

E9T triboelectric reader usage in industrial field



Application Note 026

Release 1.1 2021

Introduction

In today's industrial automation market, new Turbo technologies bring many opportunities for industrial system developers to successfully address evolving challenges.

Automation systems require cutting-edge technologies to meet customer requirements for application ranging from programmable logic controllers (PLC's) and industrial computers to human machine interface (HMI), industrial peripherals and factory communication.

Turbo has developed a solution for the industrial automation industry with a platform specifically focused on the dust emission monitoring with industrial communication capabilities, that has been designed to implement the real-time communications technologies used in industrial automation applications.

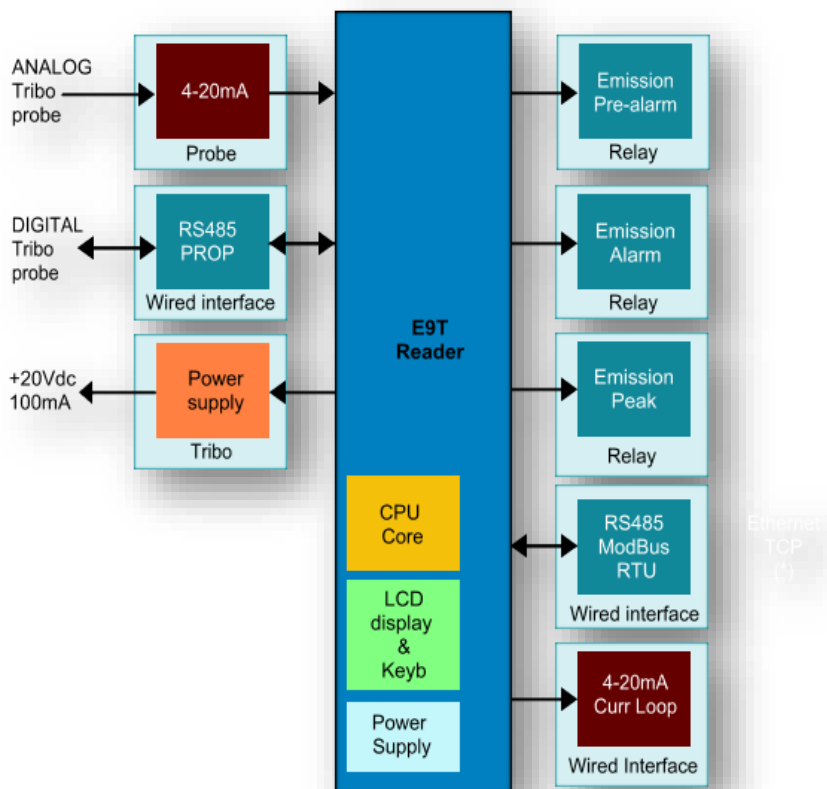
E9T triboelectric reader

The "E9T triboelectric reader", also defined like E9T control unit, is a stand-alone electronic device connected to a triboelectric probe and built for monitoring dust emission in chimneys of industrial systems.

Brief, the dust flowing in a chimney is detected by the triboelectric probe placed in the conduct and connected to the E9T control unit. The triboelectric probe is able to measure the quantity of emissions flowing and immediately communicate the measure to the E9T control unit.

The E9T control unit is provided of LCD graphical display for visualization and local programming and a lot of I/O lines for system interfacing in order to transmit emissions values and alarms status.

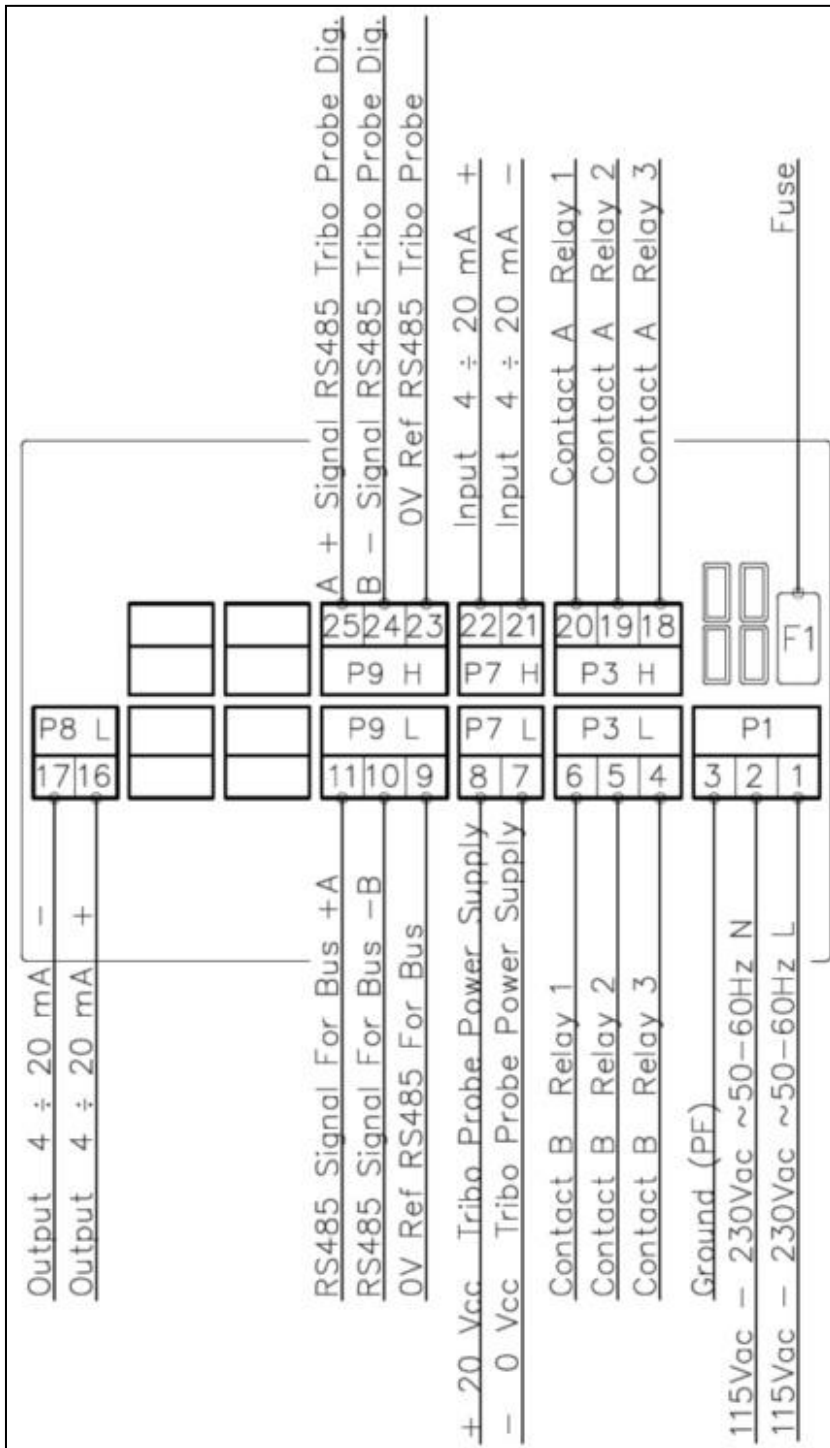
The E9T control unit schematic resources diagram is shown below:



More information are available on [Turbo web site](#)

Control unit wirings

The E9T control unit is provided of a clamp tightening plug connectors to permit all the wirings at the main system. The connectors are removable and numbered to help wiring operations. Pull carefully the plug connectors to remove it from the matched male welded on the electronic board.



Wiring operations

- 1) Remove the lower plastic front panel to access to the on-board plugs connectors.
- 2) Remove the connectors one at time, carry out the related wiring and reinsert the connect in the right positions.
- 3) Make sure that the wiring has been carried out correctly.



DANGER

Risk of electric shock

Remove the main power supply before making any connections to the Control Unit.

Terminal list

Ref	Cat	No. term	Terminal marking	Description
Main Power Input	A	1	N	AC 115-230V 50/60Hz ±10% 8VA(10VA max) Protective ground terminal
		2	L	
		3	PE	
Digital Output (B contact Relay)	B	4	3B	Contact type: 1 Form A (NO)
		5	2B	Rated Voltage: 250Vac
		6	1B	Rated current: 6A Resistive Load
				Max. switching voltage: 400Vac
Breaking max capacity: 1500VA				
Power Output for Tribo Probe	C	7 8	0V +20Vdc	+20Vdc output (tolerance ±5%) referred to 0V, maximum 100mA, short circuit protected
Bus Communication Port	D	9	0V	Mode: RS-485 Modbus RTU
		10	B(-)	Isolation to control circuit: None
		11	A(+)	Maximun nodes: 200
				HBM protection: >±15kV
		Line Terminator: 220Ω		
Digital Input 1	E	12 13		Mode: Free contact (limited at 5mA @30Vdc) Transil protection: 36V
Digital Input 3	E	14 15		Isolation to control circuit: 2,5kV
Analog Output	E	16 17	+ -	Mode: Unipolar current mode
				Isolation to control circuit: None
				Current range: 4mA to 20mA
				Accuracy: ± 32uA/step
Digital Output (A contact Relay)	B	18 19 20	3A 2A 1A	Contact type: 1 Form A (NO)
				Rated Voltage: 250Vac
				Rated current: 6A
				Max. switching voltage: 400Vac
				Breaking max capacity: 1500VA
Analog Input	E	21 22	- +	Mode: Unipolar current mode
				Isolation to control circuit: None
				Current range: 0mA to 20mA
				Accuracy: ± 32uA/step
Tribo Probe (Dig) Communication Port	D	23 24 25	0V B(-) A(+)	Mode: RS-485 Bus
				Isolation to control circuit: None
				HBM protection: >±15kV
				Line Terminator: 220Ω
Digital Input 2	E	26 27		Mode: Free contact (limited at 5mA @30Vdc)
				Transil protection: 36V
Digital Input 4	E	28 29		Isolation to control circuit: 2,5kV



DANGER

Risk of electric shock

The input and output terminals, numbered 7 to 17 and 21 to 29, are safety extra low voltage (SELV) terminals and must only be connected to low voltage supplies.

Recommended cable cross-section and length

Cat	Cross Section	Approvals	Notes
A	0,75mm ²	IEC 60227 IEC60245	No-flame cable
B	0,75mm ²		No-flame cable
C	0,75mm ²		No-flame cable
D	0,75mm ²		No-flame cable
E	0,50mm ²		No-flame cable
PE	0,75mm ²		No-flame cable, Yellow-green



Triboelectric probe interfacing

The E9T control unit can interface an analog or digital triboelectric probe. The probe is a microprocessor-based measuring instrument designed to detect and measure dust emissions caused by breaking of bag filters.

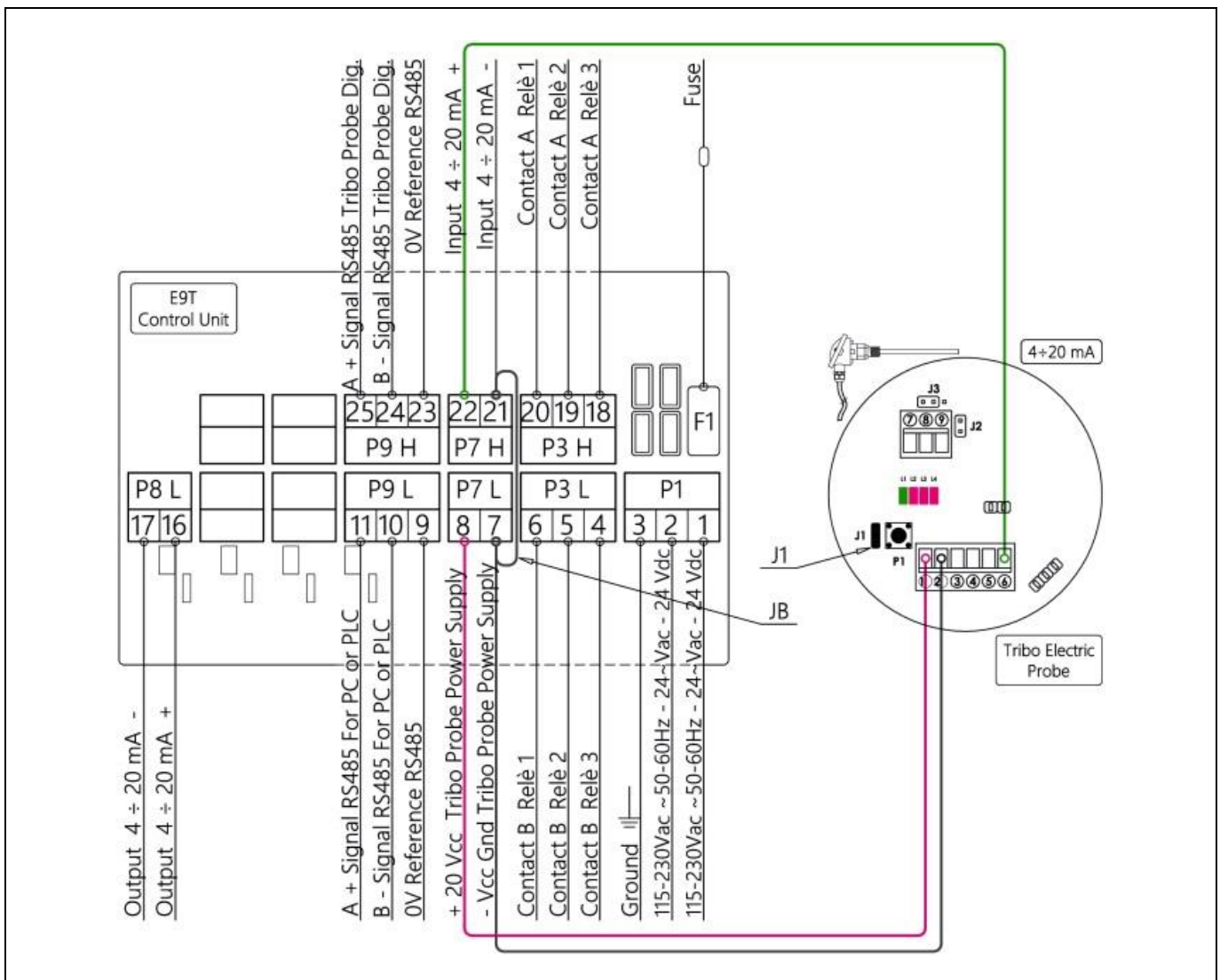
The analog triboelectric probe is provided of industrial 4-20mA current-loop isolated output to long distance transmit the emission value read to an E9T control unit. The current-loop line is more suitable in plant where there are high peaks noises and electromagnetic disturbances.

The digital triboelectric probe is provided of industrial RS-485 isolated communication port to transmit emission value read and receive some configuration messages. The communication protocol is proprietary and can only work with E9T control unit and Eco-Net family devices of Turbo. The digital line is more suitable when fast response is needed.

The standard Turbo triboelectric probe is provided of both analog and digital interface. Due to different electrical reference levels of analog and digital outputs, the end-user must connect only in one way, avoiding to connect both analog and digital at the same time.

Analog probe

The E9T control unit interfacing to analog output of the probe is shown in below schematics.



In analog probe interfacing, the E9T control unit will provide the power supply to the probe.

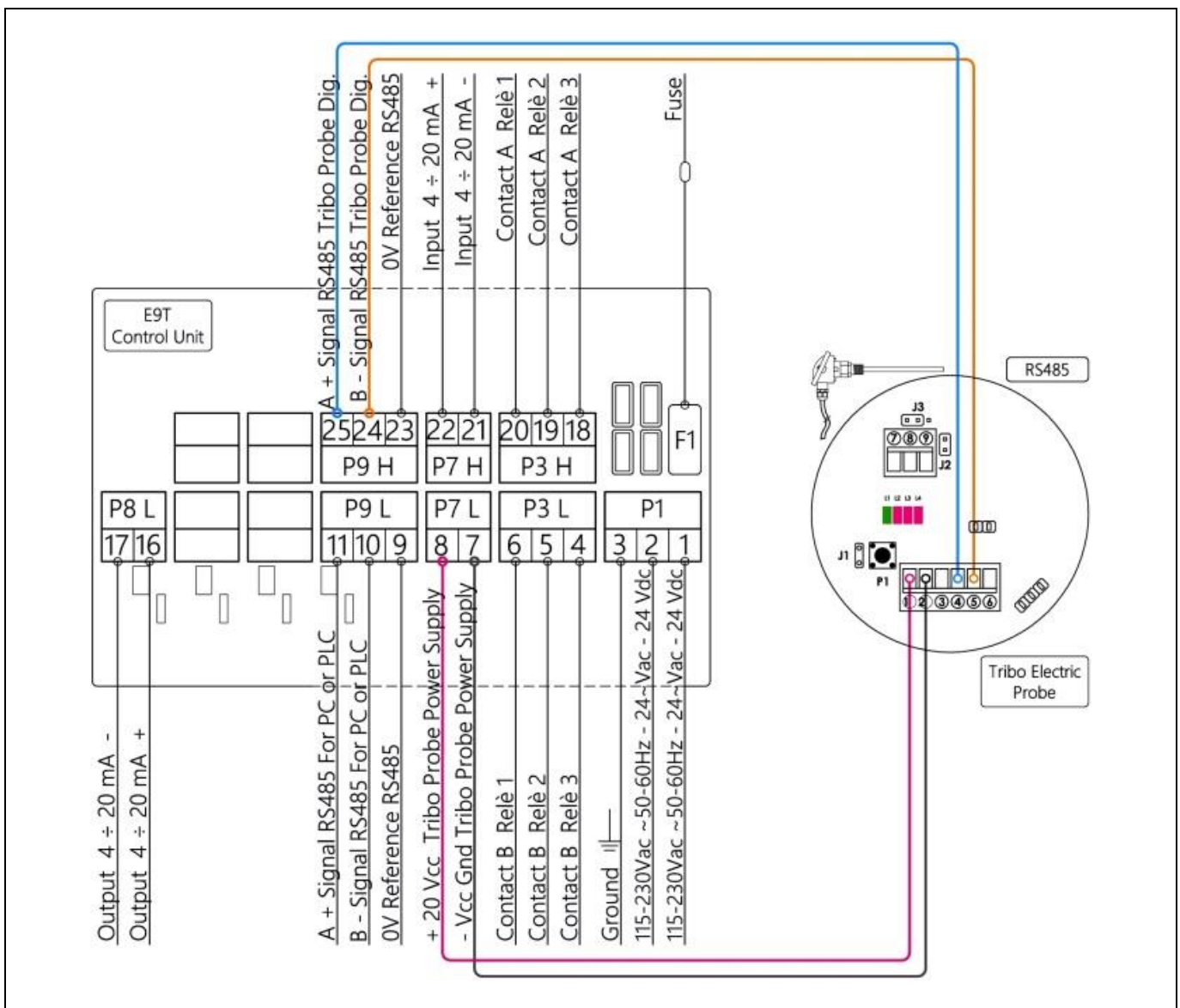
It is necessary to connect terminals 7 and 21 together (see JB jumper on the schematic..) to provide a stable measure reference point.

The J1 jumper of the triboelectric probe is used to set the emission range, only for analog output.

Please see the [E9TRB manual](#) for more information.

Digital probe

The E9T control unit interfacing to digital communication port of the probe is shown in below schematics.



The J1 jumper of the triboelectric probe doesn't take effect for digital probe.

Please see the [E9TRB manual](#) for more information.

Alarm relays

The E9T control unit is provided of three independent relay contacts related to different emission alarm events (Pre-Alarm, Alarm and Peak). Each time an alarm event is detected, the E9T switches the related relay contact in order to trigger a load (external relay bobbin, lamp, buzzer, ...) to remotely signal the alarm.

The alarm event detections are fully configurable by on-screen menu. Please see the Commissioning section for programming instructions.

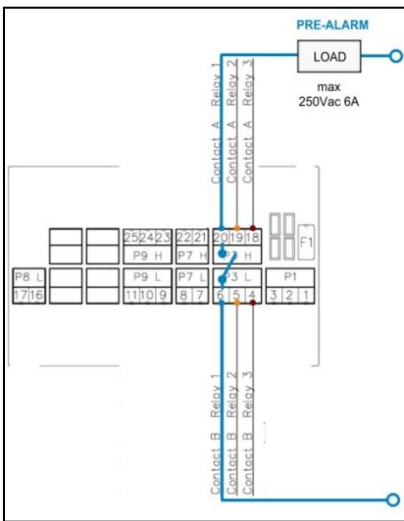
All the relay contacts are voltage free. Please do-not exceed the maximum ratings of the on-board relay contacts (please see terminals list for more details).



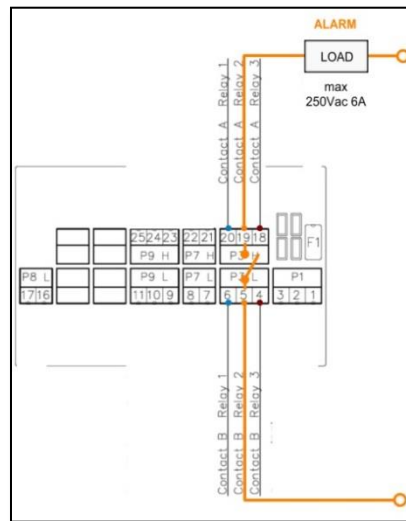
WARNING

It is not possible to set or exchange the alarm events in different relays positions than the factory hardware configuration.

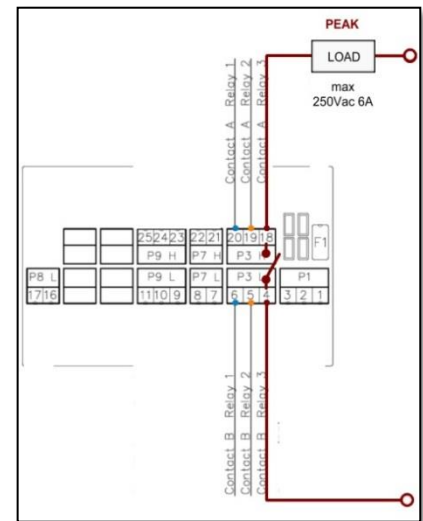
Relay connections



a) Pre-Alarm relay wiring scheme

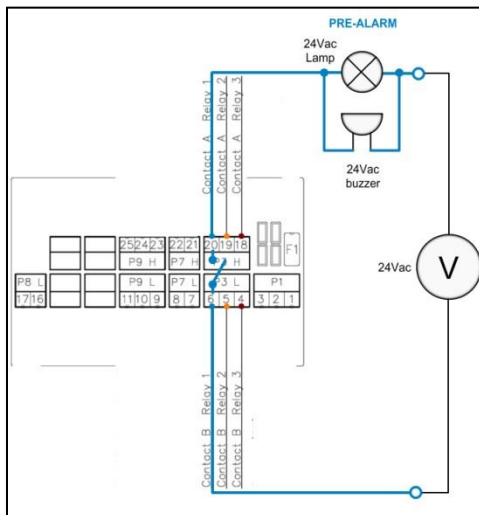


b) Alarm relay wiring scheme

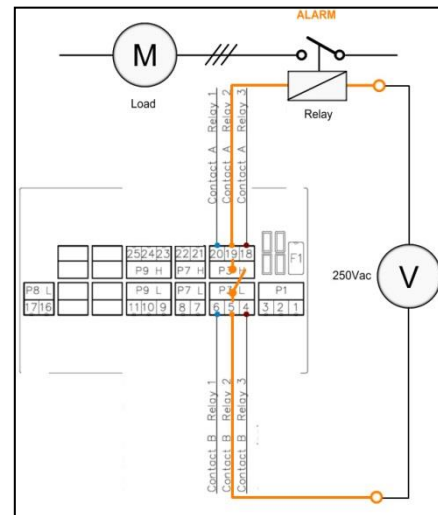


c) Peak relay wiring scheme

Example of remote acoustic and visual signaling when in Pre-Alarm

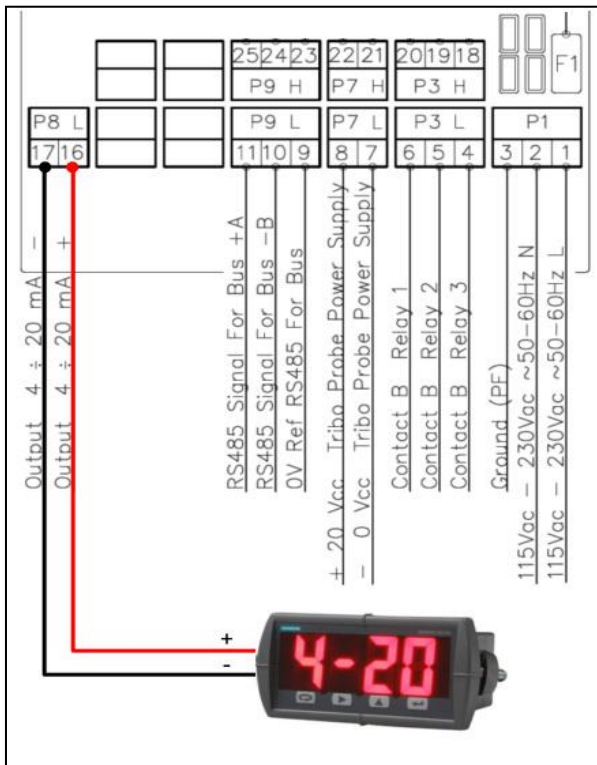


Example of indirect power motor ON/OFF when in Alarm



Analog output

The E9T analog output provides a 4-20mA current-Loop with a value proportional to emissions read and displayed. The analog output transmits the emission value to a passive panel mounted display, PLC or DCS, remotely placed in a control room.



The 4-20mA current-Loop is a standard in industrial applications, due to its simplicity of installation, high immunity to noises and the possibility to travel long distances with no signal degrading.

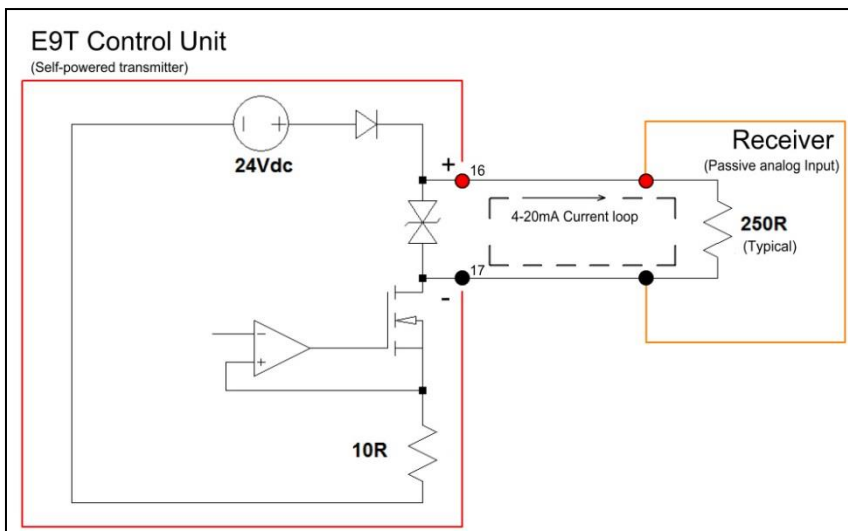
The E9T analog output is classified as ACTIVE (sourcing power) and an external power source for current-Loop is not needed.

The output is protected against reverse voltage polarity, fast voltage transients and maximum current and it is not galvanically isolated from control circuit.

WARNING

The output is +24Vdc self-powered. Do not power the current-loop line by external devices. Risk of damaging the output port.

Here is an example E9T output current-loop diagram for connection to a remote passive receiver:



Please read the instruction manual of the Receiver before connect it to the E9T's analog output.

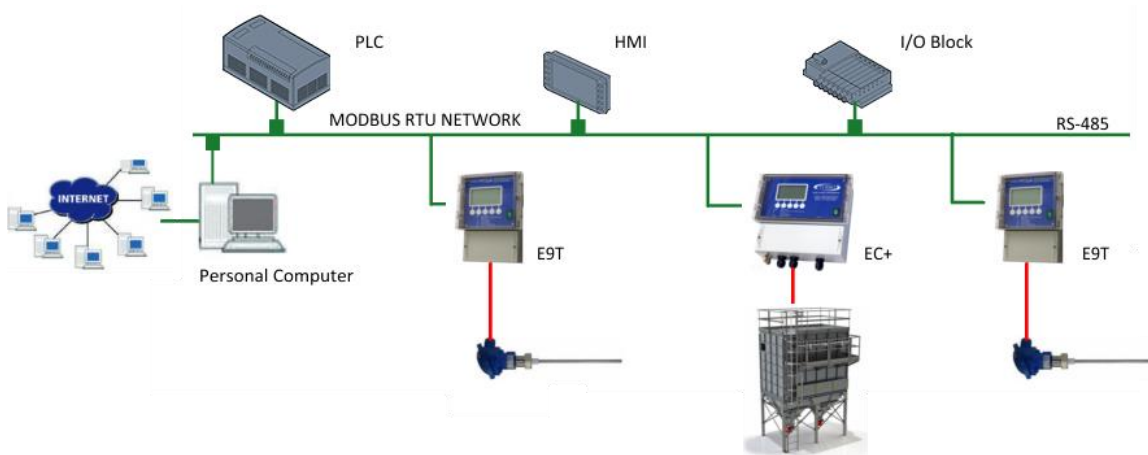
RS-485 Modbus RTU

The RS-485 Modbus RTU is a serial communication standard for industrial controllers that uses a differential signal over twisted pair wires to drive digital information at long distances supporting local networks and multidrop communication.

The RS-485 is used as the physical layer underlying many automation protocols including Modbus.

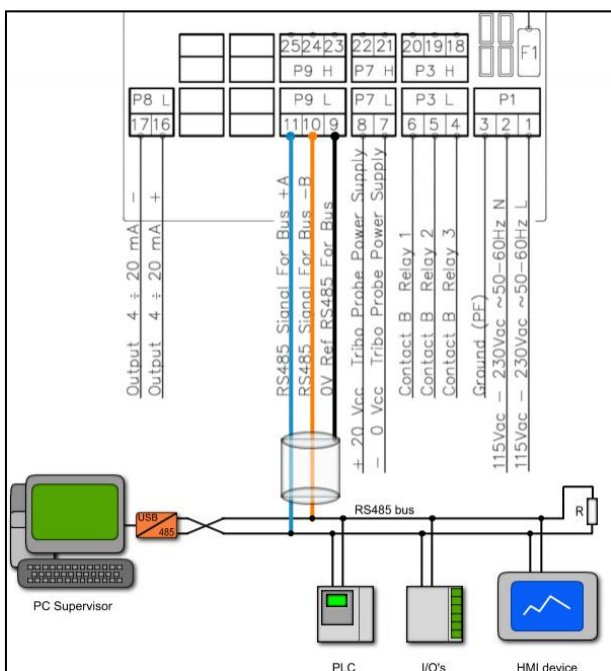
The Modbus is a serial communication protocol for use with PLC's and supervisory (RTU, SCADA) systems.

Each device on the network using Modbus is provided of a unique and configurable address.



The E9T control unit supports the RTU format, that makes use of a compact binary representation of the data.

The Modbus physical layer

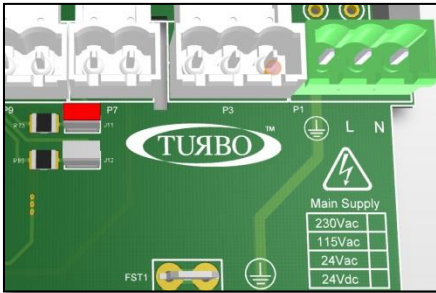


WARNING

The length and quality of the RS-485 line affect the quality of the signal. Though the theoretical maximum length of a RS-485 Bus is 1200 meters for data rates between 100Baud and 100KBaud.

Requirements of wiring in order to obtain good signal quality:

- 1) Section min 2 +1 x 0,32mm²(a twisted pair and a single pole
- 2) Shielded
- 3) Twisted pair cables
- 4) Resistant to UV rays (for outdoor installation only)
- 5) CAT.5 cable



The E9T control unit is provided of on-board 220Ω termination line resistor for RS-485 Bus.

When JP11 jumper (red highlighted) is :

Open : Termination line resistor disconnected

Closed: Termination line resistor connected

Suggested RS-485 cable

	Manufacturer	: Belden
	Application	: Industrial
	Product code	: 3106A
	Poles	: Twisted pair + single pole
	Shielded	: YES
	Type	: UV resistant

The Ground Terminal

E9T control unit have a GND (ground) terminal in order to provide a stable voltage reference for RS-485 shielded cable. If a shielded cable is used for RS-485 connection it must be connected only in one side.

Do not connect the GND terminal to an external device ground !

Modbus communication settings

E9T control unit is provided of a dedicated menu accessible by the local user interface useful to configure the Modbus communication parameters:

Ref	Item	Parameter	Measure Unit	Factory default	Range
M6.1	Address Set the RS-485 address of the Control Unit on the network	Address		1	1 255
M6.2	Communication speed Set the speed of the communication	Baud rate	Baud	9600	9600 38400
M6.3	Parity Set the parity mode of the byte	Parity	Bit	None	None Even
M6.4	Stop Set the number of Stop bits	Stop bit	Bit	1	1 2

How to choice the right communication Speed

The parasitic capacity of the transmission line increases as the line length increases, thereby limiting the maximum bus speed. An empirical law provides the following values:

Speed (bps)	Max Length (mt)
115200	85
57600	170
38400	250
19200	500
9600	1000

Note:

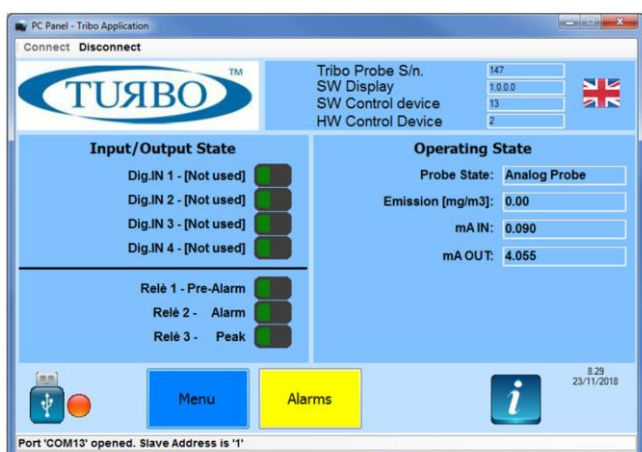
A good rule is to respect a minimum distance of 1 meter between multiple devices connected in the RS-485Bus.

Communicate with the Network

With The E9T control unit placed on the RS-485 ModBus network, the end-user can choice to work with Turbo “PC-Panel Tribo” dedicated software or develop its own application using ModBus device registers. In the Network, the E9T is to consider as slave devices.

PC-Panel Tribo Software

Turbo has designed a PC software, named “PC-Panel Tribo” for remote management of the E9T functionalities.



Developed for Windows platforms (WinXP, Win7/8, Win10), the “PC-Panel Tribo” software provide the user can interact with the device in order to configure parameters, read device status, and monitor the control unit.

Thanks to a well-defined interface, the user can navigate through the tabs to monitor all the parameters and also the real-time values. The user interface is customizable with logo, languages and displayed information in order to meet all the user requirements.

Please refers to Turbo Sales dept. to purchase and obtain the PC-Panel software package and license.



An USB to RS-485 Serial converter cable is sold with “PC-Panel Tribo” software package. The cable provides a fast, simple way to connect devices with a RS-485 interface to USB 2.0, supporting data transfer rate up to 3Mbaud.

The USB-RS-485 drivers, available free from <http://www.ftdichip.com>, which are used to make the FT232R in the cable appear as a virtual COM port (VCP). This then allows the user to communicate with the USB interface via a standard PC serial emulation port. Another FTDI USB driver, the D2XX driver, can also be used with application software to directly access the FT232R on the cable though a DLL.

The RS-485 serial converter is made of some colored cables where:

Color	Terminal
Orange	RS-485 A (+)
Yellow	RS-485 B (-)
Black	Shield

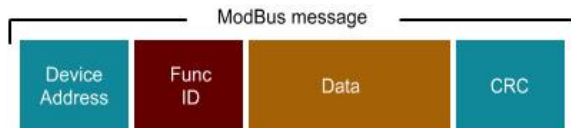
Note:

The other terminals must be cut or placed in a separate position on a terminal block. The above image is showing RS-485 cabling for an EC+ model where the serial port is placed as previously explained.

Modbus RTU protocol & registers

Modbus message

Following the ModBus protocol standard requirements, it is possible to write and read the E9T control unit registers in order to configure parameters, perform functions and check the device status in real-time operations.



Standard Modbus message for the E9T devices

<u>Device Address</u>	Comprises between 1 and 127. The "0" value is not permitted.
<u>Func ID</u>	Func 03 (Read Holding registers) Func 06 (Write Single register)
<u>Data</u>	The E9T register (AND value if writing a register) ;
<u>CRC</u>	The cyclic redundancy check is calculated following CRC16 algorithm criteria.

E9T Modbus registers

The complete list of E9T Modbus registers is listed below. In the access column R means that the related register are read-only and R/W means that the related register can be read and also written.

DEVICE Settings				
Item	Register	Access	Default	Note
Device software version	0x0000	R		Software release mounted
Device hardware version	0x0001	R		Hardware version of E9T
Alarm RESET	0x0002	R/W	0	1= force alarm RESET
Buzzer RESET	0x0003	R/W	0	1= force buzzer RESET
Device serial No.	0x000C	R/W	0	Serial number
Device menu language	0X000E	R/W	0	0=ITA, 1=ENG, 2=FR, 3=DE, 4=ESP
Enable/Disable local GUI	0X000F	R/W	0	0=Enabled 1=Disabled
Device ModBus address	0X0060	R/W	1	1÷127
Device Communication speed	0X0061	R/W	2	0=38400 Baud 1=19200 Baud 2= 9600 Baud
Device Communication Parity bit	0X0062	R/W	0	0=No Parity 1=Odd Parity 2=Even Parity
Device Communication Stop bit	0X0063	R/W	1	0=2 Stop bit 1=1 Stop bit

TRIBO Alarms Settings				
Item	Register	Access	Default	Note
Pre-Alarm threshold	0x0010	R/W	800	x 0,01 mg/m ³
Pre-Alarm Time	0x0011	R/W	300	x 0,5 seconds
Alarm threshold	0x0012	R/W	1500	x 0,01 mg/m ³
Alarm Time	0x0013	R/W	60	x 0,5 seconds
Peak threshold	0x0014	R/W	3000	x 0,01 mg/m ³
Peak Time	0x0015	R/W	10	x 0,5sec

Analog TRIBO Settings				
Item	Register	Access	Default	Note
Enable/Disable	0x0020	R/W	0	0=Disabled 1=Enabled
Zero Emissions Offset	0x0022	R/W	0	Offset to zeroing the emission
Not calibrated probe mA value	0x0023	R/W	0	x 0,01 mg/m ³
Ref. Emissions	0x0024	R/W	1000	microAmpere

Digital TRIBO Settings				
Item	Register	Access	Default	Note
Enable/Disable	0x0030	R/W	0	0=Disabled 1=Enabled
Zero Emissions Offset	0x0032	R/W	0	Offset to zeroing the emission
Calibration value K	0x0033	R/W	150	Adjustment coefficient for comparing
Emissions reading filter	0x0034	R/W	8	Filter sensitivity

ALARMS				
Item	Register	Access	Default	Note
Enable/disable Hour Count Alarm	0x0040	R/W	0	0=Disabled 1=Enabled
Hour Counter Threshold	0x0041	R/W	0	Hours
Hours from 1st power ON (LSB)	0x0050	R	0	16bit LSB
Hours from 1st power ON (MSB)	0x0051	R	0	16bit MSB

Hidden Parameters				
Item	Register	Access	Default	Note
LCD backlight ON time	0x0070	R/W	0	0=Always ON
Relay 1 contact type	0x0071	R/W	1	0=N.open 1=N.Closed
Relay 1 activation mode	0x0072	R/W	0	0=Pulse 1=Latch
Relay 1 activation time	0x0073	R/W	10	seconds
Relay 2 contact type	0x0074	R/W	1	0=N.open 1=N.Closed
Relay 2 activation mode	0x0075	R/W	0	0=Pulse 1=Latch
Relay 2 activation time	0x0076	R/W	10	seconds
Relay 3 contact type	0x0077	R/W	1	0=N.open 1=N.Closed
Relay 3 activation mode	0x0078	R/W	0	0=Pulse 1=Latch
Relay 3 activation time	0x0079	R/W	10	seconds
Enable/Disable Buzzer	0x007A	R/W	0	1=Disabled 0=Enabled
ADC 4mA IN calibration value	0x007B	R/W	120	Factory calibrated. Do not modify !
ADC 20mA IN calibration value	0x007C	R/W	600	Factory calibrated. Do not modify !
DAC 4mA OUT calibration value	0x007D	R/W	520	Factory calibrated. Do not modify !
DAC 20mA OUT calibration value	0x007E	R/W	2600	Factory calibrated. Do not modify !

Board Parameters				
Item	Register	Access	Default	Note
Control Unit Job phase	0x0090	R	0	0=Power ON 2=Running 4=Prog. ParmS 7=Prog. S/n
Digital input 1 (note ¹)	0x0097	R	1	0=Closed 1=Open
Digital input 2 (note ¹)	0x0098	R	1	0=Closed 1=Open
Digital input 3 (note ¹)	0x0099	R	1	0=Closed 1=Open
Digital input 4 (note ¹)	0x009A	R	1	0=Closed 1=Open
State of Relay 1	0x009B	R	1	0=OFF 1=ON
State of Relay 2	0x009C	R	1	0=OFF 1=ON
State of Relay 3	0x009D	R	1	0=OFF 1=ON
State of the Digital Tribo connection	0x009E	R	1	0=Connected 1=Not connected
Alarm presence	0x00A0	R	0	0=No alarm 1=Alarms
Hour counter Alarm	0x00A1	R	0	0=No alarm 1=Alarm
State of Tribo pre-alarm	0x00A2	R	0	0=No alarm 1=Alarm
State of Tribo alarm	0x00A3	R	0	0=No alarm 1=Alarm
State of Tribo peak alarm	0x00A4	R	0	0=No alarm 1=Alarm
Current output from Analog Tribo	0x00B1	R	0	microAmpere
Calculated Emission	0x00B2	R	0	x 0,01 mg/m ³ (2.00 on LCD = 200)

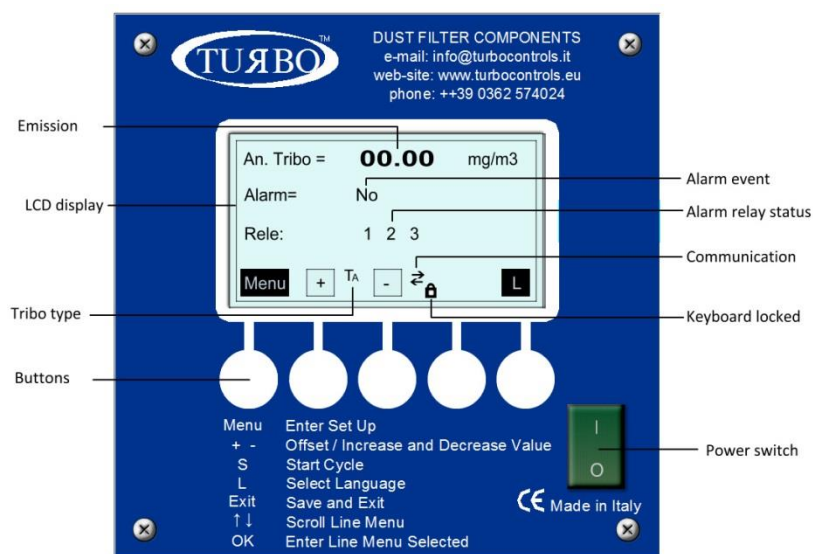
(note¹) Reserved for future developments.

Local user interface

LCD display & messages

The E9T is provided of a local user interface with a large LCD display and a membrane keyboard.

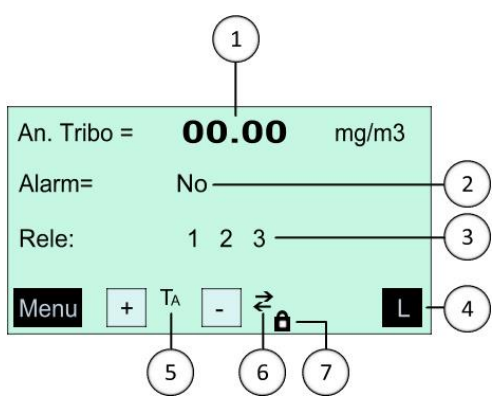
Please read the E9T user manual for more information about settings. Icons and information are arranged as shown in the following image:
















Icon	Description
T _A	Analog Triboelectric probe enabled
T _d	Digital Triboelectric probe enabled
↔	RS-485 Modbus communication
🔒	Local keyboard locked

Main screen

Item	Device state	Message displayed
1	Normal state	Emission value expressed in mg/m3
	No Tribo probe connected	Tribo disabled
2	Normal state	No
	Pre-alarm error event	Tribo 1 (preal) [flashing]
	Alarm error event	Tribo 1 (alarm) [flashing]
	Peak error event	Tribo 1 (peak) [flashing]
3	Normal state	1 2 3
	Pre-alarm error event	1 [flashing] 2 3
	Alarm error event	1 2 [flashing] 3
	Peak error event	1 2 3 [flashing]
4	Normal state	Menu + - L
	Menu page	exit ok ↑ ↓
	Sub-menu page	exit + - ↑ ↓
	Hide menu page	E + - ↑ ↓
5	No Tribo probe connected	No icon
	Analog Tribo enabled	T _A icon fixed when OK
		T _A icon flashing if fault
	Digital Tribo enabled	T _d icon fixed when OK
T _d icon flashing if fault		
6	No communication	No icon
	Communication running	↻ icon
7	Local keyboard enabled	No icon
	Local keyboard disabled	🔒 icon



Keyboard functions

		Multi-function button	
		Short press (<2sec)	<ul style="list-style-type: none"> - In main window it enters in configuration Menu - In Menu window it returns to main widow - In sub-Menu windows it returns to Menu window - During error it resets the error event on the display - In serial No. programming menu it saves the serial - In parameter modification it returns to previous menu - In hide menu it returns to main window
		Multi-function button	
		Short press (<2sec)	<ul style="list-style-type: none"> - In main window it increases the display contrast - In sub-Menu windows it increases the parameter value - During error it scrolls the errors on the 2nd row of the display - In serial No. programming menu it increases the serial
		Multi-function button	
		Short press (<2sec)	<ul style="list-style-type: none"> - In main window it decreases the display contrast - In parameter modification it decreases the parameter value - In sub-Menu windows it enters in parameter modification - In serial No. programming menu it decreases the serial
		Single function button	
		Long press 2 nd button and Short press (<2sec) the 3 th button	<ul style="list-style-type: none"> - In Menu window it enters in the hide menu
		Single function button	
		Short press (<2sec)	<ul style="list-style-type: none"> - In Menu window it moves up through the menu items
		Long press (>5sec) at power-On	<ul style="list-style-type: none"> - It activates the hidden calibration parameters
		Multi-function button	
		Short press (<2sec)	<ul style="list-style-type: none"> - In the main window it enters in language Menu - In Menu window it moves down through the menu items
		Long press (>5sec) at power-on	<ul style="list-style-type: none"> - It enters in serial No. programming menu
		Single function button	
		Long press (> 5sec) at power-on	<ul style="list-style-type: none"> - It reset all parameters values and set factory default values

Connect E9T control unit to an external device

When the E9T control unit is part of a complex machine that is controlled through the use of a PC, a PLC or a DCS, then it is necessary to make the right connections in order to use all the functions it has available.

Depending on the equipment that the complex system makes available and on the specific needs that the customer requires, the E9T can be connected in several ways, starting from reading only the emission value on a 4-20mA current-loop line up to communicating via ModBus to have full control of the control unit.

Here are some possible usage scenarios, complete with connection diagram.

Remotely read emission values via 4-20mA line

The easy way to remotely read dust emission values measured by the E9T control unit is to connect an external device provided of 4-20mA current-loop input.

Please read [Analog output chapter](#) for more information about wiring connection.

The external device analog input will be configured to read 4-20mA current-loop in PASSIVE mode.

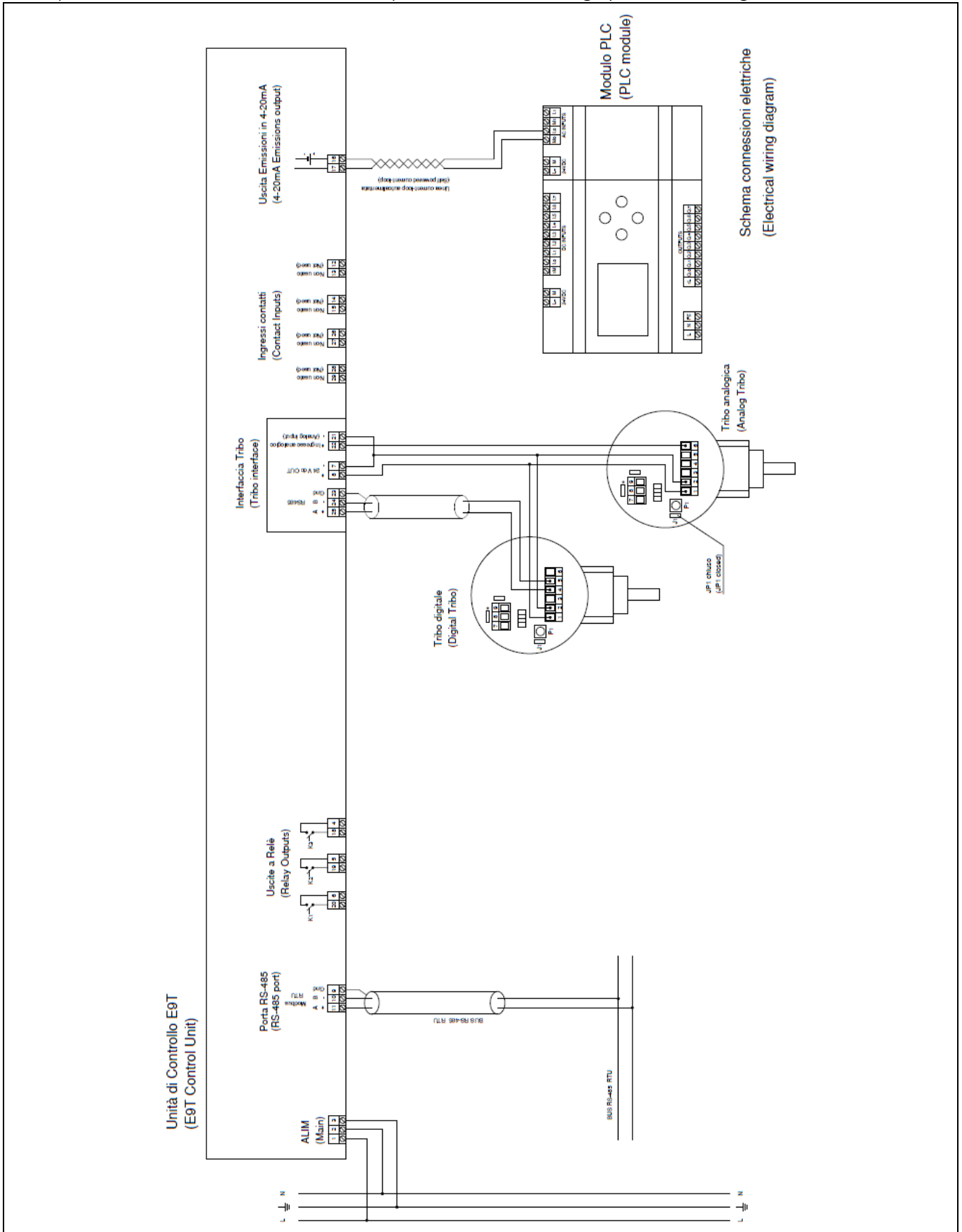
In case the 4-20mA setting is not available, the user will configure the analog input as dc voltage input and place a 250 Ohm 1/2W resistor between input terminals. With this, the user will need to set the measure scale between 1Vdc (4mA) and 5Vdc(20mA) on the external device.

The measurement scale is linear and corresponds to:

Current loop	Emission value	Note
4,00mA	0 mg/m ³	
20,0mA	50 mg/m ³	Emission full scale for a standard triboelectric probe. If an analog triboelectric probe is used, the emission full scale depends on J1 jumper setting. Please refer to documents relating to the triboelectric probe used.

The external device should be properly programmed to manage the emission value received from E9T control unit in order to display value and handle alarms.

Example of PLC connected to E9T 4-20mA output for emission reading by mean of analog channel.



Remotely handling of E9T alarms

If the external device is not provided of analog inputs, it is possible to program E9T control unit emission alarms thresholds and then connect its relay contacts to digital inputs of external device.

The external device digital inputs will be configured to read digital status of the relay contacts coming from E9T.

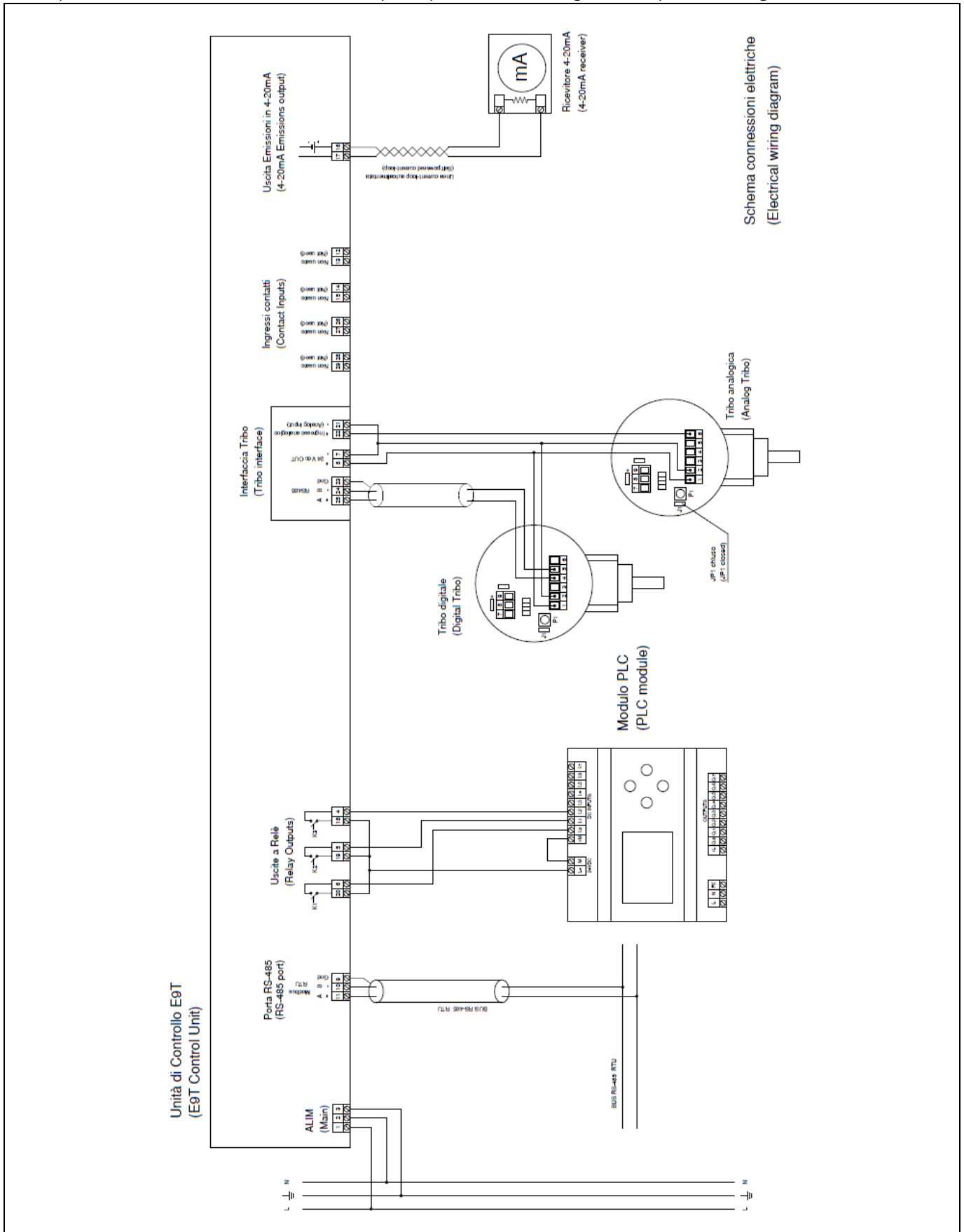
Please read [Alarm relays chapter](#) for more information about wiring connection.

The external device should be properly programmed to manage the alarms status received from E9T control unit in order to display conditions and perform some collateral functions, if needed.

It is also possible to build remotely handling of E9T alarms and remotely read emission by 4-20mA together to have the best interfacing condition.

In case, the user will need to realize both the connections and perform E9T settings to use more resources at the same time.

Example of PLC connected to E9T Alarm relays output for monitoring events by mean of digital channels.



Remotely handling via RS-485

If the external device is provided of a RS-485 communication port or a RS-485 network is available, it is possible to connect the E9T control unit to use all the functionalities available.

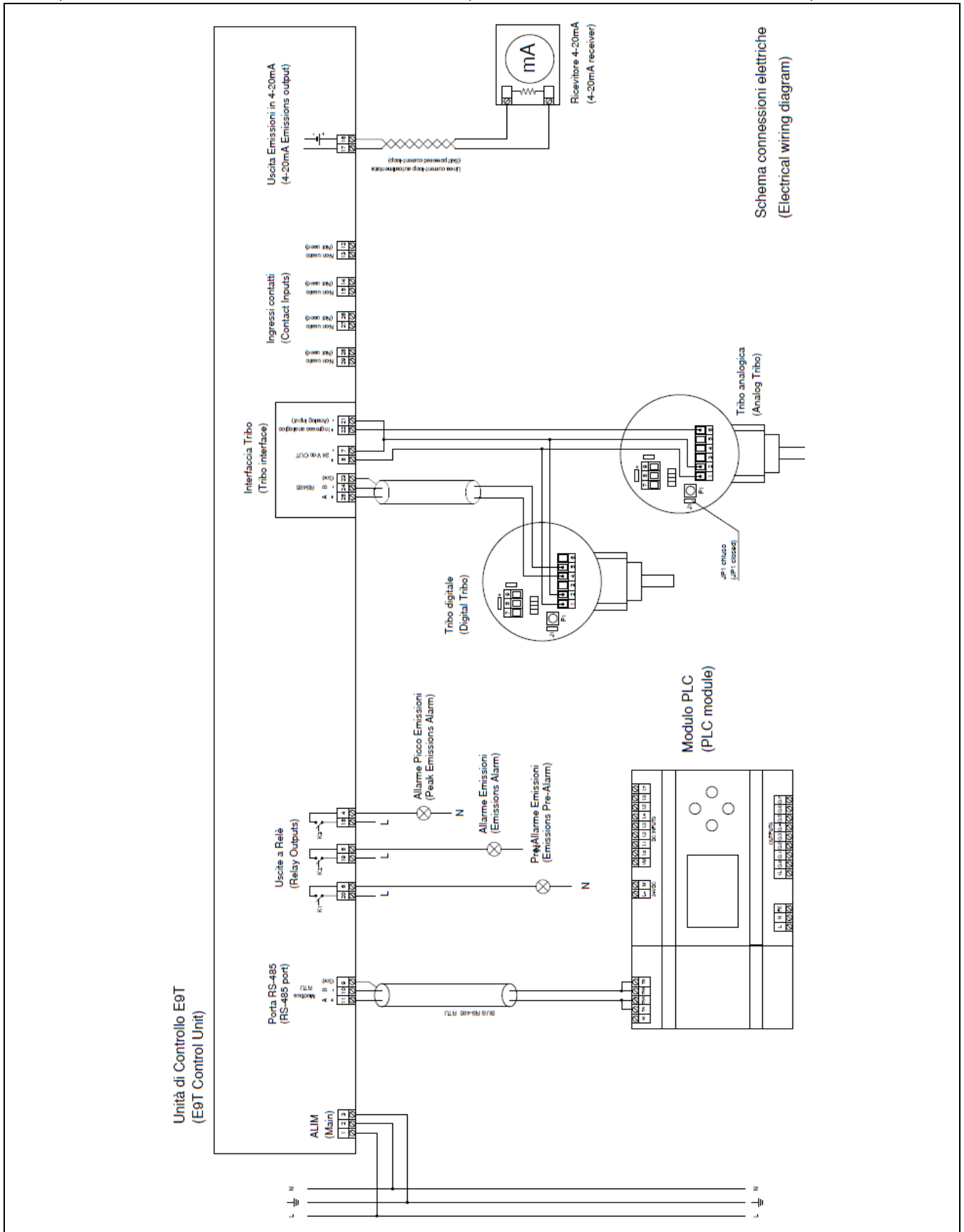
Please read [RS-485 Modbus chapter](#) for more information about wiring connection.

The user must previously assign a unique Modbus address to the E9T control unit. The external device will be configured to read and write [Modbus registers](#) available on the E9T control unit software at that address.

Thanks to Modbus features, the external device can handles messages to read emission values and alarms status in real-time. It is also possible to set alarm thresholds, relays contact type, alarm activation times, triboelectric probe parameters and offsets.

During the remotely handling via RS-485, it is also possible to build remotely handling of E9T alarms and remotely read emission by 4-20mA together to have the full interfacing condition.

Example of PLC connected to E9T RS-485 Modbus RTU port for read real-time emissions and set parameters.



Remotely handling with PC-Panel Tribo software

The E9T control unit can be sold with “PC-Panel Tribo” application, a useful Windows PC software capable to communicate with the control unit in order to configure all the parameters, monitor the status of the unit and log some information into a csv file for analysis.

Please read [PC-Panel Tribo chapter](#) for more information about the software application and interfacing and the related document [installation guide and usage](#) to better understand all the functionalities.

The “PC-Panel Tribo” software is intended to use it with only one E9T control unit at the time.

Appendix A – Reference Documents

<i>E9T_Control_Unit_UserManual_sw13_EN.pdf</i>	<i>Instructions and maintenance user manual</i>
<i>E9T_electricalWiring_rev01.pdf</i>	<i>Wiring schematic diagram</i>
<i>InMn030_PC-Panel_E9T_Tribo_EN.pdf</i>	<i>PC-Panel Tribo software installation guide and usage</i>
<i>Sonda Tribo E9Trb Manuale Uso En.pdf</i>	<i>Charge Displacement Probe E9TRB</i>

Appendix B –Revision History

Version draft	First draft	Dec 2020
Version 1.0	First Release	Mar 10, 2021
Version 1.1	Updated Turbo HQ Address	Nov 03, 2021