

## **12. CEILING SUSPENSION TYPE PACKAGED AIR-CONDITIONER**

**( Split system, Air to air )  
heat pump type**

### **Refrigerant R22 use models**

<b>FDEN308HEN-SB</b>	<b>FDEN258HEN-A</b>
<b>308HES-SB</b>	<b>258HEP-A</b>
<b>408HES-SB</b>	
<b>508HES-SB</b>	

### **Refrigerant R407C use models**

<b>FDENP308HEN-SB</b>
<b>308HES-SB</b>
<b>408HES-SB</b>
<b>508HES-SB</b>

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# 12.1 GENERAL INFORMATION

## 12.1.1 Specific features

- (1) Less refrigerant charge amount due to use of double phase refrigerant flow system. The total refrigerant charge amount has been reduced by more than 50%.
- (2) The indoor outdoor interconnection signal wiring has been done away with. The microcomputer chip is installed in the indoor unit. There is no need for the unit to communicate between the outdoor and indoor units so the unit is more resistant to electromagnetic noise thus the incidence of microcomputer malfunction has been reduced. The compressor in the outdoor unit has its own self protection function, that reacts according to abnormal high pressure and excessive high temperature.
- (3) There are only four power lines between the outdoor and indoor unit. As no signal wire is used there is no need to separate the power line from the signal line. One cable with 6 wires encased in one sheath is enough for conducting the wiring work between the outdoor unit and the indoor unit. This contributes to simpler wiring work in the field.
- (4) All air supply ports have auto swing louvers. The indoor fan motor has two speeds of high and low.
- (5) The controls are wireless residential split air conditioner type remote controller with 5 malfunction modes.
- (6) All models have service valves protruding from the outdoor unit for faster flare connection work in the field.

### (7) Simple design

With the model change, the design has been completely renewed. A simple and modern form with curves harmonizes more with the interior. The suction grill also comes in two segments, simplifying the maintenance.

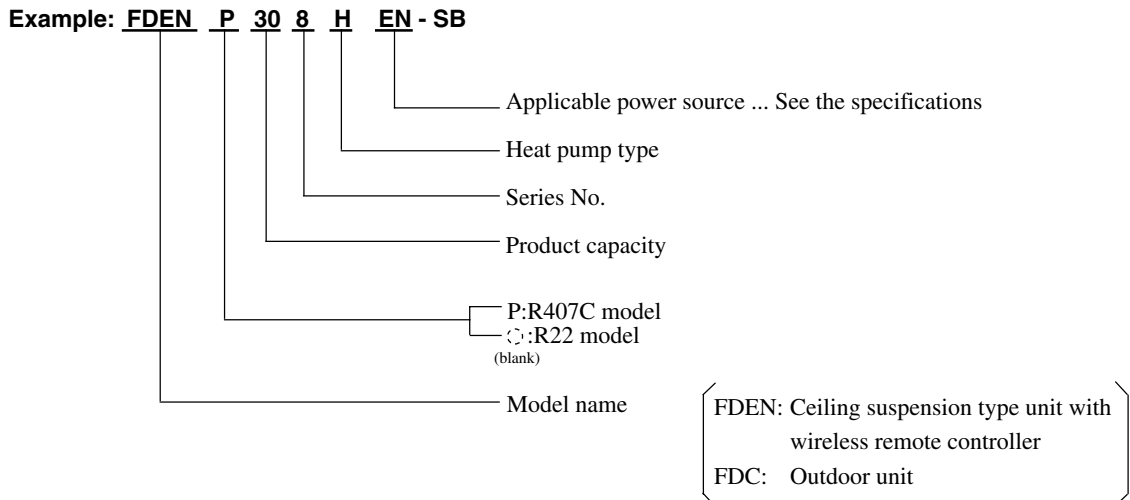
### (8) Amazingly quiet operation

Due to adoption of a newly developed silent stream fan, unpleasant operation sound, such as sound made when the fan runs against the air, has been minimized, thus achieving the trade's lowest noise level in the weak flow mode.

### (9) "Aerowing" louver

In order to make air conditioning more comfortable, an "aerowing" louver has been newly developed by applying MHI's advanced aerodynamics, leading to improved air directivity and air conditioning feeling. In the auto swing mode, the louver angle is optimum from 0 (level) to 75°, thus distributing the refreshing air evenly throughout your room. By working the remote controller, you can also set the louver angle easily. The sideways blowout angle can also be set manually up to 45° either right or left side.

## 12.1.2 How to read the model name



## 12.2 SELECTION DATA

### 12.2.1 Specifications

(1) Refrigerant R22 use models  
Model FDEN308HEN-SB

Item		Model	FDEN308HEN-SB	
			FDEN308H	FDC308HEN3B
<b>Nominal cooling capacity<sup>(1)</sup></b>		W	7100	
<b>Nominal heating capacity<sup>(1)</sup></b>		W	8000	
<b>Power source</b>			1 Phase, 220/240V, 50Hz	
Operation data <sup>(3)</sup>	Cooling input	kW	2.99/3.19	
	Running current (Cooling)	A	13.9/14.4	
	Power factor (Cooling)	%	98/92	
	Heating input	kW	2.85/3.01	
	Running current (Heating)	A	13.3/13.7	
	Power factor (Heating)	%	97/92	
	Inrush current (L.R.A)	A	95	
	Noise level <sup>(4)</sup>	dB(A)	Hi 45 Lo:39	52
<b>Exterior dimensions</b>		mm	184 × 1260 × 650	
<b>Height × Width × Depth</b>			845 × 880 × 340	
<b>Net weight</b>		kg	27	
<b>Refrigerant equipment</b>			GT-A5534EN41 × 1	
<b>Compressor type &amp; Q'ty</b>			-	
Motor	kW		2.5	
Starting method			Line starting	
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
<b>Refrigerant</b>			R22	
<b>Quantity</b>	kg	-	1.4 [Pre-charged up to the piping length of 5m]	
<b>Refrigerant oil</b>	ℓ	-	1.45 (BARREL FREEZE 32SAM)	
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
<b>Air handling equipment</b>			Multiblade centrifugal fan × 4	Propeller fan × 1
Fan type & Q'ty				
Motor	W	35 × 2	55 × 1	
Starting method			Line starting	Line starting
<b>Air flow (Standard)</b>	CMM	Hi:16.5 Lo:11.5	58	
<b>Fresh air intake</b>			Unavailable	
Air filter, Q'ty			Polypropylene net ×2(washable)	
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater	W	-	33 (Crank case heater)	
<b>Operation control</b>			Wireless remote control switch	- (Indoor unit side)
Operation switch				
Room temperature control			Thermostat by electronics	-
<b>Safety equipment</b>			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
<b>Installation data</b>		mm	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")	
<b>Refrigerant piping size</b>		(in)		
<b>Connecting method</b>			Flare piping	
<b>Drain hose</b>			(Connectable with VP20)	-
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Wireless remote controller.	
Optional parts			-	

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Operation					ISO-T1, JIS B8616
Cooling	27°C	19°C	35°C	24°C	
Heating	20°C	-	7°C	6°C	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 220/240V 50Hz.

(4) Indicates the value at mild mode.

**Model FDEN308HES-SB**

Item		Model	FDEN308HES-SB	
			FDEN308H	FDC308HES3B
<b>Nominal cooling capacity<sup>(1)</sup></b>		W	<b>7100</b>	
<b>Nominal heating capacity<sup>(1)</sup></b>		W	<b>8000</b>	
<b>Power source</b>			<b>3 Phase, 380/415V 50Hz</b>	
<b>Operation data<sup>(3)</sup></b>	Cooling input	kW	2.91/2.97	
	Running current (Cooling)	A	5.1/5.5	
	Power factor (Cooling)	%	87/75	
	Heating input	kW	2.55/2.61	
	Running current (Heating)	A	4.6/4.8	
	Power factor (Heating)	%	84/76	
	Inrush current (L.R.A)	A	45	
<b>Noise level<sup>(4)</sup></b>		dB(A)	Hi:45 Lo:39	52
<b>Exterior dimensions</b>				
<b>Height × Width × Depth</b>		mm	<b>184 × 1260 × 650</b>	<b>845 × 880 × 340</b>
<b>Net weight</b>		kg	<b>27</b>	<b>74</b>
<b>Refrigerant equipment</b>				
<b>Compressor type &amp; Q'ty</b>			–	<b>GT-A5534ES41 × 1</b>
Motor		kW	–	<b>2.5</b>
Starting method			–	Line starting
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
<b>Refrigerant</b>			<b>R22</b>	
<b>Quantity</b>		kg	–	<b>1.4 [Pre-charged up to the piping length of 5m]</b>
<b>Refrigerant oil</b>		ℓ	–	<b>1.45 (BARREL FREEZE 32 SAM)</b>
Defrost control			IC controlled de-icer	
High pressure control			High pressure switch	
<b>Air handling equipment</b>				
Fan type & Q'ty			Multiblade centrifugal fan × 4	Propeller fan × 1
Motor		W	<b>35 × 2</b>	<b>55 × 1</b>
Starting method			Line starting	Line starting
<b>Air flow (Standard)</b>		CMM	<b>Hi:16.5 Lo:11.5</b>	<b>58</b>
<b>Fresh air intake</b>			Unavailable	
Air filter, Q'ty			Polypropylene net ×2(washable)	
Shock & vibration absorber			Rubber sleeve (for fan motor)	
Electric heater		W	–	33 (Crank case heater)
<b>Operation control</b>				
Operation switch			Wireless remote control switch	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
<b>Safety equipment</b>			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
<b>Installation data</b>		mm	<b>Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")</b>	
<b>Refrigerant piping size</b>		(in)		
<b>Connecting method</b>			<b>Flare piping</b>	
<b>Drain hose</b>			(Connectable with VP20)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Wireless remote controller.	
Optional parts			–	

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1 JIS B8616
Heating	20°C	–	7°C	6°C	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

(4) Indicates the value at mild mode.

**Model FDEN408HES-SB**

Item		Model	FDEN408HES-SB	
			FDEN408H	FDC408HES3B
<b>Nominal cooling capacity<sup>(1)</sup></b>		W	<b>10000</b>	
<b>Nominal heating capacity<sup>(1)</sup></b>		W	<b>11200</b>	
<b>Power source</b>			<b>3 Phase, 380/415V 50Hz</b>	
<b>Operation data<sup>(3)</sup></b>	Cooling input	kW	4.46/4.56	
	Running current (Cooling)	A	7.6/7.9	
	Power factor (Cooling)	%	89/80	
	Heating input	kW	3.84/3.88	
	Running current (Heating)	A	6.9/7.3	
	Power factor (Heating)	%	85/74	
	Inrush current (L.R.A)	A	53	
	Noise level <sup>(4)</sup>	dB(A)	Hi: 49 Lo:43	54
<b>Exterior dimensions</b>				
<b>Height × Width × Depth</b>		mm	<b>239 × 1260 × 650</b>	<b>1050 × 920 × 340</b>
<b>Net weight</b>		kg	<b>34</b>	<b>90</b>
<b>Refrigerant equipment</b>				
<b>Compressor type &amp; Q'ty</b>			–	<b>GU-A5550ES41 × 1</b>
Motor		kW	–	<b>2.8</b>
Starting method			–	Line starting
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
<b>Refrigerant</b>			<b>R22</b>	
<b>Quantity</b>		kg	–	<b>1.7 [Pre-charged up to the piping length of 5m]</b>
<b>Refrigerant oil</b>		ℓ	–	<b>1.6 (BARREL FREEZE 32SAM)</b>
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
<b>Air handling equipment</b>				
Fan type & Q'ty			Multiblade centrifugal fan × 3	Propeller fan × 2
Motor		W	<b>35+ 55</b>	<b>40 × 2</b>
Starting method			Line starting	Line starting
<b>Air flow (Standard)</b>		CMM	<b>Hi:26 Lo:19</b>	<b>70</b>
<b>Fresh air intake</b>			Unavailable	
Air filter, Q'ty			Polypropylene net ×3(washable)	
Shock & vibration absorber			Rubber sleeve (for fan motor)	
Electric heater		W	–	40 (Crank case heater)
<b>Operation control</b>				
Operation switch			Wireless remote control switch	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
<b>Safety equipment</b>				
			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
<b>Installation data</b>		mm	<b>Liquid line: φ9.52 (3/8") Gas line: φ19.05 (3/4")</b>	
<b>Refrigerant piping size</b>		(in)		
<b>Connecting method</b>			<b>Flare piping</b>	
<b>Drain hose</b>			(Connectable with VP20)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Wireless remote controller.	
Optional parts			–	

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

(4) Indicates the value at mild mode.

**Model FDEN508HES-SB**

Item		Model	FDEN508HES-SB	
			FDEN508H	FDC508HES3B
<b>Nominal cooling capacity<sup>(1)</sup></b>		W	<b>12500</b>	
<b>Nominal heating capacity<sup>(1)</sup></b>		W	<b>14000</b>	
<b>Power source</b>			<b>3 Phase, 380/415V 50Hz</b>	
<b>Operation data<sup>(3)</sup></b>	Cooling input	kW	5.25/5.50	
	Running current (Cooling)	A	9.3/10.1	
	Power factor (Cooling)	%	85/76	
	Heating input	kW	4.80/4.93	
	Running current (Heating)	A	8.8/9.7	
	Power factor (Heating)	%	83/71	
	Inrush current (L.R.A)	A	74	
	Noise level <sup>(4)</sup>	dB(A)	Hi:50 Lo:44	55
<b>Exterior dimensions</b>				
<b>Height × Width × Depth</b>		mm	<b>239 × 1470 × 650</b>	<b>1250 × 920 × 340</b>
<b>Net weight</b>		kg	<b>40</b>	<b>101</b>
<b>Refrigerant equipment</b>				
<b>Compressor type &amp; Q'ty</b>			–	<b>GU-A5560ES41 × 1</b>
Motor		kW	–	<b>3.75</b>
Starting method			–	Line starting
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
<b>Refrigerant</b>			<b>R22</b>	
<b>Quantity</b>		kg	–	<b>1.9 [Pre-charged up to the piping length of 5m ]</b>
<b>Refrigerant oil</b>		ℓ	–	<b>1.6 (BARREL FREEZE 32SAM)</b>
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
<b>Air handling equipment</b>				
Fan type & Q'ty			Multiblade centrifugal fan × 4	Propeller fan × 2
Motor		W	<b>55 × 2</b>	<b>65 × 2</b>
Starting method			Line starting	Line starting
<b>Air flow (Standard)</b>		CMM	<b>Hi:28 Lo:20</b>	<b>110</b>
<b>Fresh air intake</b>			Unavailable	
Air filter, Q'ty			Polypropylene net ×3(washable)	
Shock & vibration absorber			Rubber sleeve (for fan motor)	
Electric heater		W	–	40 (Crank case heater)
<b>Operation control</b>				
Operation switch			Wireless remote control switch	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
<b>Safety equipment</b>				
			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
<b>Installation data</b>		mm	<b>Liquid line: φ9.52 (3/8") Gas line: φ19.05 (3/4")</b>	
<b>Refrigerant piping size</b>		(in)		
<b>Connecting method</b>			<b>Flare piping</b>	
<b>Drain hose</b>			(Connectable with VP20)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Wireless remote controller.	
Optional parts			–	

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

(4) Indicates the value at mild mode.

**Model FDEN258HEN-A**

Item		Model	FDEN258HEN-A	
			FDEN258H	FDC256HEN3A
<b>Nominal cooling capacity<sup>(1)</sup></b>		W	<b>5900</b>	
<b>Nominal heating capacity<sup>(1)</sup></b>		W	<b>6100</b>	
<b>Power source</b>			<b>1 Phase, 220/240V, 50Hz</b>	
<b>Operation data<sup>(3)</sup></b>	Cooling input	kW	2.59/2.63	
	Running current (Cooling)	A	12.6/13.2	
	Power factor (Cooling)	%	93/83	
	Heating input	kW	2.38/2.42	
	Running current (Heating)	A	11.6/12.2	
	Power factor (Heating)	%	93/82	
	Inrush current (L.R.A)	A	64	
	Noise level <sup>(4)</sup>	dB(A)	Hi: 44 Lo: 39	57
<b>Exterior dimensions</b>				
<b>Height × Width × Depth</b>		<b>mm</b>	<b>184 × 1260 × 650</b>	<b>615 × 850 × 290 + 30</b>
<b>Net weight</b>		<b>kg</b>	<b>27</b>	<b>57</b>
<b>Refrigerant equipment</b>				
<b>Compressor type &amp; Q'ty</b>			–	<b>RC5527ENE1 × 1</b>
Motor		kW	–	<b>1.87</b>
Starting method			–	Line starting
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
<b>Refrigerant</b>			<b>R22</b>	
<b>Quantity</b>		<b>kg</b>	–	<b>1.25 [Pre-charged up to the piping length of 5m]</b>
<b>Refrigerant oil</b>		<b>ℓ</b>	–	<b>1.63 (SUNISO 3GS)</b>
Defrost control			IC controlled de-icer	
High pressure control			High pressure regulator valve	
<b>Air handling equipment</b>				
Fan type & Q'ty			Multiblade centrifugal fan × 4	Propeller fan × 1
Motor		W	25 × 2	55 × 1
Starting method			Line starting	Line starting
<b>Air flow (Standard)</b>		<b>CMM</b>	<b>Hi:16 Lo:10.5</b>	<b>42</b>
<b>Fresh air intake</b>			Unavailable	
Air filter, Q'ty			Polypropylene net ×2(washable)	
Shock & vibration absorber			Rubber sleeve (for fan motor)	
Electric heater		W	–	40 (Crank case heater)
<b>Operation control</b>				
Operation switch			Wireless remote control switch	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
<b>Safety equipment</b>				
			Internal thermostat for fan motor. Frost protection thermostat.	Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.
<b>Installation data</b>		<b>mm</b>	<b>Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")</b>	
<b>Refrigerant piping size</b>		<b>(in)</b>		
<b>Connecting method</b>			<b>Flare piping</b>	
<b>Drain hose</b>			(Connectable with VP20)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Wireless remote controller.	
Optional parts			–	

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	12°C	7°C	6°C	

(2) This packaged air conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 220/240V 50Hz.

(4) Indicates the value at mild mode.



**Model FDEN258HEP-A**

Item		Model		FDEN258HEP-A	
				FDEN258H	FDC256HEP3A
<b>Nominal cooling capacity<sup>(1)</sup></b>	ISO-T1	W	6200		
	ISO-T3		5200		
<b>Nominal heating capacity<sup>(1)</sup></b>	ISO-T1	W	6400		
<b>Power source</b>		1 Phase, 220V, 60Hz			
<b>Operation data<sup>(3)</sup></b>	ISO-T1	Cooling input	kW	2.68	
		Running current (Cooling)	A	12.4	
		Power factor (Cooling)	%	98	
		Heating input	kW	2.47	
		Running current (Heating)	A	11.7	
		Power factor (Heating)	%	96	
	ISO-T3	Cooling input	kW	3.06	
		Running current (Cooling)	A	14.4	
		Power factor (Cooling)	%	97	
		Inrush current (L.R.A)	A	66	
	Noise level <sup>(4)</sup>	dB(A)	Hi:45 Lo:40	57	
<b>Exterior dimensions</b>					
<b>Height × Width × Depth</b>		<b>mm</b>	<b>184 × 1260 × 650</b>	<b>615 × 850 × 290 + 30</b>	
<b>Net weight</b>		<b>kg</b>	<b>27</b>	<b>57</b>	
<b>Refrigerant equipment</b>					
<b>Compressor type &amp; Q'ty</b>			-	<b>RC5528EPE1 × 1</b>	
Motor		kW	-	<b>1.68</b>	
Starting method			-	Line starting	
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing	
Refrigerant control			Capillary tube		
<b>Refrigerant</b>			<b>R22</b>		
<b>Quantity</b>		<b>kg</b>	-	1.25 [Pre-charged up to the piping length of 5m]	
<b>Refrigerant oil</b>		<b>ℓ</b>	-	<b>1.63 (SUNISO 3GS)</b>	
Defrost control			IC controlled de-icer		
High pressure control			High pressure regulator valve		
<b>Air handling equipment</b>					
Fan type & Q'ty			Multiblade centrifugal fan × 4	Propeller fan × 1	
Motor		W	25 × 2	55 × 1	
Starting method			Line starting	Line starting	
<b>Air flow (Standard)</b>		<b>CMM</b>	<b>Hi:16 Lo:10.5</b>	<b>44</b>	
<b>Fresh air intake</b>			Unavailable	-	
Air filter, Q'ty			Polypropylene net ×2(washable)	-	
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)	
Electric heater		W	-	40 (Crank case heater)	
<b>Operation control</b>					
Operation switch			Wireless remote control switch	- (Indoor unit side)	
Room temperature control			Thermostat by electronics	-	
<b>Safety equipment</b>			Internal thermostat for fan motor. Frost protection thermostat.	Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.	
<b>Installation data</b>		<b>mm</b>			
<b>Refrigerant piping size</b>		<b>(in)</b>	<b>Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")</b>		
<b>Connecting method</b>			<b>Flare piping</b>		
<b>Drain hose</b>			(Connectable with VP20)	-	
Insulation for piping			Necessary (both Liquid & Gas lines)		
Accessories			Mounting kit. Wireless remote controller.		
Optional parts			-		

Notes (1) The data are measured at the following conditions.

Operation	Item	Indoor air temperature		Outdoor air temperature		Standards
		DB	WB	DB	WB	
Cooling		27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating		20°C	-	7°C	6°C	
Cooling		29°C	19°C	46°C	24°C	ISO-T3, SASO

(2) This packaged air conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 220V 60Hz.

(4) Indicates the value at mild mode.

**(2) Refrigerant R407C use models**  
**Model FDENP308HEN-SB**

Item		Model	FDENP308HEN-SB	
			FDEN308H	FDCP308HEN3B
<b>Nominal cooling capacity<sup>(1)</sup></b>		W	<b>7100</b>	
<b>Nominal heating capacity<sup>(1)</sup></b>		W	<b>8000</b>	
<b>Power source</b>			<b>1 Phase, 220/240V, 50Hz</b>	
<b>Operation data<sup>(3)</sup></b>	Cooling input	kW	3.22/3.37	
	Running current (Cooling)	A	14.9/15.3	
	Power factor (Cooling)	%	98/92	
	Heating input	kW	2.97/3.11	
	Running current (Heating)	A	13.9/14.3	
	Power factor (Heating)	%	97/91	
	Inrush current (L.R.A)	A	95	
Noise level <sup>(4)</sup>	dB(A)	Hi 45 Lo:39	52	
<b>Exterior dimensions</b>				
<b>Height × Width × Depth</b>		<b>mm</b>	<b>184 × 1260 × 650</b>	<b>845 × 880 × 340</b>
<b>Net weight</b>		<b>kg</b>	<b>27</b>	<b>76</b>
<b>Refrigerant equipment</b>				
<b>Compressor type &amp; Q'ty</b>			–	<b>GT-A5534HN41 × 1</b>
Motor		kW	–	<b>2.5</b>
Starting method			–	Line starting
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
<b>Refrigerant</b>			<b>R407C</b>	
<b>Quantity</b>		<b>kg</b>	–	<b>1.75 [Pre-charged up to the piping length of 5m]</b>
<b>Refrigerant oil</b>		<b>ℓ</b>	–	<b>1.45 (MA32)</b>
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
<b>Air handling equipment</b>				
<b>Fan type &amp; Q'ty</b>			Multiblade centrifugal fan × 4	Propeller fan × 1
Motor		W	<b>35 × 2</b>	<b>55 × 1</b>
Starting method			Line starting	Line starting
<b>Air flow (Standard)</b>		<b>CMM</b>	<b>Hi:16.5 Lo:11.5</b>	<b>58</b>
<b>Fresh air intake</b>			Unavailable	–
Air filter, Q'ty			Polypropylene net ×2(washable)	–
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	–	33 (Crank case heater)
<b>Operation control</b>				
Operation switch			Wireless remote control switch	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
<b>Safety equipment</b>			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection. High pressure switch for protection.
<b>Installation data</b>		<b>mm</b>	<b>Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")</b>	
<b>Refrigerant piping size</b>		<b>(in)</b>		
<b>Connecting method</b>			<b>Flare piping</b>	
<b>Drain hose</b>			(Connectable with VP20)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Wireless remote controller.	
Optional parts			–	

Notes (1) The data are measured at the following conditions.

Operation	Item	Indoor air temperature		Outdoor air temperature		Standards
		DB	WB	DB	WB	
Cooling		27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating		20°C	–	7°C	6°C	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 220/240V 50Hz.

(4) Indicates the value at mild mode.

**Model FDENP308HES-SB**

Item		Model	FDENP308HES-SB	
			FDENP308H	FDCP308HES3B
<b>Nominal cooling capacity<sup>(1)</sup></b>		W	<b>7100</b>	
<b>Nominal heating capacity<sup>(1)</sup></b>		W	<b>8000</b>	
<b>Power source</b>			<b>3 Phase, 380/415V 50Hz</b>	
<b>Operation data<sup>(3)</sup></b>	Cooling input	kW	3.14/3.29	
	Running current (Cooling)	A	5.5/5.8	
	Power factor (Cooling)	%	87/79	
	Heating input	kW	2.99/3.13	
	Running current (Heating)	A	5.5/5.8	
	Power factor (Heating)	%	83/75	
	Inrush current (L.R.A)	A	45	
	Noise level <sup>(4)</sup>	dB(A)	Hi:45 Lo:39	52
<b>Exterior dimensions</b>				
<b>Height × Width × Depth</b>		mm	<b>184 × 1260 × 650</b>	<b>845 × 880 × 340</b>
<b>Net weight</b>		kg	<b>27</b>	<b>76</b>
<b>Refrigerant equipment</b>				
<b>Compressor type &amp; Q'ty</b>			–	<b>GT-A5534HS41 × 1</b>
Motor	kW		–	<b>2.5</b>
Starting method			–	Line starting
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
<b>Refrigerant</b>			<b>R407C</b>	
<b>Quantity</b>	kg		–	<b>1.75 [Pre-charged up to the piping length of 5m]</b>
<b>Refrigerant oil</b>	ℓ		–	<b>1.45 (MA32)</b>
Defrost control			IC controlled de-icer	
High pressure control			High pressure switch	
<b>Air handling equipment</b>				
Fan type & Q'ty			Multiblade centrifugal fan × 4	Propeller fan × 1
Motor	W		<b>35 × 2</b>	<b>55 × 1</b>
Starting method			Line starting	Line starting
<b>Air flow (Standard)</b>	CMM		<b>Hi:16.5 Lo:11.5</b>	<b>58</b>
<b>Fresh air intake</b>			Unavailable	
Air filter, Q'ty			Polypropylene net ×2(washable)	
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater	W		–	33 (Crank case heater)
<b>Operation control</b>				
Operation switch			Wireless remote control switch	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
<b>Safety equipment</b>			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection. High pressure switch for protection.
<b>Installation data</b>		mm	<b>Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")</b>	
<b>Refrigerant piping size</b>		(in)		
<b>Connecting method</b>			<b>Flare piping</b>	
<b>Drain hose</b>			(Connectable with VP20)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Wireless remote controller.	
Optional parts			–	

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1 JIS B8616
Heating	20°C	–	7°C	6°C	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

(4) Indicates the value at mild mode.

**Model FDENP408HES-SB**

Item		Model	FDENP408HES-SB	
			FDEN408H	FDCP408HES3B
<b>Nominal cooling capacity<sup>(1)</sup></b>		W	<b>10000</b>	
<b>Nominal heating capacity<sup>(1)</sup></b>		W	<b>11200</b>	
<b>Power source</b>			<b>3 Phase, 380/415V 50Hz</b>	
<b>Operation data<sup>(3)</sup></b>	Cooling input	kW	4.51/4.63	
	Running current (Cooling)	A	7.8/8.2	
	Power factor (Cooling)	%	88/79	
	Heating input	kW	4.35/4.47	
	Running current (Heating)	A	7.8/8.2	
	Power factor (Heating)	%	85/76	
	Inrush current (L.R.A)	A	53	
	Noise level <sup>(4)</sup>	dB(A)	Hi: 49 Lo:43	54
<b>Exterior dimensions</b>				
<b>Height × Width × Depth</b>		mm	<b>239 × 1260 × 650</b>	<b>1050 × 920 × 340</b>
<b>Net weight</b>		kg	<b>34</b>	<b>98</b>
<b>Refrigerant equipment</b>				
<b>Compressor type &amp; Q'ty</b>			–	<b>GU-A5550HS41 × 1</b>
Motor	kW		–	<b>2.8</b>
Starting method			–	Line starting
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
<b>Refrigerant</b>			<b>R407C</b>	
<b>Quantity</b>	kg		–	<b>2.12 [Pre-charged up to the piping length of 5m]</b>
<b>Refrigerant oil</b>	ℓ		–	<b>1.6 (MA32)</b>
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
<b>Air handling equipment</b>				
Fan type & Q'ty			Multiblade centrifugal fan × 3	Propeller fan × 2
Motor	W		<b>35+ 55</b>	<b>40 × 2</b>
Starting method			Line starting	Line starting
<b>Air flow (Standard)</b>	CMM		<b>Hi:26 Lo:19</b>	<b>70</b>
<b>Fresh air intake</b>			Unavailable	
Air filter, Q'ty			Polypropylene net ×3(washable)	
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater	W		–	40 (Crank case heater)
<b>Operation control</b>				
Operation switch			Wireless remote control switch	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
<b>Safety equipment</b>			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection. High pressure switch for protection.
<b>Installation data</b>		mm	<b>Liquid line: φ9.52 (3/8") Gas line: φ19.05 (3/4")</b>	
<b>Refrigerant piping size</b>		(in)		
<b>Connecting method</b>			<b>Flare piping</b>	
<b>Drain hose</b>			(Connectable with VP20)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Wireless remote controller.	
Optional parts			–	

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

(4) Indicates the value at mild mode.

**Model FDENP508HES-SB**

Item		Model	FDENP508HES-SB	
			FDEN508H	FDCP508HES3B
<b>Nominal cooling capacity<sup>(1)</sup></b>		W	<b>12500</b>	
<b>Nominal heating capacity<sup>(1)</sup></b>		W	<b>14000</b>	
<b>Power source</b>			<b>3 Phase, 380/415V 50Hz</b>	
<b>Operation data<sup>(3)</sup></b>	Cooling input	kW	5.36/5.43	
	Running current (Cooling)	A	9.5/9.8	
	Power factor (Cooling)	%	86/77	
	Heating input	kW	5.24/5.31	
	Running current (Heating)	A	9.4/9.7	
	Power factor (Heating)	%	84/76	
	Inrush current (L.R.A)	A	74	
<b>Noise level<sup>(4)</sup></b>		dB(A)	Hi:50 Lo:44	55
<b>Exterior dimensions</b>				
<b>Height × Width × Depth</b>		mm	<b>239 × 1470 × 650</b>	<b>1250 × 920 × 340</b>
<b>Net weight</b>		kg	<b>40</b>	<b>107</b>
<b>Refrigerant equipment</b>				
<b>Compressor type &amp; Q'ty</b>			–	<b>GU-A5560HS41 × 1</b>
Motor		kW	–	<b>3.75</b>
Starting method			–	Line starting
<b>Heat exchanger</b>			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
<b>Refrigerant</b>			<b>R407C</b>	
<b>Quantity</b>		kg	–	<b>2.58 [Pre-charged up to the piping length of 5m.]</b>
<b>Refrigerant oil</b>		ℓ	–	<b>1.6 (MA32)</b>
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
<b>Air handling equipment</b>				
Fan type & Q'ty			Multiblade centrifugal fan × 4	Propeller fan × 2
Motor		W	<b>55 × 2</b>	<b>65 × 2</b>
Starting method			Line starting	Line starting
<b>Air flow (Standard)</b>		CMM	<b>Hi:28 Lo:20</b>	<b>110</b>
<b>Fresh air intake</b>			Unavailable	
Air filter, Q'ty			Polypropylene net ×3(washable)	
Shock & vibration absorber			Rubber sleeve (for fan motor)	
Electric heater		W	–	40 (Crank case heater)
<b>Operation control</b>				
Operation switch			Wireless remote control switch	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
<b>Safety equipment</b>			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection. High pressure switch for protection.
<b>Installation data</b>		mm	<b>Liquid line: φ9.52 (3/8") Gas line: φ19.05 (3/4")</b>	
<b>Refrigerant piping size</b>		(in)		
<b>Connecting method</b>			<b>Flare piping</b>	
<b>Drain hose</b>			(Connectable with VP20)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Wireless remote controller.	
Optional parts			–	

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard. ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

(4) Indicates the value at mild mode.

## 12.2.2 Range of usage & limitations

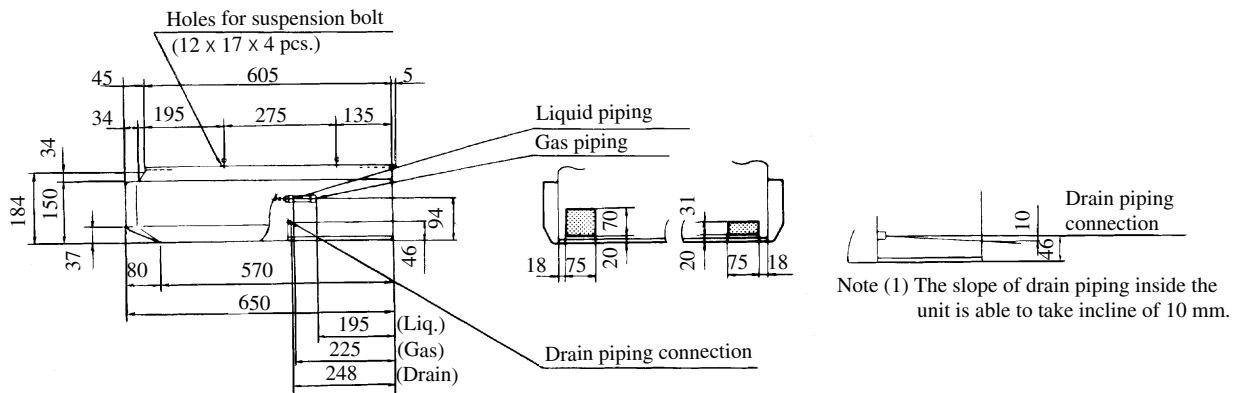
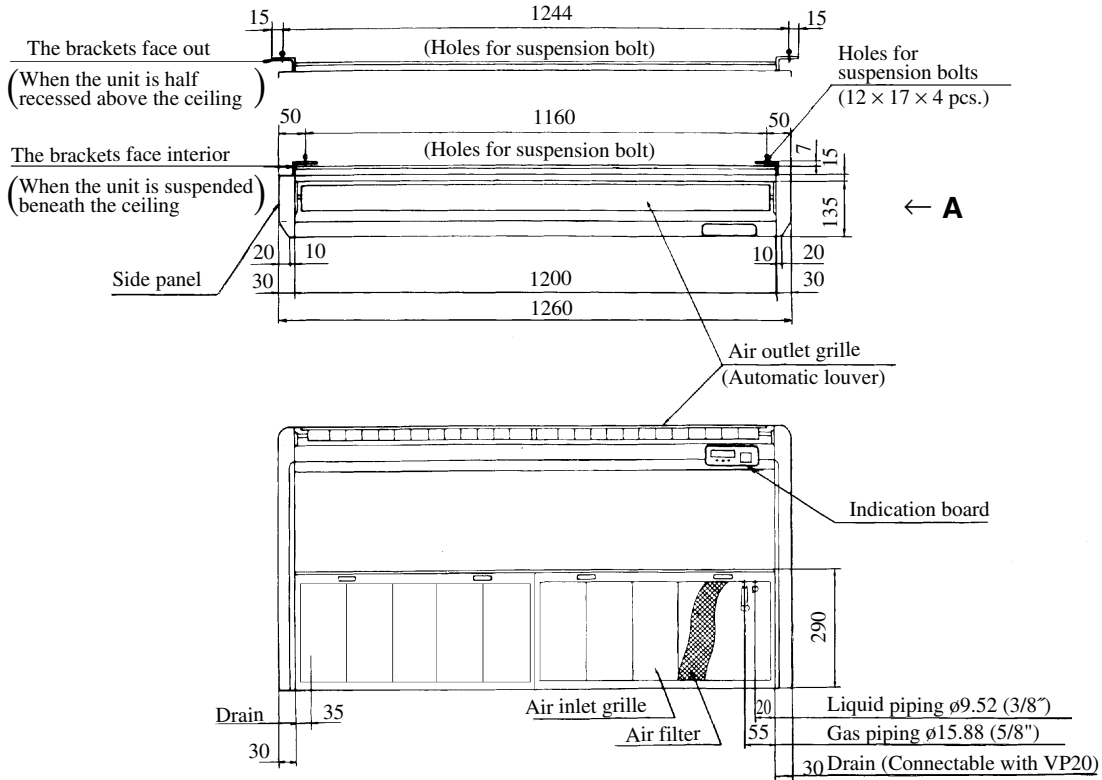
Item	Models	FDEN(P)308~508	FDEN258
Indoor return air temperature (Upper, lower limits)	Refer to the selection chart		
Outdoor air temperature (Upper, lower limits)			
Refrigerant line (one way) length	Max. 50 m		Max. 30 m
Vertical height difference between outdoor unit and indoor unit	Max. 30 m (Outdoor unit is higher) Max. 15 m (Outdoor unit is lower)		Max. 15 m
Power source voltage	Rating $\pm$ 10%		
Voltage at starting	Min. 85% of rating		
Frequency of ON-OFF cycle	Max. 10 times/h		
ON and OFF interval	Max. 3 minutes		

## 12.2.3 Exterior dimensions

### (1) Indoor unit

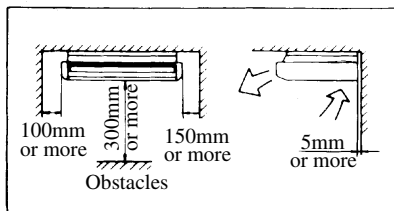
Models FDEN258H, 308H

Unit: mm

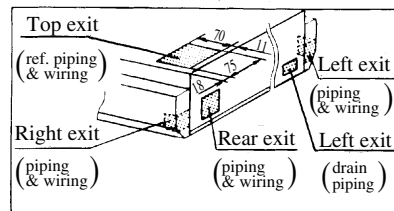


**VIEW A**

Space for installation & servicing

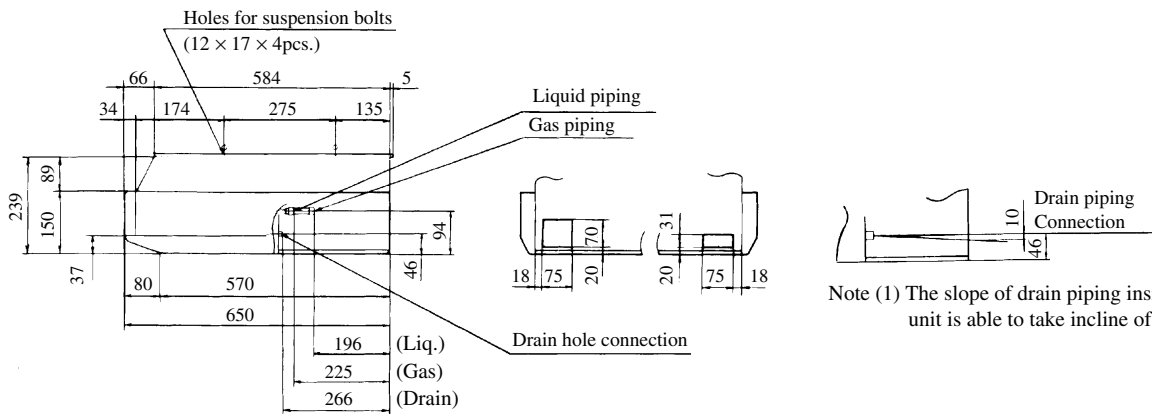
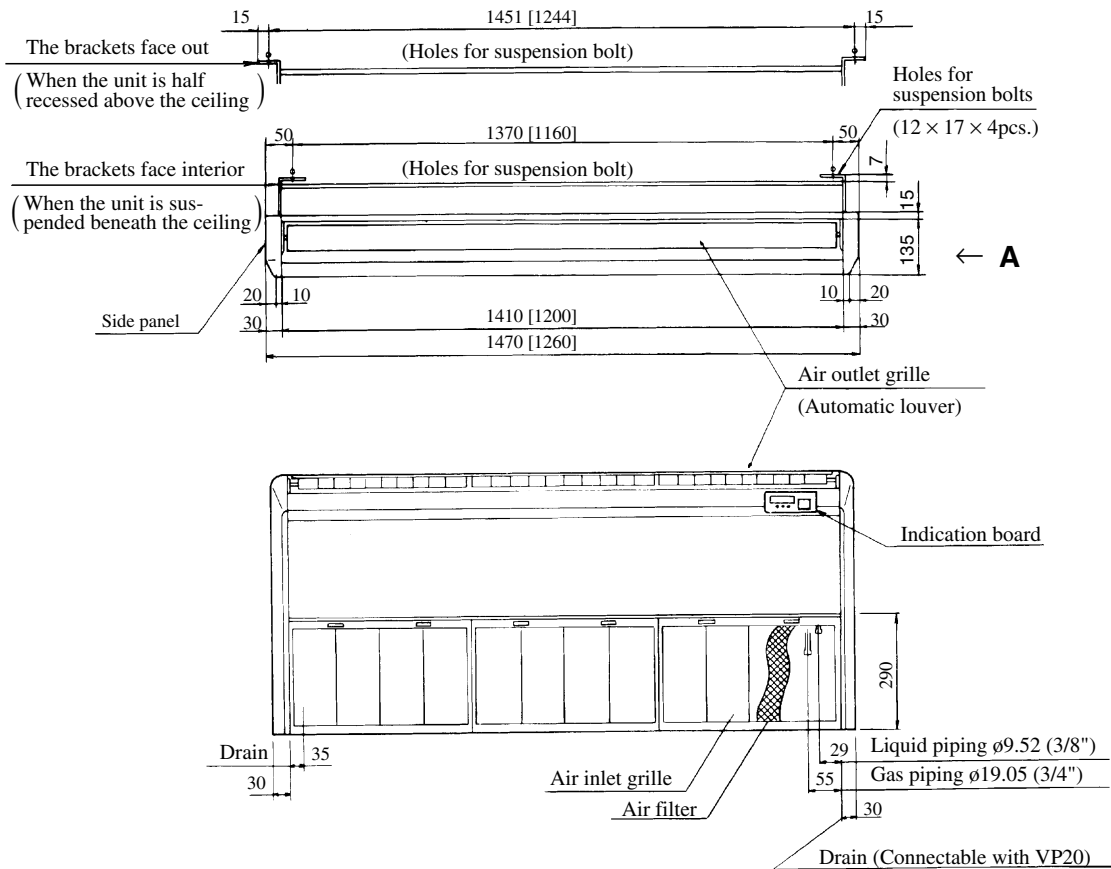


Piping & wiring draw out holes



**Models FDEN408H, 508H**

Unit: mm

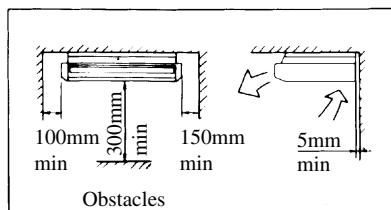


Note (1) The slope of drain piping inside the unit is able to take incline of 10 mm.

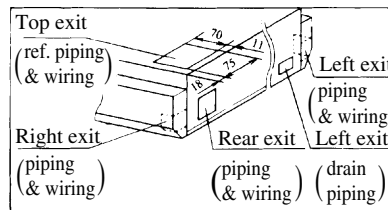
**VIEW A**

Space for installation & servicing

Ceiling suspension installation



Piping & wiring draw out holes

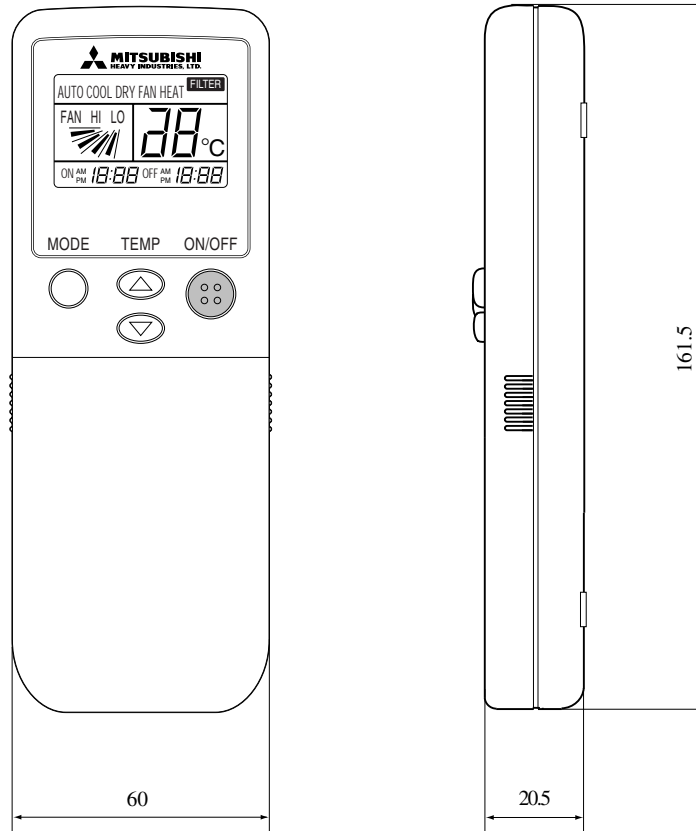


Note (1) The [ ] value dimension for models FDEN408H



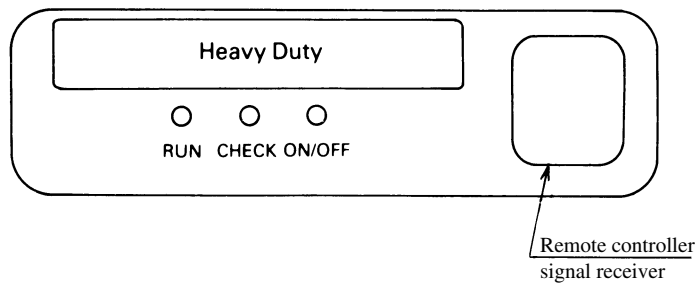
(2) Remote controller

(a) Wireless remote controller



Unit: mm

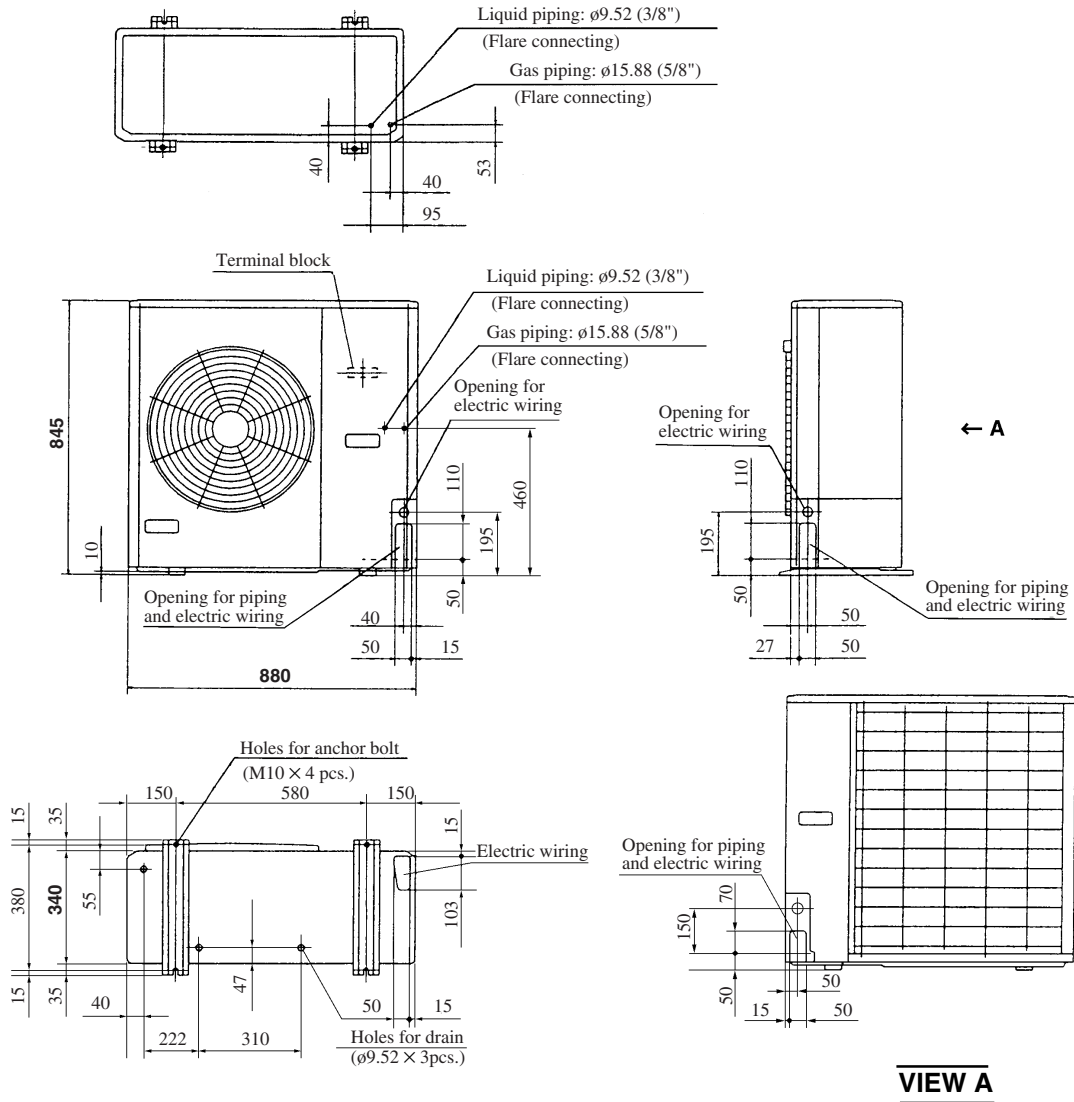
(b) Indication board of indoor unit



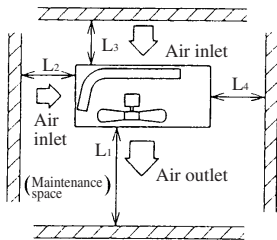
**(3) Outdoor unit**

**Models FDC308HEN3B, 308HES3B  
FDPC308HEN3B, 308HES3B**

Unit: mm



**Required space for maintenance and air flow**



**Minimum allowable space to the obstacles**

Unit:mm

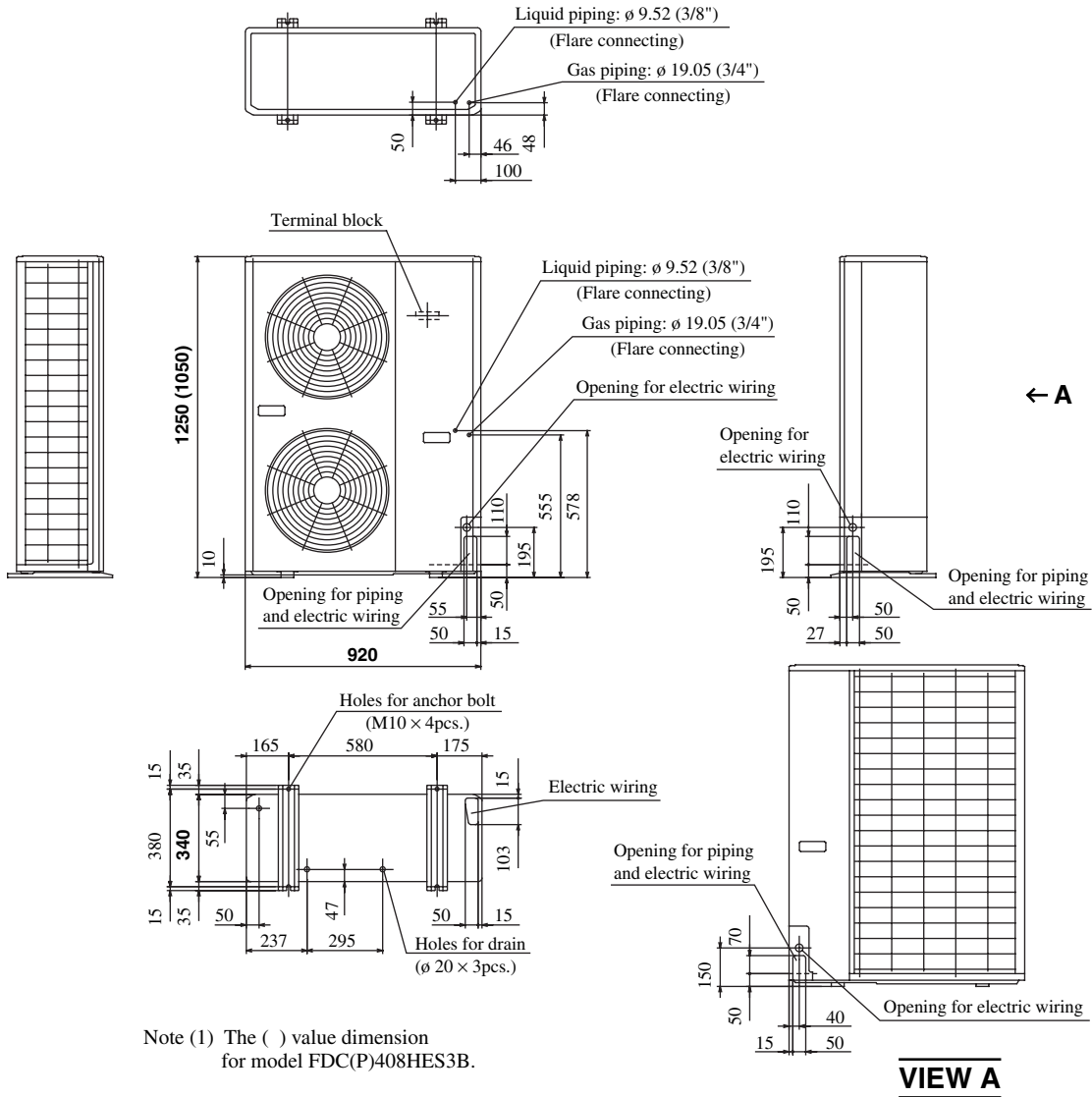
Mark	Installation type	Unit:mm		
		I	II	III
L <sub>1</sub>	Open	Open	Open	500
L <sub>2</sub>	300	5	Open	Open
L <sub>3</sub>	100	150	100	100
L <sub>4</sub>	5	5	5	5

**Notes**

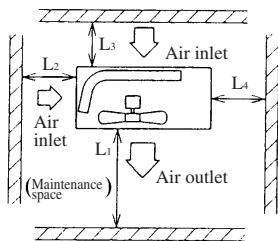
- (1) Avoid the location where four sides are entirely surrounded by walls.
- (2) Fix the unit by anchor bolts without fail. Restrict the protrusion length of anchor bolt to 15 mm and under.
- (3) When strong wind blows against the unit, direct the discharge port at a right angle to the wind direction.
- (4) Secure the space of 1 m and over at the top of unit.
- (5) Make the height of obstruction wall in front of discharge port lower than the height of unit.

**Models FDC408HES3B, 508HES3B  
FDCP408HES3B, 508HES3B**

Unit: mm



**Required space for maintenance and air flow**



**Minimum allowable space to the obstacles**

Unit:mm

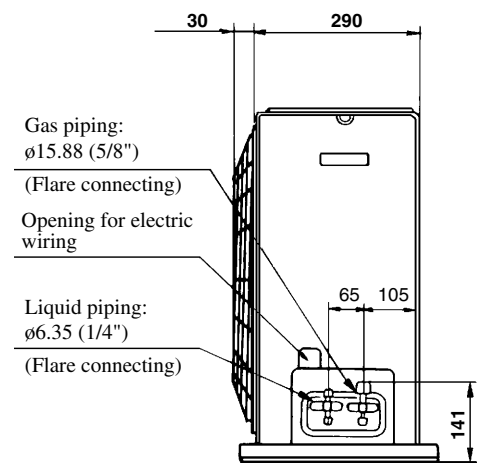
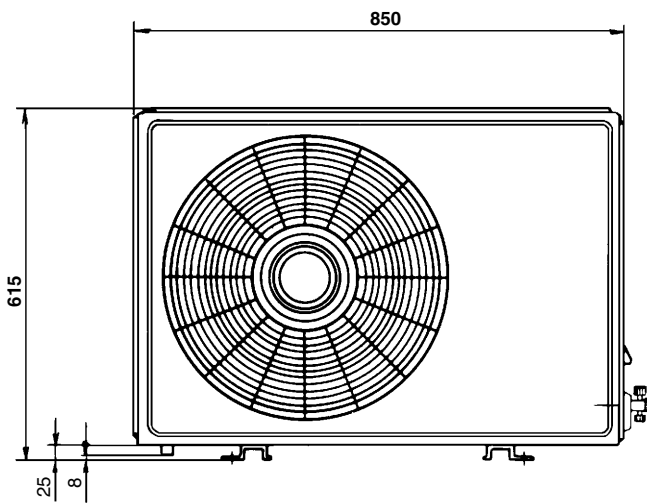
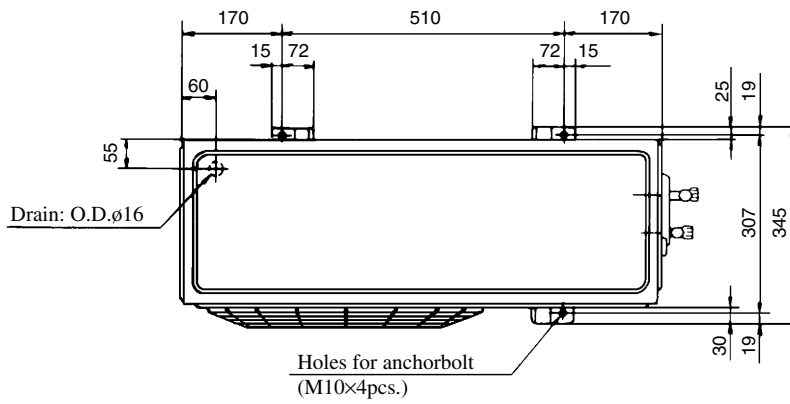
Mark	Installation type	Unit:mm		
		I	II	III
L1	Open	Open	500	
L2	300	5	Open	
L3	150	300	150	
L4	5	5	5	

**Notes**

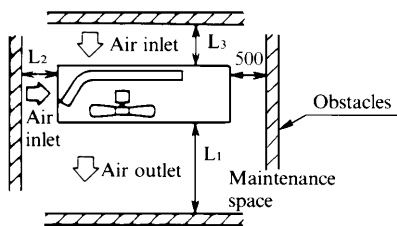
- (1) Avoid the location where four sides are entirely surrounded by walls.
- (2) Fix the unit by anchor bolts without fail. Restrict the protrusion length of anchor bolt to 15 mm and under.
- (3) When strong wind blows against the unit, direct the discharge port at a right angle to the wind direction.
- (4) Secure the space of 1 m and over at the top of unit.
- (5) Make the height of obstruction wall in front of discharge port lower than the height of unit.

**Models FDC256HEN3A, 256HEP3A**

Unit: mm



**Required space for maintenance and air flow**



**Minimum allowable space to the obstacles**

Unit:mm

Mark	Installation type	Unit:mm	
		I	II
L <sub>1</sub>	Open	100	Open
L <sub>2</sub>	100	Open	Open
L <sub>3</sub>	100	100	500

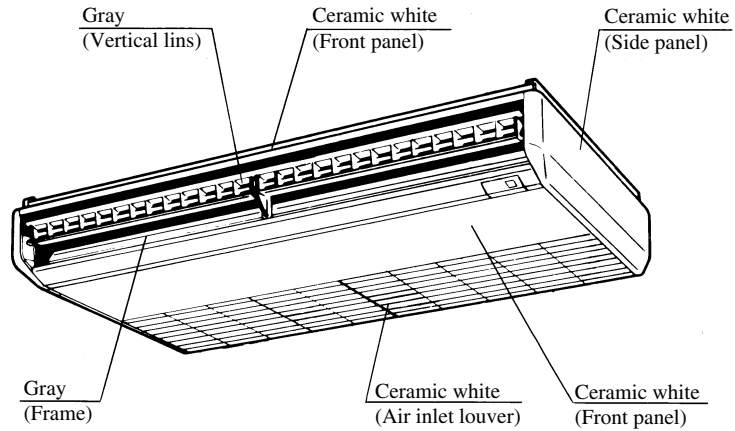
**Notes**

- (1) Fix the unit with anchor bolts.
- (2) Strong wind must not be directed to the air outlet.
- (3) Free space over the unit must be larger than 1 m.
- (4) The unit should not be surrounded by obstructions in all direction.  
At least one direction around the unit must be free.

## 12.2.4 Exterior appearance

### (1) Indoor unit

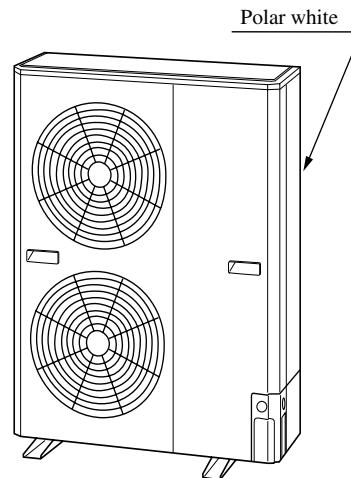
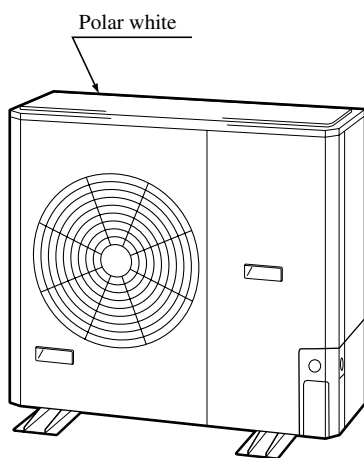
Model All models



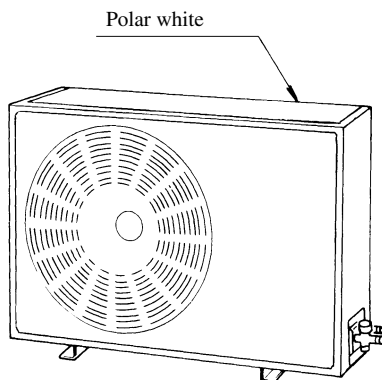
### (2) Outdoor unit

Models FDC308HEN3B  
308HES3B  
FDCP308HEN3B  
308HES3B

Models FDC408HES3B  
508HES3B  
FDCP408HES3B  
508HES3B

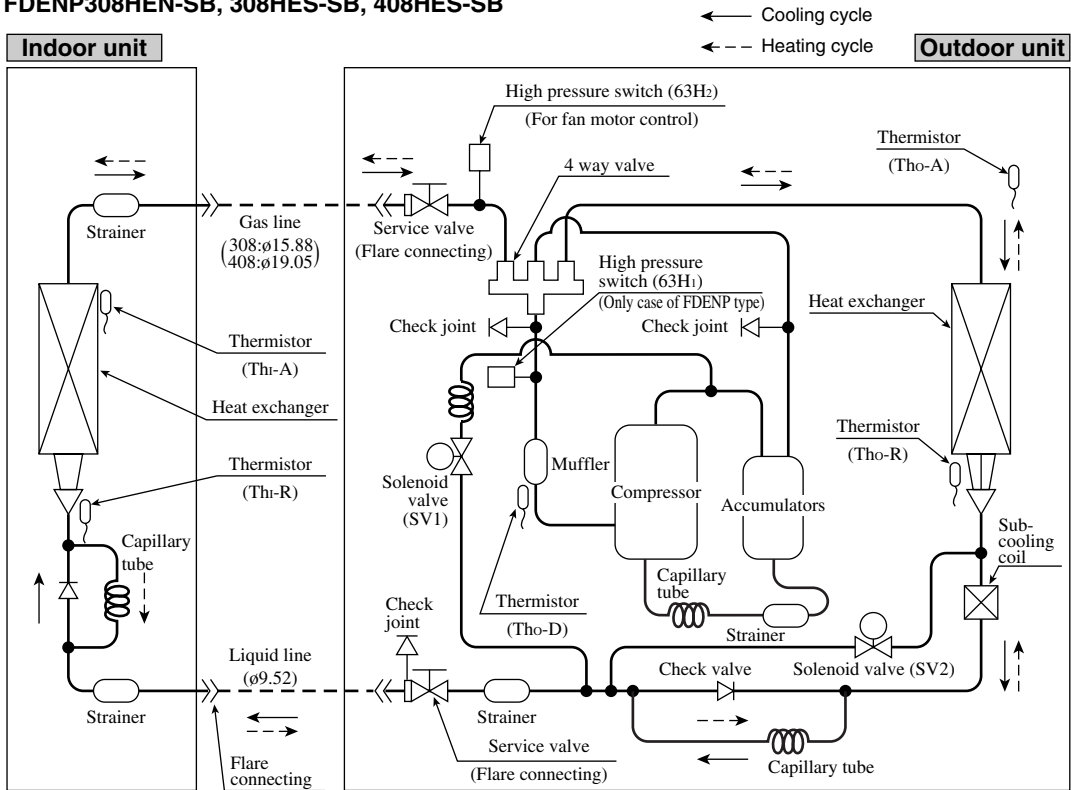


Models FDC256HEN3A  
256HEP3A

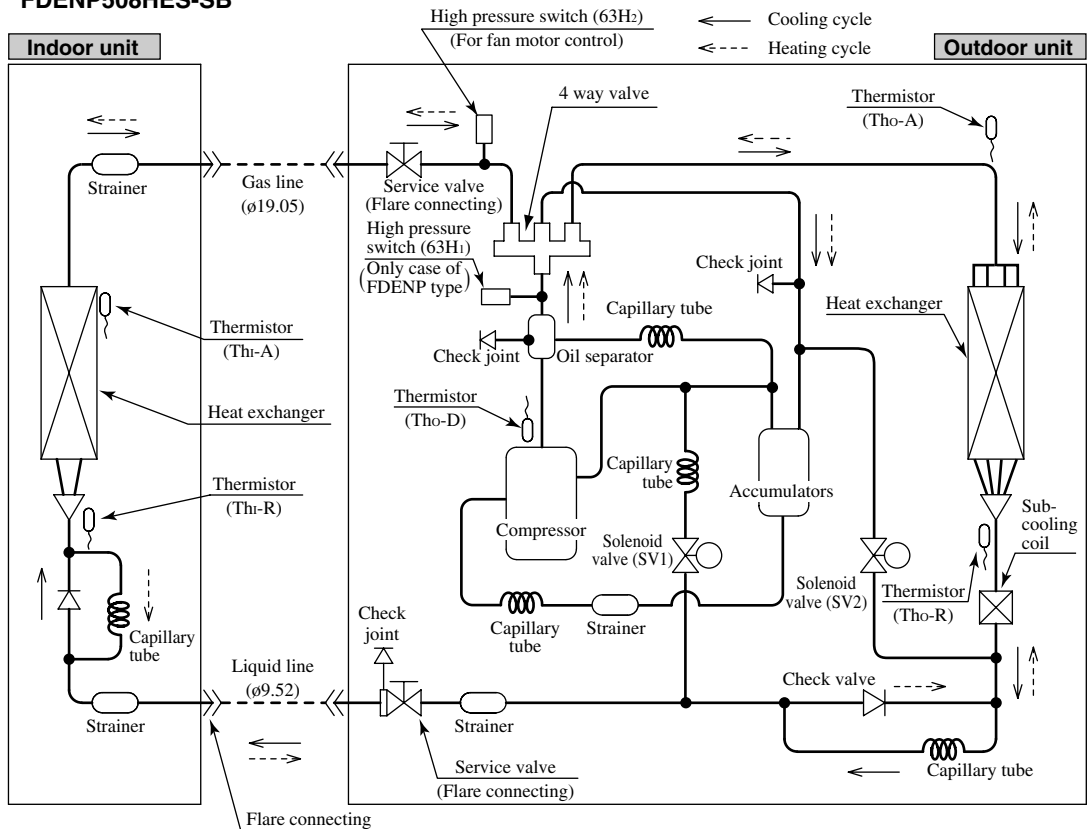


## 12.2.5 Piping system

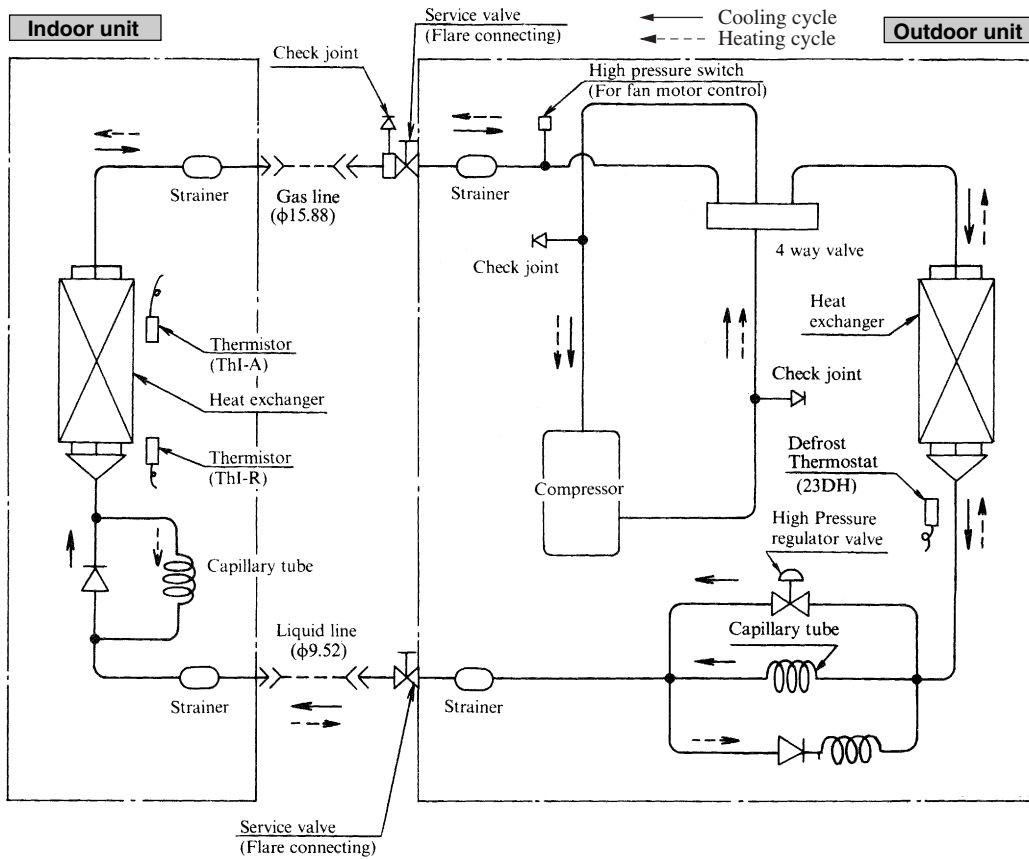
Models **FDEN308HEN-SB, 308HES-SB, 408HES-SB**  
**FDENP308HEN-SB, 308HES-SB, 408HES-SB**



Models **FDEN508HES-SB**  
**FDENP508HES-SB**



**Models FDEN258HEN-A, 258HEP-A**



**Preset point of the protective devices**

Parts name	Mark	Equipped unit	FDEN308~508	FDENP308~508	FDEN258
Thermistor (for protection over loading in heating)	Th-R	Indoor unit	OFF 68 °C		—
			ON 61 °C		
Thermistor (for frost prevention)			OFF 2.5 °C		
			ON 10 °C		
Thermistor (for detecting discharge pipe temp.)	Tho-D	Outdoor unit	OFF 135 °C		—
			ON 90 °C		
Thermistor (for detecting heat exchange temp.)	Tho-R	Outdoor unit	OFF 70 °C		—
			ON 60 °C		
Defrost thermostat	23H <sub>2</sub>	Outdoor unit	—	—	OFF 2.5 °C
	23H <sub>1</sub>				ON -6 °C
High pressure switch (for controlling FMO)	63H <sub>2</sub>	Outdoor unit	OFF 2.50MPa	OFF 2.79MPa	—
			ON 2.06MPa	ON 2.26MPa	
High pressure switch (for protection)	63H <sub>1</sub>	Outdoor unit	—	OFF 3.24MPa	OFF 2.50MPa
				ON 2.65MPa	ON 1.86MPa

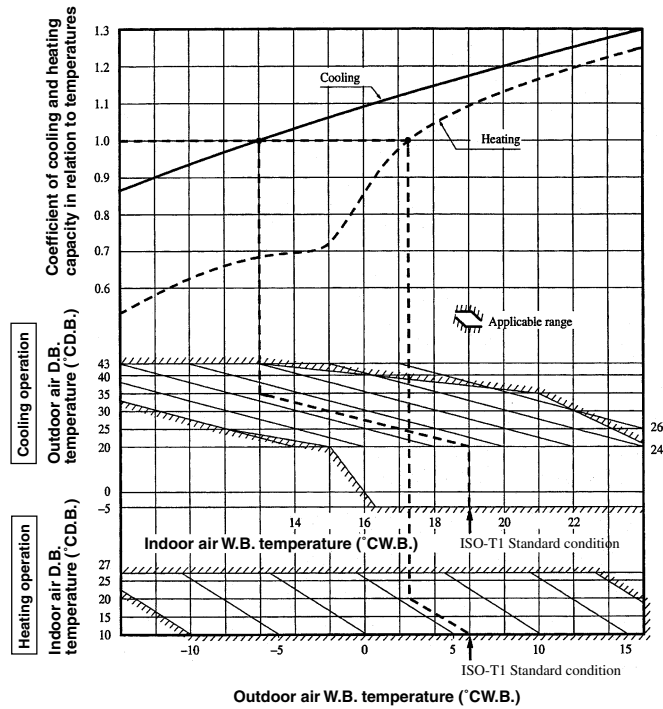
## 12.2.6 Selection chart

Correct the cooling and heating capacity in accordance with the conditions as follows. The net cooling and heating capacity can be obtained in the following way.

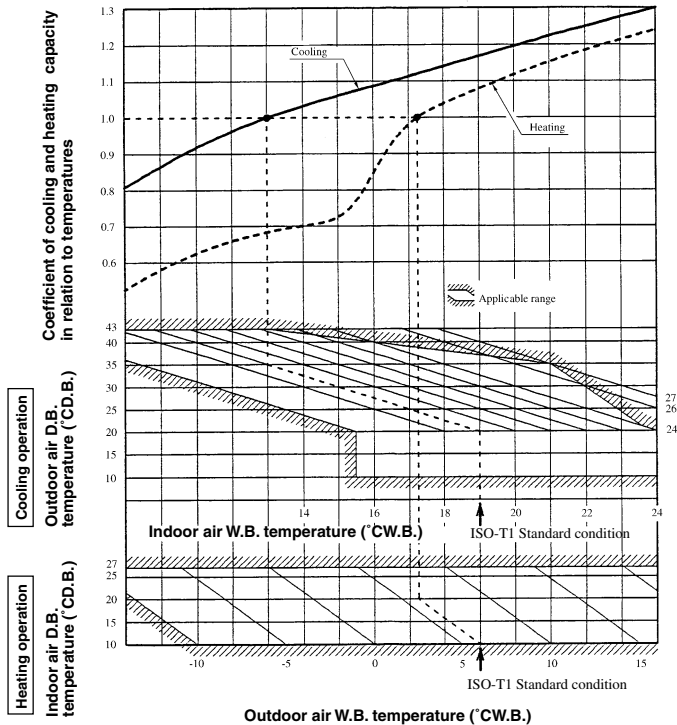
**Net capacity = Capacity shown on specification × Correction factors as follows.**

### (1) Coefficient of cooling and heating capacity in relation to temperatures

FDEN(P)308~508

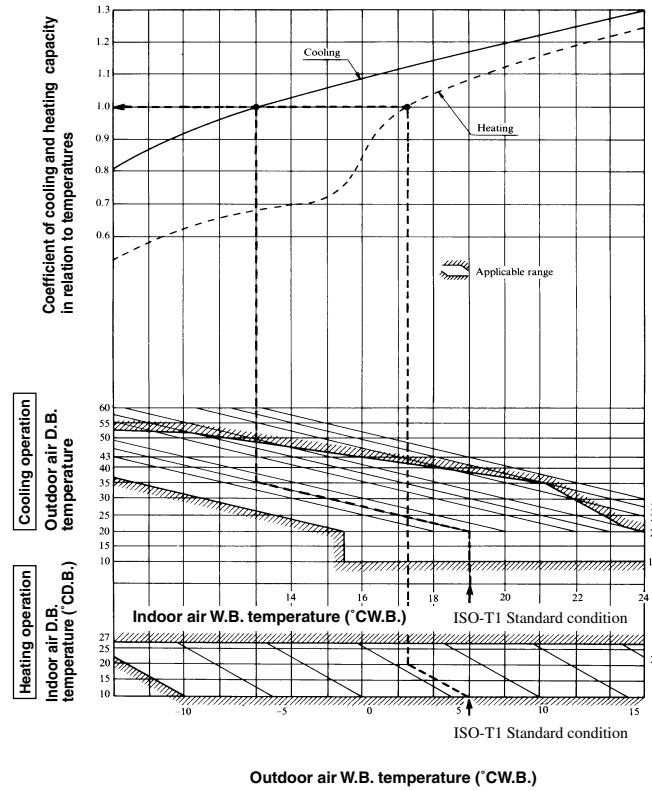


FDEN256HEN-A





**FDEN256HEP-A**



Item \ Model		FDEN258	FDEN(P)308	FDEN(P)408,508
Air flow	Hi	0.030	0.036	0.018
	Lo	0.013	0.018	0.010

**(2) Correction of cooling and heating capacity in relation to air flow rate control (fan speed)**

**Coefficient: 1.00 at High, 0.95 at Low**

**(3) Correction of cooling and heating capacity in relation to one way length of refrigerant piping**

It is necessary to correct the cooling and heating capacity in relation to the one way equivalent piping length between the indoor and outdoor units.

Equivalent piping length <sup>(1)</sup> m		7.5	10	15	20	25	30	35	40	45	50	55
Heating		1.0	1.0	1.0	1.0	1.0	0.998	0.998	0.993	0.993	0.988	0.988
Cooling	FDEN258	1.0	0.998	0.993	0.988	0.983	0.978	0.973	0.968	—	—	—
	FDEN(P)308	1.0	0.995	0.985	0.975	0.965	0.955	0.945	0.935	0.925	0.915	0.905
	FDEN(P)408	1.0	0.998	0.990	0.985	0.975	0.970	0.960	0.955	0.945	0.940	0.930
	FDEN(P)508	1.0	0.995	0.980	0.970	0.955	0.945	0.930	0.920	0.905	0.895	0.880

Note (1) Equivalent piping length can be obtained by calculating as follows.

258, 308 series [ø15.88(5/8")]: Equivalent piping length = Real piping length + (0.10 × Number or bends in piping)

408, 508, series [ø19.05(3/4")]: Equivalent piping length = Real piping length + (0.15 × Number of bends in piping)

[Equivalent piping length < Limitation length of piping + 5m]

- (4) When the outdoor unit is located at a lower height than the indoor unit in cooling operation and when the outdoor unit is located at a higher height than the indoor unit in heating operation, the following values should be subtracted from the values in the above table.

Height difference between the indoor unit and outdoor unit in the vertical height difference	5m	10m	15m	20m	25m	30m
Adjustment coefficient	0.01	0.02	0.03	0.04	0.05	0.06

15m (Outdoor unit is lower)

#### Piping length limitations

Item \ Model	FDEN(P)308~508	FDEN258
Max. one way piping length	50m	30m
Max. vertical height difference	30m (Outdoor unit is higher), 15m (Outdoor unit is lower)	15m

Note(1) Values in the table indicate the one way piping length between the indoor and outdoor units.

#### How to obtain the cooling capacity

**Example:** The net cooling capacity of the model FDENP308HEN-SB with the air flow "High", the piping length of 15m, the outdoor unit located 5m lower than the indoor unit, indoor wet-bulb temperature at 19.0 °C and outdoor dry-bulb temperature 35 °C

$$\text{Net cooling capacity} = \frac{7100}{\text{FDENP308HEN-SB}} \times \frac{1.00}{\text{Air flow "High"}} \times \frac{(0.985 - 0.01)}{\text{Length 15m. Height difference 5 m}} \times \frac{1.0}{\text{Factor by air temperatures}} = 6923 \text{ w}$$

## 12.2.7 Noise level

Notes (1) The data are based on the following conditions.

Ambient air temperature:

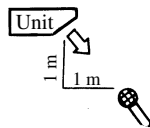
Indoor unit 27°C DB, 19°C WB.

Outdoor unit 35°C DB.

#### Indoor unit

Measured based on JIS B 8616

Mike position as below



Mike (front & at low point)

#### Outdoor unit

Measured based on JIS B 8616

Mike position: at highest noise level  
in position as below

Distance from front side 1 m

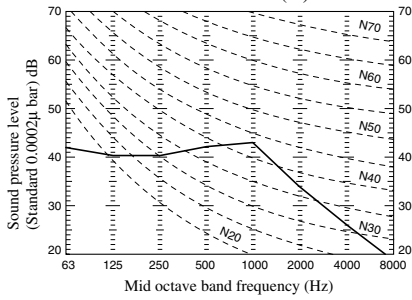
Height 1 m

- (2) The data in the chart are measured in an anechoic room.  
 (3) The noise levels measured in the field are usually higher than the data because of reflection.

**(1) Indoor unit**

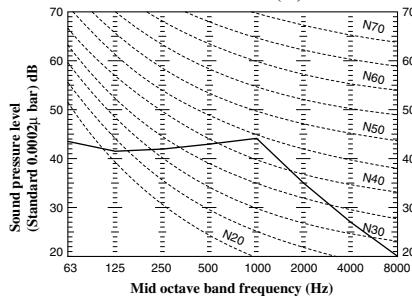
**Model FDEN258H (50Hz)**

Noise level 44 dB (A) at HIGH  
39 dB (A) at LOW



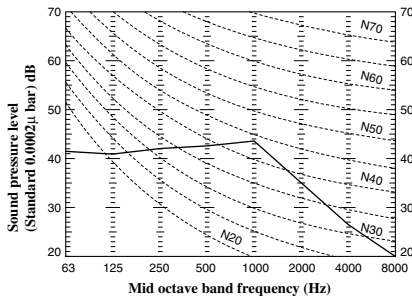
**Model FDEN258H (60Hz)**

Noise level 45 dB (A) at HIGH  
40 dB (A) at LOW



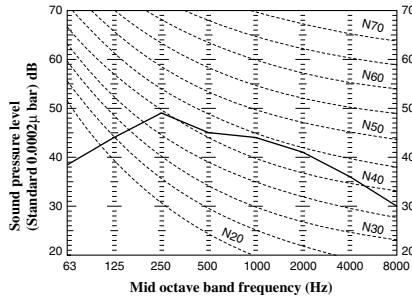
**Model FDEN308H**

Noise level 45 dB (A) at HIGH  
39 dB (A) at LOW



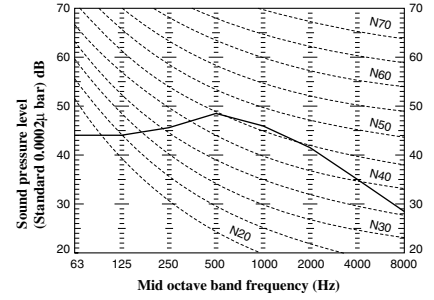
**Model FDEN408H**

Noise level 49 dB (A) at HIGH  
43 dB (A) at LOW



**Model FDEN508H**

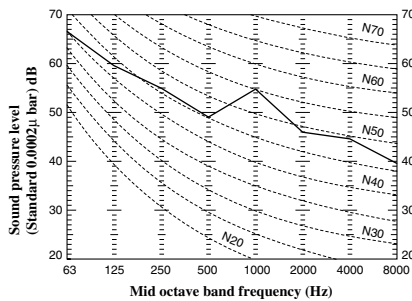
Noise level 50 dB (A) at HIGH  
44 dB (A) at LOW



**(2) Outdoor unit**

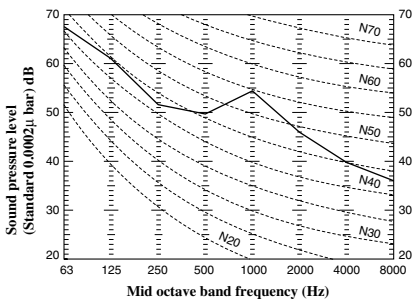
**Model FDC256HEN3A**

Noise level 57 dB (A)



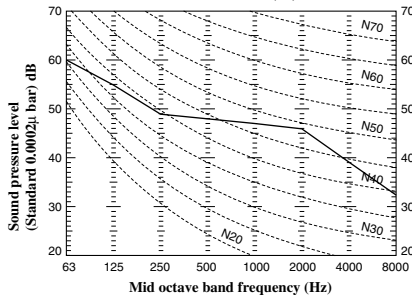
**Model FDC256HEP3A**

Noise level 57 dB (A)



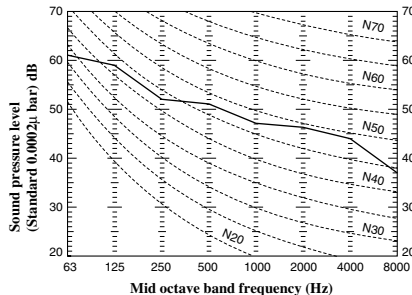
**Models FDC308HEN3B, 308HES3B  
FDCP308HEN3B, 308HES3B**

Noise level 52dB (A)



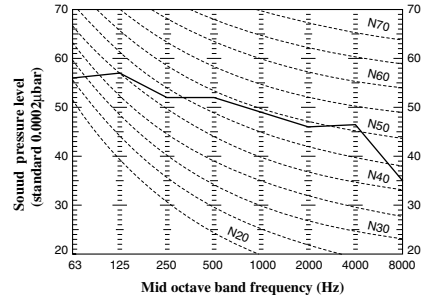
**Models FDC408HES3B  
FDCP408HES3B**

Noise level 54dB (A)



**Models FDC508HES3B  
FDCP508HES3B**

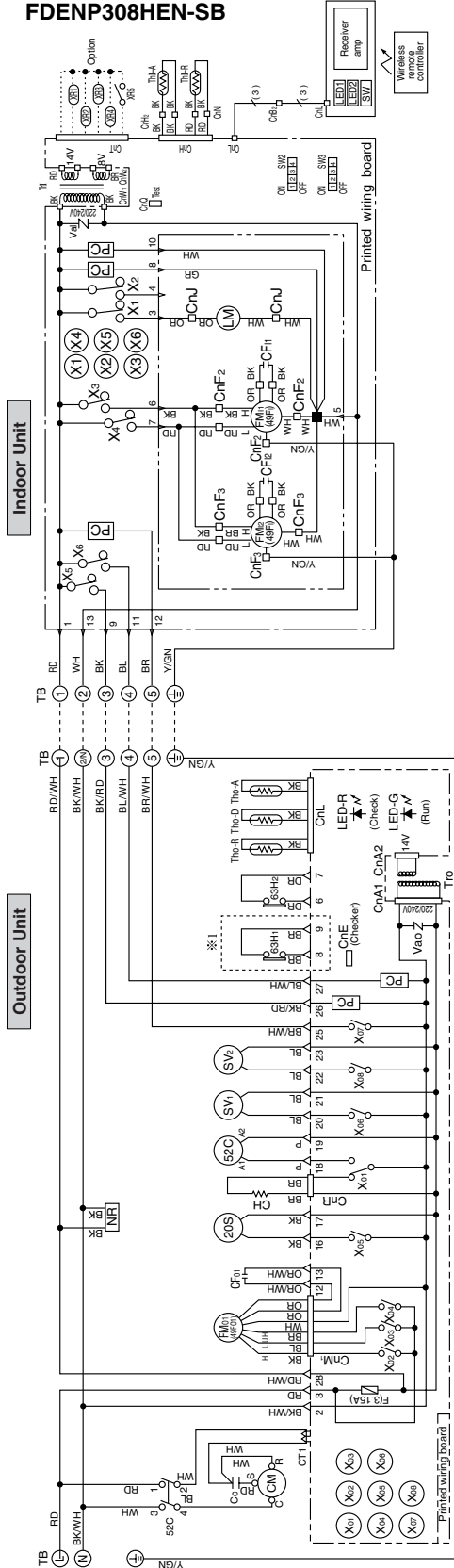
Noise level 55dB (A)



# 12.3 ELECTRICAL DATA

## 12.3.1 Electrical wiring

Models **FDEN308HEN-SB**  
**FDENP308HEN-SB**



Power source  
1 Phase 220/240V 50Hz

Note (1) ※1 63H1 is equipped with only for FDENP type.

### Meaning of marks

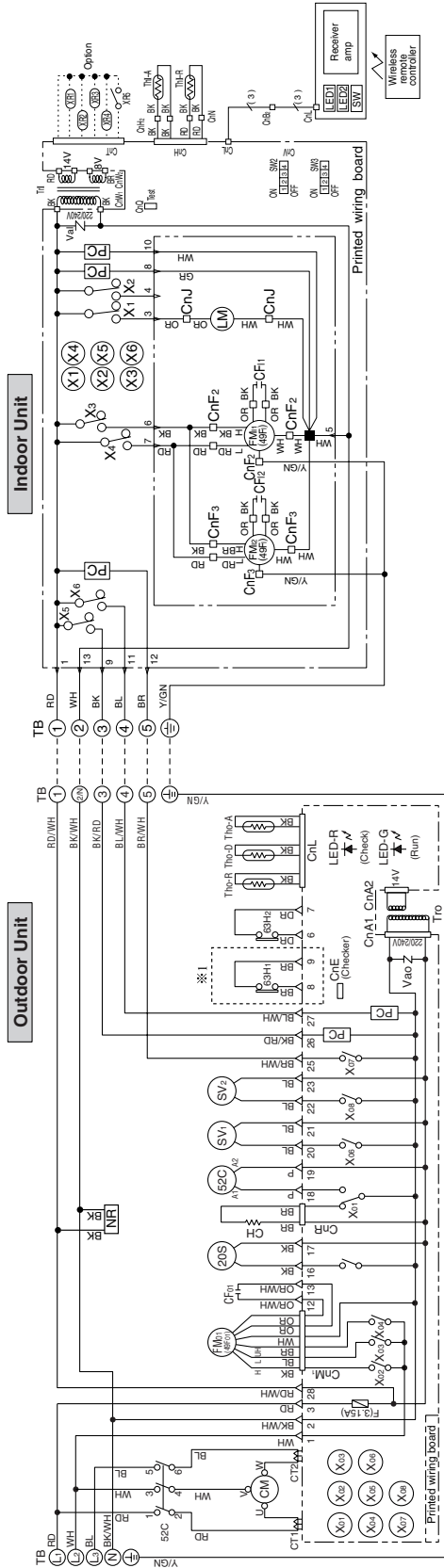
Mark	Parts name	Mark	Parts name
CC	Capacitor for CM	Th-R	Thermistor
CF1,2	Capacitor for FM1	Tho-A	Thermistor
CF0	Capacitor for FM0	Tho-D	Thermistor
CH	Crankcase heater	Tho-R	Thermistor
CM	Compressor motor	Tri	Transformer (Indoor unit)
CnA ~ W	Connector (□mark)	Tro	Transformer (Outdoor unit)
CT1	Current sensor	Val	Valve
F	Fuse	Vao	Variator
FM1,2	Fan motor (Indoor unit)	20S	4-way valve solenoid
FM0	Fan motor (Outdoor unit)	49F1	Internal thermostat for FM1
LED1	Indication lamp (Green - Run)	49F0	Internal thermostat for FM0
LED2	Indication lamp (Yellow - Check)	52C	Magnetic contactor for CM
LM	Louver motor	X1-6	Auxiliary relay
NR	Surge suppressor	X01-8	Auxiliary relay
PC	Photo coupler	63H1	High pressure switch (for protection)
SV1,2	Solenoid coil (for control)	63H2	High pressure switch (for control)
SW2,3	Switch (ON/OFF)	▽	Terminal (F)
TB	Changeover switch	■	Connector
Th-A	Terminal block (○mark)	LED-G	Indication lamp (Green)
Th-R	Thermistor	LED-R	Indication lamp (Red)

### Color mark

Mark	Color	Mark	Color
BK	Black	BK/RD	Black/Red
BL	Blue	BK/WH	Black/White
BR	Brown	BL/WH	Blue/White
GR	Gray	BR/WH	Brown/White
OR	Orange	OR/WH	Orange/White
PK	Pink	RD/WH	Red/White
RD	Red	Y/GN	Yellow/Green
WH	White		
Y	Yellow		

**Models FDEN308HES-SB  
FDENP308HES-SB**

**Power source  
3 Phase 380/415V 50Hz**



Note (1) ※1 63H is equipped with only for FDENP type.

**Meaning of marks**

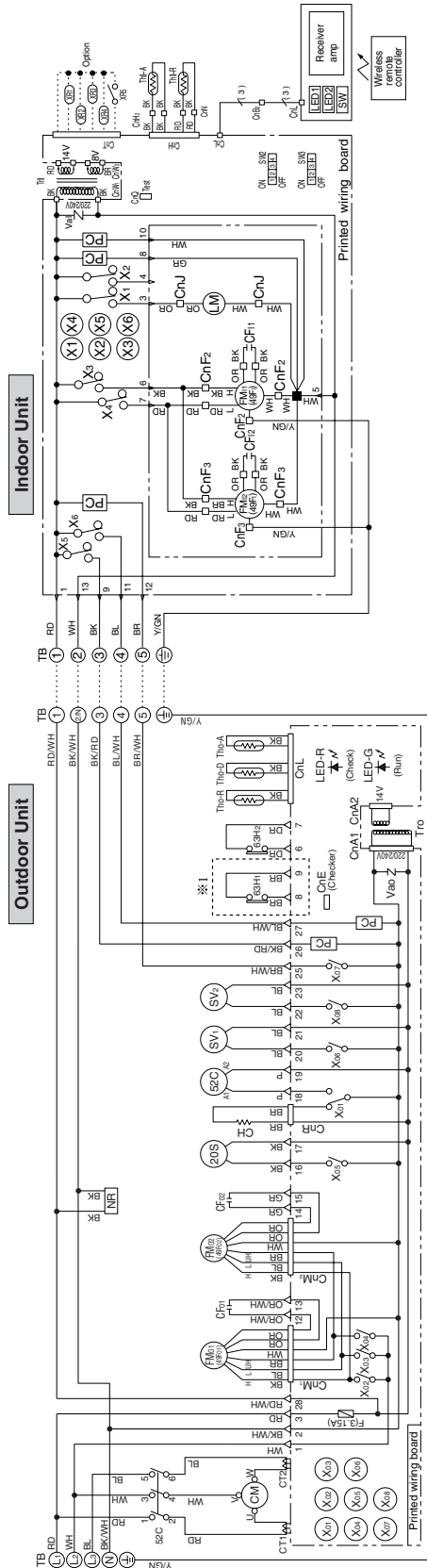
Mark	Parts name	Mark	Parts name
CF1,2	Capacitor for FM1	Tho-A	Thermistor
CF01	Capacitor for FMo	Tho-D	Thermistor
CH	Crankcase heater	Tho-R	Thermistor
CM	Compressor motor	Tr	Transformer (Indoor unit)
CnA ~ Z	Connector (□ mark)	Val	Transformer (Outdoor unit)
CT1,2	Current sensor	Vao	Variistor
F	Fuse	20S	Variistor
FM1,2	Fan motor (Indoor unit)	49F1	4-way valve solenoid
FMo1	Fan motor (Outdoor unit)	49F01	Internal thermostat for FM1
LED1	Indication lamp (Green - Run)	52C	Magnetic contactor for CM
LED2	Indication lamp (Yellow - Check)	X1-6	Auxiliary relay
LM	Lower motor	Xor-08	Auxiliary relay
NR	Surge suppressor	63H1	High pressure switch (for protection)
PC	Photo coupler	63H2	High pressure switch (for control)
SV1,2	Solenoid coil (for control)	▼	Terminal (F)
SW	Switch (ON/OFF)	■	Connector
SW2,3	Changeover switch	LED-G	Indication lamp (Green)
TB	Terminal block (□ mark)	LED-R	Indication lamp (Red)
Thi-A	Thermistor		
Thi-R	Thermistor		

**Color mark**

Mark	Color	Mark	Color
BK	Black	BK/RD	Black/Red
BL	Blue	BK/WH	Black/White
BR	Brown	BL/WH	Blue/White
GR	Gray	BR/WH	Brown/White
OR	Orange	OR/WH	Orange/White
P	Pink	RD/WH	Red/White
RD	Red	Y/GN	Yellow/Green
WH	White		

**Models FDEN408HES-SB, 508HES-SB  
FDENP408HES-SB, 508HES-SB**

**Power source  
3 Phase 380/415V 50Hz**



**Note (1) ※1 63H1 is equipped with only for FDENP type.**

**Meaning of marks**

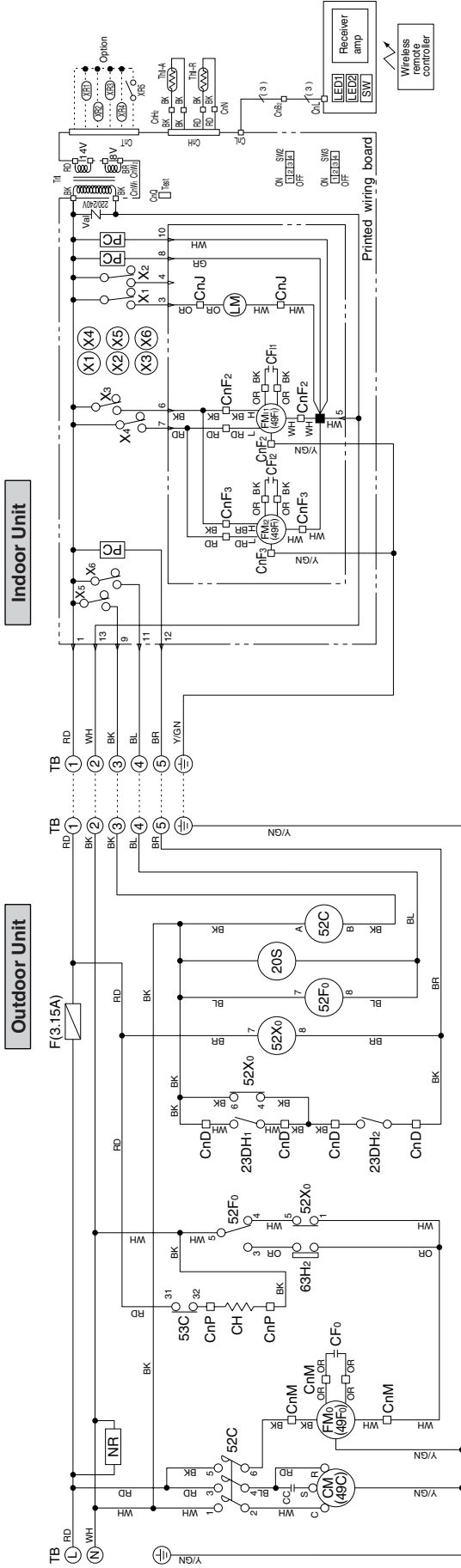
Mark	Parts name	Mark	Parts name
CF1,2	Capacitor for FMI	Tho-A	Thermistor
CF01,2	Capacitor for FMO	Tho-D	Thermistor
CH	Crankcase heater	Tho-R	Thermistor
CM	Compressor motor	Tr	Transformer (Indoor unit)
CnA ~ Z	Connector (□ mark)	Tr	Transformer (Outdoor unit)
CT1,2	Current sensor	Val	Valve
F	Fuse	Vao	Variator
FM1,2	Fan motor (Indoor unit)	20S	4-way valve solenoid
FM01,2	Fan motor (Outdoor unit)	49F1	Internal thermostat for FMi
LED1	Indication lamp (Green-Run)	49F01,2	Internal thermostat for FMO
LED2	Indication lamp (Yellow-Check)	52C	Magnetic contactor for CM
LM	Louver motor	X1-6	Auxiliary relay
NR	Surgesuppressor	X01-08	High pressure switch (for protection)
PC	Photo coupler	63H1	High pressure switch (for control)
SW	Solenoid coil (for control)	▽	Terminal (F)
SW1,2	Switch (ON/OFF)	○	Connector
SW2,3	Changeover switch	■	Indication lamp (Green)
TB	Terminal block (○ mark)	LED-G	Indication lamp (Red)
Th-A	Thermistor	LED-R	Indication lamp (Red)
Th-R	Thermistor		

**Color mark**

Mark	Color	Mark	Color
BK	Black	BK/RD	Black/Red
BL	Blue	BK/WH	Black/White
BR	Brown	BL/WH	Blue/White
GR	Gray	BR/WH	Brown/White
OR	Orange	OR/WH	Orange/White
P	Pink	RD/WH	Red/White
RD	Red	Y/GN	Yellow/Green
WH	White		

Models **FDEN258HEN-A, 258HEP-A**

Power source  
**FDEN258HEN-A**  
 1 Phase 220/240V 50Hz  
**FDEN258HEP-A**  
 1 Phase 220V 60Hz



Color mark	
Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
Y/GN	Yellow/Green

Meaning of marks			
Mark	Parts name	Mark	Parts name
CC	Capacitor for CM	Thi-A	Thermistor
CF1,2	Capacitor for FMi	Thi-R	Thermistor
CFO	Capacitor for FMO	Th	Transformer
CH	Crankcase heater	Val	Varistor
CM	Compressor motor	20S	4-way valve solenoid
CnA ~ W	Connector (□ mark)	23DH	Thermostat (deicer)
F	Fuse	49C	Internal thermostat for CM
FMi,2	Fan motor (Indoor unit)	49Fi	Internal thermostat for FMi
FMO	Fan motor (Outdoor unit)	49Fo	Internal thermostat for FMO
LED1	Indication lamp (Green-Run)	52C	Magnetic contactor for CM
LED2	Indication lamp (Yellow-Check)	52Fo	Relay for FMO
LM	Louver motor	52Xo	Relay for fan control
NR	Surge suppressor	X1-6	Auxiliary relay
PC	Photo coupler	63Hz	High pressure switch (control)
SW	Switch (ON/OFF)	◁	Terminal (F)
SW2,3	Changeover switch	■	Connector
TB	Terminal block (○ mark)		

## 12.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

This is same as FDUR heat pump series. Refer to page 306.

## 12.5 APPLICATION DATA

### SAFETY PRECAUTIONS

- Please read these “Safety Precautions” first then accurately execute the installation work.
  - Though the precautionary points indicated herein are divided under two headings. **⚠WARNING** and **⚠CAUTION**, those points which are related to the strong possibility of an installation done in error resulting in death or serious injury are listed in the **⚠WARNING** section. However, there is also a possibility of serious consequences in relationship to the points listed in the **⚠CAUTION** section as well.
- In either case, important safety related information is indicated, so by all means, properly observe all that is mentioned.
- After completing the installation, along with confirming that no abnormalities were seen from the operation tests, please explain operating methods as well as maintenance methods to the user (customer) of this equipment, based on the owner’s manual. Moreover, ask the customer to keep this sheet together with the owner’s manual.

#### **⚠ WARNING**

- This system should be applied to places of office, restaurant, residence and the like. Application to inferior environment such as engineering shop could cause equipment malfunction.
- Please entrust installation to either the company which sold you the equipment or to a professional contractor. Defects from improper installations can be the cause of water leakage, electric shocks and fires.
- Execute the installation accurately, based on following the installation manual. Again, improper installations can result in water leakage, electric shocks and fires.
- When a large air-conditioning system is installed to a small room, it is necessary to have a prior planned countermeasure for the rare case of a refrigerant leakage, to prevent the exceeding of threshold concentration. In regards to preparing this countermeasure, consult with the company from which you purchased the equipment, and make the installation accordingly. In the rare event that a refrigerant leakage and exceeding of threshold concentration does occur, there is the danger of a resultant oxygen deficiency accident.
- For installation, confirm that the installation site can sufficiently support heavy weight. When strength is insufficient, injury can result from a falling of the unit.
- Execute the prescribed installation construction to prepare for earthquakes and the strong winds of typhoons and hurricanes, etc. Improper installations can result in accidents due to a violent falling over of the unit.
- For electrical work, please see that a licensed electrician executes the work while following the safety standards related to electrical equipment, and local regulations as well as the installation instructions, and that only exclusive use circuits are used. Insufficient power source circuit capacity and defective installment execution can be the cause of electric shocks and fires.
- Accurately connect wiring using the proper cable, and insure that the external force of the cable is not conducted to the terminal connection part, through properly securing it. Improper connection or securing can result in heat generation or fire.
- Take care that wiring does not rise upward, and accurately install the lid/service panel. Its improper installation can also result in heat generation or fire.
- When setting up or moving the location of the air conditioner, do not mix air etc. or anything other than the designated refrigerant within the refrigeration cycle. Rupture and injury caused by abnormal high pressure can result from such mixing.
- Always use accessory parts and authorized parts for installation construction. Using parts not authorized by this company can result in water leakage, electric shock, fire and refrigerant leakage.

#### **⚠ CAUTION**

- Execute proper grounding. Do not connect the ground wire to a gas pipe, water pipe, lightning rod or a telephone ground wire. Improper placement of ground wires can result in electric shock.
- The installation of an earth leakage breaker is necessary depending on the established location of the unit. Not installing an earth leakage breaker may result in electric shock.
- Do not install the unit where there is a concern about leakage of combustible gas. The rare event of leaked gas collecting around the unit could result in an outbreak of fire.
- For the drain pipe, follow the installation manual to insure that it allows proper drainage and thermally insulate it to prevent condensation. Inadequate plumbing can result in water leakage and water damage to interior items.



## ⚠ NOTICE

All Wiring of this installation must comply with NATIONAL, STATE AND LOCAL REGULATIONS. These instructions do not cover all variations for every kind of installation circumstance. Should further information be desired or should particular problems occur, the matter should be referred to Mitsubishi Heavy Industries, Ltd. through your local distributor.

## ⚠ WARNING

BE SURE TO READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD CAUSE SERIOUS INJURY OR DEATH, EQUIPMENT MALFUNCTION AND/OR PROPERTY DAMAGE.

### 12.5.1 Installation of indoor unit

#### (1) Selection of installation location

- (a) A place where good air circulation and delivery can be obtained.
- (b) A place where ceiling has enough strength to support the unit.
- (c) A place where there is no obstacle around the return air inlet and supply air outlet ports.
- (d) A place where there is no moist air or oil vapor which may harm the heat exchanger.
- (e) A place where the space shown below is secured.
- (f) This unit uses a microcomputer as a control device. Therefore avoid installing the unit near the equipment that generates strong electromagnetic waves and noise.

#### (2) Installation preparation

- (a) Drilling of holes for interconnecting piping and wiring.
  - 1) Drill a hole through the wall in accordance with the piping diameter. We recommend using a hole saw drill of 70~86mm diameter and the hole should be drilled on an incline from inside to outside.
  - 2) Insert the accessory piping sleeve into the hole and cut it to the proper length in accordance with wall thickness.
- (b) Installation of suspension bolts.
  - 1) Use the template sheet to determine the positions of suspension bolts and refrigerant pipings. The refrigerant piping can be routed either to the right, left, top or rear.
  - 2) Positions of suspension bolts are as in the drawing below.

#### Air reach

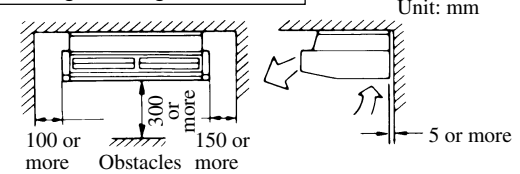
Unit: m

Model	258H	308H	408H,508H
Air reach	8	9	9.5

#### [Conditions]

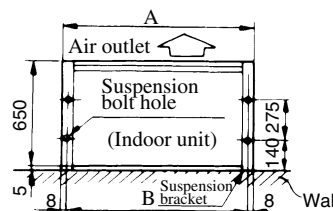
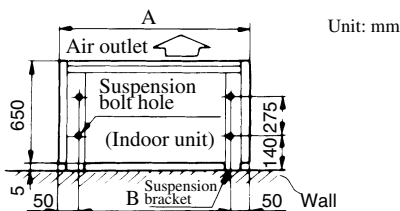
- (1) Installation height .... 2.4~3.0 m above the floor
- (2) Fan speed .... High
- (3) Air flow speed at reach point .... 0.5 m/sec

#### Ceiling mounting installation



#### • When the suspension brackets face in

#### • When the suspension brackets face out

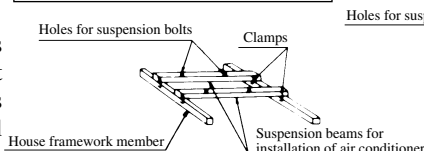


Model	Unit: mm		
	A	B	C
258H, 308H, 408H	1260	1160	1244
508H	1470	1370	1454

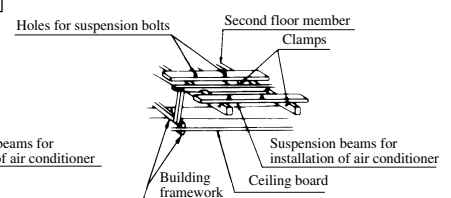
#### 3) In case of wooden structures.

- Use main strength members for suspension.
- When the suspension beams have members spaced 900 mm apart use small beams that are at least 6 cm square, in case the beams are spaced more than 180 mm apart use small beams that are more than 90 mm square.

#### In case of wooden framework construction

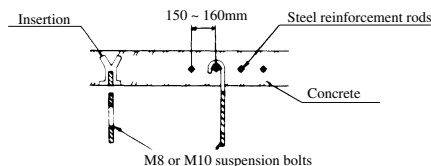


#### In case of wooden framework (two storied building)



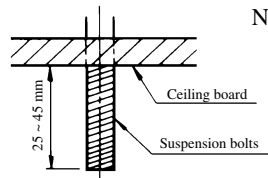
#### 4) In case of ferro-concrete buildings.

Fix the suspension bolts in the following way.



#### 5) Length of suspension.

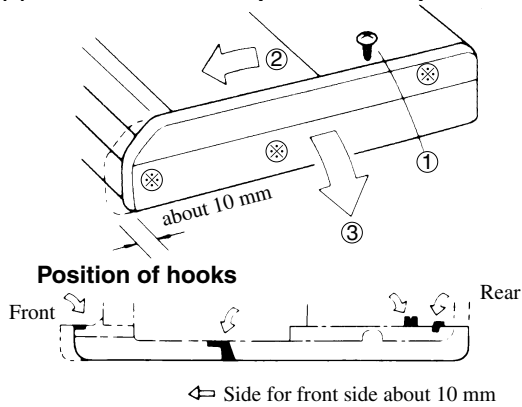
(in case of exposed type installation)



- Notes
- (1) In case the suspension bracket is set to face in, and the suspension bolts are made to the length as shown in the left drawing, the bolts ends will be put in the plastics caps of the indoor unit top panel.
  - (2) Do not remove the plastics caps.

**(3) Installation of indoor unit**

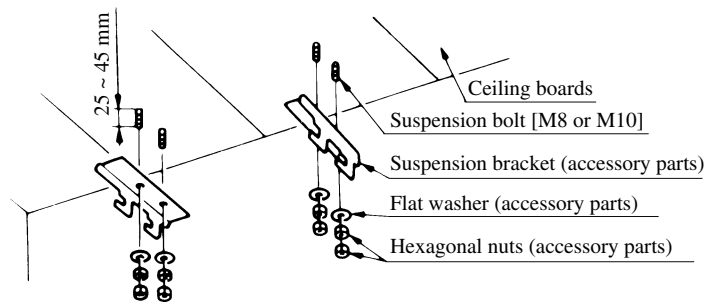
**(a) Detach the inside panel and suspension bracket.**



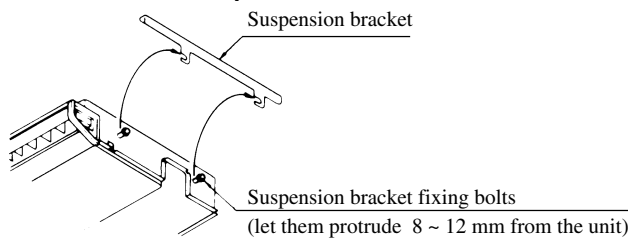
- ① Remove a fixing bolt of the side panel.
- ② Unhook four hooks (marked ⊗) by sliding the side panel in front side about 10 mm, and detach the side panel from the unit.

**(b) In case of exposed installation to the ceiling (with suspension brackets facing in)**

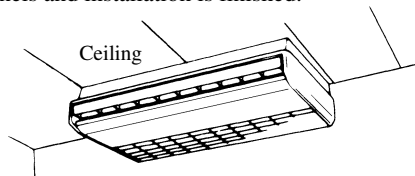
**1) Fix the suspension brackets to suspension bolts.**



**2) Hook the unit to suspension brackets.**



- 3) Fix unit securely in place by tightening the suspension bracket fixing bolts.
- 4) Attach the side panels and installation is finished.

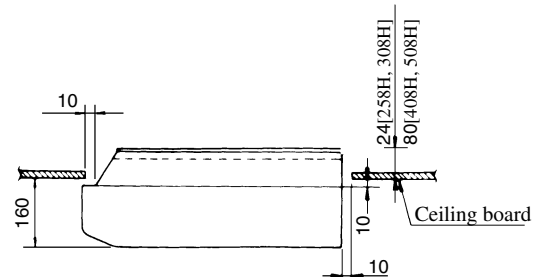
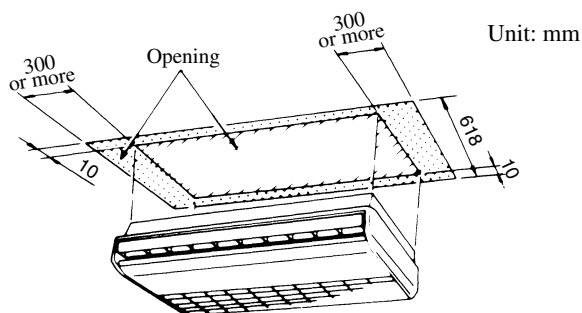


**(c) In case the unit is half recessed into the ceiling (the suspension brackets facing outside).**

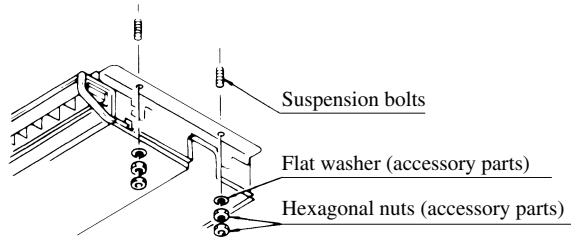
- 1) Open a hole in the ceiling large enough for the unit and the necessary installation work. (Fill up the excess opening after the installation work is finished.)

- 2) Installation space dimensions.

(Plug in dimensions)

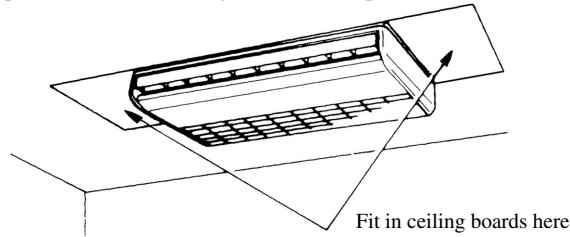


3) Mount the unit using suspension bolts.



4) Securely tighten the nuts and fix the indoor unit in place.

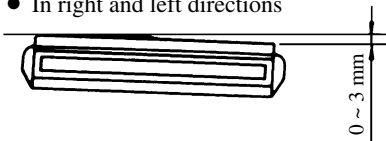
5) Attach the side panels and fit in ceiling board in the space around the unit and the work is finished.



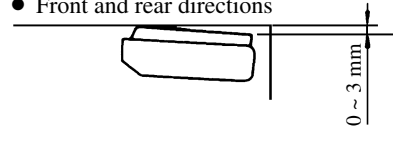
**(d) Gradient for drainage**

Mounting with proper gradient for drainage is needed as shown below.

• In right and left directions



• Front and rear directions

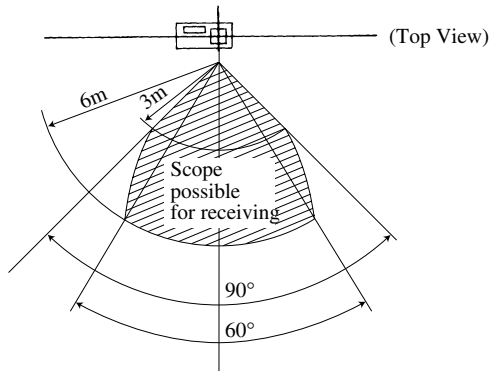
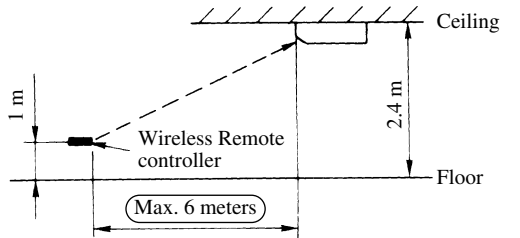


Note (1) In case of left-hand side drainage, the gradient will be to the opposite side.

**Caution**

- In case of gradient is contrary, water may leak out.
- Indoor side of drain pipe must be thermally insulated.

**(4) Cautions for wireless remote controller operation**



<Condition> Illuminance (Brightness) of the receiver area is about 360 lux.

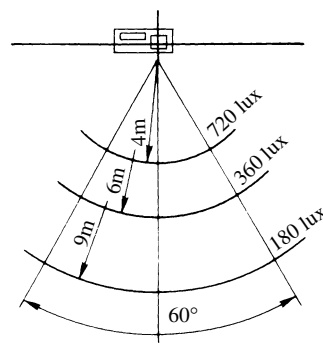
(In general office environments, there is no ceiling light source within a distance of one meter from the Air Conditioner Unit. The illuminance of a desktop is approx 1,000 lux in the above conditions.)

Notes (1) When the receiving angle is 90°, the receiving distance decrease to 3 meters.

(2) Be sure to point the Remote Controller correctly towards the Receiver.

(3) The operating range is as shown in the left drawing, but the range is changed in according to the conditions, as illumination, sunlight and etc.

(4) If the Receiver is being subjected to direct sunlight or intense lighting, the valid operating range may decrease and result in the Receiver being unable to receive the Control Signal from the Remote Controller.



(The relationship between Receiver surface illuminance and the signal reception distance. When the illuminance decreases by 50%, the receiving range increase by 50%.)

### **12.5.2 Installation of outdoor unit**

This is same as FDUR heat pump series. Refer to page 330.

## **12.6 MAINTENANCE DATA**

This is same as FDUR heat pump series. Refer to page 340.