Manual No.'17•SAF-T-269

updated March 18, 2019

MITSUBISHI HEAVY INDUSTRIES

TECHNICAL MANUAL

AIR TO AIR HEAT EXCHANGE UNITS

SAF150E7
250E7
350E7
500E7
800E7
1000E7

MITSUBISHI HEAVY INDUSTRIES THERMAL SYSTEMS, LTD.

CONTENTS

#

1. SELECTION DATA

1.1 Specifications

Item				Model		SAF150E7	SAF250E7	SAF350E7	SAF500E7	SAF800E7	SAF1000E7
Power source						1 Phase, 220-240V 50Hz					
Exterior dimensions Height × Width × Depth					mm	270×970×467	270×882×599	317×1050×804	317×1090×904	388×1322×884	388×1322×1134
Exterior appearance						Galvanized steel sheet					
Operation date				Power input	W	92-107	108-123	178-185	204-225	360-378	416-432
				Running current	A	0.42-0.45	0.49-0.51	0.81-0.77	0.93-0.94	1.64-1.58	1.89-1.80
	Capacity	UHi		Enthalpy exchange efficiency	%	63	63	66	62	65	65
			Cooling			70	70	69	67	71	71
			Heating	Temperature exchange efficiency		75	75	75	75	75	75
		Hi		Enthalpy exchange efficiency		63	63	66	62	65	65
			Cooling			70	70	69	67	71	71
			Heating	Temperature exchange efficiency		75	75	75	75	75	75
		Lo		Enthalpy exchange efficiency		66	65	71	64	68	70
			Cooling			73	72	73	69	74	76
			Heating	Temperature exchange efficiency		77	77	78	76	76	79
				Motor & Q'ty	W	10 × 2	20 × 2	40 × 2	70 × 2	180 × 2	180 × 2
Air handling equipment Fan type & Q'ty						Sirroco fan × 2					
Air flow			UHi		m^3/h	150	250	350	500	800	1000
			Hi			150	250	350	500	800	1000
			Lo			120	190	240	440	630	700
External static pressure			UHi		Pa	80	105	140	120	140	105
			Hi			70	95	60	60	110	80
			Lo			25	45	45	35	55	75
Air filter	Outside intake air					Protection for element (Washable) PS400					
	Exhaust air										
Operation time for air filter					h	3000					
Noise level			UHi		dB(A)	28.5-29.0	30.0-31.5	32.5-33.0	36.5-37.5	37.0-37.5	37.5-38.5
			Hi			28.0-29.0	29.5-30.5	30.5-31.0	34.5-35.5	36.5-37.0	37.0-37.5
			Lo			19.5-21.5	23.5-26.5	22.5-25.5	31.0-32.5	33.5-34.5	33.5-34.5
Net weight					kg	25	29	49	57	71	83
Operation control	Operation switch					Remote control					
	Operation					Ventilation (ON / OFF)					
	Fan speed					Hi / Lo					
	Function					Heat exchange / Normal Ventilation, ON / OFF timer					
Safety equipment						Internal thermostat for fan motor					

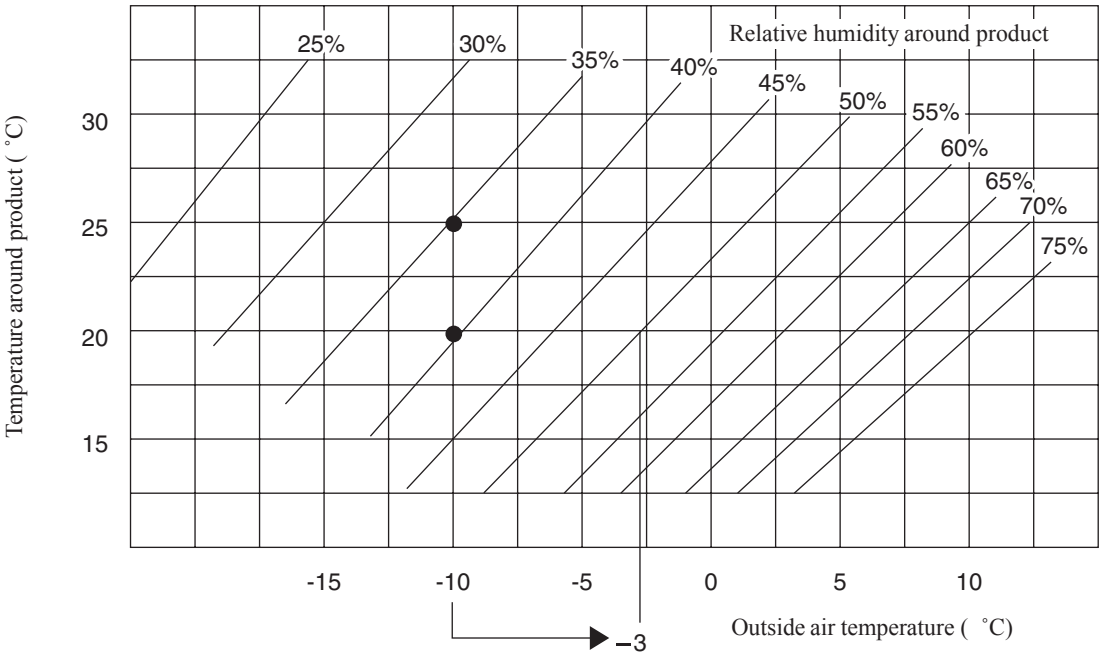
Note (1) The data are mesured at the following conditions.

		Summer	Winter
Indoor side (Supply air)	DB	27°C	20°C
	WB	20°C	14°C
Outdoor side (Outside air)	DB	35°C	5°C
	WB	29°C	2°C
Unit around	DB	27°C	20°C

1.2 Environmental conditions during use

- **Condensation on the product's surface**

If the temperature and humidity in the air around the product are high and the outside temperature is low, condensation may form on the outside surface of the product. The following graph shows the limit conditions for occurrence of condensation on the product's surface relative to the temperature and humidity surrounding the product and the outside air temperature.



Use the humidity around the product determined from this graph as shown below.

[Example 1]

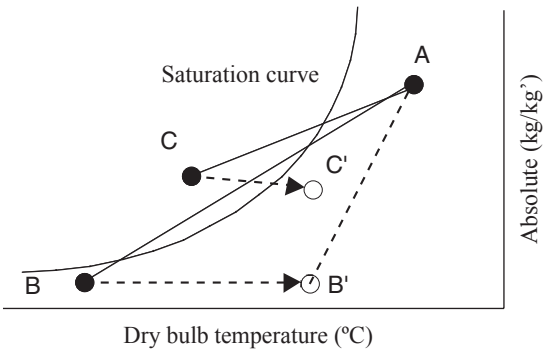
If the outside air temperature is –10ºC and the temperature of the air around the product is 20ºC, condensation will not form on the product's surface if the relative humidity around the product is below 40%. However, if the temperature of the air around the product is 25ºC, it is necessary for the relative humidity around the product to be below approximately 35%.

[Example 2]

In places where the outside air temperature is –10ºC and the temperature of the air around the product is 20ºC, and there is danger of the relative humidity around the product changing to 40~50%, condensation may form on the surface of the product, so countermeasures to preheat the outside air from –10ºC to –3ºC are necessary.

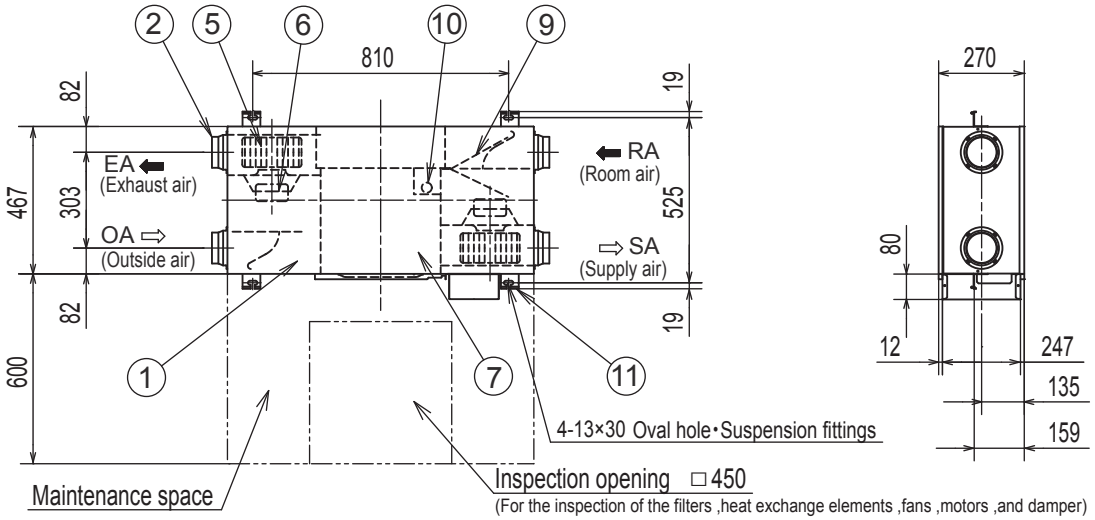
- **Condensation on the heat exchanger element**

As shown in the graph at right, points are plotted along the line between condition A, with high temperature air being drawn in, and condition B, with low temperature air being drawn in. Heat is obtained by the heat in the air from high temperature side A being exchanged at the heat exchanger unit, and in the case where the air conditions exceed the saturation curve, as in the case of point C, condensation forms on the heat exchanger element or frost forms. In such a case, Use low temperature side air B by heating it to point B' so that point C does not exceed the saturation curve but remains inside it at point C'.

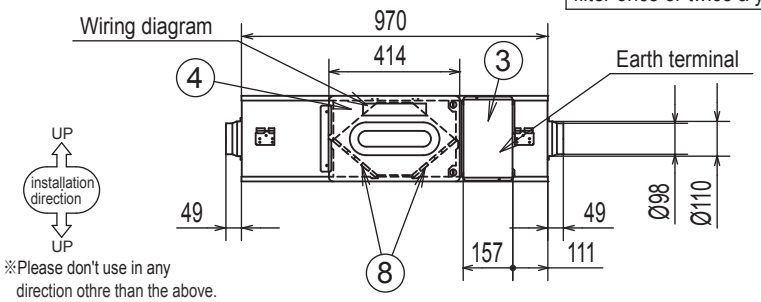


1.3 Exterior dimensions

Model SAF150E7



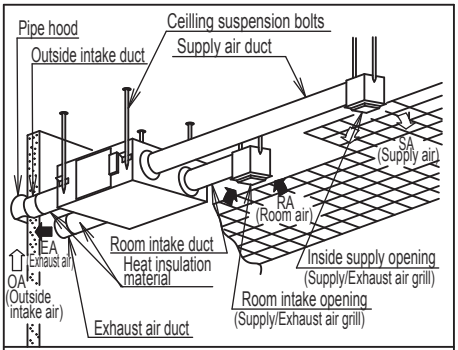
An inspection opening is necessary to clean the heat exchange element and filter once or twice a year.



※Please don't use in any direction othre than the above.

No.	Parts name	Qty.	Material	Remarks
1	Frame	1	Galvanized sheets	
2	Adapter	4	ABS	
3	Electrical equipment box	1		
4	Inspection cover	1	Galvanized sheets	
5	Fan	2	ABS	
6	Motor	2		
7	Heat exchange element	1	Special paper + Resin	
8	Filter	2	Nylon-polyester fiber	Collection efficiency AFI 82%
9	Damper	1		
10	Damper motor	1		
11	Ceiling suspension fixture	4	Galvanized sheets	

■ Reference sketch

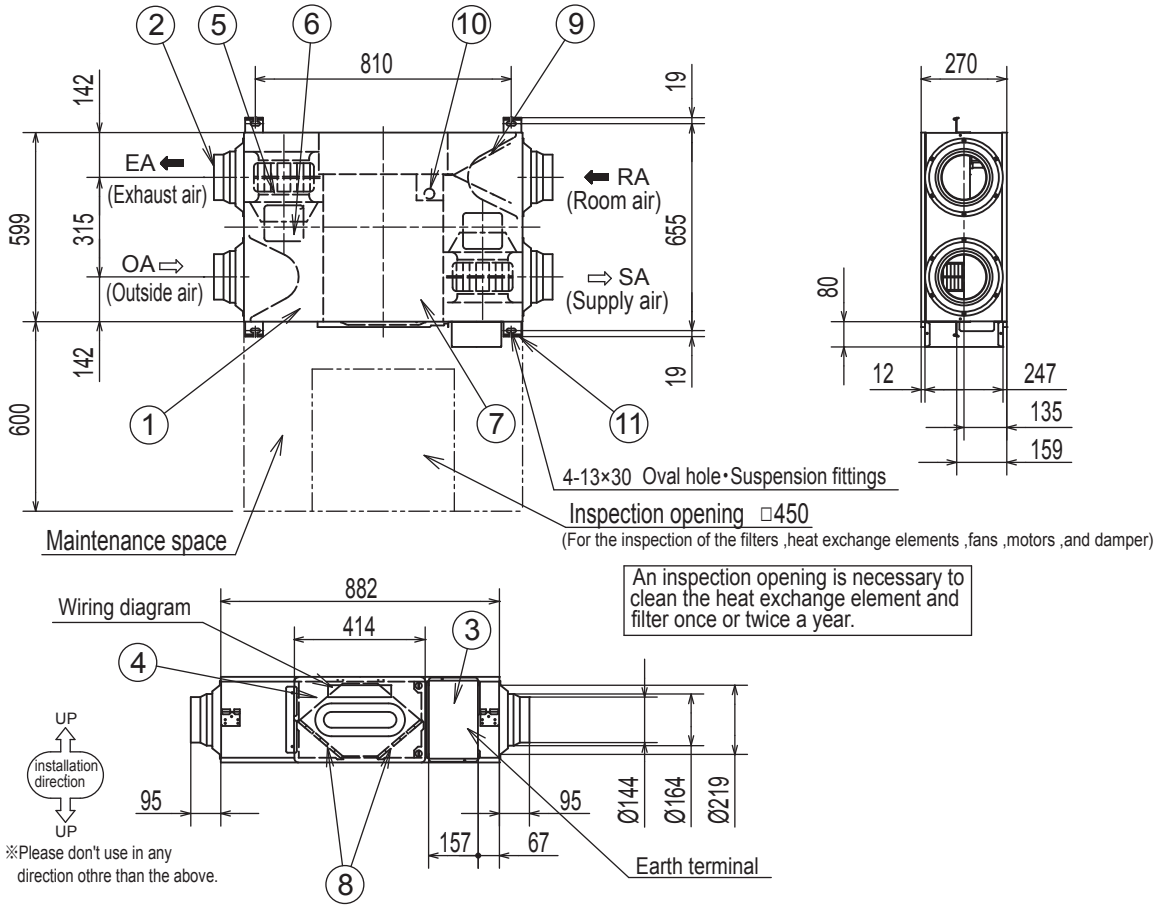


The two outside ducts (the outside intake duct and the exhaust duct) must be insulated to prevent condensation. (Material;Glass wool, Thickness;25)

* Duct size (Nominal diameter): ∅100

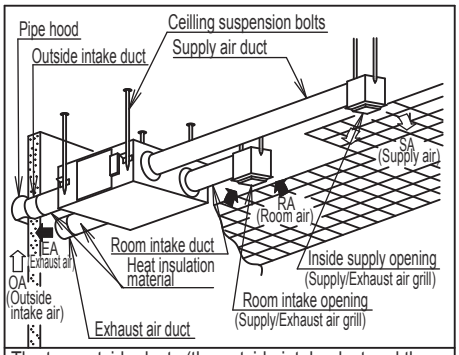
** The above dimensions do not include the thickness of the insulasion material on the unit body.

Model SAF250E7



No.	Parts name	Qty.	Material	Remarks
1	Frame	1	Galvanized sheets	
2	Adapter	4	ABS	
3	Electrical equipment box	1		
4	Inspection cover	1	Galvanized sheets	
5	Fan	2	ABS	
6	Motor	2		
7	Heat exchange element	1	Special paper + Resin	
8	Filter	2	Nylon-polyester fiber	Collection efficiency AFI 82%
9	Damper	1		
10	Damper motor	1		
11	Ceiling suspension fixture	4	Galvanized sheets	

■ Reference sketch

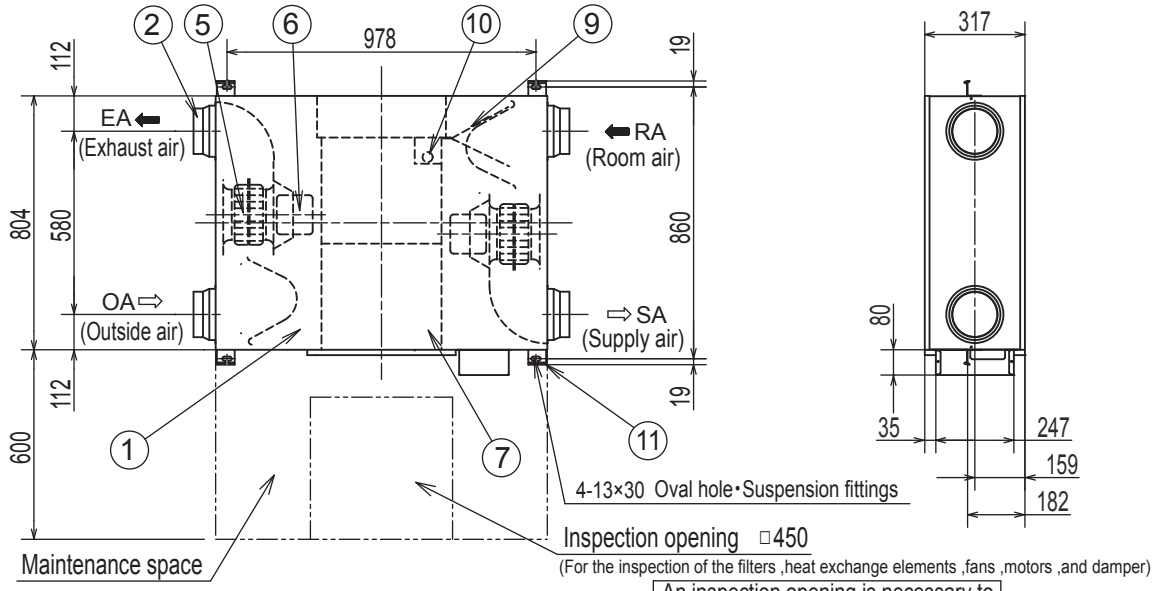


The two outside ducts (the outside intake duct and the exhaust duct) must be insulated to prevent condensation. (Material;Glass wool, Thickness;25)

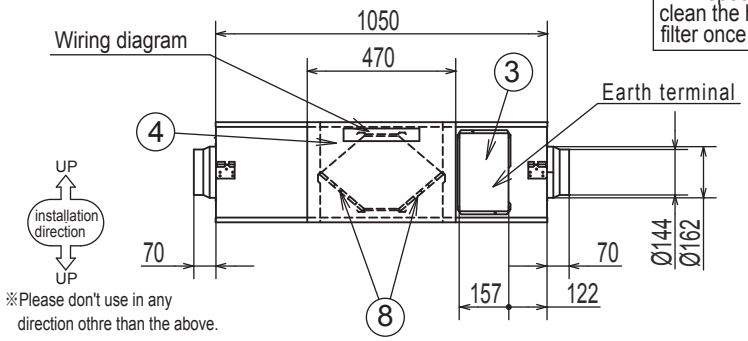
* Duct size (Nominal diameter): ∅150

** The above dimensions do not include the thickness of the insulasion material on the unit body.

Model SAF350E7



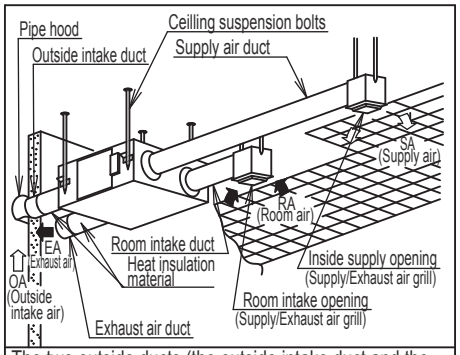
An inspection opening is necessary to clean the heat exchange element and filter once or twice a year.



※Please don't use in any direction othre than the above.

No.	Parts name	Qty.	Material	Remarks
1	Frame	1	Galvanized sheets	
2	Adapter	4	ABS	
3	Electrical equipment box	1		
4	Inspection cover	1	Galvanized sheets	
5	Fan	2	ABS	
6	Motor	2		
7	Heat exchange element	2	Special paper + Resin	
8	Filter	2	Nylon-polyester fiber	Collection efficiency AFI 82%
9	Damper	1		
10	Damper motor	1		
11	Ceiling suspension fixture	4	Galvanized sheets	

■ Reference sketch

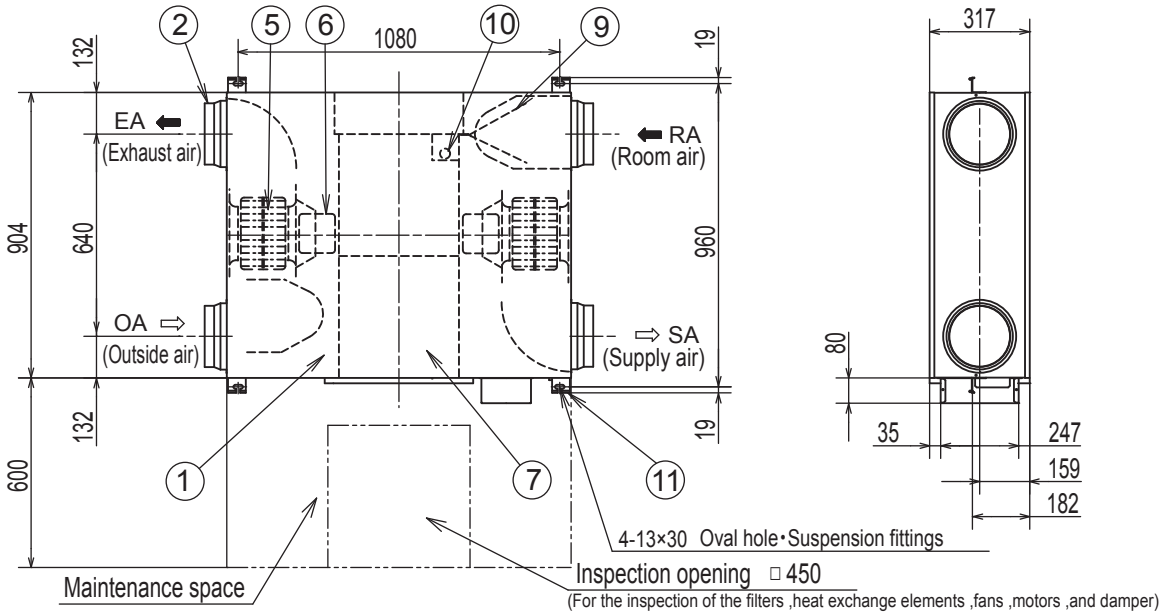


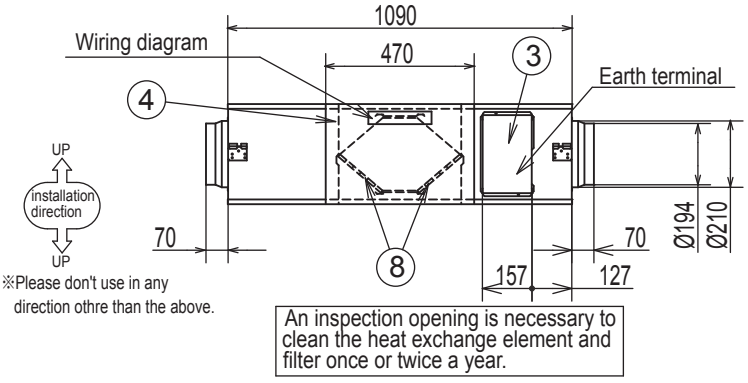
The two outside ducts (the outside intake duct and the exhaust duct) must be insulated to prevent condensation. (Material;Glass wool, Thickness;25)

* Duct size (Nominal diameter): ∅150

** The above dimensions do not include the thickness of the insulasion material on the unit body.

Model SAF500E7



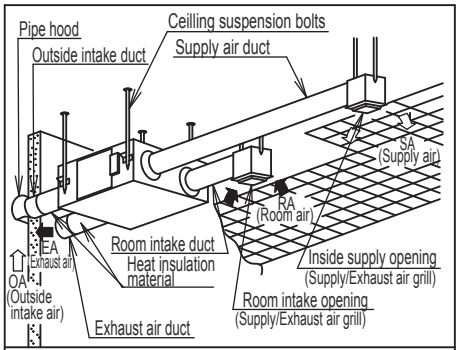


※Please don't use in any direction othre than the above.

An inspection opening is necessary to clean the heat exchange element and filter once or twice a year.

No.	Parts name	Qty.	Material	Remarks
1	Frame	1	Galvanized sheets	
2	Adapter	4	ABS	
3	Electrical equipment box	1		
4	Inspection cover	1	Galvanized sheets	
5	Fan	2	ABS	
6	Motor	2		
7	Heat exchange element	2	Special paper + Resin	
8	Filter	2	Nylon-polyester fiber	Collection efficiency AFI 82%
9	Damper	1		
10	Damper motor	1		
11	Ceiling suspension fixture	4	Galvanized sheets	

■ Reference sketch

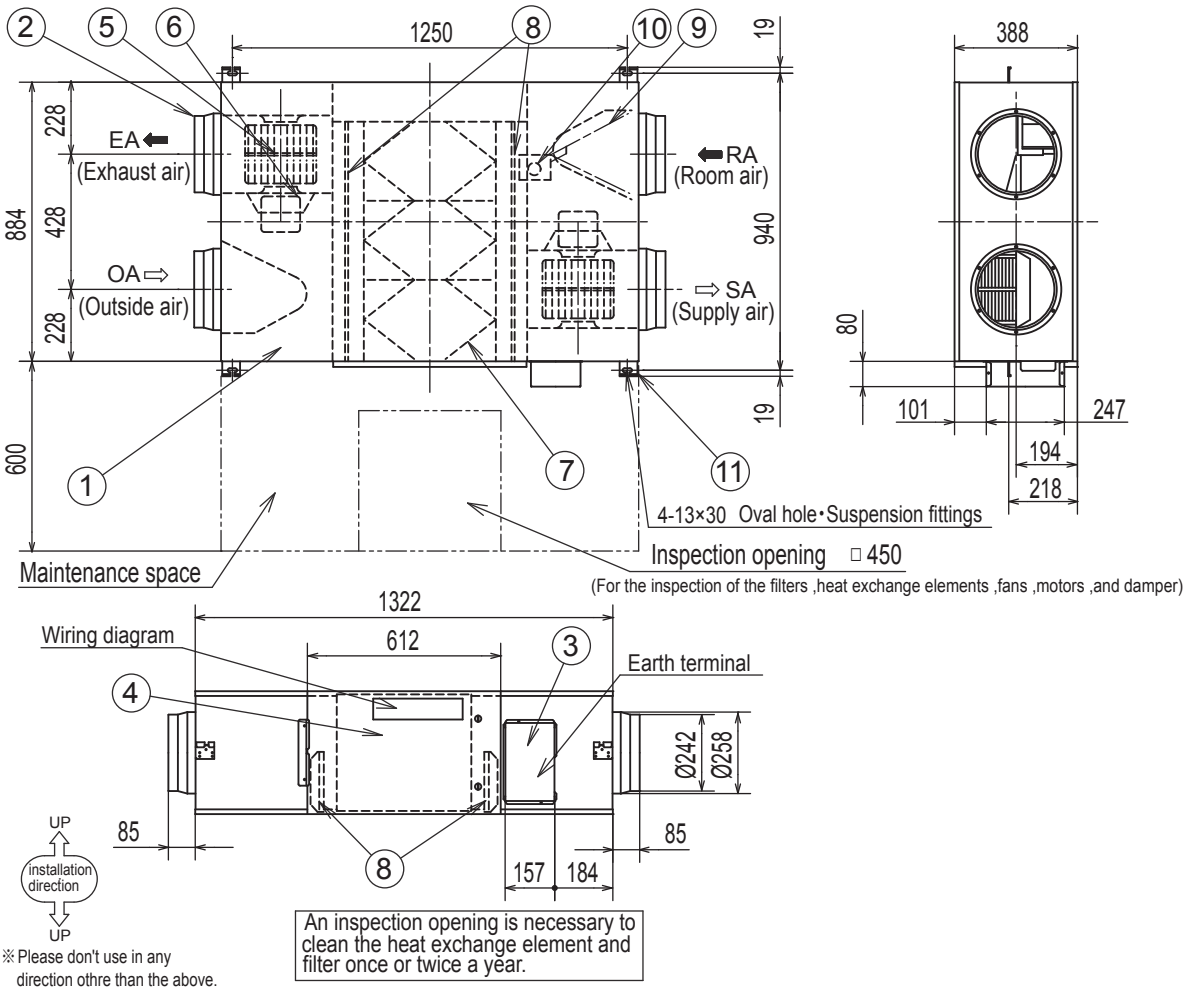


The two outside ducts (the outside intake duct and the exhaust duct) must be insulated to prevent condensation. (Material;Glass wool, Thickness;25)

* Duct size (Nominal diameter): ∅200

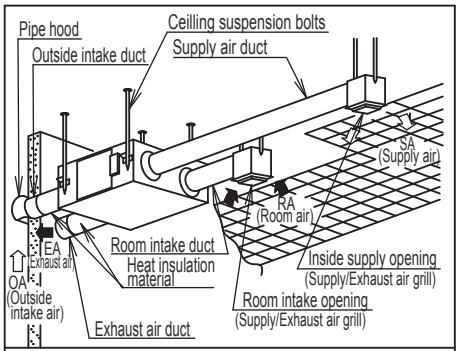
** The above dimensions do not include the thickness of the insulasion material on the unit body.

Model SAF800E7



No.	Parts name	Qty.	Material	Remarks
1	Frame	1	Galvanized sheets	
2	Adapter	4	ABS	
3	Electrical equipment box	1		
4	Inspection cover	1	Galvanized sheets	
5	Fan	2	ABS	
6	Motor	2		
7	Heat exchange element	3	Special paper + Resin	
8	Filter	2	Nylon-polyester fiber	Collection efficiency AFI 82%
9	Damper	1		
10	Damper motor	1		
11	Ceiling suspension fixture	4	Galvanized sheets	

■ Reference sketch

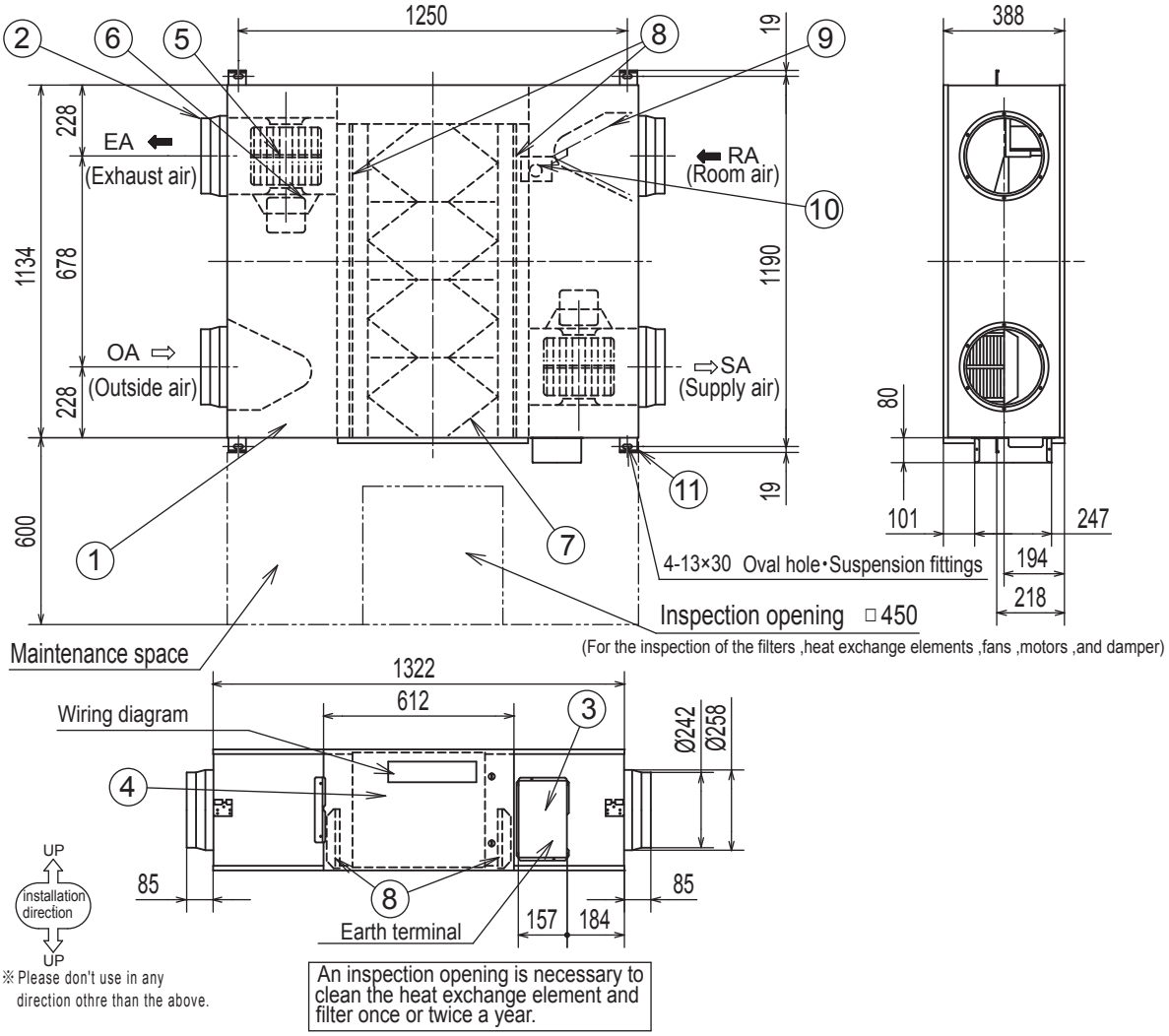


The two outside ducts (the outside intake duct and the exhaust duct) must be insulated to prevent condensation. (Material;Glass wool, Thickness;25)

* Duct size (Nominal diameter): ∅250

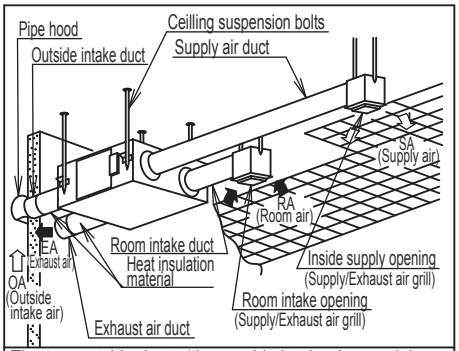
** The above dimensions do not include the thickness of the insulasion material on the unit body.

Model SAF1000E7



No.	Parts name	Qty.	Material	Remarks
1	Frame	1	Galvanized sheets	
2	Adapter	4	ABS	
3	Electrical equipment box	1		
4	Inspection cover	1	Galvanized sheets	
5	Fan	2	ABS	
6	Motor	2		
7	Heat exchange element	4	Special paper + Resin	
8	Filter	2	Nylon-Polyester Fiber	Collection Efficiency AFI 82%
9	Damper	1		
10	Damper motor	1		
11	Ceiling suspension fixture	4	Galvanized sheets	

■ Reference sketch



The two outside ducts (the outside intake duct and the exhaust duct) must be insulated to prevent condensation. (Material;Glass wool, Thickness;25)

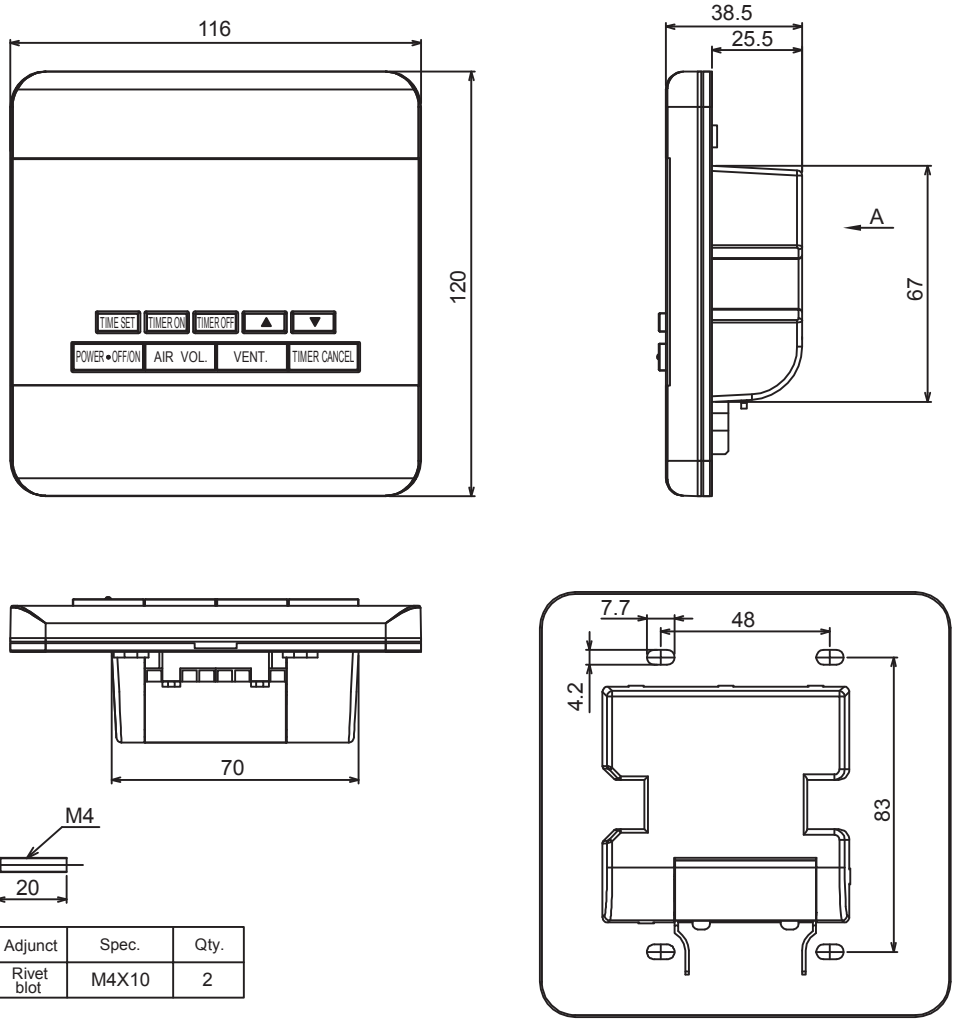
* Duct size (Nominal diameter): ∅250

** The above dimensions do not include the thickness of the insulasion material on the unit body.

Remote control

Model SAF-REMOC-F

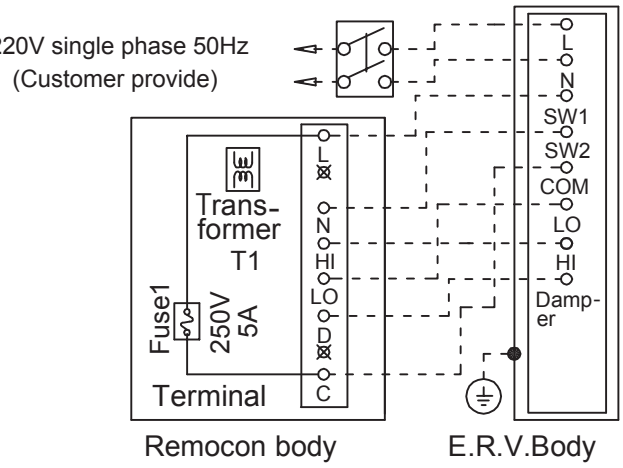
Unit:mm



Adjunct	Spec.	Qty.
Rivet blot	M4X10	2

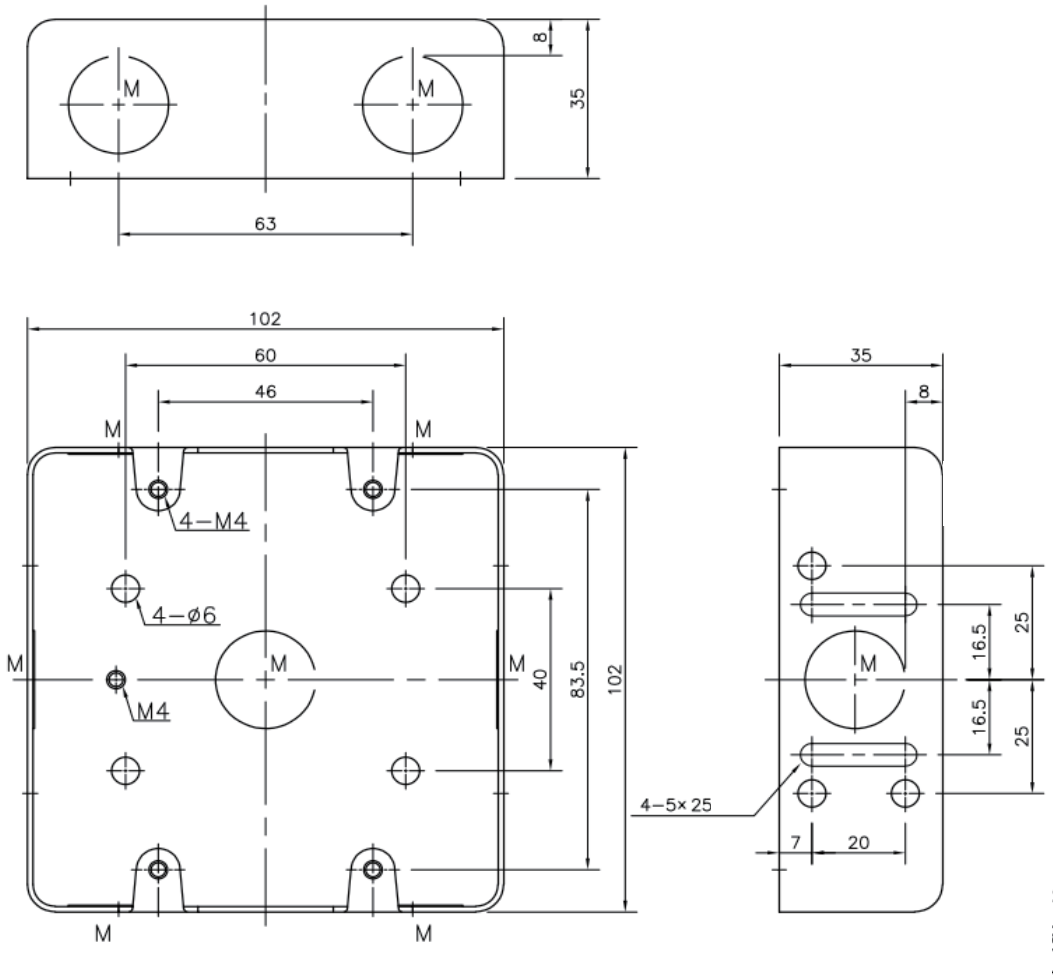
1. The outside dimension for junction box is 100 x 100.
2. Connect by the hard wire with diameter 1.5mm².

Connection diagram



Switch box

Model SAF-SWBX7-50PCS

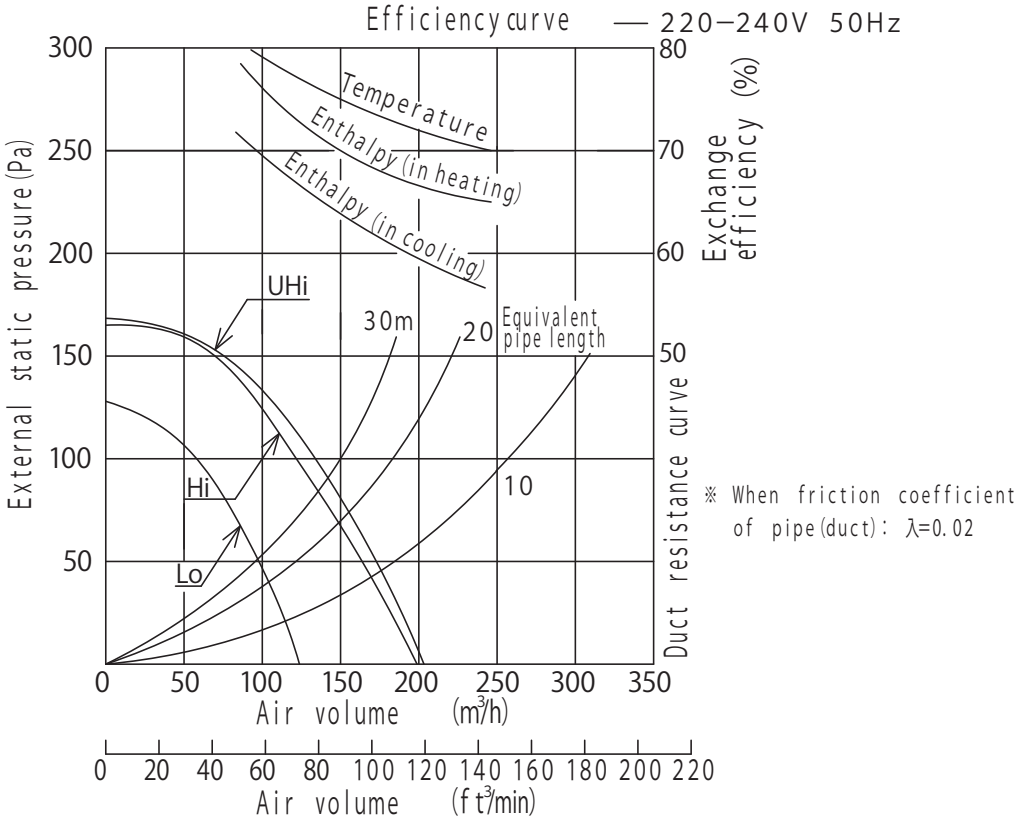


M: ϕ21.5

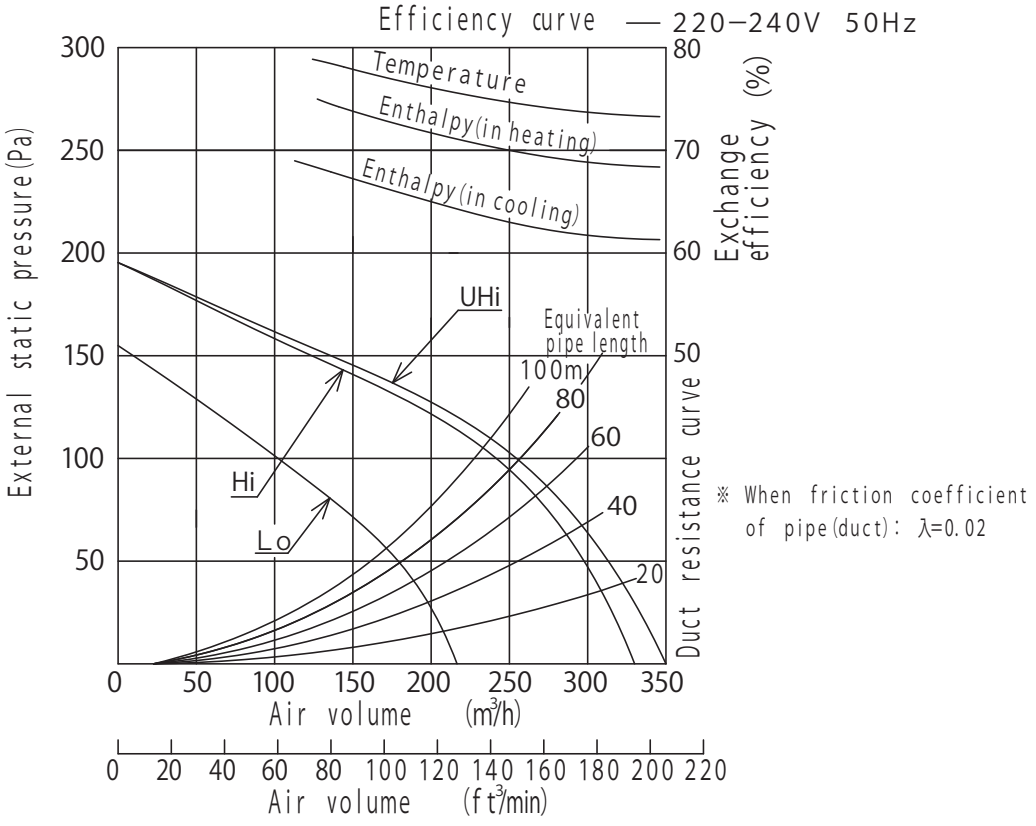
#

1.4 Characteristics of fan

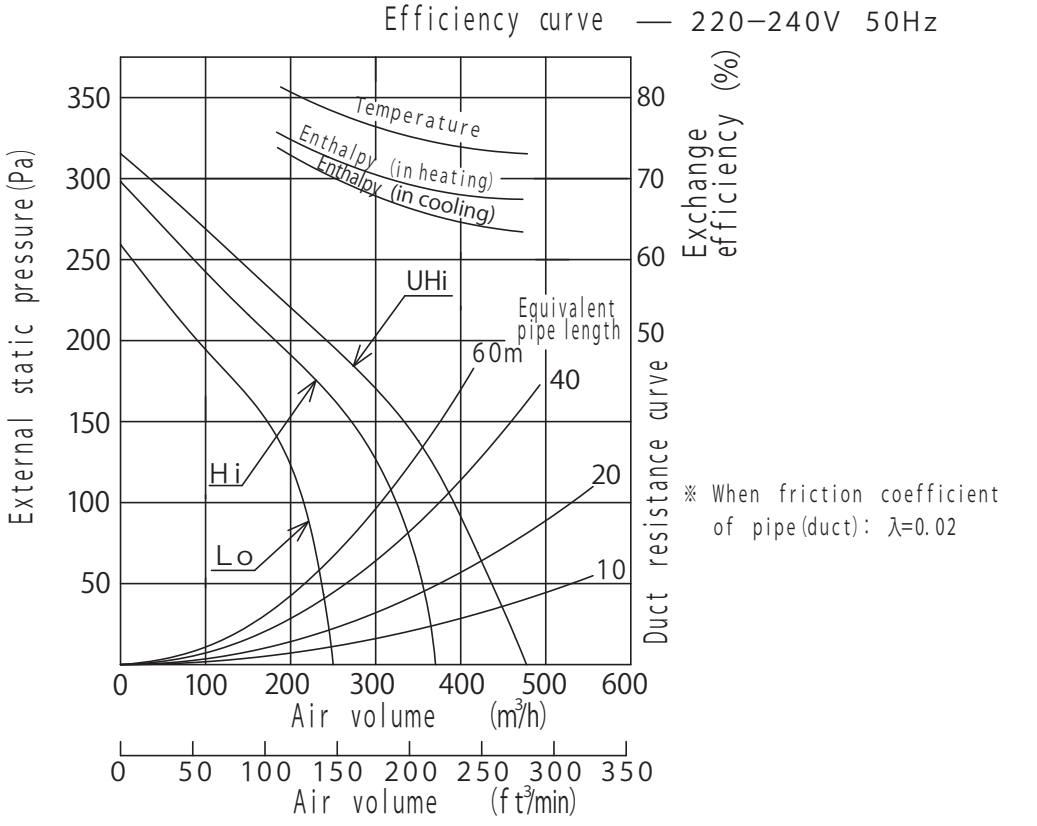
Model SAF150E7



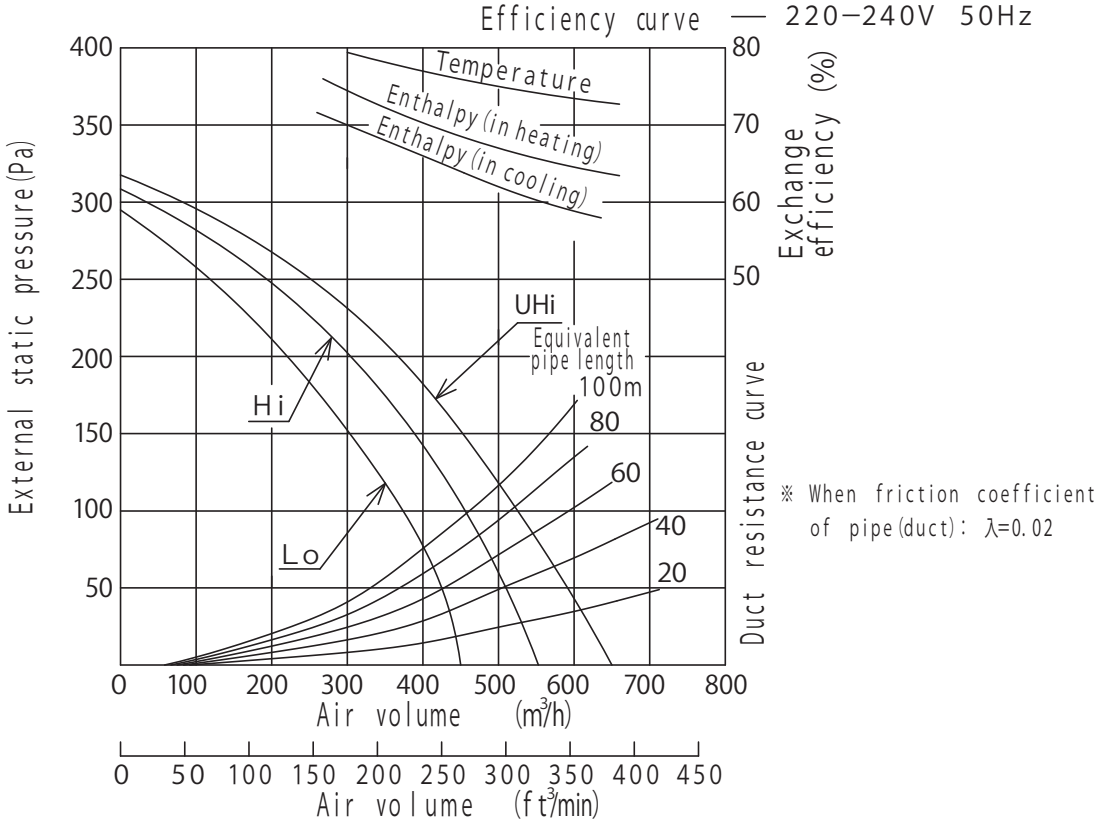
Model SAF250E7



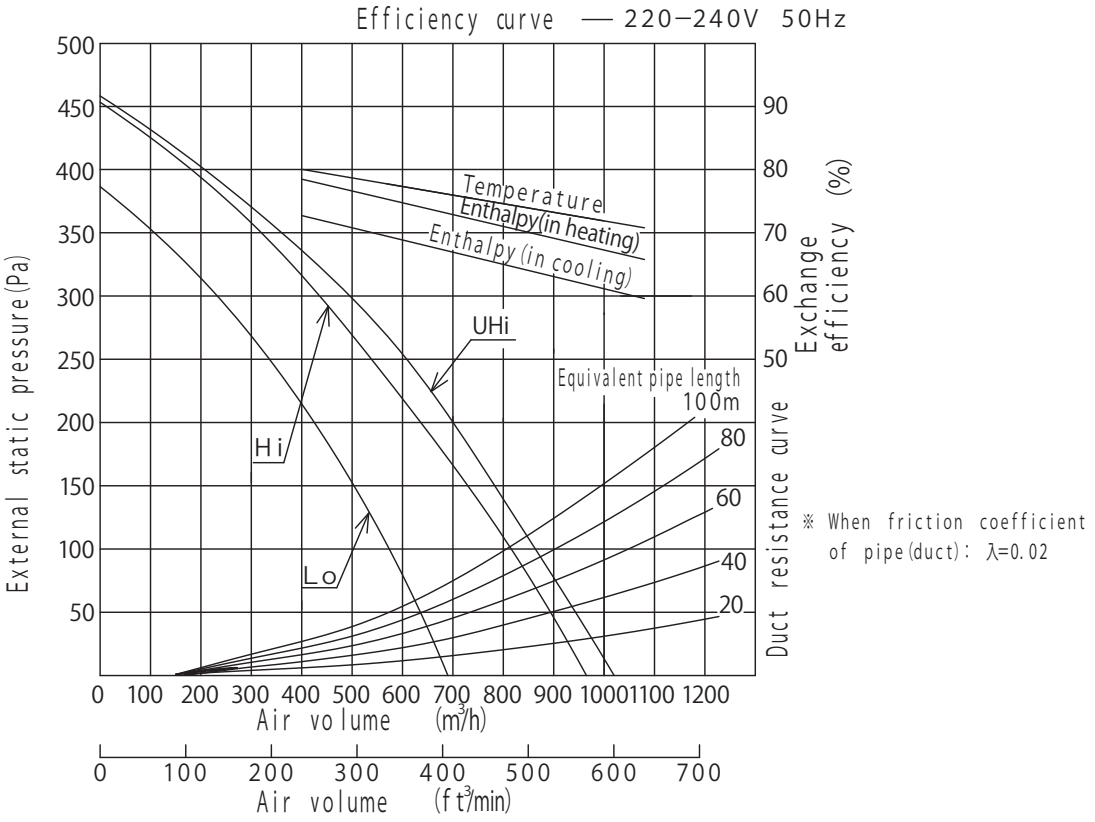
Model SAF350E7



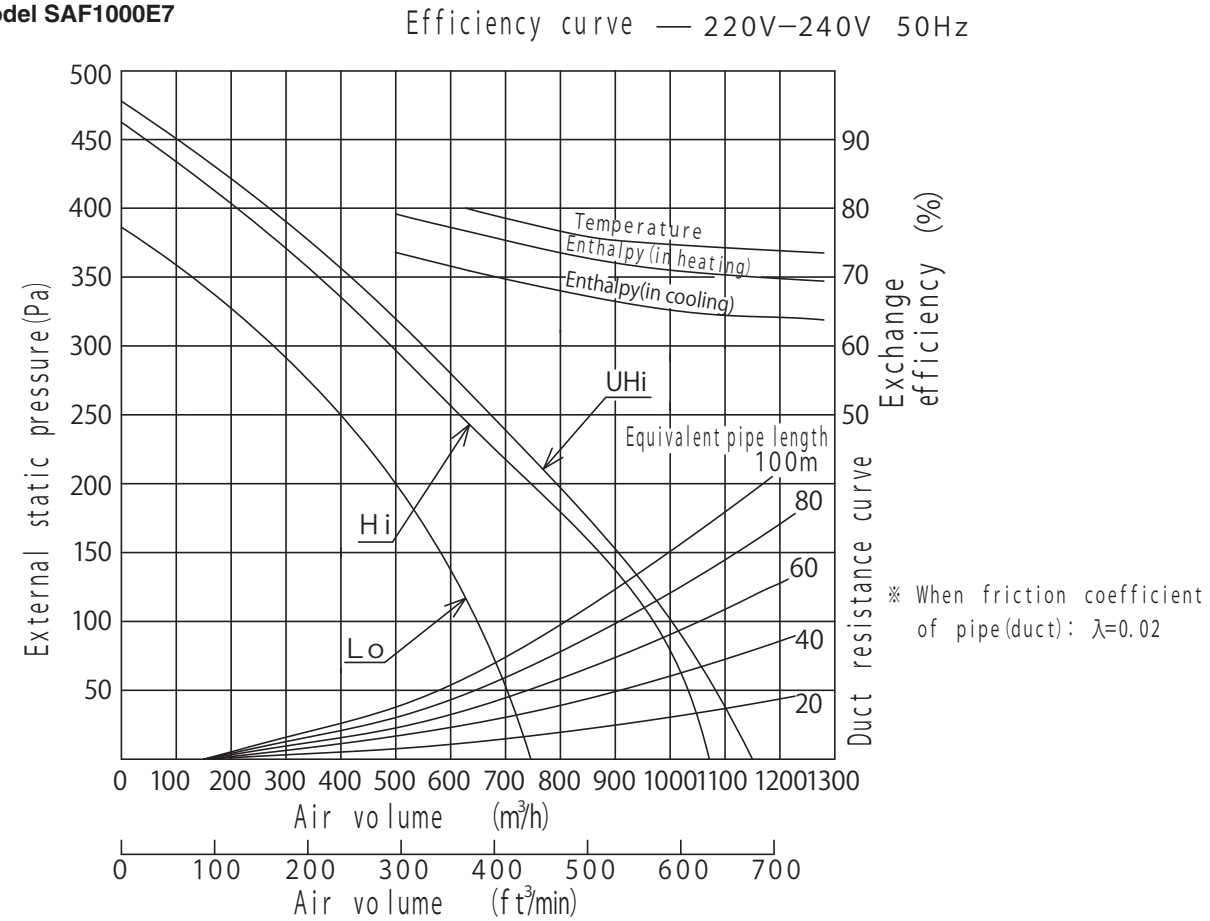
Model SAF500E7



Model SAF800E7



Model SAF1000E7

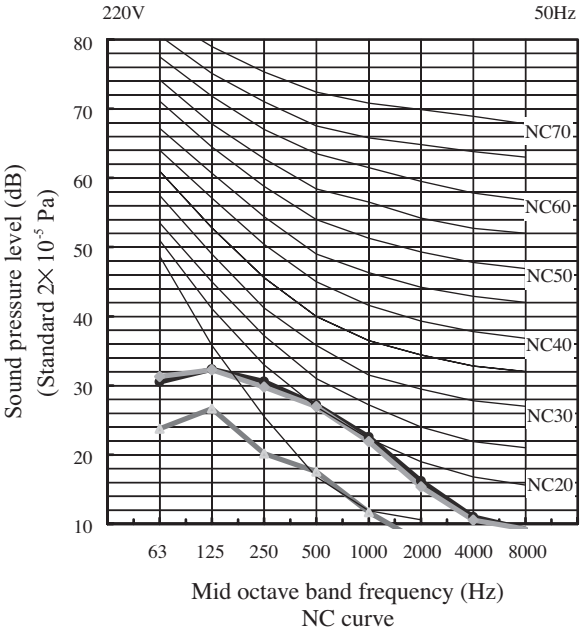


1.5 Noise level

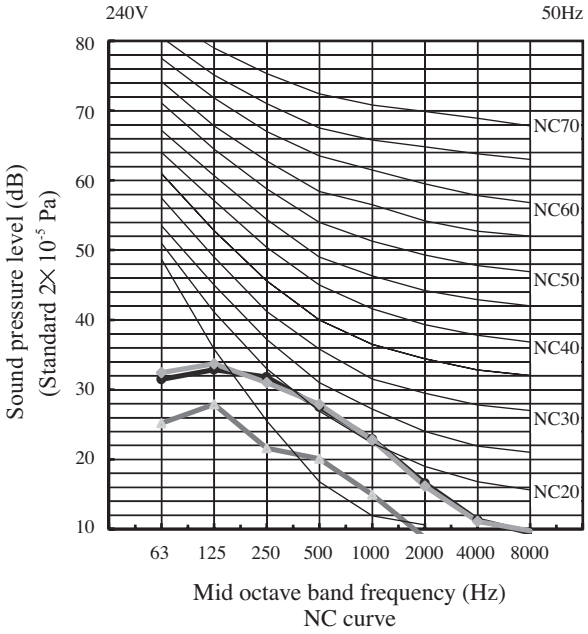
Notes (1) The data are based on the following condition.
Distance center & low point: 1.5 m.
(2) The data in the chart are measured in an unechonic room.
(3) The noise levels measured in the field are usually higher than data because of reflection.

Model SAF150E7

Noise level 28.5 dB (A) at UHi
28 dB (A) at Hi
19.5 dB (A) at Lo

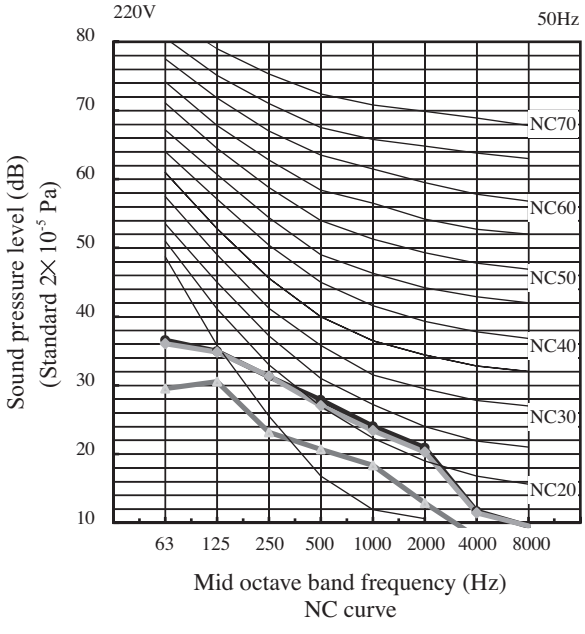


Noise level 29 dB (A) at UHi
29 dB (A) at Hi
21.5 dB (A) at Lo

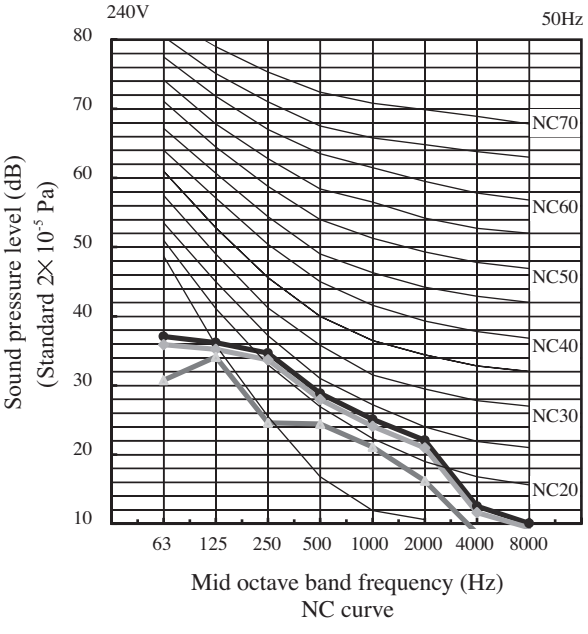


Model SAF250E7

Noise level 30 dB (A) at UHi
29.5 dB (A) at Hi
23.5 dB (A) at Lo

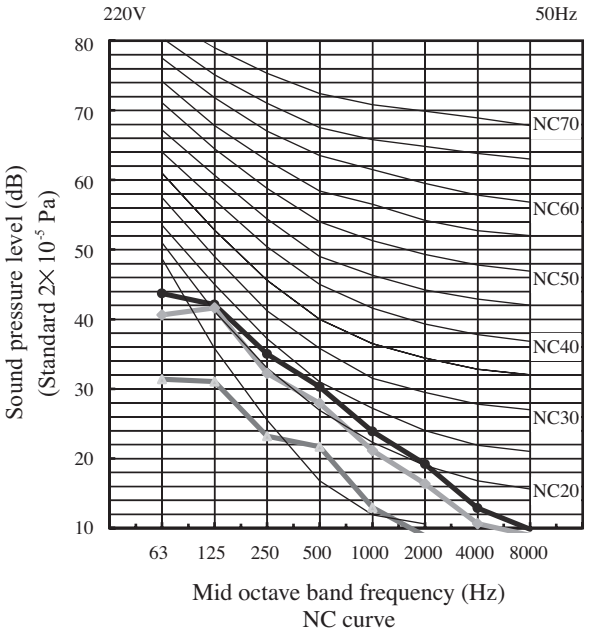


Noise level 31.5 dB (A) at UHi
30.5 dB (A) at Hi
26.5 dB (A) at Lo

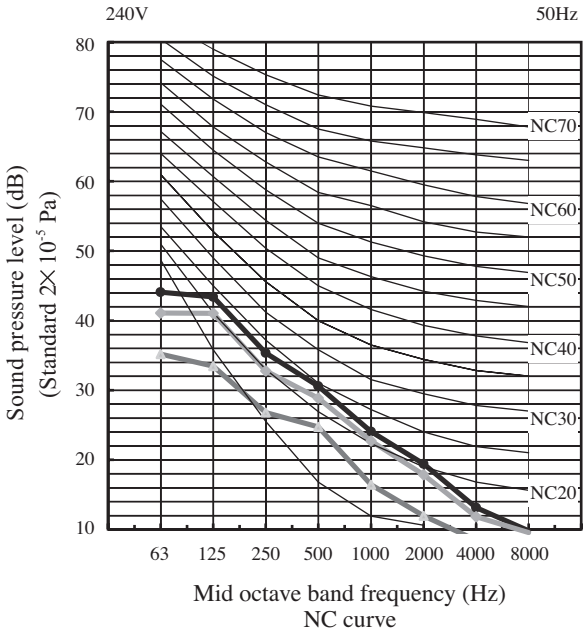


Model SAF350E7

Noise level 32.5 dB (A) at UHi
30.5 dB (A) at Hi
22.5 dB (A) at Lo

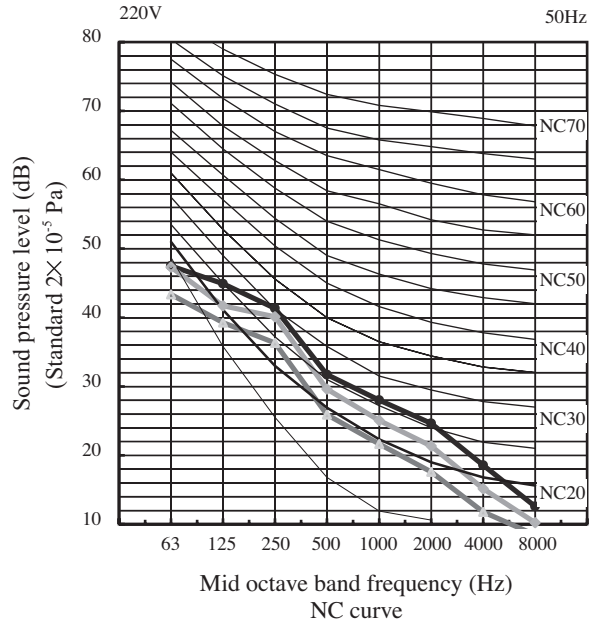


Noise level 33 dB (A) at UHi
31 dB (A) at Hi
25.5 dB (A) at Lo

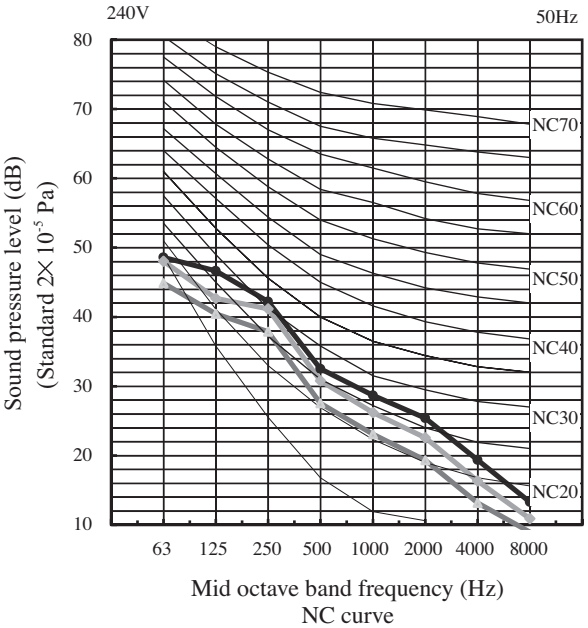


Model SAF500E7

Noise level 36.5 dB (A) at UHi
34.5 dB (A) at Hi
31 dB (A) at Lo

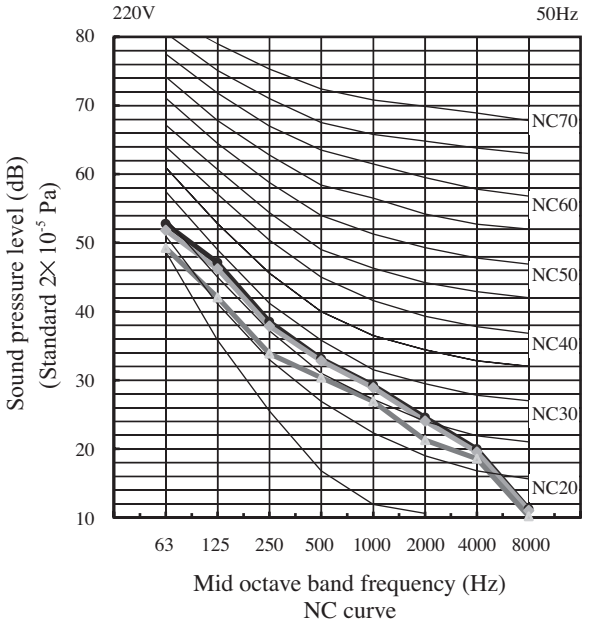


Noise level 37.5 dB (A) at UHi
35.5 dB (A) at Hi
32.5 dB (A) at Lo

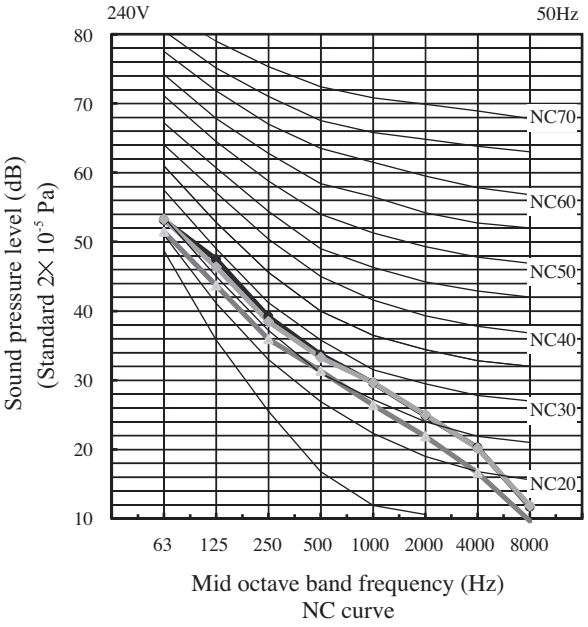


Model SAF800E7

Noise level 37 dB (A) at UHi
36.5 dB (A) at Hi
33.5 dB (A) at Lo

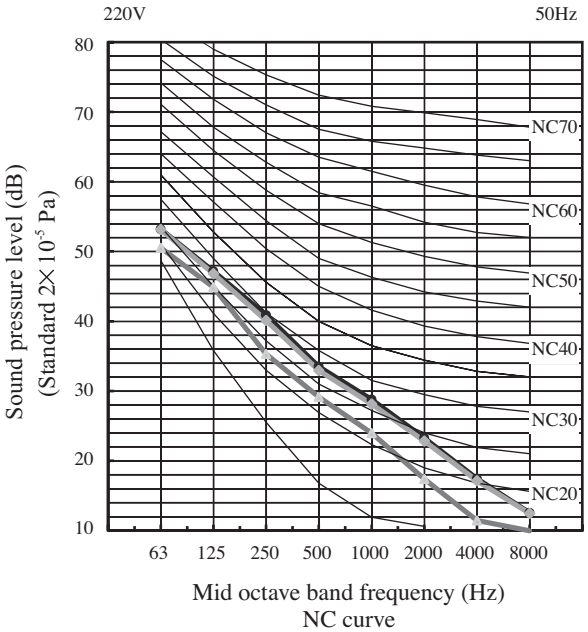


Noise level 37.5 dB (A) at UHi
37 dB (A) at Hi
34.5 dB (A) at Lo

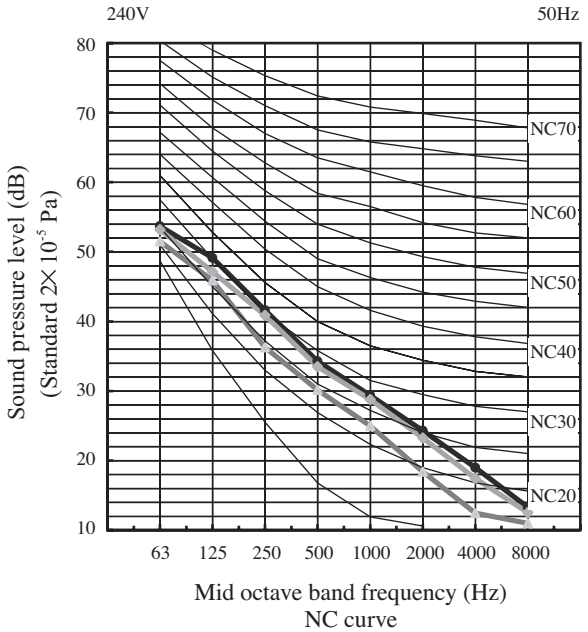


Model SAF1000E7

Noise level 37.5 dB (A) at UHi
37 dB (A) at Hi
33.5 dB (A) at Lo



Noise level 38.5 dB (A) at UHi
37.5 dB (A) at Hi
34.5 dB (A) at Lo



1.6 Usage conditions

Outdoor air conditions
Temperature range −10℃～40℃
Relative humidity 85% or less

Indoor air conditions
Temperature range −10℃～40℃
Relative humidity 85% or less

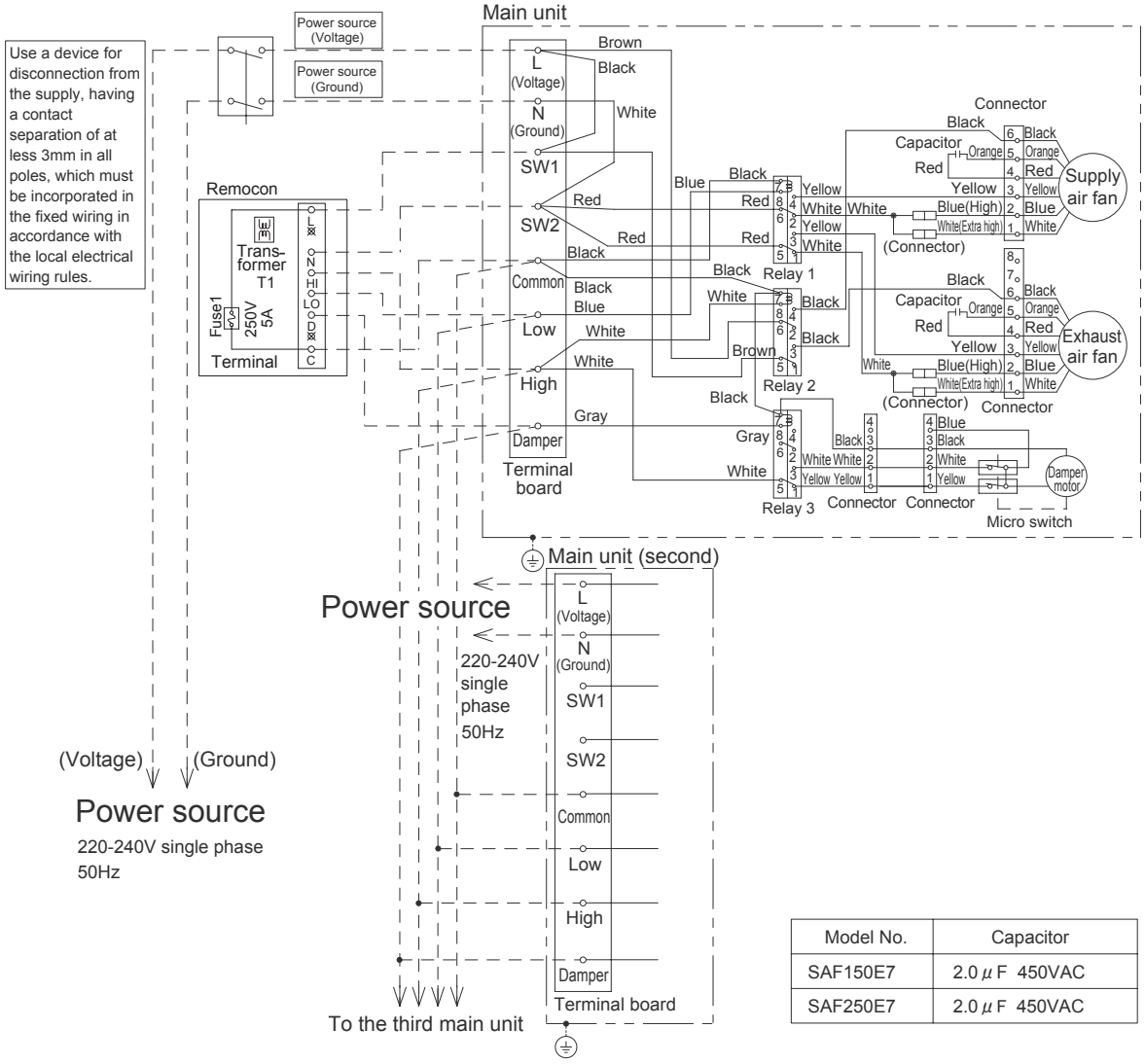
※ Indoor air here means air in air-conditioned living rooms.
Its use in refrigerators or other places where temprature can fluctuate greatly is prohibited even if a temperature range is acceptable.

#

2. ELECTRICAL DATA

2.1 Electrical wiring

Models SAF150E7, 250E7



Model No.	Capacitor
SAF150E7	2.0 μF 450VAC
SAF250E7	2.0 μF 450VAC

Notes

(1) Connect wires/cables indicated by broken lines.

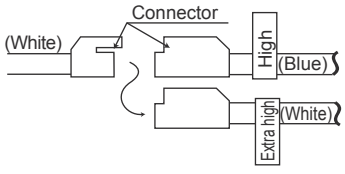
(2) For power source, use a VVF cable with ϕ1.6 or ϕ2.

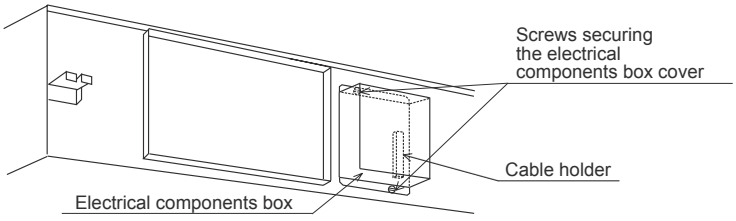
(3) Take the following steps on connect wires/cables:

- Remove two screws fixing the cover of the electrical components box, open the cover, and connect wires/cables correctly.
- Secure the cable drawn from the terminal board firmly with the cable holder.

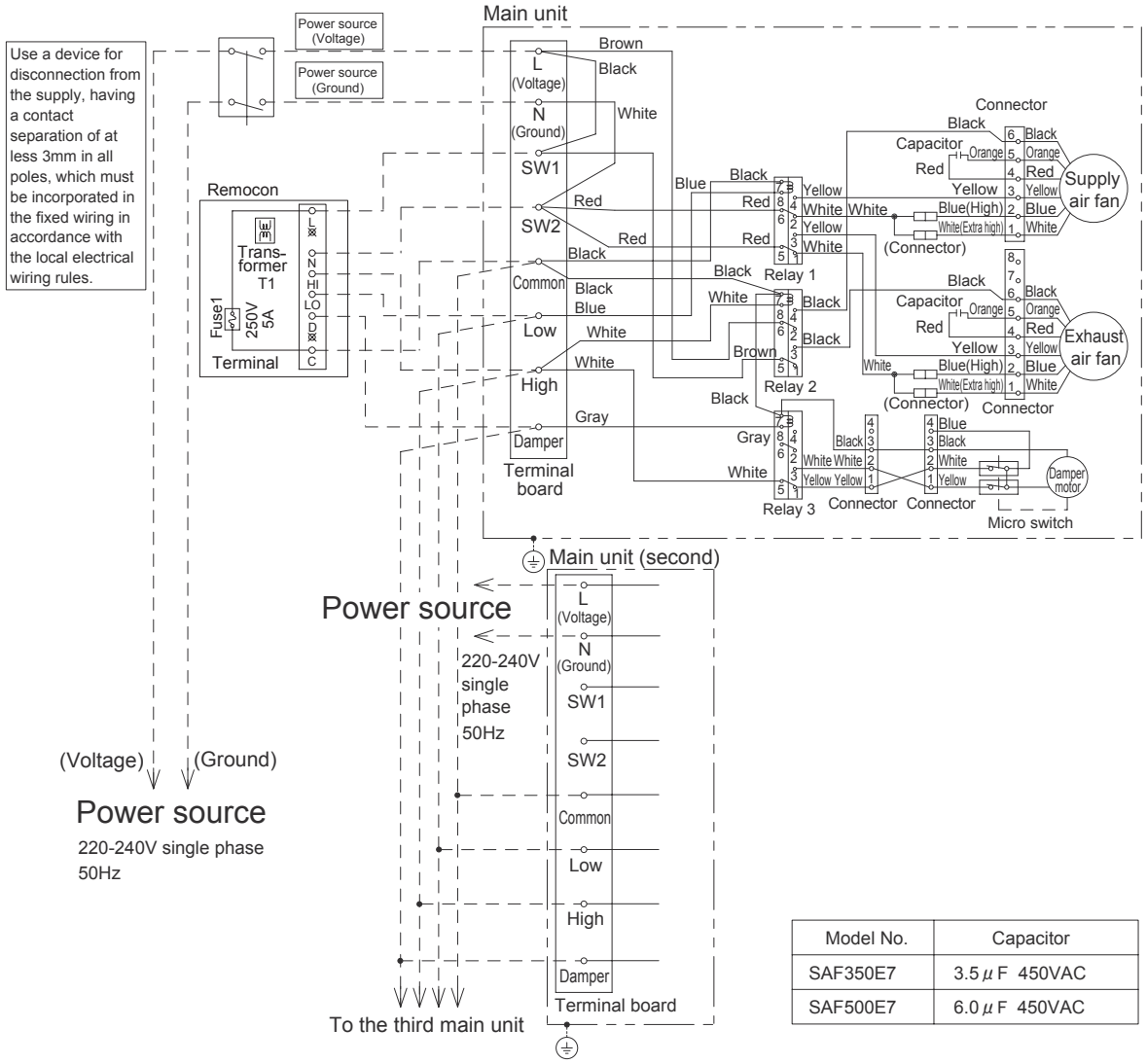
(4) If a large volume of air is required or a long duct is used, switch the wire connection from Lo to Extra high according to the following steps:

- Remove two screws securing the cover of the electrical components box, and open the cover.
- In the electrical components box, change the connection of fan motor leads from High to Extra high.





Models SAF350E7, 500E7



Model No.	Capacitor
SAF350E7	3.5 μF 450VAC
SAF500E7	6.0 μF 450VAC

Notes

(1) Connect wires/cables indicated by broken lines.

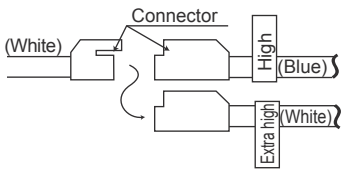
(2) For power source, use a VVF cable with ϕ1.6 or ϕ2.

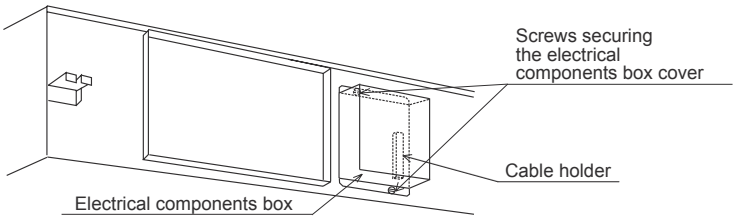
(3) Take the following steps on connect wires/cables:

- Remove two screws fixing the cover of the electrical components box, open the cover, and connect wires/cables correctly.
- Secure the cable drawn from the terminal board firmly with the cable holder.

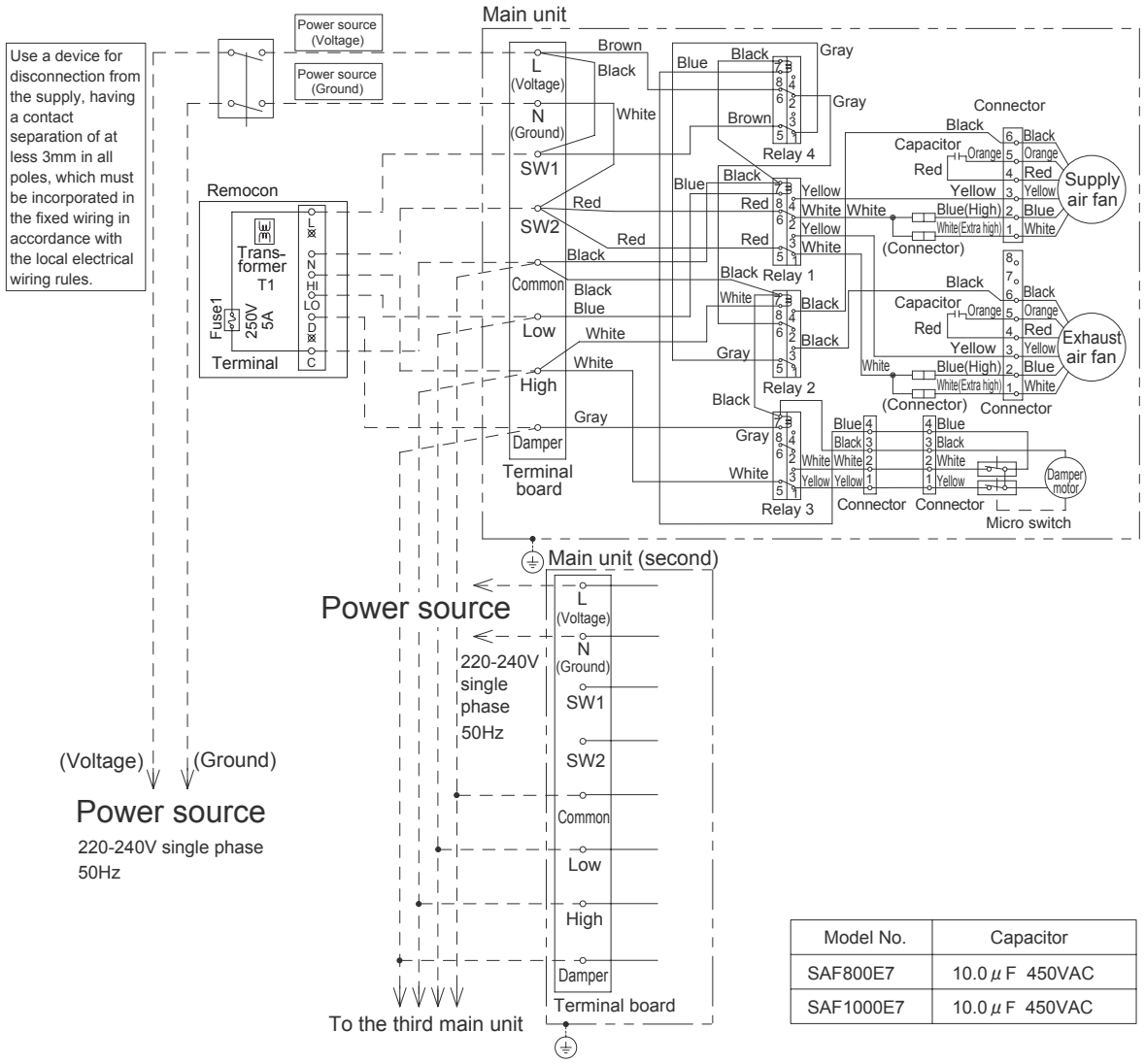
(4) If a large volume of air is required or a long duct is used, switch the wire connection from Lo to Extra high according to the following steps:

- Remove two screws securing the cover of the electrical components box, and open the cover.
- In the electrical components box, change the connection of fan motor leads from High to Extra high.





Models SAF800E7, 1000E7



Model No.	Capacitor
SAF800E7	10.0 μF 450VAC
SAF1000E7	10.0 μF 450VAC

Notes

(1) Connect wires/cables indicated by broken lines.

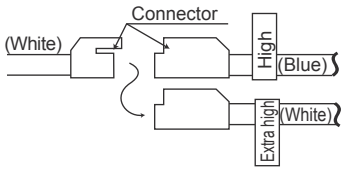
(2) For power source, use a VVF cable with ϕ1.6 or ϕ2.

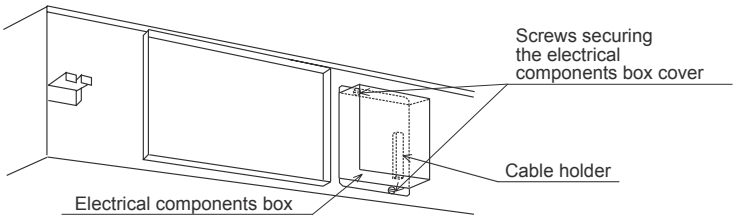
(3) Take the following steps on connect wires/cables:

- Remove two screws fixing the cover of the electrical components box, open the cover, and connect wires/cables correctly.
- Secure the cable drawn from the terminal board firmly with the cable holder.

(4) If a large volume of air is required or a long duct is used, switch the wire connection from Lo to Extra high according to the following steps:

- Remove two screws securing the cover of the electrical components box, and open the cover.
- In the electrical components box, change the connection of fan motor leads from High to Extra high.





3. APPLICATION DATA

Installation manual

PCH012D017

< SAF150E7, SAF250E7, SAF350E7, SAF500E7, SAF800E7, SAF1000E7 >

- Read through this “Cautions on safety” with care before installing the unit.
- Described below are the way we are stimulating your attention to what you are supposed to observe to prevent dangers to the users or other people as well as loss to the property.

Cautions on safety

Never fail to observe

■If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
■This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involves.
■Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
■Make sure to disconnect the power plug before cleaning the product.

Never fail to observe the caution items described hereinafter because all of them refer to the critical matters on safety.
The meanings of the marks or indications are described below.

- The degrees of danger or damage that is likely to occur due to the wrong use ignoring the indications are categorized for explanation as marked below.

⚠ WARNING	The column with this mark shows “Conceivable threat of death or serious injury”.
⚠ CAUTION	The column with this mark shows “Likelihood of damage or loss to materials only”.

- Kinds of the items to be observed are categorized for clarification with the following pictorial symbols.

⊘	This pictorial indication shows “Prohibited”.
⏚ ❗	This pictorial indication shows “Forced Execution”.

⚠ WARNING

❗	Never fail to ask the sales office from which you bought the unit or the installation service shop to install the unit. If you install it by yourself, any inappropriate installation works would cause an electric shock or a fire.	❗	The external air intake opening should be positioned away from the exhaust openings of combustion gases etc. The intake of such gases could cause a lack of oxygen in the room. The external air intake opening should not be positioned where discharged air may directly enter it. A situation like this will lead to the room being contaminated and this may pose a health risk.
	Carry out the installation works accurately in line with this installation work manual. Improper practice of installation could cause an electric shocks or a fire.		Netting or something similar should be provided at the external air intake opening to prevent birds etc. interfering with the unit. Nests or other foreign objects should be removed. That could cause a lack of oxygen in the room.
	Choose the installation place where is endurable in quality as well as in weight, then install the unit accurately with adequate strength and completeness of installation in accordance with the installation work manual. Otherwise, it is likely to cause an electric shock, a fire, a drop of the unit, thus causing the injury on the human body.	⏚	Carry out the ground work. Never connect the ground wire to a gas pipe, a water supply pipe, a lightning conductor, a ground line of a telephone, etc. An incomplete ground wire is likely to cause an electric shock.
	Carry out electrical work in accordance with the laws and regulations prevailing in the country concerned, technical standard and explanation for work, and make absolutely sure that an exclusive circuit is used. Any insufficient capacity of power circuit and improper work can result in electric shock and fire hazard.	❗	When the system is checked and the power cable undergoes maintenance, stop the operation, and switch the exclusive circuit breaker "OFF". Otherwise, it could cause an electric shock.

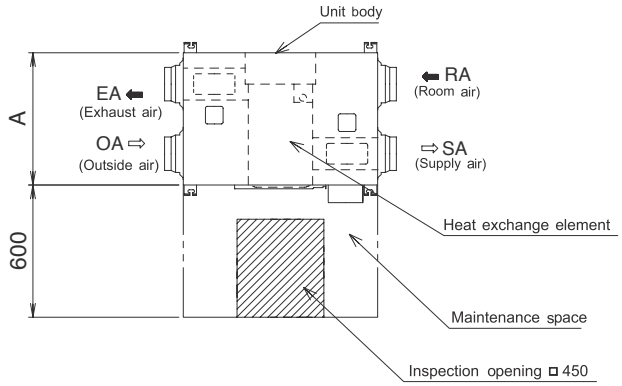
⚠ CAUTION

❗	Provide an exclusive circuit breaker that can completely break contacts on all the poles by more than 3mm through direct connection to the power terminals. Depending upon the environment for installation, it becomes necessary to install an earth leakage breaker.	❗	Install the power line and the connecting line with accuracy so the power source cover may not float. If the installation of the power source cover is inappropriate, the pin connection area is likely to cause a heat generation, a fire and an electric shock due to dust or powder.
	When you want to pierce the metal duct through the metal lath or the wire lath or the metal plate of the wooden facility, do not forget to insulate electrically between the duct and the wall. Otherwise, it would cause an electric shock or an electric leakage.	⃠	Never install the unit near the place where there is a fear of leakage of an inflammable gas. If gas happens to leak and stays around the unit, it is likely to cause a fire.
	Don't use other parts than specified (including the auxiliary parts) for installation works. If you do not use the specified parts, it is likely to cause a drop of the unit, a fire, an electric shock, etc.		Don't use the unit at the other voltages than the rated one. It could cause a fire or an electric shock.
	Install the outdoor duct in a falling gradient toward the outside so as to prevent water from coming in. If it is not installed so, the building is likely to be flooded, wetting the household effects.		Do not install the unit in locations with large amounts of oily smoke, such as food preparation areas. It could cause a fire.
	Heat-insulate the outdoor duct (including the indoor side, if necessary) to prevent dewing. If heat insulation is not adequate, water likely goes indoor and wets the household properties.		Don't install the unit at the place of a high temperature or a flame. It could cause a heat generation or a fire.
	When it is high humid and high temperature inside the ceiling, a ventilation system must be installed inside the ceiling. Otherwise, it could cause a fire or an electric leakage.		Do not install in locations where harmful or corrosive gasses may be present (i.e. acidic, alkali, organic solvent, paint gasses etc. from machinery or factories). Installation in such a location could cause a gas-poisoning and a fire.
	Connect the power line and the connecting line with accuracy using the specified cables and fix them firmly so as not to put the outer stress of the cables on the pin connecting area. Incomplete connection or fixing is likely to cause a heat generation or a fire.		Do not install in locations with high humidity, such as close to bathroom etc. It could cause an electric shock or an electric leakage etc.

Cautions for operation

Never fail to make the inspection opening at the specific place on the ceiling so you can perform the constant cleaning or the equipment checking of filter and heat exchange element.

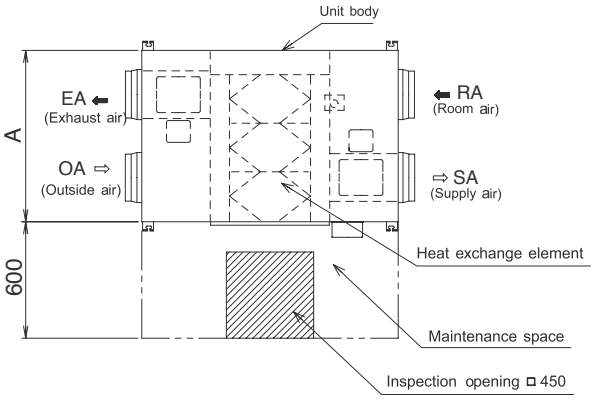
■ The inspection opening shown below is necessary to clean the heat exchange element and the filter as required. If not cleaned, they are likely to get clogged, resulting in degradation of performance.



Note) Model SAF350E7 and SAF500E7 have two heat exchange elements.

Unit: mm

Model No.	A
SAF150E7	467
SAF250E7	599
SAF350E7	804
SAF500E7	904

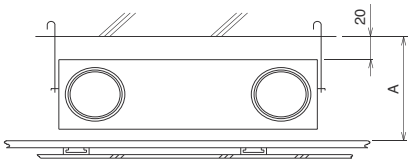


Note) Model SAF1000E7 has four heat exchange elements.

Unit: mm

Model No.	A
SAF800E7	884
SAF1000E7	1134

■ This energy recovery ventilators should be installed at the place where a larger space than the sizes shown below can be secured for the ceiling space.



Unit: mm

Model No.	Ceiling space A	Model No.	Ceiling space A
SAF150E7	320	SAF800E7	440
SAF250E7		SAF1000E7	
SAF350E7	370		
SAF500E7			

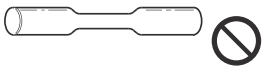
■ Don't install it near the water-heater.

■ Refrain from the following duct installation works.

(1) Excessive bending

(2) Multi-times bending

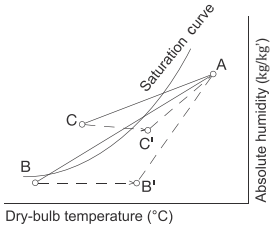
(3) Making the connecting duct smaller



■ Do not use in bathrooms or food preparation areas etc.
If you use the unit at the place of much soot and high humidity, the filter or the heat exchange element gets clogged and disables you to use it.

■ Use the energy recovery ventilators in the ambient temperature of 40°C or less.
Never install the unit at the place where the flame likely reaches directly the unit. If you use it at the atmosphere of more than 40°C for hours, it is likely to cause deterioration or deformation or damage of the resin part.

■ Be careful of dewing and frosting.
As shown in the figure to the right, 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.



Cautions for installation

⚠ CAUTION

■ Install at a stable place of sufficient strength.

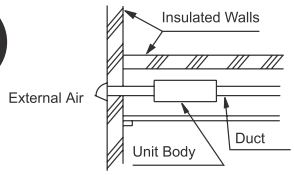
Please note that there might be some places not strong enough to install due the structure of building.

■Do not install in locations where harmful or corrosive gasses may be present (i.e. acidic, alkali, organic solvent, paint gasses etc. from machinery or factories)

Installation in such a location could cause a gas-poisoning and a fire.

Prohibited

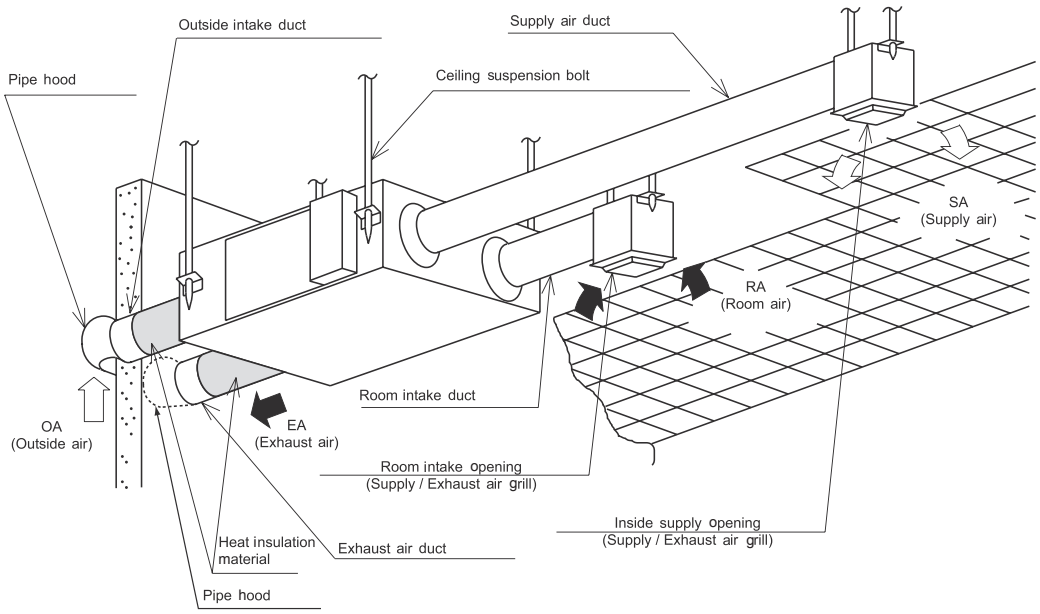
■ Never fail to install the unit inside the heat insulting walls or, in other words, in the space insulated from the open air.



Local procurements

■Cable for supply cord : VVF cable with Φ1.6 or Φ2.
Cable for connecting main unit and remote control : 300V/500V , 60227IEC10 (hard wire). Cross-section area for each core wire is 1.5mm^2.

Reference sketch

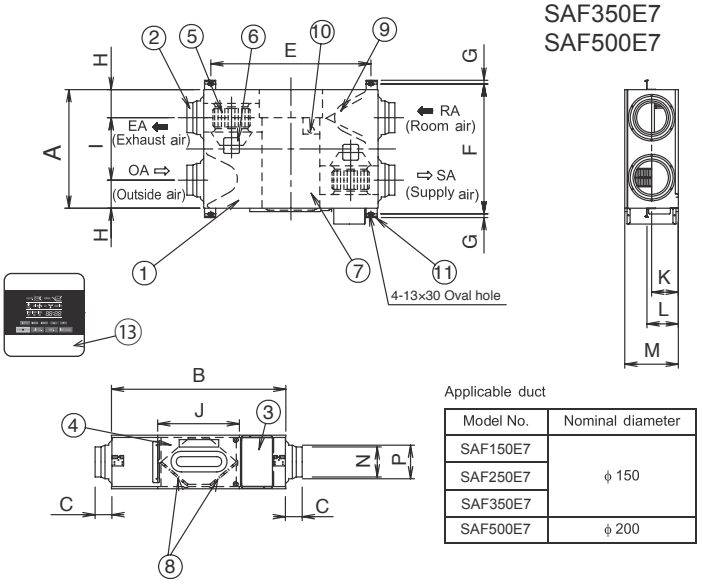


Use conditions

Outdoor air conditions: Temperature range –10°C~40°C, relative humidity 85% or less
Indoor air conditions: Temperature range –10°C~40°C, relative humidity 85% or less
Installation requirements: Same as the indoor air conditions
* Indoor air here means air in air-conditioned living rooms. Its use in refrigerators or other places where temperature can fluctuate greatly is prohibited even if a temperature range is acceptable.
Example: Indoor air conditions
During cooling period: Temperature 27°C, relative humidity 50%
During heating period: Temperature 20°C, relative humidity 40%

Name and dimension of each part

Model No. SAF150E7
SAF250E7
SAF350E7
SAF500E7



Applicable duct

Model No.	Nominal diameter
SAF150E7	ϕ150
SAF250E7	
SAF350E7	
SAF500E7	ϕ200

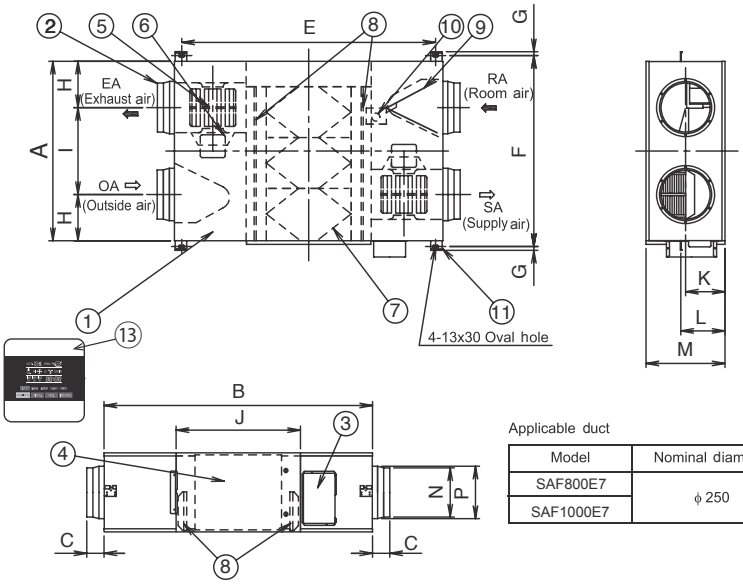
Number	Name	Quantity	Note
1	Frame	1	
2	Adapter	4	
3	Terminal	1	
4	Inspection cover	1	
5	Fan	2	
6	Motor	2	Note2)
7	Heat exchange element	1	Note1)
8	Filter	2	
9	Damper	1	
10	Damper motor	1	
11	Ceiling suspension fixture	4	
12	Electrical equipment box	1	
13	Energy recovery ventilator remocon	1	

Note1) Model No.SAF350E7 and SAF500E7 have two heat exchange elements.
Note2) Model No.SAF350E7 and SAF500E7 have different fan and motor locations.

Unit: mm

Model No.	A	B	C	E	F	G	H	I	J	K	L	M	N	P
SAF150E7	467	970	49	810	525	19	82	303	82	135	159	270	ϕ98	ϕ110
SAF250E7	599	882	95	810	655	19	142	315	414	135	159	270	ϕ144	ϕ164
SAF350E7	804	1050	70	978	860	19	112	580	470	159	182	317	ϕ144	ϕ164
SAF500E7	904	1090	70	1018	960	19	132	640	470	159	182	317	ϕ194	ϕ210

Model No. SAF800E7
SAF1000E7



Applicable duct

Model	Nominal diameter
SAF800E7	ϕ250
SAF1000E7	

Number	Name	Quantity	Note
1	Frame	1	
2	Adapter	4	
3	Terminal	1	
4	Inspection cover	1	
5	Fan	2	
6	Motor	2	
7	Heat exchange element	3	Note1)
8	Filter	2	
9	Damper	1	
10	Damper motor	1	
11	Ceiling suspension fixture	4	
12	Electrical equipment box	1	
13	Energy recovery ventilator remocon	1	

Note1) Model No.SAF1000E7 has four heat exchange elements.

Unit: mm

Model No.	A	B	C	E	F	G	H	I	J	K	L	M	N	P
SAF800E7	884	1322	85	1250	940	19	228	428	612	194	218	388	ϕ242	ϕ258
SAF1000E7	1134	1322	85	1250	1190	19	228	678	612	194	218	388	ϕ242	ϕ258

Installation method

1) Model installation

- You are required to prepare the ceiling suspension bolts, nuts and washers.
- Install the unit firmly and horizontally enough to support its weight. (Fig. 1)
- If you do not fit it firmly, it is not only dangerous but also easily vibrated. If it is not fitted horizontally, the damper unit becomes defective in operation.

Caution

- When you are required to be cautious on prevention of vibration, we recommend you to use the anti-vibration ceiling suspension fixtures.
- Never fail to make an inspection opening with □ 450 mm or more at the place shown on the paragraph of "Cautions for operation", so that you can inspect filters, Heat Exchange Elements, power source and motors.

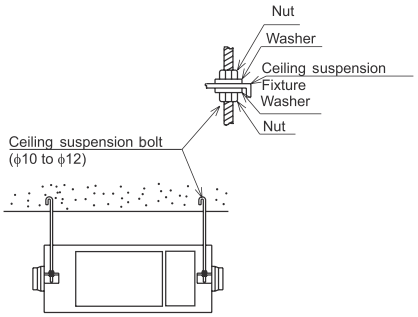


Fig. 1

2) Cautions on installing the unit body upside down

- Re-fit the ceiling suspension fixture in an opposite side. (If they are left as it is, the foolproof function of ceiling suspension bolts do not work and will cause the danger of dropping of the unit.)
- Printed indication is in a reversed position.

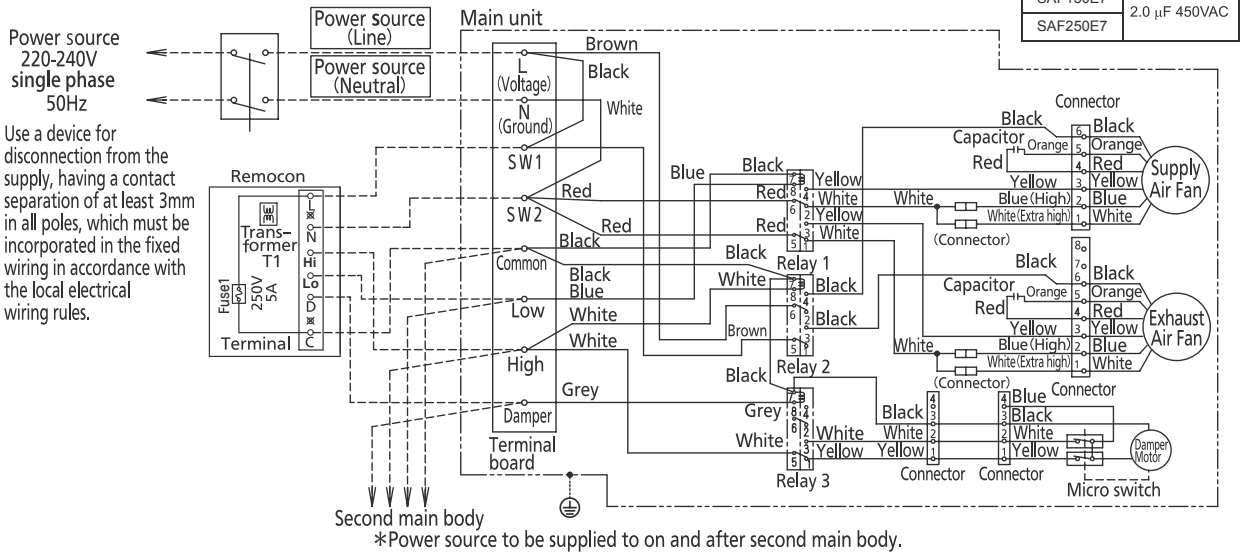
  In particular, be careful of the arrow mark [⇧] showing the direction of inserting a heat exchange element.

Electric works

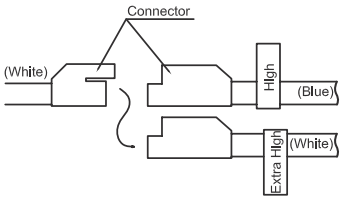
Ask a specialized electrical construction operator for advice r egardi ng wiring in accordance with "Technical standards for electrical equipment"and"Interior wiring regulation".

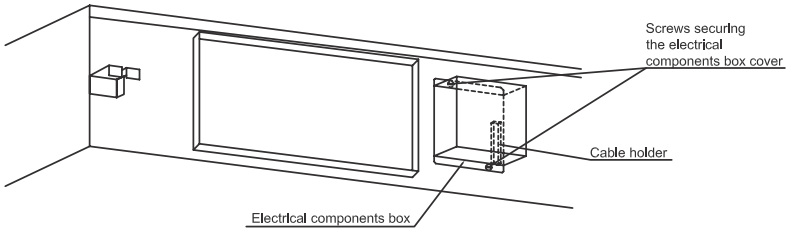
- Connect wires/cables indicated by broken lines.

Model No.	Capacitor
SAF150E7	2.0 μF 450VAC
SAF250E7	

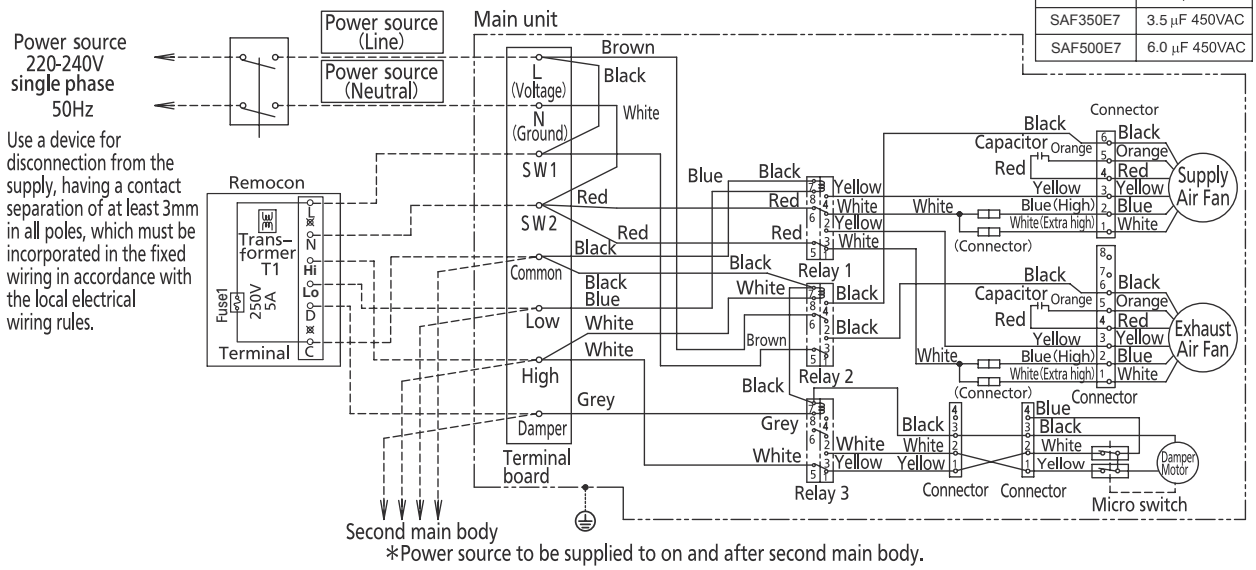


- For power source,use a VVF cable withϕ1.6 or ϕ2.
- Take the following steps on connect wires/cables:
  - Remove two screws fixing the cover of the electrical components box, open the cover ,and connect wires/cables correctly.
  - Secure the cable drawn from the terminal board firmly with the cable holder.
- If a large volume of air is requierd or a long duct is used, switch the wire connection from Low to Extra high according to the following steps:
  - Remove two screws securing the cover of the electrical components box, and open the cover.
  - In the electrical components box, change the connection of fan motor leads from High to Extra high.

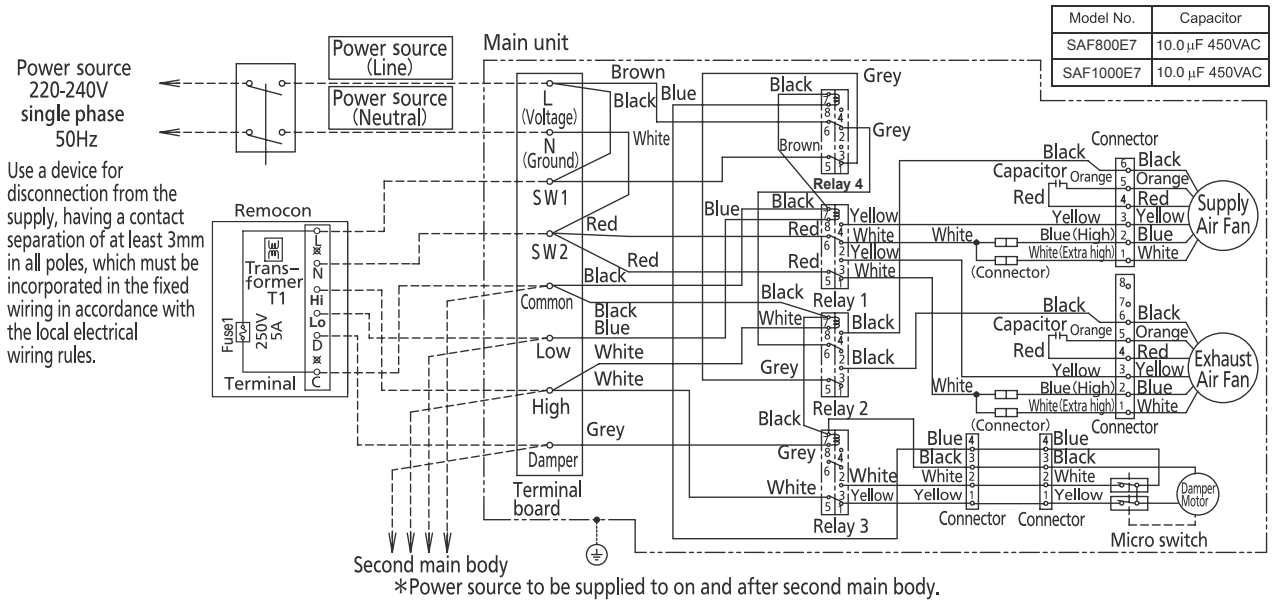




Model No.	Capacitor
SAF350E7	3.5 μF 450VAC
SAF500E7	6.0 μF 450VAC



Model No.	Capacitor
SAF800E7	10.0 μF 450VAC
SAF1000E7	10.0 μF 450VAC



Caution

- When operating multiple air-to-air heat exchange units using a single switch ,the maximum number of units able to be operated is 10.
- Be sure to use the appropriate power supply corresponding to each model number,Using an inappropriate power supply may cause the motor to burn out.
- Grounding work must be based on class D as defined in "Technical standards for electrical equipment".
- After wire connections are completed ,check the connection again before turning the power on.

Duct installation

- Duct installation is neccessary to protect against access to live parts, rain water or contact with moving parts.
- Seal the junction of an adaptor and a duct with an aluminum tape firmly to prevent any air leakage.
- The room intake opening should be positioned as far as possible from the inside supply opening.
- Use the specified ducts. (See the name and dimension of each part.)
- Install two outdoor ducts so they will be in the down gradient toward outside to prevent water from coming in. (Gradient: 1/100~1/50) (Fig. 2)
- Never fail to heat-insulate two outdoor ducts (including outside air and exhaust air duct) to prevent dewing. (Material: Glass Wool, Thickness-25mm) (Fig. 2)
- When you want to pierce the metal duct through the metal lath or the wire lath or the metal plate of the wooden facility, do not forget to insulate electrically between the duct and the wall. (Refer to the laws and regulations of the country concerned and the technical standard.)

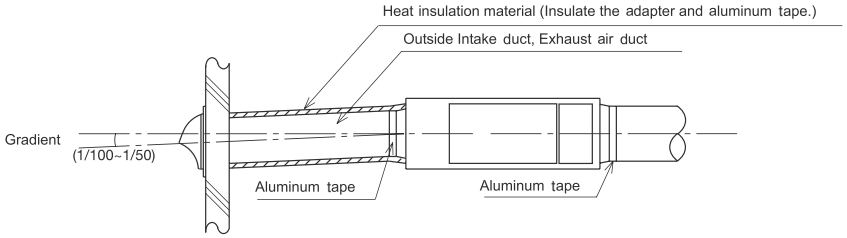


Fig. 2

Pilot running

- On completion of installation works, never fail to check wirings and perform a pilot running.
- After completion of wiring, power ON and perform a pilot run according to the following steps for checking a airflow condition and a damper operation.
- Check the opening and closing of a damper by opening the inspection cover of the side of the unit.
  - Model No. SAF800E7, SAF1000E7, two fan motors are stopped during an operation of the damper.

	Each switch setting		Checking items	
	Function select switch	Air flow switch	Airflow condition	Damper
1	Energy recovery	High (Extra High)	Check if the air from inside supply opening and the one from room intake opening are set to High (Extra High) and to Low, respectively	Open (A damper is beyond)
		Low		
2	Normal ventilation	High (Extra High)		Close (A damper is near)
		Low		

- In case that any abnormality occurs in a pilot running, its conceivable cause would be a wrong wiring. Don't forget to switch the exclusive breaker to OFF before correcting the wiring. Otherwise, it is likely to cause an electric shock.

Product information based on the Regulation (EU) No.327/2011 of March 30 2011: ecodesign requirement for fans driven by motors with an electric input power between 125W and 500kW

Model	SAF800E7	SAF1000E7
(1) Overall efficiency η	38.8%	38.6%
(2) Measurement category	B	B
(3) Efficiency category	TOTAL	TOTAL
(4) Efficiency grade	49	
(5) VSD is integrated or not.	Not applicable	
(6) Year of manufacturing	Refer to the model name label.	
(7) Manufacturer's name, address	MITSUBISHI HEAVY INDUSTRIES THERMAL SYSTEMS, LTD. 3-1, ASAHI, NISHIBIWAJIMA-CHO, KIYOSU, AICHI, 452-8561 JAPAN	
(8) Product's model number	SAF800E7	SAF1000E7
(9) Input / flow rate / pressure	0.243kW / 17.0m^3/min / 338Pa	0.229kW / 15.3m^3/min / 358Pa
(10) Rotations per minute	1381rpm	1388rpm
(11) Specific ratio	1.0	
(12) Information for disassembly, recycling, disposal	Frame : Fe, Adapter : ABS, Element : Composite materials(ABS, paper, polystyrene) Fan : ABS, Casing : polystyrene Motor : Composite materials (Frame : Fe, Copper wire : Cu, Connector : Resin, Protective tube : PVC)	
(13) Information for installation, use, maintenance	Refer to the installation manual, user's manual and service manual.	
(14) Description of additional items used when determining the fan energy efficiency, such as ducts, that are not descried in the measurement category and not supplied with the fan	1)Remove the fan casing of the product 2)Remove the adapter of the product 3)Attach the adapter to the outlet of the casing 4)Connect the adapter to the chamber at a duct of 300mm	

ISDZ12020

AIR TO AIR HEAT EXCHANGE UNITS

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