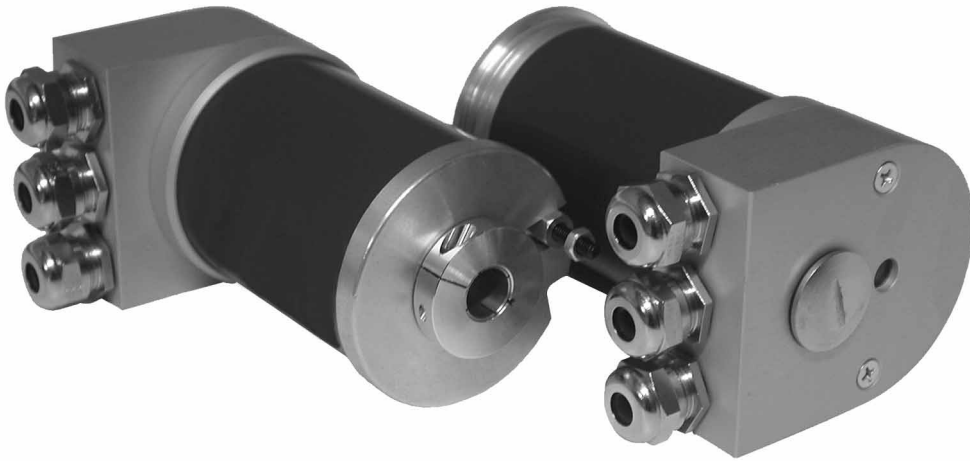




# MULTITURN ABSOLUTE ENCODER EAM PROFIBUS



## Presentation

The ELTRA Profibus multi-turn encoder (Identification Number 0x0599) conforms to the Profibus DP standard, described by European Standard EN 50170 Volume 2 and in particular, it respects the established profile for encoders "PROFIBUS-Profile for Encoders, Order No. 3.062".

The version with the Profibus DP interface maintains the same maximum resolution characteristics (8092 Pos/turn and 4096 revolutions) and the efficiency of the stand-alone version, but adds the potential and flexibility, typical of the Profibus DP network.

Through the Profibus DP it is therefore possible:

- To obtain the indication of the angular position from the encoder, during the cyclical data exchange.
- To set the resolution on the turn and on the revolutions (when setting the parameters).
- To change the pre-established direction of count increment (again when setting the parameters).
- To execute the PRESET operation, or better, to set the encoder indication to a determinate quota.
- To read the operating diagnostic.
- To have indications about the correctness of the code supplied by the device.

On a local level (on the device) it is also possible:

- To display the ON/OFF status.
- To display the bus device activity.
- To give a RESET, in other words to set the encoder current code to 0
- To set the device address.
- To insert the termination resistances, if necessary, on bus.
- To invert the count direction.

## Installing the device

Installing the Eltra Profibus encoder in a network means executing the operations typically necessary for commissioning any Profibus DP slave; the sequence of steps to follow, can be summarised thus:

- 1- Commissioning the encoder on the master (see the corresponding paragraph)
- 2- Wiring the encoder in the Profibus network, with the insertion or not of the terminals, depending on the physical position occupied by the device on the bus.
- 3- Locally setting the address for the slave (which must be unique inside the network and the same as that chosen at point 1).
- 4- Preparing the application/s on the master side and putting the Profibus network into operation.

As can be seen from the rear view of the encoder (see figure alongside) a led inspection window and a plug are present on the cover, permitting access for local settings on the device.

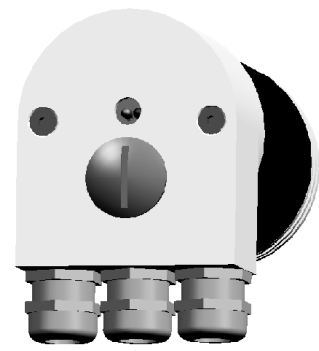
The operating status of the device is apparent from the two leds present visible through the window: in particular, the green led indicates the presence of the power supply and should be permanently on, whilst the red led goes out only during the cyclical data exchange between the Profibus master that set the encoder parameters and the encoder itself.

In the cut-away drawing, we can see the presence of the RESET button, or better the code zeroing button (to be used only when the encoder is at a standstill), two line termination dip-switches and eight dip-switches for choosing the device address.

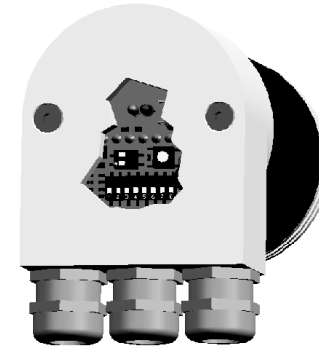
In the particular configuration shown in the cited figure, the two line termination contacts are placed to the OFF status, therefore not foreseeing the termination of the bus on the encoder.

Of the eight dip-switches available, only the first seven are used for the address of the slave, given that the maximum number of devices that can be inserted in a Profibus network is 126 elements. Also we have to bear in mind that contact 1 is the LSB of the address code, whilst contact 7 is the MSB.

The eighth switch however, is used for code inversion.



REAR VIEW OF THE ENCODER

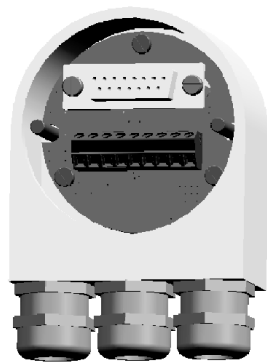


CUT-AWAY DRAWING

**CONNECTION TO THE NETWORK**

Concerning encoder connection to the Profibus DP network, access to the cables inside the device is through three skintops (it is anyway possible to use only two).

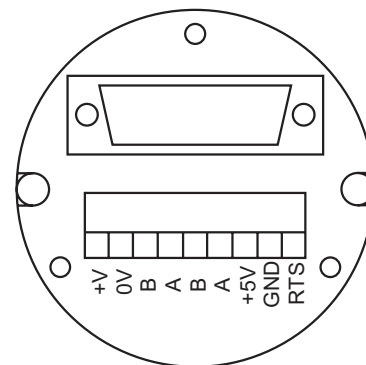
Usually, one is used for bus connection, another for connection to the network and the last, optional, to locally supply the encoder with power (if this is not distributed in the network apart from the RS-485 twin wire).



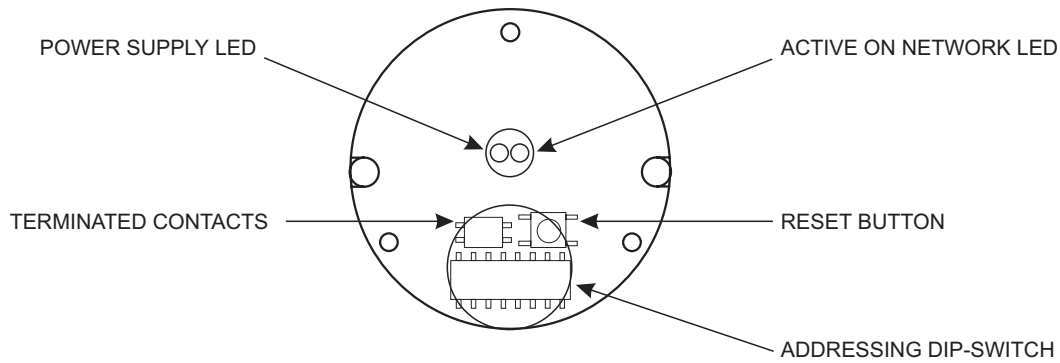
**ACCESS TO THE TERMINAL BLOCK**

To access the terminal block, it is necessary to unscrew the two screws present on the rear cover and to release the rear body from the main one, by sliding it out from the female multi-pin connector; we can now make the connections, following the serigraphy on the connector, summarised in the following table:

<b>+V</b>	SUPPLY VOLTAGE
<b>0V</b>	GROUND
<b>B</b>	PROFIBUS DP LINE OUT (RED)
<b>A</b>	PROFIBUS DP LINE OUT (GREEN)
<b>B</b>	PROFIBUS DP LINE IN (RED)
<b>A</b>	PROFIBUS DP LINE IN (GREEN)
<b>+5V</b>	DC ISOLATED
<b>GND</b>	DC ISOLATED
<b>RTS</b>	REQUEST TO SEND

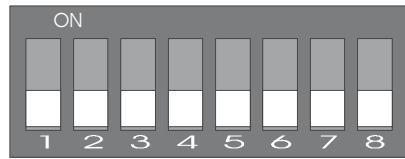


**N.B.:** To set the parameters and to configure the slave on the Profibus DP master (Commissioning operation), it is necessary to use the "Elt\_0599.gsd" file supplied with the encoder; this is anyway available at the [www.eltra.it](http://www.eltra.it) web site.

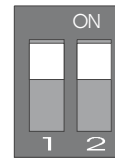


### SETTING THE DIP-SWITCHES

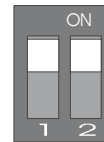
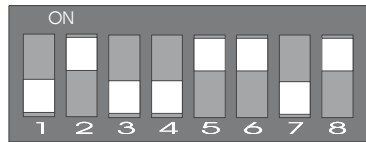
Below, apart from the standard position of the address and termination dip-switches, we give an example of closing the profibus line and device setting.



STANDARD SETTING



STANDARD SETTING



LINE CLOSED

In this example, a device address of 0100110 has been set from bit 1 to bit 7, which corresponds to decimal address 38; whilst the eighth bit corresponds to the code inversion, which in this example is active.

### NETWORK CHARACTERISTICS:

The physical means usually used to create a DP/MS network is cable A; it must have the following characteristics:

Parameter	Cable type A
Characteristic impedance in $\Omega$	135 ... 165 at a frequency of (3...20 Mhz)
Operating capacity (pF/m)	< 30
Loop resistance ( $\Omega$ /km)	$\leq 110$
Core diameter (mm)	>0.64 *
Core cross-section (mm <sup>2</sup> )	>0.34 *

This type of cable permits optimisation in the use of the network, or better, it is possible to reach the maximum possible communication speed of 12 Mbaud; in relation to the baud rate chosen, there are also the following limitations on the maximum physical dimension of a bus segment:

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

Finally, we remind of the physical and topographical characteristics of a profibus network:

Maximum number of stations 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
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.

## Ordering codes for multiturn absolute encoder

### PROFIBUS

In case of a particular Customer variant separate by a full stop

**EAM 63 A 4096 / 4096 B 8/28 F X X 10 X 3 P3 R . XXX**

**EAM** = multiturn absolute encoder

**58** = body dimension  
**63** = body dimension  
**90** = body dimension  
**115** = body dimension

**A** = mod.EAM63 / 90 / 115  
**B** = mod.EAM58  
**C** = mod.EAM58  
**D** = mod.EAM63      Type of flanges  
**E** = mod.EAM63  
**F** = mod.EAM63  
**G** = mod.EAM63

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

**2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 / 512 / 1024 / 2048 / 4096 / 8192**      Resolutions  
 N.B.: For impulse availability contact our offices

**B** = Binary      Code

**8 ÷ 28**      Encoder power supply (Vdc)

**F** = PROFIBUS      Electronics output configuration  
 N.B.: For the optionals on the output configurations contact our offices

**XXX** = Special Customer variants indicated by a progressive number from 001 to 999

**R** = radial

**P2** = two skintop  
**P3** = three skintop

**3** = 3000 with IP66      R.P.M.  
**6** = 6000

**X** = IP54 for EAM63G/F  
 IP64 excluding EAM63G/F      Protection  
**S** = optional IP66 excluding EA63F/G --EAM115

**6** = ø 6g6 mm -- 58B  
**8** = ø 8g6 mm -- 58B -- 63A / D / E -- 90A  
**9** = ø 9.52g6 mm -- 63A / D / E -- 90A      Shaft diameter  
**10** = ø 10g6 mm -- 58B / C -- 63A / D / E -- 90A -- 115A  
**11** = ø 11g6 mm -- 115A

**8** = ø 8H7 mm  
**9** = ø 9H7 mm  
**10** = ø 10H7 mm      Hole diameter only for mod.63F / G  
**12** = ø 12H7 mm  
**14** = ø 14H7 mm  
**15** = ø 15H7 mm

**X** = not to utilize      Options

**X** = not to utilize      Logics

### Enviromental Characteristics

<b>Protection</b>	IP54 standard --63F/G IP64 standard --58B/C --63A/D/E --90A --115A IP66 optional --58B/C --63A/D/E --90A
<b>Operating Temperature</b>	0° + +60°C
<b>Storage Temperature</b>	-15° + +70°C

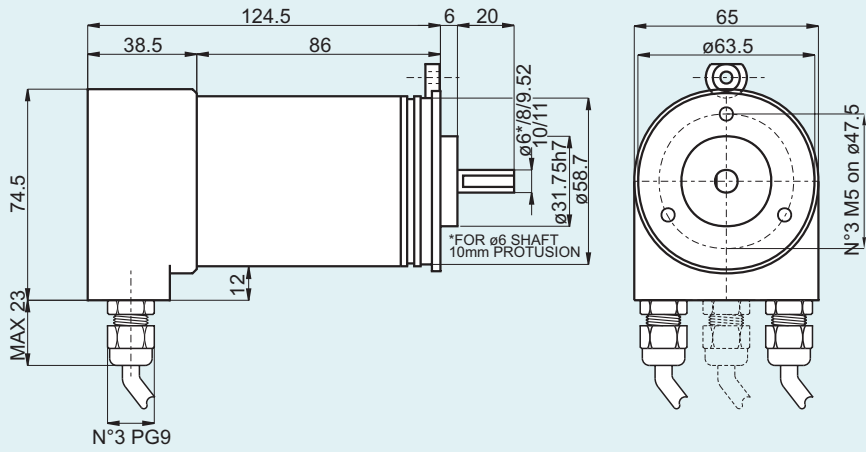
### Mechanical Characteristics

<b>Shaft diameters (mm)</b>	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
<b>Hole diameters (mm)</b>	ø8 H7 --63F/G ø9 H7 --63F/G ø10 H7 --63F/G ø12 H7 --63F/G ø14 H7 --63F/G ø15 H7 --63F/G
<b>R.P.M. Max</b>	6000 continuos 3000 continuos for --63G/F 3000 with IP66
<b>Shock</b>	50 G per 11 msec
<b>Vibrations</b>	10G 10 + 2000 Hz
<b>Bearings life</b>	10 <sup>9</sup> revolutions
<b>Bearings</b>	n°2 ball bearings
<b>Shaft material</b>	Stainless steel AISI303
<b>Body material</b>	Aluminium -UNI 9002/5- (D11S)
<b>Cover material</b>	Aluminium alloy 6060
<b>Flange material</b>	Aluminium -UNI 9002/5- (D11S)
<b>Weight</b>	~ 800 g --58B/C--63A/D/E/F/G ~ 1000 g --90A--115A

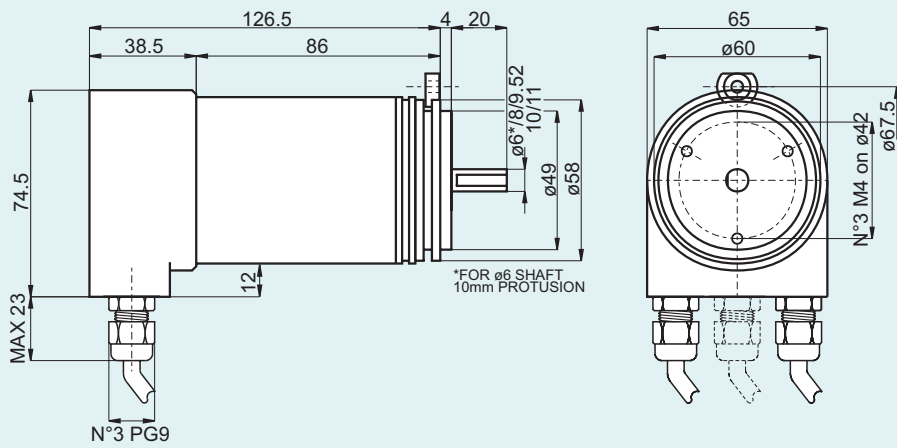
### Electronic Characteristics

<b>Turns</b>	2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 / 512 / 1024 / 2048 / 4096
<b>Resolutions</b>	2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 / 512 / 1024 / 2048 / 4096 / 8192
<b>Power supply</b>	8 ÷ 28 Vdc
<b>Current consumption without load</b>	300 mA
<b>Electronica di Bus</b>	LINE DRIVER (RS485)
<b>Max output frequency</b>	100 KHz output code <b>F</b> = $\frac{\text{RPM} \times \text{Resolution}}{60}$
<b>Accuracy</b>	+/- 1/2 LSB
<b>Bus Max Frequency</b>	12 Mbaud

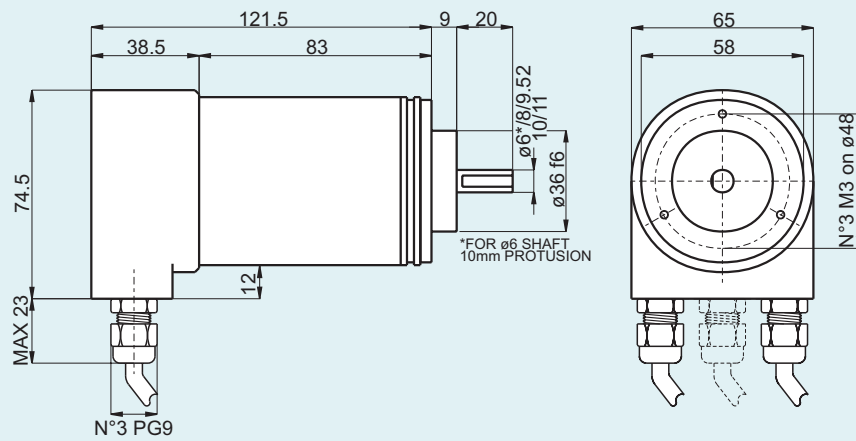
### EAM63A



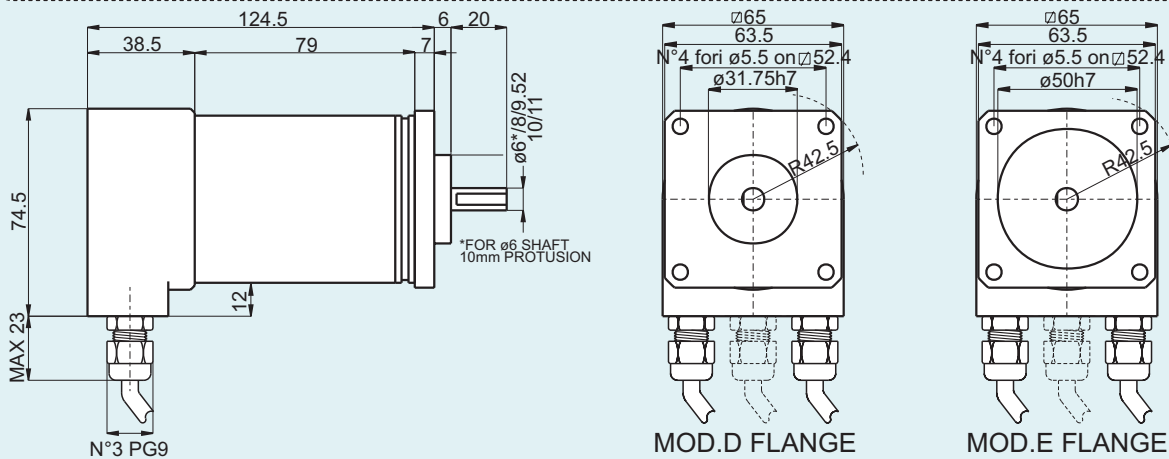
### EAM58B



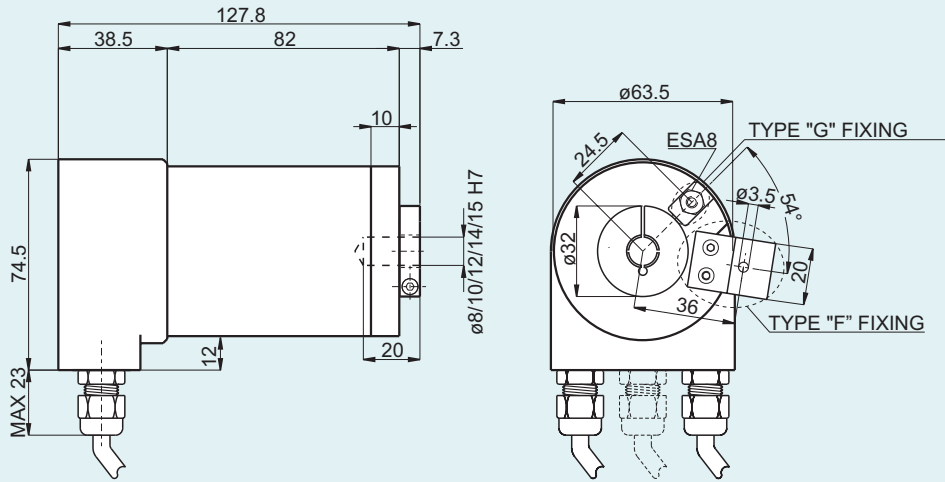
### EAM58C



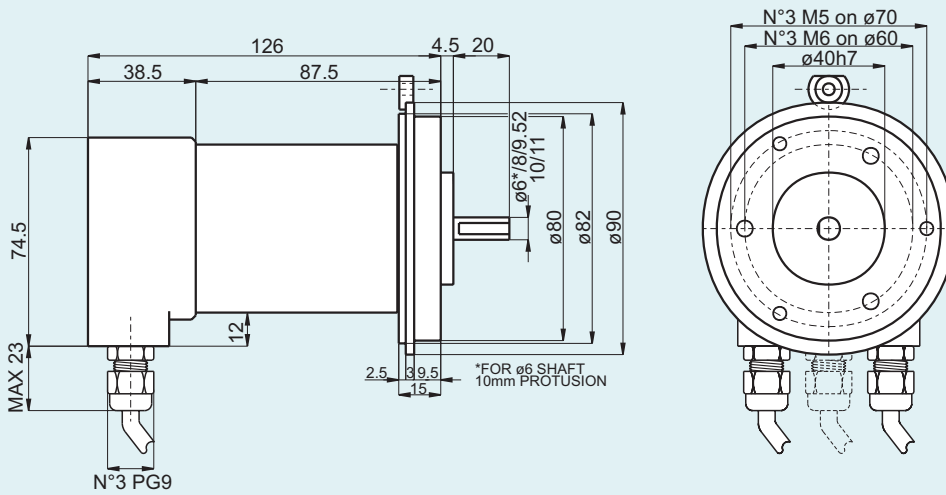
### EAM63D - EAM63E



EAM63F - EAM63G



EAM90A



EAM115A

