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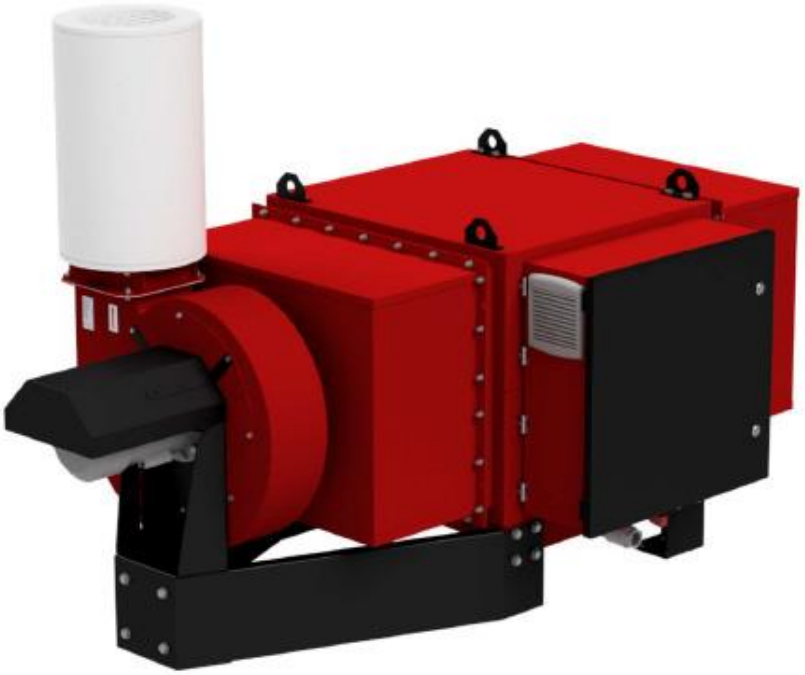
USE AND MAINTENANCE MANUAL 800E01



Electrostatic filter PROTON-4000

Contents:

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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 **PROTON-4000** electrostatic filter.

INFORMATION

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 **PROTON-4000** 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 125 W 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)

2. PURPOSE

PROTON-4000 is designed for cleaning the air from dust and oil mist, therefore it is irreplaceable in removal of mists and fumes arising at the posts of metal machining, in removal the emulsion mists during the cooling the tools by means of water-oil cooling preparations, as well as in applications for welding – especially of oil laden steel sheets or welding with small amounts of anti-spattering preparations.

PROTON-4000 is appropriate for the stationary workplaces.

! CAUTION

The maximum temperature of the conveyed air should not exceed +60°C.

3. RESERVATIONS OF MANUFACTURER

3.1 General Reservations

- Manufacturer is not responsible of effects resulting from the operational use that is in contradiction to the purpose of application of the appliance;
- 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;
- Maintenance or any repair should be carried out by an authorised person;
- Protect all the elements of the device structure from mechanical damage;
- Manufacturer is not responsible for injuries / body laceration experienced by operator during careless use;
- Check the load carrying capacity of the constructional elements of the building, in places where the device will be installed, prior to operational use. Unsure installing might result in device damage or hazard of the operator, people in the vicinity;

3.2 Particular Reservations

- **PROTON-4000** cannot be applied for conveying the air contaminated with a mixture of flammable substances in a form of gas, vapour and mist, that in contact with the air could create explosive mixtures;
- **PROTON-4000** cannot be used for conveying the air containing aggressive contaminants as these might damage the device;
- **PROTON-4000** cannot be used for cleaning the air that is polluted with conductive substances.

4. TECHNICAL DATA

Table No.1

Type	Part No.	Maximum volume flow	Maximum vacuum	Motor rate	Supply voltage	Current	Acoustic pressure level from distance	
							1m	5m
		[m³/h]	[Pa]	[kW]	[V]	[A]	[dB(A)]	
PROTON-4000	800E01	4000	2400	**2,2**	3x400V; 50Hz	**4,6**	82	68

Table No.2

Type	Weight	Ingress protection	Extraction fan	Part No. of the fan
	[kg]			
PROTON-4000	218	IP44	WPA-9-D-3-N	807W18

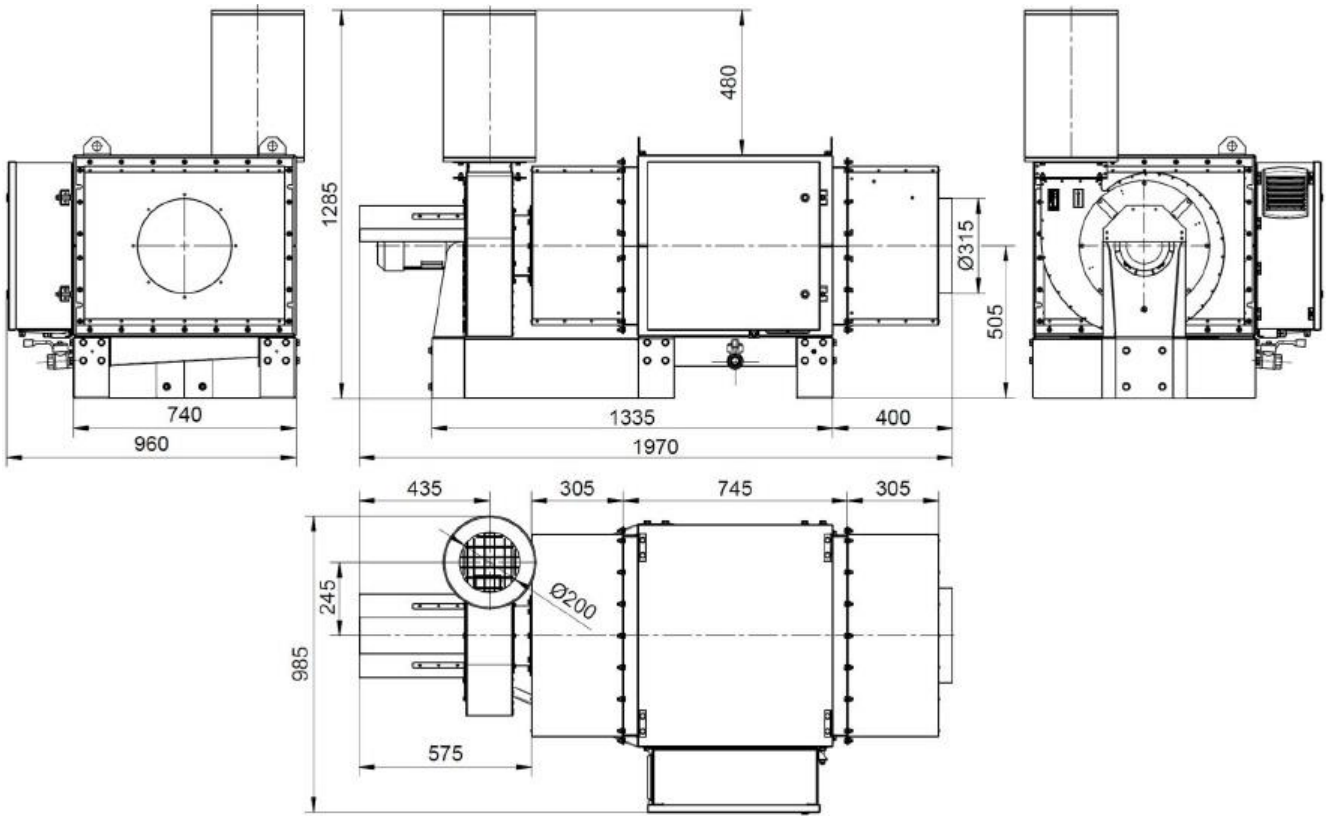

Fig. No.1 – PROTON-4000 – structure and dimensions

	Type	Part No.	Remarks
	P-PROTON	800E10	Container to wash the mechanical filters and the sections of the ioniser

Table No.3 – Additional equipment

5. STRUCTURE AND FUNCTION

PROTON-4000 – elements:

- base structure,
- inlet chamber – with inlet connection ∅315 mm,
- outlet chamber – with a built-on extraction fan,
- filtration chamber – contains filters,
- 1 ioniser – with two sections supplied with direct current **13-14 kV** and **6-7 kV** from a high-voltage converter,
- 2 filters for fatty contamination,
- 1 nonwoven (spunbond) filter cassette,
- 1 spacing frame,
- sedimentation sump – with a drainage valve **G1”**,
- fan **WPA-9-D-N** with a silencer,
- control unit.

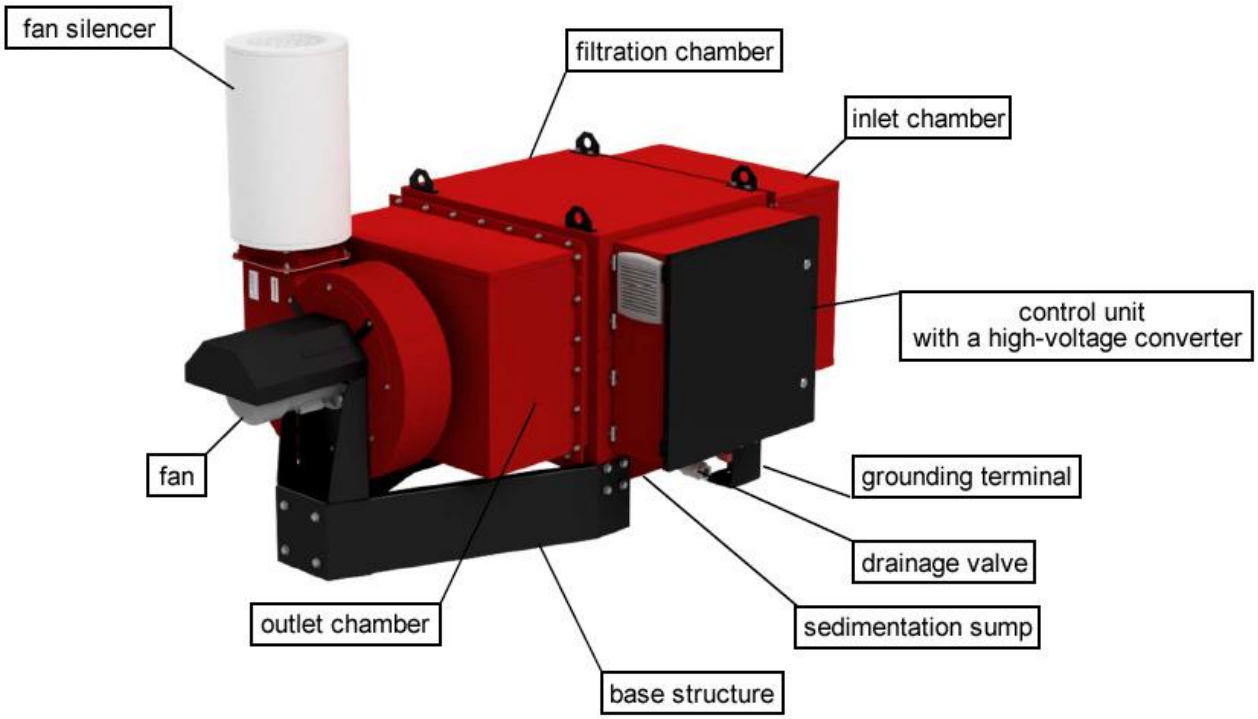

Photo No.1 – PROTON-4000 – structure

Photo No.2 – Filtration chamber – inside

Photo No.3 – Placement sequence of the filtration elements

The sequence of arrangement of the elements of the electrostatic filter
(from the right side to the left):
FILTER FOR FATTY CONTAMINATION → NONWOVEN FILTER →
→ IONISER → SPACING FRAME → FILTER FOR FATTY CONTAMINATION

The polluted air from the extraction system (of the filtration process) is drawn into the device through the inlet connection (see Fig. No.1; Photo No.1), further into the inlet chamber. The second step is the filtration chamber with the ioniser, filters for the fatty contamination and the nonwoven filter – see Photo No.2.
Mechanical filters (i.e. fatty contamination filters and nonwoven filters) are located before and after the ioniser and are capturing the larger, coarse fractions of pollutants and they create a capture section within the electrostatic filter.
Ioniser operates on the basis of electrical discharges (corona discharges) and there is created a strong electrostatic field for efficient and exact removal of the dust from the air, at a very low flow resistance. Subsequently, the cleaned air passes further through the fan and is expelled outside.
The extracted contaminants sediment on the filters surface, whereby the liquid fraction drains into sedimentation sump underneath the filtration chamber. The sedimentation sump is equipped with a drainage valve to discharge the accumulated liquid.

! CAUTION

The discharged oil should be utilised according to the regulations concerning noxious waste disposal!

6. ASSEMBLY AND STARTUP

6.1. Assembly

PROTON-4000 electrostatic filter is a stationary appliance and should be installed on a levelled and solid floor by means of fasteners / bolts.

! WARNING

For transport, lifting use exclusively transport eye handles fastened to the housing. Do not use fork lifts to displace the device as this could result in tightness loss (**unsealing**) **of the housing**!

Connect the extraction ducting of the filtration process to the inlet connection ∅315 mm and close the drainage valves of the sedimentation sump.

! CAUTION

Connect the grounding terminal of the device to the main grounding profile!

Energise the device in accordance with the parameters of the supply system of the PROTON-4000 electrostatic filter – see Table No.1 above. Carry out any electrical connections according to the connection diagrams next page; see Diagram No.1, Diagram No.2, Diagram No.3.

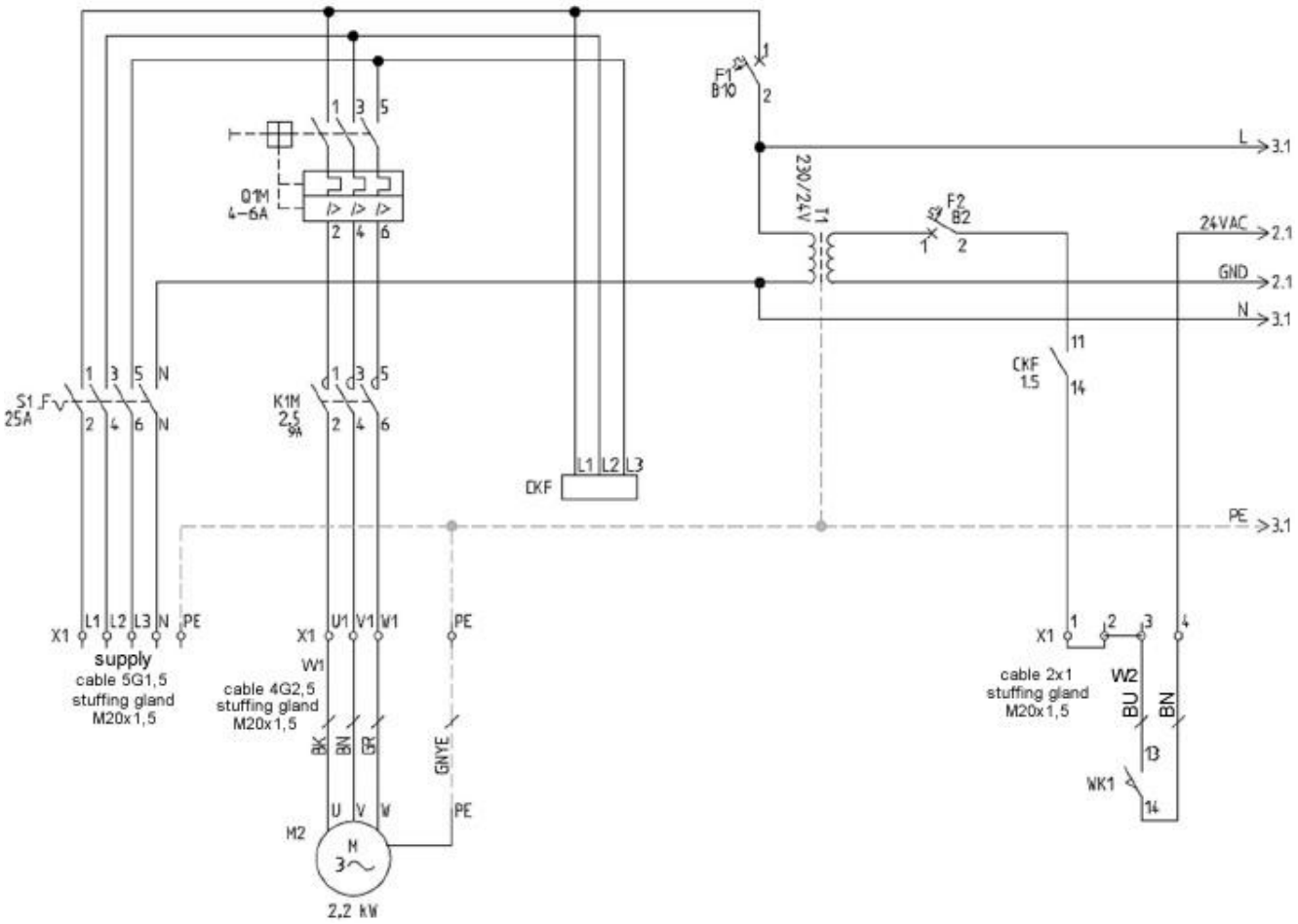

Diagram No.1 – Supply circuit of the fan

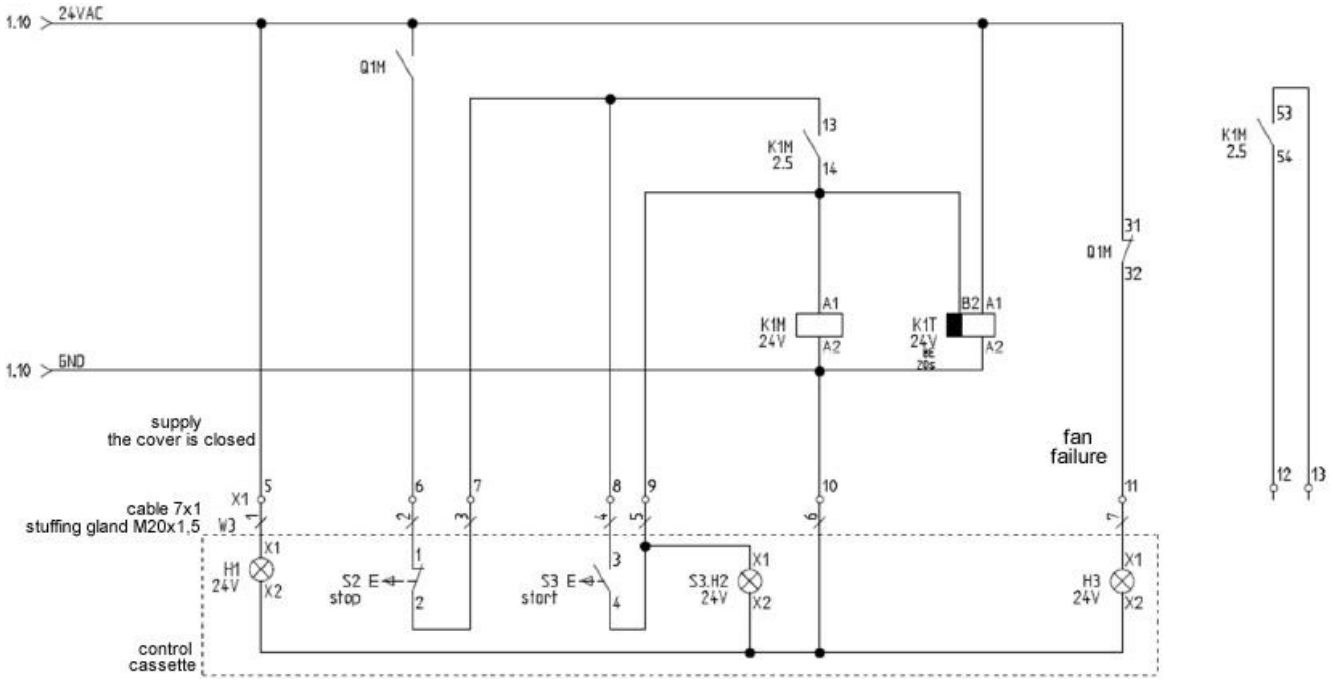

Diagram No.2 – Startup and control circuit

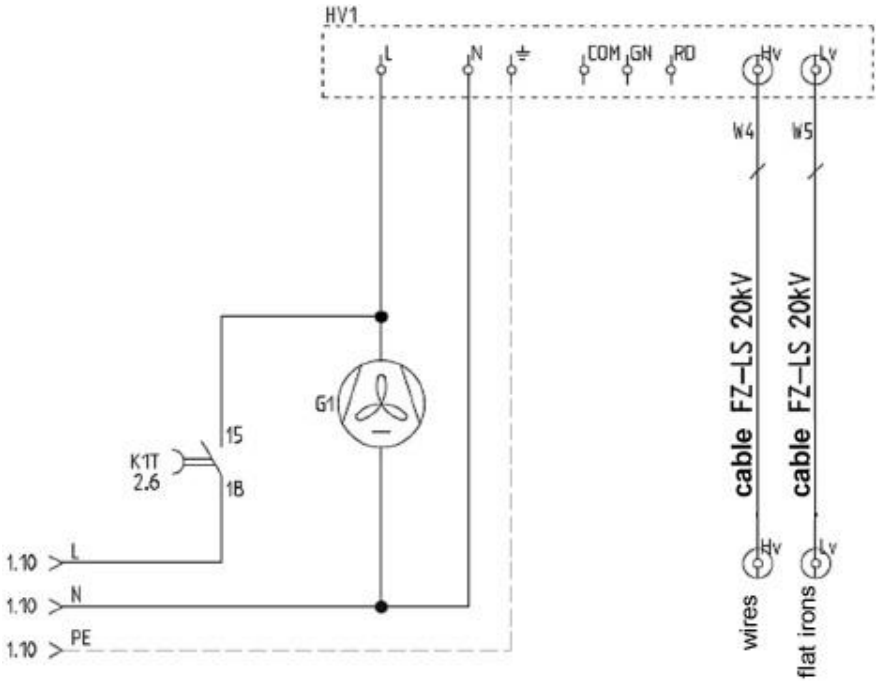

Diagram No.3 – High-voltage circuit

Table. No.4 – Functions of the electrical elements in the control unit

Symbol	Name	Function
Q1M	motor protective switch	protects the motor from blocked startup, overload, short-circuit effects
CKF	relay of phase control	to detect the fade of phase, asymmetry and incorrect phase sequence
F1, **F2**	overcurrent disconnectors	to protect the control unit and the supply of the high-voltage converters
S1	main switch	applies the supply onto the device – this is indicated by the lamp **H1**
S2	red button **STOP**	to switch off the device
S3	illuminated green button **START**	to switch on the device
K1M	contactor	to control the device startup
K1T	time relay	delays switching off the fan
G1	fan	to cool down the switchgear
H1	white lamp **SUPPLY**	indication – supply is applied by the main switch and the covers are closed
H3	red lamp **FAILURE**	indication – the **Q1M** motor protective switch activated
S3.H2	green lamp	device function "**RUN**"
WK1	limit switch	disconnects the supply at the moment when the filtration chamber is opened

7. OPERATIONAL USE

After the device was used for dust extraction during the welding, the maintenance consists in periodical cleaning the ioniser section and the mechanical filters from impurities that deposited on those elements. Additionally, it is important to discharge the liquid pollution fraction from the sedimentation sump.
Ioniser sections and mechanical filters should be washed through in a container with water and detergent – see Table No.3 – Additional equipment.
If PROTON-4000 is used for extraction of oil mist, water-oil emulsion, or similar – the impurities flow down into the sedimentation sump underneath the filtration chamber, whereby the accumulated fluid can be removed through the discharge valve.

! CAUTION

The discharged oil should be utilised according to the regulations concerning noxious waste disposal!

7.1 Startup

A. Make sure, if the cover of the electrostatic filter is tightly closed and screwed up by protective bolts.

Photo No.4 – Main switch of the power supply

B. Switch on the power supply by setting the **S1** main switch into position **ON** – see Photo No.4; this will be indicated by the white lamp **H1** "**SUPPLY**" on the control panel located at the side of the appliance – see Photo No.5.

Photo No.5 – Control panel

C. Press the green button **S3** "**START**"; this will be indicated by the built-in (in the button) green lamp – see Photo No.5. The device is working – the fan forces the air through the electrostatic filter, the ioniser section is under voltage.

7.2 How to switch off the device

A. Press the red button **S2** "**STOP**" – see Photo No.5. The green lamp in the button **START** goes off. The device switches off – the fan stops its rotations by a free run, the ioniser section of the electrostatic filter **is under voltage for the next 20 seconds**, and subsequently, the voltage fades.

B. Disconnect the power supply by setting the **S1** main switch into position **OFF** – see Photo No.4.

8. TROUBLESHOOTING GUIDE

Table No.5 – Typical disturbances and remedial measures

	Problem	Possible reason	Corrective action
1.	The flow efficiency of the device decreases gradually	pollution of the mechanical filters and the ioniser	clean the filters
2.	Device vibrations	An object / pollutant got stack in the fan chamber; the impeller or the motor is damaged	**Contact KLIMAWENT S.A.**
3.	The fan does not turn off	**Q1M** protection is switched off	Check the reason of activation of the protections; switch on the mentioned protection
4.	The lamp **FAILURE** is on	**Q1M** protection activated	Check the reason of activation of the protection; fix the malfunction.

9. MAINTENANCE AND DISPOSAL

9.1. Maintenance

Current steps of maintenance consists in periodical cleaning the filters and the sedimentation sump from the deposited impurities (depending on intensity of operational use). Mechanical filters and the ioniser can be cleaned with detergents. At least, every **12 months**, check the technical state of the fan motor, according to the rules concerning the electrical driving devices. At least, every **12 months**, check the mechanical and electrical connections, especially the grounding and the protection connections with the main grounding profile!

9.2. Recycling and Disposal

! CAUTION

At the moment when the product is subject to withdrawal from use, strictly follow the rules referring the cassation of devices that have been withdrawn from operational use and/or the waste management. **PROTON-4000** does not contain a single element that is classified as hazardous waste, on the other hand, the drained oil must be disposed in accordance to the regulations concerning the noxious waste management!

10. OCCUPATIONAL HEALTH AND SAFETY

! CAUTION

Operational use of the filtering unit is exclusively possible after getting acquainted with the contents of the present Use and Maintenance Manual. The appliance will not cause hazard under the condition that it is accurately installed to the building structure and according to the present manual!

The appliance meets the safety requirements included in the 2006/42/EC Directive and does not require any additional protection for safe operational use!

Attention! High voltage! Hazard of electric shock!

Do not introduce any modifications, disconnections or by-passing of protections against accidental startup!

Any technical revisions and repair should be executed exclusively after disconnection from the power supply. Activities connected with electrical circuit system have to be performed by an authorised person with qualifications only!

11. TRANSPORT AND STORAGE

The appliance is transported on a pallet and in foil. During the transport it is important to protect the device from damage, displacement, indents and atmospheric factors. The device should be stored in a dry room and in areas of efficient ventilation.

! WARNING

Due to large dimensions and weight of the device, handle with care especially during the assembly and transport and observe the regulations of Occupational Health and Safety!

! WARNING

For transport use only the transport eye handles on the device housing! Do not apply forklifts for transport, as this would result in tightness loss (unsealing) of the device housing!

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.

! CAUTION

Infringement of the 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 operational use that is in contradiction with the purpose of application – shall result in the loss of warranty validity!

13. DECLARATION OF CONFORMITY

CE

KLIMAWENT

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: **Electrostatic filter**

type / model: **PROTON-4000**

*serial number:*_____ *year of production:* _____

Meets the requirements of the subsequent European Directives:
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;
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place, date	*signature of the authorised person*	*name, surname, function of the signatory*

NOTES:

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