ESA ELECTRONIC ENGINEERING

INFOTECH

ELECTRONIC EQUIPMENT
FOR
DEDUSTING PLANTS

INDEX

	SEQUENCERS WITHOUT CONTROL dP		**SEQUENCERS WITH dP CONTROL**
1.	Sequencer model **PB**	7.	Sequencer model **BB**
2.	Sequencer model **PC**	8.	Sequencer model **BC**
3.	Sequencer model **LG**	9.	Sequencer model **LC**
4.	Sequencer model **SC**	10.	Sequencer model **DC**
5.	Sequencer model **LSC**	11.	Sequencer model **LDC**
6.	Sequencer model **P**	12	Sequencer model **DM**

SEQUENCERS FOR DEDUSTING PLANT

STANDARD CONFIGURATION

SEQUENCERS WITH dP vs. SEQUENCERS WITHOUT dP

Sequencers without dP control:

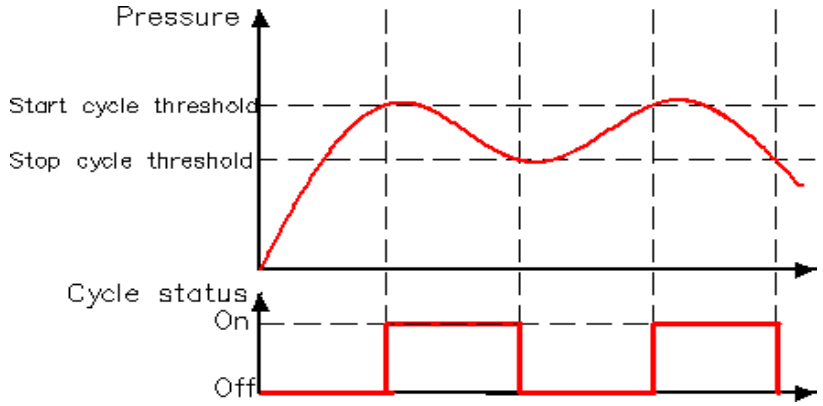
1. Continuous activation of the solenoid valves with compressor for air tanks always active and consequently electricity consumption.

2. Filter bags are under constant stress, which causes them to be damaged more quickly and must be replaced with high costs.

Sequencers with dP control:

1. By setting the dP thresholds, the activation of the solenoid valves starts only when it is needed and stop when the filter is clean.
   The compressor is active for less time and electricity consumption is reduced.

2. The service life of the bags has increased.



3. The correct threshold values must be indicated by the filter manufacturer.

SEQUENCERS WITHOUT dP - COMPARISON

PB	PC	SC/LSC	LG	P
Max. outputs for ev.: 48 3-digit LED displays 3 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Output overload protection 1 output relay contact 2 inputs from external contacts: Fan status check. Cleaning cycle start/stop Wall fixing IP65 enclosure 	Max. outputs for ev.: 36 3-digit LED display 3 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Output overload protection 3 output relay contacts 3 inputs from external contacts: Fan status check Cleaning cycle start/stop Third input on request. Operating hours counter. Wall fixing IP65 enclosure. 	Max. outputs for ev.: 120 2x16 LCD alphanumeric display 5 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Output overload protection 3 output relay contacts 3 inputs from external contacts: Fan status check Cleaning cycle start/stop Third input on request. Operating hours counter. SC: Wall fixing IP65 enclosure LSC: board only  	Max. outputs for ev.: 12. 2x16 LCD alphanumeric display 5 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Output overload protection: 2 output relay contacts 2 inputs from external contacts: Fan status check Cleaning cycle start/stop Operating hours counter Panel fixing IP20 enclosure 	Max. outputs for ev.: 24 Led operating indications. Dip switch Pulse time: 0.05 ÷ 1 sec. Interval time: 1 ÷ 120 sec. 2 output relay contacts 2 inputs from external contacts: Fan status check Cleaning cycle start/stop Wall fixing IP65 enclosure 

SEQUENCERS WITHOUT DIGITAL CONTROL dP – most used and requested options.

1. Fan status control and additional cleaning cycles after fan stops (included as standard). Option code D1a / D1a3:
In many applications it is necessary to perform a few additional full cycles when the fan turns off. By connecting a closed contact to the dedicated input of the sequencer when the fan is on and open when the fan is off, the sequencer can automatically perform the number of additional cycles set and stops when all these cycles are complete.

2. Activation of 2 solenoid valves at the same time (option on request). Option code G2:
As standard, all sequencers are designed to activate 1 solenoid valve (max. 25W) on each output. With this option, a higher-power transformer is mounted, and 2 solenoid valves can be activated at the same time (2 x 25W).

3. Different type of enclosure:
Carbon steel metallic enclosure, stainless steel or others are available on request.

4. Additional cable glands for cable entry:
Cable glands for entry cables can be added on request. The quantity and size (M16, M20.) of cable glands required, may require the use of a larger enclosure than the standard used for the sequencer model selected.

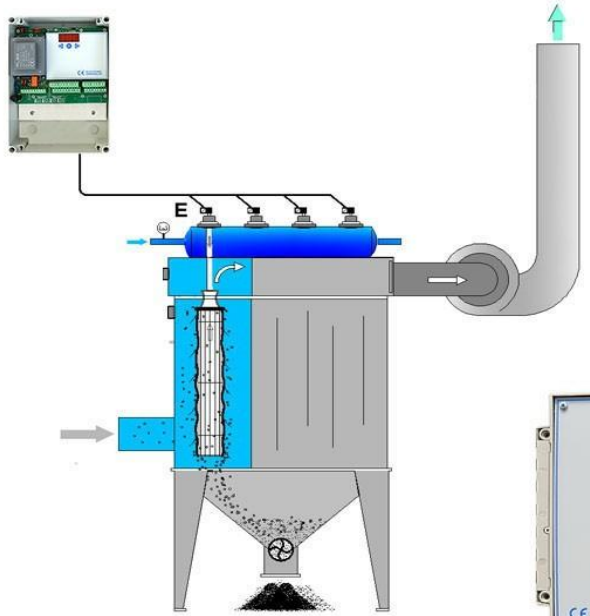
5. Other:
For other special requests, please contact the ESA technical office for feasibility and model choice.

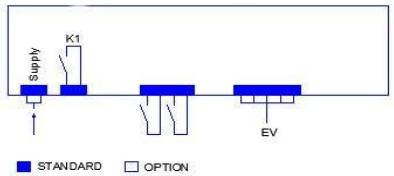
Note:

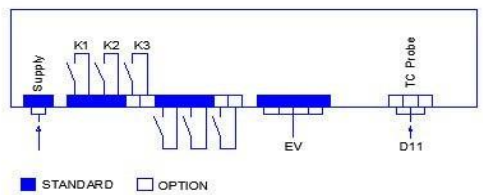
FB Model Sequencer:

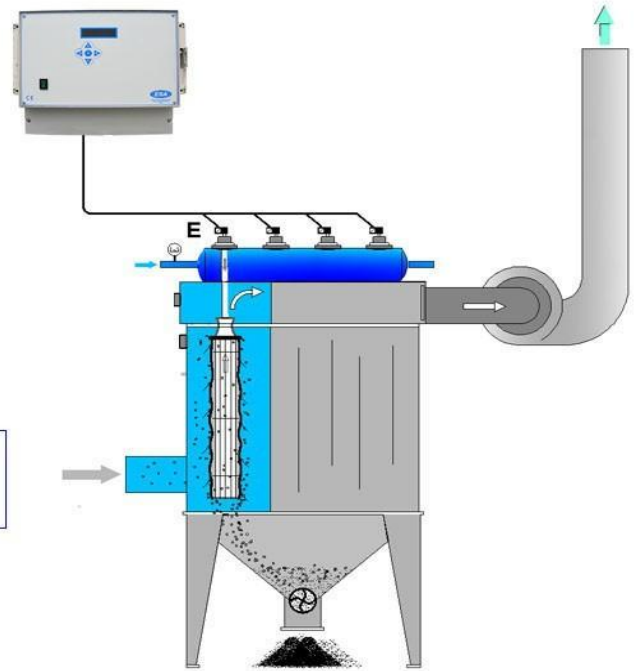
This is the PB sequencer model with pilot valves mounted on the enclosure and connected to an electronic board for activating the diaphragm valves.

APPLICATION EXAMPLE









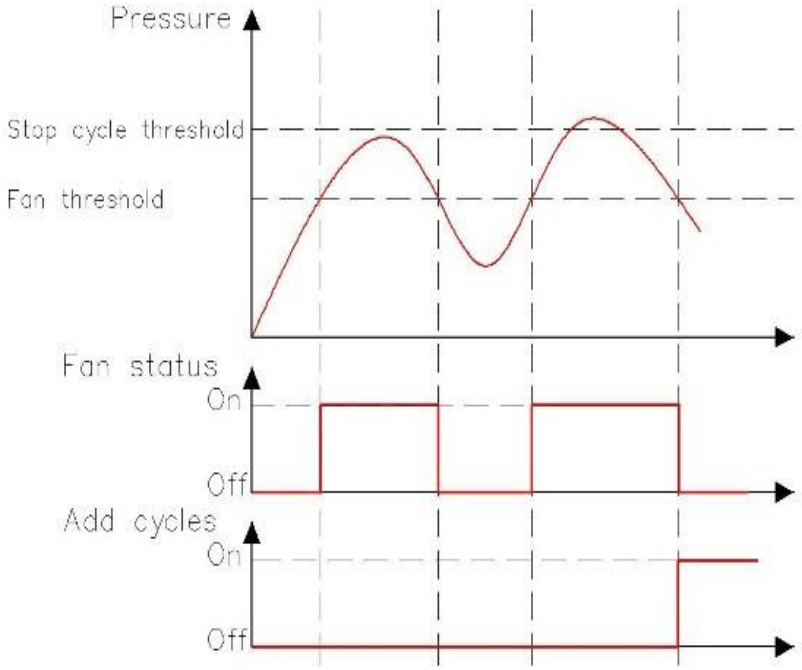
SEQUENCERS WITH dP - COMPARISON

BB	BC	DC/LDC	LC	DM
Max outputs for ev.: 48 3-digit LED displays 3 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Output overload protection. 1 output relay contact Maximum dP alarm 2 inputs from external contacts: Fan status check Cleaning cycle start/stop Wall fixing IP65 enclosure 	Max outputs for ev.: 36 3-digit LED display 3 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Output overload protection: 3 output relay contacts Min. and Max. dP alarms 3 inputs from external contacts: Tank air pressure control Cleaning cycle start/stop Third input on request. Operating hours counter. Wall fixing IP65 enclosure 	Max outputs for ev.: 120 2x16 LCD alphanumeric display 5 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Output overload protection: 3 output relay contacts Min. and Max. dP alarms 3 inputs from external contacts: Tank air pressure control cleaning cycle start/stop Third input on request. Operating hours counter. DC: Wall fixing IP65 enclosure LDC: board only  	Max outputs for ev.: 12. 2x16 LCD alphanumeric display 5 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Output overload protection: 2 output relay contacts Min. and Max. dP alarms 2 inputs from external contacts: Both inputs on request Operating hours counter. Panel fixing IP20 enclosure 	Max outputs for ev.: 96 4x16 LCD alphanumeric display 5 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Output overload protection: 3 output relay contacts Min. and Max. dP alarms 3 inputs from external contacts: Tank air pressure control cleaning cycle start/stop Third input on request. Output signal 4÷20mA Dust emission control Operating hours counter 

SEQUENCER WITH DIGITAL dP CONTROL – most used and requested options.

1. Fan status control and additional cleaning cycles after the fan stops (included as standard). Option code D1b1:
In many applications it is necessary to perform a few additional full cycles when the fan shuts off. The sequencer compares the dP reading to a set threshold (fixed or adjustable depending on the model):
dP < Set threshold = Fan off
dP > Set threshold = Fan on

As standard, additional cleaning cycles are enabled only if dP > stop cycle set threshold when the fan is on.



2. 4÷20 mA output signal of dP reading (option on request C11a. Available as standard in the DM model):
Output signal for remote dP reading or acquisition via PLC or DCS 4 mA = 0.00 kPa 20 mA = 10 kPa (standard range)

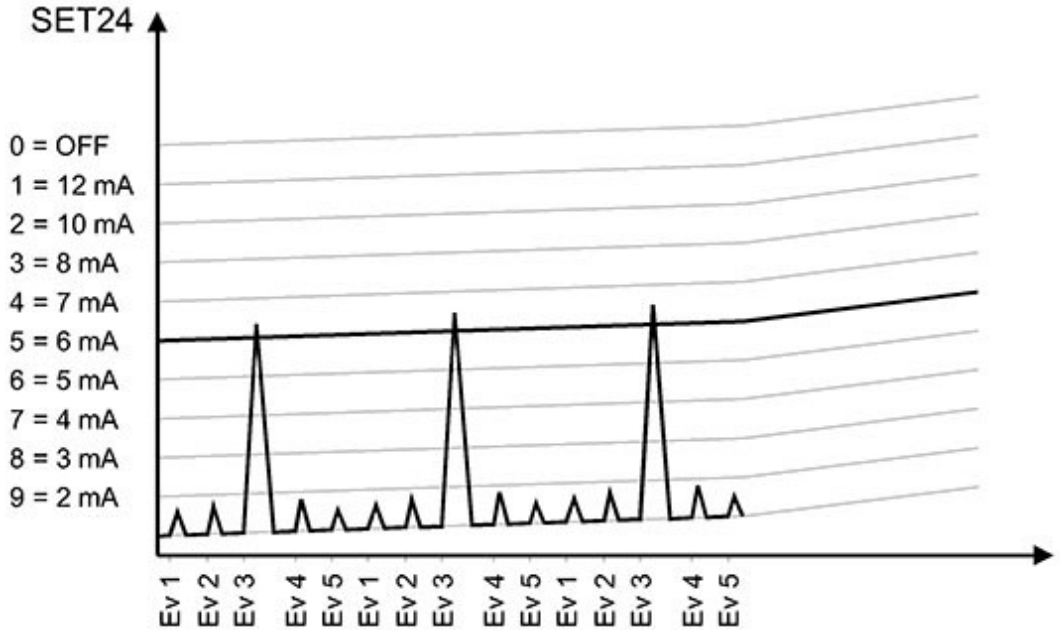
SEQUENCERS WITH DIGITAL dP CONTROL – most used and requested options.

3. Dust emission control (option on request D11 for DC/LDC models. Available as standard for the DM model)

By connecting an external TC50 probe to the sequencer, dust emissions can be monitored, and alarms can be triggered:

- Continuous emission of dust above the set threshold
- Broken bag with indication of the row of bags where the damage is:

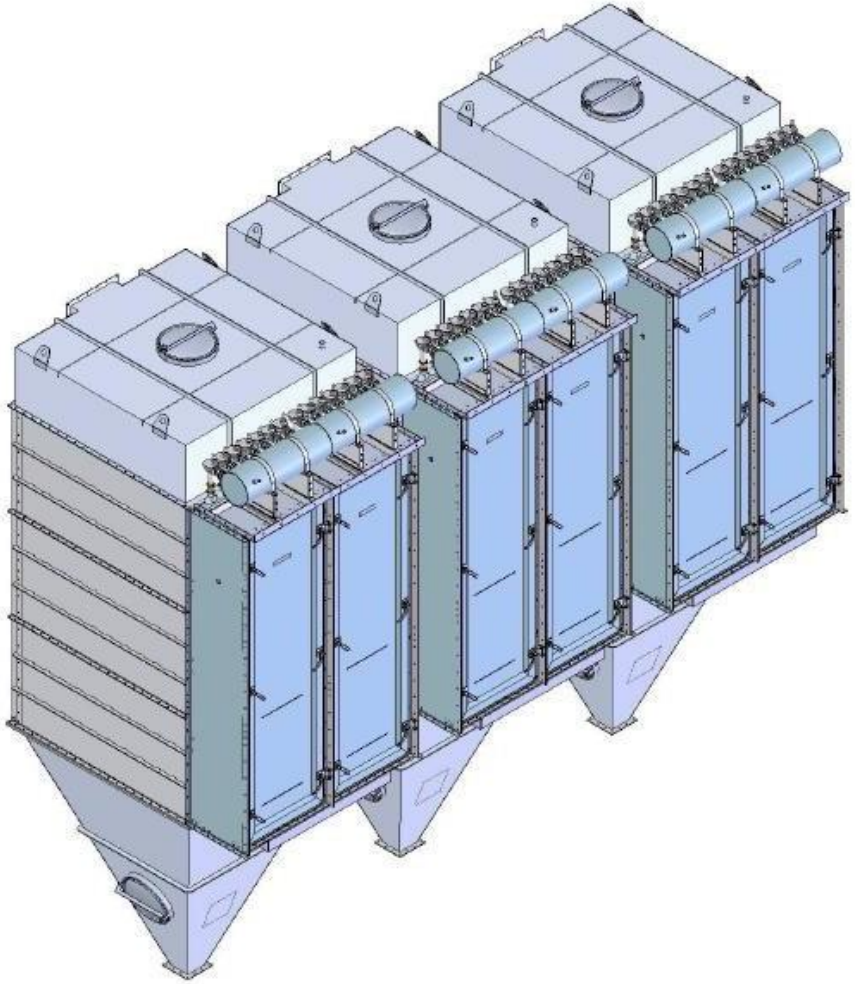
At the beginning of each cycle, a reference value of the powder emission is stored. After each activation, if the increase in dust emission exceeds the set sensitivity value, the bag could be broken. If this situation occurs on same output for 3 consecutive cycles, the broken bag alarm is activated and the number of outputs that generate this alarm is indicated on the display.



SEQUENCER WITH DIGITAL dP CONTROL – most used and requested options.

4. Filter divided into compartments
(Option on request D4-EVM/D4-EVB/D4c for DC, LDC and DM models)

In some installations, when the dust is very light, it is better to clean the bag without airflow. In this situation, a filter is divided into several compartments that can be isolated from the airflow before cleaning the bag.



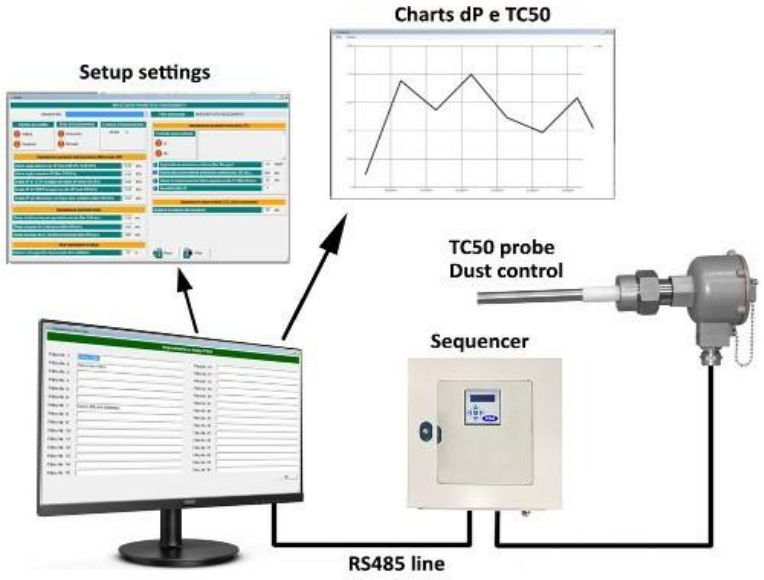
Main operational functions available:

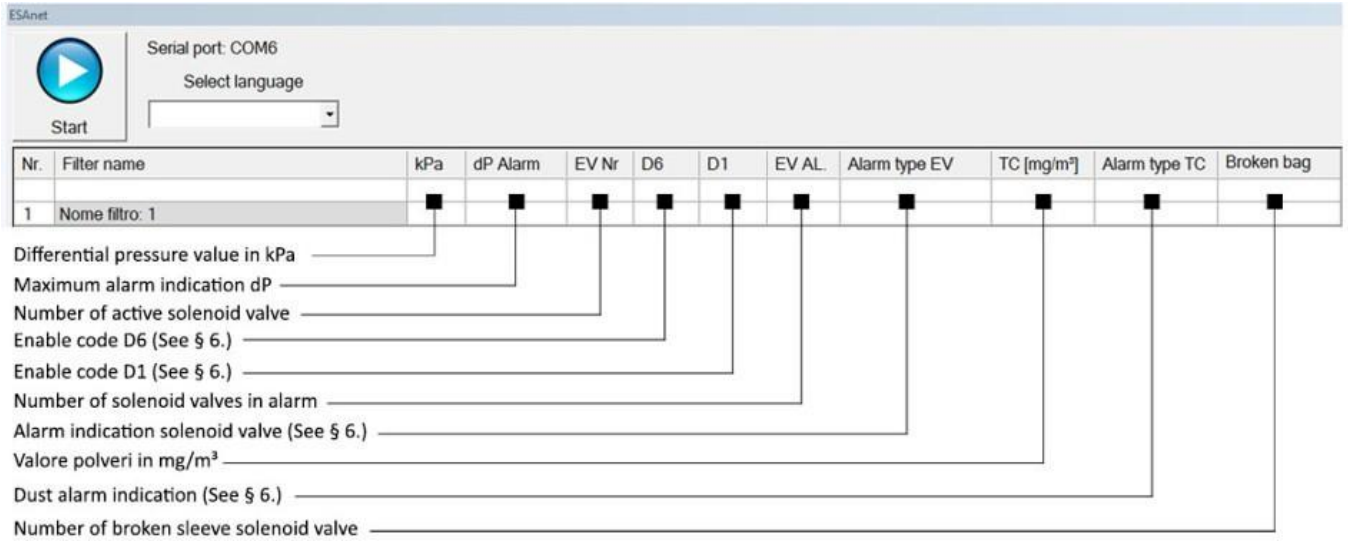
I. Activation of the damper actuator compartments
II. Cleaning cycle mode selection:
    ON-Line: clean bag without isolating the compartments from the air flow
    OFF-Line: Isolation of the compartments from the airflow before cleaning the bag
III. Exclusion of activation of 1-compartment solenoid valves in case of maintenance

SEQUENCERS WITH DIGITAL dP CONTROL – most used and requested options.

5. RS485 or fieldbus output (option on request for DC, LDC and DM models)
These sequencer models can be equipped with RS485 serial line output on request.
Through the serial line it is possible to have continuous monitoring of the operation of the filter: dP reading, dust emission value, alarm situations, and other operating indications.
It is also possible to change the main set-up parameters: pulse time, interval time, dP threshold, ...

Available solutions:
I. ESAnet Windows PC program. Connection of the RS485 line directly to the PC via the RS485-Usb converter supplied.





II. MODBUS TCP/IP (Ethernet) or RTU (RS485)
III. Profinet

Both these last solutions require the use of an external RS485-FiledBus converter.
FildBus is connected to PLCs, for example, and by creating a VPN it is possible to access the sequencer data via internet.
ESA does not manage PLCs and VPNs.

SEQUENCERS WITH DIGITAL dP CONTROL – most used and requested options.

6. Customized dP range on request

7. Activation of 2 solenoid valves at the same time (option on request). Option code G2:
As standard, all sequencers are designed to activate 1 solenoid valve (max. 25W) on each output. With this option, a higher-power transformer is mounted, and 2 solenoid valves can be activated at the same time (2 x 25W).

8. Diverse types of enclosure:
Carbon steel metal enclosure, stainless steel or others are available on request.

9. Additional cable glands for cable entry:
Cable glands for entry cables can be added on request. The quantity and size (M16, M20,) of cable glands required, may require the use of a larger enclosure than the standard used for the sequencer model selected.

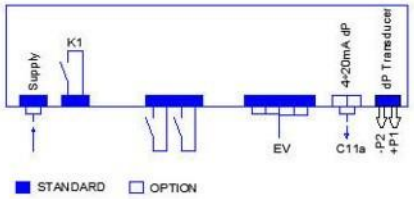
10. Others:
For other special requests, please contact the ESA technical office for feasibility and model choice.

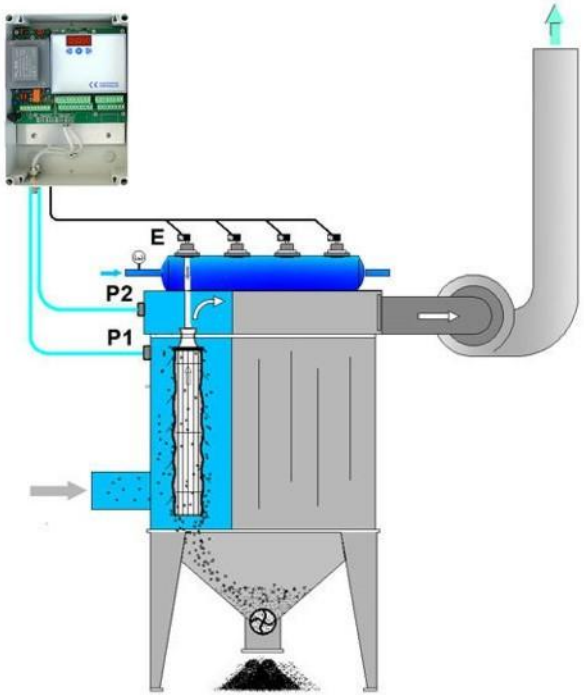
Note:

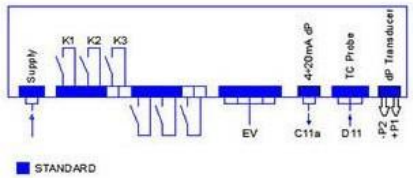
EB Model Sequencer:

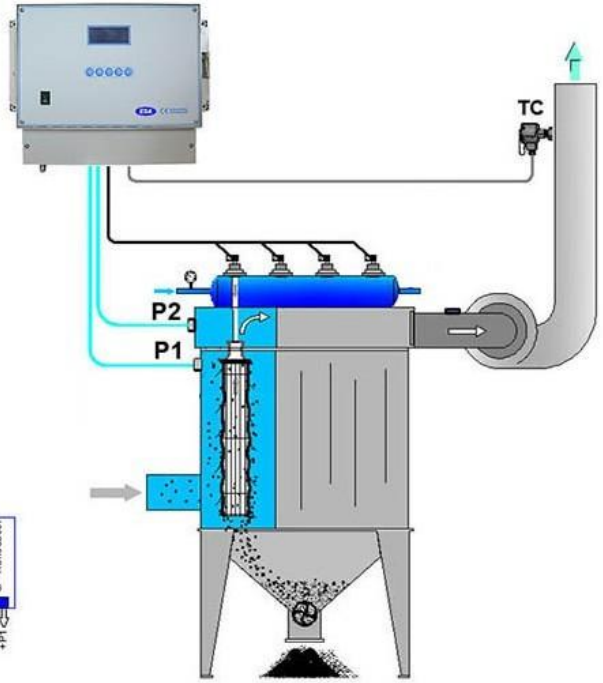
This is the BB model with pilot valves mounted on the enclosure and connected to an electronic board for activating the diaphragm valves.

APPLICATION EXAMPLE









NUMBER OF OUTPUTS AVAILABLE FOR THE VARIOUS SEQUENCER MODELS

PB: 4 – 8 – 12 – 16 – 24 – 32 – 40 – 48

BB: 4 – 8 – 12 – 16 – 24 – 32 – 40 – 48

PC: 8 – 20 – 28 – 36

BC: 8 – 20 – 28 – 36

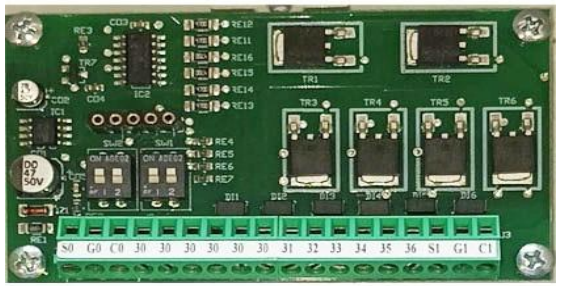
SC/LSC: 4 – 8 – 12 – 16 – 24 – 32 – 48 – 72 – 96 – 120

DC/LDC: 4 – 8 – 12 – 16 – 24 – 32 – 48 – 72 – 96 – 120

P: 12 – 24

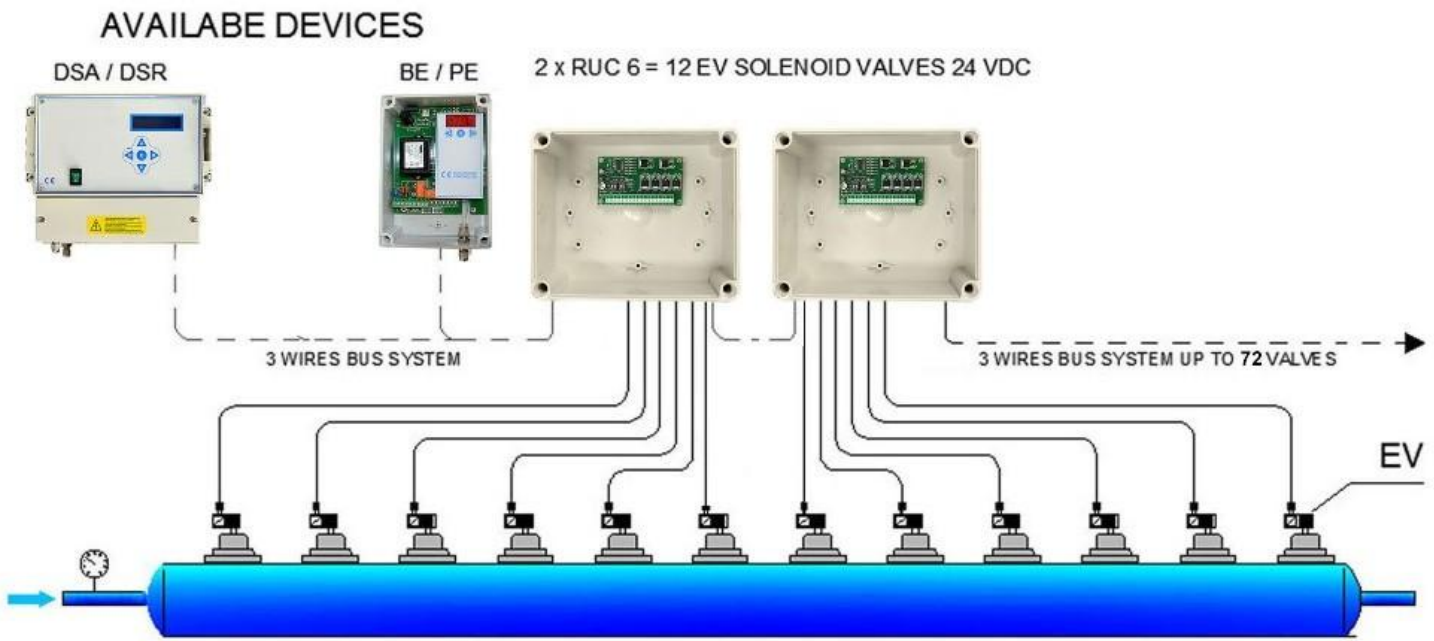
DM: 24 – 32 – 48 – 72 – 96

BUS SYSTEM: MASTER UNITS + REMOTE UNITS

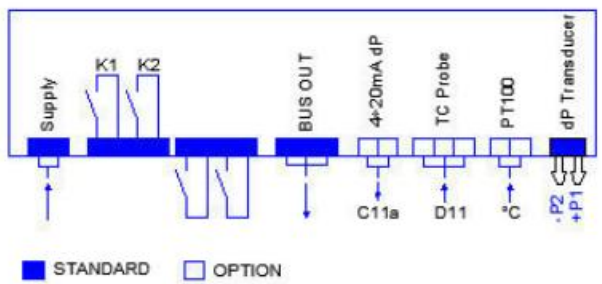


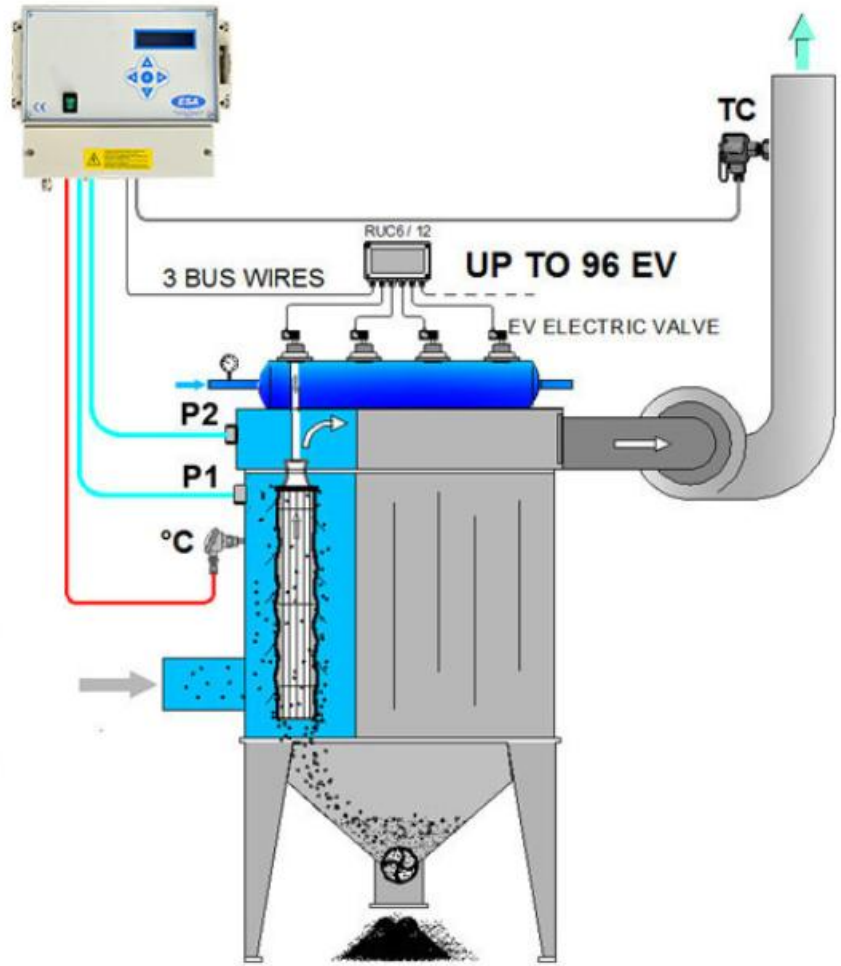
BUS SYSTEM – BASIC CONCEPT

- The bus system consists of a master unit and certain number of remote units.
- Connection between master and remote units with standard 3x0.75 mm2-wire cable
- The master unit controls the activation of the remote units, dP, dust emission,
- The remote units can control a maximum of 12 solenoid valves each.
- Maximum 72 outputs divided into up to 12 remote units connected to each Bus line.
- Control of solenoid valves only 24 VDC



APPLICATION EXAMPLE



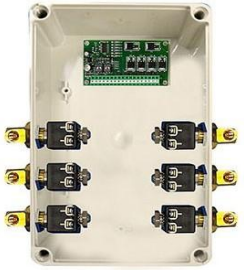
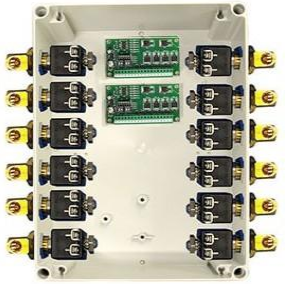


BUS SYSTEM MASTER UNITS WITHOUT AND WITH dP - COMPARISON

PE (without dP)	DSR (without dP)	BE (with dP)	DSA (with dP)
Number of Bus line for ev.: 1 3-digit LED display 3 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Outputs overload protection 2 output relay contacts 2 inputs from external contacts: Fan status check Cleaning cycle start/stop Wall fixing IP65 enclosure 	Number of Bus line for ev.: 2 2x16 LCD alphanumeric display 5 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Outputs overload protection 2 output relay contacts 2 inputs from external contacts: Fan status check Cleaning cycle start/stop Operating hours counter Wall fixing IP65 enclosure 	Number of Bus line for ev.: 1 3-digit LED display 3 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Outputs overload protection 2 output relay contacts Maximum dP alarm 2 inputs from external contacts: Fan status check Cleaning cycle start/stop Wall fixing IP65 enclosure. 	Number of Bus line for ev.: 2 2x16 LCD alphanumeric display 5 buttons Pulse time: 0.05 ÷ 5 sec. Interval time: 1 ÷ 999 sec. Outputs overload protection 2 output relay contacts Min. and Max. dP alarms 2 inputs from external contacts: Tank air pressure control cleaning cycle start/stop Operating hours counter. Wall fixing IP65 enclosure 

BUS SYSTEM REMOTE UNITS

CC

RU-C	RU-P
Remote unit for solenoid valves Number of outputs for ev.: 6 and 12 Solenoid valves voltage: 24VDC Wall fixing IP65 enclosure.	Remote unit with pilot valves for pneumatic activation of diaphragm valves Number of pilot valves: 4, 6 and 12 Wall fixing IP65 enclosure.
 	  

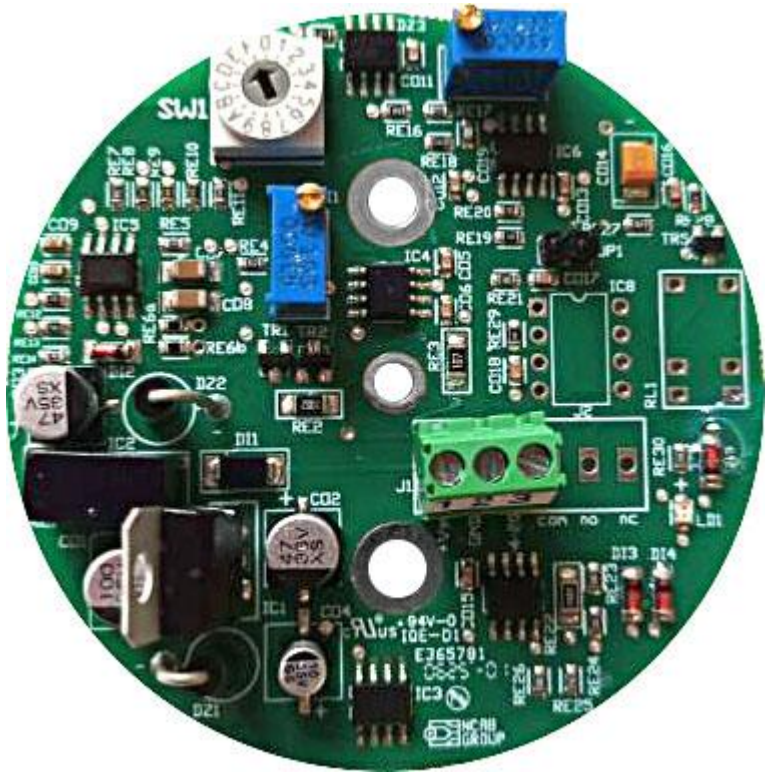
DUST EMISSION CONTROL: PROBES AND CONTROLLERS

DUST EMISSION PROBES - COMPARISON

TC50	TC50R	TC50F
Output signal: 4 ÷ 20 mA. Supply voltage: 18 ÷ 28 VDC Degree of protection: IP66. Material: AISI316L stainless steel (sensing rod) Aluminium (Electronic case) Available sensing rod length [mm]: 75 – 100 – 150 – 200 – 250 – 300 – 350 – 400 – 500 – 650 – 800 – 1000 – 1500 Minimum length: half of duct diameter Recommended length: 2/3 of duct diameter. 	Output signal: Relay contact Supply voltage: 18 ÷ 28 VDC. Degree of protection: IP66 Material: stainless steel AISI316L (sensing rod) Aluminium (Electronic case) Available sensing rod length [mm]: 75 – 100 – 150 – 200 – 250 – 300 – 350 – 400 – 500 – 650 – 800 – 1000 – 1500 Minimum length: half of duct diameter Recommended length: 2/3 of duct diameter. 	Version with stainless steel cable Output signal: 4 ÷ 20 mA. Supply voltage: 18 ÷ 28 VDC. Degree of protection: IP66. Material: AISI316L stainless steel (cable) Aluminium (Electronic case) Maximum length of stainless-steel cable: 20 m Usage: For larger ducts or fixed directly on top of the filter after On request the cable fixing kit (Code TC42) 

DUST EMISSION PROBES - FEATURES

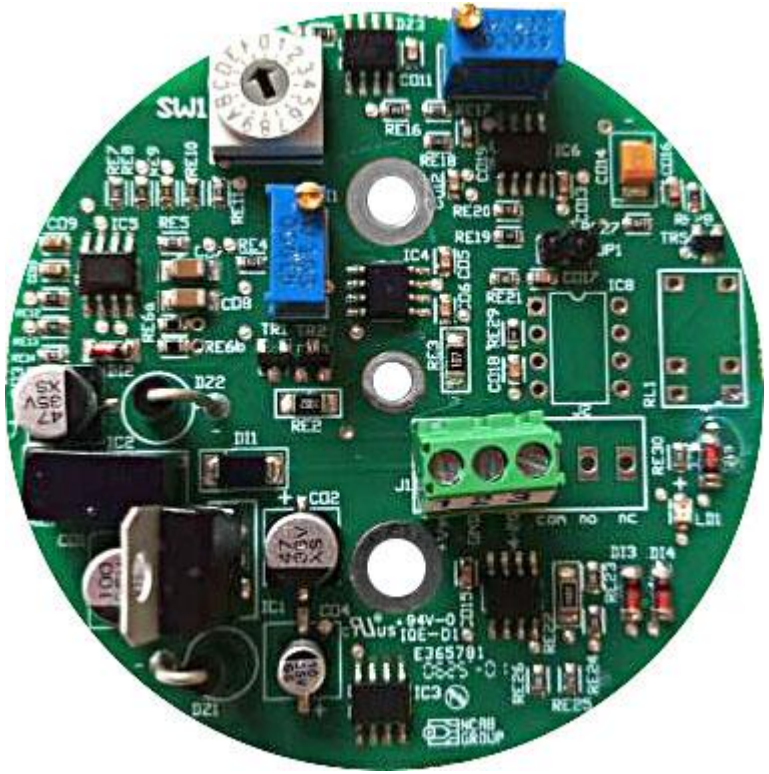
How it works: Dust particles hit the sensing rod or cable
and generate an electrostatic charge on it (tribo-electric effect).
The electronic circuitry inside the probe head is connected to the sensing rod and transforms the electrostatic charge into a manageable signal.
The amount of electrostatic charge and the output signal level depend on many factors:
- Powder type
- Particle size
- Air speed in the duct
- Length of the sensing rod in the airflow



Measurement accuracy: minimum 3 mg/m^3, in all applications.
The minimum amount of dust detected may be less than 3 mg/m^3, depending on the system conditions indicated above.
The TC probe is designed mainly to detect broken bags when the amount of dust is high.
Continuous measurement of the amount of dust in mg/m^3 resulted has an error of ±10÷15%

DUST EMISSION PROBES - FEATURES

Calibration: The TC probe cannot be calibrated in factory.
Only dust-free reading (4mA output signal) is performed in factory.
The dust quantity with an output signal of 20 mA must be calibrated to the plant.
It is suggested to check the calibration of the TC probe every year to verify that it is working properly.
TC probe calibration can only be performed if there is dust inside the duct.
The 4÷20 mA output signal must be adjusted so that a signal of 13 to 16 mA is at the maximum allowable dust level by setting the internal selector switch SW1 to the right position.



For the TC50R probe, the internal switch SW1 sets the dust emission alarm threshold and must be set to have alarm indication before the maximum allowable dust level is reached.
So, if at the maximum dust level allowed the alarm switch On with SW1 in position 4, adjust it to position 6 for example.

DUST EMISSION PROBES – FEATURES

Calibration by simulation: it is an approximate method that simulates the emission of a certain amount of powder.
This method consists of inserting pre-weighed quantities into the duct at a set time and measuring the signal generated by the TC probe.
For this calibration, it is necessary to know the flow rate of the duct.
The following example shows how to do this:
Duct flow rate = 100000 m^3/h
Emission to be simulated = 10 mg/m^3
Dust insertion time into the duct 60 sec.
Quantity of dust that must be inserted in 1 minute = 10x100000x60/3600 = 16.66 g.
So, by inserting 16.66 g. of dust in 1 minute correspond to an emission of 10mg/m^3.

Calibration by comparison: This method can be performed if the dust emission level is known from previous analyses, by comparing the value of this analysis with the output signal of the probe and adjusting it.
For example, previous analyses indicate a dust level of 10 mg/m^3 and the TC probe output signal is 18 mA.
Suppose that the maximum value allowed by law is 20 mg/m^3.
To achieve the best calibration, the TC output signal must be adapted so that it has approximately at 70% of the range (15÷16 mA) when the amount of dust is the maximum allowable of 20 mg/m^3.
In the 4÷20 mA range, 50% is 12 mA.
Having previously noted an output signal from the probe of 18 mA per 10 mg/m^3, it is evident that the amplification is too high.
Therefore, it is necessary to reduce the sensitivity via SW1 placed inside the probe, so it is sufficient to adjust the SW1 rotary selector to have an output signal of 16 mA with 20 mg/m^3 of dust emission, it means about 10 mA with 10mg/m^3 which is the real amount of dust measured by the previous analysis.

DUST EMISSION PROBES – FEATURES

Calibration for the detection of broken sleeves only

This type of calibration is simpler than the previous one because it consists of verifying that the output signal detects an abnormal passage of dust in the duct.

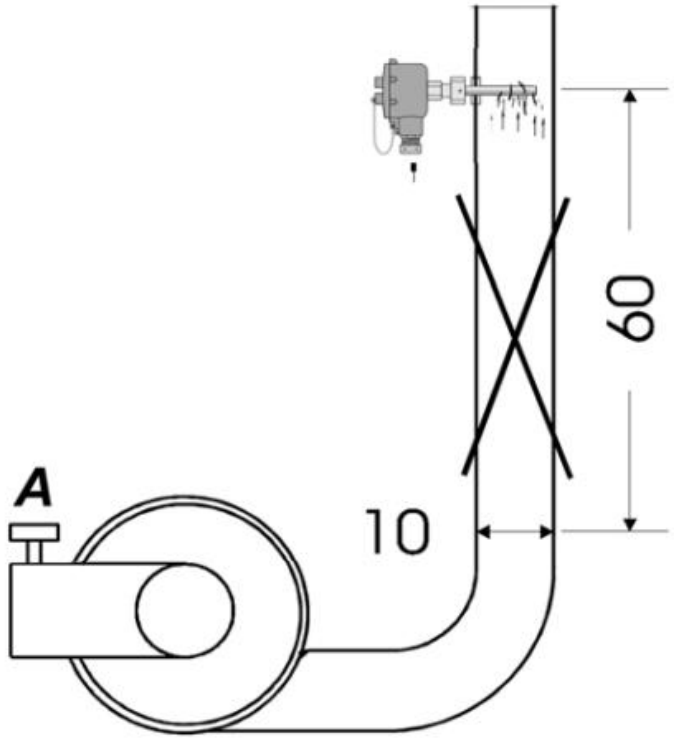
A broken sleeve or broken cartridge will result in significant amounts of dust being emitted.

This type of calibration is done by throwing a handful of dust into the duct and checking the increase in the signal, which is considerable.

This output signal peak is used to detect the broken sleeve.

Note:

for the calibration it is necessary to fix the probe where there is isokinetic condition.



TC PROBE – Most used and requested options.

1. Connection cable (option code CS):

3 or 4 wire shielded cable of 0.75 mm^2.

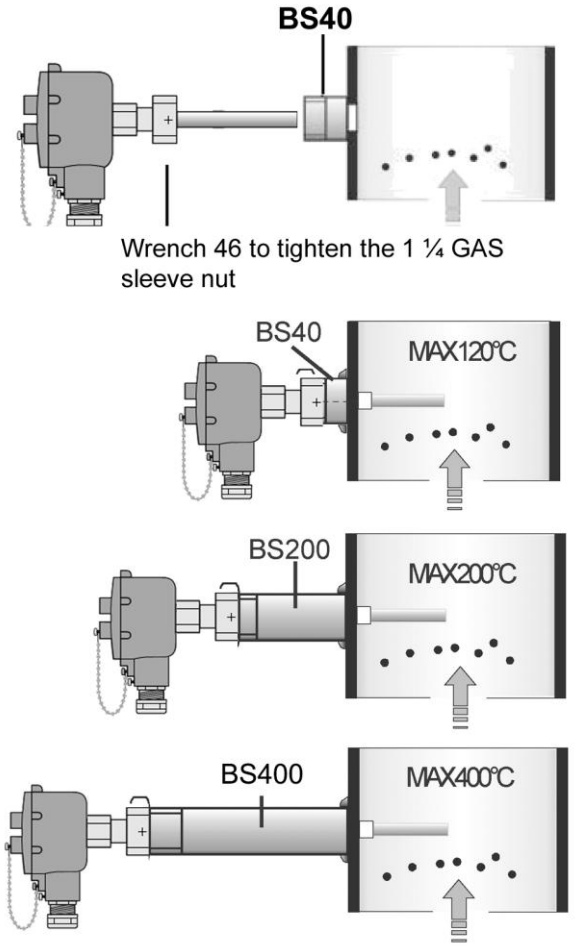
The length of the cable must be communicated to the ESA.

2. Longer fixing probe socket (option code BS200 or BS400)

BS200 socket is required if the gas temperature is between 120° and 200°.

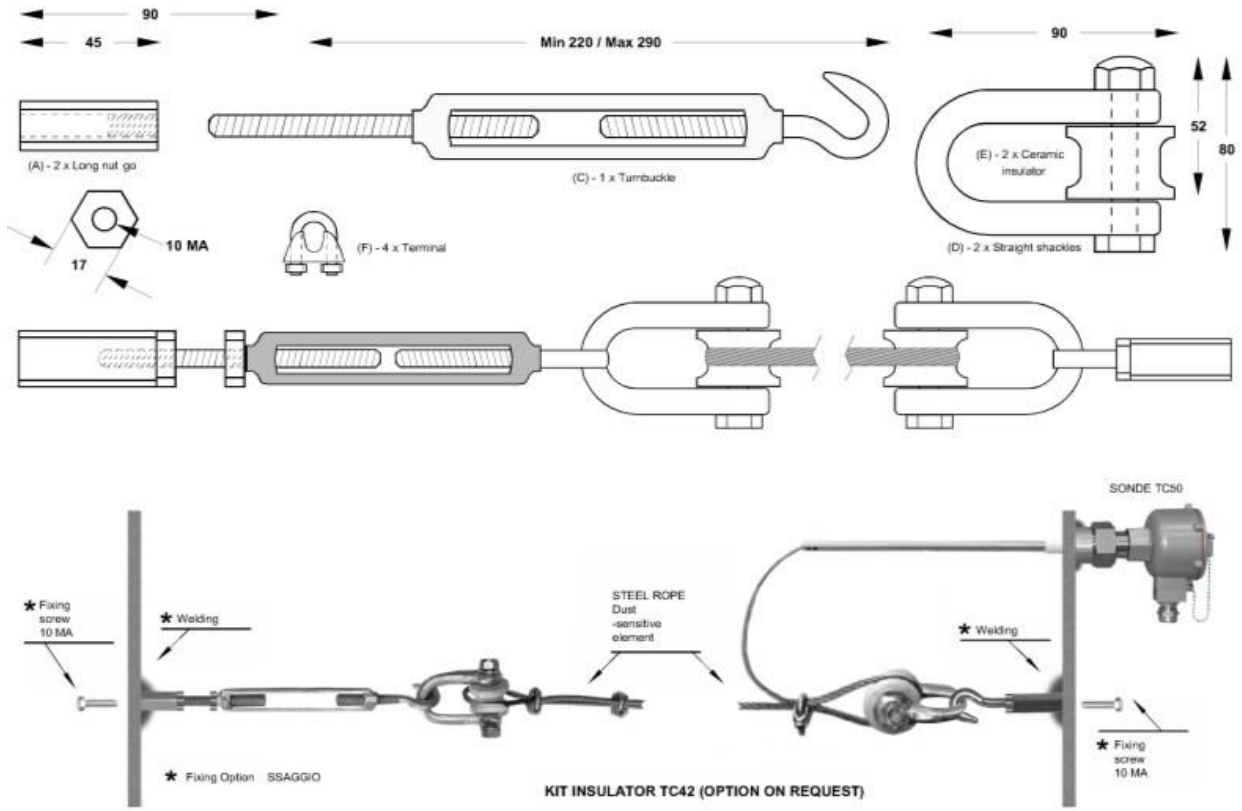
For gas temperatures between 200°C and 400°C, the socket BS400 is required.

When BS200 or BS400 are in use, 200 mm or 400 mm of the length of the probe sensing rod is located inside the socket and is not available for dust level measurement.



TC PROBE – Most used and requested options.

3. Steel cable fixing kit (TC50F only) code TC42:



TC PROBE – Ordering Information

To select the correct TC probe model, the required information is:

1. Output signal type: 4÷20 mA or relay contact.
2. Duct diameter to define rod length or rope length for TC50F.
3. Gas temperature that needs to be monitored

DUST EMISSION CONTROLLERS - COMPARISON

DST1	DMT2	DMT4
Controller for TC50 and TC50F probes 2x16 LCD alphanumeric display 5 buttons 2 output relay contacts: High Dust Emission Pre-Alarm High Dust Emission Alarm Adjustment of the TC reading in mg/m^3 Wall fixing IP65 enclosure. 	Controller for TC50 and TC50F probes and dP control via internal transducer 4x16 LCD alphanumeric display 5 buttons 2 output relay contacts: dP min and max alarm dust emission alarms. Adjustment of the TC reading in mg/m^3 dP Reading range 0÷10 kPa Wall fixing IP65 enclosure. 	Controller for TC50 and TC50F probes Connection of up to 4 TC probes 4x16 LCD alphanumeric display 5 buttons 2 output relay contacts: TC1 & TC3 Dust Emission Alarm TC2 & TC4 Dust Emission Alarm Adjustment of the TC reading in mg/m^3 Wall fixing IP65 enclosure 

TC PROBE CONTROLLERS – Most used and requested options.

1. TC probe signal output 4÷20 mA (DST1, option on request code C12)

2. RS485 or fieldbus output

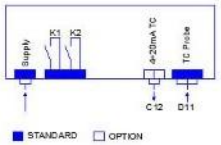
TC probe controllers on request can be equipped with RS485 serial line output.
Through the serial line it is possible to have continuous monitoring of dust emission.
It is also possible to change the main set-up parameters.

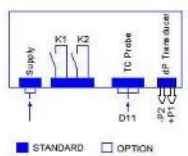
Available solutions:

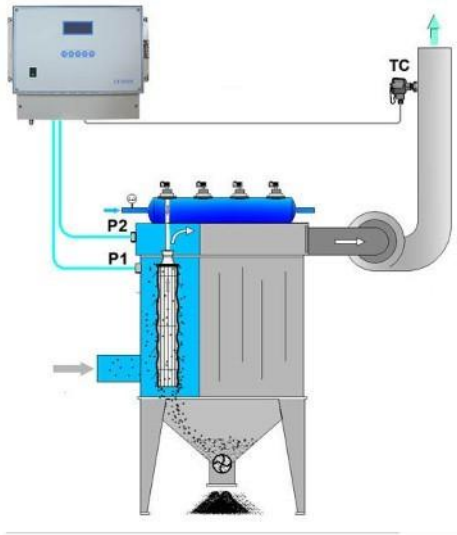
I. ESAnet Windows PC program.
   Connection of the RS485 line directly to the PC via RS485-Usb converter supplied.
II. MODBUS TCP/IP (Ethernet) or RTU (RS485)
III. ProfNet

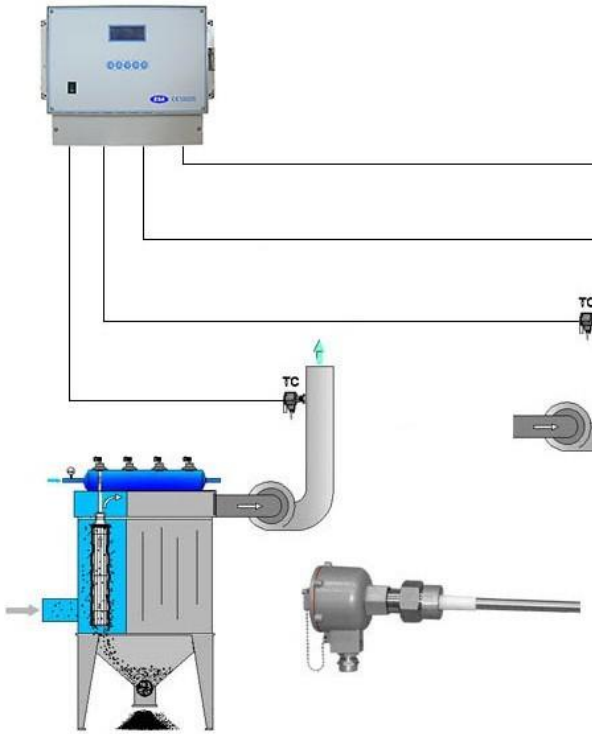
Both last 2 solutions require the use of an external RS485-FiledBus converter.
FildBus is connected to PLCs, for example, and by creating a VPN you can access your device data via the internet.
ESA does not manage PLCs and VPNs.

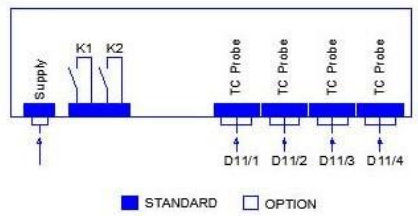
APPLICATION EXAMPLE











dP CONTROLLERS AND PRESSURE STABILIZER

PRESSURE CONTROLLERS - COMPARISON

BPB	DSP	LPC	TP11	TP30
dP reading by internal transducer. dP range: 0÷10 kPa 3-digit LED display 3 buttons 2 output relay contacts: Minimum dP alarm Maximum dP alarm. dP output signal 4÷20 mA Wall fixing IP65 enclosure 	dP reading by internal transducer. dP range: 0÷10 kPa 2x16 LCD alphanumeric display 5 buttons 2 output relay contacts: Minimum dP alarm Maximum dP alarm. dP output signal 4÷20 mA Operating hours counter. Wall fixing IP65 enclosure 	dP reading by internal transducer. dP range: 0÷10 kPa 2x16 LCD alphanumeric display 5 buttons 1 output relay contact: minimum and maximum dP alarm dP output signal 4÷20 mA Operating hours counter Panel fixing IP20 enclosure 	2-wire dP transmitter dP range: 0÷10 kPa Supply Voltage: 8÷32VDC Output signal 4÷20mA. Wall fixing IP65 aluminium enclosure 	Absolute pressure switch Pressure range: 2÷8 bar. Output SPDT contact Pneumatic Connection: 1/4" Female Degree of protection: IP65 

PRESSURE CONTROLLERS – Most used and requested options.

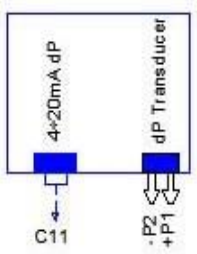
1. Custom differential pressure range

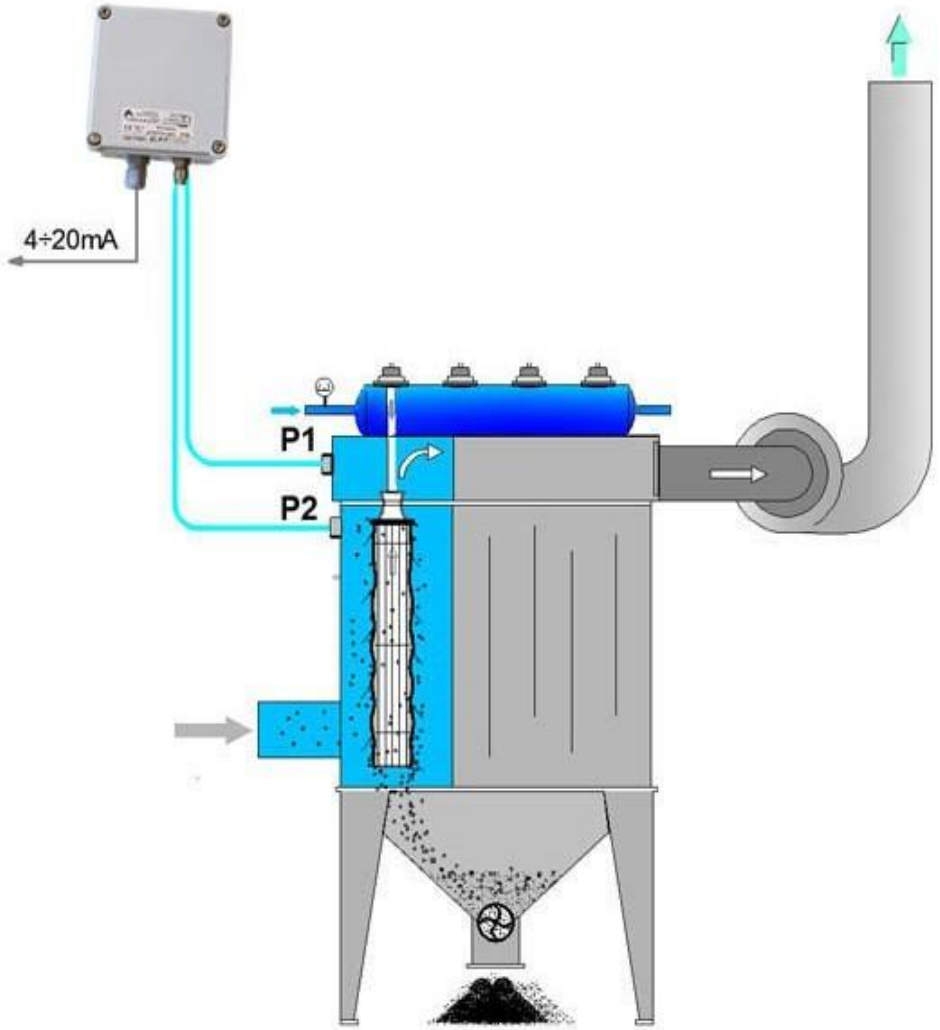
2. Separate output alarm contacts dP minimum and maximum (LPC only, option A1b)
On request on LPC controller it is possible to have 2 different output relay contacts for minimum and maximum dP alarms

3. RS485 or Fieldbus output (DSP only, D16 option on request
DSP controllers can be equipped with RS485 output serial line on request.
Through the serial line it is possible to have continuous monitoring of the differential pressure.
It is also possible to change the main set-up parameters.
The RS485 serial line can be connected to a Windows PC using the ESAnet program or by using an external converter it is possible to have MODBUS TCP/IP or RTU or Profinet for connection to PLC.

TP11 DIFFERENTIAL PRESSURE TRANSMITTER APPLICATION

TP11 can be connected to ESA DC or DM sequencers, DSP controller or directly to the PLC.
It is normally used when the distance between the filter and the device that needs to read dP is more than 30÷40 meters.
Using TP11 the connection to the sequencer or controller is done electrically and this solution is preferred overusing the pneumatic connections.



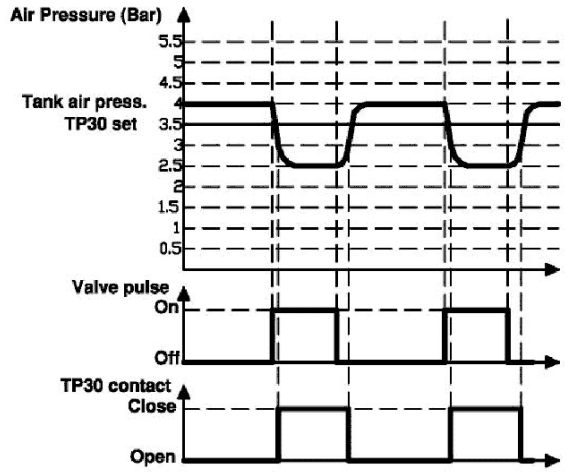


TP30 ABSOLUTE PRESSURE SWITCH APPLICATION

The TP30 is normally used to control the air pressure in the tank and, by adjusting a knob, it is possible to have the indication of low pressure in the tank via SPDT contact which can be acquired by sequencer or PLC.
With the TP30 it is also possible to monitor the activation of the solenoid valves: when a solenoid valve is activated there is a pressure drop in the tank and the TP30 could send a signal of this pressure drop to the controller which can show an activation alarm in case of a lack of pulse.
For TP30 properly operating, it must be set to a pressure level that is slightly lower than the air pressure inside the tank.
In the example, the air pressure in the tank is 4 bar and the TP30 is set to 3.5 bar.
When the solenoid valve is activated, the air pressure in the tank decreases, and if the pressure drop is at least 0.5 bar below the level set in the TP30, the TP30 output contact changes from open to closed.
At the end of the pulse duration, when the solenoid valve shuts off, the air pressure in the tank is restored and the TP30 outlet contact changes from closed to open.

EXAMPLE 1: TP30 CORRECT OPERATING

For correct operating of TP30 it has to be set at pressure level a little bit less than the air pressure inside the tank. In the example the air pressure in the tank is 4 bar and the TP30 is set at 3.5 bar. (See page 2 of the manual)
When the electrovalevs is activated the air pressure in the tank drop and if the pressure drop become minimum 0.5 bar under the set level in TP30, the output contact of TP30 change from open to close.
At the end of pulse duration when the electrovalve switch Off the air pressure in the tank is restored and the TP30 output contact change from close to open.



PRESSURE STABILIZER - COMPARISON

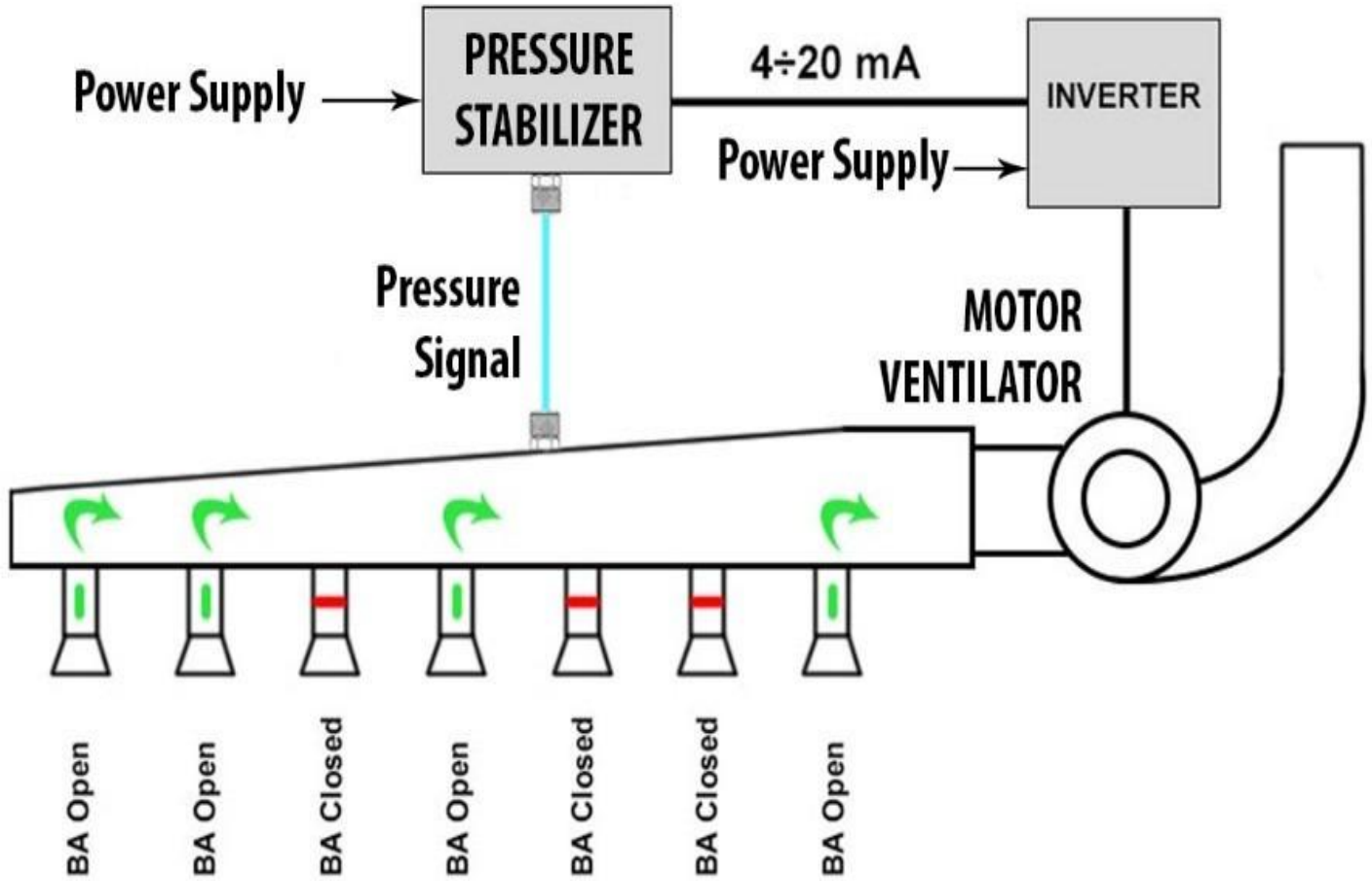
DSF	LFC
dP reading by internal transducer. dP range: 0÷10 kPa. 2x16 LCD alphanumeric display 5 buttons Start/stop regulation input contact. 4÷20 mA output signal for fan speed control by inverter. Wall fixing IP65 enclosure. 	dP reading by internal transducer. dP range. 0÷10 kPa. 2x16 LCD alphanumeric display 5 buttons Start/stop regulation input contact. 4÷20 mA output signal for fan speed control by inverter. Panel fixing IP20 enclosure. 

PRESSURE STABILIZER APPLICATION

DSF and LFC are used to maintain the same depressure within a duct by controlling the frequency of the inverter and consequently the fan speed through a 4÷20 mA signal.
The depression variation the overhead line could be caused by the opening or closing of several suction points.

DSF and LFC modulate the frequency of the inverter through PID control and by adjusting some simple parameters it is possible to adapt the regulation to each type of plant:

1. open all suction ports and adjust the inverter to the frequency (fan speed) required.
2. read the depression on the DSF/LFC display.
3. Adjust the pressure value to stabilize in the device. set up at the value read by the instrument.
4. Open and close the suction ports and adjust other parameters for optimal adjustment without pendulum effect.



CERTIFICATIONS AVAILABLE

CE

c UL us

Ex

STANDARDS COMPLIANCE

All ESA devices are manufactured in compliance with EU harmonised standards for:

EMC electromagnetic compatibility: EU Directive 2014/30/EU, harmonised standard EN60730-1:2011

LVD Low Voltage Directive: EU Directive 2014/35/EU, harmonised Standard EN60730-1:2011

ROHS 3 Directive: Directive 2015/863/EU, harmonised Standard EN63000:2018

Note: These conformities do not require certification by a notified body.

For each device, ESA made the risk analyses and perform some tests.

UL COMPLIANCE

ESA does not have UL-listed devices for North America.

UL certification is a voluntary certification and not mandatory for sale in North America.

For most requests from ESA customers selling in North America, they agree to supply ESA product within a cULus-certified enclosure.

Some of the standard enclosures used are cULus certified.

ATEX COMPLIANCE

Most ESA devices with IP65 enclosure can be manufactured in compliance with the ATEX directive for zone 22 (dust):
Directive 2014/34/EU, harmonised standards EN60079-0:2018 and EN60079-31:2014
The protection method for ATEX zone 22 used is protection by enclosure.
For ATEX zone 22, a certification by a notified body is not required and therefore only the declaration of conformity made by ESA is available and supplied.
ESA for each product conducted risk analysis and tests for compliance with the requirements of European standards.
For application in classified areas ATEX zone 21, 1 and 2, ESA offer and supply a sequencer mounted inside an explosion-proof enclosure.
With this design it is the enclosure that prevents the propagation of the explosion in case of dust or gas entry in the enclosure. The enclosure manufacturer certifies the enclosure for use in these classified areas.
For this application, it is always necessary to indicate the number and size (M20, M25,…) of cable glands required for cable entry because there are drilling limitations that can be made on the enclosure according to their size and quantity and final user is not allowed to drill the enclosure. The explosion-proof enclosure is always IEC Ex certified.
Sequencer models available as standard: DC, SC, P
Other solutions can be evaluated on request.