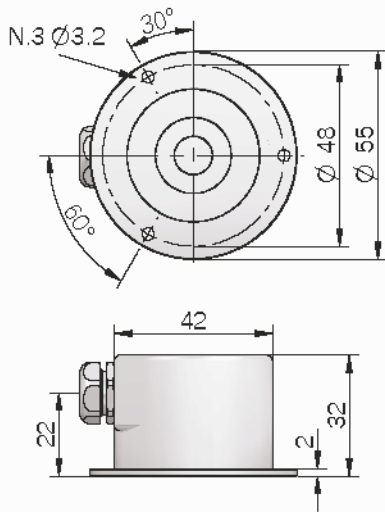


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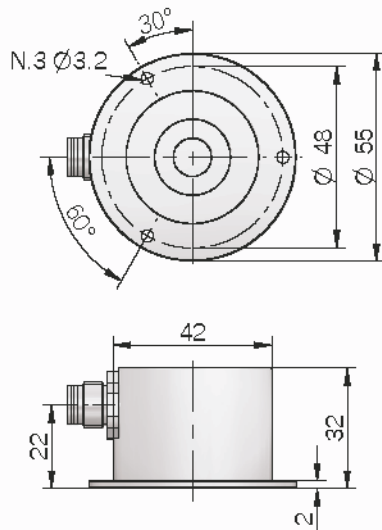
EMI 55	A	512	Z	5/28	P	10	X	10	P	R	. XXX
SERIES magnetic incremental encoder EMI											VARIANT XXX custom version
SIZE mm 55											OUTPUT DIRECTION A axial R radial
TYPE flange type A aluminum A flange type A anodized aluminum AY											OUTPUT TYPE P cable output with cable gland (standard length 0.5 m) M12 M12 connector output (5-pin, electronic P) (8-pin, electronic L)
RESOLUTION (only powers of 2) ppr from 2 to 2048 ppr 10 / 20 / 25 / 40 / 50 / 80 / 100 / 125 / 200 / 250 / 400 / 500 <i>N.B.: please directly contact our offices for pulses availability</i>											MAX ROTATION SPEED 10 10000 rpm
ZERO PULSE without zero pulse S with zero pulse Z											ENCLOSURE RATING X IP 64 S IP 67 (optional)
POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28											MAGNET CARRIER BORE DIAMETER 6 mm 8 mm 9.52 mm (3/8") 10 mm
											ELECTRONIC INTERFACE P push-pull PC protected push-pull (AEIC-7272) L line driver

NUANCE

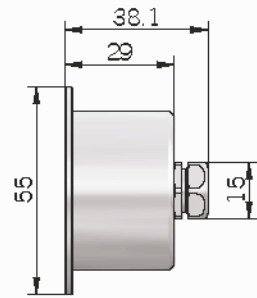
EMI 55 radial cable output



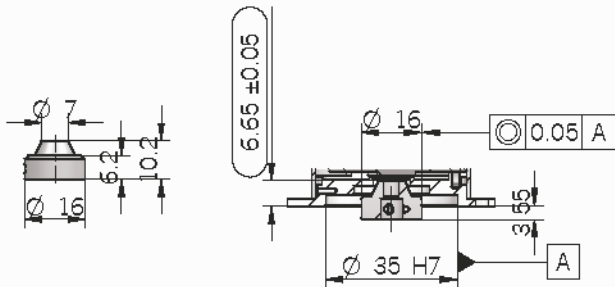
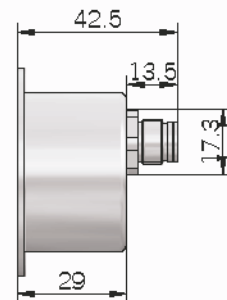
EMI 55 radial M12 output



EMI 55 axial cable output



EMI 55 axial M12 output



Electrical specifications

Resolution	up to 2048 ppr
Power supply	5 V DC $\pm 10\%$ 5 ... 28 V DC $\pm 5\%$ 8 ... 24 V DC $\pm 5\%$ (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	15 mA for channel
Signal pattern	B follows A with clockwise rotation (magnet-carrier view)
Electronic interface	push-pull line driver HTL / RS422
Max output frequency	205 kHz
Accuracy	$\pm 0.35^\circ$ max
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

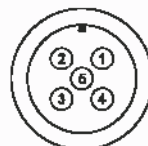
Mechanical specifications

Magnet carrier bore diameter	up to 10 mm
Enclosure rating	IP 64 (IEC 60529) IP 67 (optional) (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)
Body material	EN-AW 2011 aluminum
Magnet-carrier material	pa inted aluminum
Housing material	EN-AW 2011 aluminum
Operating temperature	-25° ... +125°C for 5 V DC -25° ... +100°C for 5 ... 28 V DC / 8 ... 24 V DC
Storage temperature	-25° ... +85°C
Weight	150 g
Mounting tolerances	± 0.2 mm (axial) ± 0.1 mm (radial)

Connections and standard colours

Function	Wire colours	Connector M12 (5-pin)	Connector M12 (8-pin)
0 Volt	black	4	1
+ Vdc	red	2	7
Ch. A	green	3	6
Ch. B	yellow	1	4
Ch. Z	blue	5	2
Ch. A -	brown	/	5
Ch. B -	orange	/	3
Ch. Z -	white	/	8
	shield	/	/

M12 connector (5-pin)
(front view)

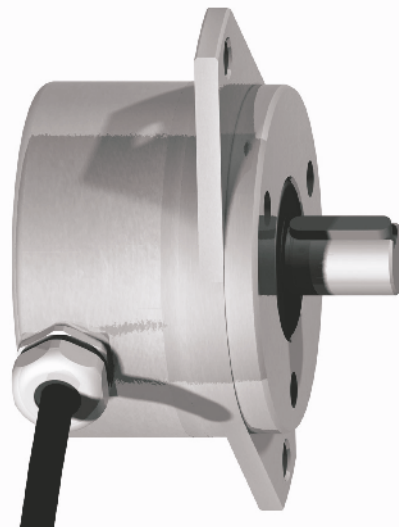


M12 connector (8-pin)
(front view)



MAIN FEATURES

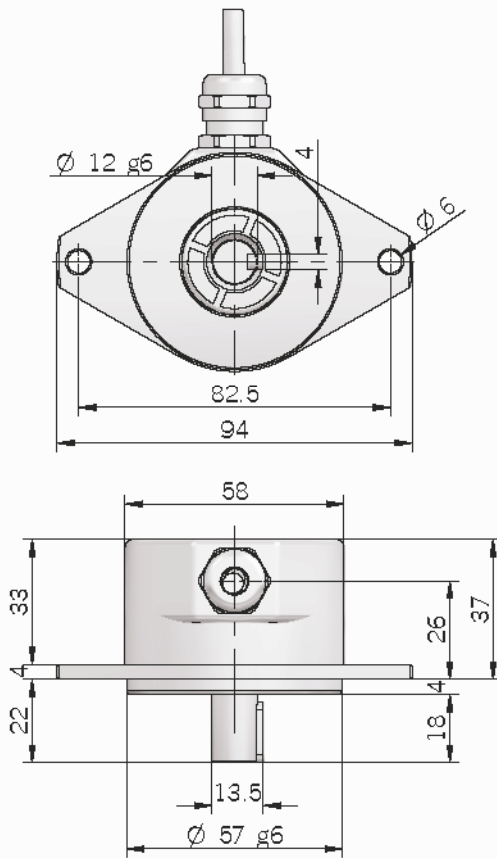
Thanks to the magnetic technology, the EMI 58 series is suitable for harsh environment applications such as marble and glass working machines, washing systems, metal working machines and all the applications where high temperature resistance is required.



ORDERING CODE

EMI	58	RY	100	S	5/28	P	K12	S	3	P	R	.	XXX
SERIES magnetic incremental encoder EMI												VARIANT XXX custom version	
SIZE mm 58												OUTPUT DIRECTION R radial	
TYPE flange type R anodized aluminum RY												OUTPUT TYPE P cable output with cable gland (standard length 1.5 m)	
RESOLUTION (only powers of 2) ppr from 2 to 2048 ppr 10 / 20 / 25 / 40 / 50 / 80 / 100 / 125 / 200 / 250 / 400 / 500												MAX ROTATION SPEED 3 3000 rpm	
<i>N.B.: please directly contact our offices for pulses availability</i>												ENCLOSURE RATING S IP 66	
ZERO PULSE without zero pulse S with zero pulse Z												BORE DIAMETER K12 mm with key	
POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28												ELECTRONIC INTERFACE P push-pull PC protected push-pull (AEIC-7272) L line driver	

EMI 58



Electrical specifications

Resolution	up to 2048 ppr
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	15 mA for channel
Electronic interface	push-pull line driver HTL / RS422
Max output frequency	205 kHz
Accuracy	\pm 0.35° max
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

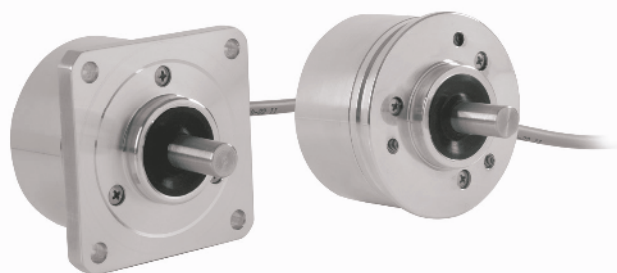
Shaft diameter	\varnothing 12 mm with key
Enclosure rating	IP 68 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	anodized aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	2 ball bearings
Bearing lifetime	10 ⁹ revolutions
Operating temperature	-25° ... +100°C
Storage temperature	-25° ... +85°C
Weight	250 g

Connections and standard colours

Function	Push pull / Npn / Npn open collector	Line driver
+VDC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
---	shield	shield

MAIN FEATURES

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

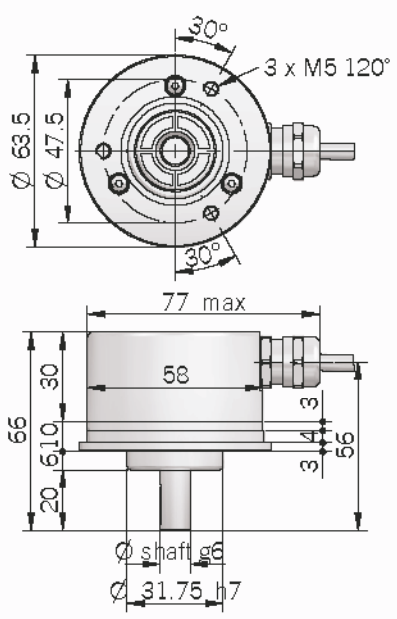


ORDERING CODE

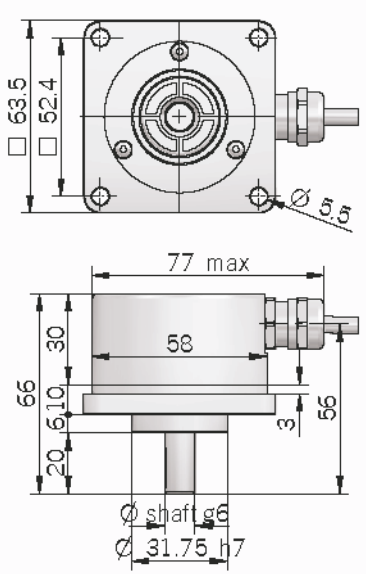
EMI	63	A	1024	Z	5	L	8	X	6	P	R	.	XXX
SERIES												VARIANT	
magnetic incremental encoder EMI												XXX custom version	
SIZE												OUTPUT DIRECTION	
mm 63												A axial	
TYPE												R radial	
synchronous flange \varnothing 31.75 mm A												OUTPUT TYPE	
centering square flange \varnothing 31.75 mm D												P cable output with cable gland (standard length 0.5 m)	
RESOLUTION												M12 M12 connector output	
(only powers of 2) ppr from 2 to 2048												(5-pin, electronic P) (8-pin, electronic L)	
ppr 10 / 20 / 25 / 40 / 50 / 80 / 100 / 125 / 200 / 250 / 400 / 500												MAX ROTATION SPEED	
<i>N.B.: please directly contact our offices for pulses availability</i>												3 3000 rpm	
ZERO PULSE												6 6000 rpm	
without zero pulse S												<i>N.B.: 3000 RPM max. with "S" enclosure rating</i>	
with zero pulse Z												ENCLOSURE RATING	
POWER SUPPLY												X IP 64	
(available only with L electronic output) 5 V DC 5												S IP 66 (optional)	
(available only with L or PC electronic output) 8 ... 24 V DC 8/24												SHAFT DIAMETER	
5 ... 28 V DC 5/28												6 mm	
												8 mm	
												9 9.52 mm (3/8")	
												10 mm	
												ELECTRONIC INTERFACE	
												P push-pull	
												PC protected push-pull (AEIC-7272)	
												L line driver	

NUANCE

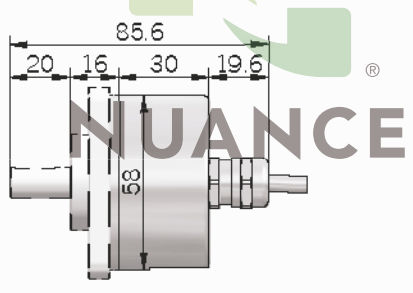
EMI 63 A



EMI 63 D



Dimensions with cover axial output



Electrical specifications

Resolution	up to 2048 ppr
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	15 mA for channel
Signal pattern	B follows A with clockwise rotation (magnet-carrier view)
Electronic interface	push-pull line driver HTL / RS422
Max output frequency	205 kHz
Accuracy	\pm 0.35° max
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

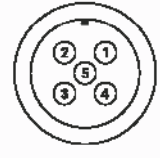
Mechanical specifications

Shaft diameter	ϕ 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 64 (IEC 60529) IP 68 (optional) (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)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	2 ball bearings
Bearing lifetime	10 ⁹ revolutions
Operating temperature	-25° ... +100°C
Storage temperature	-25° ... +85°C
Weight	350 g

Connections and standard colours

Function	Wire colours	Connector M12 (5-pin)	Connector M12 (8-pin)
0 Volt	black	4	1
+ Vdc	red	2	7
Ch. A	green	3	6
Ch. B	yellow	1	4
Ch. Z	blue	5	2
Ch. A -	brown	/	5
Ch. B -	orange	/	3
Ch. Z -	white	/	8
⊥	shield	/	/

M12 connector (5-pin) (front view)



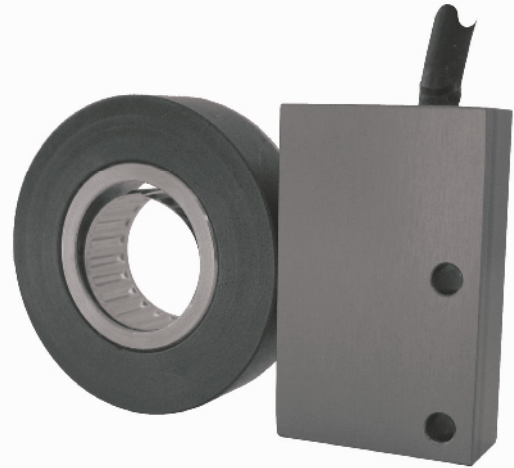
M12 connector (8-pin) (front view)



MAIN FEATURES

It is a no-contact encoder with through hollow shaft up to 28 mm. The compact size (only 11 mm of axial thickness), the high IP grade and resistance to vibrations make this product an excellent solutions for heavy duty applications.

- Up to 4096 ppr
- Line driver / push pull output
- Fixing with Star-ring
- 8000 rpm max
- IP 67 protection degree
- Working temperature: -20° ... +85°C



MAGNETIC INCREMENTAL ENCODERS

ORDERING CODE

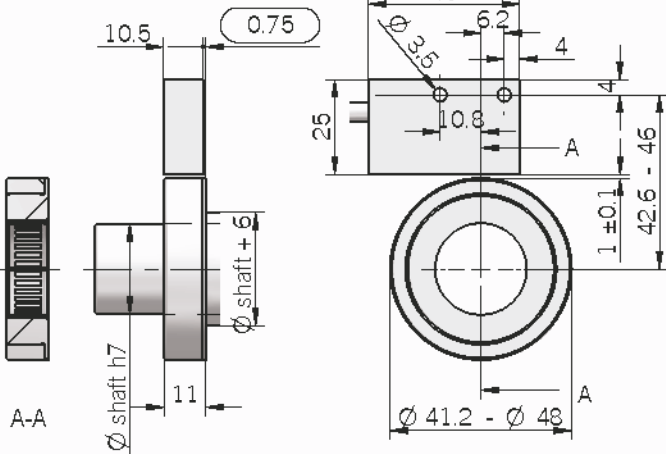
ETM	R	4096	S	5	L	9	S	8	PR	.	XXX
SERIES magnetic incremental encoder ETM											VARIANT XXX custom version
	TYPE standard R										OUTPUT TYPE PR radial cable output (standard length 1.5 m)
		RESOLUTION (only powers of 2) ppr from 64 to 4096									MAX ROTATION SPEED 8 8000 rpm
		ZERO PULSE without zero pulse S									ENCLOSURE RATING S IP 67
		POWER SUPPLY (available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28									BORE DIAMETER 9 mm 9.52 mm (3/8") 10 mm 11 mm 14 mm 19 mm 21 mm 24 mm 28 mm
											ELECTRONIC INTERFACE push-pull P protected push-pull (AEIC-7272) PC line driver L

NUANCE

N.B.: please directly contact our offices for availability

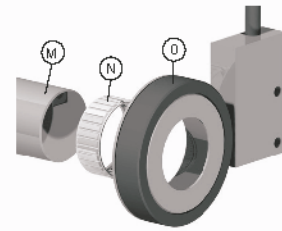
ETMR

ETMR



Shaft \varnothing 9/9.52/10/11/14/19 for magnetic ring \varnothing 41.2mm
Shaft \varnothing 21/24/28 for magnetic ring \varnothing 48mm

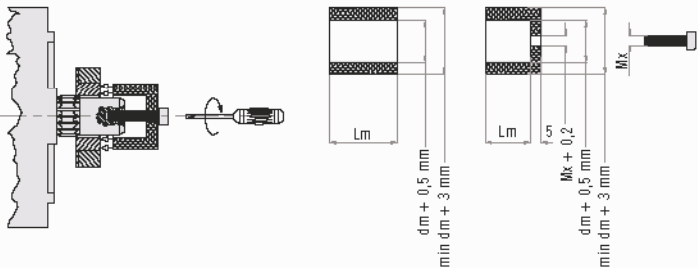
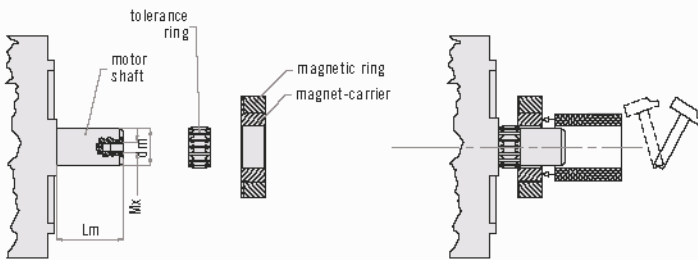
How to mount it



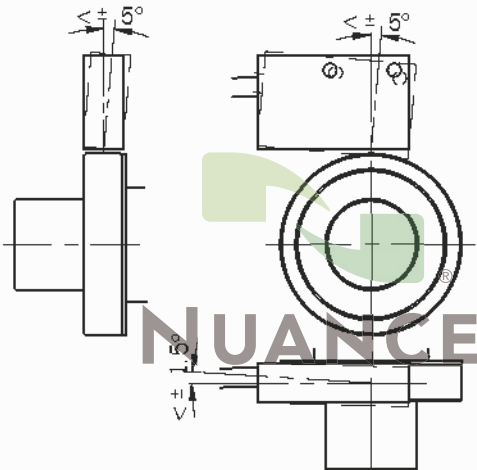
Don't hit the magnetic ring with hard objects to prevent breaking or damage!
Keep the magnetic ring away from magnetic fields to avoid distortion of magnetic pattern!

- Slip the tolerance ring (N) on to the motor shaft (M).
- Then slip the magnet (O) on to the tolerance ring till the stop, pressing lightly only on the steel surface of the magnet-carrier.

Magnet mounting precautions



Mechanical tolerances



Electrical specifications

Resolution	from 64 to 4096 ppr (only powers of 2)
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Current consumption without load	40 mA max
Max load current	20 mA per channel
Electronic interface	line driver push-pull
Max output frequency	350 kHz
Linearity error	0,25° max
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Bore diameter	9 / 9.52 / 10 / 11 / 14 / 19 / 21 / 24 / 28 mm
Enclosure rating	IP 67
Max rotation speed	8000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-8)
Magnet-carrier material	1.4305 / AISI 303 stainless steel
Mounting tolerances	axial: \pm 1 mm radial: \pm 0,1 mm
Operating temperature	-20° ... +85 °C
Storage temperature	-25° ... +85 °C
Weight	200 g

Connections and standard colours

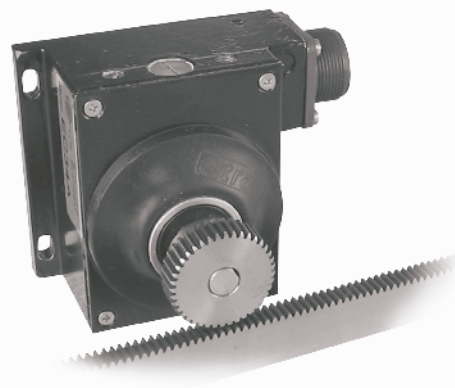
Function	Push pull	Line Driver
+VDC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
\equiv	shield	shield

MAIN FEATURES

Encoder for rack with automatic slack recovery. If compared to an incremental linear system, this type of encoder extremely simplifies linear measurements and overcomes measurement problems on long distance.

Our models are sealed in a solid aluminium body and integrate a preloading system that allows automatic slack recovery between rack and pinion.

- Up to 2000 ppr with zero signal
- Several output types available
- Up to 24 V DC power supply
- Up to 100 kHz output frequency
- Cable or connector output



ORDERING CODE

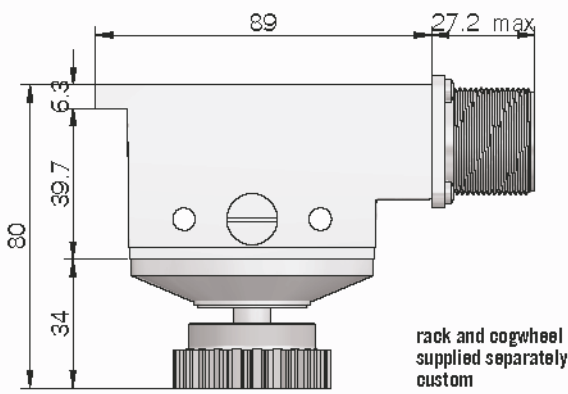
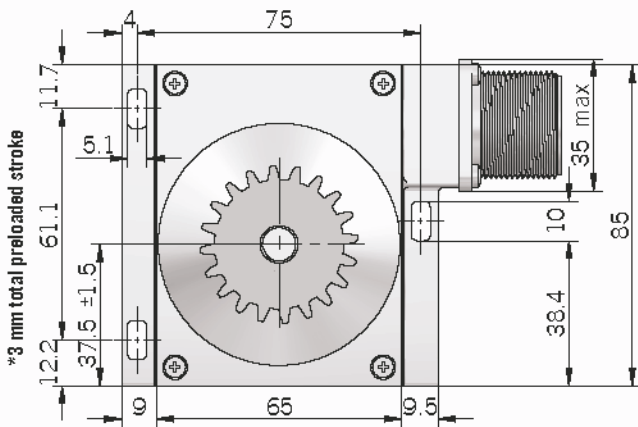
EC 34	A	100	Z	5	N	10	M	. XXX	
SERIES encoder for rack EC		ENCODER MODEL 34		TYPE A		RESOLUTION ppr from 1 to 2000		VARIANT XXX custom version	
		ZERO PULSE without zero pulse S with zero pulse Z		POWER SUPPLY 5 VDC 5 8 ... 24 VDC 8/24		OUTPUT TYPE N NPN C NPN open collector P push-pull PC protected push-pull (AEIC-7272) L line driver		OUTPUT TYPE P cable output with cable gland (standard length 1,5 m) M M connector output J J connector output	
				SHAFT DIAMETER 10 mm					

N.B.: please directly contact our offices for pulses availability

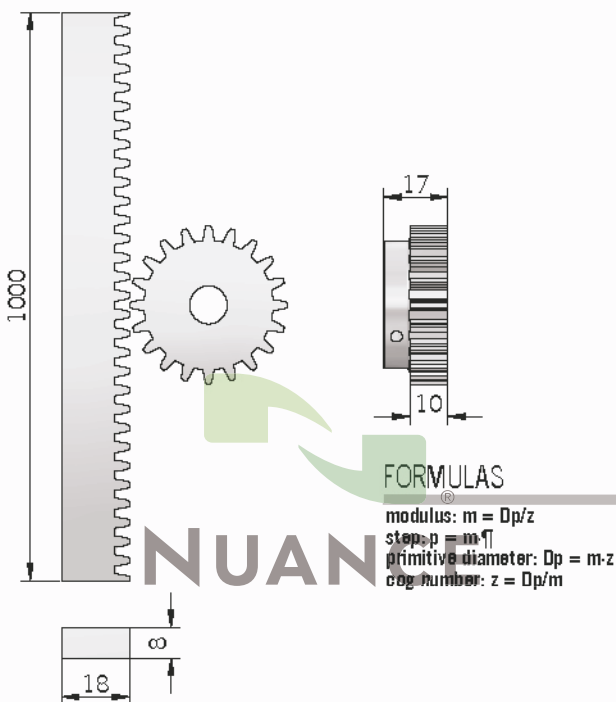
Connections

Function	N / C / P cable output	Line driver cable output	Output J7 N / C / P	Output J7 Line Driver without Zero	Output M7 N / C / P	Output M7 Line Driver without Zero	Output J10 Line Driver with Zero	Output M10 Line Driver with Zero
+V DC	red	red	6	4	F	D	4 - 5	D - E
0 V	black	black	1	6	A	F	6	F
Ch. A	green	green	3	1	C	A	1	A
Ch. A-	/	brown	/	3	/	C	7	G
Ch. B	yellow	yellow	5	2	E	B	2	B
Ch. B-	/	orange	/	5	/	E	8	H
Ch. Z	blue	blue	4	/	D	/	3	C
Ch. Z-	/	white	/	/	/	/	9	I
⊥	shield	shield	7	7	G	G	10	J

EC 34



Rack and cogwheel p = 2,5 z = 40 m = 0,796

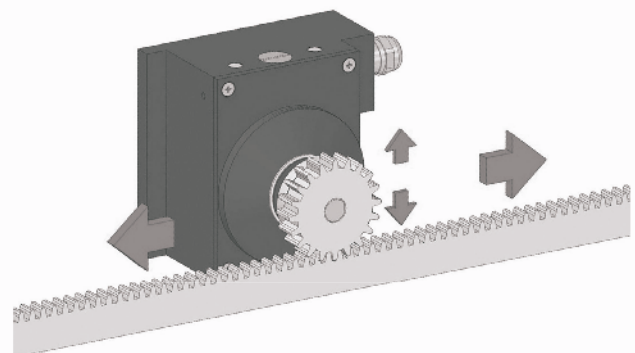


Electrical specifications

Resolution	from 1 to 2000 ppr
Power supply	5 V DC ± 10% 8 ... 24 V DC ± 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	50 mA for channel 20 mA for channel (line driver)
Output type	NPN NPN open collector push-pull line driver
Max output frequency	100 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 81000-6-2 IEC 81000-6-4

Mechanical specifications

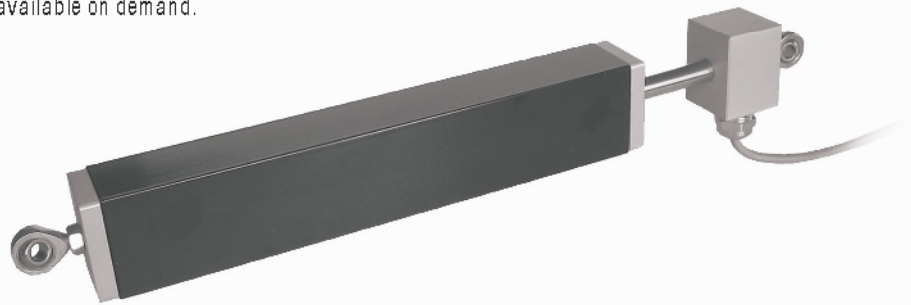
Shaft diameter	∅ 10 mm
Enclosure rating	IP 64 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load	200 N (20 kgf) axial 200 N (20 kgf) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	painted aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Rack and cogwheel material	steel
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-25° ... +70°C
Weight	700 g



MAIN FEATURES

Incremental linear system.

- Working stroke up to 500 mm.
- Available with or without zero mark on left, right or central position.
- Several electronic output configurations available. Up to 24 V DC power supply.
- Cable output. Cable with connector at the end available on demand.



OTHER PRODUCTS

ORDERING CODE

ER A 100 D 5 L 6 P . XXX

SERIES
incremental linear
encoder ER

RESOLUTION
0,2 mm (0,05 mm reading all edges) A
0,1 mm (0,025 mm reading all edges) B
0,04 mm (0,01 mm reading all edges) C
1 mm (0,25 mm reading all edges) D
0,5 mm (0,125 mm reading all edges) E
0,2 mm (0,05 mm reading all edges) F

WORKING STROKE
working stroke (mm) from 100 to 500

ZERO PULSE
without zero pulse S
central zero index (only mod. A) C
right zero index (closed position) (only mod. A) D
left zero index (open position) (only mod. A) Z

VARIANT
XXX custom version

OUTPUT TYPE
P radial cable output with cable gland (standard length 1.5 m)

FIXING HOLE DIAMETER
6 mm

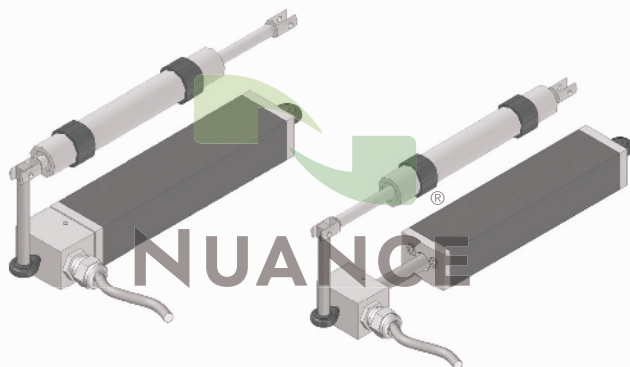
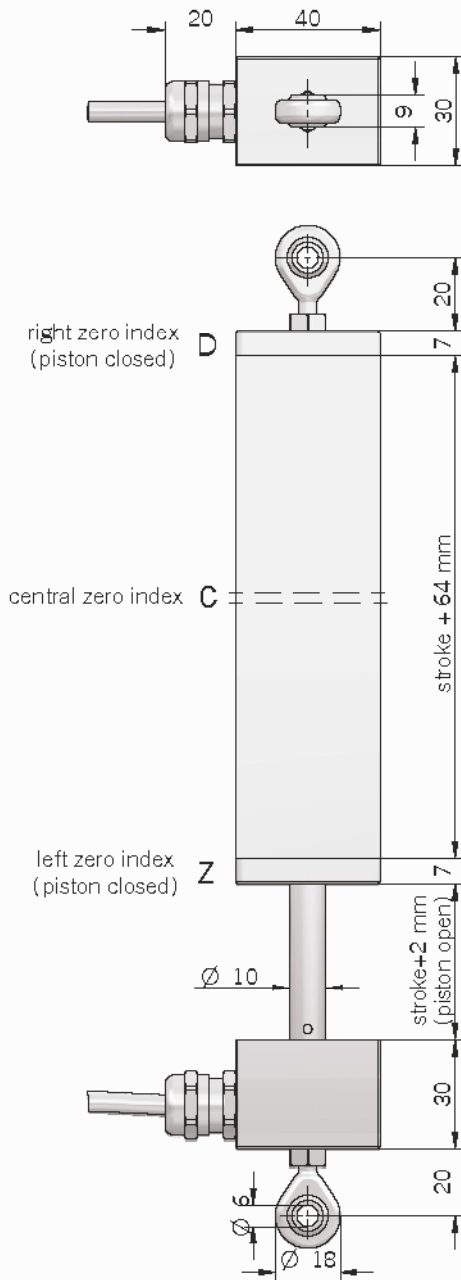
OUTPUT TYPE
N NPN (only mod. A)
C NPN open collector (only mod. A)
P push pull
L line driver

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

NUANCE

ERA/B/C/D/E/F

ER A/B/C/D/E/F



Electrical specifications

Technology	optical mod. A magnetic mod. B / C / D / E / F
Resolution	1 mm (0,25 mm reading all edges) 0,5 mm (0,125 mm reading all edges) 0,2 mm (0,05 mm reading all edges) 0,1 mm (0,025 mm reading all edges) 0,04 mm (0,01 mm reading all edges)
Linearity error	±0,25 mm max (ER D) ±0,125 mm max (ER E) ±0,05 mm max (ER A/F) ±0,025 mm max (ER B) ±0,01 mm max (ER C)
Power Supply	5 V DC ± 10% 8 ... 24 V DC ± 5%
Current consumption without load	50 mA max
Max load current	50 mA for channel (NPN / NPN open) 20 mA for channel (push pull / line driver)
Electronic interface	NPN (only mod. A) NPN open collector (only mod. A) line driver push-pull
Electromagnetic compatibility	IEC 81000-6-2 IEC 81000-6-4

Caratteristiche meccaniche

Working stroke	from 100 to 500 mm
Enclosure rating	IP 64
Travel speed	1 m/s max
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Rod material	1.4305 / AISI 303 stainless steel
Housing material	painting aluminum
Fixing	2 joint heads with ø 6 mm hole
Operating temperature	-10° ... +80 °C
Storage temperature	-25° ... +70 °C
Weight	from 400 g to 1000 g

Connections and standard colours

Function	Push pull / Npn / Npn open collector	Line driver
+VDC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⊕	shield	shield

MAIN FEATURES

Metric wheel series designed for specific industrial applications where is required to measure a linear movement (i.e. continuous sheet cutting machines of wood, textiles, glass, etc.).

Precise reading and high stress resistance are the main features of these encoders. The body is entirely designed of aluminium and mounted using an oscillating arm pivoted on the shaft. It comes with an integrated self-lubricating compact box to assure a long operation period without any maintenance. The weight of the metric wheel keeps a stable contact with the material, allowing an accurate measurement of both length and speed.

The wheel surface can be in crossed-knurl aluminium, special anti-oil or anti-sliding rubber.

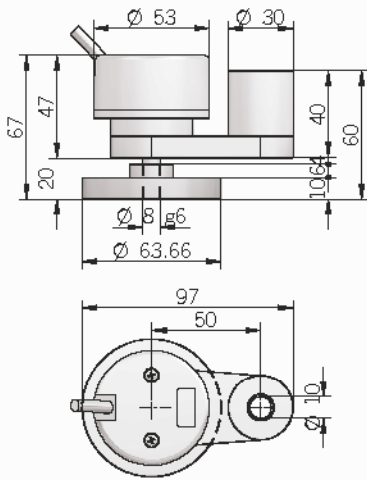


ORDERING CODE

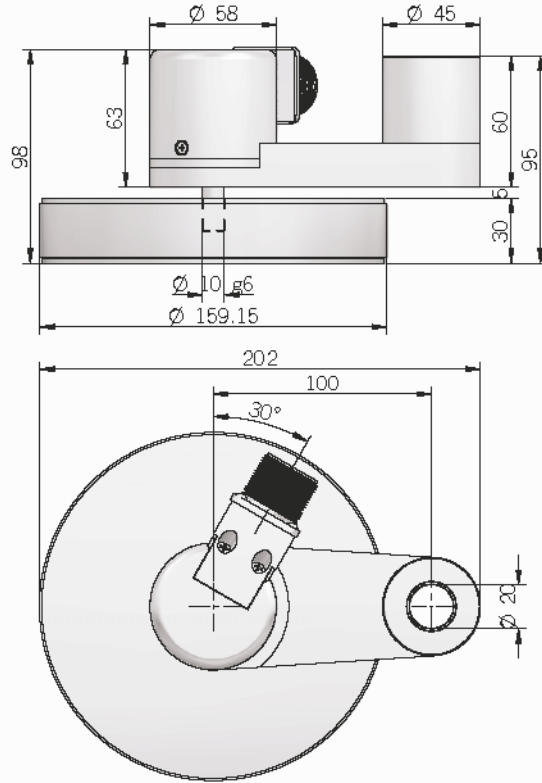
RH 200 A 500 Z 5 N 8 X 3 P R . XXX	
SERIES	VARIANT
RH series RH	XXX custom version
RM series RM	
SIZE	DIRECTION TYPE
200 mm linear extent 200	A axial
500 mm linear extent 500	R radial
WHEEL TYPE	OUTPUT TYPE
smooth A	P cable output (standard length 0,5 m) (RH 200)
knurled B	cable output (standard length 1,5 m) (RH - RM 500)
rubberized C	M M connector output (RH - RM 500)
	J J connector output (RH - RM 500)
RESOLUTION	MAX ROTATION SPEED
ppr (RM series) from 1 to 10000	3 3000 rpm
ppr (RH series) from 50 to 1024	
<i>N.B.: please directly contact our offices for pulses availability</i>	
ZERO PULSE	ENCLOSURE RATING
without zero pulse S	X IP 54 (standard RH 200)
with zero pulse Z	X IP 64 (standard RH - RM 500)
	S IP 66 (optional RH - RM 500)
POWER SUPPLY	SHAFT DIAMETER
(available only with L electronic output) 5 V DC 5	8 mm (RH 200)
(available only with L or PC electronic output) 8 ... 24 V DC 8/24	10 mm (RH - RM 500)
5 ... 28 V DC 5/28	
OUTPUT TYPE	
N NPN	
C NPN open collector	
P push-pull	
PC protected push-pull (AEIC-7272)	
L line driver	

NUANCE

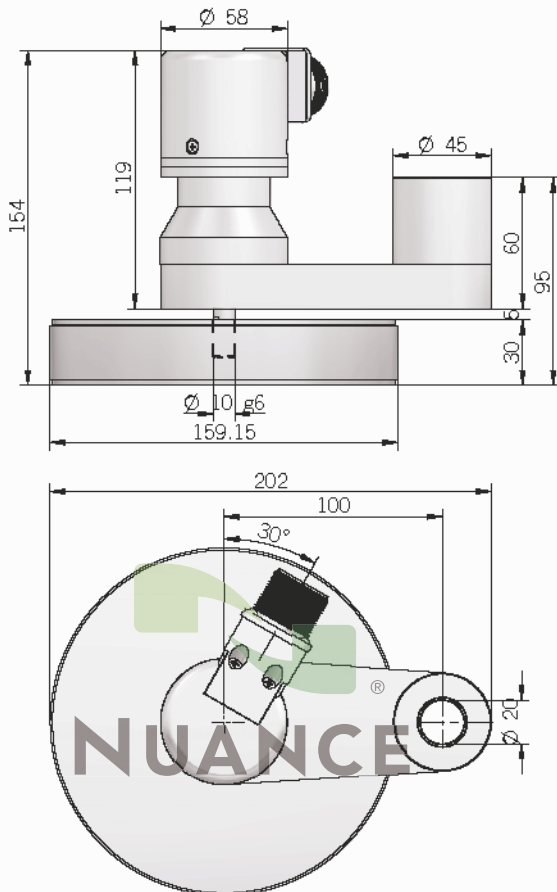
RH 200 A / B / C



RH 500 A / B / C



RM 500 A / B / C



Mechanical specifications

Shaft diameter	<ul style="list-style-type: none"> ø 8 mm (RH 200) ø 10 mm (RH - RM 500)
Enclosure rating	<ul style="list-style-type: none"> IP 54 standard (RH 200) IP 64 standard (RH - RM 500) IP 66 optional (RH - RM 500)
Max rotation speed	3000 rpm
Shock	<ul style="list-style-type: none"> 50 G, 11 ms up to 2500 ppr (IEC 60068-2-27) 20 G, 11 ms from 3000 ppr (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Shaft material	1.4305 / AISI 303 stainless steel
Body material	aluminium UNI 5076
Support material	EN-AW 2011 aluminum
Bearings	<ul style="list-style-type: none"> 2 ball bearings 2 ball bearings on support (RM 500)
Bearings life	10 ⁹ revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-25° ... +70°C
Encoder weight + support weight	<ul style="list-style-type: none"> 250 g (RH 200) 1000 g (RH - RM 500)
Wheel weight	<ul style="list-style-type: none"> 100 g (RH 200) 800 g (RH - RM 500)

Electrical specifications (RH series)

Resolution	from 50 to 1024 ppr
Power supply	5 V DC \pm 10% 8 ... 24 V DC \pm 5%
Current consumption without load	100 mA max
Max load current	50 mA for channel 20 mA for channel (line driver)
Output type	NPN NPN open collector push-pull line driver
Max output frequency	100 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Electrical specifications (RM series)

Resolution	from 1 to 10000 ppr
Power supply	5 V DC \pm 10% 5 ... 28 V DC \pm 5% 8 ... 24 V DC \pm 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	50 mA for channel 20 mA for channel (line driver)
Output type	NPN NPN open collector push-pull line driver
Max output frequency	300 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Connections

Function	N / C / P cable output	Line driver cable output	Output J7 N / C / P	Output J7 Line Driver without Zero	Output M7 N / C / P	Output M7 Line Driver without Zero	Output J10 Line Driver with Zero	Output M10 Line Driver with Zero
+V DC	red	red	6	4	F	D	4 - 5	D - E
0 V	black	black	1	6	A	F	6	F
Ch. A	green	green	3	1	C	A	1	A
Ch. A-	/	brown	/	3	/	C	7	G
Ch. B	yellow	yellow	5	2	E	B	2	B
Ch. B-	/	orange	/	5	/	E	8	H
Ch. Z	blue	blue	4	/	D	/	3	C
Ch. Z-	/	white	/	/	/	/	9	I
⏏	shield	shield	7	7	G	G	10	J



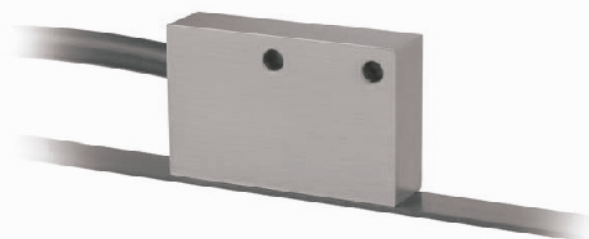
MAIN FEATURES

ETMA 1

- 0,025 mm resolution
- Zero pulse every 5 mm
- IP 67 as protection grade
- Working temperature -10° ... +60°C

ETMA 2

- 0,01 mm resolution
- Zero pulse every 2 mm
- IP 67 as protection grade
- Working temperature -10° ... +60°C



OTHER PRODUCTS

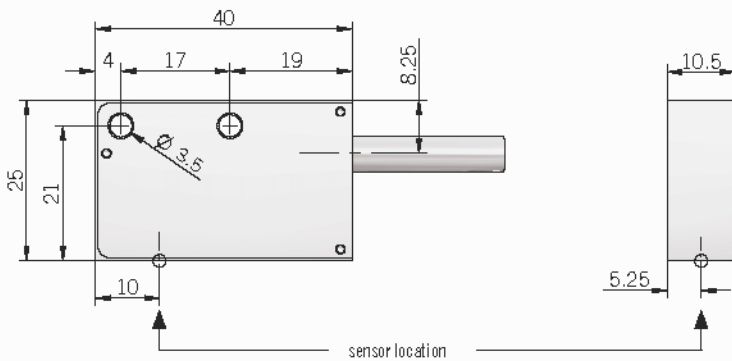
ORDERING CODE

ETM A 1 Z 5 L S PR3 . XXX

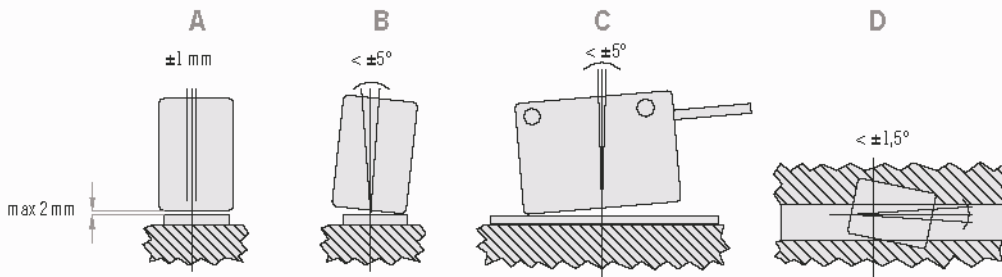
SERIES	TYPE	RESOLUTION	ZERO PULSE	POWER SUPPLY	VARIANT	OUTPUT TYPE	ENCLOSURE RATING	ELECTRONIC INTERFACE
magnetic incremental linear sensor ETM	horizontal A	0,1 mm (0,025 mm reading all edges) 1 0,04 mm (0,01 mm reading all edges) 2	without zero pulse S (ETMA 1) with zero pulse every 5 mm Z (ETMA 2) with zero pulse every 2 mm	(available only with L electronic output) 5 V DC 5 (available only with L or PC electronic output) 8 ... 24 V DC 8/24 5 ... 28 V DC 5/28	XXX custom version	PR3 cable length 3 m (standard) PR6 cable length 6 m PR10 cable length 10 m PR20 cable length 20 m	S IP 67	P push-pull PC protected push-pull (AEIC-7272) L line driver



ETMA 1 / 2

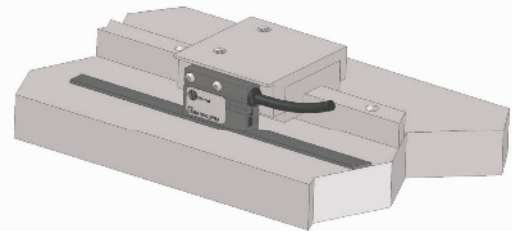


Mechanical tolerances



Electrical specifications

Resolution	0,1 mm (0,025 mm reading all edges ETMA 1) 0,04 mm (0,01 mm reading all edges ETMA 2)
Power supply	5 V DC $\pm 10\%$ 5 ... 28 V DC $\pm 5\%$ 8 ... 24 V DC $\pm 5\%$ (reverse polarity protection)
Current consumption without load	30 mA max
Max load current	20 mA for channel
Electronic interface	push-pull line driver HTL / RS422
Linearity error	$\pm 0,025$ mm (ETMA 1) $\pm 0,01$ mm (ETMA 2)
Zero pulse	every 5 mm (ETMA 1) every 2 mm (ETMA 2)
Travel speed	4 m/s
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4



Mechanical specifications

Enclosure rating	IP 67 (IEC 60529)
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Housing material	anodized aluminium
Fixing	n. 2 holes $\varnothing 3,5$ mm
Operating temperature	$-10^\circ \dots +60^\circ \text{C}$
Storage temperature	$-25^\circ \dots +70^\circ \text{C}$
Working distance from magnetic band	ETMA 1 <math>< 1,5\text{ mm}</math> with magnetic cover ETMA 1 <math>< 2\text{ mm}</math> without cover ETMA 2 <math>< 0,5\text{ mm}</math> with magnetic cover ETMA 2 <math>< 1\text{ mm}</math> without cover
Weight	150 g

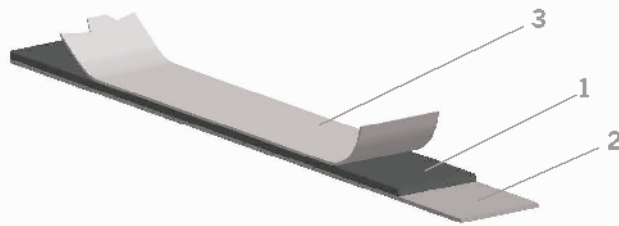
Connections and standard colours

Function	Push pull / Npn / Npn open collector	Line driver
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
---	shield	shield

GENERAL SPECIFICATIONS

As shown in the figure below, Eltra magnetic tape is composed by three layers:

- 1 - a flexible magnetic tape made of ferrite bonded into a nitrile rubber matrix;
- 2 - a stainless steel tape used to create a shield against any external magnetic fluxes and other external agents. Furthermore it's glued to the upper layer in order to give the correct mechanical consistency to the magnetic tape;
- 3 - a steel tape, magnetically transparent and with the function to protect mechanically the magnetic layer; it is the most rigid part and therefore is supplied separately due to transport and application needs. It must be stuck on layer 1 by the user.



To prevent damage from possible internal stresses in the magnetic tape rolled up with magnetic layer facing outwards, with a minimum internal diameter of 300 mm.

TIPS TO STICK ON THE MAGNETIC TAPE

Fixing pressure.

The magnetic tape is adhesive. Therefore it is important optimum contact between surfaces for right use. A good pressure must be uniformly applied to guarantee a perfect result.

Glueing temperature.

In order to guarantee optimal sticking it is recommended a surface temperature between 20 °C and 35 °C. Maximum adhesion is obtained after 72 hours at temperature of 21 °C. We suggest instead to avoid to apply the magnetic tape when surface temperature is lower than 10 °C.

Application materials.

Magnetic tape must be placed on dry, smooth and clean surfaces. Surfaces must be cleaned with aqueous solution. Metallic surfaces like brass, copper etc. must be protected to prevent possible oxidation.

Chemical agents and magnetic tape behaviour

Null effect chemicals	Medium effec chemicals	Strong effect chemicals
motor oil	JP-4 fuel	aromatic hydrocarbons (benzene, toluene, xylene, trichloroethylene, freon 10)
transmission oil	gasoline	ketones (acetone)
ATF (automatic transmission fluid)	heptane	mineral acids (hydrochloric, sulphuric, nitric, phosphoric, boric)
hydraulic oil	alcohols	
kerosene		
antifreeze		
detergents, disinfectants (Clorox®)		
turpentine		
water		
salt spray		

NUANCE

MAIN FEATURES

Encoder with potentiometric output signal.
 The potentiometer is fitted in a sturdy housing and it is supported by two bearings. It assures excellent lifetime, speed and high accuracy.



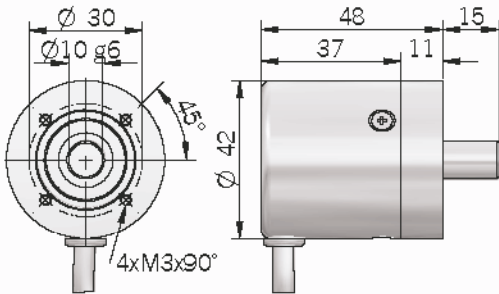
OTHER PRODUCTS

ORDERING CODE

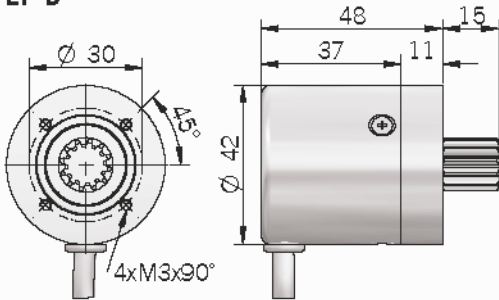
EP	A	103/10	P	R	. XXX	
						VARIANT
						XXX custom version
						OUTPUT DIRECTION
						A axial
						R radial
						OUTPUT TYPE
						P cable output (standard length 1,5 m)
						RESISTIVE VALUE
						102/1 1 kOhm / 1 turn
						102/10 1 kOhm / 10 turns
						502/1 5 kOhm / 1 turn
						502/3 5 kOhm / 3 turns
						502/10 5 kOhm / 10 turns
						103/1 10 kOhm / 1 turn
						103/3 10 kOhm / 3 turns
						103/10 10 kOhm / 10 turns
						SHAFT TYPE
						A EP A model with ϕ 10 mm shaft
						B EP B model with cogged shaft
						SERIES
						EP rotary potentiometer



EP A



EP B



Cogged shaft specifications

z = 12
m = 1
p = 3,1415

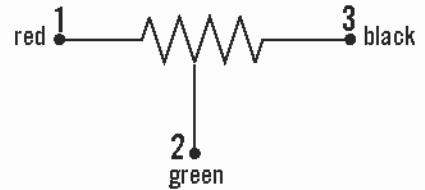
Formulas

modulus: $m = Dp/z$
step: $p = m \cdot \pi$
primitive diameter: $Dp = m \cdot z$
cog number: $z = Dp/m$

Mechanical specifications

Enclosure rating	IP 54
Shaft diameter	ø 10 mm
Shaft material	1.4305 / AISI 303 stainless steel (EP A) steel UNI C45 (EP B)
Housing material	PA 66 glass fiber reinforced
Body material	EN-AW 2011 aluminum
Bearings	2 ball bearings
Limit stop	automatic clutch (no stop)
Operating temperature	0° ... +80°C
Storage temperature	-25° ... +85°C
Weight	150

Electrical connections



General specifications

Model	Resistive value (Ohm)	Mechanical rotation	Electrical rotation	Element technology	Tolerance	Linearity	End resistance (Ohm)	Power rating (70 °C)	Life (shaft revolutions)	Shock	Vibration
102/1	1 k	270°	210°	cermet	±10%	±3%	3	2 W	25000	25 G	10 G, 10 ... 150 Hz
102/10	1 k	3600° +10° -0°	3600° +10° -0°	wirewound	±5%	±0,20%	1	2 W	1000000	50 G	15 G, 10 ... 150 Hz
502/1	5 k	320° ±5°	320° ±5°	conductive plastic	±10%	±1%	10	1 W	10000000	50 G	15 G, 10 ... 150 Hz
502/3	5 k	1080° +10° -0°	1080° +10° -0°	wirewound	±5%	±0,25%	1	1 W	300000	50 G	15 G, 10 ... 150 Hz
502/10	5 k	3600° +10° -0°	3600° +10° -0°	wirewound	±5%	±0,20%	1	2 W	1000000	50 G	15 G, 10 ... 150 Hz
103/1	10 k	300° ±5°	270° ±5°	cermet	±10%	±5%	4	1 W	25000	25 G	10 G, 10 ... 150 Hz
103/3	10 k	1080° +10° -0°	1080° +10° -0°	wirewound	±5%	±0,25%	1	1 W	300000	50 G	15 G, 10 ... 150 Hz
103/100	10 k	3600° +10° -0°	3600° +10° -0°	wirewound	±5%	±0,20%	1	2 W	1000000	50 G	15 G, 10 ... 150 Hz