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INCREMENTAL AND ABSOLUTE ENCODERS 2013

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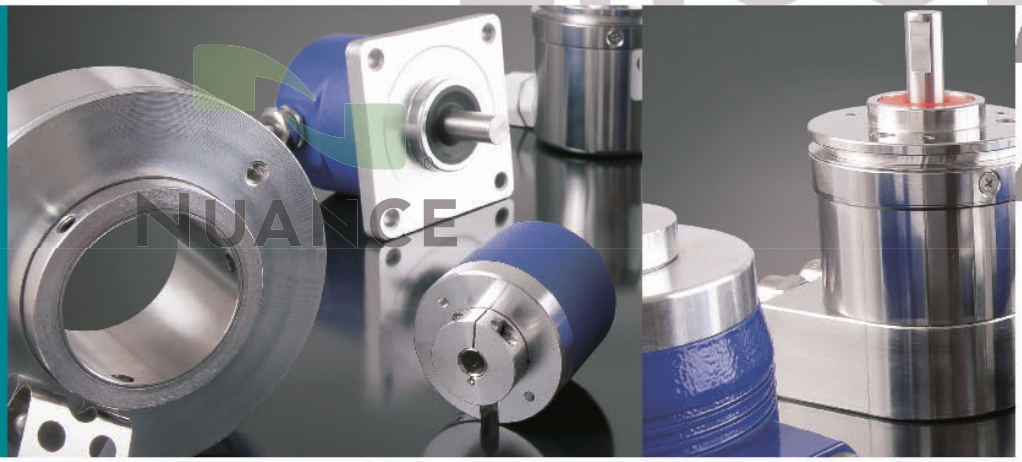

Eltra® sensing technology

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sensing technology

ELTRA SUCCESSFULLY PLAYS IN THE SENSOR MARKET OF THE FACTORY AUTOMATION SINCE MORE THAN 25 YEARS.

Thousands of customers worldwide have already chosen Eltra's products rewarding the flexible design and the customized assembling approach.

The constant investments on R&D, the skilled personnel and the most advanced technology allows to Eltra to offer over the years a wide range of products. Nowadays Eltra's product portfolio has more than 4,000 products (incremental and absolute encoders, sensors, linear transducers and accessories) and one of the strength is to deliver custom solutions based on customer specifications.

Eltra is present in foreign Countries with subsidiaries in China and Slovak Republic and a network of distributors in more than 40 Countries allowing a prompt reply to market requests and maintaining high standard in the service reliability.

Special attention is reserved to the product quality with severe tests and performance checks according to the Quality Control System (ISO 9001:2000).
Moreover, Eltra achieved other important certifications such as CE, UL/CSA and ATEX to guarantee compliance of the products to the main European and International standard and certifications.

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EExdIIC T6

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edition 06 / 2013

General description incremental encoders

Solid shaft optical incremental encoders

Blind / through shaft optical incremental encoders

N.B.: models marked with * are available with Hall phases

Magnetic incremental encoders

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Other products

General description absolute encoders

Singleturn absolute optical encoders

Multiturn absolute optical encoders

Absolute magnetic encoders

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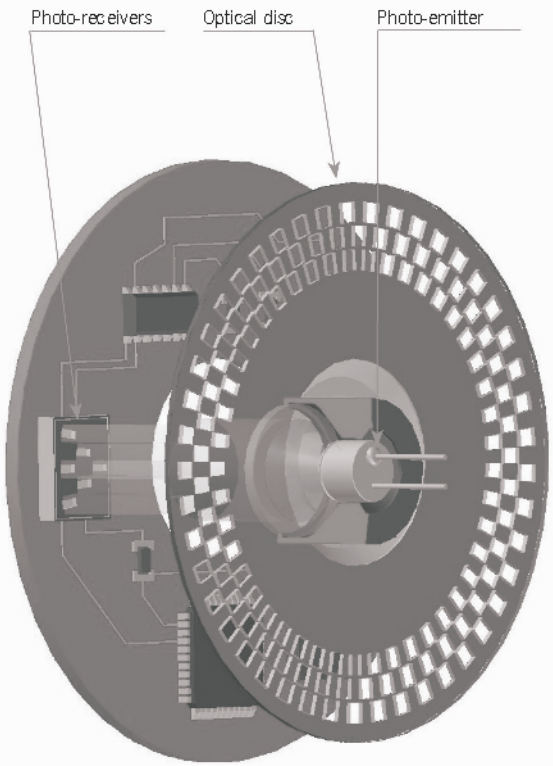
Technical basics

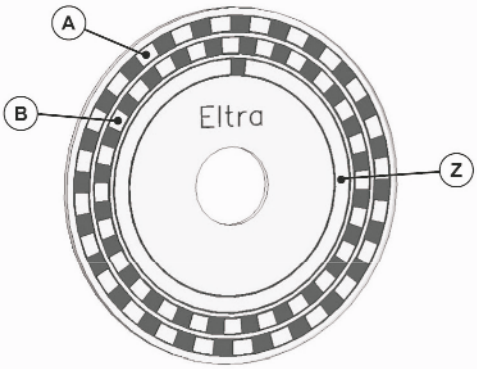
WORKING PRINCIPLE

An encoder is a rotary transducer that converts an angular movement into a series of electrical digital pulses. If associated to racks or endless screws, these generated pulses can be used to control angular or linear movements. During rotation, electrical signals can be elaborated by numerical controls (CNC), programmable logic controls (PLC), control systems, etc. Main applications of these transducers are: machinery, robots, motor feedback, measure and control devices. In Eltra encoders the angular movement transduction is based on the photoelectric scanning principle. The reading system is based on the rotation of a radial graduated disk formed by opaque windows and transparent ones alternated. The system is perpendicularly illuminated by an infrared light source. The light projects the disk image on the receivers surface which are covered by a grating called collimator having the same disk steps. The receivers trasduce the occurring light variations caused by the disk shifting and convert them into their corresponding electrical variations. Electrical signals, raised to generate squared pulses without any interference, must be electronically processed. The reading system is always carried out in differential modality, that is comparing different signals nearly identical but out of phase of 180 electrical degrees. That in order to increase quality and stability of output signals. The reading is performed comparing the difference between the two channels, to remove the noise known as "common mode", because signals are overlapped in equal way on each wave.



INCREMENTAL ENCODER

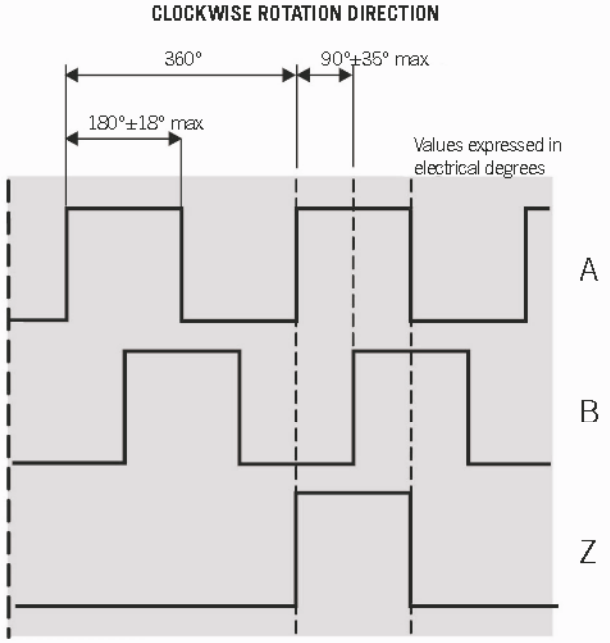
The incremental encoder usually gives two types of squared waves out of phase of 90 electrical degrees. They are usually called channel A and B. The first channel gives information about the rotation speed while the second, basing on the state sequence produced by the two signals, provides the direction of rotation. A further signal, called Z or zero channel, is also available. It gives the absolute zero position of the encoder shaft. This signal is a squared pulse with phase and width centered on A channel.



The incremental encoder accuracy depends on mechanical and electrical factors. These errors could be: grating division, disk eccentricity, bearings eccentricity, electronic reading and optical inaccuracy. The measurement unit to define encoder accuracy is the electrical degree. It determinates the division of the impulse generated by the encoder: 360 electrical degrees correspond to the mechanical rotation of the shaft which is necessary to carry out a complete cycle. To know how many mechanical degrees correspond to 360 electrical degrees the following formula has to be applied:

$$\text{electrical } 360° = \frac{\text{mechanical } 360°}{\text{nr. pulses / turn}}$$

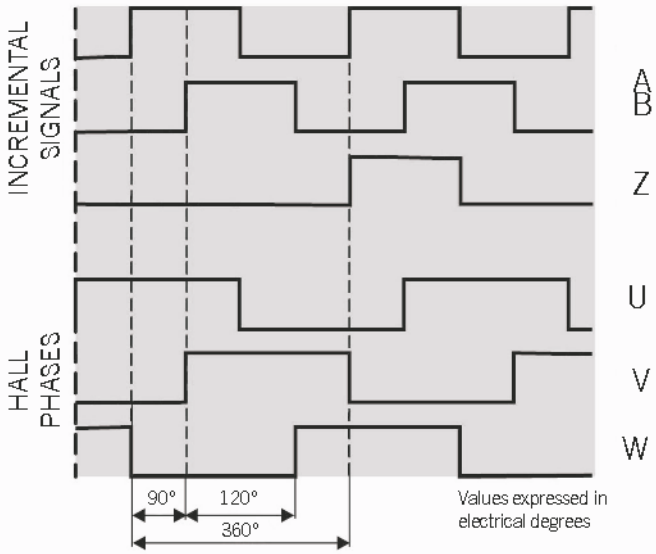
The encoder division error is given from the maximum shifting shown in the electrical degrees of two consecutive edges. This error exists in any encoder and is due to the above mentioned factors.
On Eltra encoders pulse error is ±18° e max. on full operating range, which corresponds to a ±10% from nominal value.
Regarding the 90 electrical degrees phase relation between the two channels, it differs in ±35 electrical degrees max which corresponds to ±10% respect to signal period.



Graphic representation of A, B and Z incremental signals.

INCREMENTAL ENCODER WITH INTEGRATED COMMUTATION PHASES (HALL PHASES)

In addition to the above mentioned encoders, there are other encoders that integrate additional electrical output signals. These are incremental encoders with integrated commutation signals, used as motor feedback. These additional signals simulate the Hall phases that are usually present in brushless motors and are generally realized by magnetic sensors. In Eltra encoders these commutation signals are optically generated and presented as three squared waves, shifted by 120 electrical degrees. These signals will be used by the driver that controls the motor in order to generate correct voltage phases to determine right rotation. These commutation pulses can be repeated many times within one mechanical turn because they directly depend on the pole number in the related motor. So we have commutation phases for motors of 4, 6 or more poles.



Graphic representation of A, B and Z incremental signals with U, V and W Hall phases.

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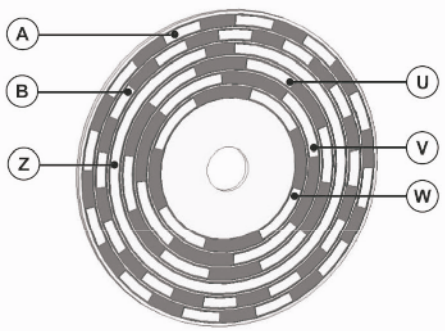


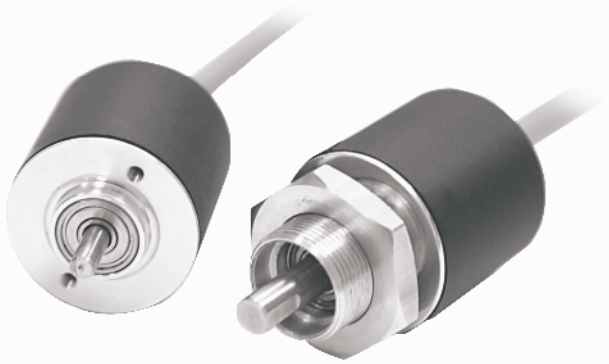
EL 30 E / H / I

INCREMENTAL ENCODER

MAIN FEATURES

Miniaturized ø 30 encoder series for general applications. Recommended when a minimal size is required even providing excellent performances.

- Up to 360 ppr with zero signal
- Several output types available
- Up to 24 V DC power supply
- Up to 50 kHz output frequency
- Cable output
- Up to 3000 RPM rotation speed
- Up to IP 54 sealing



ORDERING CODE

EL	30	E	50	Z	5	N	4	X	3	PA	.	XXX

SERIES
incremental encoder series EL

SIZE
mm 30

TYPE
clamping flange E
M18 threaded flange H
M20 threaded flange I

RESOLUTION
ppr from 1 to 360
N.B.: please directly contact our offices for pulses availability

ZERO PULSE
without zero pulse S
with zero pulse Z

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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
L line driver

SHAFT DIAMETER
4 mm (EL 30 E)
6 mm (EL 30 E / H / I)

ENCLOSURE RATING
X IP 54

MAX ROTATION SPEED
3 3000 rpm

OUTPUT TYPE
PA axial cable output (standard length 0.5 m)

VARIANT
XXX custom version

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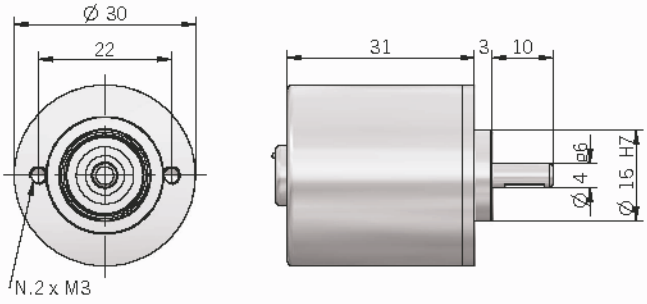
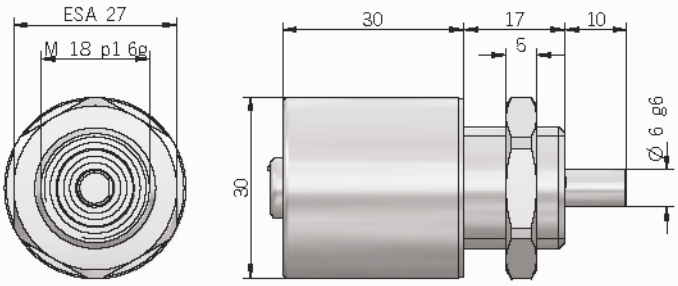
EL 30 E



Electrical specifications

Resolution	from 1 to 360 ppr
Power supply	5 V DC ± 10% 8 ... 24 V DC ± 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	50 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

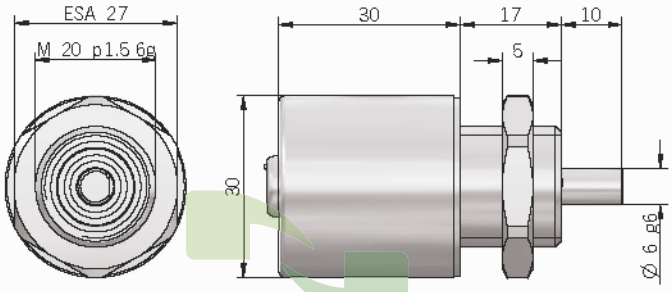
EL 30 H



Mechanical specifications

Shaft diameter	ø 4 (EL 30 E) mm ø 6 (EL 30 E / H / I) mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
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	aluminum EN-AW 2011
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-25° ... 70°C
Weight	50 g

EL 30 I



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

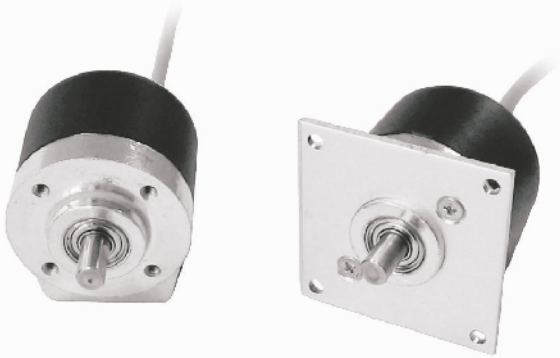
EH 38 A / B / D

INCREMENTAL ENCODER

MAIN FEATURES

Miniaturized ø 38 encoder series. Recommended when a minimal size is required even providing excellent performances.

- Up to 1024 ppr with zero signal
- Several output types available
- Up to 24 V DC power supply
- Up to 100 kHz output frequency
- Cable output
- Up to 3000 RPM rotation speed
- Up to IP 54 sealing



ORDERING CODE

EH 38 A 500 Z 5 N 6 X 3 PR . XXX

SERIES
incremental encoder series EH

SIZE
mm 38

TYPE
fixing flange ø 20 mm A
square flange □ 36,5 mm B
square flange □ 32 mm D

RESOLUTION
ppr from 50 to 1024
N.B.:please directly contact our offices for pulses availability

ZERO PULSE
without zero pulse S
with zero pulse Z

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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

SHAFT DIAMETER
6 mm

ENCLOSURE RATING
X IP 54

MAX ROTATION SPEED
3 3000 rpm

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

VARIANT
XXX custom version

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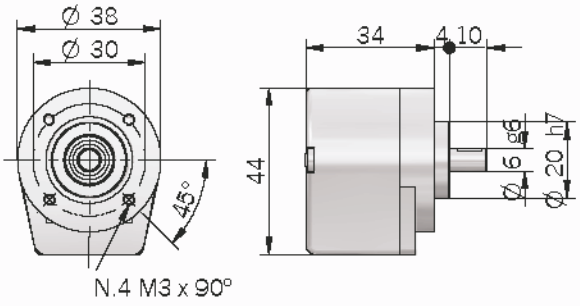
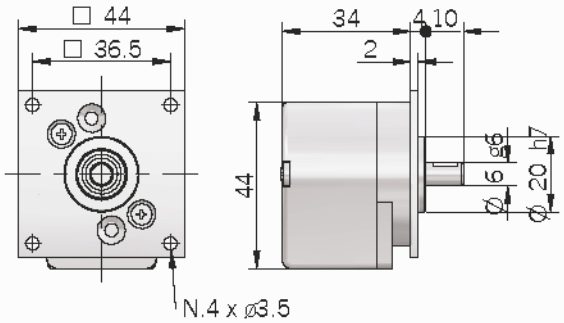
EH 38 A



Electrical specifications

Resolution	from 50 to 1024 ppr
Power supply	5 V DC ± 10% 8 ... 24 V DC ± 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 61000-6-1 IEC 61000-6-4

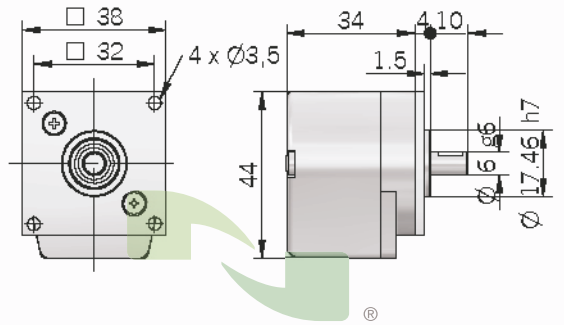
EH 38 B



Mechanical specifications

Shaft diameter	ø 6 mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load	5 N (0.5 kp) axial 5 N (0.5 kp) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	aluminum UNI 5076
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	PA66 glass fiber reinforced
Bearings	2 ball bearings
Bearings life	10^8 revolutions
Operating temperature	-20° ... +70°C
Storage temperature	-25° ... 70°C
Weight	100 g

EH 38 D



Connections and standard colours

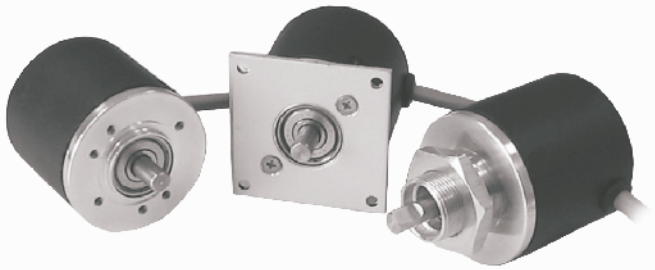
Function	Push pull / Npn / Npn open collector	Line driver
+V DC	red	red
0 V	black	black
Ch. A	green	green
Ch. A-	/	brown
Ch. B	yellow	yellow
Ch. B-	/	orange
Ch. Z	blue	blue
Ch. Z-	/	white
⏚	shield	shield

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

MAIN FEATURES

Miniaturized ø 42 encoder series for general applications.

- Up to 25000 ppr with zero signal
- Several output types available
- Up to 28 V DC power supply
- Up to 220 kHz output frequency
- Cable output
- Up to 6000 RPM rotation speed
- Up to IP 66 sealing



ORDERING CODE

EL 40 A 500 Z 5/28 N 6 X 3 P R . XXX

SERIES
incremental encoder series EL
incremental encoder series ER

SIZE
mm 40

TYPE
fixing flange ø 20 mm A
square flange □ 36,5 mm B
fixing flange ø 17,46 mm C
fixing flange ø 15 mm E
threaded flange M18 H
threaded flange M21 I
synchronous flange ø 21 mm N
synchronous flange ø 30 mm X

RESOLUTION
(EL - ER 40 A / B) max ppr 25000
(EL - ER 40 C / E / H / I / N / X) max ppr 2500
N.B.: please see resolution table or 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

SHAFT DIAMETER
4 mm (EL - ER 40 A / B / C / E)
6 mm (EL - ER 40 A / B / C / H / I / N)
8 mm (EL - ER 40 X)

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver
N.B.: with N / C interface max 2500 ppr

ENCLOSURE RATING
X IP 54
S IP 66 (optional for EL - ER 40 A / B)

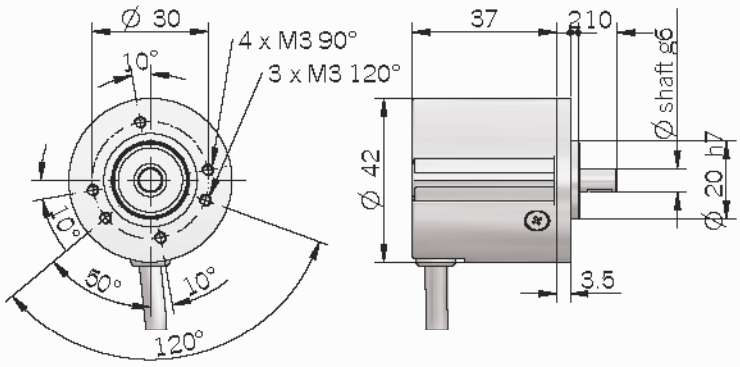
MAX ROTATION SPEED
3 3000 rpm
6 6000 rpm
N.B.: 3000 RPM max with S enclosure rating

OUTPUT TYPE
P cable output (standard length 0.5 m)

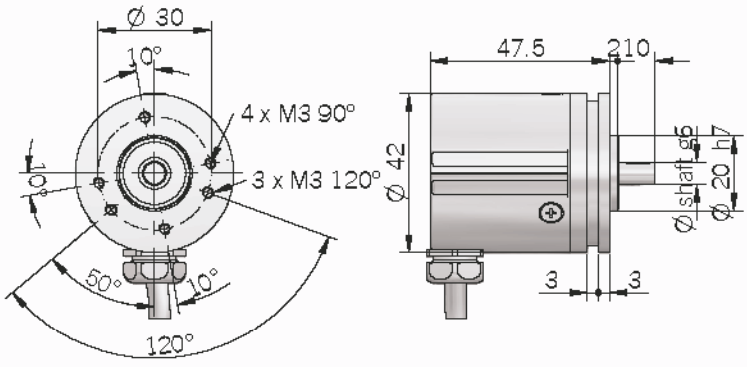
DIRECTION TYPE
A axial (excluded EL - ER 40 X)
R radial

VARIANT
XXX custom version

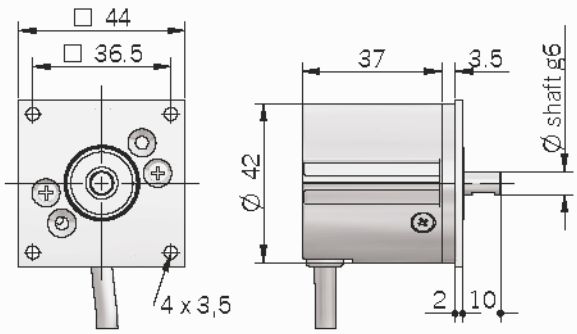
EL - ER 40 A



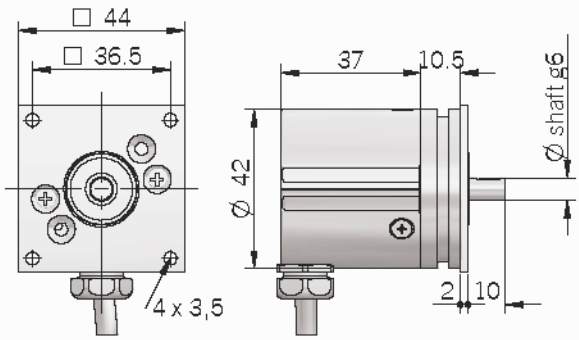
EL - ER 40 A
IP 66 version



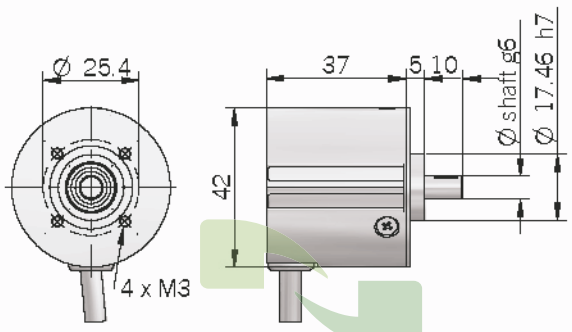
EL - ER 40 B



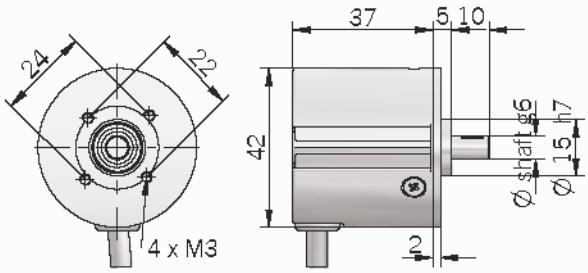
EL - ER 40 B
IP 66 version



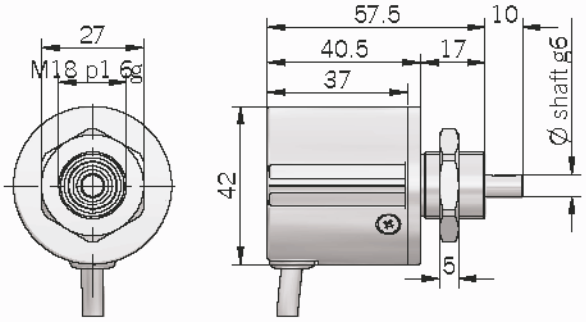
EL - ER 40 C



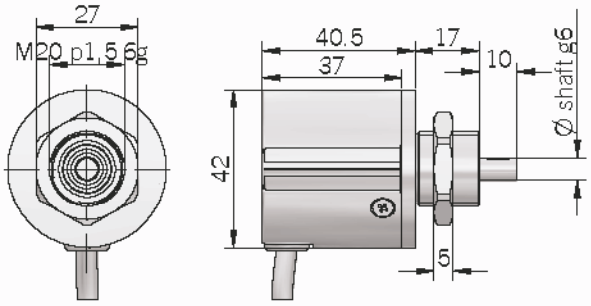
EL - ER 40 E



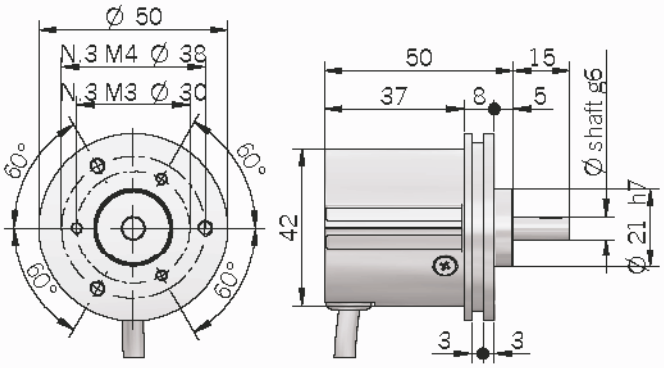
EL - ER 40 H



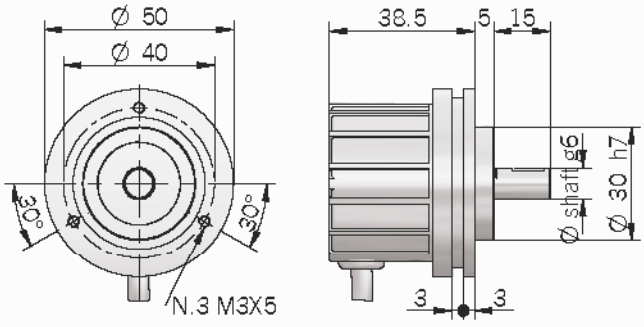
EL - ER 40 I



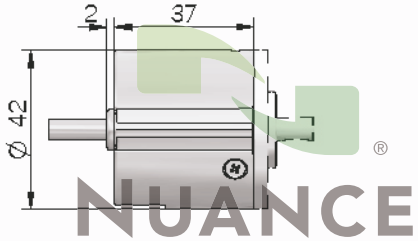
EL - ER 40 N



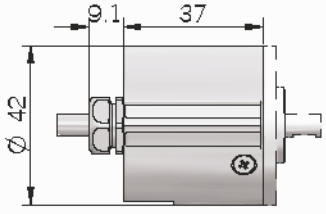
EL - ER 40 X



EL - ER 40
dimension with axial output



EL - ER 40
dimension with IP 66 axial output



Electrical specifications

Resolution	from 1 to 25000 ppr (EL - ER 40 A/B) from 1 to 2500 ppr (EL - ER 40 C/E/H/I/N/X)
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	150 kHz EL series 220 kHz ER series
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Shaft diameter	ø 4 mm (EL - ER 40 A/B/C/E) ø 6 mm (EL - ER 40 A/B/C/H/I/N) ø 8 mm (EL - ER 40 X)
Enclosure rating	IP 54 (IEC 60529) IP 66 (optional for EL - ER 40 A/B) (IEC 60529)
Max rotation speed	3000 rpm 6000 rpm (only IP 54)
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	PA 66 glass fiber reinforced
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Operating temperature	-10° ... +60°C EL series -20° ... +70°C ER series
Storage temperature	-25° ... +70°C
Weight	100 g

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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

Resolutions ER series

100 - 120 - 128 - 150 - 200 - 240 - 250 - 256 - 300 - 360 - 400 - 480 - 500 - 512 - 600 - 625 - 720 - 750 - 800 - 900 - 1000 - 1024 - 1200 - 1250 - 1440 - 1500 - 1600 - 1800 - 2000 - 2048 - 2500

Resolutions EL series

1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 30 - 32 - 40 - 50 - 70 - 80 - 90 - 160 - 180 - 350 - 450 - 660 - 700 - 2880 - 3000 - 3600 - 4000- 4096 - 5000 - 6000 - 7200 - 7500 - 8000 - 8192 - 10000 - 10240 - 12000 - 15000 - 16000 - 16384 - 20000 - 20480 - 25000

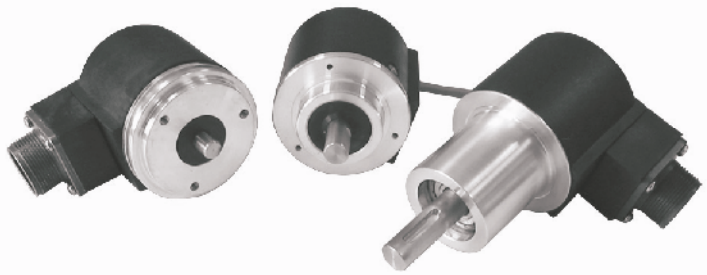
EL 58 B / C / H / T

INCREMENTAL ENCODER

MAIN FEATURES

Standard ø 58 encoder series for industrial applications with high mechanical resistance requirements. These encoders are designed to support high radial and axial shaft load and they can be mounted by means of flanges or servo-fasteners.

- 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 58 B M* 1000 Z 5/28 P 6 X 6 P R . XXX

SERIES
incremental encoder series EL

SIZE
mm 58

TYPE
synchronous flange ø 50 mm B
fixing flange ø 36 mm C
fixing flange ø 50 mm H
coupling flange ø 40 mm T

METAL COVER
M
** add for the metal cover*

RESOLUTION
ppr from 1 to 25000
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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

SHAFT DIAMETER
6 mm (EL 58 B / C / H)
8 mm (EL 58 B / C / H)
9 ø 9,52 (3/8") mm (EL 58 B / C / H)
10 mm (EL 58 B / C / H / T)
12 mm (EL 58 T)

ENCLOSURE RATING
X IP 54
S IP 66 (optional)

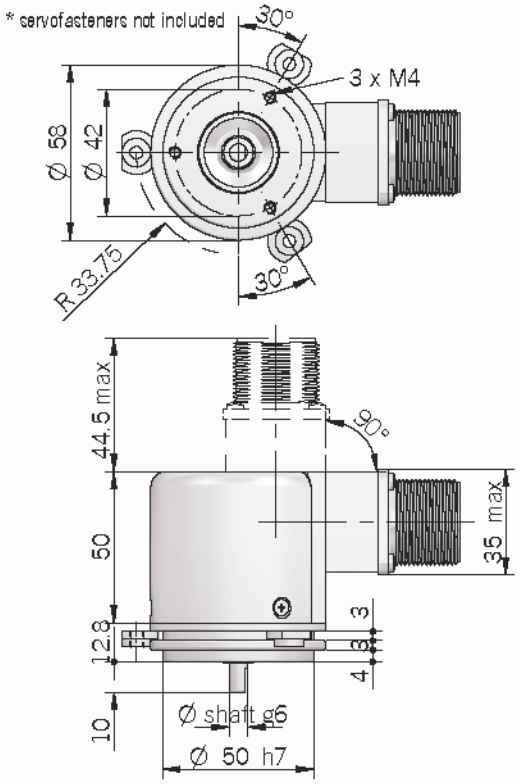
MAX ROTATION SPEED
3 3000 rpm
6 6000 rpm
N.B.: 3000 RPM max with S enclosure rating

OUTPUT TYPE
P cable output (standard length 1,5 m)
M M connector output
J J connector output

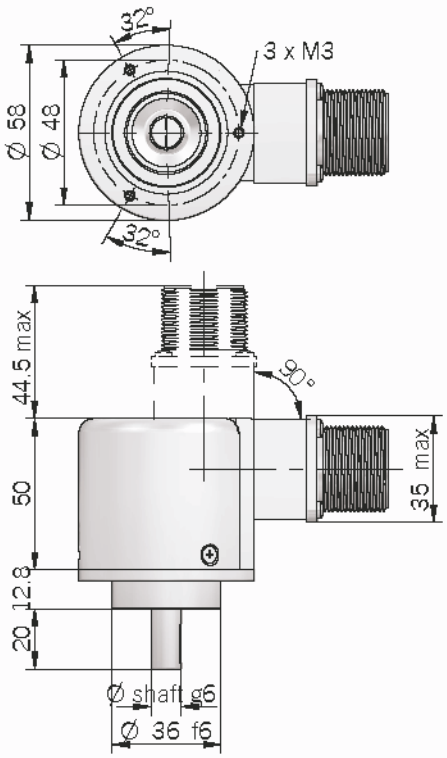
DIRECTION TYPE
A axial
R radial

VARIANT
XXX custom version

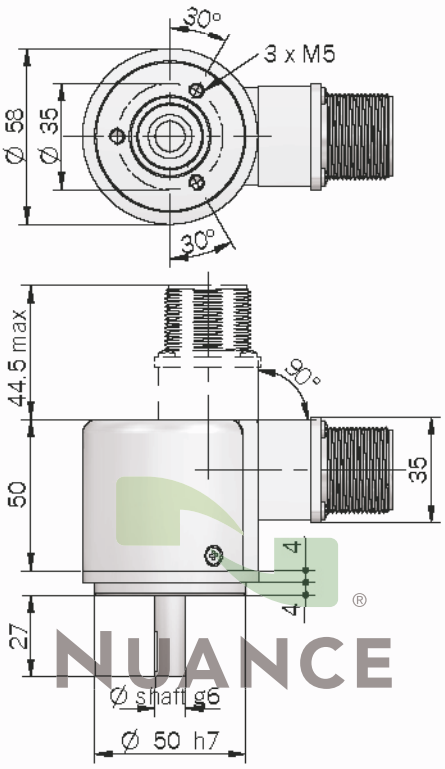
EL 58 B



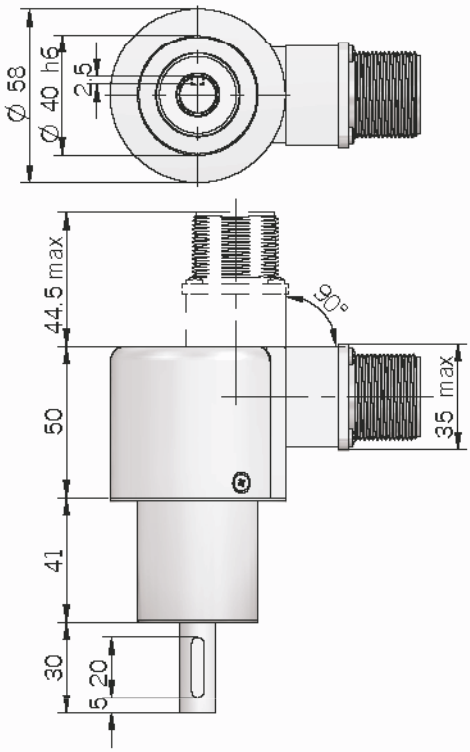
EL 58 C



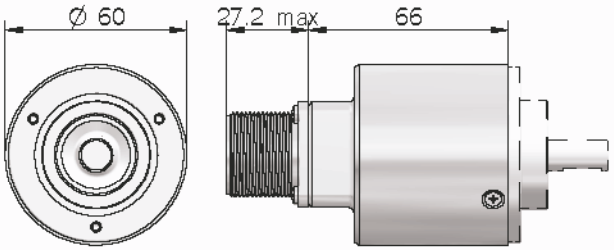
EL 58 H



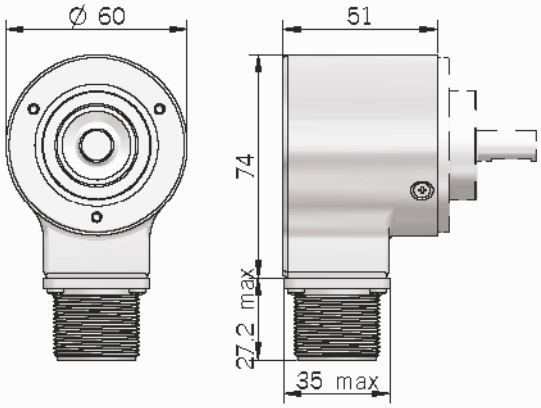
EL 58 T



Dimensions with metal cover axial output



Dimensions with metal cover radial output



Electrical specifications

Resolution	from 1 to 25000 ppr
Power supply	5 V DC ± 10% 5 ... 28 V DC ± 5% 8 ... 24 V DC ± 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	ø 6 / 8 / 9,52 (3/8") / 10 mm (EL 58 B / C / H) ø 10 / 12 mm (EL 58 T)
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	10 N (1 kgf) axial with ø6 mm shaft 20 N (2 kgf) radial with ø6 mm shaft 200 N (20 kgf)
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	300 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

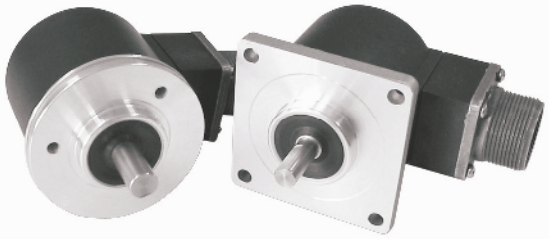
EL 63 A / D / E

INCREMENTAL ENCODER

MAIN FEATURES

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

- 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 63 A M* 1000 Z 5/28 P 6 X 6 M R . XXX

SERIES
incremental encoder series EL

SIZE
mm 63

TYPE
synchronous flange ø 31.75 mm A
centering square flange ø 31.75 mm D
centering square flange ø 50 mm E

METAL COVER
M
** add for metal cover*

RESOLUTION
ppr from 1 to 25000
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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

SHAFT DIAMETER
8 mm
9 ø 9,52 (3/8") mm
10 mm

ENCLOSURE RATING
X IP 54
S IP 66 (optional)

MAX ROTATION SPEED
3 3000 rpm
6 6000 rpm
N.B.: 3000 RPM max with S enclosure rating

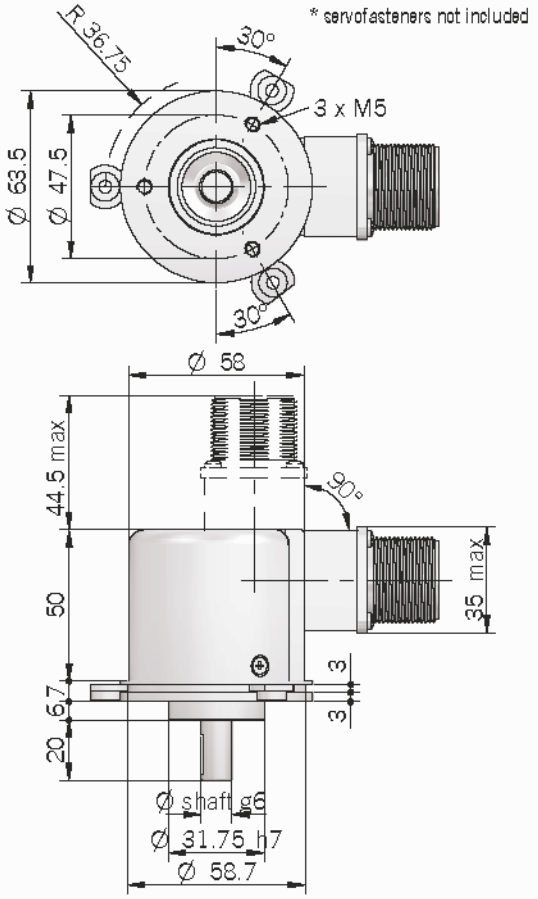
OUTPUT TYPE
P cable output (standard length 1,5 m)
M M connector output
J J connector output

DIRECTION TYPE
A axial
R radial

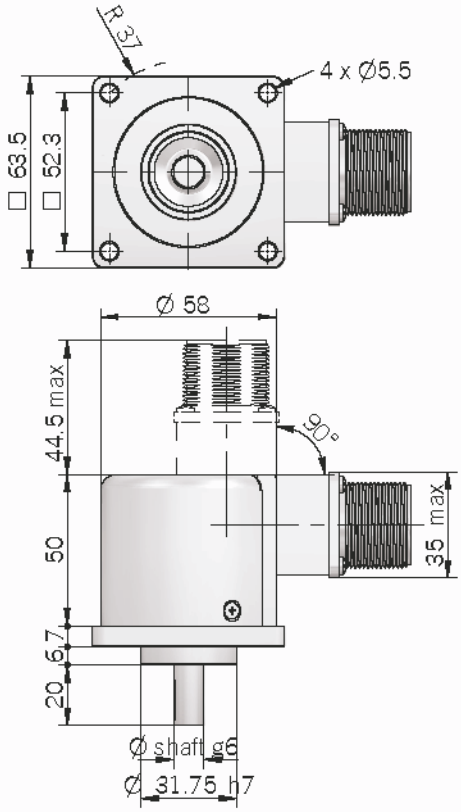
VARIANT
XXX custom version

www.eltra.it - eltra@eltra.it

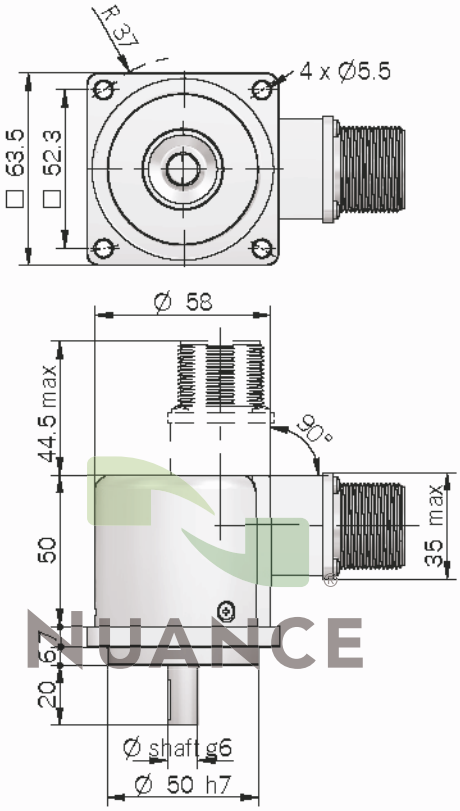
EL 63 A



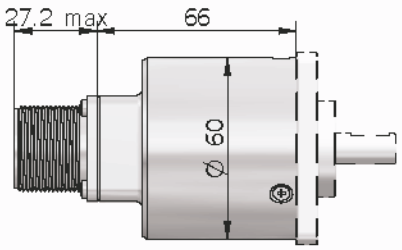
EL 63 D



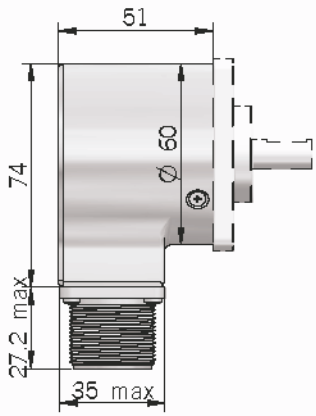
EL 63 E



Dimensions with metal cover axial output



Dimensions with metal cover radial output



Electrical specifications

Resolution	from 1 to 25000 ppr
Power supply	5 V DC ± 10% 5 ... 28 V DC ± 5% 8 ... 24 V DC ± 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	ø 8 / 9,52 (3/8") / 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 kgf)
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	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

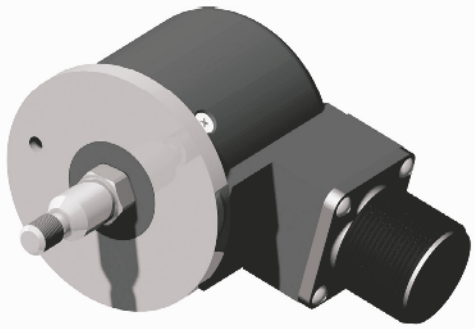
EL 63 M

INCREMENTAL ENCODER

MAIN FEATURES

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

- Up to 2500 ppr with zero.
- Several output types available
- Up to 28 V DC power supply.
- Up to 150 kHz output frequency.
- Cable or connector output
- Up to 6000 RPM rotation speed
- Up to IP 54 sealing



ORDERING CODE

EL 63 M 1000 Z 5/28 P 12/8 X 6 M R . XXX

SERIES
incremental encoder series EL

SIZE
mm 63

TYPE
with M8 threaded shaft M

RESOLUTION
ppr from 1 to 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

SHAFT DIAMETER
12/8 mm ø12/M8

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

ENCLOSURE RATING
X IP 54

MAX ROTATION SPEED
3 3000 rpm
6 6000 rpm

OUTPUT TYPE
P cable output (standard length 1,5 m)
M M connector output
J J connector output

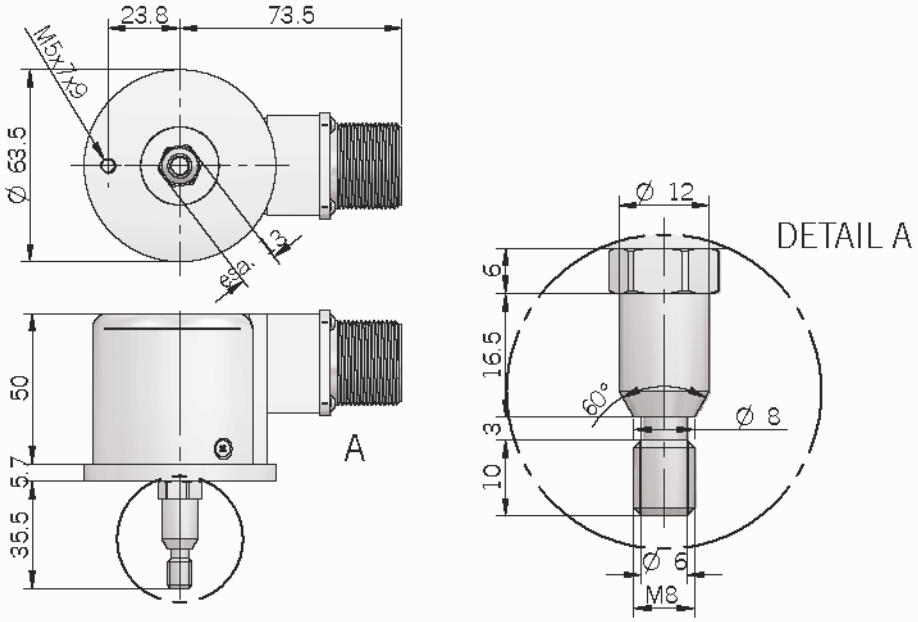
DIRECTION TYPE
A axial
R radial

VARIANT
XXX custom version

NUANCE

130322

EL 63 M



Electrical specifications

Resolution	from 1 to 2500 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	150 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Shaft diameter	ø 12/M8
Enclosure rating	IP 54 (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)
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

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

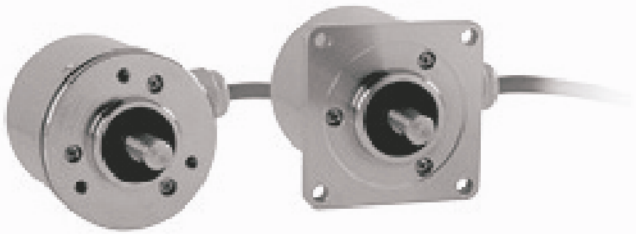
EL 63 AX / DX

STAINLESS STEEL
INCREMENTAL ENCODERS

MAIN FEATURES

Thanks to the stainless steel enclosure, this encoder is suitable for food and beverage machinery, cranes and winches for ships, offshore applications, washing systems and for all those environments where high corrosion resistance is required.

- Up to 25000 ppr.
- Several output types available
- Up to 28 V DC power supply.
- Up to IP 66 sealing



ORDERING CODE

EL 63 AX 1024 Z 5/28 L 10 S 3 PC R . XXX

SERIES
incremental encoder series EL

SIZE
mm 63

TYPE
synchronous flange ø 31.75 mm AX
centering square flange ø 31.75 mm DX

RESOLUTION
ppr from 1 to 25000
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

SHAFT DIAMETER
6 ø 6 mm
8 ø 8 mm
9 ø 9.52 mm (3/8")
10 ø 10 mm

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

MAX ROTATION SPEED
3 3000 rpm

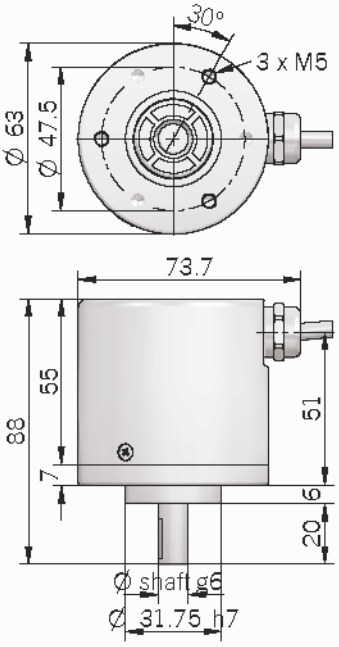
ENCLOSURE RATING
S IP 66

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

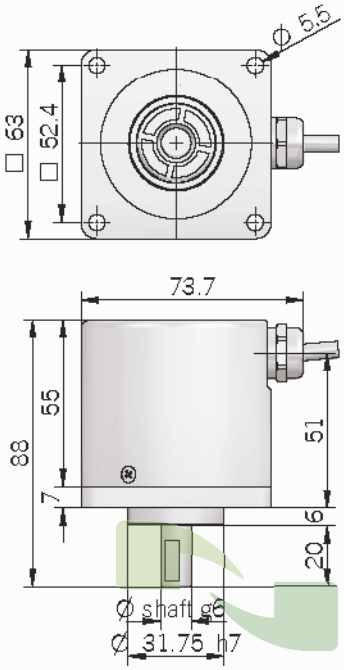
DIRECTION TYPE
R radial

VARIANT
XXX custom version

EL 63 AX



EL 63 DX



NUANCE®

Electrical specifications

Resolution	from 1 to 25000 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	300 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Shaft diameter	ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 66 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load	200 N (20 kgf)
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	1.4305 / AISI 303 stainless steel
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	1.4305 / AISI 303 stainless steel
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-15° ... +70°C
Weight	650 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

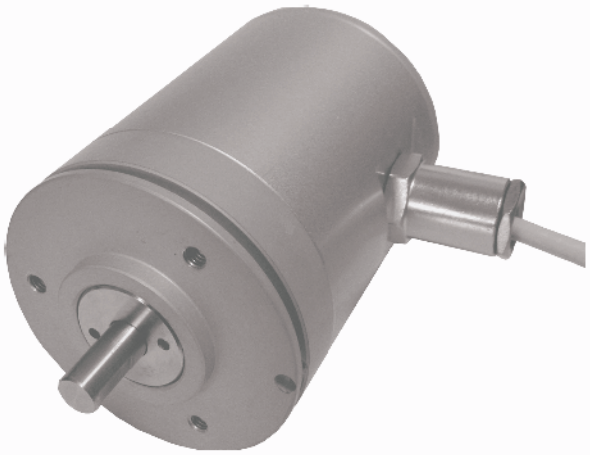
EX 80 A / D

FLAMEPROOF ENCODER

MAIN FEATURES

Flameproof encoders for applications within explosive and hazardous areas.

- Up to 10000 ppr with zero
- Several output types available
- Up to 28 V dc input voltage
- Output cable
- Several flanges available
- Up to 3000 rpm speed rotation
- Up to IP 65 sealing



EN 60079-0:2006 / EN 60079-1:2007
EN 61241-0:2006 / EN 61241-1:2004
ATEX certificate number: CESI 04 ATEX 082

ORDERING CODE

EX 80 A 1000 Z 5/28 P 10 X 3 PR . XXX

SERIES
flameproof encoder EX

SIZE
mm 80

TYPE
synchronous flange ø 40 mm A
square flange □ 65 mm D

RESOLUTION
ppr from 1 to 10000
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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

SHAFT DIAMETER
6 mm
8 mm
10 mm

ENCLOSURE RATING
X IP 65

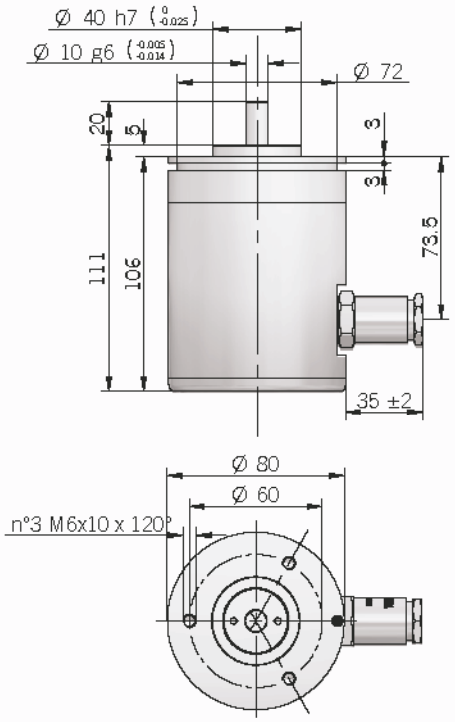
MAX ROTATION SPEED
3 3000 rpm

OUTPUT TYPE
PR radial cable output (standard length 1.5 m)

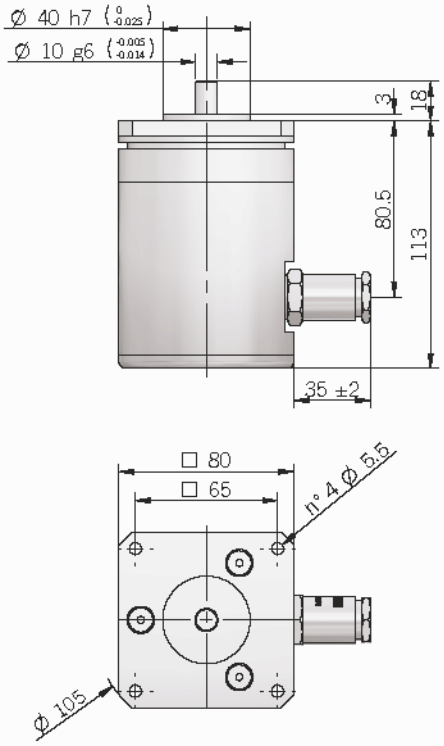
VARIANT
XXX custom version

NUANCE®

EX 80 A



EX 80 D



Electrical specifications

Resolution	from 1 to 10000 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	50 mA per channel 20 mA per channel (line driver)
Electronic interface for incremental signals	NPN NPN open collector push-pull line driver
Max output frequency	200 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-3

Mechanical specifications

Shaft diameter	6 / 8 / 10 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load	200 N (20 Kgf) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10÷2000 Hz (IEC 60068-2-6)
Bearings	n° 2 ball bearings
Bearings life	10^9 revolutions
Body material	anodized aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	anodized aluminum
Operating temperature	-20° ... +50 °C
Storage temperature	-15° ... +70 °C
Weight	1200 g

Ex II 2GD Ex d IIC T6 Ex tD A21 IP65 T85°C

Ex II 2GD

II: group II: other than mines
2: category 2: zone 1 (GAS), zone 21 (DUST)
GD: gas, vapours, mist, cloud of dust

Ex d IIC T6

Ex d: flameproof enclosure safety type
IIC: gas subdivision IIC
T6: max surface temperature 85°C

Ex tD A21 IP65 T85°C

Ex tD: flameproof enclosure safety type
A: IP grade testing method
21: zone 21
IP65: protection grade IP65
T85°C: max surface temperature 85°C

Connections and standard colours

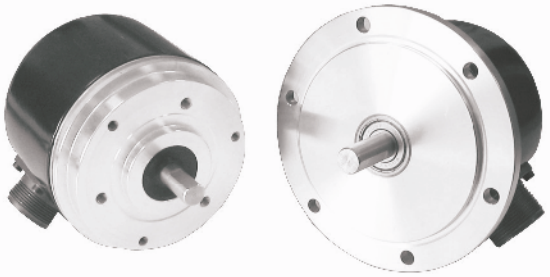
Function	Line driver	Push pull / Npn / Npn open collector
+V DC	brown	brown
0 V	gray	gray
Ch. A	green	green
Ch. A-	red	/
Ch. B	yellow	yellow
Ch. B-	pink	/
Ch. Z	blue	white
Ch. Z-	white	/
⏚	shield	shield

EH 90 A
EH 115 A - R
INCREMENTAL ENCODER

MAIN FEATURES

Encoder series for critical enviroments with high mechanical resistance requirements. The 90 model can be mounted by means of flanges or servo-fasteners; the 115 model has a tachometer generator REO-444 type compatible plug.

- Up to 2048 ppr
- Several output types available
- Up to 24 V DC
- Up to 100 kHz
- Cable or connector output
- Up to 6000 RPM rotation speed
- Up to IP 66 sealing for model 90 A



ORDERING CODE

RELAY INTERVENTION SPEED
from 600 to 4300
N.B.: for higher speeds contact our offices directly

EH 90 A 1000 Z 8/24 N 1000 Z 8/24 N 8 X 6 M R . XXX + 2000

SERIES
incremental encoder series EH

SIZE
mm 90
mm 115

TYPE
synchronous flange ø 40 mm (mod. 90) A
flange REO444 (mod. 115) A
flange REO 444 with centrifugal relay (mod. 115) R

RESOLUTION
ppr from 200 to 2048
N.B.: please directly contact our offices for pulses availability

ZERO PULSE
without zero pulse S
with zero pulse Z

POWER SUPPLY
(excluding electronic PC)5 V DC 5
8 ... 24 V DC 8/24

ELECTRONIC INTERFACE
NPN N
NPN open collector C
PUSH PULL P
protected push-pull (AEIC-7272) PC
line driver L

RESOLUTION

ZERO PULSE

POWER SUPPLY

OUTPUT TYPE

SHAFT DIAMETER
8 mm (EH 90)
9 ø 9,52 (3/8") mm (EH 90)
10 mm (EH 90 / EH 115)
11 mm (EH 115)

ENCLOSURE RATING
X IP 54
S IP 66 (optional) for model EH 90

MAX ROTATION SPEED
3 3000 rpm
6 6000 rpm
N.B.: 3000 RPM max. with "S" enclosure rating

OUTPUT TYPE
P cable output (standard length 1,5 m)
M M connector output
J J connector output

DIRECTION TYPE
A axial
R radial

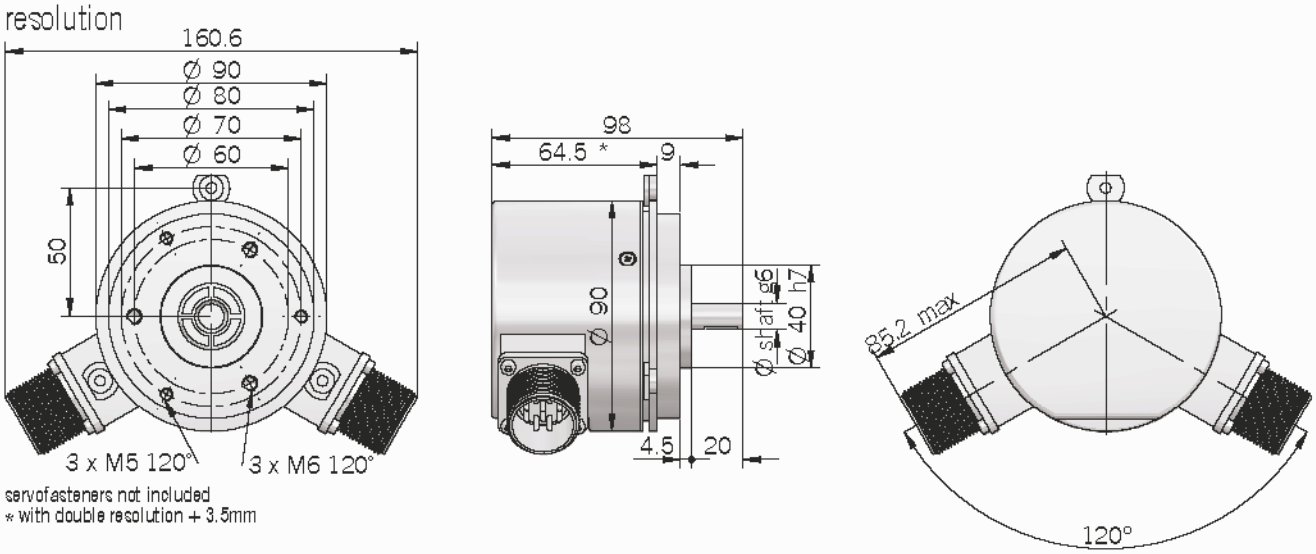
VARIANT
XXX custom version

N.B.: To be indicate only in the models "A" for double electronics and double resolution. See examples:

Double resolution and double electronics: EH90A1024Z5L-2048Z8/24L10X...
Double resolution and same electronics: EH90A1024-2048Z5L10X...
Same resolution and double electronics: EH90A1024Z5L-Z8/24L10X...

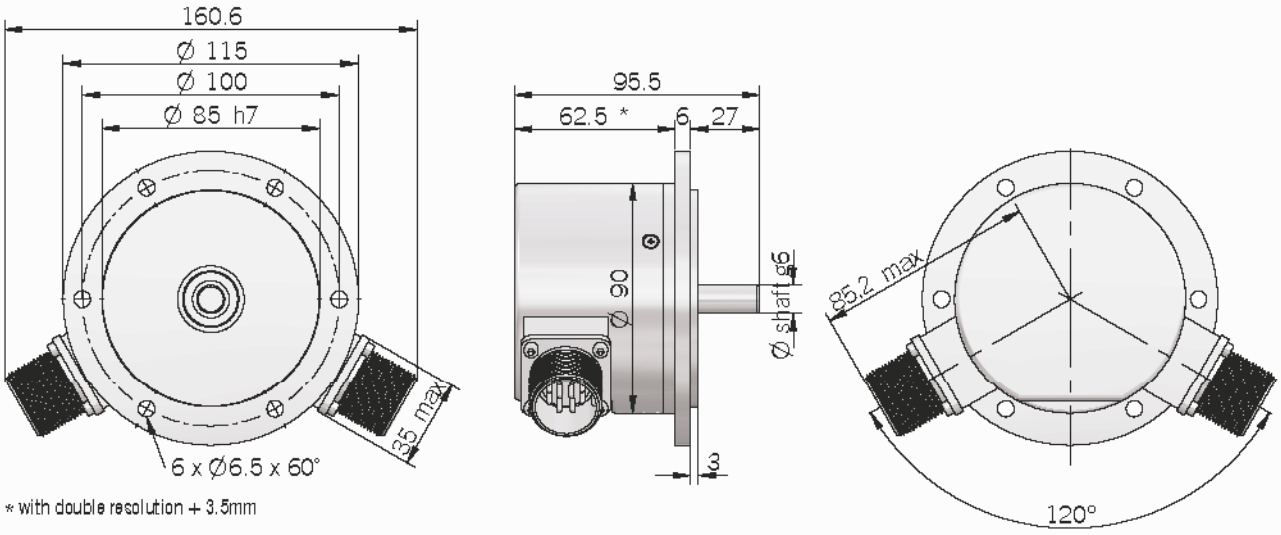
130510

EH 90 A
with double electronics / resolution



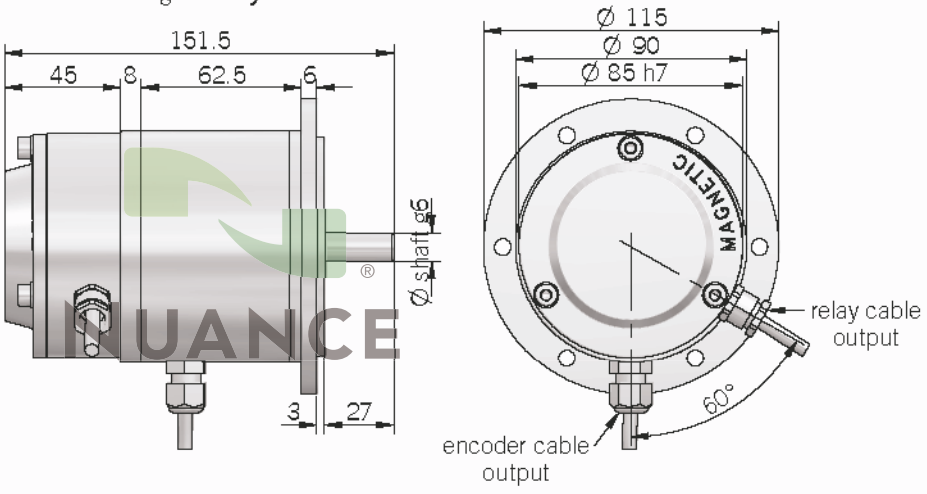
servofasteners not included
* with double resolution + 3.5mm

EH 115 A
with double electronics / resolution



* with double resolution + 3.5mm

EH 115 R
with centrifugal relay



Electrical specifications

Resolution	from 200 to 2048 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 61000-6-1 IEC 61000-6-3

Relay characteristics

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

Mechanical specifications

Shaft diameter	ø 8 / 9,52 (3/8") / 10 mm (EH 90) ø 10 / 11 mm (EH 115)
Enclosure rating	IP 54 (IEC 60529) IP 66 (optional for EH 90) (IEC 60529)
Max rotation speed	3000 rpm 6000 rpm (only with IP 54)
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	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminum
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-25° ... +70°C
Weight	750 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

NUANCE®

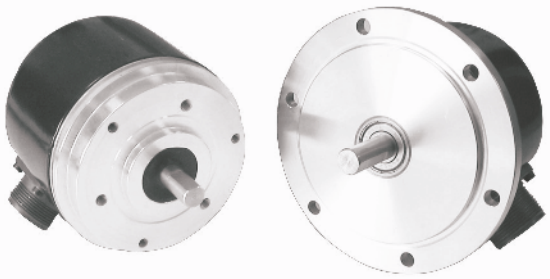
EL 90 A
EL 115 A

INCREMENTAL ENCODER

MAIN FEATURES

Encoder series for critical enviroments with high mechanical resistance requirements. The 90 model can be mounted by means of flanges or servo-fasteners; the 115 model has a tachometer generator REO-444 type compatible plug.

- Up to 10000 ppr with zeroSeveral 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 for model 90 A



ORDERING CODE

EL 90 A 1000 Z 5/28 N 8 X 6 M R . XXX

SERIES
incremental encoder series
EL

SIZE
mm 90
mm 115

TYPE
synchronous flange ø 40 mm (mod. 90)
flange REO444 (mod. 115) A

RESOLUTION
ppr from 1 to 10000
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 with L or PC electronic output) 8 ... 24 V DC 8/24
5 ... 28 V DC 5/28

ELECTRONIC INTERFACE
NPN N
NPN open collector C
push-pull P
protected push-pull (AEIC-7272) PC
line driver L

SHAFT DIAMETER
8 mm (EL 90)
9 ø 9,52 (3/8") mm (EL 90)
10 mm (EL 90 - EL 115)
11 mm (EL 115)

ENCLOSURE RATING
X IP 54
S IP 66 (optional) for model 90 A

MAX ROTATION SPEED
3 3000 rpm
6 6000 rpm
N.B.: 3000 RPM max. with "S" enclosure rating

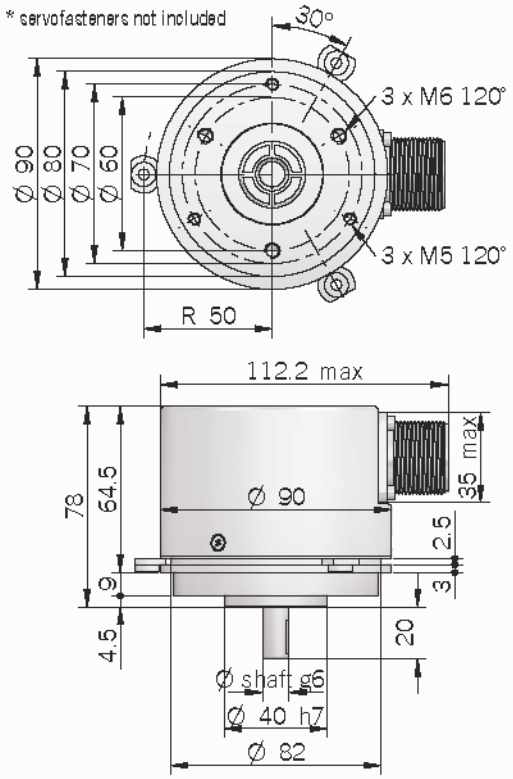
OUTPUT TYPE
P cable output (standard length 1,5 m)
M M connector output
J J connector output

DIRECTION TYPE
A axial
R radial

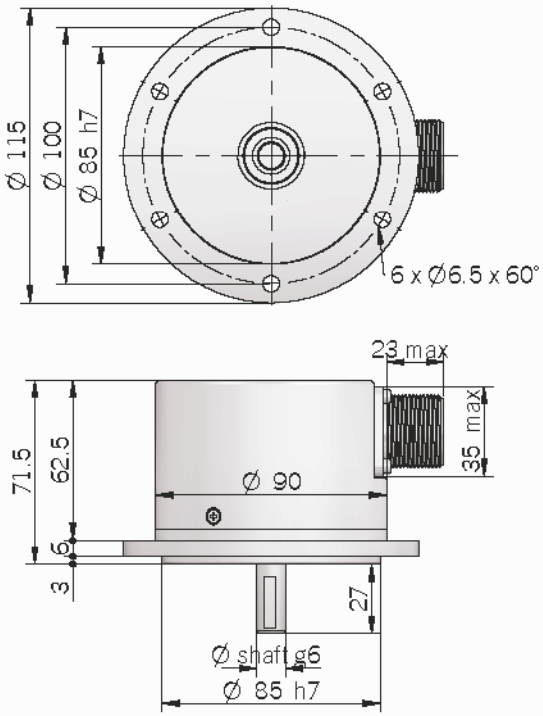
VARIANT
XXX custom version

NUANCE®

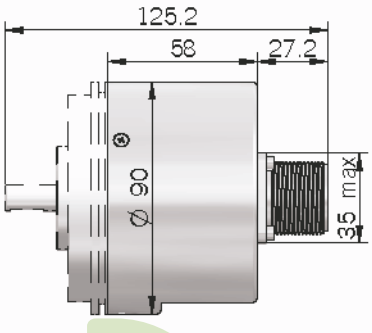
EL 90 A



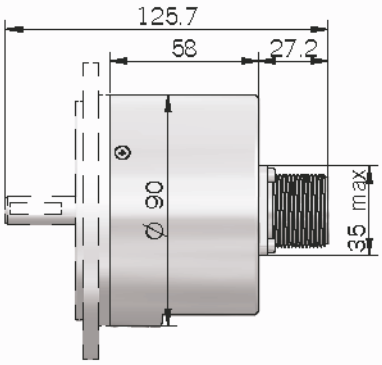
EL 115 A



EL 90
axial output



EL 115
axial output



NUANCE®

Electrical specifications

Resolution	from 1 to 10000 ppr
Power supply	5 V DC ± 10% 5 ... 28 V DC ± 5% 8 ... 24 V DC ± 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	ø 8 / 9,52 (3/8") / 10 mm (EL 90) ø 10 / 11 mm (EL 115)
Grado di protezione	IP 54 (IEC 60529) IP 66 (optional for EL 90 A) (IEC 60529)
Max rotation speed	3000 rpm 6000 rpm (only with IP 54)
Max shaft load	200 N (20 kgf) axial 200 N (20 kgf) radial
Shock	50 G, 11 ms (plastic disc) (IEC 60068-2-27) 20 G, 11 ms (glass disc) (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	painted aluminum
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Operating temperature	-10° ... +60°C
Storage temperature	-25° ... +70°C
Weight	750 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

NUANCE®

EH 17 M - EH 30 M

INCREMENTAL KIT ENCODER

MAIN FEATURES

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

- Up to 1024 ppr
- No wear due to absense of bearings
- Easy assembly
- Compact size

ORDERING CODE

EH 30 M 500 Z 8/24 P 6 X 6 PR . XXX

SERIES
incremental encoder series EH

SIZE
mm 17
mm 30

TYPE
kit encoder EH17 M - EH30 M M

RESOLUTION
ppr from 50 to 1024

ZERO PULSE
without zero pulse S
with zero pulse Z

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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push pull
L line driver

BORE DIAMETER
6 ø 6 mm
6,35 ø 6,35 mm (1/4")

ENCLOSURE RATING
X IP 54

MAX ROTATION SPEED
6 6000 rpm

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

VARIANT
XXX custom version

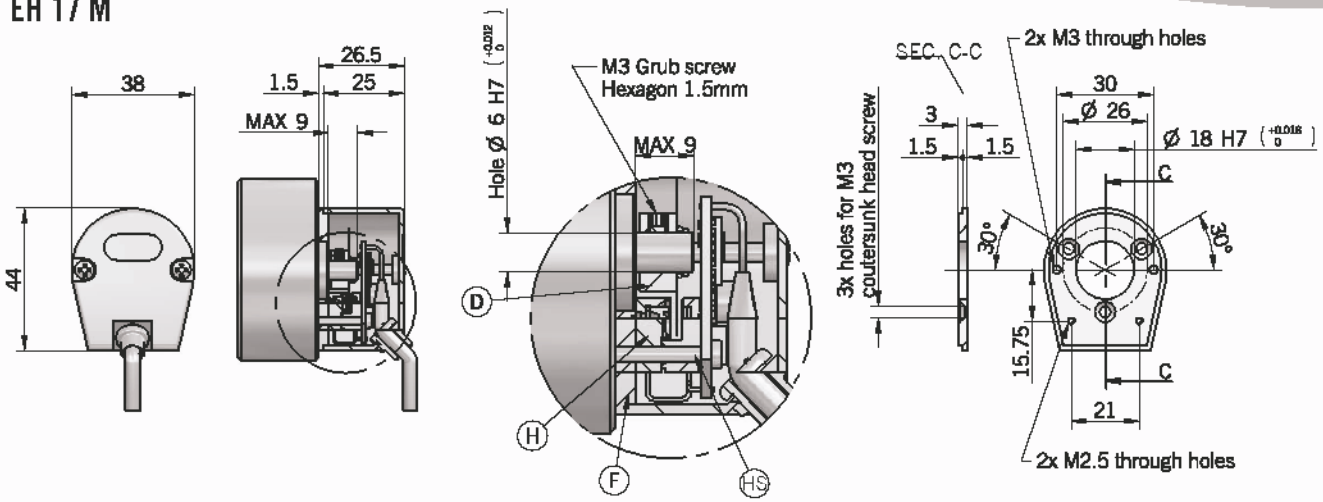
Electrical specifications

Resolution	from 50 to 1024 ppr
Power supply	5 V DC ± 10% 8 ... 24 V DC ± 5%
Current consumption without load	50 mA bidirectional 100 mA bidirectional with zero
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 61000-6-1 IEC 61000-6-4

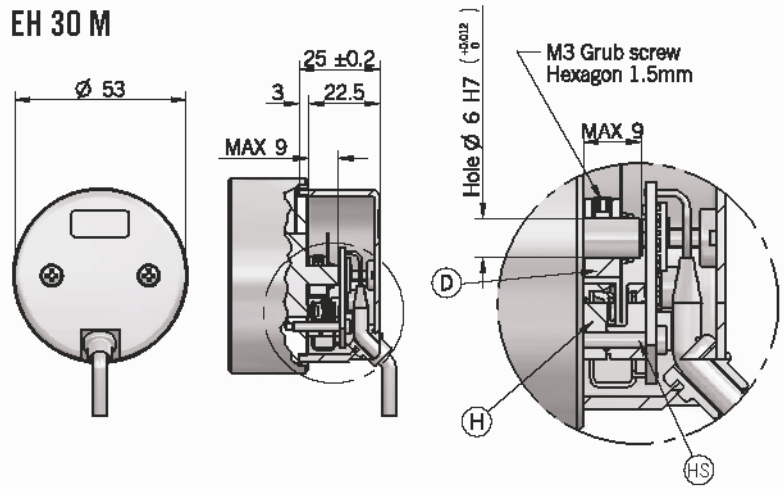
Mechanical specifications

Bore diameter	ø 6 / 6,35 (1/4") mm H7
Enclosure rating	IP 54
Max rotation speed	6000 rpm
Hub material	Aluminium
Flange material	Aluminium
Cover material	PA 66 renforced with glass fiber
Operating temperature	-20° ... +60 °C
Storage Temperature	-25° ... +70 °C

EH 17 M

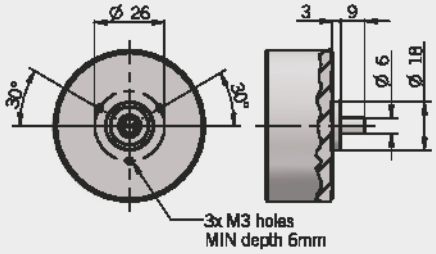


EH 30 M

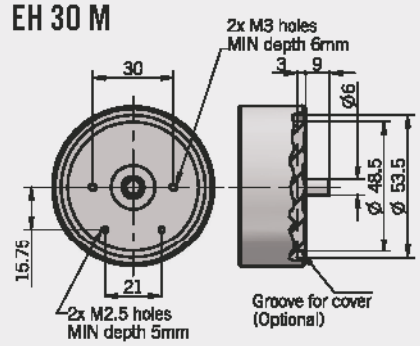


Raccomanded motor flange design

EH 17 M



EH 30 M



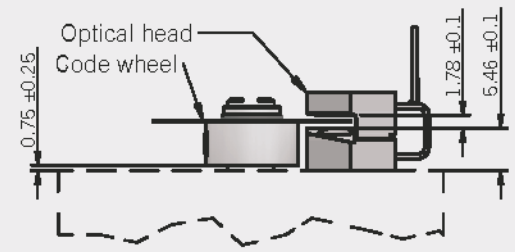


Fig.2

How to install

EH17M

1 - Fix the flange F on the motor using three screws FS with a flared head of M3.
2 - Insert the disc-holder D on the shaft motor without fix.
3 - Put the encoder H and fix using two screws HS of M2,5.
4 - Place the disc D in half the reading head and tighten the screw M3 of the disc-holder (fig.2).
5 - Close the cover C with the M3X25 screws CS.

EH30

Repeat all steps except 1.

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

EF 36 K

INCREMENTAL ENCODER
MOTOR SERIES

MAIN FEATURES

ø 36 encoder series is recommended for AC servomotor feedback. It is a 6 channels encoder: 3 for incremental signals and 3 for commutation (Hall) signals.

- Interchangeable with size 15 Resolver
- Easy mounting
- Small dimensions
- Several resolutions available

ORDERING CODE

EF 36 K 4 L 512 Z 5 L 8 X 3 PR . XXX

SERIES
incremental encoder with Hall phases EF

SIZE
mm 36

TYPE
blind hollow shaft with rear fixing K

MOTOR POLES
4 poles 4
6 poles 6
8 poles 8

ELECTRONIC INTERFACE FOR COMMUTATION SIGNALS
NPN open collector C
line driver L

RESOLUTION
ppr from 1 to 2048
N.B.: please directly contact our offices for pulses availability

ZERO PULSE
without zero pulse S
with zero pulse Z

POWER SUPPLY
5 5 V DC

ELECTRONIC INTERFACE FOR INCREMENTAL SIGNALS
L line driver

BORE DIAMETER
8 ø 8 mm
9 ø 9,52 mm (3/8")
10 ø 10 mm

ENCLOSURE RATING
X IP 40

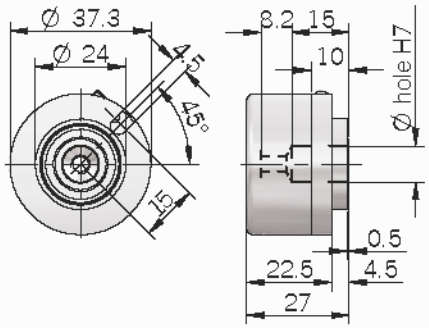
MAX ROTATION SPEED
6 3000 rpm

OUTPUT TYPE
PR radial cable output (standard length 0.3 m)

VARIANT
XXX custom version

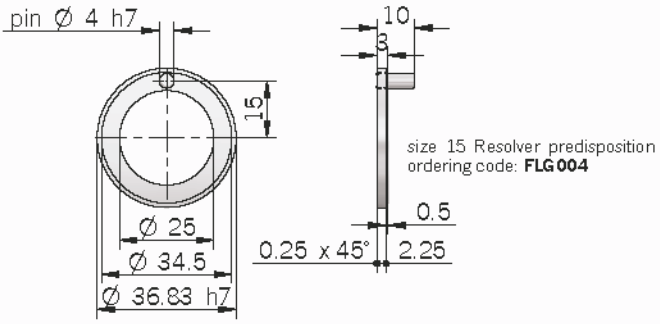
100519

EF 36 K



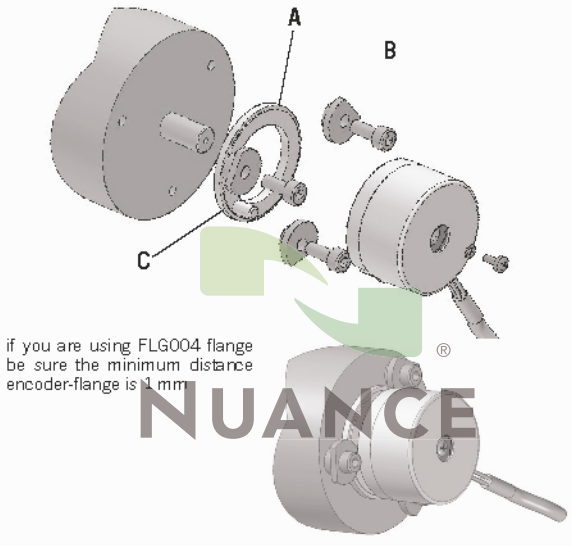
ACCESSORIES

Flanges for motor fixing



HOW TO MOUNT IT

- Insert flange (A) on the motor.
- Tighten the appropriate servo-fasteners (B) without blocking them.
- Insert encoder on motor shaft (misalignment recovery system must correspond to peg (C).
- Block the encoder on motor shaft by proper screw.
- Turn for phasing.
- Finally, fix servo-fasteners (B).
- Verify the right working of the misalignment recovery system.



if you are using FLG004 flange be sure the minimum distance encoder-flange is 1 mm

Electrical specifications

Resolution	from 1 to 2048 ppr
Power supply	5 V DC ± 10%
Current consumption without load	150 mA max
Max load current	15 mA for channel (line driver) 30 mA for channel
Output type for incremental signals	line driver
Output type for Hall phases	NPN open collector line driver
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-1 IEC 61000-6-3

Mechanical specifications

Shaft diameter	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)
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Body material	aluminum EN-AW 2011
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	aluminum EN-AW 2011
Operating temperature	-10° ... +85 °C
Storage temperature	-25° ... +85 °C
Weight	50 g
Accesories	flange for mounting on motors (size 15 Resolver type)

Connections and standard colours

Function	14 core wire
+V DC	red
0 V	black
Ch. A	green
Ch. B	yellow
Ch. Z	blue
Ch. A-	brown
Ch. B-	orange
Ch. Z-	white
Ch. U	gray
Ch. V	violet
Ch. W	gray-pink
Ch. U-	red-blue
Ch. V-	white-green
Ch. W-	brown-green
⏚	shield

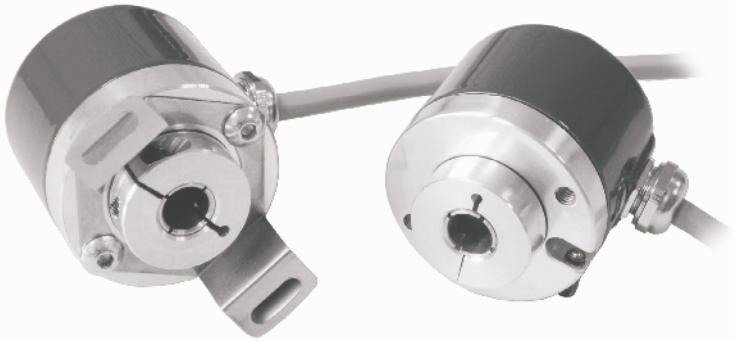
EL - ER 38 F / G

INCREMENTAL ENCODER

MAIN FEATURES

Miniaturized ø 38 encoder series for general applications.

- Up to 25000 ppr with zero signal
- Several output types available
- Up to 28 V DC power supply
- Up to 220 kHz output frequency
- Cable output
- Up to 3000 RPM rotation speed
- Up to IP 65 sealing



ORDERING CODE

ER 38 F 1024 Z 5/28 P 6 X 3 PR . XXX

SERIES
incremental encoder series EL
incremental encoder series ER

SIZE
mm 38

FIXING TYPE
blind hollow shaft with spring F
blind hollow shaft with anti-rotation pin G

RESOLUTION
(see table) ppr up to 25000
N.B.: please see resolution table or 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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver
N.B.: with N / C interface max 2500 ppr

SHAFT DIAMETER
6 mm
8 mm
9 mm ø 9,52 (3/8")
10 mm

ENCLOSURE RATING
X IP 64
S IP 65 (optional)

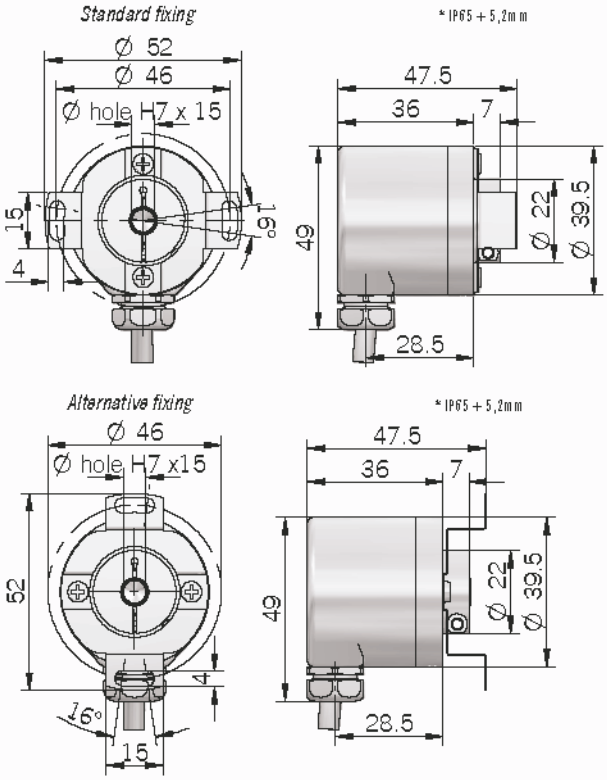
MAX ROTATION SPEED
3 3000 rpm

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

VARIANT
XXX custom version

130430

EL - ER 38 F



EL-ER 38 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

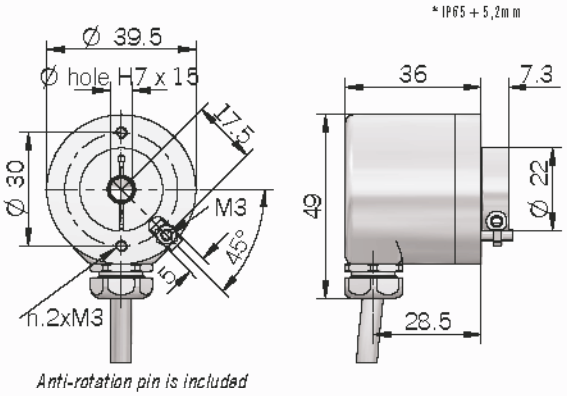
Mechanical specifications

Shaft diameter	ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 64 (IEC 60529) IP 65 (optional) (IEC 60529)
Max rotation speed	3000 rpm
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	painted aluminum
Bearings	2 ball bearings
Bearings life	10^8 revolutions
Operating temperature	-10° ... +60°C series EL -20° ... +70°C series ER
Storage temperature	-25° ... +70°C
Weight	150 g

EL series resolutions

1 - 2 - 4 - 5 - 10 - 15 - 16 - 20 - 30 - 32 - 40 - 50 - 70 - 80 - 90 - 150 - 160 - 180 - 250 - 350 - 300 - 450 - 600 - 660 - 700 - 2880 - 3000 - 3600 - 4000 - 4096 - 5000 - 6000 - 7200 - 7500 - 8000 - 8192 - 10000 - 10240 - 12000 - 14400 - 15000 - 16000 - 16384 - 20000 - 20480 - 25000

EL - ER 38 G



Anti-rotation pin is included

EL-ER 38 G 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

Electrical specifications

Resolution	from 1 to 25000 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	150 kHz EL series 220 kHz ER series
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

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

ER series resolutions

100 - 120 - 128 - 200 - 240 - 256 - 360 - 400 - 480 - 500 - 512 - 625 - 720 - 750 - 900 - 1000 - 1024 - 1250 - 1440 - 1500 - 1800 - 2000 - 2048 - 2500

130430

EL - ER 40 G

INCREMENTAL ENCODER

MAIN FEATURES

Miniaturized ø 42 encoder series for general applications.

- Up to 2500 ppr with zero signal
- Several output types available
- Up to 28 V DC power supply
- Up to 220 kHz output frequency
- Cable output
- Up to 3000 RPM rotation speed
- Up to IP 54 sealing

ORDERING CODE

EL 40 G 1000 Z 5/28 P G X 3 P R . XXX

SERIES
incremental encoder series EL
incremental encoder series ER

SIZE
mm 40

TYPE
blind hollow shaft with anti-rotation pin G

RESOLUTION
(see table) ppr from 1 to 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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

SHAFT DIAMETER
6 mm

ENCLOSURE RATING
X IP 54

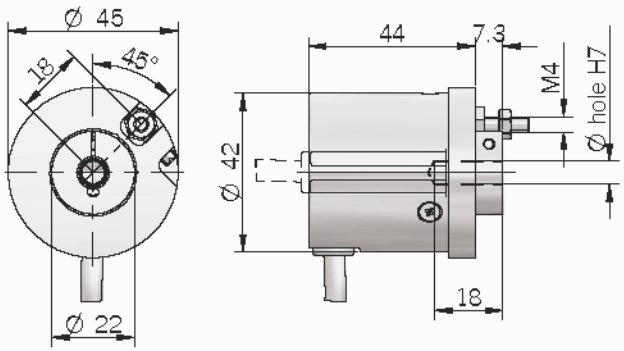
MAX ROTATION SPEED
3 3000 rpm

OUTPUT TYPE
P cable output (standard length 0.5 m)

DIRECTION TYPE
A axial
R radial

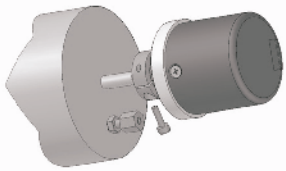
VARIANT
XXX custom version

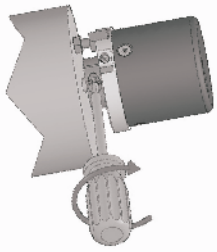
EL - ER 40 G



Mounting istructions

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





Electrical specifications

Resolution	from 1 to 2500 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	150 kHz EL series 220 kHz ER series
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Shaft diameter	ø 6 mm
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
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	PA 66 glass fiber reinforced
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Operating temperature	-10° ... +60°C series EL -20° ... +70°C series ER
Storage temperature	-25° ... +70°C
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

ER series resolutions

100 - 120 - 128 - 150 - 200 - 240 - 250 - 256 - 300 - 360 - 400 - 480 - 500 - 512 - 600 - 625 - 720 - 750 - 800 - 900 - 1000 - 1024 - 1200 - 1250 - 1440 - 1500 - 1600 - 1800 - 2000 - 2048 - 2500

EL series resolutions

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

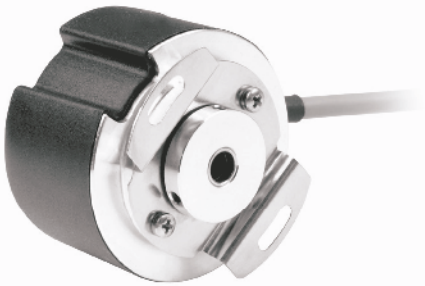
EL 48 C / P

INCREMENTAL ENCODER
MOTOR SERIES

MAIN FEATURES

ø 48 encoder series recommended for motor feedback.

- Easy mechanical mounting
- Small dimensions
- Up to 2048 ppr with zero signal
- Several output types available
- Up to 150 kHz output frequency
- 6000 RPM rotation speed



ORDERING CODE

EL	48	C	1000	Z	8/24	P	8	X	6	PR	.	XXX

SERIES
incremental encoder series EL

SIZE
mm 48

TYPE
blind hollow shaft C
through hollow shaft P

RESOLUTION
ppr from 1 to 2048
N.B.:please directly contact our offices for pulses availability

ZERO PULSE
without zero pulse S
with zero pulse Z

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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

SHAFT DIAMETER
6 mm
8 mm

ENCLOSURE RATING
X IP 40

MAX ROTATION SPEED
6 6000 rpm

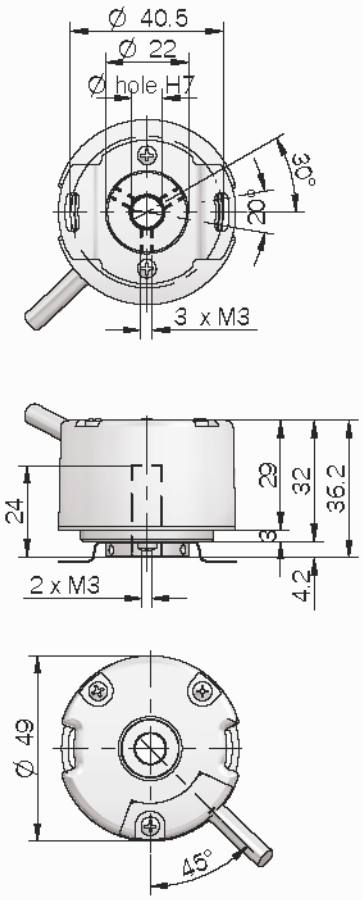
OUTPUT TYPE
PR radial cable output (standard length 0.3 m)

VARIANT
XXX custom version

NUANCE

130225

EL 48 C / P



Electrical specifications

Resolution	from 1 to 2048 ppr
Power supply	5 V DC ± 10% 8 ... 24 V DC ± 5%
Current consumption without load	100 mA max
Max load current	30 mA for channel 15 mA for channel (line driver)
Output type	NPN NPN open collector push-pull line driver
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-1 IEC 61000-6-3

Mechanical specifications

Shaft diameter	6 / 8 mm
Enclosure rating	IP 40 (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 500 Hz (IEC 60068-2-6)
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	PA 66 glass fiber reinforced
Operating temperature	-20° ... +85 °C
Storage temperature	-25° ... +85 °C
Weight	100 g

HOW TO MOUNT IT

- Couple encoder shaft with motor shaft.
- Fix spring to motor flange without tightening it.
- Fix the encoder shaft with the two grub screws.
- Turn for phasing.
- Fix the spring.

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

EL - EF 49 C / P

INCREMENTAL ENCODERS
MOTOR SERIES

MAIN FEATURES

ø 49 encoder series recommended in feedback control systems on AC servomotors. They include a traditional incremental encoder and the Hall effect phases.

· Interchangeable with size 19 Resolver; it allows easy and cost effective mounting for the back of the motor
· Easy mechanical mounting
· Small dimensions
· Wide range of resolutions available
· High temperature resistance

EL series
Basic version with incremental outputs. Several output types available.

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

ORDERING CODE

EF 49 C 6 L 2000 Z 5 L 8 X 6 MA . XXX

SERIES
incremental encoder EL
incremental encoder with Hall phases EF

SIZE
mm 49

TYPE
blind hollow shaft C
through hollow shaft P

POLES OF THE MOTOR (EF SERIES)
4 poles 4
6 poles 6
8 poles 8

OUTPUT TYPE FOR HALL PHASES (EF SERIES)
NPN open collector C
line driver L

RESOLUTION
ppr from 1 to 2048

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

ZERO PULSE
without zero pulse S
with zero pulse Z

POWER SUPPLY
5 5 V DC
8/24 8 ... 24 V DC (EL series)

OUTPUT TYPE FOR INCREMENTAL SIGNALS
N NPN (EL series)
C NPN open collector (EL series)
P push pull (EL series)
L line driver

BORE DIAMETER
6 ø 6 mm
8 ø 8 mm
9 ø9,52 mm (3/8")
10 ø 10 mm
12 ø 12 mm
12.7 ø 12.7 mm (1/2")

ENCLOSURE RATING
X IP 40

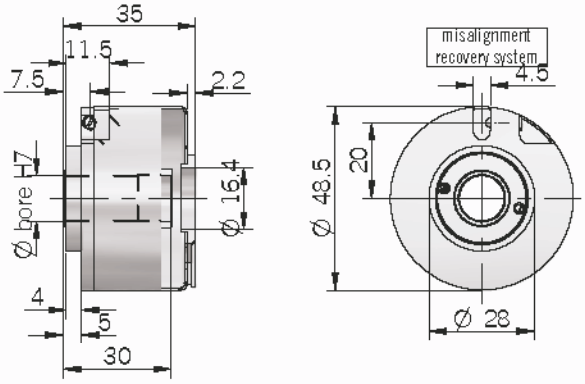
MAX ROTATION SPEED
6 6000 rpm

OUTPUT TYPE
PR radial cable output (standard length 0.3 m)

VARIANT
XXX custom version

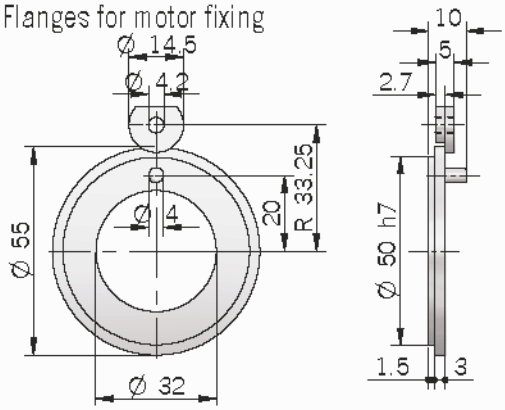
130509

EL - EF 49 C / P

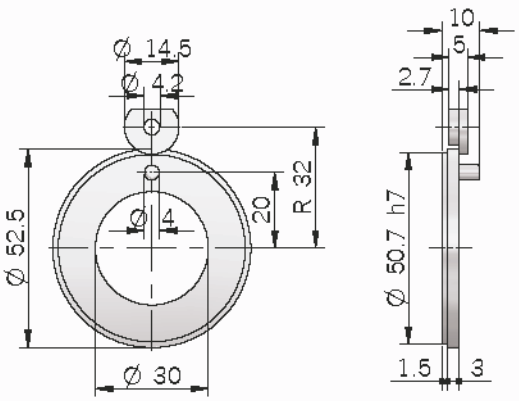


ACCESSORIES

Flanges for motor fixing



Size 19 resolver predisposition (01 version)
ordering code: **FLG000**



Size 19 resolver predisposition (14 version)
ordering code: **FLG001**

HOW TO MOUNT IT

- Insert the flange (A) on the motor.
- Tighten the proper servo-fasteners (B), without blocking them.
- Insert the encoder on the motor shaft with the misalignment recovery system just next to the peg (C).
- Place the washer on the back of the encoder and block it on the motor axle using the screw.
- Turn for phasing.
- Fix the servo-fasteners (B).
- Verify the right working of the misalignment recovery system.
- Check the connector is fully plugged in.
- Place the plastic lid (E); then screw.

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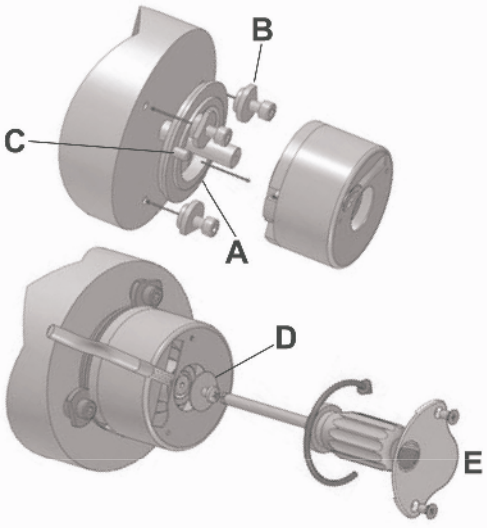


Electrical specifications

Resolution	from 1 to 2048 ppr
Max load current	15 mA for channel (line driver) 30 mA for channel
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-1 IEC 61000-6-3

Electrical specifications (EL series)

Power supply	5 V DC ± 10% 8 ... 24 V DC ± 5%
Output type	NPN / NPN open collector / push pull / line driver
Current consumption without load	100 mA max

Electrical specifications (EF series)

Power supply	5 V DC ± 10%
Output type for incremental signals	line driver
Output type for Hall phases	NPN open collector / line driver
Current consumption without load	150 mA max

Mechanical specifications

Bore diameter	ø 6 / 8 / 9,52 / 10 / 12 / 12,7 mm
Enclosure rating	IP 40
Max rotation speed	6000 rpm
Shock	50 G, 11 ms
Vibration	5 G, 10 ... 500 Hz
Shaft material	1.4305 / AISI 303 stainless steel
Body material	EN-AW 2011 aluminum
Housing material	nickel plated brass
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	100 g
Accessories	1) 3 servo-fasteners (ordering code: 94080001) 2) flanges for fixing on size 19 Resolver predisposition (01 and 14 versions)

Connections

Function	EL Push pull / Npn / Npn open collector	EL 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
⏚	shield	shield	shield

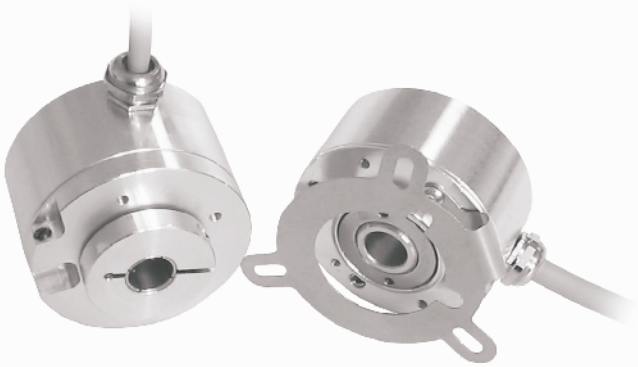
EL 50 F / G / K

INCREMENTAL ENCODER
MOTOR SERIES

MAIN FEATURES

ø 50 encoder series recommended as motor feedback.

- Several ways to fix it
- Easy mechanical mounting
- Small dimensions
- Up to 5000 ppr with zero signal
- Several output types available
- Up to 150 kHz output frequency
- Up to 6000 RPM rotation speed



ORDERING CODE

EL 50 G 1000 Z 5/28 P 8 X 3 P R . XXX

SERIES
incremental encoder series EL

SIZE
mm 50

TYPE
blind hollow shaft (front fixing with spring) F
blind hollow shaft (front fixing with pin) G
blind hollow shaft (rear fixing with screw) K

RESOLUTION
ppr from 1 to 5000
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

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ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

SHAFT DIAMETER
6 mm
8 mm
9 mm ø 9,52 (3/8")
10 mm

ENCLOSURE RATING
X IP 40
S IP 64

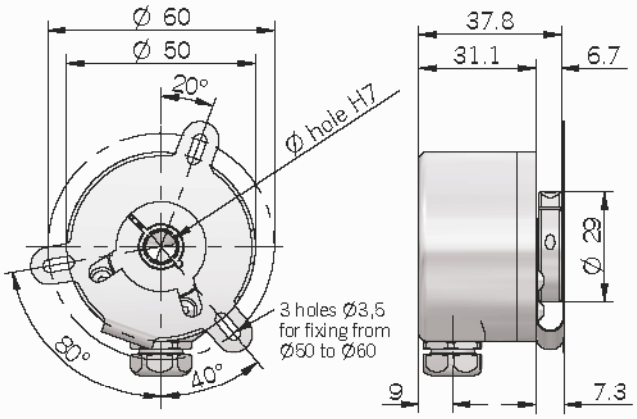
MAX ROTATION SPEED
3 3000 rpm
6 6000 rpm
N.B.: 3000 RPM max. with "S" enclosure rating

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

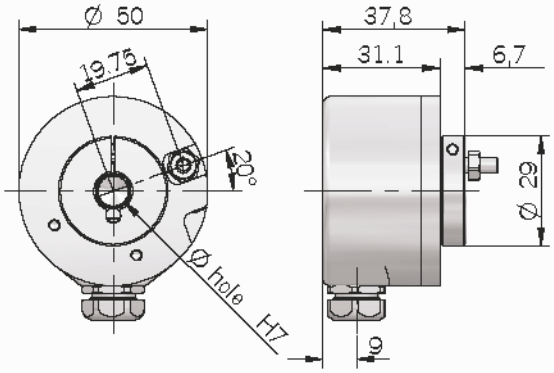
OUTPUT DIRECTION
R radial

VARIANT
XXX custom version

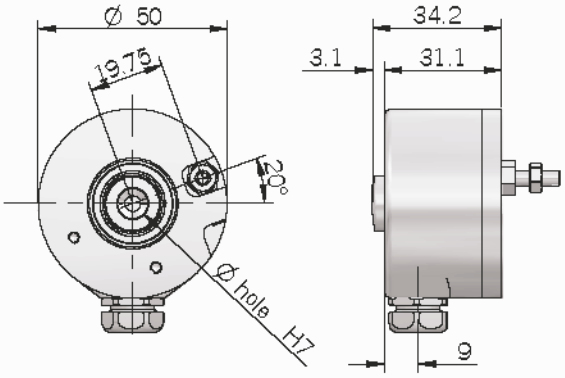
EL 50 F



EL 50 G



EL 50 K



HOW TO MOUNT IT

- Fix the anti-rotation pin (A).
- Insert encoder on the motor shaft with misalignment recovery system just next to the pin (A).
- Insert the washer (B) on the back and block it using the encoder screw on the motor axle.
- Turn for phasing.
- Fix encoder shaft by metal ring.
- Close the encoder with the plug (C).

Electrical specifications

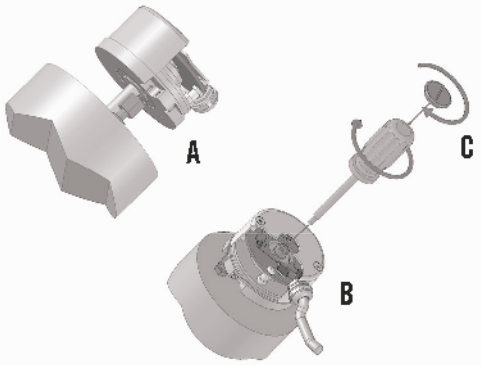
Resolution	from 1 to 5000 ppr
Power supply	5 V DC ± 10% 5 ... 28 V DC ± 5% 8 ... 24 V DC ± 5% (reverse polarity protection)
Current consumption without load	100 mA max
Max load current	30 mA for channel 20 mA for channel (line driver)
Output type	NPN / NPN open collector / push-pull / line driver
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-1 IEC 61000-6-3

Mechanical specifications

Shaft diameter	6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 40 (IEC 60529) IP 64 (IEC 60529)
Max rotation speed	3000 rpm 6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	5 G, 10 ... 500 Hz (IEC 60068-2-6)
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminum
Operating temperature	-10° ... +60 °C -10° ... +85 °C on request
Storage temperature	-25° ... +70 °C
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



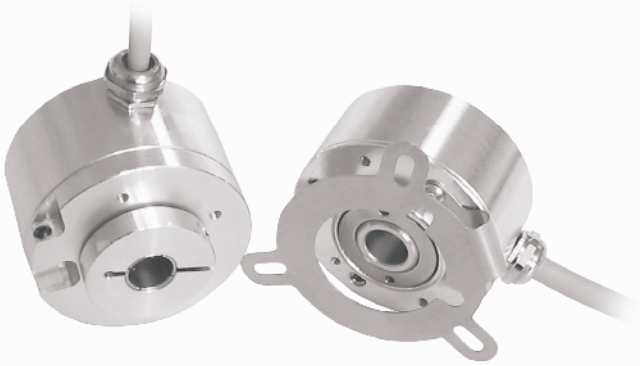
EL 50 FA / FP / GA / GP

INCREMENTAL ENCODER
MOTOR SERIES

MAIN FEATURES

ø 50 encoder series recommended as motor feedback.

- Several ways to fix it
- Easy mechanical mounting
- Small dimensions
- Up to 5000 ppr with zero signal
- Several output types available
- Up to 150 kHz output frequency
- Up to 6000 RPM rotation speed



ORDERING CODE

EL 50 G P 1000 Z 5/28 P 8 X 6 P R . XXX

SERIES
incremental encoder series EL

SIZE
mm 50

TYPE
fixing with spring F
fixing with pin G

FIXING
through hollow shaft with front fixing A
through hollow shaft with rear fixing P

RESOLUTION
ppr from 1 to 5000
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

ELECTRONIC INTERFACE
N NPN
C NPN open collector
P push-pull
PC protected push-pull (AEIC-7272)
L line driver

SHAFT DIAMETER
6 mm
8 mm
9 mm ø 9,52 (3/8")
10 mm

ENCLOSURE RATING
X IP 40

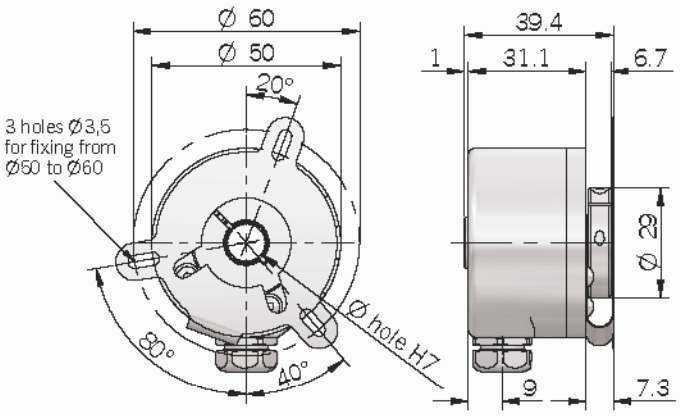
MAX ROTATION SPEED
6 6000 rpm

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

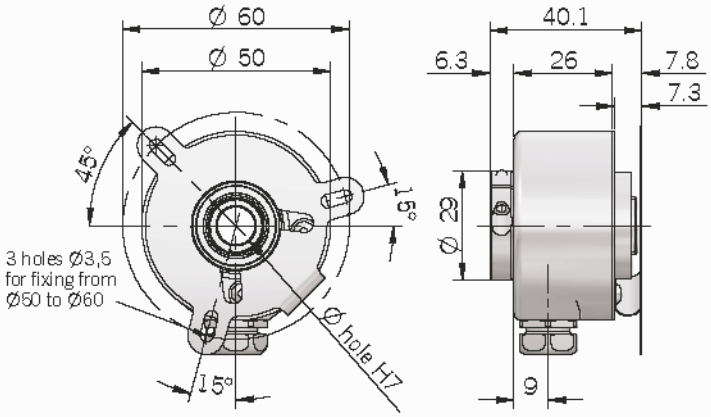
OUTPUT DIRECTION
R radial

VARIANT
XXX custom version

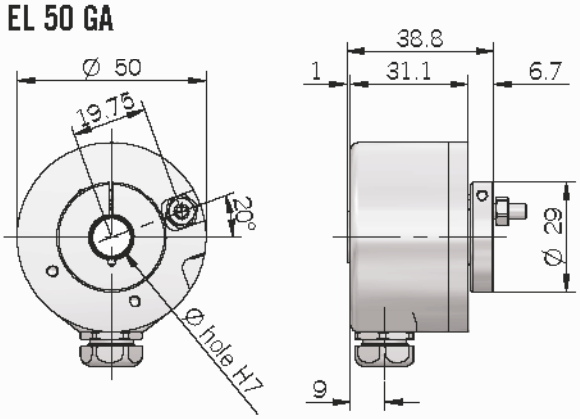
EL 50 FA



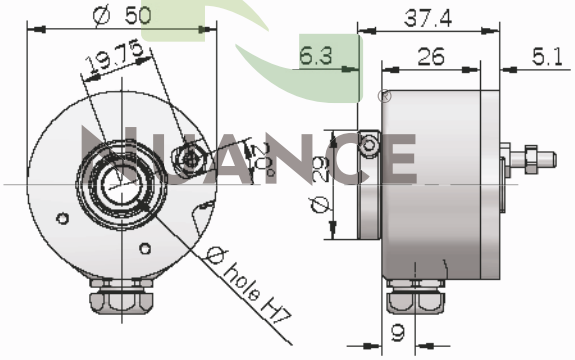
EL 50 FP



EL 50 GA



EL 50 GP



Electrical specifications

Resolution	from 1 to 5000 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	30 mA for channel 20 mA for channel (line driver)
Output type	NPN NPN open collector push-pull line driver
Max output frequency	150 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-1 IEC 61000-6-3

Mechanical specifications

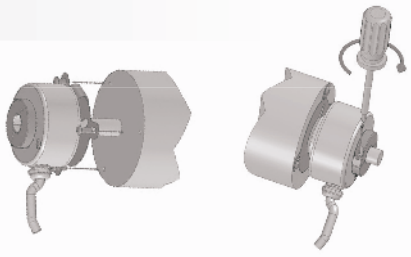
Shaft diameter	6 / 8 / 9,52 / 10 mm
Enclosure rating	IP 40 (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	5 G, 10 ... 500 Hz (IEC 60068-2-6)
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminum
Operating temperature	-10° ... +60 °C -10° ... +85 °C on request
Storage temperature	-25° ... +70 °C
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

HOW TO MOUNT IT

- Couple encoder shaft with motor shaft.
- Fix the spring to the motor flange without tightening it.
- Fix encoder shaft by the metal ring.
- Turn for phasing.
- Block the spring.



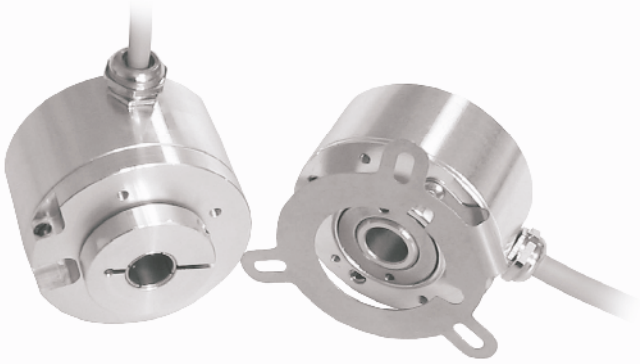
EF 50 F / G / K

INCREMENTAL ENCODER
MOTOR SERIES

MAIN FEATURES

ø 50 encoder series recommended as motor feedback.

- Several ways to fix it
- Easy mechanical mounting
- Small dimensions
- Up to 2048 ppr with zero signal
- Several output types available
- Up to 205 kHz output frequency
- Up to 6000 RPM rotation speed



ORDERING CODE

EF 50 F 6 L 2000 Z 5 L 8 X 6 PR . XXX

SERIES
incremental encoder with Hall phases EF

SIZE
mm 50

TYPE
blind hollow shaft (front fixing with spring) F
blind hollow shaft (front fixing with pin) G
blind hollow shaft (rear fixing with screw) K

POLES OF THE MOTOR
4 poles 4
6 poles 6
8 poles 8

OUTPUT TYPE FOR HALL PHASES
NPN open collector C
line driver L

RESOLUTION
ppr from 1 to 2048
N.B.: please directly contact our offices for pulses availability

ZERO PULSE
without zero pulse S
with zero pulse Z

POWER SUPPLY
5 5 V DC

OUTPUT TYPE FOR INCREMENTAL SIGNALS
L line driver

SHAFT DIAMETER
6 mm
8 mm
9 mm ø 9,52 (3/8")
10 mm

ENCLOSURE RATING
X IP 40
S IP 64

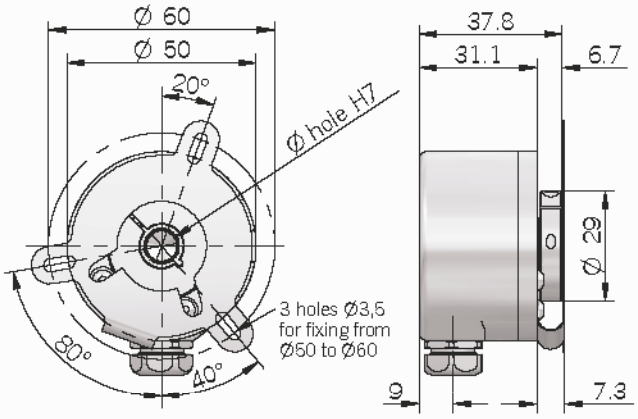
MAX ROTATION SPEED
3 3000 rpm
6 6000 rpm
N.B.: 3000 RPM max. with "S" enclosure rating

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

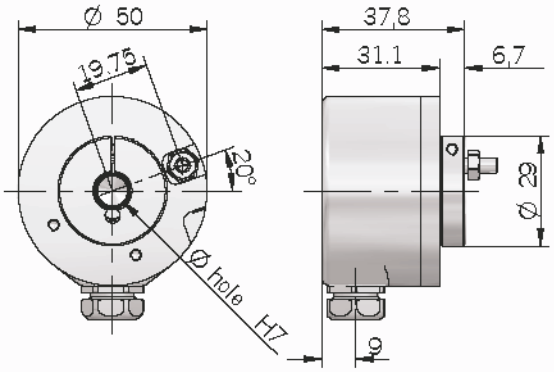
VARIANT
XXX custom version

NUANCE®

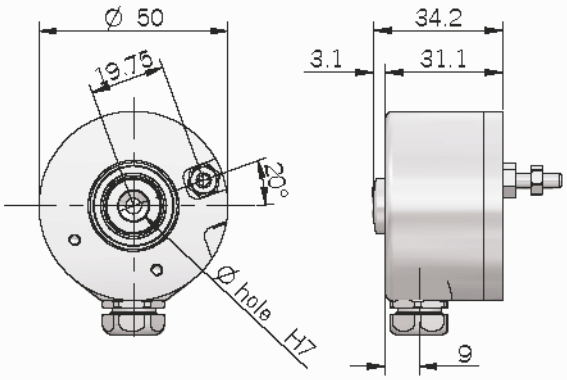
EF 50 F



EF 50 G



EF 50 K



HOW TO MOUNT IT

- Fix the anti-rotation pin (A).
- Insert encoder on the motor shaft with misalignment recovery system just next to the pin (A).
- Insert the washer (B) on the back and block it using the encoder screw on the motor axle.
- Turn for phasing.
- Fix encoder shaft by metal ring.
- Close the encoder with the plug (C).

Electrical specifications

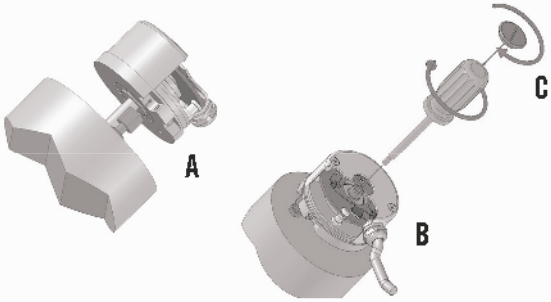
Resolution	from 1 to 2048 ppr
Power supply	5 V DC ± 10%
Current consumption without load	150 mA max
Max load current	15 mA for channel (line driver) 30 mA for channel
Output type for incremental signals	line driver
Output type for Hall phases	NPN open collector / line driver
Max output frequency	205 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-1 IEC 61000-6-3

Mechanical specifications

Shaft diameter	6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 40 (IEC 60529) IP 64 (IEC 60529)
Max rotation speed	3000 rpm 6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	5 G, 10 ... 500 Hz (IEC 60068-2-6)
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Operating temperature	-10° ... +70 °C -10° ... +85 °C on request
Storage temperature	-25° ... +70 °C
Weight	150 g

Connections and standard colours

Function	14 core wire
+V DC	red
0 V	black
Ch. A	green
Ch. B	yellow
Ch. Z	blue
Ch. A-	brown
Ch. B-	orange
Ch. Z-	white
Ch. U	gray
Ch. V	violet
Ch. W	gray-pink
Ch. U-	red-blue
Ch. V-	white-green
Ch. W-	brown-green
⏚	shield



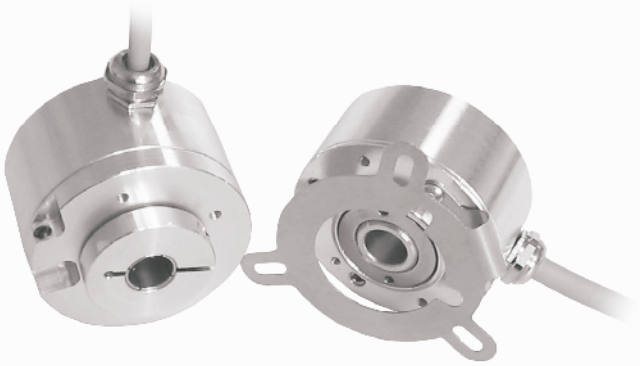
EF 50 FA / FP / GA / GP

INCREMENTAL ENCODER
MOTOR SERIES

MAIN FEATURES

ø 50 encoder series recommended as motor feedback.

- Several ways to fix it
- Easy mechanical mounting
- Small dimensions
- Up to 2048 ppr with zero signal
- Several output types available
- Up to 205 kHz output frequency
- Up to 6000 RPM rotation speed



HOLLOW SHAFT INCREMENTAL ENCODERS

ORDERING CODE

EF 50 G P 6 L 2000 Z 5 L 8 X 6 PR . XXX

SERIES
incremental encoder with Hall phases EF

SIZE
mm 50

TYPE
fixing with spring F
fixing with pin G

FIXING
through hollow shaft with front fixing A
through hollow shaft with rear fixing P

POLES OF THE MOTOR
4 poles 4
6 poles 6
8 poles 8

OUTPUT TYPE FOR HALL PHASES
NPN open collector C
line driver L

RESOLUTION
ppr from 1 to 2048

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

ZERO PULSE
without zero pulse S
with zero pulse Z

POWER SUPPLY
5 5 V DC

OUTPUT TYPE FOR INCREMENTAL SIGNALS
L line driver

SHAFT DIAMETER
6 mm
8 mm
9 mm ø 9,52 (3/8")
10 mm

ENCLOSURE RATING
X IP 40

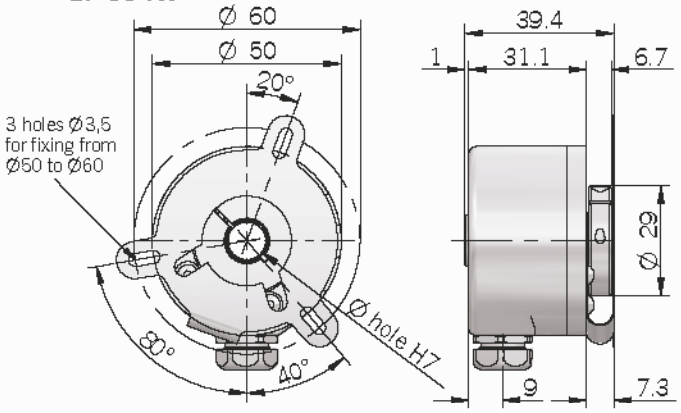
MAX ROTATION SPEED
6 6000 rpm

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

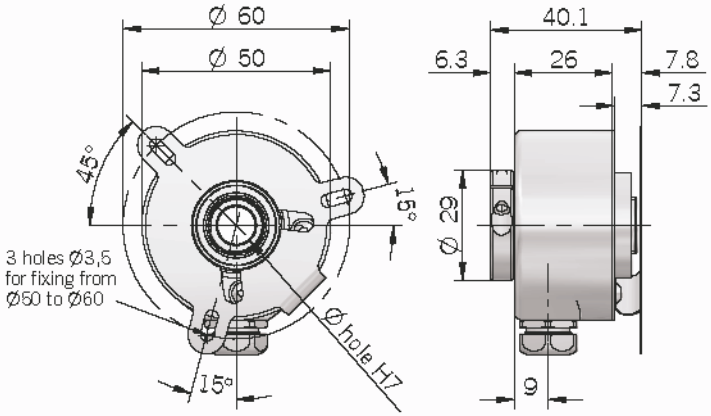
VARIANT
XXX custom version

NUANCE®

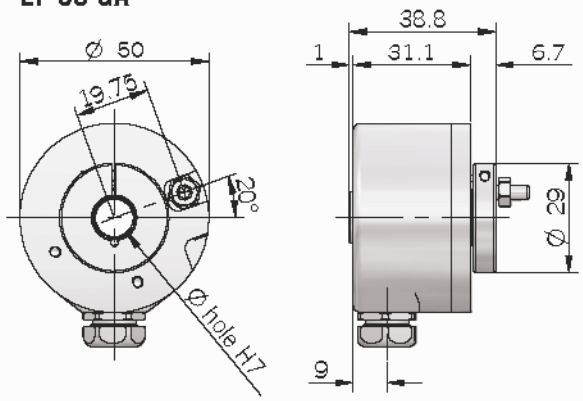
EF 50 FA



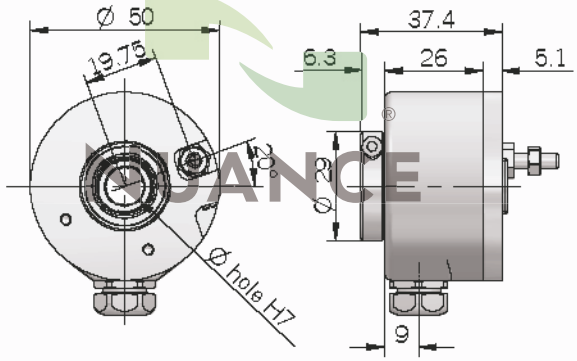
EF 50 FP



EF 50 GA



EF 50 GP



Electrical specifications

Resolution	from 1 to 2048 ppr
Power supply	5 V DC ± 10%
Current consumption without load	150 mA max
Max load current	15 mA for channel (line driver) 30 mA for channel
Output type for incremental signals	line driver
Output type for Hall phases	NPN open collector line driver
Max output frequency	205 kHz
Counting direction	A leads B clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-1 IEC 61000-6-3

Mechanical specifications

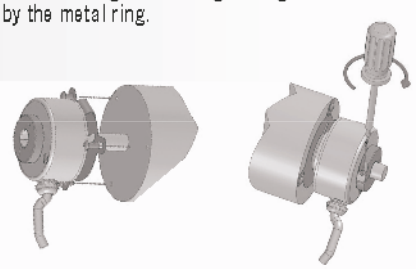
Shaft diameter	6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 40 (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	5 G, 10 ... 500 Hz (IEC 60068-2-6)
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Operating temperature	-10° ... +70 °C -10° ... +85 °C on request
Storage temperature	-25° ... +70 °C
Weight	150 g

Connections and standard colours

Function	14 core wire
+V DC	red
0 V	black
Ch. A	green
Ch. B	yellow
Ch. Z	blue
Ch. A-	brown
Ch. B-	orange
Ch. Z-	white
Ch. U	gray
Ch. V	violet
Ch. W	gray-pink
Ch. U-	red-blue
Ch. V-	white-green
Ch. W-	brown-green
⏚	shield

HOW TO MOUNT IT

- Couple encoder shaft with motor shaft.
- Fix the spring to the motor flange without tightening it.
- Fix encoder shaft by the metal ring.
- Turn for phasing.
- Block the spring.



EH - EL 53 A / B

INCREMENTAL ENCODER

MAIN FEATURES

Encoder series designed to be mounted directly on motors.
Our integrated elastic coupling allows radial and axial play compensation.

- Resolution up to 10000 ppr with zero signal for EL series, up to 1024 ppr for EH series.
- Different output types available.
- Up to 28 V DC power supply for EL series and up to 24 V DC for EH series.
- Up to 300 kHz output frequency for EL series and up to 100 kHz for EH series.
- Cable or connector output.
- Several flanges available.
- Up to 6000 RPM rotation speed.
- Up to IP 64 sealing.

ORDERING CODE

EL 53 A M* 1000 Z 5/28 N 6 X 6 M R . XXX

SERIES
incremental encoder series EL
incremental encoder series EH

SIZE
mm 53

TYPE
adjustable flange model A
adjustable flange model B

METAL COVER
M
** add for metal cover (only EL series)*

RESOLUTION
(EL series) ppr from 1 to 10000
(EH series) ppr from 50 to 1024
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
(available only with EL series) 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

BORE DIAMETER
6 mm
8 mm
10 mm

ENCLOSURE RATING
X IP 54
S IP 64 (available only with EL series)

MAX ROTATION SPEED
3 3000 rpm
6 6000 rpm

OUTPUT TYPE
P cable output (standard length 1.5 m) (EL series)
cable output (standard length 0.5 m) (EH series)
M M connector output
J J connector output

DIRECTION TYPE
A axial (EL series)
R radial

VARIANT
XXX custom version