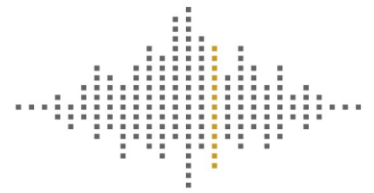


SHARPS REDMORE

ACOUSTIC CONSULTANTS ▪ Established 1990



Report

Discharge of Conditions
Blue Bell Inn, Desford
Noise Assessment Update

Prepared by
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Date 28th January 2025
Project No 2321871

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Contents

- 1.0 Introduction
- 2.0 Assessment Criteria
- 3.0 Noise Survey Details and Criteria
- 4.0 Summary and Conclusions

Appendices

- A. Acoustic Terminology
- B. Plant data sheet

This report has been prepared with all reasonable skill, care and diligence commensurate with an acoustic consultancy practice under the terms and brief agreed with our client at that time. Sharps Redmore provides no duty or responsibility whatsoever to any third party who relies upon its content, recommendations or conclusions.

1.0 Introduction

1.1 Sharps Redmore has been instructed to undertake a noise assessment in order to comply with, and enable discharge of, a planning conditions as part of a change of use application for The Blue Bell Inn, High Street, Desford, to a food store. The scheme was considered by Hinckley and Bosworth BC in May 2024 (Ref: 23/00711).

1.2 A mechanical plant condition is shown in italics below:

17. Development shall not begin until a scheme for protecting nearby dwellings from noise from the proposed mechanical plant has been submitted to and approved by the Local Planning Authority. All works which form part of the scheme shall be completed before the permitted development first comes into use.

Reason: To ensure that the development does not cause unacceptable levels of noise and disturbance to neighbouring dwellings in accordance with Policy DM10 of the Site Allocations and Development Management Policies Development Plan Document (2016).

1.3 The purpose of this report is to assess the impact of noise from environmental noise. In particular in terms of new plant that may be associated with the change of use.

1.4 The report is structured as follows:

- Section 2.0 – Assessment criteria;
- Section 3.0 – Noise Survey Details;
- Section 4.0 – Noise Assessment;
- Section 5.0 - Summary and Conclusions

1.5 A guide to the acoustic terminology used within this report included in Appendix B.

2.0 Assessment Criteria

- 2.1 Objective guidance on the assessment of noise from plant and machinery can be found in BS 4142:2014 +A1:2019 which describes a method for rating and assessing sound of an industrial and/or commercial nature according to the following summary process:
- i) Determine the background sound levels, in terms of L_{A90} , at the receptor locations of interest.
 - ii) Determine the specific sound level of the source being assessed, in terms of L_{AeqT} level ($T = 1$ hour for day or 15 minutes at night), at the receptor locations.
 - iii) Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent or other characteristic which attract attention.
 - iv) Compare the rating sound level against the background noise level; the greater the difference between the two, the higher the likelihood of complaints of the noise.
 - v) Differences (rating – background) of around +10 dB is likely to be an indication of significant adverse impact (SOAEL) depending on context; a difference of +5 dB is likely to be an indication of adverse impact, depending on context. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon context.
- 2.2 The general intent of the planning system is to ensure that a development does not result in 'significant adverse impacts on health and quality of life' (NPPF 2024 para 198). BS 4142:2014 +A1:2019 considers that the threshold of 'significant adverse impact' is likely to be around 10 dB or more... depending on upon the context.
- 2.3 BS 4142:2014 comments further with reference to low levels in section 11 in the assessment of impacts and context. It maintains that where background and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true for night time or where daytime levels are also low.
- 2.4 As can be seen above the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound exceeds the background sound level and the context in which it is placed.
- 2.5 In determining background levels the Standard, in Clause 8, maintains that the objective is not simply to ascertain the lowest measured background level but rather to quantify what is typical during particular time periods.

3.0 Noise Survey Details and Criteria.

- 3.1 To establish existing noise levels a survey was carried out over approximately a 24-hour period over the 16th and 17th May 2023 to obtain measurements of the existing noise climate. Measurements were taken at a location that was chosen to represent the residential properties to the north of the site. These being the nearest noise sensitive premises to the plant and delivery area. Full details were provided in the original report submitted with the application and a relevant summary is shown below for convenience and information in table 1.

Table 1 Survey summary.

Day	Daytime (0700 – 1900 hrs)		Evening (1900 - 2300 hrs)		Night Time (2300 – 0700 hrs)	
	L _{Aeq}	L _{A90} *	L _{Aeq}	L _{A90} *	L _{Aeq}	L _{A90} *
16-17 th May	50 dB	44 dB	44 dB	35 dB	44 dB	34 dB

*Representative typical background level for relevant time period.

- 3.2 For information, the data is summarised showing L_{Aeq} and L_{A90} parameters measured in 15-minute samples over the survey period. The existing noise climate is dominated by road traffic noise and vehicular use of the car park including pub deliveries.

Plant noise

- 3.3 Based on the location of the proposed plant, the nearest residential properties windows will be screened by the pitched roof at approximately 20m from the outdoor units sited on the flat roof area. Grazing incidence, where the receiver can just see the source over the top of the barrier, generally provides in the region of 5dB. If the source is not visible then in the region of 10dB attenuation can be provided. All plant is sited on the flat roof and would not be visible.
- 3.4 The proposal is to install: 3 x Mitsubishi PUZ M200YKA2 air con units for the shop and warehouse, 3 x Bitzer LHL3E Chiller units, and 1 x Bitzer LHL5E Freezer unit with manufacturer's noise data below in table 2 showing worst case mode SPL at 10m. Data sheets are shown at Appendix C along with the roof layout plan.
- 3.5 It is understood that the air con units serving the shop and warehouse will operated during daytime shop opening hours only. Consequently, no night time assessment is shown for theses units.
- 3.6 The following indicative noise levels are predicted at the nearest residential windows at 20m.

Table 2: Predicted noise levels at rear residential property

	Predicted noise level	
	Day (0700-2300)	Night (2300-0700)
Mitsubishi PUZ M200YKA2 (SPL 60dB @1m =40dB @10m x3)	45 dBA at 10m	N/A
Bitzer LHL5E: SPL= 38dB@10m	38 dBA at 10m	38 dBA at 10m
Bitzer LHL3E: SPL= 35@10m (x3)	40 dBA at 10m	40 dBA at 10m
Total SPL	47 dBA at 10m	42 dBA at 10m
Distance correction 10m to 20m (20logD1/D2)	-6	-6
Acoustic feature correction (intermittency)	+3	+3
Roof Screening	-10	-10
Resultant	34 dBA	29 dBA
Typical Background (Table 1 above) L_{A90}	44 dBA	34 dBA
Difference	-10	-5

- 3.7 The advice within BS 4142:2014 +A1:2019 is considered, specifically at Clause 11 of the BS ('Assessment of the impacts'), sub-paragraph '1', *"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night"*.
- 3.8 The BS 4142 numerical assessment method rates the significance of the impact by comparing the rating level with the background level. A difference (rating minus background) of around +10 dB is likely to be an indication of a significant adverse impact; around +5 dB is likely to be an indication of an adverse impact, and around +0 dB and lower, an indication of a low impact, all depending on the context.
- 3.9 It is predicted that the proposed outdoor units will operate below adopted background criteria for both day and night time. Absolute levels are also low (i.e. <35 dB) further to the advice discussed in paragraph 4.4 above, indicating a low impact.
- 3.10 To minimise any potential structure borne noise, it is recommended that the units and pipework are isolated from the building with anti-vibration mounts / resilient pipe mounts, and flexible couplings fitted between the unit and pipework.
- 3.11 It is considered that no further attenuation measures are required in order to operate below existing background levels, given the distance involved, siting, available screening, quiet plant selection, and existing noise climate.
- 3.12 SR is therefore of the opinion that there should be no adverse impact when the new plant is introduced. This will enable plant to operate during both day and night without adverse impact in compliance with national guidance and local aims. This is based on typical background levels measured for the relevant time period further to guidance within BS4142:2014 +A1:2019, and will enable Condition 17 to be met.

4.0 Summary and Conclusions

- 4.1 Sharps Redmore has undertaken an updated noise assessment at Blue Bell Inn, Desford in order to comply with the relevant noise condition associated with the application.
- 4.2 The impact of plant noise and deliveries has been assessed in accordance with BS 4142:2014+A1: 2019 based on plant data provided for the proposed external roof plant.
- 4.3 The proposed plant and flat roof siting will not exceed typical background levels complying with Condition 17.
- 4.4 External air conditioning units serving the shop floor and warehouse will operate during daytime only.
- 4.5 This assessment concludes that noise from the proposal sources would not cause adverse impact to residents if the criteria are complied with.

APPENDIX A

ACOUSTIC TERMINOLOGY

Appendix A: Guide to Acoustic Terminology

Ambient noise:

The totally encompassing sound in a given situation at a given time. Most often described in terms of the index L_{AeqT} .

Atmospheric absorption:

The excess acoustic attenuation, over and above that caused by distance attenuation, due to the interaction of an acoustic wave with air molecules.

A-weighting:

A frequency weighting which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Units may be denoted as dB(A) or as sound pressure levels L_{pA} in dB. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound.

Background noise:

See L_{A90} .

Decibel (dB):

A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 μ Pa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

Façade noise level:

The noise level adjacent to the façade of a building, usually at a distance of 1 metre.

Free-field noise level:

The noise level away from the façade of a building or other structure.

Hertz (Hz):

Unit of frequency, equal to one cycle per second. Frequency is related to the pitch of a sound.

L_{A10T} : The A weighted level of noise exceeded for 10% of the specified measurement period, T. It gives an indication of the upper limit of fluctuating noise such as that from road traffic. $L_{A10,18hr}$ is the arithmetic average of the 18 hourly $L_{A10,1hr}$ values from 0600 hrs to 2400 hrs.

L_{A90T} : The A weighted noise level exceeded for 90% of the specified time period, T. In BS 4142: 2014 it is used to define background noise level.

- L_{AeqT} : The equivalent continuous sound level - the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period, T . This period is taken to be 16 hours (0700 hrs to 2300 hrs) and 8 hours (2300 to 0700 hrs) to describe day and night, L_{Aeqt} is used to describe many types of noise and can be measured directly with an integrating sound level meter.
- SEL or L_{AE} : The sound exposure level is the A-weighted sound energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparisons to be made between different noise events which occur for different lengths of time.

APPENDIX B

DATA SHEETS AND ROOF LAYOUT

PUZ-M200/250YKA R32

High Capacity Outdoor Units

Standard Inverter Heat Pump

Mr. SLIM™

Our high capacity Standard Inverter outdoor units provide excellent system flexibility at a value price point.

Connectability to 2, 3 or 4 Mr Slim indoor units allows for great coverage in large open areas, such as retail units, gyms and halls.

R32

Key Features & Benefits:

- Connectable to up to 4 cassette, wall mount, ducted or ceiling suspended units
- Generous coverage with up to 70m pipe runs
- Maximum design flexibility due to 30m height difference between outdoor unit & indoor units
- Utilises lower GWP R32 refrigerant



PCA-M R32 Power Inverter Heat Pump

Ceiling Suspended System

Product Specifications



Mr.SLM.

R32

POWER INVERTER

PCA-M - INDOOR UNITS		PCA-M50KA	PCA-M60KA	PCA-M71KA	PCA-M100KA	PCA-M100KA	PCA-M125KA	PCA-M125KA	PCA-M140KA	PCA-M140KA
CAPACITY (kW)	Heating (nominal)	5.5 (2.5-6.6)	7.0 (2.8-8.2)	8.0 (3.5-10.2)	11.2 (4.5-14.0)	11.2 (4.5-14.0)	14.0 (5.0-16.0)	14.0 (5.0-16.0)	16.0 (5.7-18.0)	16.0 (5.7-18.0)
	Cooling (nominal)	5.0 (2.3-5.6)	6.1 (2.7-6.7)	7.1 (3.3-8.1)	9.5 (4.9-11.4)	9.5 (4.9-11.4)	12.5 (5.5-14.0)	12.5 (5.5-14.0)	13.4 (6.2-15.0)	13.4 (6.2-15.0)
	Heating (UK)	4.7 (2.15-5.6)	5.95 (2.4-6.95)	6.8 (3.0-8.65)	9.5 (3.85-11.9)	9.5 (3.85-11.9)	11.9 (4.25-13.6)	11.9 (4.25-13.6)	13.6 (4.85-15.3)	13.6 (4.85-15.3)
	Cooling (UK)	4.6 (2.1-5.15)	5.5 (2.5-6.15)	6.55 (3.05-7.45)	9.2 (4.5-10.5)	9.2 (4.5-10.5)	11.5 (5.05-12.9)	11.5 (5.05-12.9)	12.9 (5.7-13.8)	12.9 (5.7-13.8)
SHF (nominal)		0.79	0.81	0.76	0.77	0.77	0.72	0.72	0.72	0.72
COP / EER (nominal)		4.04 / 4.00	4.01 / 4.01	3.71 / 3.88	3.71 / 4.10	3.71 / 4.10	3.54 / 3.25	3.54 / 3.25	3.61 / 3.40	3.61 / 3.40
SCOP / SEER (BS EN14825)		4.2 / 6.7	4.1 / 6.5	4.2 / 6.7	4.3 / 6.4	4.3 / 6.3	4.3 / 6.2	4.3 / 6.1	4.4 / 6.2	4.4 / 6.1
ERP ENERGY EFFICIENCY CLASS	Heating/Cooling	A+ / A++	A+ / A++	A+ / A++	A+ / A++	A+ / A++	A+ / A++	A+ / A++	A+ / A++	A+ / A++
AIRFLOW (l/s)	Lo-Mi1-Mi2-Hi	167-183-217-250	250-267-283-317	267-283-300-333	367-400-433-467	367-400-433-467	383-417-450-483	383-417-450-483	400-433-483-533	400-433-483-533
PIPE SIZE MM (in)	Gas/Liquid	12.7 (1/2") / 6.35 (1/4")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")
SOUND PRESSURE LEVEL (dBA)	Lo-Mi1-Mi2-Hi	32-34-37-40	33-35-37-40	35-37-39-41	37-39-41-43	37-39-41-43	39-41-43-45	39-41-43-45	41-43-45-48	41-43-45-48
SOUND POWER LEVEL (dBA)		60	60	62	63	63	65	65	68	68
DIMENSIONS (mm)	Width x Depth x Height	960 x 680 x 230	1280 x 680 x 230	1280 x 680 x 230	1600 x 680 x 230	1600 x 680 x 230	1600 x 680 x 230	1600 x 680 x 230	1600 x 680 x 230	1600 x 680 x 230
WEIGHT (kg)		26	32	32	37	37	38	38	40	40
ELECTRICAL SUPPLY		Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit	Fed by Outdoor Unit
FUSE RATING (BS88) - HRC (A)		6	6	6	6	6	6	6	6	6
INTERCONNECTING CABLE	No. Cores	4	4	4	4	4	4	4	4	4
WIRED REMOTE CONTROLLER REFERENCE		PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA	PAR-33MAA
WIRELESS REMOTE CONTROLLER REFERENCE		PAR-SL94B	PAR-SL94B	PAR-SL94B	PAR-SL94B	PAR-SL94B	PAR-SL94B	PAR-SL94B	PAR-SL94B	PAR-SL94B

PUZ-ZM - OUTDOOR UNITS		PUZ-ZM50VKA	PUZ-ZM60VHA	PUZ-ZM71VHA	PUZ-ZM100VKA	PUZ-ZM100YKA ^③	PUZ-ZM125VKA	PUZ-ZM125YKA ^③	PUZ-ZM140VKA	PUZ-ZM140YKA ^③
SOUND PRESSURE LEVEL (dBA)	Heating/Cooling	46 / 44	49 / 47	49 / 47	51 / 49	51 / 49	52 / 50	52 / 50	52 / 50	52 / 50
SOUND POWER LEVEL (dBA)	Cooling	65	67	67	69	69	70	70	70	70
WEIGHT (kg)		46	70	70	116	123	116	125	118	131
DIMENSIONS (mm)	Width x Depth x Height	809 x 300 x 630	950 x 330 x 25 x 943	950 x 330 x 25 x 943	1050 x 330 x 40 x 1338	1050 x 330 x 40 x 1338	1050 x 330 x 40 x 1338	1050 x 330 x 40 x 1338	1050 x 330 x 40 x 1338	1050 x 330 x 40 x 1338
ELECTRICAL SUPPLY		220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	380-415v,50Hz	220-240v, 50Hz	380-415v,50Hz	220-240v, 50Hz	380-415v,50Hz
PHASE		Single	Single	Single	Single	Three	Single	Three	Single	Three
SYSTEM POWER INPUT (kW)	Heating/Cooling (nominal)	1.361 / 1.25	1.745 / 1.521	2.156 / 1.829	3.018 / 2.317	3.018 / 2.317	3.954 / 3.846	3.954 / 3.846	4.432 / 3.941	4.432 / 3.941
	Heating/Cooling (UK)	1.21 / 1.06	1.55 / 1.29	1.92 / 1.55	2.41 / 1.99	2.41 / 1.99	3.51 / 3.26	3.51 / 3.26	3.94 / 3.35	3.94 / 3.35
STARTING CURRENT (A)		5.0	6.0	6.0	13.0	6.0	13.0	6.0	13.0	6.0
SYSTEM RUNNING CURRENT (A)	Heating/Cooling [MAX]	5.95 / 5.37 [13.4]	7.43 / 6.48 [19.4]	9.23 / 7.81 [19.4]	12.97 / 9.97 [27.2]	4.34 / 3.31 [8.7]	16.87 / 16.46 [27.3]	5.69 / 5.54 [10.3]	18.76 / 16.66 [28.9]	6.42 / 5.71 [13.9]
FUSE RATING (BS88) - HRC (A)		16	25	25	32	16	32	16	40	16
MAINS CABLE NO. CORES		3	3	3	3	5	3	5	3	5
MAX PIPE LENGTH (m)		50	55	55	100	100	100	100	100	100
MAX HEIGHT DIFFERENCE (m)		30	30	30	30	30	30	30	30	30
CHARGE REFRIGERANT (kg) / CO ₂ EQUIVALENT (t)	R32 (GWP 675) - 30m	2.00 / 1.35	2.80 / 1.89	2.80 / 1.89	4.00 / 2.70	4.00 / 2.70	4.00 / 2.70	4.00 / 2.70	4.00 / 2.70	4.00 / 2.70
MAX ADDITIONAL REFRIGERANT (kg) / R32 (GWP 675) CO ₂ EQUIVALENT (t)		0.30 / 0.20	0.80 / 0.54	0.80 / 0.54	2.80 / 1.89	2.80 / 1.89	2.80 / 1.89	2.80 / 1.89	2.80 / 1.89	2.80 / 1.89

^③ Three Phase

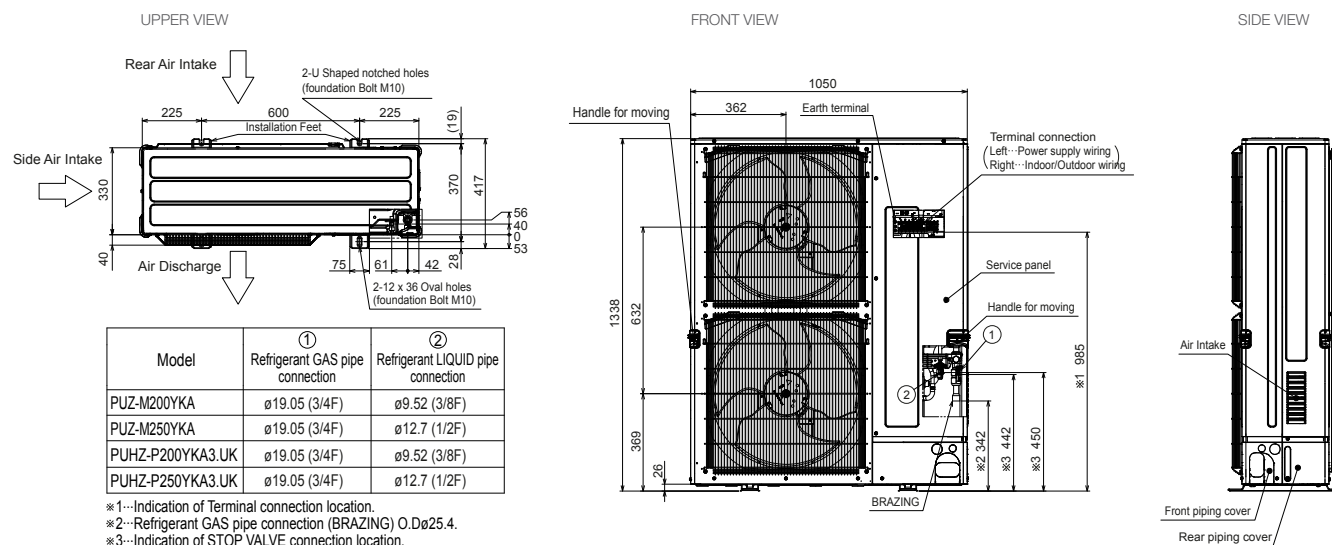
Product Dimensions PCA-M50KA			Product Dimensions PCA-M60/71KA			Product Dimensions PCA-M100/125/140KA		
Front View	Upper View	Side View	Front View	Upper View	Side View	Front View	Upper View	Side View



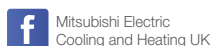
PUZ-M200/250YKA OUTDOOR UNITS		PUZ-M200YKA	PUZ-M250YKA
Capacity (kW)	Heating (nominal)	22.4	27.0
	Cooling (nominal)	19.0	22.0
SCOP (nsh) / SEER (nsc) (BS EN14825)*1		4.20 (165%) / 7.01 (277.3%)	4.18 (164.3%) / 7.04 (278.6%)
SOUND PRESSURE LEVEL (dBA)	Heating/Cooling	60 / 58	62 / 59
WEIGHT (kg)		129	138
DIMENSIONS (mm)	Width x Depth x Height	1050 x 330+40 x 1338	1050 x 330+40 x 1338
PIPE SIZE mm (in)	Gas	28.58 (1 1/8")	28.58 (1 1/8")
	Liquid	9.52 (3/8")	12.7 (1/2")
ELECTRICAL SUPPLY		380-415v, 50Hz	380-415v, 50Hz
PHASE		Three	Three
SYSTEM POWER INPUT (kW)	Heating/Cooling (nominal)	5.93 / 5.21	7.78 / 6.84
	Heating/Cooling (UK)	5.34 / 4.32	7.00 / 5.67
STARTING CURRENT (A)		5	5
SYSTEM RUNNING CURRENT (A)	Heating/Cooling [MAX]	10.08 / 9.62 [22.5]	12.18 / 11.22 [22.5]
FUSE RATING (BS88) - HRC (A)		25	25
MAINS CABLE No. CORES		5	5
MAX PIPE LENGTH (m)		70	70
MAX HEIGHT DIFFERENCE (m)		30	30
CHARGE REFRIGERANT (kg) / CO ₂ EQUIVALENT (t)	R32 (GWP 675) - 30m	5.6 / 3.78	6.8 / 4.59
MAX ADDITIONAL REFRIGERANT (kg) / CO ₂ EQUIVALENT (t)	R32 (GWP 675)	1.6 / 1.08	2.4 / 1.62

*1 PUZ-M200YKA connected to 2 x PLA-M100EA, PUZ-M250YKA connected to 2 x PLA-M125EA

PUZ-M200/250YKA DIMENSIONS



Telephone: 01707 282880
email: air.conditioning@meuk.mee.com
les.mitsubishielectric.co.uk



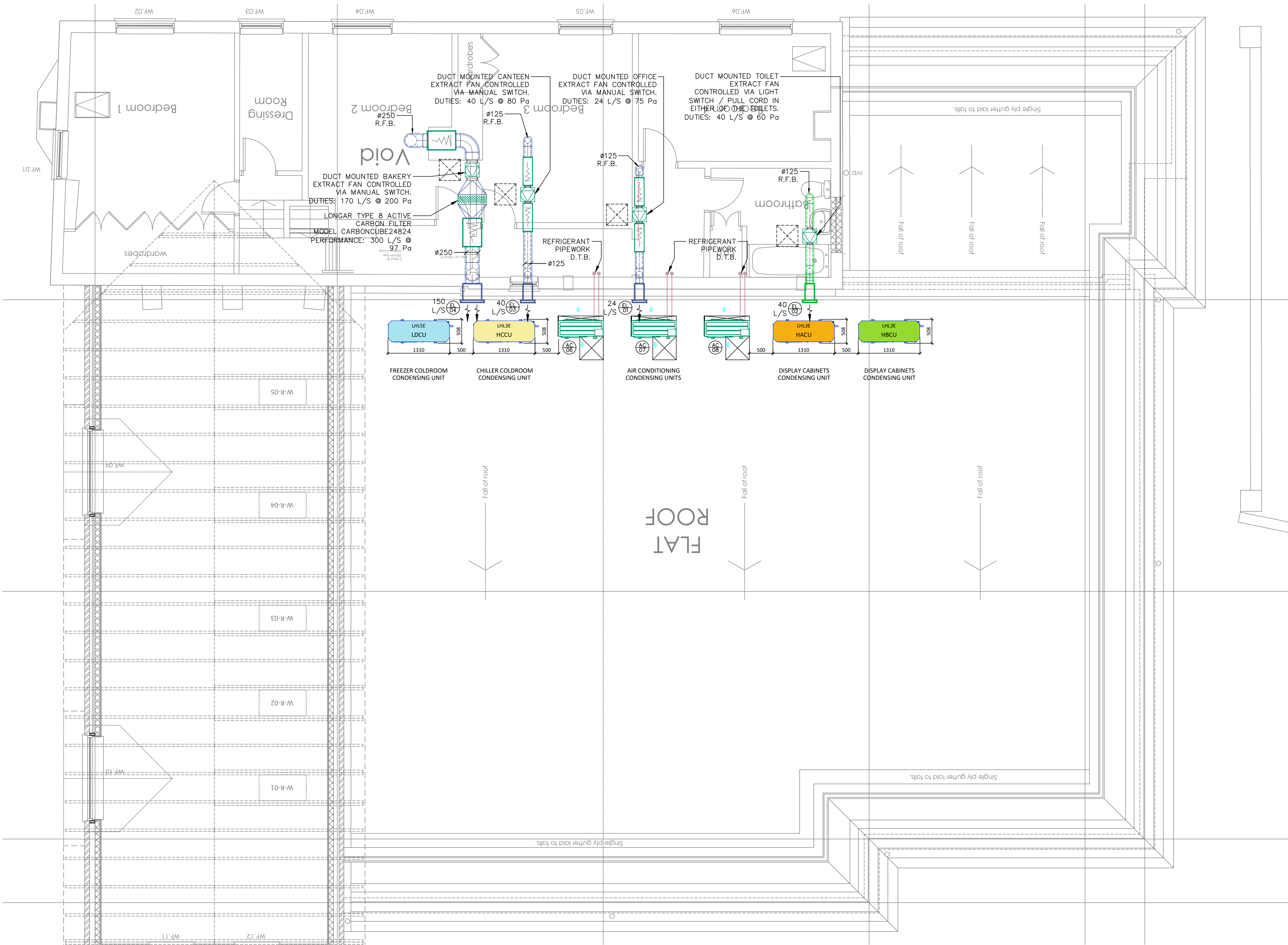
UNITED KINGDOM Mitsubishi Electric Europe Living Environment Systems Division, Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, England. Telephone: 01707 282880 Fax: 01707 278881
IRELAND Mitsubishi Electric Europe, Westgate Business Park, Ballymount, Dublin 24, Ireland. Telephone: (01) 419 8800 Fax: (01) 419 8890 International code: (003531)

Country of origin: United Kingdom - Japan - Thailand - Malaysia. ©Mitsubishi Electric Europe 2020. Mitsubishi and Mitsubishi Electric are trademarks of Mitsubishi Electric Europe B.V. The company reserves the right to make any variation in technical specification to the equipment described, or to withdraw or replace products without prior notification or public announcement. Mitsubishi Electric is constantly developing and improving its products. All descriptions, illustrations, drawings and specifications in this publication present only general particulars and shall not form part of any contract. All goods are supplied subject to the Company's General Conditions of Sale, a copy of which is available on request. Third-party product and brand names may be trademarks or registered trademarks of their respective owners.

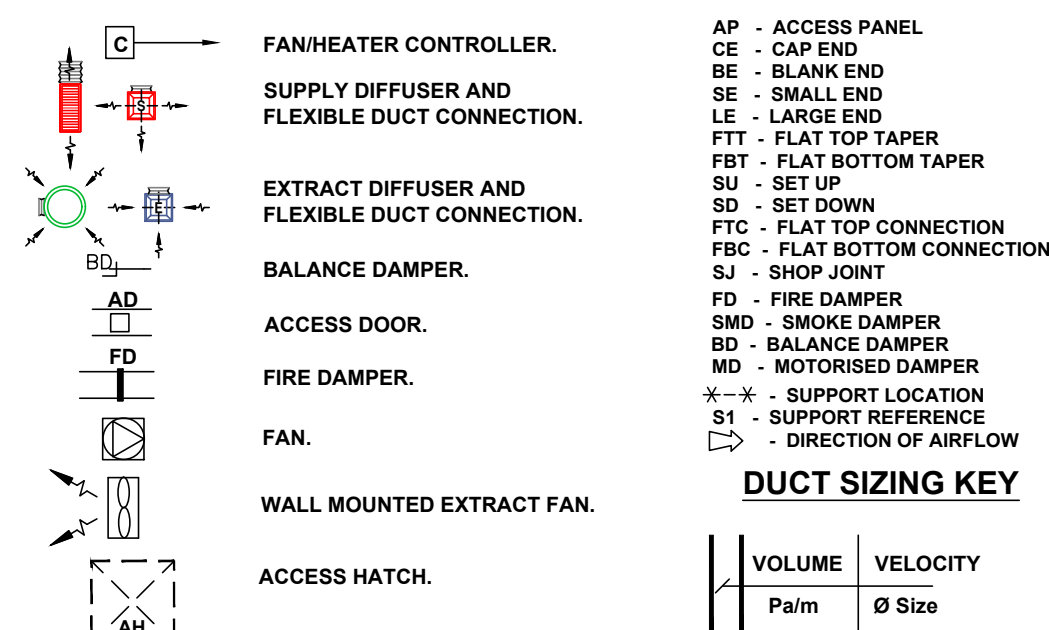
Note: The fuse rating is for guidance only. Please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R1234ze (GWP:7) or R1234yf (GWP:4). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).

Effective as of May 2020





VENTILATION LEGEND



NOTES

- DO NOT SCALE FROM THIS DRAWING.
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
- THIS LAYOUT SHALL BE READ IN CONJUNCTION WITH ALL OTHER LAYOUTS, MECHANICAL, ELECTRICAL, ARCHITECTURAL & STRUCTURAL.
 - THIS LAYOUT SHALL BE READ IN CONJUNCTION WITH THE MECHANICAL SPECIFICATION.
 - THIS LAYOUT SHOWS AN INTENT/PROPOSAL; THE CONTRACTOR'S OBLIGATION AND DESIGN RESPONSIBILITY ARE DEFINED IN THE SPECIFICATION.
 - ALLOW TO OFFSET DUCTWORK WHEREVER DUCTWORK PASSES THROUGH WALLS, CEILINGS OR FLOORS TO ALLOW FOR POSSIBLE STRUCTURAL OBSTRUCTIONS.
 - FIRE DAMPERS TO BE PROVIDED WHEREVER DUCTWORK PASSES THROUGH FIRE BARRIERS.
 - ALL FIRE DAMPERS TO BE PROVIDED WITH ACCESS DOORS. ACCESS DOORS TO BE SITED IN DUCTWORK IN ACCESSIBLE LOCATIONS. ACCESS TO FIRE DAMPERS IN DUCTWORK 1500 AND LESS TO BE VIA REMOVABLE SECTIONS OF DUCTWORK.
 - BALANCE DAMPERS TO BE PROVIDED AT ALL BRANCH CONNECTIONS.
 - DUCTWORK TYPE MATERIALS, CONSTRUCTION, INSTALLATION ALL TO COMPLY WITH DW144 & ALL CURRENT AMENDMENTS.
 - ALL SUPPLY DUCTWORK TO BE THERMALLY INSULATED.
 - ALL EXTRACT DUCTWORK (WHERE SERVICE IS USED FOR HEAT RECOVERY) TO BE THERMALLY INSULATED.
 - CONTRACTOR TO INCLUDE FOR ALL STEELWORK & BRACKETS TO SUPPORT PLANT & DUCTWORK.
 - ALL DUCTWORK, DIFFUSERS, GRILLES & LOUVRES ETC TO BE COORDINATED WITH OTHER SERVICES, STRUCTURAL & ARCHITECTURAL LAYOUTS.
 - ALL DUCTWORK TO BE PROVIDED WITH IDENTIFICATION TO COMPLY WITH BS & CURRENT AMENDMENTS.
 - ALL DUCT SIZES, FLOW RATES, VELOCITIES AND PERFORMANCE CRITERIA BASED ON CIRCULAR. THE CONTRACTOR MAY RECONFIGURE THE DUCTS TO SUIT SITE CONDITIONS - HOWEVER THE CHANGES SHALL NOT ALTER THE PERFORMANCE CRITERIA.

REFRIGERATION FIXTURE IDENTIFICATION

- HACU CONDENSING UNIT
- HBCU CONDENSING UNIT
- HCCU CONDENSING UNIT
- LDCU CONDENSING UNIT

P5	06-01-25	REFRIGERATION PLANT ADDED.	MM
P4	03-01-25	AC SELECTION ADDED	JK
P3	23-12-24	AC VRF CHANGED TO SPLIT	JK
P2	20-12-24	AC EXTERNAL UNIT MOVED, LAYOUT UPDATED	JK
P1	15-09-23	PRELIMINARY ISSUE	JK

Rev Date Description Drawn By
Client

central coop

Project
DESFORD
HIGH STREET, LE9 9JF

Drawing Title
FIRST FLOOR MECHANICAL SERVICES
AC & VENTILATION LAYOUT

CARTER
SYNERGY

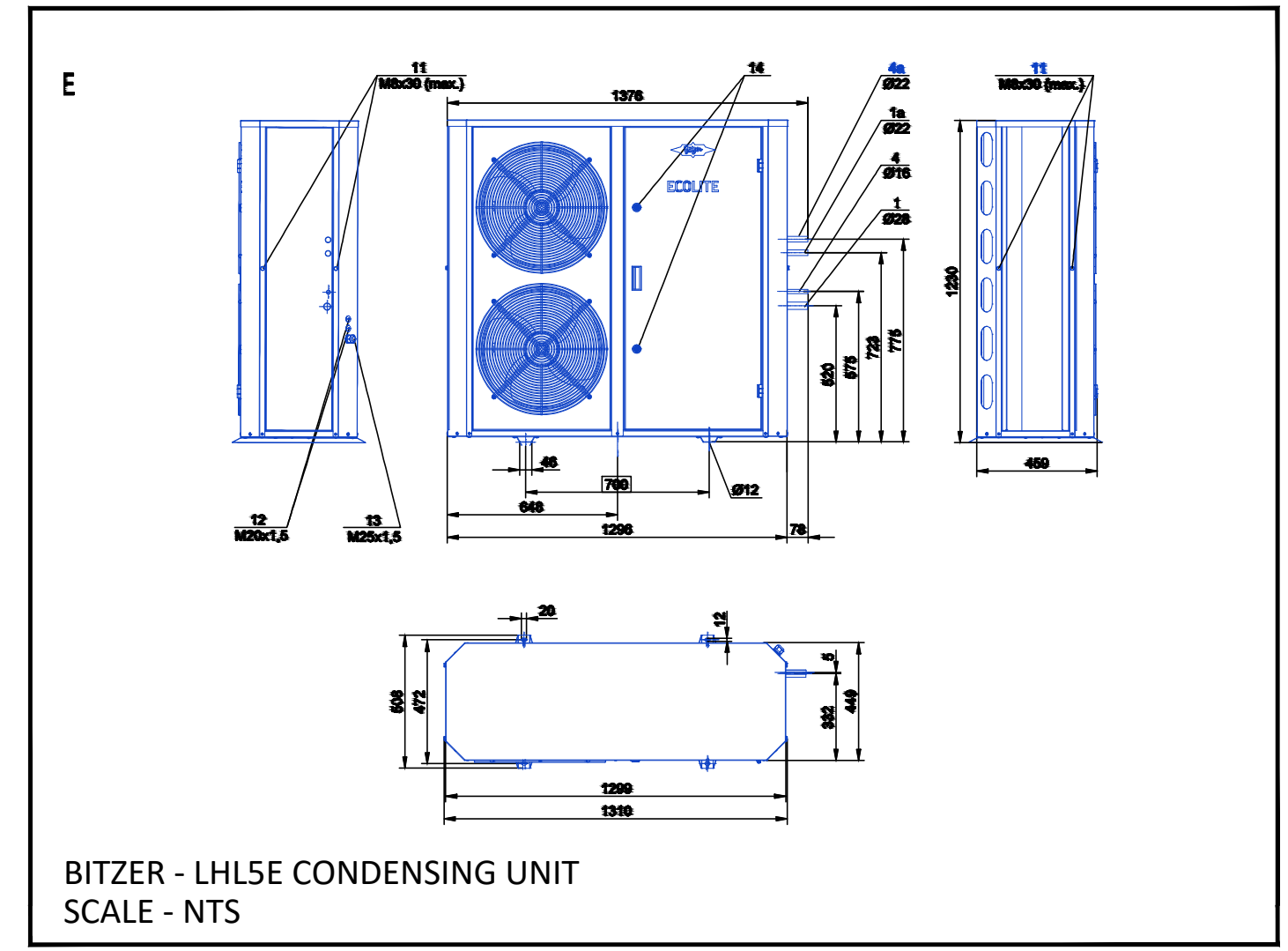
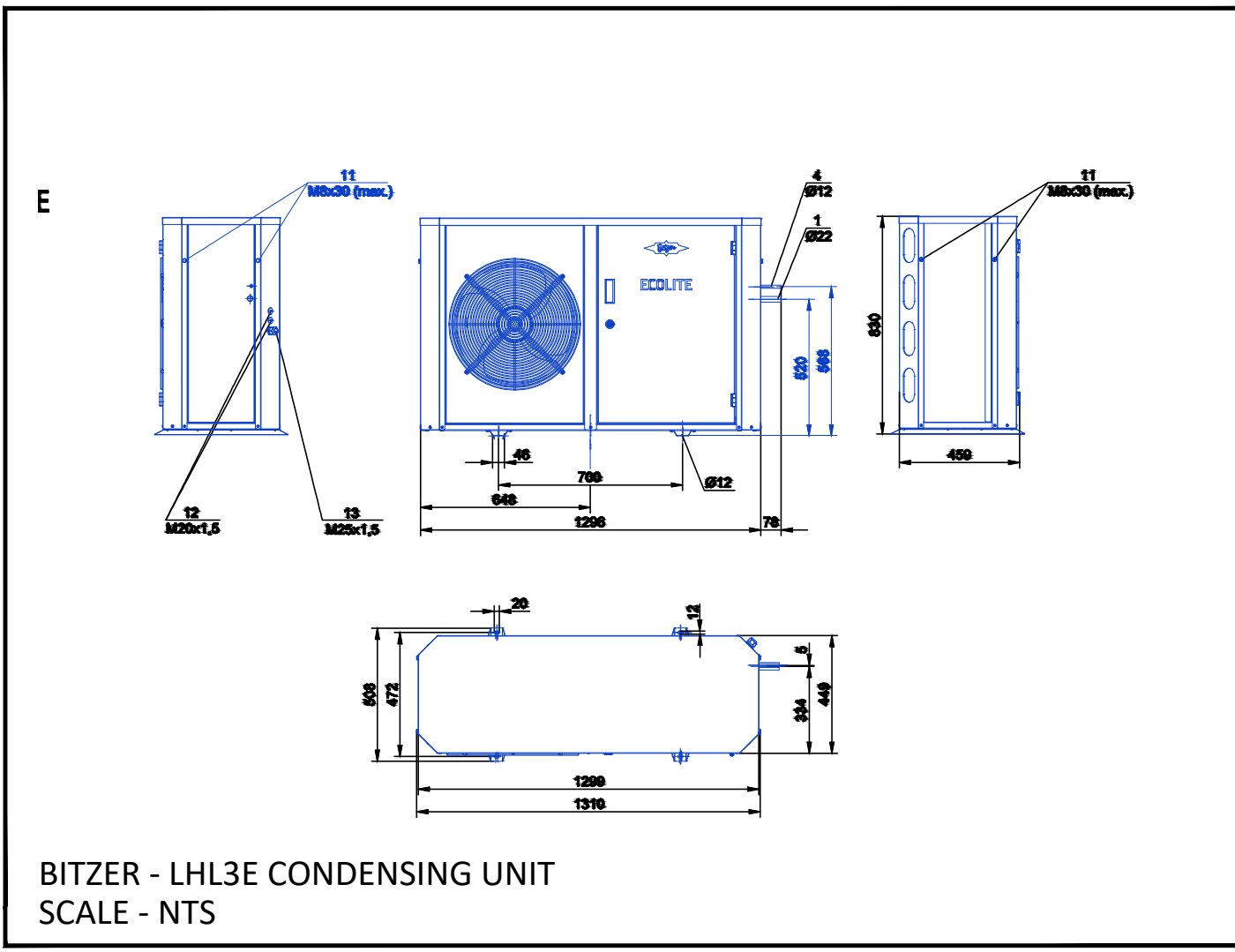
0121 250 1000
sales@cartersynergy.com
www.cartersynergy.com
90 Lea Ford Road, Birmingham, B33 9TX

Drawing Status			
PRELIMINARY			
Scale	Date	Drawn By	Checked
1:50 @ A1	SEP 2023	JK	DB
Project No.	Drawing No.	Revision	
9824	M02	P5	

Heating & Ventilation Layout,
First Floor,
Scale 1:50

CE COOP Desford – EXHAUST LOUVRE SCHEDULE					
Ref No	Manufacturer	Type / Model	Size	Flow Rate [l/s]	SPL [dB]
EL01	WATERLOO AIR PRODUCTS	YGA-EF-IS	200x200	24	5
EL02	WATERLOO AIR PRODUCTS	YGA-EF-IS	200x200	40	7
EL03	WATERLOO AIR PRODUCTS	YGA-EF-IS	200x200	40	7
EL04	WATERLOO AIR PRODUCTS	YGA-EF-IS	500x400	150	35

CE COOP Desford – AIR CONDITIONING UNITS SCHEDULE						
Ref No	Location	Manufacturer	Model	Description	Cooling Capacity [kW]	Heating Capacity [kW]
AC06	ROOF PLANT AREA	mitsubishi electric	PUZ-M200YKA2	twin-split	4.32(input)	5.34(input)
AC07	ROOF PLANT AREA	mitsubishi electric	PUZ-M200YKA2	twin-split	4.32(input)	5.34(input)
AC08	ROOF PLANT AREA	mitsubishi electric	PUZ-M100VKA2	split	1.99(input)	2.41(input)





Project survey

Selected compressors

Condensing Units

1x LHL3E/2CES-3Y



Project survey

Selected compressors

Condensing Units

1x LHL5E/4EES-4Y



Simon
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CO-OP Desford - LDCU

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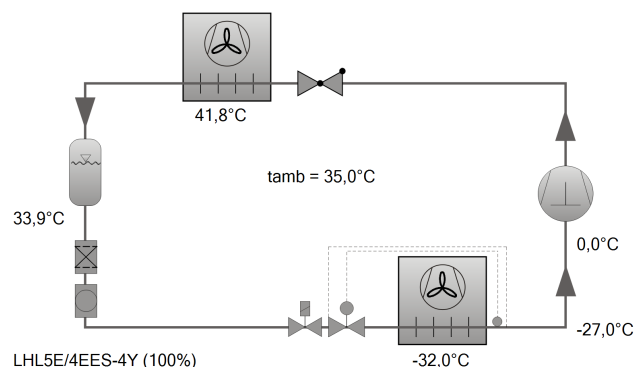
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2 / 5

Selection: Condensing Units

Input Values

Unit type	LHL5E/4EES-4Y
Series	ECOLITE
Refrigerant	R454C
Reference temperature	Dew point temp.
Evaporating SST	-32,00 °C
Ambient temp.	35,0 °C
Suct. gas superheat	32,0 K
Useful superheat	5,00 K
Operating mode	Auto
Power supply	400V-3-50Hz
Capacity control	100%



Result

Unit type	LHL5E/4EES-4Y-40S
Capacity steps	100%
Cooling capacity	2,87 kW
Evaporator capacity	2,43 kW
Heating Capacity (HR)	5,22 kW
Power input	2,35 kW
Current (400V)	4,56 A
Voltage range	380-420V
Mass flow	70,6 kg/h
Condensing SDT	41,8 °C
Liquid subcooling	1,00 K
Operating mode	Standard



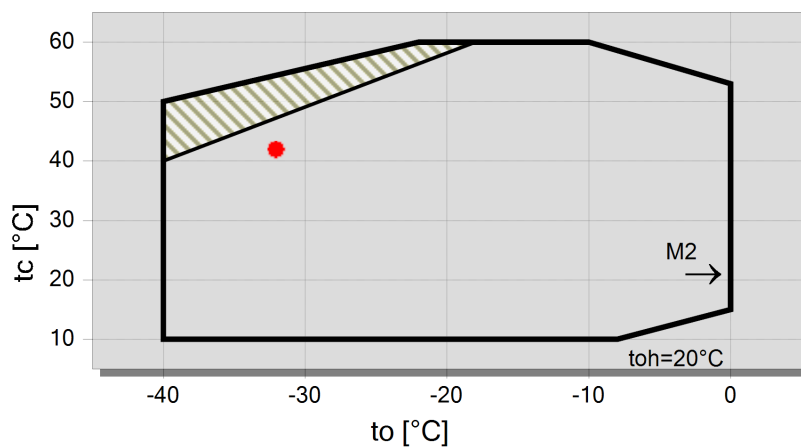
Tentative Data.

Consider national standards for the use of flammable refrigerants.

Power input including fan power absorption

Performance data certified by ASERCOM (see T. Data/ Notes)

Application Limits LHL5E/4EES-4



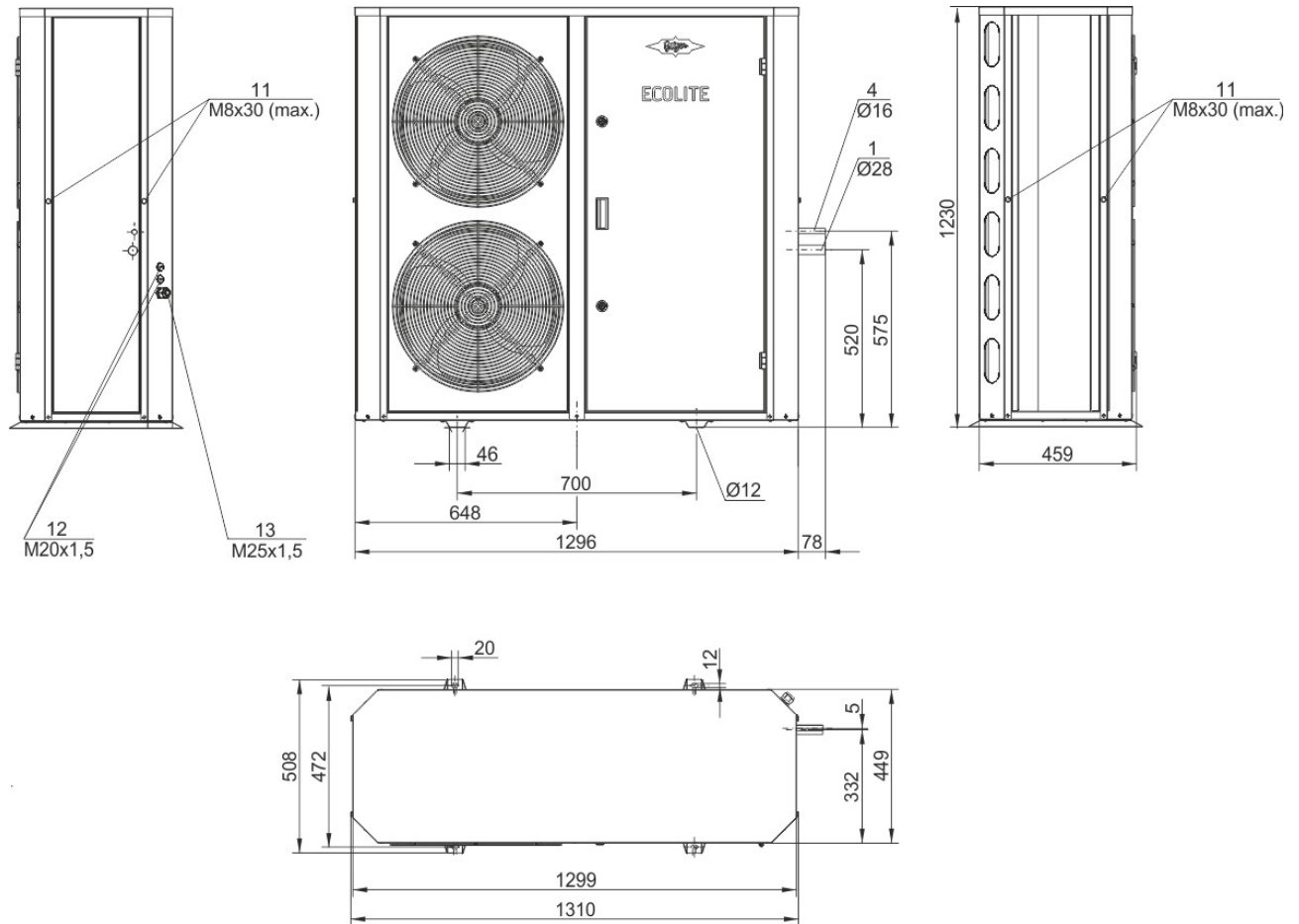
Legend

- suction gas superheat ≤ 20K
- M2: motor 2
- A



Technical Data: LHL5E/4EES-4Y

Dimensions and Connections





Technical Data

Technical Data	
Weight	214 kg
Total width	1300 mm
Total depth	450 mm
Total height	1230 mm
Connection suction line	28 mm - 1 1/8"
Connection liquid line	16 mm - 5/8"
Voltage (50Hz, more on request)	230V-1-50Hz (Standard)
Current / Power consumption of each fan (50Hz)	120 W
Air flow condenser 50Hz	6000 m³/h
Coil Volume	3,25 dm³
Extent of delivery (standard)	
*According PED 2014/68/EU	Standard
ECOLITE controller with display	Standard
ECOLINE with VARISTEP (CRII)	100 .. 50 %
Liquid receiver with shut-off valve	Standard
Complete piping and wiring with main switch and compressor contactor	Standard
High and low pressure switch	Standard
High and low pressure transmitter	Standard
Sight glass and filter drier in liquid line	Standard
Oil heater	Standard
Discharge gas temperature sensor	Standard
suction gas temperature sensor	Standard
Ambient temperature sensor	Standard
Discharge gas line	Standard
Weather protective housing	Standard
Fans: elect. Speed regulator	Standard
Sound insulation for compressor housing	Standard
Additional cooling with EC fan	Standard
Connection for pressure relief valve	Standard
Fans: Number	2
Protective charge	Standard
Available options	
Second capacity regulator (CRII)	100-10 %
Condenser with improved corrosion protection, plastic coated fins or copper fins	Option
Oil separator with check valve	Option
Adjustable high and low pressure switch	Option
Connection for heat recovery	Option
Oil level monitoring	OLC-K1
check valve for liquid line (additional pressure relief valve according to EN 378 required)	Option
Cold store temperature sensor	Option
BEST interface converter	Option
Sound measurement	
Sound pressure in 10m (to=-10°C, tamb=32°C)	37,8 dB(A) @ 50Hz, R513A
Data of compressors: see compressor program	
Max. refrigerant charge 90% at 20°C / 68°F	
Receiver type (Standard)	FS152E
R22	16,3 kg
R134a	16,5 kg
R407C	15,6 kg
R404A/R507A	14,4 kg
R407A	15,8 kg
R407F	15,4 kg
R448A	15 kg
R449A	15,1 kg
R450A	16,1 kg
R454C	14,3 kg
R455A	14,2 kg
R513A	16,5 kg
R1234yf	15,0 kg
R1234ze	15,9 kg



Condensing Units

Motor 1 = e.g. LH..E/4TES-12 with 12 "HP", primary for air-conditioning (e.g. R22,R407C) and medium temperature application (e.g. R134a, R407F, R407A, R404A, R507A, R22) and air-conditioning with R134a at high ambient temperatures.

Motor 2 = e.g. LH..E/4TES-9 with 8 "HP", for medium and low temperature application (e.g. R134a, R407F, R407A, R404A, R507A, R22) and air-conditioning with R134a.

For more information concerning the application range use the "limits" button.

Operation modes for LH..E/4VES-7 to LH../6HE-28 with R22

CIC = liquid injection with low temperature application, suction gas cooled motor

Specifications for sound emission

The data are based on 50 Hz operation.

Soundpressure: Data are valid for free field conditions with a block-shaped reference area in a distance of 10m.

For further information see technical information for sound data.



Simon
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CO-OP Desford - HA/HB

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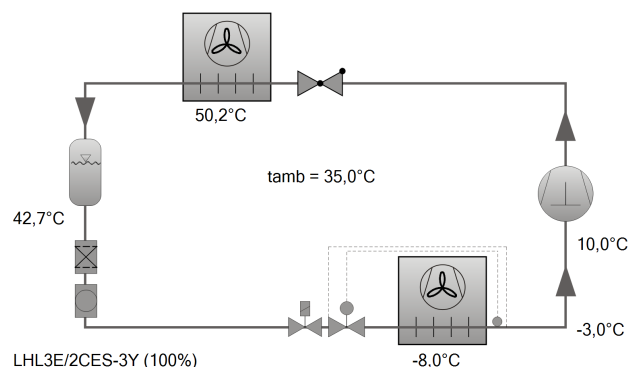
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2 / 5

Selection: Condensing Units

Input Values

Unit type	LHL3E/2CES-3Y
Series	ECOLITE
Refrigerant	R454C
Reference temperature	Dew point temp.
Evaporating SST	-8,00 °C
Ambient temp.	35,0 °C
Suct. gas superheat	18,00 K
Useful superheat	5,00 K
Operating mode	Auto
Power supply	400V-3-50Hz
Capacity control	100%



Result

Unit type	LHL3E/2CES-3Y-40S
Capacity steps	100%
Cooling capacity	6,89 kW
Evaporator capacity	6,28 kW
Heating Capacity (HR)	10,31 kW
Power input	3,42 kW
Current (400V)	6,20 A
Voltage range	380-420V
Mass flow	181,7 kg/h
Condensing SDT	50,2 °C
Liquid subcooling	1,00 K
Operating mode	Standard



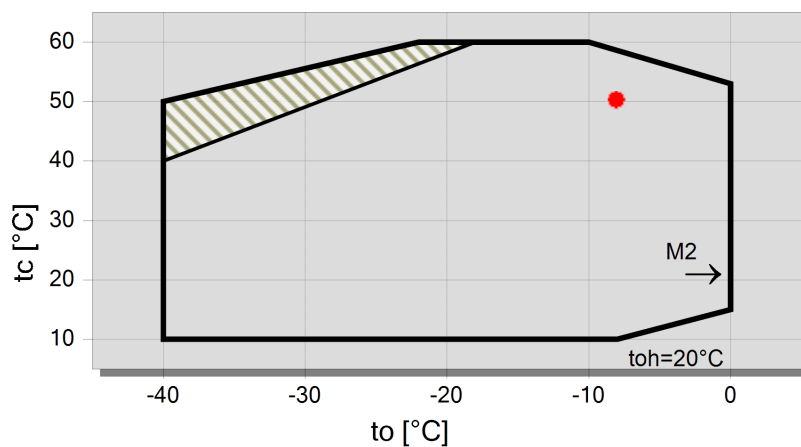
Tentative Data.

Consider national standards for the use of flammable refrigerants.

Power input including fan power absorption

Performance data certified by ASERCOM (see T. Data/ Notes)

Application Limits



Legend

suction gas superheat ≤20K

M2: motor 2

A



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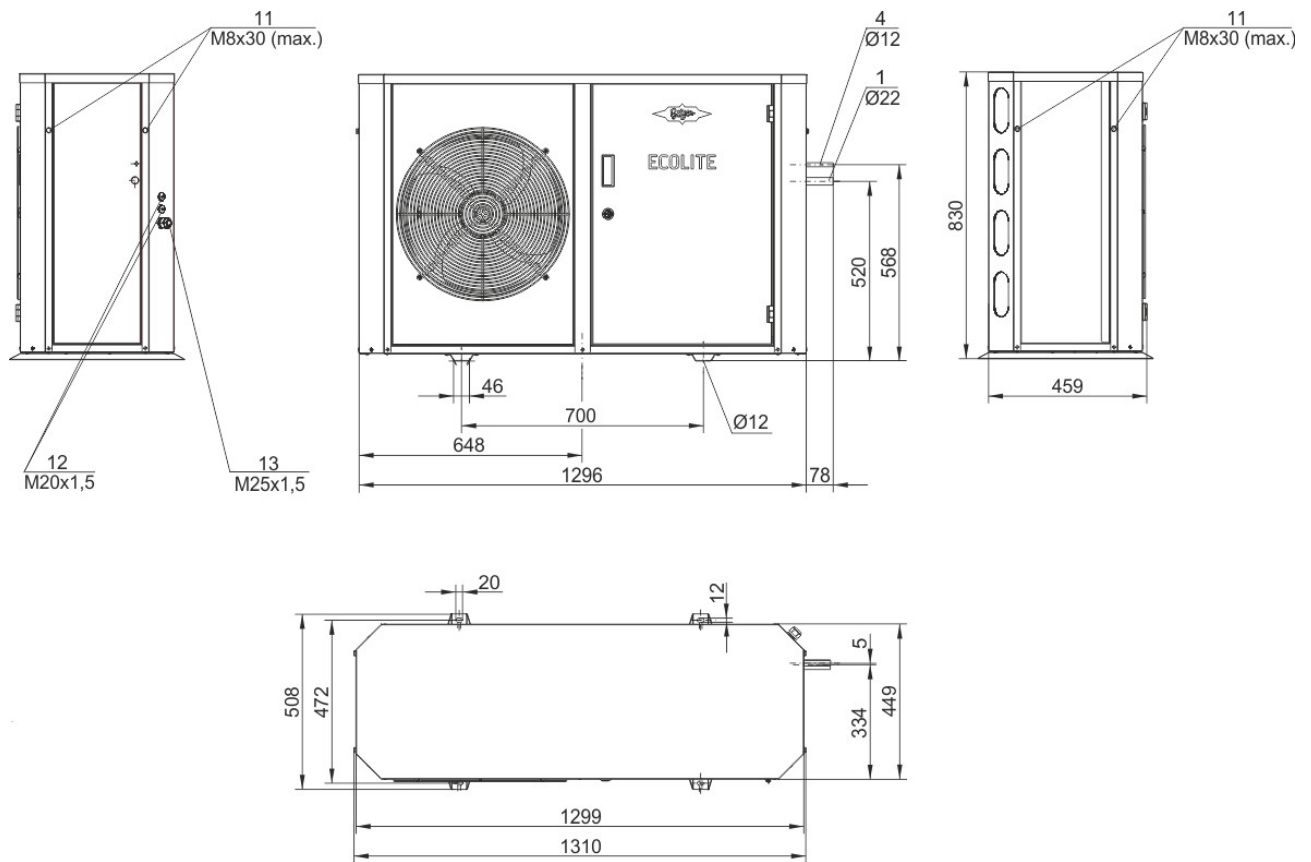
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3 / 5

Technical Data: LHL3E/2CES-3Y

Dimensions and Connections





Technical Data

Technical Data	
Weight	159 kg
Total width	1300 mm
Total depth	450 mm
Total height	830 mm
Connection suction line	22 mm - 7/8"
Connection liquid line	12 mm - 1/2"
Voltage (50Hz, more on request)	230V-1-50Hz (Standard)
Current / Power consumption of each fan (50Hz)	120 W
Air flow condenser 50Hz	3000 m³/h
Coil Volume	1,85 dm³
Extent of delivery (standard)	
*According PED 2014/68/EU	Standard
ECOLITE controller with display	Standard
ECOLINE with VARISTEP (CRII)	100 .. 50 %
Liquid receiver with shut-off valve	Standard
Complete piping and wiring with main switch and compressor contactor	Standard
High and low pressure switch	Standard
High and low pressure transmitter	Standard
Sight glass and filter drier in liquid line	Standard
Oil heater	Standard
Discharge gas temperature sensor	Standard
suction gas temperature sensor	Standard
Ambient temperature sensor	Standard
Discharge gas line	Standard
Weather protective housing	Standard
Fans: elect. Speed regulator	Standard
Sound insulation for compressor housing	Standard
Additional cooling with EC fan	Standard
Connection for pressure relief valve	Standard
Fans: Number	1
Protective charge	Standard
Available options	
Condenser with improved corrosion protection, plastic coated fins or copper fins	Option
Oil separator with check valve	Option
Adjustable high and low pressure switch	Option
Oil level monitoring	OLC-K1
check valve for liquid line (additional pressure relief valve according to EN 378 required)	Option
Cold store temperature sensor	Option
BEST interface converter	Option
Sound measurement	
Sound pressure in 10m (to=-10°C, tamb=32°C)	36,5 dB(A) @ 50Hz, R513A
Data of compressors: see compressor program	
Max. refrigerant charge 90% at 20°C / 68°F	
Receiver type (Standard)	FS76E
R22	8,5 kg
R134a	8,6 kg
R407C	8,1 kg
R404A/R507A	7,5 kg
R407A	8,2 kg
R407F	8 kg
R448A	7,8 kg
R449A	7,8 kg
R450A	8,4 kg
R454C	7,5 kg
R455A	7,4 kg
R513A	8,6 kg
R1234yf	7,8 kg
R1234ze	8,3 kg



Condensing Units

Motor 1 = e.g. LH..E/4TES-12 with 12 "HP", primary for air-conditioning (e.g. R22, R407C) and medium temperature application (e.g. R134a, R407F, R407A, R404A, R507A, R22) and air-conditioning with R134a at high ambient temperatures.

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