

Air to Air Heat exchanger Type

VN-M150HE / VN-M250HE

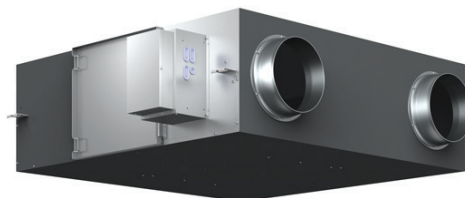
VN-M350HE / VN-M500HE

VN-M650HE / VN-M800HE

VN-M1000HE1

VN-M1500HE1

VN-M2000HE1



Contents

1. Specifications
2. Dimensions
3. Center of gravity
4. Wiring diagram
5. Electrical characteristics
6. Fan characteristics
7. Sound data

1. Specifications

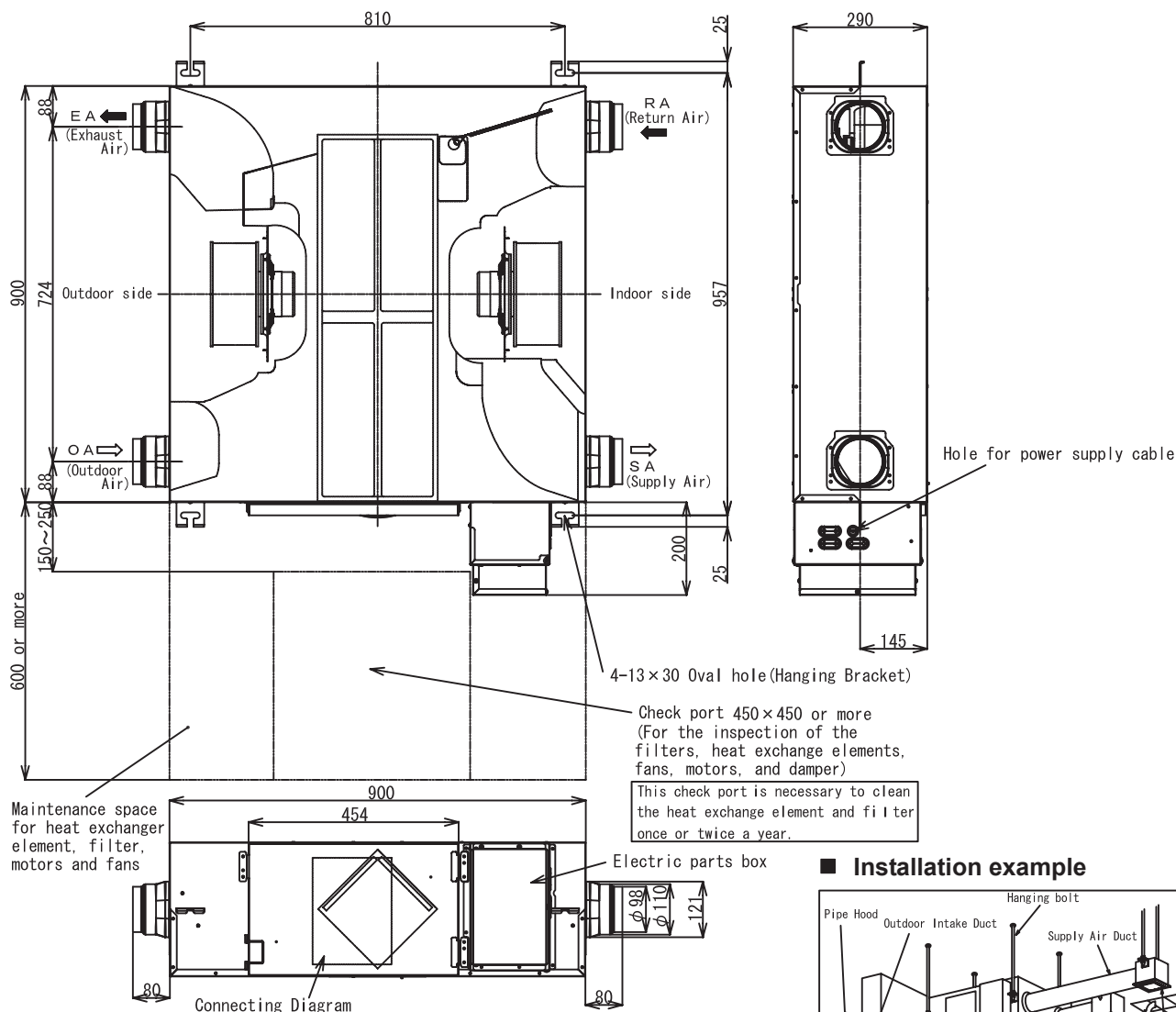
Item		Model	VN-M150HE	VN-M250HE	VN-M350HE	VN-M500HE	VN-M650HE	VN-M800HE	VN-M1000HE1	VN-M1500HE1	VN-M2000HE1
		Fan speed									
Power supply (V)			220-240V~, 50Hz								
Power consumption (W)		(Extra high)	68-78	123-138	165-182	214-238	262-290	360-383	390	640	780
		High	59-67	99-111	135-145	176-192	240-258	339-353	340	570	680
		Low	42-47	52-59	82-88	128-142	178-191	286-300	190	320	380
Air volume (m³/h)		(Extra high)	150	250	350	500	650	800	1000	1500	2000
		High	150	250	350	500	650	800	1000	1500	2000
		Low	110	155	210	390	520	700	700	1200	1400
External static pressure (Pa)		(Extra high)	82-102	80-98	114-125	134-150	91-107	142-158	105	140	105
		High	52-78	34-65	56-83	69-99	58-82	102-132	80	110	80
		Low	47-64	28-40	65-94	62-92	61-96	76-112	70	80	70
Sound pressure level (dB(A))		(Extra high)	26-28	29.5-30	34-35	32.5-34	34-36	37-38.5	38.0	41.0	41.5
		High	24-25.5	25-27	30-32	29.5-31	33-34	35.5-37	37.0	40.0	40.5
		Low	20-22	21-22	27-29	26-29	31-32.5	33.5-35	33.0	36.0	36.5
Sound power level (dB(A))		(Extra high)	41.0-43.0	44.5-45.0	49.0-50.0	47.5-49.0	49.0-51.0	52.0-53.5	53.0	56.0	56.5
Temperature exchange efficiency (%)		(Extra high)	81.5	78	74.5	76.5	75	76.5	73.5	76.5	73.5
		High	81.5	78	74.5	76.5	75	76.5	73.5	76.5	73.5
		Low	83	81.5	79.5	78	76.5	77.5	77.0	79.0	77.5
Enthalpy exchange efficiency (%)	For heating	(Extra high)	74.5	70	65	72	69.5	71	68.5	71.0	68.5
		High	74.5	70	65	72	69.5	71	68.5	71.0	68.5
		Low	76	74	71.5	73.5	71.5	71.5	71.5	73.5	72.0
	For cooling	(Extra high)	69.5	65	60.5	64.5	61.5	64	60.5	64.0	60.5
		High	69.5	65	60.5	64.5	61.5	64	60.5	64.0	60.5
		Low	71	69	67	66.5	64	65.5	64.5	67.0	65.5
Dimensions (Length x Width x Height) (mm)			900 x 900 x 290			1140 x 1140 x 350		1189 x 1189 x 400		1189 x 1189 x 810	
Weight (kg)			36	36	38	53	53	70	62	126	126
Duct diameter (mm)			Ø100	Ø150		Ø200		Ø250		Inside:Ø250, Outside:283x730	
Filtration efficiency grade (%)			82								
Operating range	Around unit		-10°C~40°C 80%RH or less								
	Outdoor Air (OA)		-15°C(*1)~43°C 80%RH or less								
	Return Air (RA)		5°C~40°C 80%RH or less								

- * Air volume can be changed over to high (extra high) mode or low mode at both heat exchange and normal ventilation modes.
- * Sound pressure level is measured 1.5m below the center of the unit, and the value which was measured at the acoustic room.
- * Sound pressure levels usually become higher than above values by the influence of actual installation condition such as reflected sound and peripheral noise.
- * Sound power level is the value of casing.

*1) When the temperature of the outdoor air is below -10°C, the unit runs cold operation mode (intermittent operation of the ventilation for air supply).
The unit cannot be used at -15°C or less.
The ventilator for air supply stops, and the ventilator for air exhaust also can be stopped by the setting.

2. Dimensions

VN-M150HE



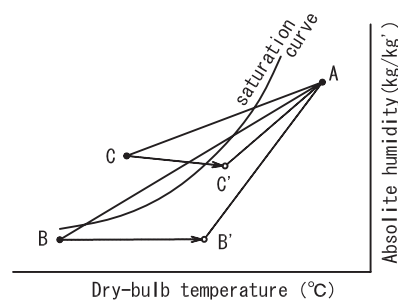
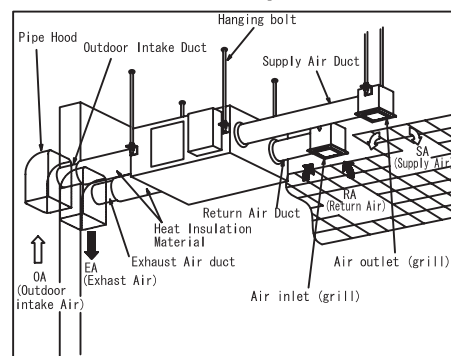
■ Attention

1. Duct size (Nominal Diameter): $\phi 100$
2. The above dimensions do not include the thickness (5 mm) of the insulation material on the unit body.

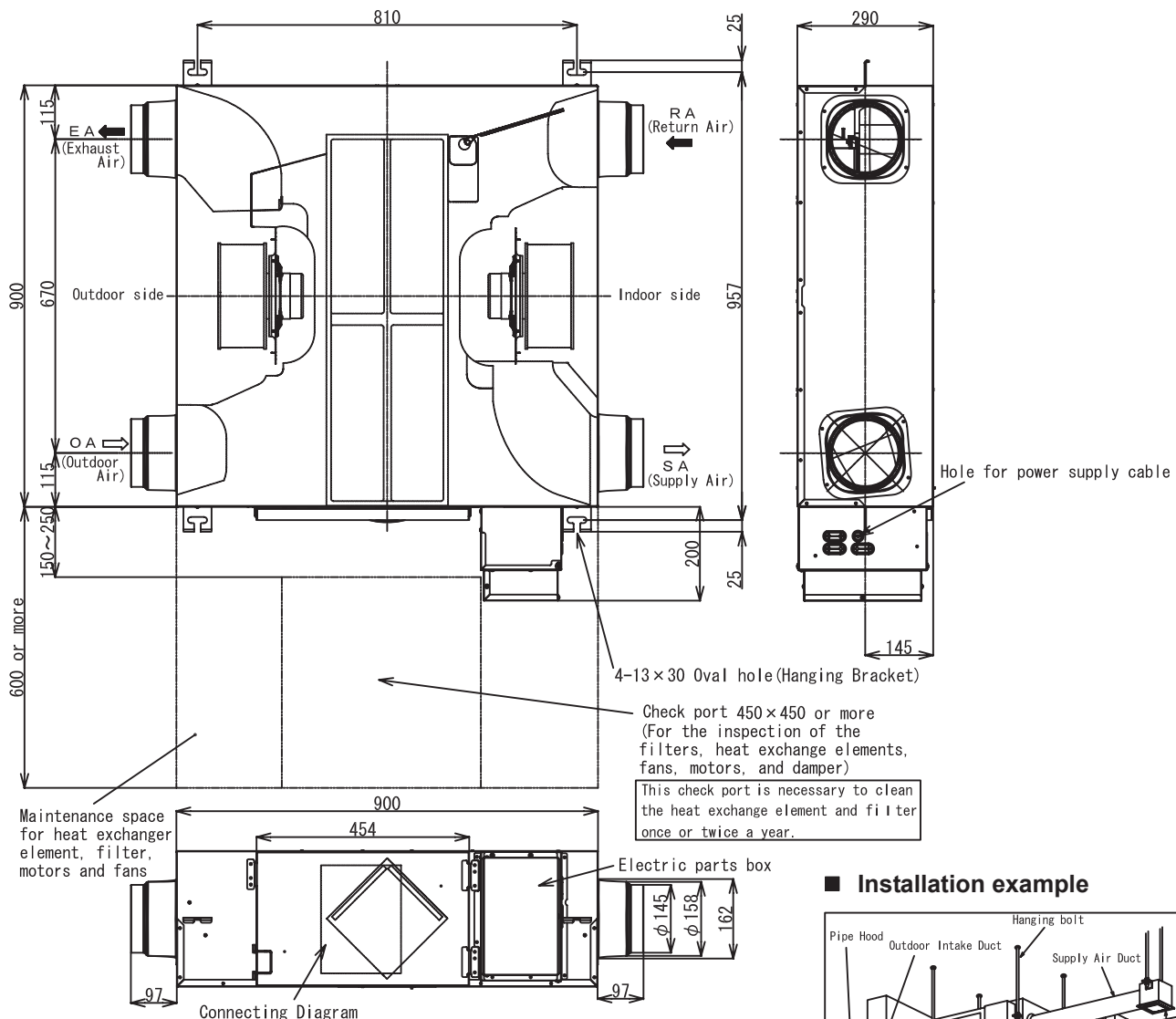
■ Attention

1. The two outdoor ducts (the Outdoor air Duct and the Exhaust air Duct) must be insulated to prevent condensation (Material: Glass wool, Thickness: 25 mm)
2. It is recommended that you use an electric damper together with the Air to Air Heat Exchanger, as wind may enter the room while the unit is not in operation in the cold or windy region.
3. As shown in the psychrometric chart, Point A is suction air condition in high temperature, Point B is discharge air condition in low temperature and Point C is the air condition that exchanged heat. If C is located at the left of the saturation curve as shown, it is dewed or frosted in the heat exchanger element of the unit. In this case to prevent the dew or frost, be sure to heat B up to B' for making C C'(right side of saturation curve).

■ Installation example



VN-M250HE, VN-M350HE



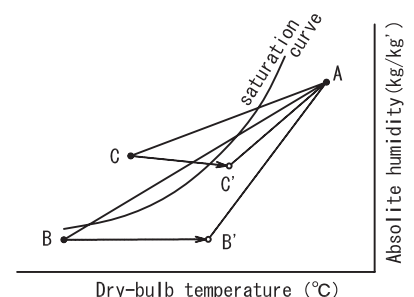
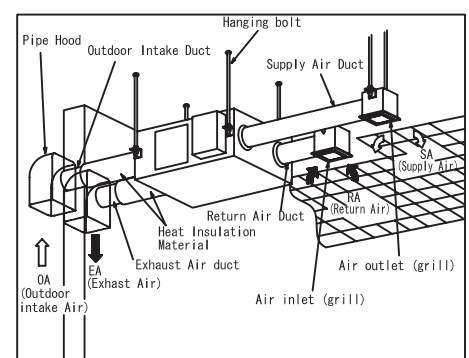
■ Attention

1. Duct size (Nominal Diameter): $\phi 150$
2. The above dimensions do not include the thickness (5 mm) of the insulation material on the unit body.

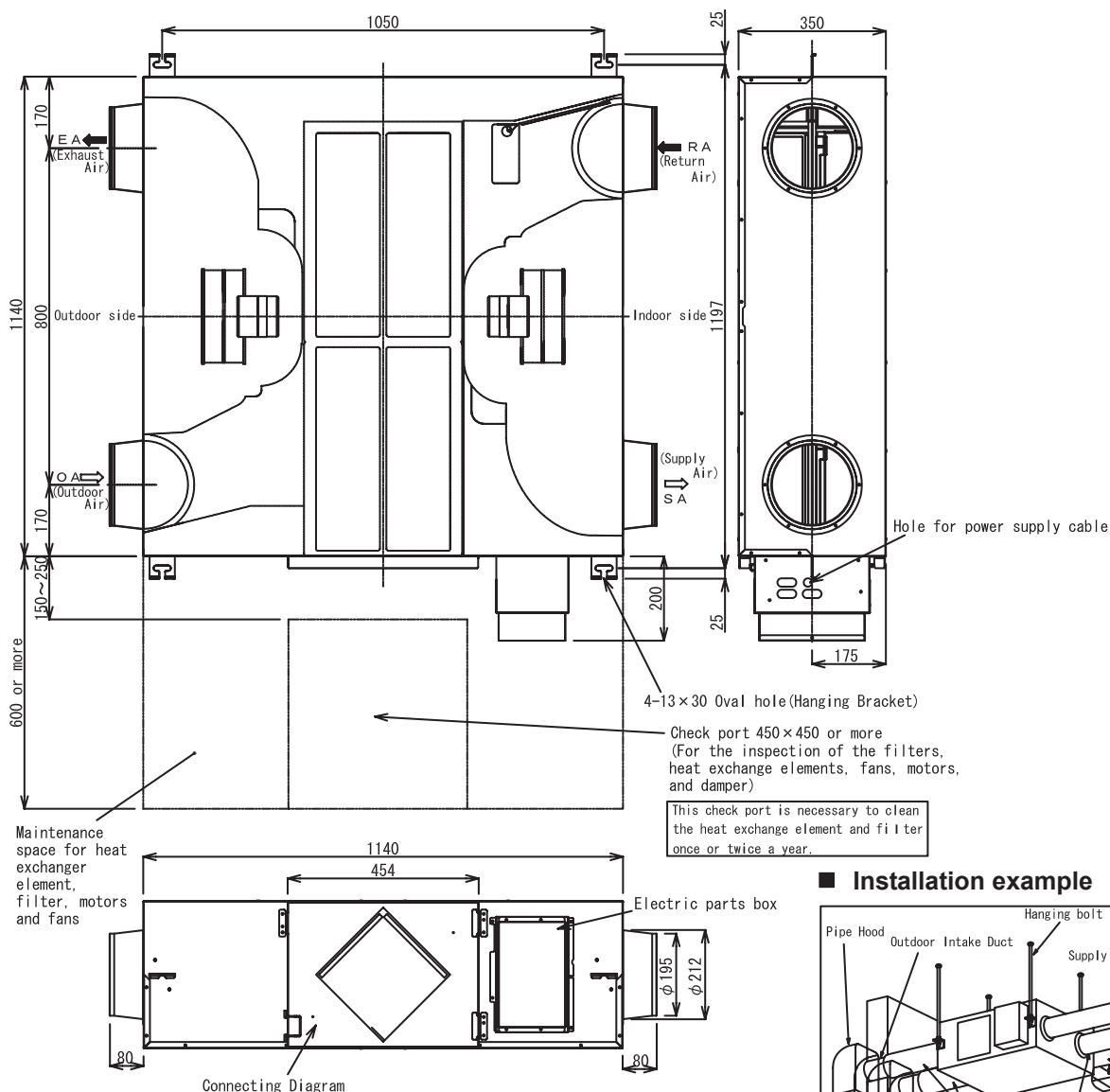
■ Attention

1. The two outdoor ducts (the Outdoor air Duct and the Exhaust air Duct) must be insulated to prevent condensation (Material: Glass wool, Thickness: 25 mm)
2. It is recommended that you use an electric damper together with the Air to Air Heat Exchanger, as wind may enter the room while the unit is not in operation in the cold or windy region.
3. As shown in the psychrometric chart, Point A is suction air condition in high temperature, Point B is discharge air condition in low temperature and Point C is the air condition that exchanged heat. If C is located at the left of the saturation curve as shown, it is dewed or frosted in the heat exchanger element of the unit. In this case to prevent the dew or frost, be sure to heat B up to B' for making C' (right side of saturation curve).

■ Installation example



VN-M500HE, VN-M650HE



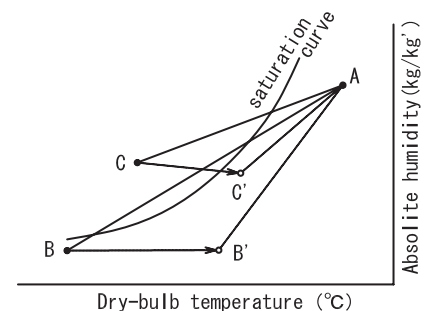
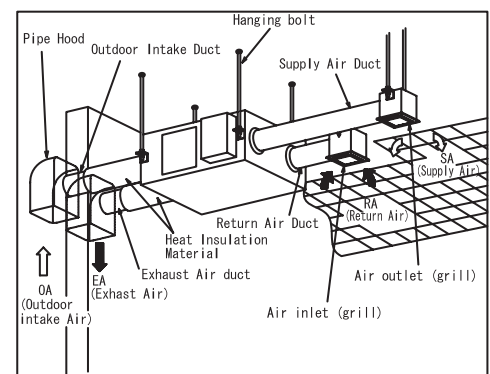
■ Attention

1. Duct size (Nominal Diameter): $\phi 200$
2. The above dimensions do not include the thickness (5 mm) of the insulation material on the unit body.

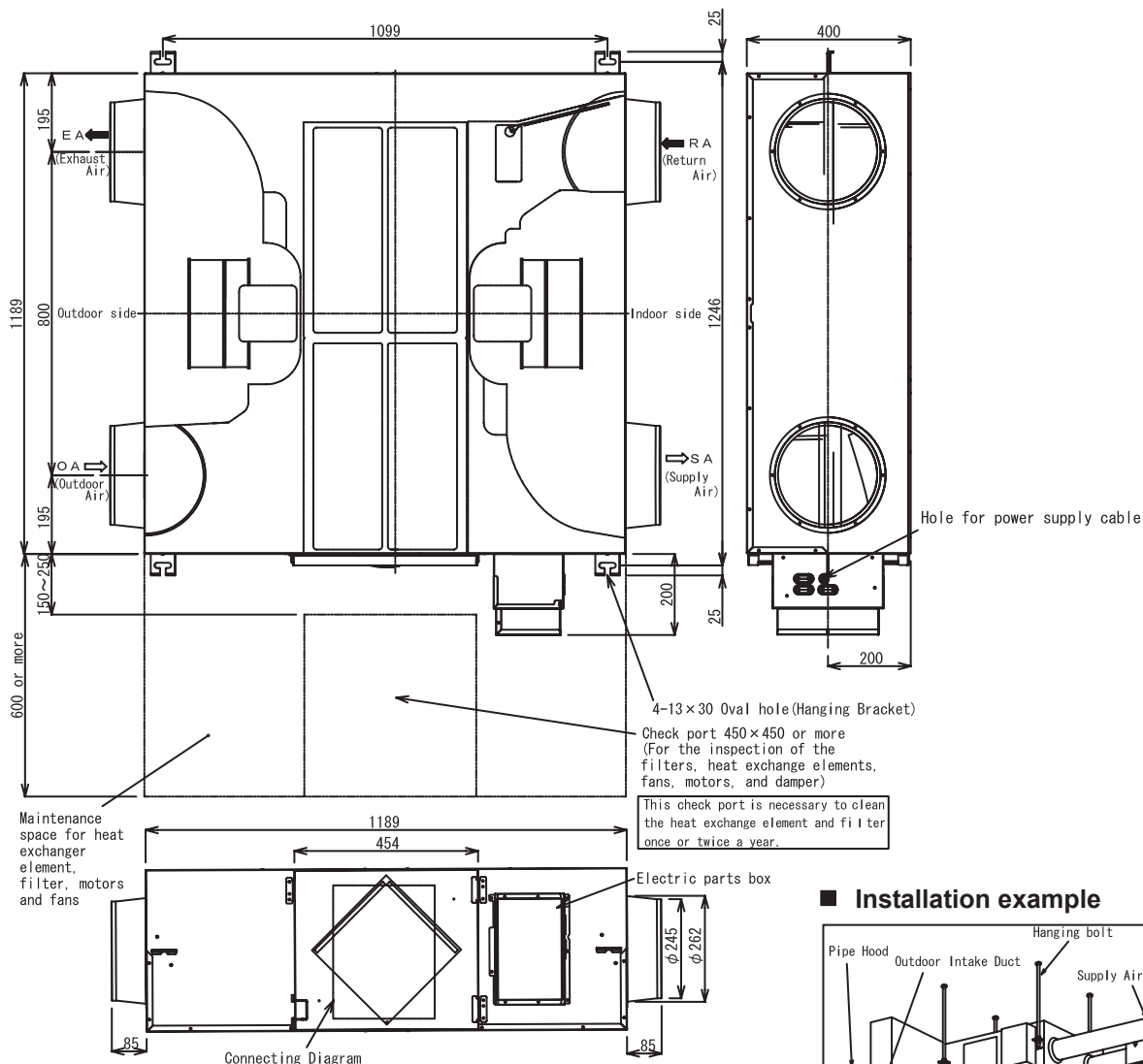
■ Attention

1. The two outdoor ducts (the Outdoor air Duct and the Exhaust air Duct) must be insulated to prevent condensation (Material: Glass wool, Thickness: 25 mm)
2. It is recommended that you use an electric damper together with the Air to Air Heat Exchanger, as wind may enter the room while the unit is not in operation in the cold or windy region.
3. As shown in the psychrometric chart, Point A is suction air condition in high temperature, Point B is discharge air condition in low temperature and Point C is the air condition that exchanged heat. If C is located at the left of the saturation curve as shown, it is dewed or frosted in the heat exchanger element of the unit. In this case to prevent the dew or frost, be sure to heat B up to B' for making C C' (right side of saturation curve).

■ Installation example



VN-M800HE



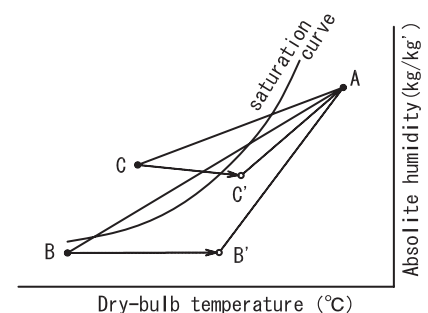
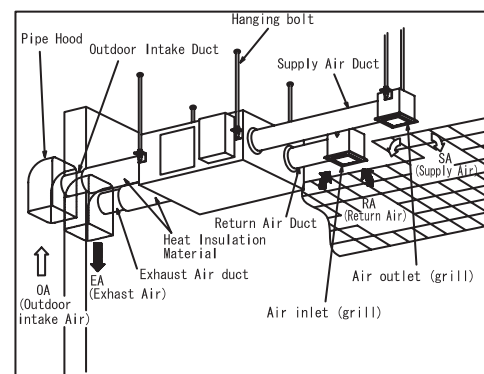
■ Attention

1. Duct size (Nominal Diameter): $\phi 250$
2. The above dimensions do not include the thickness (5 mm) of the insulation material on the unit body.

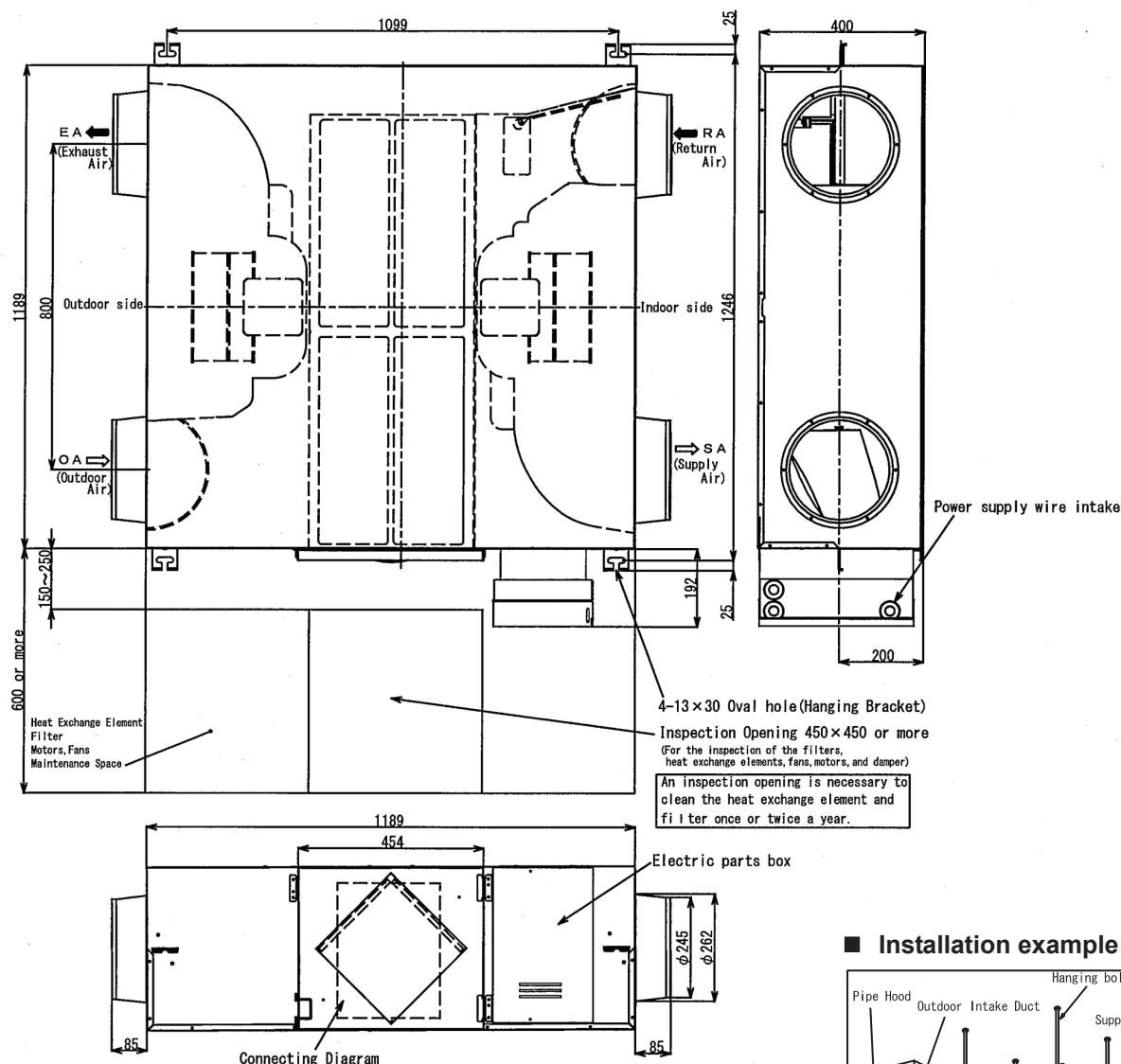
■ Attention

1. The two outdoor ducts (the Outdoor air Duct and the Exhaust air Duct) must be insulated to prevent condensation (Material: Glass wool, Thickness: 25 mm)
2. It is recommended that you use an electric damper together with the Air to Air Heat Exchanger, as wind may enter the room while the unit is not in operation in the cold or windy region.
3. As shown in the psychrometric chart, Point A is suction air condition in high temperature, Point B is discharge air condition in low temperature and Point C is the air condition that exchanged heat. If C is located at the left of the saturation curve as shown, it is dewed or frosted in the heat exchanger element of the unit. In this case to prevent the dew or frost, be sure to heat B up to B' for making C C' (right side of saturation curve).

■ Installation example



VN-M1000HE1



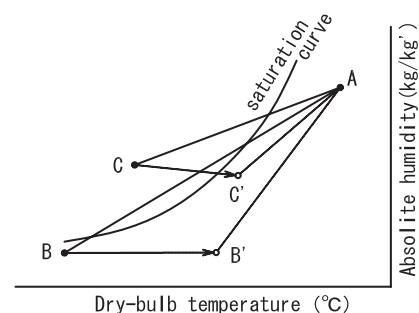
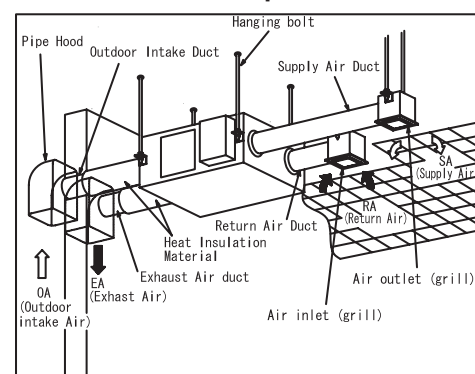
■ Attention

1. Duct size (Nominal Diameter): $\phi 250$
2. The above dimensions do not include the thickness (5 mm) of the insulation material on the unit body.

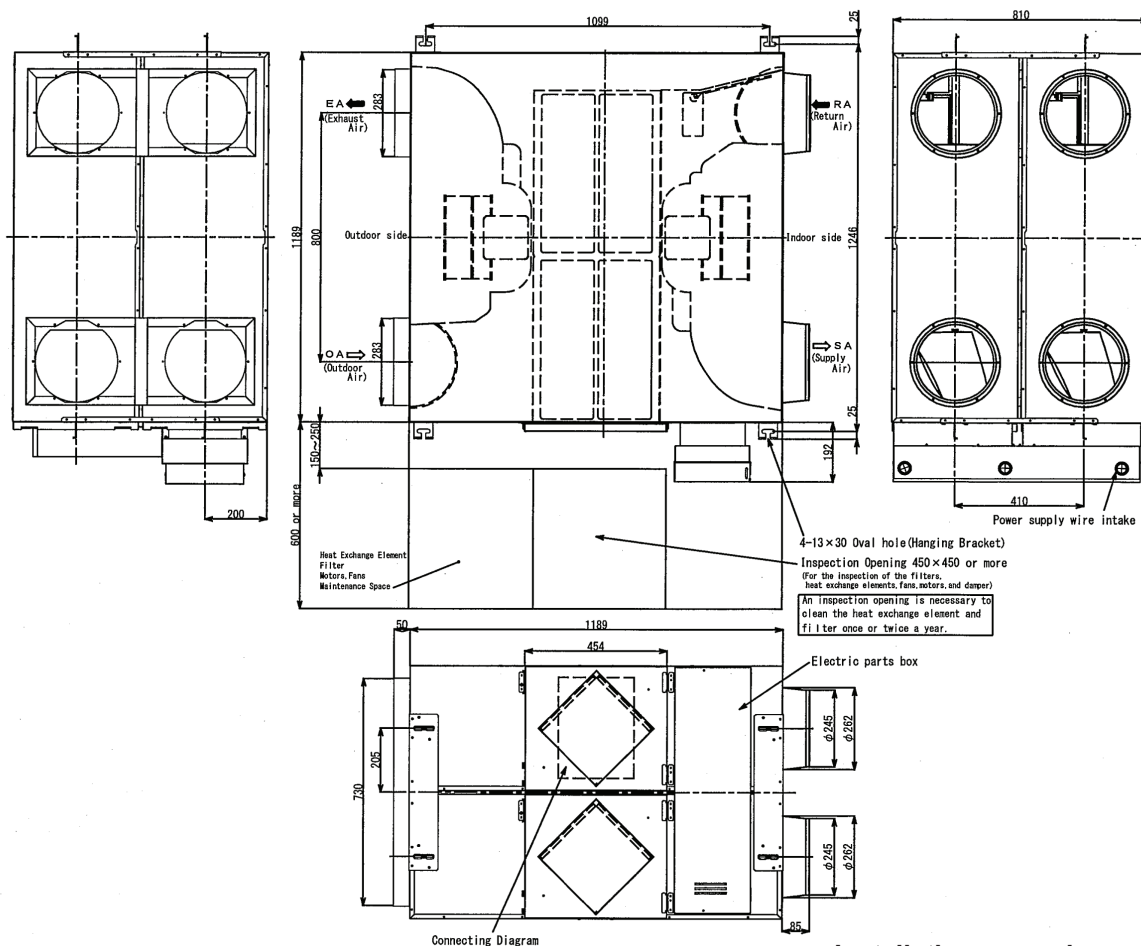
■ Attention

1. The two outdoor ducts (the Outdoor air Duct and the Exhaust air Duct) must be insulated to prevent condensation (Material: Glass wool, Thickness: 25 mm)
2. It is recommended that you use an electric damper together with the Air to Air Heat Exchanger, as wind may enter the room while the unit is not in operation in the cold or windy region.
3. As shown in the figure, suppose a high temp absorbing air condition A and a low temp absorbing air condition B are plotted on the air line figure, then a high temp air A is heat-exchanged by the unit and goes out of the saturation curve as shown by Point C. In this case, the unit will be dewed or frosted. To avoid this, you are required to heat a low temp air B up to B' so as to get C' below the saturation curve, before using the unit.

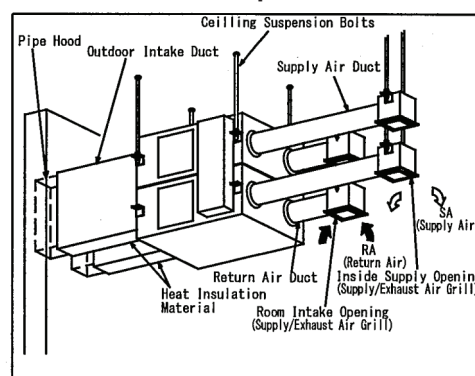
■ Installation example



VN-M1500HE1, VN-M2000HE1



■ Installation example

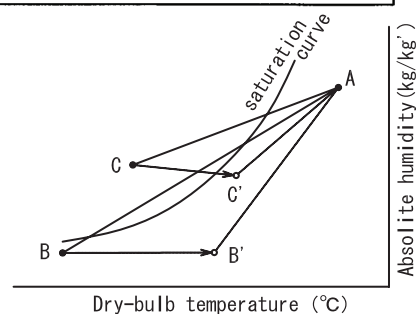


■ Attention

1. Duct size (Nominal Diameter) Indoor side: $\phi 250$
Outdoor side: 283x730
2. The above dimensions do not include the thickness (5 mm) of the insulation material on the unit body.

■ Attention

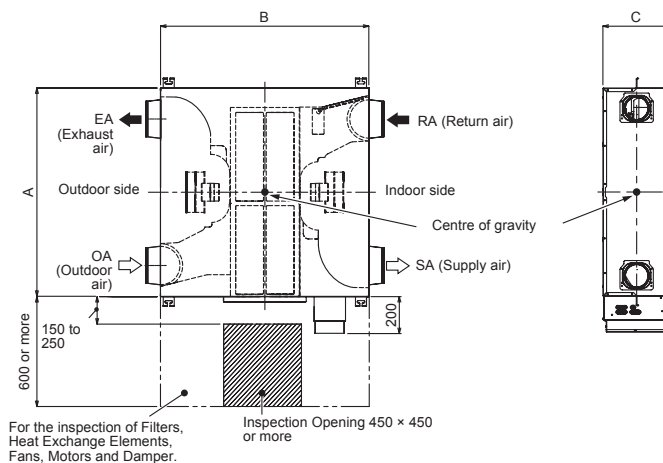
1. The two outdoor ducts (the Outdoor air Duct and the Exhaust air Duct) must be insulated to prevent condensation (Material: Glass wool, Thickness: 25 mm)
2. It is recommended that you use an electric damper together with the Air to Air Heat Exchanger, as wind may enter the room while the unit is not in operation in the cold or windy region.
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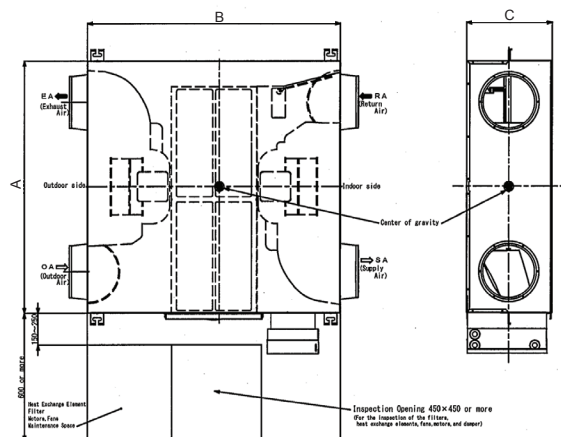
3. Center of gravity

VN-M150HE
VN-M250HE
VN-M350HE
VN-M500HE
VN-M650HE
VN-M800HE

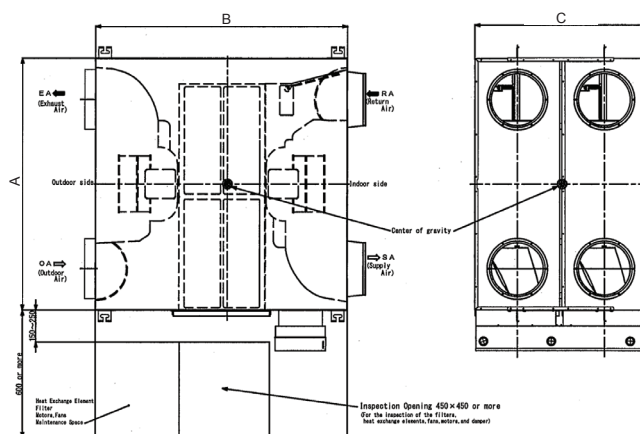
Unit: mm



VN-M1000HE1



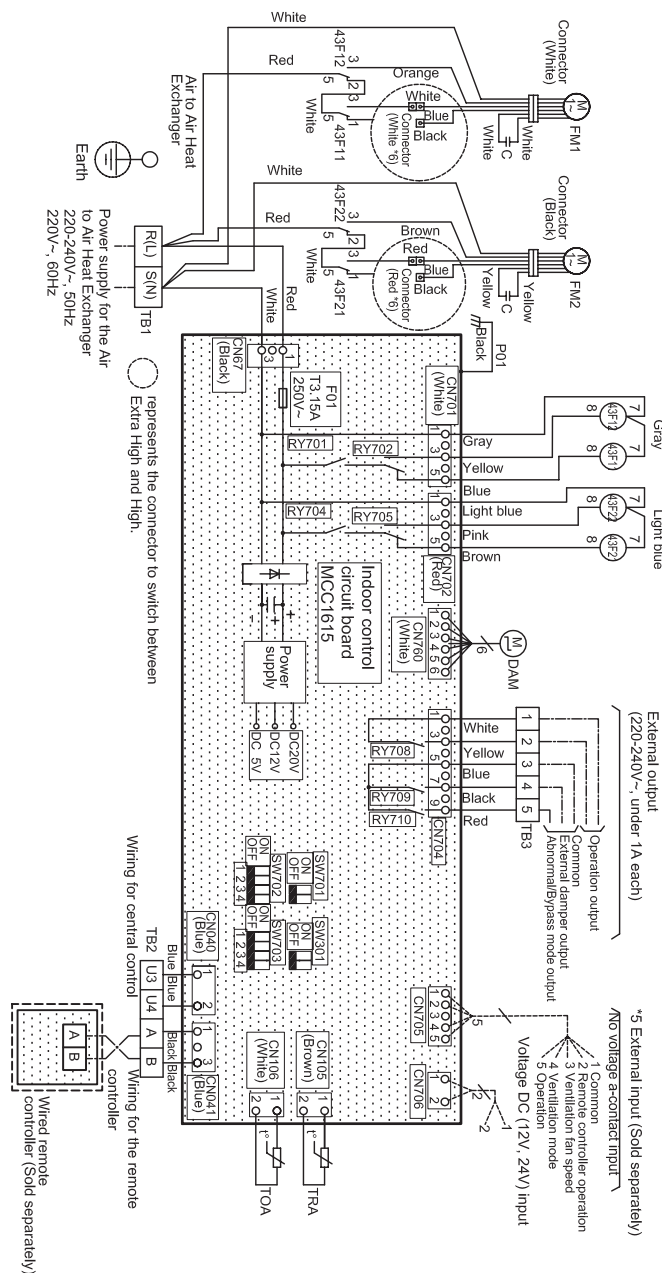
VN-M1500HE1,
VN-M2000HE1



Model Name	A (mm)	B (mm)	C (mm)	Weight (kg)	Heat exchange element
VN-M150HE, M250HE	900	900	290	36	2
VN-M350HE	900	900	290	38	2
VN-M500HE, M650HE	1140	1140	350	53	2
VN-M800HE	1189	1189	400	70	2
VN-M1000HE1	1189	1189	400	62	2
VN-M1500HE1, M2000HE1	1189	1189	810	126	4

4. Wiring diagram

VN-M150HE, VN-M250HE, VN-M350HE, VN-M500HE, VN-M650HE, VN-M800HE



Code	Part name
CN***	Connector
F01	Fuse
FM1	Air supplying motor
FM2	Air exhausting motor
DAM	Damper motor
TRA	TRA sensor

Code	Part name
TOA	TOA sensor
RY701, RY702	Relay for air supplying motor
RY704, RY705	Relay for air exhausting motor
TB1	Terminal block (power supply)
TB2	Terminal block (communication)
TB3	Terminal block (external output)

Code	Part name
SW301, SW701 SW702, SW703	DIP switch
43F11, 43F12	Relay for air supplying motor
43F21, 43F22	Relay for air exhausting motor

- The dotted line represents a wire procured locally, and the dashed line represents an option sold separately.
- represents a terminal block, —○— represents a connection terminal, and ○ represents a connector on the printed circuit board.
- ⊕ represents a protective earth.
- ▨ represents a printed circuit board.
- Using a no voltage a-contact input of the external input (Sold separately), the following operations are available:
 - Between 1 and 2: Selecting the remote controller operation (Invalid/Valid)
 - Between 1 and 3: Adjusting the ventilation fan speed (Low/High)
 - Between 1 and 4: Selecting the ventilation mode (Bypass mode/Heat exchange mode)
 - Between 1 and 5: Operation (ON/OFF)
 Use a microcurrent contact (DC12V, 1mA). In addition, ON/OFF operation is possible when using a voltage of DC12V or 24V.
- Blue wire (High) is connected as factory default. To switch to "Extra High", connect black wire's connector instead of blue.
- When the temperature of the outdoor air is below -10°C, the unit runs in the cold mode (the ventilator for air supply runs intermittently). The unit cannot run when the temperature of the outdoor air is below -15°C. The ventilator for air supply stops running and the ventilator for air exhaust also stops depending on the settings.
- Even if "Bypass mode" is selected manually, the unit switches to "Heat exchange mode" automatically to prevent condensation when the temperature of the outdoor air is below 15°C. However, "Bypass mode" is still displayed.

VN-M1000HE1

SW501 set up

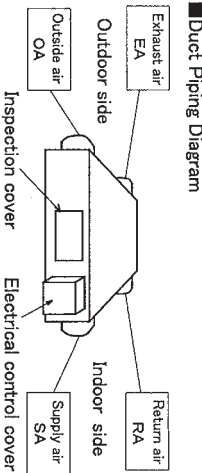
bit 1	MCC-1643
OFF	A(Master) (supply)
ON	B(Sub) (exhaust)

CN71 set up
(P.C.Board A only)

CN71	Group address setting
short	Follower
open	Header

WARNING
Moving parts.
Do not operate unit with grille removed.
Stop the unit before the servicing.

CAUTION
High temperature parts.
You might get burned when removing this cover.



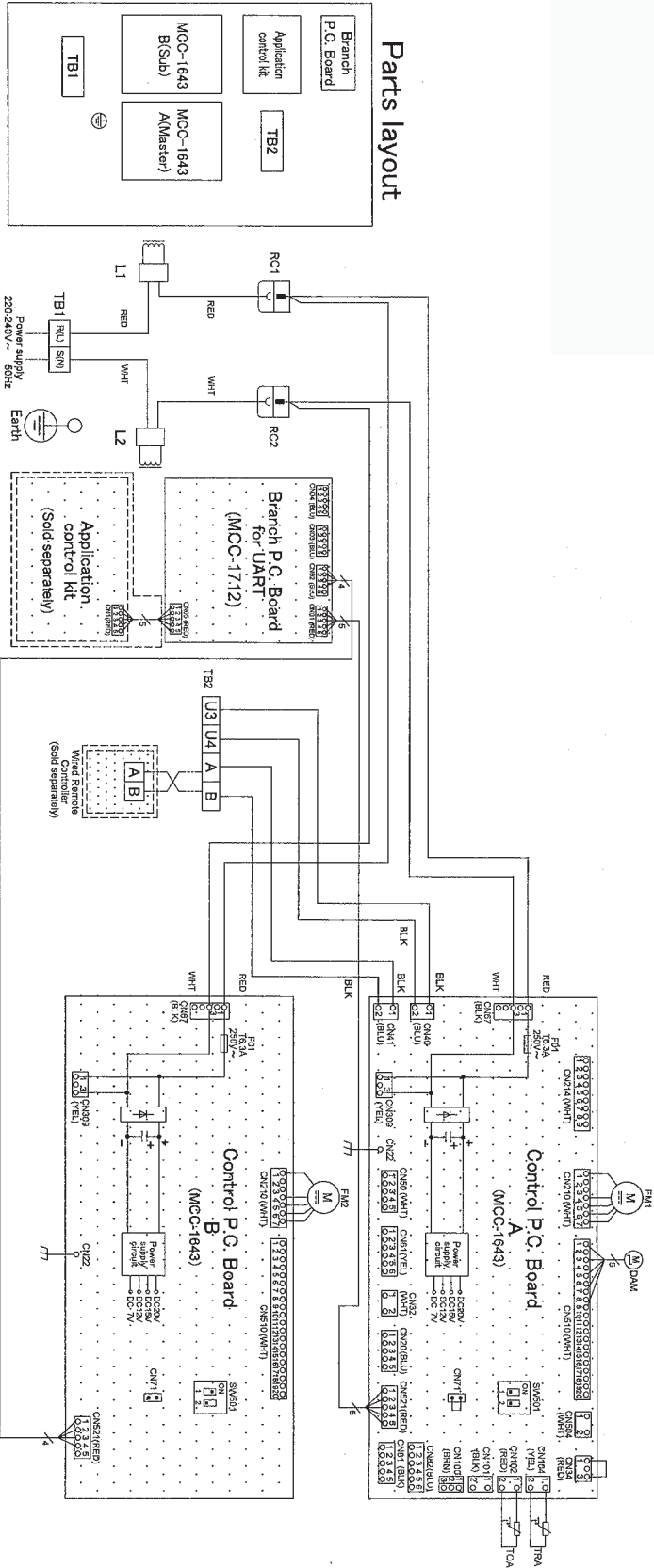
⚠ WARNING

- Before opening the electrical control cover or inspection cover of the Air to Air Heat Exchanger, set the circuit breaker to the OFF position.
- Only a qualified installer or qualified service person is allowed to remove the electrical control cover of the Air to Air Heat Exchanger and do the work required.
- Only a qualified installer or qualified service person is allowed to carry out the electrical work of the Air to Air Heat Exchanger.

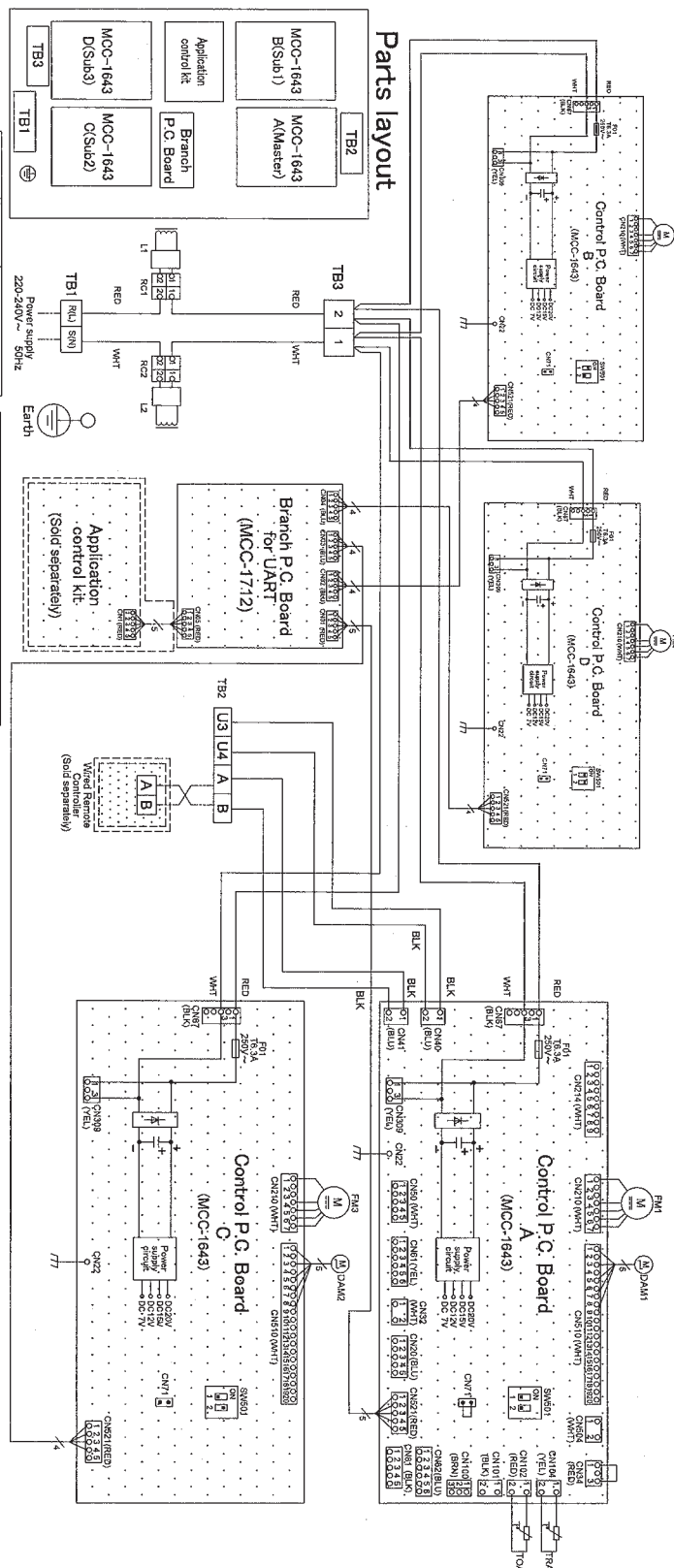
Code	Part name
CN*	Connector
DAM	Damper motor
F01	Fuse
FM1, FM2	Motor

Code	Part name
L1, L2	Reactor
TB1	Terminal block (power supply)
TB2	Terminal block (communication)
TOA	TOA sensor (Outdoor air)
TRA	TRA sensor (Return air)
RC1, RC2	Relay connector

1. The dotted line represents a wire procured locally.
2. represents a terminal block, and represents a connector on the printed circuit board.
3. represents a protective earth.
4. represents a printed circuit board.
5. represents a terminal.



VN-M1500HE1, VN-M2000HE1



⚠ WARNING

- Before opening the electrical control cover or inspection cover of the Air to Air Heat Exchanger, set the circuit breaker to the OFF position.
- Only a qualified installer or qualified service person is allowed to remove the electrical control cover or inspection cover of the Air to Air Heat Exchanger and do the work required.
- Only a qualified installer or qualified service person is allowed to carry out the electrical work of the Air to Air Heat Exchanger.

SW501 set up

bit 1	bit 2	MCC-1643
OFF	OFF	A(Master) (supply)
ON	OFF	B(Sub1) (exhaust)
OFF	ON	C(Sub2) (supply)
ON	ON	D(Sub3) (exhaust)

CN71 set up

CN71 set up (P.C.Board A only)	
CN71	Group address setting
short	Follower
open	Header

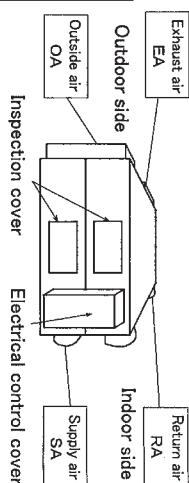
WARNING

Do not operate unit with grille removed.

CAUTION

High temperature parts.
You might get burned
when removing this cover.

■ Duct Piping Diagram



5. Electrical characteristics

	Model	Nominal Voltage (V-Ph-Hz)	Voltage Range		Fan Motor		Power Supply	
			Min	Max	kW	FLA	MCA	MOCP
50Hz	VN-M150HE	220-1-50	198	242	0.013 x 2	0.28	0.32	15
		230-1-50	207	253	0.014 x 2	0.29	0.33	15
		240-1-50	216	264	0.017 x 2	0.31	0.33	15
	VN-M250HE	220-1-50	198	242	0.024 x 2	0.56	0.61	15
		230-1-50	207	253	0.025 x 2	0.59	0.63	15
		240-1-50	216	264	0.024 x 2	0.58	0.65	15
	VN-M350HE	220-1-50	198	242	0.055 x 2	0.75	0.81	15
		230-1-50	207	253	0.057 x 2	0.78	0.82	15
		240-1-50	216	264	0.058 x 2	1.01	0.82	15
	VN-M500HE	220-1-50	198	242	0.069 x 2	1.12	1.19	15
		230-1-50	207	253	0.072 x 2	1.17	1.21	15
		240-1-50	216	264	0.076 x 2	1.28	1.23	15
	VN-M650HE	220-1-50	198	242	0.078 x 2	1.29	1.37	15
		230-1-50	207	253	0.081 x 2	1.35	1.39	15
		240-1-50	216	264	0.092 x 2	1.49	1.41	15
	VN-M800HE	220-1-50	198	242	0.123 x 2	2.06	2.15	15
		230-1-50	207	253	0.129 x 2	2.15	2.19	15
		240-1-50	216	264	0.137 x 2	2.26	2.23	15
	VN-M1000HE1	220-1-50	198	242	0.138 x 2	2.56	2.70	15
		230-1-50	207	253	0.138 x 2	2.47	2.61	15
		240-1-50	216	264	0.138 x 2	2.38	2.52	15
	VN-M1500HE1	220-1-50	198	242	0.138 x 4	4.32	5.08	15
		230-1-50	207	253	0.138 x 4	4.16	4.89	15
		240-1-50	216	264	0.138 x 4	4.00	4.70	15
	VN-M2000HE1	220-1-50	198	242	0.138 x 4	4.80	5.08	15
		230-1-50	207	253	0.138 x 4	4.62	4.89	15
		240-1-50	216	264	0.138 x 4	4.45	4.70	15

↑

Fan Motor : 2(4)pcs/unit

MCA :Minimum Circuit Amps

FLA :Full Load Amps

MOCP :Maximum Overcurrent Protection (Amps)

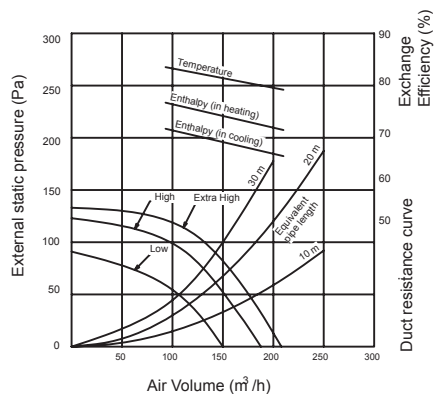
kW :Fan Motor Reated Output

6. Fan characteristics

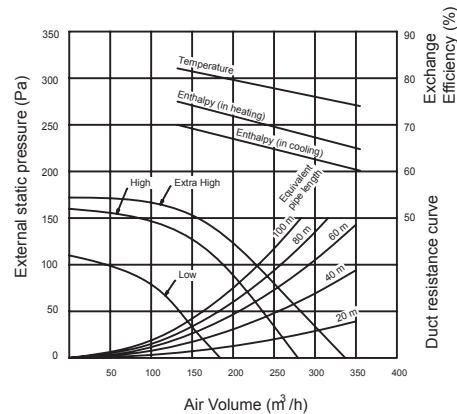
(220V~, 50Hz)

P-Q Curve * When friction coefficient of pipe (duct) : $\lambda = 0.02$

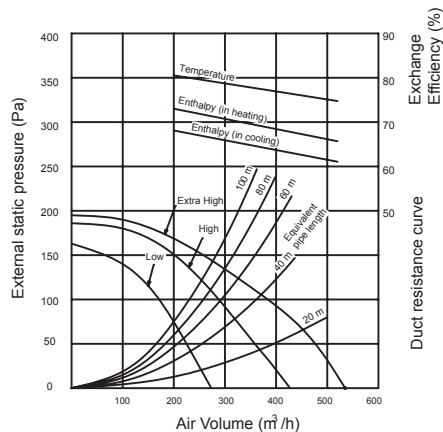
VN-M150HE



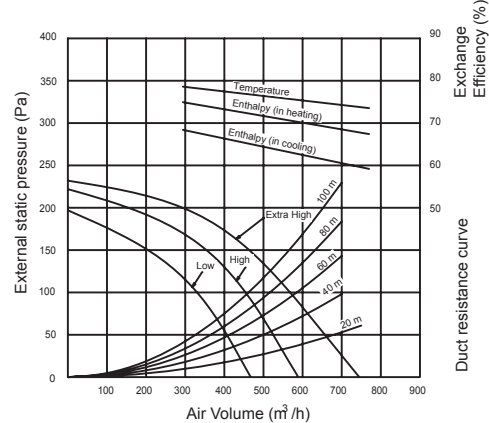
VN-M250HE



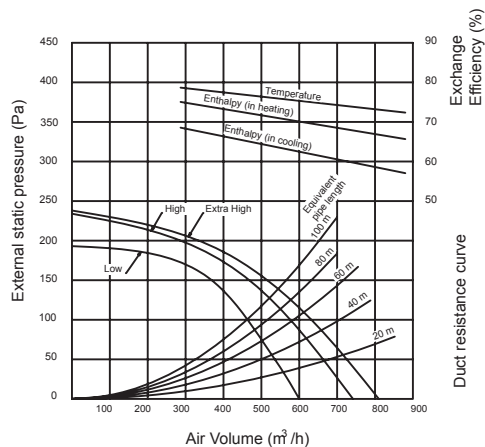
VN-M350HE



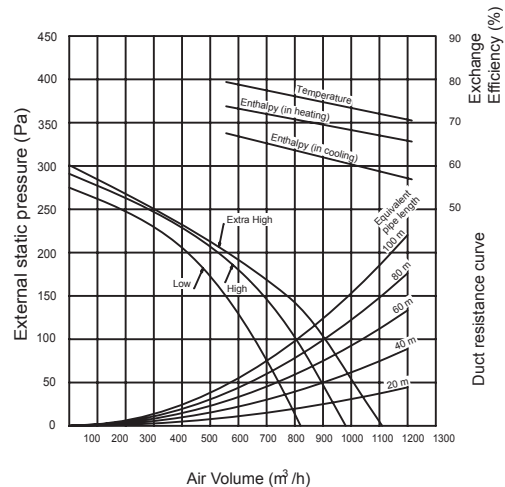
VN-M500HE



VN-M650HE



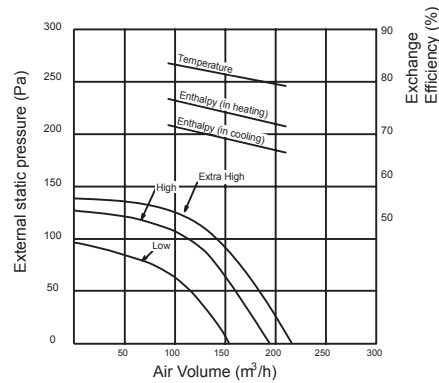
VN-M800HE



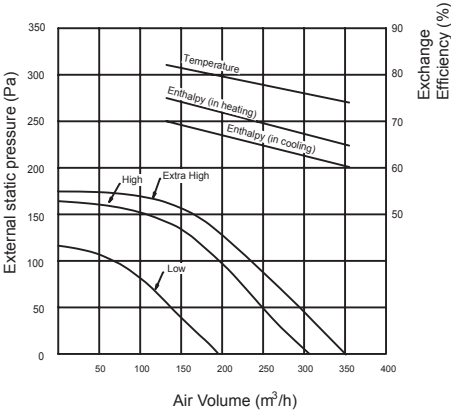
(230V~, 50Hz)

P-Q Curve * When friction coefficient of pipe (duct) : $\lambda = 0.02$

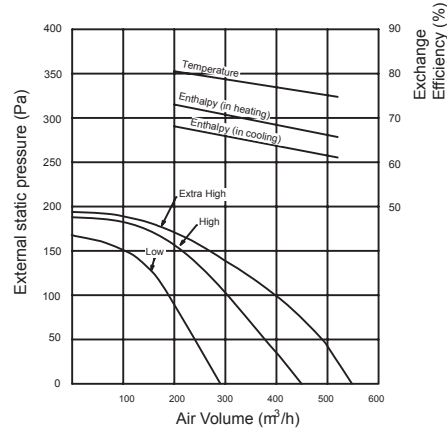
VN-M150HE



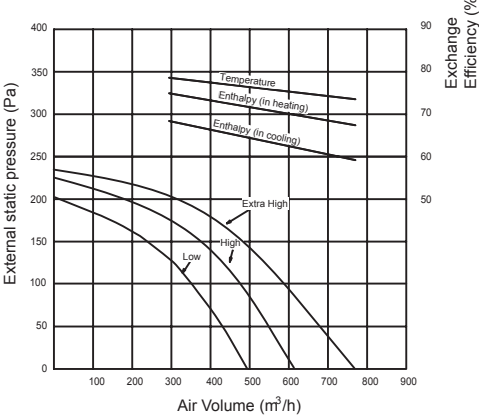
VN-M250HE



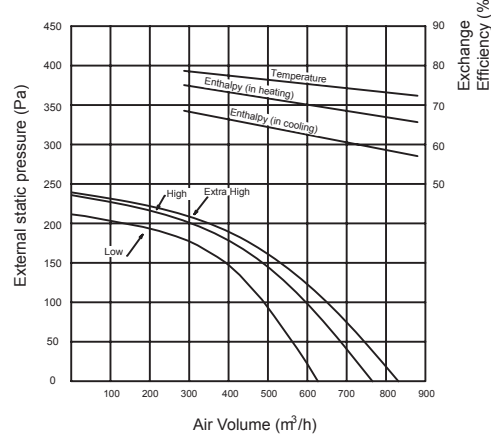
VN-M350HE



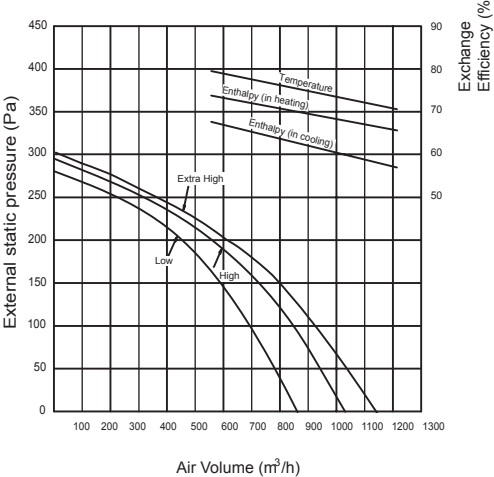
VN-M500HE



VN-M650HE



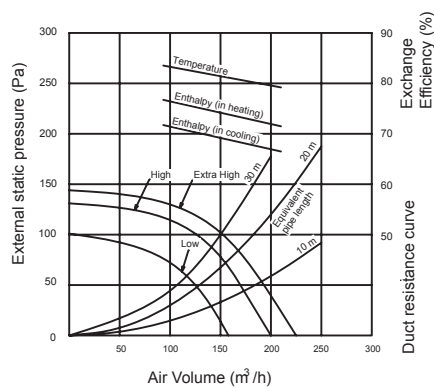
VN-M800HE



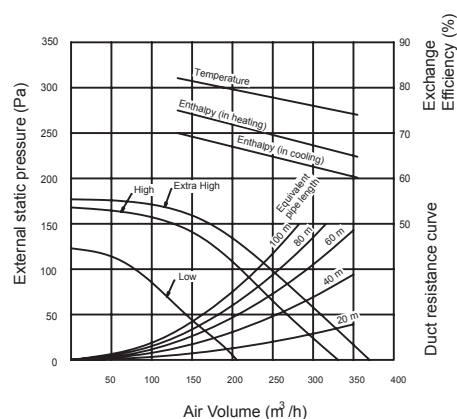
(240V~, 50Hz)

P-Q Curve * When friction coefficient of pipe (duct) : $\lambda = 0.02$

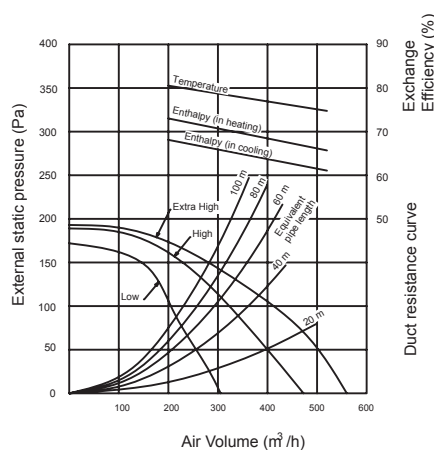
VN-M150HE



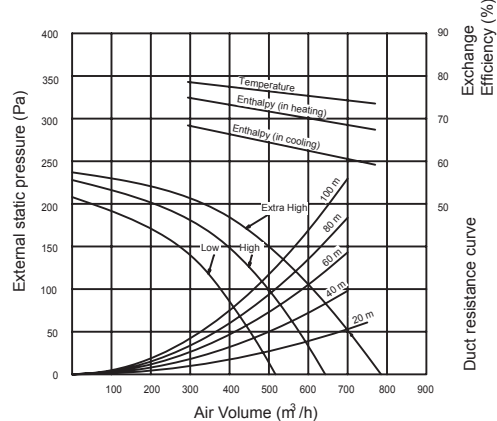
VN-M250HE



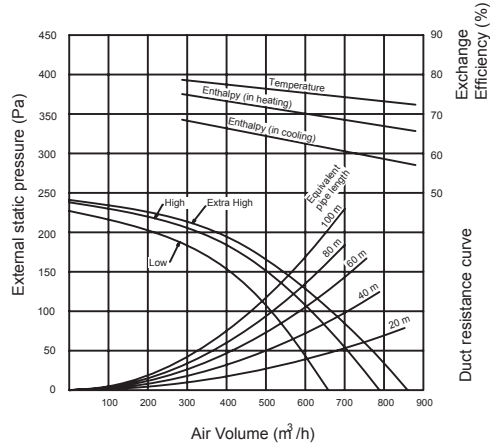
VN-M350HE



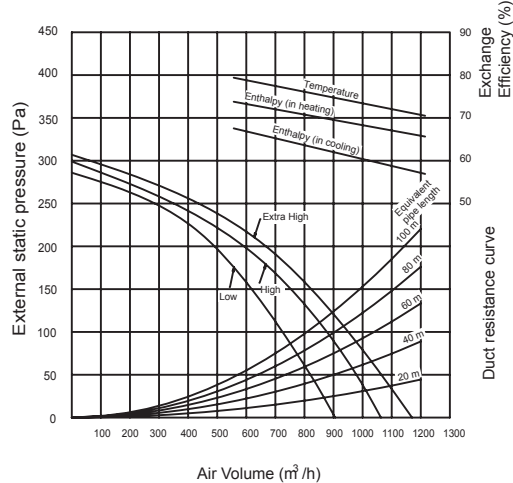
VN-M500HE



VN-M650HE



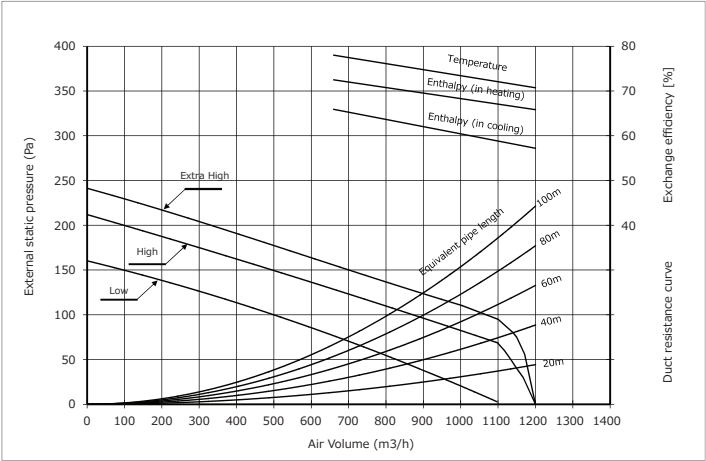
VN-M800HE



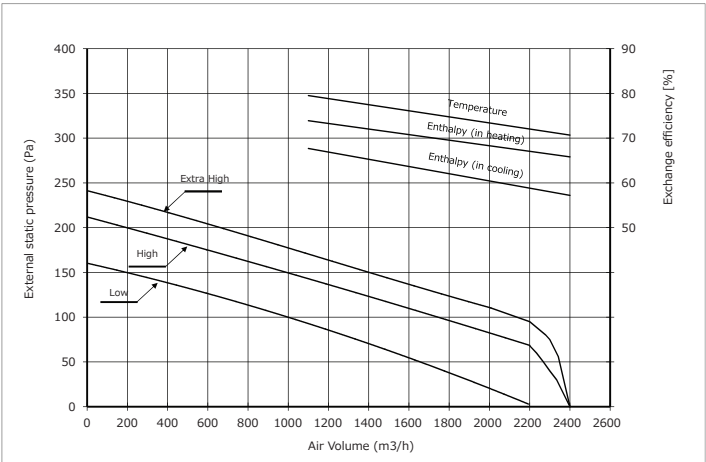
(220-240V~, 50Hz)

P-Q Curve * When friction coefficient of pipe (duct) : $\lambda = 0.02$

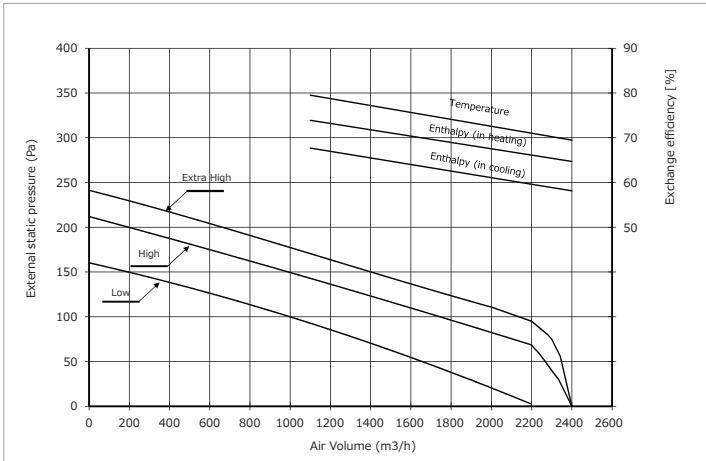
VN-M1000HE1



VN-M1500HE1



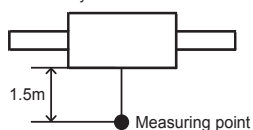
VN-M2000HE1



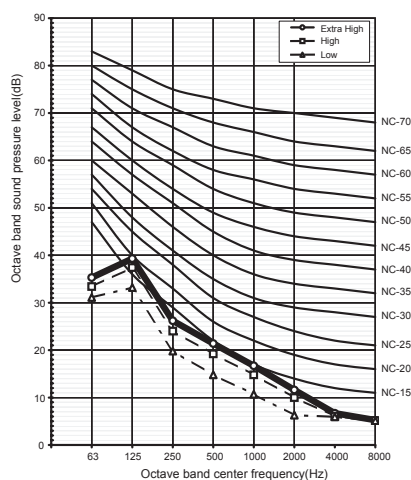
7. Sound characteristics (NC curve)

(220V~, 50Hz)

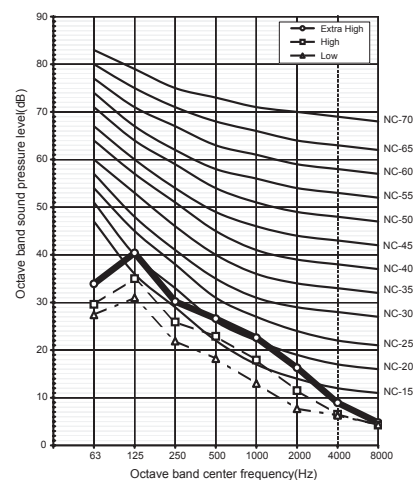
Under from body 1.5m



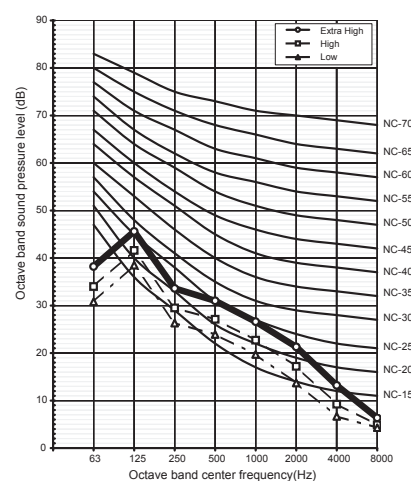
VN-M150HE



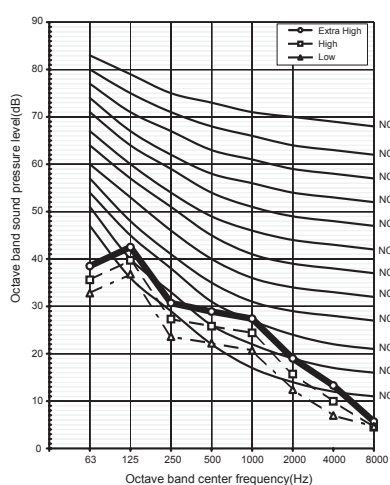
VN-M250HE



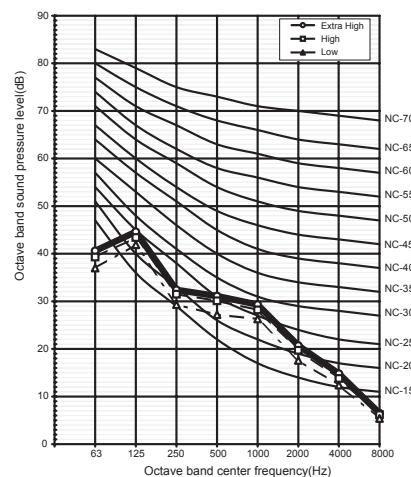
VN-M350HE



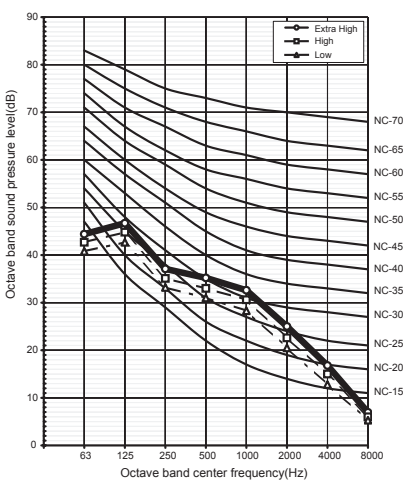
VN-M500HE



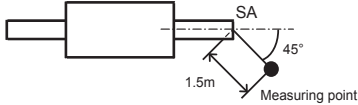
VN-M650HE



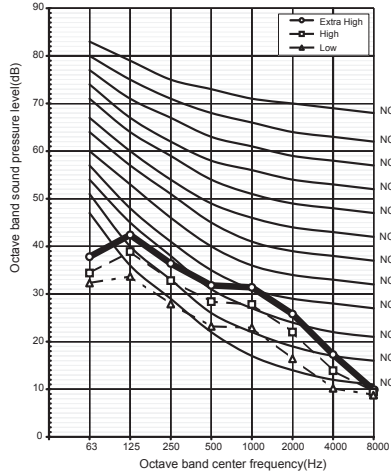
VN-M800HE



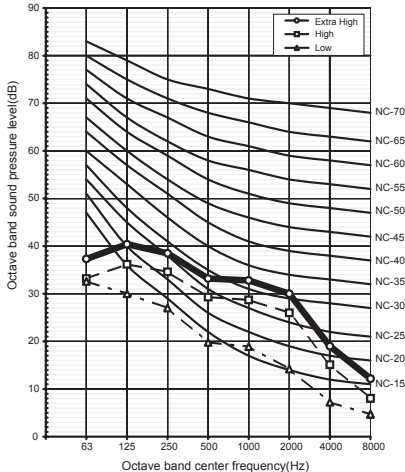
(220V~, 50Hz)



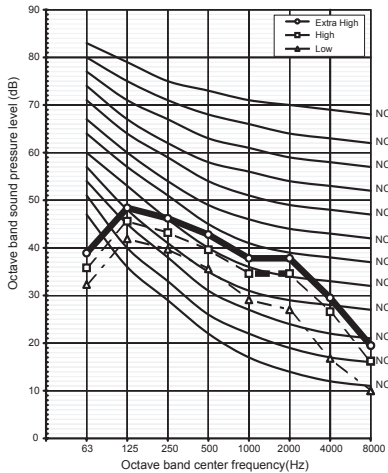
VN-M150HE



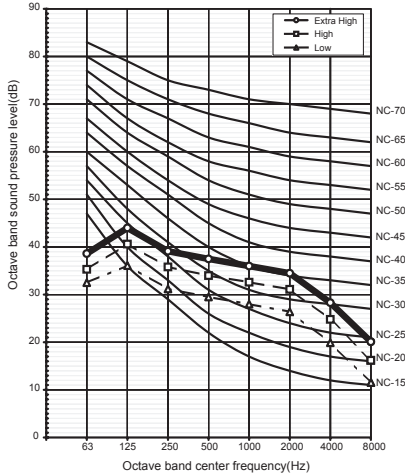
VN-M250HE



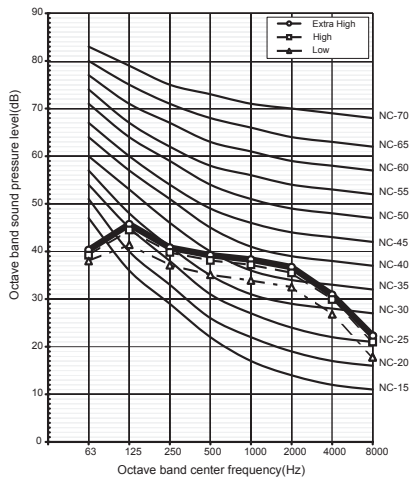
VN-M350HE



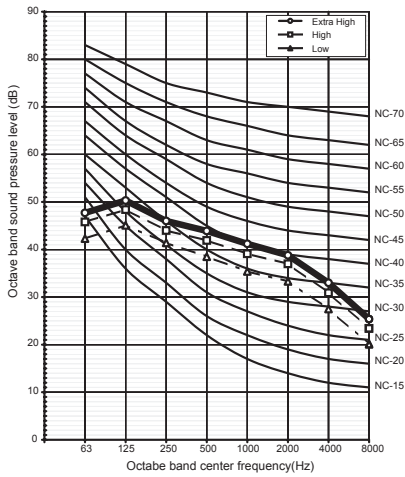
VN-M500HE



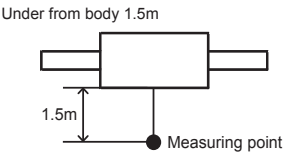
VN-M650HE



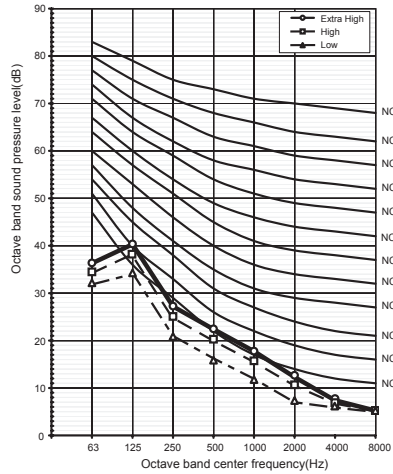
VN-M800HE



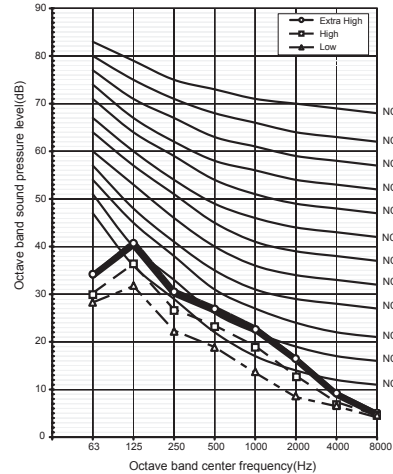
(230V~, 50Hz)



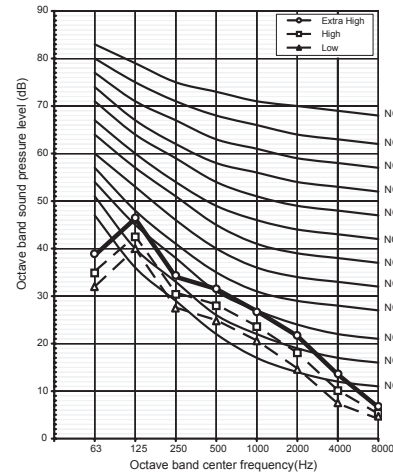
VN-M150HE



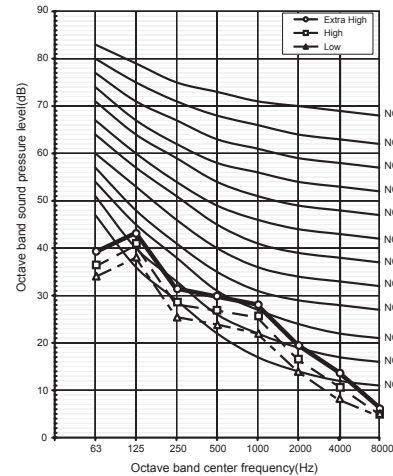
VN-M250HE



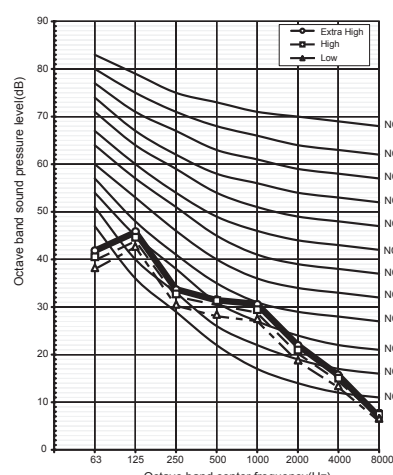
VN-M350HE



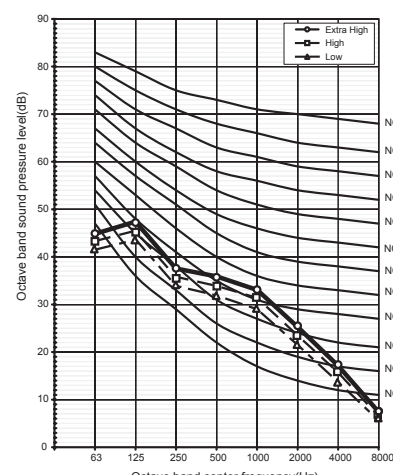
VN-M500HE



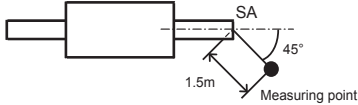
VN-M650HE



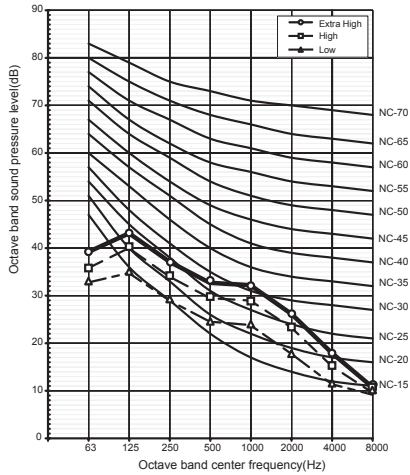
VN-M800HE



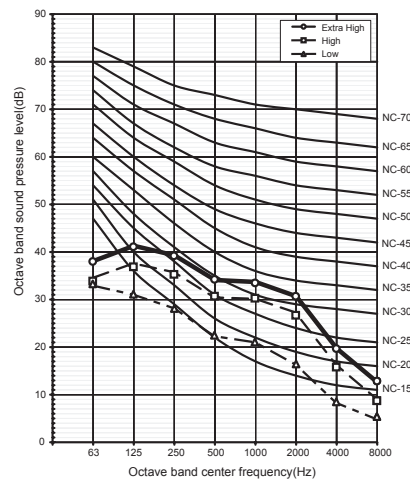
(230V~, 50Hz)



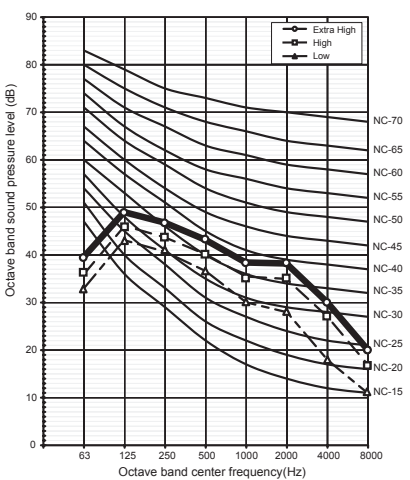
VN-M150HE



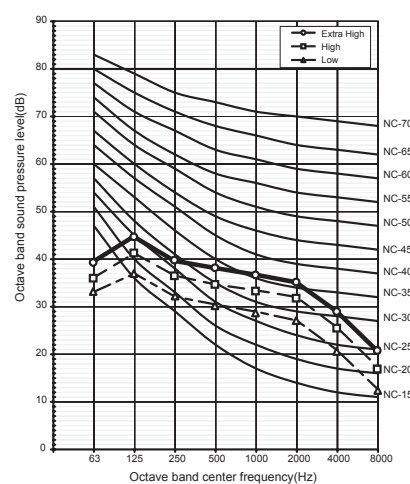
VN-M250HE



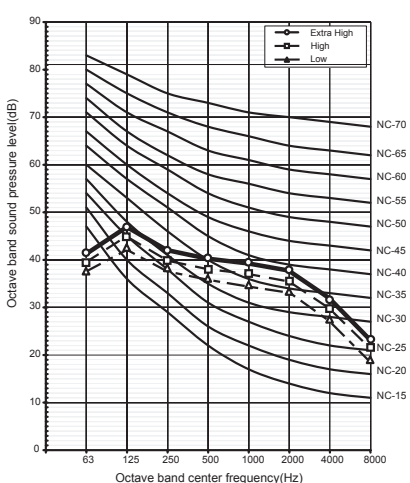
VN-M350HE



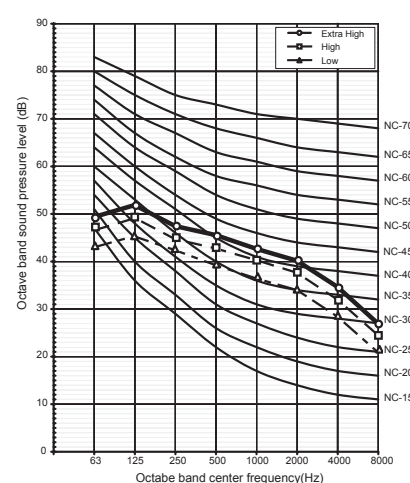
VN-M500HE



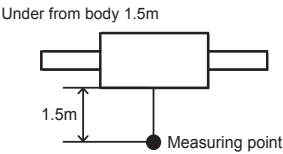
VN-M650HE



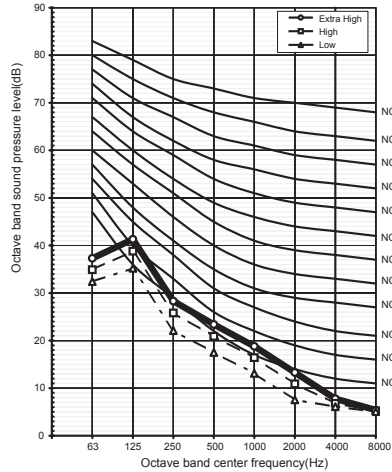
VN-M800HE



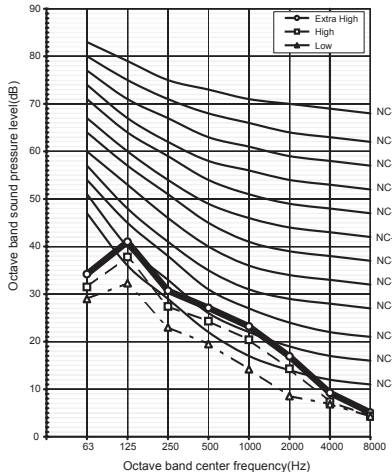
(240V~, 50Hz)



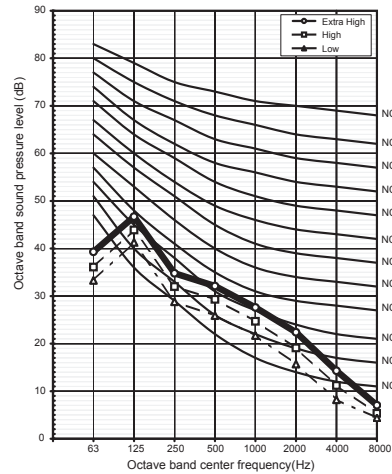
VN-M150HE



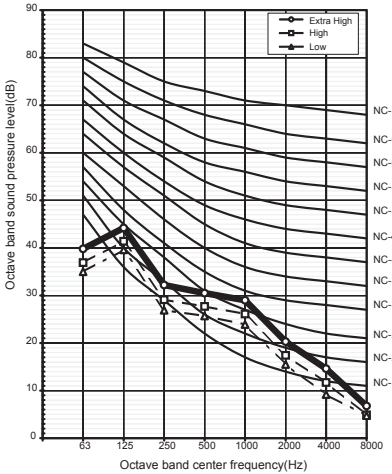
VN-M250HE



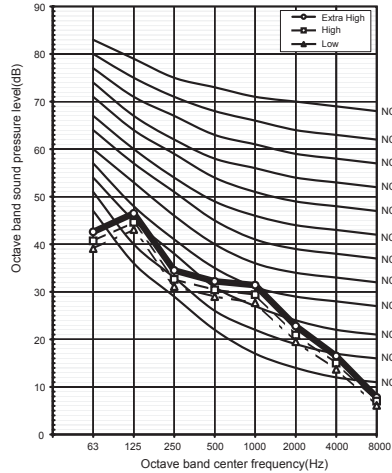
VN-M350HE



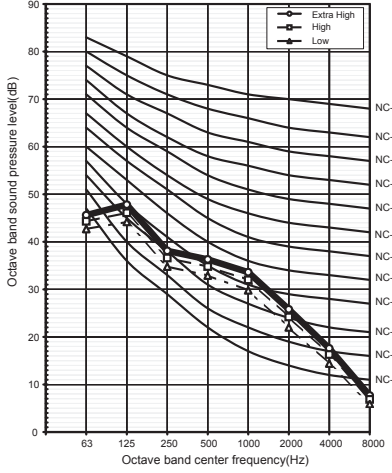
VN-M500HE



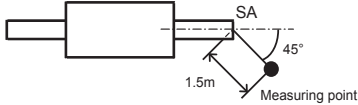
VN-M650HE



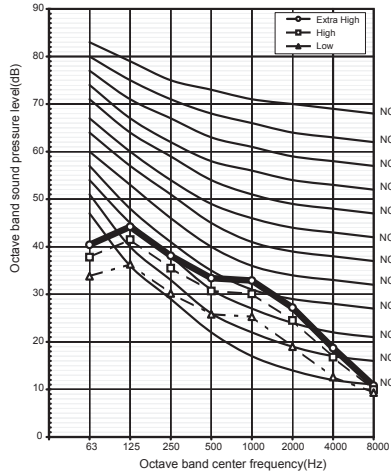
VN-M800HE



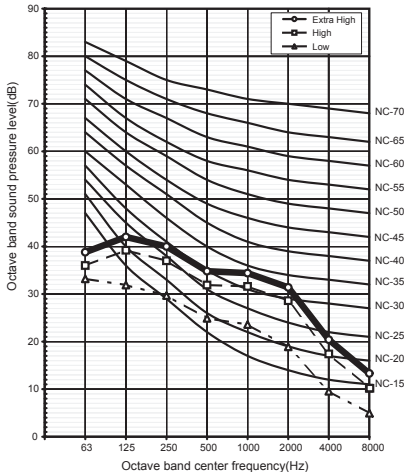
(240V~, 50Hz)



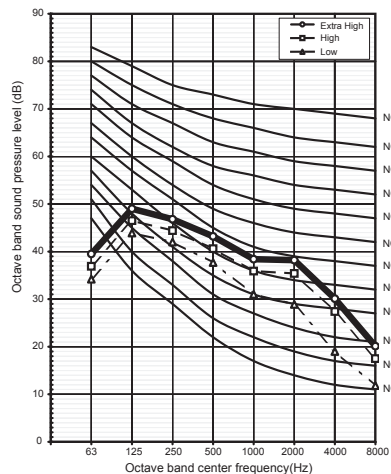
VN-M150HE



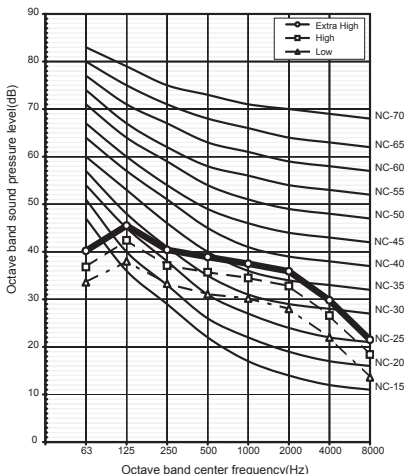
VN-M250HE



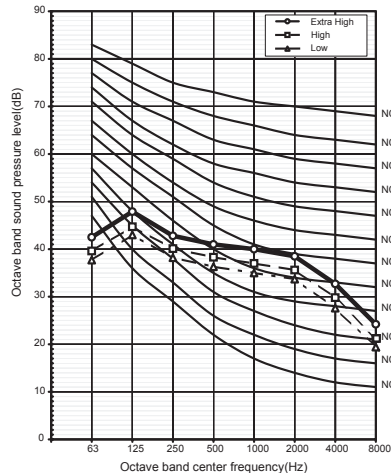
VN-M350HE



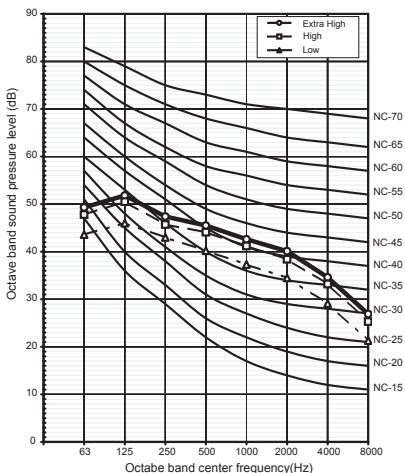
VN-M500HE



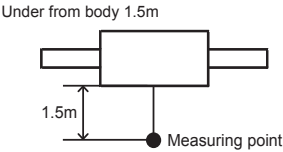
VN-M650HE



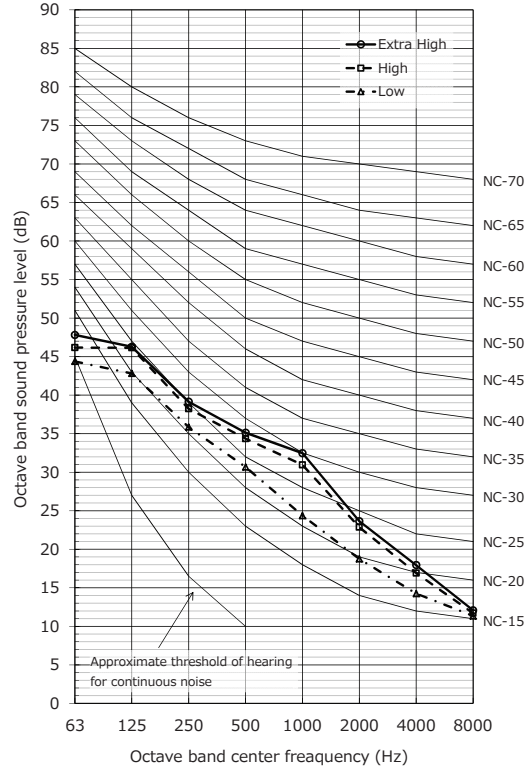
VN-M800HE



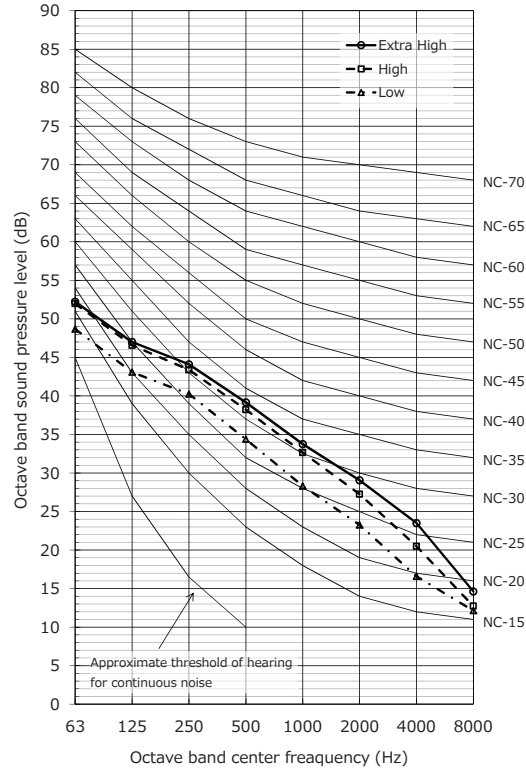
(220-240V~, 50Hz)



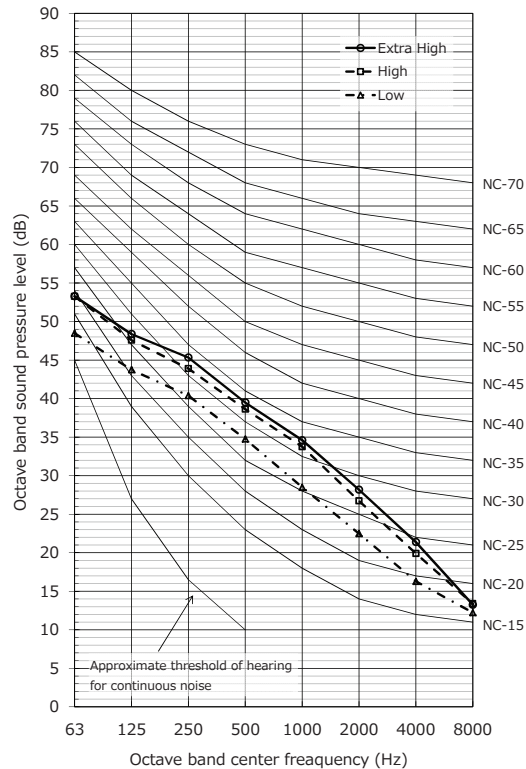
VN-M1000HE1



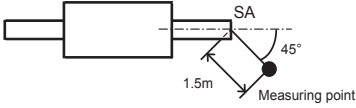
VN-M1500HE1



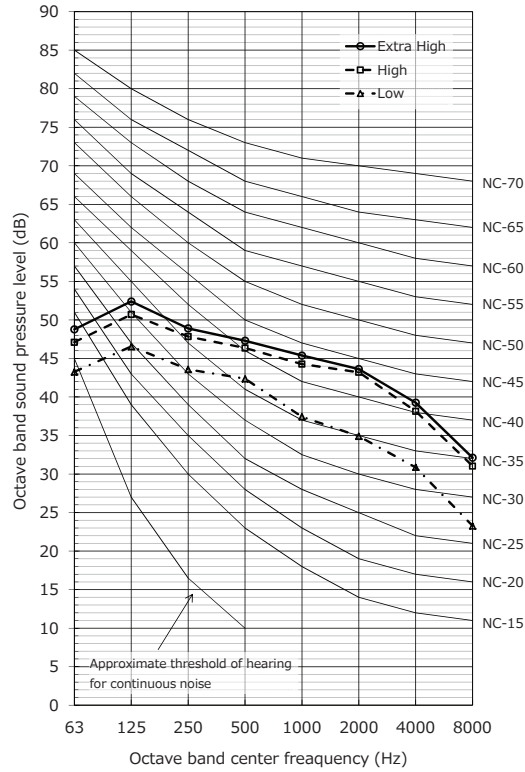
VN-M2000HE1



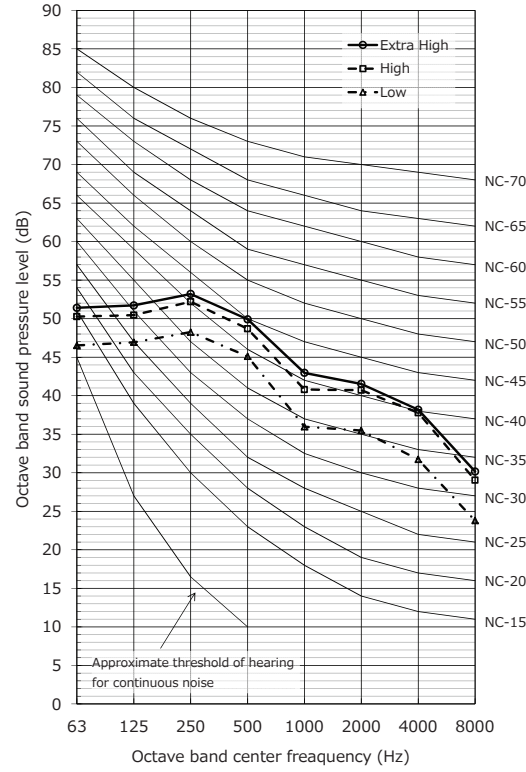
(220-240V~, 50Hz)



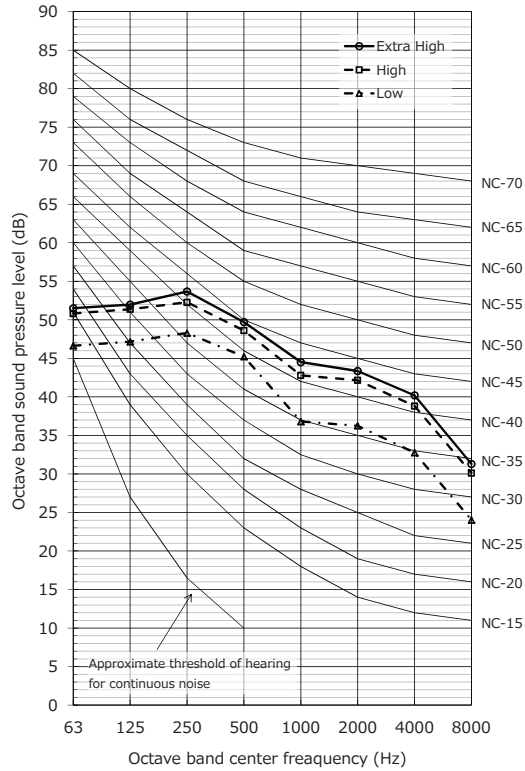
VN-M1000HE1



VN-M1500HE1



VN-M2000HE1



Air to Air Heat exchanger Type Engineering Data Book

Model name:

VN-M__0HE/VN-M__0HE1

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TOSHIBA CARRIER CORPORATION