BEFC-D Ultima Series

60Hz Floor Ceiling Indoor Unit

Technical Manual

220~240V/1/50Hz

R410A

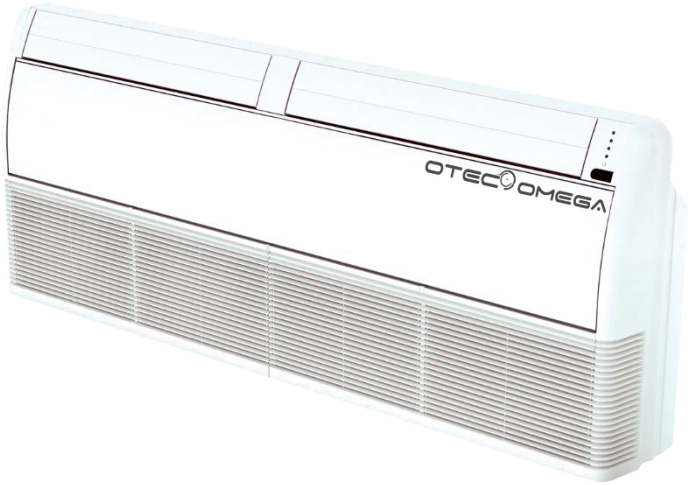
Commercial Air Conditioners

Engineering Data

Ceiling & Floor VRF IDU

AC 60Hz

Ultima Series



BEFC012Q2A-DWM036

BEFC015Q2A-DWM045

BEFC019Q2A-DWM056

BEFC024Q2A-DWM071

BEFC027Q2A-DWM080

BEFC031Q2A-DWM090

BEFC038Q2A-DWM112

BEFC048Q2A-DWM140

Ceiling & Floor

1 Specifications 4

2 Dimensions 6

3 Unit Placement 8

4 Piping Diagram 9

5 Wiring Diagram 10

6 Capacity Tables 12

7 Electrical Characteristics 14

8 Sound Levels 15

1 Specifications

BEFC012Q2A-DWM036 / BEFC015Q2A-DWM045 / BEFC019Q2A-DWM056 / BEFC024Q2A-DWM071

Model (MDV-)			BEFC012Q2A-DWM036	BEFC015Q2A-DWM045	BEFC019Q2A-DWM056	BEFC024Q2A-DWM071
Power supply			1 phase, 220-240V,60Hz			
Cooling	Capacity	kBtu/h	12	15	19	24
	Input	W	50	148	148	148
Heating	Capacity	kBtu/h	13	17	21	27
	Input	W	50	148	148	148
Indoor fan motor	Type		AC			
	Quantity		1			
Indoor coil	Number of rows		2	3		
	Tube pitchxrow pitch	in.(mm)	1x7/8(25.4x22)			
	Fin spacing	in.(mm)	1/16(1.8)			
	Fin type		Hydrophilic aluminum			
	Diameter & type	in.(mm)	3/8(Φ9.53), inner-groove tube			
	Dimensions (LxHxW)	in.(mm)	31-21/32x10x1-23/32(804x254x44)	31-21/32x10x2-19/32(804 x 254 x 66)		
	Number of circuits		3			
Indoor air flow (H/M/L)		m3/h	600/480/400	750/650/550	750/650/550	750/650/550
		CFM	353/283/235	441/383/324	441/383/324	441/383/324
Indoor noise level (H/M/L)		dB(A)	40/38/36	43/41/38	43/41/38	43/41/38
Indoor unit	Dimension (WxHxD)	in.(mm)	38-31/32×7-63/64×25-63/64(990×203×660)			
	Packing (WxHxD)	in.(mm)	42-7/8x11-21/32x29-9/32(1089x296x744)			
	Net/Gross weight	lbs.(kg)	57.3/70.6(26/32)	61.7/75(28/34)	61.7/75(28/34)	61.7/75(28/34)
Pipe connections	Liquid pipe	in.(mm)	1/4(Φ6.35)		3/8(Φ9.53)	
	Gas pipe	in.(mm)	1/2(Φ12.7)		5/8(Φ15.9)	
	Drain pipe	in.(mm)	OD63/64 (Φ25)			

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. Fan motor speed and air flow rate are from the highest speed to the lowest speed, total 3 steps for each model.
4. Sound pressure level is from highest level to lowest level, total 3 steps for each model. Sound pressure level is measured in a semi-anechoic chamber.
5. Unit body dimensions given are the largest external dimensions of the unit, including hanger attachments.

BEFC027Q2A-DWM080 / BEFC031Q2A-DWM090 / BEFC038Q2A-DWM112 / BEFC048Q2A-DWM140

Model (MDV-)			BEFC027Q2A-DWM080	BEFC031Q2A-DWM090	BEFC038Q2A-DWM112	BEFC048Q2A-DWM140
Power supply			1 phase, 220-240V,60Hz			
Cooling	Capacity	kBtu/h	27	30	38	47
	Input	W	183	183	245	245
Heating	Capacity	kBtu/h	30	34	42	51
	Input	W	183	183	245	245
Indoor fan motor	Type		AC			
	Quantity		1		2	
Indoor coil	Number of rows		3			
	Tube pitchxrow pitch	in.(mm)	1x7/8(25.4x22)			
	Fin spacing	in.(mm)	1/16(1.8)			
	Fin type		Hydrophilic aluminum			
	Diameter & type	in.(mm)	3/8(Φ9.53), inner-groove tube			
	Dimensions (LxHxW)	in.(mm)	43-5/64x10x2-19/32(1094x254x66)		53-35/64x10x2-19/32(1360x254x66)	
	Number of circuits		5			
Indoor air flow (H/M/L)		m3/h	1200/900/700	1200/900/700	1980/1860/1730	1980/1860/1730
		CFM	706/530/412	706/530/412	1165/1095/1018	1165/1095/1018
Indoor noise level (H/M/L)		dB(A)	45/43/40	45/43/40	47/45/42	47/45/42
Indoor unit	Dimension (WxHxD)	in.(mm)	50-25/64×7-63/64×25-63/64(1280×203×660)		65-3/4 x9-39/64x26-49/64(1670 x244x680)	
	Packing (WxHxD)	in.(mm)	54-19/64x11-21/32x29-19/64(1379x296x744)		69-29/64 x12-61/64x29-59/64(1764x329x760)	
	Net/Gross weight	lbs.(kg)	76.1/90.4(34.5/41)	76.1/90.4(34.5/41)	119.0/130.1(54/59)	119.0/130.1(54/59)
Pipe connections	Liquid pipe	in.(mm)	3/8(Φ9.53)			
	Gas pipe	in.(mm)	5/8(Φ15.9)			
	Drain pipe	in.(mm)	OD63/64 (Φ25)			

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. Fan motor speed and air flow rate are from the highest speed to the lowest speed, total 3 steps for each model.
4. Sound pressure level is from highest level to lowest level, total 3 steps for each model. Sound pressure level is measured in a semi-anechoic chamber.
5. Unit body dimensions given are the largest external dimensions of the unit, including hanger attachments.

2 Dimensions

2.1 Unit Dimensions

Figure 2.1: Ceiling & floor dimensions (unit: mm)

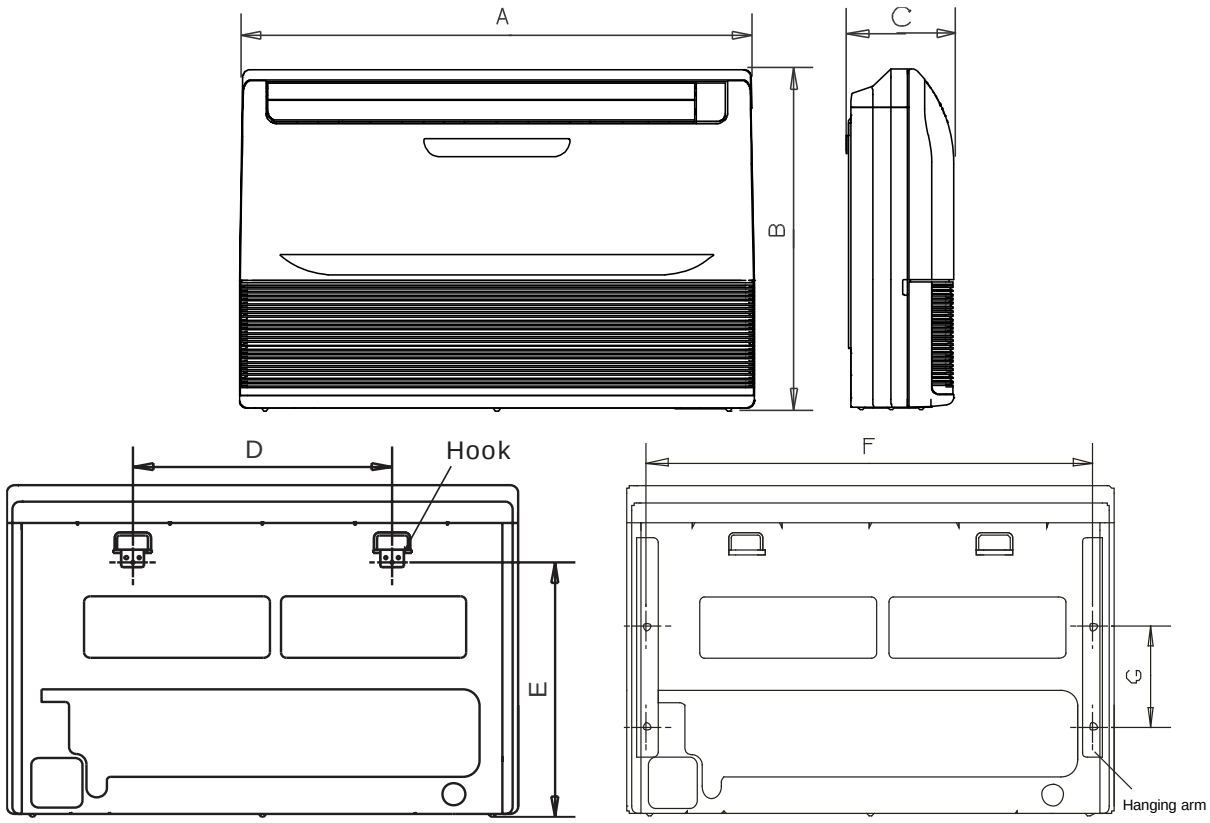


Table 2.1: Ceiling & floor dimensions

Model	Dimensions (mm)						
	A	B	C	D	E	F	G
MDV-D12DL/VN1-C(At) **MDV-D15DL/VN1-C(At)** **MDV-D18DL/VN1-C(At)** **MDV-D24DL/VN1-C(At)**	990	660	203	505	506	907	200
MDV-D28DL/VN1-C(At) **MDV-D32DL/VN1-C(At)**	1280	660	203	795	506	1195	200
MDV-D40DL/VN1-C(At) **MDV-D48DL/VN1-C(At)**	1670	680	244	1070	450	1542	200

Table 2.2: Ceiling & floor piping connections

Model	Gas pipe (mm)	Liquid pipe (mm)
BEFC012Q2A-DWM036 **BEFC015Q2A-DWM045**	Φ12.7	Φ6.35
BEFC019Q2A-DWM056 **BEFC024Q2A-DWM071** **BEFC027Q2A-DWM080** **BEFC031Q2A-DWM090** **BEFC038Q2A-DWM112** **BEFC048Q2A-DWM140**	Φ15.9	Φ9.53

3 Unit Placement

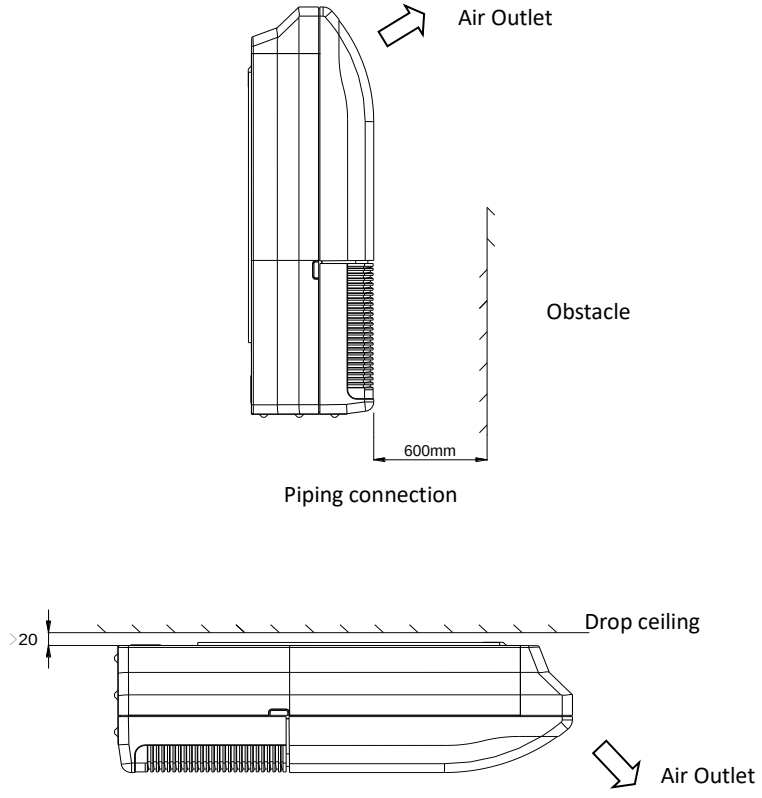
3.1 Placement Considerations

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.

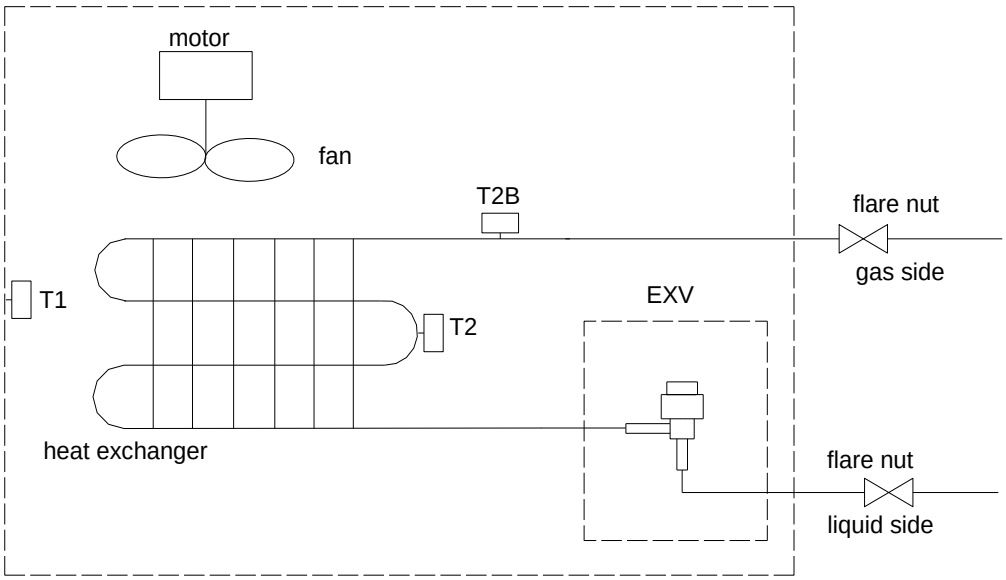
3.2 Space Requirements

Figure 3.1: Ceiling & floor space requirements (unit: mm)



4 Piping Diagram

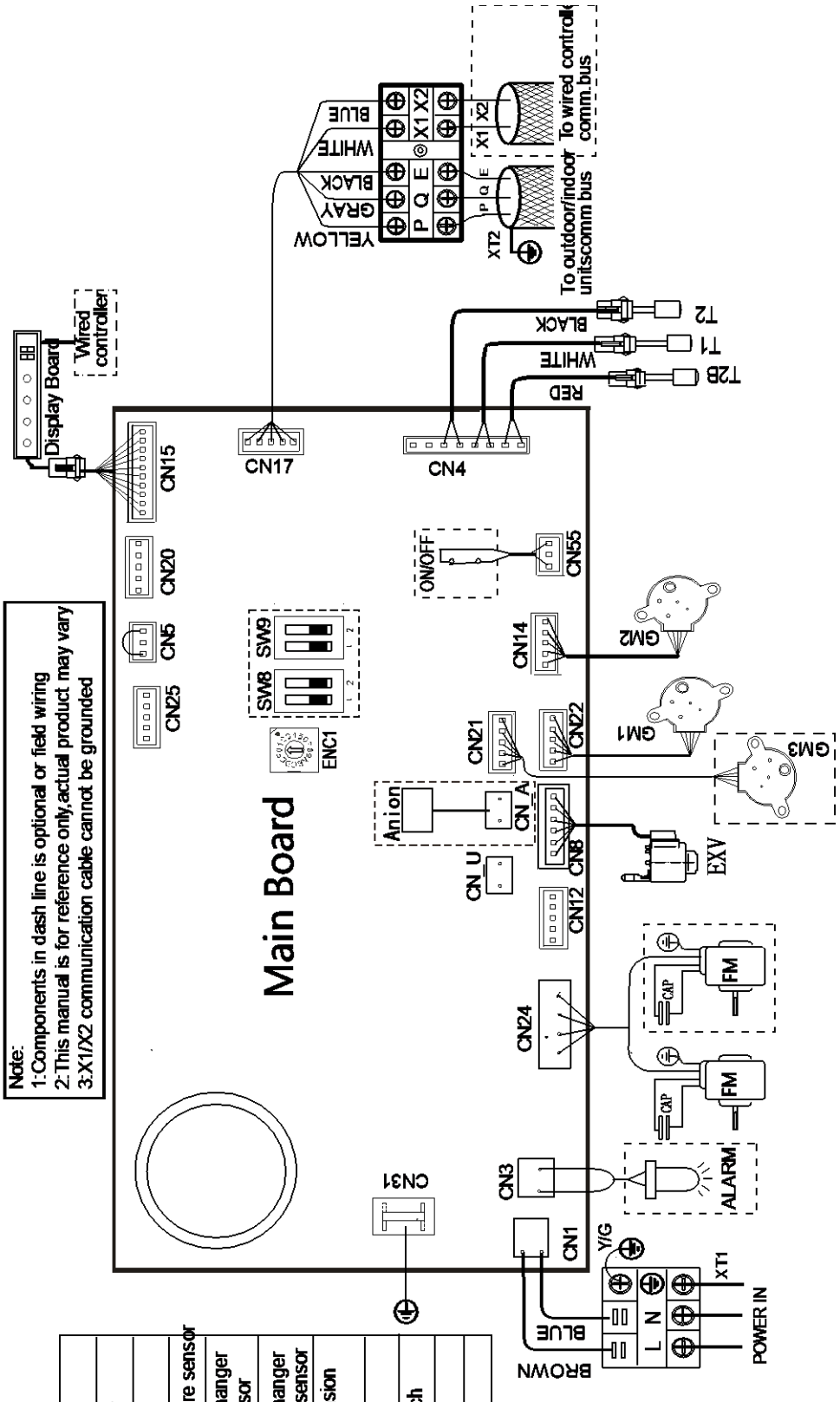
Figure 4.1: Ceiling & floor piping diagram



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

Units 5 Wiring Diagram

Figure 5.1: Ceiling & floor BEF-012(15,19,24,27,31,38,48)DWM036(45,56,71,80,90,112,140) wiring diagram



Code	Title
FM	Indoor fan motor
PUMP	Pump motor
T1	Room temperature sensor
T2B	Indoor heat exchanger outlet temp. sensor
T2	Indoor heat exchanger mid-point temp. sensor
EXV	Electronic expansion valve
CN3	Alarm port
CS	Water level switch
CN_U	UPS port
GM	Swing motor

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.

6 Capacity Tables

6.1 Cooling Capacity Table

Table 6.1: Ceiling & floor cooling capacity tables

Model	Indoor air temp. (°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
BEFC012Q2A-DWM036	3.2	3.1	3.4	3.1	3.6	3.1	3.6	3.0	3.7	2.9	3.8	2.8	3.9	2.7
BEFC015Q2A-DWM045	4.0	3.8	4.3	3.9	4.5	3.8	4.5	3.7	4.6	3.6	4.7	3.4	4.8	3.3
BEFC019Q2A-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
BEFC024Q2A-DWM071	6.3	6.0	6.7	6.0	7.0	5.9	7.1	5.8	7.2	5.6	7.4	5.4	7.6	5.2
BEFC027Q2A-DWM080	7.1	6.8	7.6	6.8	7.9	6.7	8.0	6.5	8.1	6.3	8.3	6.0	8.5	5.8
BEFC031Q2A-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
BEFC038Q2A-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
BEFC048Q2A-DWM140	12.4	11.9	13.2	11.9	13.8	11.8	14.0	11.4	14.2	11.1	14.5	10.5	14.9	10.1

Abbreviations:
TC: Total capacity (kW)
SC: Sensible capacity (kW)
Notes:
1.Shaded cells indicate rating condition

6.2 Heating Capacity Table

Table 6.2: Ceiling & floor heating capacity tables

Model	Indoor air temp. (°C DB)					
	16	18	20	21	22	24
	TC	TC	TC	TC	TC	TC
BEFC012Q2A-DWM036	4.2	4.2	4.0	3.8	3.8	3.5
MDV-D15DL/VN1-C(At)	5.3	5.3	5.0	4.8	4.7	4.4
BEFC019Q2A-DWM056	6.7	6.6	6.3	6.1	5.9	5.5
BEFC024Q2A-DWM071	8.5	8.4	8.0	7.8	7.5	7.0
BEFC027Q2A-DWM080	9.5	9.5	9.0	8.7	8.5	7.8
BEFC031Q2A-DWM090	10.6	10.5	10.0	9.7	9.4	8.8
BEFC038Q2A-DWM112	13.3	13.1	12.5	12.1	11.8	10.9
BEFC048Q2A-DWM140	15.9	15.7	15.0	14.6	14.1	13.1

Abbreviations :
TC: Total capacity (kW)
Notes:
1.Shaded cells indicate rating condition

7 Electrical Characteristics

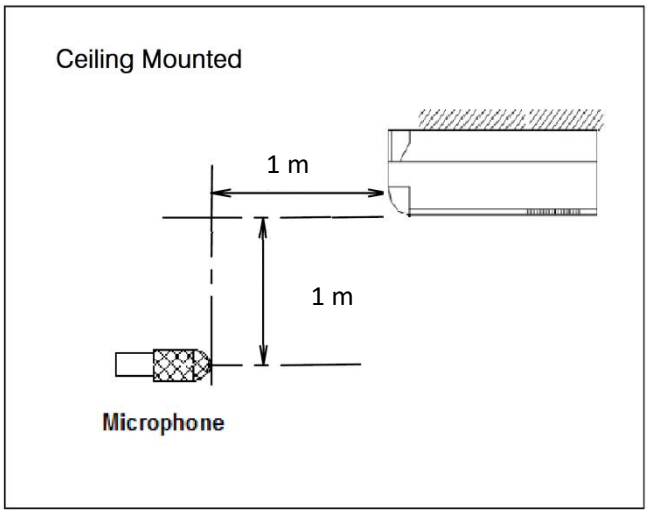
Table 7.1: Ceiling & floor electrical characteristics

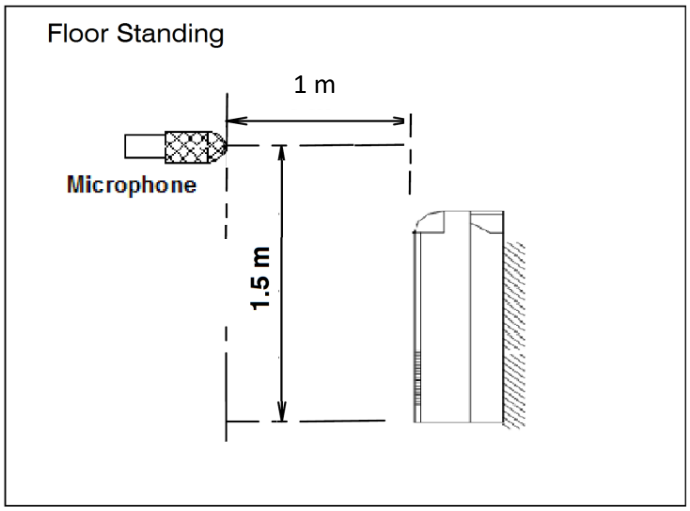
Model	Power supply						Indoor fan motors	
	Hz	Volts	Min. volts	Max. volts	MCA	MFA	Rated motor output (kW)	FLA
BEFC012Q2A-DWM036	60	220-240	198	264	0.45	15	0.10	0.35
BEFC015Q2A-DWM045	60	220-240	198	264	1.20	15	0.10	0.93
BEFC019Q2A-DWM056	60	220-240	198	264	1.20	15	0.10	0.95
BEFC024Q2A-DWM071	60	220-240	198	264	1.20	15	0.10	0.95
BEFC031Q2A-DWM090	60	220-240	198	264	1.30	15	0.10	1.10
BEFC031Q2A-DWM090	60	220-240	198	264	1.30	15	0.10	1.10
BEFC038Q2A-DWM112	60	220-240	198	264	1.70	15	0.10+0.10	0.65+0.65
BEFC048Q2A-DWM140	60	220-240	198	264	1.70	15	0.10+0.10	0.65+0.65

Abbreviations:
MCA: Minimum Circuit Amps
MFA: Maximum Fuse Amps
FLA: Full Load Amps

8 Sound Levels

8.1 Test Condition





Note:

1, during actual operation, these values are normally somewhat higher as a result of ambient conditions.

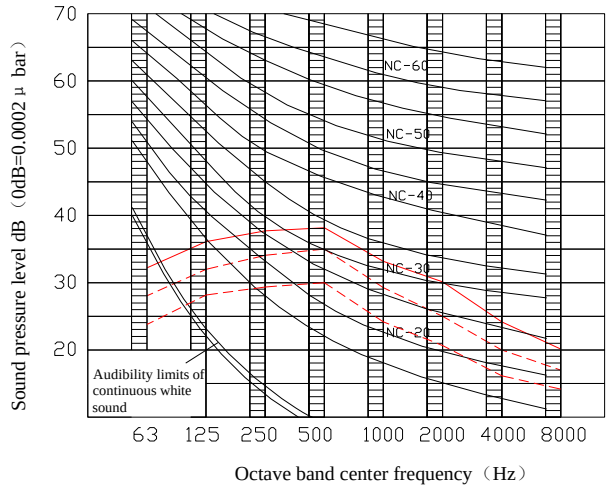
2, Anechoic chamber conversion value, measured at a point 1m in front of the unit at a height of 1.5m

8.2 Test Data (Sound Pressure Levels)

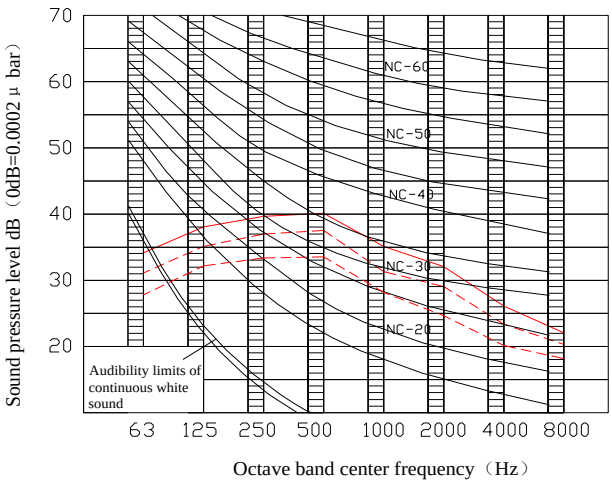
Model	Sound level under three speeds of fan (dB(A))		
	H	M	L
BEFC012Q2A-DWM036	40	38	36
BEFC015Q2A-DWM045	43	41	38
BEFC019Q2A-DWM056	43	41	38
BEFC024Q2A-DWM071	43	41	38
BEFC027Q2A-DWM080	45	43	40
BEFC031Q2A-DWM090	45	43	40
BEFC038Q2A-DWM112	47	45	42
BEFC048Q2A-DWM140	47	45	42

8.3 Octave Band Levels

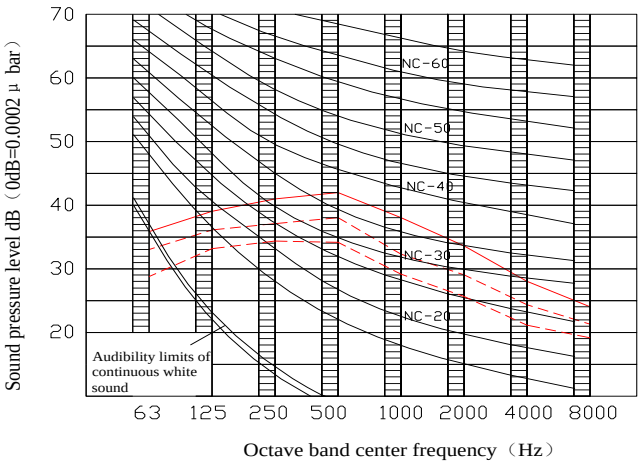
BEFC012Q2A-DWM036



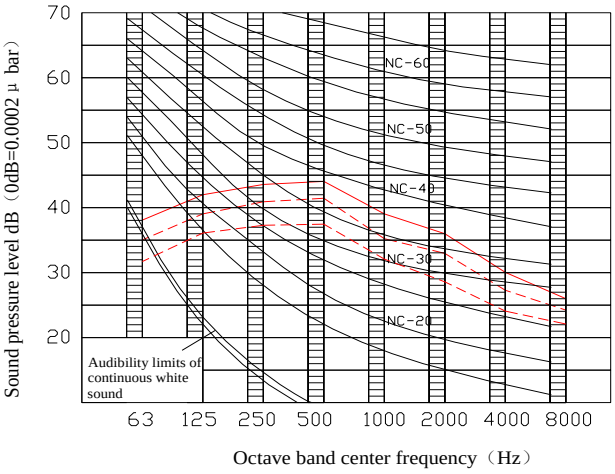
BEF-15(19) (24) DWM036(056,071)



BEFC027Q2A-DWM080



BEFC038Q2A-DWM112



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