

# **ETG DustMini-485** *for installation in hazardous areas .*

*The equipment is approved to the following marks:*

II 3G ExnL IIC T6, II 3D Ex tD A22 IP66 T85°C

## **OPERATING INSTRUCTIONS**

**ProbeMini-DD**



**ProbeMini-LT**



**ProbeMini-HT**



(The models with gray box have signaling led inside)

**Centralino Mini-485**



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**Legend:**



**IMPORTANT INSTRUCTIONS**

**TERMINOLOGY:** (default) = factory setting

The equipment must be used only for the function which it was designed for..

## 1 **DESCRIPTION** (for rapid start-up see : **Point 7**)

- The ETG DustMini serial is designed to detect the presence of dust in any kind of air filtration plant or stack. It belongs to the group "II" of instruments, correspondent to the instruments destined to be used in all the different sites than by mines, where explosive atmospheres could originate.
- The instrument is suitable for use in **Zone 2** and **Zone 22**.  
The **Zone 2** is where it is unlikely that an explosive atmosphere, consisting of a mixture of air and flammable substances in the form of gas, vapor or mist is present during normal operation. If that occurs, it may persist only for a short period.  
The **Zone 22** is where it is unlikely that an explosive atmosphere in the form of a cloud of combustible dust in air is present during normal operation but, if you present, it persists only for a short period.
- The instrument belongs to the **category 3**, indicating environments with small chance that explosive atmospheres are manifested due to gas, steam, fogs or mixtures of air and powders.
- For the **category 3** the safety level is guaranteed from the normal operation.
- The product is suitable for use in explosive atmospheres caused by gases, vapors or mists and / or explosive atmospheres caused by dust.
- The products comply with IEC EN 60079-15:2005. The type of security used is the "NL" applicable to devices with limited energy.
- The product is suitable for use in environments that have any type of gas.
- The device is designed to operate in the temperature class T6, corresponding to a maximum surface temperature of 85°C. (185°F.)
- The probe body is made of aluminum and the sensor element consists of a stainless steel rod electrode.
- The probe is fixed onto a stainless steel sleeve threaded by 1" GAS or 1" ½ GAS for model HT. (optional Supplied) quickly through a nut. The probe can be extracted without to disconnect electrically it.
- Electrical connections to the probe are made via cable with 4 twisted pairs cable .
- The power supply range for the probe is 12 Vdc provided by the.

### 1.1 **WARNINGS**

- To remove the accumulations of dust, to clean with damp cloth or with anti-static products.
- All the connections, must be made respecting the normative applicable in the zone and in the environment of installation, according to the norm of reference EN 60079-14
- Verify the earth connection of the instrument.
- The instrument is approved for zones which have precise characteristics. Don't install and to use it in different environments from those specified.
- The installation, the maintenance and the reparation, must be performed only from competent and authorized technicians.

## 2 **INSTALLATION**


- When it is possible, the probe must be placed with distances from obstacles or bends, in according to the criteria specified by the legislation UNICHIM (at least 5 diameters after curves or fans and 2 diameters before curves or discharge into the atmosphere). If it is possible, mount the probe between the filter and the fan. The not protected mounting on chimney without an hat or bend against the rain causes false alarms in presence of rain or hail and possible loss of isolation of the electrode.
- **The rod must not touch or brush the opposite wall of the conduit.** If the electrode is too long, it must be shortened (removing burrs) taking care not to apply torsion forces.
- **Do not mount the probe on vibrating surfaces.**
- The fixing of the probe is fast with nut, to be screwed on the stainless steel sleeve (optional).
- **The base must be welded on the pipe and it must penetrate at least one centimeter into it.** This is to prevent that drilling burrs could retain filaments of materials. The presence of mobile elements on the rod of the probe, or near it, generates spurious signals.
- The mounting on thin walls must be reinforced with a metallic handkerchief.
- **The cable of the probe must run separately from the power cables. It must be protected with sheath and left enough long to allow to extract the probe without to have to disconnect the cable.**
- **The probe must be protected from direct sunlight and bad weather with adequate coverage.**

### 3 PROBE CONNECTIONS

#### 3.1 POWER SUPPLY

(+ 12V) terminal 4 Red wire, to be connected to terminal 4 of connector CN3 on the apparatus.  
(-) terminal 3 Red/Black wire + cable shield, to be connected to terminal 3 of connector CN3 on the apparatus. Proper power connection is indicated by green led (inside for probe with gray box)

Power supply for Mini-485 may be required for 115/230 Vac, or 24 Vac, or 24Vdc.

 **Connect the DMA-M equipment to a power network in accordance with the law.**

- Make connections with bipolar cable 2 x 1 mm<sup>2</sup> H02VV-F (certified PVC).

The power supply of the equipment does not require to be the connection to ground.

- Lock the cable with the nut of the cable grip and clip the conductors close to the extractable terminal board.

- The power line should be provided with an omnipolar magnetothermal switch, with distance between the contacts of at least 3 mm and it must support a power consumption of 3 VA.

The switch must comply with the norms IEC 947-1 and IEC 947-3. It must be easily accessible, marked as switch for the dust detector and placed in its proximity.

- To stop the cable with the die of the pressacavo and fascettare the conductors in proximity of the terminal block

#### 3.2 DIGITAL INTERFACE

Terminal 1 **White** wire, Terminal 2 **White/black** wire, connect respectively to 1 e 2 of the control box.

### 4 CONTROL BOX CONNECTIONS

#### 4.1 POWER SUPPLY (connector CN1)

24 Vac: terminal 4, 6    24 Vdc        : terminal 4(+), 6(-)

115 Vac: terminal 4, 5    230 Vac: terminal 4, 6

#### 4.2 ALARM RELAY (connector CN1)

RELAY (normally off)

NA contact = terminal 1

NC contact = terminal 2

Common = morsetto 3

#### 4.3 Modbus RTU (connector CN2)

RS-485 line: terminals 4(-), 5(+)

#### 4.4 ANALOG OUTPUT (connector CN2)

Voltage : terminals 3(-), 1(+)

Current : terminals 3(-), 2(+)

### 5 DISPLAY AT POWER UP

- **Software Version**

- **Warm-up** ( about 25 s.)

- **Probe Test** ( about 5 s.)

- **Start Delay** ( programmable) To disable alarms generated by dusts generated by the start of the fan.

- First row: **Medium value** of dusts generated during the previous medium time.

- Second row: **Instant value** indicated by Bargraph with 16 segments.

In the second row clicking the  key following data may be displayed:

. **Time to end** of medium period time.

. **Instant concentration** in numerical format.

. **Maximum concentration value** during actual medium period time.

. **Alarm medium or instant value set** (as chosen with setting menu)

. **Analog full scale value** in mg/Nmc.

. **Mass flux value** (relative to previous medium period) max. 160.000,00 mg.

. Absolute instant reading value ( diagnostic purpose).

. Serial number of Control box.

. Serial number of Probe .

## 6 **SETTINGS** (during these operations monitoring is stopped and will then restart where stopped)

To enter programming mode press the key **P** for 3 seconds and insert password (default: 0000) (the operation will be aborted if password non recognized or no key is pressed during a 5 seconds time). To display the menu items press **P** and then **↑** **↓** to change values:

a) **Start Delay** (from 0 minutes to 30 minutes)

b) **Alarm relay activation for :**

- Max accepted mean value
- Max accepted instant value

c) **Alarm relay set-point :** up to 600.00 mg/Nmc. (10 mg/Nmc default)

d) **Medium time :** value in minutes (from 1 to 480 minutes)

e) **Analog output choice:**

- **Instant value** (default)
- **Mean value**

f) **Analog output full scale:** up to 600.00 mg/Nmc. (20 mg/Nmc default)

g) **Bargraph full scale:** up to 800 mg/Nmc. (20 mg/Nmc default)

h) **Calibration time:** in minutes, from 1 minute a 480 minutes (60 minutes default)

i) **Alarm relay mode:**

- **Normally on** (default)
- **Normally off**

l) **Anlog output type**

- **Current:** to choose as 4-20 mA (default), or 0-20 mA.
- or
- **Voltage:** 0-10 V

m) **Air flow: Nmc / h** (up to 2.000.000 / Nmc (default 10.000) the calculation of the mass flow must be related to the selected average time (ie. hourly flow = 5000 Nmcs, medium time selected = 30 minutes, value of the flow to input = 2500

## 7 **START UP**

### 7.1 **INTRODUCTION**

The equipment is furnished with a sensitivity that will not produce spurious alarms with normal dust emission. This probe, can be calibrated on the plant in which it is installed, as the different characteristics of the dusts, such material type, specific weight and the flow of air that it transports it, produce very different levels of signal.

To calibrate the equipment the mean value of the dusts emitted by the plant , when it is to regime and with active cleanings,must be determined along with gravimetric exam.

If during the installation it is not possible to effect a gravimetric exam, the following solutions can be provisionally adopted:

- On plants that produce constant dusts, the value of the most recent gravimetric exami can be used (accepting the risk that in the meantime the filtering elements are not damaged).
- On filters in depression it is possible to manually introduce, awry of the probe, a concentration of dust weighed calculated in relationship to the course of air and the time of immission.

### 7.2 **CALIBRATION**

- Enter programming mode by pressing the key P for at least 3 seconds, input the password, select "**CALIBRATION TIME**" and input the time to provide the collecting gravimetric or for the manual input of the dust sample.
- **START** of the calibration, in synchronism with the operator in field, pressing the keys **UP+DOWN** \*) contemporarily
- Possible **STOP** anticipated of the calibration again pressing the keys **UP+DOWN** and input of the password.

\*) **The effected selection pressing two keys at the same time, is activated at their release.**

### 7.3 **INPUT CALIBRATION DATA**

Contemporarily press the keys **UP + P** and to input the password. Input the calibration value press again the key **P**.

## 8 **PROBE TEST AND MAINTENANCE**

The functionality of the probe and the isolation of the electrode are automatically verified at power on and periodically in automatic; possible dysfunctions are signalled by:

- change of the state of the relay of alarm.
- analogical output of continuous full scale value.

The possible causes of Alarm are:

- **Short-circuit** between electrode and duct.
- **Loss of isolation** of the electrode: carefully clean the insulator and to remove possible filaments or cinders glued on the electrode.

## 9 **PASSWORD**

To personalize the password to contemporarily press the keys **Down + P**, to insert the actual password and to insert the new one.

## 10 **TECHNICAL SPECIFICATIONS**

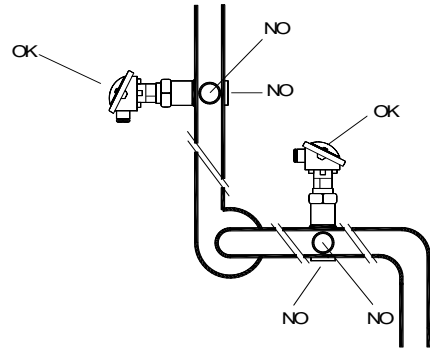
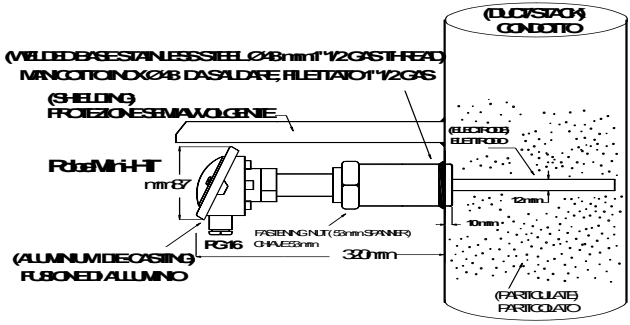
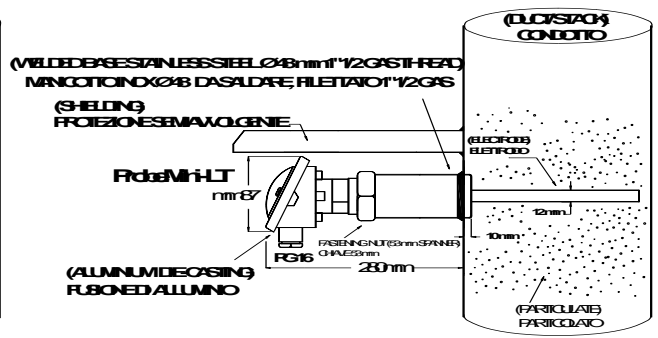
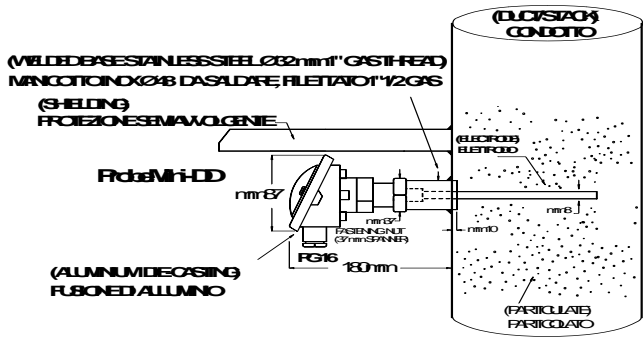
<b>Control box power supply</b>	: 115/230Vac 2VA o a 24Vac, o 24Vdc +/-10%
<b>Probe power supply</b>	: 12 Vdc 0,5 W (provided by Mini-485 control box)
<b>Probe power signal</b>	: green led (inside in gray box)
<b>Electrode Length ETG DustMini, /DD</b>	: 270 mm (protrusion from the standard base mounting)
<b>Electrode Length ETG DustMini-LT/HT</b>	: up to 1000 mm.
<b>Detectable concentrations</b>	: 0,01 ÷ □□ 5000 mg/Nm <sup>3</sup>
<b>Minimum velocity of the process flow</b>	: > 5 m/s
<b>TIMES:</b>	
<b>Instant value</b>	: 1sec (programmable via RS-485)
<b>Mean valueo</b>	: from 1 minute to 480 minutes (1 minute default)
<b>Digital probe output</b>	: Etgrisorse protocol
<b>Digital control box output</b>	: RS-485 modbus RTU (Instruction manual on request)
<b>Concentration analog full scale</b>	: 800 mg/Nmc (20 mg/Nmc default)
<b>Alarm relay set point</b>	: 6000,0 mg/Nmc (10 mg/Nmc default)
<b>Relay mode</b>	; normally (default on) or off
<b>Relay contact</b>	: 30 Vac/dc max. 200 mA (non inductive load)
<b>Mini-485 control box temperature</b>	: -20 + 50°C (-4°F +122°F)
<b>Probe temperature</b>	: -20 + 70°C (-4°F +140°F)
<b>Process Temperature Probe -/DD/LT</b>	: -20 + 100°C (-4°F +284°F)
<b>Process Temperature Probe /HT</b>	: -20 + 400°C (-4°F +752°F)
<b>Probe Material and Protection Grade</b>	: Cast aluminum, IP 66
<b>Control box Material and Protection Grade</b>	: ABS, 95 x 95 x 60 mm, IP 65

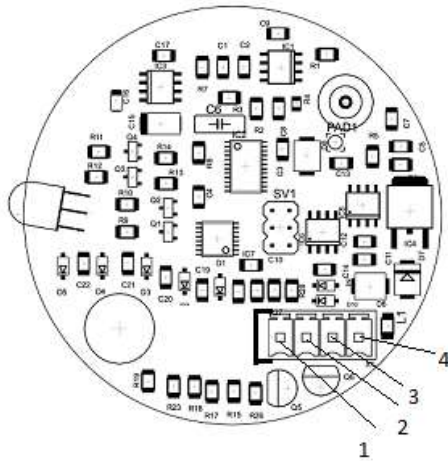
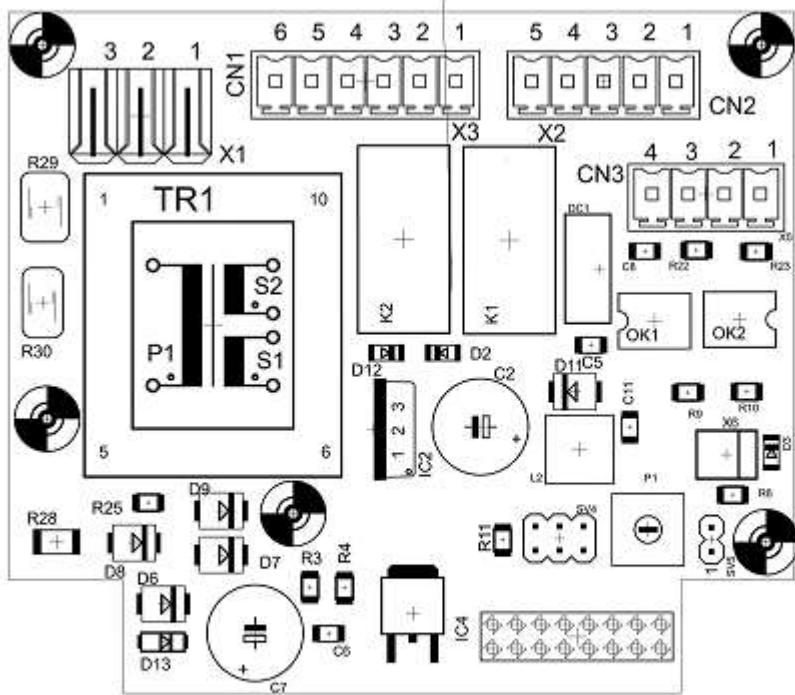
## 11 **WARRANTY**

The equipment is guaranteed for the time of one year after delivery, free our headquarter.

Mechanical or electrical damages due to incorrect use or installation, are excluded.

The warranty lapses in case of tampering of the electronic circuit.





**ETG DustMini-485**

**INSTALLATION**

**Collegamenti:**

**CN3: sonda**

**1 centralino → 1 sonda**

**2 centralino → 2 sonda**

**3 centralino → 3 sonda**

**4 centralino → 4 sonda Morsettiera**

**CN2: rs485/ out V-mA**

**1: out V**

**2: out mA**

**3: GND**

**4: A 485**

**5: B 485**

**Morsettiera CN1: (relè K1 morsetti 1-3: allarme; relè k2 morsetti 4-6: guasto sonda) 1:**

**NC**

**2: NA**

**3: C**

**4: NC**

**5: NA**

**6: C**

**Power supply X1:**

**1-3: 220 Vac; 1-2: 115 Vac**

**1-3: 24 Vac; 1: + 24 Vdc 3: 0 Vdc**