29 STORE STREET LONDON WC1E 7QB

BS4142 PLANT NOISE ASSESSMENT

25 March 2025

The Life Goddess

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ARAN ACOUSTICS

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1.0 INTRODUCTION

Aran Acoustics in collaboration with Airtight Building Solutions Ltd have been appointed to carry out a noise impact assessment for the proposed retention of 2 no. air condenser units at 29 Store Street, London.

A noise survey and assessment has been requested to ensure that noise levels from the proposed plant does not cause undue disturbance to nearby noise sensitive locations.

The purpose of this assessment is to determine the existing noise levels at the nearest noise sensitive location and establish the maximum permissible noise levels from the plant.

Such to establish suitable plant noise levels an assessment has been carried out to BS 4142: 2014 '*Method for rating and assessing industrial and commercial sound*'. This assessment has been benchmarked against an environmental noise survey carried out on 13 March 2024.

This report therefore describes the noise survey and its results. Figure 4.1 contains a graphical representation of the noise measurements taken on site. Section 5.0 provides the maximum permissible noise levels for the proposed plant. Section 6.0 provides an assessment of plant noise levels based on the proposed location.

2.0 SITE DESCRIPTION

The site is located at 29 Store Street in London. The site contains a 4-storey building with the ground floor used for commercial purposes.

Proposals include the retention of 2 no. air condenser units located within a small courtyard to the rear off the building at ground floor level as shown on the site plan within Appendix A.

The nearest noise sensitive receptors to the location of the condenser units are the rear windows of the residential flats directly above and adjacent on Gower Mews.

A subjective on-site assessment determined that the primary noise sources affecting nearby noise-sensitive receptors are plant equipment servicing the current commercial unit, noise from surrounding commercial units, and background road traffic.

Figure 2.1 below shows a location map and aerial photo of the site and surrounding area.

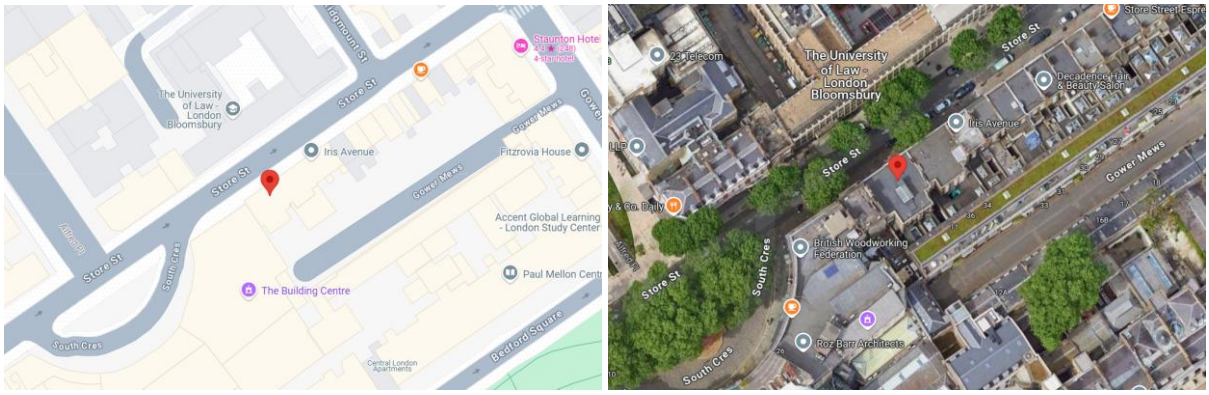


Table 2.1 – Location map and aerial photo of the site*

**Imagery courtesy of Google Maps*

3.0 ENVIRONMENTAL NOISE SURVEY

An environmental noise survey was carried out at the site between Thursday 13 and Friday 14 March 2025. The survey incorporated both day and night-time measurements.

A single noise monitor was placed at the rear of the property. The microphone was placed on a tripod and extended up to first floor level next to the nearest residential window. The proposed condenser units were switched off for the duration of the survey. Noise levels measured at the microphone location are considered representative of the existing environmental noise levels to impact nearby noise sensitive receptors.

A site plan showing the microphone location is provided in Appendix A. Site photos of the microphone position are provided in Appendix B.

3.1 Measurement Equipment

The following measurement equipment was used, which complies with the performance specifications for a Class 1 device in accordance with BS EN 61672-1, BS EN 61260 and BS EN 60942.

Name	Serial Number	Last Calibrated	Calibration Due
Norsonic Precision Sound Analyser Type 140	1403967	Feb 2024	Feb 2026
Norsonic Type 1209 Pre-amplifier	30873	Feb 2024	Feb 2026
Norsonic Type 1225 Microphone	112875	Feb 2024	Feb 2026
Rion Type NC-74 Acoustic Calibrator	35046846	Feb 2025	Feb 2026

Table 3.1 – Measurement equipment used on site

The meter was calibrated before and after testing where no deviations were found. The meter was set to measure consecutive 'A' weighted 15-minute samples.

3.2 Weather Conditions

The weather was mainly fine and dry for the duration of the survey. Wind speed remained below 5 m/s. The temperature was approximately 06 - 18 ^{o}C.

The weather conditions were seen as suitable for environmental noise surveying in accordance with BS 7445-1:2003 '*Description and measurement of environmental noise*'.

4.0 SURVEY RESULTS

The noise levels measured during the survey period are shown in Figure 4.1 below. The full set of acoustic data measured on site is available upon request.

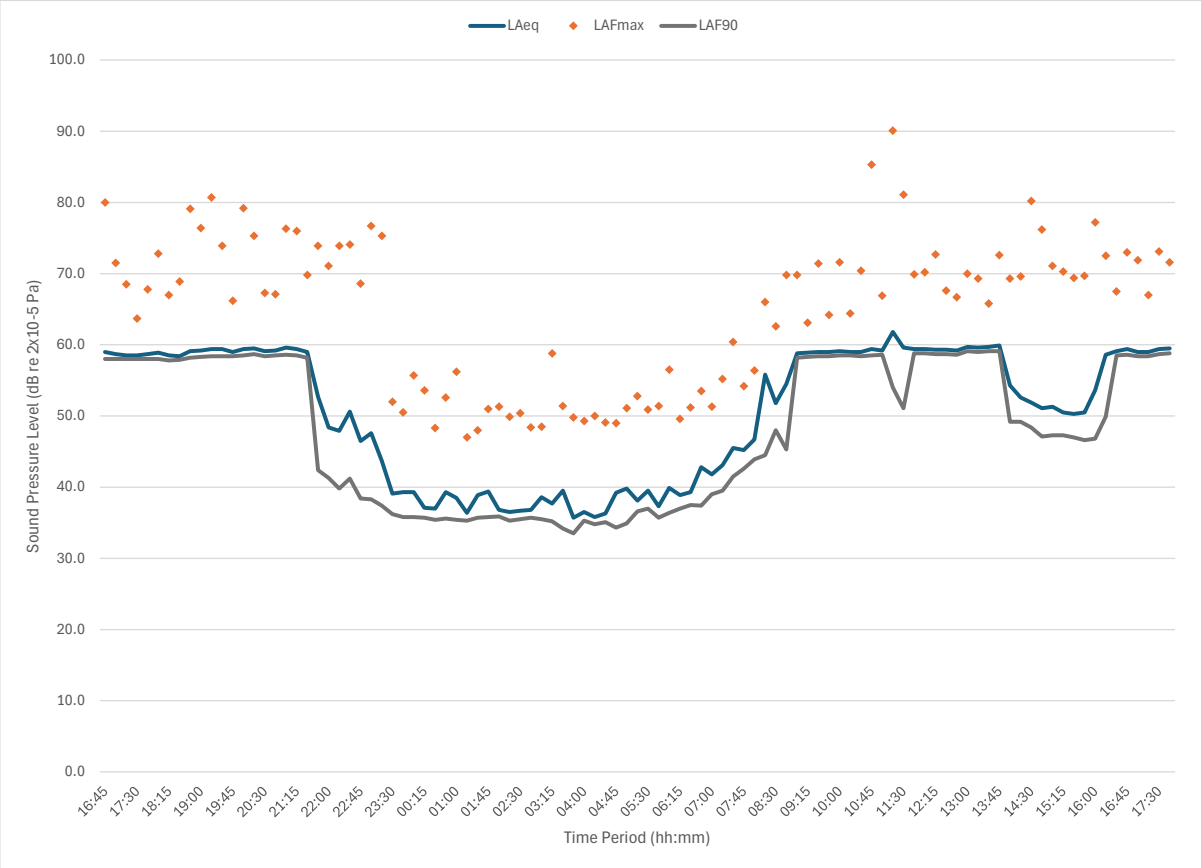


Figure 4.1 – Measured noise levels

The results indicate that noise levels remained relatively consistent throughout the daytime period, with a noticeable reduction after 21:30 hours. This decrease is considered to be primarily attributable to a reduction in plant activity servicing this commercial unit and the surrounding commercial units.

The following table provides a summary of the noise levels measured on site at the fixed microphone position during the survey period including the equivalent continuous A-weighted sound pressure level; $L_{Aeq,T}$ and representative background noise level; $L_{A90,T}$.

Time Period	Average Noise Level L_{Aeq}, dB	Representative Background L_{A90}, dB
Day (07:00 – 23:00 hours)	58	58
Night (23:00 – 07:00 hours)	40	36

Table 4.1 - Summary of measured noise levels

5.0 ASSESSMENT CRITERIA

Section 4.0 above provides a summary of measured noise levels on site. The following section provides a summary of guidance documentation relevant to this development.

5.1 British Standard 4142

BS 4142:2014 describes a method of determining the level of noise of an industrial nature, together with the procedures for assessing whether the noise in question is likely to give rise to complaints from persons living in the vicinity. As such, an assessment to BS 4142 is typically called for within planning conditions.

The likelihood of complaints in response to a specific noise depends on various factors. BS 4142 assesses the likelihood of complaints by considering the margin by which the noise in question exceeds the background noise level. BS 4142 states that:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. 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 on the context.

This standard also allows for an appropriate correction for the acoustic features present in the noise using a number of methods. A correction should be applied if one or more of the following features (see the list below), are present within the noise sources in question.

- The noise is of a tonal nature, i.e. it contains a distinguishable, discreet, continuous note such as whine, hiss, screech, hum;
- The noise is impulsive, i.e. it contains distinct impulses such as bangs, clicks, clatters, or thumps;
- The noise contains other characteristics that are neither tonal nor impulsive but is irregular enough to attract attention.

It can be concluded from BS4142 guidance document that noise levels from plant and equipment associated with the development should not generally exceed the background noise level when measured at the nearest noise sensitive location. This is a positive indication of low noise impact.

5.2 Target Plant Noise Levels

It is understood that the proposed condenser units will only operate during the day time period, i.e. 07:00 to 23:00 hours. Local Planning Authorities typically require noise levels from plant to achieve a design target of -5 dB below the existing background noise levels during the day-time period. This is seen as a design target where noise impact would be 'low' in accordance with BS 4142 and complaints from nearby noise sensitive receptors deemed unlikely.

Following analysis of manufacturers sound level data, it is considered that the proposed plant produces a broadband noise with no tonal features. The units are also inverter driven, meaning that they will gradually increase or decrease operating capacity depending on the level of duty required. This gives a positive indication that the noise produced is not immediate or distinguishable therefore no acoustic feature correction need be applied.

Based on the lowest background noise level during the proposed operating period and the suggested design targets including any tolerance or correction factors, the following table shows the maximum permissible noise level from the condenser units when measured at the window of the nearby noise sensitive receptors.

Time Period	Lowest Representative Background, L_{A90}	Tolerance Factor	Correction Factor	Max Noise Level at Residential
Day (07:00 – 23:00 hours)	58 dBA	-5 dB	-0 dB	**53 dBA**

Table 5.1 - Plant Noise Level Target

6.0 PLANT NOISE LEVEL ASSESSMENT

Proposals are to retain the 2 no. Mitsubishi condenser units located to the rear of the ground floor commercial unit as indicated on the site plans in Appendix A. The following table provides the manufacturers noise level data for the units.

	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	dBA
SRC71ZR-W (Lw)	62.0	63.0	61.0	62.0	58.0	53.0	45.0	**63**
FDC100VNP-W (Lw)*	69.0	65.0	64.0	60.0	60.0	50.0	48.0	**63**

Table 6.1 – Plant Noise Levels

*Note that the sound power level was derived from the sound pressure levels provided by the manufacturer.

The nearest noise sensitive receptors to the location of the condenser units are the rear windows of the residential flats directly above and adjacent at first level. The nearest window was estimated to be 3m from the plant location. At distance the condenser units are considered a point source and sound will decay at a rate of 6 dB per doubling of distance.

Based on manufacturers noise levels data calculations show that the combined noise level from the condenser units in operation would be **49 dBA** when measured at 1m from the window of the nearest noise sensitive receptor. This does not exceed the target plant noise level of **53 dBA** at any of the nearby noise sensitive receptors which is a positive indication of low noise impact in accordance with BS 4142 and complaints are deemed unlikely.

Plant noise calculation sheets are provided in Appendix C. Manufacturers noise level data sheets are provided in Appendix D.

6.1 Vibration

Note that attention should be given to the installation of mechanical plant to ensure there is no transmission of excessive tactile and audible frequency vibration to adjacent areas, due to the operation of equipment and/or its connection to pipe work, duct work or conduits. Suitable anti-vibration mounts and flexible connectors should be used where necessary.

7.0 SUMMARY AND CONCLUSION

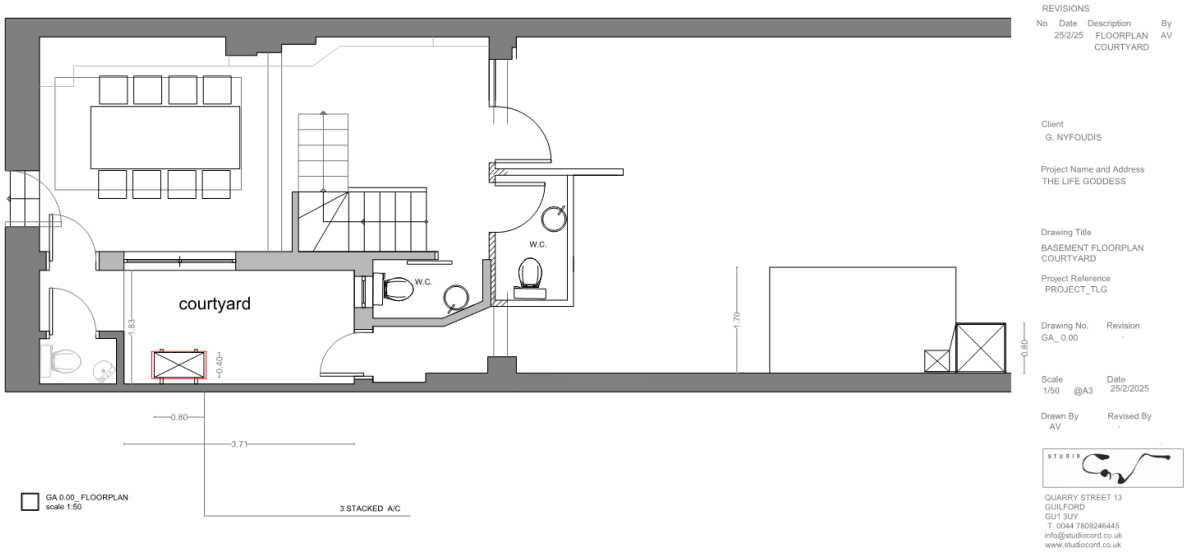
A noise survey was carried out for the retention of 2 no. condenser units located to the rear of the ground floor commercial unit at 29 Store Street, London on 13 March 2025.

From this survey the minimum representative background noise level at the nearest sensitive property was found to be 58 dB L_{A90} during the proposed operational hours (07:00 – 23:00).

Using guidance in BS 4142 and based on the proposed hours of operation, noise levels from the condenser units should not generally exceed 5 dB below the background noise level at the window of the nearby noise sensitive receptors.

Based on the manufacturer's noise data and subsequent calculations, the predicted plant noise level at the nearest noise-sensitive receptors is 49 dBA under worst-case conditions. This remains below the permissible design target and represents a low likelihood of adverse noise impact, in line with BS 4142 guidance. Consequently, complaints from nearby residential receptors are considered unlikely.

APPENDIX A – SITE PLANS



APPENDIX B – SITE PHOTOS

APPENDIX C – PLANT NOISE CALCULATION SHEETS

	QTY	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	dBA
SRC71ZR-W (Lw)	1.0	62.0	63.0	61.0	62.0	58.0	53.0	45.0	**63**
Multiple Unit Correction	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Acoustic Enclosure	0								
Distance Attenuation	3	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	
Barrier Attenuation	1								
Reflection Q	2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
SPL at Receiver		44.5	45.5	43.5	44.5	40.5	35.5	27.5	**45**

	QTY	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	dBA
FDC100VNP-W (Lp)	1.0	55.0	51.0	50.0	46.0	46.0	36.0	34.0	49
Lp to Lw	1.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
FDC100VNP-W (Lw)		69.0	65.0	64.0	60.0	60.0	50.0	48.0	**63**
Acoustic Enclosure	0								
Distance Attenuation	3	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	
Barrier Attenuation	1								
Reflection Q	2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
SPL at Receiver		51.5	47.5	46.5	42.5	42.5	32.5	30.5	**46**

Combined SPL	2	52.3	49.6	48.2	46.6	44.6	37.2	32.2	**49**

APPENDIX D – TECHNICAL DATA SHEETS

Product Data sheet for SRK71ZR-W / SRC71ZR-W — Single Split RAC - Wall Mounted

MITSUBISHI HEAVY INDUSTRIES AIR CONDITIONING EUROPE

SRK71ZR-W / SRC71ZR-W

7.1 (2.3~7.8)

Indoor Unit : SRK71ZR-W

Outdoor Unit : SRC71ZR-W

R32

Specifications

Indoor unit				SRK71ZR-W
Outdoor unit				SRC71ZR-W
Power source				1Phase, 220 - 240, 50Hz
Nominal cooling capacity (Min~Max)			kW	7.1 (2.3~7.8)
Nominal heating capacity (Min~Max)			kW	8.0 (2.0~10.8)
Power consumption		Cooling/Heating	kW	1.93 / 1.95
EER/COP		Cooling/Heating		3.68 / 4.10
Max. running current			A	17
Sound power level	Indoor	Cooling/Heating	dB(A)	57 / 60
	Outdoor	Cooling/Heating		63 / 63
Sound pressure level	Indoor	Cooling (Hi/Me/Lo/Ulo)		44 / 41 / 37 / 25
		Heating (Hi/Me/Lo/Ulo)		46 / 39 / 35 / 28
	Outdoor	Cooling/Heating		53 / 51
Air flow	Indoor	Cooling (Hi/Me/Lo/Ulo)	m3/min	20.5 / 18.6 / 16.2 / 10.4
		Heating (Hi/Me/Lo/Ulo)		25.0 / 19.8 / 17.3 / 13.3
	Outdoor	Cooling/Heating		55 / 43.5
Exterior Dimensions	Indoor	Height x Width x Depth	mm	339 x 1197 x 262
	Outdoor			750 x 880(+88) x 340
Net weight	Indoor / Outdoor		kg	15.5 / 56.0
Refrigerant		Type/GWP		R32 / 675
Refrigerant		Charge	kg/TCO2Eq	1.5 / 1.013
Refrigerant piping size		Liquid/Gas	ø inch	6.35(1/4") / 15.88(5/8")
Refrigerant line (one way) length			m	Max. 30
Vertical height differences		Outdoor is higher/lower	m	Max. 20 / Max. 20
Outdoor operating temperature range		Cooling	°C	-15~46
		Heating		-15~24
Clean filter				Allergen Clear Filter x 1, Photocatalytic Washable Deodorizing Filter x 1
Energy Class (Cooling/Heating)				A++/A+
SEER				7.40
SCOP (Average climate)				4.50
Pdesign (cooling/heating(@-10°C))			kW	7.10/6.60
Annual Electricity Consumption (cooling/heating)			kWh/a	337/2055
Designated Heating Season				Average

- The data is measured under the following conditions(ISO-T1, H1). Cooling: Indoor temp. of 27°CDB, 19°CWB, and outdoor temp. of 35°CDB. Heating: Indoor temp. of 20°CDB, and outdoor temp. of 7°CDB, 6°CWB.
- Sound level indicates the value in an anechoic chamber. During operation these values are somewhat higher due to ambient conditions.
- "tonne(s) of CO2 equivalent" means a quantity of greenhouse gases- expressed as the product of the weight of the greenhouse gases in metric tonnes and of their global warming potential.
- SEER/SCOP are based on EN14825:2016 and Commission regulation (EU) No.2016/2281

Product Data sheet for SRK100ZR-W / FDC100VNP-W | Single Split RAC - Wall Mounted

MITSUBISHI HEAVY INDUSTRIES AIR CONDITIONING EUROPE

SRK100ZR-W / FDC100VNP-W

9.6 (2.1~9.6)

Indoor Unit : SRK100ZR-W

Outdoor Unit : FDC100VNP-W

R32

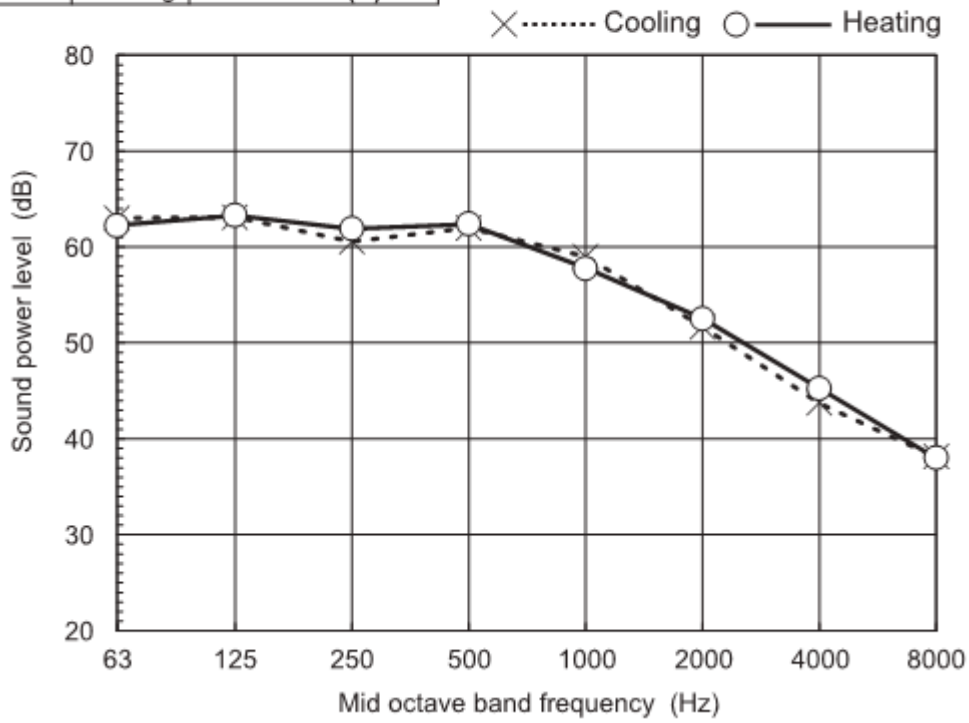
Specifications

Indoor unit				SRK100ZR-W
Outdoor unit				FDC100VNP-W
Power source				1Phase, 220 - 240, 50Hz
Nominal cooling capacity (Min~Max)			kW	9.6 (2.1~9.6)
Nominal heating capacity (Min~Max)			kW	10.0 (1.7~10.4)
Power consumption		Cooling/Heating	kW	3.10 / 2.80
EER/COP		Cooling/Heating		3.10 / 3.57
Max. running current			A	19
Sound power level	Indoor	Cooling/Heating	dB(A)	59 / 62
	Outdoor	Cooling/Heating		68 / 67
Sound pressure level	Indoor	Cooling (Hi/Me/Lo/Ulo)		48 / 45 / 40 / 27
		Heating (Hi/Me/Lo/Ulo)		48 / 43 / 38 / 30
	Outdoor	Cooling/Heating		56 / 54
Air flow	Indoor	Cooling (Hi/Me/Lo/Ulo)	m3/min	24.5 / 21.3 / 17.6 / 10.4
		Heating (Hi/Me/Lo/Ulo)		27.5 / 23.2 / 19.1 / 13.6
	Outdoor	Cooling/Heating		63 / 55
Exterior Dimensions	Indoor	Height x Width x Depth	mm	339 x 1197 x 262
	Outdoor			750 x 880(+88) x 340
Net weight	Indoor / Outdoor		kg	16.5 / 57.0
Refrigerant		Type/GWP		R32/675
Refrigerant		Charge	kg/TCO2Eq	1.7 / 1.148
Refrigerant piping size		Liquid/Gas	ø inch	6.35(1/4") / 15.88(5/8")
Refrigerant line (one way) length			m	Max. 30
Vertical height differences		Outdoor is higher/lower	m	Max. 20 / Max. 20
Outdoor operating temperature range		Cooling	°C	-15~46
		Heating		-15~24
Clean filter				Allergen Clear Filter x 1, Photocatalytic Washable Deodorizing Filter x 1
Energy Class (Cooling/Heating)				A++/A+
SEER				6.11
SCOP (Average climate)				4.14
Pdesign (cooling/heating(@-10°C))			kW	9.6/6.0
Annual Electricity Consumption (cooling/heating)			kWh/a	551/2028
Designated Heating Season				Average

- The data is measured under the following conditions(ISO-T1, H1). Cooling: Indoor temp. of 27°CDB, 19°CWB, and outdoor temp. of 35°CDB. Heating: Indoor temp. of 20°CDB, and outdoor temp. of 7°CDB, 6°CWB.
- Sound level indicates the value in an anechoic chamber. During operation these values are somewhat higher due to ambient conditions.
- 'tonne(s) of CO2 equivalent' means a quantity of greenhouse gases- expressed as the product of the weight of the greenhouse gases in metric tonnes and of their global warming potential.
- SEER/SCOP are based on EN14825:2016 and Commission regulation (EU) No.2016/2281

(Outdoor unit)

Model	SRC71ZR-W	
Noise level	Cooling	63 dB(A)
	Heating	63 dB(A)



Model FDC140VN
140VS

Noise level 51 dB (A)