

# Use and Maintenance Manual



## Filtering unit **HARD-5000-S**

Manufacturer:

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## 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 **HARD-5000-S filtering ring 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 **HARD-5000-S** 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 17<sup>th</sup>, 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 21<sup>th</sup>, 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 30<sup>th</sup>, 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:

- |                                   |  |
|-----------------------------------|--|
| ● <b>EN ISO-12100:2012</b>        | – “Safety of machinery – Basic concepts, general principles for design. Risk assessment and risk reduction”  |
| ● <b>EN 60204-1:2018-12</b>       | – “Safety of machinery – Electrical equipment of machines Part 1: General requirements”                      |
| ● <b>EN ISO 13857:2010</b>        | – “Safety of machinery – Safe distances to prevent hazard zones from being reached by upper and lower limbs” |
| ● <b>EN 60529:2003/A2:2014-07</b> | – “Degrees of protection provided by enclosures (IP Code)”   |
| ● <b>EN 61439-1:2011</b>          | – “Low-voltage switchgear and controlgear assemblies Part 1: General resolutions”                            |

## 2. Application

HARD-5000-S filtering unit is a solution for cleaning the air from viscous dusts-gas contamination. It is a perfect solution for subsequent purposes:

- filtration the aerosols arising during spray painting of not large elements,
- filtration the air contaminated with dust particles and gases arising during laser cutting of rubber, plywood, plexi, acrylic and other plastics as well as grinding of the above mentioned materials,
- for dust and gas contaminants – emitted during polishing of various materials,
- for oil-laden welding fumes, accompanied by gases emitted during the welding process,
- filtration the air contaminated with grease particles at kitchen extraction hoods,
- for elimination of unpleasant smells in chemical laboratories,
- for vapours arising during upholstery activities, such as cutting, gluing.

### 3. Reservations of Producer

1. Manufacturer accepts no liability for any consequences following from the operational use that is in contradiction to the purpose of application.
2. Installing of any additional elements that are not belonging to the normal device structure (or accessory set) is not acceptable.
3. Do not introduce any structural or constructional modifications on the device on one's own.
4. Protect the device housing from mechanical damage.
5. Maintenance and any repair can be performed exclusively by the authorised person.
6. Do not apply the device for conveying the air containing viscous impurities and aggressive compounds / substances that would have destructive effect on the filters.
7. **During the use, pay attention that any sources of ignition, i.e. glowing cigarettebutts / embers do not get drawn into the filtration chamber.**

### 4. Technical Data

Table No.1

Type	Maximum volume flow [m <sup>3</sup> /h]	Maximum vacuum [Pa]	Motor rate [kW]	Supply voltage [V]	Acoustic pressure level (dB(A))		Weight [kg]
					1 m	5 m	
HARD-5000-S	6500	4200	6,5	3x400 / 50Hz	76	72	695

**CAUTION:** Volume flow has been measured at the clean filters; Filtration efficiency 99,95%

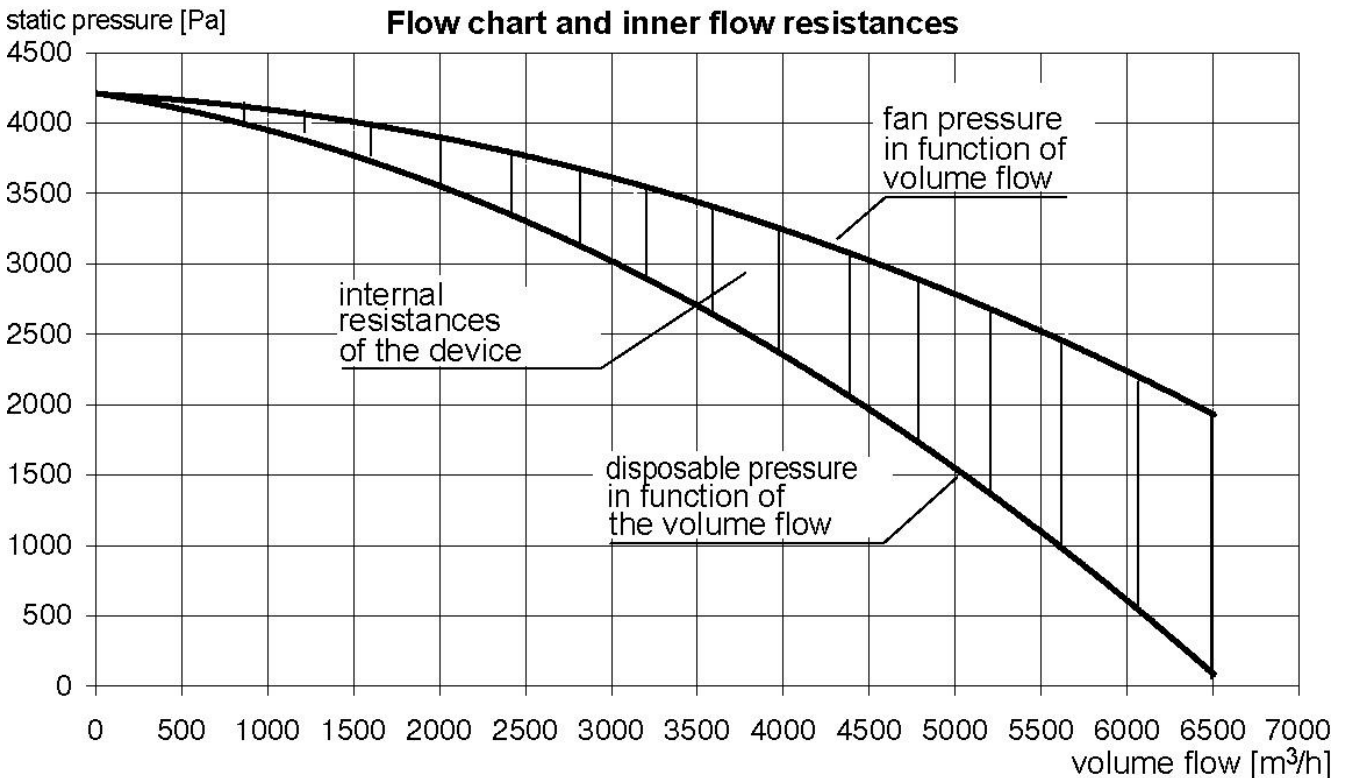



Fig. No.1 – HARD-5000-S – Flow chart

#### REPLACEABLE FILTERS

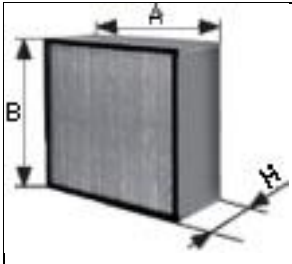
##### Pre-filter „paint stop”

	Type	Weight [kg]	Dimensions [mm]	Class	Efficiency [%]
	PS-HARD-5000	3,4	700x1030x50		G3


### Pocket filter

	Type	Weight [kg]	Dimensions AxBxHxT [mm]	Class	Efficiency [%]
	FK-8/550/8k	2,3	720x1030x550x20	F8	90

### High-efficiency filter HEPA

	Type	Weight [kg]	Dimensions AxBxH [mm]	Class	Efficiency [%]
	FA-292/KL	23,5	762x610x292	H13	99,95

### Granulated activated carbon

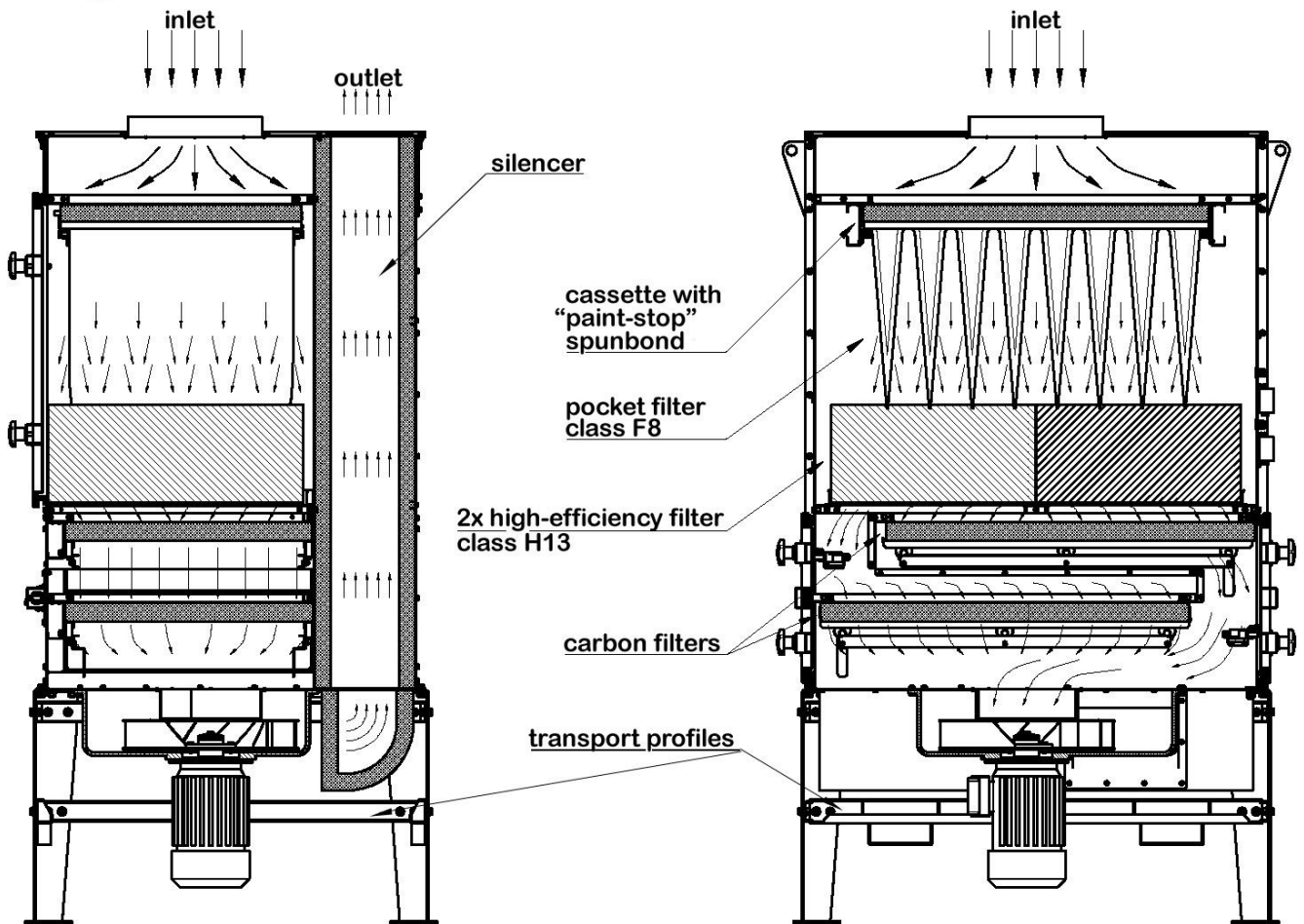
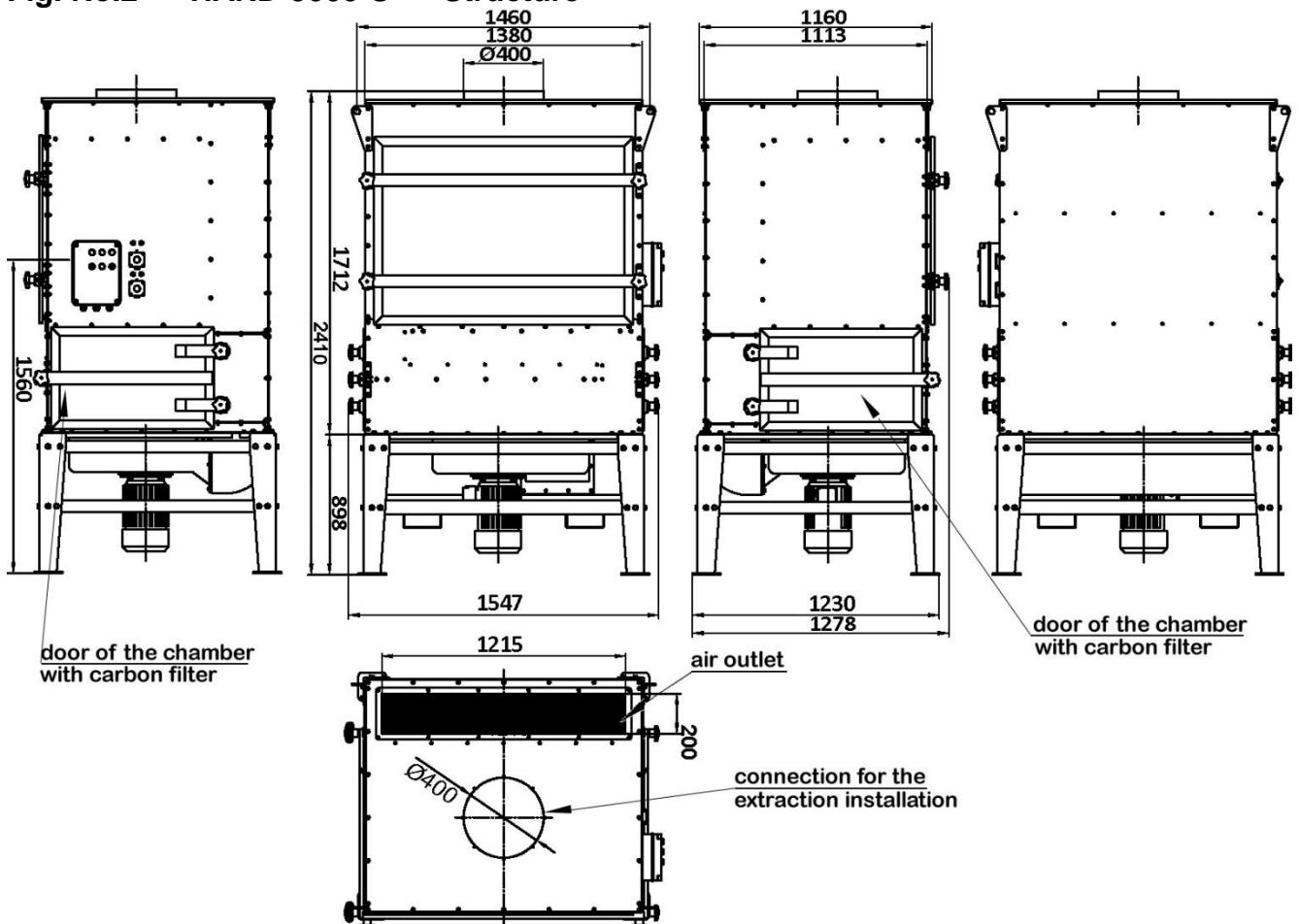
	Type	Weight [kg]	Remarks
	ORGANOSORB 10CO 4x8	2 x 20	Each cassette 20 kg Activated carbon is delivered in bulk along with the device

## 5. Structure and Function

**HARD-5000-S** filtering unit consists of subsequent elements:

- steel housing,
- radial fan – housing of cast aluminium, silencer
- pre-filter “paint-stop” – class **G3** (hardly flammable)
- pocket filter – class **F8**,
- high-efficiency filter – class **H13** – 2 pieces,
- gas absorber – 2 cassettes with granulated activated carbon, weight 2 x 20 kg (activated carbon is delivered in bulk)
- two pressure controls (pressostats) – activating the signalling lamp upon excessive flow resistance of the pocket- and high-efficiency filter,
- suction connections Ø400,
- hour-meter (for work time measuring),
- control unit.

The air is drawn in, through a Ø400 mm connection and subsequently streams through the following filters, where it is cleaned and finally returned back to the process room – through a 200 x 1215 mm rectangular outlet opening.


**Fig. No.2 – HARD-5000-S – Structure**

**Fig. No.3 – HARD-5000-S – Dimensions**

## 6. Assembly and Start-up

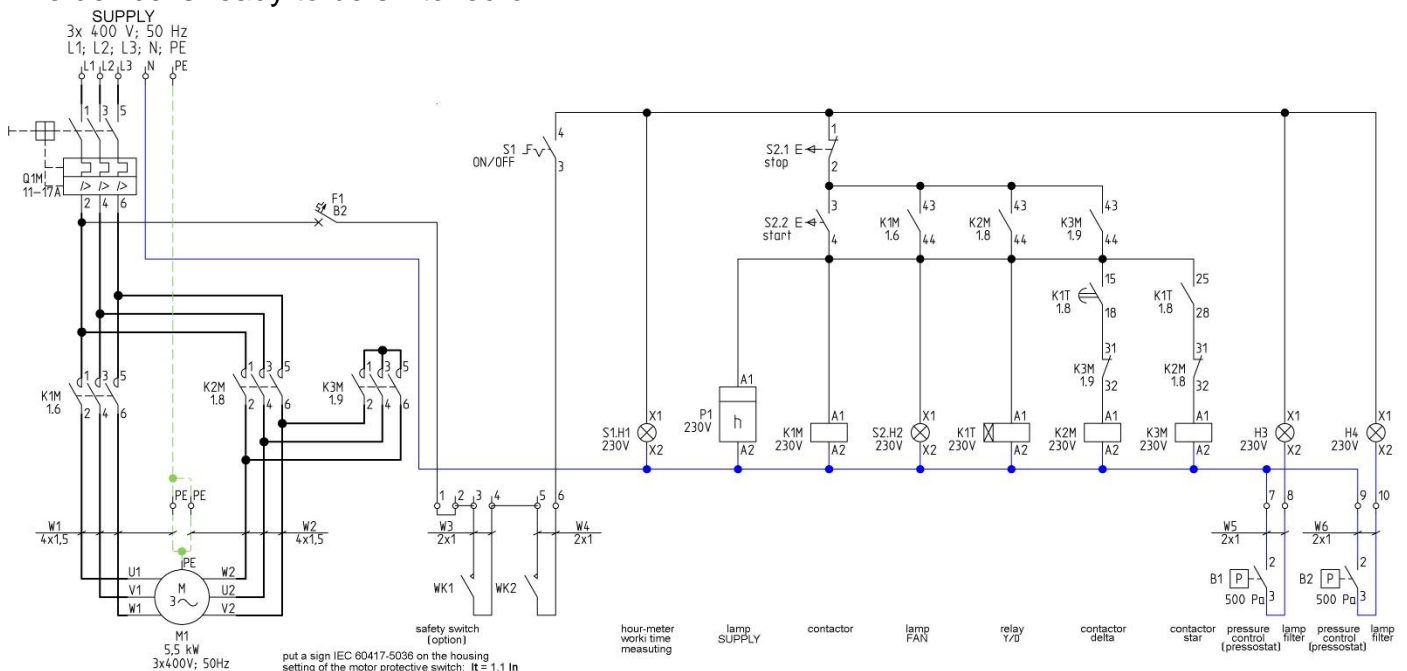
Prior to start-up, connect the HARD-5000-S filtering unit to the extraction ductwork, in such a way that the suction point is close to the contamination emission source. Connect the extraction conduit with the Ø400 opening located on the top surface of the device (see Fig. 3).  
Settings of the pressure controls (pressostats):

- B3 (pocket filter) – 450 Pa,
- B4 (high efficiency filter) – 500 Pa.

**Prior to the first start-up go through subsequent steps:**

1. Open the front cover of the device.
2. Slide out the high-efficiency **HEPA-FW** filter and the pocket filter **FK** along with the cassette with the spunbond (nonwoven) **“PAINT STOP Z”**
3. Open the covers of the left and right side of the device.
4. Release the press-up mechanism of the cassettes with activated carbon.
5. Slide out the cassettes with activated carbon.
6. Fill out the cassettes with activated carbon, up to the upper edge (carbon is delivered in original bags of manufacturer 25 kg – 2 pieces). Important is that the carbon is distributed evenly along the side walls of the cassettes. Put the perforated covers at the top of the cassettes.
7. Insert the cassettes back into the device. Handle with care, as the sealings would not get damaged while sliding them in.  
Important is that the carbon displaced aside, showing empty places within the cassettes.
8. Close the press-up mechanisms on both sides.
9. Put back the high-efficiency **HEPA-FW** filters and the pocket filters **FK** along with the cassette with spunbond (nonwoven) **“PAINT STOP”**.
10. Make power connections to the control unit, according to the Connection Diagram Fig.No.4. This can be carried out exclusively by an authorised qualified person.
11. Before closing the door, check the impeller rotation sense – it must be according to the arrow on the fan housing.
12. Close the door of the carbon filters.

The device is ready to be switched on.



**Fig. No.4 – HARD-5000-S – Connection Diagram**

## 7. Operational Use

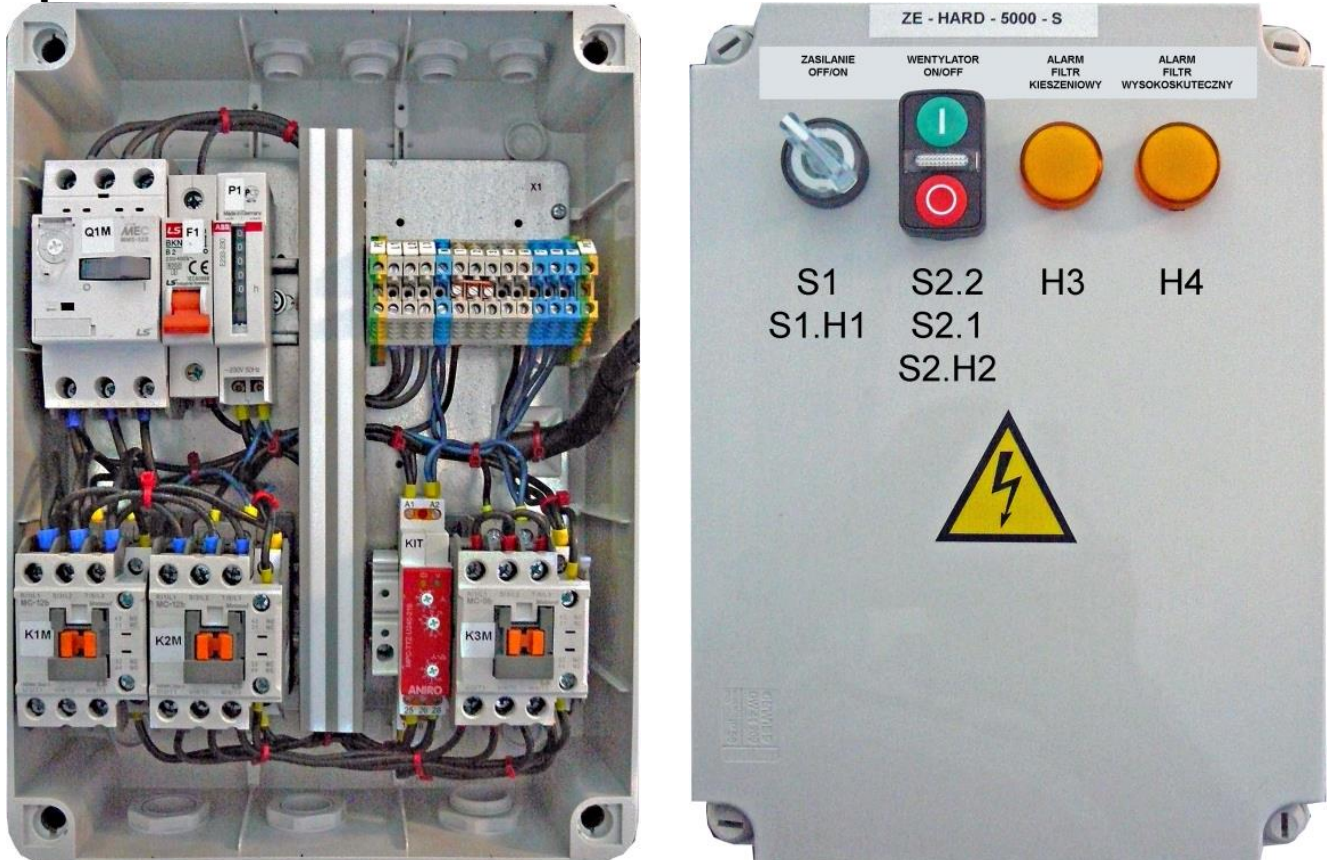


Fig. No.5 – ZE-HARD-5000-S – control unit

### SWITCHING ON THE DEVICE:

1. The motor protective switch turns on the device. Additionally, it protects the electromotor against damage due to the blocked start-up, overload, short-circuit and lack of one phase.
2. Set the **S1** illuminated switch into position “ON” – the control system is activated. The over-current switch **F1** protects the system against short-circuit within the control unit.
3. Press the green **S3.2** button “START”. A signal is sent onto the coil of the **K1M** contactor that controls the function of the extraction fan motor. This is indicated by the green **SS** lamp (the green button “START”).

### FUNCTION:

1. The device is working, the hour-meter indicates the work time, the red lamps: **H3** (pocket filter) and **H4** (high-efficiency filter) inform about the pollution state of the filters. Activation of the lamp indicates the pollution state of the filter.

### DISCONNECTION OF THE DEVICE:

1. Press the red **S3.1** “STOP” button – the coil circuit (of the **K1M** contactor) will be interrupted. The fan motor stops. The control circuit is further supplied and is in stand-by state for the fan to be operated.
2. Set the **S1** switch into position “OFF”. The control system is switched off.
3. Turn off the **Q1M** motor switch – the device is disconnected from the power supply system.

### THE STATES OF FAILURE

**CAUTION:** While opening the door of filters, the control system is getting disconnected (limit switches **B1** and **B2**).

In the course of operational use, it is important to observe the filters replacement by observing the lamps operated by pressure controls (pressostats). When the lamps appear in red – it is necessary to replace filters:

- lamp **H3** – replacement of the pocket filter
- lamp **H4** – replacement of the high-efficiency filter

To free the pocket filter, release the clamps of the filter and carefully slide out the filter (displacing it on guide profiles).

Before you replace the high-efficiency filter, first take off the pocket filter (along with the “paint-stop” filter cassette). Subsequently, by holding the high-efficiency filter handles, lift it and take of the filter out of the HARD-5000-S filtering unit.

While removing the high-efficiency filter, do not slide the filter directly on the guide profiles, as this could damage the filter sealing, and cause its inefficient function. The same applies to inserting and removing the filter. Analogically, handle with care the second high-efficiency filter.

The “paint-stop” spunbond (nonwoven) should be replaced when the extraction fan decreases its flow efficiency. Operator should on one’s own estimate the replacement time of this filter by observing its state.

The filter with activated carbon ought to be replaced at the moment when it stops absorbing the unpleasant smells. It is important to observe the hour-meter. The activated carbon bed must be replaced after 200 hours of work. Nevertheless, it depends on the intensity of the contamination. Based on the weight of the active carbon in the filter and taking into account its absorptivity, we assume that the active carbon has to be replaced after absorbing approx. 10 kg of gases. To replace the active carbon open the door of chambers with cassettes with carbon, on both sides of the device. For this reason loose the clamping mechanism. While opening the door, the limit switch disconnects the power supply. The cassette is equipped with perforated steel sheet, protecting the carbon from getting out. Having taken off the protective net, remove the worn out carbon.

Subsequently, clean the cassette and fill with new amount of activated carbon – 20 kg for each cassette. The carbon mass ought to be distributed evenly. Finally cover it with perforated steel sheet. Analogically, follow these steps with the second cassette, on the other side of the device. The placement of the filters is represented in Fig. No.2, whereas the door in Fig. No.3.

**CAUTION: Activated carbon ought to be disposed in accordance with the local regulations.**

## 8. Troubleshooting Guide

Table No.2

	Problem	Possible reason	Corrective action
1.	The suction capacity of the fan decreases, though the control lamps are not activated	excessive contamination of the “paint-stop” spunbond	replace the “paint-stop” spunbond (non-woven)
2.	The suction capacity of the fan decreases, whereby the <b>H1</b> control is on	excessive contamination of the pocket filter	replace the pocket filter for a new
3.	The suction capacity of the fan decreases, whereby the <b>H3</b> control lamp is on	excessive contamination of the high-efficiency filter	replace the high-efficiency filter for anew
4.	Unpleasant smell is emerging from the device	lack of absorptivity of the active carbon	replace the carbon layer for a new
5.	Sudden vibrations of the device	impeller defect	replace the impeller for a new



## 9. Maintenance

In the course of operational use, every 12 months check the technical state of the fan, according to the detailed rules of operational use for the electrical driving devices. Within the range of maintenance, check the mechanical and electrical connections.

**WARNING** Any activity pertaining to repair / technical revision has to be executed after the appliance is disconnected from the power supply system. Every 3 months, check the pollution state of the extraction ducting and clean it when necessary.

## 10. Occupational Health and Safety

Start-up and maintenance are exclusively possible after getting acquainted with the contents of the present User's Manual. **The circuits of the interface sockets ought to be equipped with appropriate current-differential protections (see Connection Diagram).**

**The appliance meets the safety requirements included in the 2006/42/EC Directive and do not require any additional measures of protection for a safer use.**

**WARNING** Repair / technical revision has to be carried out after the device is disconnected from the power supply system.

## 11. Transport and Storage

The appliance has to be stored in a dry rooms and in areas of efficient ventilation. In case when the filtering unit is transported on a fork-lift, there are introduced special transport profiles (see Fig. No.2). The transport profiles are screwed up to the device and after the device is put at the place of operational use, they can be unscrewed and detached.

## 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: **filtering unit**

type/model: **HARD-5000-S**

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 17<sup>th</sup>, 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:

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– **327/2011 (EU) Guideline** of March 30<sup>th</sup>, 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:

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- **EN 60529:2003/A2:2014-07** – “Degrees of protection provided by enclosures (IP Code)”
- **EN 61439-1:2011** – “Low-voltage switchgear and controlgear assemblies Part 1: General resolutions”

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13.779.200 zł paid in total

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name, surname, function  
of the signatory  
NIP: 958 159 21 35  
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