BEECHFIELD
CONSULTING ENGINEERS

Mechanical, Electrical & Energy Consultants

Great British Doner, 87 Piccadilly, Manchester M1 2DA

Commercial Kitchen Odour Abatement Strategy

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ISSUE RECORD

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Original	07.08.2025	Initial Issue		DY	NP
A	11.08.2025	Minor Amendments		DY	DY
B	09.09.2025	Drawing Amendment		NP	DY

This document has been produced to highlight the proposed odour control measured proposed for the Great British Doner, 87 Piccadilly, Manchester M1 2DA. The proposed food outlet will be located within an existing shell unit and be limited to the existing layouts and plant constraints,

The ventilation and extract routes are restricted by the existing unit, both for routes and termination points. The only available route for the kitchen extract system is via the rear elevation terminating through the existing window.

The proposed kitchen canopy will house the following:

- 2No gas fired Doner machines
- 4 ring gas cooker
- Toasting machine
- 2No, gas fryers
- Chip Scuttle (keeping food warm only)

The new kitchen extraction system is proposed to run horizontally through the unit to the rear elevation and discharge via a new termination located in the courtyard. Access will be provided to the exhaust ductwork along its length for ongoing maintenance and cleaning of the ductwork. We cannot terminate the ductwork vertically up the rear of the building at roof level as this area and the rear elevation is not in our demise. We are therefore restricted to the low-level discharge, similar to Gregg's food outlet located on the same row of shops.

For the purpose of this report we have utilised the EMAQ Guidelines to calculate the overall odour risk assessment and detailed the odour control equipment required under the same guidance to alleviate the risk.

EMAQ Risk Assessment for Odour

Odour control must be designed to prevent odour nuisance in a given situation. The following score methodology is suggested as a means of determining odour control requirements using a simple risk assessment approach. The odour control requirements considered here are consistent with the performance requirements listed in this report.

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:

Criteria	Score	Score	Details
Dispersion	Very poor	20	Low level discharge, discharge into courtyard or restriction on stack.
	Poor	15	Not low level but below eaves, or discharge at below 10 m/s.
	Moderate	10	Discharging 1m above eaves at 10 -15 m/s.
	Good	5	Discharging 1m above ridge at 15 m/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[1].
Size of kitchen	Large	5	More than 100 covers or large sized take away.
	Medium	3	Between 30 and 100 covers or medium sized take away.
	Small	1	Less than 30 covers or small take away[1].
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips. *Turkish, Middle Eastern or any premises cooking with solid fuel*
	High	7	Vietnamese, Thai, Indian, *Japanese, Chinese, steakhouse*
	Medium	4	Cantonese, *Italian, French, Pizza (gas fired),*
	Low	1	Most pubs (*no fried food, mainly reheating and sandwiches etc*), *Tea rooms*[1]

<u>Great British Doner Calculated Risk Assessment using EMAQ Guidelines:</u>

Criteria	**Rating**	**Score**
Dispersion	Very Poor	20
Proximity of Receptors	Close	10
Size of Kitchen	Small	1
Cooking Type	High	7
	<u>Total</u>	38

Currently Great British Doner (Piccadilly) is scoring a very high impact risk**.** Primarily due to the low-level discharge restrictions, and proximity of receptors.

The type of odour abatement system for the calculated impact risk is listed in the EMAQ guide to provide a very high level of control.

The EMAQ guide details that filtration and odour control requirements for a Very high level of odour control may include:

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

The completed risk assessment has demonstrated a Very High-Level of control equipment would be necessary on the proposed kitchen exhaust.

The proposals for mitigation in line with EMAQ guidelines, are to install the following:

- a packaged ESP/UVC filtration unit in the ductwork to remove grease and smoke particulates as well as gaseous odours. The combined ESP-UV System offers stage 1 – Pre Filter. Stage 2 ionization, Stage 3 Collector Cells. Stage 4 – UV.

Stage 1 – Pre Filter – Dirty Kitchen extract air goes through an aluminium mesh filter where large grease particulate in the air is intercepted.

Stage 2 – Ionization – The smaller grease and smoke particles that escape through the primary filter enter the ionization zone where [articles as small as 0.01 micron are effectively ionized and carry a positive charge to continue to the collector cell area.

Stage 3 – Collector Cells – Charged grease and smoke particles are then captured via collector cells which are composed of many parallel plats. Grease And oil are collected in the base sump of the ESP and clean air leaves the ESP outlet.

Stage 4 – UV – High energy UVC lamps are used to break down odours and traces of grease in the extract air by the mechanism of photolysis and ozonolysis (combined high intensity UVC light with ozone technology).

The unit proposed is the Plasma-cleanair ESP AG 7.000/UVC with a maximum air flow of 1,4m3/sec, based on the reduced canopy length of 4.5m (L) x 1.2m (D) and a duct velocity of 0.25m/sec. The unit's dimensions are 534x1103x780mm (drawn to scale on the attached sketch) and weighs 82kg.

Maintenance will include a service clean every of the ESP every 1-3 months inline with the EMAQ guidance. The UV Lamps have an operating life of 10,000hrs. Access for maintenance and removal of lamps is via side access and a minimum 1100mm clearance. Full access will be available along the length of the kitchen extract ductwork, with access chambers installed for full cleaning.

Details of the proposed equipment and a sketch layout plan are shown on the following pages.

The proposed extract fan is the systemair MUB/T-S 042 450EC-K insulated extract fan, suitable for medium temperatures up to 120˚C and specifically designed for the kitchen environments. The fan will provide 6,987m3/h (1.94m3/sec) at 250Pa.

Sound Power levels are detailed in the attached fan specification sheets across various frequencies.

Appendices

Proposed Grease / Smoke / Odour neutralising unit - Plasma-cleanair ESP AG 7.000/UVC

Proposed Kitchen extract fan - systemair MUB/T-S 042 450EC-K

Proposed Kitchen extract ventilation Drawing

Elevation Sketch Detail

Electrostatic Precipitator ESP AG UV

Grease, Smoke & Odour Control

plasma-cleanair
AIR, ODOUR & GREASE CONTROL



High Efficiency Grease, Smoke & Odour Removal

Our Combined ESP/UV system is specifically designed for the high efficiency removal of grease and smoke particulate as well as gaseous odours from commercial kitchen exhaust systems. With improving quality of life and living standards, people are conscious of the effects of environmental pollution and have a strong preference for a healthy environment. Therefore, having a robust kitchen purifying system that meets national standards is a social responsibility and a necessity for long-term business gains.

Benefits

- **Compliant** - with EMAQ+, DEFRA and Building & Engineering Services Association (BESA) DW/172 section 24.
- **High Purification Efficiency** – Utilizes a PWM solid-state power supply, which ensures a highly efficient, stable, and continuous supply.
- **Staggered Spiked Ionization** – The ionizer uses stainless steel staggered zigzag multi-point ionization and is not easily stained by oil and grease.
- **Safe and Reliable** – Equipped with a safety switch and a power switch, giving double the protection.
- **Energy Efficient** - Highly effective at removing grease and smoke particulates from kitchen extraction systems whilst maintaining a low pressure drop and low power consumption.
- **Modular Design** – The modular design enables horizontal parallel assembly or vertical stacking to meet various on-site requirements.
- **Packaged System** – One power supply and no need for duct transition between ESP and UV section. By incorporating UV light the depth of the system only increases by 220mm.

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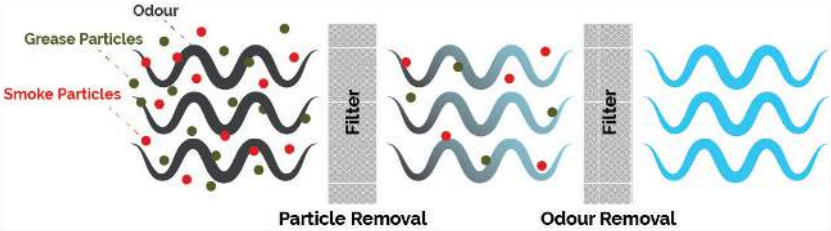
Scan the QR code for installation information

Electrostatic Precipitator ESP AG UV

Grease, Smoke & Odour Control

plasma-cleanair
AIR, ODOUR & GREASE CONTROL

How a Combined ESP-UV system works



Stage 1 - Pre Filter
Dirty kitchen extract air goes through an aluminium mesh filter where large grease particulate in the air is intercepted.

Stage 2 – Ionization
The smaller grease and smoke particles that escape through the primary filter enter the ionization zone where particles as small as 0.01 micron are effectively ionized and carry a positive charge to continue to the collector cell area.

Stage 3 – Collector Cells
Charged grease and smoke particles are then captured via collector cells which are composed of many parallel plates. Grease and oil are collected in the base sump of the ESP and clean air leaves the ESP outlet.

Stage 4 – UV
High energy UVC lamps are used to break down odours and traces of grease in the extract air by the mechanism of photolysis and ozonolysis – combining high intensity UVC light with ozone technology.

Technical Details

	ESP AG 7,000/UVC	ESP 10,500/UVC
Max. recommended Airflow	1.4 m3/s	2.1 m3/s
Weight	82kg	115kg
Dimensions	534x 1103 x 780mm	534 x 1564 x 780mm
Input Voltage	230 Volts / 1 Phase / 50 Hz	
Power	600 watts	800 watts
Efficiency	To 95% based on ASHRAE 52.2 To 99% for double pass (calculated) Reduce duty to 80% and use multiple pass configurations for high grease and smoke applications especially in sensitive areas.	
Min. recommended dwell time from UV to discharge	1 Second	
Max. Temperature	40 Deg. C	
Static Pressure	115 Pa per pass (clean)	
IP Rating	IPX4 *Weatherproof cover available on request*	
Construction	Welded galvanized steel 1.2mm (18 gauge) top/bottom, 1.5mm (16 gauge) columns	
Finish	Blue epoxy powder coating (RAL 5017)	

Installation Requirements

- Ductwork transitions to and from the ESP units to support laminar air flow in accordance with DW/144 (22.5-30 degrees maximum).
- ESP units installed no less than 1 metre away from a bend.
- ESP units to be interlocked with airflow.
- ESP unit to be installed on the negative side of the extract fan.
- According to the type and volume of cooking, single pass, double pass or triple pass ESP filtration can be selected, to ensure effective purification.
- Use Type D MCB with leakage protection.

Safety when working with Ozone

If the extract duct discharges at low level or there are receptors within a 5-metre radius of the discharge point activated carbon (minimum 0.1 second dwell/residence time) is required to absorb residual ozone before reaching atmosphere.

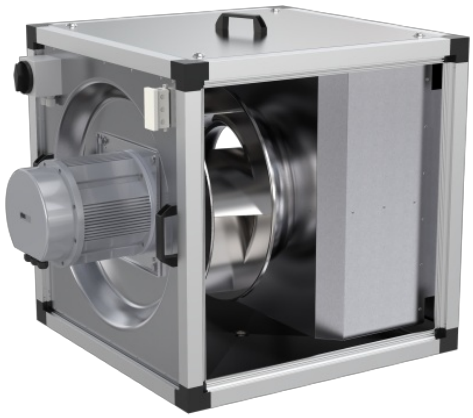
Maintenance

Minimum 600mm side access required at the ESP door to allow the door to open fully to safely remove filters and collector cells. Service and cleaning frequency depends on the type and volume of cooking. EMAQ+ Guidance recommends an ESP service clean every 1-3 months for a system employing ESP filtration. The UV lamps have a normal operating life of 10,000hrs after which time they should be replaced. Minimum 1100mm side access required to safely remove UV lamp rack Speak with a Plasma Clean Air representative to find out more.

Warranty

1 Year following compliant installation.
3 Years with compliant installation and Plasma Clean Air Service and Maintenance Contract.

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MUB/T Insulated duct fans

Powerful and efficient exhaust fans for medium temperatures up to 120°C

- For kitchen and industrial environments
- Up to 120°C medium temperature, continuous operation
- Drip pan and drain plug included
- Acoustic and thermal insulation 30 mm
- Flexible airflow direction
- Indoor and outdoor installation
- Modular system of accessories
- Available with AC and EC motors for 50 and 60Hz

Find more details in our online catalogue

Application

The MUB/T fans are specially designed to **extract** air from **kitchen environments** or **industrial applications**, where **motor** must be placed **outside of air stream**. **Drip pan** with **drain plug** on bottom are constructed for **collecting** a draining **dust, oil, water**.
By MUB/T and MUB/T-S fans an easy **maintenance** is provided through **service door** with handle.

Flexibility

Depending on the type, MUB/T fans are designed for **straight through** or **90°** airflow. The **air direction** can be easily **changed** on site. The construction of the casing and thermal insulation permits **outdoor** and **indoor** use.

Performance

High performance aluminium impeller together with **high efficient** motors are designed to ensure high-level performance to **minimize power consumption** and **maximize efficiency**.

Modularity

Thanks to variety types of **accessories** as flexible connections, dampers, roof, base frame, etc. it is easy to design any ventilation system according to your demand.
By using special **modular systems**, where some accessories as **heaters, coolers, silencers, filters** or **carbon filters** are built-in in **the same type of casing**, you can even design a simple supply or exhaust **air handing unit.**

Certifications

epd

Eco Platform: EPD Verified

This product comes with an Environmental Product Declaration (EPD), published by EPD Norway, a global EPD program operator and member of the ECO Platform (https://www.eco-platform.org/who-is-participating.html). Compliant with ISO 14025 and EN 15804, Systemair EPDs support Life Cycle Assessments (LCAs) in all markets where the product is used. Scroll down to download the EPDs.

Features

Construction

The casing consists of a corrosion-resistant **aluminium frame** with **fibreglass reinforced plastic corners of PA6**; highly shock-resistant. **Panels** made of **double skin galvanized** sheet steel with **30 mm acoustic** and **thermal** rockwool **insulation**.
The **MUB/T** and **MUB/T-ECO** fans are designed for **90° airflow**.
The **MUB/T-S** fans are designed for **straight through airflow**.
Air direction can be easily **rebuilt** on site by **changing** with **service doors (MUB/T).**
Revision switch is **included** and **prewired for MUB/T** and **MUB/T-S.**
The **MUB/T-ECO** is **without revision switch** and **service door.**
Aluminium drip with **drain plug is** placed on **bottom** of casing.

Impeller

The MUB/T fans use **radial** impeller with **backward curved blades**. These are made out of aluminum, dynamically **balanced** and paired with corresponding **IEC motor** with efficiency **IE3 or EC motor**.

Motor

Depending on the type, MUB/T fans are equipped with **AC** or **EC** external rotor motors. Motors are suitable for **50Hz** and **60Hz.**

Motor protection

Depending on the type, **AC** motors have an **integrated** thermal protection with manual (electrical) reset, prewired integral **thermocontact TK** or **thermistor PTC** with leads to a **motor protection device**.
Fans with **EC** motors have an **integrated** electronic **thermal protection** including **locked-rotor protection** and **soft-start**.

Control

EC motors with **built-in potentiometer** to adjust working point can be also controlled by external **signal 0-10V.**
EC motors, depending on the type are also equipped with **ModBus** communication **or alarm signal.**
AC motors can be controlled by **5-step, stepless** speed regulator, **D/Y** switch or **frequency converter.**

Installation

For correct drainage the MUB/T fans must be installed in position with drip pan down. Fans can be installed in any position **indoor** and together **with weather protection roof** also **outdoor**. With mounted **base frame** the MUB/T fans can stand **on floor**. For **preventing vibration** to the duct it is recommended to use **flexible connections.**

Technical parameters

Nominal data		
Voltage (nominal)	230	V
Frequency	50; 60	Hz
Phases	1~	
Input power	1,132	W
Input power kW	1.132	kW
Input current	8.8	A
Impeller speed	1,509	rpm
Air flow	max 6,987	m^3/h
Temperature of transported air	max 120	°C
Max temperature of transported air, when speed controlled	120	°C

Protection/Classification		
Enclosure class, motor	IP55	
Insulation class	F	

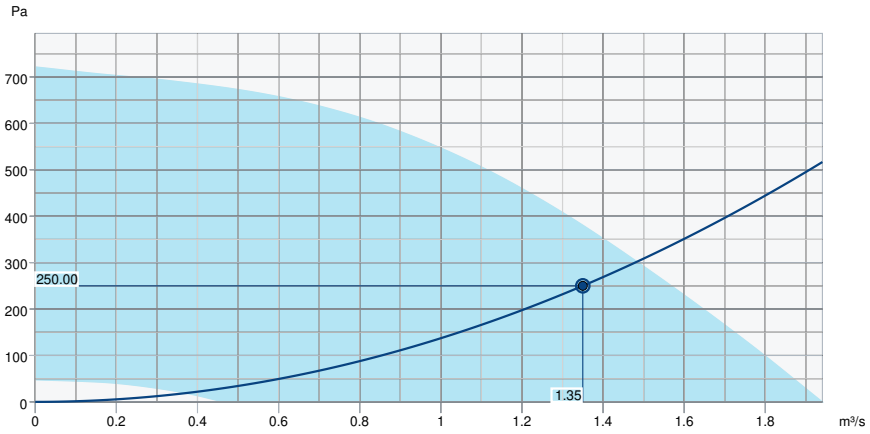
Data according to ErP		
ErP ready	Not ErP relevant	

Dimensions and weights		
Weight	74.5	kg

Others		
Duct connection type	Square	
Motor type	EC	

Performance

Performance curve



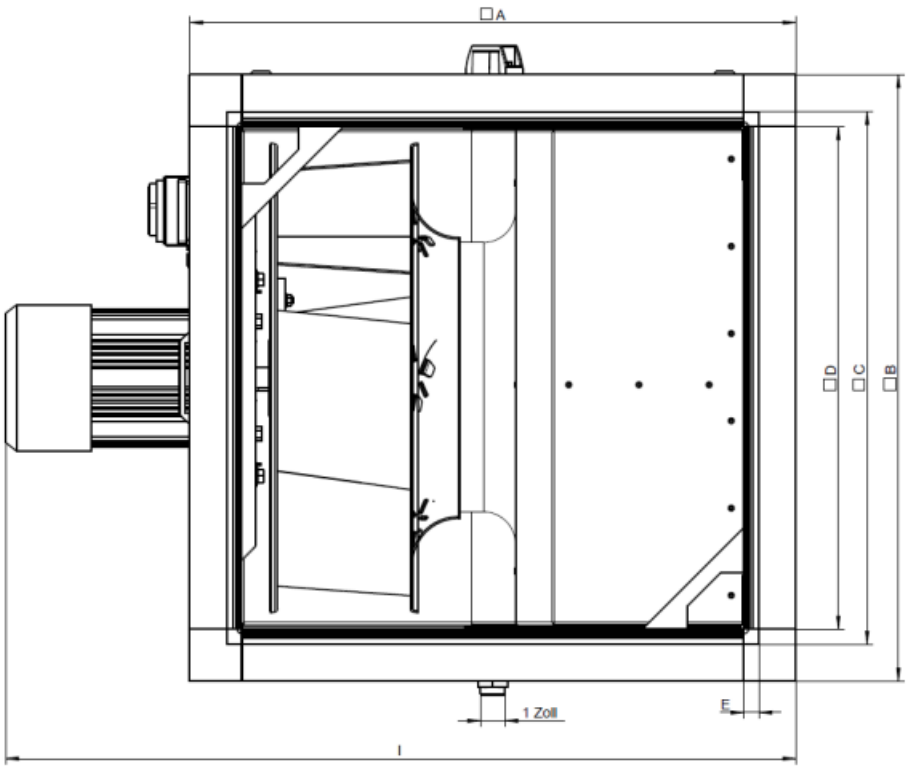
Hydraulic data	
Required air flow	1.35 m³/s
Required static pressure	250 Pa
Working air flow	1.35 m³/s
Working static pressure	250 Pa
Air density	1.204 kg/m³
Power	849.9 W
Fan control - RPM	1,356 rpm
Current	6.69 A
SFP	0.630 kW/m³/s
Control voltage	9.0 V
Supply voltage	230 V

Sound power level		63	125	250	500	1k	2k	4k	8k	Total
Inlet	dB(A)	50	72	74	77	78	74	68	63	83
Outlet	dB(A)	52	73	76	79	79	75	70	64	84
Surrounding	dB(A)	35	59	58	52	54	52	44	33	63
Sound pressure level at 3m (20m² Sabine)	dB(A)	-	-	-	-	-	-	-	-	56
Sound pressure level at 3m free field	dB(A)	-	-	-	-	-	-	-	-	42

Acoustic

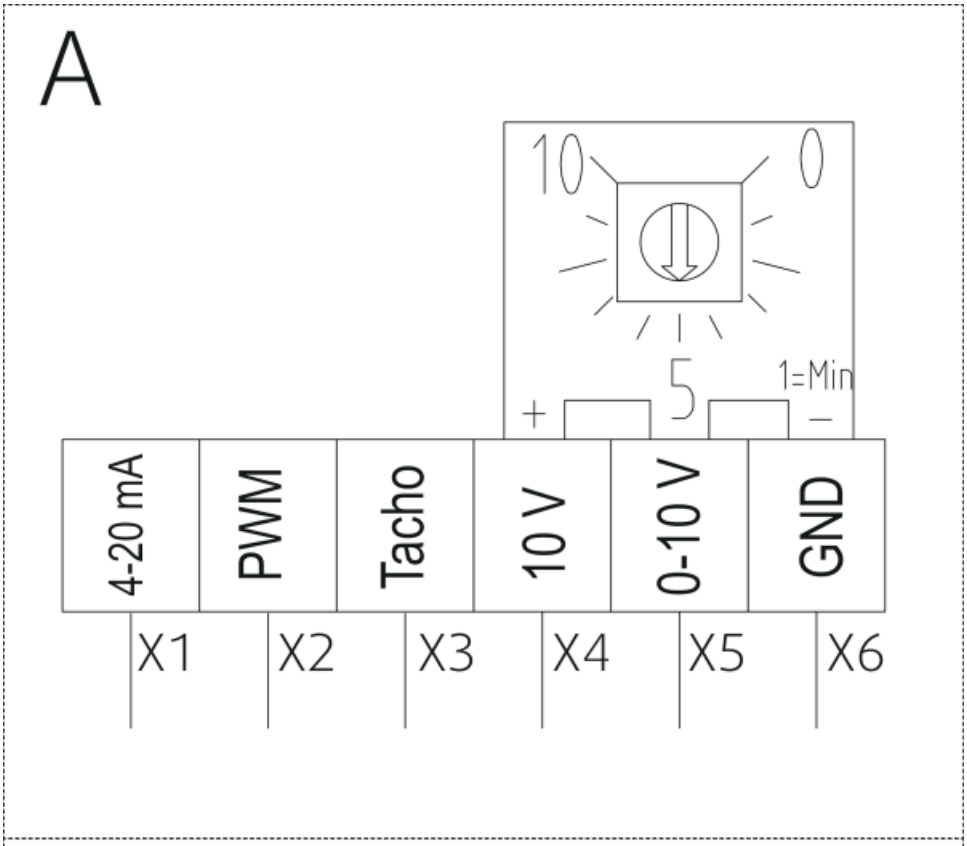
The Level of Casing-Breakout-Noise depends on the quality of shielding the acoustic inlet and outlet noises.
The shown Level of Casing-Breakout-Noise will be reached only in case of 100 % shielding the acoustic inlet and outlet noise and a correspondingly low environment noise.

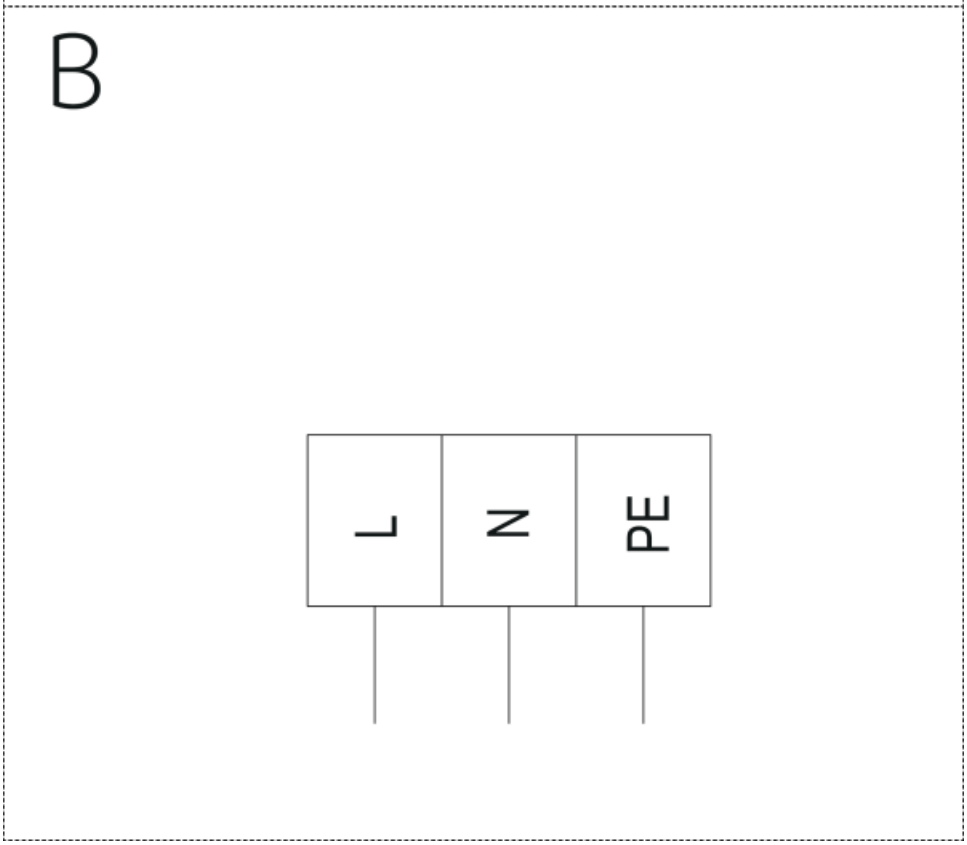
Dimension



	□A	□B	□C	□D	E	I
MUB/T-S 042 450EC	690	690	590	548	21	921

Wiring





A			**Terminal box (control)**
4–20 mA	X1	red	DC current [4 — 20 mA]
PWM	X2	brown	PWM- signal input with 80 Hz and voltage 10 to 24 Vpk The motor speed can be set via the duty cycle. When the duty cycle is changed from 10 to 95% the motor changes speed from 0% to 100% of the maximal speed. Start fire mode: apply +10V to PWM for longer than 5 seconds, e.g. by bridging against +10V (X4). Attention! in fire mode, all motor protection functions are disabled!
Tacho	X3	white	Tacho (details, see manual)
10 V	X4	yellow	10 V DC [max. 25 mW or 2.5 mA]
0–10 V	X5	blue	DC voltage [2 — 10 V]
GND	X6	black	Common (Ground)

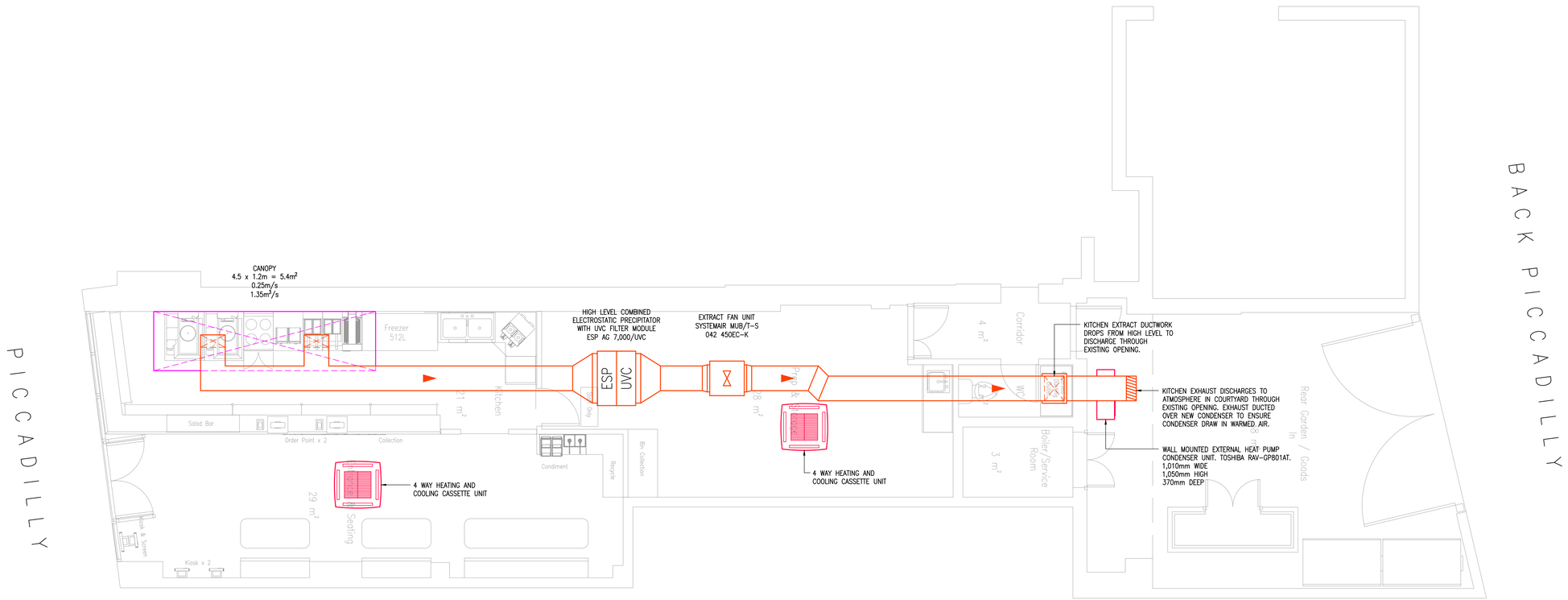
B			Terminal box (mains)
L		brown	220-277 V~ // 50/60 Hz
N		blue	
PE		green-yellow	

Accessories

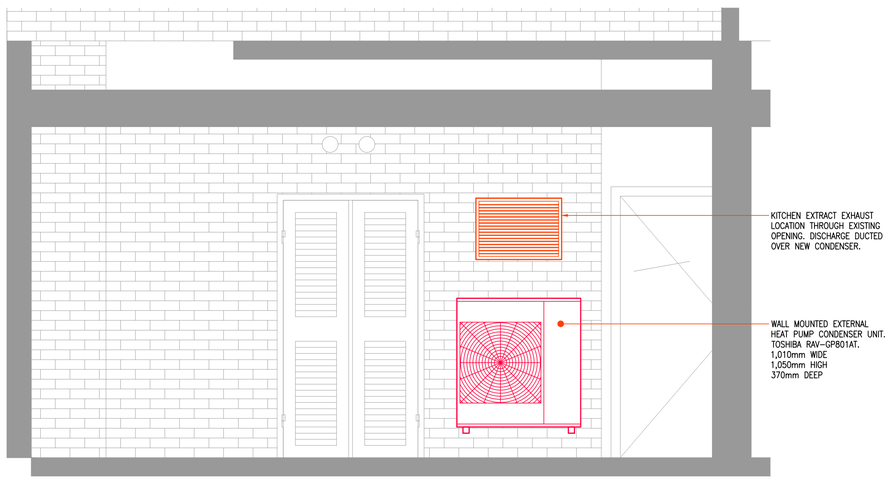
- CXE/AVC Modbus (37256)
- EC-Basic-H humidity (24807)
- EC-Basic-U universal 0-10V (24806)
- EC-Vent control board (3115)
- FGV 042/586-586 flex. conn. (4605)
- MTV-1/010 Controller 0..10V+ (30650)
- REV-3POL/03-7,5kW R/Y (33978)
- Step switch S-5EC-2, 0-10V (449084)
- UGS 042/500 adapter flex 120°C (38369)
- WSD 042 (730x730x70) complete (31481)
- WSG 042 MUB/T complete (36071)
- Presence detector/IR24-P (6995)
- CCM outlet MUB042 d400 (311682)
- CCMI outlet 042 d400 KIT 30mm (239093)
- Free cooling control FCC (238089)
- KKD 042-damper-section (333317)
- KKF-ALU 042-filter-section (376815)
- KKF-CAR 062-filter-section (277347)
- KKF-KITCHEN 062-filter-section (277364)
- Presence detector DBWF-W (382780)
- SDM Service Door MUB 042 30mm (273934)
- EC-Basic-CO2 and temperature (24808)
- EC-Basic-T temperature (24805)
- EC-Selector (9908)
- EC-Vent Room Unit (3018)
- MTP 10, 10K, Speed control (32731)
- Potentiometer MTP 20, 0-10V (310220)
- SD-MUB Vibration pad set (37324)
- UGS 042/400 adapter flex 120°C (38368)
- UGS 042/500 adapter flex. (4357)
- WSD MUB/T-S short (37497)
- FGV 042/586-586 flex. 120°C (38361)
- RT 0-30 Room Thermostat (5151)
- CCM outlet MUB042 d500 (311683)
- CCMI outlet 042 d500 KIT 30mm (239094)
- GRU 042-690/100 (276661)
- KKF 30 042-filter-section (93311)
- KKF-CAR 042-filter-section (277346)
- KKF-KITCHEN 042-filter-section (277363)
- KKS 042 silencer-section (276851)
- Room hygrostat HR-S (286251)

Documents

- Installation, Operation and Maintenance instruction_003
- EPD_416492_Systemair_MUB_T-S_EC_pdf
- COMMISSIONING REPORT_FANS_160628_EN_001.PDF
- EPD_416492_Systemair_MUB_T-S_EC_json



PROPOSED KITCHEN EXTRACT SYSTEM



REAR ELEVATION

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Client:

Project:
GREAT BRITISH DONER
PICCADILLY
MANCHESTER

Drawing Title:
MECHANICAL LAYOUT

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