

USE AND MAINTENANCE MANUAL



Filtering unit HARD-2000-S

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Producer: **KLIMAWENT S.A.**
81-571 Gdynia, ul. Chwaszczyńska 194
tel. 58 629 64 80, 58 771 43 40
fax 58 629 64 19
email: klimawent@klimawent.com.pl



1. INTRODUCTION

The purpose of the present Use and Maintenance Manual is to supply User with directions within the range of application, assembly, start-up and operational use of the **HARD-2000-S** Filtering unit.



Prior to assembly at the place of operation and use, it is important to get thoroughly acquainted with the contents of the present instruction.



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 **HARD-2000-S** meets the requirements of the current state of technology as well as the safety and health assurances included in:

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2006/42/EC Directive of the European Parliament and of the Council of the 17 May, 2006 on machinery, amending the 95/16/EC Directive (recast) / Official Journal EC L157 of the 09.06.2006, page 24);

2014/35/EC Directive of the European Parliament and of the Council of the 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 / Official Journal EC L96 of the 29.03.2014;

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

327/2011 (EC) Regulation of 30 March, 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 / Official Journal L No.90 of 06.04.2011 /

Is in accordance with the subsequent harmonised standards:

EN ISO-12100:2012 Safety of machinery – General principles of design – Assessment and reduction of hazard

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 from being reached by upper and lower limbs

EN 60529:2003/A2:2014-07 Degrees of protection provided by enclosures (Code IP)

EN 61439:2011 Low-voltage switchgear and controlgear assemblies – Part 1: General resolutions

2. PURPOSE

HARD-2000-S filtering unit is a solution for cleaning the air from viscous dust-gas contamination, whereby the dust can be of viscous and dry properties as well. It is a perfect solution for subsequent purposes:

- aerosols arising during the spray painting of not large surfaces,
- 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,
- dust and gas contaminants emitted during polishing of various materials,
- oil-laden welding fumes, accompanied by gases emitted during the welding process,
- air contaminated with grease particles at kitchen extraction hoods,
- unpleasant irritating smells in chemical laboratories,
- vapours arising during upholstery activities, such as cutting, gluing.

3. RESERVATIONS OF MANUFACTURER

- Manufacturer is not responsible of effects resulting from the operational use that is in contradiction to the purpose of application of the device;
- Installing of any additional elements that are not belonging to the normal device structure (or accessory set) is inadmissible;
- Any structural changes / modifications, introduced on one's own are not allowed;
- Protect the device structure from mechanical damage;
- Maintenance or any repair should be carried out by an authorised person;
- The appliance cannot be used for conveying the air containing viscous and aggressive contaminants as these might damage the filters;
- **During the use take into account that any ignition source (i.e. sparks, cigarette, embers) would be drawn into the filtration chamber.**

4. TECHNICAL DATA

Table No.1

Type	Maximum volume flow	Maximum vacuum	Motor rate	Supply voltage	Noise level [dB(A)]		Weight [kg]
	[m ³ /h]	[Pa]	[kW]	[V]	1m	5m	
HARD-2000-S	2000	2000	1,5	230 / 50Hz	73	66,5	237

CAUTION: Volume flow has been measured at clean filters; Filtration efficiency: 9,95%

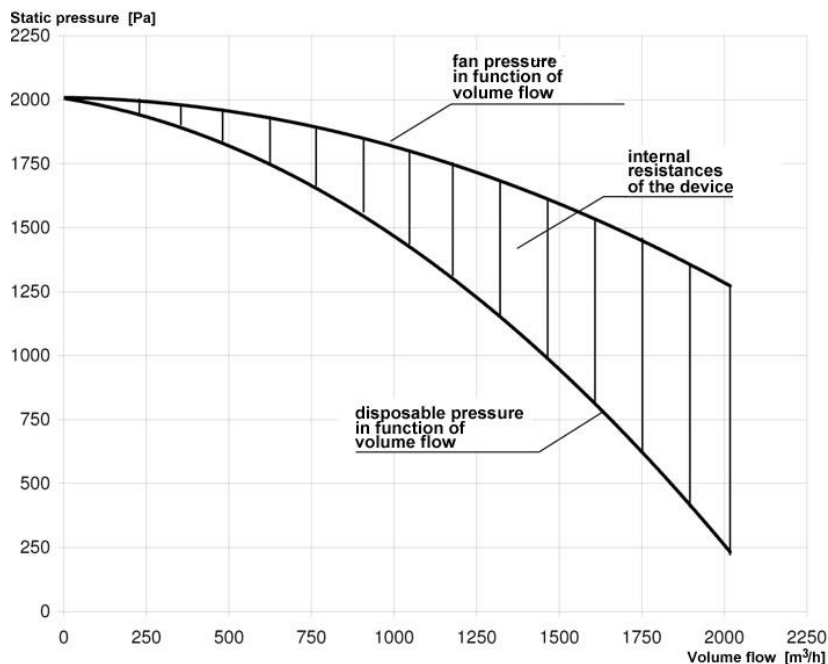


Fig. No.1 – HARD-2000-S – Flow chart

5. STRUCTURE AND FUNCTION

HARD-2000-S consists of:

- steel housing
- radial fan – housing of cast aluminium
- pre-filter “paint-stop” – class **G3** (hardly flammable)
- pocket filter – class **F8**
- high-efficiency filter – class **H13**
- gas absorber – a cassette with granulated activated carbon, weight 2 x 10 kg (carbon is delivered in bulk)
- two pressure controls (pressostats) – activating the signalling lamp upon excessive flow resistance of the pocket filter and the high-efficiency filter
- suction connections – to install extraction arms or hoses
- silencer – at the fan outlet
- hour-meter (for work time measuring)
- control unit.

The air is drawn in, through suction connections and next streams through the following filters, where it is cleaned and finally returned outside.

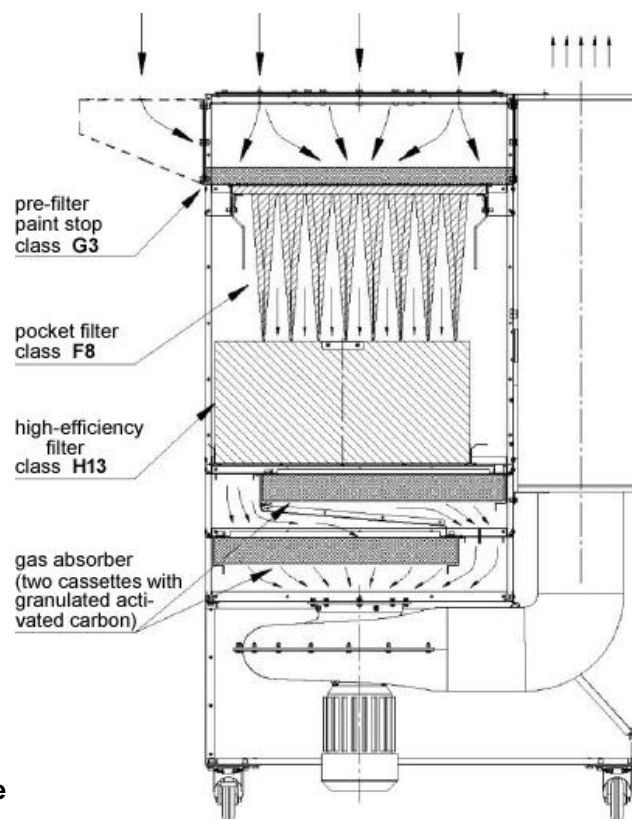


Fig. No.2 – HARD-2000-S – Structure

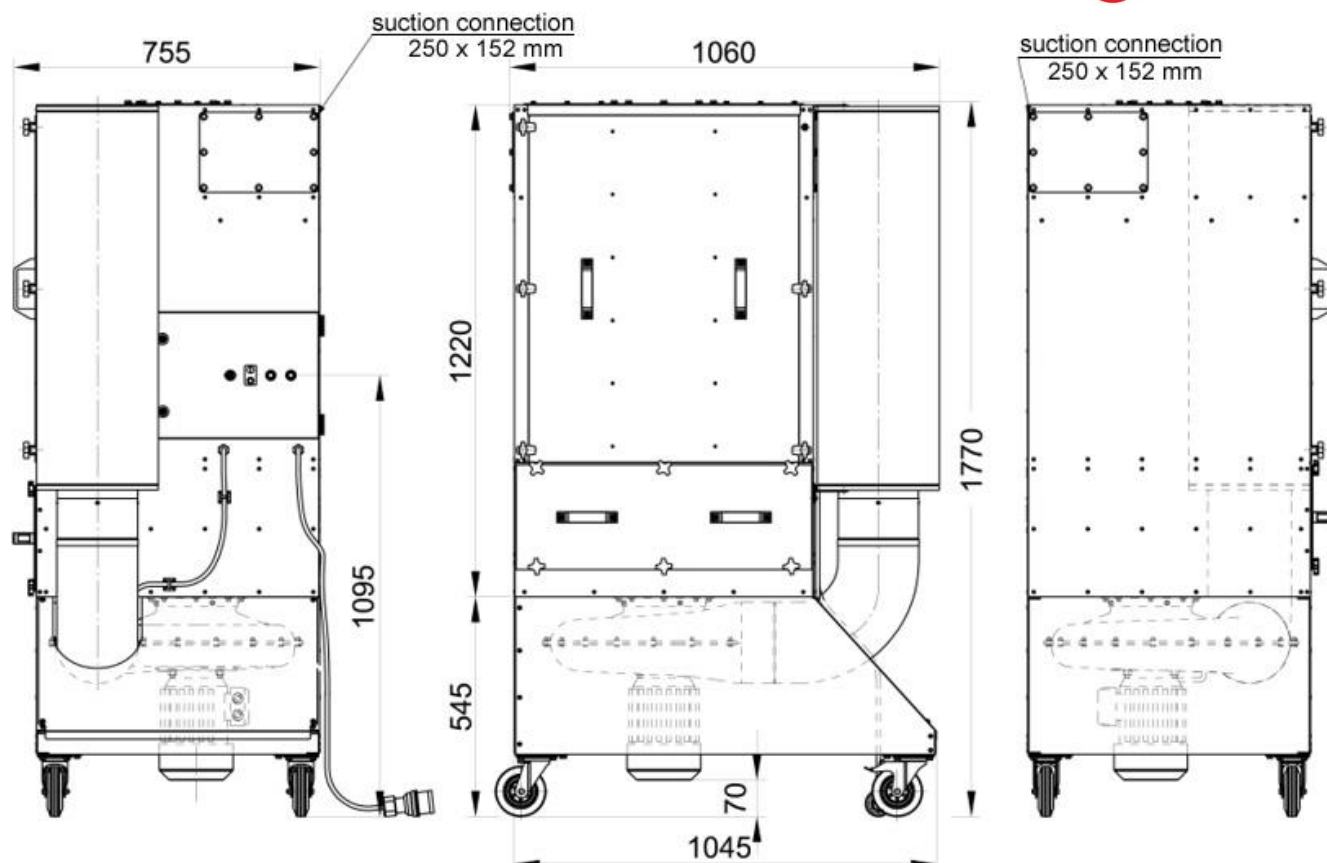


Fig. No.3 – HARD-2000-S – Dimensions, layout of connections

6. ASSEMBLY AND STARTUP

Before the use, install the ERGO LUX extraction arm or a hose on the HARD-2000-S filtering unit. For the extraction arm apply a suitable bracket **DB-ERGO**, whereas for the hose use simply an appropriate **DC** coupling.

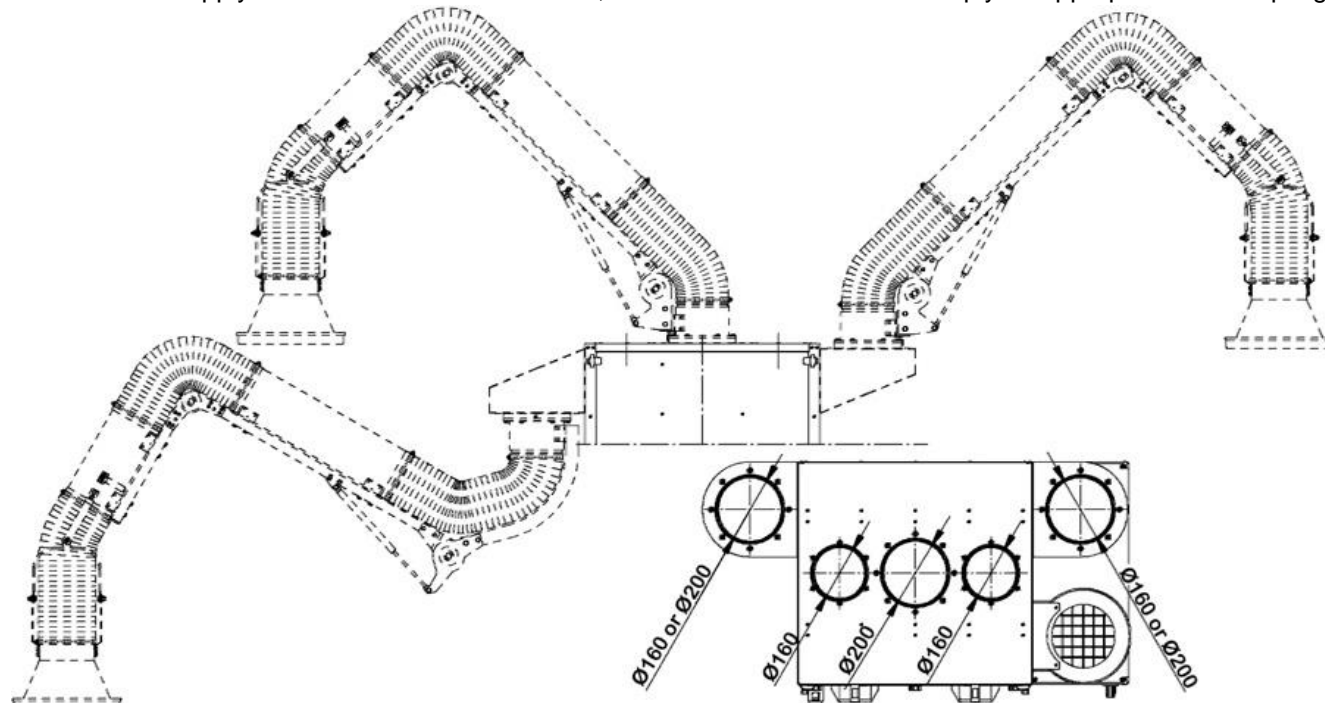


Fig. No.4 – Placement of connections of the ERGO LUX extraction arms

On the filtering unit can be installed ERGO LUX-L or ERGO LUX-D – directly on the upper surface, or indirectly, by means of a **DB-ERGO LUX-L** or **DB-ERGO LUX-D** bracket. DB-ERGO LUX brackets can be mounted in two ways, with their inlet upwards (for the standing extraction arm), or with their inlet downwards (for the hanging extraction arm version).

Flexible hose should be fastened by means of a DC coupling. **Brackets, ERGO LUX extraction arms and hoses do not belong to the accessory set of the filtering unit** (they should be ordered separately as additional equipment). Layout of the connections is illustrated in Fig. No.3 along with the overall dimensions of the device.

Subsequent activities before the startup:

1. remove two cover from the device top;
2. slide out the HEPA high-efficiency filter and the FK pocket filter;
3. screw out (inside the filtering unit) the blocking bolts of the activated carbon cassette;
4. slide out the cassettes with activated carbon;
5. fill out the cassettes with activated carbon up to the level – of approx.10 mm below the upper edge of the cassette; activated carbon is delivered in a manufacturer's 25kg bag; whereby, important is that the activated carbon is distributed evenly along the side walls of the cassettes and gently pressed down to make it more dense;
6. load the cassettes back into the device. Handle with care, as the fragile sealings would not get damaged while sliding the cassettes in. Mind that the carbon would not get displaced aside, showing empty places within the cassettes;
7. screw in the blocking bolts securing the cassette with activated carbon;
8. insert back the HEPA high-efficiency filter and the FK pocket filter;
9. close the covers.

At that point, the filtering unit is ready for operation. To start the device connect the plug into socket 230V/50Hz and turn on the motor protective switch.

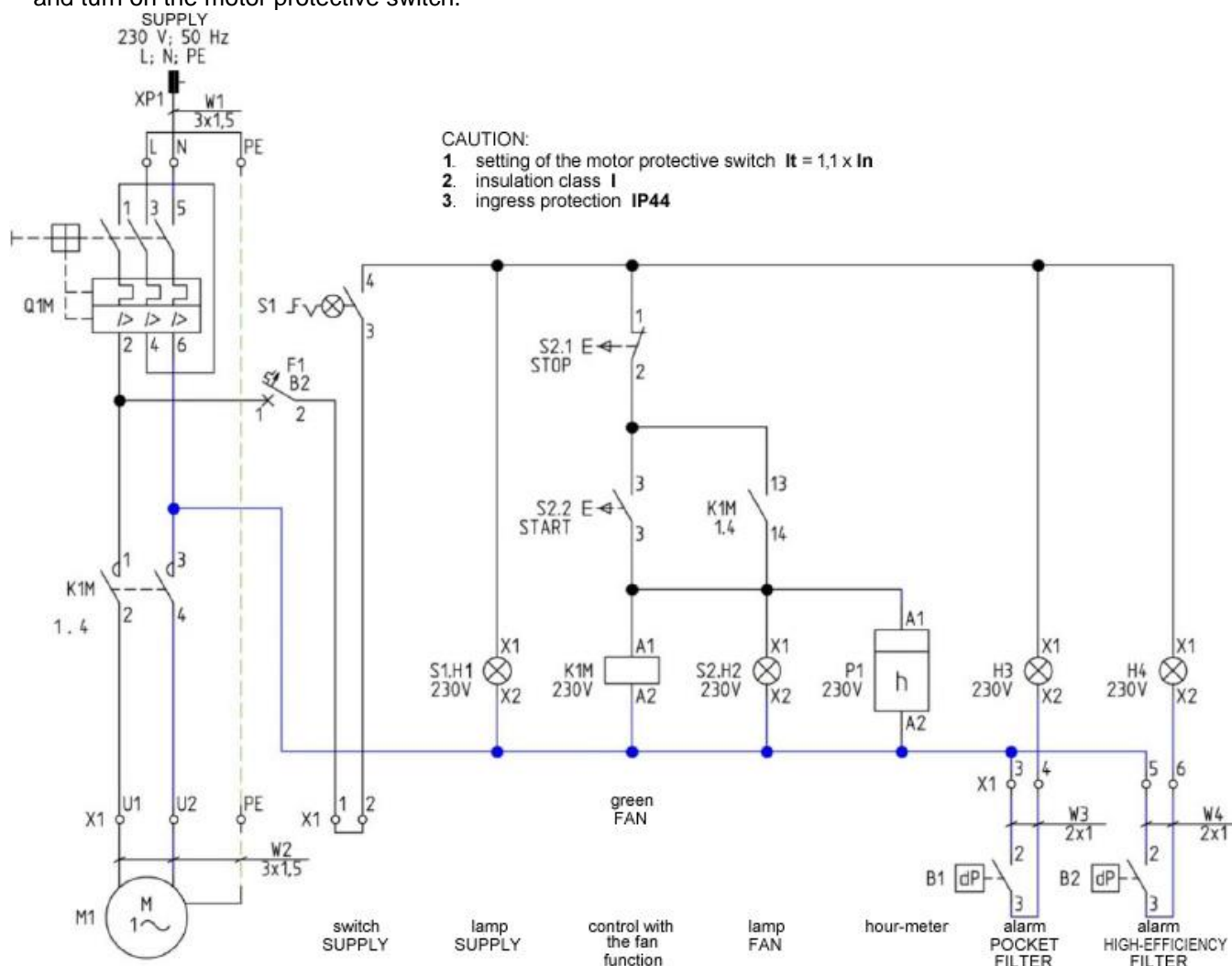


Fig. No.5 – HARD-2000-S – Connection diagram

Implemented functions of the control unit:

- **Q1M** – motor protective switch – protects the motor from failure due to the blocked start-up, overload and short-circuit;
- **P1** – hour-meter – to count the work hours of the device;
- **F1** – over-current protection – to safeguard the control circuit;
- **K1M** – contactor – start-up of the fan;
- **B1** – pressure control (pressostat) – compares the pressure in front of the filter and behind the filter; when the difference reaches 500 Pa the contact closes;
- **B2** – pressure control (pressostat) – compares the pressure in front of the filter and behind the filter; when the difference reaches 500 Pa the contact closes;
- **S1.H1** – white lamp – indicates the applied voltage onto the control circuit;
- **S2.H2** – green lamp – indicates work of the device – status “RUN”;

- **H3** – modular yellow lamp – indicates pollution state of the filter;
- **H4** – modular yellow lamp – indicates pollution state of the filter;
- **S2.1** – fan work – **STOP**;
- **S2.2** – fan work – **STOP**;

7. OPERATIONAL USE

During the use, observe the replacement periods of filters by monitoring the signal lamps activated by the pressure controls (pressostats). The lighting signal lamps indicate the replacement necessity of the following filters:

- **H3** yellow lamp – signalizes the replacement necessity of the **pocket filter** – upon limit resistance of the filter – 500 Pa; the lamp is coordinated with **B1** pressure control (pressostat);
- **H4** yellow lamp – indicates replacement obligation of the **high-efficiency filter** – filter limit resistance 500 Pa the lamp is coordinated with **B2** pressure control (pressostat).

Replacement of the pocket filter – beforehand, release the filter clamps and gently slide the filter out of the guide profiles. In order to replace the high-efficiency filter, first pull out the pocket filter, then (gripping the front handle and rear handle of the high-efficiency filter) lift and remove it from the HARD-2000-S filtering unit.

Do not slide the high-efficiency filter directly on the guide profiles (while pulling out), as this could damage the sealing and cause filter malfunction as a result afterwards. The same rule applies while inserting and removing the filter

Replace the nonwoven (spunbond) paint-stop filter, after you observe the fan efficiency decrease. User should on one's own estimate the filter replacement time, depending on the specified technological process.

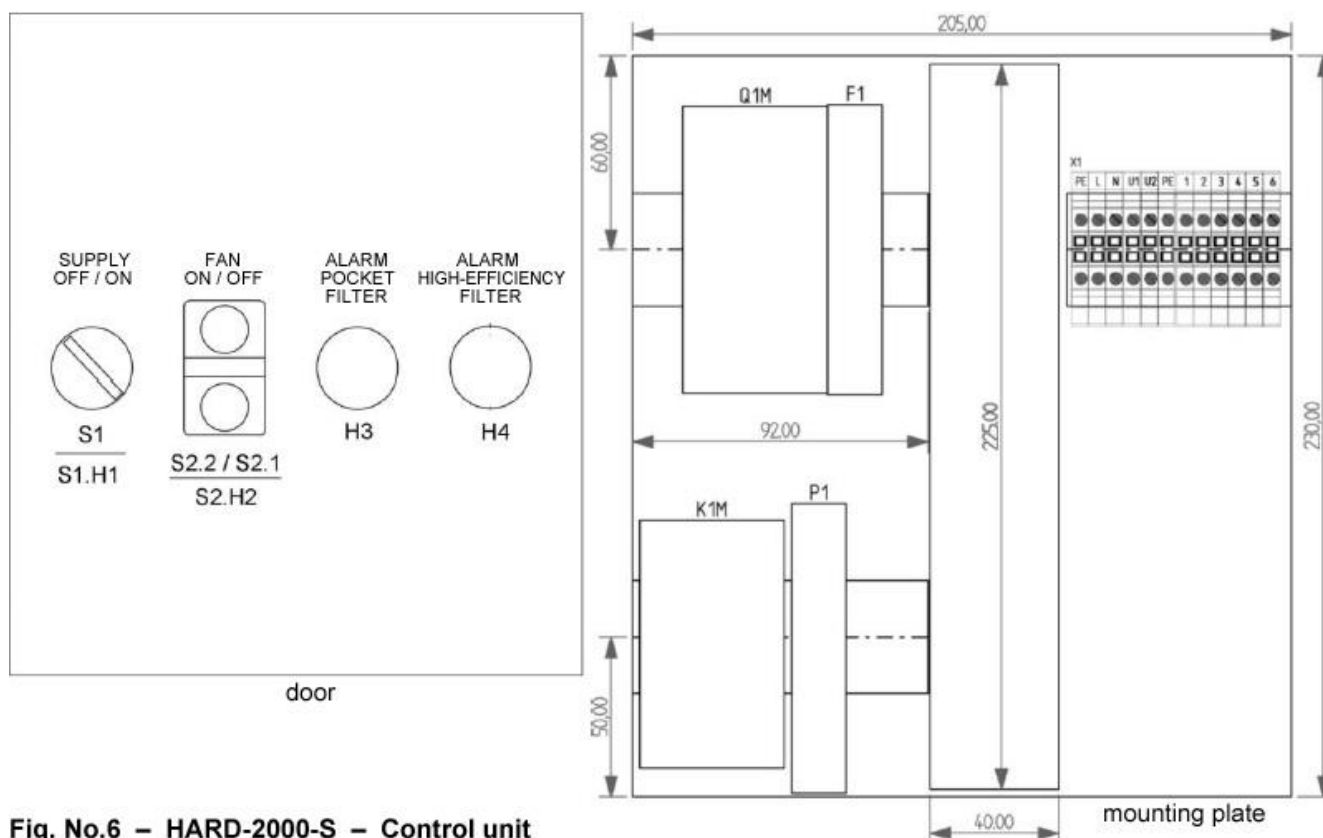


Fig. No.6 – HARD-2000-S – Control unit

Activated carbon filter ought to be replaced when it stops absorbing the unpleasant smells/odours. Observe the indications of the hour-meter (measuring the work time). The activated carbon layer should be replaced after approx. 200 hours of operation. Nevertheless, this depends on the intensity of contaminates accumulation.

Taking into account the activated carbon weight (in the filter) and its absorptivity, operator can assume roughly, that the carbon ought to be replaced after absorbing approx. 5 kg of gases.

To replace the activated carbon unscrew the bolts pressing the cassettes against the guide profiles. Subsequently, draw out the cassette and remove the worn out carbon. Put in the new carbon and distribute evenly the carbon mass within the whole cassette. **CAUTION: Activated carbon ought to be disposed in accordance with the local regulations.**

REPLACEABLE FILTERS

Table No.2 – Pre-filter paint stop

	Type	Weight [kg]	Dimensions [mm]	Class	Efficiency [%]
	PS-HARD-2000-S	0.5	700x740x50		G3

Table No.3 – Pocket filter

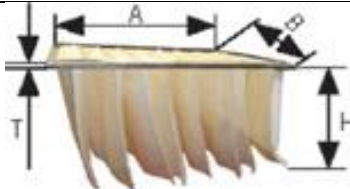
	Type	Weight [kg]	Dimensions AxBxHxT [mm]	Class	Efficiency [%]
	FK-HARD-2000-S	2,3	610x610x360x20		F8

Table No.4 – High-efficiency filter HEPA

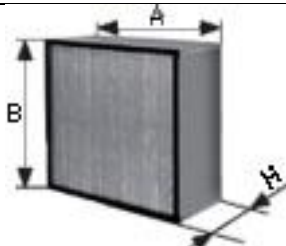

	Type	Weight [kg]	Dimensions AxBxH [mm]	Class	Efficiency [%]
	FK-HARD-2000-S	18,8	610x610x292		H13

Table No.5 – Granulated activated carbon

	Type	Weight [kg]	Remarks
	ORGANOSORB 10CO 4x8	2 x 10	Each cassette contains a half of the total volume of the activated carbon. Activated carbon is delivered in bulk along with the device

8. TROUBLESHOOTING GUIDE

Table No.6

	Problem	Possible reason	Corrective action
1.	the flow capacity of the fan decreases, whereby the signal lamps are not lighted	the “paint-stop” nonwoven (spunbond) is polluted excessively	replace the “paint-stop” nonwoven (spunbond) for a new
2.	the fan flow capacity decreases, whereby the H1 lamp is on	pocket filter is excessively polluted	replace the pocket filter for a new
3.	the fan flow capacity decreases, whereby the H3 lamp is on	high-efficiency filter is excessively polluted	replace the high-efficiency filter
4.	unpleasant smell / odour is perceptible near the filtering unit	activated carbon bed is oversaturated	replace the activated carbon in the cassette
5.	vibrations of the appliance occur	the fan impeller is faulty	replace the impeller for new

9. MAINTENANCE AND REPAIR

Every 12 months, within the scope of periodical technical revision, check the technical state of the fan, with reference to detailed rules of use of electrical drive devices. During the maintenance, examine the mechanical and electrical connections. **Technical revisions and any maintenance should be performed after the filtering unit is disconnected from the power supply.**

Check the pollution state of the extraction ducting (ERGO LUX extraction arms and suction conduits) and clean them when necessary.

10. OCCUPATIONAL HEALTH AND SAFETY

Start-up and maintenance are exclusively possible after getting acquainted with the contents of the present Use and Maintenance Manual. **Circuits of the interface sockets ought to be equipped with appropriate short-circuit- and current-difference protections (see Connection Diagram).**

The appliance meets the safety requirements included in the 2006/42/EC Directive and does not require any additional measures of protection for a safe use. Any activity connected with repair/technical revision has to be executed exclusively after the fan is switched off and the device disconnected from the power supply.

11. TRANSPORT AND STORAGE

HARD-2000-S is transported on a pallet, protected with foil against weather conditions. During the transport, the appliance must be kept in vertical position and protected from overturn, knocking down and uncontrolled displacement / slide. Store the device in dry rooms and areas of efficient ventilation.

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. DECLARATION OF CONFORMITY



DECLARATION OF CONFORMITY EC No. _____

Manufacturer (eventually also the authorised representative / importer):

name: KLIMAWENT S.A.

address: 81-571 GDYNIA, ul. Chwaszczyńska 194

A person, authorised for issuing the technical documentation:

name and address: Teodor Świrbutowicz, KLIMAWENT S.A.

hereby declares that the product: **Filtering unit**

type / model: **HARD-2000-S**

serial number: _____

year of production: _____

Meets the requirements of the subsequent European Directives:

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2014/35/EC Directive of the European Parliament and of the Council of the 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 / Official Journal EC L96 of the 29.03.2014;

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EN 60529:2003/A2:2014-07 Degrees of protection provided by enclosures (Code IP)

EN 61439:2011 Low-voltage switchgear and controlgear assemblies – Part 1: General resolutions

place, date

*signature of the
authorised person*

*name, surname,
function of the signatory*