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# Economizer E8T 16 Output Channels

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## Use and Maintenance Instructions

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## Description

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

Differential pressure digital control through internal transducer, which allows the accurate analysis of the cleaning filter clogging status.

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


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

- dP filter clog status
- running solenoid valves
- time remaining for next air jet start
- emission value

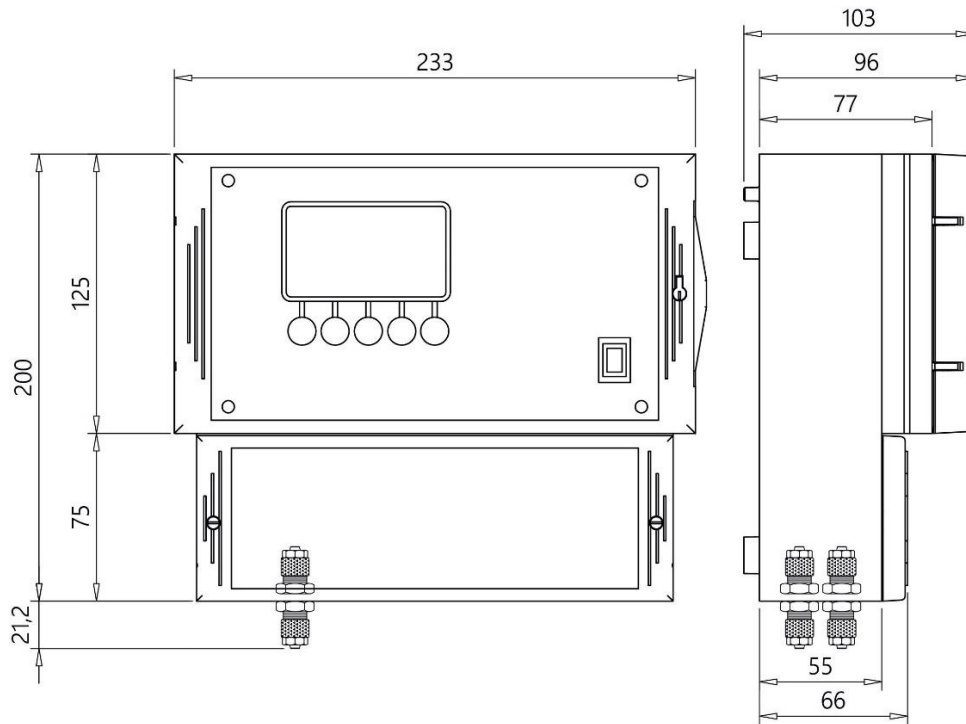
Interface menu available in five languages.

- ✧ Operating modes
  - manual, automatic, proportional, special manual.
- ✧ Selectable pressure unit of measure
  - kPa, millibar, mm H<sub>2</sub>O, Inch w.c.
- ✧ Manual solenoid valve activation.
- ✧ Operating time expressed in seconds and minutes with selectable values for any application.
- ✧ Cleaning function with fan off (post-cleaning) by "dP fan" threshold in automatic / proportional mode and by contact in manual / special manual modes, with selectable number of cycles up to 100.
- ✧ With the automatic operation, is activated upon reaching the dP Start Cleaning value, turns off when the low threshold is reached dP End Cleaning.
- ✧ Hour counter and impulse counter.
- ✧ Minimum dP alarm "broken sleeve" (with the possibility of inclusion / exclusion).
- ✧ Maximum dP alarm (clogged filter).
- ✧ Faulty solenoid valve alarm.
- ✧ Filter element maintenance alarm (with the possibility of inclusion / exclusion).
- ✧ Cleaning start from external contact.
- ✧ Compressed air consent input.
- ✧ Pre-coating function.

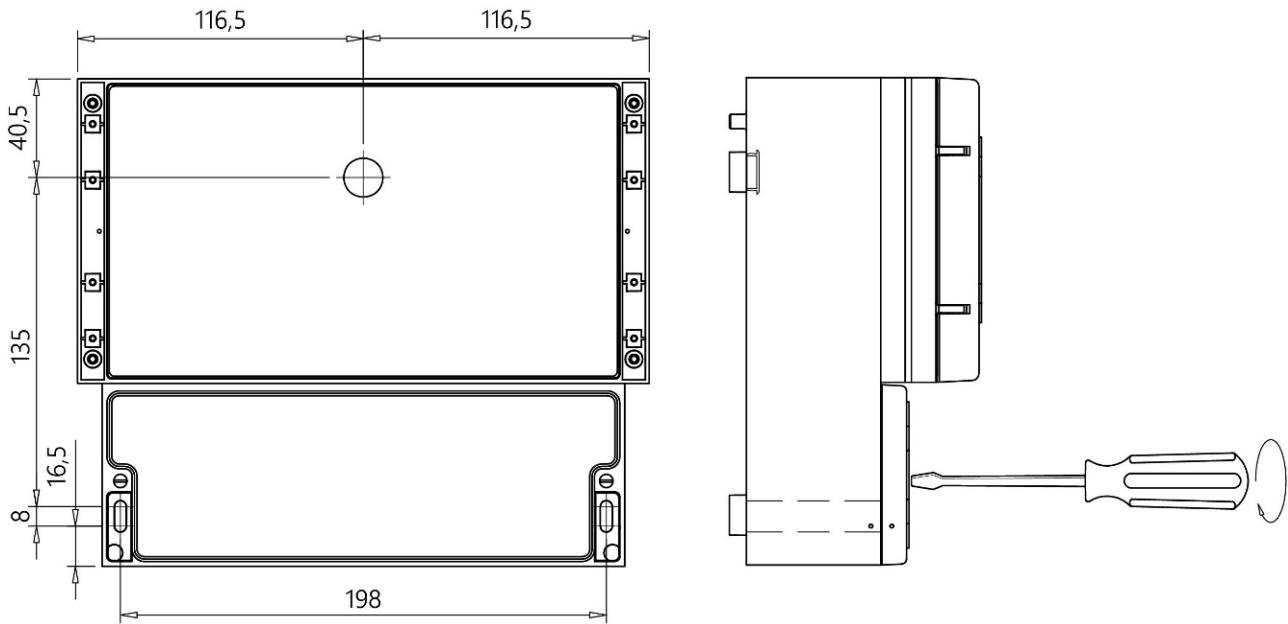
## Technical Specifications

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
Outputs Proportionate To Dp Value For Remote Pressure Reading	from 4 to 20 mA x 1
Power Consumption	28 Watt 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 m.sec. - 10 s
Interval Pause Time Between Valve Opening	1 sec. - 7200 sec.
Measurable Pressure	0 - 10 kPa
Maximum Pressure Applicable To The Gauge	50 kPa - 0.5 bar Higher pressures will damage the device 
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 safety-related indications are highlighted using the symbols:

	Attention - Danger	Warning - Generic
	Risk – Danger	Electric Current
	Dispose of in compliance with the electrical and electronic equipment Standard WEEE	

## Installation Regulations and Warnings

- ⇒ Protect the equipment from direct exposure to sunlight.
- ⇒ Do not position the equipment near or directly in contact with sources of heat or electromagnetic fields. 
- ⇒ Fix the equipment at a height of at least 60 cm from the ground.  
In a clearly visible place that is easily accessible.
- ⇒ Connect the equipment to power lines other than those used for operating motors or other high power devices, which could generate network interference or instability.
- ⇒ The unit electric power supply must be protected by a 230 Vac~ 30 mA Residual Current Device RCD and a bipolar 230 Vac~ 10 A magnet circuit breaker, positioned in a place that is easily accessible.
- ⇒ Before intervening on the equipment to perform any operation, deactivate the magnet circuit breaker switch. 
- ⇒ For electric operations, always remove voltage, wait 30 seconds for the internal capacitors to discharge before opening. At the end of the operations, close the equipment before powering up.
- ⇒ Before intervening on the equipment to perform any operation, check the conditions of the atmosphere are safe.
- ⇒ For connection of the supply voltage, use flame-retardant wires with a minimum section of 0.75 mm<sup>2</sup> certified and conform to the IEC 60227 or IEC 60245 standard.
- ⇒ Use flame-retardant cables with a minimum cross-section area of 0.75 mm<sup>2</sup> for all control signals.
- ⇒ Use flame-retardant cables with a minimum cross-section area of 0.75 mm<sup>2</sup> to connect to the indicating relays.
- ⇒ Use flame-retardant cables with a minimum cross-section area of 0.5 mm<sup>2</sup> for electro valves control signals.
- ⇒ The earth wire must be yellow/green.
- ⇒ The earth wire must be connected first.
- ⇒ The yellow/green wire must only be used for the earth connection.

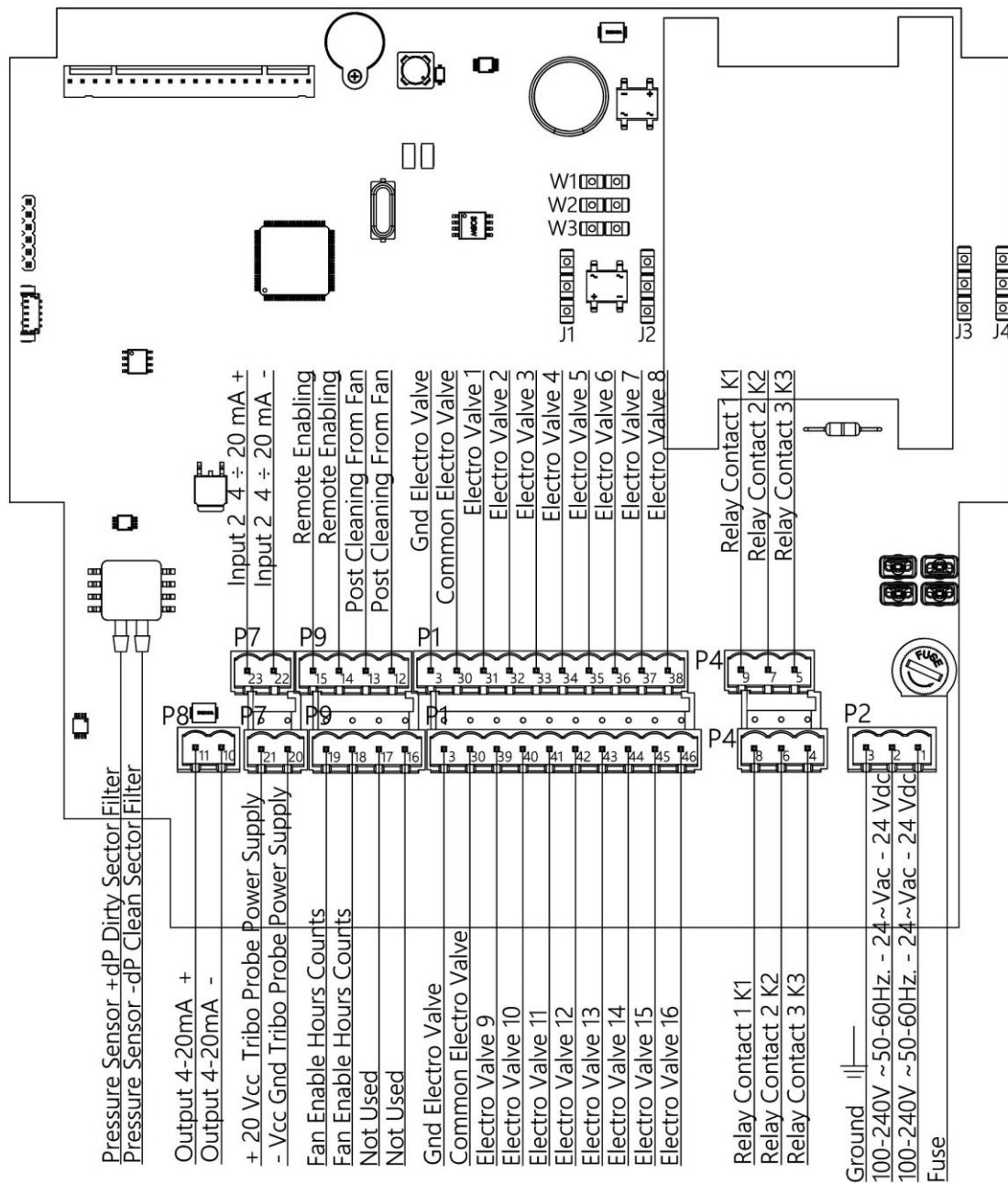
- ⇒ The cable glands must be chosen according to the diameter of the cable to be used.
- ⇒ Sealing of the cable glands is guaranteed by the compression of the rubber gasket that tightens on the outer diameter of the cable.
- ⇒ The size of cable and cable gland must ensure that power cord traction is not acting on the terminals.
- ⇒ The terminal block must not be the mechanical anchorage point of the wires.
- ⇒ The cable gland PG9 supplied on request, has minimum cable diameter of 4 mm and maximum of 8 mm, with 19 mm clamping nut.
- ⇒ Any use not described in this user instruction manual or incorrect use of the device may cause damage to the device or to the equipment connected to it.
- ⇒ Furthermore, incorrect use or tampering with the equipment may cause injury.
- ⇒ The impermeability of the casing is guaranteed when the door is closed.
- ⇒ Make sure that rigid or flexible ducts used for wiring, do not fill up with water or other liquids.
- ⇒ Do not make unprotected holes in the container or holes that are protected by accessories with protection rating lower than that 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.



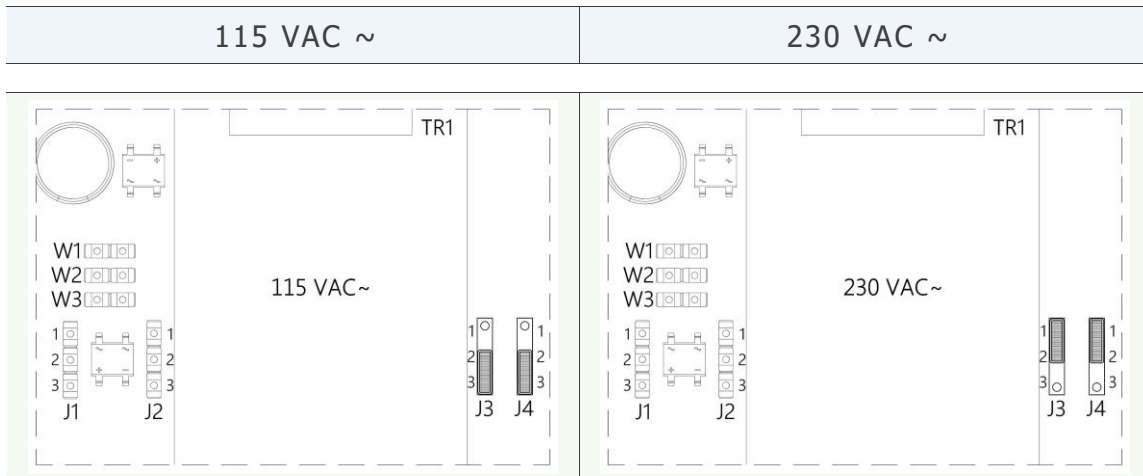
## Electrical Connections

To connect the wires to the E8T control unit, remove the cover panel to access the terminal board, unscrewing the two screws.



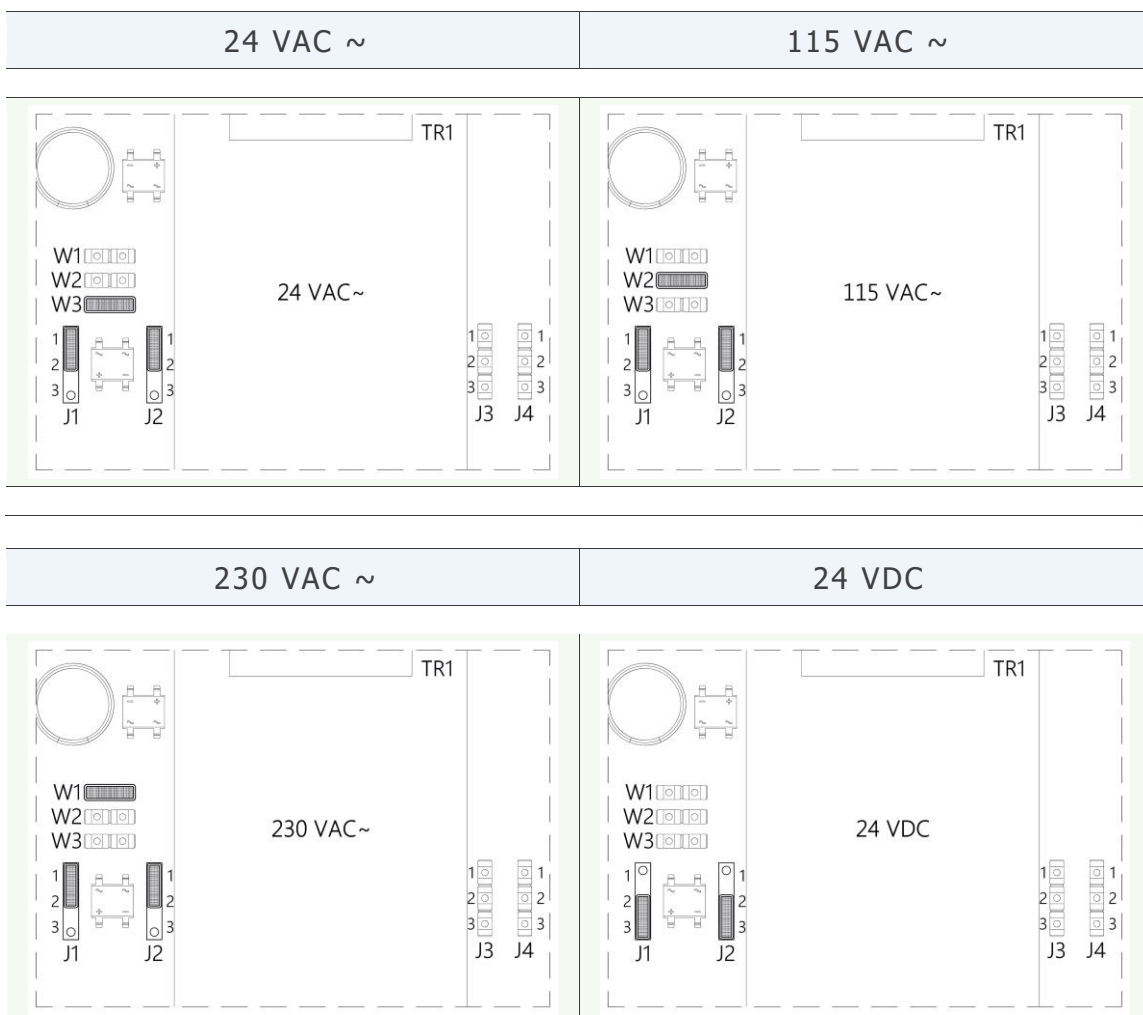


## Jumper Configuration Power Input



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 24Vac and 24Vdc the output voltages cannot be 115Vac or 230Vac.

## Keyboard And Monitor

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

When turned on, the screen displays the firmware version during initialisation



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 starts/stops solenoid valves in manual/special manual mode. It is not enabled in automatic/proportional mode.
- 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 dP reading.

With the probe installed, the   and-keys change the screen to display the emission reading values with that of the DP values.

Without the probe installed, only the screen with dP values is available.



## 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 Automatic Proportional Special
Pulse Time Opening Valve	50 mSeconds ÷ 10 Seconds
Cycle Time Interval Openings	1 Second ÷ 7200 Seconds
Number of Valves	1 ÷ 16
Unit Measure dP	mm H2O - Mbar - Kpa - Inch WC
dP Start Cleaning	Enter the start cleaning dP value for Automatic or Proportional operating mode
dP Stop Cleaning	Enter the end cleaning dP value for Automatic or Proportional operating mode



## 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
dP Fan On / Off	dP threshold tied to fan on / off for which the tool recognizes that suction is on over the set threshold while cleaning cycles are started with the fan off under it Post-Cleaning
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
Precoating	Enables the Precoating function. For applying the layer of powder protective on the filter media
dP Precoating	Enter the dP value where the pre-coating function is kept enabled. When exceeded the instrument returns to the originally set operating mode
Cycles Man. 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 Man. 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
dP Dirty Filter	Enter the dP threshold to trigger the clogged filter alarm.
Enabling Minimum dP	Minimum dP alarm enabling (broken sleeve).
Low Alarm Thresh. dP	Enter the dP threshold to trigger the Minimum dP alarm.
Hour Meter 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.
Calibration Zero dP =	Press the keys   to calibrate zero dP. Run this operations with the filter fan off.
4 mA Output	Press the keys   to calibrate the 4mA output which corresponds to zero dP
20 mA Output	Press the keys   to calibrate the 20mA output which corresponds to dP full scale



## 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
<b>Pre-Alarm Threshold</b> 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 <sup>3</sup>	00800
<b>Pre-Alarm Time Recognition</b> 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
<b>Threshold Alarm</b> 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 <sup>3</sup>	01500
<b>Time Alarm Recognition</b> 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
<b>Threshold Peak</b> 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 <sup>3</sup>	03000
<b>Time Recognition Peak</b> 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
<b>Reference Emissions</b>	0.01 mg/m <sup>3</sup>	5000



Reference $\mu$ Ampere	0.001 mA	20000
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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
- the internal dust filter pressure
- 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.

## Automatic Operating Mode

When Automatic mode is selected from the basic set up menu, first menu item, the economizer will work autonomously running pneumatic cleaning only when necessary. If the device detects clogging over the dP Start Cleaning threshold, cleaning is started.

If clogging drops under the dP Stop Cleaning threshold, cleaning is suspended and turns off, until the pressure rises to a value over dP Start Cleaning.

When cleaning, the time in which the economizer cleans can be set in the basic set up menu.

## Proportional Operating Mode

By selecting the Proportional mode in the basic set up menu, the economizer works autonomously initially setting the Start Cleaning threshold, pulse time and pause time.

Automatically, when the Start Cleaning threshold is exceeded, the solenoid valves are activated in sequence. If the dP threshold lowers 15% at the end of an entire pulse cycle for the connected solenoid valves, cleaning is suspended until the pressure rises over the dP Start Cleaning threshold.

If the dP value does not drop 15% under the Start Cleaning threshold, the pause time frequency is automatically reduced proportionately at each complete cycle of connected solenoid valve pulses, until a pause time between solenoid valves is

minimum 10 seconds. The minimum 10 second threshold was chosen to not stress air distribution by the compressor connected to the filter.

## Special Manual Operating Mode

In the basic set up men, 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 and it is hard to work with automatic and proportional modes.

## 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 1 Terminals 8-9 Conn. P4	Relay 2 Terminals 6-7 Conn. P4	Relay 3 Terminals 4-5 Conn. P4
dP Minimum if enabled in the menu	Valve Activation Failed	Triboelectric Probe Pre - Alarm
dP Dirty Filter		Triboelectric Probe Alarm
Replace Filters if enabled in the menu		Triboelectric Probe Peak

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.

Post-cleaning is automatically activated in Automatic and Proportional operating modes and when differential pressure drops under a threshold that can be set in the advanced set up menu, second menu item.

While in Manual and 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)
- Activation pressure (dP fan ON/OFF threshold)
- 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.

## Pre-Coating Function

This function lets you run pre-coating. Pre-coating is a filter element treatment run with a powder called pre-coating powder. During the pre-coating phase, cleaning is suspended until the dP pre-coating threshold is reached.

In the advanced set up menu, the following pre-coating settings can be set:

- Pre-coating start: Enable on / Disable off.
- Disable pressure dP Pre-Coating.

## 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 Out Function

This function lets you check pressure readings from remote through 4 ÷ 20mA transmitter.

Connect the signal to be sent to the remote device to terminals 10\_11 on connector P8.

The gain range can be set in the Calibration / Test menu, see Accessing the Calibration and Test Menu section.

### 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.

## 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.
The differential pressure reading is not correct.	Obstructed pneumatic connections. Damaged pipes.	Check that the differential pressure is 0.00 kPa with the pipes disconnected. In this case, check that the connection pipes between device and filter are not obstructed or damaged.
The cleaning cycle is not carried out.	The economizer is in economy mode and therefore does not start up.	Adjust the start-up pressure threshold or set the economizer to Manual mode.
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.
Does post-cleaning fail to start when the normal cleaning cycle ends?		Activate post-cleaning from the advanced configuration menu. Check that the measured pressure is lower than the post-cleaning activation pressure when the fan is off.
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.
Does 0.0 kPa-mmBar-mm H <sub>2</sub> O-Inch w.c. fail to appear when the fan is off?		Set the reading to 0 under the zero dP option in the Calibration / Test menu.

Do alarm messages  
appear?

Check the Alarms menu.

## Default Settings

The default settings are:

Setting	Value
Operating Mode	Automatic
Start Of Cleaning Dp	0.80 kPa
End Of Cleaning Dp	0.40 kPa
Pulse Time Valves	200 m.sec.
Pause Time Cycle Valves	20 sec.
Post-Cleaning Activation	0.10 kpa
Number Of Valves	1
Cleaning When Fan Is Off	2
Pulse Time V. Cleaning Fan Off	200 m.sec.
Pause Time V. Cleaning Fan Off	20 sec.
Start Precoating dP	1.50 kpa
Language	Italian

## Maintenance

The control unit has no parts that can be replaced, except for the fuse.

All repair operations must be carried out by the manufacturer.

To clean dust and dirt from the surfaces, gently rub with cotton or other soft cloth soaked with non-aggressive, non-abrasive detergents, use those used for glass surfaces; do not use solvents or aromatic compounds and do not rub with abrasive sponges.



## 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. Warranty



## Warranty

The warranty has a duration of 2 years. The company will replace any electronic component deemed defective exclusively at our workshop, except in the presence of contrary agreements to be authorized by the company.

## 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.
- Obstructed pneumatic connections. Damaged pipes.

## 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:

**Economizer**

Model:

**E8T**

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.)**





*Mario Lohvio*

TURBO s.r.l.

**Code And Serial Number**