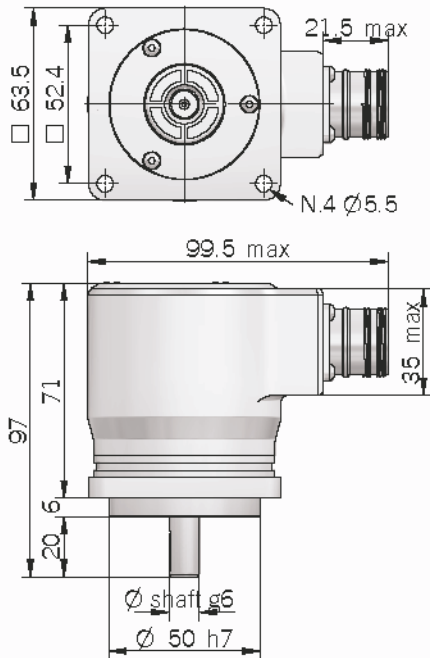
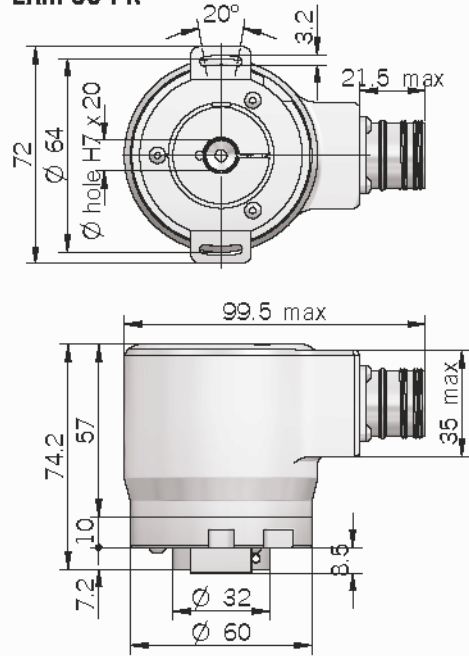


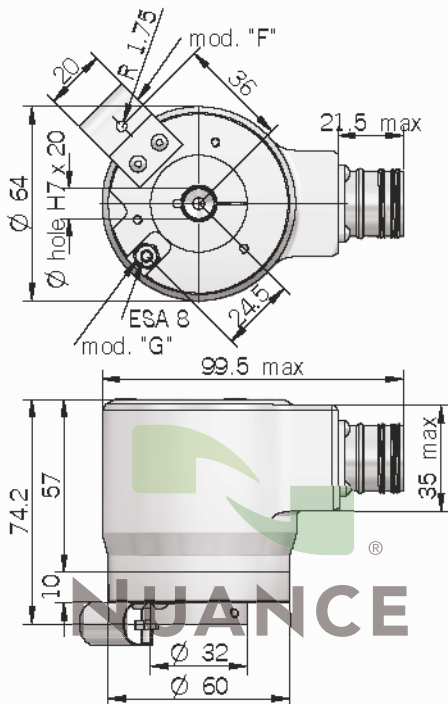
EAM 63 ER



EAM 58 FR

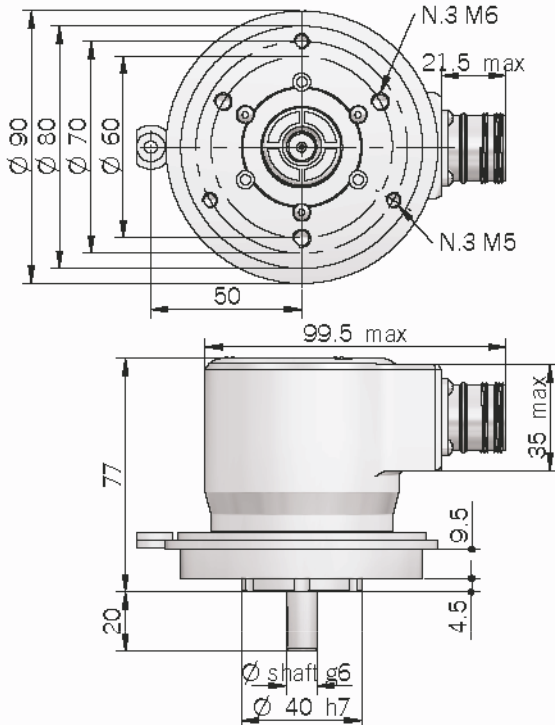


EAM 63 FR - EAM 63 GR

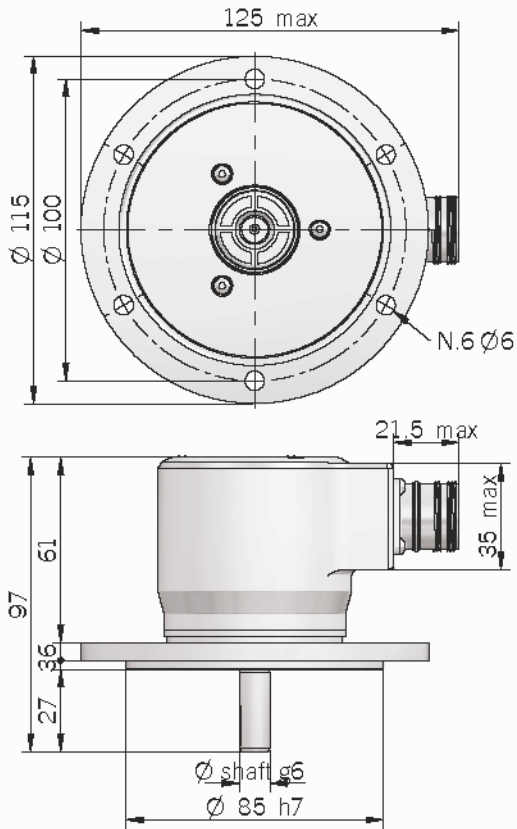


EAM 90 AR

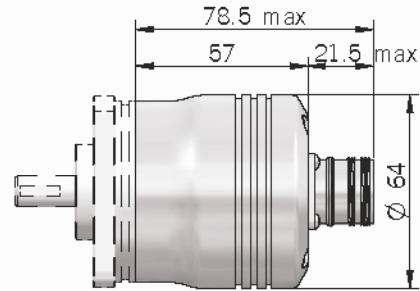
* servofasteners not included



EAM 115 AR

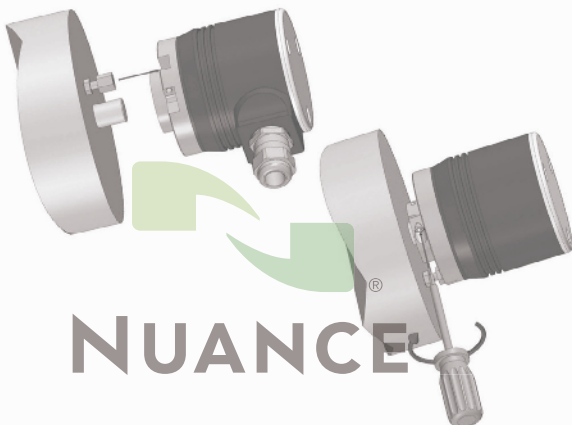


Dimensions with axial output cover



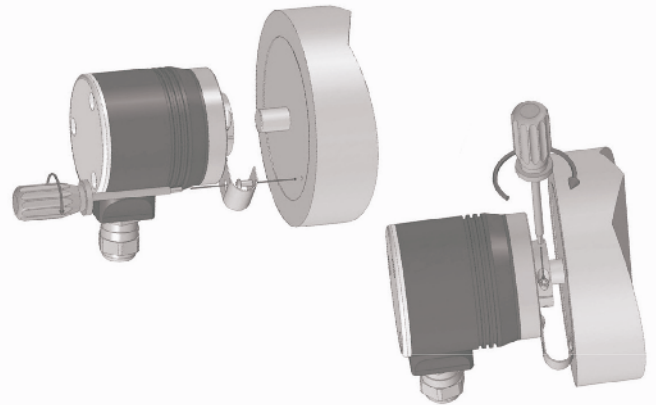
HOW TO MOUNT THE EAM63GR

- 1) Fix the antirotation pin on the motor flange.
- 2) Couple the encoder shaft with the motor shaft, ensuring that the pin is inserted on the frontal part of the encoder (maintaining a minimum distance of 0,5 mm).
- 3) Fix the encoder shaft by the metal ring.



HOW TO MOUNT THE EAM63FR

- 1) Couple the encoder shaft with the motor shaft.
- 2) Fix the spring at the motor flanges without screwing it.
- 3) Fix the encoder shaft by the metal gear.
- 4) Block the spring.

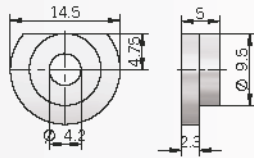


NUANCE

Electrical specifications

Multiturn resolution	from 2 to 16384 (powers of 2)
Singleturn resolution	from 2 to 8192 (powers of 2)
Power supply	5 V DC \pm 10% (only with SSI interface) 8 ... 28 V DC \pm 5%
Current consumption without load	100 mA
Max load current	20 mA per channel (Parallel interface)
Electronic interface	Parallel interface: PUSH-PULL (positive logic) SSI RS422
Auxiliary input (U/D - LATCH)	active high (+Vdc) <i>connect to OV if not used</i>
Max frequency	Parallel 25 kHz 100 kHz ... 1 MHz SSI
SSI monostable time (Tm)	18 μ s
SSI pause time (Tp)	> 35 μ s
Accuracy	\pm 1/2 LSB
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Shaft diameter (mm)	6 (58B) 8 (58B - 63A/D/E - 90A) 9.52 (3/8") (63A/D/E - 90A) 10 (58B - 63A/D/E - 90A - 115A) 11 (115A)
Bore diameter (only for mod.58F - 63F/G)	8 / 9 (3/8") / 10 / 12 / 14 / 15 mm
Enclosure rating	IP 54 (IEC 60529) IP 66 (IEC 60529) optional for -58B/C -63A/D/E -90A
Max rotation speed	6000 rpm continuous 3000 rpm continuous for 58F - 63G 3000 rpm with IP66
Max shaft load	10 N (1 Kp) axial with ϕ 6 shaft 20 N (2 Kp) radial with ϕ 6 shaft 100 N (10 Kp) axial 100 N (10 Kp) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-8)
Bearings life	10 ⁹ revolutions
Bearings	n° 2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Body material	EN-AW 2011 aluminum
Housing material	pa inted aluminium
Flange material	EN-AW 2011 aluminum
Operating temperature	0° ... +60°C
Storage temperature	-15° ... +70°C
Weight	350 g - 58B/C - 63A/D/E/G 750 g - 90A - 115A
Accessories	set N° 3 fasteners for models -63A -58B -90A Ord. Cod.: 94080001 



PRESENTATION

The Eltra multiturn Profibus encoder series (Identification Number 0x0599) is complying to the Profibus DP standard as described on the European Standard EN 50170 Volume 2. Particularly, Eltra Profibus encoders are according to "PROFIBUS-Profile for Encoders, Order No. 3.062". The Profibus DP interface maintains the same maximum resolution and characteristics (8192 ppr and 4096 revolutions) of the stand-alone version and adds the plus of the Profibus DP network.

By the Profibus DP network is possible:

- During the periodic data exchange, getting the indication of the angular position from the encoder.
- During the set up, setting the resolution as number positions within the single turn and as number of turns.
- During the set up, changing the default increase direction count.
- To perform the PRESET operation (set the encoder to read a specific position).
- Reading the diagnostic operating mode.
- Getting info about the code supplied by the device.

Directly from the device it is possible:

- To display the ON/OFF status.
- To display the device activity on the bus.
- Setting the device address.
- If requested, inserting in the bus the termination resistance.
- Inverting the counting direction.



HARDWARE INSTALLATION DEVICE

Installing the Eltra Profibus encoder in a network requires the execution of the standard steps necessary for configuring any Profibus DP slave. The sequence of steps is as follow:

1. Commissioning the slave on the master (see corresponding paragraph).
2. Wiring the encoder into the Profibus network using or not terminations depending on the physical position the devices has in the bus.
3. Directly set the address (which must be unique in the network and the same as the one chosen in point 1) for the slave.
4. Preparing the master side application/s and setting up the Profibus network.

On the back cover of the encoder (see picture) there is a led inspection window.

The device operating status can be controlled by the two led through the window. The green one shows the power presence and must be permanently switched on. The red led switches off only during the periodic data exchange between the Profibus master and the encoder.

In the section plan a long side the 2 dip-switches of termination line and the 8 dip switches of device address are shown. In the particular shown configuration, the 2 termination line contacts are set to OFF so the termination of the bus is not expected to occur on the encoder.

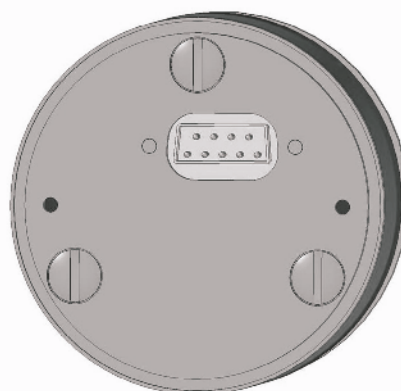
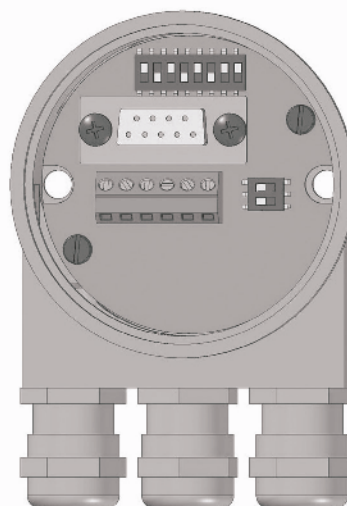
Only seven out of the eight available dip-switches are used to address the slave because the maximum number of devices that can be connected to a Profibus network is 126. For addressing the device, only the first seven dip switches out of the eight available are used.

The contact number 8 is the LSB while the number 2 is the MSB.

The eight contact (1) is used to invert the code.

CONNECTION TO THE NETWORK

For connecting Profibus encoders to the network, cables within the device can be accessed by the three cable glands (in any event only two of them can be used).



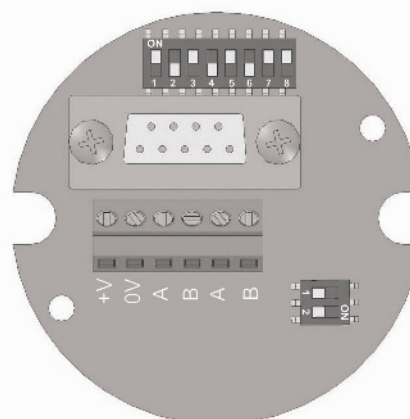
TERMINAL BLOCK ACCESS

To access the terminal block, unscrew the two screws on the rear plug and release the rear case from the main one.

Then, connect wires according to the cable connections as reported on the table on the right.

Please NOTE:

to set and configure the slave into the Profibus DP master ('commissioning' step) it is necessary to use the "Exx_0599.gsd" file delivered with the encoder. This file can eventually be downloaded from web site: www.eltra.it.



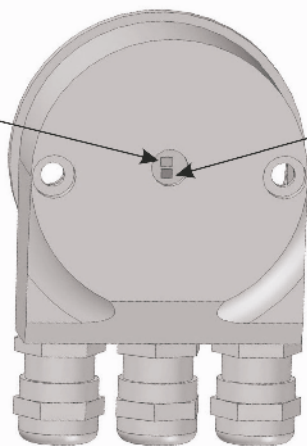
Cable connections

+V	SUPPLY VOLTAGE
0V	GROUND
A	PROFIBUS DP LINE OUT (Green)
B	PROFIBUS DP LINE OUT (Red)
A	PROFIBUS DP LINE IN (Green)
B	PROFIBUS DP LINE IN (Red)



LED

Input voltage LED, NORMALLY TURN ON



Active on network LED, NORMALLY TURN OFF

NETWORK SPECIFICATIONS

Usually, an A type cable is used to wire a DP/FMS network. This cable has to have the following characteristics:

Parameter	Cable type A
Characteristics in Ω	135 ... 165 at a frequency of (3 ... 20 Mhz)
Operating capacity (pF/m)	< 30
Loop resistance (Ω /km)	< = 110
Core diameter (mm)	> 0.64*
Core cross-section (mm ²)	> 0.34*

This cable allows an optimum network utilization. In fact, it is possible to reach the maximum communication speed allowed (12Mbaud). However, there are some limitations due to the maximum physical dimensions of a bus segment as follows:

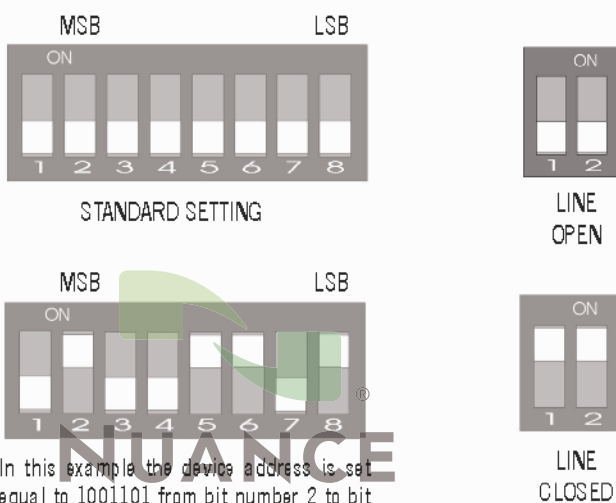
Baud rate (kbit/s)	Range/Segment
9.6	1200 m
19.2	1200 m
93.75	1200 m
187.5	1000 m
500	400 m
1500	200 m
12000	100 m

Finally, main physical and topographical specifications of a Profibus network are as follows:

Specifications	
Maximum number of station participating in the exchange of user data	DP: 126 (address from 0 ... 125) FMS: 127 (address from 0 ... 126)
Maximum number of stations per segment including repeaters	32
Available data transfer rates in kbit/s	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, 12000 According to EN 50170, a maximum of 4 repeaters are allowed between any two stations. Dependent on the repeater type and manufacturer, more than 4 repeaters are allowed in some cases. Refer to the manufacturer's technical specification for details.
Max number of segments in series	

DIP-SWITCHES SETTING

Below it is reported an example of the standard position of address and termination dip switches as well as settings for closing a Profibus line.



In this example the device address is set equal to 1001101 from bit number 2 to bit number 8 corresponding to HEX 77. Meanwhile, the first bit represents the inversion of the code (activated in this case).

Output connections for PROFIBUS® DP encoder

Function	S3 connector 5-pin (power supply)	S3 connector 5-pin (line out)	S3 connector 5-pin (line in)
+ Vdc	2		
0 Volt	4		
signal A (out)		2	
signal B (out)		4	
signal A (in)			2
signal B (in)			4

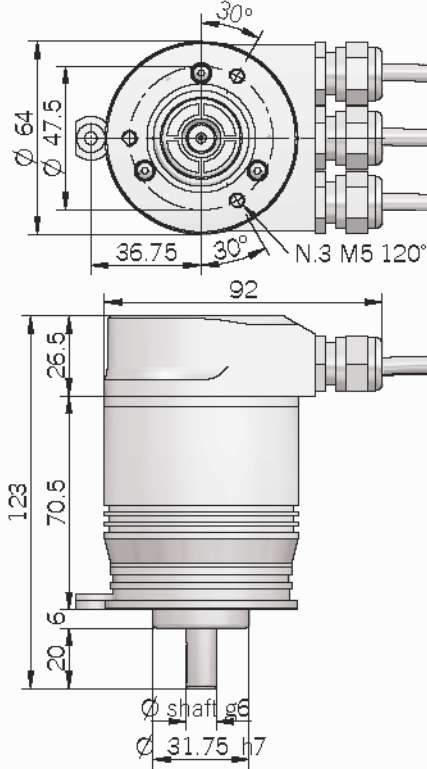
PROFIBUS ENCODER ORDERING CODE

EAM 63 A R 4096 / 4096 G 8/28 P P X 10 X 3 P3 R . XXX	
SERIES absolute multiturn encoder EAM	VARIANT XXX custom version
SIZE mm 58 mm 63 mm 90 mm 115	OUTPUT DIRECTION R radial
TYPE synchronous flange ø 31.75 mm (EAM63) A synchronous flange ø 40 mm (EAM90) A RE0444 flange (EAM115) A synchronous flange ø 50 mm (EAM58) B fixing flange ø 38 mm (EAM58) C centering square flange ø 31.75 mm (EAM63) D centering square flange ø 50 mm (EAM63) E blind hollow shaft with spring (EAM58 / 63) F blind hollow shaft with anti-rotation pin (EAM63) G rev. 2.0 (compact version) R	OUTPUT TYPE P3 cable glands S3 M12 connectors
MULTITURN RESOLUTION 4096 <i>N.B.: programmable 1 ... 4096 during commissioning</i>	MAX ROTATION SPEED 3 3000 rpm with IP 66 6 6000 rpm
SINGLETURN RESOLUTION 4096 / 8192 <i>N.B.: programmable 2 ... 4096 / 2 ... 8192 during commissioning</i>	ENCLOSURE RATING X IP 54 S optional IP 66 with the exception EAM 58F - 63F/G - 115A
CODE TYPE Binary B	SHAFT DIAMETER 6 mm - 58B 8 mm - 58B - 63A/D/E - 90A 9 mm (9.52 mm 3/8") - 63A/D/E - 90A 10 mm - 58B/C - 63A/D/E - 90A - 115A 11 mm - 115A
POWER SUPPLY 12 ... 28 V DC 12/28	BORE DIAMETER ONLY FOR MOD. 58F - 63F/G 8 mm 9 mm (9.52 mm 3/8") 10 mm 12 mm 14 mm 15 mm
ELECTRONIC INTERFACE PROFIBUS DP V0 CLASS 2 F	OPTIONS X to be reported if not used
	LOGIC X to be reported if not used



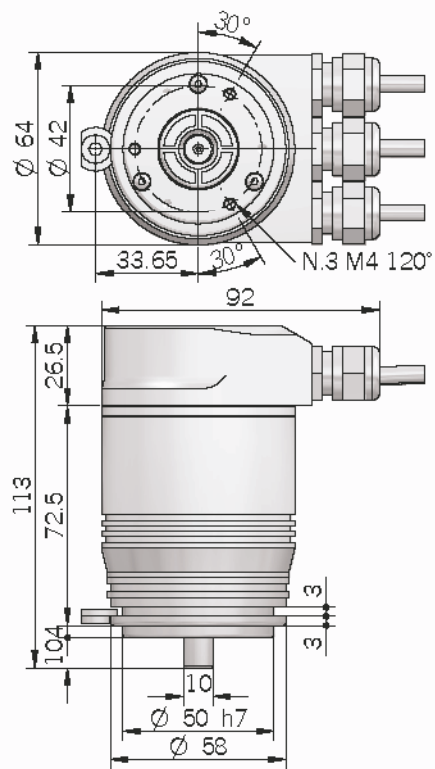
EAM 63 A

* servofasteners not included

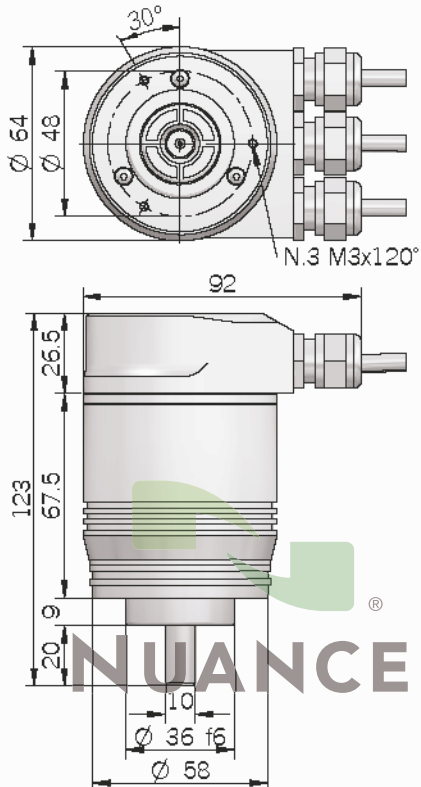


EAM 58 B

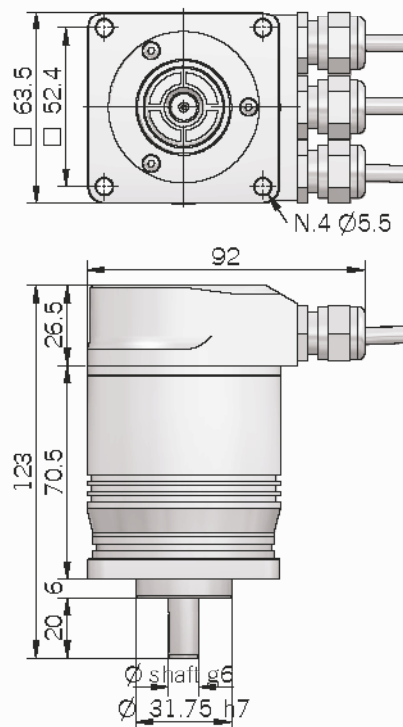
* servofasteners not included



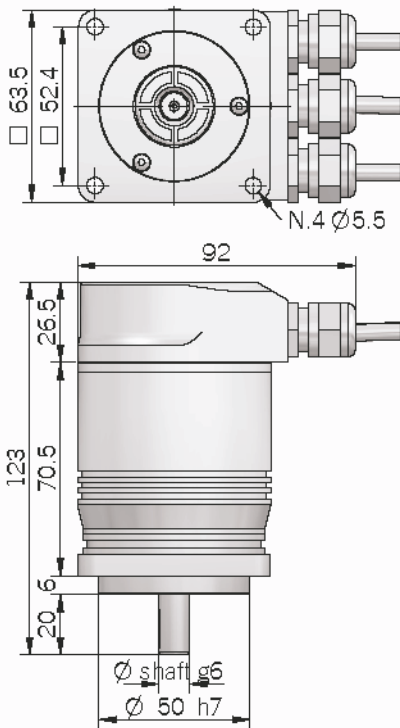
EAM 58 C



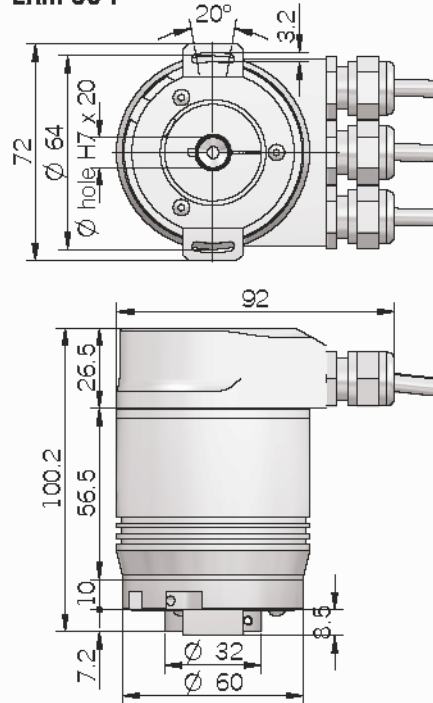
EAM 63 D



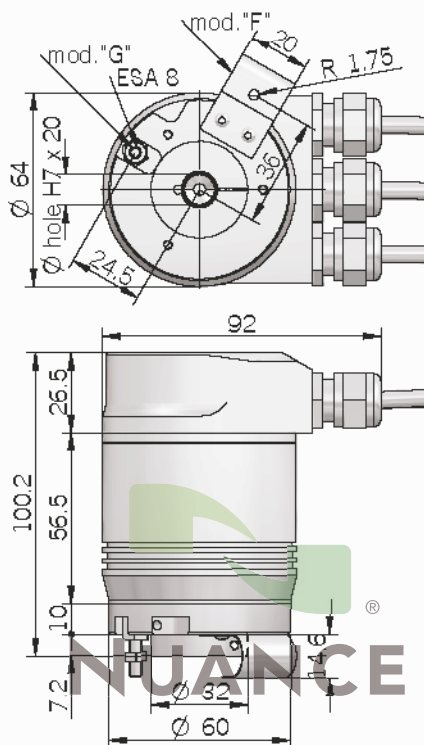
EAM 63 E



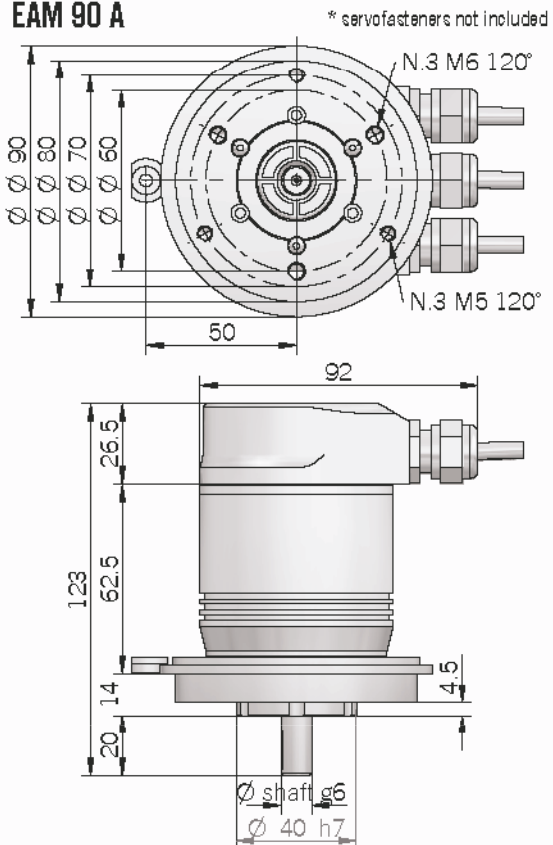
EAM 58 F



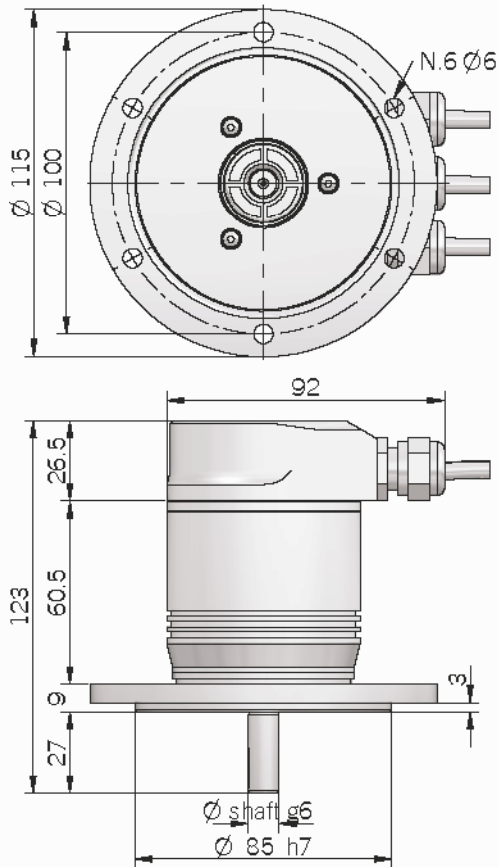
EAM 63 F / G



EAM 90 A



EAM 115 A



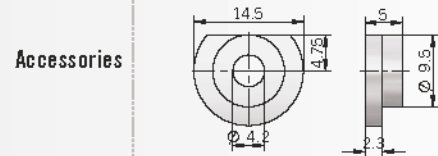
Electrical specifications

Multiturn resolution	1 ... 4096 <i>programmable during commissioning</i>
Singleturn resolution	2 ... 4096 / 2 ... 8192 <i>programmable during commissioning</i>
Power supply	12 ... 28 V DC \pm 5%
Current consumption without load	300 mA
Electronic interface	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm <i>please refer to installation guide for more informations</i>
Response frequency	25 kHz
Accuracy	\pm 1/2 LSB [®]
Counting direction	<i>programmable during commissioning</i>
Start-up time	500 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Shaft diameter (mm)	6 (58B) 8 (58B - 63A/D/E - 90A) 9.52 (3/8") (63A/D/E - 90A) 10 (58B - 63A/D/E - 90A - 115A) 11 (115A)
Bore diameter (only for mod.58F - 63F/G)	8 / 9 (3/8") / 10 / 12 / 14 / 15 mm
Enclosure rating	IP 54 (IEC 60529) IP 66 (IEC 60529) optional for -58B/C -63A/D/E -90A
Max rotation speed	6000 rpm continuous 3000 rpm continuous for 58F - 63G 3000 rpm with IP66
Max shaft load	10 N (1 Kp) axial with ϕ 6 shaft 20 N (2 Kp) radial with ϕ 6 shaft 100 N (10 Kp) axial 100 N (10 Kp) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10 ⁹ revolutions
Bearings	n° 2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Body / Cover material	EN-AW 2011 aluminum
Housing material	painting aluminium
Flange material	EN-AW 2011 aluminum
Operating temperature	0° ... +60°C
Storage temperature	-15° ... +70°C
Weight	350 g - 58B/C - 63A/D/E/G 750 g - 90A - 115A

set N° 3 fasteners for models -63A -58B -90A
Ord. Cod.: 94080001



EAM 63 AX / DX SSI

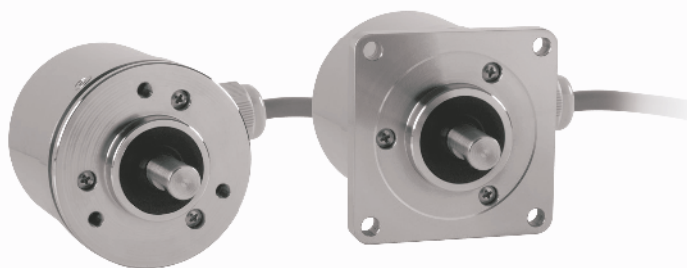
STAINLESS STEEL
SINGLETURN ABSOLUTE ENCODERS



MAIN FEATURES

Thanks to the stainless steel enclosure, the encoder is suitable for food and beverage machinery, cranes and winches for ships, offshore applications, washing systems and all those environments where high corrosion resistance is required. EAM 63 AX / DX is available with SSI output.

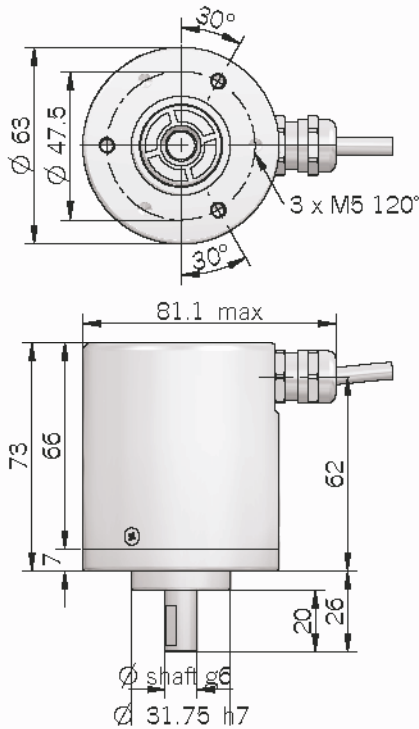
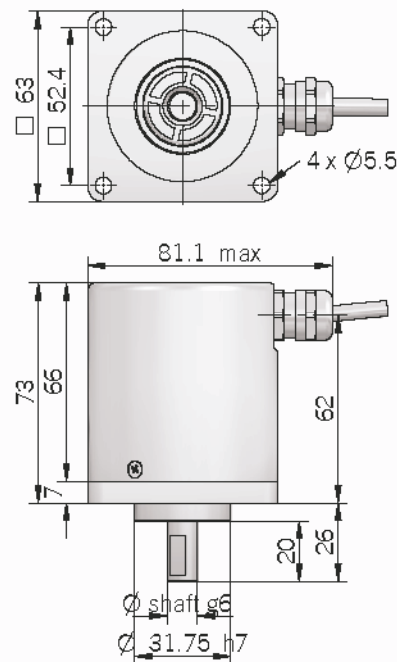
- Maximum frequency 1 MHz
- Up to IP 66 sealing



ORDERING CODE

EAM 63 AX 4096 / 4096 G 8/28 S X X 10 S 3 PC R . XXX	
SERIES multiturn absolute encoder EAM	VARIANT XXX custom version
SIZE mm 63	OUTPUT DIRECTION R radial
TYPE synchronous flange \varnothing 31.75 mm AX centering square flange \varnothing 31.75 mm DX	OUTPUT TYPE PC cable output with (standard length 1.5 m)
MULTITURN RESOLUTION 2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 / 512 / 1024 / 2048 / 4096 / 8192 / 16384	MAX ROTATION SPEED 3 3000 rpm
SINGLETURN RESOLUTION 2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 / 512 / 1024 / 2048 / 4096 / 8192	ENCLOSURE RATING S IP 66
<i>N.B. please directly contact our offices for pulses availability</i>	SHAFT DIAMETER 6 mm 8 mm 9 mm (9.52 mm 3/8") 10 mm
CODE TYPE Binary B Gray (standard) G	OPTION X to be reported if not used
POWER SUPPLY 5 V DC 5 8 ... 28 V DC 8/28	LOGIC X to be reported if not used
ELECTRONIC INTERFACE SSI (Serial Synchronous Interface) S	



EAM 63 AX**EAM 63 DX****Electrical specifications**

Multiturn resolution	from 2 to 16384 (powers of 2)
Singleturn resolution	from 2 to 8192 (powers of 2)
Power supply	5 V DC \pm 10% 8 ... 28 V DC \pm 5%
Current consumption without load	100 mA
Electronic interface	SSI RS422
Auxiliary input (U/D)	active high (+Vdc) <i>connect to 0V if not used</i>
Max frequency	100 kHz ... 1 MHz SSI
SSI monostable time (Tm)	18 μ s
SSI pause time (Tp)	> 35 μ s
Accuracy	\pm 1/2 LSB
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Output connections for SSI encoder

Function	Cable colours
+ Vdc	red
0 Volt	black
U/D	red-blue
dato +	green
dato -	brown
clock +	yellow
clock -	orange or pink
⏏	shield

Mechanical specifications

Shaft diameter (mm)	6 / 8 / 9.52 (3/8") / 10
Enclosure rating	IP 66 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load	10 N (1 Kp) axial with ϕ 6 shaft 20 N (2 Kp) radial with ϕ 6 shaft 100 N (10 Kp) axial 100 N (10 Kp) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10 ⁹ revolutions
Bearings	n° 2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Body material	1.4305 / AISI 303 stainless steel
Housing material	1.4305 / AISI 303 stainless steel
Flange material	1.4305 / AISI 303 stainless steel
Operating temperature	0° ... +60°C
Storage temperature	-15° ... +70°C
Weight	650 g

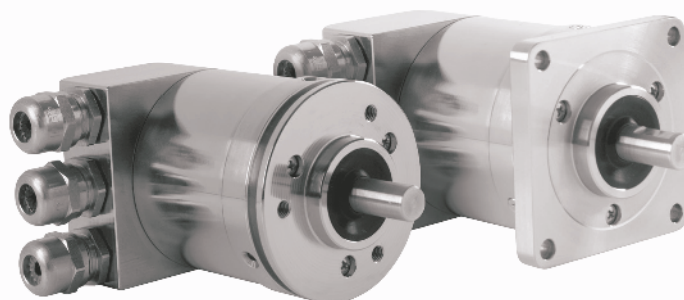
EAM 63 AX / DX PROFIBUS

STAINLESS STEEL
MULTITURN ABSOLUTE ENCODERS



MAIN FEATURES

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

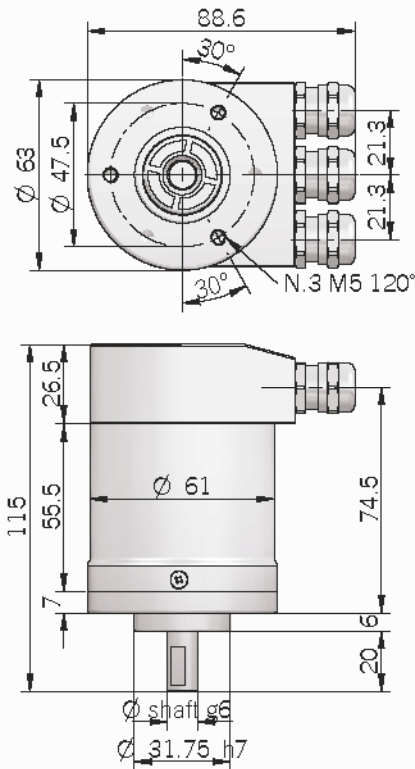


ORDERING CODE

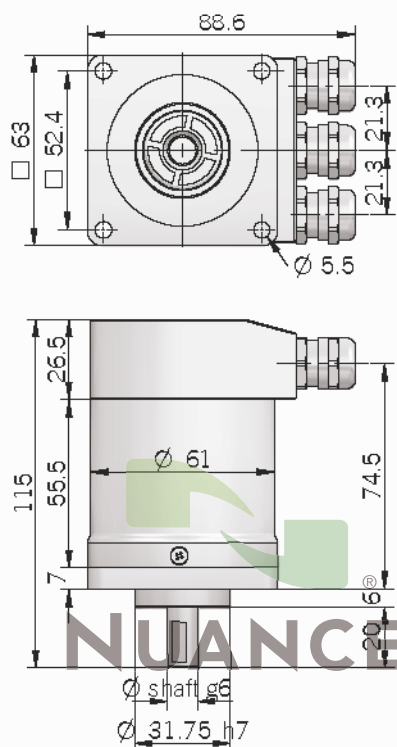
EAM 63 AX 4096 / 8192 B 12/28 F X X 6 S 3 P3 R . XXX	
SERIES multiturn absolute encoder EAM	VARIANT XXX custom version
SIZE mm 63	OUTPUT DIRECTION R radial
TYPE synchronous flange \varnothing 31.75 mm AX centering square flange \varnothing 31.75 mm DX	OUTPUT TYPE P3 cable glands
MULTITURN RESOLUTION 4096 <i>N.B.: programmable 1 ... 4096 during commissioning</i>	MAX ROTATION SPEED 3 3000 rpm
SINGLETURN RESOLUTION 4096 / 8192 <i>N.B.: programmable 2 ... 4096 / 2 ... 8192 during commissioning</i>	ENCLOSURE RATING S IP 68
CODE TYPE binary B	SHAFT DIAMETER 6 mm 8 mm 9 mm (9.52 mm 3/8") 10 mm
POWER SUPPLY 12 ... 28 V DC 12/28	OPTION X unused option
ELECTRONIC INTERFACE PROFIBUS DP V0 CLASSE 2 F	LOGIC X unused option



EAM 63 AX



EAM 63 DX



Mechanical specifications

Shaft diameter (mm)	6 / 8 / 9.52 (3/8") / 10
Enclosure rating	IP 66 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load	10 N (1 Kp) axial with $\phi 6$ shaft 20 N (2 Kp) radial with $\phi 6$ shaft 100 N (10 Kp) axial 100 N (10 Kp) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10 ⁹ revolutions
Bearings	n° 2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Body / Cover material	1.4305 / AISI 303 stainless steel
Housing material	1.4305 / AISI 303 stainless steel
Flange material	1.4305 / AISI 303 stainless steel
Operating temperature	0° ... +60°C
Storage temperature	-15° ... +70°C
Weight	1000 g

Electrical specifications

Multiturn resolution	1 ... 4096 <i>programmable during commissioning</i>
Singleturn resolution	2 ... 4096 / 2 ... 8192 <i>programmable during commissioning</i>
Power supply	12 ... 28 VDC \pm 5%
Current consumption without load	300 mA
Electronic interface	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm <i>please refer to installation guide for more informations</i>
Response frequency	25 kHz
Accuracy	\pm 1/2 LSB
Counting direction	programmable during commissioning
Start-up time	500 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Output connections for PROFIBUS® DP encoder

Function	S3 connector 5-pin (power supply)	S3 connector 5-pin (line out)	S3 connector 5-pin (line in)
+ Vdc	2		
0 Volt	4		
signal A (out)		2	
signal B (out)		4	
signal A (in)			2
signal B (in)			4

EAMX 80 A / D

MULTITURN ABSOLUTE
FLAMEPROOF ENCODER



MAIN FEATURES

Flameproof encoders for applications within explosive and hazardous areas.

- Up to 8192 (13 bit) as single turn
- Up to 16384 (14 bit) as multi turn
- Several output types available. Up to 28 V dc input voltage
- Output cable
- Several flanges available
- Up to 3000 rpm speed rotation
- IP 65 as protection grade



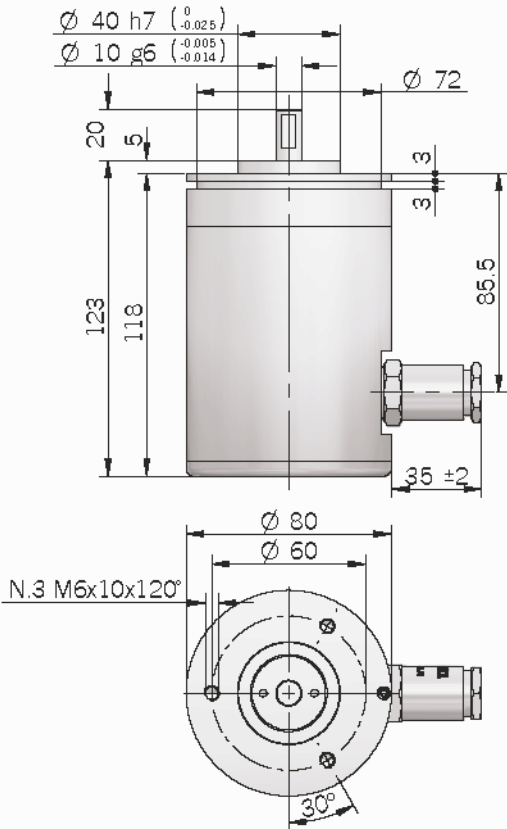
EN 60079-0:2006 / EN 60079-1:2007
EN 61241-0:2006 / EN 61241-1:2004
ATEX certificate number: CESI 04 ATEX 082

ORDERING CODE

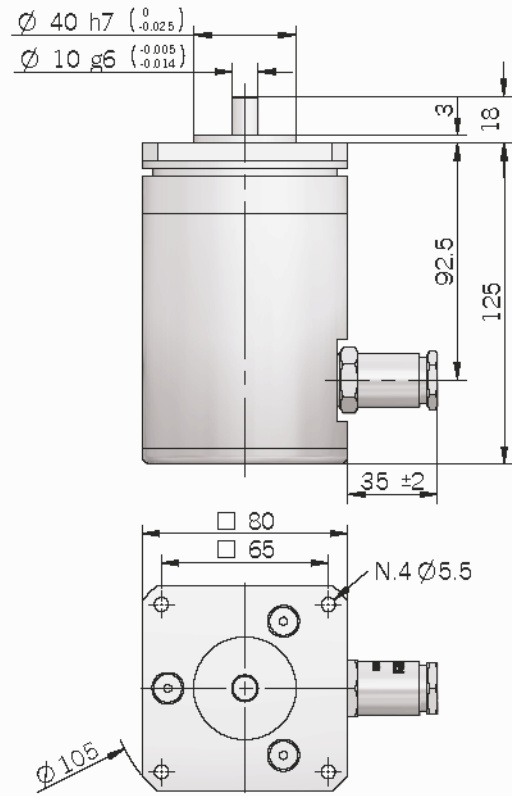
EAMX 80 A 4096 / 4096 G 5 S X X 10 X 3 PR . XXX	
SERIES multiturn absolute flameproof encoder EAMX	VARIANT XXX custom version
SIZE mm 80	OUTPUT TYPE PR radial cable output (standard length 1.5 m)
TYPE synchronous flange \varnothing 40 mm A square flange \square 65 mm D	MAX ROTATION SPEED 3 3000 rpm
MULTITURN RESOLUTION 2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 / 512 / 1024 / 2048 / 4096 / 8192 / 16384	ENCLOSURE RATING X IP 65
SINGLETURN RESOLUTION 2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 / 512 / 1024 / 2048 / 4096 / 8192	SHAFT DIAMETER 6 mm 8 mm 10 mm
<i>N.B.: please directly contact our offices for pulsas availability</i>	OPTIONS X to be reported if not used
CODE TYPE Binary B Gray (standard) G	LOGIC X to be reported if not used
POWER SUPPLY 5 V DC 5 8 ... 28 V DC 8/28	OUTPUT TYPE S SSI (Serial Synchronous Interface)



EAMX 80 A



EAMX 80 D



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

NUANCE

Electrical specifications

Multiturn resolution	from 2 to 16384 (powers of 2)
Singleturn resolution	from 2 to 8192 (powers of 2)
Power supply	5 V DC \pm 10% 8 ... 28 V DC \pm 5%
Current consumption without load	100 mA
Electronic interface	SSI RS422
Auxiliary input (U/D)	active high (+Vdc) <i>connect to OV if not used</i>
Max frequency	100 kHz ... 1 MHz SSI
SSI monostable time (Tm)	18 μ s
SSI pause time (Tp)	> 35 μ s
Accuracy	+/- 1/2 LSB
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Output connections for SSI

Function	Wire cable
+ V dc	red
0 Volt	gray
dato +	green
dato -	brown
clk +	yellow
clk -	pink
U / D	blue
\equiv	shield

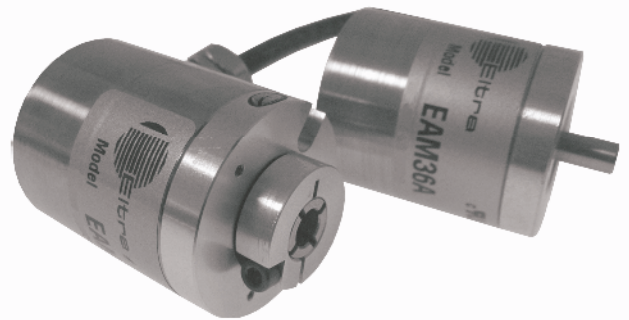
Mechanical specifications

Shaft diameter (mm)	6 / 8 / 10
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load	10 N (1 Kp) axial with \varnothing 6 shaft 20 N (2 Kp) radial with \varnothing 6 shaft 200 N (20 Kp) axial 200 N (20 Kp) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-8)
Bearings life	10 ⁹ revolutions
Bearings	n° 2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Body material	anodized aluminum
Housing material	anodized aluminum
Operating temperature	0° ... +50°C
Storage temperature	-15° ... +70°C
Weight	1200 g



MAIN FEATURES

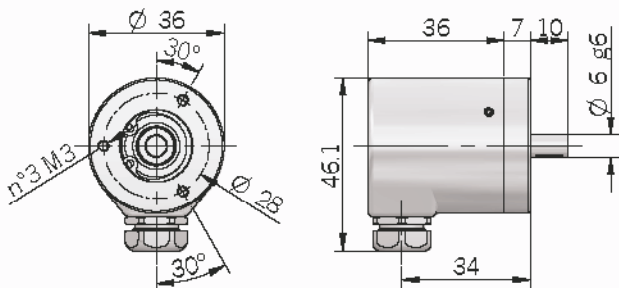
- Compact absolute magnetic multiturn encoder
- 51 bit as maximum resolution (12 singleturn + 39 multiturn)
- Multiturn counting based on self-powered Wiegand system without gears or battery
- Power supply 5 Vdc or 8 ... 30 Vdc
- SSI as electronic interface
- Code reset for easy setup
- Enclosure rating up to IP 65
- Working temperature -20° ... +100°C
- Radial cable output



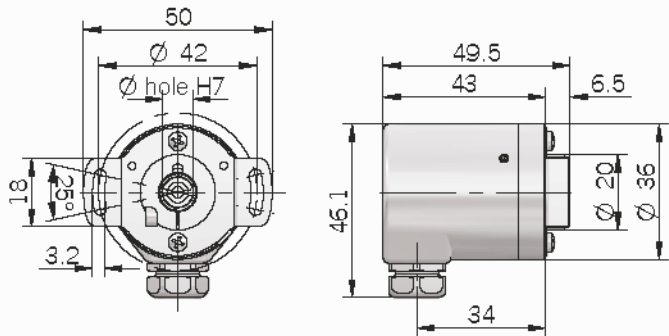
ORDERING CODE

EAM 36 G 13 / 12 G 8/30 S P X 6 X 8 P R . XXX	
SERIES multiturn absolute encoder EAM	VARIANT XXX custom version
SIZE mm 36	OUTPUT DIRECTION R radial
FLANGE / FIXING TYPE solid shaft - fixing flange \varnothing 28 mm A blind hollow shaft - spring F blind hollow shaft - antirotation pin G	OUTPUT TYPE P cable output (standard length 0.5 m)
MULTITURN RESOLUTION from 1 to 39 bit	MAX ROTATION SPEED \varnothing 8000 rpm
SINGLETURN RESOLUTION from 1 to 12 bit	ENCLOSURE RATING X IP 65
CODE TYPE Binary B Gray G	SOLID / BLIND HOLLOW SHAFT DIAMETER 6 mm
POWER SUPPLY 5 V DC 5 8 ... 30 V DC 8/30	OPTIONS X unused option ZE code reset
ELECTRONIC INTERFACE SSI S	LOGIC P positive

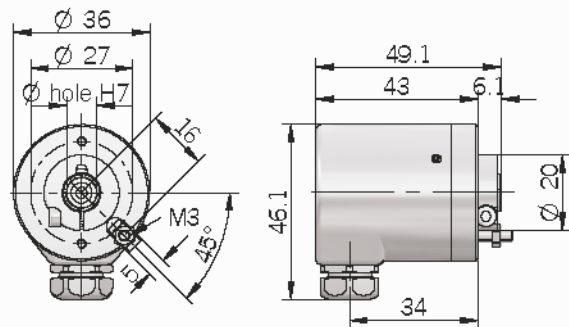
EAM 36 A



EAM 36 F



EAM 36 G



Mechanical specifications

Solid shaft / Blind hollow shaft diameter	6 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	8000 rpm continuous / 10000 rpm instantaneous
Shaft load	20 N axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Life bearing	10 ⁹ revolutions
Bearings	n° 2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Bearing stage material	EN-AW 2011 aluminium
Housing material	AISI 420 stainless steel
Working temperature	-20° ... +100°C
Storage temperature	-20° ... +85°C
Weight	150 g

Connections for SSI output

Function	Cable colour
+ V dc	red
0 Volt	black
data +	green
data -	brown
clk +	yellow
clk -	orange
U / D	red / blue
RESET	white
⊥	shield

Electrical specifications

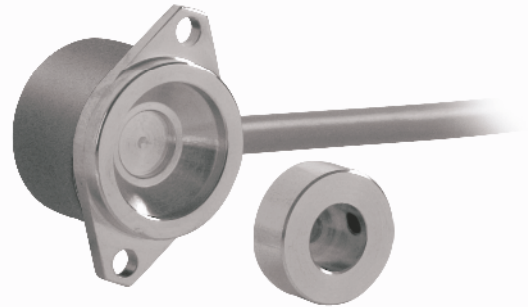
Multiturn resolution	from 1 to 39 bit self-powered Wiegand system, without gears or battery
Singleturn resolution	from 1 to 12 bit magnetic technology without contact
Power supply	5 V DC ± 5% 8 ... 30 V DC ± 5%
Power draw without load	600 mW
Electronic interface	SSI RS422
Clock frequency	100 kHz - 1 MHz SSI
SSI pause time (Tp)	> 35 μs
SSI monostable time (Tm)	20 μs
Auxiliary inputs (U/D - Reset)	active high (+Vdc) connect to 0V if not used / Reset t _{min} 150 ms
Accuracy	+/- 0.35° max
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

MAIN FEATURES

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

Main characteristics:

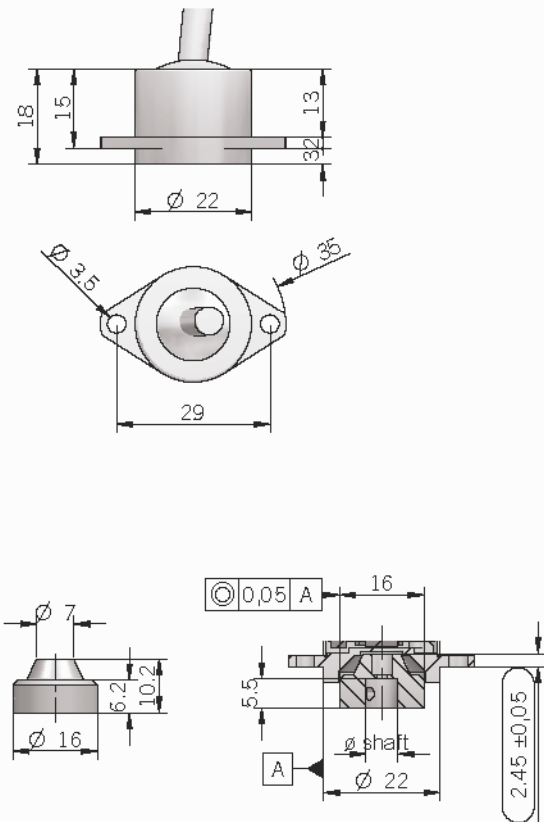
- Compact dimensions
- Absence of physical contact between encoder and motor shaft
- High temperature resistant
- High resolution and precision
- High protection rating
- High operating speed
- Excellent mechanical sturdiness
- Very easy mounting



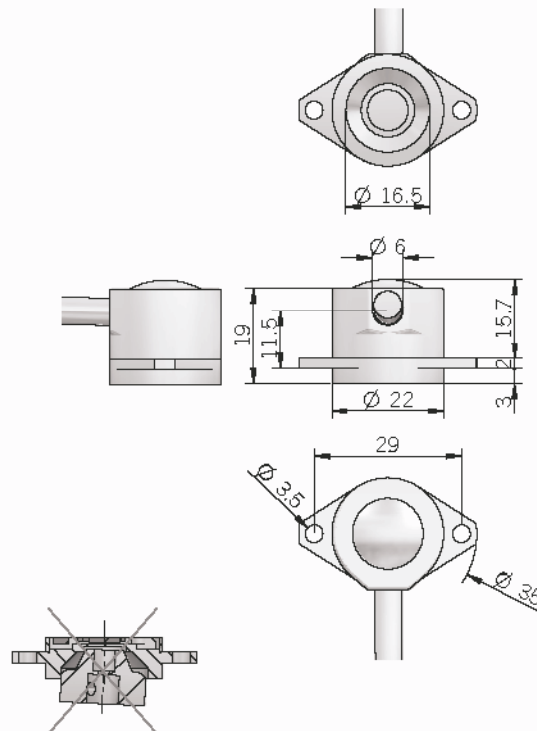
ORDERING CODE

EM	A	22	A	512	B	5	S	P	X	G	S	10	P	R	.	XXX	
SERIES																VARIANT	
magnetic encoder EM																XXX custom version	
TYPE																OUTPUT DIRECTION	
absolute A																A axial	
sinusoidal S																R radial	
SIZE																OUTPUT TYPE	
mm 22																P cable output (standard length 0.5 m)	
TYPE																MAX ROTATION SPEED	
aluminium kit encoder ø 22 mm A																10 10000 rpm	
anodized aluminum kit encoder ø 22 mm AY																ENCLOSURE RATING	
RESOLUTION																S IP 67	
(EMA series) (only powers of 2) ppr from 8 to 8192																BORE DIAMETER (MAGNET CARRIER)	
(EMA series) ppr 25 / 40 / 50 / 80 / 100 / 125 /																6 ø 6 mm	
160 / 200 / 250 / 320 / 400 /																8 ø 8 mm	
500 / 800 / 1000 / 1600 / 2000																9 ø 9.52 mm (3/8")	
(EMS series) ppr 1																10 ø 10 mm	
<i>please directly contact our offices for pulses availability</i>																OPTION	
CODE																X unused option	
(EMA series) binary B																LOGIC	
(EMS series) unused option X																P positive (EMA series)	
POWER SUPPLY																X unused option (EMS series)	
5 V DC 5																OUTPUT TYPE	
(EMA series) SSI S																	
(EMS series) sine - cosine line driver L																	

EMA - EMS 22 axial cable output



EMA - EMS 22 radial cable output



Electrical specifications

Resolution	up to 8192 ppr (EMA series) 1 ppr (EMS series)
Power supply	5 V DC \pm 5%
Current consumption without load	100 mA max
Max load current	15 mA per channel (EMS series)
Electronic interface	RS422 SSI (EMA series) sine - cosine (EMS series) 1 Vpp
SSI output code	binary
Max frequency	100 KHz ... 1 MHz (SSI) 1 KHz (EMS series)
SSI monostable time (T_m)	20 μ s
Accuracy	\pm 0.35° max
Counting direction	decreasing clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-1 IEC 61000-6-4

Mechanical specifications

Bore diameter (magnet carrier)	6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 67 (IEC 60529)
Max rotation speed	10000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10÷2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Housing material	EN-AW 2011 aluminum
Magnet carrier material	EN-AW 2011 aluminum
Operating temperature	-40° ... +125 °C
Storage temperature	-25° ... +65 °C
Weight	30 g
Magnet carrier mounting tolerances (to get best electrical performances)	\pm 0.2 mm (axial) \pm 0.1 mm (radial)

Connections and standard colours

Wire colours	Function (EMA 22)	Function (EMS 22)
black	0 Volt	0 Volt
red	+ Vdc	+ Vdc
green	Data +	Sin +
brown	Data -	Sin -
yellow	Clk +	Cos +
orange	Clk -	Cos -
shield	⏏	⏏



NUANCE

MAIN FEATURES

Singleturn absolute magnetic encoder size 50 mm.

Main characteristics:

- Up to 8192 ppr.
- Parallel and SSI electronic interface.
- Several mechanical flanges.
- Up to IP 67 protection grade.

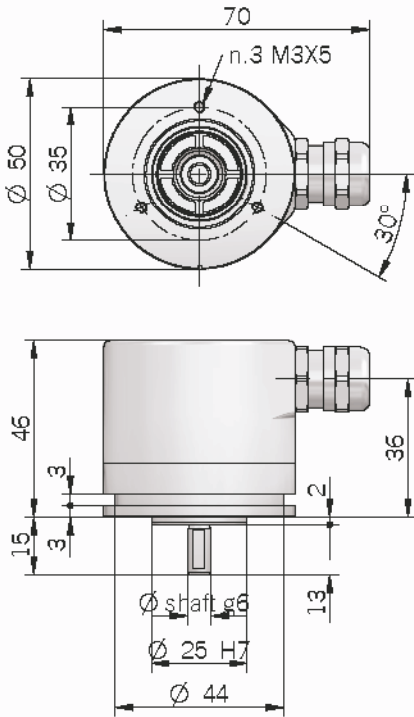


ORDERING CODE

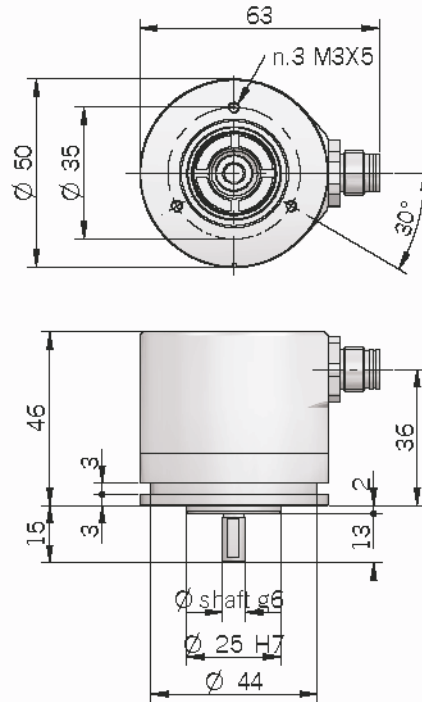
EMA	50	B	512	G	5	N	N	X	G	X	3	P	R	.	XXX
SERIES singleturn absolute magnetic encoder EMA														VARIANT XXX custom version	
SIZE mm 50														OUTPUT DIRECTION R radial A axial	
TYPE synchro - clamping flange ø 25 mm A synchro - clamping flange ø 25 mm anodized AY synchro - clamping flange ø 30 mm B synchro - clamping flange ø 25 mm anodized BY														OUTPUT TYPE P cable output (standard length 0.5 m) M12 M12 connector output (8-pin) (only SSI with code reset ZE)	
RESOLUTION ppr from 2 to 4096 with N / C / P / R / U interface ppr from 2 to 8192 with S interface <i>N.B.: please directly contact our offices for pulses availability</i>														MAX ROTATION SPEED 3 3000 rpm continuous (5000 rpm peak)	
CODE TYPE Binary B Gray G Adjusted Binary (0-XXX) BC Adjusted Gray (0-XXX) GC														ENCLOSURE RATING X IP 65 S IP 67 (optional)	
POWER SUPPLY 5 V DC 5 8 ... 30 V DC 8/30														SHAFT DIAMETER 6 mm 8 mm 9 9.52 mm (3/8") 10 mm	
ELECTRONIC INTERFACE NPN (negative logic standard) N NPN OPEN COLLECTOR (negative logic standard) C PNP (positive logic standard) R PNP OPEN COLLECTOR (positive logic standard) U PUSH PULL (positive logic standard) P SSI (positive logic standard) S														OPTION X unused option ZE code reset S strobe SZE strobe and code reset <i>N.B.: S and SZE option available only with binary or adjusted binary code type</i>	
LOGIC N Negative P Positive															



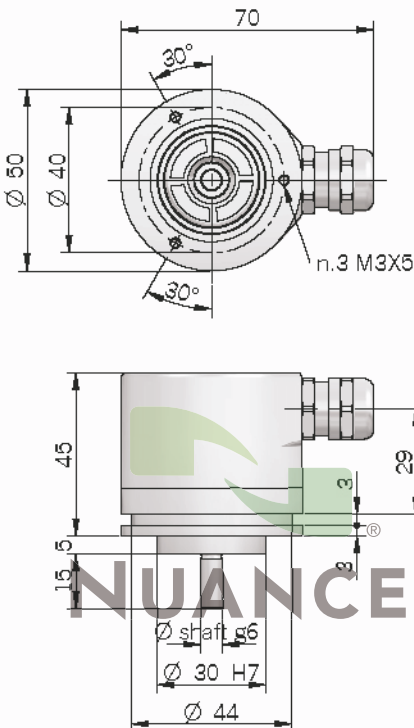
EMA 50 A / AY
radial cable output



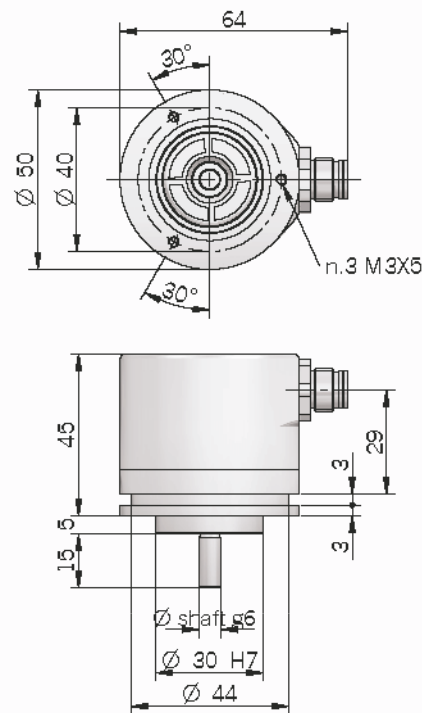
EMA 50 A / AY
radial M12 output



EMA 50 B / BY
radial cable output



EMA 50 B / BY
radial M12 output



NUANCE

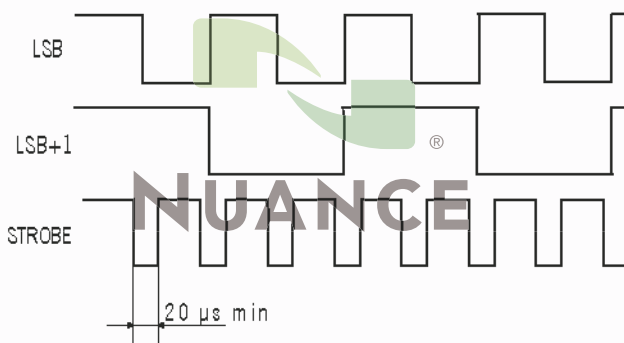
Electrical specifications

Resolution	from 2 to 4096 ppr with N/C/P/R/U interface from 2 to 8192 ppr with S interface
Power supply	5 V DC \pm 10% 8 ... 30 V DC \pm 5%
Current consumption without load	< 100 mA
Max load current	20 mA for channel (push pull) 40 mA for channel (NPN / PNP)
Electronic interface	NPN / NPN OPEN COLLECTOR / PNP / PNP OPEN COLLECTOR / PUSH PULL / RS422 SSI
Auxiliary inputs (U/D - Reset)	active high (+Vdc) <i>connect to 0V if not used / Reset t_{min} 150 ms</i>
Output frequency	25 kHz parallel / 100 kHz ... 1 MHz
SSI monostable time (Tm)	20 μ s
SSI pause time (Tp)	> 35 μ s
Strobe time (binary code)	20 μ s <i>with N/C/R/U/P interface</i>
Accuracy	\pm 0.35° max
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Shaft diameter	6 / 8 / 9.52 (3/8") / 10 mm
Enclosure rating	IP 65 (IEC 60529) IP 67 (optional) (IEC 60529)
Max rotation speed	3000 rpm continuous 5000 rpm peak
Max shaft load	30N (3 Kgf) axial 50N (5 Kgf) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10÷2000 Hz (IEC 60068-2-6)
Bearings	n° 2 ball bearings
Bearings life	10 ⁹ revolutions
Shaft material	1.4305 / AISI 303 stainless steel
Body material	EN-AW 2011 aluminum
Housing material	EN-AW 2011 aluminum
Operating temperature	-25° ... +85 °C
Storage temperature	-25° ... +85 °C
Weight	200 g

Strobe timing



Connections for PARALLEL encoder

Function	B / G	16 / 18 wire cable colours
bit 1 (LSB)	G ⁰ / B ⁰	green
bit 2	G ¹ / B ¹	yellow
bit 3	G ² / B ²	blue
bit 4	G ³ / B ³	brown
bit 5	G ⁴ / B ⁴	orange or pink
bit 6	G ⁵ / B ⁵	white
bit 7	G ⁶ / B ⁶	gray
bit 8	G ⁷ / B ⁷	violet
bit 9	G ⁸ / B ⁸	gray / pink
bit 10	G ⁹ / B ⁹	white / green
bit 11	G ¹⁰ / B ¹⁰	brown / green
bit 12	G ¹¹ / B ¹¹	white / yellow
0 Volt	/	black
+ Vdc	/	red
U / D	/	red / blue
RESET	/	yellow / brown
STROBE	/	white / gray
\perp	/	shield

Connections for SSI encoder

Function	Wire cable	M12 Connector (8-pin)
+ V dc	red	8
0 Volt	black	5
data +	green	3
data -	brown	2
clk +	yellow	4
clk -	orange or pink	6
U / D	red / blue	7
RESET	white	1
\perp	shield	/

M12 Connector (8-pin)
(front view)



EMA 50 F / FY / G / GY

SINGLETURN ABSOLUTE
MAGNETIC ENCODER

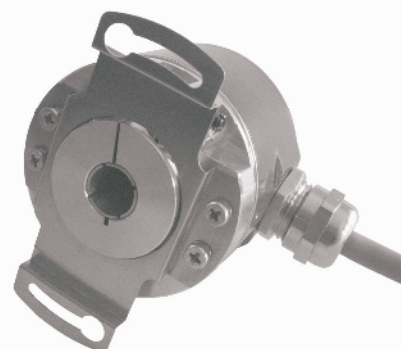


MAIN FEATURES

Singleturn absolute magnetic encoder size 50 mm.

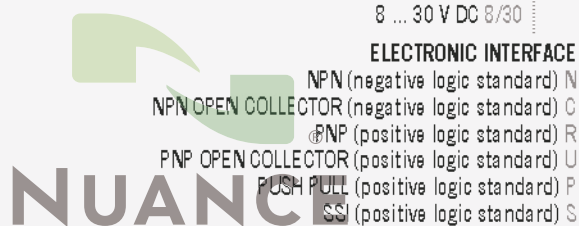
Main characteristics:

- Up to 8192 ppr.
- Parallel and SSI electronic interface.
- Blind hollow-shaft
- Several mechanical flanges.
- Up to IP 67 protection grade.

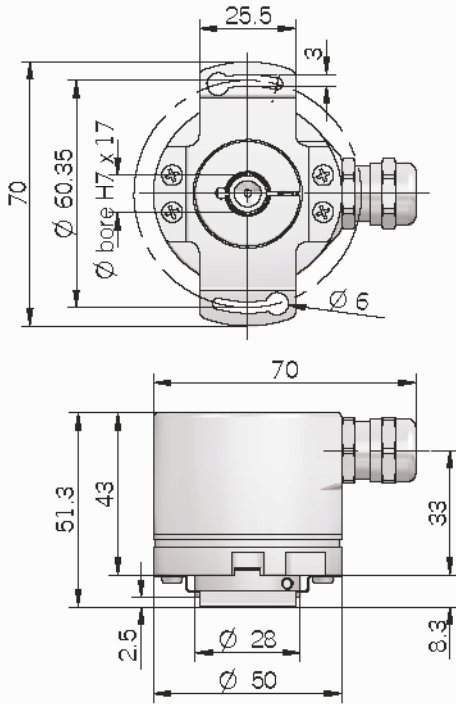


ORDERING CODE

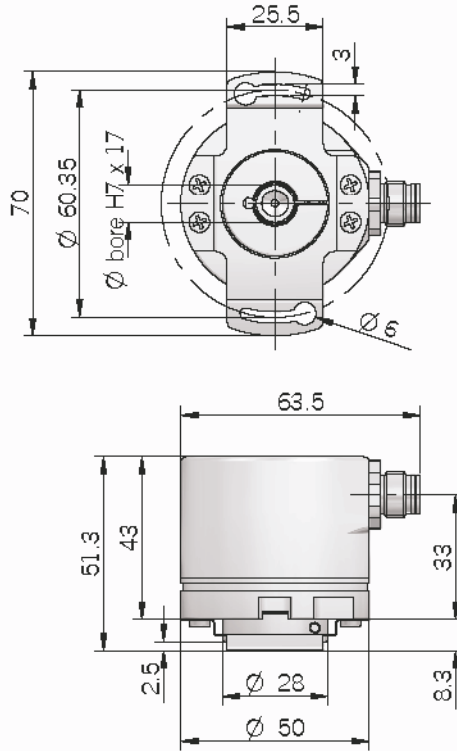
EMA	50	F	512	G	5	N	N	X	6	X	3	P	R	.XXX
SERIES singleturn absolute magnetic encoder EMA												VARIANT XXX custom version		
SIZE mm 50												OUTPUT DIRECTION R radial A axial		
TYPE with spring F anodized with spring FY with anti-rotation pin G anodized with anti-rotation pin GY												OUTPUT TYPE P cable output (standard length 0.5 m) M12 M12 connector output (8-pin) (only SSI with code reset ZE)		
RESOLUTION ppr from 2 to 4096 with N / C / P / R / U interface ppr from 2 to 8192 with S interface <i>N.B.: please directly contact our offices for pulses availability</i>												MAX ROTATION SPEED 3 3000 rpm continuous (5000 rpm peak)		
CODE TYPE Binary B Gray G Adjusted Binary (0-XXX) BC Adjusted Gray (0-XXX) GC												ENCLOSURE RATING X IP 65 S IP 67 (optional)		
POWER SUPPLY 5 VDC 5 8 ... 30 V DC 8/30												SHAFT DIAMETER 6 mm 8 mm 9 9.52 mm (3/8") 10 mm 12 mm 14 mm 15 mm		
ELECTRONIC INTERFACE NPN (negative logic standard) N NPN OPEN COLLECTOR (negative logic standard) C PNP (positive logic standard) R PNP OPEN COLLECTOR (positive logic standard) U PUSH PULL (positive logic standard) P SSI (positive logic standard) S												OPTION X unused option ZE code reset S strobe SZE strobe and code reset <i>N.B.: S and SZE option available only with binary or adjusted binary code type</i>		
LOGIC N Negative P Positive														



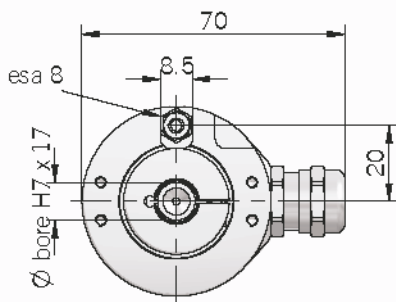
EMA 50 F / FY
radial cable output



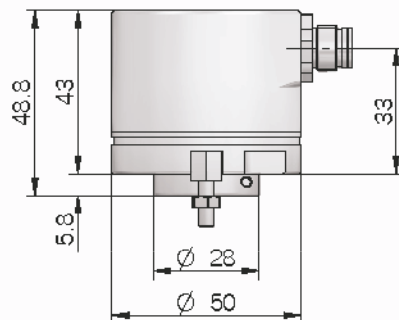
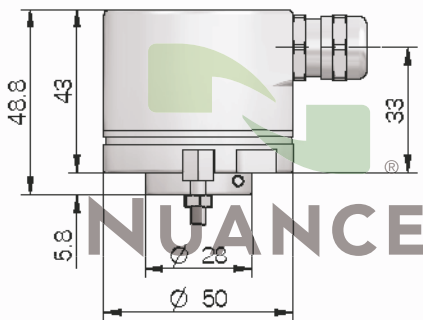
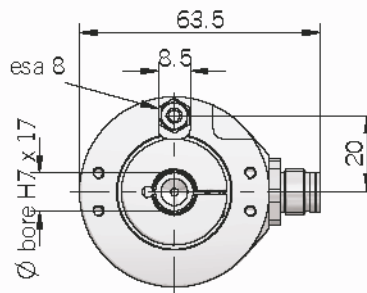
EMA 50 F / FY
radial M12 output



EMA 50 G / GY
radial cable output



EMA 50 G / GY
radial M12 output



Electrical specifications

Resolution	from 2 to 4096 ppr with N/C/P/R/U interface from 2 to 8192 ppr with S interface
Power supply	5 V DC \pm 10% 8 ... 30 V DC \pm 5%
Current consumption without load	< 100 mA
Max load current	20 mA for channel (push pull) 40 mA for channel (NPN / PNP)
Electronic interface	NPN / NPN OPEN COLLECTOR / PNP / PNP OPEN COLLECTOR / PUSH PULL / RS422 SSI
Auxiliary inputs (U/D - Reset)	active high (+Vdc) <i>connect to 0V if not used / Reset t_{min} 150 ms</i>
Output frequency	25 kHz parallel / 100 kHz ... 1 MHz
SSI monostable time (Tm)	20 μ s
SSI pause time (Tp)	> 35 μ s
Strobe time (binary code)	20 μ s <i>with N/C/R/U/P interface</i>
Accuracy	\pm 0.35° max
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Connections for PARALLEL encoder

Function	B / G	16 / 18 wire cable colours
bit 1 (LSB)	G ⁰ / B ⁰	green
bit 2	G ¹ / B ¹	yellow
bit 3	G ² / B ²	blue
bit 4	G ³ / B ³	brown
bit 5	G ⁴ / B ⁴	orange or pink
bit 6	G ⁵ / B ⁵	white
bit 7	G ⁶ / B ⁶	gray
bit 8	G ⁷ / B ⁷	violet
bit 9	G ⁸ / B ⁸	gray / pink
bit10	G ⁹ / B ⁹	white / green
bit 11	G ¹⁰ / B ¹⁰	brown / green
bit 12	G ¹¹ / B ¹¹	white / yellow
0 Volt	/	black
+ Vdc	/	red
U / D	/	red / blue
RESET	/	yellow / brown
STROBE	/	white / gray
⊥	/	shield

Mechanical specifications

Shaft diameter	6 / 8 / 9.52 / 10 / 12 / 14 / 15 mm
Enclosure rating	IP 65 (IEC 60529) IP 67 (optional) (IEC 60529)
Max rotation speed	3000 rpm continuous 5000 rpm peak
Max shaft load	30N (3 Kgf) axial 50N (5 Kgf) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10÷2000 Hz (IEC 60068-2-6)
Bearings	n° 2 ball bearings
Bearings life	10 ⁸ revolutions
Shaft material	1.4305 / AISI 303 stainless steel
Body material	EN-AW 2011 aluminum
Housing material	EN-AW 2011 aluminum
Operating temperature	-25° ... +85 °C
Storage temperature	-25° ... +85 °C
Weight	200 g

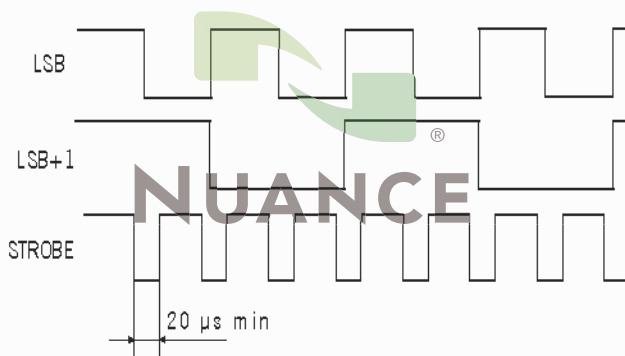
Connections for SSI encoder

Function	Wire cable	M12 Connector (8-pin)
+ V dc	red	8
0 Volt	black	5
data +	green	3
data -	brown	2
clk +	yellow	4
clk -	orange or pink	6
U / D	red / blue	7
RESET	white	1
⊥	shield	/

M12 Connector (8-pin)
(front view)



Strobe timing

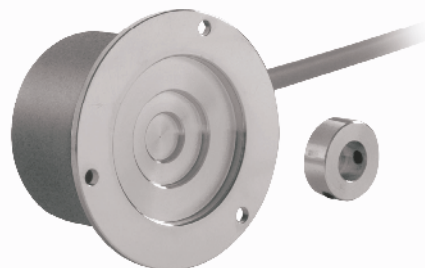


MAIN FEATURES

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

Main characteristics:

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

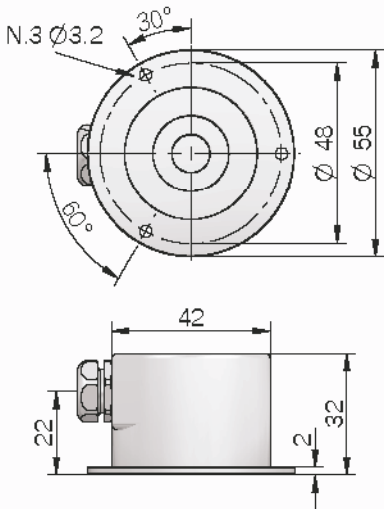


ORDERING CODE

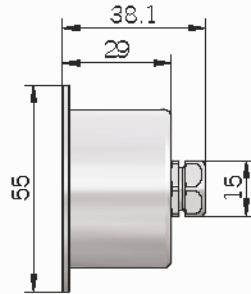
EM	A	55	A	512	B	5	S	P	X	G	X	10	P	R	.	XXX	
SERIES																VARIANT	
magnetic encoder EM																XXX custom version	
TYPE																OUTPUT DIRECTION	
absolute A																A axial R radial	
SIZE																OUTPUT TYPE	
mm 55																P cable output with cable gland (standard length 0.5 m) M12 M12 connector output (8-pin)	
TYPE																MAX ROTATION SPEED	
aluminium kit encoder \varnothing 35 mm A anodized aluminum kit encoder \varnothing 35 mm AY																10 10000 rpm	
RESOLUTION																ENCLOSURE RATING	
(only power of 2) ppr from 8 to 8192 ppr 25 / 40 / 50 / 80 / 100 / 125 / 160 / 200 / 250 / 320 / 400 / 500 / 800 / 1000 / 1600 / 2000																X IP 65 S IP 67 optional	
<i>N.B.: please directly contact our offices for pulses availability</i>																BORE DIAMETER (MAGNET CARRIER)	
CODE																6 \varnothing 6 mm 8 \varnothing 8 mm 9 \varnothing 9.52 mm (3/8") 10 \varnothing 10 mm	
Binary B Gray G																OPTION	
POWER SUPPLY																X unused option	
5 VDC 5 8 ... 30 VDC 8/30																LOGIC	
OUTPUT TYPE																P positive	
SSI S																	



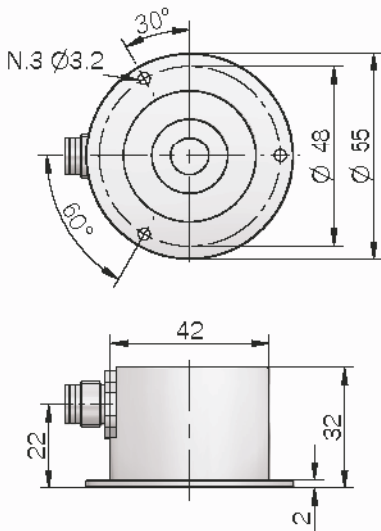
EMA 55 A
radial cable output



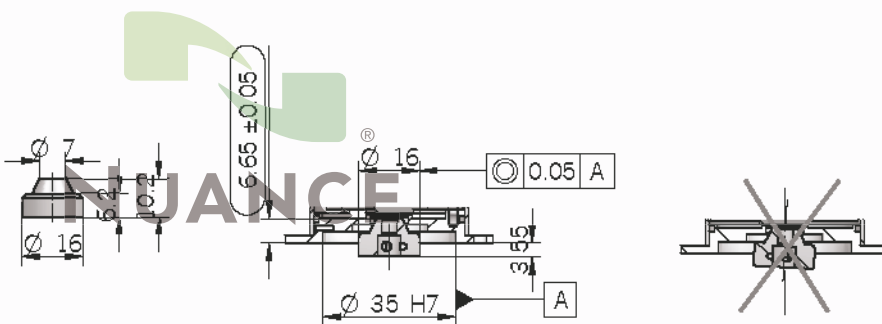
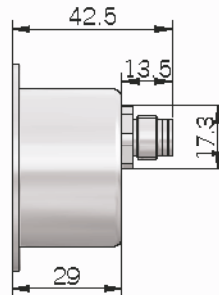
EMA 55 A
axial cable output



EMA 55 A
radial M12 output



EMA 55 A
axial M12 output



Electrical specifications

Resolution	from 8 to 8192 ppr (only power of 2) 25 / 40 / 50 / 80 / 100 / 125 / 160 / 200 / 250 / 320 / 400 / 500 / 800 / 1000 / 1600 / 2000 ppr
Power supply	5 V DC $\pm 10\%$ 8 ... 30 V DC $\pm 5\%$
Current consumption without load	< 100 mA
Electronic interface	RS422 SSI
Output frequency	100 kHz ... 1 MHz SSI
SSI monostable time (T_m)	20 μ s
SSI pause time (T_p)	> 35 μ s
Accuracy	$\pm 0.35^\circ$ max
Counting direction	decreasing clockwise (shaft view)
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

Magnet carrier bore diameter	up to 10 mm
Enclosure rating	IP 65 (IEC 60529) IP 67 (optional) (IEC 60529)
Max rotation speed	10000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Magnet-carrier material	EN-AW 2011 aluminum
Housing material	paint ed aluminum
Operating temperature	-25° ... +100°C
Storage temperature	-25° ... +85°C
Weight	150 g
Mounting tolerances	± 0.2 mm (axial) ± 0.1 mm (radial)

Connections for EMA series

Function	Wire cable	Connector M12 (8-pin)
+ V dc	red	8
0 Volt	black	5
data +	green	3
data -	brown	2
clk +	yellow	4
clk -	orange or pink	6
\perp	shield	/

Connector M12 (8-pin)
(front view)




NUANCE

EML 38 F / G

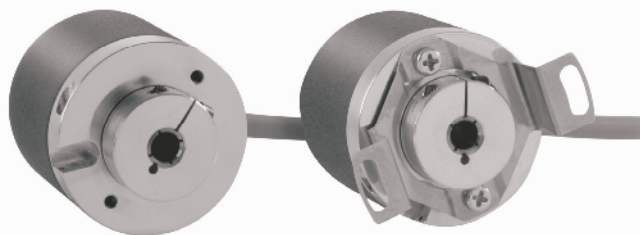
LINEAR MAGNETIC SINGLETURN ABSOLUTE ENCODER



MAIN FEATURES

The EML 38 is a magnetic rotary encoder with blind hollow shaft. Its sturdiness, compact size and easy mounting system make the EML 38 suitable for heavy duty applications such as marble and glass working machinery, marine and industrial applications.

- Analogue linear voltage or current output
- IP 67 protection class
- Wide temperature range (-25 ... 100 °C)



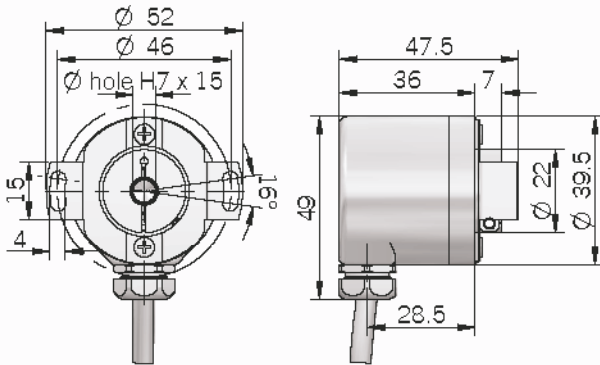
ORDERING CODE

EML 38 F 360 X 5 V 05 D 6 X 6 PA . XXX	
SERIES singleturn absolute magnetic linear encoder EML	VARIANT XXX custom version
SIZE overall dimension 39.5 mm 38	OUTPUT TYPE PA axial cable output with cable gland (standard length 0.5 m) PR radial cable output with cable gland (standard length 0.5 m)
TYPE front spring F flange with hollow for anti-rotation pin G	MAX ROTATION SPEED 3 3000 rpm (only with S option) 6 6000 rpm
ACTIVE ANGLE degrees 360 degrees 270 degrees 180 degrees 90	ENCLOSURE RATING X IP 64 S IP 67 cover side / IP 65 shaft side
OPTION unused option X	BORE DIAMETER 6 mm 8 mm 9 9.52 mm (3/8") 10 mm
POWER SUPPLY 5 VDC 5 12 ... 28 VDC 12/28	CODE SENSE D decrease with clockwise rotation shaft view (standard) I increase with clockwise rotation shaft view
ELECTRONIC INTERFACE analogue linear voltage output V analogue linear current output I	OUTPUT RANGE 05 0 ... 5 V 010 0 ... 10 V (only with 12/28 power supply) 020 0 ... 20 mA (only with 12/28 power supply) 420 4 ... 20 mA (only with 12/28 power supply)



EML 38 F

radial output

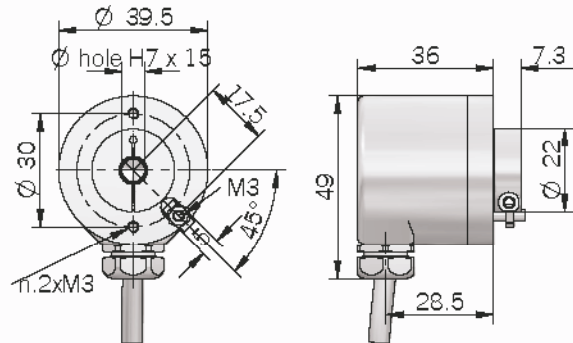


EML 38 F mounting instructions

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

EML 38 G

radial output

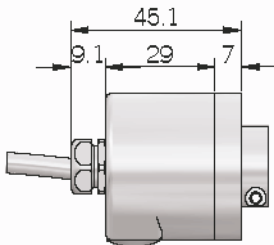


EML 38 G mounting instructions

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

EML 38

axial output



Electrical specifications

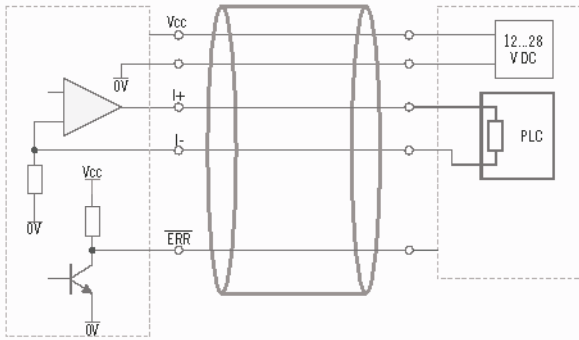
Resolution	8 bits per revolution
Active angle	90 ... 360 mechanical degrees
Power supply	5 V DC \pm 5% 12 ... 28 V DC \pm 5% reverse polarity protection
Current consumption without load	40 mA max
Signal pattern	decreasing with clockwise rotation (shaft view)
Error signal	active on low state (sensor fault)
Electronic interface	analogue linear voltage output (0 ... 5 V / 0 ... 10 V) analogue linear current output 4 wires source (0 ... 20 mA / 4 ... 20 mA)
Load	$R_{min} = 1 \text{ k}\Omega$ (voltage output) $R_{max} = (V_{dd} - 3) / 0.02$ (current output)
Linearity error	< 1%
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

Mechanical specifications

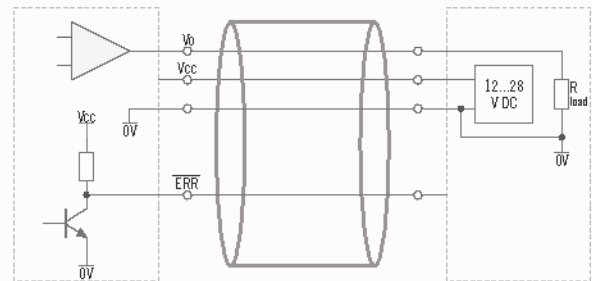
Bore diameter	6 / 8 / 9.52 (3/8") / 10 mm
Enclosure rating	IP 64 (IEC 60529) IP 67 cover side / IP 64 shaft side (optional) (IEC 60529)
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 \pm 2000 Hz (IEC 60068-2-6)
Body material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	2 ball bearings
Bearing lifetime	10 ⁹ revolutions
Operating temperature	-25° ... +100 °C
Storage temperature	-25° ... +85 °C
Weight	250 g

ELECTRONIC INTERFACE

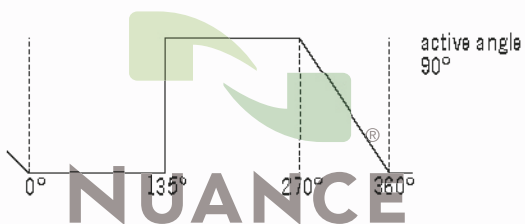
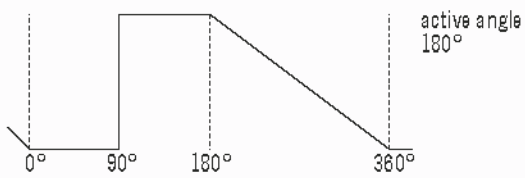
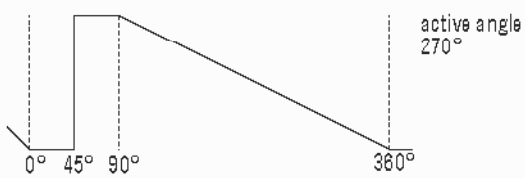
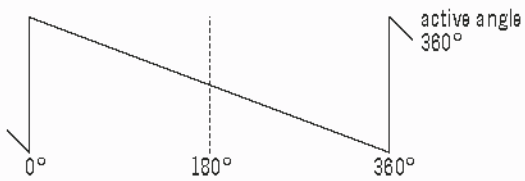
Current output



Voltage output



Signal pattern



Electrical connections

Function	Wire colour (voltage output)	Wire colour (current output)
+VDC	red	red
0 V	black	black
error	blue	blue
V_{out}	green	/
I_{out}	/	green
I_{in}	/	yellow
---	case	case

EML 50 A / AY / B / BY

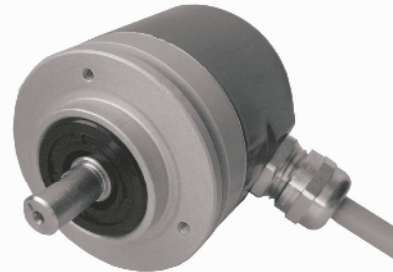
LINEAR MAGNETIC
SINGLETURN ABSOLUTE ENCODER



MAIN FEATURES

The EML 50 is a magnetic rotary encoder. Its sturdiness, compact size and easy mounting system make the EML 50 suitable for heavy duty applications such as marble and glass working machinery, marine and industrial applications.

- Analogue linear voltage or current output
- IP 67 protection class
- Wide temperature range (-25° ... +85 °C)

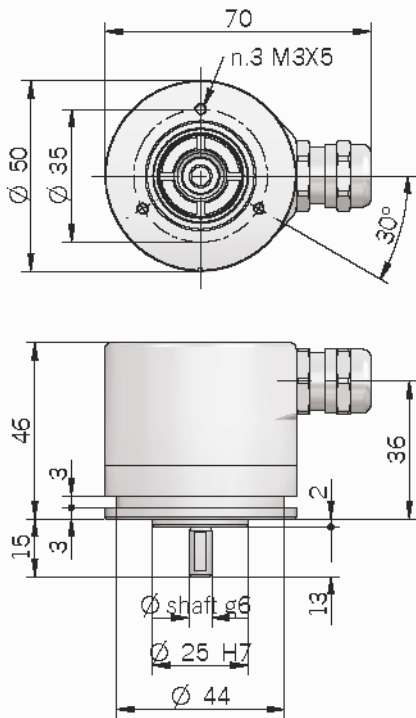


ORDERING CODE

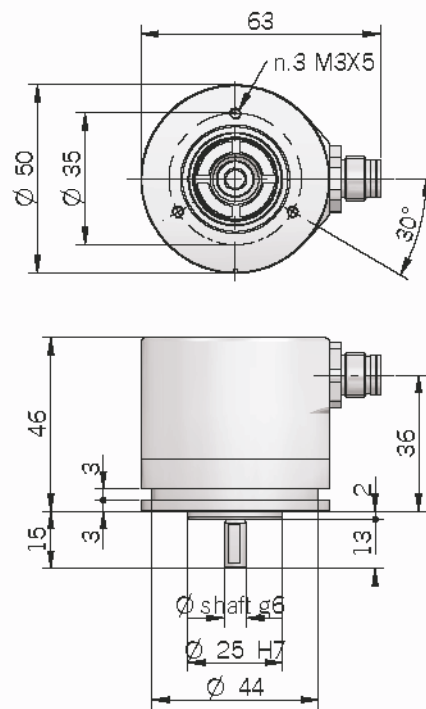
EML 50 A 360 X 5 V 05 X 6 X 3 P R . XXX	
SERIES singleturn absolute magnetic linear encoder EML	VARIANT XXX custom version
SIZE mm 50	OUTPUT DIRECTION R radial A axial
TYPE synchro - clamping flange ø 25 mm A synchro - clamping flange ø 25 mm anodized AY synchro - clamping flange ø 30 mm B synchro - clamping flange ø 30 mm anodized BY	OUTPUT TYPE P cable output (standard length 0.5 m) M12 M12 connector output (5-pin)
ACTIVE ANGLE degrees 360 degrees 270 degrees 180 degrees 90	MAX ROTATION SPEED 3 3000 rpm continuous (5000 rpm peak)
OPTION unused option X code reset ZE	ENCLOSURE RATING X IP 65 S IP 67 (optional)
POWER SUPPLY 5 V DC 5 12 ... 28 V DC 12/28	SHAFT DIAMETER 6 mm 8 mm 9 9.52 mm (3/8") 10 mm
ELECTRONIC INTERFACE analogue linear voltage output V analogue linear current output I	OPTION X unused option
	OUTPUT RANGE 05 0 ... 5 V 010 0 ... 10 V (only with 12/28 power supply) 020 0 ... 20 mA (only with 12/28 power supply) 420 4 ... 20 mA (only with 12/28 power supply)



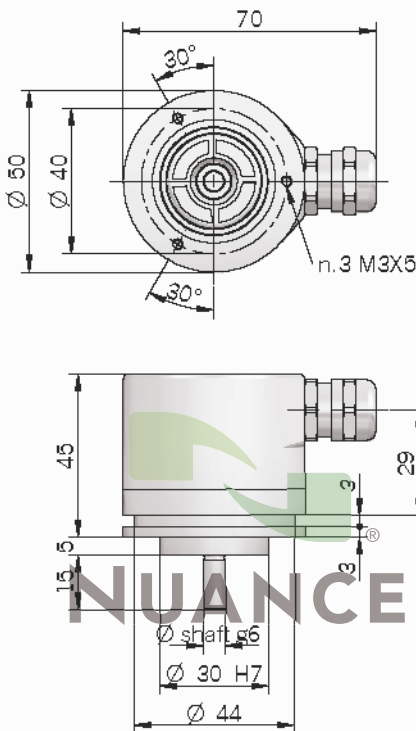
EML 50 A / AY
radial cable output



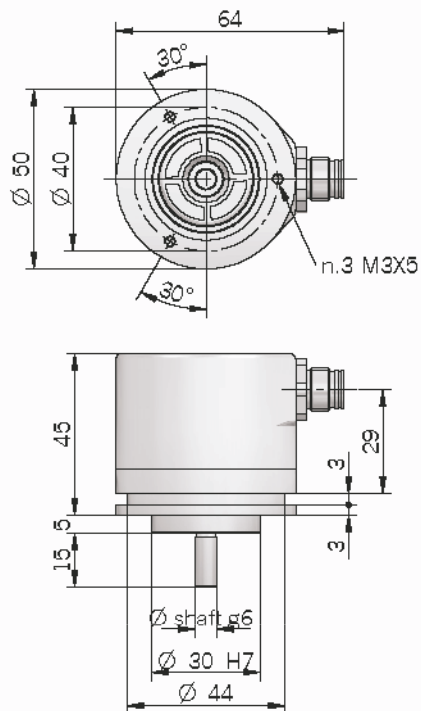
EML 50 A / AY
radial M12 output



EML 50 B / BY
radial cable output

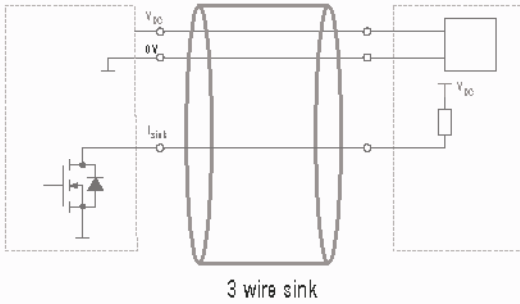


EML 50 B / BY
radial M12 output

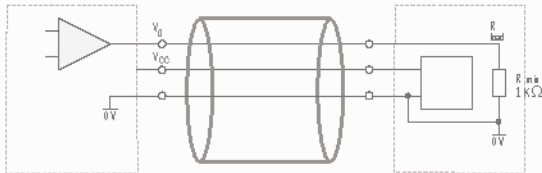


ELECTRONIC INTERFACE

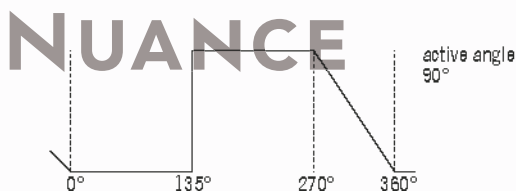
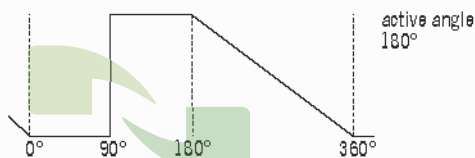
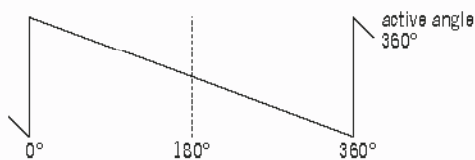
Current output



Voltage output



Signal pattern



NUANCE

Electrical specifications

Resolution	12 bits per revolution
Active angle	90 ... 360 mechanical degrees
Power supply	5 V DC $\pm 5\%$ 12 ... 28 V DC $\pm 5\%$ reverse polarity protection
Current consumption without load	40 mA max
Signal pattern	decreasing with clockwise rotation (shaft view)
Auxiliary inputs (U/D - Reset)	active high (+Vdc) connect to 0V if not used / Reset t_{min} 150 ms
Electronic interface	analogue linear voltage output (0 ... 5 V / 0 ... 10 V) analogue linear current output 3 wires sink (0 ... 20 mA / 4 ... 20 mA)
Load	$R_{min} = 1 \text{ k}\Omega$ (voltage output) $R_{max} = (V_{DC} - 2) / 0.02$ (current output)
Linearity error	< 1%
Start-up time	150 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

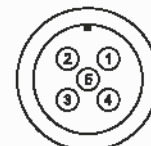
Mechanical specifications

Shaft diameter	6 / 8 / 9.52 / 10 mm
Enclosure rating	IP 65 (IEC 60529) IP 67 (optional) (IEC 60529)
Max rotation speed	3000 rpm continuous 5000 rpm peak
Max shaft load	30N (3 Kgf) axial 50N (5 Kgf) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10÷2000 Hz (IEC 60068-2-6)
Bearings	n° 2 ball bearings
Bearings life	10 ⁹ revolutions
Shaft material	1.4305 / AISI 303 stainless steel
Body material	EN-AW 2011 aluminum
Housing material	EN-AW 2011 aluminum
Operating temperature	-25° ... +85 °C
Storage temperature	-25° ... +85 °C
Weight	200 g

Electrical connections

Function	Wire colour (voltage output)	Wire colour (current output)	M12 Connector (5-pin)
+V DC	red	red	2
0 V	black	black	4
Vout	green	/	3
lin	/	yellow	3
RESET	white	white	1
U/D	blue	blue	5
⊖	shield	shield	/

M12 connector (5-pin) (front view)



EML 50 F / FY / G / GY

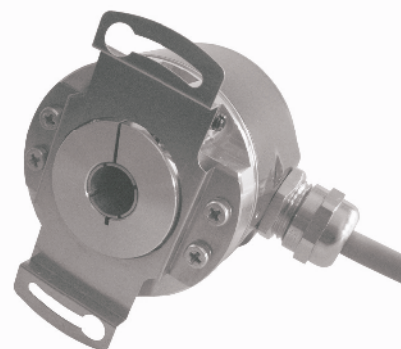
LINEAR MAGNETIC
SINGLETURN ABSOLUTE ENCODER



MAIN FEATURES

The EML 50 is a magnetic rotary encoder. Its sturdiness, compact size and easy mounting system make the EML 50 suitable for heavy duty applications such as marble and glass working machinery, marine and industrial applications.

- Analogue linear voltage or current output
- blind hollow shaft
- IP 67 protection class
- Wide temperature range (-25° ... +85 °C)

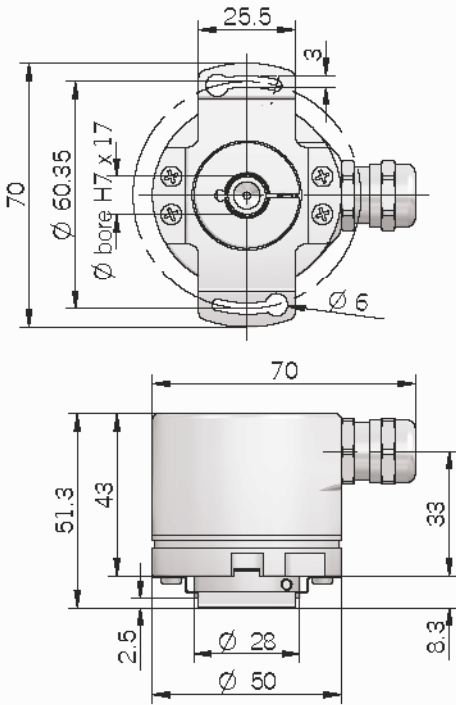


ORDERING CODE

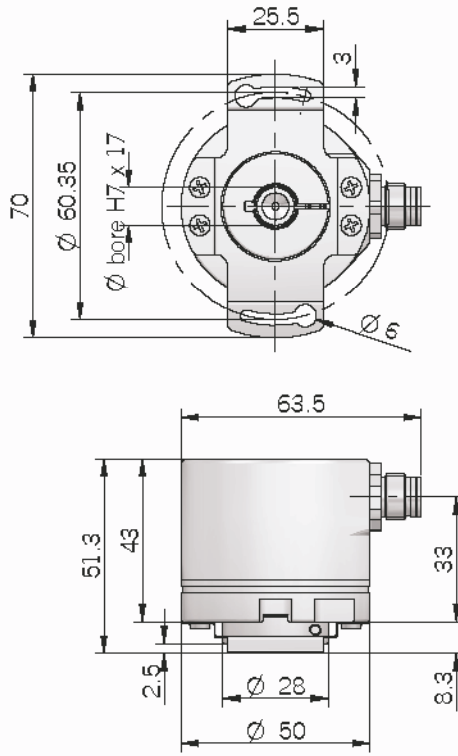
EML 50	F	360	X	5	V	05	X	6	X	3	P	R	. XXX
SERIES singleturn absolute magnetic linear encoder EML												VARIANT XXX custom version	
	SIZE mm 50											OUTPUT DIRECTION R radial A axial	
		TYPE with spring F anodized with spring FY with anti-rotation pin G anodized with anti-rotation pin GY										OUTPUT TYPE P cable output (standard length 0.5 m) M12 M12 connector output (5-pin)	
		ACTIVE ANGLE degrees 360 degrees 270 degrees 180 degrees 90										MAX ROTATION SPEED 3 3000 rpm continuous (5000 rpm peak)	
		OPTION unused option X code reset ZE									ENCLOSURE RATING X IP 65 S IP 67 (optional)		
		POWER SUPPLY 5 V DC 5 12 ... 28 V DC 12/28								SHAFT DIAMETER 6 mm 8 mm 9 9.52 mm (3/8") 10 mm 12 mm 14 mm 15 mm			
		ELECTRONIC INTERFACE analogue linear voltage output V analogue linear current output I							OPTION X unused option				
										OUTPUT RANGE 05 0 ... 5 V 010 0 ... 10 V (only with 12/28 power supply) 020 0 ... 20 mA (only with 12/28 power supply) 420 4 ... 20 mA (only with 12/28 power supply)			



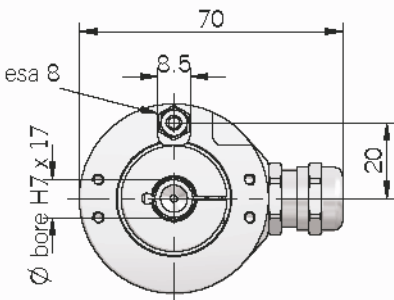
EML 50 F / FY
radial cable output



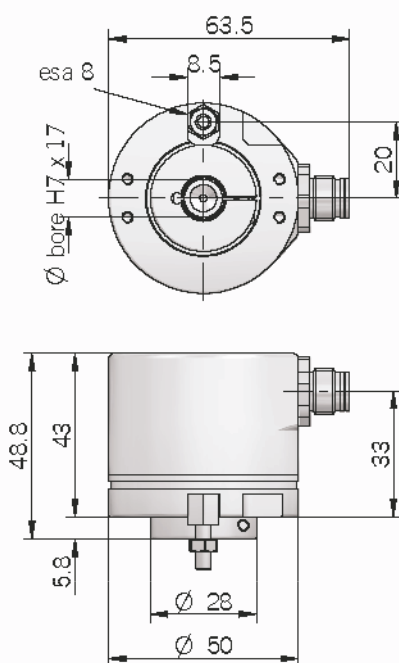
EML 50 F / FY
radial M12 output



EML 50 G / GY
radial cable output

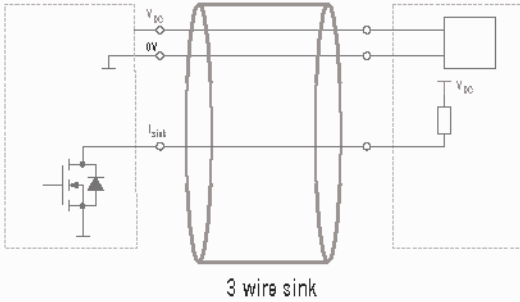


EML 50 G / GY
radial M12 output

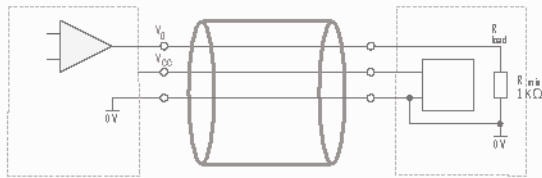


ELECTRONIC INTERFACE

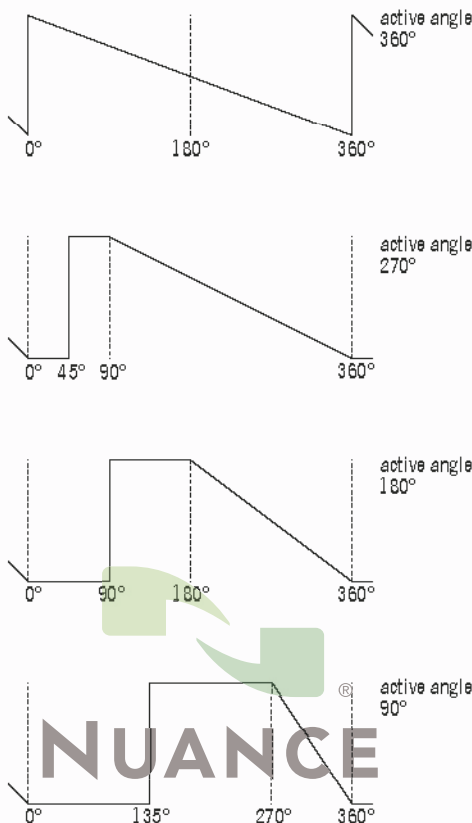
Current output



Voltage output



Signal pattern



Electrical specifications

Resolution	12 bits per revolution
Active angle	90 ... 360 mechanical degrees
Power supply	5 V DC \pm 5% 12 ... 28 V DC \pm 5% reverse polarity protection
Current consumption without load	40 mA max
Signal pattern	decreasing with clockwise rotation (shaft view)
Auxiliary inputs (U/D - Reset)	active high (+Vdc) connect to 0V if not used / Reset t_{min} 150 ms
Electronic interface	analogue linear voltage output (0 ... 5 V / 0 ... 10 V) analogue linear current output 3 wires sink (0 ... 20 mA / 4 ... 20 mA)
Load	$R_{min} = 1 \text{ k}\Omega$ (voltage output) $R_{max} = (V_{dc} - 2) / 0.02$ (current output)
Linearity error	< 1%
Start-up time	150 ms
Electromagnetic compatibility	IEC 61000-6-2 IEC 61000-6-4

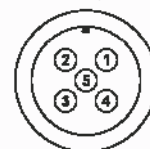
Mechanical specifications

Shaft diameter	6 / 8 / 9.52 (3/8") / 10 / 12 / 14 / 15 mm
Enclosure rating	IP 65 (IEC 60529) IP 67 (optional) (IEC 60529)
Max rotation speed	3000 rpm continuous 5000 rpm peak
Max shaft load	30N (3 Kgf) axial 50N (5 Kgf) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10÷2000 Hz (IEC 60068-2-6)
Bearings	n° 2 ball bearings
Bearings life	10 ⁹ revolutions
Shaft material	1.4305 / AISI 303 stainless steel
Body material	EN-AW 2011 aluminum
Housing material	EN-AW 2011 aluminum
Operating temperature	-25° ... +85 °C
Storage temperature	-25° ... +85 °C
Weight	200 g

Electrical connections

Function	Wire colour (voltage output)	Wire colour (current output)	M12 Connector (5-pin)
+V DC	red	red	2
0 V	black	black	4
V _{out}	green	/	3
I _{in}	/	yellow	3
RESET	white	white	1
U/D	blue	blue	5
⊥	case	case	/

M12 connector (5-pin) (front view)



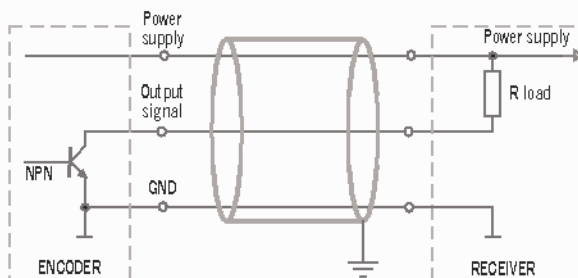
NPN AND NPN OPEN COLLECTOR ELECTRONIC

It is composed by an NPN transistor and a pull-up resistor used to match the output voltage to the power supply when the transistor is off.

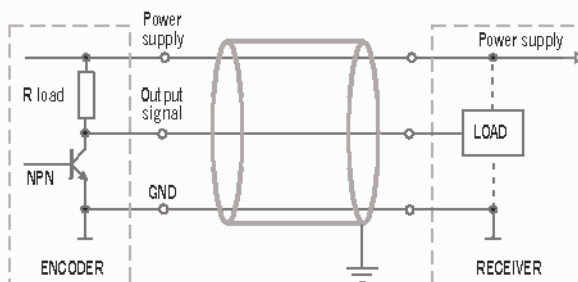
It has low saturation levels at 0 Vdc and close to 0 at the positive. It is proportionally influenced by the cable length, pulses frequency and by the load.

Please consider these specs for a proper use. On the open collector variant there's no pull-up resistor, freeing in such way the transistor collector from the tie of the encoder power supply allowing to obtain signals with different voltage.

NPN OPEN COLLECTOR



NPN

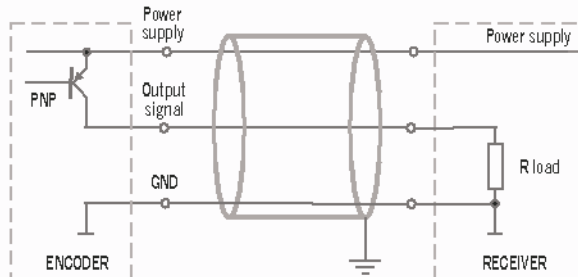


PNP AND PNP OPEN COLLECTOR ELECTRONIC

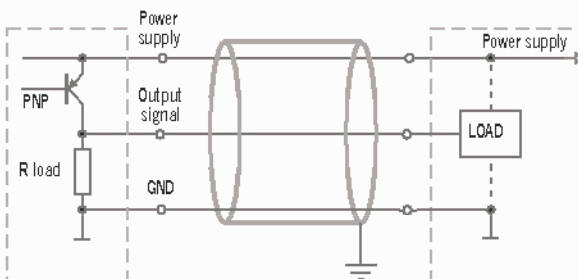
Main characteristics and limitations are the same as for NPN electronics. Main difference is the transistor, which is a PNP type. The resistor, if present, is a pull-down one.

Therefore, it is connected between the output and 0V.

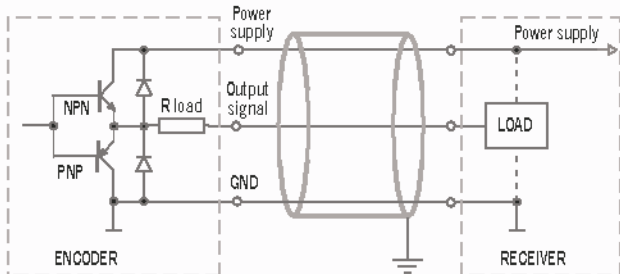
PNP OPEN COLLECTOR



PNP



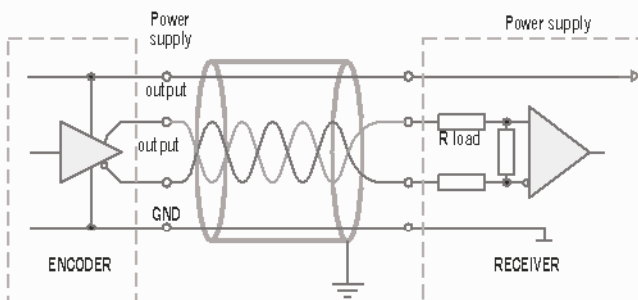
PUSH-PULL



PUSH-PULL ELECTRONIC

In NPN or PNP major limitations are caused by the resistor, which works with a much higher impedance than a transistor. To overcome this issue, push-pull electronic uses a complementary transistor, so the impedance is lower for commutation to positive and to zero. This solution increases frequency performances allowing longer cable connections and an optimal data transmission even at high working speed. Saturation signals are low but sometimes higher than in NPN and PNP electronics. Anyway, PUSH-PULL electronics is in any case indifferently applicable instead of NPN or PNP.

LINE DRIVER



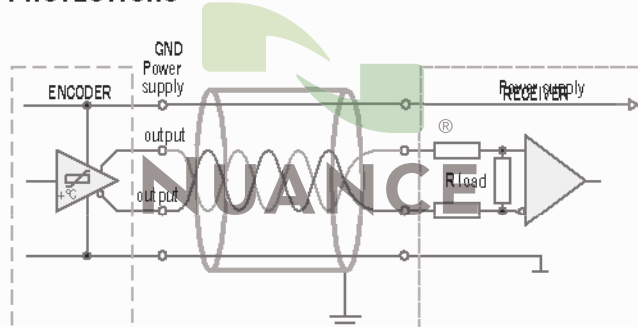
LINE DRIVER ELECTRONIC

LINE DRIVER is used when operating environments are particularly exposed to electrical disturbances or when the encoder is quite far from the receiver system.

Data transmission and receiving work on two complementary channels so disturbances are limited (cross talk from other cables). These interferences are known as «common mode disturbances» as their generation is due to a common point which is 0V.

Instead, in LINE-DRIVER transmitted and received signals are in «differential» way. In other words, it works basing the communication on voltage differences between complementary channels. Therefore it is not effective to common way disturbances. This type of transmission is used in 5 Vdc systems and it is also known as RS422. It is available also with power supplies up to 24 Vdc.

PROTECTIONS



OUTPUT STAGE PROTECTION

A highly integrated ASIC is used to protect outputs from short circuits. This solution is based on an active sensor which controls instantly the temperature reached by the element to be protected. In this way, protection is very effective.

Moreover, it ensures a constant protection against repetitive and permanent short circuits, that is why is strongly suggested for heavy usages.

It is available for LINE-DRIVER and PUSH-PULL electronics.

ENCODER CABLE LENGTH

Based on the power supply, electronic interface and output frequency maximum cable length are as below tables:

Incremental encoders			
Power supply (Vdc)	Electronic interface	Frequency (kHz)	Max cable length (m)
5V	Line driver RS422	50	300
5V	Line driver RS422	100	200
5/28V - 8/24V	Line driver	50	80
5/28V - 8/24V	Line driver	100	40
5/28V - 8/24V	Push-pull	50	60
5/28V - 8/24V	Push-pull	100	30

System setup: ambient temperature (20°C), load current 20 mA , Eltra AWG24 shielded cable.

Absolute encoders			
Power supply (Vdc)	Electronic interface	Frequency (kHz)	Max cable length (m)
8/28V	Push pull Parallel	25	100
5V - 8/28V	SSI	100	300
5V - 8/28V	SSI	200	200
5V - 8/28V	SSI	400	50
5V - 8/28V	SSI	1000	10
12/28V	Analogue (current)	-	200

Depending on the application, maximum cable length might be shorter, particular eg: where a high level of electrical noise is present. Please carefully select the power supply core diameter. Its size should be big enough that encoder voltage is inside working parameters as specified within the product datasheet.

Use always shielded cables, for further details or informations please directly contact our offices.



NPN / NPN open collector (TTL compatible) / push-pull

Function	5 wires	J connector 7 pins	M connector 7 pins	H connector 12 pins	V connector 9 pins	M12 connector 5 pins
+V DC	red	6	F	12	5	2
0 V	black	1	A	10	9	4
Signal A	green	3	C	5	1	3
Signal B	yellow	5	E	8	2	1
Signal Z	blue	4	D	3	3	5
⊥	shield	7	G	9	4	/

Line driver (without Z)

Function	8 wires	J connector 7 pins	M connector 7 pins	H connector 12 pins	V connector 9 pins	M12 connector 8 pins
+V DC	red	4	D	12	5	7
0 V	black	6	F	10	9	1
Signal A	green	1	A	5	1	6
Signal B	yellow	2	B	8	2	4
Signal A -	brown	3	C	6	6	5
Signal B -	orange	5	E	1	7	3
⊥	shield	7	G	9	4	/

Line driver (with Z)

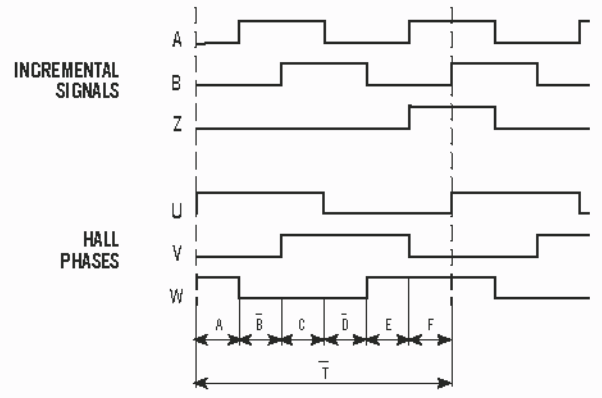
Function	8 wires	J connector 10 pins	M connector 10 pins	H connector 12 pins	V connector 9 pins	M12 connector 8 pins	MA connector 19 pins
+V DC	red	4	D	12	5	7	A
+V DC	red	5	E	12	5	7	A
0 V	black	6	F	10	9	1	C
Signal A	green	1	A	5	1	6	M
Signal B	yellow	2	B	8	2	4	P
Signal Z	blue	3	C	3	3	2	R
Signal A -	brown	7	G	6	6	5	N
Signal B -	orange	8	H	1	7	3	B
Signal Z -	white	9 [®]	I	4	6	8	L
⊥	shield	10	J	9	4	/	D

NUANCE

Line driver (with Hall phases)

Function	14 wires	MA connector 19 pins
+V DC	red	A
0 V	black	C
signal A	green	M
signal B	yellow	P
signal Z	blue	R
signal A -	brown	N
signal B -	orange	B
signal Z -	white	L
signal U	gray	H
signal V	purple	G
signal W	gray-pink	F
signal U -	red-blue	K
signal V -	white-green	V
signal W -	brown-green	U
⊕	shield	D

Signal configuration



POLES	A/B/C/D/E/F	T
4	30° ±1,5°	180°
6	20° ±1,5°	120°
8	15° ±1,5°	90°

Connectors

Connector type	Ref. code
J 7 pins cable mount straight plug (female)	PLS-20-7 (PLT® Apex)
J 10 pins cable mount straight plug (female)	SCG8A18-10S (SamWoo Electronics)
M 7 pins cable mount straight plug (female)	MS3108-18S-1 (Amphenol®)
M 10 pins cable mount straight plug (female)	MS3108-18-1 (Amphenol®)
H 12 pins cable mount straight plug (female)	-
V 9 pins	D-Subminiature DE-9
M 12 5 pins	-
M 12 8 pins	-
MA 19 pins cable mount straight plug (female)	MS3116-14-19S (Amphenol®)

Precautions against electrostatic discharges

Be sure the metallic case of the connector is connected to the ground through a ring fixed to the screw of the connector itself. (Fig. 1)

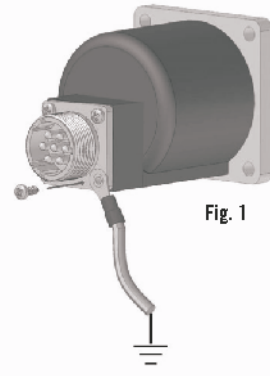


Fig. 1

Connect the cable shield to the ground and to the connector case. (Fig. 2)

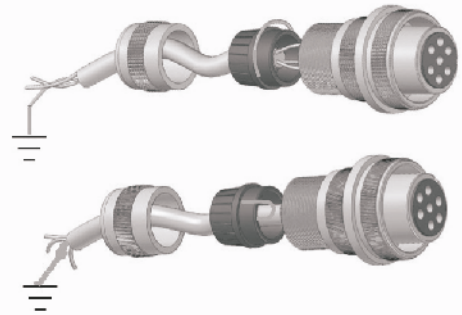


Fig. 2

Proper installation of cables

- Make sure cable shield is connected to the ground and avoid connecting it to the power ground (0 V).
- Keep the encoder cable (signal cable) sufficiently far from power lines.
- Choose the cable according to installation requirements.
- Lay the cable avoiding spirals.

Further informations

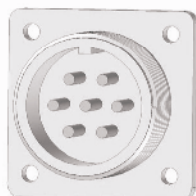
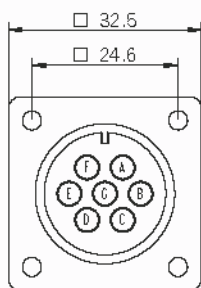
- Custom cables, extensions and connectors are available on demand.
- Testing on 100% of the production.
- Anti-vibration wiring system.
- Contact us for further informations.

ABSOLUTE ENCODER CONNECTORS

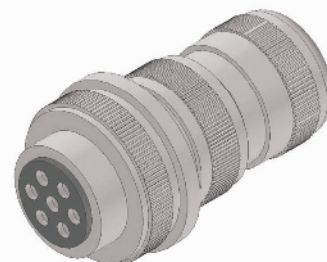
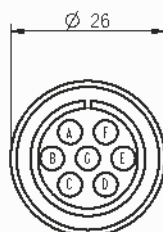


STANDARD CONNECTORS FOR ABSOLUTE ENCODERS

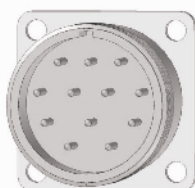
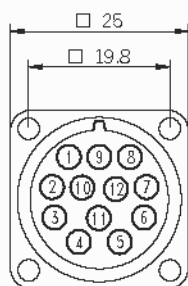
M07MP



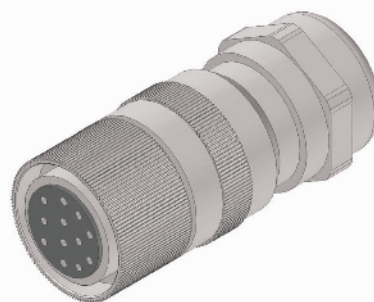
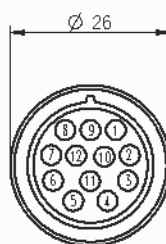
M07FV



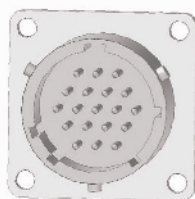
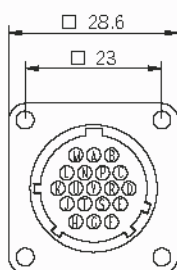
H12MP



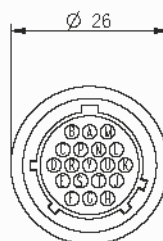
H12FV



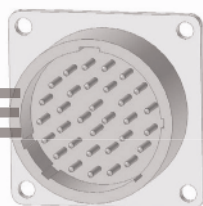
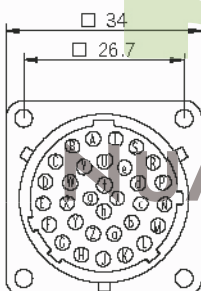
M19MP



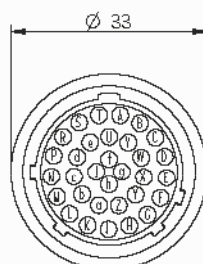
M19FV



M32MP



M32FV



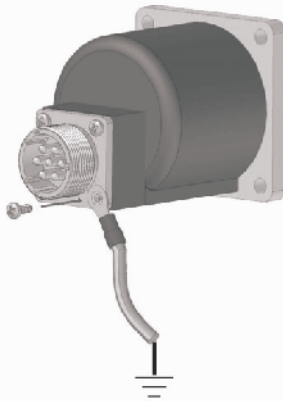
TECHNICAL BASICS

OUTPUT CONNECTORS

PRECAUTIONS AGAINST ELECTROSTATIC DICHARGES

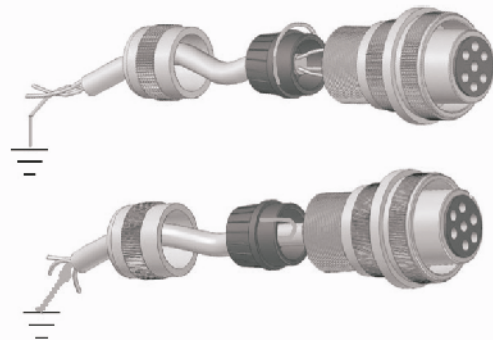
Be sure the metallic connector is connected to the ground through a ring fixed to the screw of the connector itself. (Fig. 1)

Fig. 1



Ground connect to the shield and the connector case. (Fig. 2)

Fig. 2



For a better protection of the electronics against electrostatic discharges connect the metallic connector case to ground.

CABLE PROPER USE

Ensure a ground connection to the cable shield avoiding to connect it to the power ground.

Keep the encoder cable (signal cable) to a proper distance from the power ones.

Choose the cable's length according to installation requirements.

Spread the cable avoiding spirals.

NEWS

Cable extensions and connectors could be designed on demand.

Testing on 100% of the production. ®

Antivibration wiring system.

NUANCE

Contact us for further information.

Cables availability

POLES N°	CEI MARK	IEC MARK	UL MARK	SHIELD	TYPE
5	CEI 20-22 II			FOIL	SEMIRIGID
		IEC 60332-1	UL-CSA	BRAID	FLEXABLE
		IEC 60332-1	UL-CSA	FOIL	SEMIRIGID
8	CEI 20-22 II	IEC 60332.3		BRAID	SEMIRIGID
	CEI 20-22 II			FOIL	SEMIRIGID
		IEC 60332-1	UL-CSA	BRAID	FLEXABLE
		IEC 60332-1		FOIL	SEMIRIGID
	CEI 20-22 II	IEC 60332.3		BRAID	SEMIRIGID
10	CEI 20-22 II			BRAID	SEMIRIGID
12	CEI 20-22 II			FOIL	SEMIRIGID
16	CEI 20-22 II			FOIL	SEMIRIGID
32	CEI 20-22 II			FOIL	SEMIRIGID

NOTE: please, directly contact our offices for non-standard cables availability.

INSTALLATION AND OPERATION PRECAUTIONS



The encoder must be used with respect to its specifications. Encoder is a pulse generator and not a safety device.



Assembling and installing personnel must be qualified and carefully follow instructions of technical manual.



Don't expose the device to stress or impacts in order to ensure the correct working otherwise the warranty expires.



Make sure that the mechanical coupling of the encoder shaft is designed with the appropriate elastic couplings, especially in the case of accentuated axial or radial movements.



Make sure that the environment of use is free of corrosive agents (acids, etc.) or substances that are not compatible with the device.



Check the ground connection of the device if it is not possible to provide additional external connection.



Before putting it in operation, verify the voltage range applicable to the device and protect it from exceeding the stated technical specifications.



Connect power supply and signals cables in order to avoid capacitive or inductive interferences that may cause malfunction of the device.



Cable wiring must be carried out in a **POWER-OFF** condition.



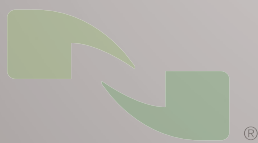
For safety reason, we strongly recommend to avoid any mechanical or electrical modification. In that case, they will void the warranty.

MAIN PRODUCT WARRANTY TERMS

Replacements or repairs whether under the warranty or at the customer's expense must be performed in the service department of Eltra Srl or by explicitly authorized personnel. Before sending material for repairing, you must obtain an RMA number from our sales office. During the repair process in our service department, Eltra srl will be authorized to remove all parts that the customer added to the product. Any malfunction due to a failure to observe these usage and installation precautions will lead to the warranty voiding. Repairs will not extend the product warranty. We also exclude compensation for any type of damage or injury due to the use, or suspension of use, of the transducer. Note: for additional information, refer to the sale terms on our website, www.eltra.it, or call our office.

ELTRA IN THE WORLD

AUSTRALIA ARGENTINA AUSTRIA BELGIUM BRAZIL CANADA
CHILE CHINA CZECH REPUBLIC DENMARK EGYPT FINLAND
FRANCE GERMANY GREECE HONG KONG INDIA INDONESIA
IRAN ISRAEL ITALY SOUTH KOREA MALAYSIA MEXICO THE
NETHERLANDS NEW ZEALAND NORVEGIA POLAND PORTUGAL
RUSSIA SLOVAK REPUBLIC SOUTH AFRICA SPAIN SWEDEN
SWITZERLAND TAIWAN TURKEY UNITED KINGDOM USA



NUANCE





Via Guido Salvagnini, 17
36040 - Sarego - Vicenza - ITALY
tel. +39 0444 436489
fax. +39 0444 835335
e-mail: eltra@eltra.it
www.eltra.it

