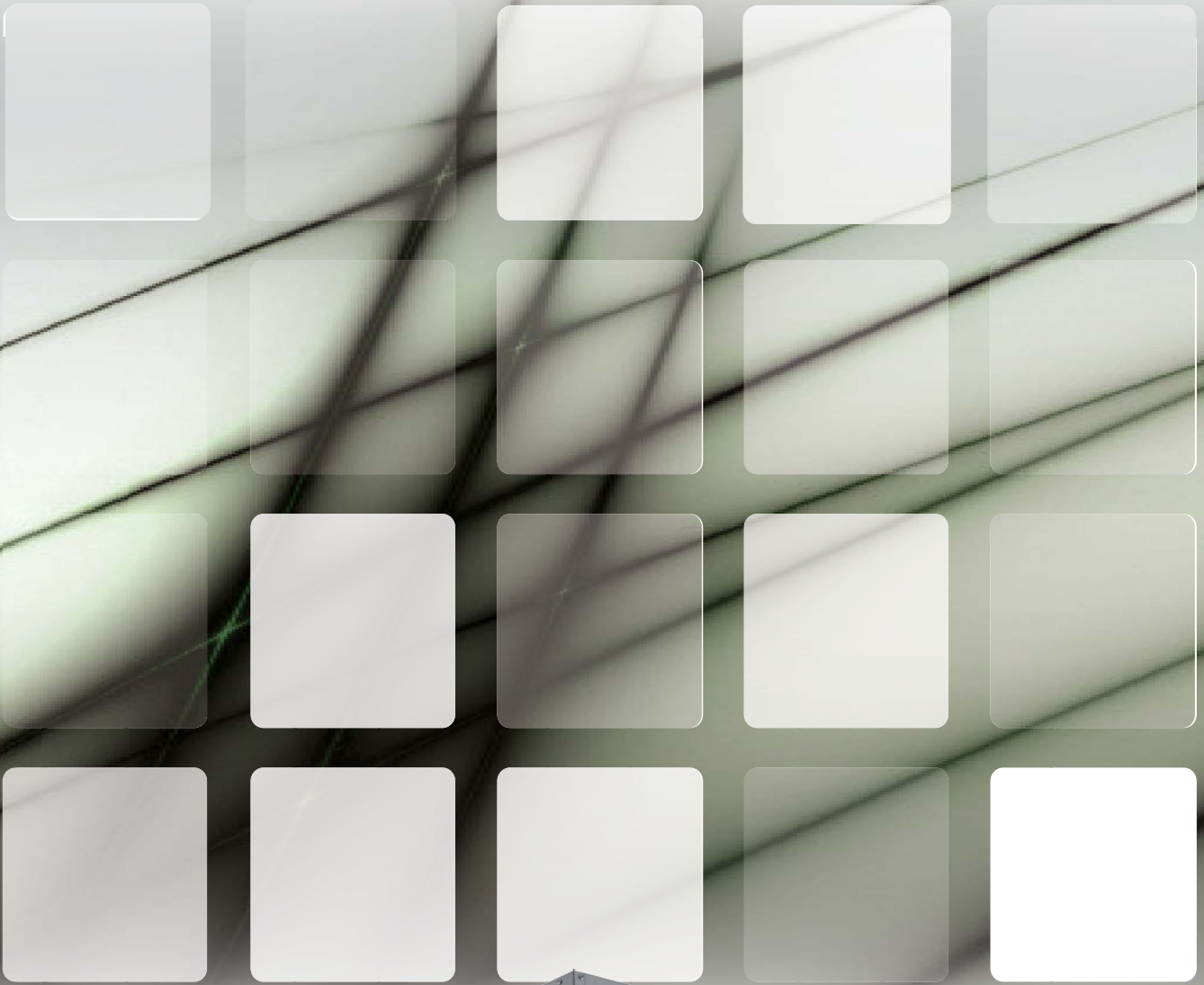


# BECS(R)-D Ultima Series

## 50Hz Round Flow Cassette VRF Indoor Unit

### Technical Manual

**220~240V/1/50Hz**



# Technical Manual

## Four-way Cassette VRF IDU

### Ultima Series

### AC 50Hz



BECS010Q3A-DWM028

BECS031Q3A-DWM090

BECS012Q3A-DWM036

BECS036Q3A-DWM100

BECS015Q3A-DWM045

BECS038Q3A-DWM112

BECS019Q3A-DWM056

BECS048Q3A-DWM140

BECS024Q3A-DWM071

BECS060Q0A-DWM160

BECS027Q3A-DWM080

# Four-way Cassette

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# Ultima Series VRF Indoor Units

## 1 Specifications

BECS010Q3A-DWM028 / BECS015Q3A-DWM045 / MDV-D15Q4/N1-

Table 1.1: BECS010 (12,15) specifications

Model			BECS010Q3A-DWM028	BECS012Q3A-DWM036	BECS015Q3A-DWM045
Power supply			1 phase, 220-240V, 50Hz		
Cooling <sup>1</sup>	Capacity	kBtu/h	9	12	15
	Input	W	80	80	88
Heating <sup>2</sup>	Capacity	kBtu/h	10	13	17
	Input	W	80	80	88
Indoor fan motor	Type		AC		
	Quantity		1		
Indoor coil	Number of rows		1	1	2
	Tube pitch × row pitch		mm 21×13.37		
	Fin spacing		mm 1.5		
	Fin type		Hydrophilic aluminum		
	Diameter & type		mm Φ7, inner-groove		
	Dimensions (L×H ×W)		2033×168×13.37		2051×168×26.74
	Number of circuits		4		8
Indoor air flow (H/M/L)		m <sup>3</sup> /h	764/638/554		905/740/651
Sound pressure level (H/M/L) <sup>3</sup>		dB(A)	32/31/30		36/34/33
Indoor unit	Dimensions <sup>4</sup> (W×H×D)		mm 840×230×840		
	Packing (W×H×D)		mm 955×260×955		
	Net/Gross weight		kg 21.5/26.7		23.7/28.9
Panel	Dimensions (W×H×D)		mm 950×70×950		
	Packing(W×H×D)		mm 1035×89×1035		
	Net/Gross weight		kg 5.8/7.9		
Refrigerant type			R410A		
Pipe connections	Liquid pipe	mm	Φ6.35		
	Gas pipe	mm	Φ12.7		
	Drain pipe	mm	OD Φ32		

Notes:

1. Indoor temperature 27°C DB, 19°C WB; outdoor temperature 35°C DB; equivalent refrigerant piping length 7.5m with zero level difference.
2. Indoor temperature 20°C DB; outdoor temperature 7°C DB, 6°C WB; equivalent refrigerant piping length 7.5m with zero level difference.
3. Sound pressure level is measured 1.4m below the unit in a semi-anechoic chamber.
4. Unit body dimensions given are the largest external dimensions of the unit, including hanger attachments.

# Ultima Series VRF Indoor Units

## BECS019Q3A-DWM056 / BECS024Q3A-DWM071 / BECS027Q3A-DWM080

Table 1.2: BECS018(24,28) specifications

Model			BECS019Q3A-DWM056	BECS024Q3A-DWM071	BECS027Q3A-DWM080
Power supply			1 phase, 220-240V, 50Hz		
Cooling <sup>1</sup>	Capacity	kBtu/h	19	24	27
	Input	W	88	88	110
Heating <sup>2</sup>	Capacity	kBtu/h	21	27	30
	Input	W	88	88	110
Indoor fan motor	Type		AC		
	Quantity		1		
Indoor coil	Number of rows		2		
	Tube pitch × row pitch	mm	21×13.37		
	Fin spacing	mm	1.5		
	Fin type		Hydrophilic aluminum		
	Diameter & type	mm	Φ7, inner-groove		
	Dimensions (L×H×W)	mm	2051×168×26.74		
	Number of circuits		8		
Indoor air flow (H/M/L)		m <sup>3</sup> /h	905/740/651	950/767/663	1200/1021/789
Sound pressure level (H/M/L) <sup>3</sup>		dB(A)	36/34/33	38/36/35	42/39/37
Indoor unit	Dimensions <sup>4</sup> (W×H×D)	mm	840×230×840		
	Packing (W×H×D)	mm	955×260×955		
	Net/Gross weight	kg	23.7/28.9		
Panel	Dimensions (W×H×D)	mm	950×70×950		
	Packing (W×H×D)	mm	1035×89×1035		
	Net/Gross weight	kg	5.8/7.9		
Refrigerant type			R410A		
Pipe connections	Liquid pipe	mm	Φ9.53		
	Gas pipe	mm	Φ15.9		
	Drain pipe	mm	OD Φ32		

Notes:

1. Indoor temperature 27°C DB, 19°C WB; outdoor temperature 35°C DB; equivalent refrigerant piping length 7.5m with zero level difference.
2. Indoor temperature 20°C DB; outdoor temperature 7°C DB, 6°C WB; equivalent refrigerant piping length 7.5m with zero level difference.
3. Sound pressure level is measured 1.4m below the unit in a semi-anechoic chamber.
4. Unit body dimensions given are the largest external dimensions of the unit, including hanger attachments.

# Ultima Series VRF Indoor Units

## BECS031Q3A-DWM090 / BECS036Q3A-DWM100

Table 1.3: BECS031(36) specifications

Model			BECS031Q3A-DWM090	BECS036Q3A-DWM100
Power supply			1 phase, 220-240V, 50Hz	
Cooling <sup>1</sup>	Capacity	kBtu/h	30	34
	Input	W	140	165
Heating <sup>2</sup>	Capacity	kBtu/h	34	37
	Input	W	140	165
Indoor fan motor	Type		AC motor	
	Number		1	
Indoor coil	Number of rows		2	2
	Tube pitch × row pitch	mm	21×13.37	
	Fin spacing	mm	1.5	
	Fin type		Hydrophilic aluminum	
	Diameter & type	mm	Φ7, inner-groove	
	Dimensions (L×H×W)	mm	2051×252×26.74	
	Number of circuits		8	
Indoor air flow (H/M/L)		m <sup>3</sup> /h	1332/1129/908	1651/1304/1127
Sound pressure level (H/M/L) <sup>3</sup>		dB(A)	43/39/38	45/42/40
Indoor unit	Dimensions <sup>4</sup> (W×H×D)	mm	840×300×840	
	Packing (W×H×D)	mm	955×330×955	
	Net/Gross weight	kg	28.7/34.1	
Panel	Dimensions (W×H×D)	mm	950×70×950	
	Packing (W×H×D)	mm	1035×89×1035	
	Net/Gross weight	kg	5.8/7.9	
Refrigerant type			R410A	
Pipe connections	Liquid pipe	mm	Φ9.53	
	Gas pipe	mm	Φ15.9	
	Drain pipe	mm	OD Φ32	

Notes:

1. Indoor temperature 27°C DB, 19°C WB; outdoor temperature 35°C DB; equivalent refrigerant piping length 7.5m with zero level difference.
2. Indoor temperature 20°C DB; outdoor temperature 7°C DB, 6°C WB; equivalent refrigerant piping length 7.5m with zero level difference.
3. Sound pressure level is measured 1.4m below the unit in a semi-anechoic chamber.
4. Unit body dimensions given are the largest external dimensions of the unit, including hanger attachments.

## Ultima Series VRF Indoor Units

### BECS038Q3A-DWM112 / MDV-D48Q4/N1-E(At)

Table 1.4: BECS038(48) specifications

Model			BECS038Q3A-DWM112	BECS048Q3A-DWM140	BECS060Q0A-DWM160
Power supply			1 phase, 220-240V, 50Hz		1 phase, 220-240V, 50/60Hz
Cooling <sup>1</sup>	Capacity	kBtu/h	38	47	54
	Input	W	165	176	170
Heating <sup>2</sup>	Capacity	kBtu/h	42	54	61
	Input	W	165	176	170
Indoor fan motor	Type		AC motor		DC motor
	Number		1		
Indoor coil	Number of rows		2	3	3
	Tube pitch × row pitch	mm	21×13.37		
	Fin spacing	mm	1.5		
	Fin type		Hydrophilic aluminum		
	Diameter & type	mm	Φ7, inner-groove		
	Dimensions (L×H×W)	mm	2051×252×26.74	2007×252×40.11	2200×252×40.11
	Number of circuits		8	12	12
Indoor air flow (H/M/L)	m <sup>3</sup> /h	1651/1304/1127	1658/1335/1130	2100/1950/1800/1750/1600/1450/1350	
Sound pressure level (H/M/L) <sup>3</sup>	dB(A)	45/42/40	46/41/39	46/44/42/41/39/38/37	
Indoor unit	Dimensions <sup>4</sup> (W×H×D)	mm	840×300×840		950×300×950
	Packing (W×H×D)	mm	955×330×955		1050×335×1050
	Net/Gross weight	kg	28.7/34.1	30.9/36.3	35.3/41.2
Panel	Dimensions (W×H×D)	mm	950×70×950		1050×55×1050
	Packing (W×H×D)	mm	1035×89×1035		1115×100×1115
	Net/Gross weight	kg	5.8/7.9		7.4/9.7
Refrigerant type			R410A		
Pipe connection	Liquid pipe	mm	Φ9.53		
	Gas pipe	mm	Φ15.9		
	Drain pipe	mm	OD Φ32		

Notes:

- Indoor temperature 27°C DB, 19°C WB; outdoor temperature 35°C DB; equivalent refrigerant piping length 7.5m with zero level difference.
- Indoor temperature 20°C DB; outdoor temperature 7°C DB, 6°C WB; equivalent refrigerant piping length 7.5m with zero level difference.
- Sound pressure level is measured 1.4m below the unit in a semi-anechoic chamber.

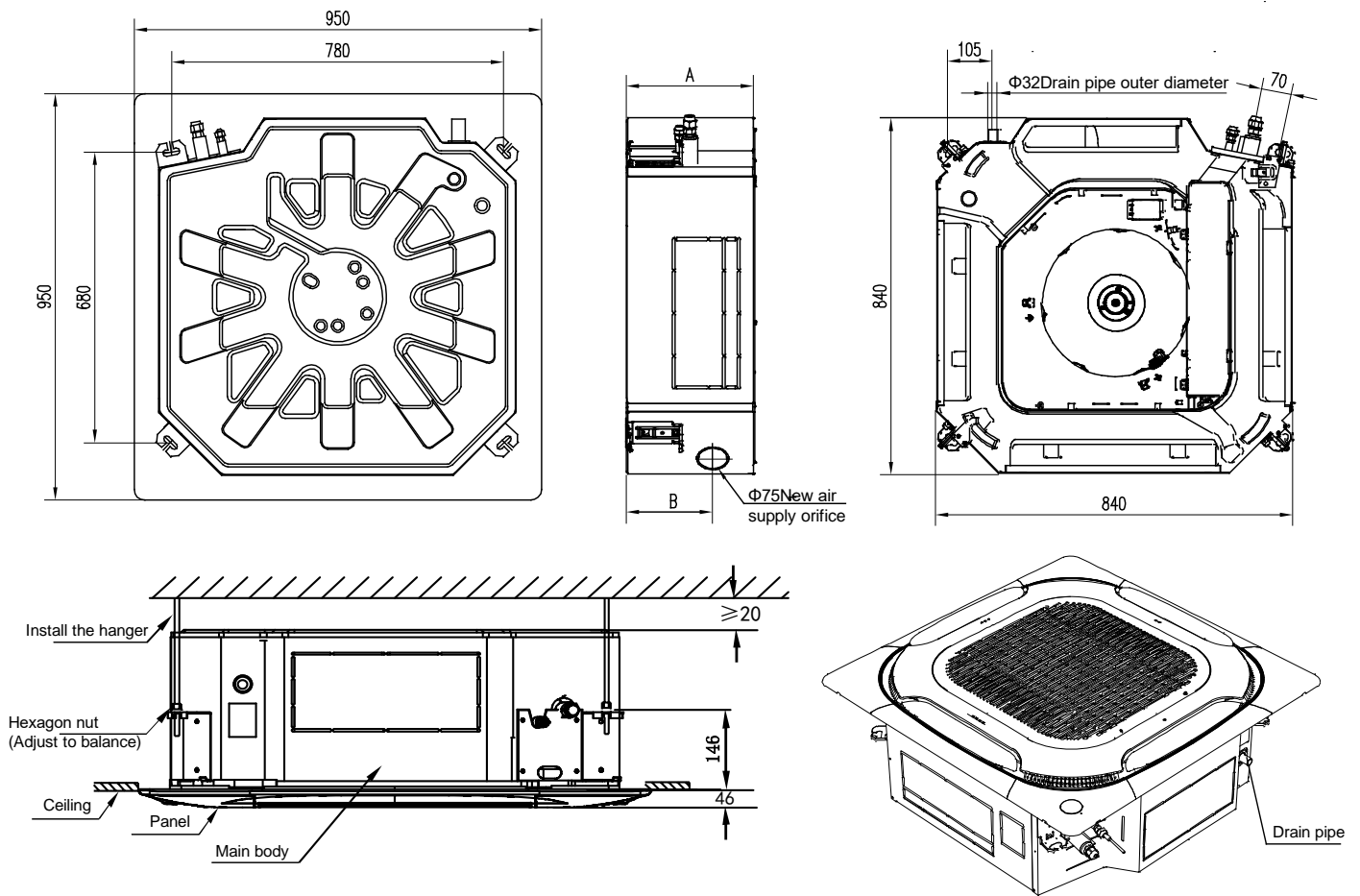
Unit body dimensions given are the largest external dimensions of the unit, including hanger attachments.

# Ultima Series VRF Indoor Units

## 2 Dimensions

### 2.1 Unit Dimensions

Figure 2.1: BECS10 (12,15,18,24,28,32,36,40,48) Four-way Cassette dimensions (unit: mm)





# Ultima Series VRF Indoor Units

Figure 2.2: BECS060Q0A-DWM160 Four-way Cassette dimensions (unit: mm)

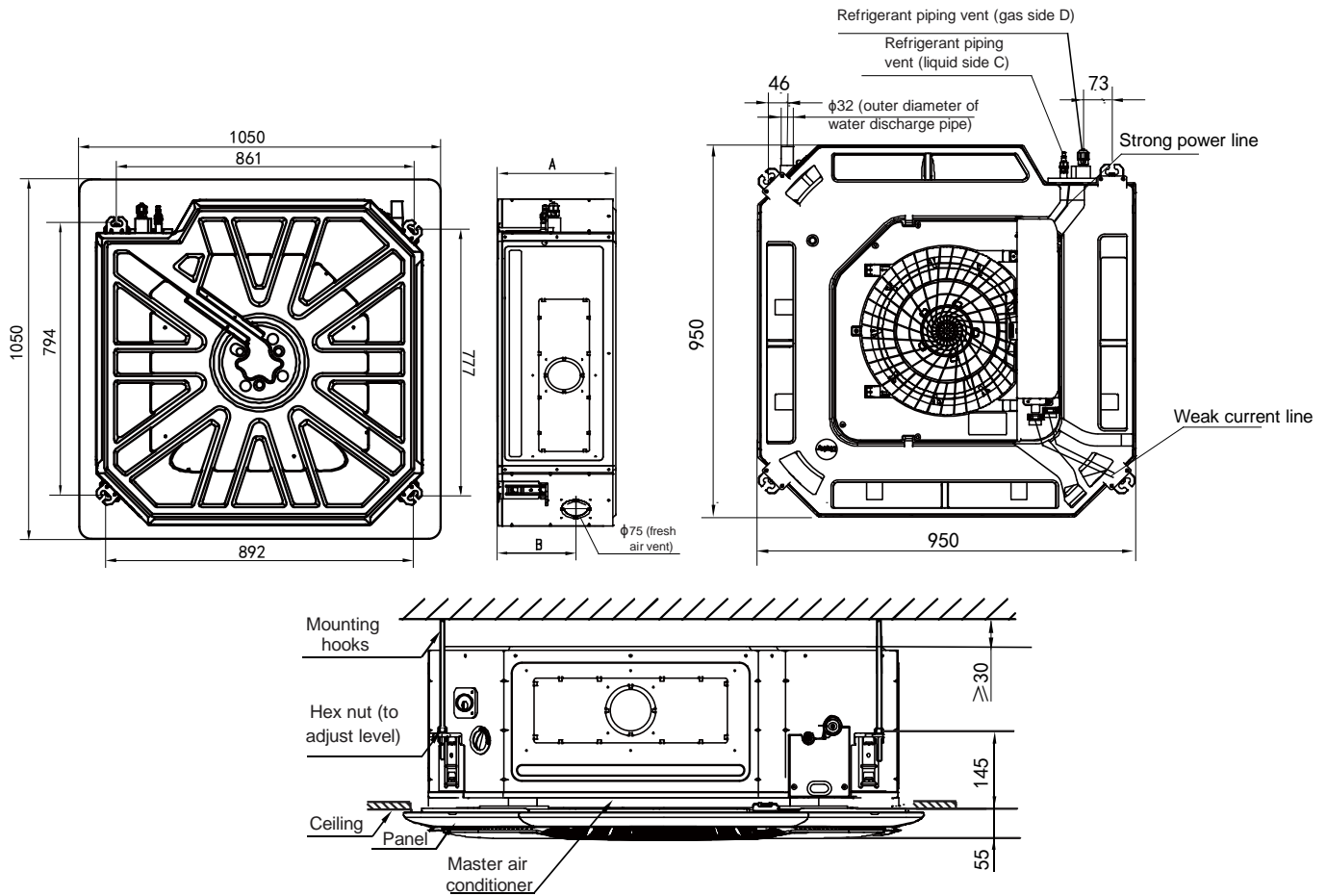


Table 2.1: Four-way Cassette dimensions

Model names	Dimensions (mm)	
	A	B
BECS010Q3A-DWM028 BECS012Q3A-DWM036 BECS015Q3A-DWM045 BECS019Q3A-DWM056 BECS024Q3A-DWM071 BECS027Q3A-DWM080	230	126
BECS031Q3A-DWM090 BECS036Q3A-DWM100 BECS038Q3A-DWM112 BECS048Q3A-DWM140	300	197
BECS060Q0A-DWM160	300	200

Table 2.2: Four-way Cassette piping connections

Model names	Gas pipe (mm)	Liquid pipe (mm)
BECS010Q3A-DWM028 BECS012Q3A-DWM036 BECS015Q3A-DWM045	Φ12.7	Φ6.35
BECS019Q3A-DWM056 BECS024Q3A-DWM071 BECS027Q3A-DWM080 BECS031Q3A-DWM090 BECS036Q3A-DWM100 BECS038Q3A-DWM112 BECS048Q3A-DWM140 BECS060Q0A-DWM160	Φ15.9	Φ9.53

# Ultima Series VRF Indoor Units

## 3 Unit Placement

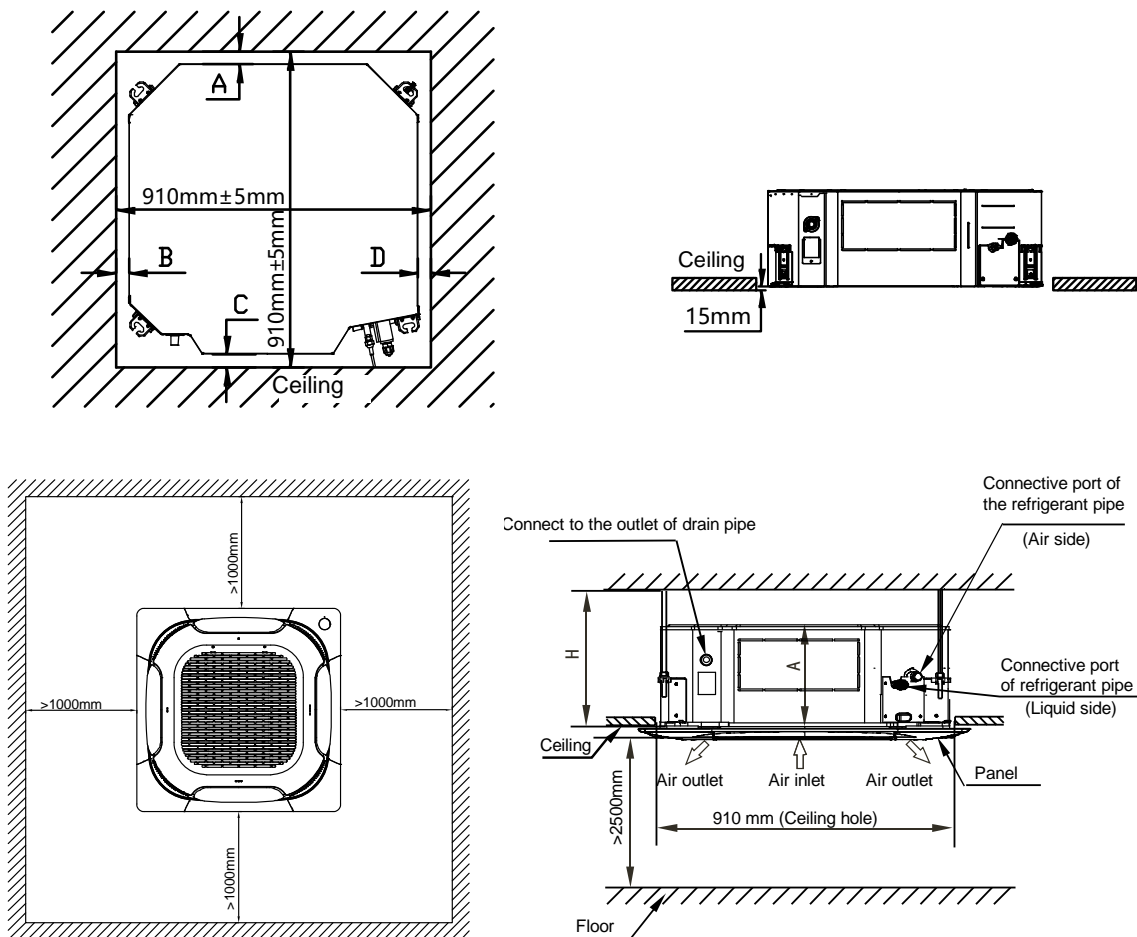
### 3.1 Placement Considerations

Unit placement should take account of the following considerations:

- Units should not be installed in the following locations:
  - Where exposure to direct radiation from a high-temperature heat source or to interference from a source of electromagnetic radiation may occur.
  - Where dust or dirt may affect heat exchangers.
  - Where exposure to oil or to corrosive or harmful gases, such as acidic or alkaline gases, may occur.
  - Where exposure to salinity may occur, such as seaside locations.
  - Where highly flammable materials are present.
  - Where exposure to oily air may occur, such as a kitchen.
  - Where exposure to very high humidity may occur, such as a laundry.
- Units should be installed in positions where:
  - The ceiling is horizontal and is able to bear the unit's weight.
  - There are no obstructions that could impede the airflow into and out of the unit.
  - The airflow out of the unit can reach throughout the room.
  - There is sufficient space for access during installation, servicing and maintenance.
  - The refrigerant piping and drain piping can be easily connected to the refrigerant piping and drain piping systems.
  - Short-circuit ventilation (where outlet air returns quickly to a unit's air inlet) will not occur.

### 3.2 Space Requirements

Figure 3.1: BECS010 (12,15,18,24,28,32,36,40,48)Q4/N1-E(At) Four-way Cassette space requirements (unit: mm)



**Units** Figure 3.2: BECS060Q0A-DWM160 Four-way Cassette space requirements (unit: mm)

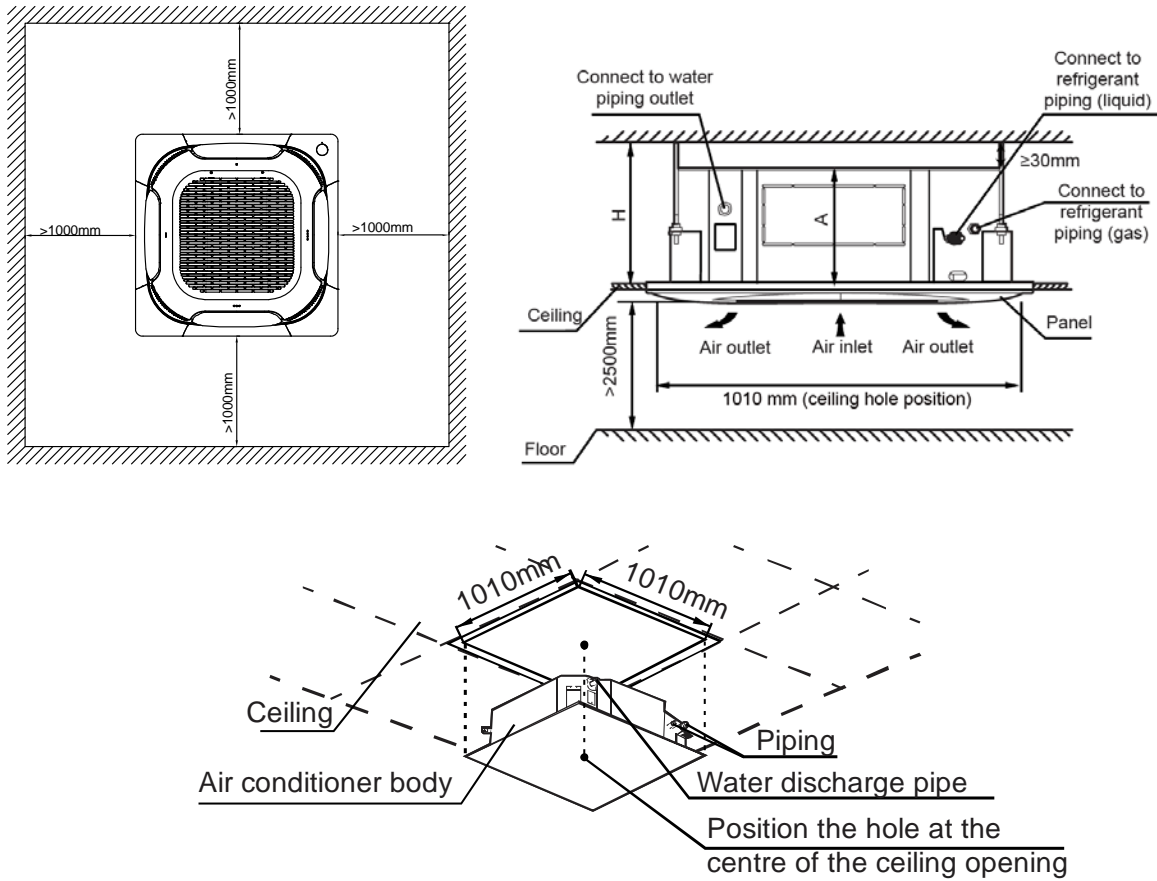
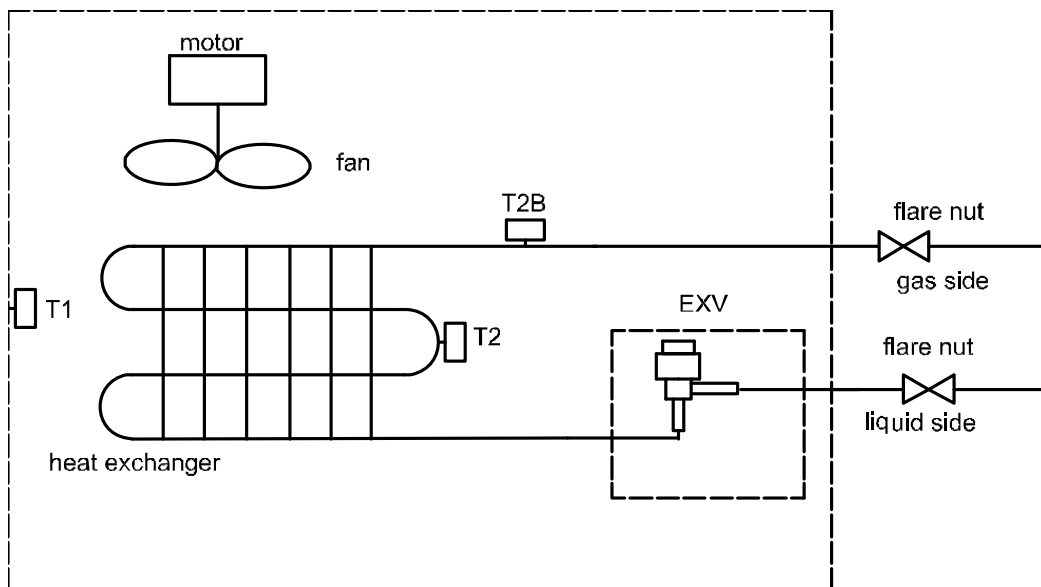


Table 3.1: Four-way Cassette dimensions and space requirements

Model name	Dimensions / Requirements (mm)	
	A	H
BECS010Q3A-DWM028	230	≥260
BECS012Q3A-DWM036		
BECS015Q3A-DWM045		
BECS019Q3A-DWM056		
BECS024Q3A-DWM071		
BECS027Q3A-DWM080		
BECS031Q3A-DWM090	300	≥330
BECS036Q3A-DWM100		
BECS038Q3A-DWM112		
BECS048Q3A-DWM140		
BECS060Q0A-DWM160		

## Units 4 Piping Diagram

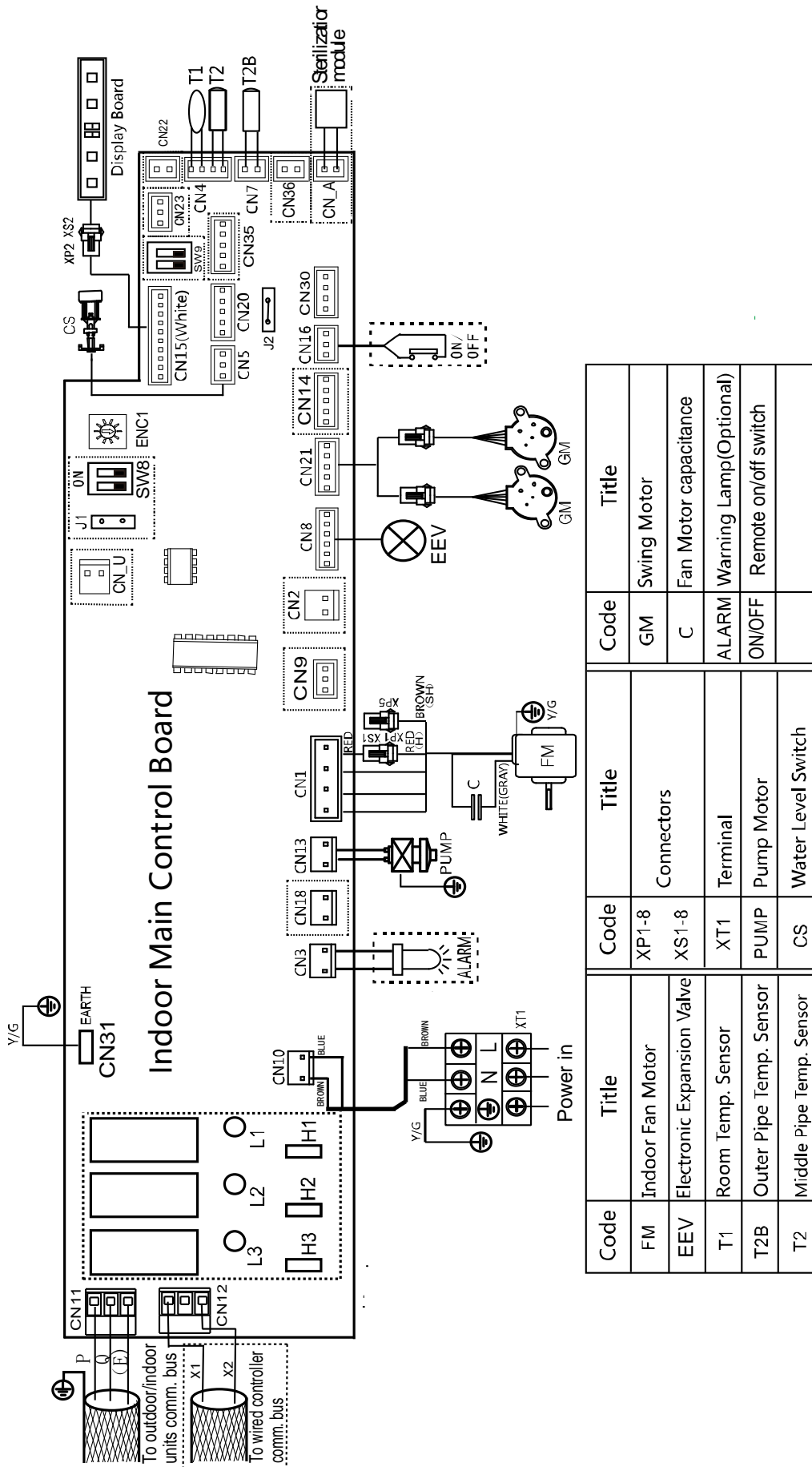
Figure 4.1: Four-way Cassette piping diagram



Legend	
T1	Indoor ambient temperature sensor
T2	Indoor heat exchanger mid-point temperature sensor
T2B	Indoor heat exchanger outlet temperature sensor

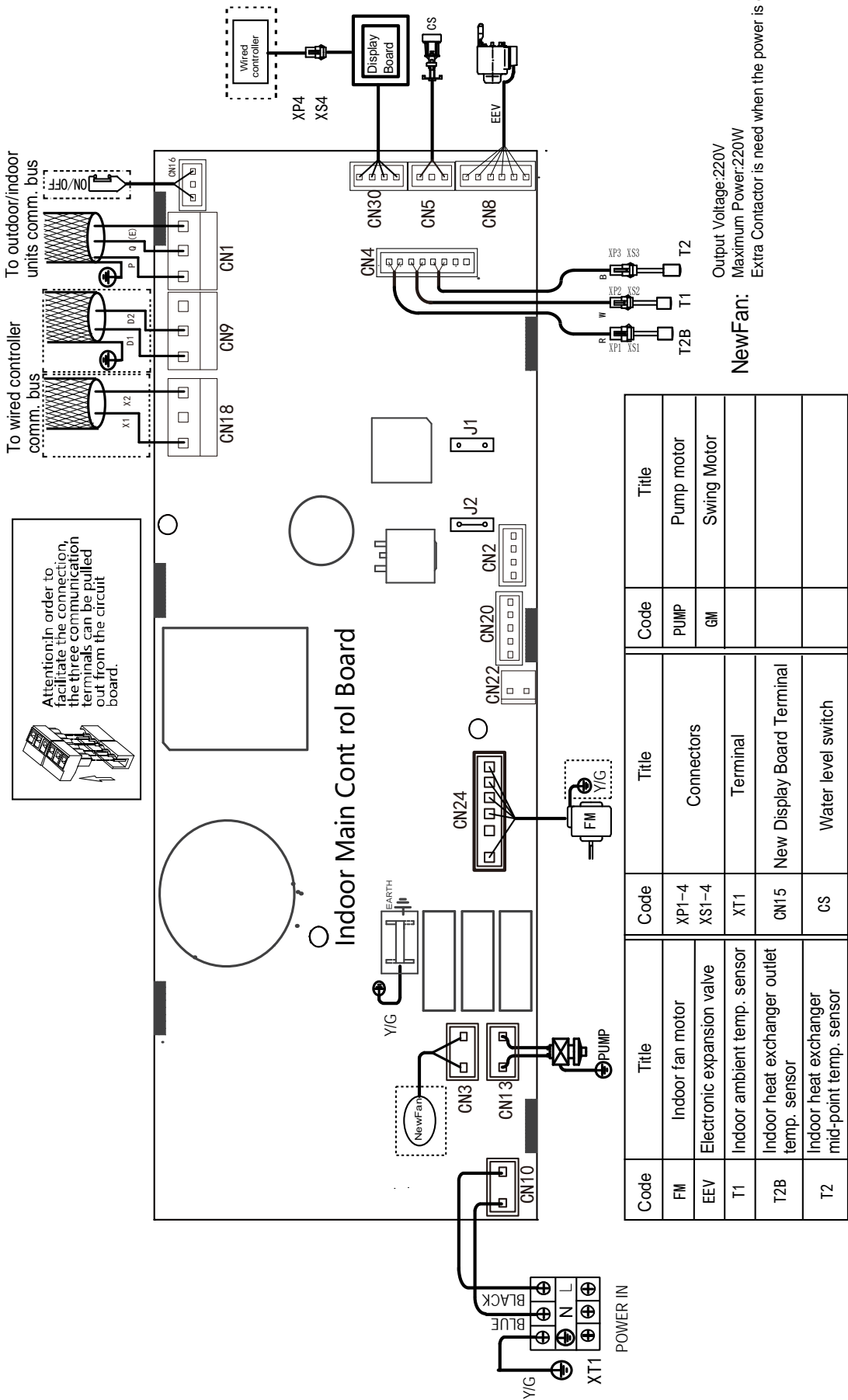
## 5 Wiring Diagram

Figure 5.1: BECS010 (12,15,18,24,28,32,36,40,48)Q4/N1-E(At) Four-way Cassette wiring diagram



# Ultima Series VRF Indoor Units

Figure 5.2: BECS060QA-DWM160 Four-way Cassette wiring diagram



### Notes for installers and service engineers

#### Caution

- All installation, servicing and maintenance must be carried out by competent and suitably qualified, certified and accredited professionals and in accordance with all applicable legislation.
- Units should be grounded in accordance with all applicable legislation. Metal and other conductive components should be insulated in accordance with all applicable legislation.
- Power supply wiring should be securely fastened at the power supply terminals – loose power supply wiring would represent a fire risk.
- After installation, servicing or maintenance, the electric control box cover should be closed. Failing to close the electric control box cover risks fire or electric shock.
- Switch ENC1 (indoor unit capacity setting) is factory-set and its setting should normally not be changed. The only circumstances in which a switch ENC1 might need to be set in the field is when replacing a main PCB. When replacing a main PCB, ensure that the capacity setting on switch ENC1 on the new PCB is consistent with the unit capacity given on the unit's nameplate.

# Ultima Series VRF Indoor Units

## 6 Capacity Tables

### 6.1 Cooling Capacity Table

Table 6.1: Four-way Cassette cooling capacity

Model	Indoor air temperature (°C WB/DB)													
	14/20		16/23		18/26		19/27		20/28		22/30		24/32	
	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC
BECS010Q3A-DWM028	2.5	2.5	2.7	2.5	2.8	2.5	2.8	2.4	2.9	2.3	2.9	2.2	3.0	2.1
BECS012Q3A-DWM036	3.2	3.2	3.4	3.2	3.6	3.2	3.6	3.0	3.7	3.0	3.8	2.8	3.9	2.7
BECS015Q3A-DWM045	4.0	3.8	4.3	3.9	4.5	3.9	4.5	3.7	4.6	3.6	4.7	3.4	4.8	3.3
BECS019Q3A-DWM056	5.0	4.8	5.3	4.8	5.6	4.8	5.6	4.6	5.7	4.5	5.8	4.2	6.0	4.1
BECS024Q3A-DWM071	6.3	6.0	6.7	6.0	7.0	6.0	7.1	5.8	7.2	5.6	7.4	5.4	7.6	5.2
BECS027Q3A-DWM080	7.1	6.9	7.6	6.9	7.9	6.8	8.0	6.6	8.1	6.4	8.3	6.1	8.5	5.8
BECS031Q3A-DWM090	8.0	7.6	8.5	7.6	8.9	7.6	9.0	7.3	9.1	7.1	9.4	6.8	9.6	6.5
BECS036Q3A-DWM100	8.9	8.6	9.5	8.6	9.9	8.5	10.0	8.2	10.1	7.9	10.4	7.6	10.6	7.2
BECS038Q3A-DWM112	9.9	9.5	10.6	9.6	11.1	9.5	11.2	9.2	11.3	8.9	11.6	8.4	11.9	8.1
BECS048Q3A-DWM140	12.4	11.6	13.2	11.7	13.8	11.6	14.0	11.3	14.2	11.0	14.5	10.5	14.9	10.1
BECS060Q0A-DWM160	14.2	13.5	15.1	13.5	15.8	13.4	16.0	13.0	16.2	12.6	16.6	12.0	17.0	11.5

Abbreviations:

TC: Total capacity (kW)

SC: Sensible capacity (kW)

Notes:

1. Shaded cells indicate rating condition

### 6.2 Heating Capacity Table

Table 6.2: Four-way Cassette heating capacity

Model	Indoor air temperature (°C DB)					
	16	18	20	21	22	24
	TC	TC	TC	TC	TC	TC
BECS010Q3A-DWM028	3.4	3.4	3.2	3.1	3.0	2.8
BECS012Q3A-DWM036	4.2	4.2	4.0	3.8	3.8	3.5
BECS015Q3A-DWM045	5.3	5.3	5.0	4.8	4.7	4.4
BECS019Q3A-DWM056	6.7	6.6	6.3	6.1	5.9	5.5
BECS024Q3A-DWM071	8.5	8.4	8.0	7.8	7.5	7.0
BECS027Q3A-DWM080	9.5	9.5	9.0	8.7	8.5	7.8
BECS031Q3A-DWM090	10.6	10.5	10.0	9.7	9.4	8.8
BECS036Q3A-DWM100	11.8	11.7	11.1	10.8	10.4	9.7
BECS038Q3A-DWM112	13.3	13.1	12.5	12.1	11.8	10.9
BECS048Q3A-DWM140	17.0	16.8	16.0	15.5	15.0	13.9
BECS060Q0A-DWM160	18.0	17.9	17.0	16.5	16.0	14.8

Abbreviations:

TC: Total capacity (kW)

Notes:

1. Shaded cells indicate rating condition



## 7 Electrical Characteristics

Table 7.1: Four-way Cassette electrical characteristics

Model	Power supply						Indoor fan motors	
	Hz	Volts	Min. volts	Max. volts	MCA	MFA	Rated motor output (kW)	FLA
BECS010Q3A-DWM028	50	220-240	198	264	0.3	15	0.026	0.2
BECS012Q3A-DWM036	50	220-240	198	264	0.3	15	0.026	0.2
BECS015Q3A-DWM045	50	220-240	198	264	0.4	15	0.026	0.3
BECS019Q3A-DWM056	50	220-240	198	264	0.4	15	0.026	0.3
BECS024Q3A-DWM071	50	220-240	198	264	0.4	15	0.03	0.3
BECS027Q3A-DWM080	50	220-240	198	264	0.5	15	0.037	0.4
BECS031Q3A-DWM090	50	220-240	198	264	0.7	15	0.05	0.5
BECS036Q3A-DWM100	50	220-240	198	264	0.7	15	0.065	0.6
BECS038Q3A-DWM112	50	220-240	198	264	0.7	15	0.065	0.6
BECS048Q3A-DWM140	50	220-240	198	264	0.8	15	0.065	0.6
BECS060Q0A-DWM160	50	220-240	198	264	1.26	15	0.09	1.01

Abbreviations:

MCA: Minimum Circuit Amps

MFA: Maximum Fuse Amps

FLA: Full Load Amps

## 8 Sound Levels

### 8.1 Overall

Table 8.1: Four-way Cassette sound pressure levels<sup>1</sup>

Model	Sound pressure levels dB(A)		
	H	M	L
BECS010Q3A-DWM028	32	31	30
BECS012Q3A-DWM036	32	31	30
BECS015Q3A-DWM045	36	34	33
BECS019Q3A-DWM056	36	34	33
BECS024Q3A-DWM071	38	36	35
BECS027Q3A-DWM080	42	39	37
BECS031Q3A-DWM090	43	39	38
BECS036Q3A-DWM100	45	42	40
BECS038Q3A-DWM112	45	42	40
BECS048Q3A-DWM140	46	41	39

Notes:

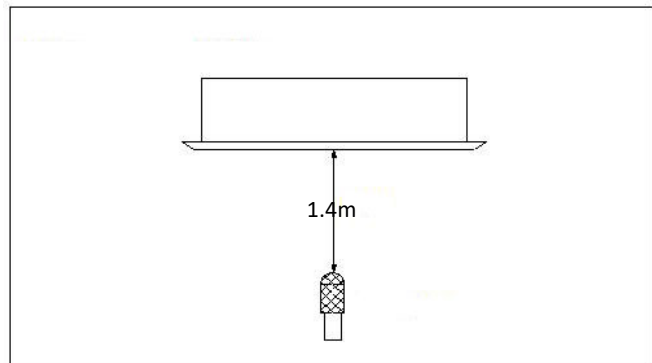
1. Sound pressure levels are measured 1.4m below the unit in a semi-anechoic chamber. During in-situ operation, sound pressure levels may be higher as a result of ambient noise.

Model name	Sound pressure levels dB(A)						
	SSH	SH	H	M	L	SL	SSL
BECS060Q0A-DWM160	46	44	42	41	39	38	37

Notes:

1. Sound pressure levels are measured 1.4m below the unit in a semi-anechoic chamber. During in-situ operation, sound pressure levels may be higher as a result of ambient noise.

Figure 8.1: Four-way Cassette sound pressure level measurement



### 8.2 Octave Band Levels

Figure 8.2: BECS010 (12) octave band levels

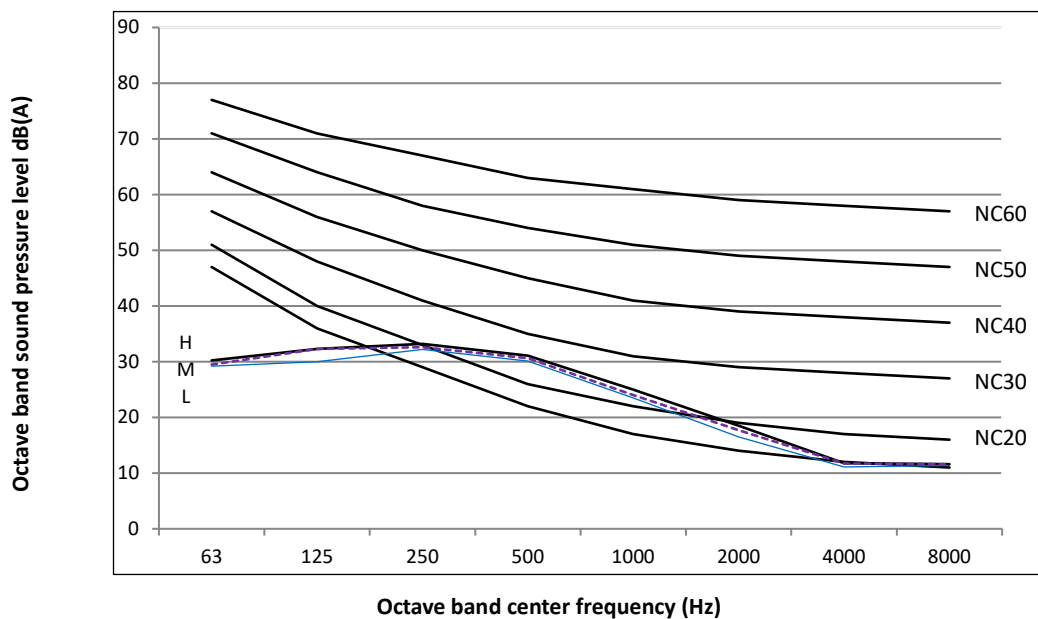


Figure 8.3: BECS015 (18) octave band levels

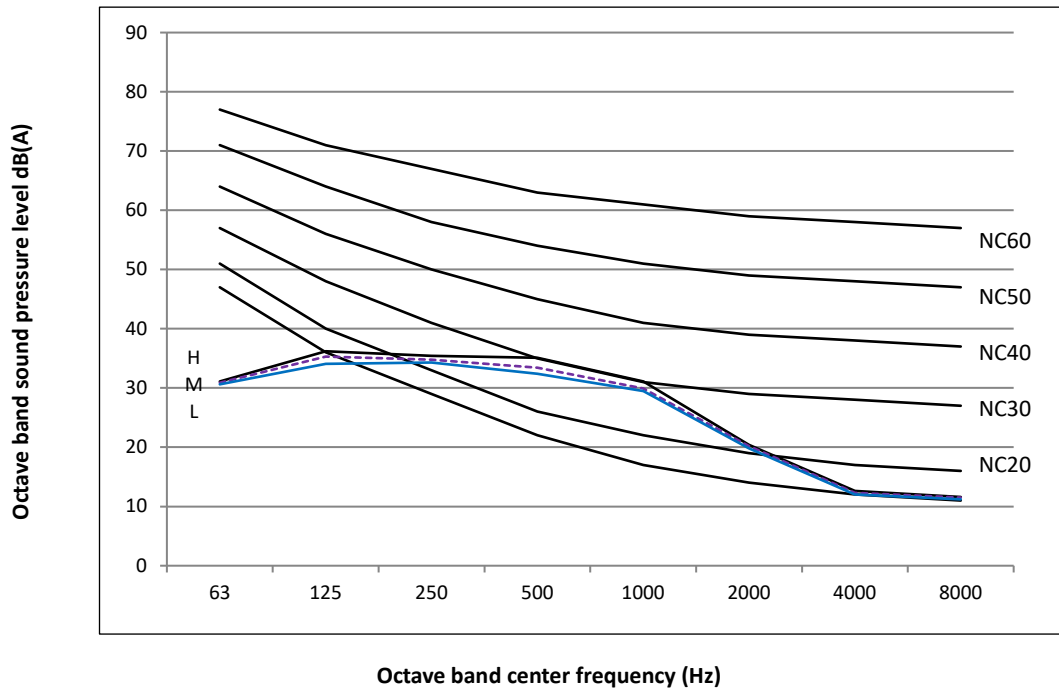
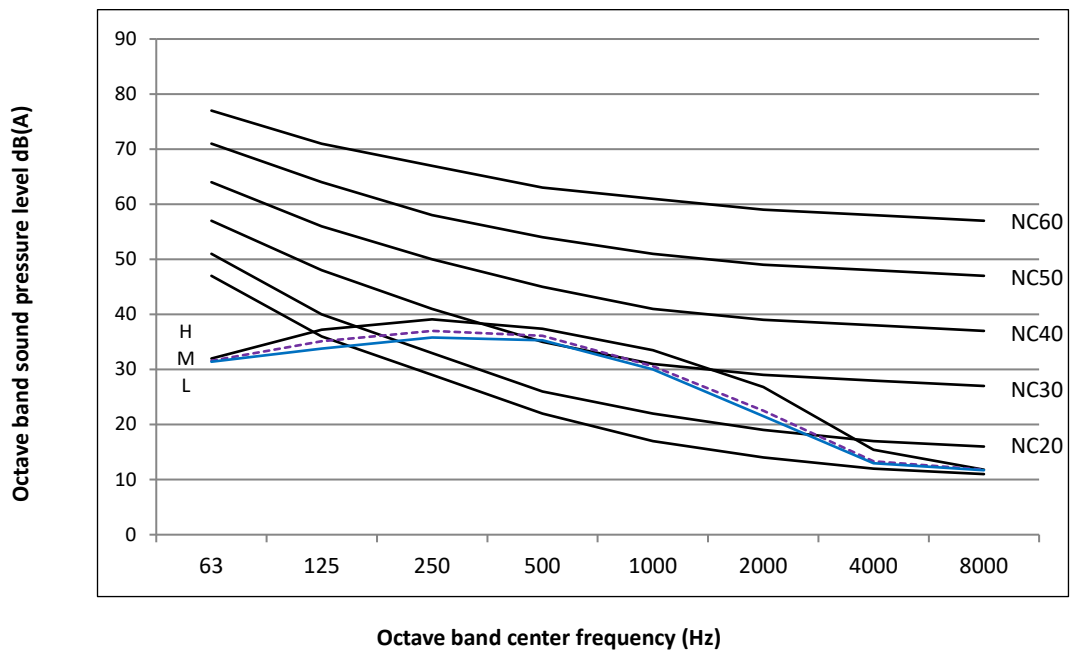


Figure 8.4: BECS024Q3A-DWM071 octave band levels



# Ultima Series VRF Indoor Units

Figure 8.5: BECS027Q3A-DWM080 octave band levels

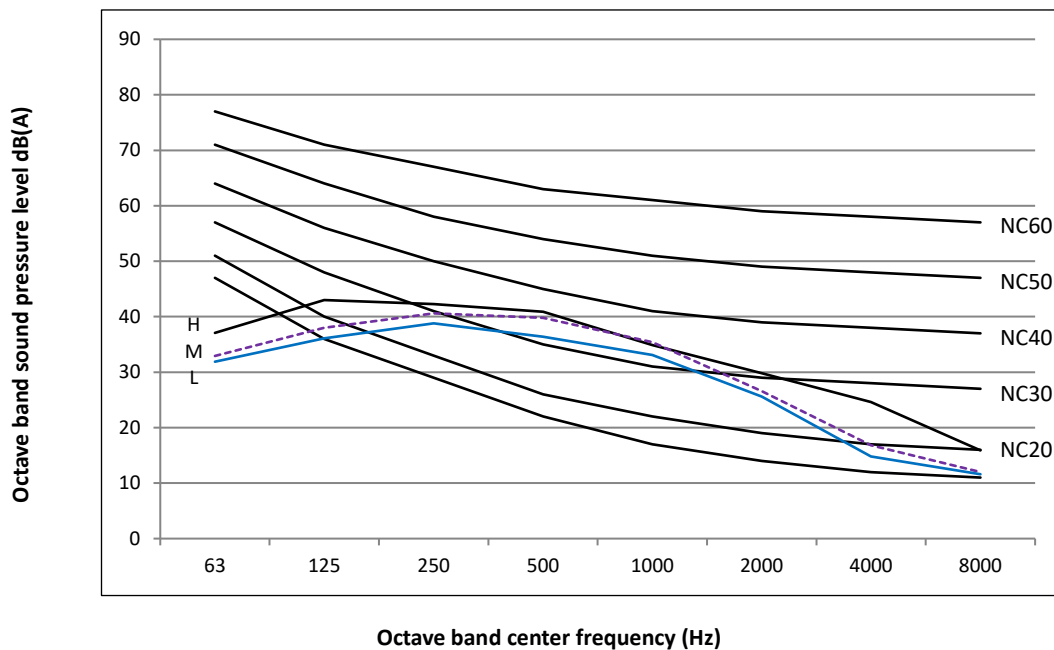


Figure 8.6: BECS031Q3A-DWM090 octave band levels

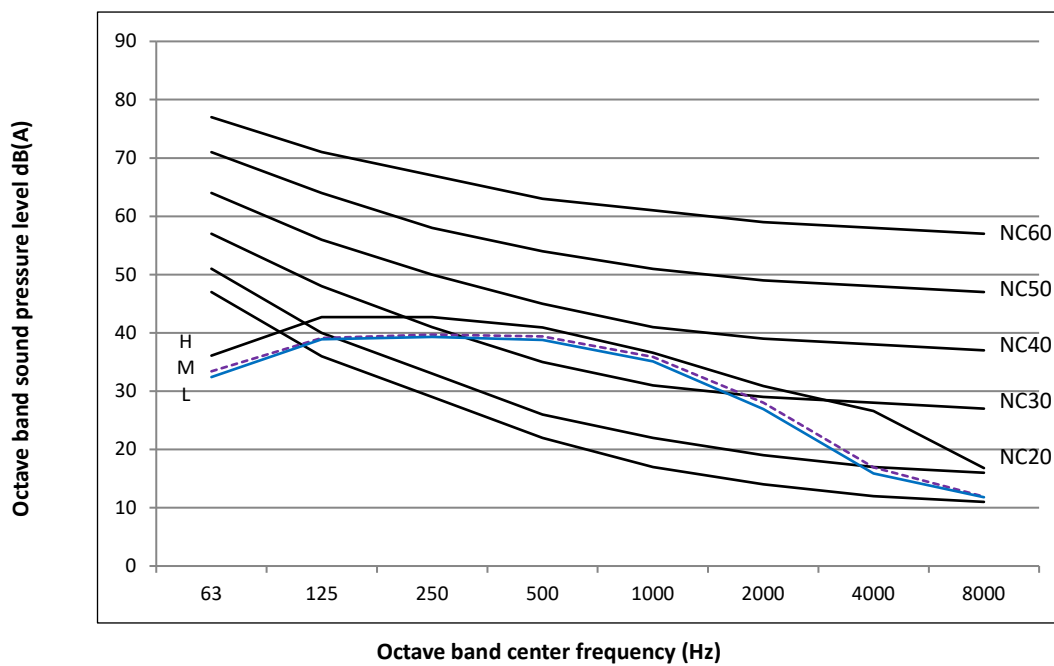


Figure 8.7: BECS(40) octave band levels

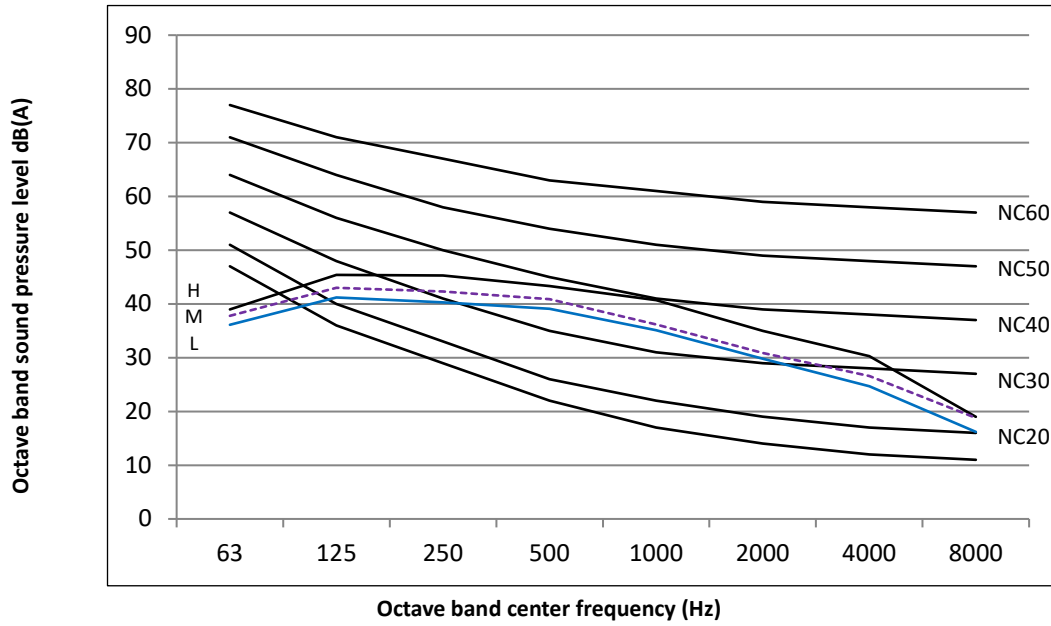
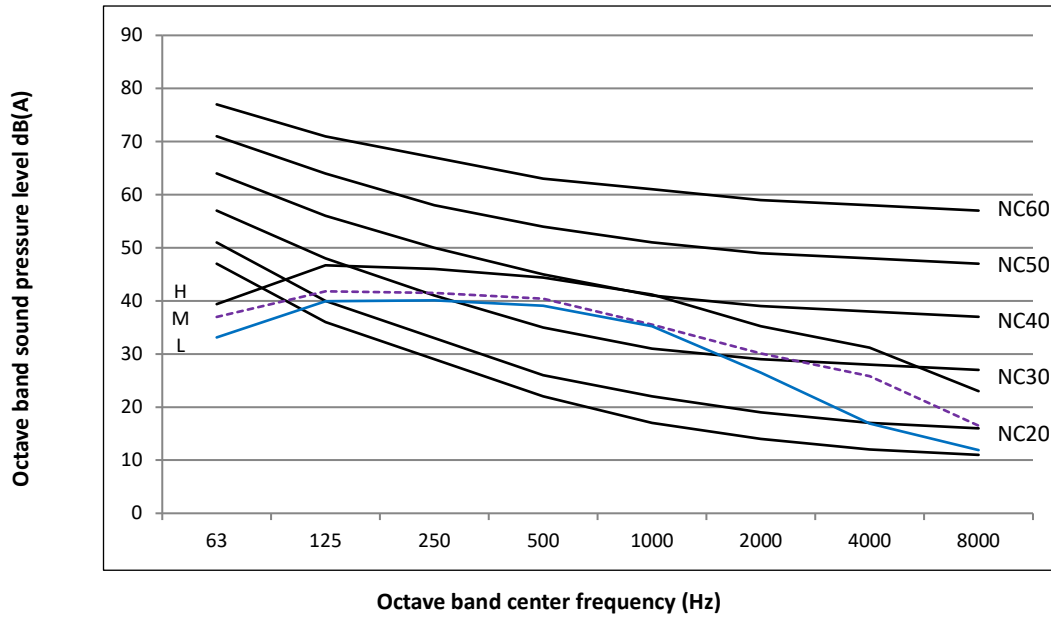
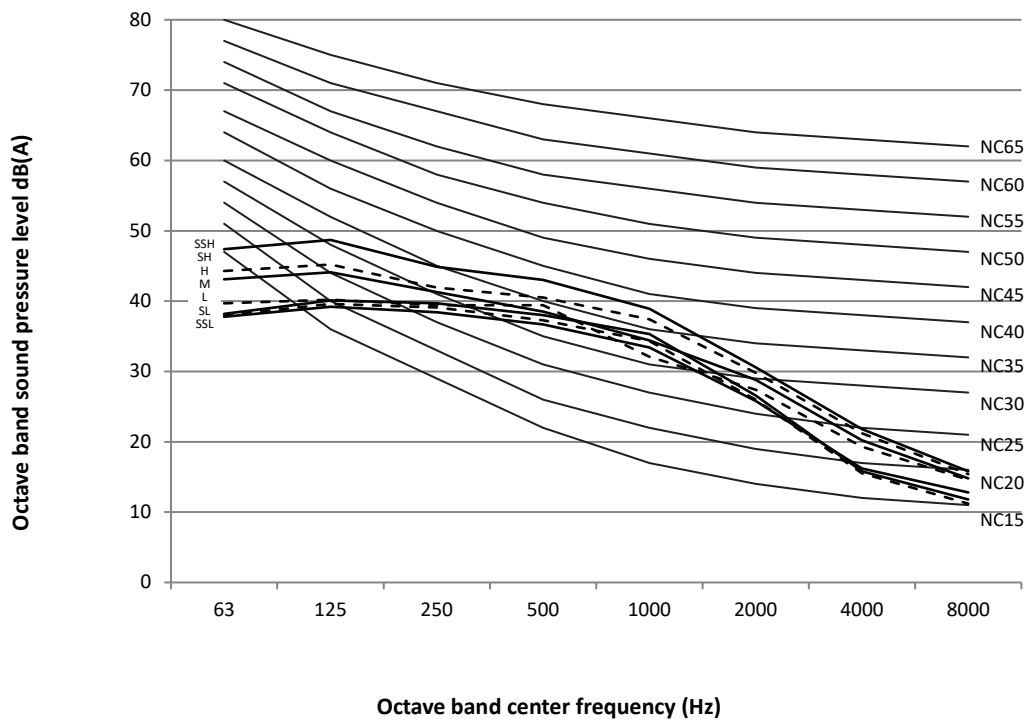


Figure 8.8: BECS048Q3A-DWM140 octave band levels



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Figure 8.9: BECS060Q0A-DWM160 octave band levels





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