

16. HIGH STATIC PRESSURE, DUCT TYPE PACKAGED AIR- CONDITIONER

**(Split system, Air cooled)
cooling only type**

**FDU308CEN-A
308CES-A
408CES-A
508CES-A
508CEM-A**

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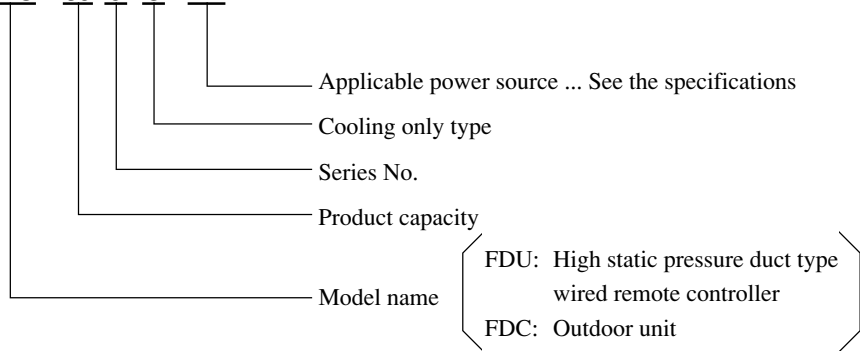
16.1 GENERAL INFORMATION

16.1.1 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 4 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) The controls are wired residential split air conditioner type remote controller with 4 malfunction modes.
- (5) All models have service valves protruding from the outdoor unit for faster flare connection work in the field.
- (6) Operation noise has been drastically reduced by increasing the number of high performance fans and by thorough sound insulation.
- (7) When installing, the optimum outside static pressure can be set using the fan controller.
- (8) With the height of all equipment made uniform at 360 mm and neatly installed into the ceiling, the installation of equipment with different capacities into the same ceiling space is made easy.

16.1.2 How to read the model name

Example: **FDU 30 8 C EN - A**



16.2 SELECTION DATA

16.2.1 Specifications

Model FDU308CEN-A

Item		Model	FDU308CEN-A		
			FDU308-A	FDC306CEN3	
Nominal cooling capacity⁽¹⁾	ISO-T1	W	7100		
	ISO-T3		5700		
Power source			1 Phase, 220/240V 50Hz		
Operation data⁽²⁾	ISO-T1	Cooling input	kW	3.29/3.33	
		Running current (Cooling)	A	16.5/17.3	
		Power factor (Cooling)	%	91/80	
	ISO-T3	Cooling input	kW	3.48/3.52	
		Running current (Cooling)	A	17.5/18.3	
		Power factor (Cooling)	%	90/80	
		Inrush current (L.R.A)	A	89	
		Noise level	dB(A)	41	56
	Exterior dimensions				
Height × Width × Depth		mm	360 × 820 × 830	844 × 950 × 340	
Net weight		kg	48	67	
Refrigerant equipment					
Compressor type & Q'ty			–	RC5532ENE1 × 1	
Motor		kW	–	2.24	
Starting method			–	Line starting	
Heat exchanger			Louver fins & inner grooved tubing	Slitted fins & bare tubing	
Refrigerant control			–	Capillary tube	
Refrigerant			R22		
Quantity		kg	Holding charged	1.3 [Pre-charged up to the piping length of 5m]	
Refrigerant oil		ℓ	–	1.63 (SUNISO 3GS)	
High pressure control			High pressure regulator valve		
Air handling equipment					
Fan type & Q'ty			Multiblade centrifugal fan × 2	Propeller fan × 1	
Motor		W	130 × 1	60 × 1	
Starting method			Line starting	Line starting	
Air flow (Standard)		CMM	20	54	
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max 200 (20)	–	
Fresh air intake			Available	–	
Air filter, Q'ty			Field purchased	–	
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)	
Electric heater		W	–	–	
Operation control					
Operation switch			Remote control switch (Optional: RCD-C-E)	– (Indoor unit side)	
Room temperature control			Thermostat by electronics	–	
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat.	Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.	
Installation data					
Refrigerant piping size		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")		
Connecting method			Flare piping		
Drain hose			(Connectable with VP25)	–	
Insulation for piping			Necessary (both Liquid & Gas lines)		
Accessories			Mounting kit.		
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
		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.

JIS B8616 "UNITARY AIR-CONDITIONERS"

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

Model FDU308CES-A

Item		Model		FDU308CES-A	
				FDU308-A	FDC306CES3
Nominal cooling capacity⁽¹⁾		ISO-T1	W	7100/7700	
		ISO-T3		5700/6000	
Power source		3 Phase, 380-415V 50Hz, 380V 60Hz			
Operation data⁽²⁾	ISO-T1	Cooling input	kW	3.05/3.06/3.64	
		Running current (Cooling)	A	5.9/6.0/7.1	
		Power factor (Cooling)	%	79/71/78	
	ISO-T3	Cooling input	kW	3.24/3.25/3.87	
		Running current (Cooling)	A	6.3/6.4/7.6	
		Power factor (Cooling)	%	78/71/77	
	Inrush current (L.R.A)		A	43	
	Noise level		dB(A)	41/43	56
Exterior dimensions					
Height × Width × Depth		mm	360 × 820 × 830		844 × 950 × 340
Net weight		kg	48		67
Refrigerant equipment					
Compressor type & Q'ty				RC5538ESE1 × 1	
Motor		kW	-		2.24
Starting method				Line starting	
Heat exchanger		Louver fins & inner grooved tubing		Slitted fins & bare tubing	
Refrigerant control		-		Capillary tube	
Refrigerant		R22			
Quantity		kg	Holding charged		1.3 [Pre-charged up to the piping length of 5m]
Refrigerant oil		ℓ	-		1.63 (SUNISO 3GS)
High pressure control		High pressure regulator valve			
Air handling equipment					
Fan type & Q'ty		Multiblade centrifugal fan × 2		Propeller fan × 1	
Motor		W	130 × 1		60 × 1
Starting method		Line starting		Line starting	
Air flow (Standard)		CMM	20/24		54/56
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max 200 (20)		-
Fresh air intake		Available		-	
Air filter, Q'ty		Field purchased		-	
Shock & vibration absorber		Rubber sleeve (for fan motor)		Rubber mount (for compressor)	
Electric heater		W	-		-
Operation control		Remote control switch			
Operation switch		(Optional: RCD-C-E)		- (Indoor unit side)	
Room temperature control		Thermostat by electronics		-	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.		Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.	
Installation data					
Refrigerant piping size		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")		
Connecting method		Flare piping			
Drain hose		(Connectable with VP25)		-	
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		Mounting kit.			
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
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.

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380V 50Hz/415V 50Hz/380V 60Hz.

Model FDU408CES-A

Item		Model		FDU408CES-A	
				FDU408-A	FDC406CES3
Nominal cooling capacity⁽¹⁾	ISO-T1	W	10200/11300		
	ISO-T3		8900/9900		
Power source		3 Phase, 380-415V 50Hz, 380V 60Hz			
Operation data⁽²⁾	ISO-T1	Cooling input	kW	3.96/3.96/4.88	
		Running current (Cooling)	A	7.8/7.8/9.4	
		Power factor (Cooling)	%	77/71/79	
	ISO-T3	Cooling input	kW	4.30/4.30/5.38	
		Running current (Cooling)	A	8.4/8.4/10.1	
		Power factor (Cooling)	%	78/71/81	
	Inrush current (L.R.A)	A	45		
	Noise level	dB(A)	44/46	57	
Exterior dimensions					
Height × Width × Depth		mm	360 × 820 × 830		1250 × 950 × 340
Net weight		kg	49		80
Refrigerant equipment					
Compressor type & Q'ty		-		RC5547ESE1 × 1	
Motor		kW	-		2.61
Starting method		-		Line starting	
Heat exchanger		Louver fins & inner grooved tubing		Slitted fins & bare tubing	
Refrigerant control		-		Capillary tube	
Refrigerant		R22			
Quantity		kg	Holding charged		1.55 (Pre-charged up to the piping length of 0m)
Refrigerant oil		ℓ	-		1.63 (SUNISO 3GS)
High pressure control		High pressure regulator valve			
Air handling equipment					
Fan type & Q'ty		Multiblade centrifugal fan × 2		Propeller fan × 2	
Motor		W	200 × 1		60 × 2
Starting method		Line starting		Line starting	
Air flow (Standard)		CMM	27/32		100/110
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max 200 (20)		-
Fresh air intake		Available		-	
Air filter, Q'ty		Field purchased		-	
Shock & vibration absorber		Rubber sleeve (for fan motor)		Rubber mount (for compressor)	
Electric heater		W	-		-
Operation control		Remote control switch			
Operation switch		(Optional: RCD-C-E)		- (Indoor unit side)	
Room temperature control		Thermostat by electronics		-	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.		Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.	
Installation data					
Refrigerant piping size		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ19.05 (3/4")		
Connecting method		Flare piping			
Drain hose		(Connectable with VP25)		-	
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		Mounting kit.			
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					
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
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.

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380V 50Hz/415V 50Hz/380V 60Hz.

Model FDU508CES-A

Item		Model		FDU508CES-A		
				FDU508-A	FDC506CES3	
Nominal cooling capacity⁽¹⁾	ISO-T1	W	12500/14000			
	ISO-T3		10600/11900			
Power source			3 Phase, 380-415V 50Hz, 380V 60Hz			
Operation data⁽²⁾	ISO-T1	Cooling input	kW	5.01/5.03/6.03		
		Running current (Cooling)	A	10.3/10.3/11.5		
		Power factor (Cooling)	%	74/68/80		
	ISO-T3	Cooling input	kW	5.56/5.58/6.63		
		Running current (Cooling)	A	11.6/11.6/12.5		
		Power factor (Cooling)	%	73/67/81		
	Inrush current (L.R.A)		A	68		
	Noise level		dB(A)	45/47	59	
Exterior dimensions						
Height × Width × Depth		mm	360 × 1200 × 830	1250 × 950 × 340		
Net weight		kg	62	85		
Refrigerant equipment						
Compressor type & Q'ty			–	RC5563ESE2 × 1		
Motor		kW	–	3.73		
Starting method			–	Line starting		
Heat exchanger			Louver fins & inner grooved tubing	Slitted fins & bare tubing		
Refrigerant control			–	Capillary tube		
Refrigerant				R22		
Quantity		kg	Holding charged	1.85 [Pre-charged up to the piping length of 5m]		
Refrigerant oil		ℓ	–	2.07 (SUNISO 3GS)		
High pressure control				High pressure regulator valve		
Air handling equipment						
Fan type & Q'ty			Multiblade centrifugal fan × 2	Propeller fan × 2		
Motor		W	230 × 1	60 × 2		
Starting method			Line starting	Line starting		
Air flow (Standard)		CMM	34/40	100/110		
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max 200 (20)	–		
Fresh air intake			Available	–		
Air filter, Q'ty			Field purchased	–		
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)		
Electric heater		W	–	40 (Crank case heater)		
Operation control						
Operation switch			Remote control switch (Optional: RCD-C-E)	– (Indoor unit side)		
Room temperature control			Thermostat by electronics	–		
Safety equipment						
			Internal thermostat for fan motor. Frost protection thermostat.	Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.		
Installation data						
Refrigerant piping size		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ19.05 (3/4")			
Connecting method			Flare piping			
Drain hose			(Connectable with VP25)	–		
Insulation for piping			Necessary (both Liquid & Gas lines)			
Accessories			Mounting kit.			
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
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.

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380V 50Hz/415V 50Hz/380V 60Hz.

Model FDU508CEM-A

Item		Model		FDU508CEM-A	
				FDU508-A	FDC506CEM3
Nominal cooling capacity⁽¹⁾		ISO-T1	W	12500/14000	
		ISO-T3		11900	
Power source		3 Phase, 230V 50Hz/220V 60Hz			
Operation data⁽²⁾	ISO-T1	Cooling input	kW	4.76/5.76	
		Running current (Cooling)	A	15.2/16.9	
		Power factor (Cooling)	%	79/89	
	ISO-T3	Cooling input	kW	6.28	
		Running current (Cooling)	A	18.2	
		Power factor (Cooling)	%	91	
	Inrush current (L.R.A)		A	108	
	Noise level		dB(A)	45/47	59
Exterior dimensions					
Height × Width × Depth		mm	360 × 1200 × 830	1250 × 950 × 340	
Net weight		kg	62	85	
Refrigerant equipment					
Compressor type & Q'ty		-		RC5563EME2 × 1	
Motor		kW	-	3.73	
Starting method		-		Line starting	
Heat exchanger		Louver fins & inner grooved tubing		Slitted fins & bare tubing	
Refrigerant control		-		Capillary tube	
Refrigerant		R22			
Quantity		kg	Holding charged	1.8 [Pre-charged up to the piping length of 5m]	
Refrigerant oil		ℓ	-	2.07 (SUNISO 3GS)	
High pressure control		High pressure regulator valve			
Air handling equipment					
Fan type & Q'ty		Multiblade centrifugal fan × 2		Propeller fan × 2	
Motor		W	230 × 1	60 × 2	
Starting method		Line starting		Line starting	
Air flow (Standard)		CMM	34/40	100/110	
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max 200 (20)		-
Fresh air intake		Available		-	
Air filter, Q'ty		Field purchased		-	
Shock & vibration absorber		Rubber sleeve (for fan motor)		Rubber mount (for compressor)	
Electric heater		W	-	40 (Crank case heater)	
Operation control					
Operation switch		Remote control switch (Optional: RCD-C-E)		- (Indoor unit side)	
Room temperature control		Thermostat by electronics		-	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.		Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.	
Installation data					
Refrigerant piping size		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ19.05 (3/4")		
Connecting method		Flare piping			
Drain hose		(Connectable with VP25)		-	
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		Mounting kit.			
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
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.

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 230V 50Hz/220V 60Hz.

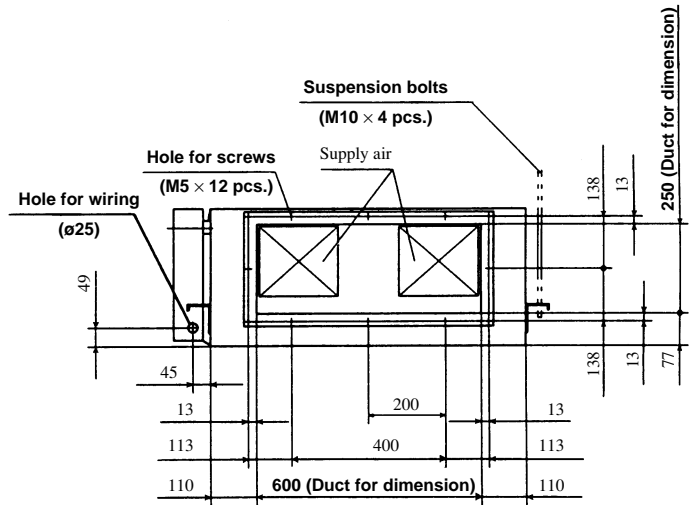
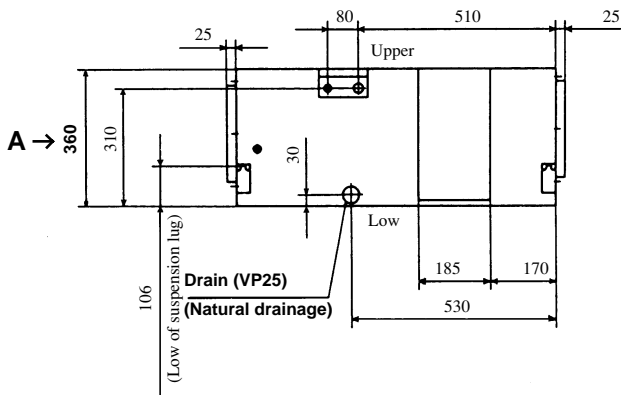
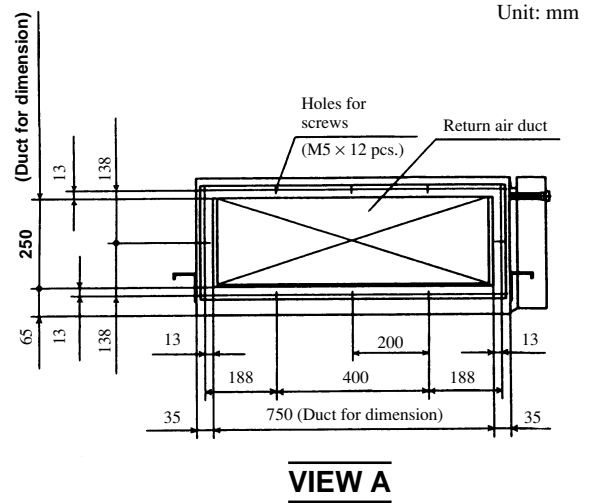
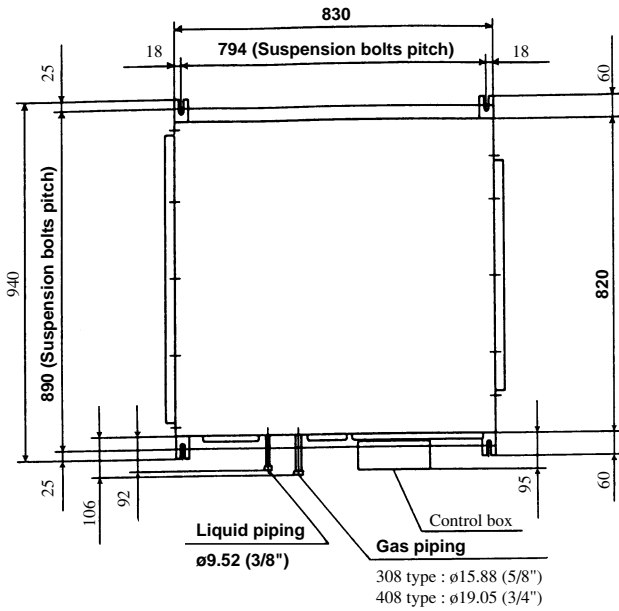
16.2.2 Range of usage & limitations

Item	Models	All models
Indoor return air temperature (Upper, lower limits)		Refer to the selection chart
Outdoor air temperature (Upper, lower limits)		
Indoor unit atmosphere (behind ceiling) temperature and humidity		Dew point temperature 28°C or less, relative humidity 80% or less
Refrigerant line (one way) length		Max. 30m
Vertical height difference between outdoor unit and indoor unit		Max. 15m
Power source voltage		Rating ± 10%
Voltage at starting		Min. 85% of rating
Frequency of ON-OFF cycle		Max. 10 times/h
ON and OFF interval		Min. 3 minutes

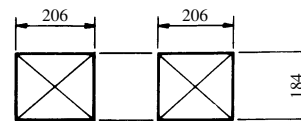
16.2.3 Exterior dimensions

(1) Indoor unit

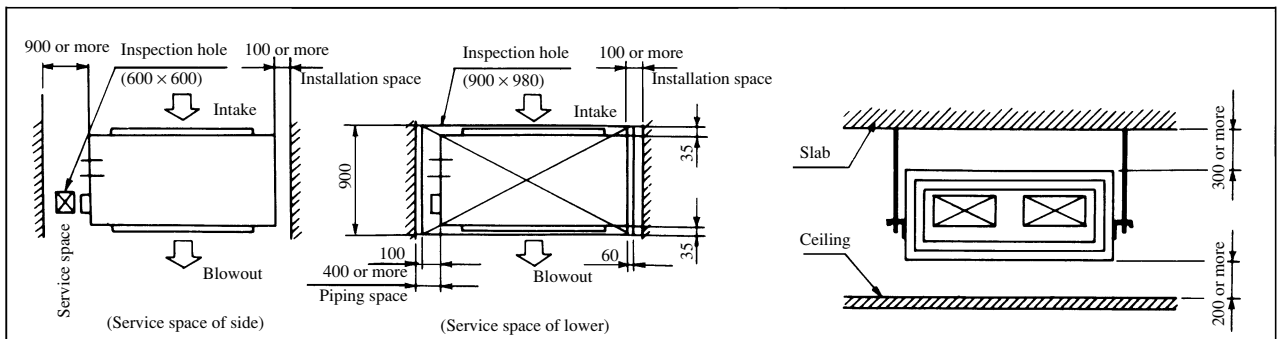
Models FDU308-A, 408-A



Dimension for supply air

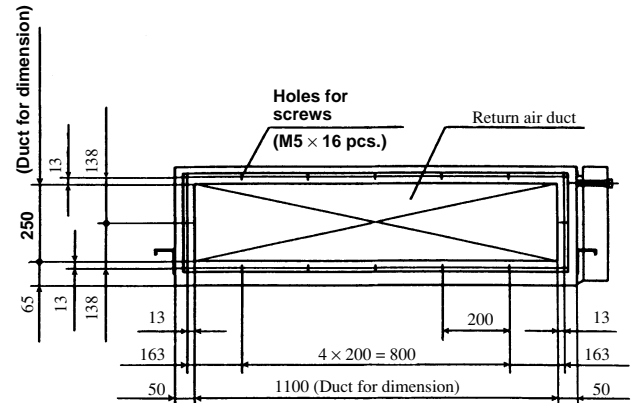
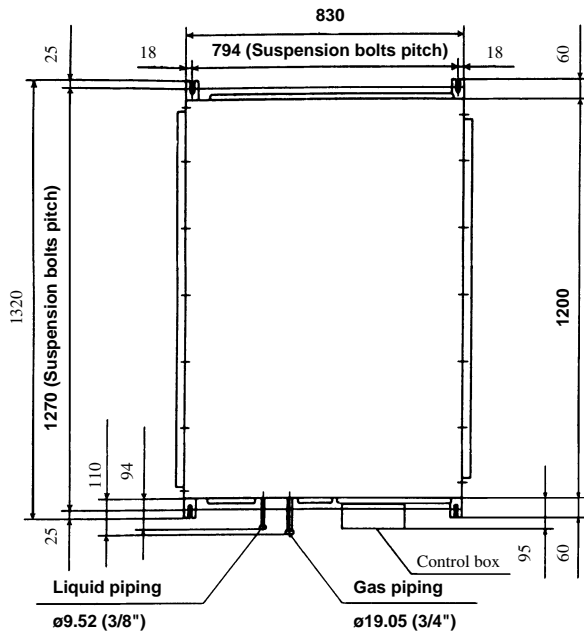


Space for installation and service

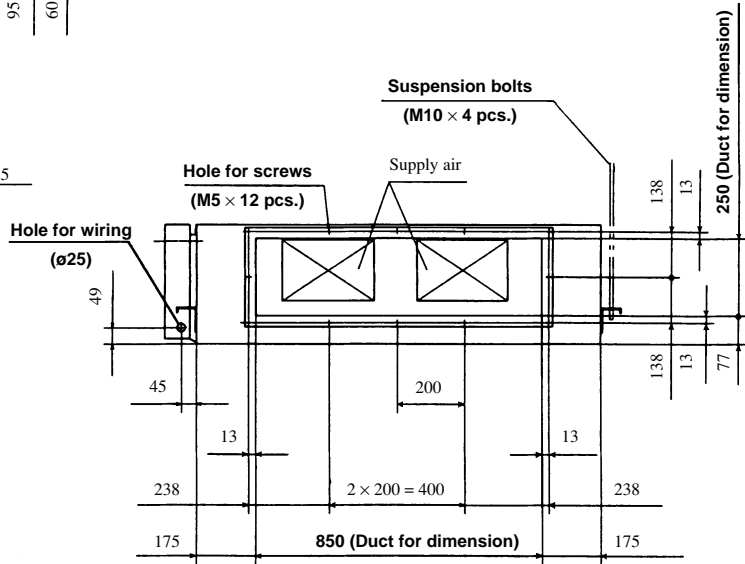
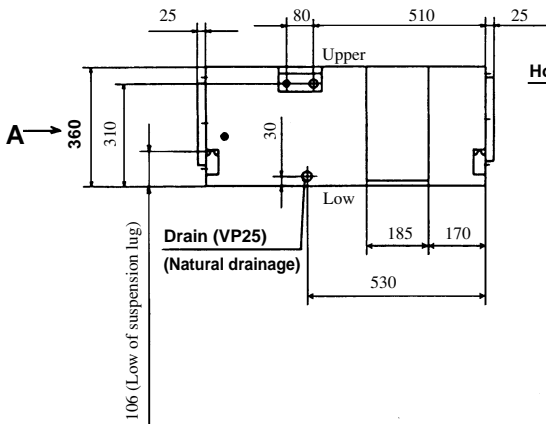


Model FDU508-A

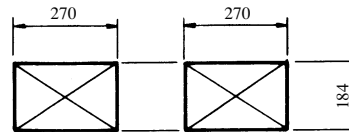
Unit: mm



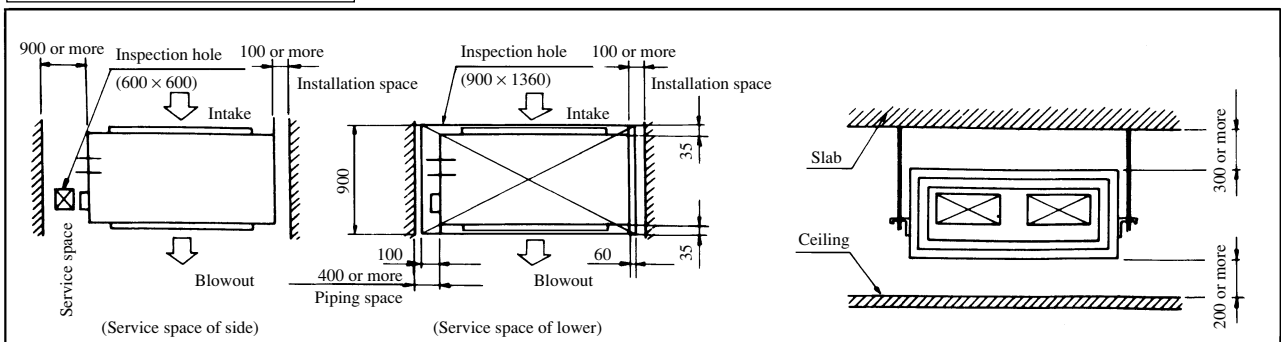
VIEW A



Dimension for supply air



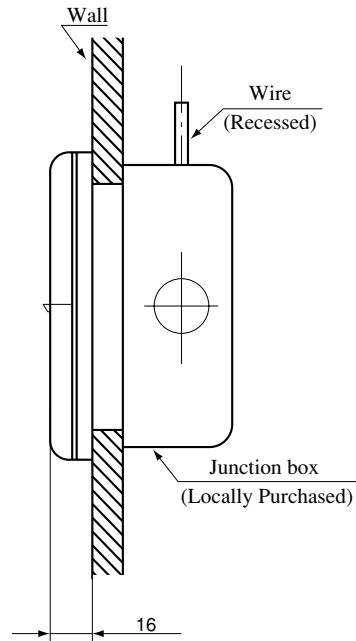
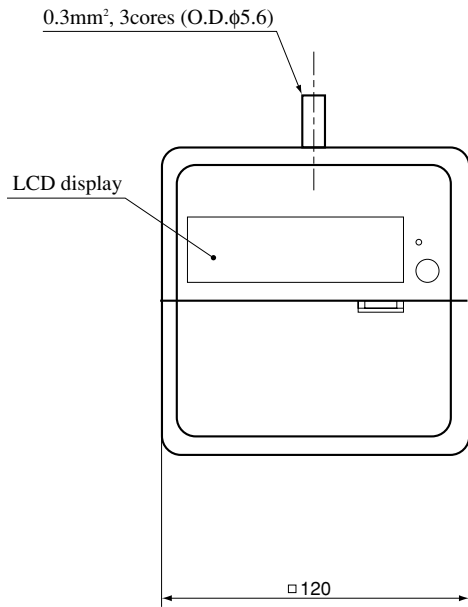
Space for installation and service



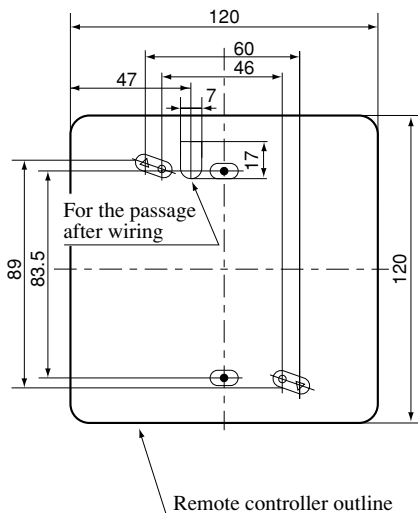
FDU-C

(2) Remote controller (Optional parts)

Unit: mm



Remote controller mounting dimensions



- ◆ Usable JIS box, JIS C 8336
 - Switch box for 1 piece (without cover)
(use of the ● mark hole as illustrated on the left)
 - Switch box for 2 pieces
(use of the ○ mark hole as illustrated on the left)
(without cover)
(use of the △ mark hole as illustrated on the left)
(when installing the cover)

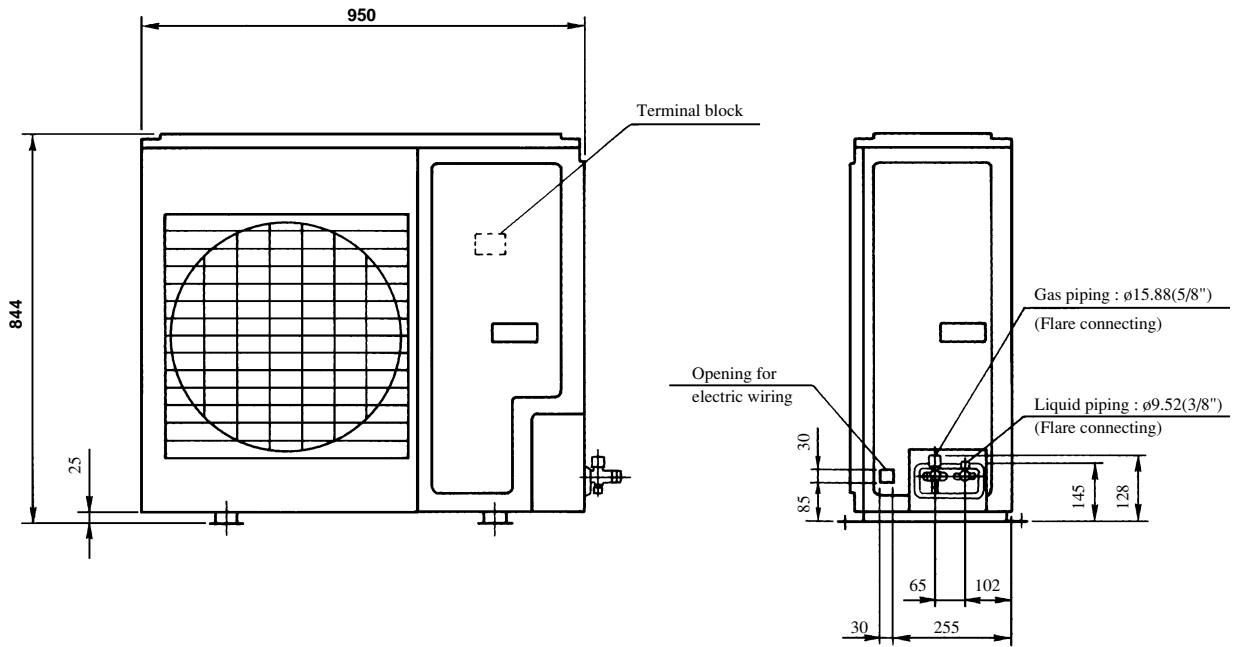
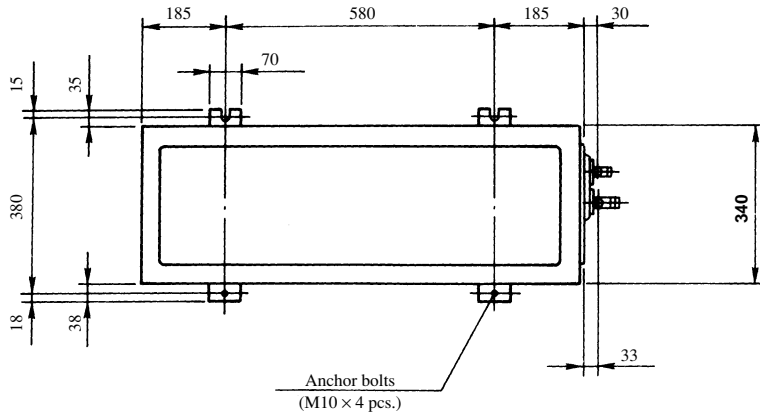
Note (1) Allowable length of remote controller cable: 600 m

Allowable rang of wire thickness and length

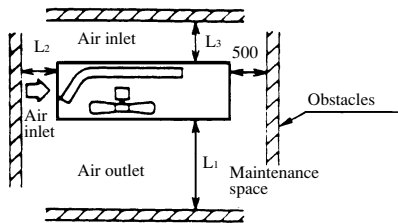
Standard Within	0.3 mm ²	× Within 100 m
	0.5 mm ²	× Within 200 m
	0.75 mm ²	× Within 300 m
	1.25 mm ²	× Within 400 m
	2 mm ²	× Within 600 m

(3) Outdoor unit
Models FDC306CEN3, 306CES3

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

Mark	Installation type		
	I	II	III
L1	Open	Open	500
L2	300	0	Open
L3	100	150	100

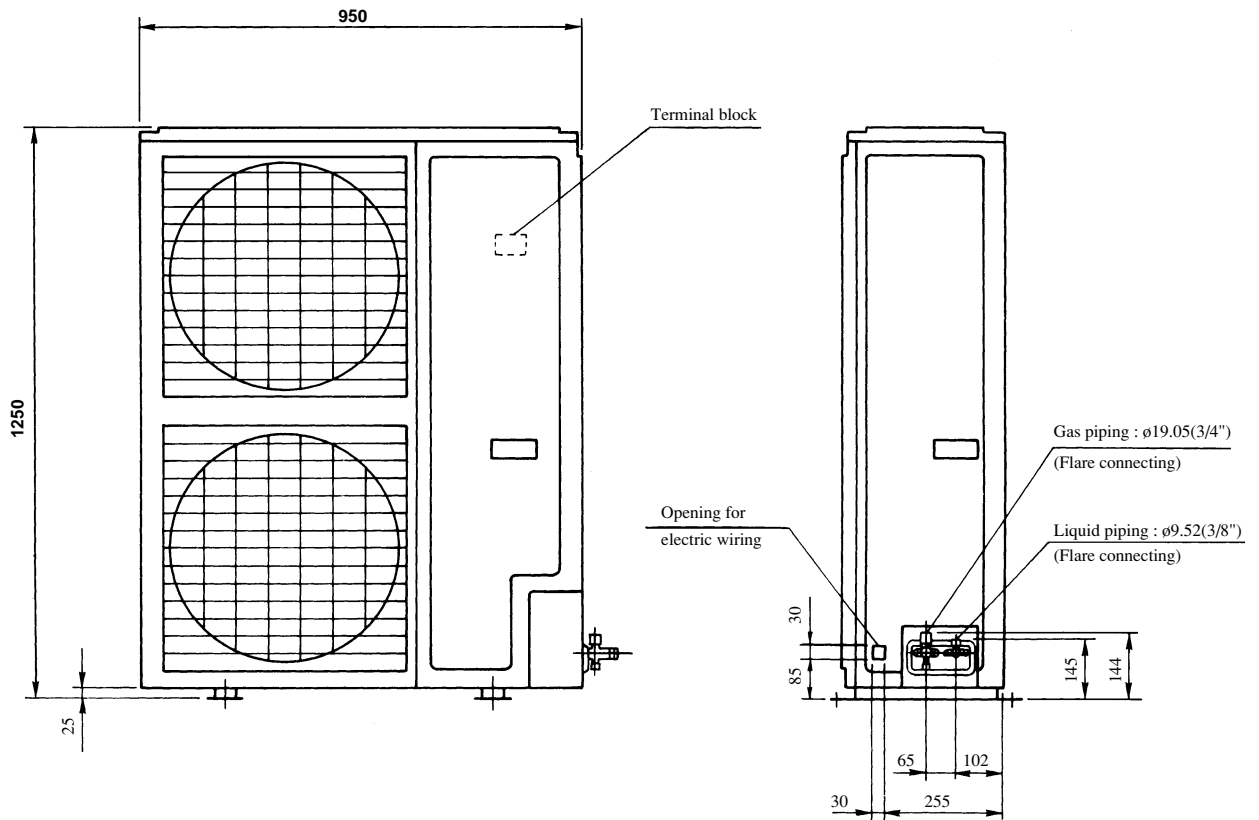
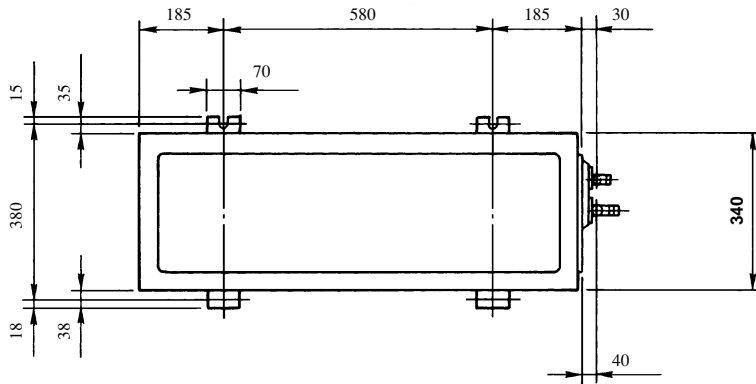
Notes

- (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.

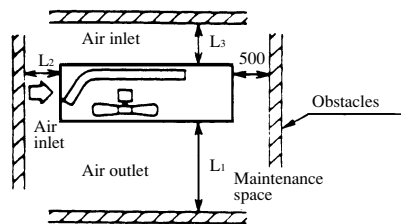
FDU-C

Models FDC406CES3, 506CES3, 506CEM3

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 ₁	Open	Open	Open	500
L ₂	300	0	Open	Open
L ₃	150	300	150	150

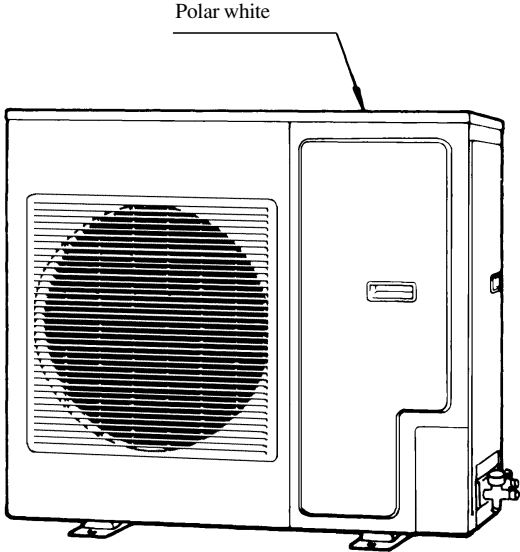
Notes

- (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.

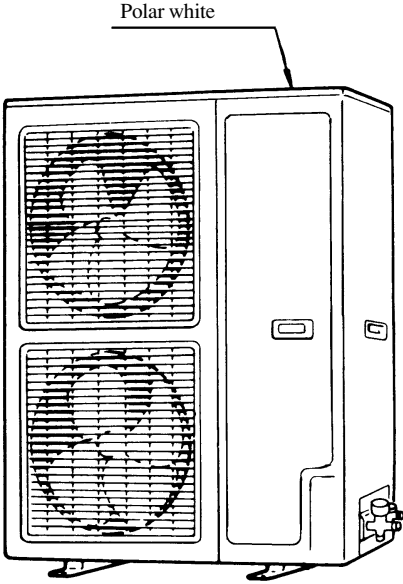
16.2.4 Exterior appearance

(1) Indoor unit Zinc steel plate

(2) Outdoor unit
Models FDC306CEN3, 306CES3

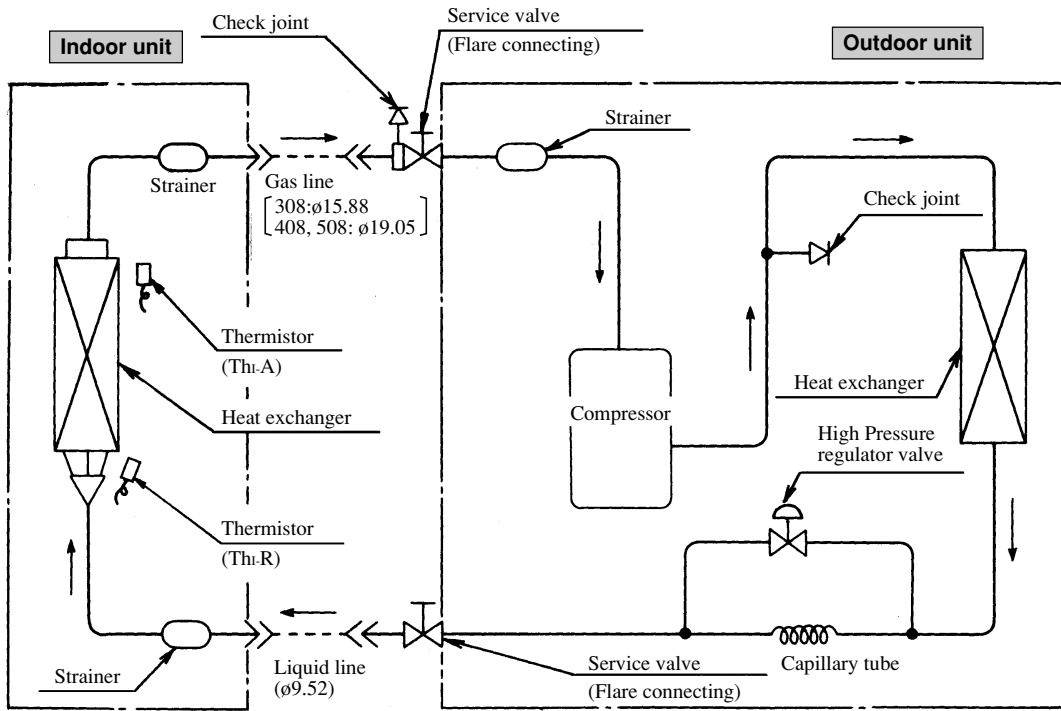


Models FDC406CES3, 506CES3, 506CEM3



16.2.5 Piping system

Models FDU308CEN-A, 308CES-A, 408CES-A, 508CES-A, 508CEM-A



Preset point of protective devices

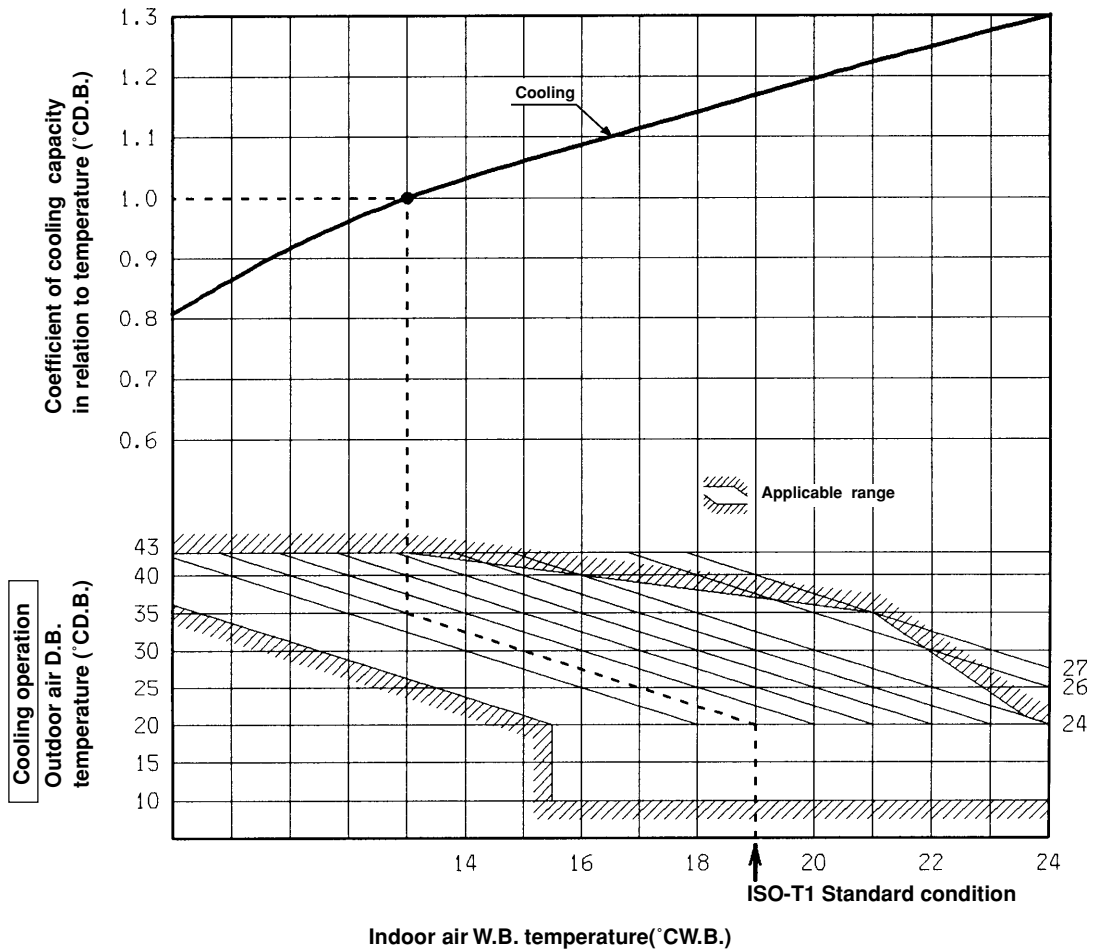
Part name	Mark	Equipped unit	All models
Thermistor (for frost prevention)	Thi-R	Indoor unit	OFF 2.5°C ON 10°C

16.2.6 Selection chart

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

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

- (1) Coefficient of cooling capacity in relation to temperatures
 - (a) Only case of ISO-T1 models.



FDU-C

(b) Only case of ISO-T3 and SASO models.

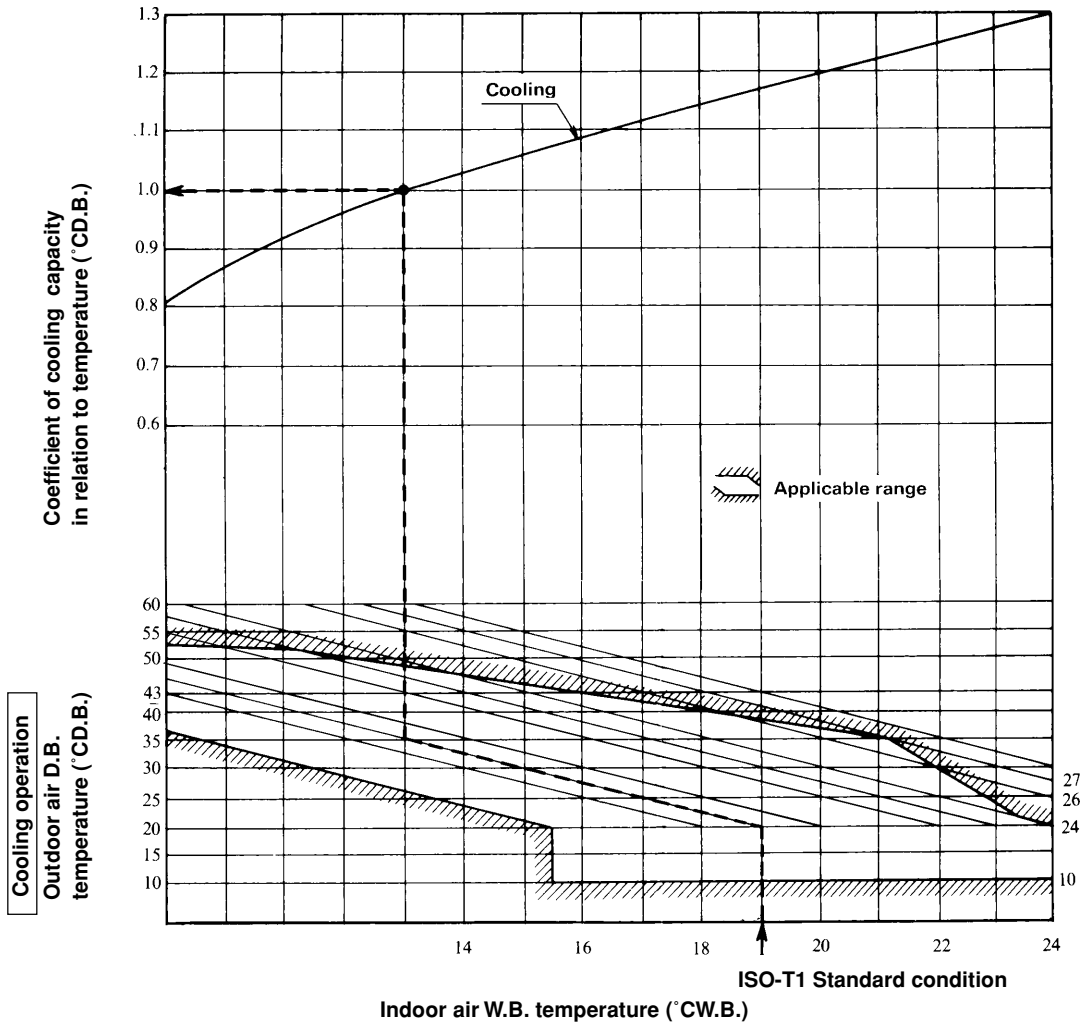


Table of bypass factor

(50/60 Hz)

Item		Model	FDU308 type	FDU408 type	FDU508 type
Air flow	Upper limit		0.019/0.096	0.048/0.05	0.103/0.106
	Standard		0.067/0.086	0.032/0.043	0.076/0.094
	Lower limit		0.043/0.057	0.017/0.025	0.051/0.064

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

Coefficient: 1.00 at High, 0.95 at Low

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

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

(50/60Hz)

Equivalent piping length ⁽¹⁾ m		5	10	15	20	25	30	35
Cooling	FDU308 type	1.0	0.99	0.98/0.975	0.97/0.965	0.96/0.95	0.95/0.94	0.94/0.925
	FDU408 type	1.0	0.995/0.99	0.985/0.98	0.98/0.97	0.97/0.96	0.965/0.95	0.955/0.94
	FDU508 type	1.0	0.99/0.985	0.975/0.97	0.965/0.955	0.95/0.94	0.94/0.925	0.925/0.91

Note (1) Equivalent piping length can be obtained by calculating as follows.
 308 series [ø15.88 (5/8")]: Equivalent piping length = Real piping length + (0.10 × Number of 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 + 5 m]

(4) When the outdoor unit is located at a lower height than the indoor unit in cooling 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 differenc	5 m	10 m	15 m
Adjustment coefficient	0.01	0.02	0.03

Piping length limitations

Model	All models
Item	
Max. one way piping length	30 m
Max. vertical height difference	15 m

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 FDU308CEN-A with the air flow “High”, the piping length of 15 m, the outdoor unit located 5 m lower than the indoor unit, indoor wet-bulb temperature at 19.0°C and outdoor dry-bulb temperature 35°C is

$$\text{Net cooling capacity} = \underset{\substack{\uparrow \\ \text{FDU308CEN-A}}}{7100} \times \underset{\substack{\uparrow \\ \text{Air flow "High"}}}{1.00} \times \underset{\substack{\uparrow \\ \text{Length 15 m.} \\ \text{Height difference 5 m}}}{(0.98 - 0.01)} \times \underset{\substack{\uparrow \\ \text{Factor by air temperatures}}}{1.0} = 6887 \text{ W}$$

16.2.7 Characteristics of fan

How to interpret the blower characteristics table

Example • What is the Fan Controller’s Volume Number setting if, at the high operation speed of FDU308CES (60Hz), it is required to have 140Pa (14mmAq) outside static pressure at 24m³/min airflow volume as the operating point?

Move the 140Pa (14mmAq) outside static pressure point to the right as shown in the diagram below. The “a - point”, i.e. where this intersects with the solid curve tracing the 24m³/min airflow volume upwards, is the appropriate Volume Number. In this example the appropriate Volume Number is “No. 6”.

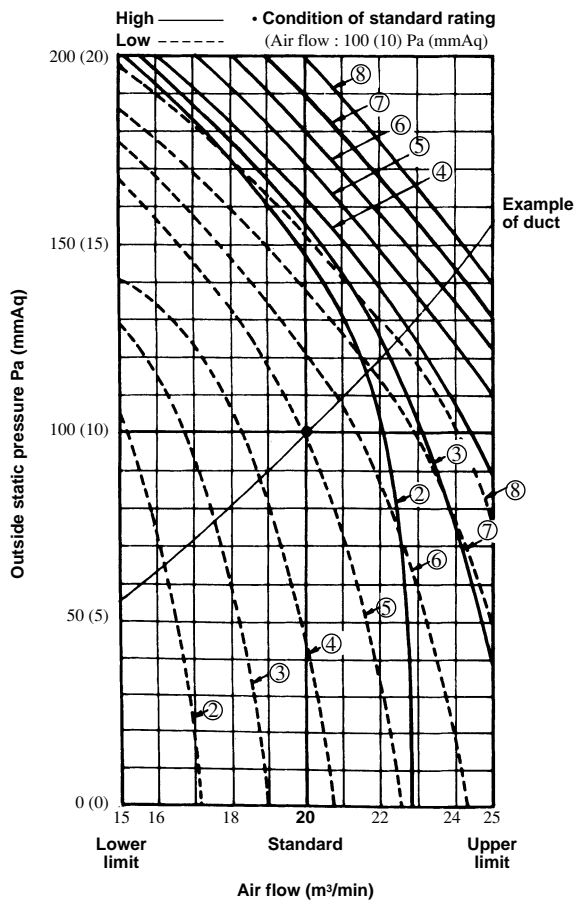
- In this situation, a condition of 19.7m³/min airflow volume at 93Pa (9.3mmAq) outside static pressure can be predicted at Low Tap and it can be concluded that operation is possible.

Always follow the procedure in “b - Point” to verify that the condition at Low Tap is not outside the Feasible Operation Airflow Volume Range.

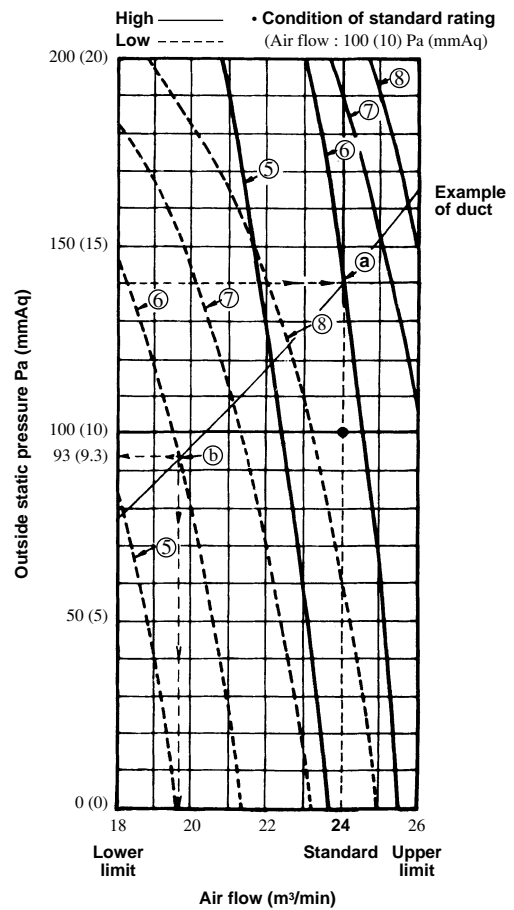
Notes (1) Circled values in the Special Feature Table indicate Fan Controller Volume Numbers. Volume Numbers with no entry are outside the Feasible Operation Airflow Volume Range and therefore operation is not possible.

(2) The Fan Controller Volume Number is set at “No. 5” when shipped from the assembly plant.

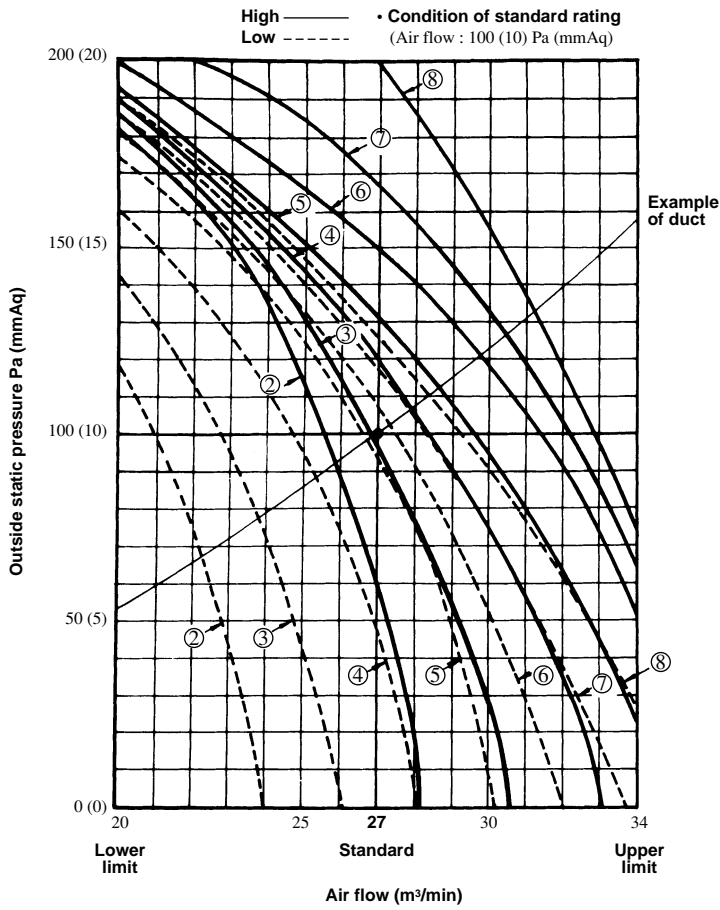
Model FDU308-A (50Hz)



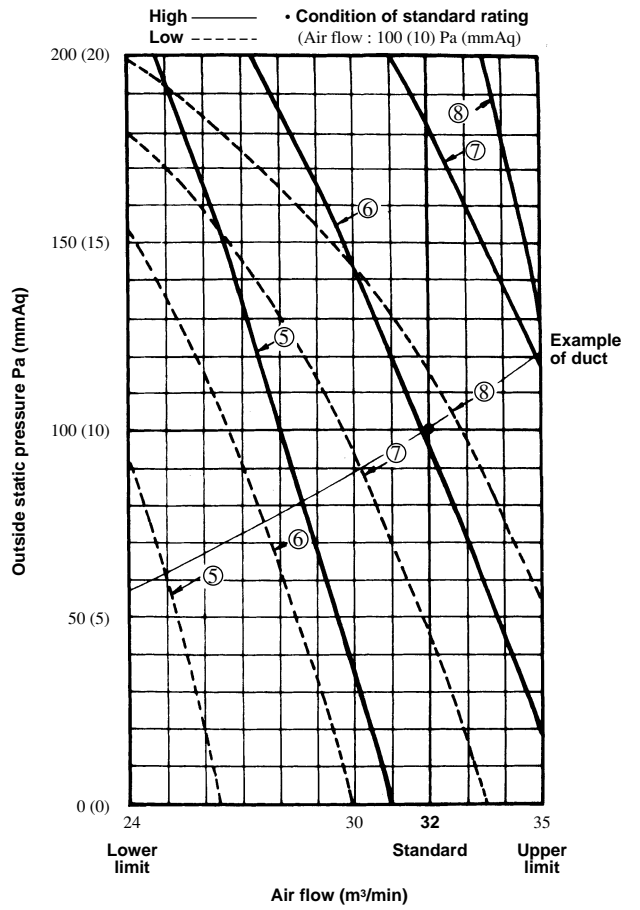
Model FDU308-A (60Hz)



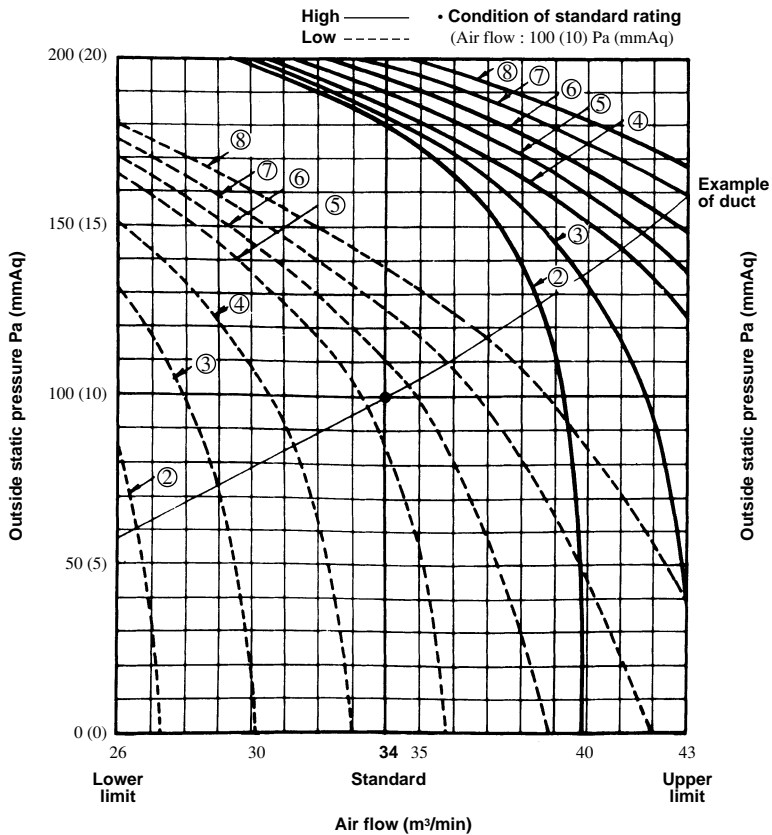
Model FDU408-A (50Hz)



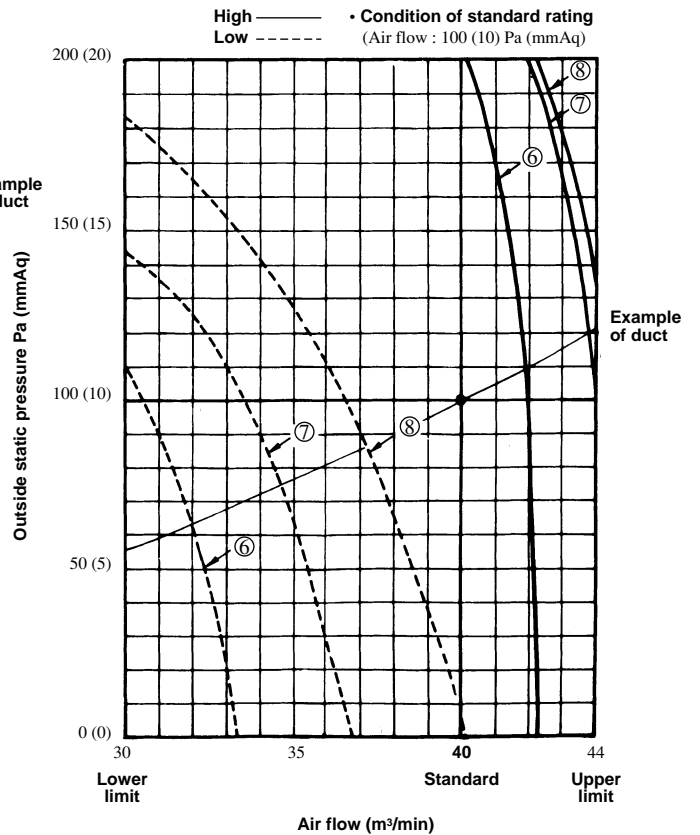
Model FDU408-A (60Hz)



Model FDU508-A (50Hz)



Model FDU508-A (60Hz)

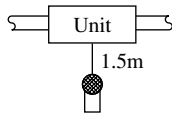


16.2.8 Noise level

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

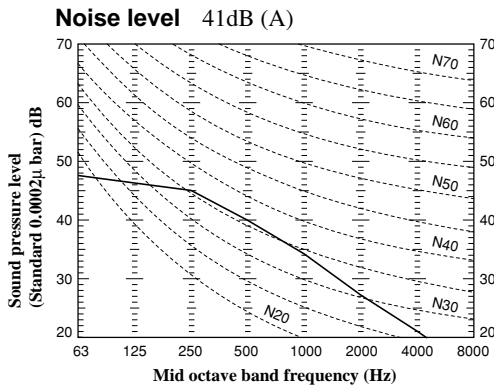


Outdoor unit
Measured based on JIS B 8616
 Mike position: at highest noise level
 in position as below
 Distance from front side 1 m
 Height 1 m

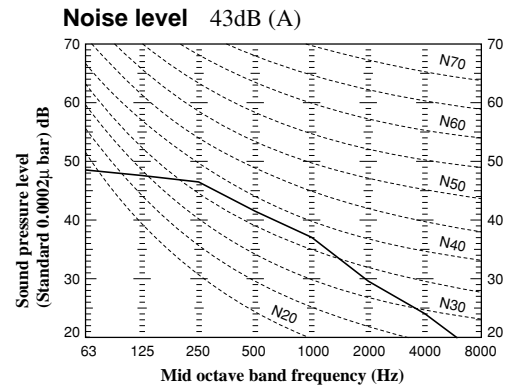
- (2) The data in the chart are measured in an anechoic room.
- (3) The noise levels measured in the field are usually higher than the data because of reflection.

(1) Indoor unit

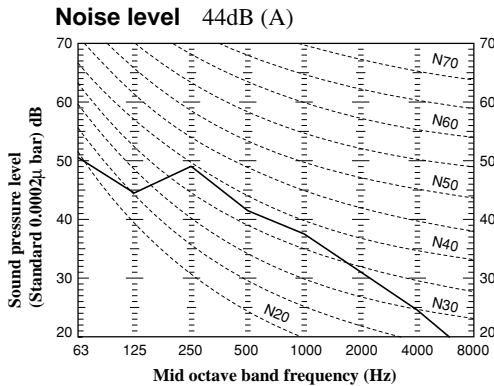
Model FDU308-A (50Hz)



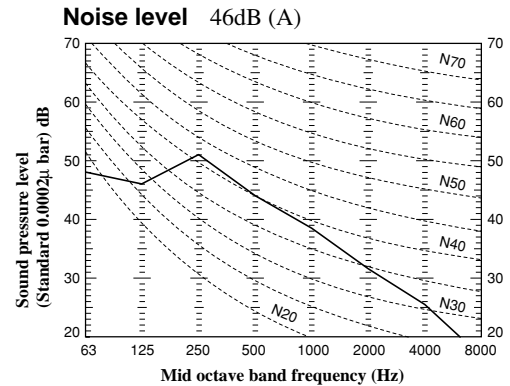
Model FDU308-A (60Hz)



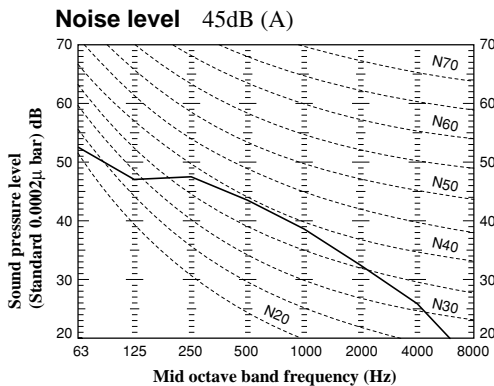
Model FDU408-A (50Hz)



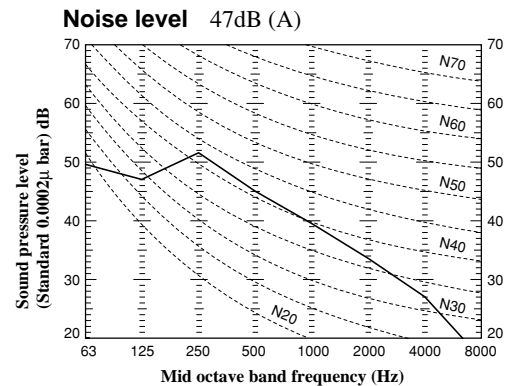
Model FDU408-A (60Hz)



Model FDU508-A (50Hz)

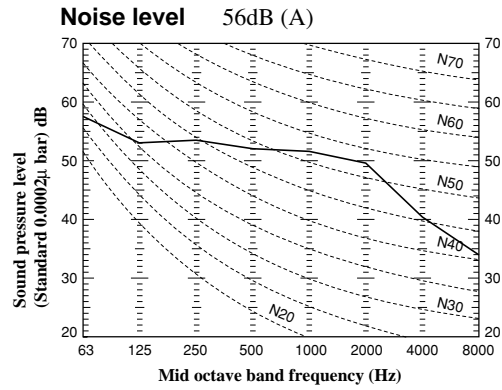


Model FDU508-A (60Hz)

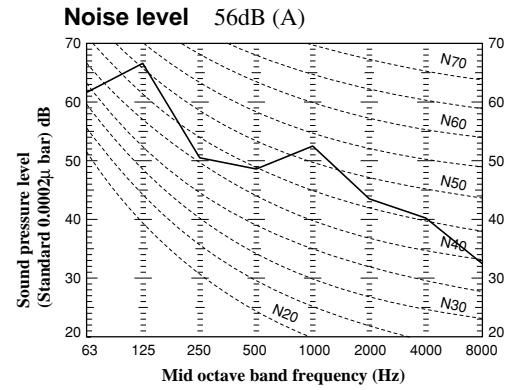


(2) Outdoor unit

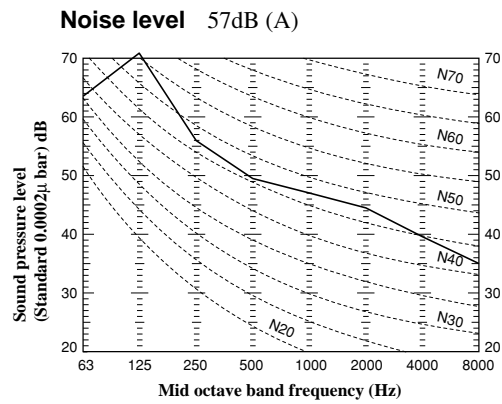
Model FDC306CEN3



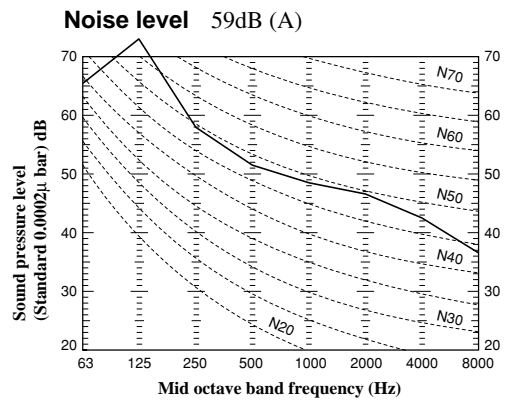
Model FDC306CES3



Model FDC406CES3



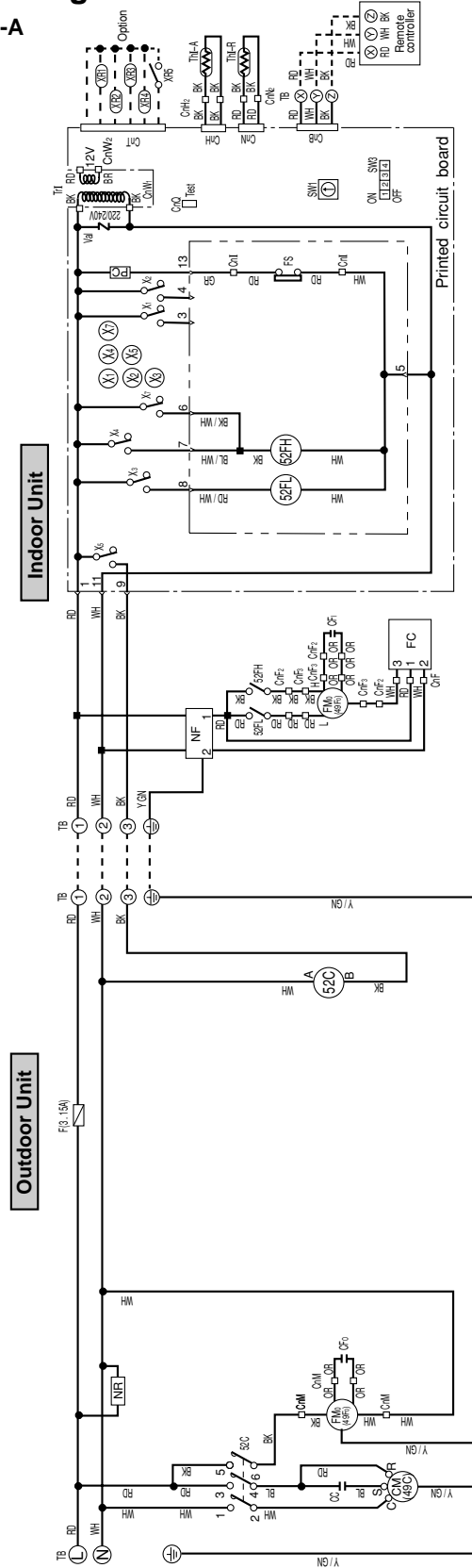
Models FDC506CES3, 506CEM3



16.3 ELECTRICAL DATA

16.3.1 Electrical wiring

Model FDU308CEN-A



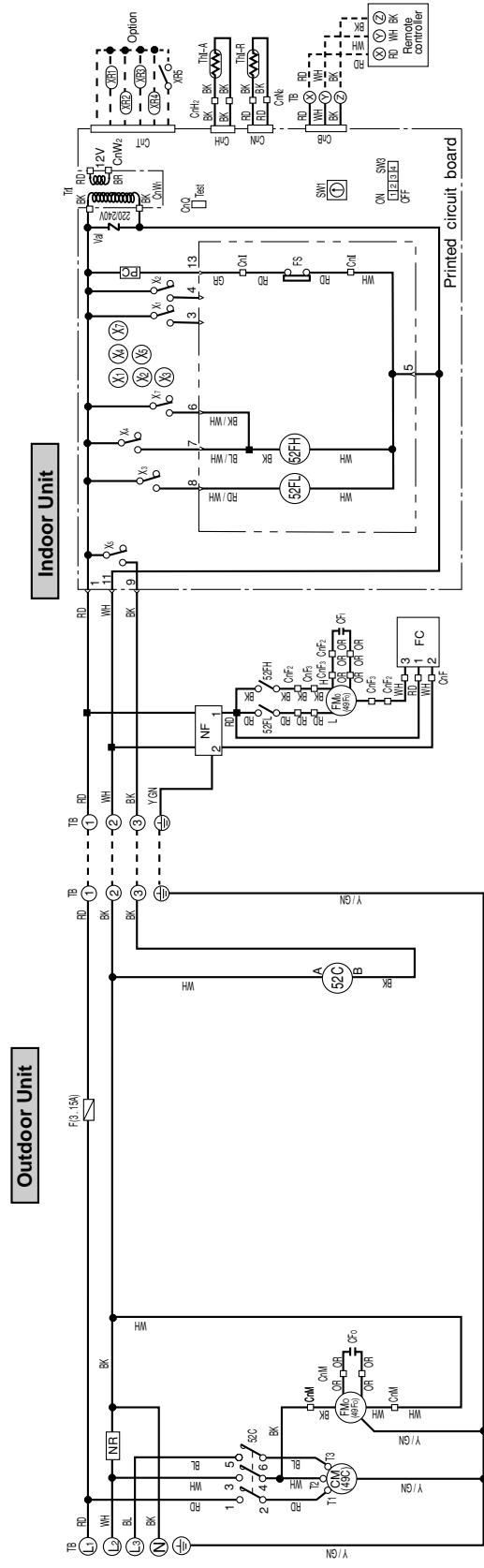
Power source
1 Phase 220/240V 50Hz

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

Meaning of marks		
Mark	Parts name	Mark
CC	Capacitor for CM	Thr-A
CFi	Capacitor for FMi	Thr-R
CFO	Capacitor for FMo	Trl
CM	Compressor motor	Val
CnA ~ W	Connector (□ mark)	49C
F	Fuse	49Fi
Fc	Fan controller	52C
FMi	Fan motor (Indoor unit)	52FH
FMo	Fan motor (Outdoor unit)	52FL
FS	Float switch	X1-5, 7
NF	Noise filter	◊
SW1	Switch (Address set)	■
SW3	Changeover switch	
TB	Terminal block (○ mark)	

Model FDU308CES-A

Power Source
3 Phase 380-415V 50Hz / 380V 60Hz



Color mark

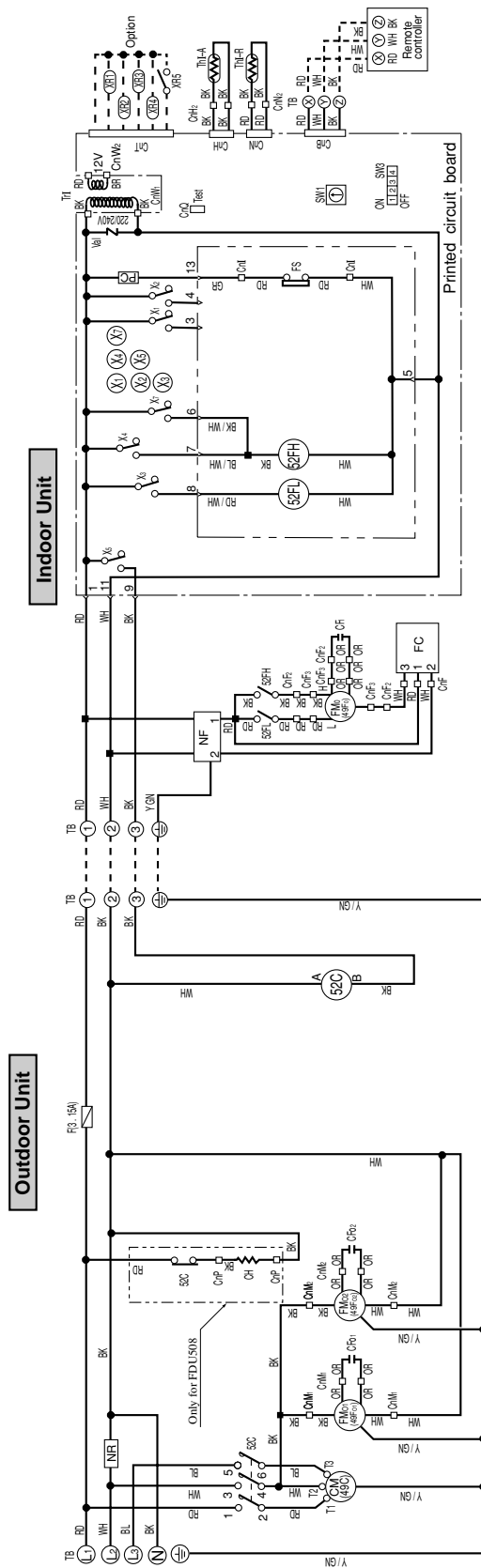
Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
BK/WH	Black/White
BL/WH	Blue/White
RD/WH	Red/White
Y/GN	Yellow/Green

Meaning of marks

Mark	Parts name	Mark	Parts name
CF1	Capacitor for FMI	Thi-A	Thermistor
CF2	Capacitor for FMO	Thi-R	Thermistor
CM	Compressor motor	Tri	Transformer
CnA ~ W	Connector (□ mark)	Val	Valvistor
F	Fuse	49C	Internal thermostat for CM
Fc	Fan controller	49Fi	Internal thermostat for FMI
FMI	Fan motor (Indoor unit)	49Fo	Internal thermostat for FMO
FMO	Fan motor (Outdoor unit)	52C	Magnetic contactor for CM
FS	Float switch	52FH	Auxiliary relay (for FMI)
FF	Noise filter	52FL	Auxiliary relay (for FMO)
SW1	Switch (Address set)	X1~5, 7	Auxiliary relay
SW3	Changeover switch	◁	Terminal (F)
TB	Terminal block (○ mark)	■	Connector

Models FDU408CES-A, 508CES-A

Power Source
3 Phase 380-415V 50Hz / 380V 60Hz



Meaning of marks

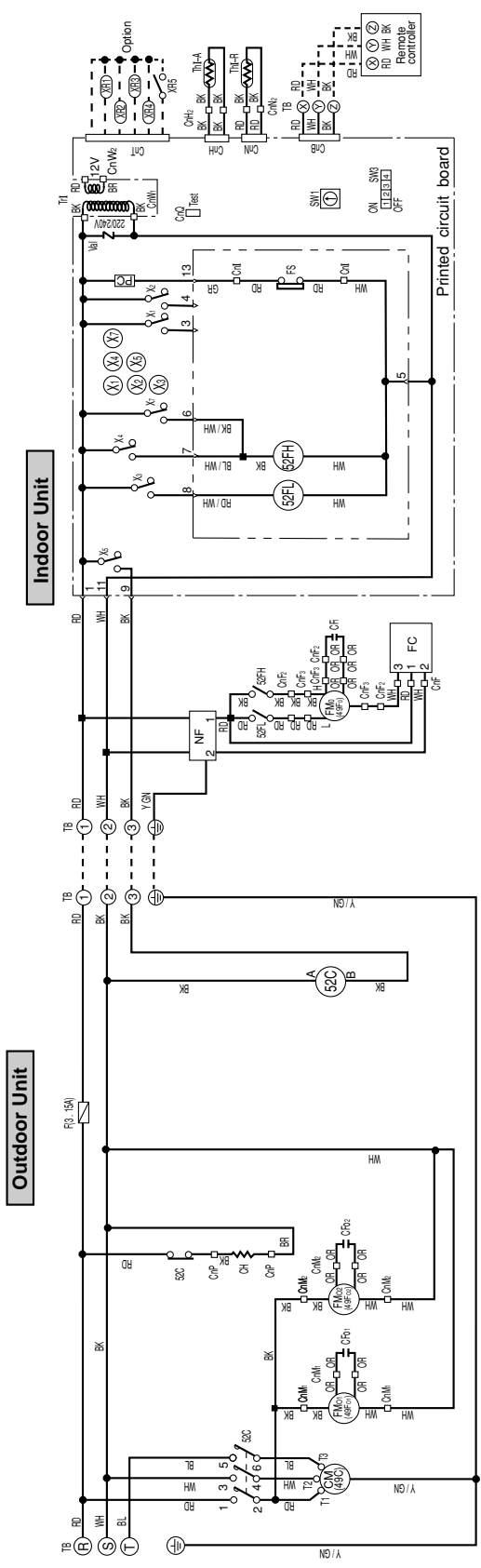
Mark	Parts name	Mark	Parts name
CF1	Capacitor for FMI	Th-A	Thermistor
CFo1, 2	Capacitor for FMo	Th-R	Thermistor
CH	Crankcase heater	Tr1	Transformer
CM	Compressor motor	Val	Valve
CnA ~ W	Connector (□ mark)	49C	Internal thermostat for CM
F	Fuse	49Fi	Internal thermostat for FMI
Fc	Fan controller	49Fo1, 2	Internal thermostat for FMo
FMI	Fan motor (Indoor unit)	52C	Magnetic contactor for CM
FMo1, 2	Fan motor (Outdoor unit)	52FH	Auxiliary relay (for FMI)
FS	Float switch	52FL	Auxiliary relay (for FMI)
NF	Noise filter	X1-5, 7	Auxiliary relay
SW1	Switch (Address set)	◁	Terminal (F)
SW3	Changeover switch	■	Connector
TB	Terminal block (O mark)		

Color mark

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

Model FDU508CEM-A

Power Source
3 Phase 230V 50Hz/220V 60Hz



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

Meaning of marks	Mark	Parts name	Mark	Parts name
CF1	Th-A	Capacitor for FMI	Th-R	Thermistor
CFo1, 2	Th-R	Capacitor for FMo	Th-I	Thermistor
CH	Val	Crankcase heater	Tr1	Transformer
CM	Cm	Compressor motor	Val	Valve
CnA ~ W	49C	Connector (□ mark)	49C	Internal thermostat for CM
F	49Fi	Fuse	49Fi	Internal thermostat for FMI
Fc	49Fo1, 2	Fan controller	52C	Internal thermostat for FMo
FmI	52C	Fan motor (Indoor unit)	52FH	Magnetic contactor for CM
FMo1, 2	52FL	Fan motor (Outdoor unit)	52FL	Auxiliary relay (for FMI)
FS	X1-5, 7	Float switch	△	Auxiliary relay (for FMI)
NF	□	Noise filter	■	Terminal (F)
SW1		Switch (Address set)		Connector
SW3		Changeover switch		
TB		Terminal block (O mark)		

16.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

Except for function relating to heating, same as the unit for FDT(N) heat pump type. See page 317.

16.5 APPLICATION DATA

The application data for the cooling only models are similar to those for the heat pump models. (See page 623.)

16.6 MAINTENANCE DATA

Same as the cooling /heating equipment for FDT(N) heat pump type. Refer to page 348.