BOFA™

A Donaldson Company

A WORLD LEADER IN FUME EXTRACTION TECHNOLOGY

3D PrintPRO HT

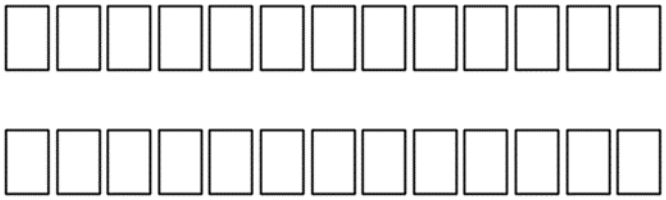
USER MANUAL

BOFA Technical Service
If a problem arises with your 3D PrintPRO HT unit please contact us:

- Visit our website at www.bofainternational.com for online help.
- Or contact the helpline on **+44 (0) 1202 699 444**, Mon-Fri, 9am-5pm.
  Email: bofatechnical@donaldson.com.

Serial Number
For future reference, fill in your 3D PrintPRO HT details in the space provided. The serial numbers are on the rating label located on the side/rear of the unit.

Serial Number:



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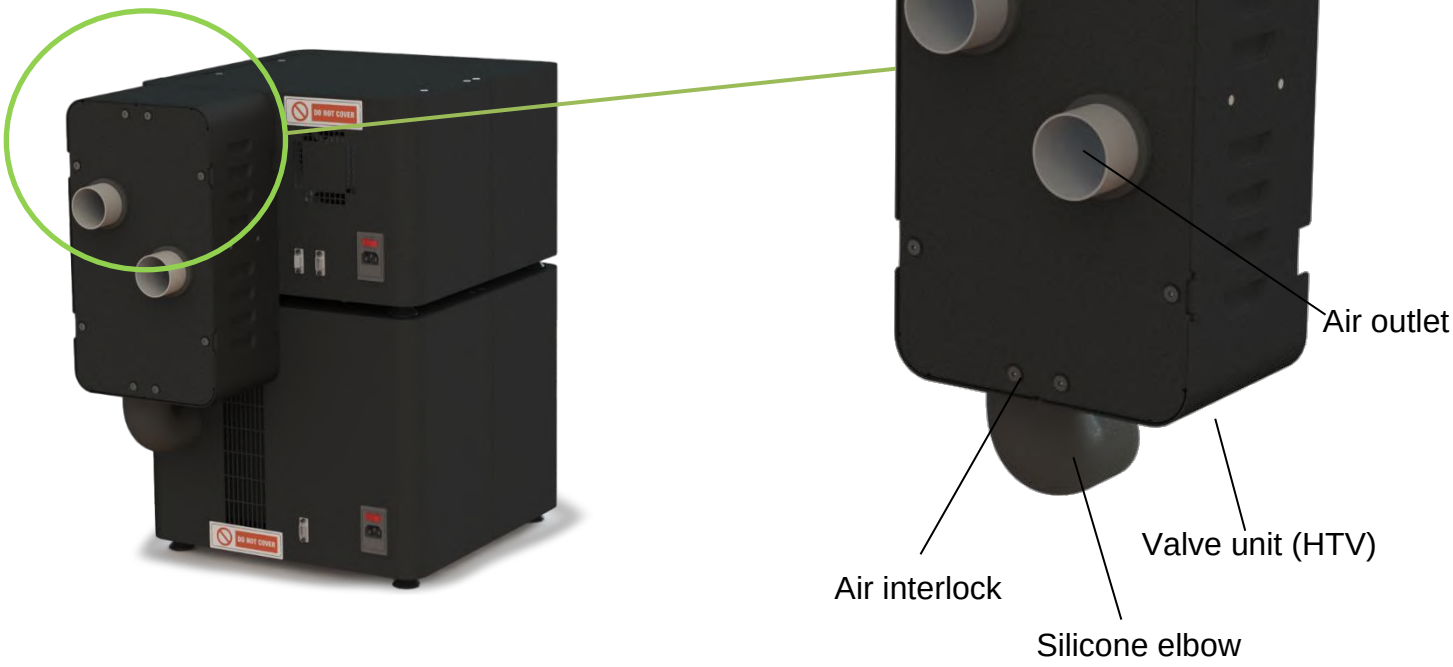
Overview – Extraction system

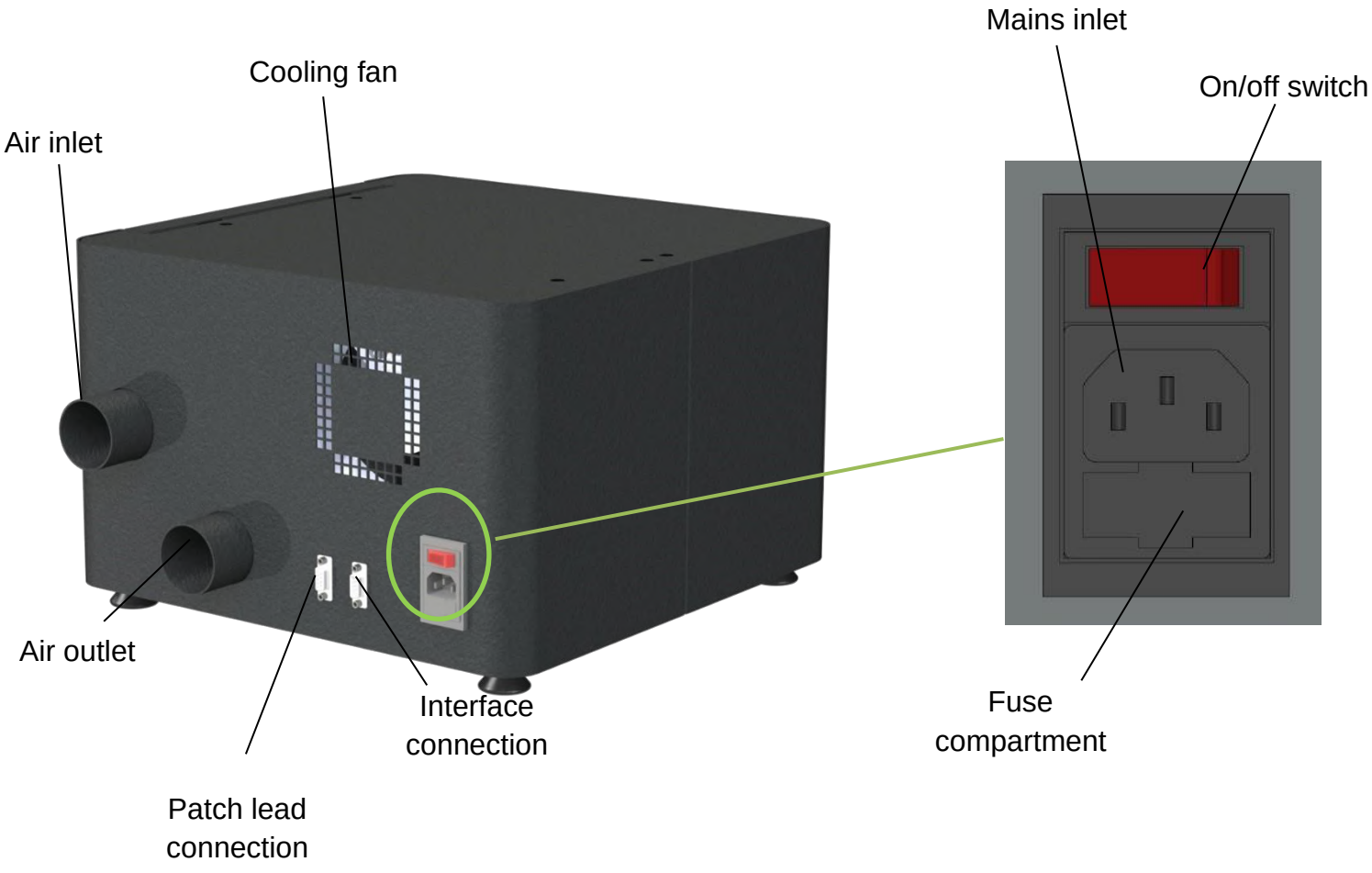
1 01

Front view

Rear view

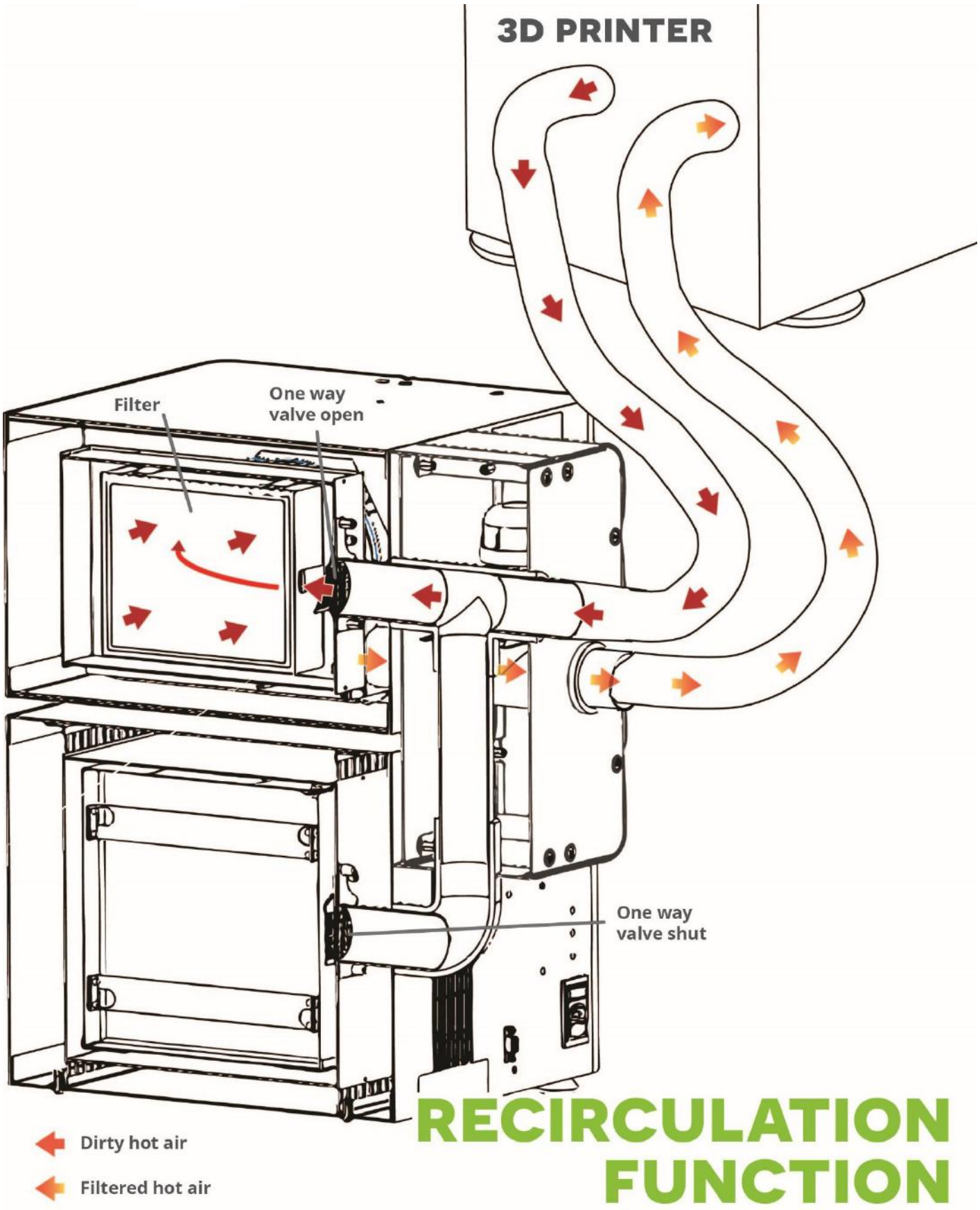


Overview – Recirculation unit (HTR)

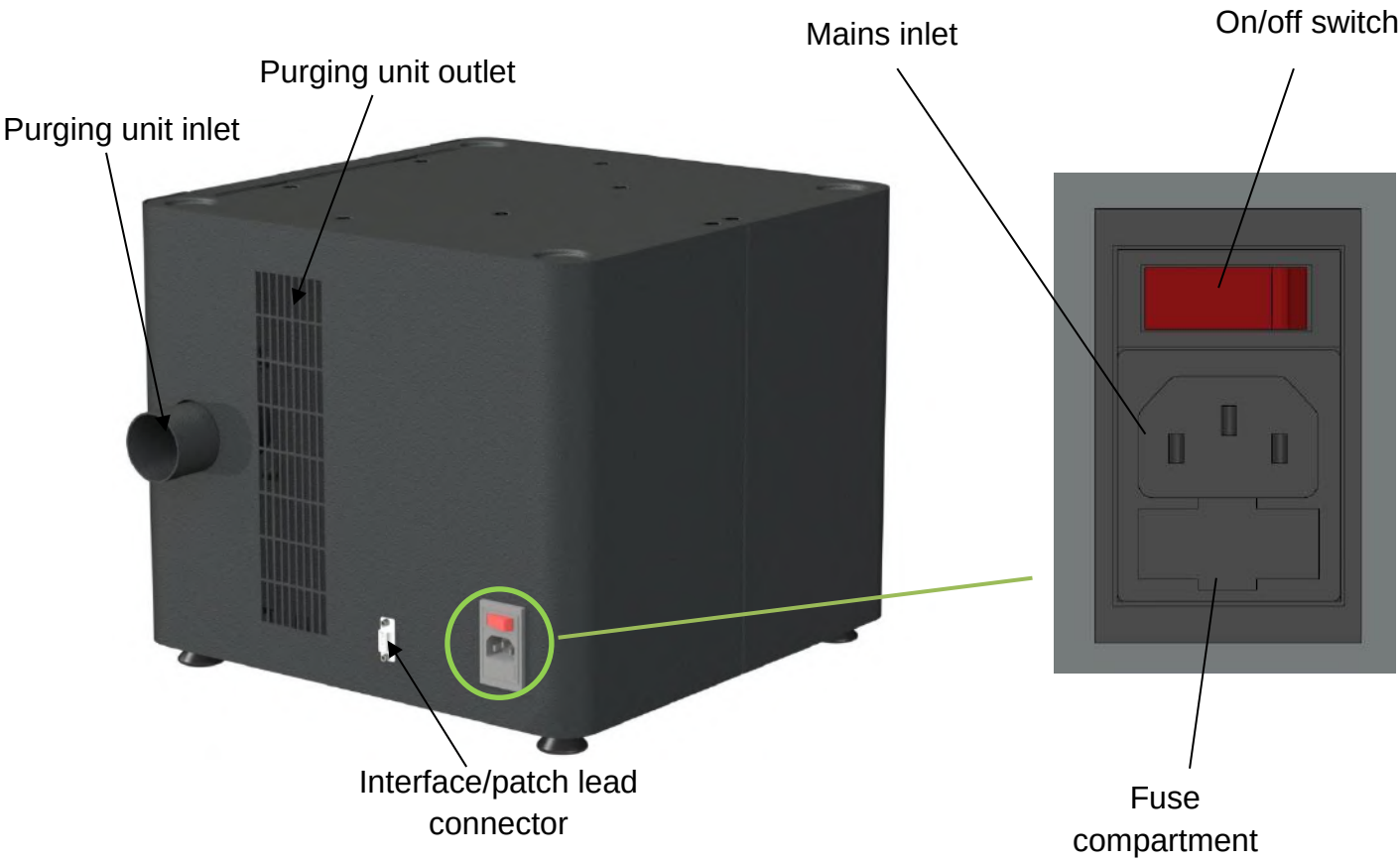


Overview - Recirculation unit function

1 03

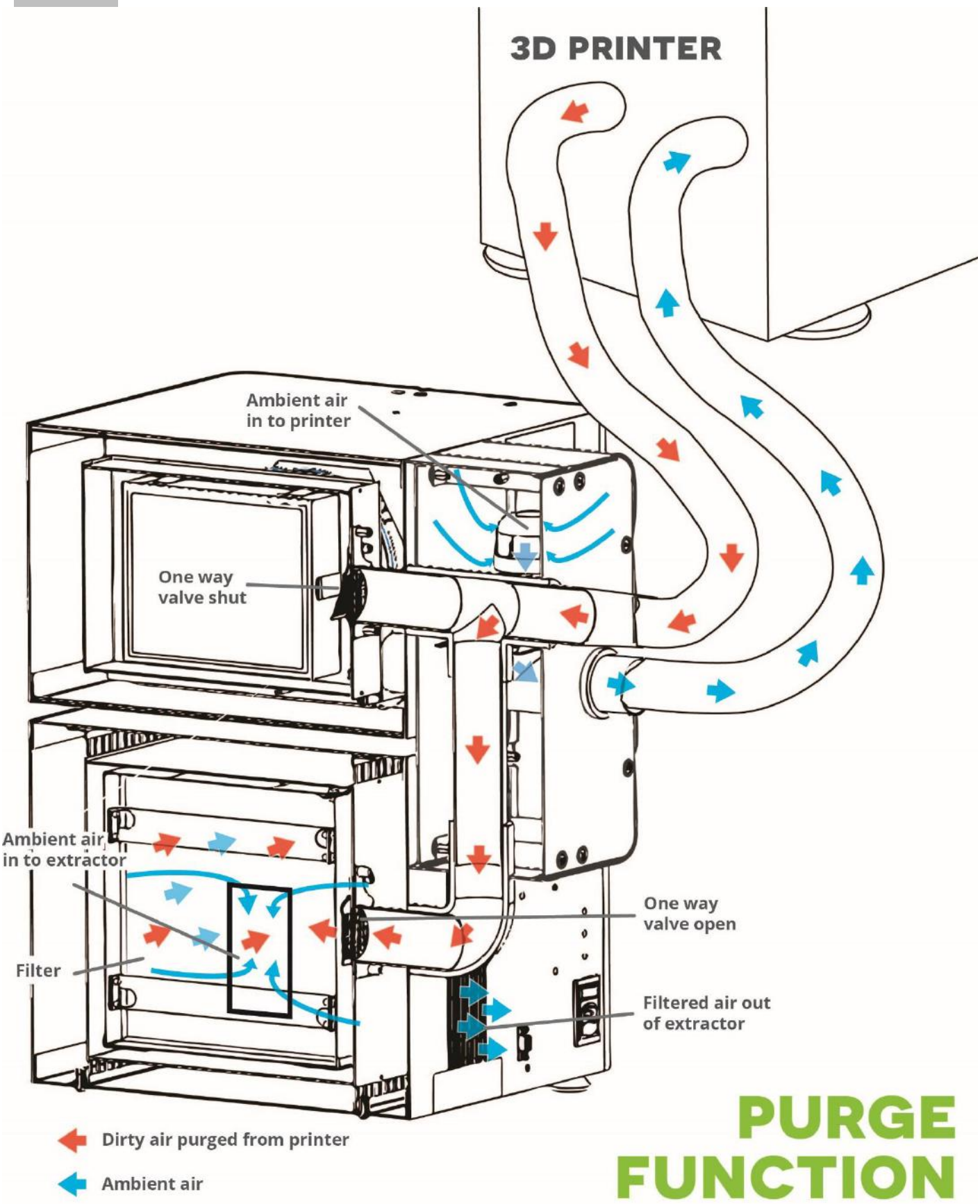


Overview – Purge unit (HTP)



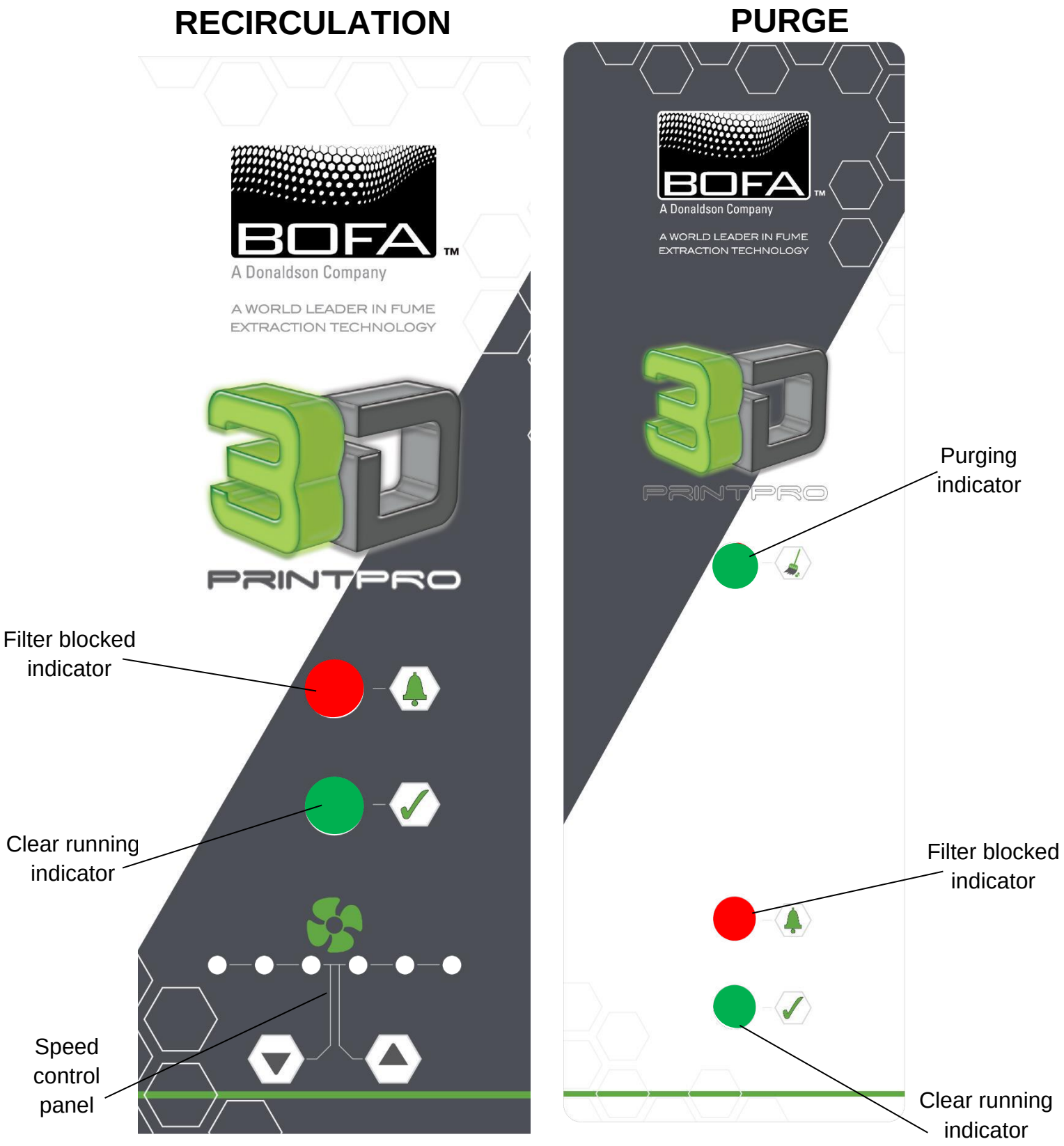
Overview - Purge unit function

1 05



Overview – Control panel

1 06



Safety instructions

2 01

Important safety notes
Concerning symbols used on the extraction unit and referred to within this manual.


Danger

Refers to an immediate impending danger. If the danger is not avoided, it could result in death or severe (crippling) injury. Please consult the manual when this symbol is displayed.


Warning

Refers to a possible dangerous situation. If not avoided, it could result in death or severe injury. Please consult the manual when this symbol is displayed.


Caution

Refers to a possible harmful situation. If not avoided, damage could be caused to the product or something in its environment.


Important (refer to manual)

Refers to handling tips and other particularly useful information. This does not signify a dangerous or harmful situation. Refer to manual if this symbol is displayed.

Refers to hot surfaces present. If not avoided, it could result in severe injury. Please refer to the manual if this symbol is displayed. Process fume/gas entering this system should be less than or equal to 100°C (212°F).

Electrical safety
The unit has been designed to meet the essential health and safety requirements of the Low Voltage Directive 2014/35/EC. The requirements of the EMC Directive 2014/30/EU are also met.

EU Declaration
The unit has been designed to meet the essential health and safety requirements of the Machinery Directive 2006/42/EC, Low Voltage Directive 2014/35/EC and the EMC Directive 2014/30/EU. For the full DOC and further information please contact the technical team at bofatechnical@donaldson.com.

Warning
When working with the pump/motor housing open, live 230/115 volt mains components are accessible. Ensure that the rules and regulations for work on live components are always observed.

Important
To reduce the risk of fire, electric shock or injury:

1. Always isolate the system from the mains power supply before removing the pump/motor access panel.
2. Use only as described in this manual.
3. Connect the system to a properly grounded outlet.

Dangers to eyes, breathing and skin
Once used, the filter within the 3D PrintPRO HT system may contain a mixture of particulates, some of which may be sub-micron size. When the used filters are moved it may agitate some of this particulate, which could get into the breathing zone and eyes of the operative. Additionally, depending on the materials being used, the particulate may be an irritant to the skin.

This unit should not be used on processes with sparks of flammable materials or with explosive dusts and gases, without implementation of additional precautions.
Caution: When changing used filters always wear a mask, safety shoes, goggles and gloves.

Intended use
This equipment has been designed to extract and filter fume from a variety of applications. However, it is the user's responsibility to ensure the equipment is installed correctly and is suitable for the application.
This machine must not be used on wet applications or acidic fumes. To be used indoors.

Recirculation unit

Please note that the Recirculation unit as a standalone does not remove VOC. If you require it to remove VOC, you will either need the Purge unit or the full system.

Carbon selection

Please note that the media within the filter fitted in the 3D PrintPRO HTP is capable of adsorbing a wide range of organic compounds. However, it is the responsibility of the user to ensure it is suitable for the application it is being used on.

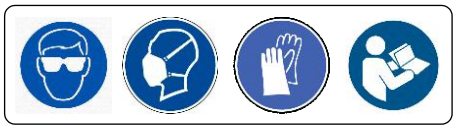
When the Purge unit purges the printer, allowance must be made on the printer for ambient air to replace the extracted air.

Safety instructions

2 02

Warning and information labels
The following listing details labels used on your 3D PrintPRO HT extraction unit.

Goggles, gloves & mask label



Meaning: Goggles, gloves and masks should be worn while handling used filters.

Do not cover label

Meaning: Do not cover any louvers or holes adjacent to the label.

Electrical danger

Meaning: Removal of panels with this label attached will allow access to potentially live components.

Warning label

Meaning: Power should be isolated before the panel with this label attached is opened/removed.

Single person lift

Meaning: Best practice manual handling to be used when lifting this item, refer to customer risk assessment.

Serial number label

Meaning: This label contains a variety of information about the extraction unit, including.

- Company name, address & contact number
- Extractor model
- Unit serial number
- Operating voltage range
- Maximum current load
- Operating frequency
- Year of manufacture
- Relevant approval markings/logos

PLEASE NOTE: If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be compromised.

Fire risk warning

In the very rare event that a burning ember or spark is drawn into the fume extraction unit, it may be possible that the filters will ignite.

Whilst any resultant fire would typically be retained within the fume extraction unit, the damage to the extractor could be significant. It is therefore essential to minimise the possibility of this occurring by undertaking an appropriate risk assessment to determine:

a). Whether additional fire protection equipment should be installed.

b). Appropriate maintenance procedures to prevent the risk of build-up of debris which could potentially combust.

This unit should not be used on processes where sparks could occur, with explosive dusts and gases, or with particulates which can be pyrophoric (can spontaneously ignite), without implementation of additional precautions.

It is essential that nozzles or other extraction/fume capture devices and hoses/pipework are cleaned regularly to prevent the build-up of potentially ignitable debris.

Before installation

3 01

Packaging removal & unit placement

Before installation, check the extraction unit for damage.
All packaging must be removed before the unit is connected to the power supply.
Please read all instructions in this manual before using this extractor.

1. Move the unit to the location where it is going to be installed and remove the outer packaging. **This unit should be installed in a well-ventilated area.**
2. **Best practice manual handling to be used when lifting this item.** Lift the HTP unit off the packaging by the bottom of the extractor and place it at the bottom to form the base of the tower, then lift the HTR unit and place on top. Make sure that the feet align with the marks on the top of the HTP. Important: Ensure that 500 mm space is available around any vented panels on the extractor to ensure adequate airflow.
3. Check the filter is located in its correct position before replacing the lid and securing the clips.

Caution

Do not block or cover the airflow and motor cooling ports on the unit, as this severely restricts airflow and may cause damage to the unit.

Caution

Under no circumstances should the exhaust outlet/s be covered as this will restrict the airflow and cause overheating.

Caution

The pipework used with this extractor must be high temperature resistant, this can be either the one sold by BOFA or you may use your own pipework. If this is the case, we are not responsible for any damage that may be caused for using alternate pipework.

If you are using the entire 3D PrintPRO HT system or the 3D PrintPRO HTR system alone, you will need 2 hoses (1UA1020646 Full System Hose Kit). However, if you are only using the 3D PrintPRO HTP system, you will need 1 hose (1UA1020657 Single System Hose Kit).

System	Hose Kit
Full – HTR, HTP and HTV	1UA1020646
HTR	1UA1020646
HTP	1UA1020647

Installation

4 01

Specification 3D PrintPRO HT

Refer to section 08 01.

Connecting to a power supply
Please follow the above specification when selecting the power supply outlet for the extraction system, ensure the power supply is suitable before connecting the 3D PrintPRO HT system.

Check the Integrity of the electrical power cable, if the supply cord is damaged the extraction unit should not be connected to the mains.

The extraction unit **MUST** be connected to a properly earthed outlet.

Connect the power cable to an isolated electrical supply.

The mains socket should be installed near the extractor; it should be easily accessible and able to be switched on/off. The cable run should be arranged so as not to create a trip hazard. **To disconnect the system from power you must remove the power cord from the IEC socket.**

Replaceable fuses
Rated current T2A, 5 x 20 mm 250V if these are required then order by quoting the part number: 1UA1070022.

Pairing with the 3D printer system

The 3D PrintPRO HT has been specially designed to be used alongside a high-temperature 3D printer with chamber temperatures up to 100ºC.

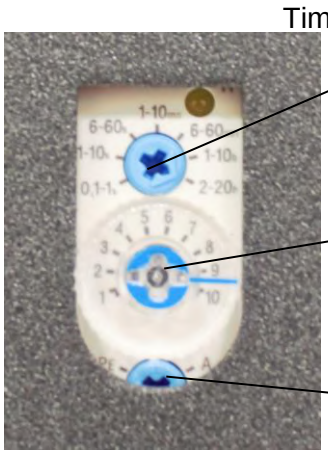
The 3D PrintPRO HT is a modular unit comprised of 3D PrintPRO HTR (Recirculation) and 3D PrintPRO HTP (Purge).

Setting the timer relay

The 3D PrintPRO HTP (Purge) comes with a timer relay that would work as an “over-run” function for your Purge unit. An "over-run" is where the extractor continues to run and filter air, even though the printer has stopped printing. The purpose of this feature is to continue to capture & filter emissions contained within the chamber and being released while the printed parts cools down.

When a printer has finished printing, the 12V signal will be cut to the Purge unit, triggering the overrun function to start. The timer delay relay which creates the "over-run" should be adjusted, allowing the user to set the time that the 3D PrintPRO HTP "over-runs" for.

The standard "over-run" length for 3D PrintPRO HTP is pre-set by BOFA to 5 minutes. To change the time that the extractor is going to run for, you will have 2 setting options. Please see picture below.



The time adjustment setting will go from 0.1-1 second to 2-20 hours while the increment setting will go from level 1 to level 10. For example, if the time adjustment setting is set to 1-10 minutes the increment setting will setup the time from 1 minute to 10 minutes depending on the level that you want to set it up to. Timer relay function should be set to ‘W’. Do not adjust this as the unit will not function correctly.

Purge timings

Guidance on Purge timings to be set to.

Volume of Printer (m^3)	HTP Extraction Rate m3/hr	Over Run Time Guideline (mins)
1.5	25-30	235
1.25	25-30	145
1	25-30	105
0.8	25-30	75
0.6	25-30	50
0.4	25-30	30
0.2	25-30	15

Installation

4 02

Note: Care must be taken to ensure that the system is correctly wired for the extraction unit to function correctly.

Remote stop/start feature
Enables the extraction unit to be remotely turned on/off via an external signal.

DC voltage input
This configuration requires that 12V DC be applied to pins 1 and 6 (+ volts to pin 1, 0 volts to pin 6).

- **Required input voltage: 12V DC**
- **Minimum signal load: 55mA @ 12V DC**

When the system is provided with the correct DC voltage, the HTR unit motor will start and maintain the set flow rate (refer to section **5** for how to set the flow).

The extractor will need to be turned on (see section **5** for turning the extractor on) for this feature to operate.

While the HTR motor starts, the HTP motor will sit in readiness mode (whilst the process is in operation). When the DC voltage is removed, the HTR motor will slow down and come to a stop and the HTP motor will start.

The HTP motor will run for a pre-set time (see section 4.01). When the timer is complete the motor will slow down and come to a stop.

If the DC signal is re-applied at any point during the cycle the sequence will restart.

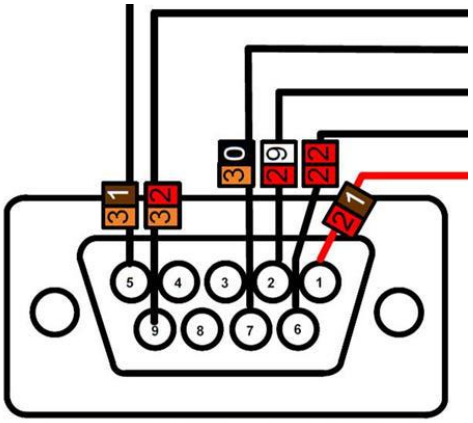
Filter blocked signal
The system will supply a closed connection when the filter is full/blocked.

A volt free signal (closed connection) is given on pins 2 & 7, signalling a filter blocked or full condition.

Connection specification

- **Maximum current load: 3A**

For the pin out see the diagram below:



9-way ‘D’ type socket (male)

(Viewed from rear of connector)

Pin 1 = 12V stop/start

Pin 2 = HTR filter full signal

Pin 5 = HTP filter full signal

Pin 6 = 0V start/stop

Pin 7 – HTR filter full signal

Pin 9 = HTP filter full signal

Installation

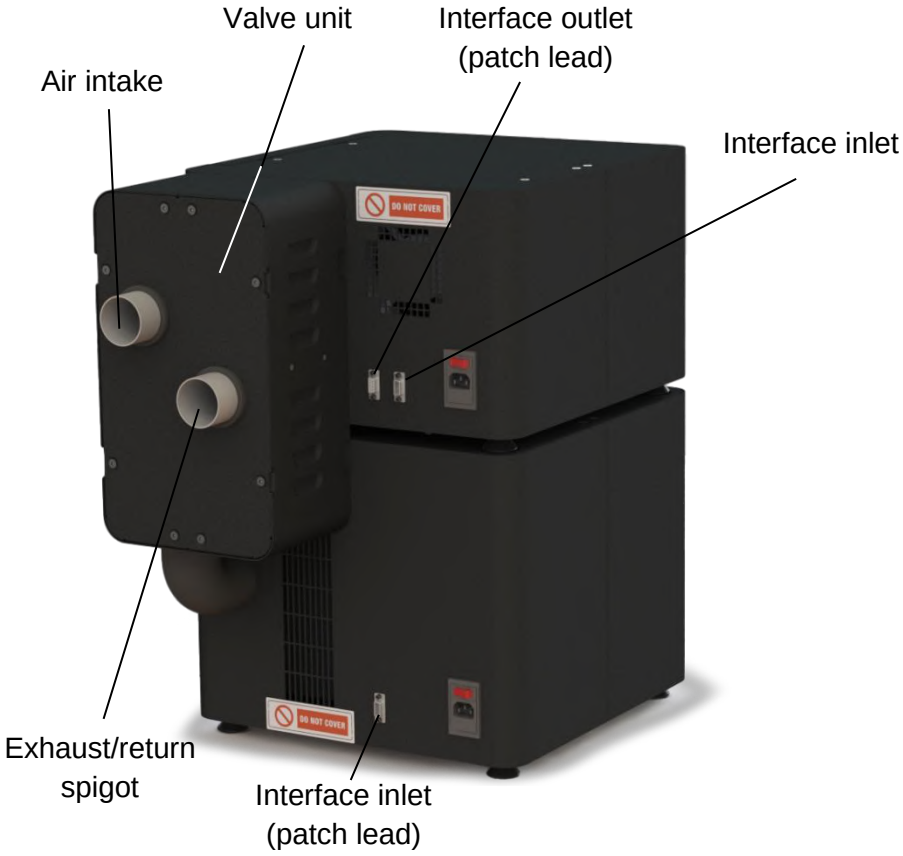
4 03

Linking both 3D PrintPRO HT units together

The 3D PrintPRO HTV or valve unit can be used to connect the two modules, giving you an entire system.

To connect the valve unit (HTV) to the individual units, guide the silicone elbow onto the HTP first to steady the HTV. This will allow you to line up the air intake/exhaust with the HTR and then push onto the spigots. Alternate between pushing the HTV onto the HTR and HTP until the HTV is in full contact.

Ensure the HTR is supported to prevent it from separating from the HTP and falling.

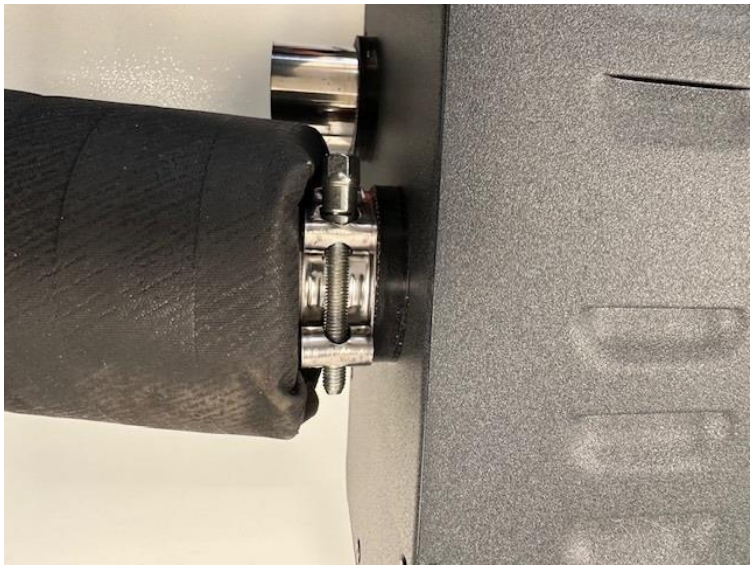


Connect the link interface cable from the interface outlet of the 3D PrintPRO Recirculation to the 3D PrintPRO Purge interface inlet.

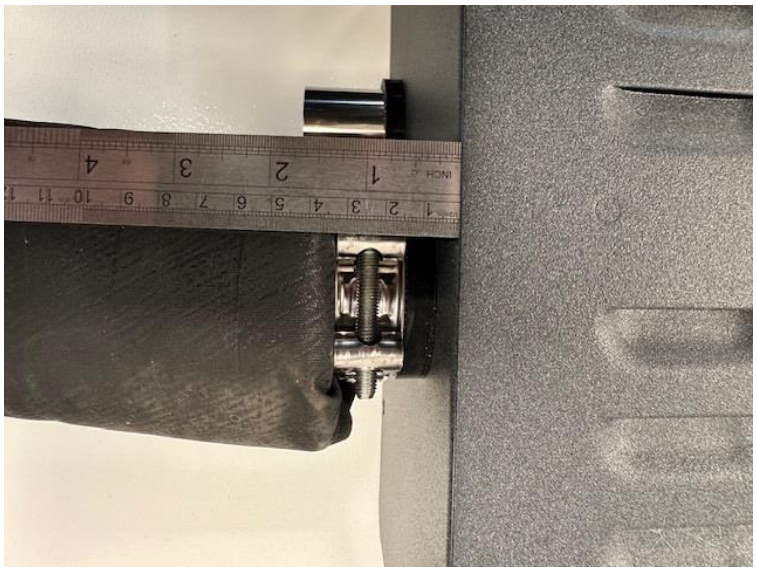
Installation

4 04

Connecting the hoses



1. Connect the 2 insulated hoses to the rear of the valve unit. Use the industrial clamp to fix the hose in place (10mm socket required).



2. Measure the distance between the end of the insulation and the unit.

3. From the insulation provided in the kit, cut a length that is 10mm more than the gap previously measured (see image above).

4. Remove the 2 protective strips from the insulation revealing the adhesive surface. Wrap the insulation around the industrial clamp and adhere both adhesive surfaces to one another. This will add a protective shield to the industrial clamp as this may get hot during the print process.

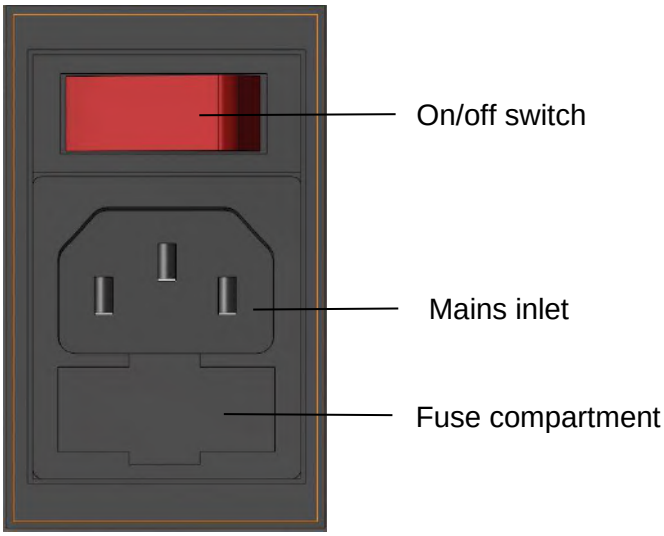
Operation

5 01

Turning extraction unit on

The 3D PrintPRO HT features a fused C14 IEC inlet for the mains cable as well as an on/off switch. The unit can be powered on and off by pressing the red rocker switch to the right-hand side.

The power lead used to power the extractor must be suitable for 10A and up to 250V.



Setting the desired airflow

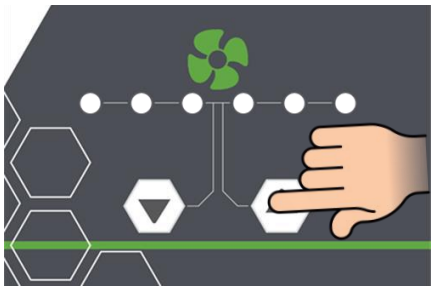
The 3D PrintPRO HT features manual flow control. This enables the user to set the required airflow rate. Over time as the filters begin to block, the user should manually increase the motor speed to ensure the correct flow is maintained to compensate for any loss in performance caused by the added restriction of the partially blocked filters. **This feature can only be found in the 3D PrintPRO HTR (Recirculation).**

The extractor and all pipe work must be fully installed and connected before the airflow is set.

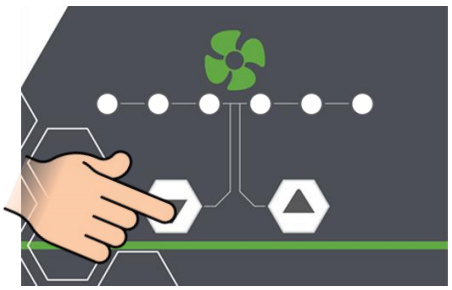
To set the airflow of the Recirculation unit

Press the up arrow button to increase airflow and press the down arrow button to decrease airflow. The level of airflow is indicated by the horizontal row of six blue LEDs to the right of the on/off switch. As the airflow increases, more blue LEDs light up and the opposite for decreasing the airflow.

Increasing the airflow



Decreasing the airflow



NOTE: HTR cooling fan will be active in standby mode.

NOTE: It is important not to restrict the intake hose to the HTP unit because of the unique way in which is cools the incoming air from the hot print process. Ambient air is drawn in through a hidden vent in the HTP door, the vent size is such that it splits in the extraction force 50/50 with the intake hose. Restricting the intake hose will cause and imbalance and will greatly increase the time taken to purge the printer.

Maintenance

6 01

Maintenance: UK
It is a legal requirement, under regulation 9 of the COSHH regulations that all local exhaust ventilation systems are thoroughly examined and tested at least once every 14 months (typically carried out annually). The approved code of practice recommends that a visual check should be carried out at least once a week.

COSHH requires the annual inspection and testing to be carried out by a competent person and specifies that documentation results are recorded in a log.

Contact the seller for more information about inspection and certification.

Maintenance: General
User maintenance is limited to cleaning the unit and filter replacement, only the manufacturers trained maintenance technicians are authorised to carry out component testing and replacement. Unauthorised work or the use of unauthorised replacement filters may result in a potentially dangerous situation and/or damage to the extractor unit and will invalidate the manufacturer's warranty.

Cleaning the unit
The powder-coated finish can be cleaned with a damp cloth and non-aggressive detergent; do not use an abrasive cleaning product as this will damage the finish.

The cooling inlets, outlets and hose kits should be cleaned once a year to prevent build-up of dust and overheating of the unit.

Filter information
A log of filter changes should be maintained by the user.
The filters require attention when the display shows the configuration shown on the next page or when the extractor no longer removes fume efficiently.

It is recommended that a spare set of filters are kept on site to avoid prolonged unit unavailability. Part numbers for replacement filters can be found in section 7.01 Replacement Parts.

To prevent overheating, units should not be run with a blocked filter condition, or with dust obstruction of inlets/outlets.

Fire risk warning

In the very rare event that a burning ember or spark is drawn into the fume extraction unit, it may be possible that the filters will ignite.

Whilst any resultant fire would typically be retained within the fume extraction unit, the damage to the extractor could be significant.

It is therefore essential to minimise the possibility of this occurring by undertaking an appropriate risk assessment to determine:

a). Whether additional fire protection equipment should be installed.

b). Appropriate maintenance procedures to prevent the risk of build-up of debris which could potentially combust.

This unit should not be used on processes where sparks could occur, with explosive dusts and gases, or with particulates which can be pyrophoric (can spontaneously ignite), without implementation of additional precautions.

It is essential that nozzles or other extraction/fume capture devices and hoses/pipework are cleaned regularly to prevent the build-up of potentially ignitable debris.

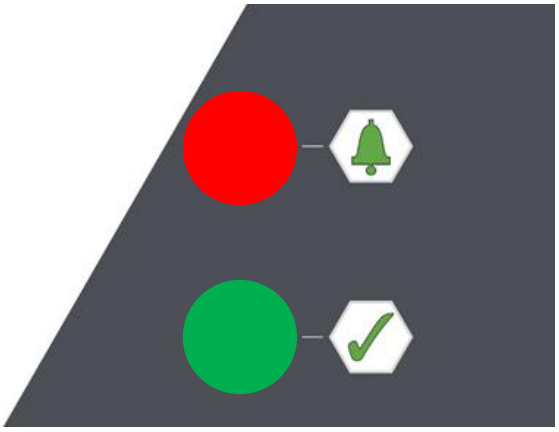
Maintenance

6 02

Filter replacement

The 3D PrintPRO HT will alert the user when its filters need to be replaced. When the filter becomes full the red alarm LED above the airflow adjustment buttons will illuminate.
The filter indicator does not indicate when the carbon in the combined filter is saturated or has expired. Refer to section 7.01 for filter replacement.

Note: Filter full/blocked LEDs will only work when the units are running. When not recirculating or purging, the clean filter light will always be on.



Note: Allow 30 minutes for the Recirculation unit to cool down before carrying out a filter change.

To remove and replace the HEPA filter in the 3D PrintPRO HT Recirculation unit follow the procedure detailed below.

1. Isolate the electrical supply to the extractor.
2. Undo the screw on the door at the right side of the extractor.
3. Remove the HEPA filter from the bracket.
4. Once removed it is recommended that the used filters are bagged and sealed for disposal.
5. Place the new filter into position.
6. Replace the door and tighten the locking screw.

Note: Extractor should not run without filters fitted.

To remove and replace the combined filter on the Purge unit follow the procedure detailed below.

1. Isolate the electrical supply to the extractor.
2. Undo the screw on the door at the right side of the extractor.
3. Remove the combined filter.
4. Once removed it is recommended that the used filters are bagged and sealed for disposal.
5. Place the new filter into position. Ensure the filter is fitted correctly.
6. Replace the door and tighten the locking screw.

Replacement parts

7 01

Consumable spares

The 3D PrintPRO HT contains a HEPA filter and a combined filter. These should be replaced every year or when instructed to do so by the 3D PrintPRO extraction system (see section **6** for replacing the filters)

To maintain performance it is important that the filters are replaced with identical BOFA filters. To re-order, please refer to the filter number printed on the filter installed in your extraction unit. See part numbers below.

- 1UA1030499 (HEPA - HTR)
- 1UA1030487 (Combined - HTP)

Maintenance protocol

Users can record changes in filter change intervals on the table below.

Unit Serial Number:	
HEPA filter (1UA1030499)	
Date	Engineer

Combined filter (1UA1030487)	
Date	Engineer

Filter disposal

The combined filter is manufactured from non-toxic materials. Filters are not re-usable, cleaning used filters is not recommended. The method of disposal of the used filters depends on the material deposited on them.

For your guidance

Deposit	EWC listing*	Comment
Non-hazardous	15 02 03	Can be disposed of as non-hazardous waste.
Hazardous	15 02 02M	The type of hazard needs to be identified and the associated risks defined. The thresholds for these risks can then be compared with the amount of material in the filters to see if they fall into the hazardous category, if so, the filters will need to be disposed of in line with the local/national regulations.

*European Waste Catalogue

System specifications

8 01

Unit: 3D PrintPRO HTR 230V

Minimum flowrate: 20 m³h (11.7 cfm) ± 10%
Maximum flowrate: 80 m³h (47.1 cfm) ± 10%
Airflow measuring method: Hot wire
Suction pressure: 40 mBar ± 10%
Weight: 20 kg
Motor: Centrifugal fan
Output: 195w
Electrical supply: 230V
Hertz: 50Hz
Full Load Current: 2.0A
Noise Level: Below 65dB (A) (at operator position)
Maximum altitude – <2000M
Mains supply fluctuations: ±10%
Overvoltage category: OVC2
Pollution degree: PD2

Size:

	Metric (mm)	Imperial (inches)
Height	268	10.6
Width	406	16.0
Depth	445	17.5

Filters:

Filter type	Construction	Efficiency
Filter HEPA	Maxipleat construction with webbing spacers	99.997% @ 0.3 microns

3D PrintPRO HT (full system)

Size:

	Metric (mm)	Imperial (inches)
Height	608	23.9
Width	406	16.0
Depth	590	23.3

Unit: 3D PrintPRO HTP 230V

Flowrate: 22 m³h (12.9 cfm) ± 10%
Airflow measuring method: Hot wire
Weight: 24 kg
Motor: Centrifugal fan
Electrical supply: 230V
Hertz: 50 Hz
Full load current: 2.0A
Noise level: Below 75dB (A) (at operator position)
Maximum altitude – <2000M
Mains supply fluctuations: ±10%
Overvoltage category: OVC2
Pollution degree: PD2

Size:

	Metric (mm)	Imperial (inches)
Height	347	13.7
Width	406	16.0
Depth	445	17.5

Filters:

Filter type	Construction	Efficiency
Combined Filter	Maxipleat construction with webbing spacers	99.997% @ 0.3 microns

Combined filter (Gas section)

Filter type	Carbon type	Volume
Combined filter (Gas)	Activated carbon	2.95 ltrs

Environmental operating range:

Temperature: +5°C to + 40°C
Humidity: Max 80% RH up to 31°C
Max 50% RH at 40°C.

Process fume/gas entering this system should be less than or equal to 100°C (212°F).

Wiring schematic available upon request.
Spares parts list available upon request.

Please Note: It is very important to ensure that the neutral connection is connected before turning the unit on. Failure to do this may result in damage to the extraction unit.

Contact Information

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Local Exhaust Ventilation System – **Inspection Record**

Health & Safety at Work Act 1974 – Control of Substances Hazardous to Health – Regulation 9 (2002)
Thorough Examination and Testing of Local Exhaust Ventilation Systems

Company:	System Designation:	System Installation Date:
Designated Person:		

Inspection and Maintenance Schedules

1. Daily checks.

2. Weekly inspection of process enclosure, extract offtake, hose/ducting and extract/filtration unit.

3. Monthly inspection of process enclosure, extract offtake, hose/ducting and extract/filtration unit.

4. Yearly inspection/testing.

Process enclosure, extract offtake(s), hose/ducting and extract/filtration unit. Inspection and Maintenance Record

1. Daily inspection

Inspection of the process to ensure extract devices/nozzles/enclosures/hoses are in place and correctly positioned. Examination of the extractor to ensure it is running. This to be carried out by the operator. Daily inspection not recorded.

2. Weekly inspection

Weekly inspection by supervisor of physical condition of extract devices/nozzles/enclosures/hoses and extraction unit for damage, change (parts added or removed) and correct operation etc. Check also that daily inspections have been completed. Tick boxes to confirm system ok/change. Add details of any changes. Report changes to Engineering Manager. Record any remedial actions taken.

Week number	Date	System ok	System change	Details of change/repairs etc.	Initial
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

Process enclosure, extract offtake, hose/ducting and extract/filtration unit. Inspection and Maintenance Record

2. Weekly inspection . . . Continued

Weekly inspection by supervisor of physical condition of extract devices/nozzles/enclosures/hoses and extraction unit for damage, change (parts added or removed) and correct operation etc. Check also that daily inspections have been completed. Tick boxes to confirm system ok/change. Add details of any changes. Report changes to Engineering Manager. Record any remedial actions taken.

Week number	Date	System ok	System change	Details of change/repairs etc.	Initial
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					

Process enclosure, extract offtake, hose/ducting and extract/filtration unit.
Inspection and Maintenance Record

3. Monthly inspection

In addition to weekly checks. Disconnect hoses, check for blockage and smooth operation of fan, signs of dust or vapour/gas/odour carry over. Tick boxes to confirm system ok/change. Add details of any changes. Report changes to Engineering Manager. Record any remedial actions taken.

Month number	Date	System ok	System change	Details of change/repairs etc.	Initial
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

4. Yearly inspection

Annual service To include all regular checks together with inspection of filter condition and replacement where necessary, motor and electrical checks.	Comments	Supervisor signature: Date:
Annual thorough inspection and testing of LEV system in accordance with C.O.S.H.H. regulation 9 (max interval 14 months) including reporting.	Comments	Supervisor signature: Date: