



INTELLIGENT • EFFICIENT • RELIABLE

VENTILATION SYSTEMS

PLANNING PACK



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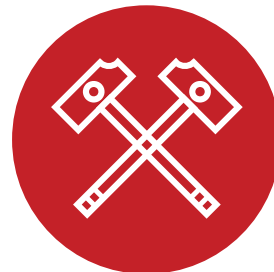
OVER 60 YEARS EXPERIENCE

Established in 1957 the wealth of knowledge and industry experience gained over this time has been paramount to our continued success.



INNOVATORS AND LEADERS IN OUR INDUSTRY

We are the leaders and innovators within the Foodservice industry. Using our knowledge and expertise, we constantly strive to deliver and create the best equipment you can find in the industry and will always be looking to innovate the next best thing.



BESPOKE SERVICE

We offer a service tailored to suit your needs, whether you are an architect looking for project management or an empty shop looking for a design and fit out service, Hopkins have a package to suit you.

SOLUTIONS TO CONTROL ODOUR AND NOISE FROM COMMERCIAL KITCHEN VENTILATION SYSTEMS

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INTRODUCTION

Problems associated with nuisance odour and noise emissions from commercial kitchen exhausts are very common, particularly in urban areas where housing may be adjacent to or even immediately above catering premises. These premises might include pubs, clubs, restaurants and takeaways that may be open until the early hours of the morning.

Responsibility for the enforcement of statutory controls available to Local Authorities is shared between a number of regulatory functions;

- An authority's Building Control Officer would usually handle building Regulation requirements relating to the structural safety of installations such as high exhaust flues;
- Planning issues relating to new premises, and to the acceptability and positioning of new ventilation systems that involve the provision of a large flue, are likely to require planning consent, the application for which would be submitted to the Local Planning Authority (or the Planning Service in the Department of the Environment in Northern Ireland);
- Environmental Health Officers providing advice on the odour and noise control aspects of any planning application to the Planning Officers; and
- Environmental Health Officers/Technical Officers would deal with any complaints of statutory nuisance arising from the smell or noise of a kitchen extraction system.

Many kitchen extraction systems are well designed, well maintained and seldom cause nuisance problems. Others can provide a significant and recurring source of nuisance.

The following document will provide information on all of the elements we offer, technical information and recommended maintenance schedules.

If we have provided you with a ventilation design, please refer to this document for further information. Noting that our design may not include all of the elements included in this document.

DESIGN

HOW DO WE DESIGN A SYSTEM

Our designers refer to a number of standards and practices to provide a system that meets current regulations.

Incorporating guidance from respected and trusted organisations including Purified Air, we use the following guidelines for reference:

DW172 - Specification for Kitchen Ventilation Systems

TR19 - Guide to Good Practice - Internal Cleanliness of Ventilation Systems

DW 144, Specification for Sheet Metal Ductwork, Heating & Ventilating
Contractors Association

Defra - Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems

BS 4142, Method for Rating Industrial Noise Affecting Mixed Residential and
Industrial Areas, British Standards Institute, 1997.

RISK ASSESSMENT

Purified Air assist us with this, using a standardised document and then apply their own knowledge to the data to provide a recommendation.

An example of the Risk Assessment is included on the next page

The DEFRA Guide

When the Environmental Protection Act 1990 was brought in, “an Act to make provision for the improved control of pollution arising from certain industrial and other processes”, Councils up and down the country had the power to enforce pollution levels across their boroughs.

In 2004 Netcen, an operating division of AEA Technology Plc was asked to produce a report on behalf of the Department for Environment, Food and Rural Affairs exclusively covering Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems and in January 2005 the DEFRA Guide was published.

Purified Air's Managing Director, David Collins, was consulted extensively during the preparation of the DEFRA guide and was very pleased to be able to assist NETCEN and DEFRA. David has been working in this business since the early 1980's and is a world renowned expert in the field of commercial kitchen exhaust filtration.

DEFRA Guide Risk Assessment for Odour Table 1

Criteria	Score	Score	Details
Dispersion	Very Poor	20	Low level discharge into courtyard or restriction on stack
	Poor	15	Not low level but below eaves, or discharge at below 10m/s
	Moderate	10	Discharging 1m above eaves at 10-15m/s
	Good	5	Discharging 1m above ridge at 15m/s
Proximity of receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge
	Far	1	Closest sensitive receptor more than 100m from kitchen discharge
Size of Kitchen	Large	5	More than 100 covers or large sized take away
	Medium	3	Between 30 and 100 covers for medium sized take away
	Small	1	Less than 30 covers or small sized take away
Cooking Type (odour and grease loading)	Very High	10	Pub (high level of fried food), fried chicken, burgers or fish and chips
	High	7	Kebab, Vietnamese, Thai or Indian
	Medium	4	Cantonese, Japanese or Chinese
	Low	1	Most pubs, Italian, French, Pizza or Steakhouse

DEFRA Guide Risk Assessment for Odour Table 2

Impact Risk	Odour Control Requirement	Significance Score*
Low to Medium	Low level odour control	Less than 20
High	High level odour control	20 to 35
Very high	Very high level odour control	more than 35

*Based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type

- **Annex B of the DEFRA Guide lays out the information required to support the planning application for a commercial kitchen.**
- **Annex C of the DEFRA Guide outlines risk assessment for odour control for a commercial kitchen.**

To establish what odour control equipment your premises may require, calculate your score from the Risk Assessment for Odour Table 1.

This score can then be applied to the Risk Assessment for Odour Table 2 which will dictate the broad level of control that you require.

These levels are expanded upon in the Risk Assessment for Odour Table 2 Notes.

Specifying the right equipment at the right level is not an exact science and takes years to perfect, our specialist field team are all highly experienced and only too pleased to give you a free site survey.

Risk Assessment for Odour Table 2 Notes

Low to medium level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.1 second residence time).
2. Fine filtration followed by counteractant/neutralising system to achieve the same level of control as point 1.

High level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.2 – 0.4 second residence time).
2. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as point 1.

Very high level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.4 – 0.8 second residence time).
2. Fine filtration or ESP followed by carbon filtration and counteractant/neutralising system to achieve the same level of control as point 1.
3. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as point 1.
4. Fine filtration or ESP followed by wet scrubbing to achieve the same level of control as point 1.

EQUIPMENT

VENTILATION SYSTEM ELEMENTS

* If we have provided you with a ventilation design, please refer to this document for further information. Noting that our design may not include all of the elements included in this document.

FAN

KBR FAN MOTOR



WHAT DOES THE FAN DO?

The purpose of the fan is to create negative (pull)/positive(push) air pressure, which moves the air through the duct system

A properly specified fan is essential for the system to work effectively and safely.

WHAT ARE THE KEY BENEFITS OF THE FAN?

- Capable of moving air which is upto 120°C in temperature
- Low sound level
- The KBR casing is manufactured from double skinned galvanised sheet steel and is insulated with 50 mm mineral wool.
- The KBR fans have a swing-out door for easy inspection and service.
- The fan is isolated from the casing via connectors and anti-vibration dampers are incorporated into the base
- frame.

MANUFACTURER

Unit 28, Gravelly Industrial Park, Birmingham, B24 8HZ, England

MODELS AVAILABLE

KBR 315E4 Thermo fan

TECHNICAL & MAINTENANCE

See Next Page

TECHNICAL SUMMARY

KBR 315E4 Thermo fan

Centrifugal box fan, 120° C continuous, insulated

Item Number: [33749](#)

Variant: 230V 1~ 50Hz

- Max temperature of transported air 120° C
- Speed-controllable(except models 280D2 & 280D2-4)
- Integral thermal contacts
- Low sound level

The KBR fans have impellers manufactured from aluminum with backward-curved blades and external rotor motors. The KBR casing is manufactured from doubleskinned galvanised sheet steel and is insulated with 50 mm mineral wool. The KBR fans have a swing-out door for easy inspection and service. The direction of the door opening can easily be changed from left to right at site. The fan is isolated from the casing via connectors and anti-vibration dampers are incorporated into the base frame.

To protect the motors from overheating the KBR fans have integral thermal contacts(KBR 280D2 & 280D2-4 with PTC) with external leads for connection to a motor protection device.



Technical parameters

Nominal data			
Voltage (Nominal)	230	V	
Frequency	50	Hz	
Phase(s)	1~		
Input power	251	W	
Starting current	4.9	A	
Input current	1.07	A	
Impeller speed	1,445	r.p.m.	
Air flow	max 0.585	m³/s	
Capacitance of capacitor	12	µF	
Temperature of transported air	max 120	° C	
Max temperature of transported air, when speed controlled	120	° C	
Sound data			
Sound pressure level at 10m (free field)	28	dB(A)	
Sound pressure level at 4m (free field)	36	dB(A)	
Protection/Classification			
Enclosure class, motor	IP54		
Insulation class	F		

Dimensions and weights

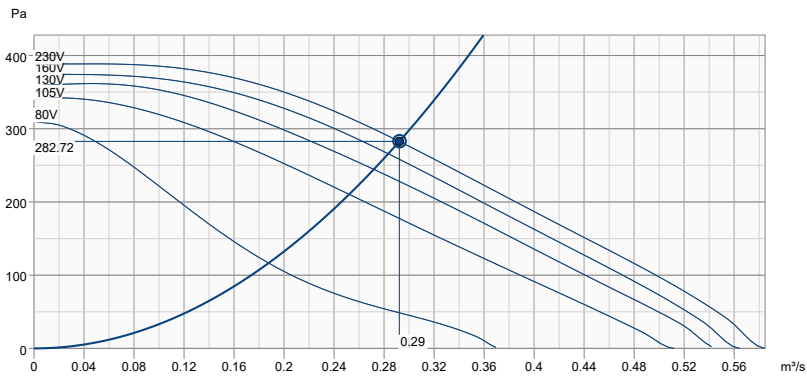
Duct dimension; Circular, inlet	315	mm
Duct dimension; Circular, outlet	315	mm
Weight	54	kg

Others

Duct connection type	Circular
Motor type	AC

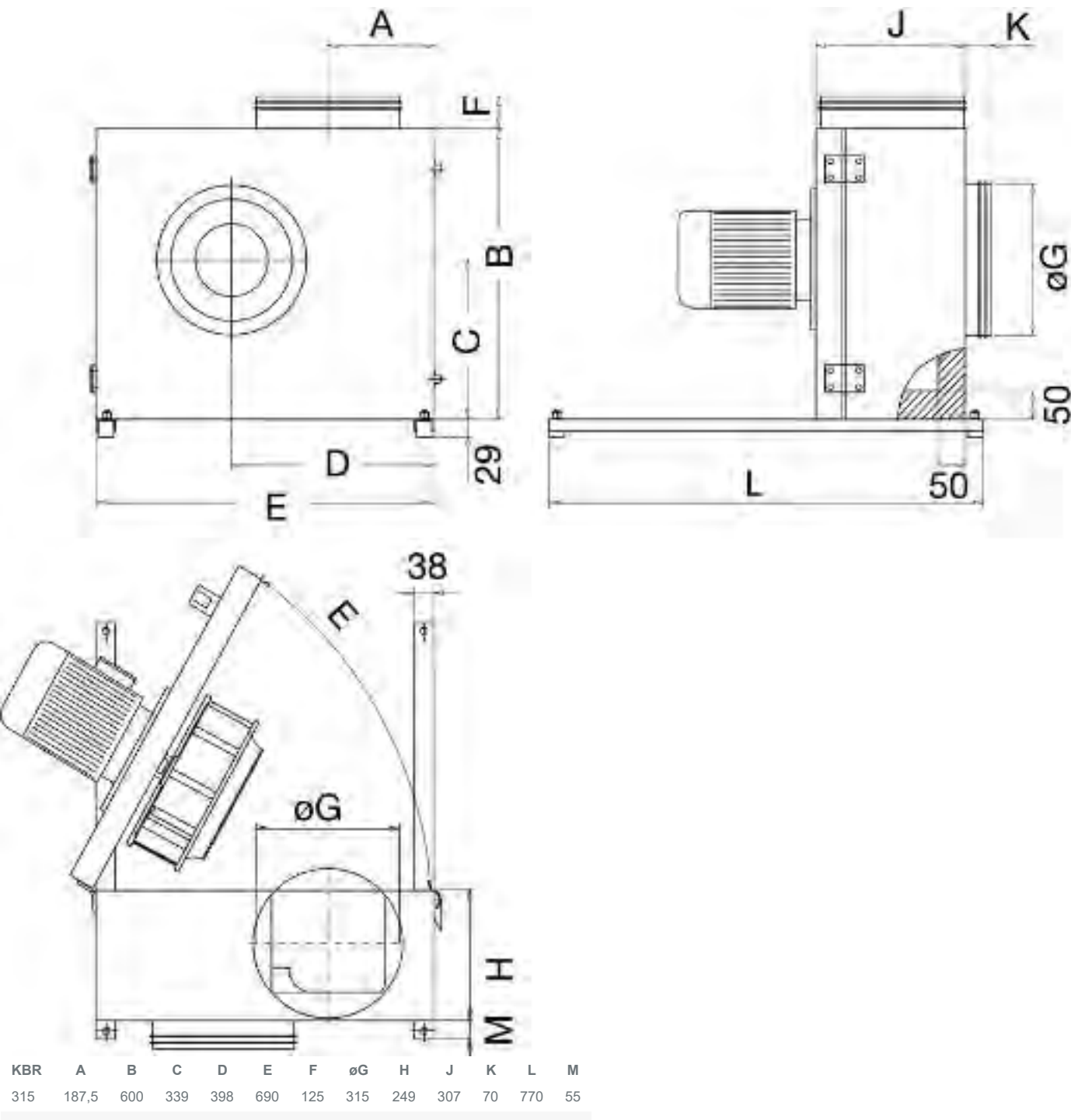
Performance

Performance curve

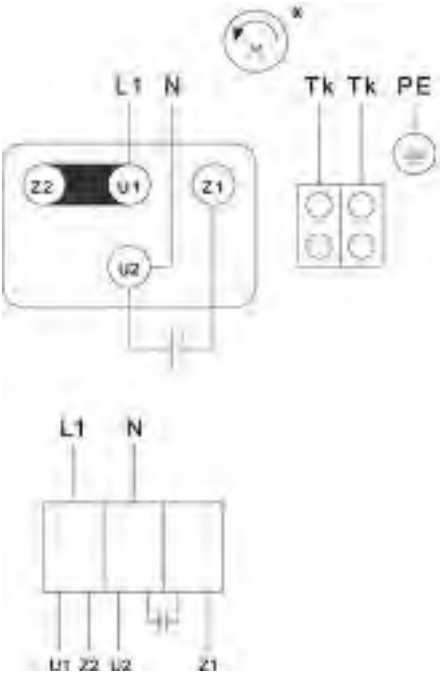


Hydraulic data	
Required air flow	0.29 m³/s
Required static pressure	283 Pa
Working air flow	0.29 m³/s
Working static pressure	283 Pa
Air density	1.204 kg/m³
Power	245.2 W
Fan control - RPM	1445 rpm
Current	1.05 A
SFP	0.839 kW/m³/s
Control voltage	230.0 V
Supply voltage	230 V

Dimension



Wiring



(*) motor shaft rotation seen from inlet of the fan.

Acoustic

Mid-frequency band, Hz									
		Tot	125	250	500	1k	2k	4k	8k
LwA Inlet	dB(A)	77	75	74	69	67	63	57	54
LwA Outlet	dB(A)	79	77	76	71	69	65	59	56
LwA Surrounding	dB(A)	59	57	56	51	49	45	39	36

Accessories

- ASF 315/KB Flex. connection (2718)
- REU 3 Speed control (5005)
- S-ET 10 Motor Protection (161199)
- S-ET 10E Motor Protection (5155)
- CO2RT-R-D Transmitter (6993)
- DTV500A (96807)
- HR1 Room Humidistat (215150)
- RT 0-30 Room Thermostat (5151)
- WBK 315/355 Wall bracket (2721)
- FRQ5S-E-6A (37421)
- RTRE 3 Speed control (5009)
- S-ET 10 Motor Protection (5154)
- WSD KBR-1 Weather roof f.motor (2728)
- DTV200 (6261)
- FRQS-E-6A (37419)
- Presence detector/IR24-P (6995)
- ALS-KBR drain plug (2727)

Documents

- MANUAL_Thermobox KBR_EN_[004].PDF
- EU DECLARATION OF CONFORMITY_THERMOFANS_EN_[002].PDF

FAN

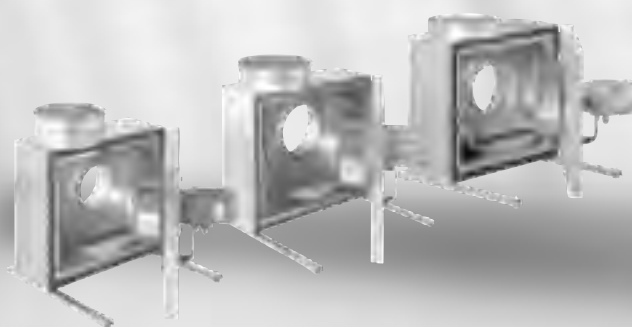
**TECHNICAL & OPERATIONS
MANUAL**

Thermo box KBR, KBR/F

Installation and Operating Instructions

GB

Document in original language | · 004



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E&OE

Systemair AB reserves the rights to alter their products without notice.
This also applies to products already ordered, as long as it does not affect the previously agreed specifications.

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1 General information

1.1 Notice symbols



Danger

Direct hazard
Failure to comply with this warning will lead directly to death or to serious injury.



Caution

Hazard with a low risk
Failure to comply with this warning may lead to moderate injuries.



Warning

Potential hazard
Failure to comply with this warning may lead to death or serious injury.

Important

Hazard with risk of damage to objects
Failure to comply with this warning will lead to damage to objects.



Note:

Useful information and instructions

1.1.1 Instruction symbols

Instruction

- ◆ Carry out this action
- ◆ (if applicable, further actions)

Instruction with fixed sequence

1. Carry out this action
2. Carry out this action
3. (if applicable, further actions)

2 Important safety information

Planners, plant builders and operators are responsible for the proper assembly and intended use.

- ◆ Read the operating instructions completely and carefully.
- ◆ Keep the operating instructions and other valid documents, such as the circuit diagram or motor instructions, with the fan. They must always be available at the place of use.
- ◆ Observe and respect local conditions, regulations and laws.
- ◆ Abide by the system-related conditions and requirements of the system manufacturer or plant constructor.
- ◆ Safety elements may not be dismantled, circumvented or deactivated.
- ◆ Only use the fan in a flawless condition.
- ◆ Provide generally prescribed electrical and mechanical protective devices.
- ◆ During installation, electrical connection, commissioning, troubleshooting, and maintenance, secure the location and premises against unauthorised access.
- ◆ Do not circumvent any safety components or put them out of action.
- ◆ Before any work on the fan, test absence of voltage.
Even when the motor is stopped, dangerous voltages may be present on terminals.
- ◆ Keep all the warning signs on the fan complete and in a legible condition.
- ◆ The device is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- ◆ Do not allow children to play with the device.

2.1 Personnel

The fan may only be used by qualified, instructed and trained personnel. The persons must know the relevant safety directives in order to recognise and to avoid risks. The individual activities and qualifications can be found in Table 1 *Qualifications*, page 2.

Table 1 Qualifications

Activities	Qualifications	
Storage, operation, transport, cleaning, disposal	Trained personnel (see following note)	
Electrical connection, commissioning, electrical disconnection	Electrical expert or matching qualification	
Installation, disassembly	Fitter or matching qualification	
Maintenance	Electrical expert or matching qualification	Fitter or matching qualification
Repair	Electrical expert or matching qualification	Fitter or matching qualification
	Smoke extraction fans and EX fans only by agreement with Systemair.	

**Note:**

The operator is responsible for ensuring that personnel are instructed and have understood the contents of the operating instructions. If something is unclear, please contact Systemair or its representative.

2.2 Personal protective equipment

◆ Wear protective equipment during all work in the vicinity of the fan.

- protective working clothes
- protective working gloves
- goggles
- protective working shoes
- helmet
- hearing protection

2.3 5 rules of electrical safety

1. Disconnect (disconnection of the electrical system from live components at all terminals)
2. Prevent reactivation
3. Test absence of voltage
4. Ground and short-circuit
5. Cover or restrict adjacent live parts

3 Warranty

For the assertion of warranty claims, the products must be correctly connected and operated, and used in accordance with the data sheets. Further prerequisites are a completed maintenance plan with no gaps and a commissioning report. Systemair will require these in the case of a warranty claim. The commissioning report is a component of this document. The maintenance plan must be created by the operator, see section 12.2 *Maintenance*, page 13.

4 Delivery, transport, storage

Safety information

Warning: Risk from rotating fan blades

◆ Prevent access by unauthorised persons by safety personnel or access protection.

Warning: Suspended loads

◆ Do not walk under suspended loads.

◆ Make sure that there is nobody under a suspended load.

Delivery

Each fan leaves our plant in an electrically and mechanically proper condition. We recommend transporting the fan to the installation site in the original packaging.

Checking delivery

- ◆ Check the packaging and the fan for transport damage. Any findings should be noted on the cargo manifest.
- ◆ Check completeness of the delivery.

Unpacking

When opening the transport packaging, there is a risk of damage from sharp edges, nails, staples, splinters etc.

- ◆ Unpack the fan carefully.
- ◆ Check the fan for obvious transport damage.
- ◆ Only remove the packaging shortly before assembly.

Transport

Safety information

Warning: Electrical or mechanical hazards due to fire, moisture, short circuit or malfunction.

- ◆ Never transport the fan by the connecting wire, terminal box, impeller, protection grille, inlet cone or silencer.
- ◆ In open transport, please make sure that no water can penetrate into the motor or other sensitive parts.
- ◆ We recommend transporting the fan to the installation site in the original packaging.

Caution: If transported without care during loading and unloading, the fan may be damaged.

- ◆ Load and unload the fan carefully.
- ◆ Use hoisting equipment that is suitable for the weight to be hoisted.
- ◆ Observe the transportation arrows on the packaging.
- ◆ Use the fan packaging exclusively as transport protection and not as a lifting aid.

Storage

- ◆ Store the fan in the original packaging in a dry, dust-free location protected against weather.
- ◆ Avoid the effects of extreme heat or cold.

Hazard due to loss of function of the motor bearing

- ◆ Avoid storing for too long (recommendation: max. 1 year).
- ◆ Check that the motor bearing functions properly before installation.

5 Description

5.1 Intended use

All KBR-versions:

- The fan is intended for installation in ventilation systems.
- The fans are exclusively intended for extract air applications.

KBR

- The fan is suitable for extracting contaminated air (dust, kitchen exhaust).

KBR/F

- The fan is suitable for conveying contaminated air.
- The smoke extraction units KBR/F are used in case of fire to extract smoke gases, as well as in normal working conditions of up to 200°C.

Incorrect use

Incorrect use refers mainly to using the fan in another way to that described. The following examples are incorrect and hazardous:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Conveying of explosive and combustible media • Conveying of aggressive media • Operation in an explosive atmosphere | <ul style="list-style-type: none"> • Operation without duct system • Operation with the air connections closed • Installation outside without weather protection |
|---|---|

5.2 Technical data

Max. ambient temperature [°C]	see data sheet, available in our online catalogue.
Sound pressure [dB]	see data sheet, available in our online catalogue.
Voltage, current, frequency, enclosure class, weight	see name plate of the fan
The motor data can be found on the name plate of the motor, or in the technical documents of the motor manufacturer.	
The data on the name plate of the fan apply to "standard air" according to ISO5801.	

KBR

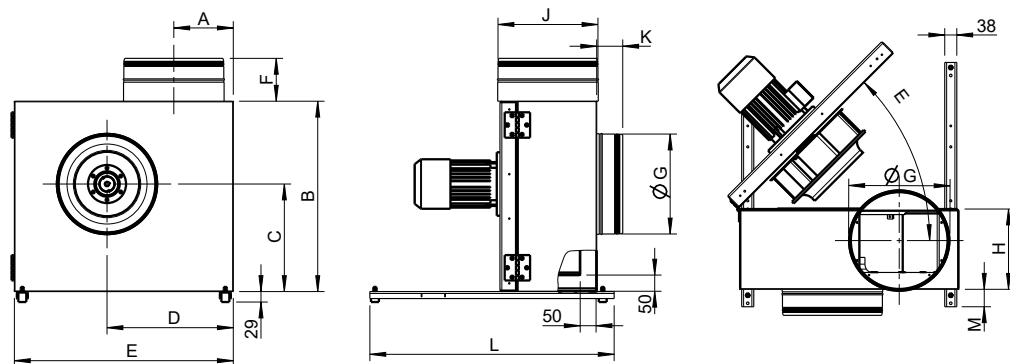
- Temperature range [°C] of transported air = -20 to 120 (This is the maximum range. For the temperature range of your fan, please check the data sheet.)

KBR/F

- Temperature range [°C] of transported air = -20 to 200 or up to 400°C/120 min (once)

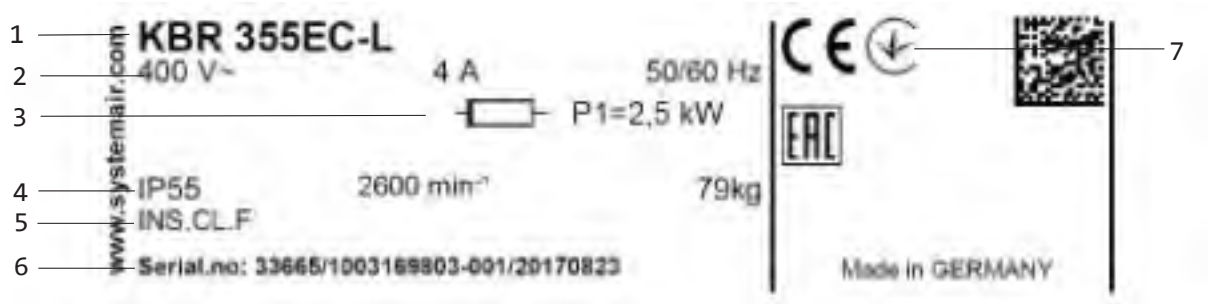
5.3 KBR and KBR/F

Table 2 Dimensions



KBR KBR/F	A	B	C	D	E	F	F KBR/F	G	H	J	K	K KBR/F	L	M
280	171,5	537	295	360	625	125	60	280	234	291	70	8	620	55
315	187,5	600	339	398	690	125	60	315	249	307	70	8	770	55
355	206,7	655	372	451	770	125	60	355	273	331	70	8	770	55

6 Name plate and type key



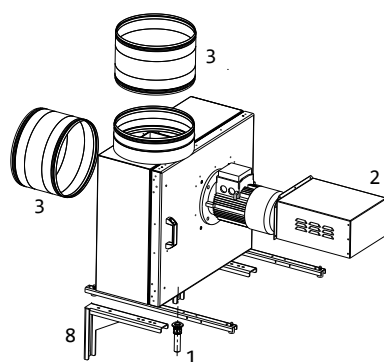
- | | | | |
|---|---|---|---|
| 1 | Type designation | 5 | Insulation class |
| 2 | Voltage/current/frequency | 6 | Article number/production number/manufacturing date |
| 3 | Input power | 7 | Certifications |
| 4 | Enclosure class/fan impeller speed/weight | | |

Table 3 Type key

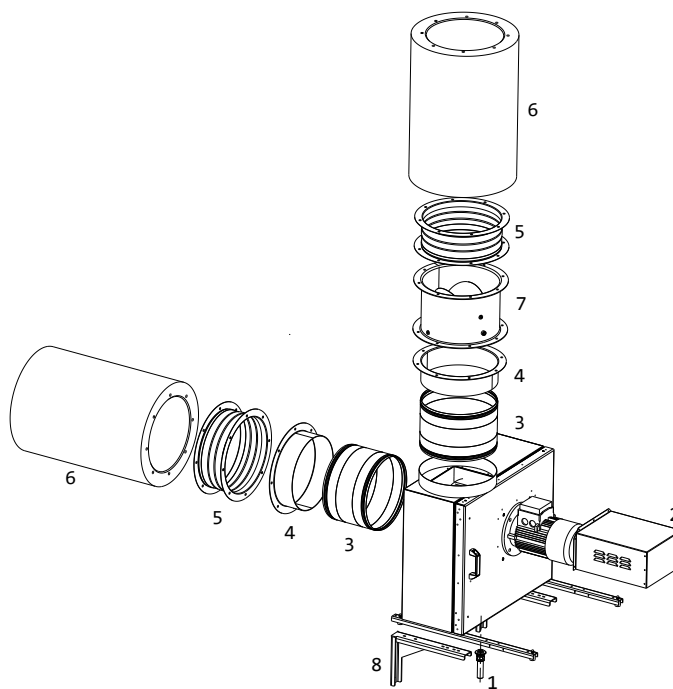
KBR	355	EC	-L	
			-L	More power version
				Normal power version
			-K	Lesspower version
			Motor type	
			EC	Electronically commutated/1 phased or 3 phased
			E4	4 poled/controllable by frequency converter/1 phased
			DV	4 poled voltage controllable/3 phased
			D2	2 poled/controllable by frequency converter/3 phased
			D2-4	2-4 poled/controllable by frequency converter/3 phased
			Duct Diameter	
			Fantype	
			KBR	Thermo fan
			KBR/F	Thermo fan —Smoke extraction fan

7 Accessories

For details of the accessories, please check our online catalog or contact Systemair.



Accessories KBR



Accessories KBR/F

Table 4 Accessories

1	ALS-KBR	Drain plug	5	EVH	Flexible connection AXC400°C
2	WSD-KBR-2	Weather roof for motor	6	RSA	Silencer
3	ASF	Flexible connection	7	LRK	Air-operated damper
4	UGF	Transition flange		WBK	Wall bracket

8 Installation

Safety information

- ◆ Observe *2 Important safety information*, page 1
- ◆ Use installation material with fire resistance classes that meet temperature requirements.
- ◆ Provide contact and intake protection and ensure safety distances according to DIN EN ISO 13857 and DIN 24167-1.
- ◆ To reduce transmission of vibration to the duct system, we recommend flexible connections from our accessory range, see chapter Accessories.

Preconditions

- ◆ Ensure that the fan and all its components are undamaged.
- ◆ Fit the fans in such a way that there is sufficient access for installation, troubleshooting, maintenance and repair.
- ◆ Protect against dust and moisture when installing.
- ◆ Ensure that the information on the name plates (fan and motor) matches up with the operating conditions.

Important

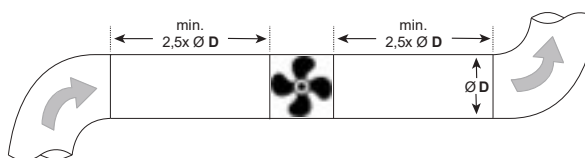
Damage to the bearings or other parts of the fan can occur.

- ◆ Do not place a duct bend directly before or after the fan!
- ◆ Ensure a smooth and constant air flow to the device.

Important

Damage to the bearings or other parts of the fan can occur.

- ◆ Do not place a duct bend directly before or after the fan!
- ◆ Ensure a smooth and constant air flow to the device.



- Round duct system: D = Nominal diameter
- Rectangular duct system: D = Hydraulic diameter

Installation positions**Important**

Damage to the fan if condensation water cannot drain.

- ◆ Ensure that the drain plug is always at the lowest point of the fan to ensure that the condensation water can drain.

8.1 Assembly/Disassembly impeller — Internal rotor motor

If an external rotor motor is used, the motor and impeller can't be separated.

Important

Damage to the motor and impeller.

The ball bearing of the motor and the balanced impeller may be damaged by forceful impacts.

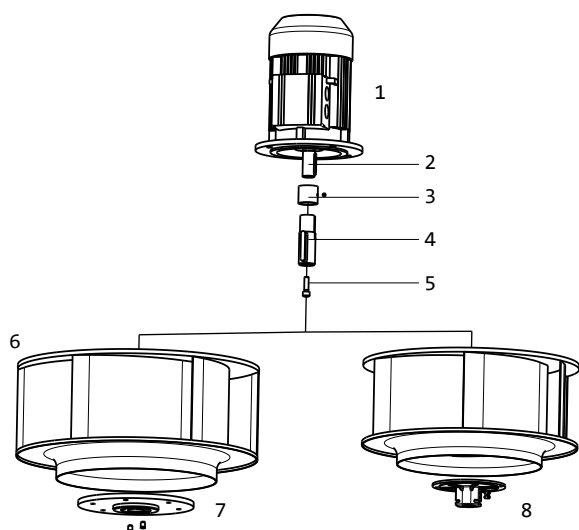
- ◆ Attach the impeller and/or the shaft extension to the shaft or the rotor without forceful impacts.
- ◆ Do not separate the impeller and the hub. They were balanced as one unit by Systemair.

**Note:**

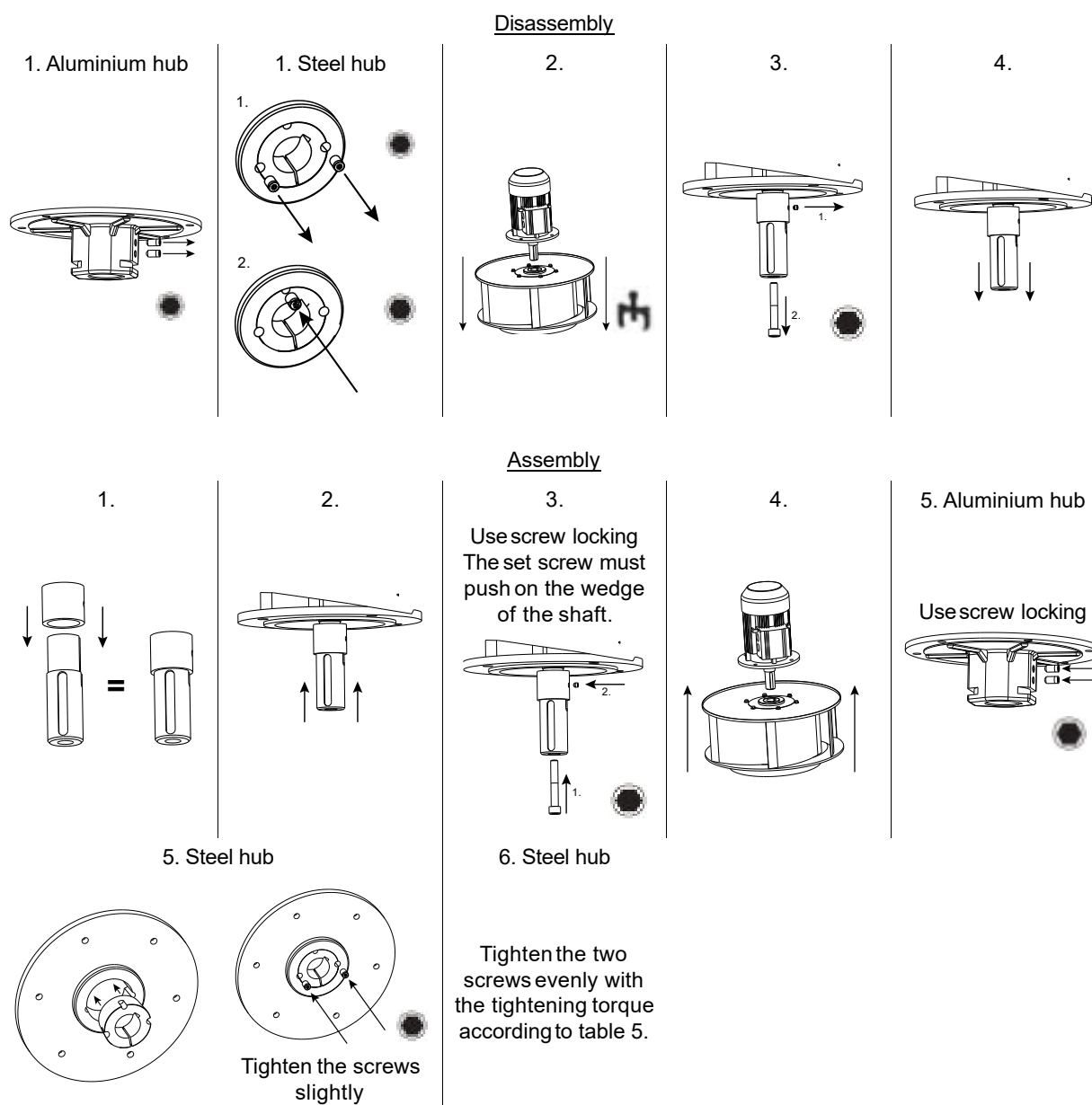
The hub can be heated for easier assembly and disassembly, for example with a hot-air blower.

- Precondition for assembly: the wedge is in the intended groove.
- Tools: hexagon socket wrench and suitable tool for removal, torque wrench for the taper clamping bush.

- 1 Motor
- 2 Motor shaft
- 3 Sleeve (not available at every fan)
- 4 Shaft extension (not available at every fan)
- 5 Hexagon socket screw
- 6 Impeller
- 7 Steel hub
- 8 Aluminium hub



The hub is shown without impeller due to better lucidity.

**Table 5 Tightening torques for various types of bush**

Type of bush	1008	1108	1210	1215	1310	1610	1615	2012	2517	3020
Tightening torque [Nm]	5.7	5.7	20	20	20	20	20	31	49	92

9 Electrical connection

Safety information

- ◆ Observe *2 Important safety information*, page 1
- ◆ Prevent the ingress of water into the connection box.

Connection

- ◆ Check if the data on the nameplate matches the connection data.
- ◆ Complete the electrical connection according to the circuit diagram.
- ◆ Fans with EC-motors must be switched on/off via the control input.
- ◆ Connect the cable end in a dry environment.
- ◆ Install a circuit breaker in the permanent electrical installation, with a contact opening of at least 3 mm at each pole.

Protective grounding wire

The protective grounding must have a cross-section equal to or greater than that of the phase conductor.

Residual current circuit breaker

All-current-sensitive residual current circuit breakers are required for use in alternating-current systems with 50/60 Hz, in combination with electronic devices such as EC motors, frequency converters or uninterruptible power supplies (UPS).

9.1 Electrical connection accessories

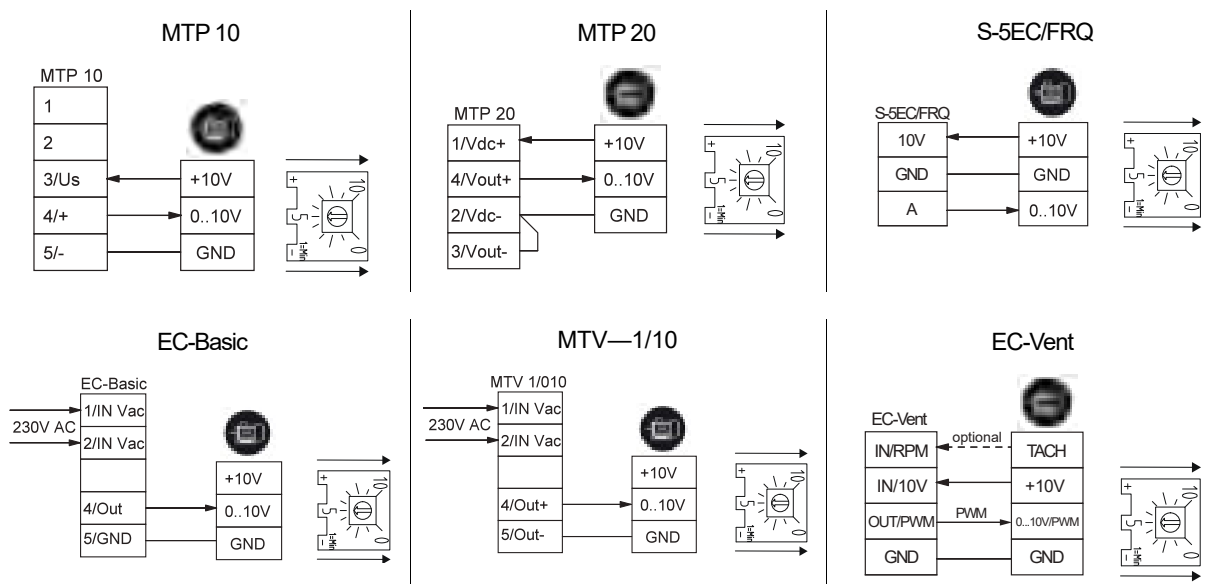
The following wiring diagrams show the electrical connections between accessories and fans (with EC motor) or frequency converters (e.g. FRQ, FRQS, FXDM) which can be controlled with a 0–10V signal. If you are not sure if your fan is equipped with an EC-motor please see chapter 6 *Name plate and type key*, page 5.

motor/frequency
converter



Wire- colours of motors with carried out cables: +10V = red 0..10V/PWM = yellow GND = blue

Control via 0–10V signal



Control via switching on / off

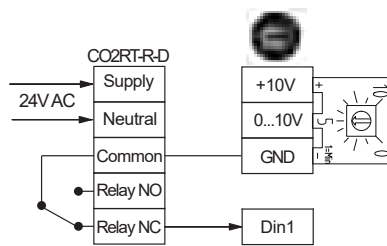
The following fans are equipped with a DIN1 connection:

KBR355EC-L

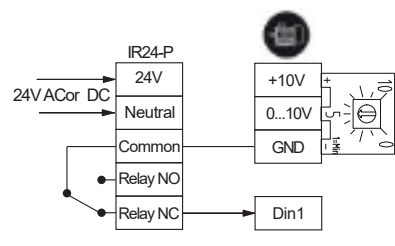
Din1: enable electronics

- enable: pin open or voltage 5–50 V DC
- disable: bridge to GND

CO2RT-R(-D)



IR24-P



9.2 Protecting the motor



Note:

In fans equipped with an EC motor, there is no additional motor protection needed. The motor protection is integrated in the electronics of the motor.

Important

Damage to motor due to overcurrent, overload or short circuit.

- ◆ Lead-out temperature monitors must be integrated in the control circuit in such a way that, if a fault occurs, the motor cannot switch on again automatically after it has cooled down.
- ◆ Motor lines and temperature monitor lines should be laid separately on principle.
- ◆ Without thermal protection: Use a motor protection switch!

9.3 Variable-speed fans



Warning

Resonant frequencies may result in increased vibration in certain speed ranges. These vibrations may destroy components.

- ◆ Only operate the fan outside these speed ranges.
- ◆ Passthrough these speed ranges so quickly that any vibration cannot exceed the admissible resonant frequency values.
- ◆ Observe the operating instructions of the frequency converter.



Caution

Damage as a result of incorrect commissioning of the frequency converter.

- ◆ Install the fan and frequency converter as near as possible to one another.
- ◆ Use shielded cables.
- ◆ All components (fan, frequency converter and motor) must be grounded.
- ◆ Avoid running the fan via the frequency converter below 10 Hz.
- ◆ Heating of the motor due to use of a variable frequency drive must be checked in the application by the customer.
- ◆ Never exceed the maximum impeller rotation speed indicated on the name plate of the fan.
- ◆ In any case Systemair recommends an all-pole sine filter if the fan is operated with a frequency converter.

10 Commissioning

Warranty claims can only be made if commissioning work is carried out correctly and written evidence thereof is provided.

Safety information

- ◆ Observe *2 Important safety information*, page 1

Preconditions

- | | |
|--|---|
| <ul style="list-style-type: none"> ◆ Installation and electrical connection have been correctly performed. ◆ Before switching the fan on, check for externally visible damage and ensure that the protective equipment functions properly. | <ul style="list-style-type: none"> ◆ Inlet and outlet are free. ◆ Cable glands are tight. ◆ Safety devices have been fitted. |
|--|---|

Commissioning of speed-controlled fans

Check the fan for vibrations at all normal operation speeds during commissioning. Determine and evaluate vibrations on the housing and bearing areas in accordance with DIN ISO 14694 depending on motor power and positioning.

Measurable vibration velocities depend e.g. on following factors:

- positioning
- bottom section/foundation state
- flow conditions

The working point of the fan, as well as used external devices and accessories, also influence the running characteristics.

Tests

Do the tests requested in the commissioning report (16 *Commissioning Report*, page 15)

11 Operation

Safety information

- ◆ Observe *2 Important safety information*, page 1

12 Troubleshooting/maintenance/repair

Safety information

◆ Observe *2 Important safety information*, page 1

12.1 Troubleshooting

Table 6 Troubleshooting

Fan does not run smoothly	Impeller imbalance	Rebalancing by a specialist company if possible, otherwise contact Systemair.
	Soiling on the impeller	Clean carefully, rebalance
	Material decomposition on the impeller due to aggressive material conveyed.	Contact Systemair
	Impeller rotates in wrong direction.	Changedirection of rotation (swap two phases in case of a 3-phase motor). Contact Systemair
	Deformation of impeller due to excessive temperature.	Ensure that the temperature does not exceed the certified value/Install new impeller.
	Vibrations, oscillations	Check the installation of the fan/check the duct system, see 8 <i>Installation</i> , page 6.
	Fan operation in resonant frequency range	Consider chapter 9.3 <i>Variable-speed fans</i> , page 10
Air output of fan too low	Impeller rotates in wrong direction.	Changedirection of rotation if possible, otherwise contact Systemair.
	Wrong wiring configuration (e.g. Y instead of Delta).	Check and possibly correct the wiring configuration.
	Pressure losses too high.	Optimize the line routing.
	Flow regulators not or only partly open.	Check opening position on site.
	Intake or pressure ducts are blocked.	Remove the blockage.
Grinding sounds when starting or operating the fan	Check if the duct connections of the fan are strained.	Loosen the duct connections and realign it.
Thermal contacts/resistors have triggered	Impeller rotates in wrong direction.	Changedirection of rotation (swap two phases in case of a 3-phase motor).
	Missing phase	In case of a 3 phase standard motor (not EC), check if all 3 phase are present.
	Motor overheated	Check the cooling impeller (if used), measure the motor winding (if possible) / contact Systemair.
	Capacitor (if used) not or not correctly connected.	Connect the capacitor correctly.
	Motor blocked	Contact Systemair
Fan does not reach nominal speed	Defective motor winding	Check the winding by resistance measurement (if possible). Contact Systemair
	Control units (if used) such as frequency converter or transformer are set incorrectly.	Correct the settings of the control units.
	Mechanical blockage	Remove the blockage.

Troubleshooting cont'd

Motor does not rotate	Faulty supply voltage	Check the supply voltage, re-establish the voltage supply.
	Faulty connection	Allow the motor to cool down, find and resolve the cause of the fault.
	Temperature monitor has responded.	Allow the motor to cool down, find and resolve the cause of the fault.
Electronics/motor overheated	Insufficient cooling	Improve cooling.
	Overloaded motor	Check if the correct fan is used for your application.
	Ambient temperature too high	Check if the correct fan is used for your application.



Note:

For all other damage/defects, please contact Systemair.

12.2 Maintenance

Warranty claims can only be made if maintenance work is carried out correctly and written evidence thereof is provided.

We recommend regular maintenance intervals to ensure continuous fan operation. These maintenance intervals are specified in the "Activities" table below. In addition, the operator must carry out follow-up activities such as cleaning, replacing defective components or other corrective measures. For traceability reasons, a maintenance plan must be created which documents the work carried out. This must be created by the operator. If the operating conditions are "extreme", the maintenance intervals must be reduced so that maintenance is carried out more frequently. Examples of extreme operating conditions:

- Kitchen exhaust fans
- Durable ambient temperature > 30 °C or < -10 °C, or temperature fluctuations > 20 K

Table 7 Activities

Activity	Normal operating conditions		Extreme operating conditions	
	Every six months	Annually	Quarterly	Every six months
Check the fan and its components for visible damage, corrosion and contamination.		X		X
Check the impeller for damage and imbalance.		X		X
Check the condensate drain is working correctly.		X	X	
Clean the fan/ventilation system (see 13 <i>Cleaning</i> , page 14).	X		X	
Check the screwed connections for damages/defects and check that they are firmly seated.		X	See normal operating conditions	
Check the fan intake is free from contamination.		X		X
Check that the fan and its components are being used correctly.	X		See normal operating conditions	
Check the current consumption and compare this with the rated data.		X		X
Check the vibration dampers (if used) are working correctly and check for visible damage and corrosion.		X	See normal operating conditions	
Check the electrical and mechanical protective equipment is working correctly.		X	See normal operating conditions	
Check the fan's rating plate is legible.		X		X

Activities cont'd

Check the connection clamps and screwed cable connections for damage/defects, and check that they are firmly seated.		X	See normal operating conditions
Check the flexible connectors for damage.	X		See normal operating conditions

Spare parts

- ◆ Use original spare parts from Systemair only.
- ◆ When ordering spare parts, please specify the serial number of the fan. This can be found on the name plate.

13 CleaningSafety information

- ◆ Observe *2 Important safety information*, page 1

Procedure

Keeping the fan clean extends its service life.

- Install a filter monitor.
- Change the filters of the ventilation system.
- Do not use steel brushes or sharp-edged objects.
- Do not use a high-pressure cleaner (steam jet cleaner) under any circumstances.
- Do not bend the fan blades when cleaning.
- When cleaning the impeller, pay attention to balance weights that have been positioned
- Keep the airways of the fan clear and clean them if necessary with a brush.

14 Deinstallation/dismantling

Deinstall and dismantle the fan in reverse order of installation and electrical connection.

15 Disposal

- ◆ Ensure material is recycled. Observe national regulations.
- ◆ The device and the transport packaging are predominantly made from recyclable raw materials.
- ◆ Disassemble the fan into its components.
- ◆ Separate the parts according to:
 - reusable material
 - material groups to be disposed of (metal, plastics, electrical parts, etc.)

16 Commissioning Report

Warranty claims can only be made if commissioning work is carried out correctly and written evidence thereof is provided.

Fan			
Description:			
Article no.:		Manufacturing order no.:	
Installer			
Company:		Contact person:	
Company address:			
Tel. no.:		Email:	
Operator (Place of installation)			
Company:		Contact person:	
Company address:			
Tel. no.:		Email:	
Type of connection	Yes	No	
Directly to mains	☐	☐	
0-10 V signal (ECmotor)	☐	☐	
via contactor control	☐	☐	
Transformer	☐	☐	
Frequency converter	☐	☐	
	Sinusfilter	☐	☐
	Shielded cables	☐	☐
Motor protection	Yes	No	
Motor protection switch or motor protection relay	☐	☐	
PTCresistor	☐	☐	
	Resistance value [Ω]:		
Thermal contact	☐	☐	
Electrical motor protection	☐	☐	
Others:			
Functional check	Yes	No	
Impeller easily rotatable (by hand)	☐	☐	
Rotation direction acc. to directional arrow	☐	☐	
Smooth running without unusual noise/ vibrations	☐	☐	
Nominal data - Fan (name plate on fan housing)			
Voltage [V]:		Current [A]:	
Frequency [Hz]:		Power [kW]:	
Fan impeller speed [rpm]:			
Measured data at commissioning			
Voltage [V]:		Temp. of transported air [$^{\circ}\text{C}$]:	

Current L1 [A]*:	Fan impeller speed [rpm]:
Current L2 [A]:	Air volume [m³/s]:
Current L3 [A]:	Differential pressure [Pa]*:
*For single-phase fans, fill in line "Current L1 [A]"	*Δ- Pressure between suction-side and discharge of the fan

If an air flow measurement is not possible, this value can be calculated using the following formula:

	X	=	
Duct cross-section [m²]	Flow speed [m/s] Grille measurement acc. to VDI 2044		Air volume [m³/s]:

	Yes	No
Commissioning of the fan successful?	☐	☐

Date, installer's signature

Date, operator's signature

17 EUDeclaration of conformity

The manufacturer: Systemair GmbH
Seehöfer Straße 45
97944 Boxberg
Germany

Product designation: Thermo fans

Type designation: AxZent; KBR; MUB-K; MUB/T; MUB/T-S; DVN; DVNI

Since year of manufacture: 2018

The manufacturer declares that the above mentioned products in their design and construction and the version marketed by us complies with the harmonization legislation listed below:

EU directives:	2006/42/EC	Machinery directive
	2014/30/EU	Directive electromagnetic compatibility (EMC)
	2011/65/EU	RoHS directive

18 EUDeclaration of conformity — Smoke extract fans

The manufacturer: Systemair GmbH
Seehöfer Straße 45
97944 Boxberg
Germany

Product designation: Smoke extract fans

Type designation: KBR/F; MUB/F

The manufacturer declares that the above mentioned products in their design and construction and the version marketed by us complies with the harmonization legislation listed below:

EU directives:	2006/42/EC	Machinery directive
	2014/30/EU	Directive electromagnetic compatibility (EMC)
	2011/65/EU	RoHS directive



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SILENCER

NOISE ATTENUATOR

SILENCER

WHAT DOES A SILENCER DO?

The purpose of the silencer is to attenuate the noise

WHAT ARE THE KEY BENEFITS OF THE FAN?

Effectively reduces sound in the duct route, by upto 22dB

MANUFACTURER

Systemair Ltd, Unit 28, Gravelly Industrial Park, Birmingham, B24 8HZ, England

MODELS AVAILABLE

LDC 315-900 Silencer

TECHNICAL & MAINTENANCE

See Next Page

SILENCER

TECHNICAL SUMMARY

LDC 315-900 Silencer

Round, for air handling units

Item Number: [5197](#)

Silencer

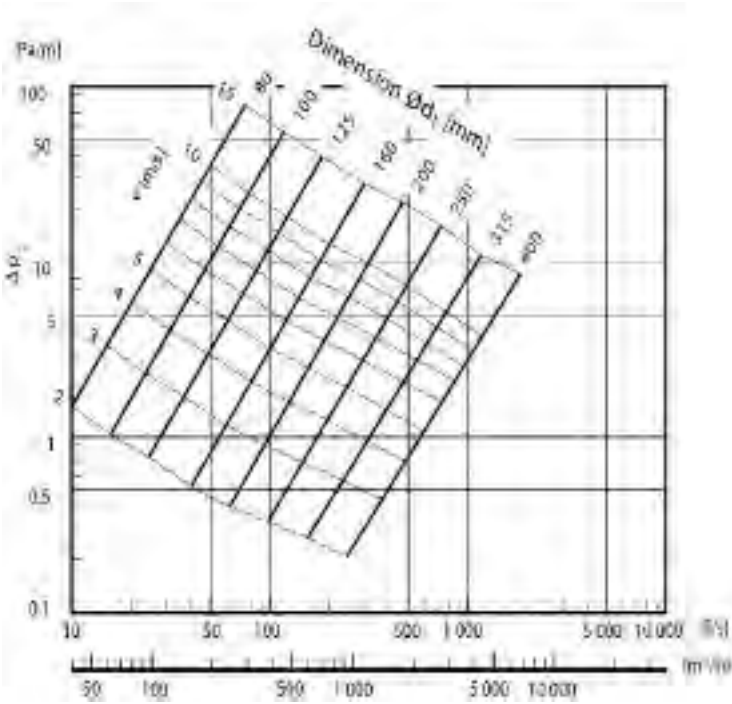
Easily-fitted silencer for circular ducts, fitted with a connection that complies with the spiral duct standard. The LDC effectively reduces noise in the duct. Two silencers can be used together in installations where noise reduction is a particularly strong requirement. This is very effective. For the most effective noise reduction, the silencer should be fitted immediately behind a fan or bend. The silencer should be used together with an insulated fan where there is a requirement for noise reduction both in the duct and in the surroundings as a whole. Insulation thickness 50 mm.



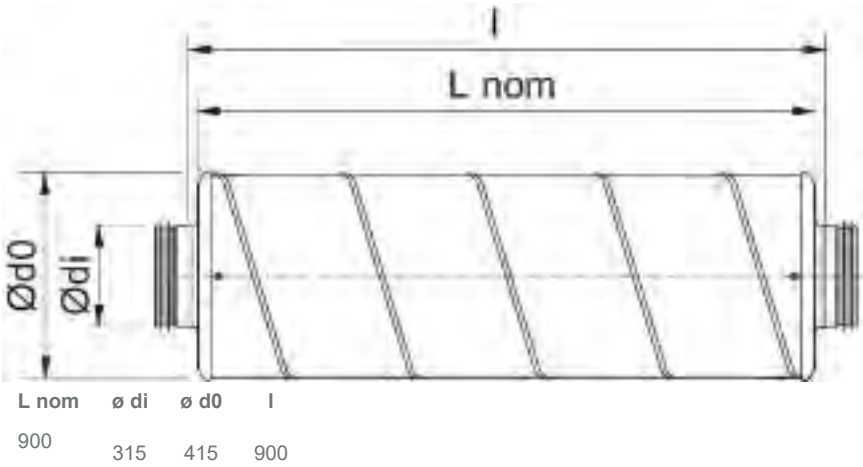
Technical parameters

Dimensions and weights		
Duct dimension; Circular, inlet	315	mm
Duct dimension; Circular, outlet	315	mm
Weight	15	kg
Others		
Duct connection type	Circular	

Performances



Dimension



Acoustic

Noise suppression dB (mid-frequency Hz)

	63	125	250	500	1k	2k	4k	8k
LDC 100-300	2	2	6	14	21	25	20	11
LDC 100-600	4	3	11	24	36	49	34	17
LDC 100-900	5	4	15	34	50	50	48	23
LDC 100-1200	6	5	19	45	50	50	50	29
LDC 125-300	2	2	6	13	16	20	15	10
LDC 125-600	3	3	9	23	30	40	22	14
LDC 125-900	4	4	12	33	45	50	30	17
LDC 125-1200	5	5	15	43	50	50	38	21
LDC 150-300	1	2	4	10	12	15	8	8
LDC 150-600	-	3	7	20	27	31	16	11
LDC 160-300	1	2	4	10	12	15	8	8
LDC 160-600	2	3	7	19	27	29	14	11
LDC 160-900	2	4	10	28	42	43	20	15
LDC 200-300	1	2	5	8	10	11	5	5
LDC 200-600	2	3	7	16	21	23	9	8
LDC 200-900	2	4	8	24	32	34	13	10
LDC 250-600	3	2	7	13	17	16	8	6
LDC 250-900	3	4	8	20	26	23	10	8
LDC 315-600	0	2	6	11	14	9	4	5
LDC 315-900	1	3	7	16	22	12	6	7
LDC 355-900	-	3	6	13	18	10	6	7
LDC 400-900	1	3	5	10	13	7	5	6

CARBON FILTERS

CARBON FILTERS

CARBON FILTERS

WHAT IS A CARBON FILTER?

Our Sitesafe carbon filters are passive filters (unlike ESP's) and use panels of activated carbon to remove the malodorous gases within the commercial kitchen extract duct through the process of chemical adsorption. By installing our ESP units before our Sitesafe filters, the carbon life span is greatly increased, allowing it to nullify malodours at optimum efficiency for much longer.

HOW ARE THEY USED

These go into a filter housing and are often refillable or replaceable. They consist of activated carbon, manufactured from natural carbons such as coal, peat, or wood, and physically modified through chemical or thermal composition to give them a very large surface area per volume with sub-microscopic pores where adsorption takes place. Contaminants adhere to the carbon surface and are trapped. Carbon filters come in many varieties and should be adequate to the volume and demands of the overall air filtration system. They should be cleaned every 4-6 weeks.

MANUFACTURER

Purified Air Ltd, Lyon House, Lyon Rd, Romford, ESSEX, RM1 2GB, UK

MODELS AVAILABLE

Sitesafe PA240824 & Sitesafe 3 x PA240824

TECHNICAL & MAINTENANCE

See Next Page

CARBON FILTERS

TECHNICAL SUMMARY

Passive Filtration

At Purified Air we supply a range of passive filtration that can be used both in conjunction with our powered units or as standalone filters dependant on the situation.



The filters include:

- 1. Carbon Filters**
- 2. Absolute (HEPA) Filters**
- 3. Bag Filters**
- 4. Pleated Panels**

Carbon Filters

We manufacture Sitesafe carbon filters, these innovative carbon units measure 594x196x597mm, three combining to 594x594x597mm, directly replacing our original carbon blocks whilst providing exactly the same filter performance as an existing full size cell.

Their advantage is that they only weigh 18kg each against the 68kg of our original blocks. This takes the strain out of fitting and servicing, allowing only one

engineer to complete the task where two had been previously required.

Our Sitesafe carbon filters use panels of activated carbon to remove the malodorous gases within the commercial kitchen extract duct through the process of chemical adsorption. By installing our ESP units before our Sitesafe filters, the carbon life span is greatly increased, allowing it to nullify malodours at optimum efficiency for much longer.

Will require two people plus lifting equipment to carry and install.



Carbon PA242424

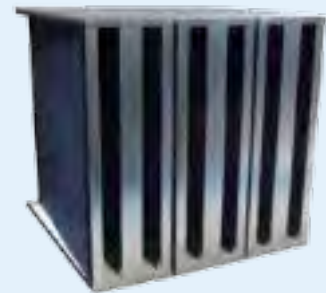
Size	594 x 594 x 597
Gross Weight	68.2Kg
Carbon Weight	50Kg
Rated Airflow	3600m ³ /hr*
Pressure Drop	120Pa

Safe for one person to carry.
No special lifting equipment required.



Sitesafe PA240824

Size	594 x 196 x 597
Gross Weight	17.95Kg
Carbon Weight	16.6Kg
Rated Airflow	1200m ³ /hr*
Pressure Drop	120Pa



Sitesafe 3 x PA240824

Size	594 x 594 x 597
Gross Weight	53.85Kg
Carbon Weight	50Kg
Rated Airflow	3600m ³ /hr*
Pressure Drop	120Pa

*Rated Airflow based on a dwell time of 0.1 seconds. Available in all sizes to retrofit carbon cells

Carbon Filter Cell Part Number	Nominal Size (inches)	Height (mm)	Width (mm)	Depth (mm)	Weight of Encased Carbon (Kg)	Weight of Entire Cell (Kg)	Capacity @ 0.1 Second Dwell Time M3/h
PA-240824-7C "Site Safe"	24 x 08 x 24	594	196	597	17	18	1266
PA-242412-7C	24 x 24 x 12	594	594	297	25	36	1900
PA-242424-7C	24 x 24 x 24	594	594	597	50	61	3800

Please find our most popular sizes above, we do supply many different sizes and grades of carbon filters so please contact us with your requirements.

Absolute (HEPA) Filters

To qualify to be called a High-Efficiency Particulate Air or HEPA filter, the filter must be able to remove, from the air that passes through it, 99.97% of particles down to a sub-micron level. Our main use of HEPA filtration is the removal of smoke particles.

We do supply many different sizes and grades of HEPA filters so please contact us with your requirements.



Bag Filters

Our general purpose bag filters are manufactured using a galvanised steel header to retain the pocket sets.

The pockets are produced from synthetic micro-fibres specifically designed for use in air filtration. They can be applied as a pre filter to carbon cells in malodour extraction, taking out oil and grease particles ahead of the carbon filter stage.



Pleated Panels

Our pleated panel filters are constructed using a core of pleated fibrous media designed specifically for use in air filtration. This is then thermally bonded onto a galvanised steel support mesh for maximum rigidity which is then fully bonded into a moisture resistant rigid white lined card frame. These filters are used as stand-alone pre filters or as a pre filter to bag filters filtering oil and grease particles.



Panel Filter Part Number	Nominal Size (inches)	Height (mm)	Width (mm)	Depth (mm)	Rated Airflow m3/s
FILTER023	24 x 24 x 2	594	594	45	0.705
FILTER024	24 x 24 x 4	594	594	95	0.945

Please find our most popular sizes above, we do supply many different sizes and grades of panel filters so please contact us with your requirements.

With all of our filter range we hold stock of our most commonly requested sizes but of course we can manufacture to order, given sufficient lead times.



FreePhone (UK Only) 0800 018 4000
International +44 1708 755414

Purified Air Limited, Lyon House, Lyon Road, Romford, Essex, RM1 2BG.

www.purifiedair.com | enq@purifiedair.com

ELECTROSTATIC PRECIPITATORS

ESP

WHAT IS AN ESP?

Electrostatic separators (ESP) are used to separate solid or liquid particles from ventilation air. The particles distributed in the gas are electrostatically charged so that they stick to collection plates.

The main components of an ESP are the filter housing, discharge and collecting electrodes, power supply, gas guides or baffles and a rapping system for cleaning the collecting plates.

HOW EFFECTIVE ARE THEY?

ESPs can be designed to eliminate extensive quantities of smoke, giving collection efficiencies of 99% at 1 μm and 90% at 0.1 μm .

The effectiveness of an ESP is limited to removing the grease that adheres to smoke and should not be considered to be a primary source of odour control.

The types of ESP that are used to treat kitchen ventilation emissions are less effective at temperatures over 60°C and are not suitable for relative humidity levels of above 75%.

Where an ESP is used to treat oily fume the collecting plates can become fouled, rendering them less effective. Weekly servicing should be the minimum requirement and they should be cleaned immediately as soon as there is any sign of deterioration in fume control.

MANUFACTURER

Purified Air Ltd, Lyon House, Lyon Rd, Romford, ESSEX, RM1 2GB, UK

MODELS AVAILABLE

ESP 1500E, ESP 300E, ESP 4500E & ESP 6000E

TECHNICAL & MAINTENANCE

See Next Page

TECHNICAL SUMMARY

Our ESP Range

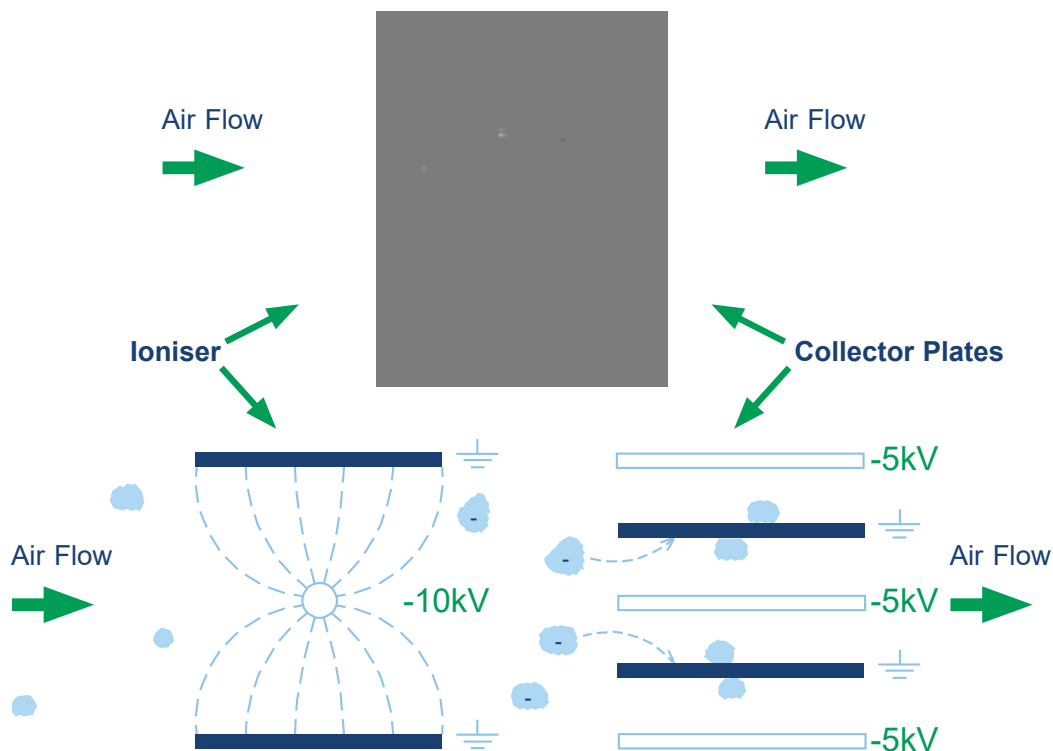


ESP 4500

- ESP 1500E which can handle up to 0.7m³/sec of air flow
- ESP 3000E which can handle up to 1.4m³/sec of air flow
- ESP 4500E which can handle up to 2.1m³/sec of air flow
- ESP 6000E which can handle up to 2.8m³/sec of air flow

Our ESP's have been specifically designed for kitchen extract systems; they have integral sumps to collect the oil, grease and smoke particles filtered out of the exhaust. This not only simplifies servicing but eradicates potentially dangerous spillage from the bottom of the units and greatly cuts down on build-ups of grease within the ducting.

The ionisation voltage has been designed to run at a negative potential which enhances the ionisation of particles and also produces more ozone which is helpful in reducing cooking odours.



The above diagram shows, in a basic visual, how an electrostatic precipitator works. As air passes into the combined ioniser / collector cell, the particulates in the air stream are polarised to a negative potential. As they continue through the ioniser and between the collector cell plates, the polarised particulates are repelled away from the negatively charged plates and attracted to the earthed plates where they stick and so are filtered out of the air flow.

Our ESP units fit in-line with the kitchen ducting and can be configured modularly to cope with all extract volume requirements.



1. Cooking particulates and odours
2. Canopy Grease Filter
3. ESP - Particulate Control Unit
4. Airflow

KEY FEATURES

- Eliminates up to 98% of oil, grease and smoke particles
- Filters particles down to sub-micron levels
- Produces Ozone to help reduce malodours
- Designed with an integral sump
- Modular in design
- Specifically designed for commercial kitchen application
- Energy efficient: - uses no more than 50W
- Greatly reduces grease build-up within the duct run



3 ESP Units Stacked in modular formation



4 ESP Units Stacked in modular formation with a double pass

Technical Specification

	ESP 1500E	ESP 3000E	ESP 4500E	ESP 6000E
Electrical Supply	220/240V 50Hz	220/240V 50Hz	220/240V 50Hz	220/240V 50Hz
Power Consumption	20 Watts	30 Watts	40 Watts	50 Watts
Max Air Volume	up to 0.7m ³ /sec	up to 1.4m ³ /sec	up to 2.1m ³ /sec	up to 2.8m ³ /sec
Dimensions W/H/D	450mm/630mm/ 640mm	900mm/630mm/ 640mm	1350mm/630mm/ 640mm	1800mm/630mm/ 640mm
Weight	55Kg	85Kg	118Kg	153Kg

**TECHNICAL & OPERATIONS
MANUAL**

Electrostatic Precipitation (ESP) Filter Unit



Technical and Operations Manual

For Models: ESP 1500EI
ESP 3000EI
ESP 4500EI
ESP 6000EI

Using this Manual

This manual is intended to be used as a work of reference for professional, well trained and authorised users to assist them to safely install, use, maintain and repair the Unit mentioned on the cover of this document.

Please note that it is strongly recommended training be given by Purified Air Limited prior to operatives attempting to carry out maintenance or repair work on these Units.

Copyright Statement

All rights reserved

No part of this publication may be copied or published by means of printing, photocopying, microfilm or otherwise without prior written consent of the manufacturer. This restriction also applies to the corresponding drawings and diagrams.

The information given in this manual has been collected for the general convenience of our clients. It has been based on general data pertaining to construction material properties and working methods known to us at the time of issue of the document and is therefore subject at any time to change or amendment and the right to change or amend is hereby expressly reserved. The instructions in this publication only serve as a guideline for installation, use, maintenance and repair of the models mentioned on the cover page of this document.

This manual is to be used for the standard models of the Unit of the types given on the cover page. Thus the manufacturer cannot be held responsible for any damage resulting from the application of this manual to the version actually delivered to you.

This manual has been written with great care. However, the manufacturer cannot be held responsible, either for any errors occurring in this manual or their consequences.

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1. Safety

1.1 Introduction

Everyone working on or with the Unit must be familiar with the contents of this manual and must strictly observe the instructions herein.

The Management should instruct personnel in accordance with this manual and observe all instructions and directions given herein.

Note: Always follow the steps for any instructions in this manual in the order given.

Always keep this manual with the Unit.

The user of the Unit is always fully responsible for observing all applicable local safety instructions and regulations.

Specific working conditions or selected accessories may require additional safety instructions. Contact your supplier immediately if you detect a potential danger when using the Unit.

1.2 Safety Warnings and Instructions

The following symbols and notifications are used in this manual:



WARNING!

Used to warn of a risk of injury or death.



WARNING! - DANGER OF ELECTRIC SHOCK!

Used to warn of a risk of injury or death from electric shock.



CAUTION

Used to caution of a risk of damage to equipment.



INFORMATION

Important information or useful hints about usage.



RECYCLING

Recycling information.



WEEE REGULATIONS

Ensure that waste electrical equipment is disposed of correctly.

1.3 Pictograms, Warnings and Instructions Displayed on the Unit

The pictograms, warning and instructions attached to the Unit are part of the safety features.

They must not be covered or removed and must be present and legible during the entire life of the Unit.

- Immediately replace or repair damaged or illegible pictograms, warnings and instructions.

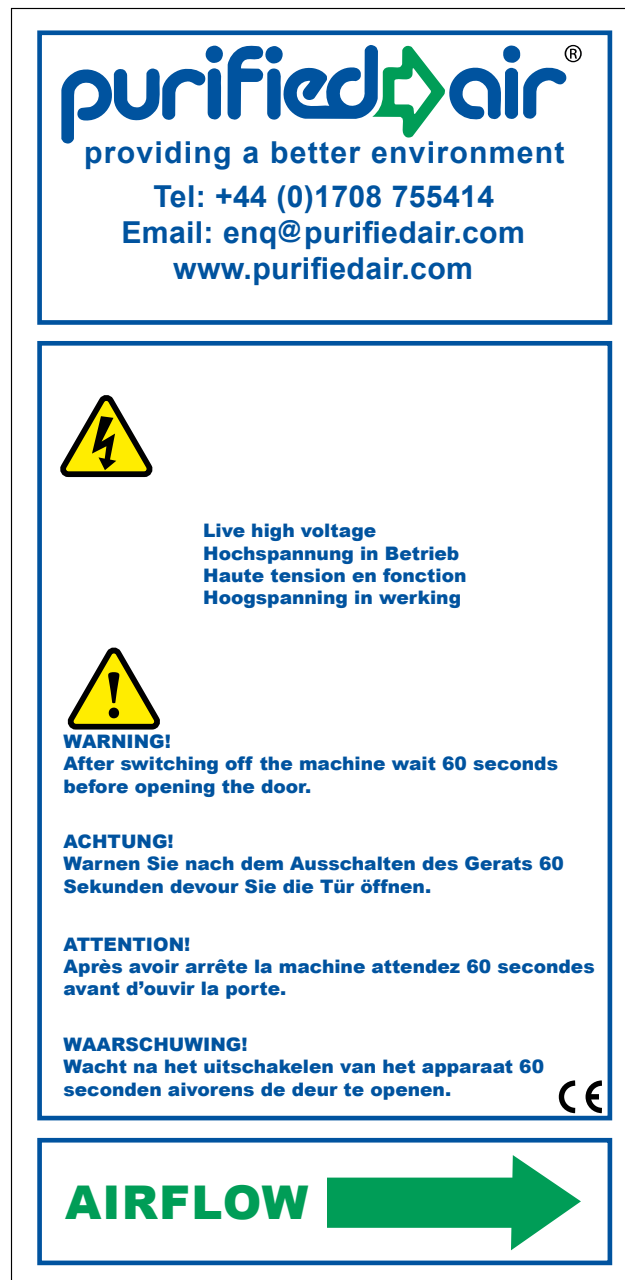


Figure 1 - Unit Label

1.4 Safety Features

An Interlock in the Unit's Door Assembly interrupts the mains power if the main filter compartment is opened before the mains power has been isolated.



CAUTION

All safety features must be correctly installed and can only be removed for maintenance and repair tasks by skilled and authorised service engineers.

The Unit must not be used if the safety features are not fully present or defective.

The safety features should be regularly checked to ensure that they are functioning correctly and, if defective, should be repaired immediately.

1.5 Safety Warnings and Cautions



WARNING! RISK OF EXPLOSION!

The Unit is not explosion-proof rated. It can cause sparks and should therefore not be used in areas with an explosion risk.



WARNING! Fire Hazard!

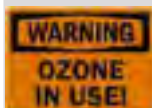
Never use the Unit for extracting and/or filtering inflammable, glowing or burning particles or solids or liquids.

Never use the Unit for extracting and/or filtering of aggressive fumes (such as hydrochloric acid) or sharp particles.



WARNING!

Ozone (O₃) is produced by the Unit. Ozone can be poisonous at low concentrations.



Inhalation of ozone causes dryness of the mouth, coughing and irritates the nose, throat, and chest.

It may cause difficulty in breathing, headaches and fatigue, and could aggravate existing bronchial conditions including asthma. The characteristic sharp, irritating odour is readily detectable at low concentrations (0.01 to 0.05 ppm).

The Unit must not be operated without the kitchen's extractor fan(s) running.



WARNING! - DANGER OF ELECTRIC SHOCK!

To avoid electric shock:

Do not operate Unit without a proper electrical ground/earth.

Always disconnect power to the Unit and isolate the Unit, before performing any service or maintenance.

Do not operate the Unit if its power cables are damaged or if any other damage to the Unit is visible or suspected.

The supplied utility/mains power must match the power requirements listed on the Unit's rating label.



CAUTION

Regularly inspect the Unit and check it for damage.

Verify the correct functioning of all of the safety features.

Read and save all notices, warnings and safety instructions received with this Unit.

Do not alter the construction or design of this Unit.

Do not remove safety labels or devices.

Do not use this equipment for other than its intended purpose, as described in this manual.

Only use original spare parts.



CAUTION

Make sure the room is always sufficiently ventilated, particularly in smaller, confined areas.

Do not use the Unit at a relative humidity exceeding 75%.

Do not use the Unit at temperatures below -10°C or above 60°C.

Keep the operating controls free from dirt and grease.

Check the working environment. Do not allow unauthorised persons to enter the working environment.

Use common sense. Stay alert and pay attention to your work. Do not use the Unit when you are tired or under the influence of drugs, alcohol or medicine.

1.6 Modifications

Modification of the Unit is not permitted.

1.7 Users

Installation or maintenance of the Unit is exclusively reserved for authorised, trained and qualified users.

Temporary personnel and trainees should only access the Unit under the supervision and responsibility of the authorised, trained and qualified users.

1.8 Technical Specifications

There are currently four models in the range:

- ESP 1500EI, which contains a single ESP Collector Cell.
- ESP 3000EI, which contains two ESP Collector Cells.
- ESP 4500EI, which contains three ESP Collector Cells.
- ESP 6000EI, which contains four ESP Collector Cells.

The specification of each model is detailed below:

	ESP 1500EI	ESP 3000EI	ESP 4500EI	ESP 6000EI
Power consumption	20 Watts	30 Watts	40 Watts	50 Watts
Maximum air handling capacity	Up to 0.7m ³ /sec	Up to 1.4m ³ /sec	Up to 2.1m ³ /sec	Up to 2.8m ³ /sec
Dimensions	W 450mm H 630mm D 640mm	W 900mm H 630mm D 640mm	W 1350mm H 630mm D 640mm	W 1800mm H 630mm D 640mm
Weight	55kg	85kg	118kg	153kg
Power supply	220/240V 50Hz 1ph	220/240V 50Hz 1ph	220/240V 50Hz 1ph	220/240V 50Hz 1ph
Filter efficiency	Up to 98%	Up to 98%	Up to 98%	Up to 98%
Housing	Epoxy-coated galvanised steel	Epoxy-coated galvanised steel	Epoxy-coated galvanised steel	Epoxy-coated galvanised steel

1.8.1 Rating Plates

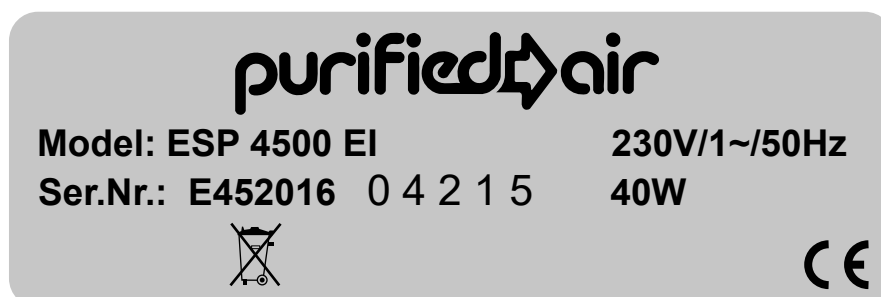
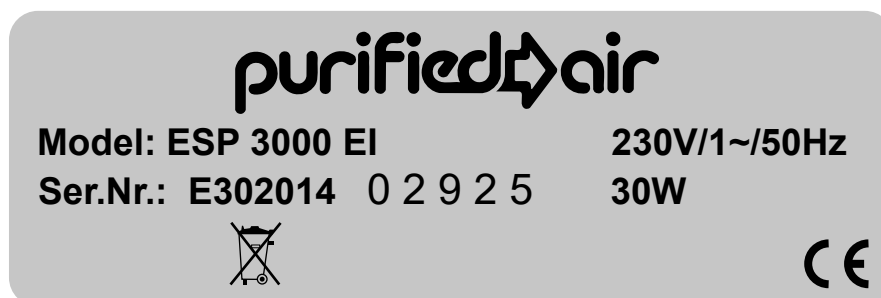
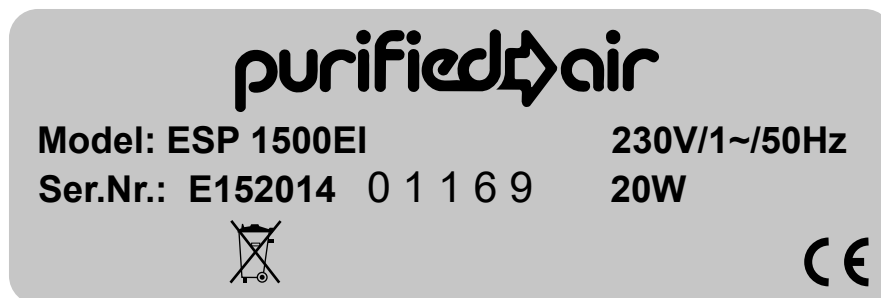


Figure 2 - Rating Plates for Each Model

2. Product Overview

2.1 Intended Use

The Electrostatic Precipitator (ESP) models covered by this manual have been designed primarily for filtering the extract air from commercial kitchens and have various specific features to suit that purpose.

Note: Though they can also be used for air filtration in other commercial and industrial applications where a high degree of filtration is needed, before considering alternative uses, please check with the manufacturer to confirm that your Unit will be suitable for its intended use.



CAUTION

No liability is accepted for damage or injury which results from any alternative use which has not been verified in writing by the manufacturer.

Using the Unit for alternative uses not approved in writing by the manufacturer is considered contrary to its intended use.

The Unit has been built in accordance with state-of-the-art standards and recognised safety regulations.

Individual Units can be mounted together in various combinations to satisfy the requirements of a particular installation.



CAUTION

Only use the Unit:

If it is not damaged in any way.

After following the instructions laid down in this manual.



Figure 3 - ESP Filter Unit (Model ESP 4500EI)

2.2 Features

The following features are applicable to all four models covered by this manual:

- They can be installed outside without an additional weather housing.
The Unit's casings is fully weatherproofed, with the Main Door components having an IP Rating of 64 and the Door Assemblies themselves being tightly sealed to the main chassis.
- The ionisation voltage runs at a negative potential which enhances both the ionisation of particles and their consequent precipitation and the production of ozone which helps eliminate odours in a kitchen environment.
- A high degree of efficiency, with power consumption between 20 Watts and 50 Watts, depending on the model.
- The Unit can be linked to a Building Management System (BMS) via a suitable relay mounted on the DIN rail (See: *Connecting the Unit to a Building Management System on page 21*).
- All internal components are designed for easy removal.
- The Mesh Filters (Pre and Post) are designed to drain independently and the Collector Cell is designed to be efficient, robust and effective.
- The Collector Cells and Filter Carriers can be easily removed for cleaning.
- The Collector Cells can be fitted with ionisation wires or with stainless steel spiked ioniser blades.
- All internal surfaces are as smooth and as free from screw and rivet heads as practically possible to allow for ease of cleaning.
- Fully welded sumps prevent leakage of collected grease. The inward sloping edges of the sumps encourage the flow of grease away from both the ducting and either side of the Unit.
- The Door Assemblies are designed to allow the Unit to be quickly reconfigured for different airflow directions.

2.3 Operating Principles

Commercial kitchen exhaust pollution is composed of two distinct phases:

- The particulate phase; oil, smoke and grease particles.
- The gaseous or odour phase.

2.3.1 Oil, Smoke and Grease Filtration

The primary function of Purified Air's range of Electrostatic Precipitators (ESPs) is to effectively filter the particulate phase (oil, smoke and grease) of extracted kitchen fumes.

The Unit covered by this manual utilises an ionisation process to filter particulates in the exhaust down to a sub-micron level, with an efficiency of up to 98% when fitted correctly.

The ESP Filters have been exclusively designed for filtering extracted kitchen fumes and have integral sumps built in to collect the oil and grease particles. This not only simplifies servicing but eradicates potentially dangerous spillage from the bottom of the Unit.

The entire range fits in-line with the kitchen's ducting and the modular layout allows additional Units to be easily added to cope with all kitchen fume extraction requirements.

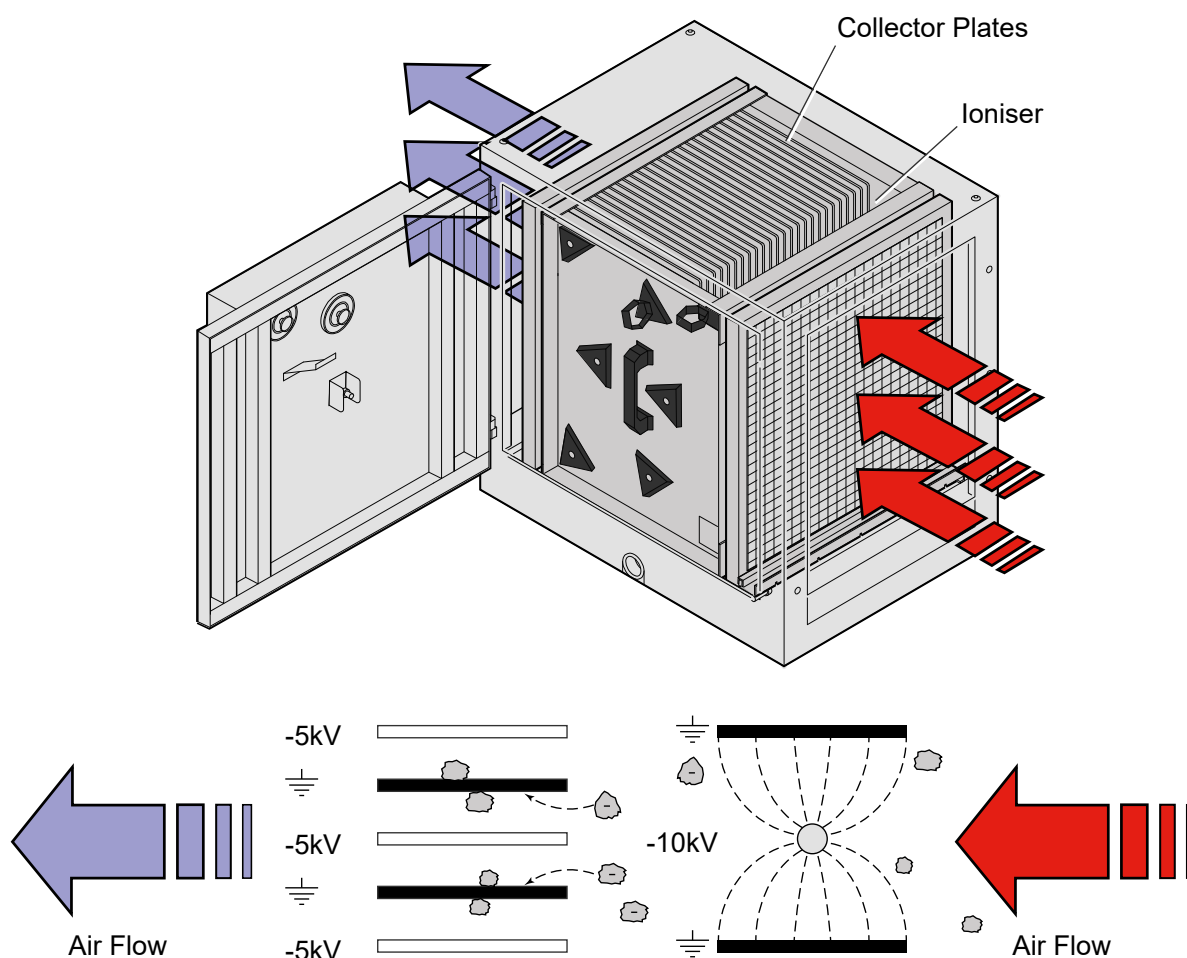


Figure 4 - Electrostatic Precipitator (ESP) - Operating Principles

Figure 4 (above) shows, in simple terms, how an electrostatic precipitator functions and this is summarised below:

1. The air first passes through a pre-filter.
2. The air then passes into the combined Collector Cell/Ioniser section where the particulates in the air stream are charged to a negative potential.
3. The negatively ionised air then passes between the Collector Cell's plates, which are alternatively negatively charged or earthed.
4. The negatively charged particulates passing through the plates are then simultaneously repelled away from the negatively charged plates and attracted to the earthed plates, where they stick, effectively filtering them from the airflow.
5. The particulates remain on the plates or drain down in to the sump (hence the need for regular cleaning).
6. The cleaned air exits through a post filter.

2.3.2 Odour Control

Ozone is produced as a function of the charging of the Collector Cell's plates in Purified Air's range of Electrostatic Precipitators. This helps to combat the gaseous or odour phase of kitchen exhaust pollution.

However, for total control of the gaseous phase, Purified Air also manufactures and distributes a range of Ultra Violet equipment and Ozone Generators as well as our Odour Neutraliser, the ON100.

Note: We also supply a full range of passive filtration equipment, including Activated Carbon, Baffle, Mesh, HEPA, Bag and Panel filters.

2.4 Electrostatic Precipitator Unit - Components

All models of Electrostatic Precipitator Unit comprise a Main Chassis with a number of removable components, a Main Door and an Electrical Housing Door.

2.4.1 Main Chassis

The Main Chassis contains the removable Collector Cell, Filter Carrier, Pre and Post Mesh Filters and non-removable, fully welded, Sump with Drain Plug.

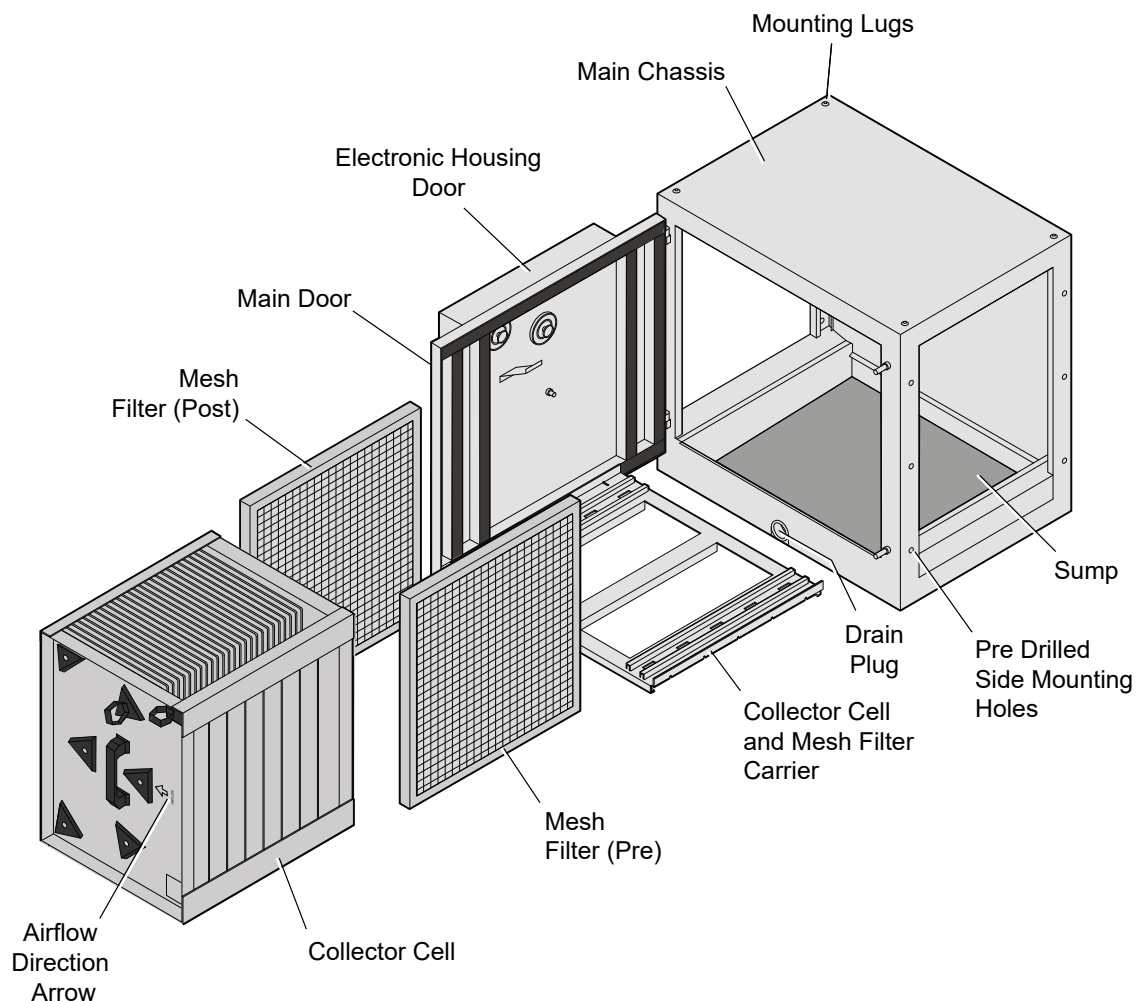


Figure 5 - Electrostatic Precipitator Unit - Main Chassis Components

2.4.2 Main and Electrical Housing Door Assemblies

The Main Door has an Electrical Housing Door which contains the High Voltage Power Supply (HVPS) and control elements. On the front of the Electrical Housing Door are mounted the Rotary Mains Isolator Switch and green Run Light Indicator.

The Main Door can be hung either way up to allow the Unit to be handed for different airflow directions.

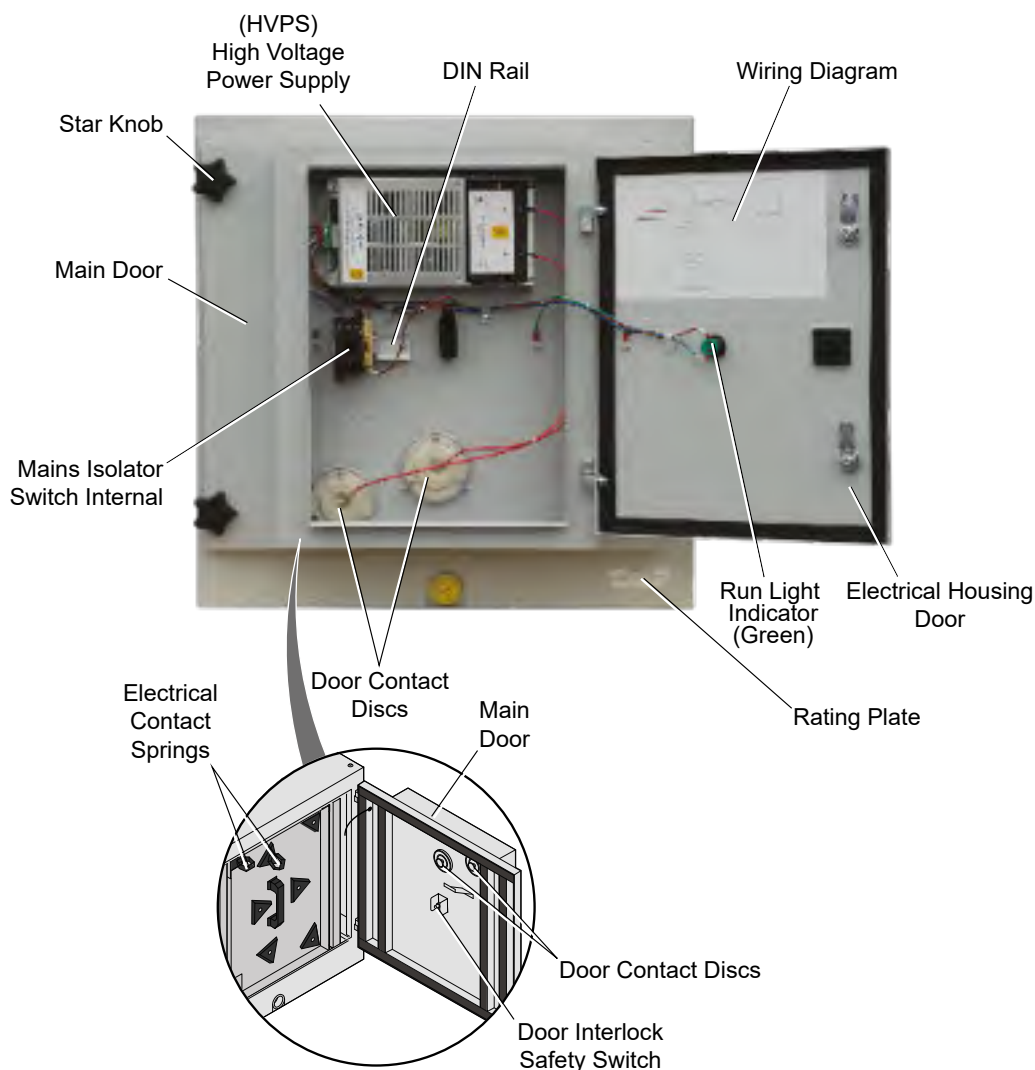


Figure 6 - Door Assemblies

3. Storage, Unpacking and Handling

3.1 Storage

Prior to installation, each ESP Filtration Unit must be stored in its original packaging in dry conditions.

3.2 Shipping List

Each Unit is shipped with the following:

- ESP Filter components - Mesh Filters and Collector Cells.
- This Technical and Operations Manual.

3.3 Unpacking and Handling

Before installing:

1. Strip away all packaging, wrapping and strapping (this must only be done by trained, professional installers).
2. Open the Unit and carefully remove all Mesh Filters and Collector Cells and place in a safe and secure position, away from the installation area.

This operation will greatly reduce the weight of the Unit and allow much easier installation.

3. Once the Unit have been successfully installed, carefully replace the Mesh filters and Collector Cells, ready for commissioning.



WARNING!

The Unit is heavy and the appropriate lifting and handling practices must be observed, for both unpacking and installation, to avoid personal injury or damage to the equipment.

See the Technical Specifications for Unit weights.

4. Installation Guidance

4.1 Overview

Installation should be carried out by a trained professional installer.

As installations vary widely depending on the specific site requirements, this section only provides general guidance for the installer.

If in any doubt, contact Purified Air Limited.

4.2 Model Dimensions

The dimensions, and the necessary service space required at the front of the Unit, are detailed opposite for each model.

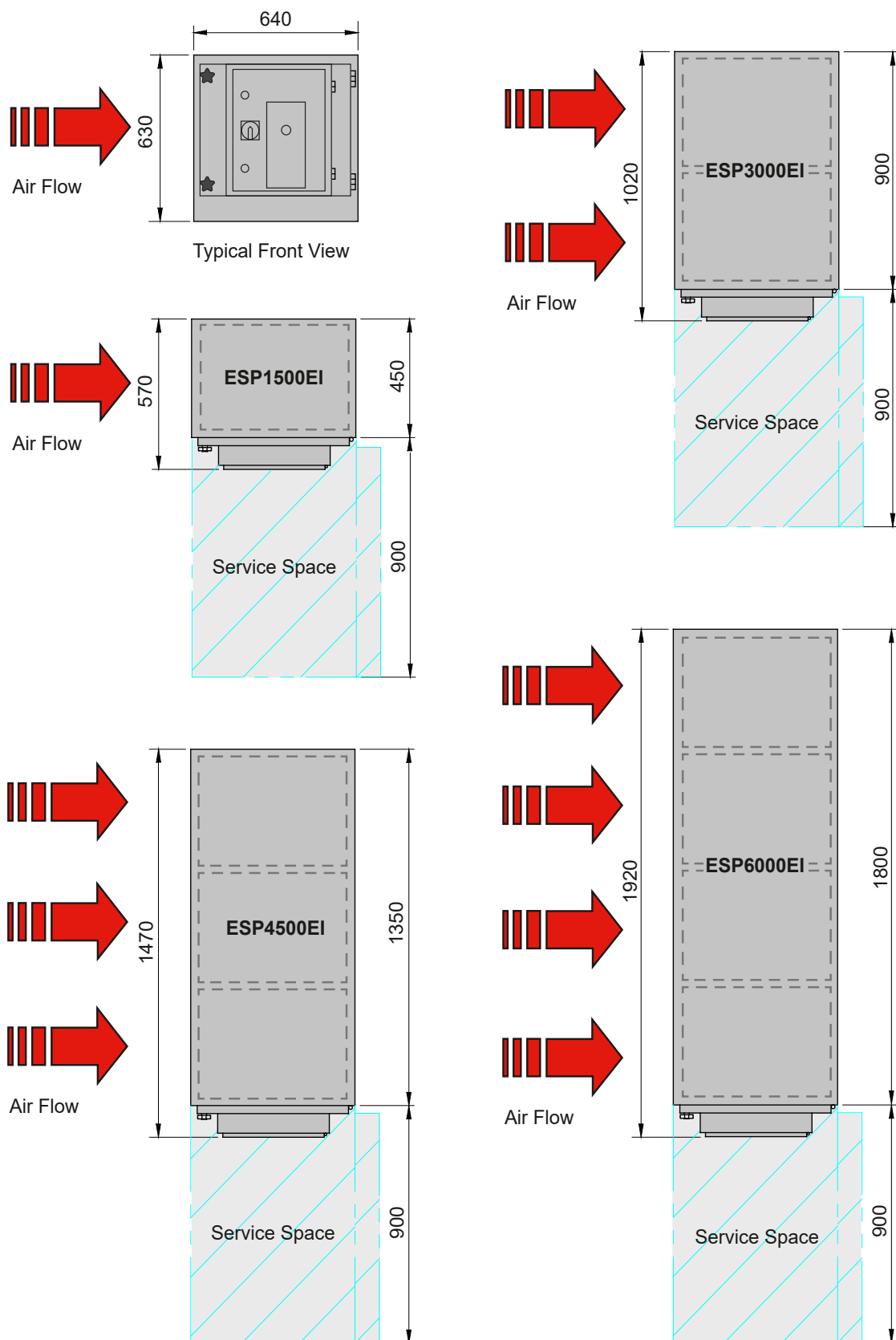


Figure 7 - Model Dimensions - ESP 1500EI, ESP 3000EI, ESP 4500EI and ESP 6000EI
(All Dimensions in Millimetres)

4.3 Pressure Loss Graphs

Any equipment added to a duct system will cause a drop in air pressure in the duct system, downstream of the added equipment.

To ensure that the duct system performs as expected, please note the Pressure Loss Graphs for each of the models:

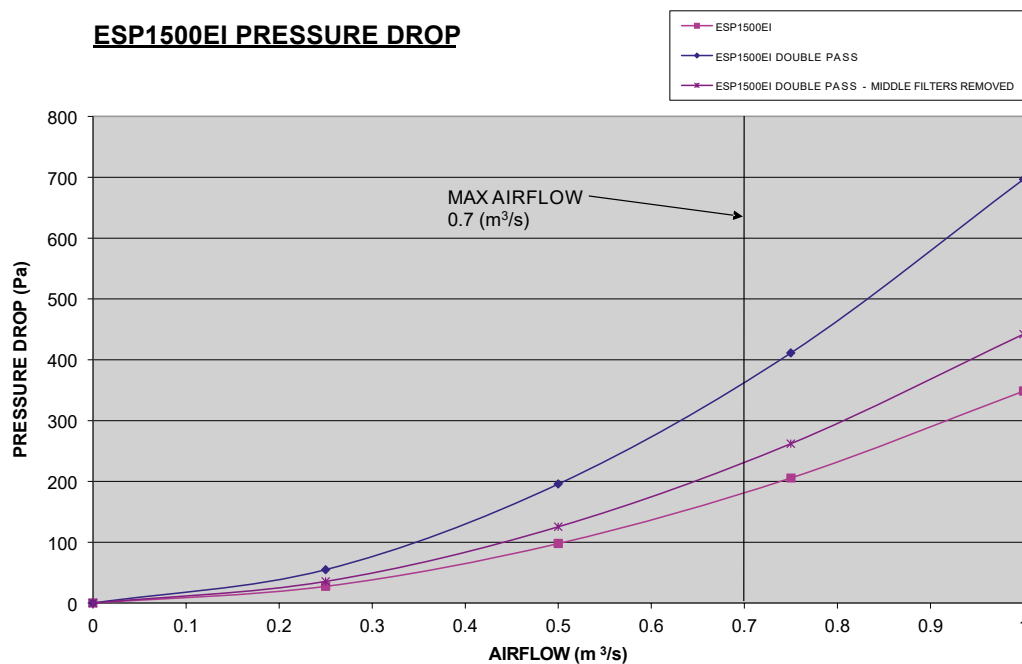


Figure 8 - Graph of ESP 1500EI Pressure Drop

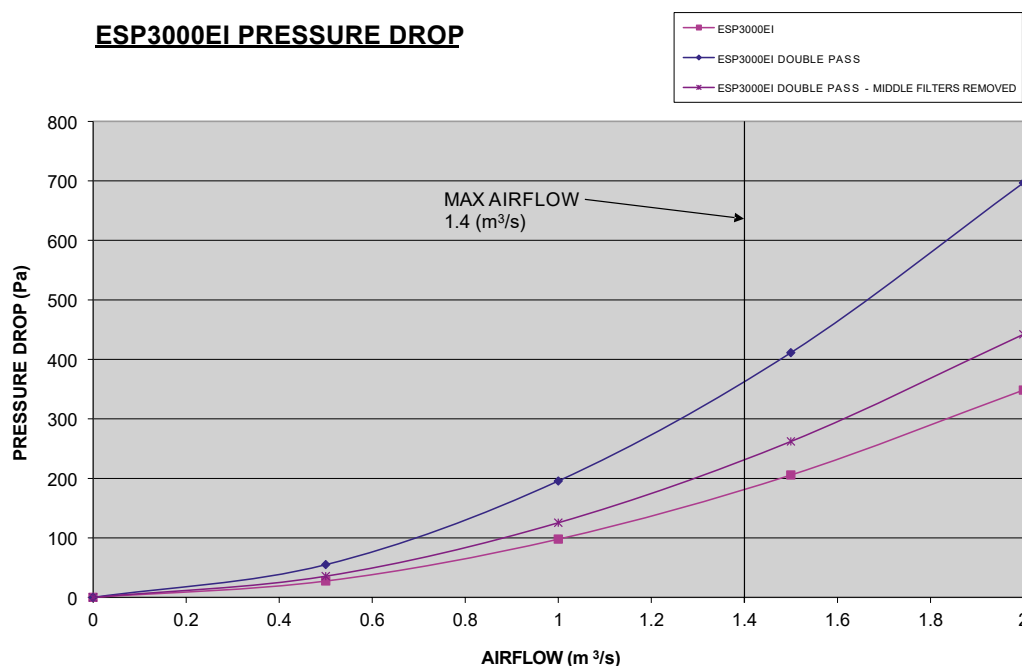


Figure 9 - Graph of ESP 3000EI Pressure Drop

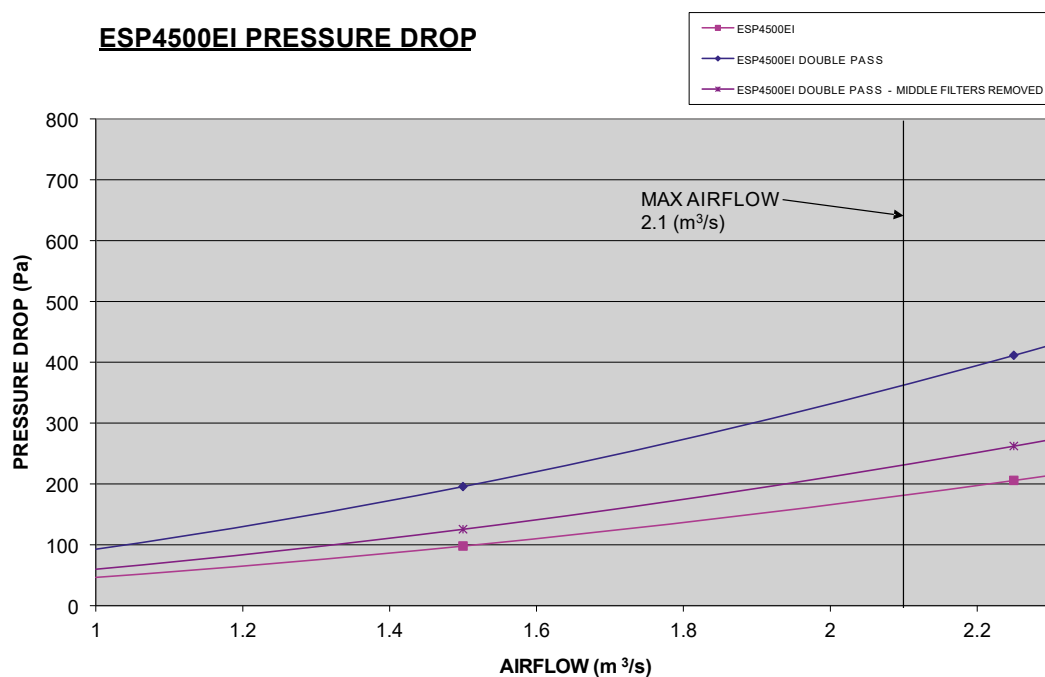


Figure 10 - Graph of ESP 4500EI Pressure Drop

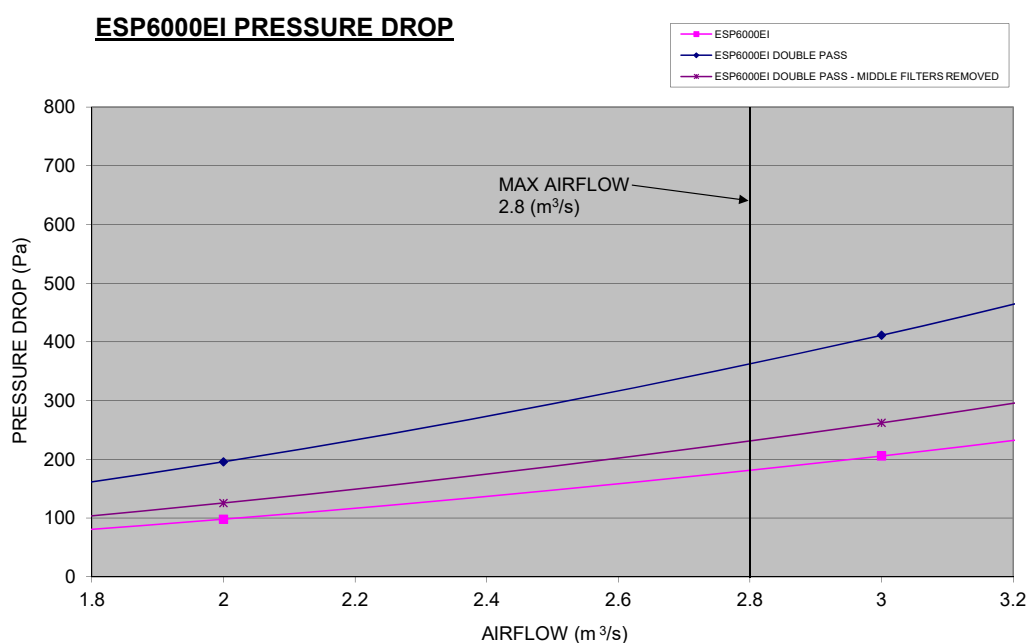


Figure 11 - Graph of ESP 6000EI Pressure Drop

4.4 Installing Single Units

When installing a single Unit, please note the following:

- The Unit should be positioned as close to the cooking source as possible, but please ensure that the fume temperature will never exceed the maximum operational temperature of the Unit, i.e. 60°C.
- Ensure that there is adequate service space around the Unit to enable the removal of the Unit's components.
- Ensure that there is adequate and safe access for servicing and maintaining the Unit.
- Check that the supporting structure is adequate for the weight of the Unit prior to installation. See Technical Specifications for Unit weights.
- The Unit should be mounted in the ducting system.
- The Unit can either be supported by a suspension bracket or suspended by screw rods attached to the top of the Unit. Suspension by screw rods will necessitate drilling holes in the top of the Unit's housing for this purpose.
- The Unit can also be placed on the ground, providing a suitable frame is placed in between the Unit and the floor to allow the system to be drained properly.

We suggest that this frame has a minimum height of 150mm and that you use suitable rubber or neoprene insulation between the Unit and the frame.

- The ducting should be fabricated to ensure as straight and even an airflow as possible, prior to entry into the Unit.
Turbulent air or air directed to one side of the Unit will make the Unit less efficient.

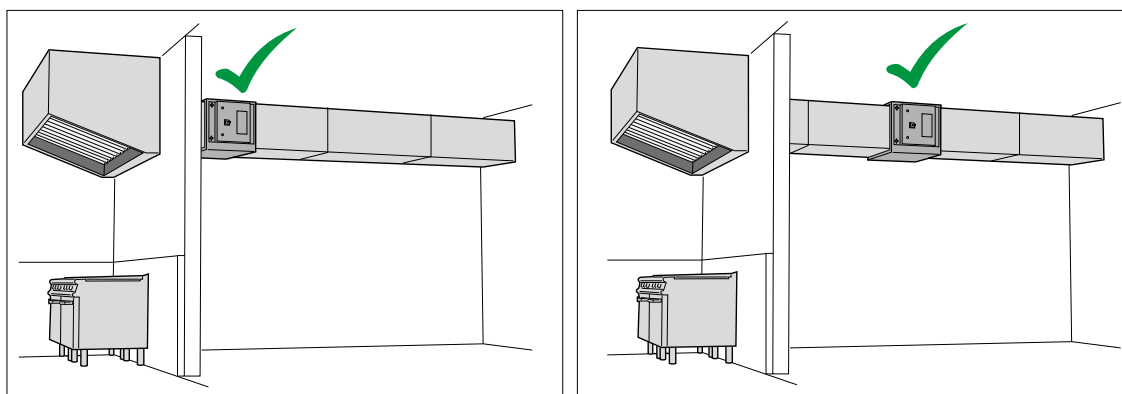


Figure 12 - Preferred Mounting of Filter Unit

Please consult the Wiring Diagram, mounted on the inside of the Door Assembly and shown on page 33 of this manual, when connecting the Unit to the mains. Beware of possible differences in the mains power supply.



INFORMATION

The ESP filter must be interfaced with the extraction fan so that they run in conjunction.

4.5 Installing Multiple Units

Multiple Units can be mounted in series, both vertically or horizontally or in parallel with each other.

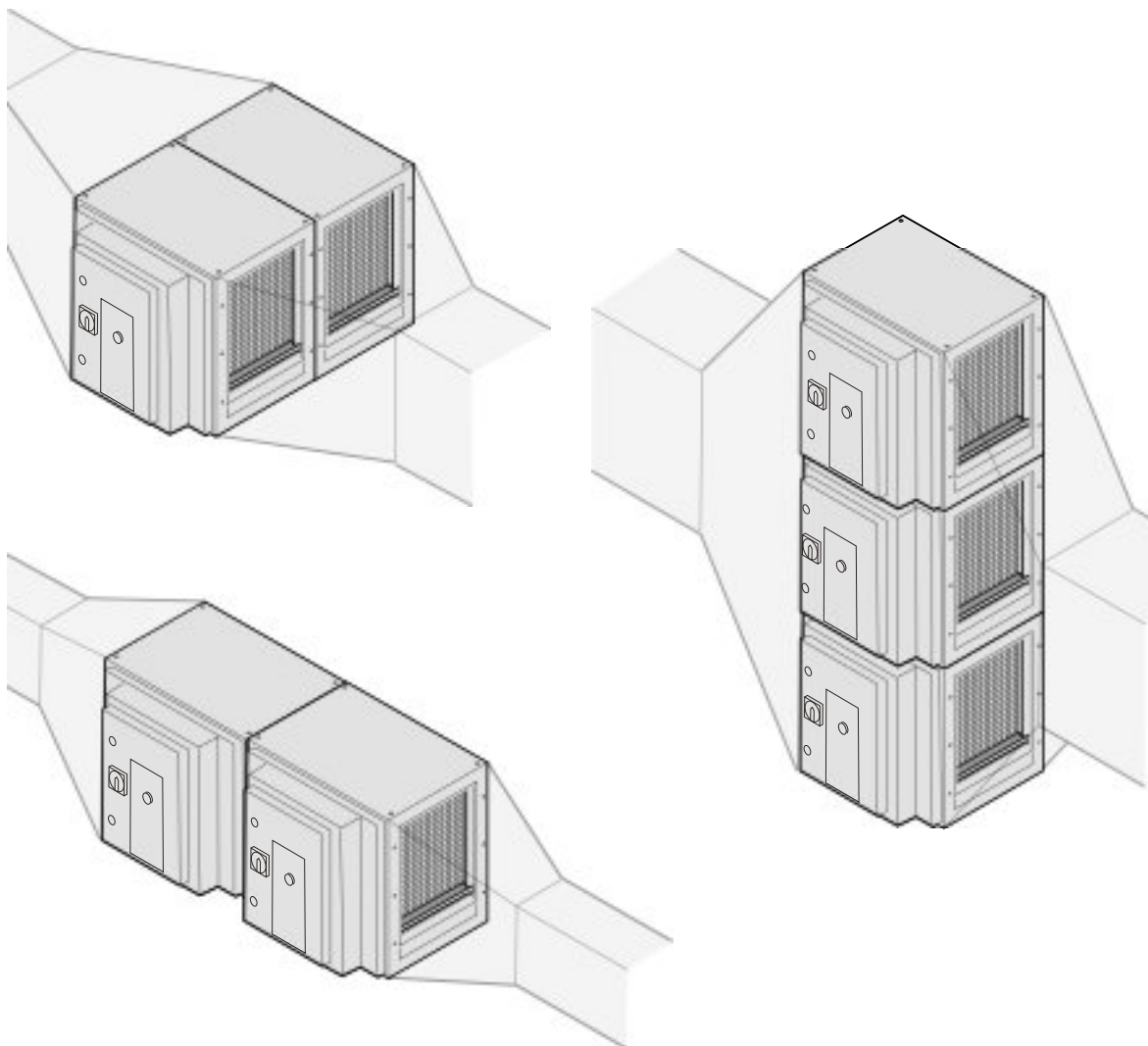


Figure 13 - Multiple Unit Installation Examples

When mounting multiple Units, please note the guidance for installing a single Unit and also note the following:

- The side flanges are pre-drilled to allow combinations of Units to be easily aligned and connected together.
- Locating lugs are also provided on the top of the Units to allow the vertical stacking and connection of combinations of Units. Up to four Units can be stacked on top of each other.



INFORMATION

Never install Units in front of entrances and exits which may be used by the emergency services.

4.6 Changing Airflow Direction / Re-Handling Unit

The ESP can be configured to allow airflow in either direction, i.e. air entering the Unit from the left or right hand side to take account of space constraints or the existing infrastructure.

The following tools will be required to change the airflow's direction:

- 7mm spanner or socket.
- Small adjustable spanner.
- 14 or 13mm socket depending on model.
- Cross head screwdriver.
- Pair of pliers.
- Optionally, a portable electric drill with a socket attachment.

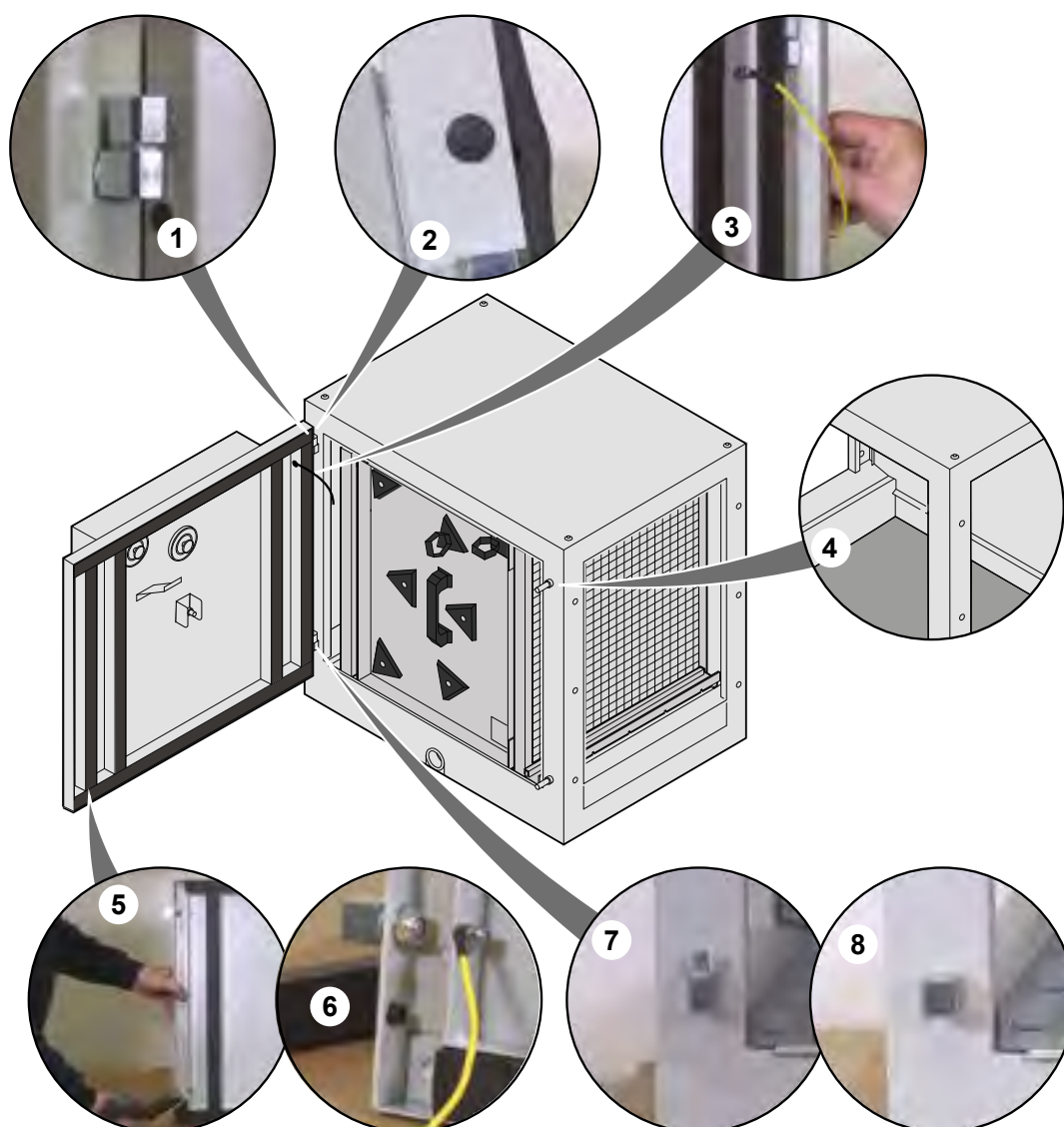


Figure 14 - Re-Handling Process Components

To change the airflow direction:

1. Fully undo the two Star Knobs ❹ (anti-clockwise) and open the Main Door.
2. Remove the Mesh Filters (pre and post), followed by the Collector Cell.
3. Remove the Earth Connection ❸ from the Main Chassis using a 7mm spanner.
4. Lift the Door Assembly off the Two Part Hinge ❶, taking care not to drop the hinge pins ❷ and washers.
5. Remove the hinge pins and washers and put somewhere safe.
6. Put the Door Assembly in a safe place.
7. Undo the Hinge Blocks ❸ using a combination of a 13/14mm socket and adjustable spanner and remove from the Main Chassis.
8. Remove the Threaded Rods ❹ that the Star Knobs were attached to, from the other side of the door aperture, using a deep 13/14mm socket or portable drill with the same attached.



INFORMATION

Note that the two sets of holes on either side of the door aperture are identical.

9. Install the Threaded Rods ❹ and Hinge Blocks ❸ on the opposite sides of the door aperture to their original locations, ensuring that the hinge pin location holes on the hinge blocks face upwards.
10. Turn the Door Assembly through 180° i.e. turn upside down.
11. Remove the Door Assembly Sealing Strip/Rubber Seal ❺.
12. Remove the Grommets ❷ from the holes near the Hinge Blocks ❸.
13. Remove the Hinge Blocks ❸ using a combination of an adjustable spanner and pliers.
14. Replace the Hinge Blocks ❸ into the holes previously occupied by the Grommets ❷, making sure that the hinge pin location holes on both hinge blocks point downwards.
15. Refit the Grommets ❷ into the holes left by the hinge blocks.
16. Relocate the Earth Connections ❸ to the top of the door's frame using either a screwdriver or pliers depending on the model.
17. Replace the Sealing Strip/Rubber Seal ❺.
18. Locate the Hinge Pins ❷ into the hinge pin location holes in the Hinge Blocks ❸ on the main body of the Unit.
19. Rehang the Door Assembly.
20. Re-attach the Earth Connection ❸ to the main body of the Unit.
21. Turn the Collector Cell through 180° (i.e. turn upside down to match the new orientation of the door) and replace in the Unit followed by the Mesh Filters (pre and post).
22. Ensure that the Collector Cell's spring electrical contacts line up with the electrical contact discs on the Door Assembly.

23. Remove the label from the door and replace with a new one in the correct orientation having first cleaned the door's surface.
It will be easier to adjust the new label's location if the door's surface is first wiped over with a slightly wet cloth before the label is attached. Once the water has dried, the correctly located label can be smoothed down.
24. Re-orientate the Rotary Mains Isolator Switch by removing the centre fixing screw and the red cover. Turn the red cover through 180°, replace it on the square centre shaft and secure with the fixing screw.
25. Follow the instructions listed in Operation and Control on page 22 to test the correct functioning of the Unit.



INFORMATION

For additional information, please see the video showing how to change the airflow's direction on the Purified Air website:

www.purifiedair.com

4.7 Connecting the Unit to a Building Management System

The Unit can be connected to a Building Management System (BMS).

- In order to complete this connection, a BMS Connection Kit must be purchased as a separate item.
- Connect the BMS to the Unit using the relay provided on the DIN rail in the Door Assembly.
- Refer to the Wiring Diagram on page 33 for details on how to connect the Unit to a BMS.



INFORMATION

Note that the BMS connection will only provide a Run or Fault signal.

5. Operation and Control

5.1 Control Panel

The Control Panel is part of the Electrical Housing Door and contains the Unit's Rotary Mains Isolator Switch and Run Light Indicator.

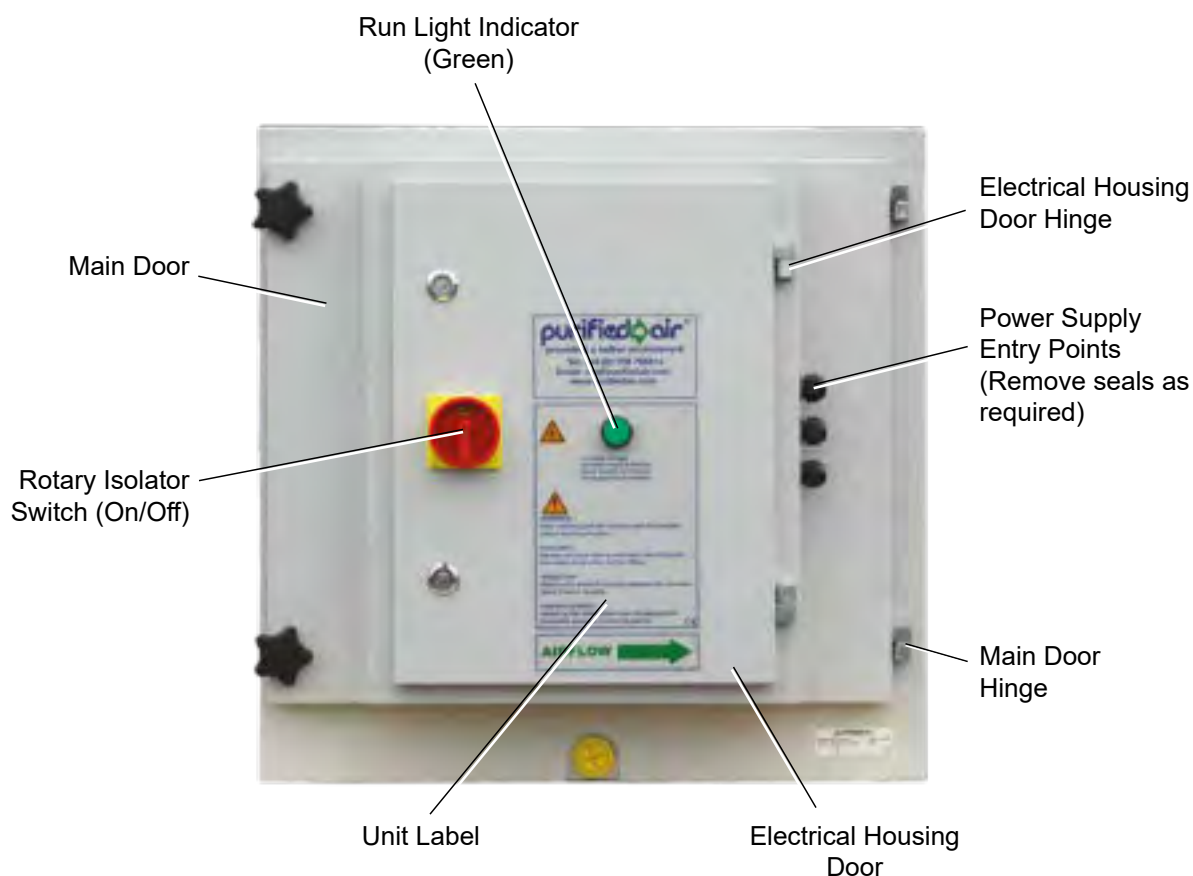


Figure 15 - Control Panel Components

5.2 Before Use

Before use, ensure that all safety precautions have been taken and that environmental conditions are suitable for operation of the Unit (see 1.5 Safety Warnings and Cautions on page 3).

5.3 Switching On

To start the Unit from the Control Panel on the Electrical Housing Door:

1. Turn the Rotary Mains Isolator Switch to the 'On' position.

Note: The green Run Light Indicator will illuminate during normal operation.

Regularly check that the green Run Indicator Lamp is illuminated when using the Unit as it indicates that the electrostatic filter is properly charged.



WARNING

Please contact your service agent if the green Run Light Indicator doesn't illuminate when the Rotary Main Isolator Switch is in the 'On' position.

2. Check that the interfaced extractor fan is also running. Turn off the Unit if this is not the case and investigate further.

5.4 Arcing and Auto-Shutdown

Some arcing within the Unit during operation is normal.

If the problem persists, due to excess debris, the Unit will automatically cycle on and off until the problem clears or until a service visit is carried out.

Note: If excessive arcing occurs, the Unit will automatically shutdown and then restart after a short time.

5.5 Switching Off

To stop the Unit, turn the Rotary Mains Isolator Switch to the 'Off' position.



CAUTION!

After switching off the Unit, wait 60 seconds before opening the door to allow the static electricity charge to dissipate.

6. Fitting Stainless Steel Ioniser Blades

6.1 Fitting Stainless Steel Ioniser Blades to a Collector Cell

Some specifications require solid stainless steel spiked ioniser blades to be fitted, replacing the standard Ioniser Wires.



Figure 16 - Stainless Steel Ioniser Blade

The stainless steel spiked blades are made out of 0.7mm sheet stainless steel with a pressed ridge or spine down the centre.



WARNING!

The Ioniser Blade has sharp points so care should be taken when handling.

This modification can be made in the factory or, alternatively, an engineer can perform the replacement on site.

6.1.1 Replacing Ioniser Wires with Stainless Steel Ioniser Blades on Site

To replace the Ionisers Wires with Stainless Steel Ioniser Blades on site, please see the instructions below:

1. Turn the Rotary Mains Isolator Switch to the 'Off' position and wait for 60 seconds to allow the accumulated static electricity charge to dissipate.
2. Fully undo the two Star Knobs (anti-clockwise) and open the Main Door.
3. Slide out the Pre and Post Filters and, after making a note of the airflow direction arrow, slide out the Collector Cell.
4. Remove the existing Ioniser Wires by unhooking them from the Upper and Lower Ioniser Bars, pulling the unsprung end of each Ioniser Wire against the spring's tension.
Once the Ioniser Wires have been removed from the Collector Cell, there will be eight locating holes in each of the Upper and Lower Ioniser Bars.
5. Take the first Stainless Steel Ioniser Blade and locate its protruding lugs into both the Upper and Lower Ioniser Bars location holes.
6. Once in place, using a pair of long nosed pliers, carefully bend the lug down to secure the top of the Ioniser Blade into position on the Upper Ioniser Bar (see Figure 17 - Fitting Stainless Steel Ioniser Blades on page 25).

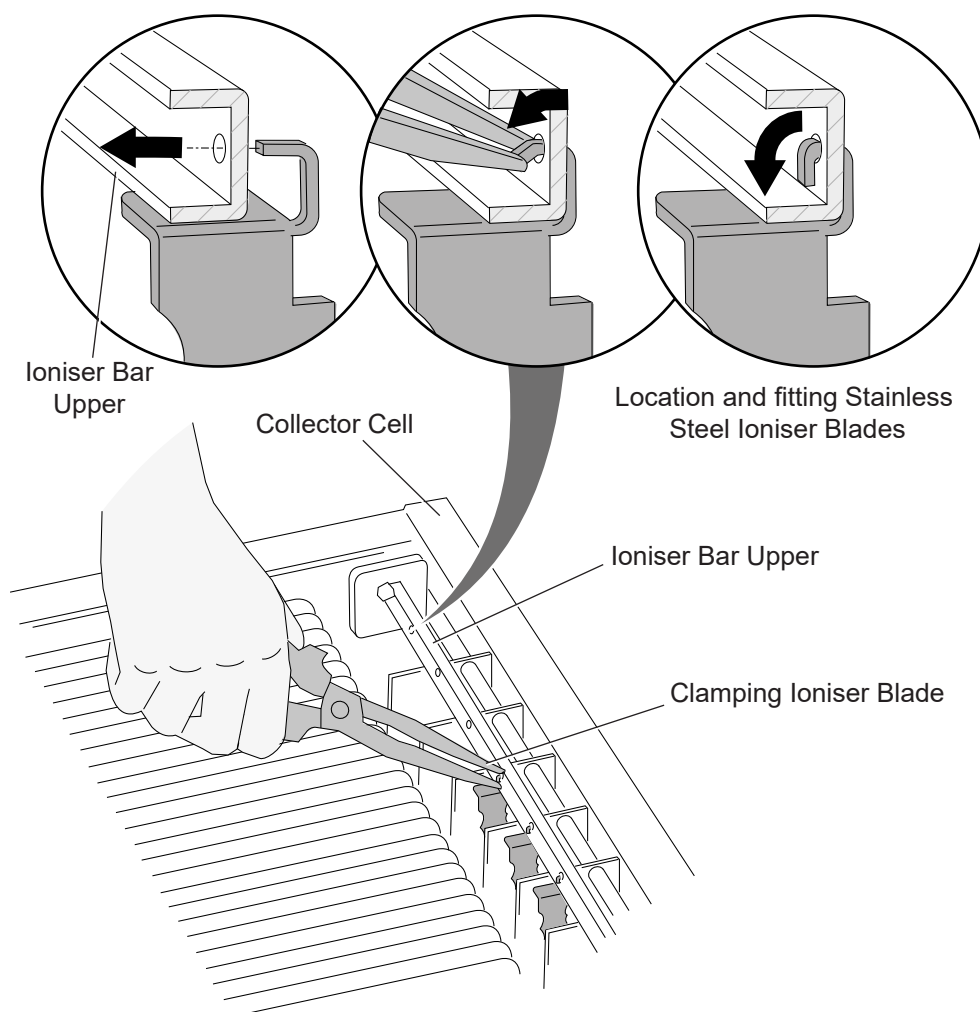


Figure 17 - Fitting Stainless Steel Ioniser Blades

7. Turn the Collector Cell upside down, being careful to keep the Ioniser Blade's lower protruding lug located in the Lower Ioniser Bar's location hole, and carefully bend the lug down to secure the bottom lug of the Ioniser Blade. The blade should now be securely attached to the Collector Cell's Upper and Lower Ioniser Bars.
8. Turn the Collector Cell back upright and repeat the steps 5, 6 and 7 above for each Ioniser Blade until all eight have been securely fitted.

The Collector Cell is now ready to be placed back into the Main Chassis:

1. Replace the Pre and Post Mesh Filters and replace the Collector Cell back into the Main Chassis.
Note: Make sure that the air flow direction arrow, noted in step 3 on page 24, is pointing in the correct direction.
2. Close the Main Door and replace and tighten the two Star Knobs making sure that the Main Door is tightly closed.
3. Turn the Rotary Mains Isolator Switch to the 'On' position.

7. Maintenance and Cleaning

7.1 Introduction

If you carry out the simple cleaning and maintenance described below, at the prescribed intervals, paying attention to the associated Warnings and Cautions, then any problems will mostly be detected and corrected before they result in a total breakdown of the Unit.

The indicated maintenance intervals can vary depending on specific working and local environmental conditions. It is therefore recommended that the Unit is thoroughly inspected annually in addition to the indicated periodic maintenance. Please contact your service agent to arrange this.



WARNING!

Overdue maintenance can lead to fire.

Always switch OFF the Unit and isolate the electric supply before carrying out the activities below.

Do not carry out any service, maintenance or repairs to the Unit before it has been protected against unintended starting by switching off and isolating the electrical supply.

7.2 Maintenance and Cleaning Schedule

Basic maintenance activities can be carried out by the user. Please see the table below for the optimum frequency for such activities.

Note: Other activities are strictly reserved for qualified personnel.

Basic Maintenance Activities	Frequency
Clean the outside of the Unit with mild detergent	Every 6 months
Check the door sealing material (see 7.3.2 on page 27)	Every 12 months
Clean the inside of the Unit and remove dust/ grease from the filter compartment (see 7.3.2 on page 27)	From once a week to once every 3 months depending on the degree of pollution.
Clean the Mesh Pre-filter, ESP Collector Cell and the Mesh Post-filter and check for damage (see 7.3.3 on page 28 and 7.3.4 on page 28)	From once a week to once every 3 months depending on the degree of pollution.

7.3 Cleaning and Maintenance Tasks

Clean or replace the Mesh Filters and Collector Cell and clean the Main Chassis at the prescribed intervals mentioned in Maintenance and Cleaning Schedule on page 26 or:

- If the Mesh Filters and/or Collector Cell are damaged.
- When the Collector Cell starts to make a crackling sound (arcing).
- When the filtering and extraction performance of the Unit starts to decline.

It is a matter of experience to determine when the Unit needs to be cleaned, since the nature and the degree of pollution depends strongly on factors such as the particular location, humidity, and intensity of use etc. Nevertheless, the filters and Main Chassis should be cleaned regularly at intervals ranging from once a week to once every 3 months using the procedures outlined in the sections below:

7.3.1 Removing the Mesh Filters and Collector Cell

Start the cleaning procedure by removing the Mesh Filters and Collector Cell from the Main Chassis:

1. Isolate the Unit from the mains power supply by turning the Rotary Mains Isolator Switch to the 'Off' position.
2. Allow at least 60 seconds for any static electrical charge to dissipate.
3. Double check that the mains power supply has been isolated.
4. Unscrew the top and bottom Star Knobs on the main Door Assembly anti-clockwise and open it.
5. Remove the Mesh Pre-Filter, Collector Cell and the Mesh Post-Filter in this order.
6. Remove the Filter Carrier.

7.3.2 Cleaning the Main Chassis

Having removed the Mesh Filters (pre and post) and the Collector Cell:

1. Remove any accumulated grease from the sump; depending on its viscosity, either via the Drain Plug (see Figure 5 - Electrostatic Precipitator Unit - Main Chassis Components on page 10) or by scooping and scraping it out.
2. Spray the sump with a high quality degreaser and wipe over the sump's surfaces with a suitable cloth or paper towels.
3. Clean the electrical contact points on the inside of the Door Assembly, using a high quality degreaser and a suitable cloth or paper towels, ensuring that they are free of contaminants/grease.
4. Ensure that the rubber door seal is undamaged and free from contaminants/grease, cleaning with warm soapy water if necessary.
5. Clean the Filter Carrier and Backplate, using a high quality degreaser and a cloth, and replace in the Unit.

7.3.3 Cleaning the Mesh Filters (pre and post)

Clean the Mesh Filters as follows:

1. Clean the Mesh Filters (pre and post) in hot water (at approx. 60°C) to which a detergent solution has been added. This treatment can be repeated several times. A pressure washer can also be used to clean the filters.
2. Allow the Mesh Filters to dry completely after cleaning before re-inserting into the Unit.

7.3.4 Cleaning the Collector Cell

Clean the Collector Cell as follows:

1. Clean the Collector Cell in hot water (approx. 60°C) to which a detergent solution has been added.



WARNING

Although the Collector Cell can be cleaned using a pressure washer, extreme care must be exercised to avoid damaging or distorting the plates.

2. Check the Ioniser during washing for broken Ionisation Wires.

Note: If fitted, broken ionisation wires can simply be replaced by hooking the sprung end of the new wire over the support post, pulling the wire against the spring's tension and attaching the other end of the wire to the opposite post, having first removed the broken wire.

3. Whilst washing the Collector Cell, check to see if any of the Collector Cell's plates have been bent.

Note: If a bent plate is found, it can normally be straightened by either carefully applying pressure with a screwdriver or by using a pair of long nosed pliers.

If the Collector Cell is beyond repair, please contact Purified Air to purchase a new one.

4. Allow the Collector Cell to dry completely after cleaning before re-inserting into the Unit.

7.3.5 Replacing the Collector Cell and Pre and Post Mesh Filters

Replace the Collector Cell and pre and post Mesh Filters as follows:

1. Replace the Collector Cell.

Note: If the Unit has more than one Collector Cell, ensure that the electrical connections between them are making contact.

2. Slide the Mesh Filters (pre and post) into their previous positions in the Collector Cell and Filter Carrier.

**INFORMATION**

Ensure that the Collector Cell is correctly orientated with the extraction duct's airflow, as indicated by the arrow engraved on the Collector Cell.

Pay due attention to the position of the contact pin and contact spring on the Collector Cell which should connect with the contact discs on the door when it is closed.

3. Close the Main Door and refit the top and bottom Star Knobs.
4. Tighten the Star Knobs clockwise sufficiently to ensure a good seal between the Main Door and the Main Chassis of the Unit.

Note: It may be necessary to push the Main Door inwards, against the seal, onto the Main Chassis of the Unit whilst tightening the Star Knobs to enable them to be tightened sufficiently to ensure an adequate seal.

5. Switch the Unit On as normal. The green Run Light Indicator should illuminate.

**INFORMATION**

After the Unit is turned on, you may briefly hear a clicking or arcing as the plates in the Collector Cell build up a charge. This is perfectly normal.

**WARNING**

Should the clicking or arcing persist or the green Run Light Indicator go out, the Unit has a fault.

In this case, switch off the Unit and consult a qualified service technician.

7.4 Servicing

Purified Air or their designated distributor will be happy to carry out regular servicing of the Unit and offer Preventative Maintenance Contracts for all installations of their equipment.

Please contact their Head Office for full details:

service@purifiedair.com

Freephone: 0800 018 4000

8. Troubleshooting

If the Unit does not function correctly, consult the checklist below to see if you can correct the error yourself.



INFORMATION

A number of problems in the checklist below can also be caused by defects in other equipment connected to the Unit. This manual only deals with problems and solutions directly related to the Unit itself.

Problem	Possible Cause	Solution
Insufficient Extraction Capacity	Mesh Filters clogged or saturated.	Clean the filters.
	A breach/hole in the ducting.	Check and replace sealing material/repair hole.
Dust or smoke from the extraction outlet and/or green Run Light Indicator is not illuminated.	Collector Cell is saturated or mounted incorrectly causing short-circuiting.	Clean the Collector Cell and mount correctly.
	Poor/dirty electrical contacts in the Collector Cell.	Check and clean/repair.
	Short-circuit in the Collector Cell (caused by bent plates).	Check and repair.
Unit makes a cracking sound (= short circuit).	Collector Cell incorrectly mounted.	Mount correctly.
	Collector Cell heavily polluted.	Clean Collector Cell.
	Collector Cell not totally dry.	Allow thorough drying after cleaning.
	Bent Collector Cell plates.	Repair.
	Bent or broken ionisation wires (see 6. Fitting Stainless Steel Ioniser Blades on page 24).	Replace.
	Metal particles in Collector Cell.	Clean Collector Cell.
Unit switches off or will not start when clean collectors are installed during service.	The collector cell could appear dry but could have traces of water behind the insulators or secreted within the collector.	Run the extract system for one hour with the ESP switched off. This should allow any excess water to evaporate. After this period, try to restart the unit. If it still fails to start contact the supplier.



CAUTION

Should it not be possible to correct the error, consult a qualified service engineer.

9. Spare Parts List and Components Illustration

Item Number	Item Description	Part Number
	Collector	
1	Collector Cell Unit	ESP-1601-CC
2	Mesh Filter Element	ESP-1501-MF
	Collector Cell	
3	Ioniser Wire with springs (8 per pack) (Not Shown)	ESP-1602-IW
4	Push Button Brass HV contact	ESP-1603-BB
5	HV Spring contact	ESP-1604-SC
6	Insulator HV Black Thermoset Square	ESP-1605-IS
8	Stainless Steel Spiked Ioniser Blades (8 per pack) (Not Shown) (see 6 - Fitting Stainless Steel Ioniser Blades on page 24)	ESP-1607-SI
	Door	
9	Complete ESP Door & Electronics	ESP-1701-CD
10	High Voltage Power Supply (HVPS) including HV cable (2 parts) + wiring loom for post 2014 models.	ESP-1750-HV
11	Door Hinge (15mm) (main door & electrical door)	ESP-1702-DH
12	Door safety interlock switch	ESP-1703-DS
13	Rotary Mains Isolator Switch	ESP-1704-MS
14	HV Output Terminal Contact Disc on door (ceramic)	ESP-1705-OT
15	Clear PVC dome covers for HV output terminals.	ESP-1706-DC
16	HV Cable (2 pcs per set) (Not Shown)	ESP-1707-HC
17	LED Run Lamp (green 230V)	ESP-1708-LG
18	Door Star Knobs	ESP-1709-SK
19	Drain Plug	ESP-1710-DP
20	Rubber Door Seals (set of 6)	
21	Pictograms, Warning and Instruction Labels	
	Upgrades	
	HVPS (PWM200) replaces components in older models such as HF Driver, HV Transformer & HV short circuit protector.	These older parts are all now superseded
	HVPS Conversion kit for pre-2008 and pre-2014 Models.	ESP-HVPSCONV1
	HVPS Conversion kit for post-2014 Models. (ESP ____ EI)	ESP-HVPSCONV2
	BMS Kit fitted prior to leaving factory	ESP-1801-BMS
	BMS Kit fitted on site	ESP-1802-BMS

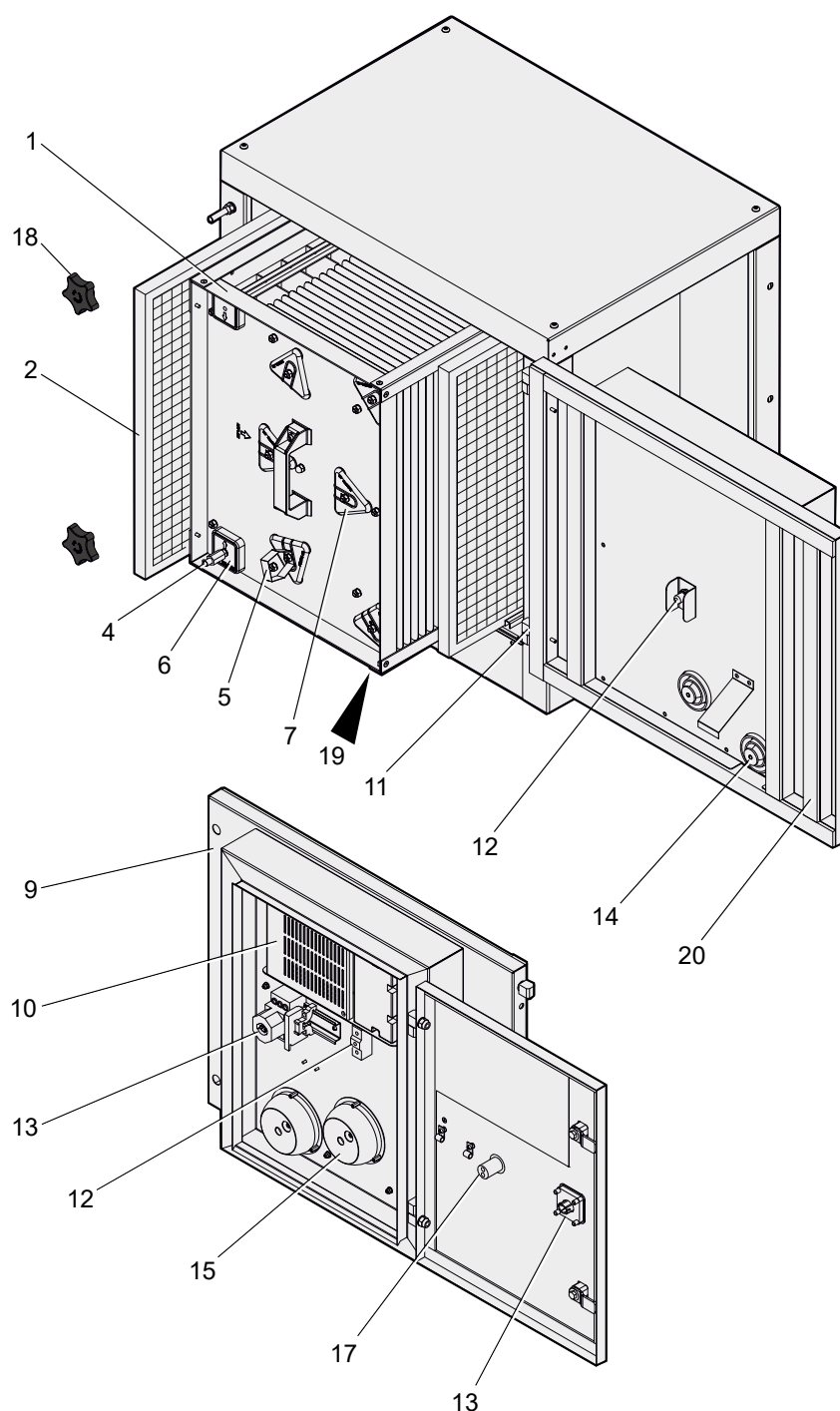


Figure 18 - Parts List Components Illustration

9.1 Spare Parts Ordering

All parts listed in the 9. Spare Parts List and Components Illustration on page 31 are available as spare parts.

Please quote the Part Number when ordering.

10. Wiring Diagram

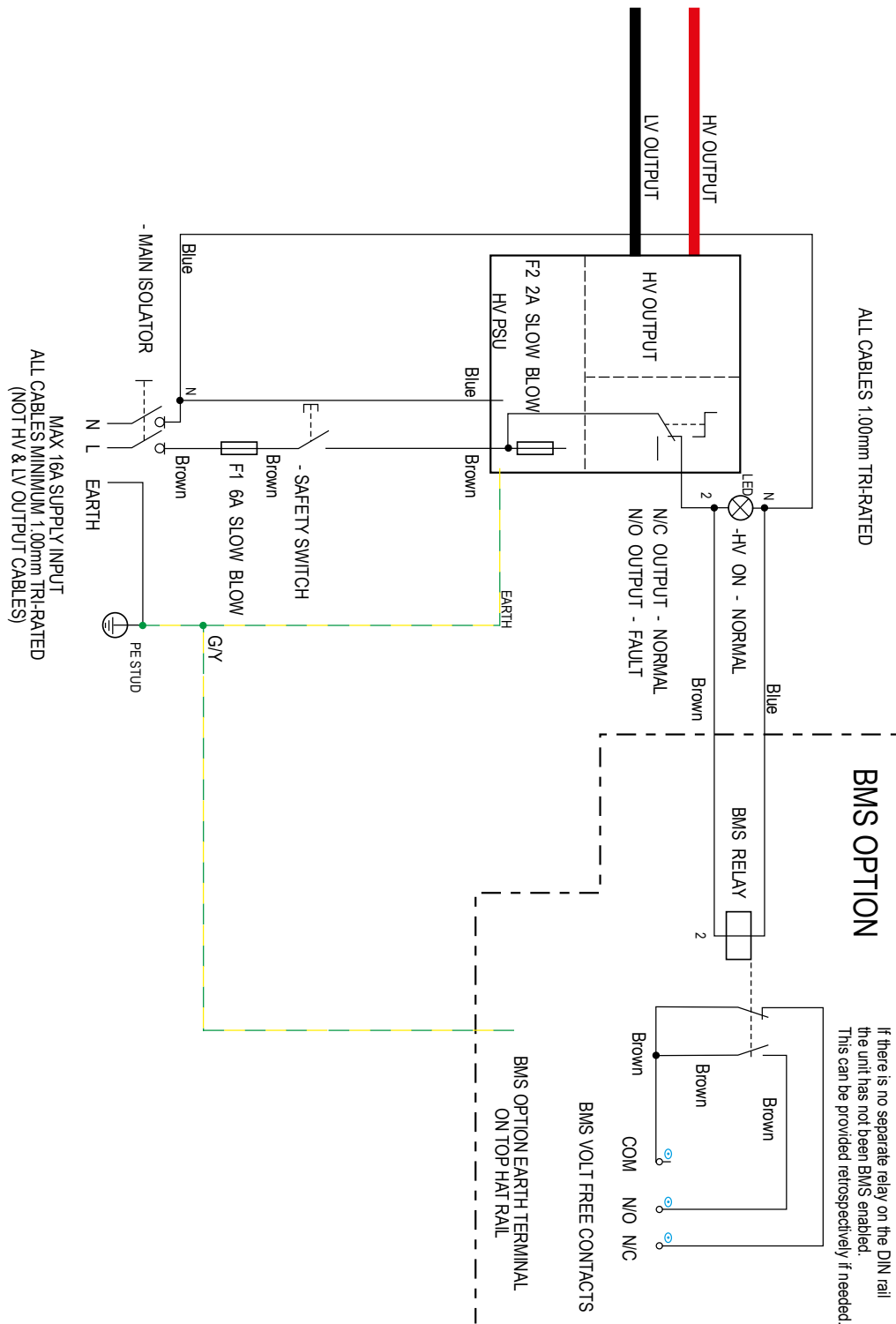


Figure 19 - Unit Wiring Diagram

11. Equipment Disposal



11.1 Packaging Material Disposal



INFORMATION

The Unit's Packaging materials are manufactured from recyclable materials in accordance with applicable local regulations.

The purpose of the packaging is to protect the Unit during transport. It consists of the following substances that can be reused:

- Cardboard (corrugated)
- Wood (untreated)

Do not dispose of the packaging material as general industrial waste.

11.2 Used Unit Disposal

Units which you would like to dispose of may still contain valuable substances and materials. Do not dispose of the Unit as general industrial waste.

12. Contact Details

At Purified Air, we pride ourselves on our excellent levels of customer service and maintenance.

12.1 Nationwide Coverage in the UK

We can offer nationwide coverage with teams of directly employed service engineers working out of our UK hubs.

For all UK Service and Maintenance enquiries, please contact via:

service@purifiedair.com

0800 018 4000

12.2 Service and Maintenance Contracts

With every installation, we offer the opportunity to sign up to one of our service and maintenance contracts. These are structured to suit individual needs, on a post pay basis with the customer only being invoiced after each service, saving them both time and money against ad hoc servicing requests.

12.3 Dependability

Whether you have our commercial kitchen exhaust filtration equipment in your restaurant, cafe or take away, you can rest assured that we will always be there when you need us.

12.4 Global Sales

For all installations of our equipment outside of the UK, please refer back to your designated distributor.

13. Warranty Statement

Your new Electrostatic Precipitator is guaranteed against the cost of breakdown repairs for one year from the date of the original purchase.

The manufacturer does not accept any liability for damage to the Unit or personal injury caused by non-observance of the safety instructions in this manual or negligence during the installation, use, maintenance and repair of the models mentioned on the cover of this manual and any associated accessories.

What is covered?

- Repairs necessary as a result of faulty materials, defective components or manufacturing defect.
- The cost of functional replacement parts, but excluding consumable items.
- The labour costs of a Purified Air approved repairer to carry out the repair.

What is not covered?

- Transit, delivery or accidental damage or misuse and abuse.
- Any installation which fails to meet the installation, location and operating requirements and parameters outlined in this manual.
- Manufacturing defects only affecting the Unit's cosmetic appearance.
- Consumable items including but not limited to pre and post Mesh Filters, Collector Cell and Ionisation Wires (see 6. Fitting Stainless Steel Ioniser Blades on page 24).
- Repairs required as a result of unauthorised repair or installation by anyone other than a Purified Air approved installer.
- Any damage caused to the Unit by its use by anyone other than authorised, trained and qualified users or personnel under the supervision and responsibility of authorised, trained and qualified users.
- Any damage caused to the Unit by incorrect servicing procedures.
- Use of the Unit in any application which is not specifically mentioned in this manual or approved, in writing, by the manufacturer.
- The guarantee is applicable only to new products and is not transferable if the product is resold.

Purified Air disclaims any liability for incidental or consequential damages.

The guarantee does not in anyway diminish your statutory or legal rights.

Please keep your purchase receipt or other proof of purchase in a safe place. You will need to have it should the product require attention under guarantee.

14. Certification

14.1 EC Declaration of Conformity

Purified Air Limited Lyon House Lyon Road Romford Essex RM12BG Tel: +44 1708 755414 Fax: +44 1708 721488 Email: enq@purifiedair.co.uk www.purifiedair.co.uk	 
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EC Declaration of Conformity

Document Number: Doc ESP 1201

We, Purified Air Limited at above address, declare the products detailed below comply with the requirements of the following EU Directives,

- Low Voltage Directive 2005/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC

Equipment description	<i>Electrostatic Precipitator</i>			
Make/Brand	<i>Purified Air</i>			
Model reference	ESP 1500EI	ESP 3000EI	ESP 4500EI	ESP 6000EI

Compliance of the equipment has been assessed with respect to the essential requirements and with reference to the following harmonised standards:

- EN 60204-1:2006 +A1:2009
- EN55014-1 :2006+A 1:2009
- EN 55014-2: 1997+ A2:2008
- EN 61000-3-2:2006 +A2: 2009
- EN 61000-3-3:2008

A technical file for this equipment is retained at the above address



Gareth Smith
 Technical Director
 Purified Air Limited
 January 2016

Figure 20 - EC Declaration of Conformity



FreePhone (UK Only) 0800 018 4000
International +44 1708 755414

Purified Air Limited. Lyon House, Lyon Road, Romford, Essex. RM1 2BG

www.purifiedair.com | enq@purifiedair.com

UV-O

ULTRA VIOLET OZONE GENERATORS



WHAT IS A UV-O?

UV-O Odour Control Units are designed to efficiently remove odorous compounds from the fumes extracted from commercial kitchens

The UV light produced by the UV-C lamps converts oxygen present in the air into ozone

Ozone is a highly reactive oxidant which interacts with most contaminants, allergens and odour producing compounds it comes into contact with, oxidising them and rendering them harmless.

The UV light produced by the lamps can also further convert the ozone to hydroxyl free radicals in the presence of water or water vapour. Free radicals are highly reactive oxidants which makes them effective natural air cleansing agents.

The mixture of ozone and hydroxyl free radicals produced in this way creates a much more powerful oxidising action (Ozonolysis) than the use of ozone alone.

HOW EFFECTIVE ARE THEY?

When installed correctly, Purified Air's UV-O Odour Control Units have the following features and benefits:

- Use highly efficient UV-C technology.
- Twelve month effective lamp life.
- Minimum maintenance requirements.
- Enhanced safety - UV-C lamps are locked behind panels.
- Designed to complement our Electrostatic Precipitator (ESP) system.
- Reduce the need for duct cleaning.
- Can reduce cooking odours by up to 90%*.
- Grease is broken down in to more easily managed compounds.
- Virtually no pressure increase within the duct.

* In particularly odourous environments, high levels of odour control will only be achieved by also using good quality particulate control systems (particularly ESPs) and supplementary odour control systems in conjunction with this Unit.

MANUFACTURER

Purified Air Ltd, Lyon House, Lyon Rd, Romford, ESSEX, RM1 2GB, UK

MODELS AVAILABLE

UVO1000 & UVO500

TECHNICAL & MAINTENANCE

See Next Page

TECHNICAL SUMMARY

UV-O Range

Unlike other UV-C systems, our UV-O units are located outside of the kitchen extract duct and are connected via a spigot and spiral ducting.



KEY FEATURES

- Easy to install
- Can be retro-fitted into existing duct
- Virtually no pressure loss
- No monthly maintenance needed

Our UV-O range includes:-

- **UV-O 500 which handles up to 1 m³/sec of air flow**
- **UV-O 1000 which handles up to 2 m³/sec of air flow**

The UV-O 500 has been designed for smaller capacity commercial kitchens.

The UV-O range uses UV-C technology to produce ozone and hydroxyl free radicals to oxidise cooking odours through a process of ozonolysis.

Unlike other UV-C systems, our UV-O units are located outside of the kitchen extract duct and are connected via a spigot and small diameter ducting.

Although it is widely accepted that the best way to apply UV-C light is directly in-line with the air stream itself, performance will be impacted as the lamps get dirty.

With our UV-O units the air flow does not come from the exhaust duct but from the ambient air around the unit, which is filtered on entry. This means that it is able to provide a uniform supply of ozone and hydroxyl free radicals into the extract system with an extremely low pressure loss.

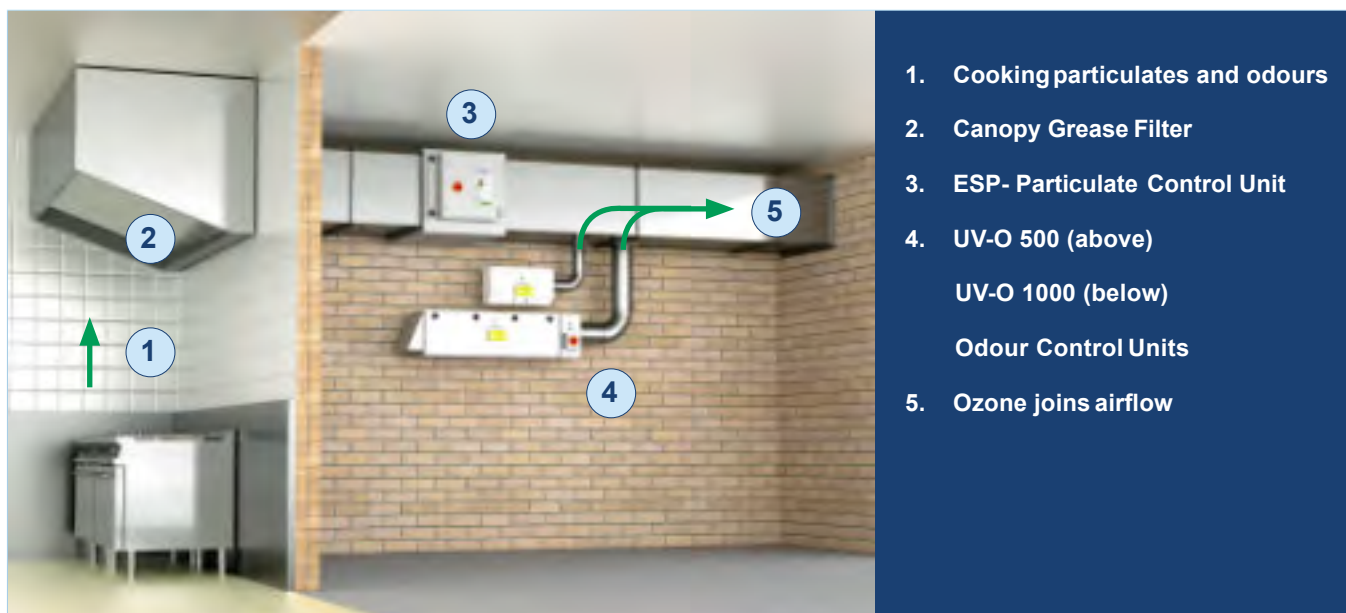
For optimum performance we would recommend between 2 & 6 seconds of dwell time to allow the ozone to work effectively upon the malodorous gasses within the duct.



UV-O 500 Unit



UV-O 1000 Unit



1. Cooking particulates and odours
2. Canopy Grease Filter
3. ESP- Particulate Control Unit
4. UV-O 500 (above)
UV-O 1000 (below)
Odour Control Units
5. Ozone joins airflow

Technical Specification

	UV-O 500	UV-O 1000
Electrical Supply	220/240V 50Hz	220/240V 50Hz
Power Consumption	140 Watts	700 Watts
Max Air Volume	up to 1m ³ /sec	up to 2m ³ /sec
Dimensions	W 605mm H 300mm D 200mm	W 1568mm H 350mm D 363mm
Weight	10.5Kg	50Kg

This unit's tried and tested UV-C technology allows for the siting of commercial kitchens in locations such as residential areas and shopping centres, where previously planning permission may not have been granted. After extensive research and development Purified Air are able to devise the best combination of lamps to provide the most effective odour control.

Safety

Ultra-Violet band C light is the most powerful of the three bands, it is a very strong oxidant and as such exposure to UV-C light is dangerous. To ensure safety the UV-C lamps are secured behind locked panels and the system has been engineered to shut down automatically when these panels are unlocked. However, since the lamps typically have a minimum life of twelve months and with the system able to operate at optimum efficiency even if one lamp fails it is unlikely that, apart from routine servicing by experienced engineers, that the system will ever need to be opened.

UV-O

**TECHNICAL & OPERATIONS
MANUAL**

UV-O Odour Control Units



Technical and Operations Manual

Models Covered: UV-O 500
UV-O 1000

Using this Manual

This manual is intended to be used as a work of reference by professional, well trained and authorised users to assist them in safely installing, using, maintaining and repairing the Units mentioned on the cover of this document.

Please note that it is strongly recommended that training is given by Purified Air Limited prior to operatives attempting to carry out maintenance or repair work on these Units.

Copyright Statement

All rights reserved

No part of this publication may be copied or published by means of printing, photocopying, microfilm or otherwise without prior written consent of the manufacturer. This restriction also applies to the corresponding drawings and diagrams.

The information given in this manual has been collected for the general convenience of our clients. It has been based on general data pertaining to construction material properties and working methods known to us at the time of issue of the document and is therefore subject, at any time, to change or amendment and the right to change or amend is hereby expressly reserved. The instructions in this publication only serve as a guideline for installation, use, maintenance and repair of the models mentioned on the cover page of this document.

This manual is to be used for the standard models of the Units of the type given on the cover page. Thus the manufacturer cannot be held responsible for any damage resulting from the application of this manual to the version actually delivered to you.

This manual has been written with great care. However, the manufacturer cannot be held responsible either for any errors occurring in this manual or their consequences.

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1. Safety

1.1 Introduction

Everyone working on or with these Units must be familiar with the contents of this manual and must strictly observe the instructions herein.

The Management should instruct personnel in accordance with this manual and observe all instructions and directions given herein.

Note: Always follow the steps for any instructions in this manual in the order given.

Always keep this manual with your Unit.

The users of the Units are always fully responsible for observing all applicable local safety instructions and regulations.

Specific working conditions or selected accessories may require additional safety instructions. Contact your supplier immediately if you detect a potential danger when using these Units.

1.2 Safety Warnings and Instructions

The following symbols and notifications are used in this manual:



WARNING!

Used to indicate where there is a risk of injury or death.



WARNING! - DANGER OF ELECTRIC SHOCK!

Used to indicate where there is a risk of injury or death from electric shock.



WARNING

Used to indicate that Ozone (O3) is produced by this Unit



WARNING

Used to indicate that the Unit contains lamps that produce UV light.



CAUTION

Used to indicate where there is a risk of damage to equipment.



INFORMATION

Important information or useful hints about usage.



RECYCLING

Recycling information.



WEEE REGULATIONS

Used to ensure that waste electrical equipment is disposed of correctly.

1.3 Pictograms, Warnings and Instructions Displayed on the Unit

The pictograms, warning and instructions attached to the Unit are, themselves, safety features.

They must not be covered or removed and must remain present and legible through the entire life of the Unit.

- Immediately replace or repair damaged or illegible pictograms, warnings and instructions.

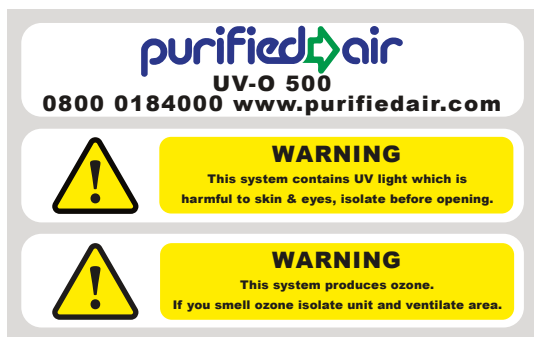


Figure 1 - UV-O 500 Unit Label

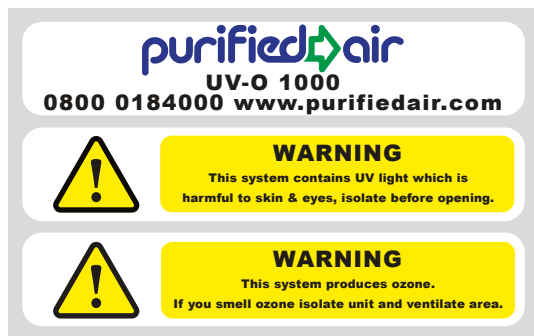


Figure 2 - UV-O 1000 Unit Label

1.4 Safety Features

To prevent inadvertent exposure to UV light, the UV-C lamps are secured behind locked panels, with the Units automatically shutting down when these panels are unlocked.



CAUTION

- All safety features must be correctly fitted and can only be removed for maintenance and repair jobs by skilled and authorised service engineers.
- These Units must not be used if the safety features are not fully present or defective.
- The safety features should be regularly checked for their proper functioning and, if defective, should be immediately repaired.

1.5 Safety Warnings and Cautions



WARNING! RISK OF EXPLOSION!

These Units are not explosion-proof rated. They can cause sparks and should therefore not be used in areas with an explosion risk.



WARNING!

Ozone (O₃) is produced by these Units. Ozone can be poisonous at certain levels of concentration.



Inhalation of ozone causes dryness of the mouth, coughing, and irritates the nose, throat, and chest.

It may cause difficulty in breathing, headaches and fatigue, and could aggravate existing bronchial conditions including asthma. The characteristic sharp, irritating odour is readily detectable at low concentrations (0.01 to 0.05 ppm).

UNIT MUST NOT BE OPERATED WITHOUT KITCHEN EXTRACT FAN RUNNING.



WARNING! - DANGER OF ELECTRIC SHOCK!

- To avoid electric shock:
- Do not operate these Units without a proper electrical ground/earth.
- Always disconnect power to these Units and isolate them from the power supply before performing any service or maintenance.
- Do not operate these Units if their power cables are damaged, or if any other damage to them is visible or suspected.
- The supplied utility/mains power must match the power requirements listed on the Units' rating labels.



WARNING!

- These Units contain lamps that produce UV light.
- Avoid exposure to direct or reflected ultraviolet rays.
- Immediate or prolonged exposure to UV light can result in painful eye injury, skin burn, premature skin aging, or skin cancer.



CAUTION

- Regularly inspect your Unit and check it for damage.
- Verify the correct functioning of all of the safety features.
- Read and save all notices, warnings and safety instructions received with your Unit.
- Do not alter the construction or design of these Units.
- Do not remove safety labels or devices.
- Do not use these Units for other than their intended purpose; as described in this manual.
- Only use original spare parts.
- Keep the operating controls free from dirt and grease.



CAUTION

- Make sure the room is always sufficiently ventilated, particularly in smaller confined areas.
- Do not use these Units at a relative humidity exceeding 75%.
- Do not use these Units at temperatures below 5°C or above 56°C.
- Check the working environment. Do not allow unauthorised persons to enter the working environment.
- Use common sense. Stay alert and pay attention to your work. Do not use these Units when you are tired or under the influence of drugs, alcohol or medicine.

1.6 Modifications

Modification of these Units is not permitted.

1.7 Users

Installation or maintenance of these Units is exclusively reserved for authorised, trained and qualified users.

Temporary personnel and trainees should only access these Units under the supervision and responsibility of authorised, trained and qualified users.

1.8 Technical Specifications

	UVO500	UVO1000
Electrical Supply:	220/240V 50Hz	220/240V 50Hz
Max Power Consumption:	140 Watts	700 Watts
Max Air Volume:	1m3/sec	2m3/sec
Weight:	10.5 Kg	50 Kg
Dimensions:	W 610mm	W 1521mm
	H 300mm	H 350mm
	D 200mm	D 404mm

1.8.1 Rating Plates



Figure 3 - UV-O 500 Unit Rating Plate



Figure 4 - UV-O 1000 Unit Rating Plate

2. Product Overview



Figure 5 - UV-O 500 Unit



Figure 6 - UV-O 1000 Unit Installed

2.1 Intended Use

UV-O Odour Control Units are designed to efficiently remove odorous compounds from the fumes extracted from commercial kitchens.

Simple to install, the Units are designed to be located on the outside of the ducting. The fact that they are externally located makes these Units ideal for retrospective installations and, as the UV lamps are outside of the airstream, maintenance requirements are minimal.

To maximise the Units' efficiency, they should be installed into the extraction ducting of a commercial kitchen, down stream of the extraction hood on the negative side of the fan.



CAUTION

Using these Units for other purposes is considered contrary to their intended use. The manufacturer accepts no liability for any damage or injury resulting from such use.

These Units have been built in accordance with state-of-the-art standards and recognised safety regulations.



CAUTION

Only use these Units

- **If they are not damaged in any way.**
- **After following the instructions laid down in this manual.**

2.2 Features

When installed correctly, Purified Air's UV-O Odour Control Units have the following features and benefits:

- Use highly efficient UV-C technology.
- Robust, compact construction.
- Twelve month effective lamp life.
- Minimum maintenance requirements.
- Enhanced safety - UV-C lamps are locked behind panels.
- Optional self-diagnostic system.
- Designed to complement our Electrostatic Precipitator (ESP) system.
- Reduce the need for duct cleaning.
- Can reduce cooking odours by up to 90%*.
- Grease is broken down in to more easily managed compounds.
- Virtually no pressure increase within the duct.

* In particularly odourous environments, high levels of odour control will only be achieved by also using good quality particulate control systems (particularly ESPs) and supplementary odour control systems in conjunction with this Unit.

2.3 Operating Principles

Purified Air's UV-O Odour Control Units contain either two (UV-O 500) or ten (UV-O 1000) high output UV-C (short-wavelength ultraviolet radiation) lamps and are designed to be located outside the extraction duct.

2.3.1 Ozone and Free Radical Production

The UV light produced by the UV-C lamps converts oxygen present in the air into ozone.

Ozone is a highly reactive oxidant which interacts with most contaminants, allergens and odour producing compounds it comes into contact with, oxidising them and rendering them harmless.

The UV light produced by the lamps can also further convert the ozone to hydroxyl free radicals in the presence of water or water vapour.

Free radicals are highly reactive oxidants which makes them effective natural air cleansing agents.

The mixture of ozone and hydroxyl free radicals produced in this way creates a much more powerful oxidising action (Ozonolysis) than the use of ozone alone.

2.3.2 Location

It is widely accepted that the best way to apply UV-C is in the airstream itself. However, in such a situation, the lamps can quickly become dirty, greatly reducing their effectiveness.

Unlike other UV-C systems, the UV-O Odour Control Units are designed to be located outside of the kitchen extract duct, connected via a spigot.

Negative pressure forms as the extract fume is drawn down the duct across the spigots opening, thus drawing ambient air into the Unit and across the UV lamps producing Ozone which is then introduced into the duct.

As the ambient air is relatively contaminant free the lamps stay cleaner allowing a more constant production of Ozone.

2.4 Components

2.4.1 UV-O 500 Components

The UV-O 500 Unit consists of a Main Chassis which contains the UV lighting source behind a lockable, hinged, access panel.

A green Power Light and blue Safety Light are located on the lower Panel of the Unit.

An Airflow Sensor (See Figure 8 - Air Flow Sensor on page 10) is mounted on the right hand side of the Main Chassis below the Duct Connection Spigot.

The Air Inlet is located on the left hand side of the Unit (See Figure 9 - Air Inlet on page 10).

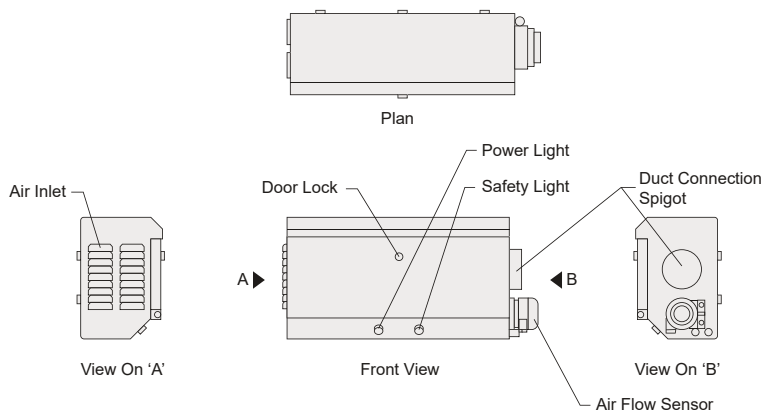


Figure 7 - UV-O 500 - Views



Figure 8 - Air Flow Sensor



Figure 9 - Air Inlet

2.4.2 UV-O 1000 Components

The UV-O 1000 Unit consists of a Main Chassis which contains the UV lighting source behind a lockable hinged access panel also secured with four star knobs. A Control Panel, on the right hand side of the Main Chassis, contains the Rotary Mains Isolation Switch green Power Light and blue Safety Light.

An Airflow Sensor (See Figure 11 - UV-O 1000 Air Flow Sensor and Air Outlet on page

11) is mounted on the right hand side of the Main Chassis below the Airflow Outlet/Duct Connection Spigot.

The Air Inlet, containing the Unit's filter, is located on the left hand side of the Unit (See Figure 12 - Air Inlet on page 12).

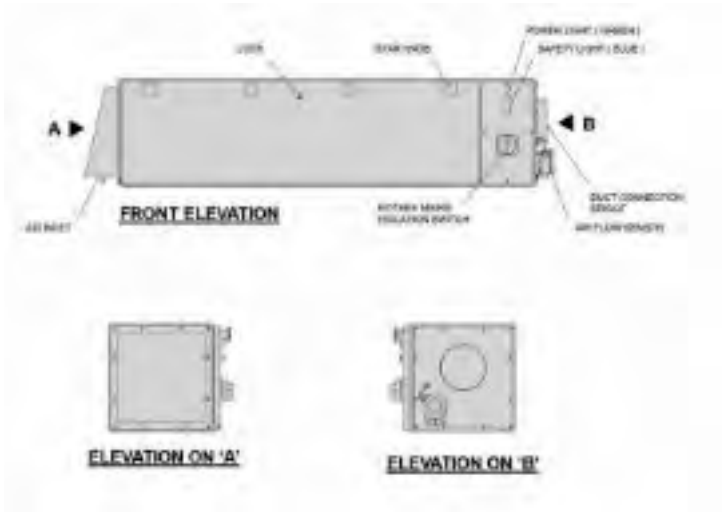


Figure 10 - UV-O 1000 - Front and Side Views



Figure 11 - UV-O 1000 Air Flow Sensor and Air Outlet



Figure 12 - Air Inlet

3. Storage, Unpacking and Handling

3.1 Storage

Prior to installation, a UV-O Unit must be stored in its original packaging in a dry environment.

3.2 Shipping List

Each Unit is shipped with the following:

- Main Unit.
- Airflow Sensor Probe Assembly.
- This Technical and Operations Manual.

It is strongly recommended that Purified Air commission the UV-O Unit. However, should the customer decide to complete these tasks (See 4.3.3 Commissioning the UV-O 500 Unit on page 20 and 4.4.3 Commissioning the UV-O 1000 Unit on page 27) and following the signing of a waiver indemnifying Purified Air against any negative consequences, the following additional items will also be provided:

- Keys to the Main Unit's Front Panel.
- Two or Ten UV-C Lamps depending on the model.

3.3 Unpacking and Handling

Strip away all packaging, wrapping and strapping (this must only be done by trained, professional installers).



WARNING!

- **These Units are heavy and the appropriate lifting and handling practices must be observed, for both unpacking and installation, to avoid personal injury or damage to the equipment.**
- **Consult the Technical Specifications (See Paragraphs 1.8 Technical Specifications on page 6 and for the Units' weights.**



CAUTION

Inspect the Unit and check it for damage. Ensure all safety features are present and functioning correctly.

4. Installation Guidance

4.1 Overview

Installation of the Units should only be carried out by trained, professional installers.

Installations vary widely depending on the specific site requirements, therefore, this section only provides general guidance for the installers.

Note: It is strongly recommended that UV-O Units are commissioned by Purified Air Ltd to ensure that they are installed correctly and safely.

If in any doubt regarding the installation of the UV-O Units, contact Purified Air Ltd.

4.2 Unit Dimensions

The dimensions of the UV-O Units are detailed below.

4.2.1 UV-O 500 Unit Dimensions

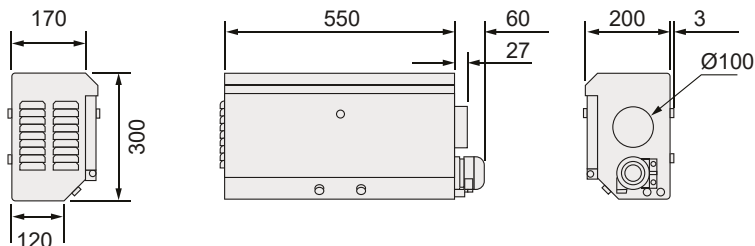


Figure 13 - UV-O 500 - Dimensions
(All Dimensions in Millimetres)

4.2.2 UV-1000 Unit Dimensions

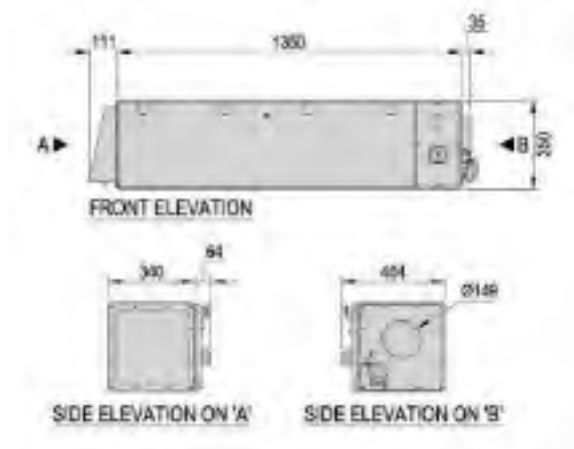


Figure 14 - UV-O 1000 - Dimensions
(All Dimensions in Millimetres)

4.3 Installing the UV-O 500 Unit

4.3.1 Installing the UV-O 500 Main Chassis

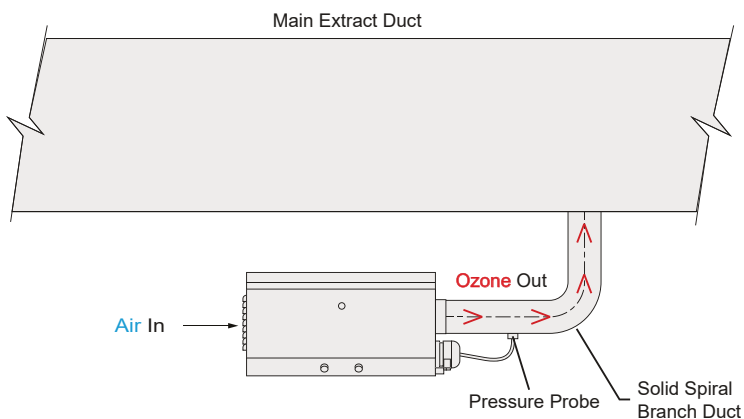


Figure 15 - UV-O 500 Installation Schematic

Before installation, the following points should be considered:

- The UV-O 500 Unit should be located in close proximity to the kitchen extract ducting.

- The Unit should be positioned with good access to allow for future servicing and maintenance.
- It is recommended that the Unit be mounted onto a wall using the pre-drilled holes in the rear of the casing.



WARNING!

If an alternative method of mounting the Unit is employed it is important that these holes are totally blocked/closed to prevent the escape of UV light.

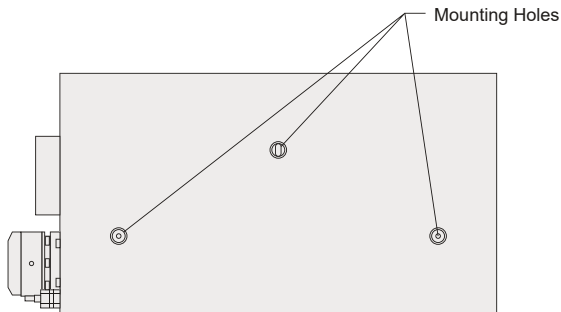


Figure 16 - UV-O 500 Mounting Holes

Rigid 100mm diameter galvanised metal ducting should be used to connect the UV-O 500 Unit to the kitchen extraction ducting (See Figure 15 - UV-O 500 Installation Schematic on page 15).

The 100mm galvanised metal ducting should connect securely to the spigot on the side of the Unit and be connected to the kitchen extraction ducting via a spigot.



WARNING!

The Unit must be installed on the suction (negative pressure) side of the extraction fan.



WARNING

- The UV-O 500 will produce ozone which is a poisonous gas with a distinctive smell.
- The kitchen extract system into which the UV-O 500 system is installed must be sound with no holes that will allow ozone to escape.
- If ozone is smelt within the premises, the UV-O 500 must be switched off immediately.
- Care must be taken that the kitchen extract point is not close to air inlets, windows etc. where elevated ozone levels will cause a problem.





CAUTION

- Never install the Unit in front of entrances and exits which could be used by the emergency services.
- Check that any intended supporting structure is adequate for the weight of the Unit. See Technical Specifications for the Unit weight.

4.3.2 Installing the UV-O 500 Air Flow Sensor Pressure Probe

The UV-O 500 must only be allowed to operate when the kitchen's extraction system is running.

To this end, an Air Flow Sensor and Pressure Probe, measuring air pressure in the extraction ducting, are fitted to the UV-O 500 and only allow the Unit to operate when a sufficient volume of air is flowing through the extraction ducting.

The Air Flow Sensor will switch on power to the Unit if the air pressure in the duct is between 20 and 300Pa, (less than the pressure outside the duct or "at the sensor").



Figure 17 - Air Flow Sensor

Install the Air Flow Sensor's Pressure Probe into the Branch Duct which connects the UV-O 500 to the Main Extract Duct (See Figure 15 - UV-O 500 Installation Schematic on page 15) as follows:

1. Drill one 7mm and two 2mm holes into the Branch Duct corresponding to the holes in the Airflow Sensor's Pressure Probe mounting flange.
2. Insert the Airflow Sensor's Pressure Probe into the 7mm hole drilled in the Branch Duct and secure with screws through the flange into the two 2mm holes drilled in the Branch Duct
(See Figure 18 - Installing the Air Flow Sensor's Pressure Probe on page 18).

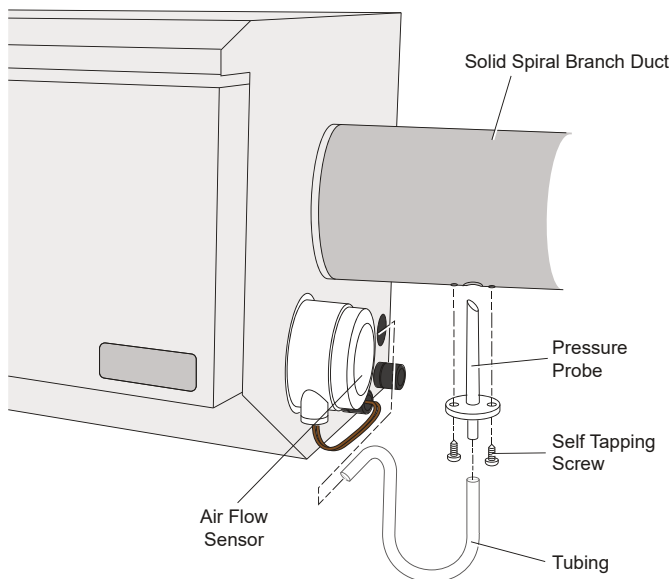


Figure 18 - Installing the Air Flow Sensor's Pressure Probe

3. Connect the Pressure Probe via the PVC tube to Port P1 on the Air Flow Sensor, leaving Port P2 unused and open to the atmosphere (see Figure 19 below):

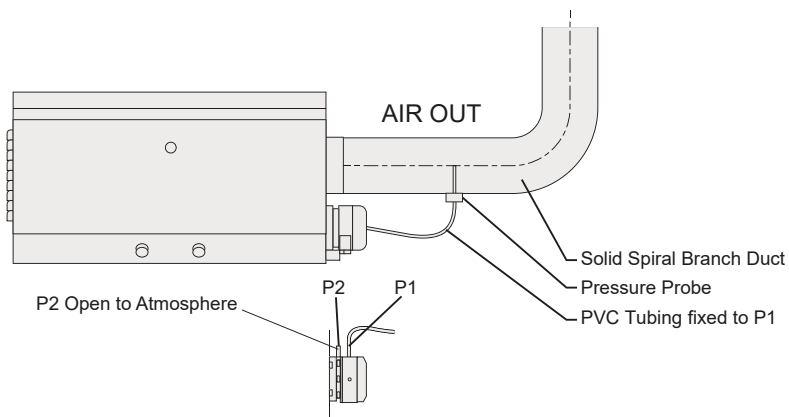


Figure 19 - Connecting the Air Flow Sensor's Pressure Probe

4. Link the extraction fan and UV-O 500 power supplies.

5. Turn on the extraction fan and confirm that air is passing through the Unit's air inlet and passing into the extraction ducting.



WARNING



Under no circumstances should the Unit be used if the direction of the airflow is reversed and air is exiting from the Unit's air inlet.



CAUTION

The Unit's air inlet must be kept clear to allow airflow through the system.

4.3.3 Commissioning the UV-O 500 Unit by Others

As the Unit is owned by your company, you may wish to commission it yourselves. If this is the case, one of your Directors must sign the UVC Disclaimer acknowledging that you fully understand the dangers associated with the installation procedure. On receipt of the signed UVC Disclaimer, Purified Air will supply the correct number and type of lamps required for the UV-O unit ordered along with a set of keys.

Final commissioning of the Unit to be carried out as follows:

1. Unlock and open the Front Panel which hinges down once the lock has been undone.

Note: The lamp holder can be released from its fixings to simplify installation of the lamps. (See Figure 23. Electrical Connections on page 22)

2. Insert the UV lamps into their clips.
3. Slide the lamps to the Left to engage them with their plugs (See Figure 36 - UV-O 500 UV Lamp Plugs on page 35).



Figure 20 - UV-O 500 UV Lamp



Figure 21 - UV-O 500 UV Lamp Location

4. Wire the UV-O 500 Unit into the mains via an isolating switch (not supplied) mounted not more than 1 meter from the Unit, in an easily accessible location:

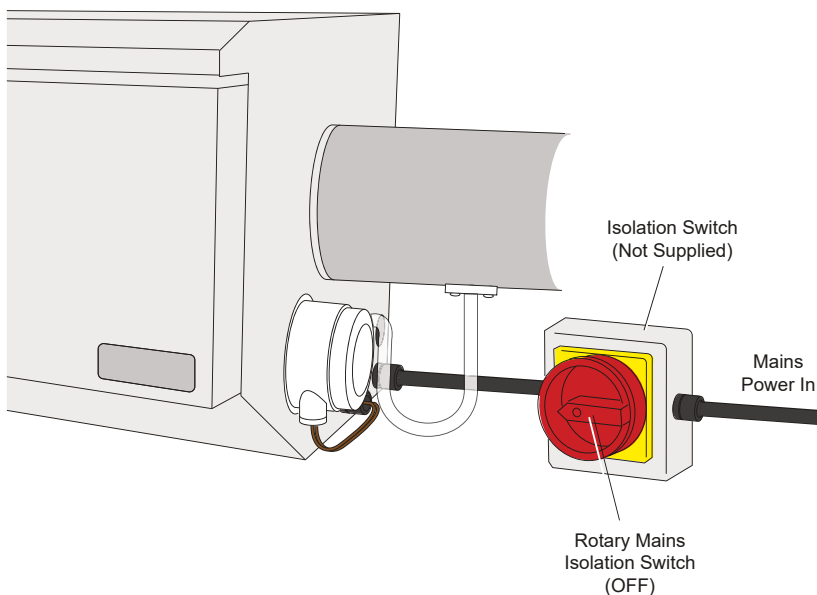


Figure 22 - Installation of Rotary Mains Isolation Switch

- The Unit's mains connection terminals are located on the end of the lamp holder section (See Figure 23 - Electrical Connections on page 22)
- The mains cable should be run through the cable gland located in the bottom right hand corner of the Unit, behind the Air Flow Sensor (See Figure 17 - Air Flow Sensor on page 17).



Figure 23 - Electrical Connections

Note: To check that all UV lamps are working it is necessary to bypass the micro-switches on the inside top front of the UV-O 500 to enable the Front Panel to be open when the Unit is in operation. This procedure should only be undertaken by a qualified Purified Air engineer.



CAUTION

Appropriate PPE equipment should be worn during this check.

5. Once the lamps have been fitted and the electrical connection completed, the Front Panel can be closed and locked.

4.4 Installing the UV-O 1000 Unit

4.4.1 Installing the UV-O 1000 Main Chassis



Figure 24 - UV-O 1000 Installation Schematic

Before installation, the following points should be considered:

- The UV-O 1000 Unit should be located in close proximity to the kitchen extract ducting.
- The Unit should be positioned with good access to allow for future servicing and maintenance.
- If the Unit is to be mounted onto a wall, the casing can be drilled to allow this.



WARNING!

If you drill the case to mount the Unit onto a wall, it is important to make sure that the fixings used will not allow any UV light to escape.

- Alternatively, mounting brackets are supplied that can be fixed to the spigot and inlet plates via the bolts already in place, as shown below:

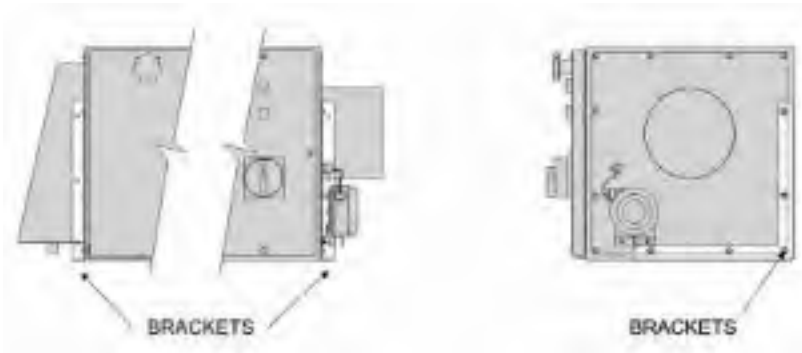


Figure 25 - UV-O 1000 Mounting Bracket Installation

Rigid 100mm diameter galvanised metal Branch Duct should be used to connect the UV-O 1000 Unit to the kitchen extraction ducting (See Figure 24 - UV-O 1000 Main Chassis Installation Schematic on page 23).

The 100mm galvanised Branch Duct should connect securely to the spigot on the side of the Unit and should be connected to the kitchen extraction ducting via a spigot.



WARNING!

The Unit must be installed on the suction (negative pressure) side of the extraction fan.



WARNING

- The UV-O 1000 will produce ozone which is a poisonous gas with a distinctive smell.
- The kitchen extract system into which the UV-O 1000 system is installed must be sound with no holes that will allow ozone to escape.
- If ozone is smelt within the premises the UV-O 1000 must be switched off immediately.
- Care must be taken that the kitchen extract point is not close to air inlets, windows etc., where elevated ozone levels will cause a problem.



CAUTION

- Never install the Unit in front of entrances and exits which could be used by the emergency services.
- Check that any intended supporting structure is adequate for the weight of the Unit. See Technical Specifications for the Unit weight.



4.4.2 Installing the UV-O 1000 Pressure Probe

The UV-O 1000 must only be allowed to operate when the kitchen's fume extraction system is running.

To this end, an Air Flow Sensor and Pressure Probe, measuring air pressure in the extraction ducting, are fitted to the UV-O 1000 and only allow the Unit to operate when a sufficient volume of air is flowing through the extraction ducting:

The Air Flow Sensor will switch on power to the Unit if the air pressure in the duct is between 20 and 300Pa, (less than the pressure outside the duct or "at the sensor").



Figure 26 - Air Flow Sensor

Install the Air Flow Sensor's Pressure Probe into the Branch Duct which connects the UV-O 1000 to the Main Extract Duct (See Figure 27 - Installing the Air Flow Sensor's Pressure Probe on page 26) as follows:

1. Drill one 7mm and two 2mm holes into the Branch Duct, corresponding to the holes in the Airflow Sensor's Pressure Probe mounting flange.
2. Insert the Airflow Sensor's Pressure Probe into the 7mm hole drilled in the Branch Duct and secure with screws through the flange into the two 2mm holes drilled in the Branch Duct (See Figure 27 - Installing the Air Flow Sensor's Pressure Probe on page 26).

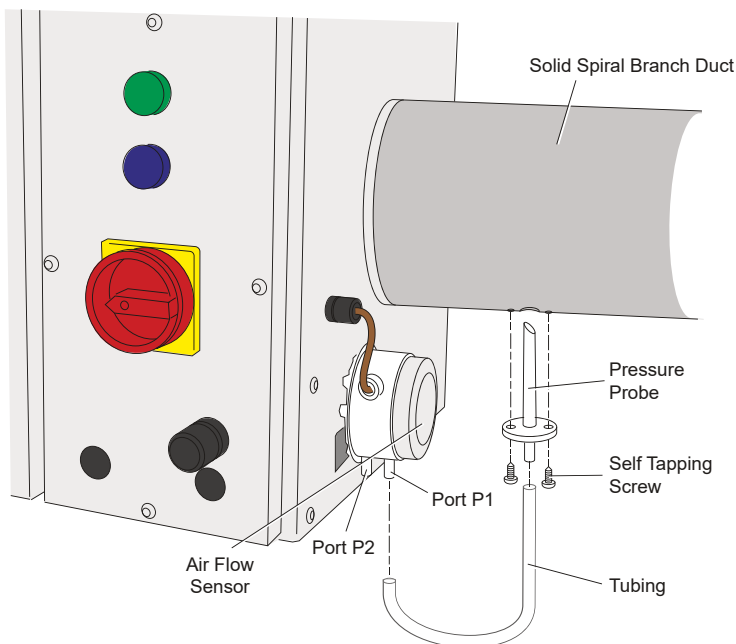


Figure 27 - Installing the Air Flow Sensor's Pressure Probe

3. Connect the Pressure Probe via the PVC tube to Port P1 on the Air Flow Sensor, leaving Port P2 unused and open to the atmosphere (see Figure 27 above).
4. Link the extraction fan and UV-O 1000 power supplies.
5. Turn on the extraction fan and confirm that air is passing through the Unit's air inlet and passing into the extraction ducting.



WARNING

Under no circumstances should the Unit be used if the direction of the airflow is reversed and air is exiting from the Unit's air inlet.





CAUTION

The Unit's air inlet must be kept clear to allow airflow through the system.

4.4.3 Commissioning the UV-O 1000 Unit by Others

As the Unit is owned by your company, you may wish to commission it yourselves. If this is the case, one of your Directors must sign the UVC Disclaimer acknowledging that you fully understand the dangers associated with the installation procedure. On receipt of the signed UVC Disclaimer, Purified Air will supply the correct number and type of lamps required for the UV-O unit ordered along with a set of keys.

Final commissioning of the Unit to be carried out as follows:

1. Undo the Front Panel's lock and four Star Knobs.
2. Lower down the Front Panel.
3. Slide the Lamp Holder out of the Unit on its Runner System:

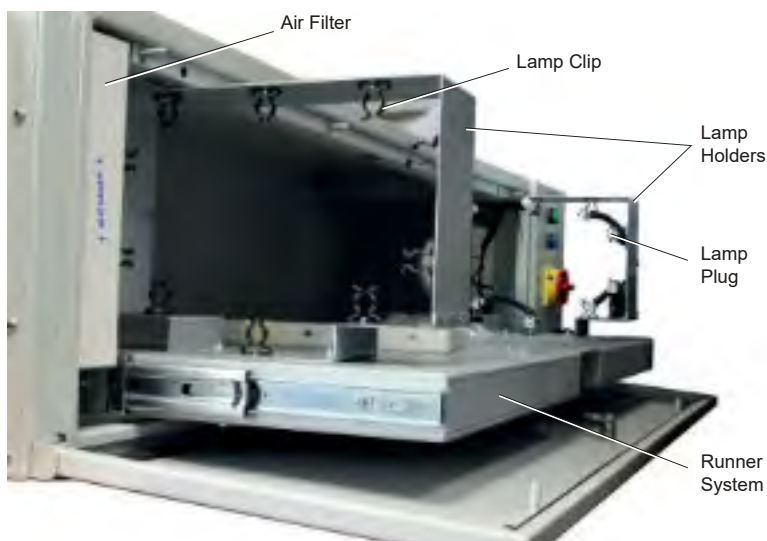


Figure 28 - Lamp Holder and Runner System

4. Clip the lamps into position (see Figure 28 above).
5. Connect the plugs to the ends of the UV lamps (see Figure 28 above).



Figure 29 - Lamp Clips



Figure 30 - Lamp Plugs



Figure 31 - UV-O 1000 UV Lamp

6. The UV-O 1000 should now be wired into the mains via the Rotary Mains Isolation Switch on the front of the Unit as follows

- The Unit's mains connection terminals are located behind a control panel on the right hand side of the main chassis. This is held in place by 4No. screws. There is an internal cover, with 1No. screw, which needs to be taken off to access the connection terminal. (See Figure 28 - Lamp Holder and Runner System on page 27).
- The mains cable should be run through the cable gland located in the bottom right hand corner of the front of the Unit (See Figure 33 - UV-O 1000 Control Panel on page 30)

Note: To check that all UV lamps are working it is necessary to bypass the micro-switches on the inside top front of the UV-O 1000 to enable the Front Panel to be open when the Unit is in operation. This procedure should only be undertaken by a qualified Purified Air engineer.



CAUTION

Appropriate PPE equipment should be worn during this check.



WARNING!

- These Units contain lamps that produce UV light.
- Avoid exposure to direct or reflected ultraviolet rays.
- Immediate or prolonged exposure to UV light can result in painful eye injury, skin burn, premature skin aging, or skin cancer.

7. Once the lamps have been fitted and the electrical connection completed, push the assembled Runner System back into position, replace electrical control panel covers, close up the Front Panel, secure the four Star Knobs and fasten the lock.

4.4.4 Building Management System

The ability to connect a Building Management System (BMS) to the UVO range of units is an optional extra. If required this can be ordered with the unit and fitted by Purified Air before dispatch at an additional cost, alternatively it can be retro fitted once installed on site, again by an experienced Purified Air engineer, but this does incur a higher additional cost.

5. Operation and Control

5.1 UV-O 500 Control Panel

The lower, angled section of the front of the Unit's main case contains a green Power Light and blue Safety Switch Light.



Figure 32 - UV-O 500 Control Panel

5.2 UV-O 1000 Control Panel

A Control Panel is situated on the right hand side of the Main Chassis which contains the Rotary Mains Isolation Switch, Green Power Light and Blue Safety Switch Light.

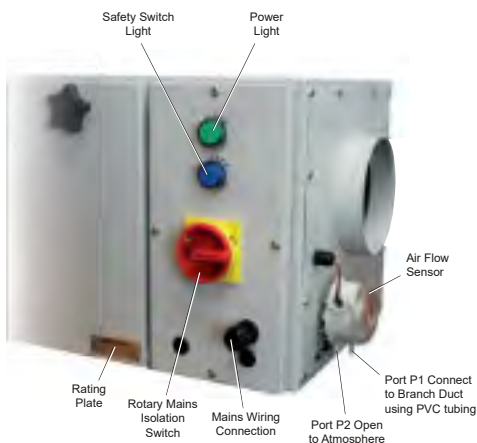


Figure 33 - UV-O 1000 Control Panel

5.3 Before Use

5.3.1 UV-O 500 and UV-O 1000

Before use, ensure that all safety precautions have been taken and that environmental conditions are suitable for operation of the Unit (See 1.5 Safety Warnings and Cautions on page 4).

5.4 Switching the UV-O 500 Unit On

1. Ensure that the kitchen extractor fan is running.
2. Turn on the Rotary Mains Isolation Switch (On/Off) to the 'On' position.

Note: The green Power Light will illuminate, indicating that power is being supplied to the Unit.

The blue Safety Switch Light will illuminate (See Figure 32 - UV-O 500 Control Panel on page 30), indicating that the various safety switches are engaged and that sufficient airflow is passing through the Unit.



WARNING

Please contact your service agent if either the green Power Light or blue Safety Switch Light don't illuminate when the Rotary Mains Isolation Switch is in the 'On' position.



WARNING

- If ozone can be smelt in the area where the UV-O 500 Unit is installed, the Unit has been incorrectly installed
- It should be isolated via the Mains Isolator Switch and Purified Air contacted for further information.

5.4.1 Switching the UV-O 500 Unit Off

To switch the Unit off, turn the Rotary Mains Isolation Switch
(See figure 22 - Installation of Rotary Mains Isolation Switch on page 21)
to the 'Off' position.

Note: Both the green Power Light and blue Safety Switch Light will extinguish.



WARNING

Please contact your service agent if either the green Power Light or blue Safety Switch Light do not extinguish when the Rotary Mains Isolation Switch is in the 'Off' position.

5.5 Switching the UV-O 1000 Unit On

To start the Unit from the Control Panel:

1. Ensure that the kitchen extractor fan is running.
2. Turn on the Rotary Mains Isolation Switch (On/Off) to the 'On' position. **Note:** The green Power Light (See Figure 33 - UV-O 1000 Control Panel on page 30) will illuminate, indicating that power is being supplied to the Unit. The blue Safety Switch Light will illuminate (See Figure 33 - UV-O 1000 Control Panel on page 30), indicating that the various safety switches are engaged and that sufficient airflow is passing through the Unit.



WARNING

Please contact your service agent if either the green Power Light or blue Safety Switch Light do not illuminate when the Rotary Mains Isolation Switch is in the 'On' position.



WARNING

- If ozone can be smelt in the area where the UV-O 1000 Unit is installed, the Unit has been incorrectly installed
- It should be isolated via the Rotary Mains Isolation Switch and Purified Air contacted for further information.

5.5.1 Switching the UV-O 1000 Unit Off

To switch the Unit off from the Control Panel:

Turn the Rotary Mains Isolation Switch (On/Off) to the 'Off' position.

Note: Both the green Power Light and blue Safety Switch Light will extinguish.



WARNING

Please contact your service agent if either the green Power Light or blue Safety Switch Light don't extinguish when the Rotary Mains Isolation Switch is in the 'Off' position.

5.6 BMS Connections

Please note:

Any **BMS** connection to this unit should be **24V 0.5A max.**

The BMS relay has volt free contacts.

When the unit is isolated the BMS connection could still be LIVE.

If you have any queries regarding this please contact Purified Air Limited.

6. Maintenance

6.1 Introduction

If you carry out the simple maintenance and cleaning described below at the regular intervals, paying attention to the associated Warnings and Cautions, then any problems will mostly be detected and corrected before they result in a total breakdown of the Unit.

The indicated maintenance intervals can vary depending on specific working and local environmental conditions. It is therefore recommended that the Units are thoroughly inspected annually, in addition to the indicated periodic maintenance. Please contact your supplier for this purpose.



WARNING!

- Overdue maintenance can cause fire.
- Always switch OFF the Unit and **isolate the electric supply** before carrying out the activities below.
- Do not carry out any service, maintenance or repairs on the Unit before it has been protected against unintended starting.

6.1.1 Maintenance Schedule UV-O 500 and UV-O 1000

Basic maintenance activities can be carried out by the user. Please see the table below for the optimum frequencies for such activities.

Note: Other activities are strictly reserved for qualified personnel.

Basic Maintenance Activities	Frequency	
	UV-O 500	UV-O 1000
Clean UV Lamps See paragraph 6.2.1. Cleaning the UV-O 500 lamps on page 34 and paragraph 6.3.1. Cleaning the UV-O 1000 Lamps on page 37	Every 2 months (depending on degree of pollution)	
Replace UV Lamps paragraph 6.2.2. Replacing the UV-O 500 Lamps on page 35 and paragraph 6.3.2. Replacing the UV-O 1000 Lamps on page 37	Every 12 months	

Basic Maintenance Activities	Frequency	
	UV-O 500	UV-O 1000
Replace Filter See paragraph 6.3.3. Replacing the UV-O 1000 Filter on page 38	Not Applicable	Every 2 months (Depending on degree of pollution)
Clean the inside of the Unit and remove dust/ grease See paragraph 6.2.4. Cleaning the Inside of the UV-O 500 on page 36 and paragraph 6.3.4. Cleaning the Inside of the UV-O 1000 on page 39	Every 3 months	

**CAUTION**

Observe the maintenance intervals given in this manual.

Overdue maintenance can lead to high repair costs and modifications can render the warranty null and void.

Always use tools, parts and service techniques that have been approved by the manufacturer.

6.2 Cleaning and Maintenance Tasks - UV-O 500

It is a matter of experience to determine when your UV-O 500 Unit needs to be cleaned as the nature and degree of any pollution depends strongly on factors such as the particular location, humidity and the intensity of use etc. Nevertheless, the UV lamps should be cleaned and the inside of the Units cleaned regularly, at intervals not exceeding 3 months, using the procedures outlined in the sections below:

6.2.1 Cleaning the UV-O 500 lamps

**WARNING**

Appropriate PPE equipment should be worn at anytime when there is a possibility that the light emitted from the UV lamps can be viewed or come into contact with skin.

To clean the UV-O 500 lamps:

1. Isolate the Unit from the mains power supply by turning the Rotary Mains Isolation Switch to the 'Off' position.
2. Double check that the mains power supply has been isolated and that the Power Light is 'Off'.

3. Undo the lock on the Front Panel and open it.
4. Slide the lamps to the right to disengage them from their plugs (See Figure 34 - UV-O 500 UV Lamp Plugs below).
5. Remove the lamps from their clips (See Figure 35 - UV-O 500 Lamp Clips on page 36).
6. Clean the lamps by wiping them with alcohol wipes or a lint free cloth soaked in isopropyl alcohol and dry with a lint free cloth.

Note: Natural oily deposits left by fingers and palms create an opaque mark on the lamp thereby reducing the UV transmission. These marks also cause the quartz to break down, causing premature lamp failure. Use caution when cleaning near the ends of the lamps excessive pressure may remove or smear the coating protecting the lamp electrodes.

It is a matter of experience to determine when the UV lamps need to be cleaned, since the nature and the degree of pollution depend strongly on factors such as the particular location, environmental conditions and intensity of use, etc.

Note: Whatever the situation, however, the UV lamps should be cleaned regularly according to the schedule (See 6.1.1 Maintenance Schedule UV-O 500 and UV-O 1000 on page 33).

6.2.2 Replacing the UV-O 500 Lamps

1. Replace the lamps in their clips (See Figure 35 - UV-O 500 Lamp Clips on page 36).
2. Slide the lamps to the left to engage them with their plugs (See Figure 34 - UV-O 500 UV Lamp Plugs on page 35).
3. Close the Front Panel and fasten the lock.
4. Switch on the mains power supply to the Unit by turning the Rotary Mains Isolation Switch to the 'On' position.



Figure 34 - UV-O 500 UV Lamp Plugs



Figure 35 - UV-O 500 Lamp Clips

6.2.3 Replacing the UV-O 500 Filter

Not Applicable.

6.2.4 Cleaning the Inside of the UV-O 500

Having disconnected the mains power supply to the Unit, opened its Front Panel and removed the UV Lamps (See 6.2.1 Cleaning the UV-O 500 lamps on page 34):

Spray a suitable cloth or paper towel with a high quality degreaser and wipe over the Unit's internal surfaces.

- Ensure that the lamp holders and plugs are free from contaminants/grease.
- Ensure that the rubber door seal is undamaged and free from contaminants/grease, cleaning it with warm soapy water if necessary.



CAUTION

Ensure that all internal surfaces and the UV lamp plugs are completely dry before replacing the lamps, closing the Front Panel and turning the Rotary Mains Isolation Switch to 'ON'.

6.3 Cleaning and Maintenance Tasks - UV-O 1000

It is a matter of experience to determine when your UV-O 1000 Unit needs to be cleaned as the nature and degree of any pollution depends strongly on factors such as the particular location, humidity and the intensity of use etc. Nevertheless, the UV lamps should be cleaned and the inside of the Units cleaned regularly, at intervals not exceeding 3 months, using the procedures outlined in the sections below:

6.3.1 Cleaning the UV-O 1000 Lamps

To clean the UV-O 1000 lamps:

1. Isolate the Unit from the mains power supply by turning the Rotary Mains Isolator Switch to the 'Off' position.
2. Double check that the mains power supply has been isolated.
3. Undo the lock, unscrew the four Star Knobs anti-clockwise on the Front Panel and open it.
4. Slide out the UV Lamp Holder on the Runner System (See Figure 28- Lamp Holder and Runner System on page 27).
5. Carefully remove plugs from the end of the lamps (See Figure 28 - Lamp Holder and Runner System on page 27).
6. Remove the lamps from their clips (See Figure 28 - Lamp Holder and Runner System on page 27).
7. Clean the lamps by wiping them with alcohol wipes or a lint free cloth soaked in isopropyl alcohol and dried with a lint free cloth.

Note: Natural oily deposits left by fingers and palms create an opaque mark on the lamp thereby reducing the UV transmission. These marks also cause the quartz to break down, causing premature lamp failure. Use caution when cleaning near the ends of the lamps excessive pressure may remove or smear the coating protecting the lamp electrodes.

It is a matter of experience to determine when the UV lamps need to be cleaned, since the nature and the degree of pollution depend strongly on factors such as the particular location, environmental conditions and intensity of use, etc.

Note: Whatever the situation, however, the UV lamps should be cleaned regularly according to the schedule outlined in (See 6.1.1 Maintenance Schedule UV-O 500 and UV-O 1000 on page 33).

6.3.2 Replacing the UV-O 1000 Lamps

1. Replace the lamps in their clips (See Figure 29 - Lamp Clips on page 28).
2. Replace the plugs on the end of the lamps (See Figure 30 - Lamp Plugs on page 28).
3. Slide in the UV Lamp Holder on the Runner System (See Figure 28 - Lamp Holder and Runner System on page 27).
4. Close the Front Panel, screw the four Star Knobs clockwise to tighten them and fasten the lock.
5. Switch on the mains power supply to the Unit by turning the Rotary Mains Isolator

Switch to the 'On' position.

6.3.3 Replacing the UV-O 1000 Filter

1. Isolate the Unit from the mains power supply by turning the Rotary Mains Isolator Switch to the 'Off' position.
2. Double check that the mains power supply has been isolated.
3. Undo the lock, unscrew the four Star Knobs anti-clockwise on the Front Panel and open it.
4. Remove the old filter element by sliding it out of its housing inside the Unit's main body, on the left-hand side.
5. Spray the filter housing and mounting with a high quality degreaser and wipe down with a suitable cloth or paper towel.
6. Insert the new filter element by sliding it into the housing inside the Unit's main body.

Note: Ensure that the filter element is inserted in the correct orientation, with the arrows printed on the end of the filter's frame pointing in the direction of the airflow through the Unit.



CAUTION

Ensure that the filter housing and mounting are completely dry before inserting the new filter, closing the Front Panel and reconnecting the mains power supply.

7. Close the Front Panel, screw the four Star Knobs clockwise to tighten them and then fasten the lock.
8. Switch on the mains power supply to the Unit by turning the Rotary Mains Isolator Switch to the 'On' position.



Figure 36 - UV-O 1000 Air Filter

6.3.4 Cleaning the Inside of the UV-O 1000

1. Isolate the Unit from the mains power supply by turning the Rotary Mains Isolator Switch to the 'Off' position.
2. Double check that the mains power supply has been isolated.
3. Undo the lock, unscrew the four Star Knobs anti-clockwise on the Front Panel and open it.
4. Remove the UV lamps (See 6.3.1 Cleaning the UV-O 1000 Lamps on page 37) and filter (See 6.3.3 Replacing the UV-O 1000 Filter on page 38).
5. Spray a suitable cloth or paper towel with a high quality degreaser and wipe over the Unit's internal surfaces.
 - Ensure that the lamp holders and plugs are free from contaminants/grease.
 - Ensure that the rubber door seal is undamaged and free from contaminants/grease, cleaning it with warm soapy water if necessary.
6. Replace the UV lamps (See 6.3.2 Replacing the UV-O 1000 Lamps on page 37) and filter (See 6.3.3 Replacing the UV-O 1000 Filter on page 38).
7. Close the Front Panel, screw the four Star Knobs clockwise to tighten them and fasten the lock.
8. Switch on the mains power supply to the Unit by turning the Rotary Mains Isolator Switch to the 'On' position.



CAUTION

Ensure that all internal surfaces and the UV lamp plugs are completely dry before replacing the UV lamps and filter, closing the Front Panel and turning the Rotary Mains Isolator Switch to 'ON'.

7. Troubleshooting

If your UV-O Unit does not function correctly, consult the checklist below to see if you can correct the error yourself.



INFORMATION

A number of problems in the checklist below can also be caused by defects in equipment connected to the Unit. This manual only deals with problems and solutions directly related to the Unit itself.

Problem	Possible Cause	Solution
If either of the indicator lights go out		Contact Purified Air
If both of the indicator lights go out	Loss of Electric Power	Check that power is going to the Unit. If not, turn on the power. If there is power to the Unit contact Purified Air.



CAUTION

Should it not be possible to correct the error, consult a qualified service engineer.

8. Commissioning Waiver

Due to the danger of exposure to UV light in unprotected conditions, commissioning is normally carried out by Purified Air engineers. These engineers are fully trained and carry protective equipment to ensure that they and others are not harmed when working on the Unit.

Should the customer decide to carry out the final commissioning of the Unit, a Commissioning Waiver will have to be signed and returned to Purified Air.

Special safety locks are fitted to this equipment.

The customer owns the Unit and is entitled to have keys to it. However, before releasing keys to the customer Purified Air require a Director of the company to sign a Commissioning Waiver acknowledging that it is fully understood about the dangers associated with this Unit and will take every precaution to ensure that no person comes to harm when accessing the Unit. Furthermore the customer takes full responsibility for any injury caused due to the Unit being incorrectly accessed or been left unattended or accessible.

Once the Commissioning Waiver has been signed and returned to Purified Air a set of keys for the Unit will be supplied.

9. **Wiring Diagrams**

9.1 **UV-O 500**

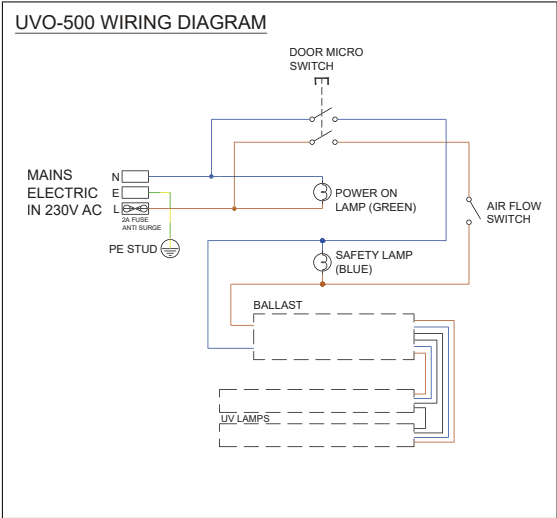


Figure 37 - UV-500 Unit Wiring Diagram

9.2 UVO 500 BMS

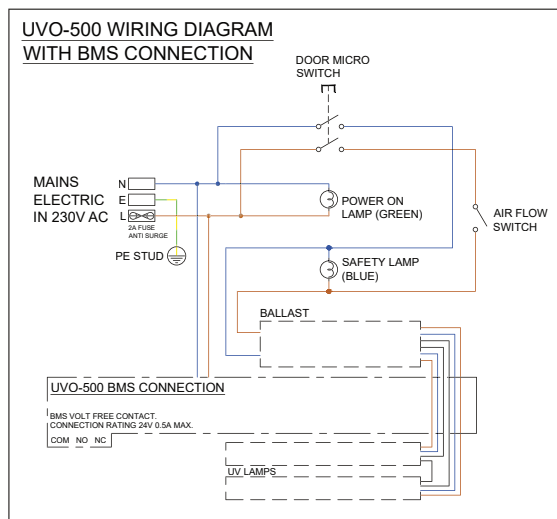


Figure 38 - UV-500 BMS Unit Wiring Diagram

9.3 UV-O 1000

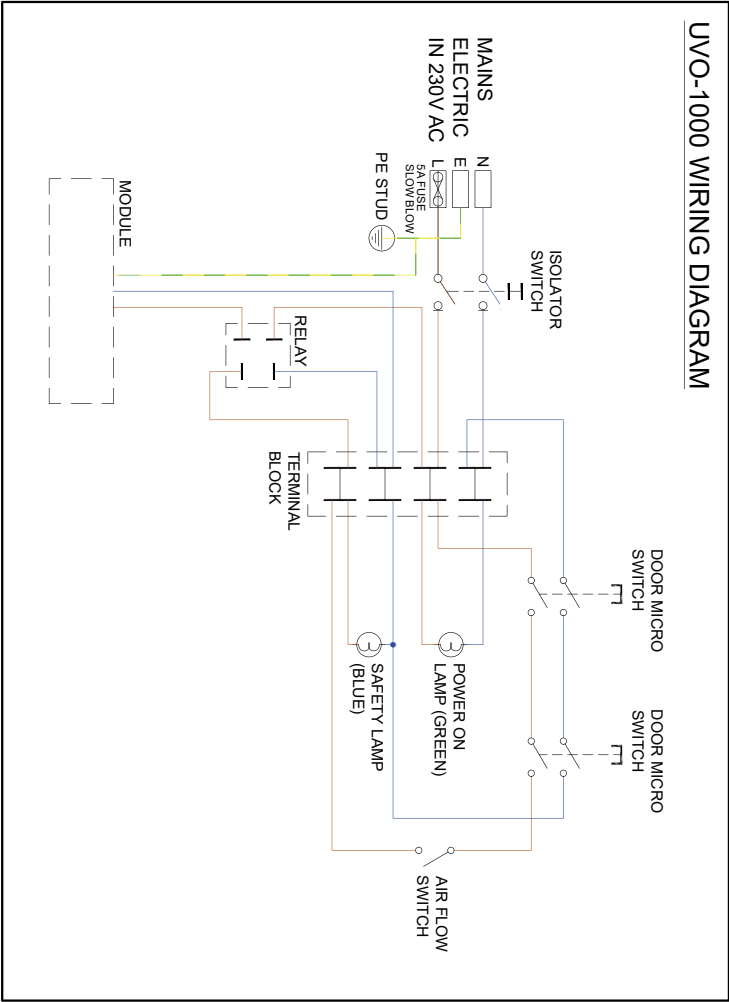


Figure 39 - UV-O 1000 Unit Wiring Diagram

9.4 UV-O 1000 BMS

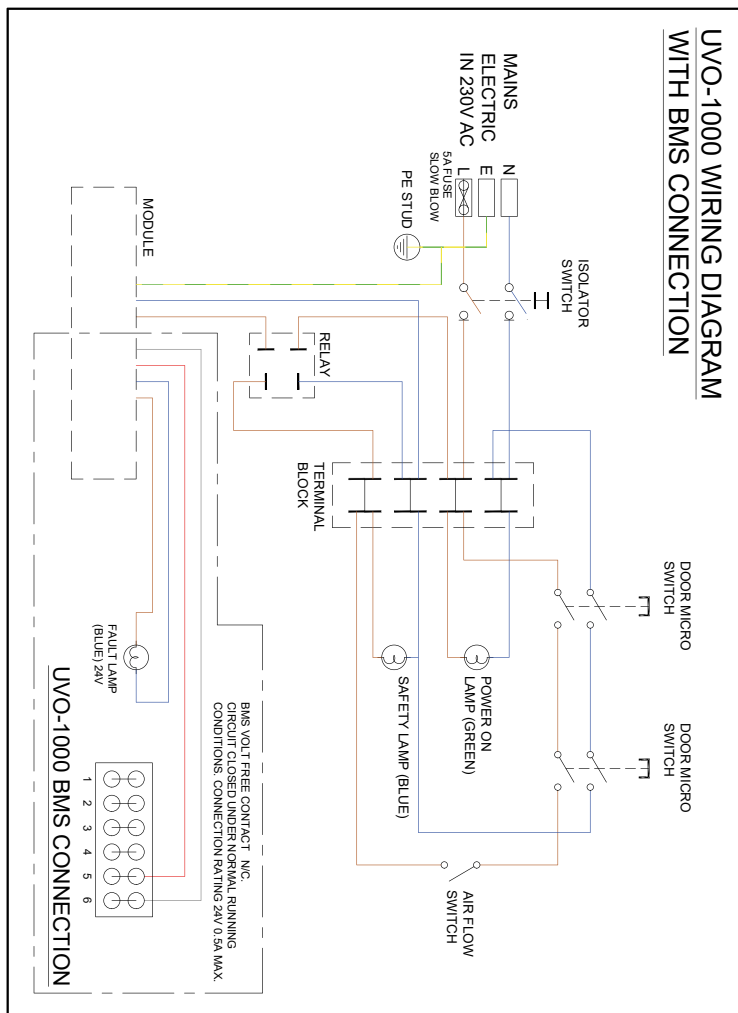


Figure 40 - UV-O 1000 BMS Unit Wiring Diagram

10. Equipment Disposal



10.1 Packaging Material Disposal



INFORMATION

The Unit's packaging materials are manufactured from recyclable materials in accordance with applicable local regulations.

The purpose of the packaging is to protect the Unit during transport. It consists of the following substances that can be reused:

- Cardboard (corrugated)
- Wood (untreated) if palletized

Do not dispose of the packaging material in the industrial waste.

10.2 Used Unit Disposal

Units to be disposed of may still contain valuable substances and materials.

Do not dispose of the Unit in the industrial waste.



WARNING

LAMPS CONTAIN MERCURY (Hg), dispose of in accordance with local disposal laws

11. Contact Details

At Purified Air, we pride ourselves on our excellent levels of customer service and maintenance.

11.1 Nationwide Coverage

We have hubs in both Manchester and London and can offer nationwide coverage with teams of directly employed service engineers.

For all Service and Maintenance enquiries, please contact via:

service@purifiedair.com

0800 018 4000

11.2 Service and Maintenance Contracts

With every installation, we offer the opportunity to sign up for one of our service and maintenance contracts. These are structured to suit individual needs, on a post pay basis with the customer only being invoiced after each service, saving them both time and money against ad hoc servicing requests.

11.3 Dependability

So, whether you have our commercial kitchen exhaust filtration equipment in your restaurant, cafe or take away, you can rest assured that we will always be there when you need us.

11.4 Global Sales

For all installations of our equipment outside of the UK, please refer back to your designated distributor.

12. Warranty Statement

Your new UV-O Unit is guaranteed against the cost of breakdown repairs for one year from the date of the original purchase.

The manufacturer does not accept any liability for damage to the Unit or personal injury caused by non-observance of the safety instructions in this manual or negligence during the installation, use, maintenance and repair of the models mentioned on the cover of this manual and any associated accessories.

What is covered?

- Repairs necessary as a result of faulty materials, defective components or manufacturing defect.
- The cost of functional replacement parts, but excluding consumable items.
- The labour costs of a Purified Air approved repairer to carry out the repair.

What is not covered?

- Transit, delivery or accidental damage or misuse and abuse.
- Any installation which fails to meet the installation, location and operating requirements and parameters outlined in this manual.
- Manufacturing defects only affecting the Unit's cosmetic appearance.
- Consumable items including, but not limited to, the UV lamps.
- Repairs required as a result of unauthorised repair or installation by anyone other than a Purified Air approved installer.
- Any damage caused to the Unit by its use by anyone other than authorised, trained and qualified users or personnel under the supervision and responsibility of authorised, trained and qualified users.
- Any damage caused to the Unit by incorrect servicing procedures.
- Use of the Unit in any application which is not specifically mentioned in this manual or approved, in writing, by the manufacturer.
- The guarantee is applicable only to new products and is not transferable if the product is resold.

Purified Air disclaims any liability for incidental or consequential damages.

The guarantee does not in anyway diminish your statutory or legal rights.

Please keep your purchase receipt or other proof of purchase in a safe place. you will need to have it should the product require attention under guarantee.

13. Certification

13.1 EC Declaration of Conformity - UV-O 500 and UV-O 1000

Purified Air Limited
Lyon House
Lyon Road
Romford
Essex RM12BG

Tel: +44 1708 755414
Fax: +44 1708 721488
Email: enq@purifiedair.co.uk
www.purifiedair.co.uk



EC Declaration of Conformity

Document Number: DoC UVC 1201

We; Purified Air Limited at above address, declare the products detailed below comply with the requirements of the following EU Directives,

- Low Voltage Directive 2014/35/EU
- Electromagnetic Compatibility Directive 2004/108/EC
- RoHS Directive 2011/65/EU

Equipment description	<i>UV-C Odour Control</i>		
Make/Brand	<i>PurifiedAir</i>		
Model reference	<i>UVO 500</i>	<i>UVO 1000</i>	
	<i>UVC 1500</i>	<i>UVC 3000</i>	<i>UVC 4500</i>

Compliance of the equipment has been assessed with respect to the essential requirements and with reference to the following harmonised standards:

- *EN 61347-1:2008*
- *EN 61547:2009*
- *EN 55015:2006 + A2:2008*
- *EN 61000-3-2:2006 + A2:2009*
- *EN 61000-3-3:2008*

A technical file for this equipment is retained at the above address

*Gareth Smith - Technical Director.
Purified Air Limited
June 2017*



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Purified Air Limited. Lyon House, Lyon Road, Romford, Essex. RM1 2BG

www.purifiedair.com | enq@purifiedair.com



ON

ODOUR NEUTRALISER



WHAT IS AN ON?

Once the airstream in the exhaust duct has had the majority of the particulates removed by one of our ESP units the gaseous phase or malodour can then be treated by the ON 100.

The vapour from a specially blended neutralising agent, ELIMINODOR®, is mixed with ambient air drawn into the ON100 and ionised to a negative potential of 15,000 volts. This ionised vapour then passes along a nonconductive tube to be discharged into the centre of the duct via a venturi spigot, the metal ducting is earthed through the same high tension circuit which makes the contaminant at an opposite potential to the negatively charged ELIMINODOR® vapour. This then causes the negative and positive particles to combine, so treating the malodour by chemical reaction.

HOW EFFECTIVE ARE THEY?

Purified Air's ON100 unit in conjunction with ELIMINODOR® can reduce malodour in your commercial kitchen exhaust by up to 90%.

MANUFACTURER

Purified Air Ltd, Lyon House, Lyon Rd, Romford, ESSEX, RM1 2GB, UK

MODELS AVAILABLE

ON100

TECHNICAL INFORMATION

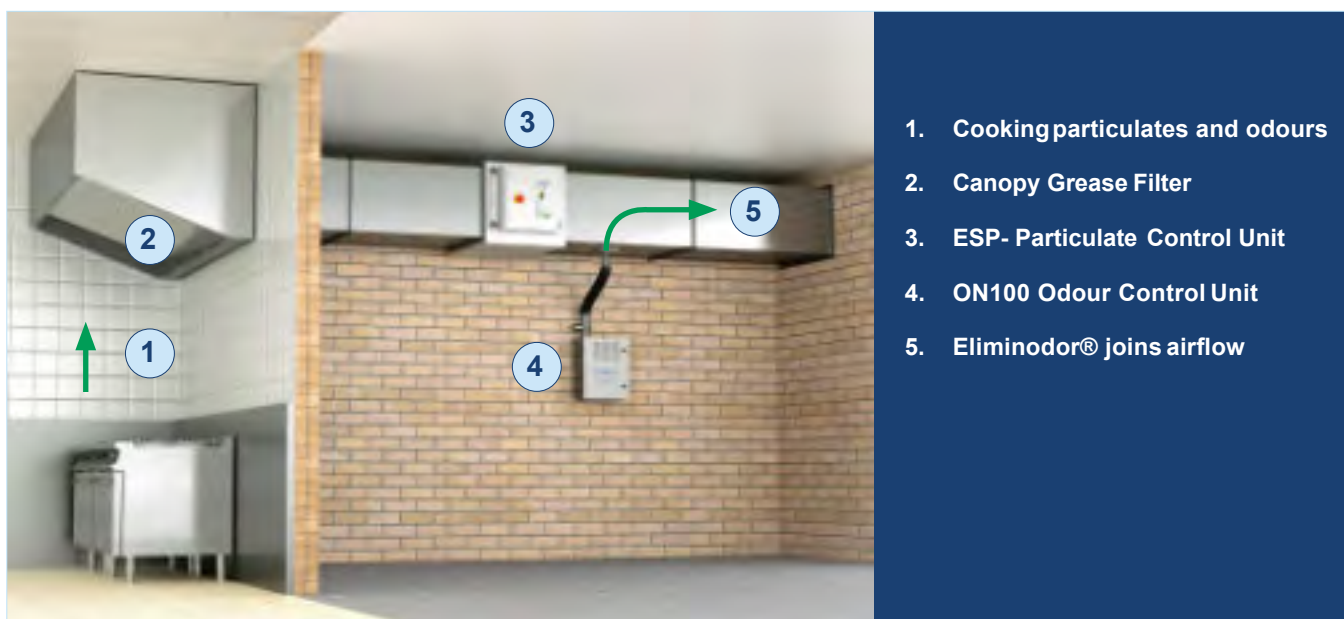
See Next Page

ON

TECHNICAL SUMMARY

ON100

Purified Air use patented technology to scientifically treat cooking odours emitted by commercial kitchen and restaurant exhausts.



Once the airstream in the exhaust duct has had the majority of the particulates removed by one of our ESP units the gaseous phase or malodour can then be treated by the ON 100.



The vapour from a specially blended neutralising agent, ELIMINODOR®, is mixed with ambient air drawn into the ON100 and ionised to a negative potential of

15,000 volts. This ionised vapour then passes along a nonconductive tube to be discharged into the centre of the duct via a venturi spigot, the metal ducting is earthed through the same high tension circuit which makes the contaminant at an opposite potential to the negatively charged ELIMINODOR® vapour. This then causes the negative and positive particles to combine, so treating the malodour by chemical reaction.

Key Features

- **Compact Design**
- **Easy to maintain**
- **Easy to install**
- **No airflow resistance**
- **Energy efficient - uses no more than 40W**

Technical Specification

Electrical Supply	220/240V 50Hz
Max Power Consumption	40 Watts
Ionisation voltage	15kV negative
Max Air Volume	up to 4.16m ³ /sec
Dimensions	W 400mm H 500mm D 200mm
Weight	12.25kg



ON100 Unit

ELIMINODOR®

This product has been specifically developed and blended for use in Purified Air's ON100 unit.

ELIMINODOR® is a finely balanced blend of essential oils and other chemicals which neutralise odorous gases found in the exhausts of commercial kitchens and restaurants.

Purified Air have designed this unique system to ensure that only minimal quantities of ELIMINODOR® are required for optimum results.

Approximate dosage: one litre every 2 - 4 weeks under normal conditions.



Guaranteed Process

Purified Air's ON100 unit in conjunction with ELIMINODOR® can reduce malodour in your commercial kitchen exhaust by up to 90%.

The contamination of ELIMINODOR® with any other ingredients will cause its blend to become unstable and could render ELIMINODOR® completely ineffective, it will also nullify all and any manufacturer's warranty supplied by Purified Air Limited for the ELIMINODOR® and the ON100 unit that it is used in.

ON

**TECHNICAL & OPERATIONS
MANUAL**

O.N.100 Odour Neutraliser



Technical and Operations Manual

For Models: O.N.100

Using this manual

This manual is intended to be used as a work of reference for professional, properly trained and authorised users to assist them in safely installing, using, maintaining and repairing the Unit mentioned on the cover of this document.

Please note that it is strongly recommended that training is given by Purified Air Limited prior to operatives attempting to carry out maintenance or repair work on this Unit.

Copyright Statement

All rights reserved

No part of this publication may be copied or published by means of printing, photocopying, microfilm or otherwise without prior written consent of the manufacturer. This restriction also applies to the corresponding drawings and diagrams.

The information given in this manual has been collected for the general convenience of our clients. It has been based on general data pertaining to construction material properties and working methods known to us at the time of issue of the document and is therefore subject, at any time, to change or amendment and the right to change or amend is hereby expressly reserved. The instructions in this publication only serve as a guideline for installation, use, maintenance and repair of the model mentioned on the cover page of this document.

This manual is to be used for the standard model of the Unit of the type given on the cover page. Thus the manufacturer cannot be held responsible for any damage resulting from the application of this manual to the version actually delivered to you.

This manual has been written with great care. However, the manufacturer cannot be held responsible, either for any errors occurring in this manual or their consequences.

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1. Safety

1.1 Introduction

Everyone working on or with the Unit must be familiar with the contents of this manual and must strictly observe the instructions herein.

The Management should instruct personnel in accordance with this manual and observe all instructions and directions given herein.

Note: Always follow the steps for any instructions in this manual in the order given.

Always keep this manual with the Unit.

The user of the Unit is always fully responsible for observing all applicable local safety instructions and regulations.

Specific working conditions or selected accessories may require additional safety instructions. Contact your supplier immediately if you detect a potential danger when using the Unit.

1.2 Safety Warnings and Instructions

The following symbols and notifications are used in this manual:



WARNING!

Used to indicate where there is a risk of injury or death.



WARNING! - DANGER OF ELECTRIC SHOCK!

Used to indicate where there is a risk of injury or death from electric shock.



CAUTION

Used to indicate where there is a risk of damage to equipment.



INFORMATION

Important information or useful hints about usage.



RECYCLING

Recycling information.



WEEE REGULATIONS

Used to ensure that waste electrical equipment is disposed of correctly.



ENVIRONMENTAL HAZARD

Used to indicate where a biological substance threatens the health of living organisms especially humans.



HARMFUL IRRITANT

Used to indicate a substance causing temporary or reversible inflammation of living tissue.

1.3 Pictograms, Warnings and Instructions Displayed on the Unit

The pictograms, warning and instructions attached to the Unit are part of the safety features.

They must not be covered or removed and must be present and legible during the entire life of the Unit.

- Immediately replace or repair damaged or illegible pictograms, warnings and instructions.



Figure 1 - Unit Label



Figure 2 - O.N.100 Labels

1.4 Safety Features



CAUTION

- All safety features must be correctly fitted and can only be removed for maintenance and repair jobs by skilled and authorised service engineers.
- The Unit must not be used if the safety features are not fully present or defective.
- The safety features should be regularly checked for their proper functioning and, if defective, should be immediately repaired.

1.5 Safety Warnings and Cautions

To guard against injury, basic safety precautions should be observed, including the following before attempting to use the Unit:



WARNING! RISK OF EXPLOSION!

The Unit is not explosion-proof rated. It can cause sparks and should therefore not be used in areas with an explosion risk.



WARNING!

- Fire Hazard! Never use the Unit for extracting and/or filtering inflammable, glowing or burning particles or solids or liquids.
- Never use the Unit for extracting and/or filtering aggressive fumes (such as hydrochloric acid) or sharp particles.



WARNING! - DANGER OF ELECTRIC SHOCK!

To avoid electric shock:

- Do not operate Unit without a proper electrical ground/earth.
- Always disconnect power to the Unit and isolate the Unit, before performing any service or maintenance.
- Do not operate the Unit if the power cables are damaged, or if any other damage to the Unit is visible or suspected.
- The supplied utility/mains power must match the power requirements listed on the Unit's rating label.



ENVIRONMENTAL HAZARD

On spillage a substance which has the potential to threaten the surrounding natural environment.



HARMFUL IRRITANT

Corrosive substances cause temporary inflammation of living tissue. Gloves and eye protection must be worn when using corrosive substances.



CAUTION

- Make sure the room is always sufficiently ventilated, particularly in smaller confined areas.
- Do not use the Unit at a relative humidity exceeding 75%.
- Do not use the Unit at temperatures below 5°C or above 56°C.
- Check the working environment. Do not allow unauthorised persons to enter the working environment.
- Use common sense. Stay alert and pay attention to your work. Do not use the Unit when you are tired or under the influence of drugs, alcohol or medicine.
- Regularly inspect the Unit and check it for damage.
- Verify the correct functioning of all of the safety features.
- Read and save all notices, warnings and safety instructions received with this Unit.
- Do not alter the construction or design of this Unit.
- Do not remove safety labels or devices.
- Do not use this equipment for other than its intended purpose, as described in this manual.
- Only use original spare parts.
- Keep the operating controls free from dirt and grease.

1.6 Modifications

Modification of the Unit is not permitted.

1.7 Users

Installation or maintenance of the Unit is exclusively reserved for authorised, trained and qualified users.

Temporary personnel and trainees should only access the Unit under the supervision and responsibility of authorised, trained and qualified users.

1.8 Technical Specifications

The technical specifications of the O.N.100 are listed below:

Electrical Supply	220/240V 50Hz
Max Power Consumption	50 Watts
Ionisation Voltage	12kV negative
Max Air Volume	up to 4.16m ³ /sec
Weight:	12.25kg

1.8.1 Rating Plate



Figure 3 - O.N.100 Rating Plate

2. Product Overview

2.1 Intended Use

The O.N.100 is designed to be installed in the extraction ducting of a commercial kitchen, downstream of the extraction hood and upstream of the extraction fan, to remove odours from pre-filtered kitchen extraction system fumes from which particulates have previously been removed.



CAUTION

The airstream must first be cleaned of the majority of particulate contaminants made up of hydrocarbons and grease vapour, leaving only the gaseous phase (odour) to be treated by the O.N.100.



INFORMATION

To efficiently filter the gaseous phase of particulates, we also supply a full range of electrostatic and passive filtration equipment, including Activated Carbon, Baffle, Mesh, HEPA, Bag and Panel filters.



CAUTION

Using the Unit for other purposes is considered contrary to its intended use. The manufacturer accepts no liability for any damage or injury resulting from such use.

2.2 Features

When installed correctly, Purified Air's O.N.100 has the following features and associated benefits:

- Instant control of odours via the ELIMINODOR[®] concept, with up to to 90% of odours eliminated.
Dependent on the level of activity within the kitchen, only a faint odour of cooking or ELIMINODOR[®] (the neutralising chemical) will be detected directly at the discharge.
- A visual indication of the neutralising chemical's (ELIMINODOR[®]) level.
- Fully adjustable.
- Simple and economical to maintain.
- Easily installed into new/existing systems.
- No resistance to airflow in the extraction duct.
The O.N.100 does not cause any pressure drop and can therefore be installed into any new or existing system without needing to upgrade the fan.
- User-friendly controls.

The O.N.100 works by adding an odour neutralising chemical (ELIMINODOR®) to the airstream extracted from the kitchen.

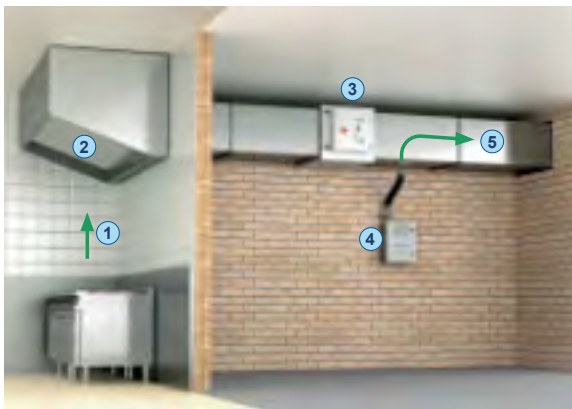
The ELIMINODOR® neutralising chemical produced by Purified Air Limited combines odour neutralising agents with materials that impart a pleasant scent to the air.

The O.N.100 unit is supplied with an Eliminator fluid level, float indicator, built into the tank. This provides a volt free contact to indicate when the Eliminator has reached a low level and requires topping up that can be connected to a BMS system if required.

2.3 Operating Principles

After being cleaned of the majority of particulate contaminants by suitable Purified Air Units, the gaseous phase of the contamination passes the O.N.100 Unit for odour elimination by the Odorfoyl process as follows:

1. Ambient air is drawn into the Unit and mixed with the odour neutralising chemical (ELIMINODOR®).
2. A vapour is formed which is then ionised to a negative potential of 15,000V by a High Voltage Power Supply.
3. The flow of neutralising chemical (ELIMINODOR®) is controlled by the air velocity within the duct therefore, once a system is commissioned and balanced, the optimum dosage will always be supplied.
4. The metal ducting is earthed through the High Voltage Power Supply's circuit giving the contaminants an opposite potential to the negatively charged vapour.
5. The electrostatic difference between the contaminants and the neutralising vapour causes the two to combine, facilitating chemical reactions between them which neutralise the malodour.



- 1 Cooking particulates and odours
- 2 Canopy Grease Filter
- 3 ESP - Particulate Control Unit
- 4 ON100 Odour Control Unit
- 5 ELIMINODOR® joins airflow

Figure 4 - O.N.100 Operating Principles

2.4 O.N.100 Odour Neutraliser - Components

The O.N.100 Odour Neutraliser comprises:

- A main Unit with a lockable front panel, containing:
 - ▶ A high voltage power supply.
 - ▶ A tank with filling spout and level indicator.
 - ▶ A fan with an adjustable speed controller.
- A Non Conductive Venturi spigot with associated Spigot and Damper Control Assembly.



Figure 5 - Typical Front Panel and Control Damper Knob

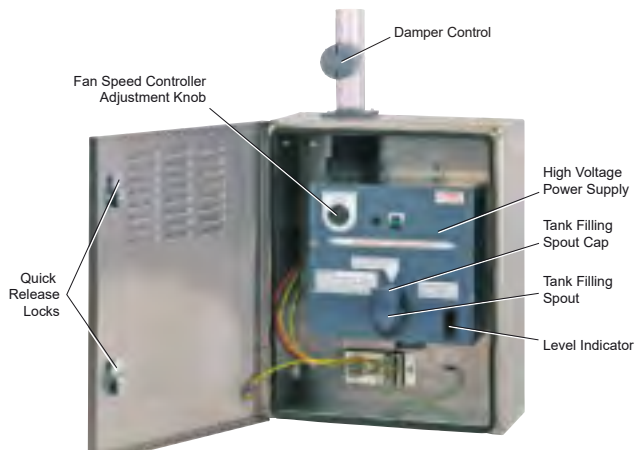


Figure 6 - O.N.100 Components and Controls

3. Storage, Unpacking and Handling

3.1 Storage

Prior to installation, each O.N.100 Unit, must be stored in its original packaging in dry conditions.

3.2 Shipping List

Each Unit is shipped with the following:

- O.N.100 Main Unit
- Venturi Tube
- Spigot
- Damper Control Assembly
- x 3 Jubilee Clips
- Can of ELIMINODOR[®] Neutralising Solution

3.3 Unpacking and Handling

The O.N.100 Unit must only be unpacked by trained, professional installers.

Before installing:

Strip away all packaging, wrapping and strapping (this must only be done by trained, professional installers) and remove the Unit and associated components.



CAUTION

See Technical Specifications for the Unit's weight.



Figure 7 - O.N.100 Associated Components

4. Installation Guidance

4.1 Overview

The Unit can be freestanding on a flat surface or fixed to a wall or duct.

- Wherever the Unit is positioned you should bear in mind that frequent access will be required to replenish the neutralising fluid.



CAUTION

- **Never install the Unit in front of entrances and exits which may be used by emergency services.**
- **The O.N.100, wherever possible, should be interfaced with the extract fan.**
- **Installation of the O.N.100 Unit must only be made on the negative pressure side of the fan.**
- **If there is ductwork inside the premises on the positive pressure side of the fan, please ensure that it is completely sealed so as not to let fumes or odour control compounds back into the premises.**
- **Make sure that the Unit is mounted level and upright.**
- **If the O.N.100 Unit is fixed to a wall or duct, ensure that the suspension construction is adequate prior to installing the Unit.**

4.2 Model Dimensions

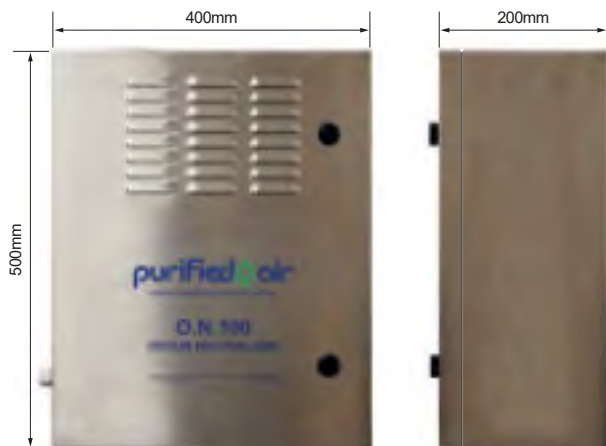


Figure 8 - O.N.100 Unit Dimensions

4.3 Assembling the O.N.100 Main Unit

Prepare the O.N.100's main unit for installation by attaching the Control Damper Assembly as follows:

1. Pass the threaded end of the Control Damper Assembly through the hole in the top of the Unit's casing.
2. Screw the Threaded Captive Collar onto the threaded end of the Control Damper Assembly
3. Secure the Control Damper Assembly into place by positioning the Flange over the four captive threaded studs and tightening the four hexagonal nuts.

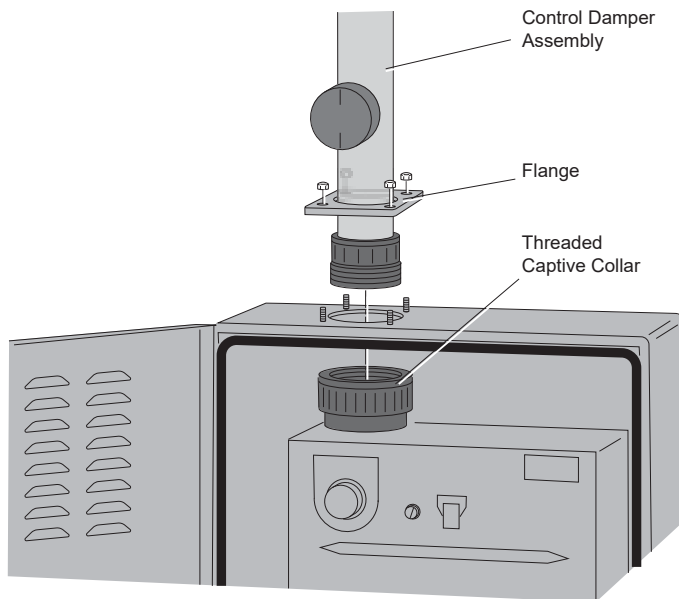


Figure 9 - Assembling the O.N.100 Main Unit

4.4 Installing the O.N.100

To install and setup the O.N.100, first install the main Unit and then connect the Venturi Tube and Spigot to the extraction ducting.

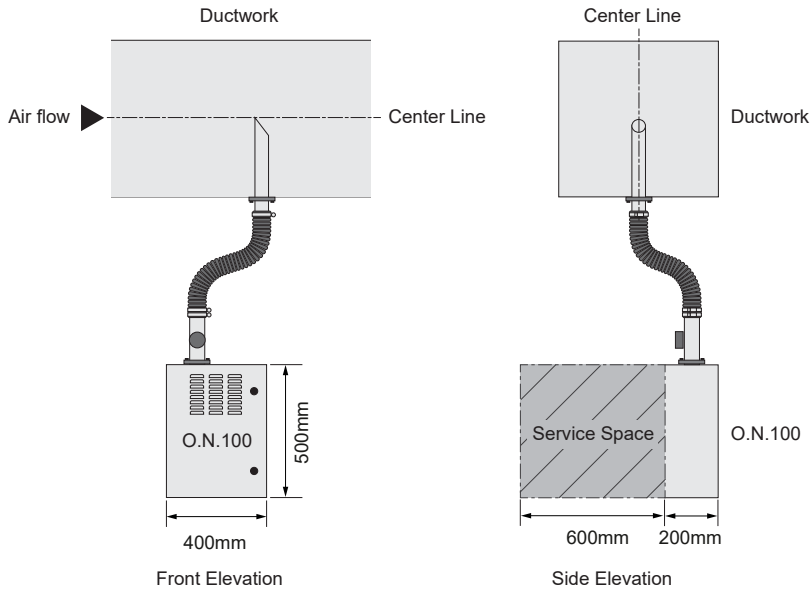


Figure 10 - O.N.100 Installation Schematic

4.4.1 Installing the Main Unit

1. Place the Unit where it is to be located, allowing at least 600mm in front of the Unit to allow for access for servicing.

Note: If access equipment is required for servicing the Unit, more space may be required in front of the Unit.



CAUTION

- Please consult the Unit Wiring diagram (see 9. Unit Wiring Diagram on page 23) when connecting the O.N.100 to the mains. Beware of possible differences in the mains power supply.
- The Unit should be connected so that it only runs when the extractor fan is running.
- The Unit will not function properly if the ducting is not earthed as this conveys the electrostatic difference between the pollutant and the neutralizing fluid. Therefore, it is important to connect an earth lead to the ducting the Unit will be serving (if the ducting is painted, scrape the paint away under the earth lead's connection to the ducting to ensure electrical continuity).

2. Connect to a single-phase electrical supply.
3. Once the Unit is in position, the Control Damper assembly has been attached and

the Unit connected to the mains electrical supply, test the operation of the Unit, prior to completion of the installation, as follows:

- i. Unlock and open the front cover of the Unit and locate the Liquid Control Rate Knob which controls the speed of the Unit's fan (see *Figure 12 - Liquid Control Rate Knob and Filler Cap* on page 15).



INFORMATION

The fan is used to evaporate and mix the neutralising fluid with air in the Unit's mixing chamber.

The fan's speed determines the rate of evaporation of the neutralising fluid.

- ii. Turn the Liquid Control Rate to 'MAX' and fully open the Control Damper by turning its knob clockwise.

You should now be able to detect the air coming out of the Control Damper Assembly's outlet.

- iii. Check that turning the Liquid Control Rate Knob anti-clockwise and clockwise alters the air volume, and therefore the rate of neutralising fluid delivery, as required.



Figure 11 - Liquid Control Rate Knob and Filler Cap

4. Now that operation of the Unit itself has been checked:
 - i. To switch off the fan, turn the Liquid Control Rate to 'OFF'.
 - ii. Unscrew the tank's filler cap (see *Figure 12 - Liquid Control Rate Knob and Filler Cap on page 15*).
 - iii. Pour the contents of the supplied bottle of ELIMINODOR® into the tank and replace the filler cap.



Figure 12 - ELIMINODOR® Odour Neutralising Agent



Figure 13 - Tank Filler

- iv. To switch the fan on, turn the Liquid Control Rate to 'MAX', you should now be able to detect a strong odour of ELIMINODOR®.

4.4.2 Installing the Spigot

Following completion of the first stage of the installation procedure, the Unit can now be switched off and the O.N.100's installation completed by the installation of the Spigot.



CAUTION

The Spigot must be installed at least one metre (m) prior to the duct's extraction fan and, if possible, in a straight piece of ducting away from bends and other obstructions that will disrupt the airflow.

Install the Spigot as follows:

1. Drill a 50mm hole in the ducting to accommodate the Spigot.
Note: This is best carried out with a tank cutting drill bit.
2. The Spigot tip should be as close to the centre of the ducting as possible (see *Figure 11 - O.N.100 Installation Schematic on page 14*).
Note: If necessary, the Spigot can be cut to the correct length if it is too long, though material should only be taken from the base of the Spigot, not its angled end.
3. The angled face of the Spigot **MUST** face away from the airflow in order to establish a venturi effect.



CAUTION

Under no circumstances should the angled face of the Spigot be positioned in any direction other than **AWAY** from the airflow as this can cause blow back and prevent the system from working at all.

5. Once the Spigot is in place it should be secured using self tapping screws through its flange and into holes drilled into the ducting.



INFORMATION

The flange is a tight push fit over the Spigot, when the Spigot's final position is settled, you may wish to fix the Spigot to the flange to prevent any movement. This can be carried out by using a good quality PVC glue.

6. Place the three jubilee clips over the Venturi Tube.
7. The Spigot can now be connected to the Unit via the Venturi Tube.
Push one end of the Venturi Tube onto the top of the Control Damper Assembly protruding through the Unit's case and the other onto the Spigot installed in the ducting.
8. Once the hose is in place, place two of the jubilee clips over the bottom (Control Damper Assembly) connection and one over the Spigot connection and then tighten them.



CAUTION

Be sure not to overtighten the jubilee clips, as this may crack the Control Damper Assembly or Spigot.

5. Operation and Control

In normal use, the Unit is switched on by connecting to the mains power supply and turning the Liquid Control Rate Knob, located inside the front cover (see *Figure 12 - Liquid Control Rate Knob and Filler Cap on page 15*), to a previously determined setting (see *5.1 Commissioning on page 18*).

Note: Before using the Unit for the first time, a period of commissioning should be undertaken (see *5.1 Commissioning on page 18*).

5.1 Commissioning

Once the O.N.100 is fully installed, it should be adjusted to minimise the consumption of ELIMINODOR[®] (the odour neutralising fluid) and maximise the elimination of odours as follows:

1. Turn the fan to 'Level 3' and make sure Control Damper is fully closed in the horizontal position.
2. Gradually increase the output of the Unit by turning the Control Damper's knob (see *Figure 6 - Typical Front Panel and Control Damper Knob on page 9*) clockwise until the smell of both kitchen odour and ELIMINODOR[®] can only be faintly detected.

The Unit is now set correctly.



INFORMATION

Cooking odour may be detected at the discharge point but, if you stand back a metre or so from the end of the duct, you will note that the majority of the cooking odour has been neutralised.

Unless dealing with an extraordinarily odorous system, ELIMINODOR[®] is designed to evaporate into the system in very small quantities.

If, after twenty minutes operation, more than a trace of ELIMINODOR[®] can be seen in either the Spigot or the Control Damper's transparent tube, then the air velocity leaving the Unit is too high, leading to excessive ELIMINODOR[®] being evaporated.

To reduce the evaporation of ELIMINODOR[®], turn the Control Damper Knob gradually anti-clockwise until the optimum setting is found.



INFORMATION

It may take some time to find this setting and it is recommended that this exercise be carried out over a period of a few hours to ensure that the settings are correct.

6. Maintenance and Cleaning

6.1 Maintenance



WARNING

Always disconnect mains power from the equipment before performing any service or maintenance.

Do not carry out any service, maintenance or repairs on the Unit before it has been protected against unintended starting.

The only maintenance required is daily checking of the ELIMINODOR[®] neutralising chemical's level and topping it up if necessary.

6.1.1 Addition of Neutralising (ELIMINODOR[®]) Fluid.

The amount of ELIMINODOR[®] consumed will depend on the type of cooking odour present and the volume of air passing through the extraction duct.

Note: An average installation should use approximately one litre of ELIMINODOR[®] solution every three to four weeks.

To refill the Unit:

1. Unlock and open the Unit's front cover (see *Figure 6 - Typical Front Panel and Control Damper Knob on page 9*).
2. Turn the Unit off by turning the Liquid Control Rate Knob (see *Figure 12 - Liquid Control Rate Knob and Filler Cap on page 15*) to 'OFF'.
3. Remove the filler cap and pour in the ELIMINODOR[®] solution (see *Figure 14 - Tank Filler on page 16*).

Note: Ensure that the liquid's level is maintained between the upper and lower red lines on the reservoir's Level Indicator to ensure the Unit's optimum performance (see *Figure 12 - Liquid Control Rate Knob and Filler Cap on page 15*).



CAUTION

Overfilling the Unit may lead to damage. Once the Unit has been filled replace the filler cap and return the Liquid Control Rate Knob to its previous position.



CAUTION

Never allow the system to run dry for more than twenty four hours.

4. Replace the filler cap.
5. Turn the Unit back on by turning the Liquid Control Rate Knob clockwise.
6. Close and lock the Unit's front cover.



CAUTION

ONLY USE PURIFIED AIR'S ELIMINODOR® SOLUTION.

ELIMINODOR® is a finely balanced blend of oils and other chemicals specifically developed to neutralise cooking odours.

The contamination of ELIMINODOR® with any other ingredients will cause its blend to become unstable and could render ELIMINODOR® completely ineffective, it will also nullify all and any manufacturer's warranty supplied by Purified Air Limited for the ELIMINODOR® and the O.N.100 unit that it is used in.

6.2 Cleaning

6.2.1 After Topping up with ELIMINODOR®.

Wipe away any spills of ELIMINODOR® and associated deposits from the filler spout and the outside surface of the tank (*see Figure 14 - Tank Filler on page 16*).

7. Troubleshooting



WARNING!

If the Unit does not function (correctly), consult the checklist below to see if it is possible to remedy the error yourself. Should this not be possible, consult a qualified service engineer.



INFORMATION

A number of problems in the checklist below can also be caused by defects in the connected equipment. This manual only deals with problems and solutions directly related to the Unit itself.

7.2.1 Troubleshooting Checklist

Problem	Possible Cause	Solution
Cooking odours strongly detectable at the extract duct's outlet	Unit has run out of ELIMINODOR [®] solution.	Re-fill tank with ELIMINODOR [®] solution.
	Insufficient ELIMINODOR [®] solution is being introduced into the extract airstream.	Gradually turn the Control Damper's knob clockwise to increase the airflow passing through the Unit and the quantity of ELIMINODOR [®] solution evaporated. In conjunction with gradually adjusting the Liquid Control Rate knob up.
A strong smell of ELIMINODOR [®] solution is still present when the kitchen is busy.	Excess ELIMINODOR [®] solution is being introduced into the extract airstream.	Gradually turn the Control Damper's knob anti-clockwise to decrease the airflow passing through the Unit and the quantity of ELIMINODOR [®] solution evaporated. In conjunction with gradually adjusting the Liquid Control Rate knob down.
More than a trace of ELIMINODOR [®] solution can be seen in the Spigot or the tube leaving the Unit.	Excess ELIMINODOR [®] solution is being introduced into the extract airstream.	Gradually turn the Control Damper's knob anti-clockwise to decrease the airflow passing through the Unit and the quantity of ELIMINODOR [®] solution evaporated. In conjunction with gradually adjusting the Liquid Control Rate knob down.

8. Spare Parts List

8.1 Spare Parts Ordering

The following items are available to order:

PCB Board



HVPS



Fan



Hose



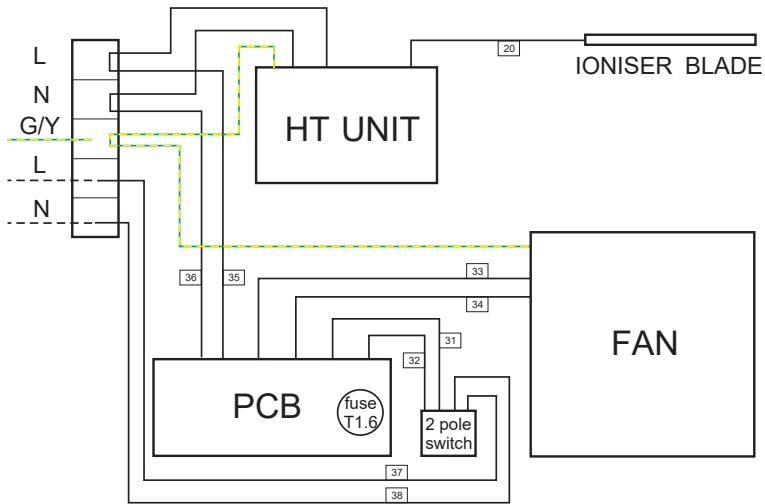
Damper Assembly



Non Conductive Venturi spigot.



9. Unit Wiring Diagram



G/Y = Earth

20 12kV to IONISER

31 live to PCB

33 live to FAN

35 live from PCB to HT UNIT

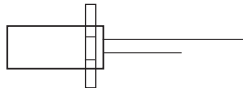
36 neutral from PCB to HT UNIT

32 neutral to PCB

34 neutral to FAN

37 live in

38 neutral in



float assembly fitted to the base unit and wired onsite

Figure 14 - Unit Wiring Diagram

10.

10.1 Equipment Disposal



10.2 Packaging Material Disposal

The purpose of the packaging is to protect the Unit during transport. It consists of the following substances that can be reused:

Cardboard (corrugated)

Do not dispose of the packaging material in the industrial waste.



INFORMATION

The Unit's Packaging materials are manufactured from recyclable materials in accordance with applicable local regulations.

10.3 Used Unit Disposal

Units which you would like to dispose of may still contain valuable substances and materials.

Do not dispose of the Unit as general industrial waste.

11. Contact Details

At Purified Air, we pride ourselves on our excellent levels of customer service and maintenance.

11.1 Nationwide Coverage

We have hubs in both Manchester and London and can offer nationwide coverage with teams of directly employed service engineers.

For all Service and Maintenance enquiries, please contact via:

service@purifiedair.com

0800 018 4000

11.2 Service and Maintenance Contracts

With every installation, we offer the opportunity to sign up for one of our service and maintenance contracts, these are structured to suit individual needs, on a post pay basis with the customer only being invoiced after each service, saving them both time and money against ad hoc servicing requests.

11.3 Dependability

So whether you have our commercial kitchen exhaust filtration equipment in your restaurant, cafe or take away, you can rest assured that we will always be there when you need us.

11.4 Global Sales

For all installations of our equipment outside of the UK, please refer back to your designated distributor.

12. Warranty Statement

Your new O.N.100 Odour Neutraliser is guaranteed against the cost of breakdown repairs for one year from the date of the original purchase.

The manufacturer does not accept any liability for damage to the Unit or personal injury caused by non-observance of the safety instructions in this manual or negligence during the installation, use, maintenance and repair of the models mentioned on the cover of this manual and any associated accessories.

What is covered?

- Repairs necessary as a result of faulty materials, defective components or manufacturing defect.
- The cost of functional replacement parts, but excluding consumable items.

What is not covered?

- Transit, delivery or accidental damage or misuse and abuse.
- Any installation which fails to meet the installation, location and operating requirements and parameters outlined in this manual.
- Manufacturing defects only affecting the Unit's cosmetic appearance.
- Consumable items including but not limited to ELIMINODOR[®] neutralising solution.
- Repairs required as a result of unauthorised repair or installation by anyone other than a Purified Air approved installer.
- Any damage caused to the Unit by its use by anyone other than authorised, trained and qualified users or personnel under the supervision and responsibility of authorised, trained and qualified users.
- Any damage caused to the Unit by incorrect servicing procedures.
- Use of the Unit in any application which is not specifically mentioned in this manual or approved, in writing, by the manufacturer.
- The guarantee is applicable only to new products and is not transferable if the product is resold.

Purified Air disclaims any liability for incidental or consequential damages.

The guarantee does not in anyway diminish your statutory or legal rights.

Please keep your purchase receipt or other proof of purchase in a safe place. you will need to have it should the product require attention under guarantee.

13. Certification

13.1 EC Declaration of Conformity

Purified Air Limited
Lyon House
Lyon Road
Romford
Essex RM12BG

Tel: +44 1708 755414
Fax: +44 1708 721488
Email: enq@purifiedair.co.uk
www.purifiedair.co.uk

purifiedair



EC Declaration of Conformity

Document Number: DoC ON100 1201

We, Purified Air Limited at above address, declare the products detailed below comply with the requirements of the following EU Directives,

- Low Voltage Directive 2014/35/EU
- Electromagnetic Compatibility Directive 2014/30/EU
- RoHS Directive 2011/65/EU

Equipment description	Odour <i>control</i> unit
Make/Brand	Purified Air
Model reference	ON100

Compliance of the equipment has been assessed with respect to the essential requirements and with reference to the following harmonised standard:

- EN 60204-1:2006 +A1:2009

A technical file for this equipment is retained at the above address

David Collins
Managing Director.
Purified Air Limited
January 2017

14. Safety Datasheets

14.1 ELIMINODOR[®] Health and Safety Datasheet

1. IDENTIFICATION OF SUBSTANCE / PREPARATION AND COMPANY

COMPOUND NAME: O.N.100 DEODORIZING LIQUID
CODE NUMBER: 83750
COMPANY: Purified Air Limited,
Lyon House,
Lyon Road,
Romford,
Essex. RM1 2BG England
TELEPHONE NUMBER: 01708 755414

2. COMPOSITION AND INFORMATION ON INGREDIENTS

This is a concentrated fragrance compound, containing a mixture of aroma chemicals and natural essential oils.

3. HAZARDS IDENTIFICATION

GENERAL: When undiluted and not properly handled this may cause irritation to skin and eyes or by inhalation.
HAZARD SYMBOL: See COSHH sheet 14.1
RISK CODES: None required.
ENVIRONMENT: Keep away from drains, surface and ground water, and soil to avoid possible contamination.

4. FIRST AID MEASURES

INHALATION: Remove from the exposure area to fresh air. Contact a doctor if necessary. If breathing has stopped start resuscitation.
INGESTION: Obtain medical advice immediately.
SKIN CONTACT: Remove contaminated clothing. Wash with plenty of soap and water.
EYE CONTACT: Flush with plenty of water and seek medical advice if necessary.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon dioxide, foam or dry powder – DO NOT USE A DIRECT WATER JET.
COMBUSTION UNITS: Carbon dioxide and unidentified organic compounds.
SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS ONLY: Wear protective clothing and avoid inhalation of vapours.

6. ACCIDENTAL RELEASE MEASURES

Remove all sources of ignition. Ensure proper ventilation. Avoid inhalation, skin and eye contact. Soak up spillage with sand or other inert absorbent material such as earth or vermiculite.

Transfer used material to a suitable waste container, and dispose in accordance with local regulations. Any absorbent cloth used for mopping up should be treated as oily waste and disposed of promptly.

7. HANDLING AND STORAGE

HANDLING PROCEDURES: Maintain good occupational and personal hygiene
Avoid inhalation and contact with skin and eyes.

STORAGE CONDITIONS: Store in tightly sealed containers, of amber glass, aluminium or lacquered steel away from ignition sources and in a cool place, preferably 10-20 degC with good ventilation.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

EXPOSURE CONTROLS: Maintain adequate ventilation.

PERSONAL PROTECTION: Respiratory Protection - Not generally required.
Hand Protection - Wear chemically resistant disposable gloves.
Eye Protection - Not normally required. Where there is a risk of splashing wear safety glasses.
Skin Protection - Wear overalls. Always wash routinely before breaks, meals and at the end of the work period.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	LIQUID
Odour:	According to standard
Colour:	YELLOW
PH:	Not determined
Viscosity:	Mobile liquid
Freezing Point degC:	Not determined
Melting Point degC:	Not determined
Flash Point degC:	65
Auto Flammability:	Not determined
Explosive Properties:	Not expected
Oxidising Properties:	Not expected
Vapour Pressure:	Not determined
Relative Density @ 25 degC:	0.8020
Solubility in water:	INSOLUBLE
Partial Coefficient:	Not determined
(n-octanol / water):	Not determined
Refractive Index @ 20 degC:	1.4443

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Extreme temperatures and conditions as this may spoil the Unit.

HAZARDOUS DECOMPOSITION UNITS:
Not determined

TOXICOLOGY INFORMATION.

This Unit is a mixture and has not been tested as a whole. No further data is available.

11. ECOLOGICAL INFORMATION

None available.

12. DISPOSAL CONSIDERATIONS

Dispose in accordance with the law and local regulations.

13. TRANSPORT INFORMATION

Class	Packing	Group
-------	---------	-------

UN No:

ADR/RID (Road):

IMDG (Sea):

IATA (Air):

14. REGULATORY INFORMATION

HAZARD SYMBOLS: This Product carries a harmful rating

RISK CODES: None required

SAFETY PHRASES:

CONTAINS:

15. OTHER INFORMATION

The information in this HSDS is correct to the best of our knowledge. However the accuracy of this information cannot be guaranteed by the company as the data has been obtained from different sources. We will therefore not accept liability for misuse of this data resulting in damage or loss.

14.2 COSHH Assessment for ELIMINODOR[®]



COSHH Assessment

COSHH ASSESSMENT FORM

Substance	Eliminodor
Substance Description	Concentrate fragrance material - Liquid
Is there a safer alternate substance/material?	No
Supplier / Manufacturer	Purified Air Limited
Nature of Use	Concentrated fragrance material for manufacturing purposes.
Storage	Store in well filled and tightly closed original containers, at around +15C and protected from light. Avoid plastic and uncoated metal containers. Store in a cool well ventilated area. Keep away from sources of ignition and naked flames.
Handling Precautions	Apply good manufacturing and industrial hygiene practices and adequate ventilation. Respect good personal hygiene. Smoking, eating and drinking should be prohibited
Use / Application of Substance Used	Concentrate fragrance material.

Hazard Identification (Delete as Appropriate)					
					
Environmental	Harmful/Irritant				

Exposure (Delete as Appropriate)		Engineering Controls	Yes	No
Degree	Low	Can the process be isolated		✓
Duration (hours)	<4	Can the process be controlled	✓	
Quantities	Low	Can ventilation / extraction be used		✓

Hazard Identification	Yes	Level	No		Yes	No
Is there a Workplace Exposure Limit (WEL)?			✓	Hazardous by inhalation?		✓
				Hazardous by ingestion?	✓	
				Hazardous by absorption?	✓	
Irritant to eyes?	✓			Irritant to the skin?	✓	



COSHH Assessment

If any of the following answers are Yes, attach the relevant data to this assessment	Yes	No
1 Is manufacturer's hazard information sheet available?	✓	
2 Will employees be given the information concerning the hazard?	✓	
3 Will employees be given specific training?	✓	
4 Will exposure monitoring and or control measures be required?	✓	
5 Does the substance need to be disposed of by an authorised waste disposal	✓	
6 Have storage requirements for the substance been provided?	✓	

State any First Aid Measures

Inhalation: No damage to health is expected.

Eye Contact: Remove contact lenses. Irrigate copiously with clean water for at least 10 minutes holding lids apart. Seek medical advice if symptoms persist.

Skin Contact: Remove contaminated clothing. Wash skin thoroughly with soap and water or skin cleaner. Contact physician if irritation persists.

Ingestion: If accidentally swallowed rinse mouth with water. In severe cases seek medical attention and show the safety data sheet.

State any measures to be taken in the event of accidental release: Avoid inhalation and contact with skin and eyes. Use Personal Protective Equipment. Inform fire brigade if there are any large spillages. Keep away from drains, surface and ground water, and soil. Spillages should be contained immediately by use of sand or inert powder and disposed of according to local regulations.

Handling precautions in place: Yes

Maintenance of controls: Supervision of staff and safety inspections

Monitoring of exposure: N/A

Information to staff: First aid arrangements and COSHH details

Written instructions issued: Hazard data sheet and COSHH assessment

Training required: Safe system of work



COSHH Assessment

Health Surveillance: N/A
Fire Precautions: - Carbon Dioxide, Foam or Powder Fire Extinguishers to be used. - DO NOT USE WATER EXTINGUISHERS. - Avoid inhalation of fumes during combustion of product – use protection for the respiratory tract. - Contaminated fire extinguishing water must be collected separately; it must not enter sewerage system.
Storage: Store in a cool, dry and well ventilated area away from sources of heat, ignition and direct sunlight. Avoid plastic and uncoated metal containers.
Transport: Always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.
Disposal: Wastes, including emptied containers, are controlled wastes and should be disposed of in accordance with the regulations made under The Control of Pollution Act and the Environment Protection Act. Avoid disposing into drainage systems and into the environment.
Ecological Information: Avoid contaminating the earth as well as surface and ground water.

Personal Protective Equipment					
					
Safety glasses should be worn.	Use chemically resistant gloves.	Use suitable protection clothing.			



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CLEANING

MAINTENANCE & CLEANING

The following pages have been extracted from the DEFRA guidance issued in January 2005.

This is supplementary information to the instruction already provided in this document.

Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems

This report was prepared by Netcen on behalf of Department for Environment, Food and Rural Affairs

January 2005

Maintenance requirements

Proprietors of commercial kitchens are under a duty to ensure that the ventilation system serving the respective premises are maintained and operated effectively.

Good maintenance is a prerequisite for ensuring that a system complies with Best Practicable Means under statutory nuisance provision and will form a key element of any scheme designed to minimise harm to the amenity under planning regulation. Good maintenance is also required by the Food Hygiene Regulations^[20] and will minimise the risk of fire.

4.11.1 Consequence Of Poor Maintenance

Poor maintenance is widely found with control systems. The consequence of poor maintenance is illustrated in the following examples.

Example 1

Time Frame	Performance of System	System Pressure Drop
New installed or maintained filtration system.	Good flow, optimal grease and odour removal.	Low pressure drop as per design.
Period 1 ± continued operation.	Flow restriction introduced as fine filtration system becomes blinded with particulate matter.	Increased pressure drop.
Period 2 ± continued operation.	Flow restriction increases, resulting in the velocity through the system decreasing. This causes increased residence time within filters and improved control. This also causes the face velocity at the canopy to decrease.	Further increase in pressure drop.
Period 3 ± continued operation and equipment failure.	Eventually blinding of fine filters occurs and adsorption in carbon filter reaches maximum capacity. At this point the system fails completely and grease/odour removal will be negligible.	Further increase in pressure drop until flow within duct work drops.

Example 2

Time Frame	Performance of System
New installed or maintained ESP.	Optimal particulate removal.
Period 1 ± continued operation.	Coating of charged plates resulting in reduced particulate removal efficiency.
Period 2 ± continued operation and equipment failure.	Coating of internal surfaces continues until particulate removal efficiency drops significantly. Other maintenance issues such as shorting of electrical equipment will occur.

Both examples of poor maintenance described above are commonly found in commercial kitchens. The resultant loss in performance is often put down to inappropriate equipment or design. It is however more likely that the main

contributory factor in poor performance of grease and odour removal systems is the inadequacy of the maintenance schedule applied to equipment. The optimum maintenance period will depend on the capacity of the equipment installed. It is fair to say that most kitchen ventilation systems are designed with very little excess capacity.

A key consideration in the performance of the kitchen ventilation system is the build-up of debris within the ductwork itself. Good hygiene practice should ensure that the face of the canopy, filters and any other parts requiring cleaning are cleaned regularly to comply with the Food Safety (General Food Hygiene) Regulations 1995^[20]. It is unlikely however that such cleaning will be afforded to the ductwork beyond the canopy and coarse grease filtration system. Material adhering to any other internal surfaces within the duct will contribute to the overall odour emission from the premises. This feature is common with poorly maintained ventilation systems of any kind and will lead to increased and unnecessary loading on any arrestment equipment and can lead to corrosion of the ductwork itself. In extreme circumstances excess debris within a duct work system can be seen as grease and dirt accumulations around seals and joints in the ductwork. This debris is combustible and therefore is a potential fire hazard.

Poor maintenance of ventilation systems can also lead to noise complaints. These are often attributed to worn bearings, imbalance due to erosion or damage, dust and deposits on the impeller and in the adjacent ductwork. Additionally, silencers may be damaged, eroded, corroded or clogged and flexible connectors may become brittle or stiff.

4.11.2 Recommendations for maintenance

Maintenance of the kitchen equipment should be carried out in order to ensure the system remains as efficient as possible and also to ensure that the ventilation plant remains in good condition.

Minimum performance requirements of general maintenance of a kitchen ventilation system ^[22]		
The ideal criteria for the debris accumulation within a ventilation system are as follows:		
	Surface Contaminant Limits	Test Method
Extract	6g/m ² 180 µm	Dust Vacuum Test (VT) Deposit thickness test (DTT)
Recirculation	1g/m ² 60 µm	Dust Vacuum Test (VT) Deposit thickness test (DTT)
Supply	1g/m ² 60 µm	Dust Vacuum Test (VT) Deposit thickness test (DTT)
The maximum allowable debris accumulation within a ventilation system are as follows:		
Wet Film Thickness Test Measurement		Recommended Action
200µm as a mean across the system		Complete cleaning required
Any single measurement above 500µm		Urgent local cleaning required

To achieve these limits it is recommended that^[29]:

- a visual inspection of the ventilation system be carried out at least once a week. All metal surfaces should be checked to ensure that there is no accumulation of grease or dirt and that there is no surface damage;
- cooker hoods and grease filters should be cleaned on a daily basis;
- baffle type self draining filters and collection drawers should be cleaned weekly as a minimum. The cleaning period for mesh filters should be at least twice a week;
- cleaning period for extract ductwork are used as follows:

Heavy Use	12-16 Hours Per Day	3 Monthly
Moderate Use	6-12 Hours Per Day	6 Monthly
Light Use	2-6 Hours Per Day	Annually

- periodic deep hygiene cleaning^[29] be undertaken by a specialist contractor. All accessible main ductwork runs and branches, including fitted equipment should be inspected and cleaned. [Note: periodic will be defined by the use of equipment];
- all fans are maintained on a regular basis as recommended by the fan manufacturer; and
- ventilation grilles, where fitted have easily removable cores to facilitate cleaning.

Recommendations for maintenance of odour control system

For a system employing fine filtration and carbon filtration;

- Change fine filters every two weeks
- Change carbon filters every 4 to 6 months

For a system employing ESP and other in line abatement systems:

- Clean every 2-6 months

4.11.3 Maintenance Activities

A range of cleaning techniques are available and these are summarised in Tables 5.1 and 5.2.

Table 5.1: Examples of wet cleaning techniques

Generic Name	Method of Removing Deposit
Wet Vacuum	Suction
Chemical Clean	Softens or dissolves deposits
Hand Wash	Washing of internal surface using appropriate medium
Steam/High pressure	High pressure system water wash used to dislodge/ dissolve deposits

Table 5.2: Examples of dry cleaning techniques

Generic Name	Energy Source	Method of Removing Deposit
Air Whip/Skipper Ball	Compressed Air (Low Volume)	A rubber hose or plastic ball that under pressure agitates the wall of the ductwork.
Air Lance	Compressed Air (Low Volume)	Usually an air gun with a trigger that is able to direct compressed air locally.
Air Nozzle	Compressed Air (High Volume)	Usually a plastic or metal ball placed on the end of a flexible hose. Compressed air leaving small openings in the ball propels the hose forward inducing the nozzle to closely traverse the internal surface of the duct.
Hand Wipe	Manual	Wiping of the surface using a medium appropriate to the purpose.
Hand Scrape	Manual	Removing heavy deposits by hand scraping.
Hand Brushing	Manual	Brushing the surface using a brush appropriate to the purpose.
Hand Vacuum	Electricity/Manual	Suction
Mechanical Brushing	Compressed Air and/or Electricity	Brushing the surface of the ductwork using a mechanical action.
Mechanical Brush and Air Technology Combined	Compressed Air/ Electricity	Brushing the surface of the ductwork using a mechanical action and compressed air.

4.11.4 Monitoring Methods

Monitoring methods that may be used for assessing the level of debris accumulation are summarised in Table 5.3.

Table 5.3: Examples of dry cleaning techniques

Test Method	Reference	Description Of Method
Deposit thickness test (DTT) Dust Vacuum Test (VT) Wet Film Thickness Test (WFTT)	US National Air Duct Cleaners Association NADCA ACR 2002 ^[30]	HVCA ³ Guide to Good Practice: Cleanliness of Ventilation Systems ¹ [22]
Indicative test	Measurement of grease deposit thickness on hard surfaces using a	



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