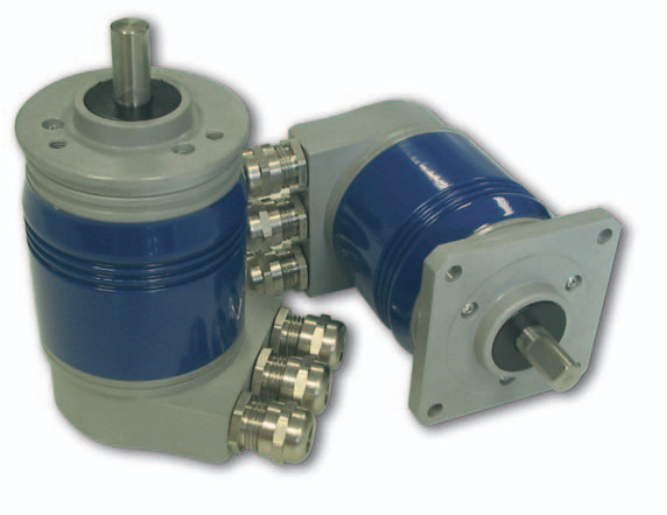
EAM PROFIBUS
MULTITURN ABSOLUTE ENCODER

ISO 9001:2000

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 (8.192 ppr and 4.096 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 f 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 follows:

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.

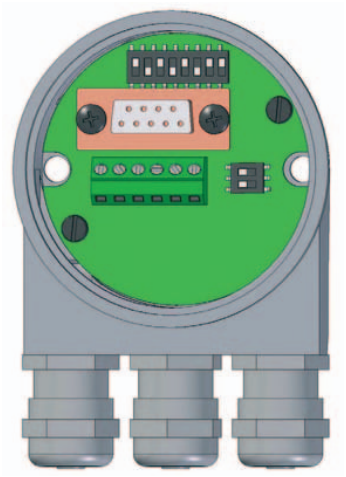
On the back cover of the encoder (see picture) there is a led inspection window.
The device operating status can be controlled by the two led through the window. The green one shows the power presence and must be permanently switched on.
The red led switches off only during the periodic data exchange between the Profibus master and the encoder.
In the section plan alongside 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 in 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 eighth 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 skintops (in any event only two of them can be used).

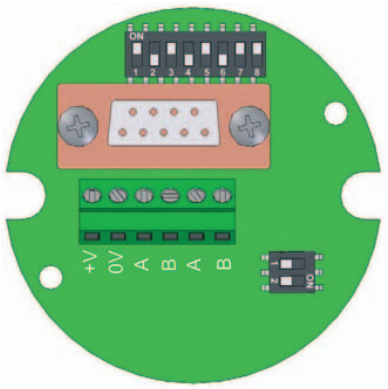
Usually, a skintop is used for the connection to the bus, a second one to continue the network and the last one to eventually supply the power to the encoder (if the power supply is not available by the network in addition to the RS-485 twin wire).



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 by sliding it out from the sunken connector. Then, connect wires according to the diagram on the connector and 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 our following 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)

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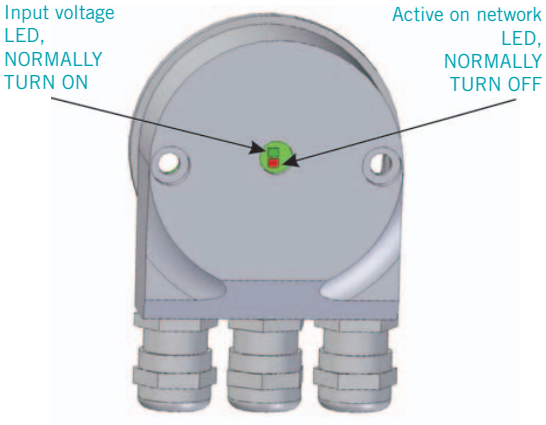
LED



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.

STANDARD SETTING

LINE OPEN

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).

LINE CLOSE

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 (mm²)	> 0.34*)

This cable allows an optimum network utilization. In fact, it is possible to reach the maximum communication speed allowed (12 MBaud). 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 partecipating in the excahnge 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
Max. number of segments in series	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.

PROFIBUS encoder ordering code

Full stop to separate special versions

EAM 63 A 4096 / 4096 B 12/28 F X X 10 X 3 P3 R . XXX

Absolute multiturn encoder EAM

Body dimension 58
Body dimension 63
Body dimension 90
Body dimension 115

Type of flange

mod. EAM63/90/115 A
mod. EAM58 B
mod. EAM58 C
mod. EAM63 D
mod. EAM63 E
mod. EAM58/63 F
mod. EAM63 G

Turns

2/4/8/16/32/64/128/256
512/1024/2048/4096/8192

Resolution

2/4/8/16/32/64/128/256/512
1024/2048/4096

Please directly contact our offices for pulses availability

Code type

Binary B

Input voltage

12 ÷ 28

Output types

PROFIBUS F

For optional about output types please refer to the absolute output section

Logic

To be reported if not used X

Options

X To be reported if not used

Shaft diameter

6 ø 6g6 mm - 58B
8 ø 8g6 mm - 58B - 63A/D/E -90A
9 ø 9,52g6 mm - 63A/D/E - 90A
10 ø 10g6 mm - 58B/C - 63A/D/E -90A -115A
11 ø 11g6 mm -115A

Bore diameter only for mod. 58F - 63F/G

8 ø 8H7 mm
9 ø 9,52H7 mm
10 ø 10H7mm
12 ø 12H7 mm
14 ø 14H7 mm
15 ø 15H7 mm

Enclosure rating

X IP54
S Optional IP66 with the exception of EAM63G/F - EAM115A

R.P.M.

3 3000 with IP66
6 6000

R Radial
P2 Two skintops
P3 Three skintops

Special version code numbered from 001 to 999

Environmental specifications

Enclosure rating	IP54 IP66 optional -58B/C -63A/D/E -90A
Operating temperature	0°÷ +60°C
Storage temperature	-15°÷ +70°C

Electrical specifications

Turns	2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 512 / 1024 / 2048 / 4096
Resolution	2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 512 / 1024 / 2048 / 4096 / 8192
Input voltage	12 ÷ 28 Vdc
Input current with no output load	300 mA
Electronic of Bus	LINE DRIVER (RS485)
Output frequency	100 KHz output code
Acuracy	+/- 1/2 LSB
Bus frequency	12 Mbaud

$$F = \frac{RPM \times Resolution}{60}$$

Mechanical specifications

Shaft diameter (mm)	ø6 g6 - 58B ø8 g6 - 58B - 63A/D/E - 90A ø9,52 (3/8") g6 - 63A/D/E - 90A ø10 g6 - 58B/C - 63A/D/E - 90A - 115A ø11 g6 - 115A
Bore diameter (mm)	ø8 H7- 58F - 63F/G ø9 H7- 58F - 63F/G ø10 H7- 58F - 63F/G ø12 H7- 58F - 63F/G ø14 H7- 58F - 63F/G ø15 H7- 58F - 63F/G
R.P.M. Max	6000 continuous 3000 continuous for 63G/F 3000 with IP66
Shock	50 G for 11 msec
Vibrations	10G 10 ÷ 2000 Hz
Bearings life	10^9 revolutions
Bearings	n° 2 ball bearings
Shaft material	Stainless steel AISI303
Body material	Aluminium UNI 9002/5 - (D11S)
Housing material	Aluminium alloy 6060
Flange material	Aluminium UNI 9002/5 (D11S)
Weight	800 g -58B/C -63A/D/E/F/G 1000 g - 90A -115A

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Switches International (011)462-4253 / www.switches.co.za

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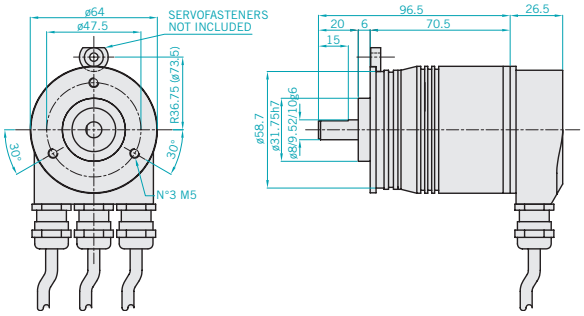
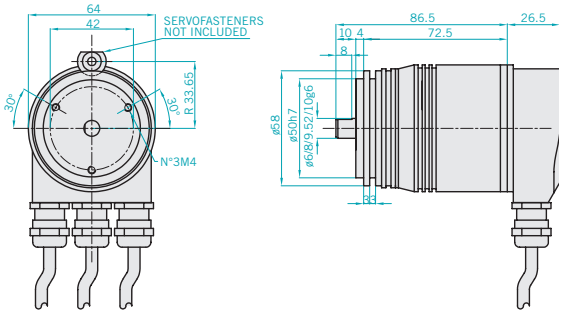
EAM63 A



EAM58 B



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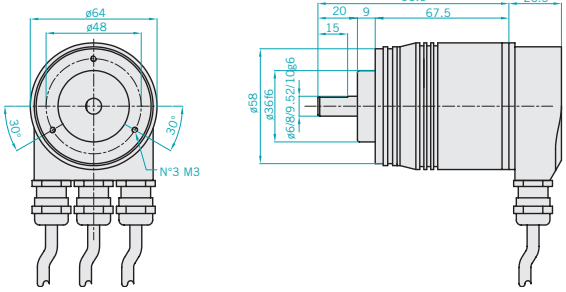
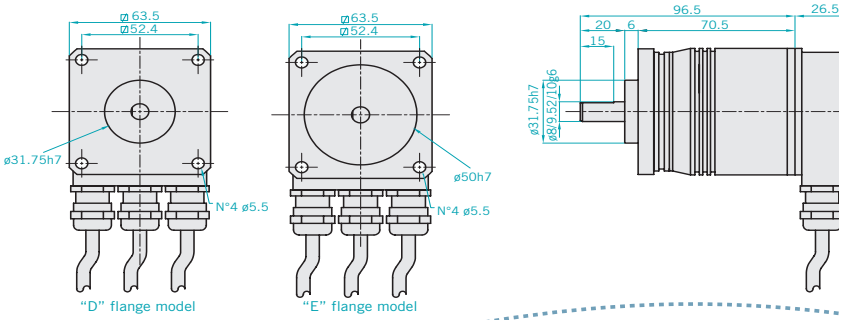
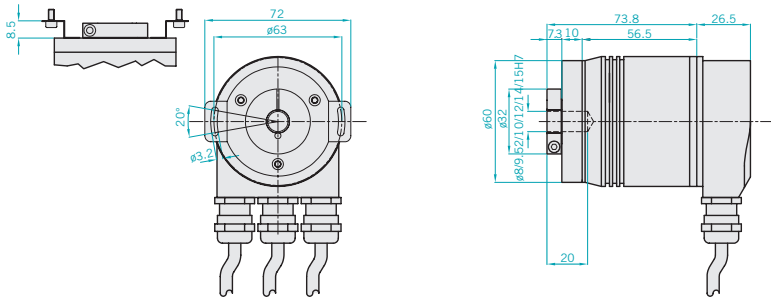


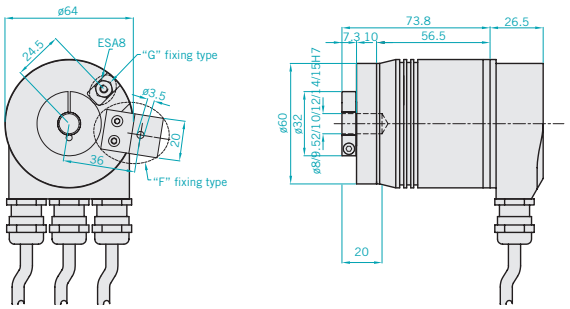
EAM63D - EAM63 E



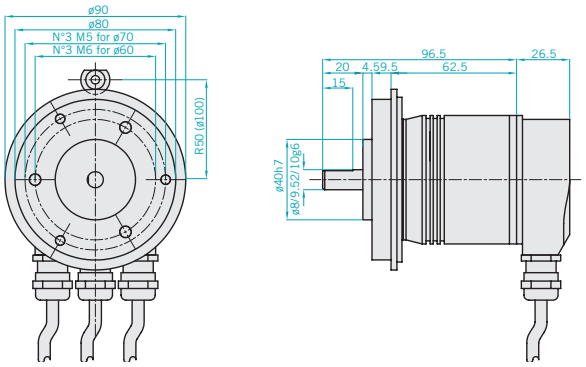
EAM58 F



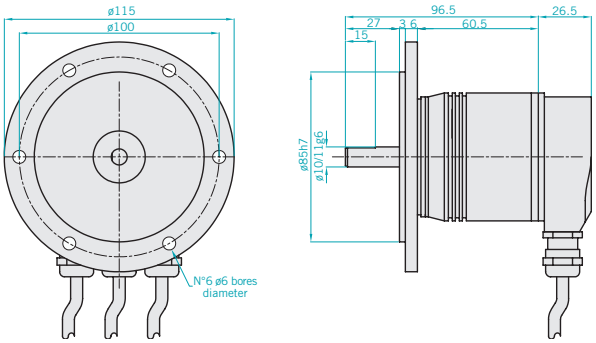
EAM63 F-G



EAM90 A



EAM115 A



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