

Ref: 50-194-TN2-1
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BY Email

TECHNICAL NOTE ON NOISE FOR CONDITIONS 10 AND 11 LISTED BUILDING EXTENSION, LAYSTALL STREET, MANCHESTER

1. BACKGROUND & OBJECTIVES

E3P have been commissioned to produce a Noise Impact Assessment (50-194-R1-3) dated February 2021 for the proposed development at Laystall Street in Manchester. It is understood that since planning permission was granted, an extension to the listed building is proposed along with a new ventilation and heating/cooling strategy is proposed for this building which now includes Air Conditioning Units.

As such, the Environmental Health Department have requested consideration of noise impact from these units as well as existing noise upon the proposed extension and, in particular, have requested that the following is achieved:

Within 3 months of this consent a scheme for any required acoustic insulation for the externally mounted ancillary equipment to the rear of 34 Laystall Street to ensure that it achieves a background noise level of 5 dB below the existing background (LA90) in each octave band at the nearest noise sensitive location shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the equipment. The approved scheme shall be implemented prior to occupancy and shall remain operational thereafter.



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29) LISTED BUILDING – Prior to the occupation of the office accommodation a scheme for the acoustic insulation of any externally mounted ancillary equipment (including any Mechanical Ventilation Heat Recovery (MVHR) systems associated with the development to ensure that it achieves a background noise level of 5 dB below the existing background (LA90) at the nearest noise sensitive location shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the equipment. The approved scheme shall be completed before the premises is occupied and a verification report submitted for approval by the city council as local planning authority and any non compliance suitably mitigated in accordance with an agreed scheme prior to occupation. The approved scheme shall remain operational thereafter.

Reason – To secure a reduction in noise in order to protect future residents from noise nuisance, pursuant to policies SP1, H1 and DM1 of the Core Strategy.

11) Prior to commencement of development details of the following shall be submitted:
(a) a scheme for acoustically insulating and mechanically ventilating the residential accommodation against local road traffic network, any local commercial/industrial premises, plant and equipment on adjacent premises and the insulation requirements and specification for plant room service risers /lift shafts; and

The approved noise insulation scheme and mitigation measures shall be completed before any of the dwelling units are occupied.

The following noise criteria will be required to be achieved:

Bedrooms (night time - 23.00 - 07.00) 30 dB LAeq (individual noise events shall not exceed 45 dB L_{Amax,F} by more than 15 times)

Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq

As such, this Technical Note that considers the potential impact of noise from the air conditioning units upon existing/proposed residential receptors in the immediate vicinity in accordance with the above and BS 4142:2014+A1 'Methods for rating and assessing industrial and commercial sound'. An updated Background sound survey has been conducted to inform this Technical Note. Furthermore, an assessment of existing noise sources upon the proposed residential receptors will be undertaken,

The technical note has been completed by Lee Faulkner, Associate Director at E3P, with over 13 years' experience in the measurement and assessment of noise and vibration. I hold the Post Graduate Diploma in Acoustics and Noise Control and I am a full corporate member of the Institute of Acoustics (MIOA).



2. BASELINE NOISE LEVELS

2.1. UNATTENDED BACKGROUND AND AMBIENT SOUND SURVEY

E3P have undertaken an unattended background and ambient sound survey in a position considered representative of the existing and proposed receptors.

The survey was carried out over the following time period:

 12:45 Thursday 15th February to 07:00 Tuesday 20th February 2024.

The following noise measurement position was chosen for the Background Sound Survey:

 Noise Measurement Position 1 (NMP1): Located out of a north facing 1st floor window overlooking Laystall Street and considered representative of the proposed noise sensitive receptors. The microphone of the sound level meter was set at a height of 4 m above ground level. and in façade conditions. Sound sources consisted of road traffic on the local road network, specifically Great Ancoats Street.

Table 1 details the measured ambient sound levels. The full data set is available upon request. It is assumed that the office plant items would only operate during the day and so periods between 07:00 and 19:00 are assumed. A correction of -3 dB is applied to correct to free-field.

TABLE 1 MEDIAN AND RANGE OF MEASURED AMBIENT SOUND PRESSURE LEVELS

DATE	TIME PERIOD	RANGE OF MEASURED AMBIENT SOUND PRESSURE LEVELS, $L_{Aeq,T}$ (dB)	MEDIAN MEASURED AMBIENT SOUND PRESSURE LEVELS, $L_{Aeq,T}$ (dB)
Friday 15th February 2024	07:00–19:00	51.3-57.9	53.9
Saturday 16th February 2024	07:00–19:00	52.0-60.2	54.2
Sunday 17th February 2024	07:00–19:00	50.4-58.2	54.5
Monday 18th February 2024	07:00–19:00	49.7-53.4	52.3

The worst case measured 16 hour and 8 hour noise levels were noted to be 64 dB during the day (as measured on Friday, Saturday and Monday) and 62 dB during the night (as measured on Saturday night).

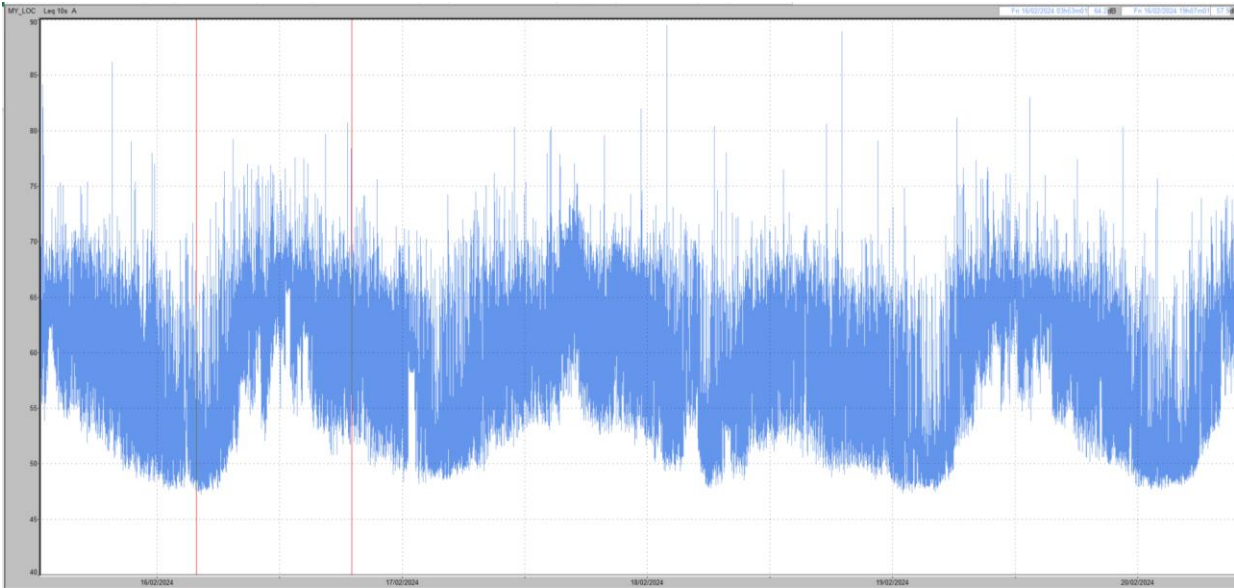
The time history graph is shown below:



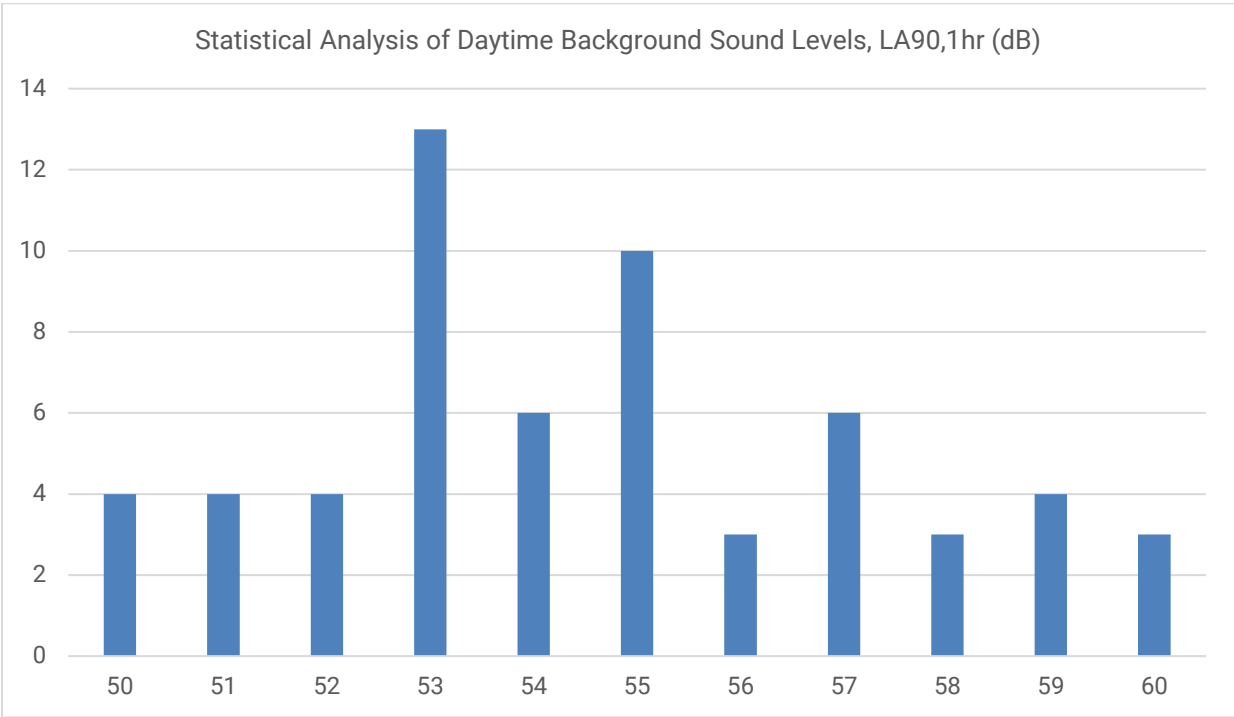
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The graph below provides a statistical analysis of the measured daytime background sound levels.



As can be seen, a background sound level of 53 dB is considered most appropriate and typical for use in the assessment. The level highlighted bold above are the lowest measured levels to be used in the assessment to inform a worst-case assessment.



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Table 2 details the equipment used in the surveys.

TABLE 2 NOISE MEASUREMENT EQUIPMENT AND CALIBRATION DATES

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	CALIBRATION DUE DATE
NMP1	Sound Level Meter	01dB Fusion	12039	28/07/2025
	Pre-amplifier	01dB Pre22	1805124	
	Microphone	GRAS 40CD	330832	
	Calibrator	Cirrus CR 515	87281	19/01/2025

The sound level meter was field calibrated on site using the above-mentioned calibrator prior to and after noise measurements were taken. No significant drift was witnessed as noted above. Calibration certificates are available upon request.

The previous NIA completed by E3P did not include for background sound levels. However, an adjacent application on Lomax Street for Rain City Developments (Ducie Street) Limited included a Noise Impact Assessment Report conducted by Hann Tucker Associates (dated 25th April 2018) with background sound measurements conducted in a position to the rear of this development. As such, this position and associated baseline levels are considered representative for comparison to those collected in February 2024.

Specifically, the following information has been taken from the report, as noted in Section 6, pages 6 to 8, the results of which are shown below:

Position	Daytime (07:00 – 23:00 hrs)		Night-time (23:00 – 07:00 hrs)		
	$L_{Aeq,16h}$	Typical Lowest $L_{A90,15min}$	$L_{Aeq,8h}$	Typical Lowest $L_{A90,15min}$	Typical Highest $L_{A1max,15min}$
1	66 dB	54 dB	63 dB	54 dB	79 dB
2	58 dB	51 dB	58 dB	51 dB	73 dB

Position 2 is noted to be to the rear of Laystall Street and considered representative of background sound levels likely at future noise sensitive facades that are closest to the proposed A/C Units.

Accordingly, background sound levels are taken as 51 dB during the day. This is equal to the lowest median value measured at NMP1, resulting in limits of 46 dB.

As noted, the levels captured at NMP1 are 2 dB higher than those to the rear of Laystall Street above, as such, the above 51 dB is used with a corresponding limit of 46 dB.



3. PLANT NOISE IMPACT ASSESSMENT

In order to consider the potential noise impact from the A/C units, E3P have undertaken 3D noise modelling of the units based on information provided by the client, specifically:

- ✳ AC Unit Plan – L00 (LO316).
- ✳ Air Conditioning Technical Data RXM-R – Sound Power Level of 63 dB.
- ✳ Air Conditioning Technical Data RZAG-MV1 – Sound Power Level of 70 dB.
- ✳ Air Conditioning Technical Data ARXM-R – Sound Power Level of 65 dB.

With regard to assumptions for the assessment, the following has been considered for the full planning application aspects:

- ✳ Ground elevations have been taken as existing by way of a 2 m grid Digital Terrain Model (DTM) which contains public sector information licensed under the Open Government License v3.0.
- ✳ The proposed x m high wall is included with 0 dB absorption and set as reflective.
- ✳ Reflection order of 1 allowed for as per CadnaA recommendations; and
- ✳ No soft ground attenuation has been applied.

For the BS 4142:2014+A1:2019 assessments, penalties are applied to the specific sound level in order to provide the rating level. Given that the sources of noise are A/C units and that the receptors are inside, no penalties are applied in this instance as it is assumed that there would be no tonal elements to the noise, nor any intermittency or impulsivity. As such, the output from the noise model can be considered the Rating Level.

Table 3 details the resultant rating level at the closest facades, output from the model. The grid noise map can be seen in Figure 1 of Appendix I.

As discussed, the lowest median background sound level is applied, in this case 51 dB, to all receptors. This informs a worst-case assessment.

TABLE 3 BS 4142:2014+A1:2019 ASSESSMENT – DAYTIME

RECEPTOR	CALCULATED RATING LEVEL, $L_{A,r}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)	CRITERION, $L_{A,r} = L_{A90} - 5dB$ (dB)	DIFFERENCE +/- (dB)
Existing to East	36	51	46	-10
Proposed to South	46	51	46	0

Table 3 indicates that the predicted rating level falls below the criterion for receptors to the east and achieves for those to the south. As such, no adverse impact is predicted and the above shows compliance with the MCC criterion.



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In addition to the above, E3P also note that the condition requires the above criterion to be achieved in all octave bands. As such, hand calculations have been undertaken based on the supplied information for the units to calculate octave band rating levels at the façade and compare this to the octave band background sound level measured between 07:00 and 19:00 on Monday 5th February which was noted to be the lowest median period.

TABLE 4 OCTAVE BAND ASSESSMENT

	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz
RZAG140MV Sound Power Level, L_w (dB)	76	69	73	70	62	58	52
RXM60 Sound Power Level, L_w (dB)	59	63	62	59	55	49	45
ARXM Sound Power Level, L_w (dB)	62	68	65	62	58	53	47
Combined Sound Power Level for all 6 Units, L_{WA} (dB)	79.3	75.1	76.9	73.9	67.0	62.6	56.8
Distance to Façade (m)	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Line of Sight Removal (barrier) (dB)	-3	-3	-3	-3	-3	-3	-3
Predicted Sound Pressure Level at Receptor, L_{eq} (dB) (A)	52.0	47.9	49.7	46.7	39.8	35.3	29.6
Background Sound Level, L_{90} (dB)	62.0	57.1	54.6	51.4	51.3	47.1	39.2
Criterion (-5 dB) (B)	57.0	52.1	49.6	46.4	46.3	42.1	34.2
Difference, +/- (A-B)	-5.0	-4.2	0.1	0.3	-6.5	-6.8	-4.6

As can be seen, there is not exceedance of the criterion in any octave band. The 0.3 dB difference in the 500 Hz band is not considered significant.



4. PROPOSED RESIDENTIAL NOISE IMPACT ASSESSMENT

As well as the proposed sound sources, E3P have considered the existing sound sources that have a potential to impact upon the proposed residential dwellings within the extension.

Accordingly, the worst-case measured façade noise levels have been used to inform the assessment. These were as follows, with a façade correction of -3 dB applied:

-  Daytime average noise level of 61 dB $L_{Aeq,16hr}$.
-  Night-time average noise level of 59 dB $L_{Aeq,8hr}$.
-  10th highest maximum noise level of 78 dB $L_{Amax,fast}$.

These measured noise levels are assumed at all habitable room windows associated with the proposed residential extension.

Accordingly, the below details the BS 8233 assessment with the aim to achieve the levels stipulated in Condition 11. In order to predict internal noise levels, it is assumed that standard double glazing 4 / 16 / 4 would be installed with a sound reduction of 30 dB R_w . As road traffic is the main noise source here, the $+C_{t,r}$ correction is applied resulting in a reduction of 25 dB. As such, the allowable external noise levels are 60 dB during the day and 55 dB (75 dB max) at night. The below details the results

-  Living room and bedrooms during the day – 1 dB in exceedance with standard glazing.
-  Bedrooms at night (average) – 4 dB in exceedance.
-  Bedrooms at night (maximum) – 3 dB in exceedance.

As noted above, standard glazing is not suitable for any habitable room windows on the extension. As such, the following glazing requirements are recommended:

-  Minimum reduction of 34 dB R_w (30 dB $R_w + C_{t,r}$) – example configuration could be 10 mm glass / 16 mm air space / 4 mm glass.

The above would achieve internal noise levels of 31 dB during the day and 29 dB (44 dB max) at night, all of which falls below the required criteria.

As well as the above, it is important to consider open windows. It is understood that the developer is to install a MVHR system, in accordance with Part F requirements and, as such, windows do not need to be open to achieve the necessary ventilation. The proposed system is understood to be the Nuaire MR XBOX Eco2, a copy of specification sheet is appended to the rear of the report.

With regards to Part O requirements, all bedrooms would exceed the internal criteria of 40 dB average and 55 dB max with windows open to mitigate overheating. As such, any overheating assessment would need to account for this. However, E3P note that the Nuaire system includes a boost function which could counter this requirement. Windows are to remain openable for purge ventilation and at the users discretion.



Laystall Street – Listed Building Extension

Technical Note on Noise from A/C Units

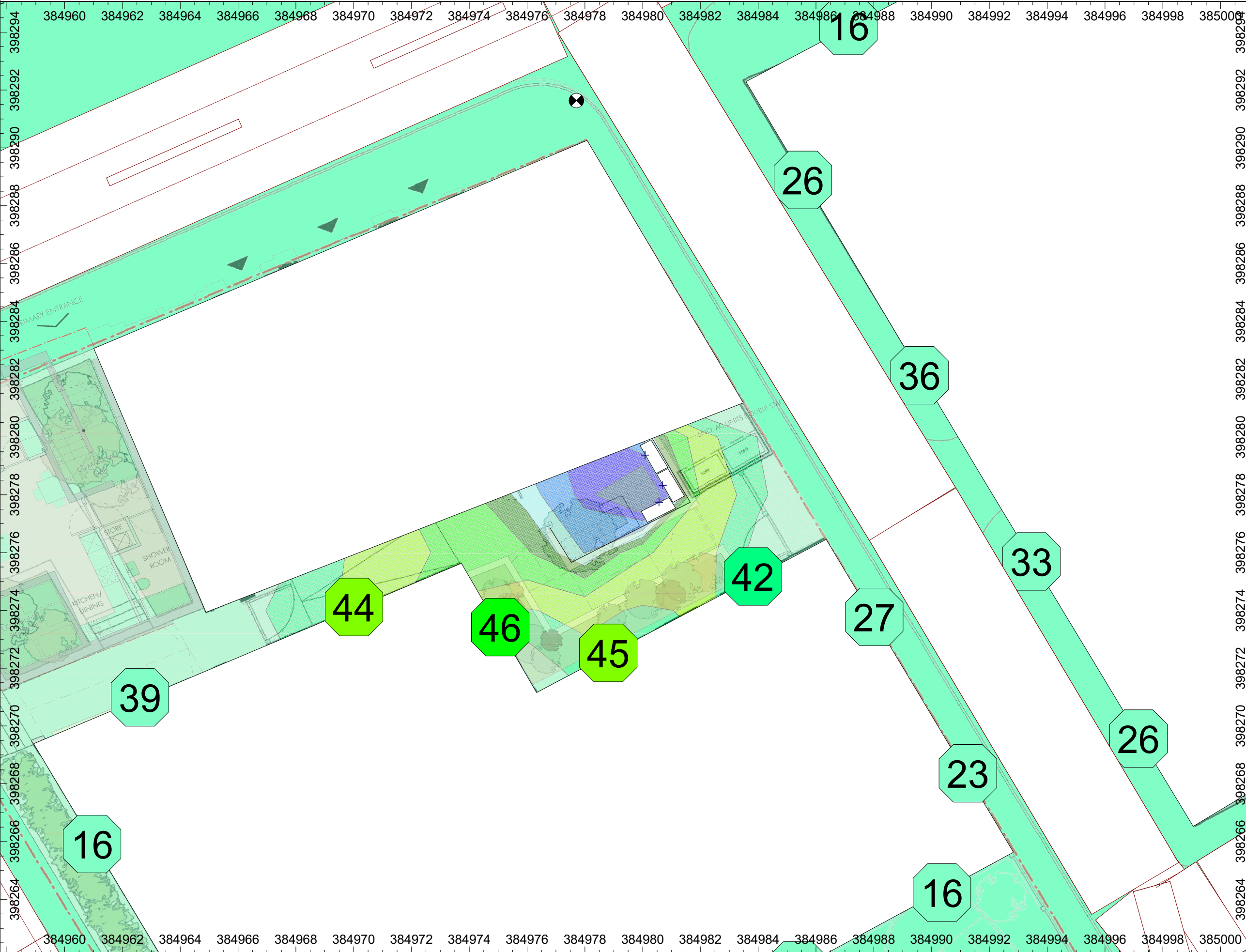
February 2024

Yours sincerely,
For and on behalf of E3P Ltd

Lee Faulkner
Associate Director



Figure 1 - Daytime Grid Noise Map - Calculation at 1.5m above ground level



Project:
 Laystall Street,
 Manchester

Project-No:
 50-194

Client:
 McCauls

**Rating Level,
 LA,r (dB)**

... <= 40
 40 < ... <= 42
 42 < ... <= 45
 45 < ... <= 48
 48 < ... <= 50
 50 < ... <= 52
 52 < ... <= 55
 55 < ... <= 58
 58 < ...

Noise Map Objects

+ Point Source
 vert. Area Source
 Road
 Building
 Barrier
 Bridge
 Contour Line
 Receiver
 Building Evaluation
 Calculation Area

Project Engineer: L Faulkner
 Date: 23/11/2023

MRXBOXAB-ECO2 MRXBOX-ECO2 and Opposite Handed versions

ACHIEVES
100%
DUTY IN BYPASS
MODE

The MRXBOXAB-ECO2 has been designed with automatic 100% bypass as listed on the SAP Product Characteristics Database (PCDB).

Due to its intelligent and smart design, there will be no reduction in airflow when operating in bypass mode resulting in enhanced performance.

Both the MRXBOXAB-ECO2 and the MRXBOX-ECO2 are designed to provide optimised balanced (supply and extract) mechanical ventilation with heat recovery and both are listed on the PCDB.

The units operate by continuously extracting moisture-laden air from 'wet' rooms within the property and at the same time drawing in fresh supply air from outside. The heat from the extracted stale air is recovered via a heat exchanger inside the heat recovery unit which becomes tempered then filtered before supplying into the habitable rooms, creating comfortable and well ventilated homes.

The heat exchanger block within these units can recover up to 95% of the normally wasted heat. The two independent fans have full-speed control for background and boost ventilation rates.

The MRXBOXAB-ECO2 has a Summer bypass function. In warmer months this function automatically activates to ensure the property is being well-ventilated and comfort levels are maintained in the home by continuously drawing in fresh filtered air into the habitable rooms.

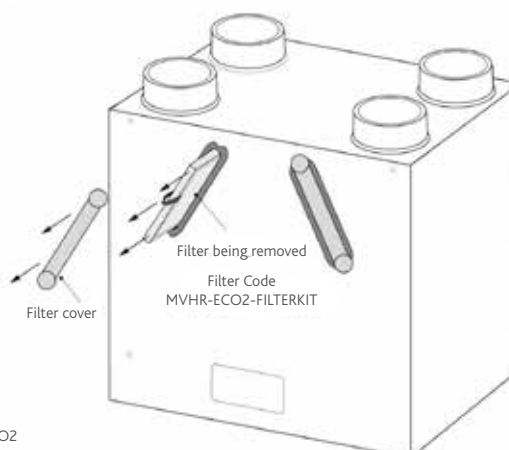


Typical Installation ▼

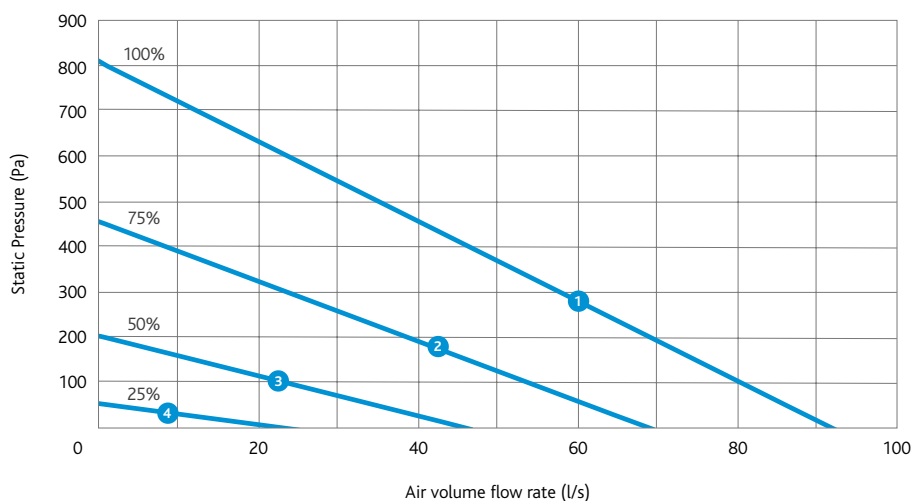
INSTALLATION FEATURES



Typical cupboard installation of MRXBOXAB-ECO2



Performance - MRXBOX(AB)-ECO2 ▼



CODE DESCRIPTION

MRXBOXAB-ECO2

Wall mounted unit with 100% bypass and integral humidistat.

MRXBOX-ECO2

Wall mounted unit.

MRXBOXAB-ECO2-OH

Opposite handed configuration wall mounted unit with 100% bypass and integral humidistat.

MRXBOX-ECO2-OH

Opposite handed configuration wall mounted unit.

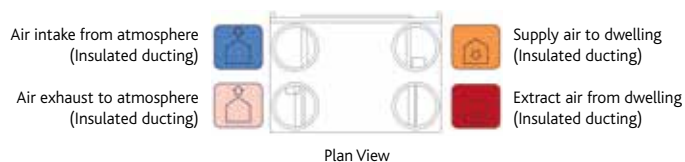
Electrical & Sound ▼

	Maximum power consumption		Sound Power Levels dB re 1pW (Frequency Hz)								dBA @3m
Curve	(Watts)		63	125	250	500	1k	2k	4k	8k	
1	155	Open inlet	48	52	59	55	50	46	35	27	
		Open outlet	60	67	69	69	64	64	54	46	
		Breakout	59	60	58	59	49	46	35	27	40
2	69	Open inlet	44	47	57	50	45	41	30	21	
		Open outlet	55	63	63	65	60	59	49	40	
		Breakout	56	57	53	52	44	40	28	18	34
3	19	Open inlet	39	38	48	40	35	29	16	<16	
		Open outlet	48	54	53	55	49	47	35	24	
		Breakout	43	48	44	42	34	29	<16	<16	24
4	7	Open inlet	38	31	27	23	<16	<16	<16	<16	
		Open outlet	38	34	31	31	22	<16	<16	<16	
		Breakout	37	31	24	20	<16	<16	<16	<16	<16

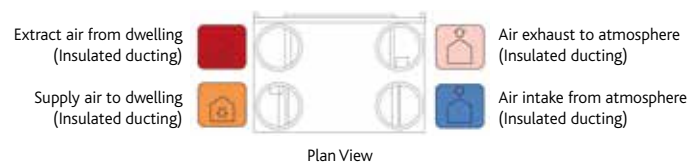
The maximum power consumption shown above (Watts) is consumed on units running continuously, not taking into account any heat recovery saving and based on SAP Product Characteristic Database (PCDB) testing. The breakout case-radiated dBA values are given for Hemispherical free field radiation at 3m - to obtain the Spherical radiated data, subtract 3 dBA.

Please note: Sound data is provided at a particular duty point for 25%, 50%, 75% and 100%. For accurate sound data at a specific speed duty, please use Nuaire's fan selector or call the office on 029 2085 8500.

Standard Handing



Opposite Handing



MRXBOXAB-ECO2
& MRXBOX-ECO2

SAP 2009 Test Results ▼

Product Code	MRXBOXAB-ECO2			MRXBOX-ECO2		
Application	Specific Fan Power (W/l/s)	Heat Exchange Efficiency	Energy Saving Trust Best Practice Compliant	Specific Fan Power (W/l/s)	Heat Exchange Efficiency	Energy Saving Trust Best Practice Compliant
Kitchen + 1 Wet Room	0.49	90%	Yes	0.46	90%	Yes
Kitchen + 2 Wet Room	0.50	90%	Yes	0.45	89%	Yes
Kitchen + 3 Wet Room	0.58	89%	Yes	0.50	89%	Yes
Kitchen + 4 Wet Room	0.69	88%	Yes	0.60	88%	Yes
Kitchen + 5 Wet Room	0.81	87%	Yes	0.70	87%	Yes

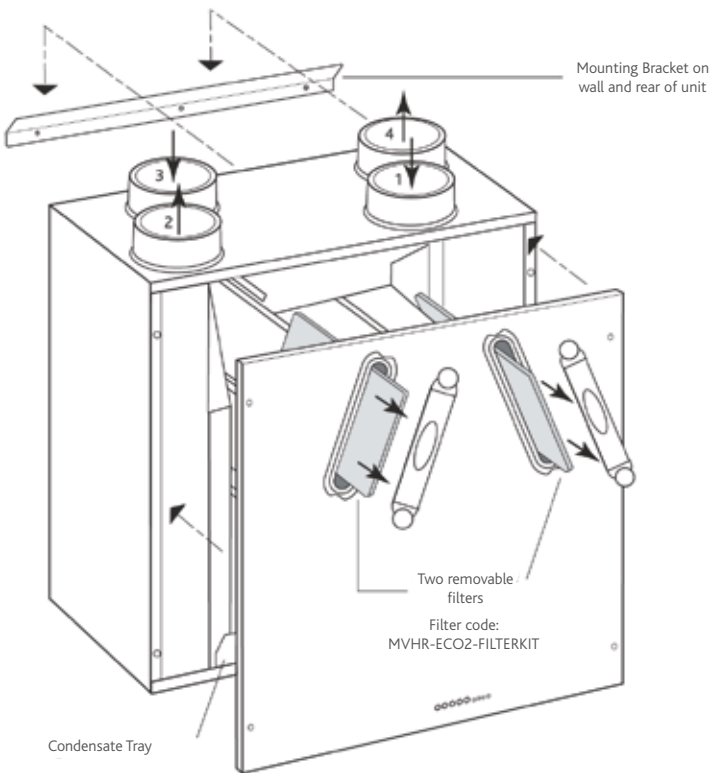
SAP 2012 Test Results ▼

Product Code	MRXBOXAB-ECO2			MRXBOX-ECO2		
Application	Specific Fan Power (W/l/s)	Heat Exchange Efficiency	Energy Saving Trust Best Practice Compliant	Specific Fan Power (W/l/s)	Heat Exchange Efficiency	Energy Saving Trust Best Practice Compliant
Kitchen + 1 Wet Room	0.52	90%	Yes	0.47	89%	Yes
Kitchen + 2 Wet Room	0.59	89%	Yes	0.54	88%	Yes
Kitchen + 3 Wet Room	0.77	87%	Yes	0.66	87%	Yes
Kitchen + 4 Wet Room	1.00	86%	Yes	0.85	87%	Yes
Kitchen + 5 Wet Room	1.23	86%	Yes	1.05	86%	Yes

General Arrangement ▼

SPIGOT LOCATION & DUCTING REFERENCES

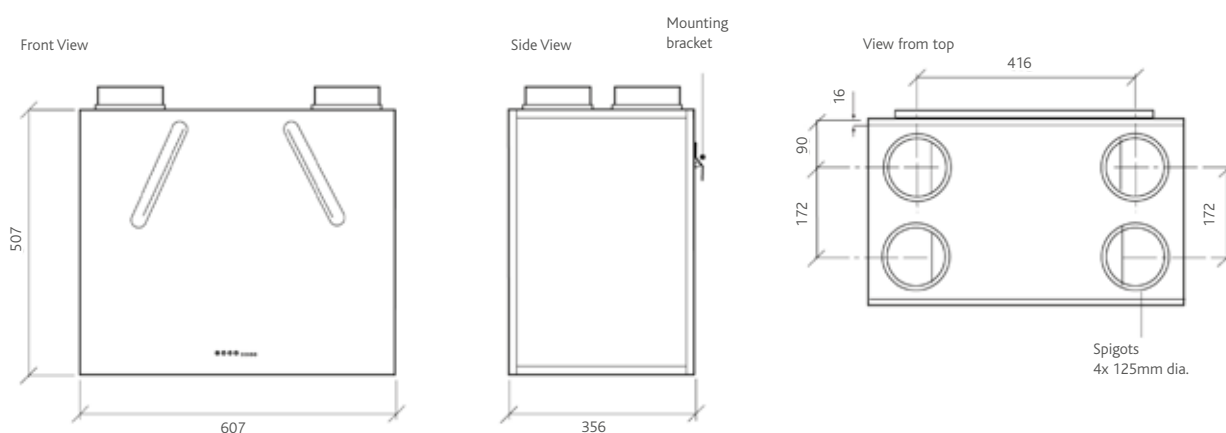
Spigot 1. 125mm dia. = Extract air from dwelling.
Spigot 2. 125mm dia. = Extract air to outside.
Spigot 3. 125mm dia. = Intake air from outside.
Spigot 4. 125mm dia. = Supply air to property



Technical - MRXBOX(AB)-ECO2 ▼

DIMENSIONS (mm)

Weight - 20kg



Electrical Details ▼

Please note: The electrical connection of the unit must be carried out by a qualified electrician.

The unit is supplied with a flexible cord for connection to the mains supply.

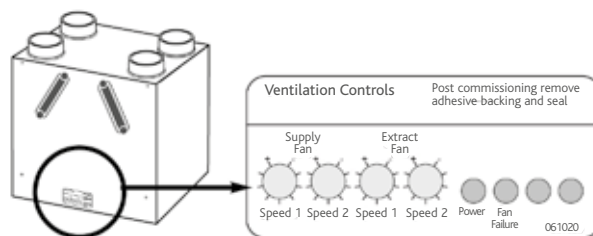
NOTE: This unit must be earthed.

The mains power supply cable should be connected to a fixed wiring installation in accordance with current IEE wiring regulations.

Electrical Details: MRXBOX(AB)-ECO2

Voltage:	230V 1ph 50Hz
Consumption:	1.2 Amp

Detail of unit control on front panel.

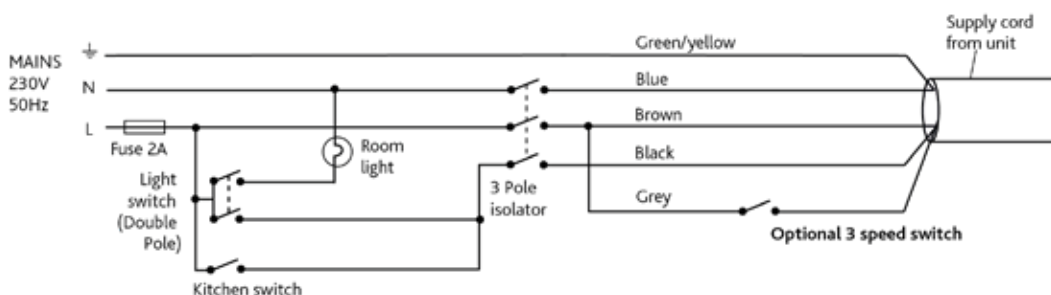


Tamper proof label following commissioning, includes system status indication.

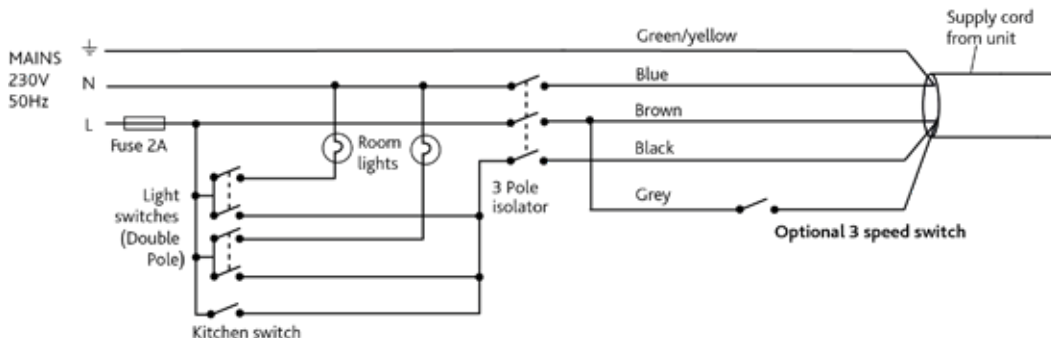
MRXBOXAB-ECO2 & MRXBOX-ECO2

Wiring - MRXBOX(AB)-ECO2 ▼

UNIT SERVING KITCHEN & BATHROOM



UNIT SERVING KITCHEN & TWO BATHROOMS



Optional Sensors and Detectors ▼

Customise MRXBOX(AB)-ECO2 for enhanced performance. All supplied with pre-plugged 10m data cable and incorporates status LED.

MRXBOX95-PIR (Passive Infrared)

A low voltage sensor, detects movement and activates system. Incorporates overrun timer and timer adjustments.

MRXBOX95-HUM (Relative Humidity)

A low voltage sensor, activates the system when the RH level is above set point. Incorporates overrun timer and RH setpoint level adjustment.

MRXBOX95-RFI (Remote Fail Indicator)

If fan failure occurs, the audio visual indicator will flash a warning.



MRXBOX-VSC
CONTROL SCREEN
COMPATIBLE WITH
THIS UNIT

Consultants Specification

SPECIFICATION

The unit shall be fully insulated providing excellent thermal and acoustic characteristics and shall be complete with a multi-plate, counter-flow, high-efficiency heat exchanger block, with a thermal efficiency of up to 95%. The heat exchanger shall be protected by G3 grade filters on fresh air inlet and system extract. The heat exchanger and filters shall be accessible via the front access panel, enabling quick and easy maintenance.

The unit shall have low energy, high-efficiency EC fan/motor assemblies with sealed for life bearings, the impellers shall be backward-curved centrifugal type. The motors shall be suitable for an ambient temperature of 40°C.

The unit shall be supplied complete with an insulated condensate drip tray and 21.5mm drain connection.

The unit shall be suitable for 125mm circular ducting.

Note: The unit is also available in opposite handed format, refer to spigot configuration for set up.

The breakout noise level and power requirements shall be as detailed by the unit manufacturer and in accordance with the ventilation equipment schedule.

Units shall be MRXBOX-ECO2 or MRXBOXAB-ECO2 as manufactured by Nuaire and shall be listed on the SAP PCDB.

MRXBOX-ECO2-OH and MRXBOXAB-ECO2-OH are opposite handed assemblies compliant as per standard handed versions listed in SAP PCDB.

OPERATION

The supply and extract system shall be positioned as indicated on the drawings and shall be in accordance with the particular fan schedule in the specification.

The combined supply and extract with heat recovery unit shall supply filtered fresh air to each of the habitable rooms and moisture-laden air shall be extracted from all wet areas, e.g. bathroom, en suite, w.c, kitchen, utility rooms etc. The supply air shall be pre-heated by the warm extract air via the integrated counter-flow heat exchanger element. The extracted air shall also be filtered before it reaches the heat exchanger block.

The ventilation unit shall vary its speed and therefore the ventilation rate, as it receives signals from one of the following:

- Switched live signal from light/remote switches.

When signals are received, the fan shall alter its speed to adjustable, normal and boost rates.

The unit shall have the facility to commission the supply and extract fans independently on minimum speed (continuous background ventilation) and boost speed via inbuilt minimum and maximum speed adjustment. The fans shall have infinitely variable speed control.

INTEGRAL AUTOMATIC HX BYPASS WITH NO REDUCTION IN AIRFLOW (MRXBOXAB-ECO2 & MRXBOXAB-ECO2-OH)

The bypass damper shall open automatically via a wax actuator, allowing the air to bypass the heat exchanger to deliver fresh filtered air during the warmer months.

The automatic bypass diverts 100% airflow around the heat exchanger with no reduction in airflow as independently tested by the BRE.

INTEGRAL HUMIDITY SENSOR (MRXBOXAB-ECO2 & MRXBOXAB-ECO2-OH)

The integral humidity sensor incorporated within the extract fan chamber will automatically boost both the extract and supply fan, to the commissioned boost speed, when the humidity level exceeds that set by the front panel mounted adjustment potentiometer.

CONTROL OPTIONS

All versions shall have the following functions integrally mounted within the fan unit on a purpose made PCB, all such components are pre-wired and factory fitted by the manufacturer:

- Independent control of background supply and extract flow rates.
- Independent control of boost speed supply and extract flow rates.
- Integral heat exchanger frost protection.
- Fan failure indication.
- Integral S/L terminal for boost from remote switch, e.g. light switch.
- Additional S/L terminal for 100% boost speed from remote switch, e.g. plate switch.
- Discreet daily run monitor.
- Remote fail indicator (part number MRXBOX95-RFI).
- Indication and controls – The unit shall have clear LED visual indication for maintenance, servicing and operation mode, i.e. HX bypass, frost protection.

MRXBOX-VSC (VISUAL SYSTEM CONTROLLER)

The MRXBOX-VSC is compatible with the Nuaire MRXBOXAB-ECO2 heat recovery units and can be purchased separately. The controller comes complete with commissioning and end user functions.

The display will be a 3.5" LCD display and will remain on standby until such time the screen is touched.

The initial display will show the MVHR system status as listed below:

- Current fan speed.
- Current indoor/outside temperature.
- Indicate when the Summer bypass is activated.
- Indicate when frost protection is activated.
- Indicate when the filters require cleaning/changing.

The unit shall come with a 5 year warranty which starts from the day of delivery, and includes parts and labour for the first year and parts only for the remaining 4 years.