Use and Maintenance Manual

Wet Filtering Unit WET-5000

Manufacturer:
KLIMAWENT S.A.
81-571 Gdynia; **ul. Chwaszczyńska 194**
phone 58 629 64 80; **58 771 43 40**
phone 58 629 64 80
e-mail: klimawent@klimawent.com.pl
www.klimawent.com.pl

804U11 WET-5000 08.11.2019/EN

Contents:

1. Introductory Remarks

The purpose of the present Use and Maintenance Manual is to supply User with directions within the range of application, installation, start-up and the use of the **WET-5000 wet filtering unit**.

Installing, start up and operational use are exclusively admissible after getting acquainted with the contents of the Use and Maintenance Manual.

With regard to continuity of work carried on improvement of our products, we reserve for ourselves the revision possibility of the draft and technological changes improving their functional features and safety.

Construction of the **WET-5000** wet filtering unit meets the requirements of the current state of technology as well as the safety and health assurances included in:

– **2006/42/EC Machinery Directive** of the European Parliament and of the Council of May 17th, 2006 on machinery – amending the 95/16/EC (recast) /*Journal of Laws EC L157 of 09.06.2006, page 24*/

– **2014/35/EC Directive** of the European Parliament and of the Council of 26 February, 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits. /*Journal of Laws EC L96 of 29.03.2014*/

The appliance meets the requirements included in:

– **2009/125/EC (ErP) Directive** of the European Parliament and of the Council of October 21th, 2009 establishing a framework for the setting of ecodesign requirements for energy-related products / *Journal of Laws L 285 of 31.10.2009* /

327/2011 (**EU**) **Regulation** of March 30th, 2011 on implementing the **2009/125/EC Directive** of the European Parliament and of the Council with regard to ecodesign requirements for fans driven by motors with an electric input power between 125W and 500 kW
/ *Journal of Laws L No. 90 of 06.04.2011* /

Additionally, the appliance meets following harmonized standard:

• **EN ISO-12100:2012**	– "Safety of machinery – Basic concepts, general principles for design. Risk assessment and risk reduction"
• **EN 60204-1:2018-12**	– "Safety of machinery – Electrical equipment of machines Part 1: General requirements"
• **EN ISO 13857:2010**	– "Safety of machinery – Safe distances to prevent hazard zones being reached by upper and lower limbs"
• **EN ISO 12499:2008**	"Industrial fans – Mechanical safety of fans; Protections"
• **EN ISO 13349:2010**	"Fans – Vocabulary and definitions of categories"
• **EN 61439-1:2011**	"Low-voltage switchgear and controlgear assemblies" Part 1: General resolutions"
• **EN 61439-2:2011**	"Low-voltage switchgear and controlgear assemblies" Part 2: Power switchgear and controlgear assemblies for conversion and distribution of electric energy"

2. Application

WET-5000 filtering units have been engineered for cleaning the dust-laden air from the impurities a during the manufacturing processes. It is irreplaceable in extraction of dry dust particles, as well as wet, viscous dusts. Additionally, the appliance is appropriate for capturing the dust with large amounts of sparks, arising during various production processes, such as grinding or in chemical industry, pharmaceutics and food industry.

The appliance should be used in rooms where the temperature is higher than +5ºC, whereby the temperature of the cleaned air must not be lower than +5ºC.

3. Reservations of Producer

Manufacturer is not responsible for damages that are caused by subsequent below mentioned reasons:

- Operational use that is in contradiction with the instructions, or the installing of the device is incorrect.

- The device is incorrectly connected to the electrical power supply or to the water installation.
- Use that is in incompatibility with the present Use and Maintenance Manual or with the being valid regulations.
- Installing on the device structure additional elements not belonging to the device composition.
- Changes or modifications introduced within the device by User on one's own, or use of spare parts that are not original.
- The principles of maintenance and technical supervision are not observed, according to the present Use and Maintenance Manual.
- Conveying the air containing viscous contamination, aggressive substances or of temperature lower than +5ºC or higher than +40ºC.

4. Technical Data

Table No.1

Type	Maximum volume flow [m³/h]	Fan motor rate [kW]	Supply voltage [V/50Hz]	Capacity of the water chamber [m³]	Optimum of flow resistance [Pa]	Weight [kg]
WET-5000	6000	**11**	3x400+PE	1,1	1800-2000	1400

Necessarily connect the WET-5000 filtering unit to the water installation and drainage of sludge. Make the connection to the water supply system through a manual and electromagnetic valve by means of a pipe of diameter minimum 1".
Connection to the sludge discharge – a pipe minimum 3".

5. Structure and Function

WET-5000 consists of subsequent elements:

- mixing chamber – there are installed guide plates to create whirls of the dust-water mixture
- hopper – to collect the waste after the filtration; in the lowest point (in the bottom) is located a release of diameter 3"
- fan chamber with a fan – brand MZ Aspiratori Spa, model GF500/2, type 5, fig.D, serial No. G15014879
- system to control the water level and water re-fill state (in the mixing chamber)
- catcher section
- control switchgear

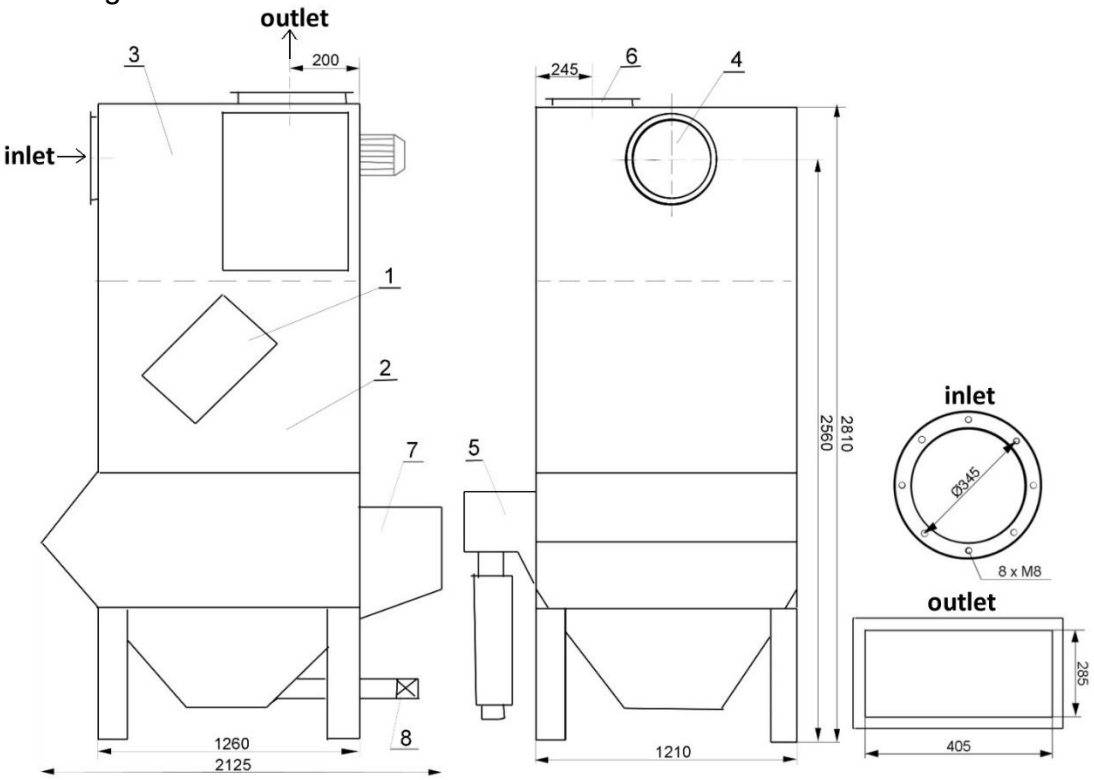


Fig. No.1 – Wet filtering unit WET-5000 – Structure

Key
1 dripping device
2 mixing chamber
3 fan chamber
4 inlet for the contaminated air
5 water supply, water level control container
6 clean air outlet
7 revision glass
8 sludge discharge

5.2 Function

WET-5000 filtering unit works in the mode of a wet filtration, within the vacuum part of the installation, i.e. at the suction side of the fan. The polluted air, while passing through the set of guide plates immersed in the water (so called backfall), is getting mixed with the water, creating an aerated "dust-water" mixture.
The particles that are captured in the dust separator, create sludge with the water. The sludge accumulates in the hopper and collects the waste.
It is important to empty the sludge through a drainage valve. When the air passes the backfall, it gets additionally cleaned from the rest of water particles, in the outdropping device.
The water level is controlled by a minimum level probe and maximum level probe.
Subsequently, the water decrease (which evaporated from the system) is re-filled through the water supply electromagnetic valve – as a water supply control element.

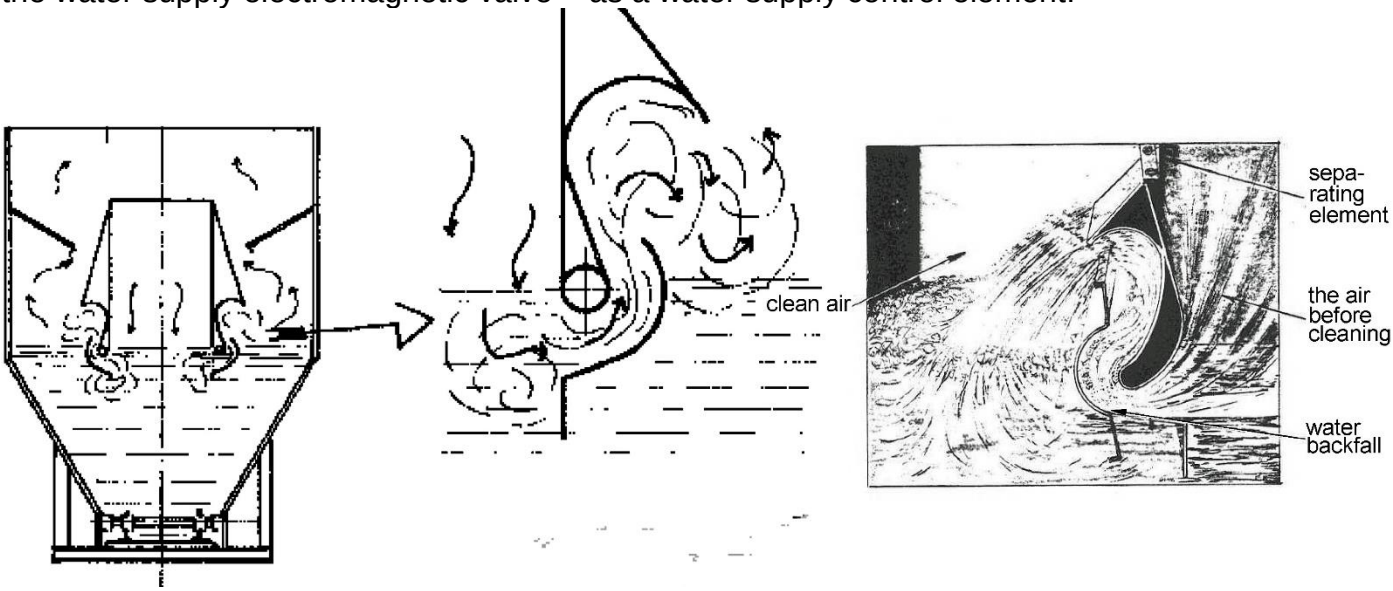


Fig. No. 2 – WET-5000 wet filtering unit – Function

6. Operational Use

Before the appliance is placed on the floor, prepare the foundation adapted to the weight of the device filled up with water. It must be placed stably on the floor, as the device vibrations (during the function) should be foreseen.
Because of large dimensions, the device is delivered in two assemblies: the lower element is the collecting hopper along with the supporting structure; the upper part consisting of a mixing chamber and a fan chamber.
At the beginning, put the lower part on the foundation. Important is levelling of this assembly and screwing up its legs to the floor. The levelling is important for the correct function of the whole filtering unit.
Before assembling of the two parts, put the sealing on the lower flange (when the sealing is not glued up by manufacturer).
During the assembling of the upper part, handle with care, as the sealing and the flanges are fragile and would get damaged. Having matched and assembled together the mounting holes, crew up tightly the external flanges (using the contact washers to attach the grounding cables of both parts). Finally, carry out the grounding of the whole device, and examine the correctness of the grounding connections (between the screwed together parts), subsequently check the grounding of the whole device itself.

Make connection to the water supply system, through a manual- and electromagnetic valve, through a pipe of minimum 1” diameter. Additionally, the sludge discharge must be carried out by a pipe of minimum 3” diameter. During the installing, pay attention that the pipes would not charge the device. Before the start-up of the fan, the device must be filled up with water up to the level of overflow, i.e. to the lower line of the water backfall (see Fig. No. 2).
This level shall be indicated by the maximum level probe. The minimum and maximum levels should be adjusted in such way, that the flow resistances is in the range 1800 and 2000 Pa. During the first filling up with water, examine if the device is correctly levelled and the water level is even with the water backfall line.

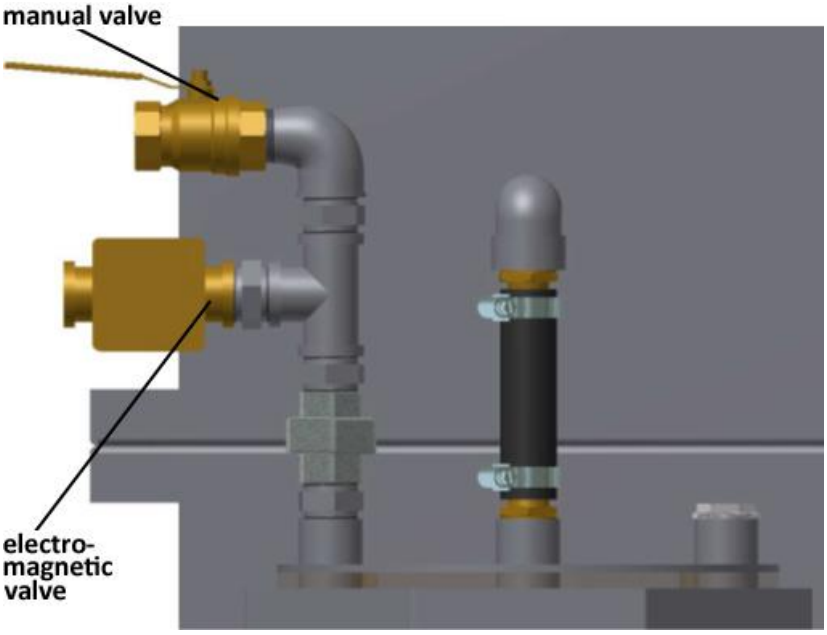


Fig. No.3 – Connection to the water supply

Before the start-up of the fan, close tightly the cover of the container for controlling the water level. Otherwise it is difficult to maintain the correct water level.

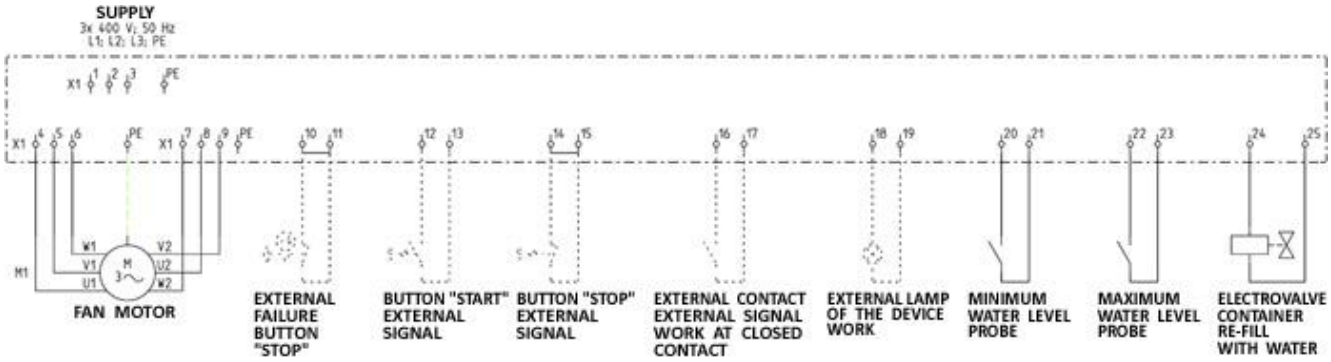


Fig. No.4 – Flow chart of the electrical connections

7. Operational Use

Designations

QS1 – supply application
HL1 – supply
HL2 – thermal relay
HL7 – high difference of pressures
HL4 – maximum water level
HL5 – filling up with water
SA1 – manual / remote
SH2 – fan start / stop
HL6 – low differences of pressures
HL3 – minimum water level
SH1 – failure stop.

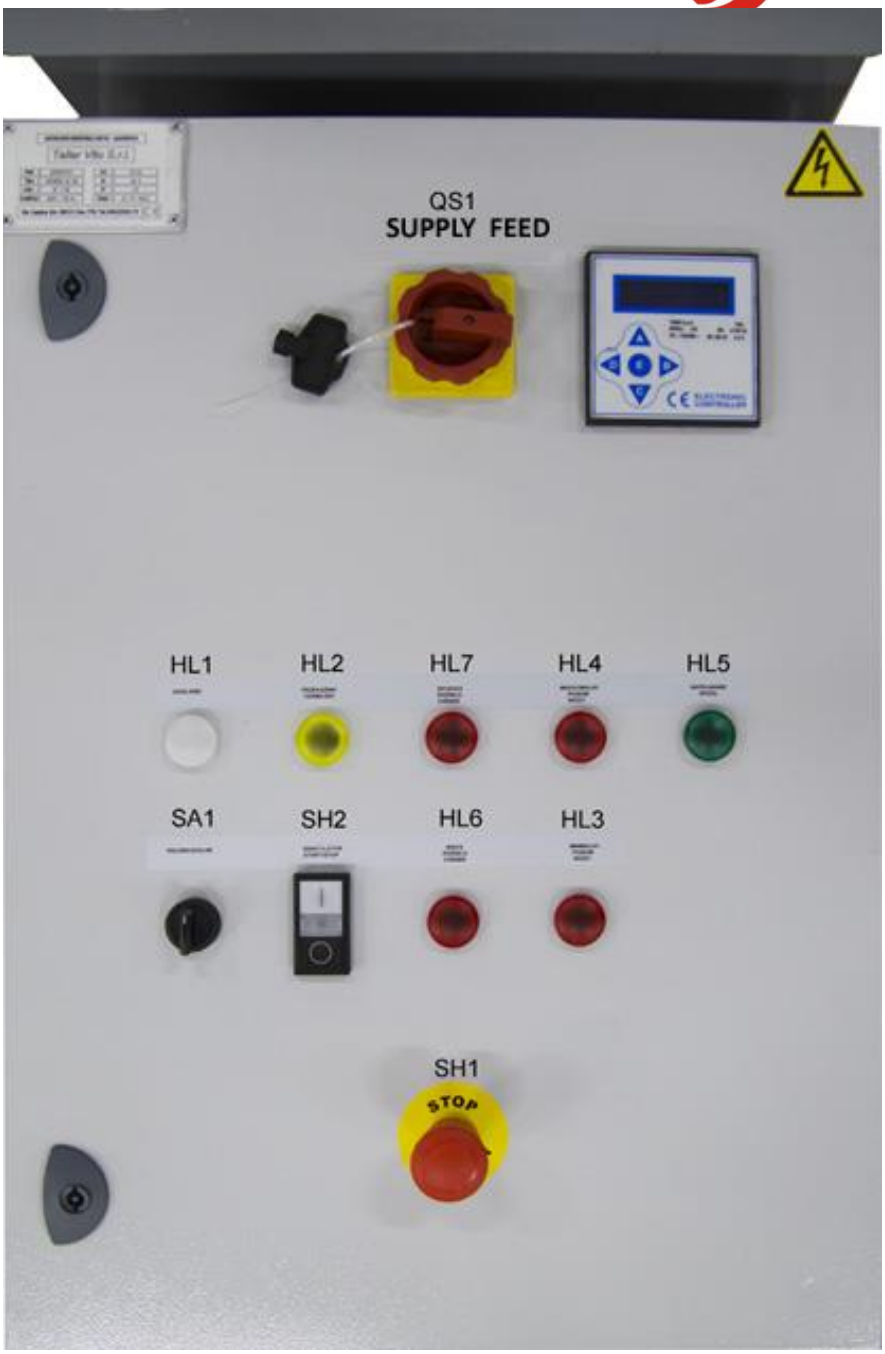


Fig. No.5 – Switchgear

7.1 Description of function

To start up the device, make sure if the safety disconnector is unlocked, the main disconnector **QS1** set into position **ON**. After the voltage is applied (through the main disconnector), the white **HL1** lamp goes on. The red lamp **HL3** – means minimum level, **HL4** – maximum level – both indicate the current level of the water.
When the water level is below the minimum level, the device cannot be started. In this case the electro-valve gets opened and the device will be filled up with water, until it reaches the maximum level. The state of the opened electro-valve is indicated by a green lamp **HL5**. During the time when the device is automatically refilled with water, it cannot be switched on. When the water reaches the maximum level, the electro-valve closes.

Prior to starting the device, select the control mode by switch **SA1**:
M – manual – the system is controlled form the switchgear or from the terminals on the terminal strip **X1** or
A – automatic.

Having selected the manual mode – to start the device press the **SH2** button "**START**", or – to the terminals **12**-**13** fasten the mono-stable pushbutton with the terminal **NO** and

subsequently, press the button.
The fan will have a soft start-up through "**delta-star**" mode. At the moment, when it is switched into "**star**" – the white lamp **SH2** (built in the button) will go on, indicating the "**RUN**" state of the fan.

It is possible to observe the signalling beyond the switchgear – in this case, to the terminals **18**-**19** must be connected a lamp supplied with **110VAC**.
To stop the device, press the button **SH2** "**STOP**" – or, when (in the circuit) there is plugged-in a mono-stable button with a terminal **NC**, this must be pressed.
The device with an adjusted time delay **10s** will switch off after 10 seconds. After the device is disconnected, the automation checks the water level and fills it automatically up, when necessary.
Automatic mode – first plug in the terminal **NO** (of the external device) to the terminals **16**-**17**. The external device will appoint the work mode of the appliance. This terminal must be closed, so the device can operate. When the terminals get opened – the device switches off, after time delay 10 seconds.

In the switchgear, there is installed a digital pressure control (pressostat).

7.2 Description of the parameters on the display

A1a Alarms of the minimum and maximum pressure **dP** on the relays **K1** and **K2**. Relay **K1** means the alarm of minimum **dP**, relay **K2** alarm of the maximum **dP**.

C3 Readout of the pressure difference – pressure difference converter (maximum **10k Pa**).

C7c1 Alarm of the minimum vacuum **dP**. The terminal is closed in the alarm state, the resetting proceeds automatically. While observing the **dP** readout as a value below the threshold adjusted in the **Setup**, User activates the alarm of minimum **dP**. The display indicates the state of alarm as a code **E8** (see the description of alarms), the alarm is being reset automatically, when the displayed **dP** value exceed above the threshold.

C7d1 The alarm of maximum **dP**. The terminal is opened during the state of alarm, reset proceeds automatically. While observing the **dP** readout as a value above the threshold adjusted in the **Setup**, User activates the alarm of maximum **dP**. The display indicates the state of alarm as a code **E7** (see the description of alarms), the alarm is being reset automatically, when the displayed **dP** value decreases below the threshold.

C8 Readout of the zero value **dP** (reference value), this can be corrected with buttons **A** and **C**.

C13_10 The scale of the **dP** background 10.00 Pa = 100.0 mbar = 1012 mmH2O. Maximum value of the differential pressure, (measured at the device), is 10.00 kPa = 100.0 mbar = 1012 mmH2O. In case of other indications and of 10 kPa – the display will show "**E**" instead of the numeric value **dP**.

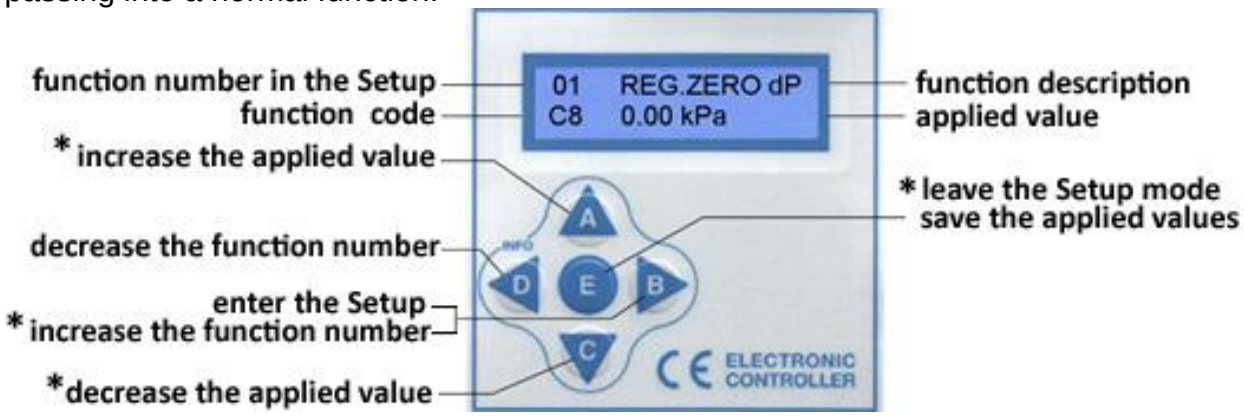
C11a Signal 4÷20 mA in the readout of **dP** output (proportionally to the vacuum value) – terminals **10**-**11**. 4 mA = value **dP** amounts 0.00 kPa, 20 mA = value **dP** – takes the value with reference to the background of the requested scale .

D14c Counter of the work hours. In the **Setup** can be displayed the hours counter of the device work. The counting proceeds all the time when the device is working and stops automatically.

SL The display is multi-language. In the **Setup** User can choose the language of descriptions appearing on the display: Italian, French, German, Spanish.

7.3 Introduction of the functional parameters

When, after 5 minutes User do not press any button, the device will leave the **Setup** mode, passing into a normal function.

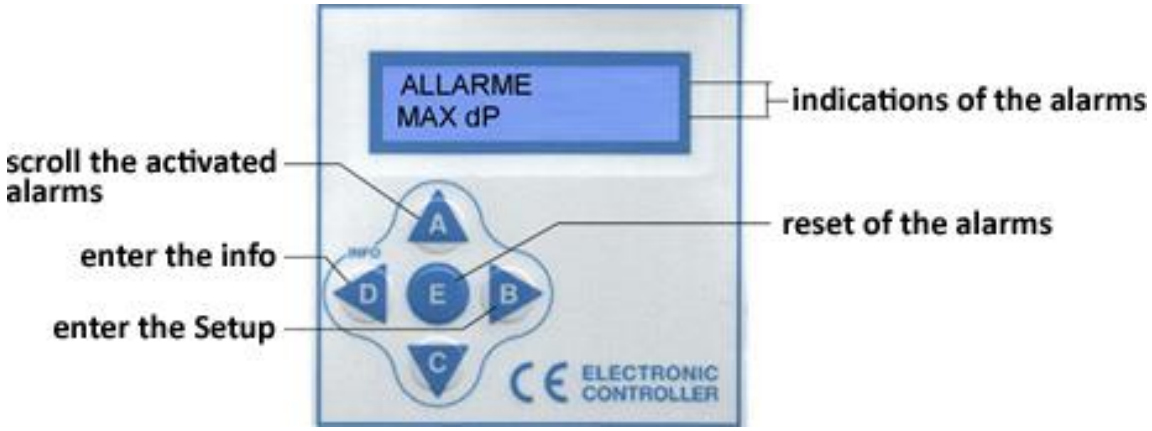


***** This function is active only after entering the **Setup** mode (button **B**)

Descriptions of the screens:

Setup / Display		Description	Range	Code	Default
00 **SL**	select the language Italian	select the language on the display		SL	
10 **C8**	set zero **dP** 0.00 kPa	setting the zero for the **dP**		C8	0.00
02 **C7c1**	alarm minimum **dP** OFF kPa	alarm threshold – minimum **dP**	0.01÷9.99	C7c1	OFF
03 **C7d1**	alarm maximum **dP** 3.00 kPa	alarm threshold – maximum **dP**	0.01÷9.99	C7d1	3.00
04 **D14a**	counter of work hours 000000 hours	counts the hours of the device work	0+6535	D14c	

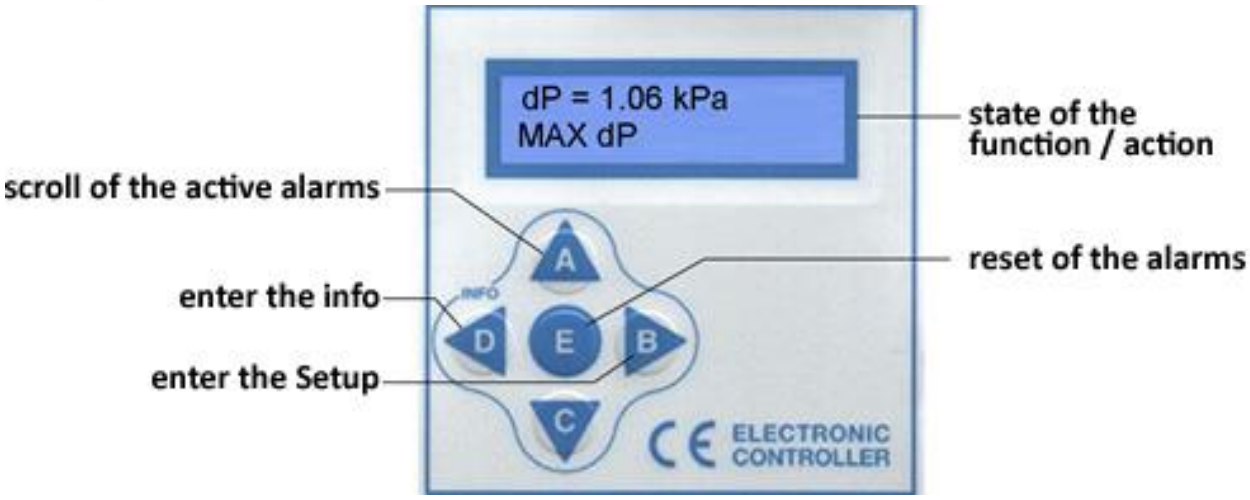
7.4 Indications of the display in the state of alarm



Setup / Display		Description	Code
E7	alarm of maximum **dP**	activated alarm of maximum **dP** supremely SET 03	C7d
E8	alarm of minimum **dP**	activated alarm of minimum **dP** subordinately SET 02	C7c

7.5 Indications of the display during the RUN of the device

While switching on the device, the indications appear on the display and the pressostat control too.



Display	Description	Code
dP = 1.06 kPa	accurate differential indications (**dP** = xxx)	C3

7.6 Information and guide on the display

When after 5 minutes User do not press any button, the device passes into the state of “info” taking normal function.

7.7 Solving the problems with the display

Failure	Possible reason	Solution
The display is not switching on.	The fuse is burnt out. Lack of supply.	Check the fuse in the power supply module. Examine whether the device is under power supply – according to the requirements for the device.
The displayed value of the pressures difference is incorrect.	The pneumatic connections are clogged. The connections (hoses) are damaged.	Check, if (after the connection of the cables (+/-) the displayed value matches the zero setting (reference value), if this is not the case, check whether the hoses are not clogged (stuffed) and their state.

During the operational use, the water level should be maintained in such level, that the air flow resistances (through the device) are in the range of 1800 and 2000 Pa.
The readout of the differential manometer is in the switchgear.

8. Troubleshooting Guide

	Problem	Possible reason	Corrective action
1.	High water level	The drainage pipe of the level control container is clogged.	Unclog the passage/flow.
		The passage (under the hopper) through the drainage valve valve is clogged.	Unclog the passage.
		The valve (of the manual water re-fill) is closed incorrectly.	Close the valve.
		The electro-magnetic valve is functioning incorrectly.	Correct the failure or replace the electro-valve into a new
		The hatch is sealed incorrectly.	Tighten up the hatch.
		The out-flow of the drainage is clogged.	Unclog the drainage pipe.
2.	Decreased cleaning	The guide plates (in the mixing chamber) are corroded or worn out.	Replace the guide plates.
		The drainage valve (in the overflow container or under the hopper) is open.	Close the drainage valve.
		Insufficient water outflow.	Remove the reason/cause.
		The water (within the device) is evaporating at the high ambient temperature.	Refill the water.
3.	There is some water in the fan	The water passed through during the assembly/installing activity or during the device rest.	Remove the water from the fan.
		The dripping out is mounted incorrectly.	Check and install it correctly.
		Too high air flow through the device.	Check the vacuum in the mixing chamber and reduce the flow.

9. Maintenance

9.1 Container of the water level control

Once a week, (when the device is disconnected) open the hatch in the water level control container. Check whether the container, the level probe and the discharge are not polluted – eventually clean them when necessary. Clean the viewer and close it tightly.
In the first months of operational use, repeat those steps every week and subsequently arrange reasonable checks in adequate intervals.

9.2 Drainage valve

Check the drainage valve and clean it – after each cleaning of the device.
The way of cleaning should be suitable to the sort of pollution (existing in the cleaned air), normally cleaning with water is sufficient.

9.3 WET-5000 Wet Filtering Unit

After one month of the device function – let out the water, if necessary, clean it with water, and check all the surfaces of the mixing chamber, of the hopper and the guide plates.
The next checks and cleaning ought to be arranged, depending on the intensity of operational use of the device and on the sort of contamination in the air.

9.4 Fan GF500/2, Type 5, Fig. D, serial No. G15014879, Producer MZ Aspiratori Spa

Follow the steps as in the Use and Maintenance Manual of the manufacturer.

9.5 Spare parts

Periodically, replace the elements of the guide plates in the mixing chamber.
Depending on the wear out, arrange the order of the element at the manufacturer.

10. Occupational Health and Safety

- **Assembly, start-up and maintenance of the filtering unit is admitted exclusively after getting acquainted with the contents of the present Use and Maintenance Manual.**
- **For safety reason, the device has to be connected to the power supply in accordance with the being in force regulations within the range personal protection from electrical shock.**
- **Connection to the power system can be carried out exclusively by a person of adequate electrical qualifications.**
- **Any activities connected with repair and technical revisions, as well as troubleshooting can be carried out after the device is switched off and disconnected from the power supply.**
- **The fan, as a rotary machine, constitute a potential source of hazard, therefore its installing, start-up and servicing should be executed by qualified personnel.**

11. Transport and Storage

The WET-5000 wet filtering unit is transported in two assemblies, protected with foil and placed on pallets. For the transport time, the assemblies should be placed vertically (upright) and protected from overturn and displacement / slide.
As the device is a thin-wall construction, handle with care while the subsequent assemblies are lifted during the transport, unloading and assembly. The device ought to be stored in dry and well ventilated rooms.

12. Terms of warranty

The period of warranty for the purchased device is indicated in the “Card of Warranty”. The warranty does not comprise:

- mechanical damage and malfunctions caused by User,
- device failures caused during the use which is in contradiction with the purpose of application and with the present Use and Maintenance Manual,
- malfunctions resulting from the improper transport, storage or incorrect maintenance.

Infringement of the Section 3 “Reservations of Producer” of the present Use and Maintenance Manual and, especially modifications undertaken by User on one’s own or use in contradiction with the purpose of application – shall result in the loss of warranty validity.

13. Sample of the Declaration of Conformity

Declaration of conformity EC No. ……..

Manufacturer (eventually the authorized representative / importer):
name: **KLIMAWENT S.A.**
address: **81-571 Gdynia, Chwaszczyńska 194**

A person, authorized for issuing the technical documentation: Teodor Świrbutowicz, KLIMAWENT S.A. hereby declares that the appliance:
name: **wet filtering unit**
type/model: **WET-5000**
serial number: …….. year of production: ……..
meets the requirements of the subsequent European Directives:

- **2006/42/EC Machinery Directive** of the European Parliament and of the Council of May 17th, 2006 on machinery – amending the 95/16/EC (recast) /*Journal of Laws EC L157 of 09.06.2006, page 24*/
- **2014/35/EC Directive** of the European Parliament and of the Council of 26 February, 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits. /*Journal of Laws EC L96 of 29.03.2014*/

The appliance meets the requirements included in:

- **2009/125/EC (ErP) Directive** of the European Parliament and of the Council of October 21th, 2009 establishing a framework for the setting of ecodesign requirements for energy-related products /*Journal of Laws L 285 of 31.10.2009* /
- **327/2011** (**EU**) **Guideline** of March 30th, 2011 on implementing the **2009/125/EC Directive** of the European Parliament and of the Council with regard to ecodesign requirements for fans driven by motors with an electric input power between 125W and 500 kW /*Journal of Laws L No. 90 of 06.04.2011*/

The appliance meets following harmonized standard:

• **EN ISO-12100:2012**	– "Safety of machinery – Basic concepts, general principles for design. Risk assessment and risk reduction"
• **EN 60204-1:2018-12**	– "Safety of machinery – Electrical equipment of machines Part 1: General requirements"
• **EN ISO 13857:2010**	– "Safety of machinery – Safe distances to prevent hazard zones being reached by upper and lower limbs"
• **EN ISO 12499:2008**	"Industrial fans – Mechanical safety of fans; Protections"
• **EN ISO 13349:2010**	"Fans – Vocabulary and definitions of categories"
• **EN 61439-1:2011**	"Low-voltage switchgear and controlgear assemblies" Part 1: General resolutions"
• **EN 61439-2:2011**	"Low-voltage switchgear and controlgear assemblies" Part 2: Power switchgear and controlgear assemblies for conversion and distribution of electric energy"

……	……	……
place, date	signature of authorised person	name, surname, function of the signatory

KLIMAWENT S.A.
Supported Employment Enterprise
81-571 Gdynia, ul. Chwaszczyńska 194
phone: +49 58 829 64 80
email: klimawent@klimawent.com.pl
www.klimawent.com.pl

District Court Gdańsk-Północ
in Gdańsk, VII Wydział Gospodarczy
of the National Register of Court
KRS 0000308902 company stock
13.779.200 zł paid in total

NIP: 958 159 21 35
REGON: 220631262
Bank Account: **Santander Bank Polska S.A.**
56 1500 1025 1210 2007 8845 0000