
Sequencer E7T 16 Output Channels



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Description

Sequencer for the control of industrial dust collector system pneumatic cleaning.

Voltage free contact digital inputs, input and output relay contacts.

LCD backlit monochromatic graphic monitor where the following can be read at any time:

- running solenoid valves
- time remaining for next air jet start
- the signalling of any alarms

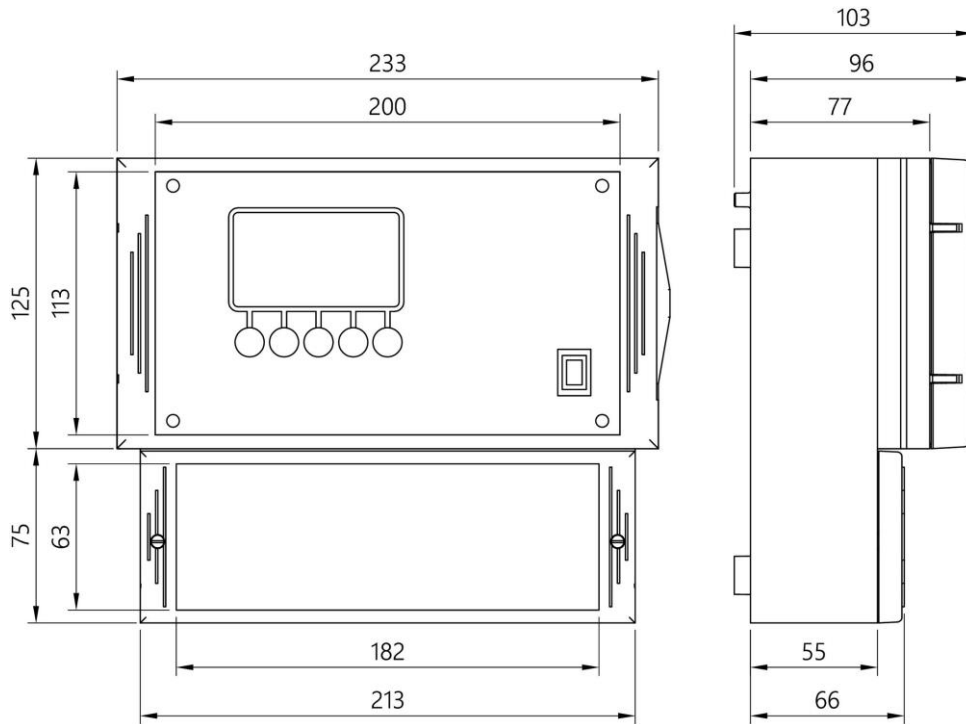
Interface menu available in five languages.

- ✦ Operating modes
 - manual, special manual.
- ✦ Solenoid valve not working alarm.
- ✦ Filter element maintenance alarm (with the possibility of inclusion / exclusion).
- ✦ Manual solenoid valve activation.
- ✦ Cleaning start from external contact.
- ✦ Hour counter and impulse counter.
- ✦ Cleaning function with fan off (post-cleaning) by contact in manual / special manual modes, with selectable number of cycles.
- ✦ Compressed air consent input.
- ✦ Operating time expressed in seconds and minutes with selectable values for any application.

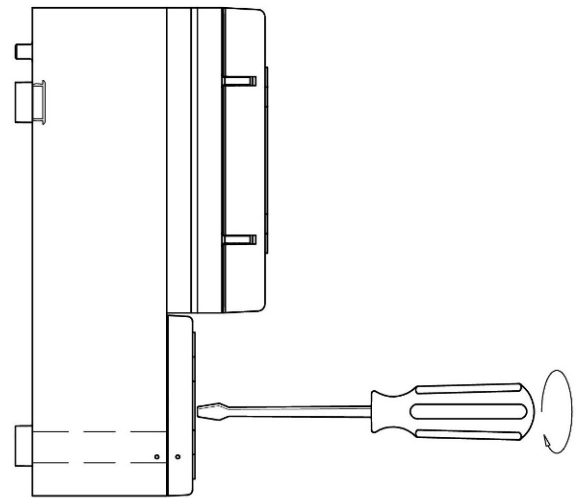
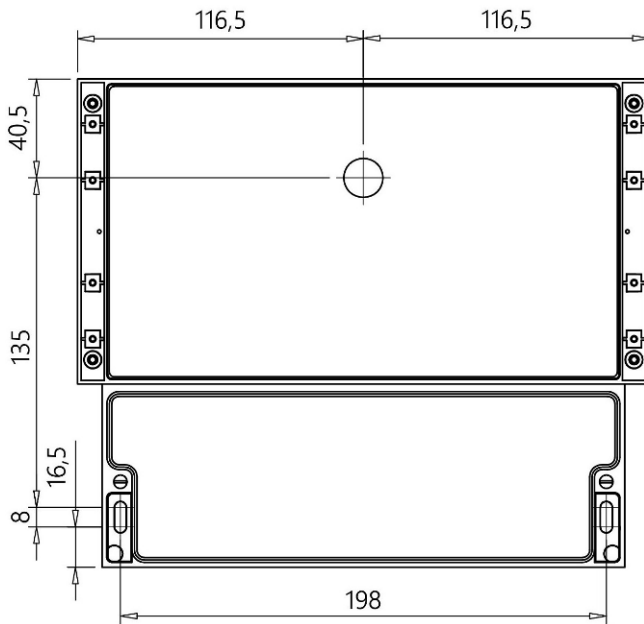
Technical Specifications

Power Voltage	115 Vac 50-60 Hz \pm 10 % 230 Vac 50-60 Hz \pm 10 %
Alternative Power Voltage Upon Request	24 Vac \pm 10 % 24 Vdc \pm 10 %
Output Voltage For Solenoid	115 Vac 50-60 Hz \pm 10 % 230 Vac 50-60 Hz \pm 10 % 24 Vac \pm 10 % 24 Vdc \pm 10 %
Inputs	from 4 to 20 mA x 1
Power Consumption	28 Watts Maximum Load
Alarm Relays	3 Normally Closed
Display	Graphic LCD Backlit Monochromatic B/W 128 x 64 Pixel
Glass Fuse 5 x 20 mm	115 or 230 Vac 1 x 1 A 24 Vac or 24 Vdc 1 x 3 A
Operating Temperature	-10 °C - 55 °C
Storage Temperature	-20 °C - 60 °C
Environmental Humidity	0 ÷ 95% Relative Non Condensing
Valve Opening Impulse Time	50 ms - 10 s
Interval Pause Time Between Valve Opening	1 sec. - 7200 sec.
Casing	ABS Base Polycarbonate Cover
Protection Degree From Water And Dust	IP65 DIN EN 60529
Shock Resistance	IK07 2 Joule (EN62262).

Dimensions And Measurements



Fastening






Weight 2.1 Kg

To open the transparent cover, press on the right side and lift.





Warning Symbols Used In This Manual

The information regarding safety are highlighted using the symbols:

	Warning-Danger	Generic - Warning-
	Risk - Danger	Electric Current
	Dispose according to the standards for electrical and electronic equipment RAAE	

Installation Rules Notes and Warnings

- ⇒ Protect the device from direct exposure to sunlight.
- ⇒ Do not position the device near or directly in contact with sources of heat or electromagnetic fields. 
- ⇒ Fix the device of a height of at least 60 cm from the ground.
In a clearly visible place easily accessible.
- ⇒ Connect the device to power lines other than those for operating motors or other large power devices which could generate network interference or instability.
- ⇒ The electrical supply of the unit must be protected by a differential switch 230 Vac~ 30 mA and a bipolar magneto thermic 230 Vac~ 10 A, positioned in a place easily accessible.
- ⇒ Before working on the equipment to perform any operation switch off the magneto thermic differential switch. 
- ⇒ For electric operations, always remove voltage, wait 30 seconds for the inside capacitors to discharge before opening. At the end of the operations, close the device to restore the correct degree of protection before powering up.
- ⇒ For the connection of the supply voltage, use anti-flame wires with a minimum section of 0.75 mm² certified and conform to the standard IEC60227 or IEC60245.
- ⇒ Use flame-retardant cables with a minimum cross-section area of 0.75 mm² for all control signals.
- ⇒ Use flame-retardant cables with a minimum cross-section area of 0.75 mm² to connect to the indicating relays.
- ⇒ Use flame-retardant cables with a minimum cross-section area of 0.5 mm² for electro valves control signals.
- ⇒ The wire ground conductor of protection must be yellow/green.
- ⇒ The wire ground conductor of protection must be connected first.
- ⇒ The wire which is colored yellow/green must only be used for the ground conductor.

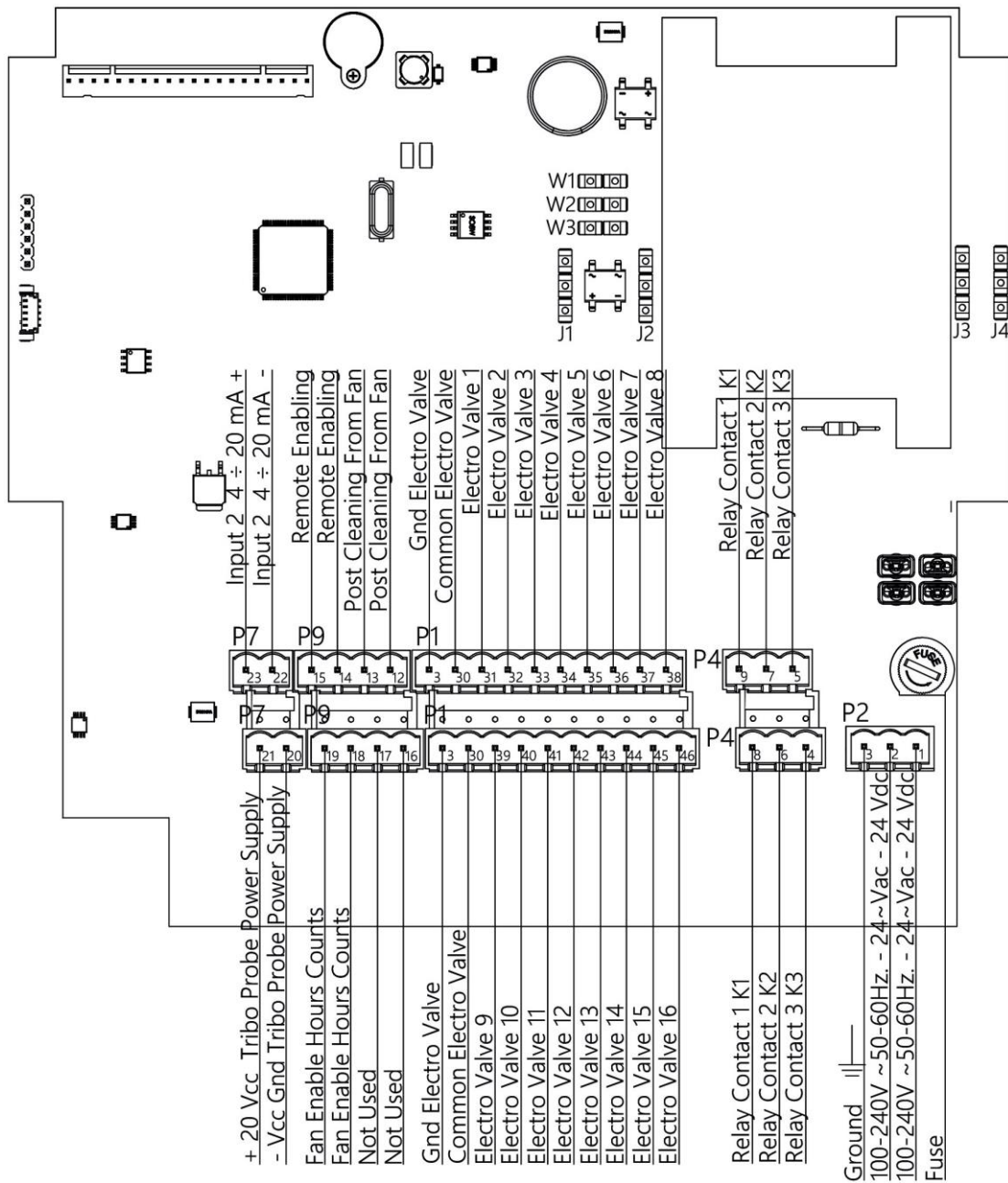
- ⇒ The cable glands must be chosen according to the diameter of the cable to be used.
- ⇒ The sealing of the press cable is guaranteed by the compression of the rubber gasket that tightens on the outer diameter of the cable.
- ⇒ The tightness of the cable gland is guaranteed by the compression of the rubber seal that tightens on the outer diameter of the cable.
- ⇒ The size of cable and cable gland must ensure that a power cord traction is not acting on the terminals.
- ⇒ The terminal block must not be the point of mechanical anchoring of the conductors.
- ⇒ The cable gland PG9 supplied on request, has cable diameter minimum of 4 mm and a maximum of 8 mm, with clamping nut by 19 mm.
- ⇒ Any use not described in this user instruction manual or incorrect use of the device may cause damage to the device or to the devices connected to it.
- ⇒ Furthermore, incorrect use or tampering with the device may cause injury.
- ⇒ Waterproofness of the casing is guaranteed when the flap is closed.
- ⇒ Make sure that rigid or flexible ducts used for wiring, if any, do not fill up with water or other liquids.
- ⇒ Do not make holes not protected on the container or protected by accessories with protection degree lower than that of the housing of the control unit.
- ⇒ Cut off power supply immediately if water is found in the casing.
- ⇒ If the control unit is used in ways not specified by the manufacturer, the protection provided by the device may be impaired.
- ⇒ The Control Unit does not release potentially toxic or harmful substances to the health and the environment.
- ⇒ No part with dangerous voltage is normally accessible.

Do not use the control unit if you have not read or do not understand this manual.



Electrical Connections

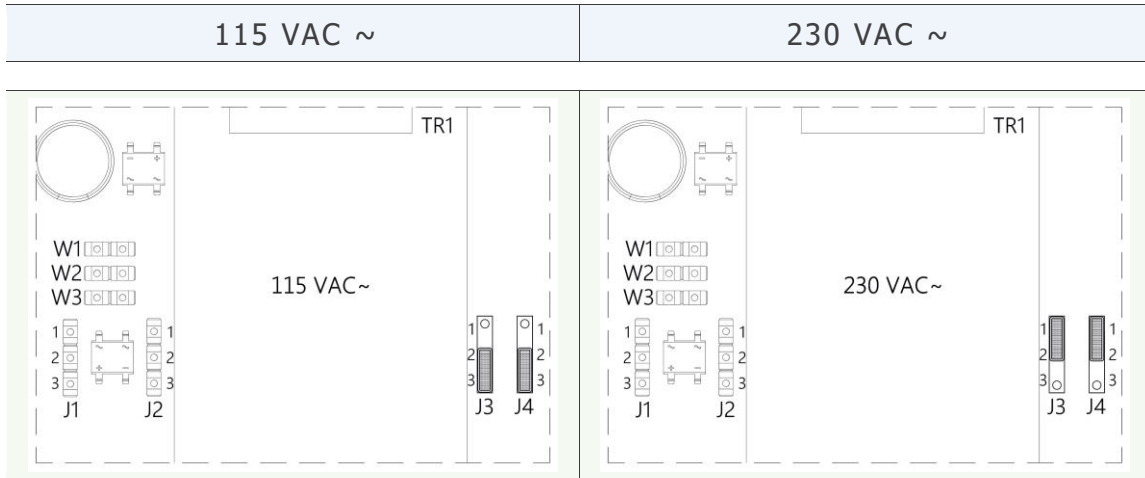
To connect the wires to the E7T control unit, remove the cover panel to access the terminal board, unscrewing the two screws.



If the economiser is in G2 version with reinforced transformer, connect two solenoid valves in parallel to each terminal.

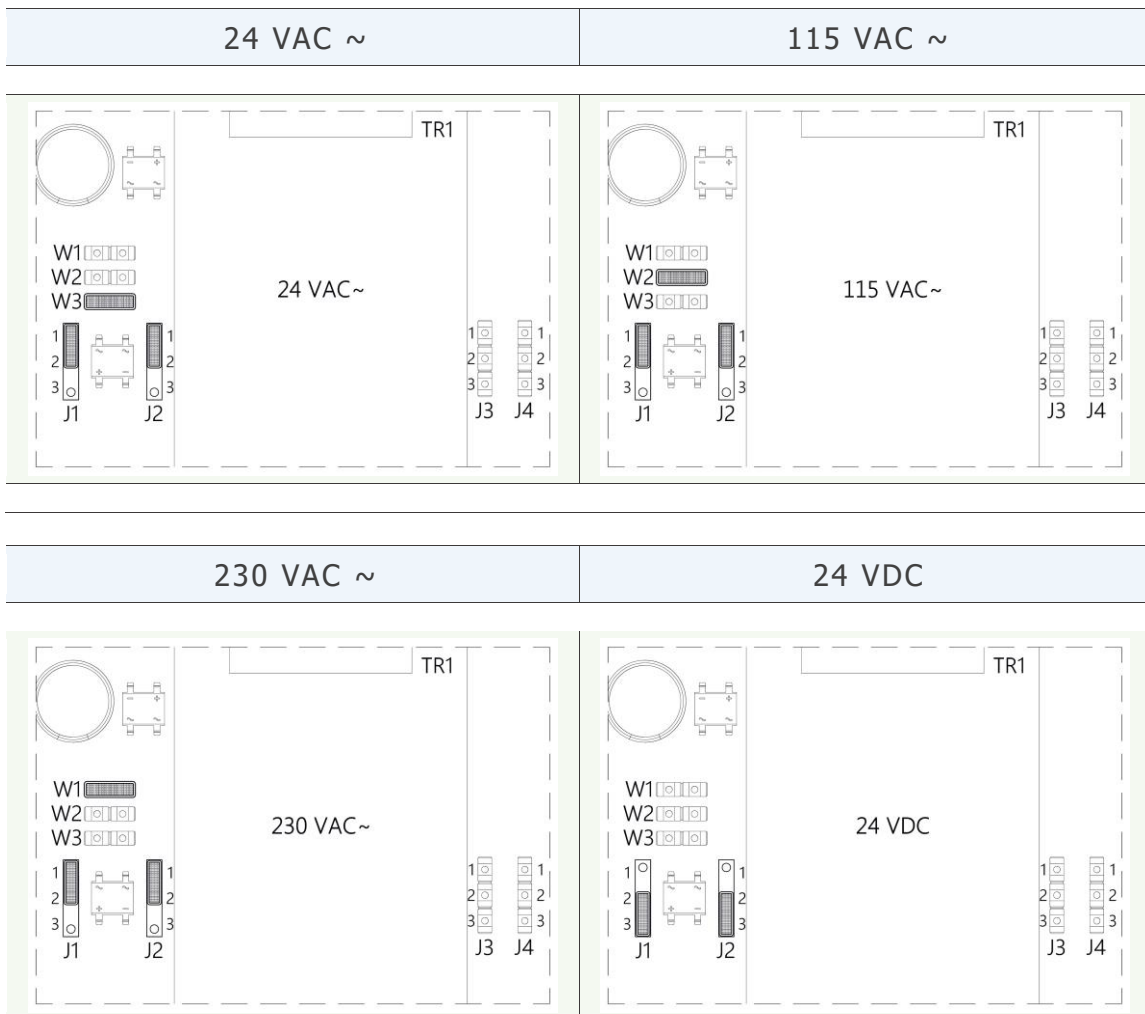
Sequencer E7T 16 Output Channels

Jumper Configuration Power Input



In 24 Vac and 24 Vdc powered versions, the J3 and J4 jumpers are not used.

Jumper Configuration Output Voltage



In the versions powered at 24 Vac and 24 Vdc the output voltages cannot be 115 Vac or 230 Vac.



Keyboard And Monitor



There are 5 round keys on the front panel to control the instrument and select functions.



At power on, during the verification of initialization, the first screen that is shown is the firmware version.




The next screen is always displayed during normal operations:

- Menu provides access to settings it is used as RESET in the event of alarms
- Keys   Increase and decrease the values, manually start valves in Test mode, used to scroll any alarms.
- The **S** key allows to start / stop the activation of the solenoid valves.
- Use the **L** key to select one of the 5 available languages: Italian, English, French, German, Spanish.

On the main screen, when an alarm is active, the letter **L** changes state becomes **A**, pressing   scrolls through the alarms, pressing **A** returns to the screen with the operating mode.

In the versions with tribo electric probe, the black box between the two   keys indicates that the probe is installed.

With the probe installed the  key changes the screen to display the readings of the emissions.

Without the probe installed is available only the screen with the operating mode.



Menu Layout



Basic Settings

Press the **Menu** key in the main screen.

Use the arrows   to select Main Set Up

Press **OK** key.



Use the arrows   to select the item to be set.

Use keys   to increase or decrease the value and change the item conditions. Press **exit** to save and exit.



Set Operation	Selectable Parameters
Operative Mode	Manual Special
Pulse Time Opening Valve	50 mSeconds ÷ 10 Seconds
Cycle Time Interval Openings	1 Second ÷ 7200 Seconds
Number of Valves	1 ÷ 16



Advanced Settings

Press the **Menu** key in the home page.

Use the arrows   to select Advanced Set Up.

Press **OK** key.



Use the arrows   to select the item to be set.

Use keys   to increase or decrease the value and change the item conditions. Press **exit** to save and exit.



Set Operation	Selectable Parameters
Cleaning Fan off	Number of complete cleans with fan off for the number of connected solenoid valves.
Pulse Time	Valve opening time in cycles with fan off 50 mSeconds ÷ 10 Seconds
Cycle Time	Interval between valve opening in cycles with fan off 1 Second ÷ 7200 Seconds
Cycles Manual Special	If Special operating mode was selected in basic set up, enter the number of complete cycles for the number of connected solenoid valves to be completed
Pause Cycles Manual Special	If Special operating mode was selected in basic set up, enter the pause between the number of cycles



Alarms

Press the **Menu** key in the home page.

Use the arrows   to select Advanced Set Up.

Press **OK** key.



Use the arrows   to select the item to be set.

Use keys   to increase or decrease the value and change the item conditions. Press **exit** to save and exit.



Set Operation	Selectable Parameters
Hourmeter Fan	Enabling the fan hour meter. Connect the fan filter remote switch to terminals 18_19 connector P9, to count actual suction working hours
Replace Filters	Enter the number of working hours desired to trigger the filtering element replacement alarm (sleeves/cartridges), the alarm is only generated if the fan hour meter is enabled and the fan remote switch connected to terminals 18_19 on connector P9 on the electronic board.



Calibration / Test



Press the **Menu** key in the home page.

Use the arrows   to select Calibration / Test.

Press **OK** key.

Use the arrows   to select the item to be set.

Use keys   to increase or decrease the value and change the item conditions. Press **exit** to save and exit.



Set Operation	Selectable Parameters
No. Valve (+/- = ON) Activation	Press the keys   to manually start the solenoid valves connected to the electronic board in sequence.



Counters

Press the **Menu** key in the home page.

Use the arrows   to select Counters.

Press **OK** key.

Use the arrows   to select the item to be set.

Use keys   to increase or decrease the value and change the item conditions. Press **exit** to save and exit.

Set Operation	Selectable Parameters
Hours Power	Counting the operating hours of the electronic control unit.
Pulse count	Number of times the valves connected to the electronic board were started.
Hours Fan	Hours the filter fan is on. The counter is only on if the filter fan remote switch is connected to terminals 18_19 on connector P9 and the fan hour counter function enabled in the Alarm menu.



Tribo Electric Probe



For the E8T versions were is provided.

Press the **Menu** key in the home page.

Use the arrows   to select Counters.

Press **OK** key.

Use the arrows   to select the item to be set.

Use keys   to increase or decrease the value and change the item conditions. Press **exit** to save and exit.

Tribo Electric Probe Alarms	Parameters	Factory Setting
Pre-Alarm Threshold The alarm value of the first critical threshold is set to indicate that the amount of tolerated emissions has been exceeded.	0.01 mg/m ³	00800
Pre-Alarm Time Recognition Set the duration time of the interval in which the emissions of the first critical threshold must remain before being reported.	Multiple of 0.5 Sec.	00300
Threshold Alarm The alarm value of the second critical threshold is set to indicate that the maximum amount of tolerated emissions has been exceeded.	0.01 mg/m ³	01500
Time Alarm Recognition Set the duration time of the interval in which the emissions of the second critical threshold must remain before being reported.	Multiple of 0.5 Sec.	00060
Threshold Peak The alarm value of the threshold indicating the breakage of the bag or the cartridge is set, the dust concentration is very high, the emission of dust in the environment is maximum.	0.01 mg/m ³	03000
Time Recognition Peak Set set the duration time of the interval in which the emissions that signal the breakage of the bag or cartridge must remain before being reported.	Multiple of 0.5 Sec.	00010
Reference Emissions	0.01 mg/m ³	5000
Reference μ Ampere	0.001 mA	20000

The alarms generated by the tribo electric probe activate the K3 relay at the 8_9 terminals of the P4 connector.

The relay is normally closed, opens in case of alarm, and opens to the control unit off in the absence of power.

Operation Description

The displayed information are:
the operating mode, active outputs and the time necessary to activate the next output.



Manual Operating Mode

When manual operating mode is set, the economizer works as a programmable cycle sequencer. The connected outputs will be activated at programmed time intervals. Manual operating mode can be selected in the Main Set Up menu under the first menu item.

Intervals are programmed in the same menu where activation time, pause time and the number of solenoid valves connected to the device are set.

Special Manual Operating Mode

In the basic set up menu, first menu item, select Special mode, enter the pulse time and pause time. Open the advanced set up menu, second menu item, enter the number of complete cycles and pause time between these cycles for the connected solenoid valves.

With this mode, unlike manual mode, the device only runs the solenoid valves for the set number of cycles and will remain in stand-by until an operator presses **S** (start / stop) in the main menu to repeat the cycles. This mode is especially suited for small filters or filters where the dP has low values or the inverter keeps pressure constant.

Other Function Descriptions

Alarms

This function allows an alarm device to be connected. The alarm device can be connected to two alarm relays (see wiring diagram) which are opened when the threshold set in the ALARMS menu is exceeded. For details, see the third menu item and the description in the Accessing the Alarm menu section.

When an alarm is triggered, it is signaled on the display by a blinking row that is normally occupied by the operating mode. The menu key is used for Reset and keys **+** **-** can be used to scroll any alarm items that may have triggered for relay no. 1: Replace Filters (if enabled in the menu) while failed valve activation is signaled with relay no. 2.

PP Open is indicated on the screen if the contact is not closed or the fan is not connected to terminals 12_13 connector P9.

Remote Open is reported on the screen if the contact is not closed or the remote control is not connected to terminals 14_15 connector P9.

Cleaning Function With Fan Off Post-Cleaning

This function allows a cleaning cycle to be run with the fan off.

In Manual or Special Manual modes, it occurs through a contact connecting the fan to terminals 12_13 on connector P9, see wiring diagram.

In the advanced set up menu, the following post-cleaning settings can be set:

Start cleaning with fan off (Enable / Disable)

Number of cycles (cycles completed)

Pause time (pause duration between one solenoid valve start and the next during post-cleaning).

Pulse time (cleaning pulse duration regardless of the fan on operating time).

Selecting The Number Of Outputs

The number of outputs, solenoid valves on which the economizer runs the cleaning cycle can be selected. Cleaning is run in order from the first solenoid valve to the last. Valve regulation is possible in the basic set up menu.

Cleaning Function From Remote Control

This function lets you pneumatically clean only after an external consent is received. The external consent can be connected to prevent cleaning without pressure in the high pressure circuit or in the compressed air tank.

The external contact must be voltage free, normally open and connected to terminals 14_15 connector P9.

4-20mA IN Function

Terminals 22_23 on connector P7 can be connected to a tribo electric probe that generates a signal in current that varies from 4 - 20 mA.

In the 3 signal relays, alarms are broken down as follows:

- ⇒ Relay No. 1 to contacts 4_5 connector P4, replacement filters.
- ⇒ Relay No. 2 to contacts 6_7 connector P4, failure to activate the valve.
- ⇒ Relay No. 3 to contacts 8_9 connector P4, alarms tribo electric probe.

Trouble Shooting *FAQ*

Fault	Possible Cause	Solution
The display does not light up.	Burnt fuse. Power voltage.	Check the protection fuse on the power voltage. Check that the power voltage is present and compliant with that required for the device (terminals 1 and 2).
The outputs do not light up.	Output voltage. Wiring to solenoid valves.	Check that the timer and solenoid valve output voltage agree. Check wiring between timer and solenoid valves.
Does the economizer occasionally reset?		Check that there are no unfiltered pulse loads on the power line (spot welding machines, welding machines, plasma cutters etc.). Install a filter on the economizer power line, if needed.
Does post-cleaning start during normal cleaning?		Change the post-cleaning start-up threshold by lowering it.
Do the alarms fail to activate signaling devices?		The alarm devices must be powered by voltage external to the economizer. A relay opening is needed to activate them.
Do alarm messages appear?		Check the Alarms menu.

Maintenance

The only parts which may be replaced are fuses.

All other operations must be carried out by the manufacturer.

Scrapping

Dispose of properly after use. Dispose of the product according to laws in force for electronic equipment.



This device is for use in a dust collection system and is therefore part of a fixed installation.

Default Settings

The default settings are:

Setting	Value
Operating Mode	Manual
Pulse Time Valves	200 m.sec.
Pause Time Valves Cycle	20 sec.
Number Of Connected Valves	1
Cleanings When Fan Is Off	2
Pulse Time V. Cleaning Fan Off	200 m.sec.
Pause Time V. Cleaning Fan Off	20 sec.
Language	Italian

Warranty

The warranty lasts for two years. The manufacturer will replace any faulty electronic component exclusively at their own facilities only, unless otherwise authorized in advance by the manufacturer.

Warranty Exclusions

The warranty will be cancelled in case of:

- ❑ Signs of unauthorized tampering or repairs.
- ❑ Incorrect use of the device not respecting technical data.
- ❑ Incorrect electric connections.
- ❑ Failure to respect system standards.
- ❑ Use not in accordance with EC standards.
- ❑ Atmospheric events (lightening, electrostatic discharges,), power surges.

Declaration Of Conformity Of The Manufacturer



The manufacturer:

TURBO SRL

The manufacturer's address:

Via Po 33/35 20811 Cesano Maderno, Italy

Declares that the product:

Sequencer

Model:

E7T

Complies with the following directives:

Directive 2014/30/EU Electromagnetic Compatibility compliant with Harmonised European standards EN61000-6-2:2005 class B of EN61000-6-4:2001

Directive 2014/35/EU Low Voltage compliant with Harmonised European Standards EN 60947-1:2004

This product was tested using standard settings.

Cesano Maderno, 15 July 2017

F. Messina (C.E.O.)



TURBO s.r.l.

Code And Serial Number