

MHI

Manual No. '03-M-T-078

TECHNICAL MANUAL

Collection data

MULTI-TYPE
PACKAGED AIR-CONDITIONER
(Split system, Air to air heat pump type)

(OUTDOOR UNIT)

FDCP808HES3, FDCP1008HES3

(INDOOR UNIT)

FDT208, 258, 308, 408, 508

FDR208, 258, 308, 408, 508

FDUR208, 258, 308, 408, 508

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1 GENERAL INFORMATION

1.1 Specific features

Ideal for the installation conditions characteristic of larger rooms and L-shaped or other non-standard-shaped rooms, the Multi-Type V series allows an extensive degree of flexibility in the selection of indoor units. Specifically, the selection of indoor units with differing capacities and differing or similar types is supported, as is the selection of indoor units with similar capacities and differing types. Furthermore, a maximum of up to four individual indoor units can be operated in synchrony with a single outdoor unit.

- (1) Simultaneous operation possible in non-standard-shaped rooms or large-sized areas.
- (2) Select indoor units of differing capacities and differing or similar types; alternatively, indoor units of similar capacities and differing types.
- (3) Up to four individual indoor units can be connected to single outdoor unit.
- (4) Indoor unit.

(i) Ceiling recessed type (FDT)

- (a) All air supply ports have auto swing louvers. The indoor fan motor has two speeds of high and low.

(b) 700mm high drain head

Adoption of drain pump with high drain head and high capacity (600cc/min) has made it possible to have maximum 700 mm(from below ceiling drain head.[In case 700mm drain head is required, set it up close to the unit. It is impossible to do piping on down slope.]

(ii) Cassetteria type (FDR)

(a) 2 types of optional decorative panel

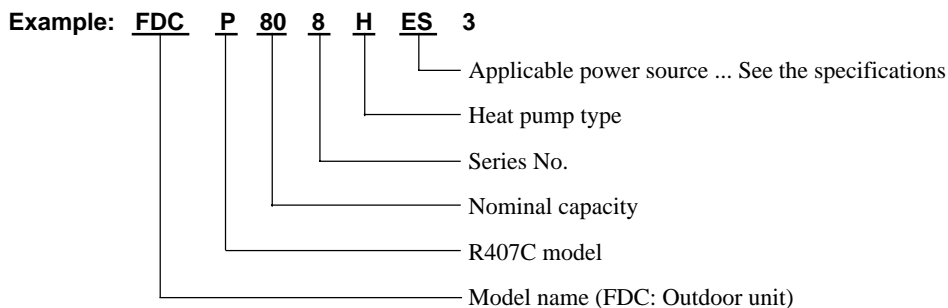
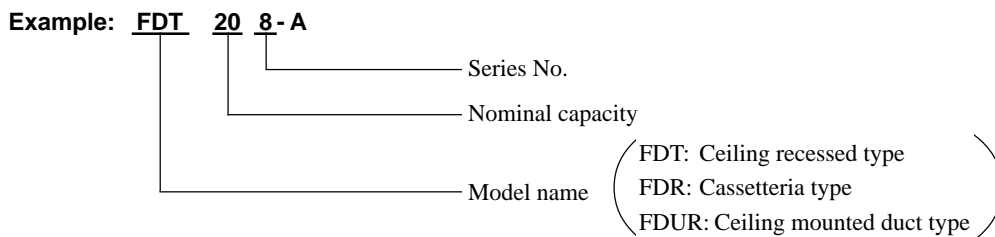
- 1) Optional decorative panel consists of silent panel and a canvas duct panel. [has smaller sizes and is prepared with canvas duct panel which provides higher drain head.]
- 2) Flexibility of installation is increased with 2 type panels.

(iii) Ceiling mounted duct type (FDUR)

(a) The position of the suction port can be changed.

The suction from the lower inlet is available by replacing the duct connecting section (at the side face) and the lower plate. (They are changed on site.)

1.2 How to read the model name



1.3 Table of models

Model \ Capacity	208	258	308	408	508
Ceiling recessed type (FDT)	○	○	○	○	○
Cassetteria type (FDR)	○	○	○	○	○
Ceiling mounted duct type (FDUR)	○	○	○	○	○
Outdoor unit to be combined(FDC)	FDCP808HES3 (8 Horse Power)		FDCP1008HES3 (10 Horse Power)		

1.4 Table of system combinations

Outdoor unit	Type	Indoor unit assembly capacity	Branch pipe set (Optional)
FDCP808HES3	Twin	408+408	DIS-WB
		308+508	
	Triple	308+308+308	DIS-TB
	Double twin	208+208+208+208	DIS-WA×2set DIS-WB×1set
FDCP1008HES3	Twin	508+508	DIS-WB
	Triple	208+408+408	DIS-TB
		258+258+508	
		308+308+408	
	Double twin	258+258+258+258	DIS-WA×2set DIS-WB×1set

Notes (1) It is possible to used different models (FDT, FDR, FDUR) when combining indoor units.

(2) Always use the branch piping set (optional) at branches in the refrigerant piping.

2 SELECTION DATA

2.1 Specifications

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models FDT208-A, 258-A

Item		Model	FDT208-A	FDT258-A
Nominal cooling capacity ⁽¹⁾	W		5000	5700
Nominal heating capacity ⁽¹⁾	W		5400	6100
Power source			1 Phase 220/240V 50Hz	
Noise level	dB(A)		Hi: 38 Lo: 33	Hi: 39 Lo: 35
Exterior dimensions Height × Width × Depth	mm		Unit:215 × 700 × 700 Panel:26 × 800 × 800	Unit:260 × 840 × 840 Panel:30 × 950 × 950
Net weight	kg		23(Unit:18 Panel:5)	30(Unit:24 Panel:6)
Refrigerant equipment Heat exchanger			Louver fine & inner grooved tubing	
Refrigerant control			Capillary tube	
Air handling equipment Fan type & Qty			Turbo fan × 1	
Motor	W		30 × 1	25 × 1
Starting method			Line starting	
Air flow(Standard)	CMM		Hi: 14 Lo: 10	Hi: 16 Lo: 11
Fresh air intake			Available	
Air filter, Qty			Long life filter × 1(Washable)	
Shock & vibration absorber			Rubber sleeve(for fan motor)	
Operation control Operation switch			Remote control switch (Optional:RCD-H-S-E)	
Room temperature control			Thermostat by electronics	
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	mm(in)		Liquid line: φ6.35 (1/4") Gas line: φ15.88 (5/8")	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 line)	
Accessories			Mounting kit, Drain hose	
Optional parts			Decorative Panel	

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℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating	20℃	—	7℃	6℃	

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

●Decorative Panel model (Optional)

Model	Item	Panel Part No.
FDT208-A		T-PSA-22W-E
FDT258-A		T-PSA-32W-E

Models FDT308-A, 408-A, 508-A

Item		Model	FDT308-A	FDT408-A	FDT508-A
Nominal cooling capacity ⁽¹⁾		W	7100	10000	12500
Nominal heating capacity ⁽¹⁾		W	8000	11200	14000
Power source			1 Phase 220/240V 50Hz		
Noise level		dB(A)	Hi: 41 Lo: 35	Hi: 48 Lo: 40	Hi: 49 Lo: 43
Exterior dimensions Height × Width × Depth		mm	Unit:260 × 840 × 840 Panel:30 × 950 × 950	Unit:320 × 840 × 840 Panel:30 × 950 × 950	
Net weight		kg	30(Unit:24 Panel:6)	34(Unit:28 Panel:6)	36(Unit:30 Panel:6)
Refrigerant equipment Heat exchanger			Louver fine & inner grooved tubing		
Refrigerant control			Capillary tube		
Air handling equipment Fan type & Q'ty			Turbo fan × 1		
Motor		W	30×1	80×1	130×1
Starting method			Line starting		
Air flow(Standard)		CMM	Hi: 17 Lo: 12	Hi: 26 Lo: 19	Hi: 28 Lo: 20
Fresh air intake			Available		
Air filter, Q'ty			Long life filter × 1(Washable)		
Shock & vibration absorber			Rubber sleeve(for fan motor)		
Operation control Operation switch			Remote control switch (Optional:RCD-H-S-E)		
Room temperature control			Thermostat by electronics		
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat		
Installation data Refrigerant piping size		mm(in)	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")	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, Drain hose		
Optional parts			Decorative Panel		

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℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating	20℃	—	7℃	6℃	

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

●Decorative Panel model (Optional)

Item	Panel Part No.
Model FDT308-A, 408-A, 508-A	T-PSA-32W-E

(b) Cassetteria type (FDR)

Models FDR208-A, 258-A

Item	Model	FDR208-A		FDR258-A	
		Silent panel	Canvas panel	Silent panel	Canvas panel
Decorative panel					
Panel model (Option)		R-PNLS-26W-E	R-PNLC-26W-E	R-PNLS-36W-E	R-PNLC-36W-E
Nominal cooling capacity ⁽¹⁾	W	5000		5700	
Nominal heating capacity ⁽¹⁾	W	5400		6100	
Power source		1 Phase 220/240V 50Hz			
Noise level	dB(A)	Hi: 43 Lo: 37	Hi: 44 Lo: 38	Hi: 43 Lo: 37	Hi: 44 Lo: 38
Exterior dimensions Height × Width × Depth	mm	Unit:355 × 750 × 635 Panel:10 × 1040 × 750	Unit:(299+α) × 750 × 635 Panel:10 × 864 × 585	Unit:355 × 950 × 635 Panel:10 × 1240 × 750	Unit:(299+α) × 950 × 635 Panel:10 × 1064 × 585
Net weight	kg	Unit:30 Panel:7	Unit:30 Panel:5	Unit:35 Panel:8	Unit:35 Panel:6
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Capillary tube			
Air handling equipment Fan type & Q'ty		Multiblade centrifugal fan × 2			
Motor	W	55 × 1		90 × 1	
Starting method		Line starting			
Air flow(Standard)	CMM	Hi: 14 Lo: 11		Hi: 18 Lo: 14	
Available static pressure	Pa	Standard:50, High:85		Standard:45, High:80	
Fresh air intake		Available			
Air filter Q'ty		Polypropylene net × 2(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Operation control Operation switch		Remote control switch (Optional:RCD-H-E)			
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data Refrigerant piping size	mm(in)	Liquid line: φ6.35 (1/4") Gas line: φ15.88 (5/8")		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, Drain hose			
Optional parts		Silent panel, Canvas panel, Canvas duct			

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℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating		20℃	—	7℃	6℃	

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

(3)Canvas panel is used in combination with following canvas duct
Canvas duct: HA01503

(4)Add the canvas duct length to the unit height for the canvas type.

Models FDR308-A, 408-A

Item	Model	FDR308-A		FDR408-A	
		Silent panel	Canvas panel	Silent panel	Canvas panel
Decorative panel		Silent panel	Canvas panel	Silent panel	Canvas panel
Panel model (Option)		R-PNLS-36W-E	R-PNLC-36W-E	R-PNLS-46W-E	R-PNLC-46W-E
Nominal cooling capacity ⁽¹⁾	W	7100		10000	
Nominal heating capacity ⁽¹⁾	W	8000		11200	
Power source		1 Phase 220/240V 50Hz			
Noise level	dB(A)	Hi: 44 Lo: 38	Hi: 45 Lo: 39	Hi:45 Lo: 38	Hi: 46 Lo: 39
Exterior dimensions Height × Width × Depth	mm	Unit:355 × 950 × 635 Panel:10 × 1240 × 750	Unit:(299+α) × 950 × 635 Panel:10 × 1064 × 585	Unit:406 × 1370 × 635 Panel:10 × 1660 × 750	Unit:(350+α) × 1370 × 635 Panel:10 × 1484 × 585
Net weight	kg	Unit:35 Panel:8	Unit:35 Panel:6	Unit:50 Panel:9	Unit:50 Panel:7
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Capillary tube			
Air handling equipment Fan type & Qty		Multiblade centrifugal fan × 2		Multiblade centrifugal fan × 3	
Motor	W	100 × 1		45 × 1 + 90 × 1	
Starting method		Line starting			
Air flow(Standard)	CMM	Hi: 20 Lo: 15		Hi: 28 Lo: 22	
Available static pressure	Pa	Standard:45, High:80		Standard:50, High:80	
Fresh air intake		Available			
Air filter Q'ty		Polypropylene net × 2(Washable)		Polypropylene net × 3(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Operation control Operation switch		Remote control switch (Optional:RCD-H-E)			
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data Refrigerant piping size	mm(in)	Liquid line:φ 9.52 (3/8") Gas line:φ 15.88 (5/8")		Liquid line:φ 9.52 (3/8") Gas line:φ 19.05 (3/4")	
Connecting method		Flare piping			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		Mounting kit, Drain hose			
Optional parts		Silent panel, Canvas panel, Canvas duct			

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℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating	20℃	—	7℃	6℃	

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

(3)Canvas panel is used in combination with following canvas duct
Canvas duct: HA01503

(4)Add the canvas duct length to the unit height for the canvas type.

Model FDR508-A

Model		FDR508-A	
Decorative panel		Silent panel	Canvas panel
Panel model (Option)		R-PNLS-46W-E	R-PNLC-46W-E
Nominal cooling capacity ⁽¹⁾	W	12500	
Nominal heating capacity ⁽¹⁾	W	14000	
Power source		1 Phase 220/240V 50Hz	
Noise level	dB(A)	Hi: 46 Lo: 39	Hi: 47 Lo: 40
Exterior dimensions Height × Width × Depth	mm	Unit:406 × 1370 × 635 Panel:10 × 1660 × 750	Unit:(350+α) × 1370 × 635 Panel:10 × 1484 × 585
Net weight	kg	Unit:52 Panel:9	Unit:52 Panel:7
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Capillary tube	
Air handling equipment Fan type & Q'ty		Multiblade centrifugal fan × 3	
Motor	W	50 × 1 + 100 × 1	
Starting method		Line starting	
Air flow(Standard)	CMM	Hi: 34 Lo: 27	
Available static pressure	Pa	Standard:50, Hi speed:80	
Fresh air intake		Available	
Air filter Q'ty		Polypropylene net × 3(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Operation control Operation switch		Remote control switch (Optional:RCD-H-E)	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
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, Drain hose	
Optional parts		Silent panel, Canvas panel, Canvas duct	

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℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating	20℃	—	7℃	6℃	

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

(3)Canvas panel is used in combination with following canvas duct
Canvas duct: HA01484

(4)Add the canvas duct length to the unit height for the canvas type.

(c) Ceiling mounted duct type (FDUR)

Models FDUR208-A, 258-A

Item	Model	FDUR208-A	FDUR258-A
Nominal cooling capacity ⁽¹⁾	W	5000	5700
Nominal heating capacity ⁽¹⁾	W	5400	6100
Power source		1 Phase 220/240V 50Hz	
Noise level	dB(A)	Hi: 40 Lo: 36	Hi: 41 Lo: 37
Exterior dimensions Height × Width × Depth	mm	295 × 850 × 650	
Net weight	kg	39	40
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Capillary tube	
Air handling equipment Fan type & Q'ty		Multiblade centrifugal fan × 2	
Motor	W	90 × 1	130 × 1
Starting method		Line starting	
Air flow(Standard)	CMM	Hi: 17 Lo: 13.5	Hi: 21 Lo: 17
Available static pressure	Pa	Standard:50, Max:85	
Fresh air intake		—	
Air filter Q'ty		Polypropylene net × 1(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Operation control Operation switch		Remote control switch (Optional:RCD-H-E)	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	mm(in)	Liquid line: φ6.35 (1/4") Gas line: φ15.88 (5/8")	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, Drain hose	
Optional parts		Silent panel	

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℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating	20℃	—	7℃	6℃	

(2)This packaged air-conditioner is manufactured and tested in conformity with the following standard.
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●Silent Panel model (Optional)

Item	Panel Part No.	Color
Model FDUR208-A, 258-A	UR-PS-27W-E	Ceramic white

Models FDUR308-A, 408-A, 508-A

Item		Model	FDUR308-A	FDUR408-A	FDUR508-A
Nominal cooling capacity ⁽¹⁾	W		7100	10000	12500
Nominal heating capacity ⁽¹⁾	W		8000	11200	14000
Power source			1 Phase 220/240V 50Hz		
Noise level	dB(A)		Hi: 41 Lo: 37	Hi: 44 Lo: 40	Hi: 45 Lo: 41
Exterior dimensions Height × Width × Depth	mm		295 × 850 × 650	350 × 1370 × 650	
Net weight	kg		40	63	65
Refrigerant equipment Heat exchanger			Louver fine & inner grooved tubing		
Refrigerant control			Capillary tube		
Air handling equipment Fan type & Q'ty			Multiblade centrifugal fan × 1		
Motor	W		230×1	280×1	460×1
Starting method			Line starting		
Air flow(Standard)	CMM		Hi: 25 Lo: 20	Hi: 34 Lo: 27	Hi: 42 Lo: 33.5
Available static pressure	Pa		Standard: 50, Max: 130		
Fresh air intake			—		
Air filter, Q'ty			Polypropylene net × 1(Washable)		
Shock & vibration absorber			Rubber sleeve(for fan motor)		
Operation control Operation switch			Remote control switch (Optional:RCD-H-E)		
Room temperature control			Thermostat by electronics		
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat		
Installation data Refrigerant piping size	mm(in)		Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")	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, Drain hose		
Optional parts			Silent Panel		

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℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating	20℃	—	7℃	6℃	

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

●Silent Panel model (Optional)

Model	Panel Part No.	Color
FDUR308-A	UR-PS-27W-E	Ceramic white
FDUR408-A, 508-A	UR-PS-47W-E	

(2) Outdoor unit

Models FDCP808HES3, 1008HES3

Item	Model	FDCP808HES3	FDCP1008HES3
Power source		3 Phase 380/415V 50Hz	
Nominal cooling capacity ⁽¹⁾	W	20000	25000
Nominal heating capacity ⁽¹⁾	W	22400	28000
Noise level	dB(A)	58	
Exterior dimensions Height × Width × Depth	mm	1450 × 1350 × 600	
Net weight	kg	195	205
Refrigerant equipment compressor type & Q'ty		CB90H × 1	CB125H × 1
Motor	kW	6.5	9.0
Starting method		Line starting	
Crankcase heater	W	70	
Heat exchanger		Slitted fines & bare tubing	
Refrigerant control		Capillary tube	
Refrigerant		R407C	
Quantity	kg	4.95(Pre-charged up to the piping length of 5m)	7.1(Pre-charged up to the piping length of 5m)
Refrigerant oil	ℓ	4.4 (MA32R)	
Defrost control		MC controlled De-Icer	
Air handling equipment Fan type & Q'ty		Propeller fan × 2	
Motor	W	100×2	
Starting method		Line starting	
Air flow(Standard)	CMM	180	
Shock & vibration absorber		Rubber mount (for compressor)	
Safety equipment		Internal thermostat for fan motor. High pressure protection switch	
Installation data Refrigerant piping size	mm(in)	Liquid line: φ12.7 (1/2") Gas line: φ25.4 (1")	Liquid line: φ15.88 (5/8") Gas line: φ28.58 (1 1/8")
Connecting method		Liquid line: Flare piping Gas line: Brazing	
Drain		Hole for drain(φ20 × 8pcs, φ50 × 1pcs)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		-	

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in ISO-T1.

(2) The refrigerant quantity in the connecting pipe is not included Charge it additionally at the site.

(3) Operation chart

Regarding the operation characteristics of the twin unit of the same model and with the same capacity, please refer to the nameplate on the equipment.

For any other combinations (Twin, triple or double-twin of different models and different capacities), please calculate based on the following operation characteristics. (See page 12.)

(a) Operating characteristic of outdoor unit

(380 V/415 V)

Item		Model	FDCP808HES3	FDCP1008HES3
Cooling input	kW		8.20/8.38	12.36/12.42
Heating input			7.78/7.86	11.22/11.43
Cooling running current	A		13.3/13.5	19.8/18.9
Heating running current			12.6/12.8	18.6/17.9
Inrush current (L.R.A)	A		99	154
Cooling power factor	%		94/86	95/91
Heating power factor			94/85	92/89

Note (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(b) Operating characteristic of indoor unit

FDT Series

(220 V/240 V)

Item	Model	FDT Series				
		208-A	258-A	308-A	408-A	508-A
Power input (kW)		0.10/0.11		0.11/0.12	0.21/0.21	0.27/0.27
Running current (A)		0.5/0.5		0.6/0.6	1.2/1.2	1.4/1.4

FDR Series

(220 V/240 V)

Item	Model	FDR Series				
		208-A	258-A	308-A	408-A	508-A
Power input (kW)		0.10/0.11	0.11/0.12	0.15/0.16	0.19/0.19	0.24/0.24
Running current (A)		0.5/0.5		0.7/0.7	0.9/0.9	1.2/1.2

FDUR Series

(220 V/240 V)

Item	Model	FDUR Series				
		208-A	258-A	308-A	408-A	508-A
Power input (kW)		0.18/0.19	0.20/0.22	0.23/0.24	0.33/0.37	0.40/0.45
Running current (A)		0.9/0.9	1.0/1.0	1.1/1.3	1.5/1.7	1.8/2.0

Notes (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(2) The values shown in the above table are common to both cooling and heating operations.

(c) Calculation of total operation characteristics

Since the operation characteristics of series Multi depend on combination of indoor unit, calculate the total operation characteristics of the system by using the formulas below according to specifications of each indoor unit or outdoor unit.

1) Total power input

Total power input (kW) = Power input of outdoor unit + \sum (Power input of indoor unit)

2) Total running current

Total running current (A) = Running current of outdoor unit + $[\sum$ (Running current of indoor unit) \times 2/3]

3) Total power factor

Total power factor (%) = [Total power input (W) / $\sqrt{3}$ × Total running current (A) × Power source] × 100

Total operation characteristics = Operation characteristic value of outdoor unit + Operation characteristic value of indoor unit

[Example]

(Conditions) Operation Voltage Indoor unit: 220 V, 50 Hz
 Outdoor unit: 380 V, 50 Hz
 Operation mode Cooling and Heating
 Unit Outdoor unit: FDCP808HES3 × 1 unit
 Indoor unit: FDUR308-A × 1 units, FDT508-A × 1 units

Operation characteristics of each unit (Cooling/Heating)

Model	FDCP808HES3	FDUR308-A	FDT508-A
Power input (kW)	8.20/7.78	0.23/0.23	0.27/0.27
Running current (A)	13.8/12.6	1.1/1.1	1.4/1.4

① Total power input (kW)

(Cooling) $8.20 + 0.23 + 0.27 = 8.70$ (kW)

(Heating) $7.78 + 0.23 + 0.27 = 8.28$ (kW)

② Total running current (A)

(Cooling) $13.3 + (1.1 + 1.4 \times \frac{2}{3}) \approx 15.0$ (A)

(Heating) $12.6 + (1.1 + 1.4 \times \frac{2}{3}) \approx 14.3$ (A)

③ Total power factor (%)

(Cooling) $\frac{8.70 \times 1000}{\sqrt{3} \times 15.0 \times 380} \times 100 \approx 88$ %

(Heating) $\frac{8.28 \times 1000}{\sqrt{3} \times 14.3 \times 380} \times 100 \approx 88$ %

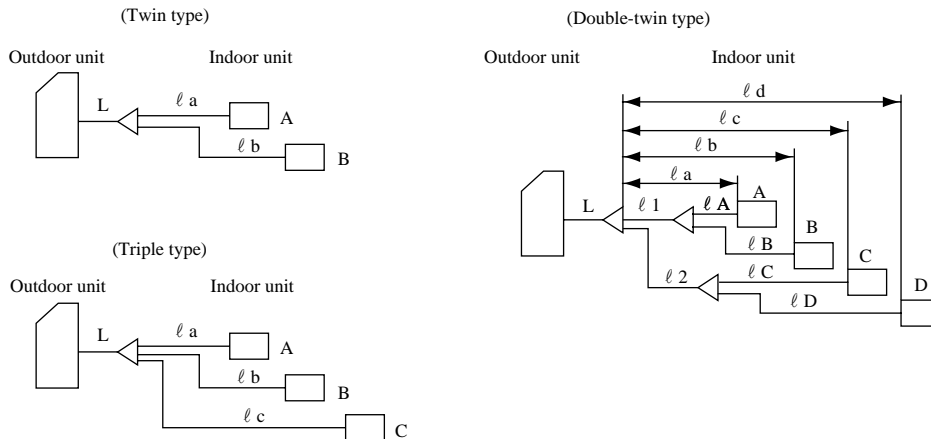
2.2 Range of usage & limitations

Model	FDCP808HES3	FDCP1008HES3
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. 50m ⁽¹⁾	
Vertical height difference between outdoor unit and indoor unit	Max. 30m (Outdoor unit is higher) Max. 15m (Outdoor unit is lower)	
Difference in height between indoor units	Max. 4m	
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	Max. 3 minutes	

Note (1) Refer to the next page for details of common pipe length.

Height and length restrictions for refrigerant piping

Model FDCP808, 1008HES3



In the illustration the L is main piping and l_a , l_b , l_c , and l_d are branch piping.

- One-way pipe length (m) $L + l_a \leq 50$, $L + l_b \leq 50$, $L + l_c \leq 50$, $L + l_d \leq 50$
- Branch pipe length (m) $|l_a - l_b| \leq 10$, $|l_a - l_c| \leq 10$, $|l_b - l_c| \leq 10$
 $|l_a - l_d| \leq 10$, $|l_b - l_d| \leq 10$, $|l_c - l_d| \leq 10$
 $l_a \leq 30$, $l_b \leq 30$, $l_c \leq 30$, $l_d \leq 30$
 $l_A + l_B \leq 15$, $l_C + l_D \leq 15$
- Vertical height difference between outdoor unit and indoor unit
 Outdoor unit is higher Max. 30m
 Outdoor unit is lower Max. 15m
- Difference in higher between indoor units Max. 4m

Request

- (1) When the capacity of the indoor unit to be connected is 208 or less, be sure to use a pipe diameter of $\phi 9.52$ for the size of the liquid piping of branch piping (between branch and indoor units). (for twin, triple, and double-twin only) For connections to indoor units (liquid piping side dai. $\phi 6.35$) use the different diameter adapter coupling that is included in the branch piping kit.
- (2) For the branch be sure to select the specified branch pipe set (sold separately) and then to follow the directions of the instruction manual included in the branch pipe set when installing the piping. Be sure to install the branch piping so that the branch is level.

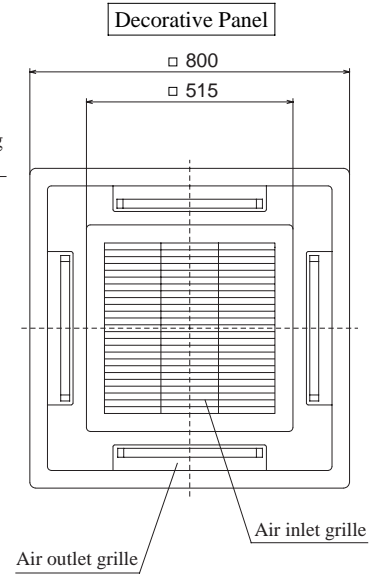
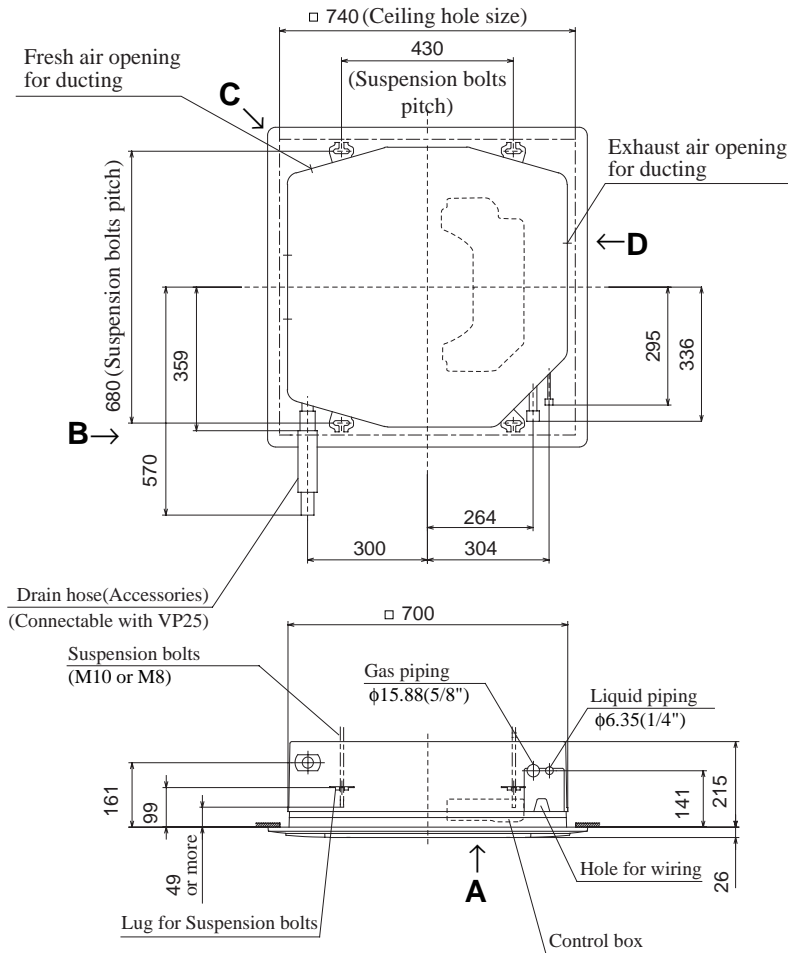
2.3 Exterior dimensions

(1) Indoor unit

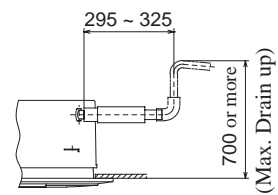
(a) Ceiling recessed type (FDT)

Model FDT208-A

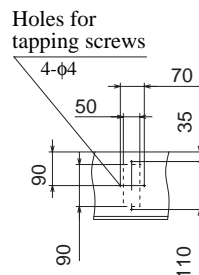
Unit : mm



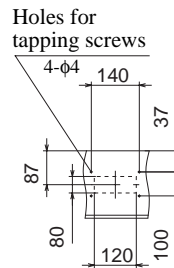
VIEW A



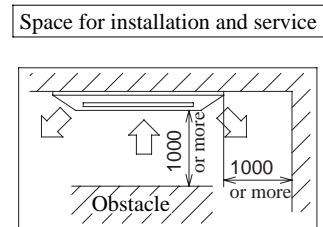
VIEW B



VIEW C

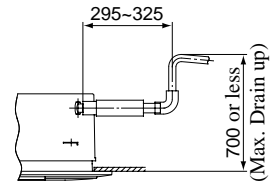
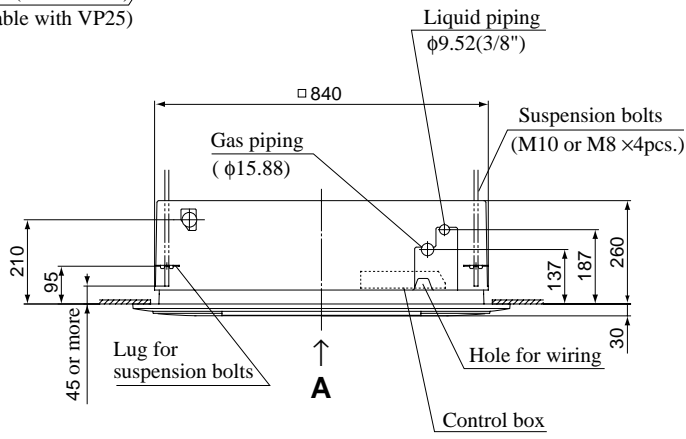
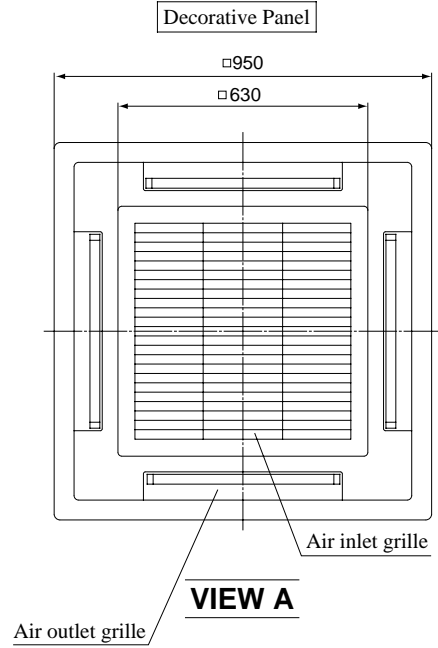
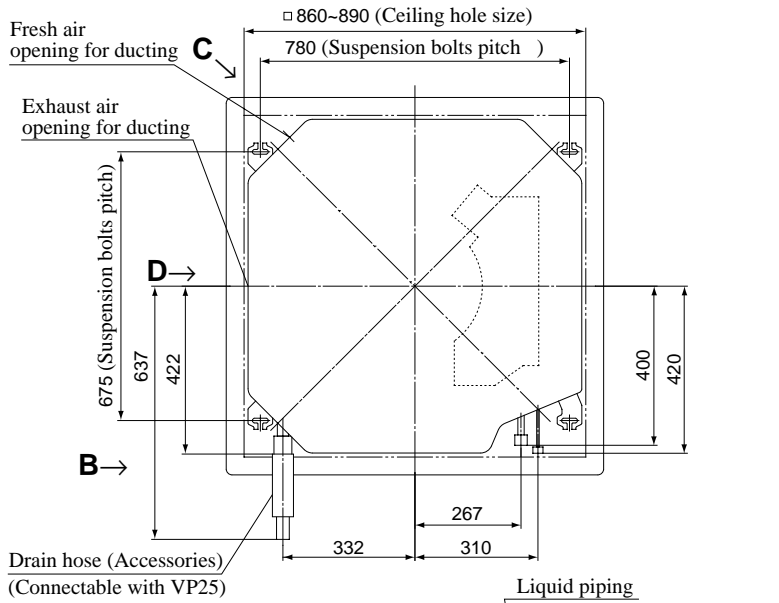


VIEW D

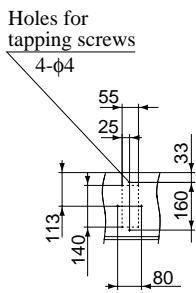


Models FDT258-A, 308-A

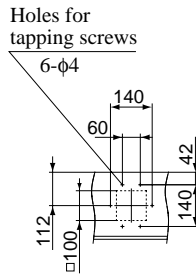
Unit : mm



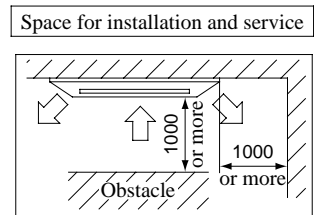
VIEW B



VIEW C

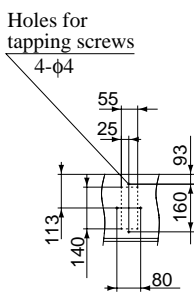
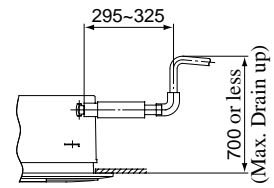
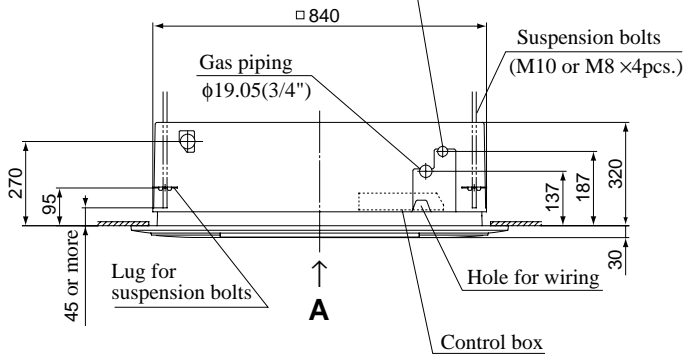
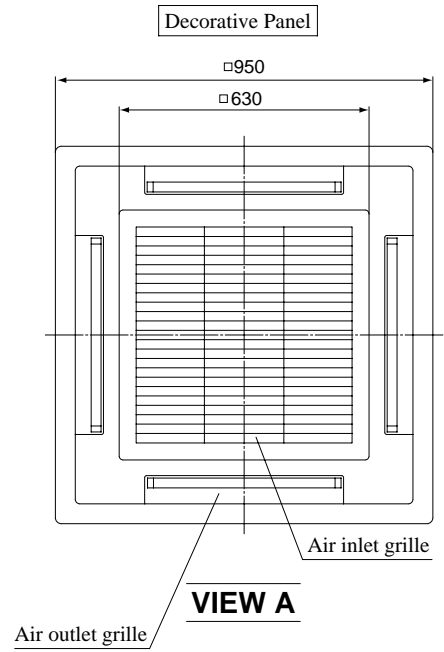
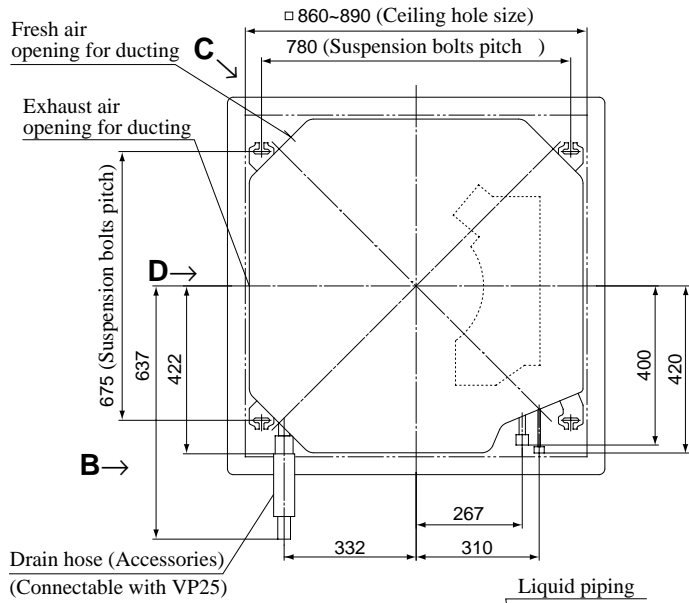


VIEW D

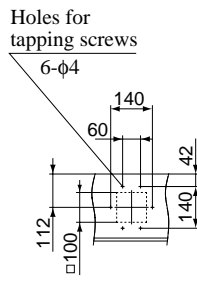


Models FDT408-A, 508-A

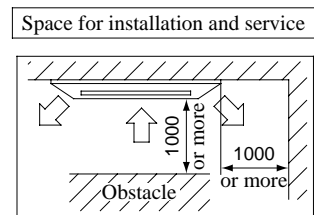
Unit : mm



VIEW C



VIEW D

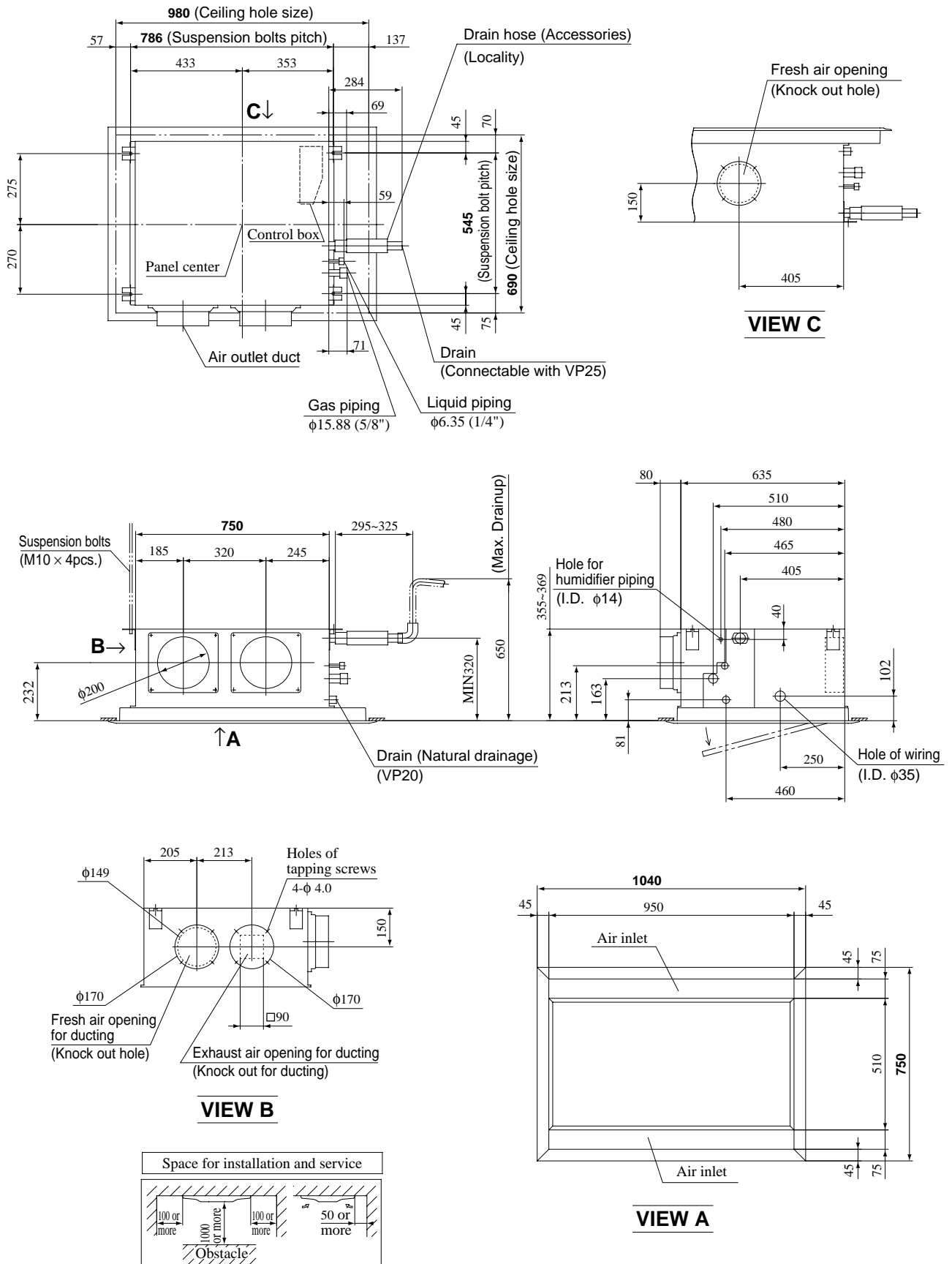


(b) Cassetteria type (FDR)

Model FDR208-A

Silent Panel (Model: R-PNLS-26W-E)

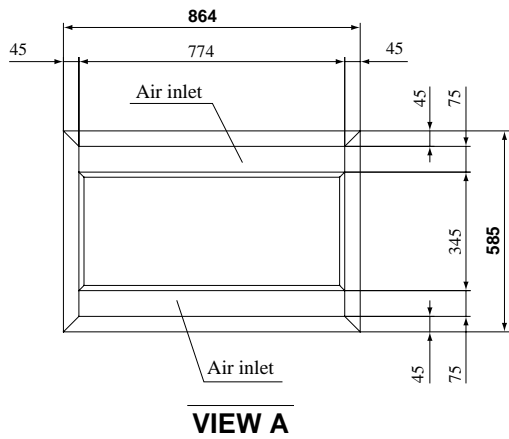
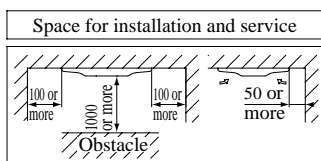
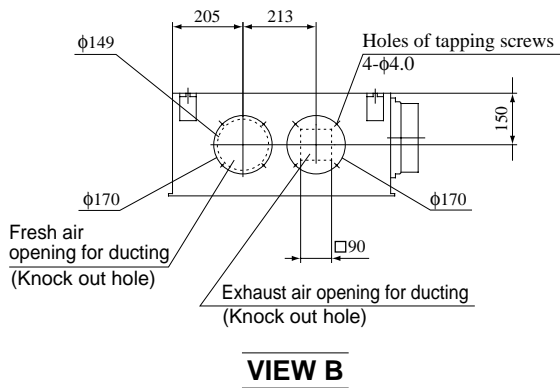
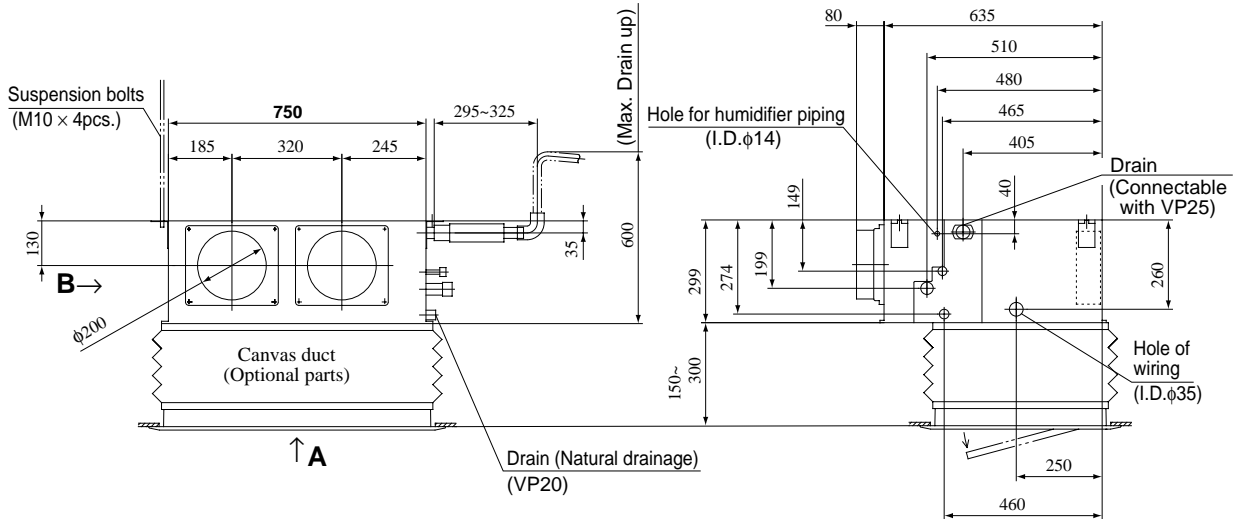
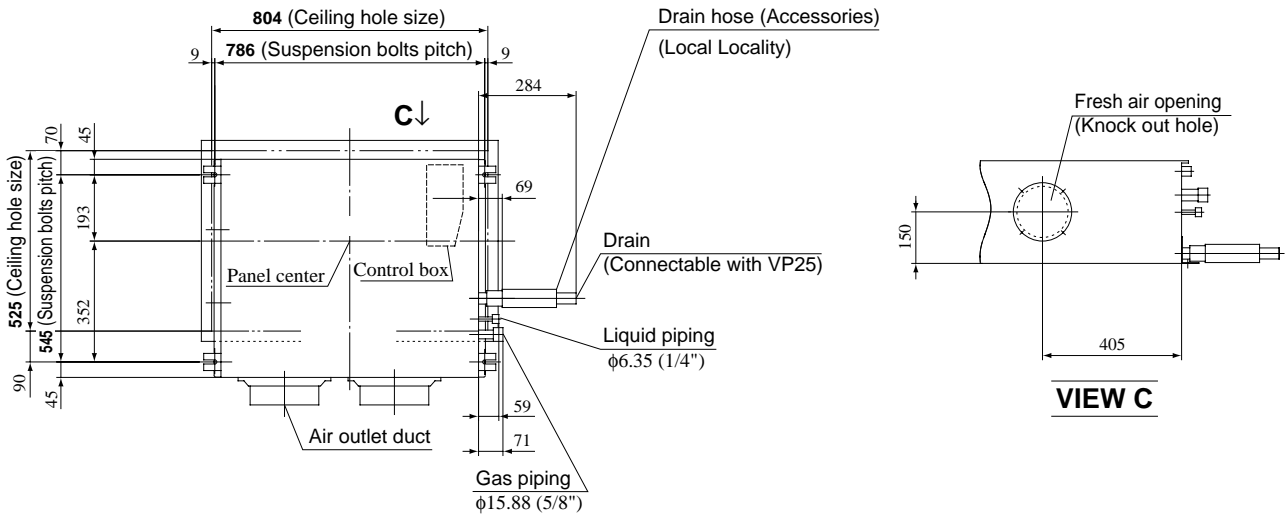
Unit : mm



Model FDR208-A

Canvas Panel (Model: R-PNLC-26W-E)

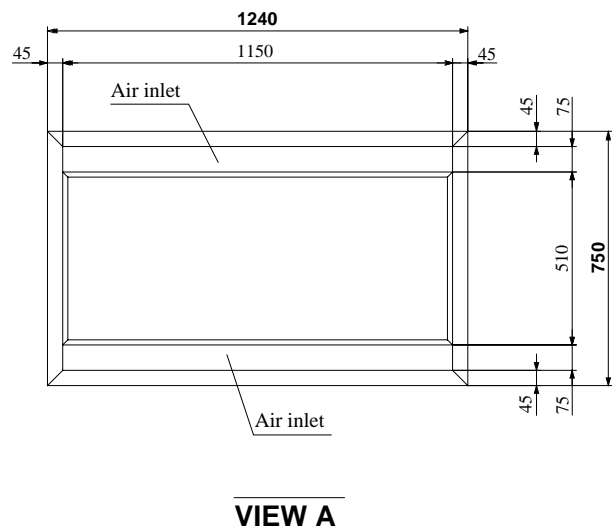
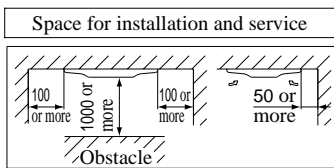
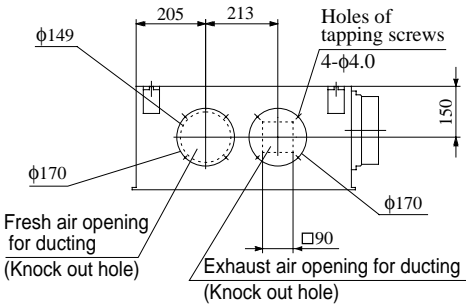
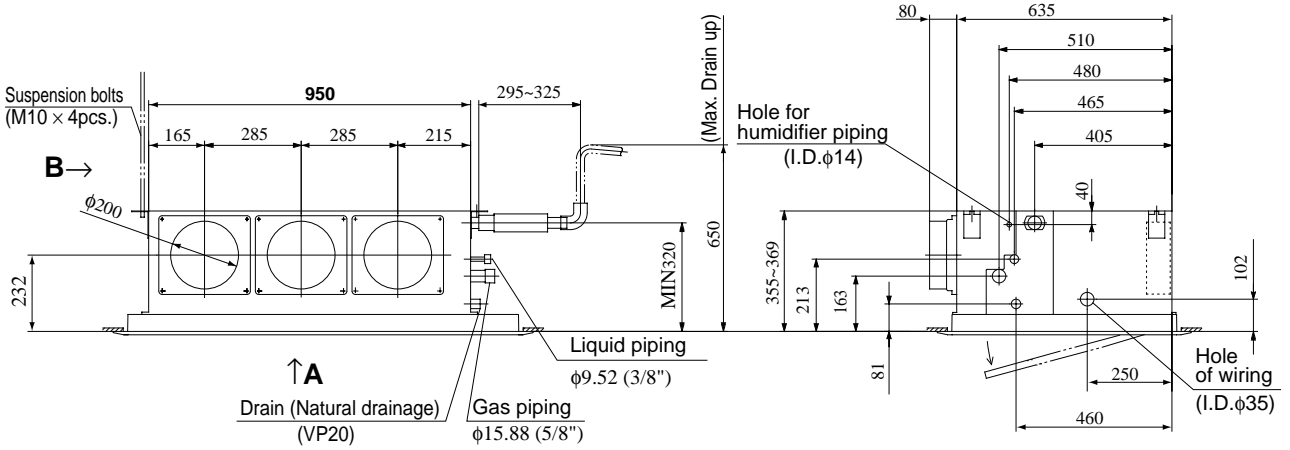
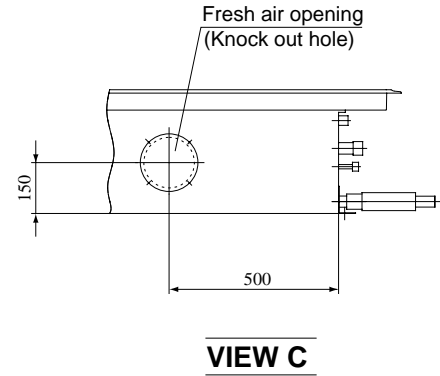
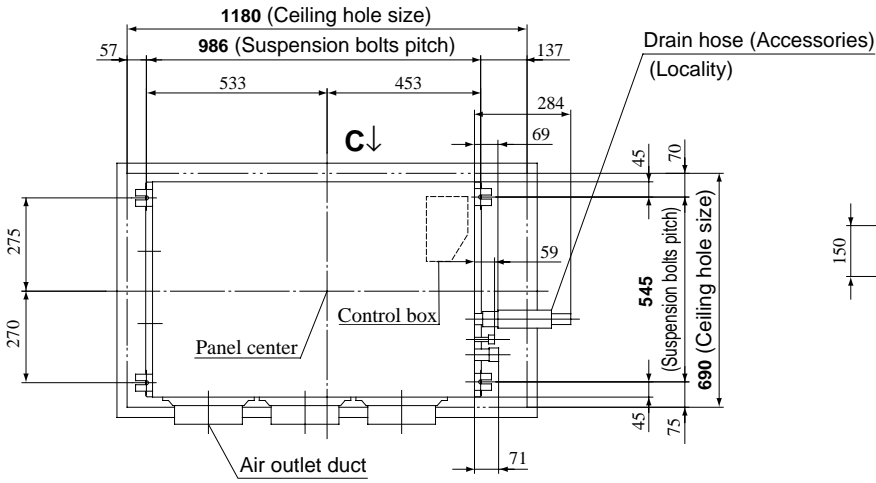
Unit : mm



Models FDR258-A, 308-A

Silent Panel (Model: R-PNLS-36W-E)

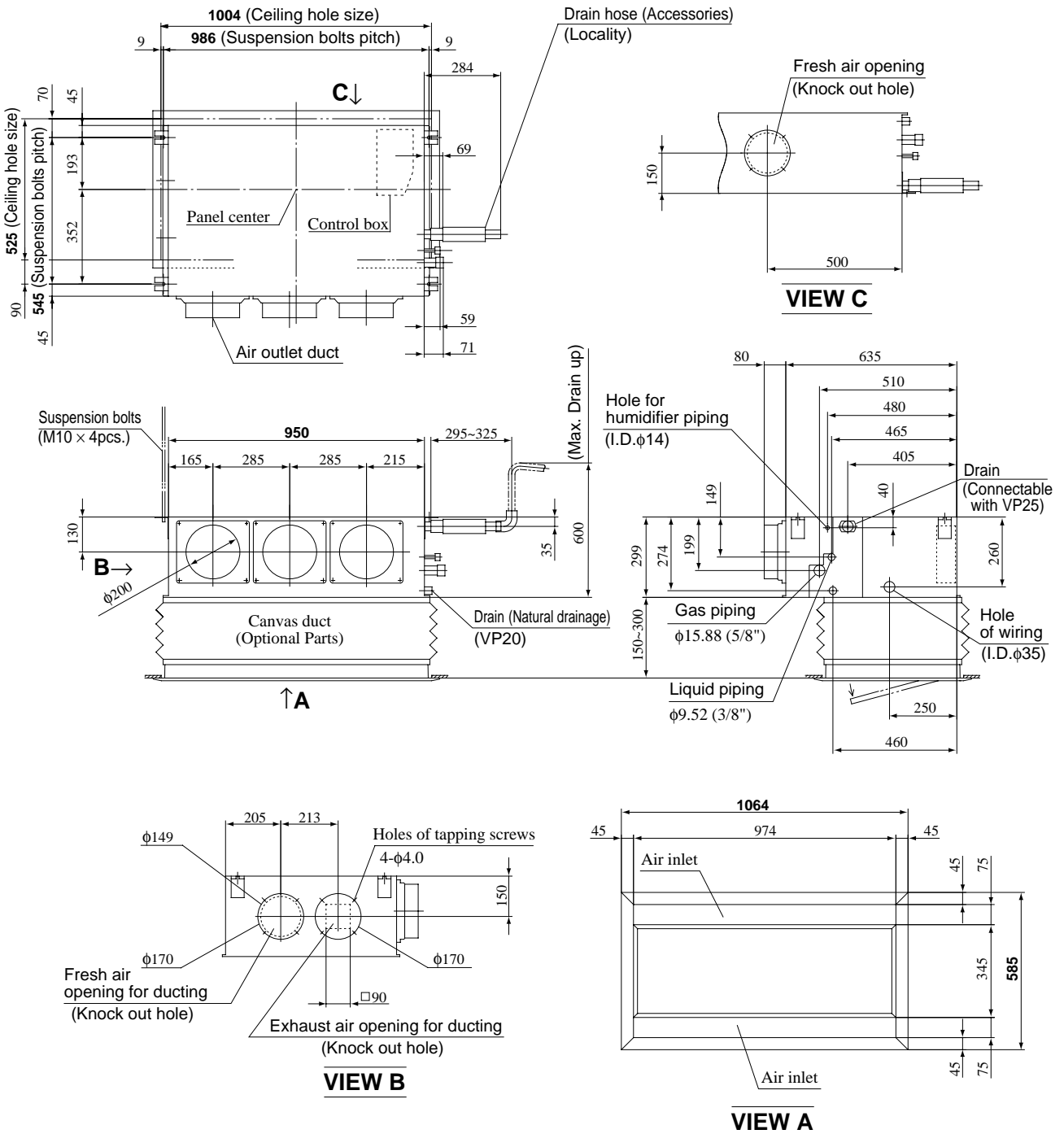
Unit : mm



Models FDR258-A, 308-A

Canvas Panel (Model: R-PNLC-36W-E)

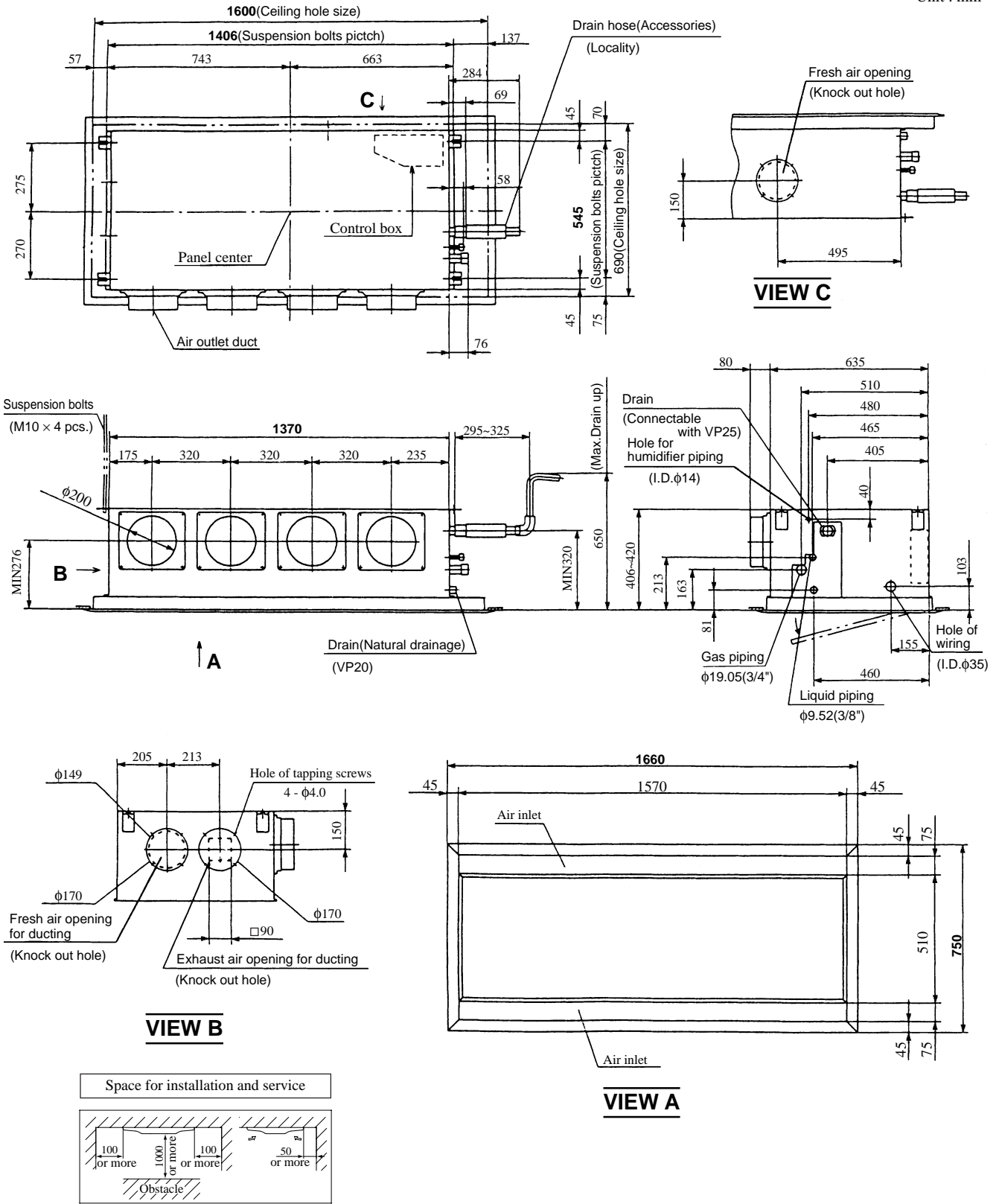
Unit : mm



Models FDR408-A, 508-A

Silent Panel (Model: R-PNLS-46W-E)

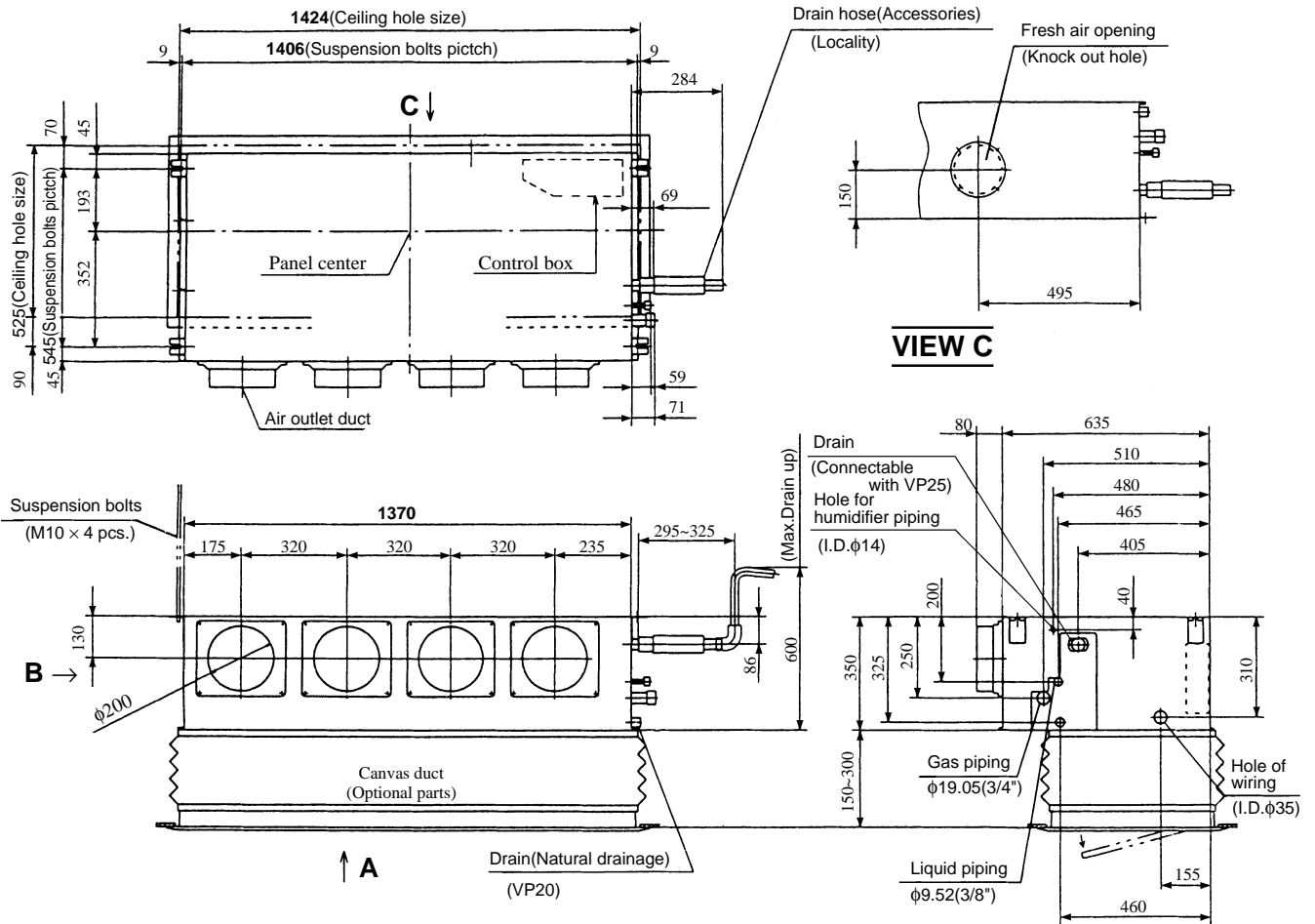
Unit : mm



Models FDR408-A, 508-A

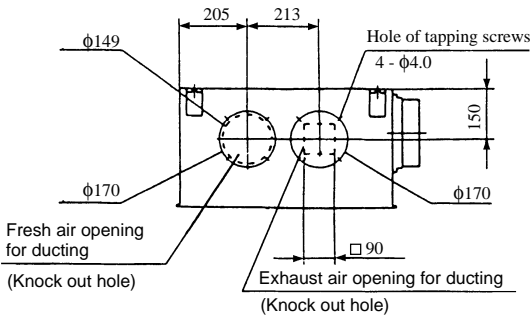
Canvas Panel (Model: R-PNLC-46W-E)

Unit : mm

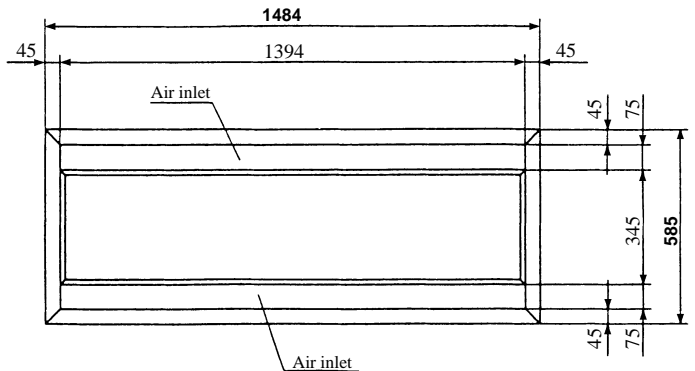


VIEW C

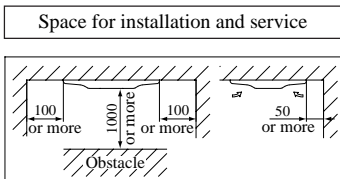
A



VIEW B



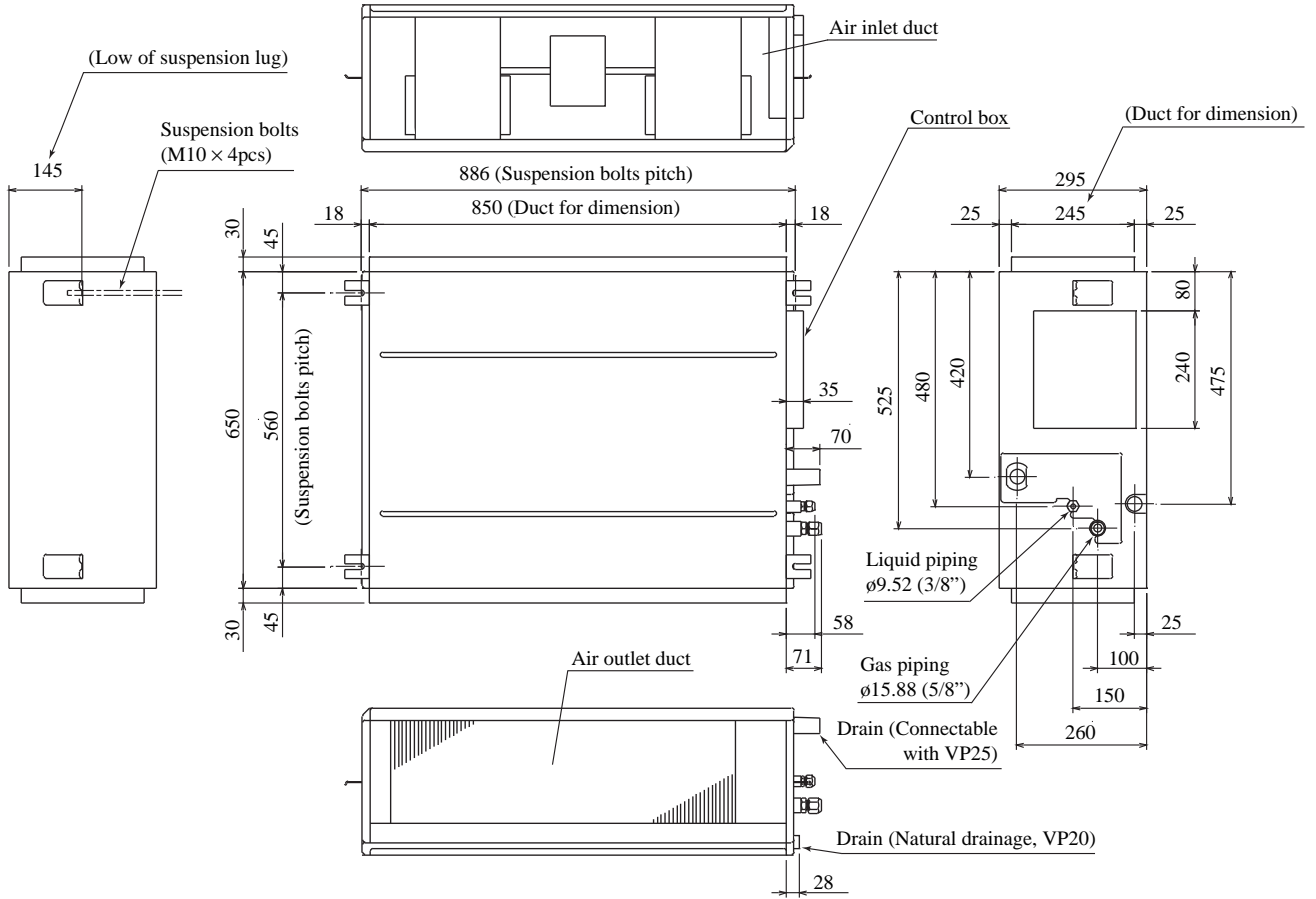
VIEW A



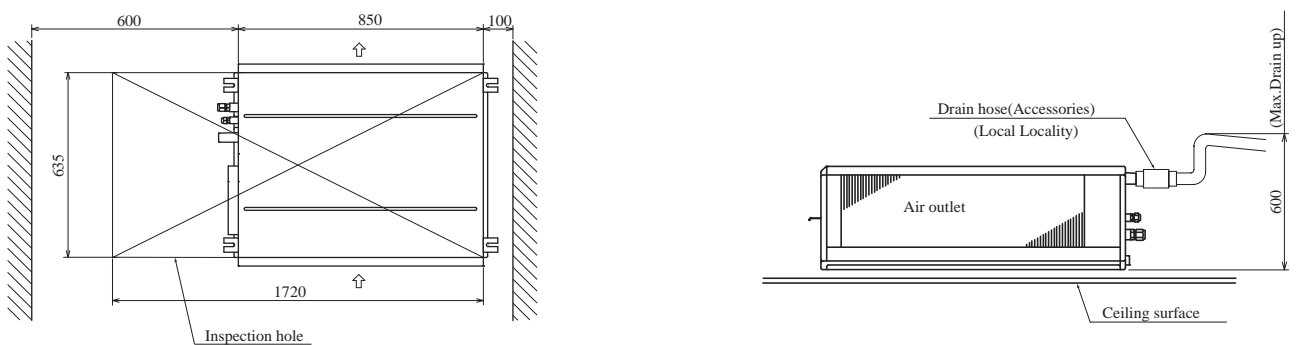
(c) Ceiling mounted duct type

Models FDUR208-A, 258-A, 308-A

Unit : mm

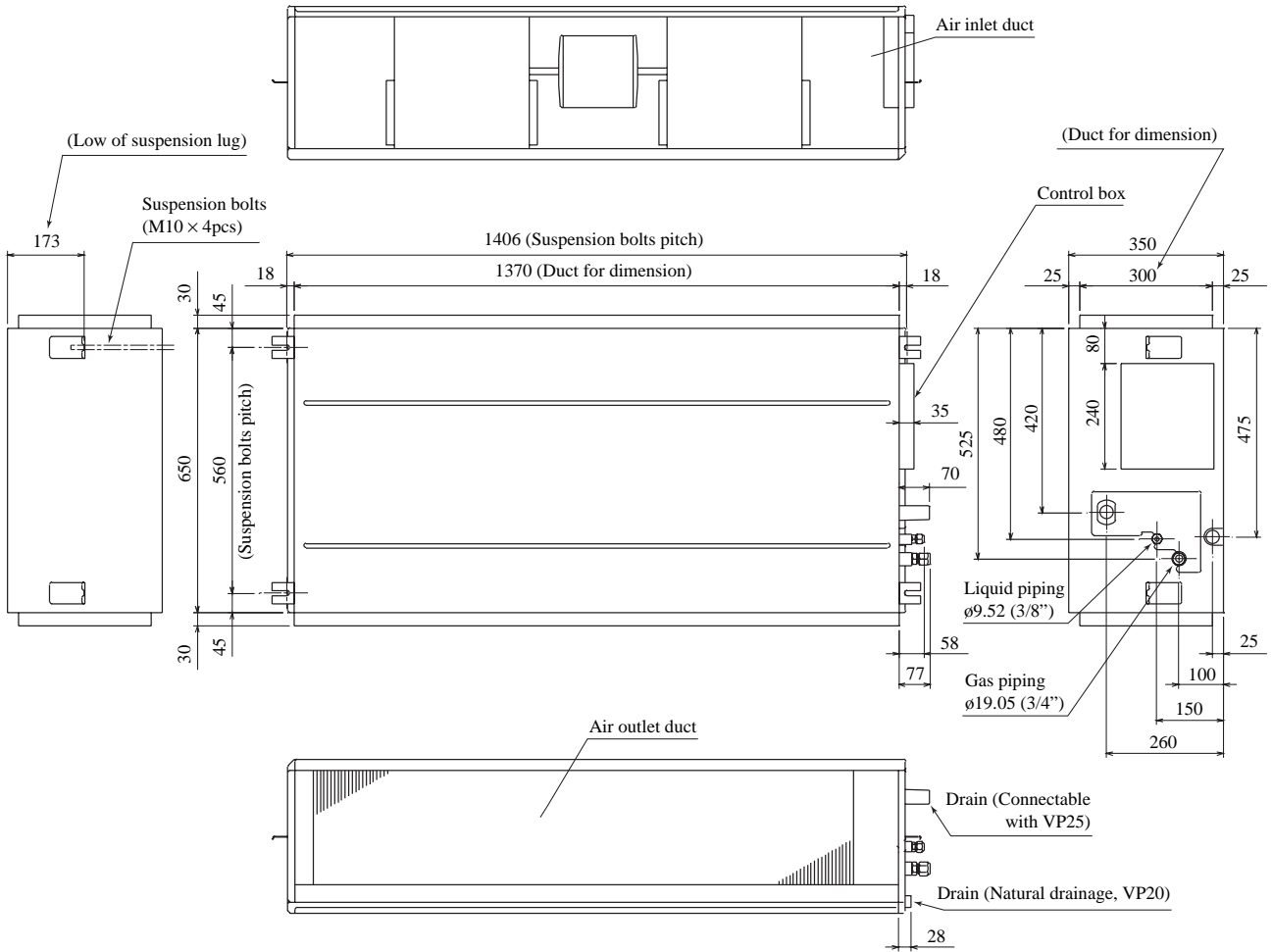


Space for installation and service

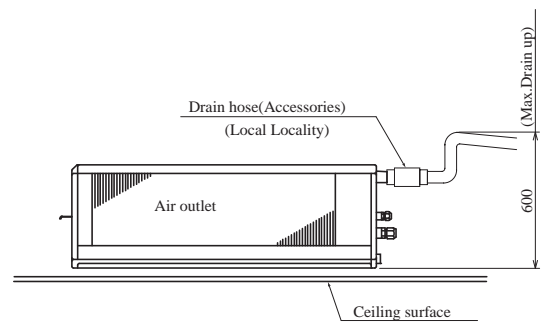
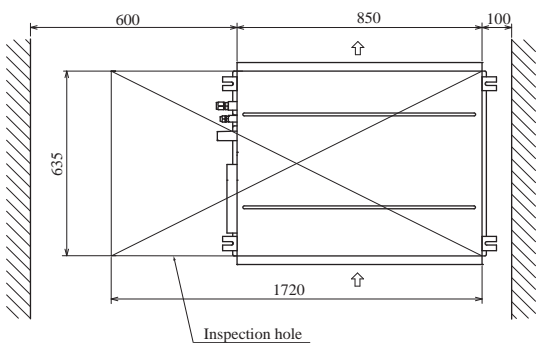


Models FDUR408-A, 508-A

Unit : mm

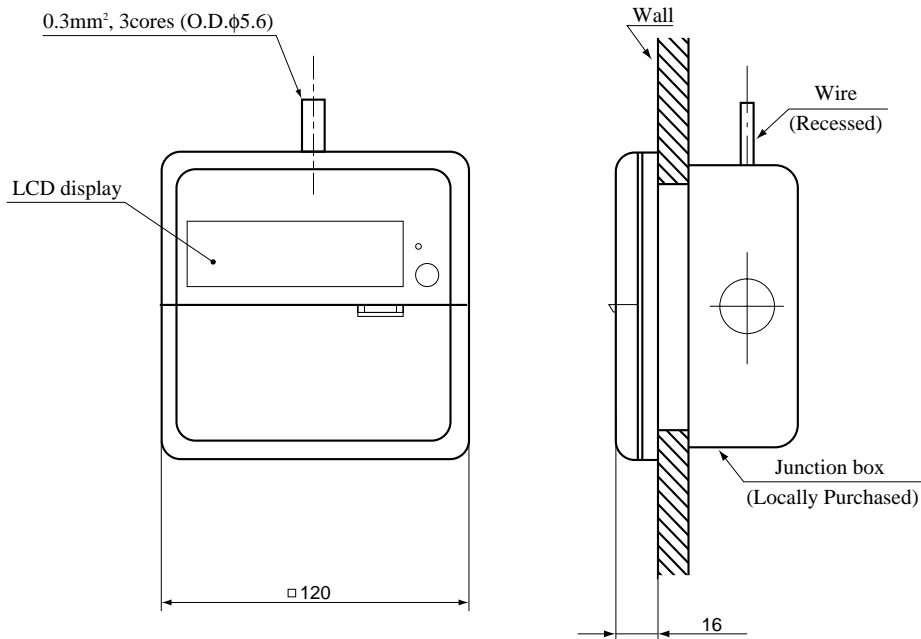


Space for installation and service

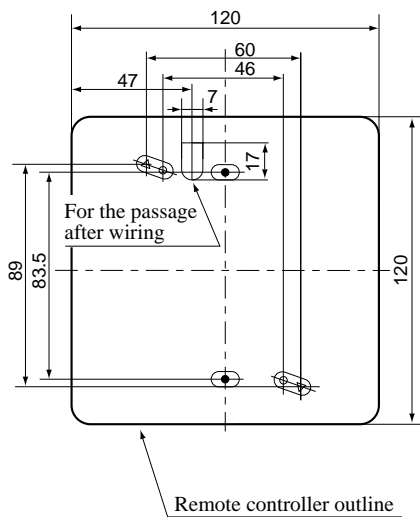


(2) Remote controller (Optional parts)

Unit : mm



Remote controller mounting dimensions



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

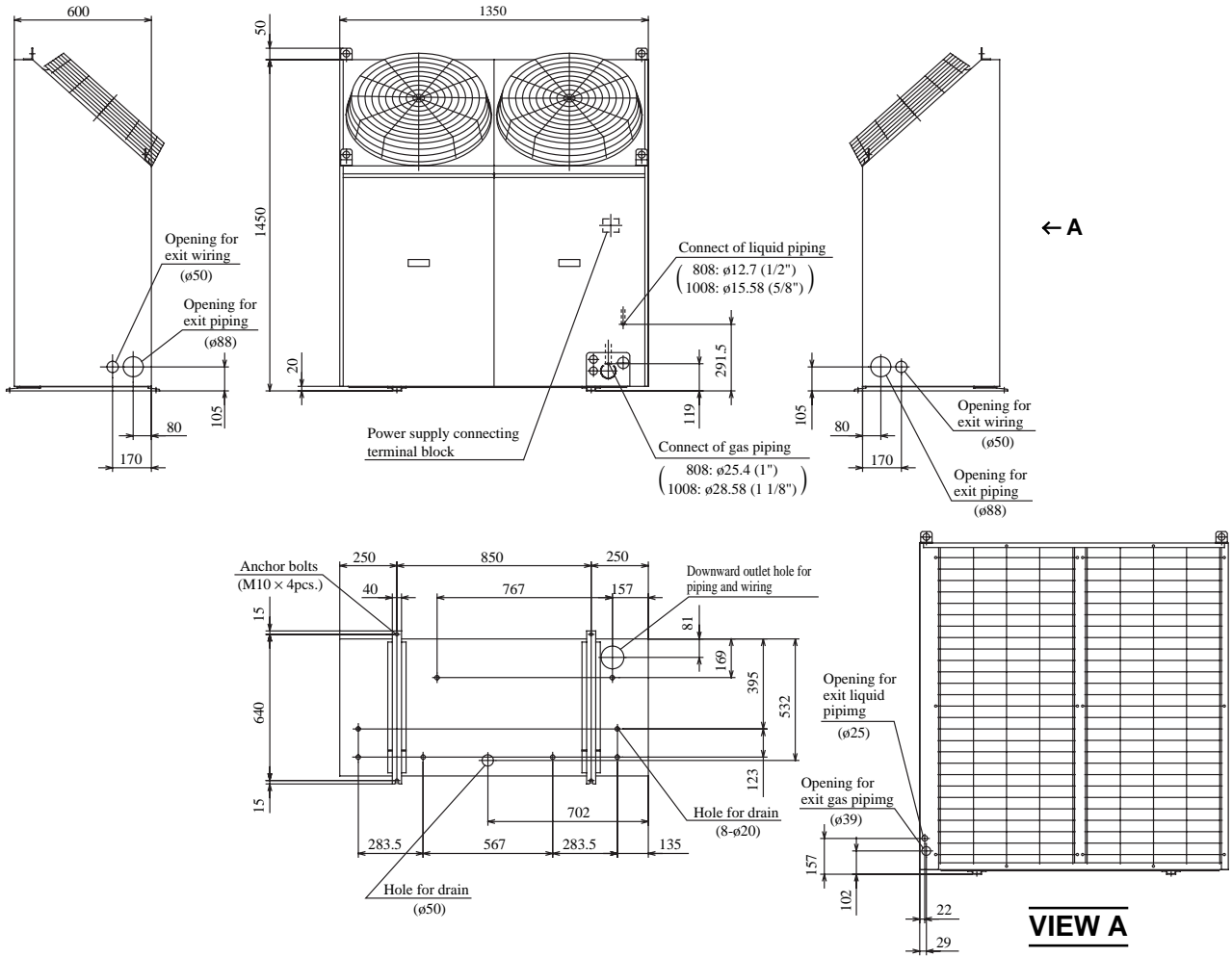
Allowable rang of wire thickness and length

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

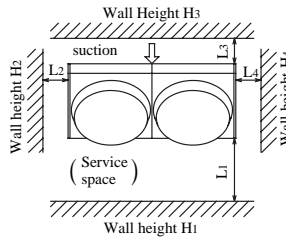
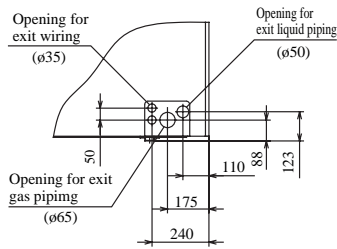
(3) Outdoor unit

Unit: mm

Models FDCP808HES3, 1008HES3

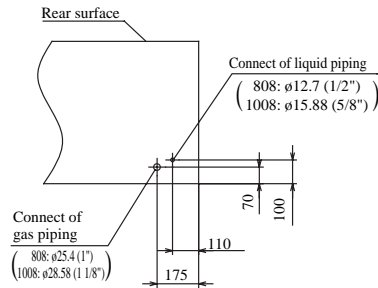


Dimensions of refrigerant piping connecting mouth (Front)



Installation Dimensions	Example		
	I	II	III
L ₁	Open	Open	500
L ₂	0	0	0
L ₃	300	300	300
L ₄	Open	500	0
H ₁	—	—	1000 or less
H ₂	Not limited	Not limited	Not limited
H ₃	Not limited	Not limited	700 or less
H ₄	—	Not limited	Not limited

- Notes
- (1) Make sure to secure the unit with anchor bolts.
 - (2) When the strong wind blows, place the unit so that discharge outlet faces the wind direction with right angle.
 - (3) Make sure to allow the space of 1 m or more above the unit.
 - (4) Connect the refrigerant piping (both gas side and liquid side) at local site.
 - (5) If the wall height H₁, H₃ of installation example III exceeds the limited value, make sure the value of L₁, L₃ are to be as follows.
 $L_1 = H_1 - 500$
 $L_3 = 300 + (H_3 - 700) / 2$, however, if L₃ exceeds 600, there is no limit for the wall height H₃.

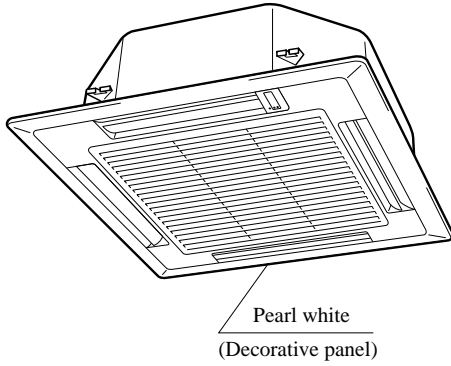


2.4 Exterior appearance

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models All models

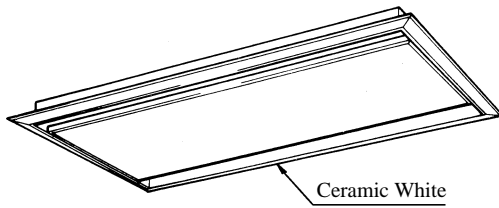


Type	Item	Panel model
FDT208-A		T-PSA-22W-E
FDT258-A~508-A		T-PSA-32W-E

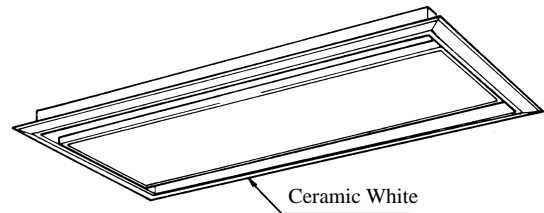
(b) Cassetteria type (FDR)

Models All models

Silent panel type

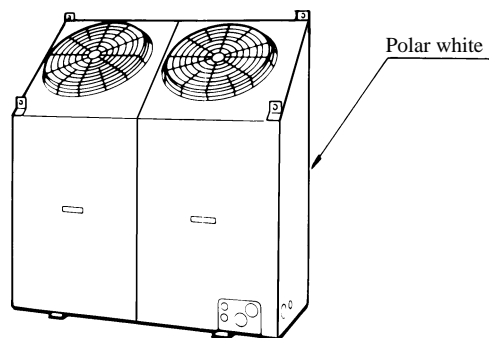


Canvas-duct panel type



(2) Outdoor unit

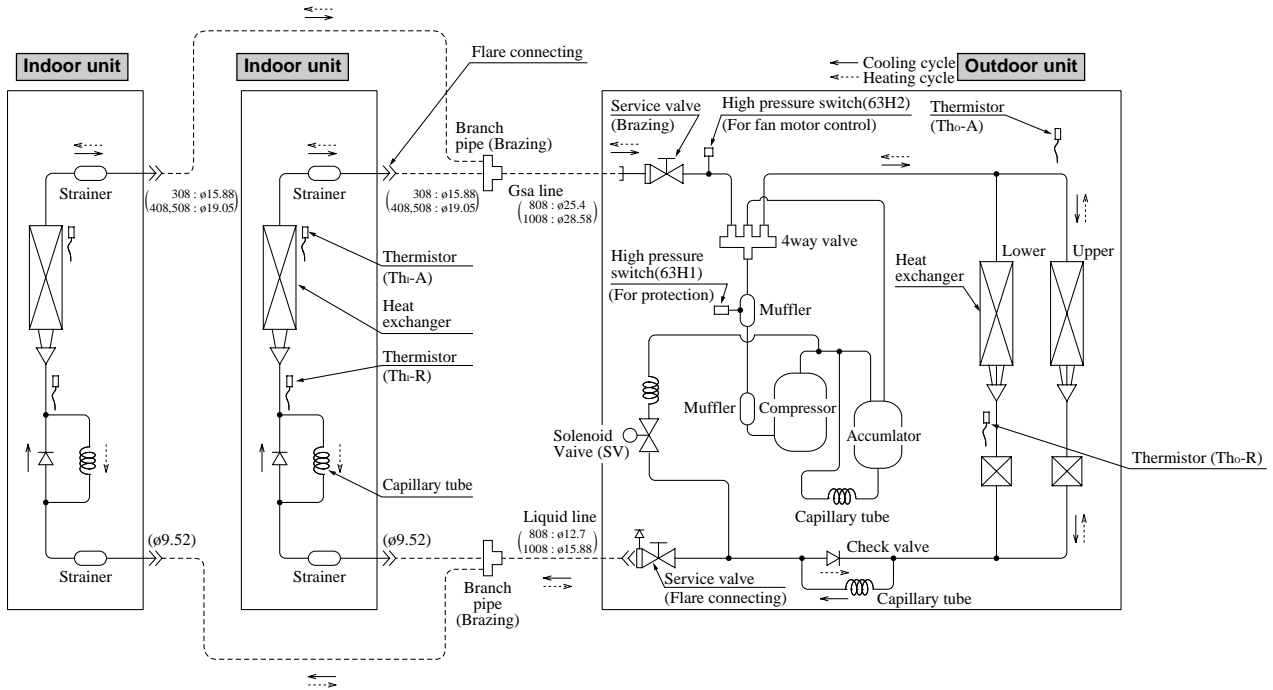
Models FDCP808HES3, 1008HES3



2.5 Piping system

(1) Twin type

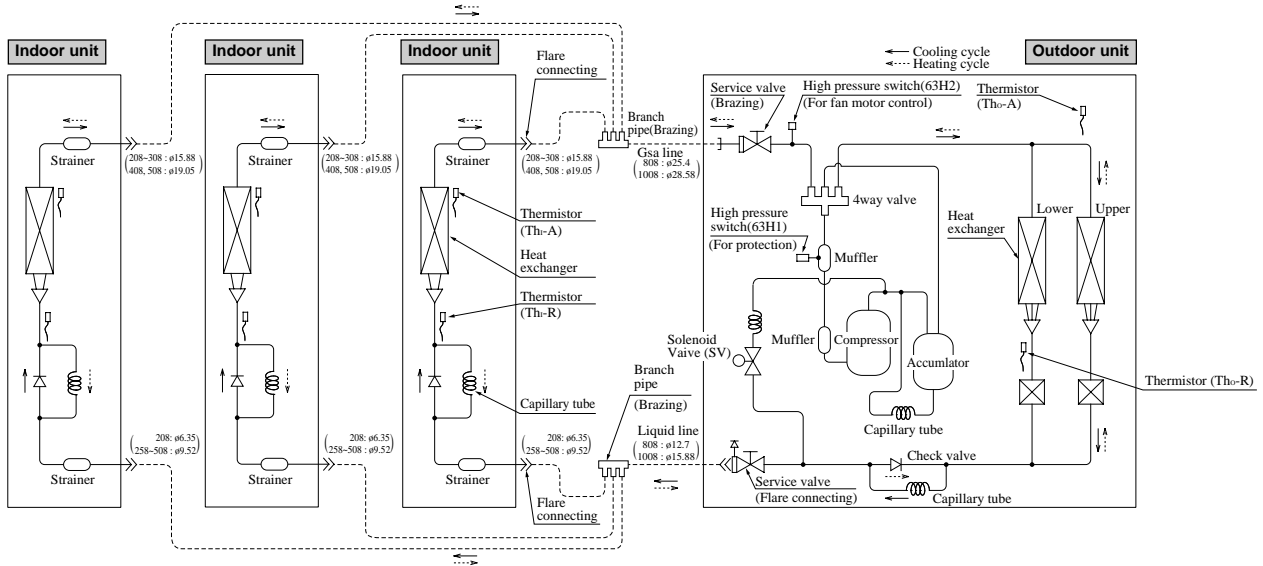
Models FDCP808HES3,1008HES3



Note (1) Refer to page 72 for piping size after branching.

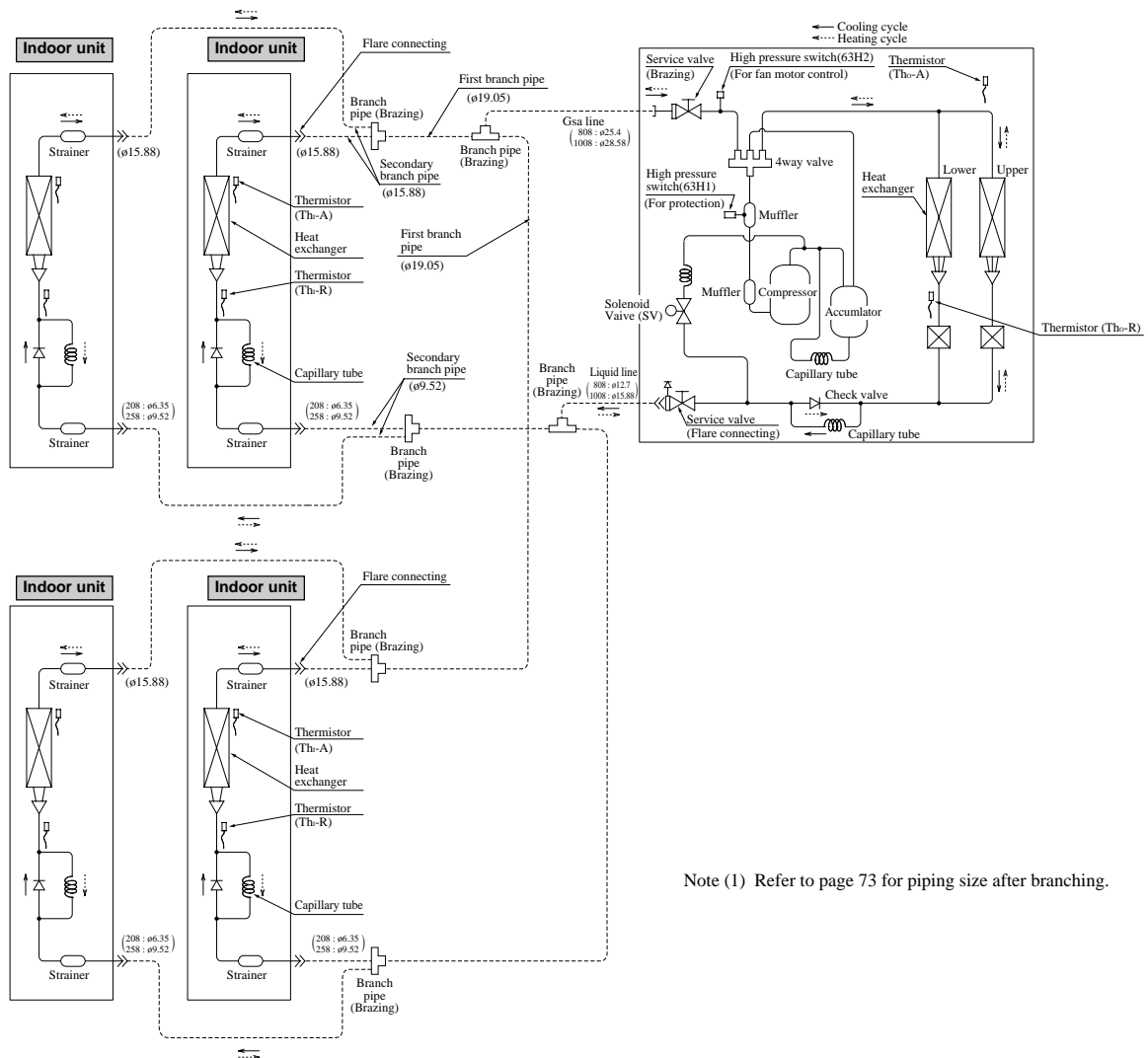
(2) Triple type

Models FDCP808HES3,1008HES3



Note (1) Refer to page 73 for piping size after branching.

(3) Double twin type
Models FDCP808HES3,1008HES3



Note (1) Refer to page 73 for piping size after branching.

Preset point of the protective devices

Parts name	Mark	Equipped unit	FDCP808HES3, 1008HES3
Thermistor (for protection over-loading in heating)	Thi-R	Indoor unit	OFF 68°C ON 61°C
Thermistor (for frost prevention)			OFF 2.5°C ON 10°C
Thermistor (for detecting heat exchange temp.)	Tho-R	Outdoor unit	OFF 70°C ON 60°C
High pressure switch (for controlling FMo)	63H2		OFF 2.79MPa ON 2.26MPa
High pressure switch (for protection)	63H1	Outdoor unit	OFF 3.24MPa ON 2.65MPa

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 specifications × Correction factors as follows.

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

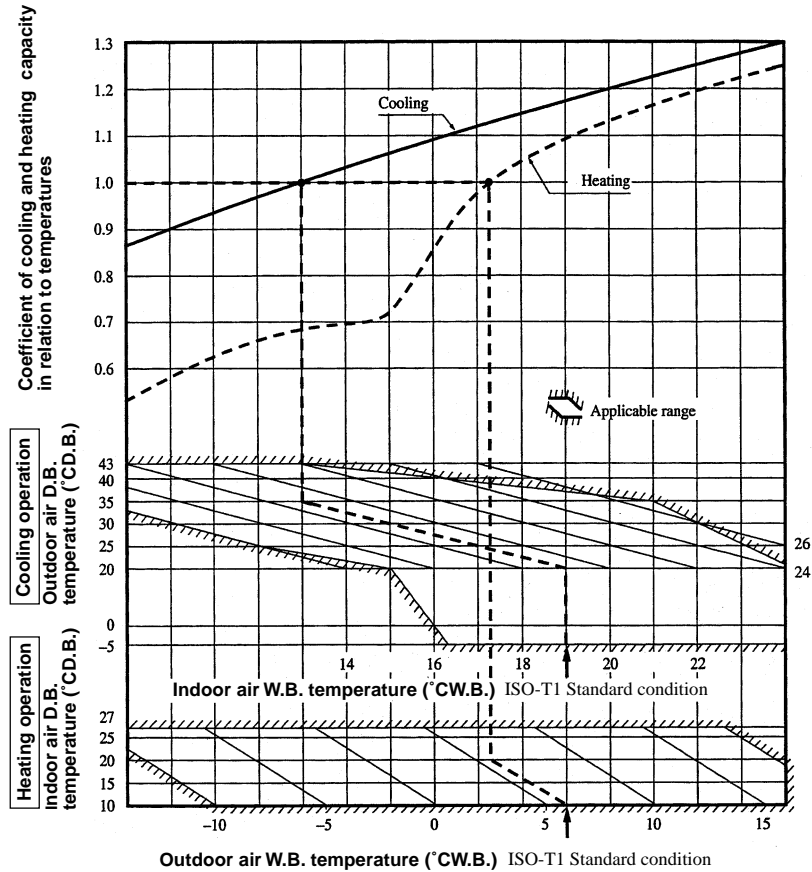


Table of bypass factor

FDT series

Model		208	258	308	408	508
Air flow	Hi	0.112	0.050	0.065	0.076	0.025
	Lo	0.073	0.030	0.030	0.050	0.013

FDR series

Model		208	258	308	408	508
Air flow	Hi	0.035	0.032	0.039	0.085	0.035
	Lo	0.021	0.020	0.023	0.060	0.023

FDUR series

Model		208	258	308	408	508
Air flow	Hi	0.111	0.053	0.069	0.106	0.050
	Lo	0.083	0.037	0.049	0.079	0.034

(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 ⁽¹⁾ 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	FDC808, 1008	1.0	0.995	0.985	0.975	0.965	0.955	0.945	0.935	0.925	0.915	0.905

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

808 [φ25.4 (1")] : Equivalent piping length = Real piping length + (0.40 × Number of bends in piping)

1008 [φ28.58 (1 1/8")] : Equivalent piping length = Real piping length + (0.45 × 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

Piping length limitations

Item	Model	All models
Max. one way piping length		50m
Max. vertical height difference		Outdoor unit is higher 30m 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 and heating capacity

Example : The net cooling capacity of the model FDCP808HES3 with the air flow "High", the piping length of 40m, 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 is

$$\text{Net cooling capacity} = \underbrace{20000}_{\text{FDCP808HES3}} \times \underbrace{1.00}_{\text{Air flow "High"}} \times \underbrace{(0.935 - 0.01)}_{\substack{\text{Length 40 m.} \\ \text{Height difference 5 m}}} \times \underbrace{1.0}_{\text{Factor by air temperatures}} = 18500 \text{ w}$$

2.7 Characteristics of fan

(1) Casseteria type (FDR)

• External static pressure table

Unit: Pa

Type	Duct specs. Air flow (m ³ /min)	1 spot closing ⁽¹⁾		Standard ⁽²⁾		Square duct ⁽³⁾	
		Standard	High speed ⁽⁴⁾	Standard	High speed ⁽⁴⁾	Standard	High speed ⁽⁴⁾
FDR208-A	14	—	—	50	85	50	90
FDR258-A	18	30	65	45	80	50	85
FDR308-A	20	25	60	45	80	50	85
FDR408-A	28	40	70	50	80	50	85
FDR508-A	34	40	70	50	80	55	85

Notes (1) 1 spot closing: Round duct flange at center is removed and shield with a decorative panel (option).

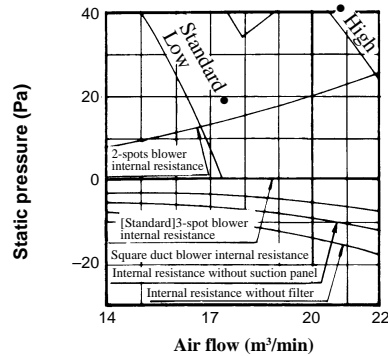
(2) Standard: ø200 ducts are installed at all blowout holes.

(3) Square duct: All round ducts are removed and replaced with special square duct flanges (option).

(4) When operating at a high speed, invert the connection of white and red connectors on the flank of control box.

How to interpret the blower characteristics table

Example : Case of FDR308-A



① 2-spot blowout.....

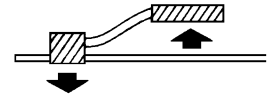
Internal resistance increases more than the standard 3-spot blowout. Approx. 14 Pa at 17m³/min.

② Square duct blowout.....

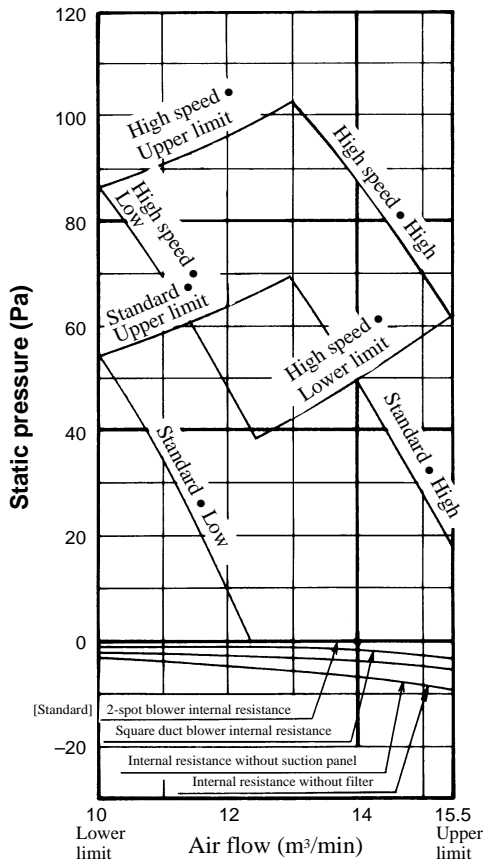
Internal resistance decreases more than the standard round duct (ø200 3-spot). 3 Pa at 17 m³/min. (External static pressure increases in reverse.)

③ Decorative panel.....

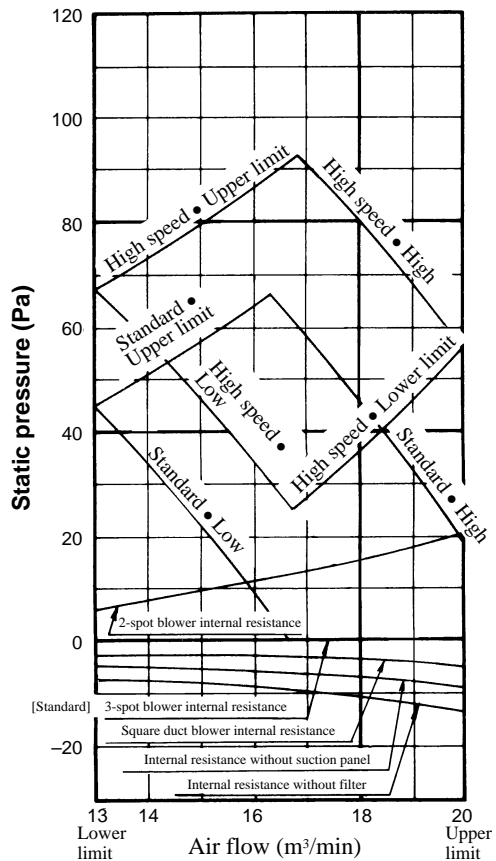
When the decorative panel is not used with the ceiling return type, the part of internal resistance related to the panel decrease. 3 Pa at 17m³/min.



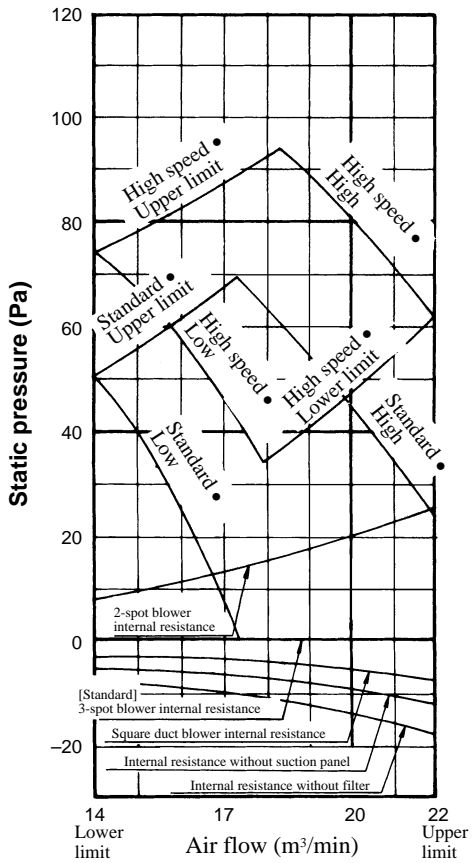
Model FDR208-A



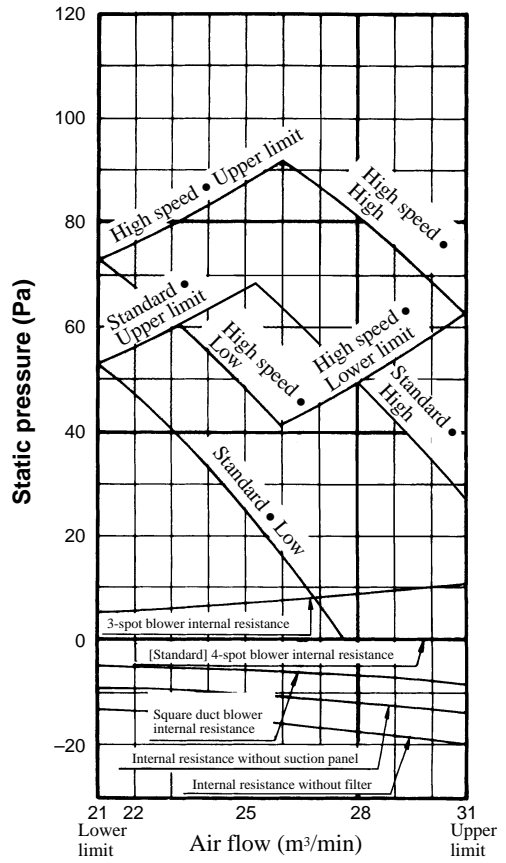
Model FDR258-A



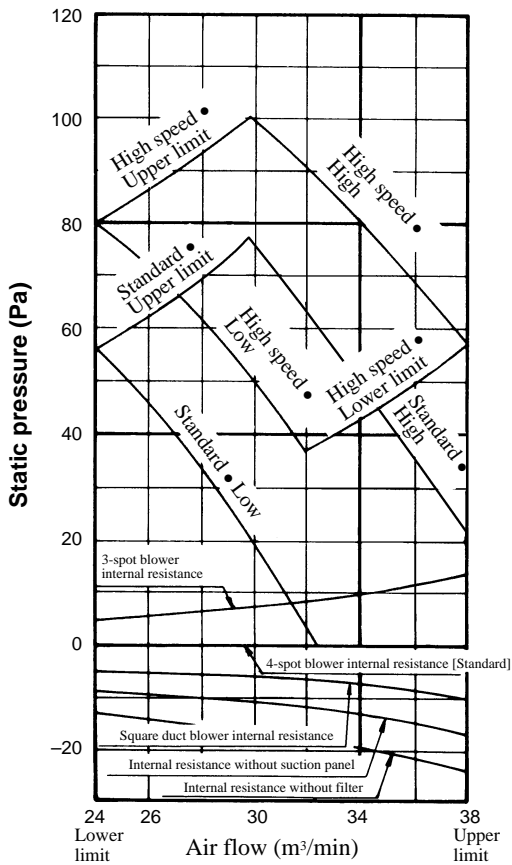
Model FDR308-A



Model FDR408-A

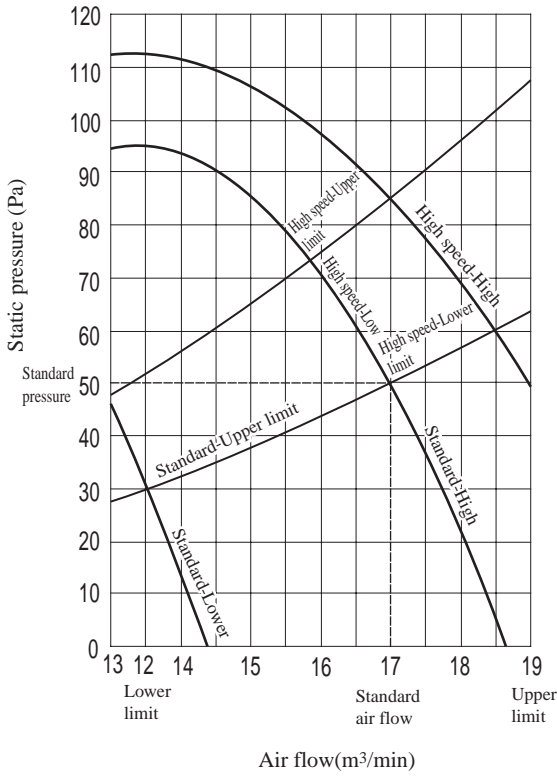


Model FDR508-A

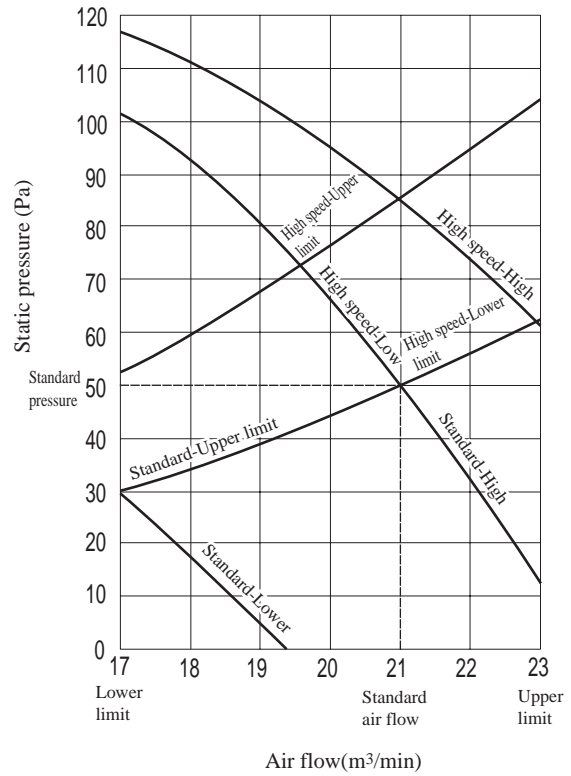


(2) Ceiling mounted duct type (FDUR)

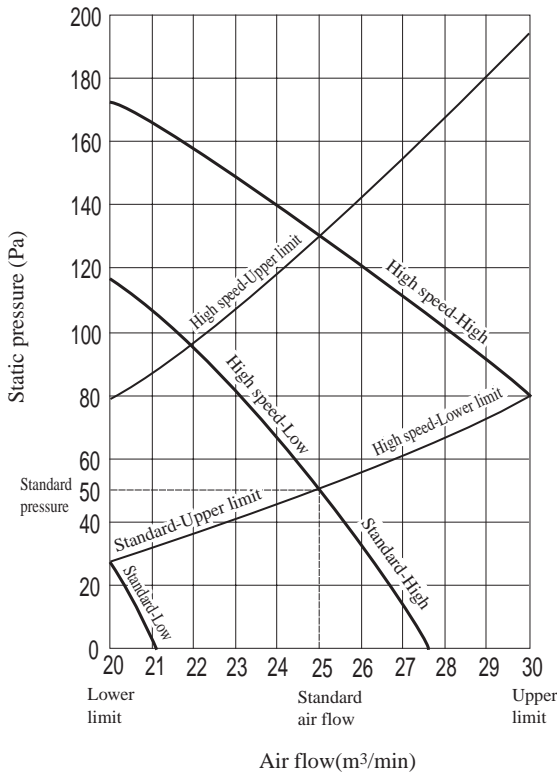
Model FDUR208-A



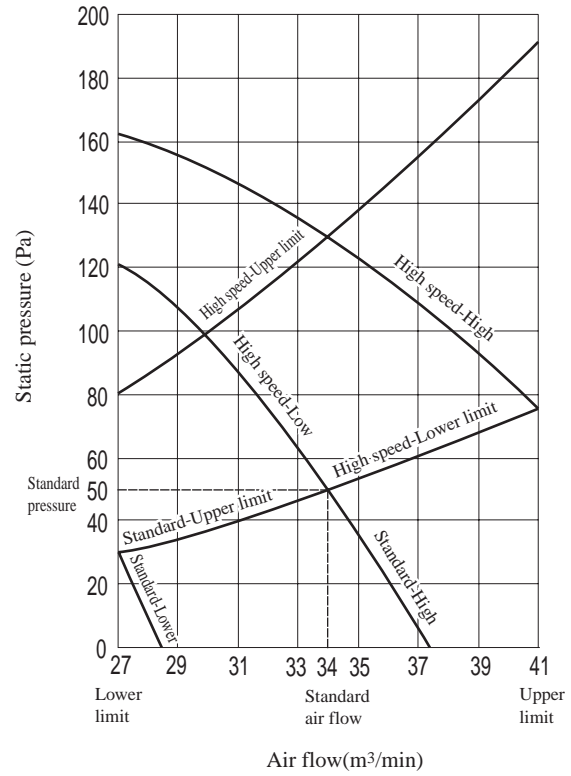
Model FDUR258-A



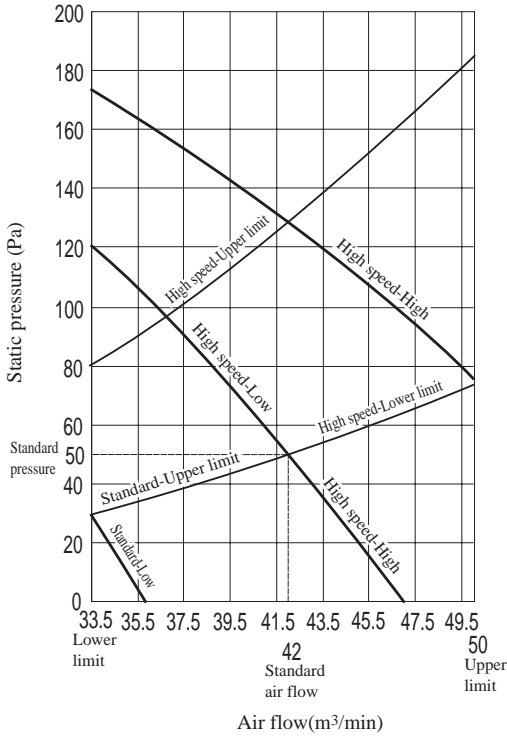
Model FDUR308-A



Model FDUR408-A



Model FDUR508-A



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

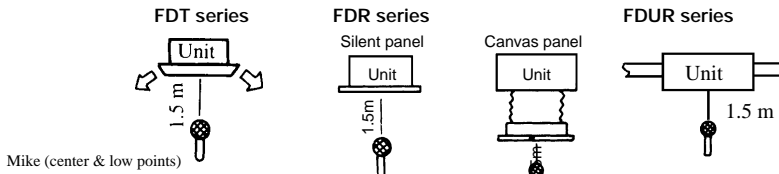
Measured based on JIS B 8616

Mike position as below

Outdoor unit

Measured based on JIS B 8616

Mike position: front height is 1 meter.



(2) The data in the chart are measured in an anechoic room.

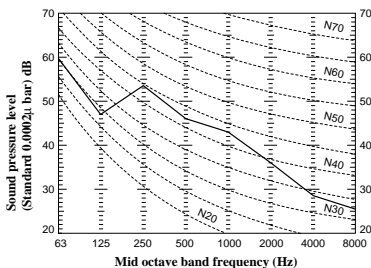
(3) The noise levels measured in the field are usually higher than the data because of reflection.

(1) Indoor unit

(a) Ceiling recessed type (FDT)

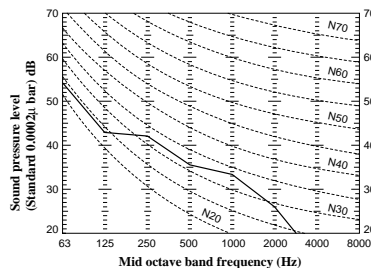
Model FDT208-A

Noise level 38 dB (A) at HIGH
33 dB (A) at LOW



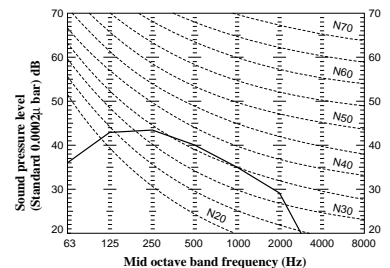
Model FDT258-A

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



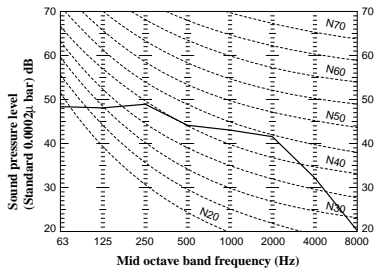
Model FDT308-A

Noise level 41 dB (A) at HIGH
35 dB (A) at LOW



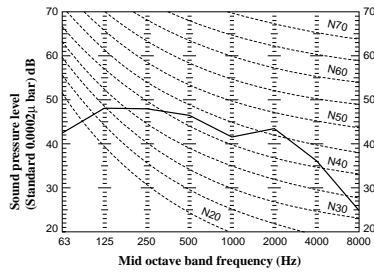
Model FDT408-A

Noise level 48 dB (A) at HIGH
40 dB (A) at LOW



Model FDT508-A

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

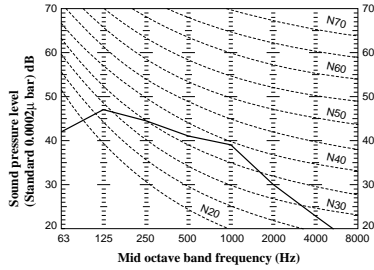


(b) Cassetteria type (FDR)

1) Silent panel

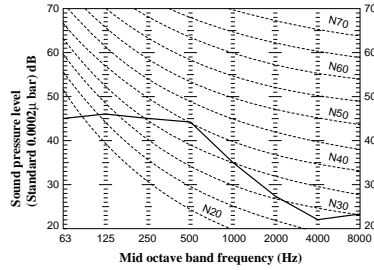
Model FDR208-A

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



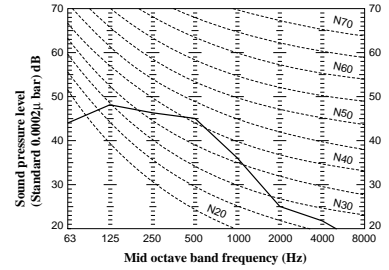
Model FDR258-A

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



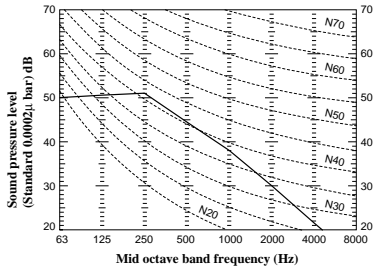
Model FDR308-A

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



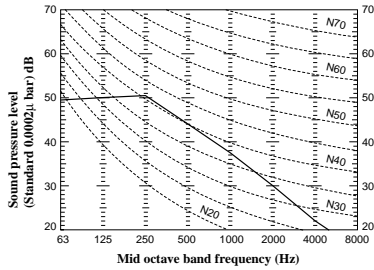
Model FDR408-A

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



Model FDR508-A

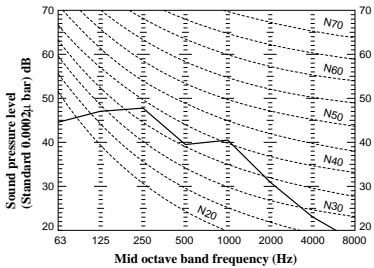
Noise level 46 dB (A) at HIGH
39 dB (A) at LOW



2) Canvas panel

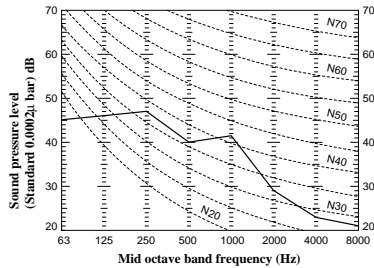
Model FDR208-A

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



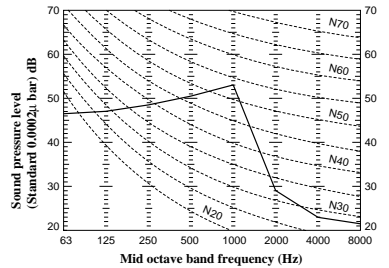
Model FDR258-A

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



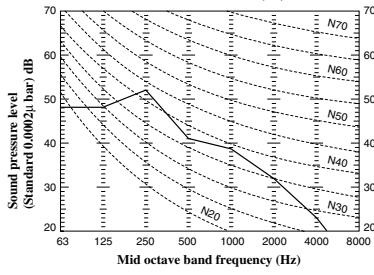
Model FDR308-A

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



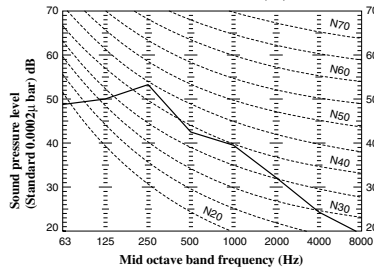
Model FDR408-A

Noise level 46 dB (A) at HIGH
39 dB (A) at LOW



Model FDR508-A

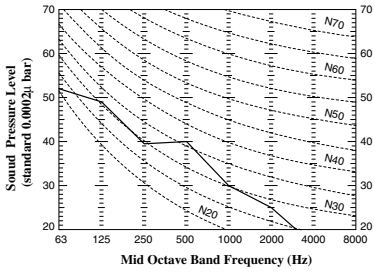
Noise level 47 dB (A) at HIGH
40 dB (A) at LOW



(c) Ceiling mounted duct type (FDUR)

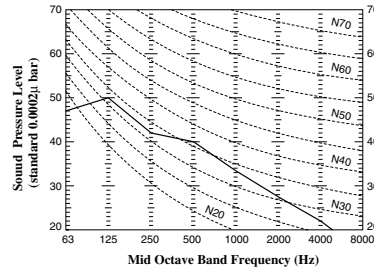
Model FDUR208-A

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



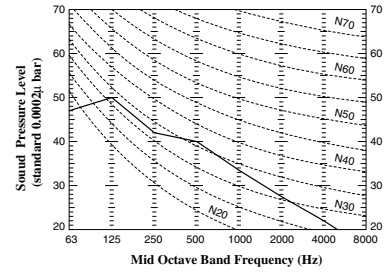
Model FDUR258-A

Noise level 41 dB (A) at HIGH
37 dB (A) at LOW



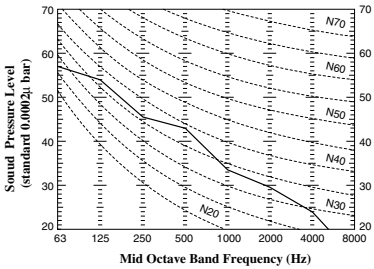
Model FDUR308-A

Noise level 41 dB (A) at HIGH
37 dB (A) at LOW



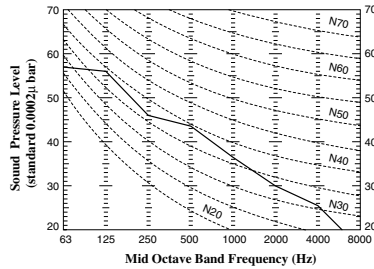
Model FDUR408-A

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



Model FDUR508-A

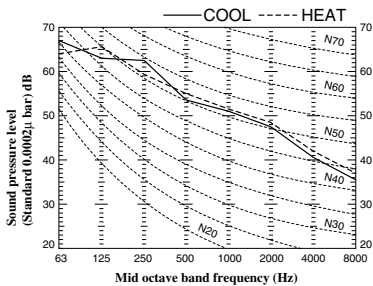
Noise level 45 dB (A) at HIGH
41 dB (A) at LOW



(2) Outdoor unit

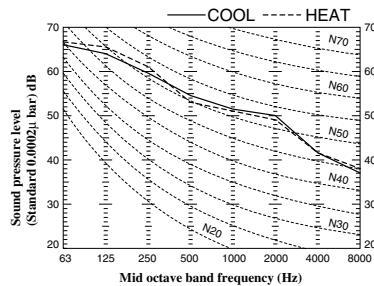
Model FDCP808HES3

Noise level 58 dB (A)



Model FDCP1008HES3

Noise level 58 dB (A)



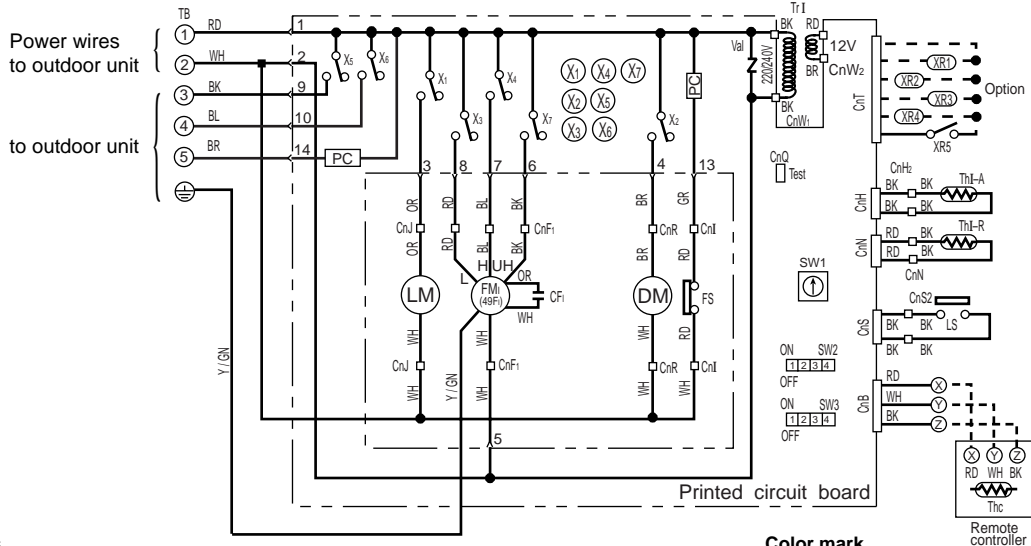
3 ELECTRICAL DATA

3.1 Electrical wiring

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models All models



Meaning of marks

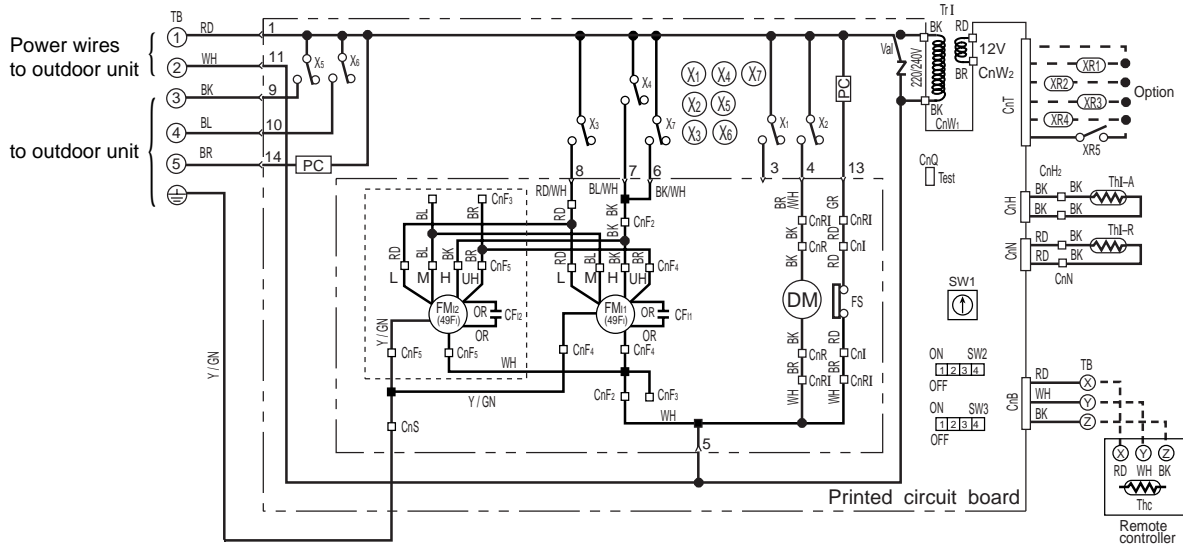
Mark	Parts name	Mark	Parts name	Mark	Parts name
FMi	Fan motor (indoor unit)	X1-7	Auxiliary relay	CnA-W	Connector
49Fi	Internal thermostat for FMi	Thc	Thermistor	TB	Terminal block
CFi	Capacitor for FMi	Th-A	Thermistor	◼	Connector
LM	Louver motor	Th-R	Thermistor	◁	Terminal (F)
LS	Limit switch	Tr	Transformer	SW1	Switch (Address set)
DM	Drain motor	Var	Varistor	SW2, 3	Changeover switch
FS	Float switch	PC	Photo coupler		

Color mark

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red

(b) Casseteria type (FDR)

Models All models



Note(1) "FMi2" and the following wires (shown in [dashed]) are equipped only for FDR408, 508.

Meaning of marks

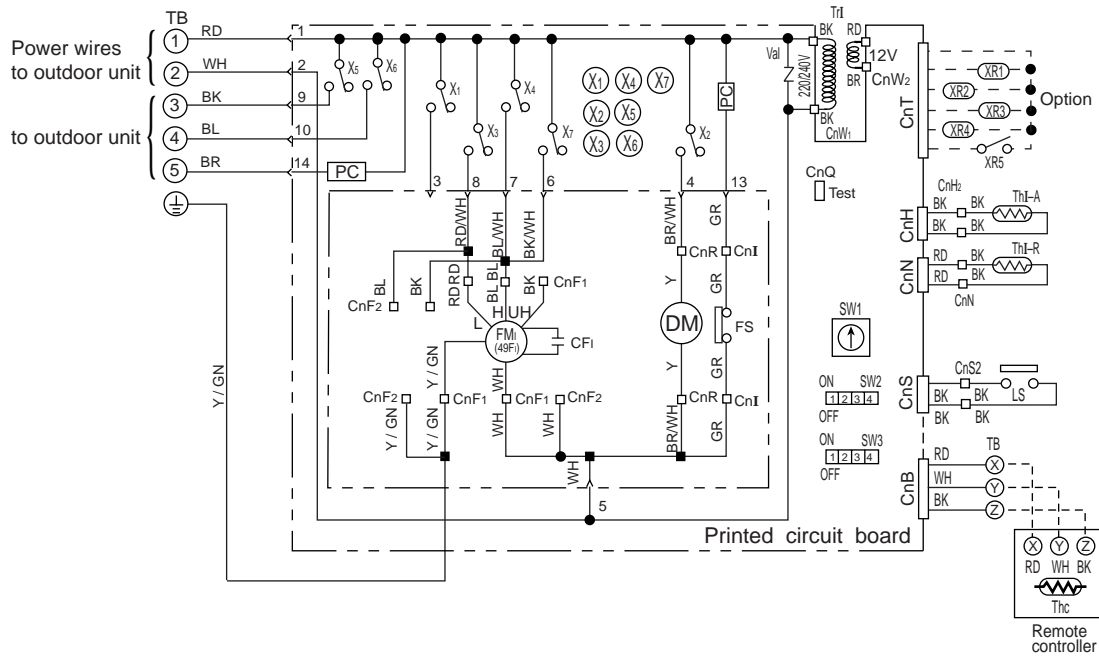
Mark	Parts name	Mark	Parts name	Mark	Parts name
FMi1, 2	Fan motor (indoor unit)	Thc	Thermistor	CnA-W	Connector
49Fi	Internal thermostat for FMi	Th-A	Thermistor	TB	Terminal block
CFi1, 2	Capacitor for FMi	Th-R	Thermistor	◼	Connector
DM	Drain motor	Tr	Transformer	◁	Terminal (F)
FS	Float switch	Var	Varistor	SW1	Switch (Address set)
X1-7	Auxiliary relay	PC	Photo coupler	SW2,3	Changeover switch

Color mark

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

(c) Ceiling mounted duct type (FDUR)

Models All models



Meaning of marks

Mark	Parts name	Mark	Parts name
FM	Fan motor (indoor unit)	Tri	Transformer
49Fi	Internal thermostat for FMi	Vai	Varistor
CF	Capacitor for FMi	PC	Photo coupler
DM	Drain motor	CnA - W	Connector
FS	Float switch	TB	Terminal block
X1-7	Auxiliary relay	■	Connector
Thc	Thermistor	△	Terminal (F)
Th-A	Thermistor	SW1	Switch (Address set)
Th-R	Thermistor	SW2, 3	Changeover switch

Color mark

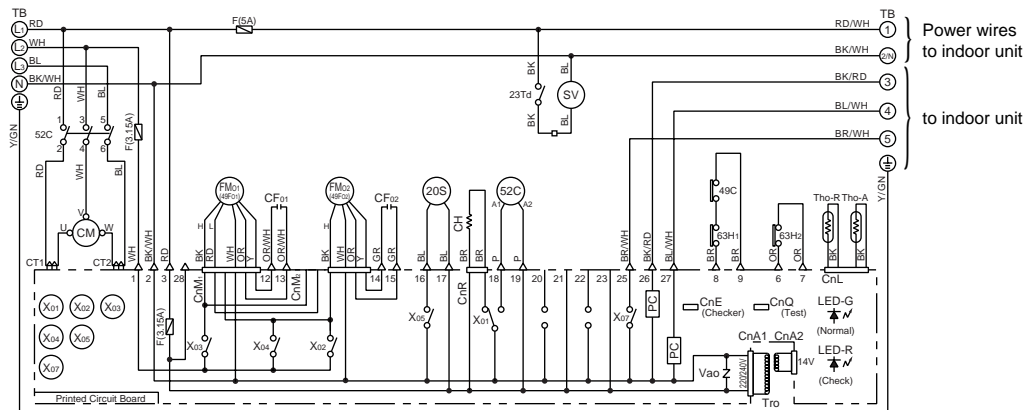
Mark	Color	Mark	Color
BK	Black	WH	White
BL	Blue	Y/GN	Yellow/Green
BR	Brown	RD/WH	Red/White
GR	Gray	BL/WH	Blue/White
OR	Orange	BK/WH	Black/White
RD	Red	BR/WH	Brown/White

(2) Outdoor unit

Models FDCP808HES3, 1008HES3

Power source

3Phase 380-415V 50Hz



Meaning of marks

Mark	Parts name	Mark	Parts name
CM	Compressor motor	LED-R	Indication lamp (Red)
FMo1,2	Fan motor (outdoor unit)	CT1,2	Current sensor
52C	Magnetic contactor for CM	Tho-R	Thermistor (outdoor H.Ex.temp.)
49C	Internal thermostat for CM	Tho-A	Thermistor (outdoor air temp.)
49Fo1,2	Internal thermostat for FMo	Tro	Transformer
CH	Crankcase heater	Vao	Varistor
CFo1,2	Capacitor for FMo	PC	Photo coupler
Xo	Auxiliary relay	CnA-R	Connector
63H1	High pressure switch (for protection)	TB	Terminal block
63H2	High pressure switch (for control)	SV	Solenoid valve (for control)
F	Fuse	23Td	Thermostat
LED-G	Indication lamp (Green)		

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	Y	Yellow

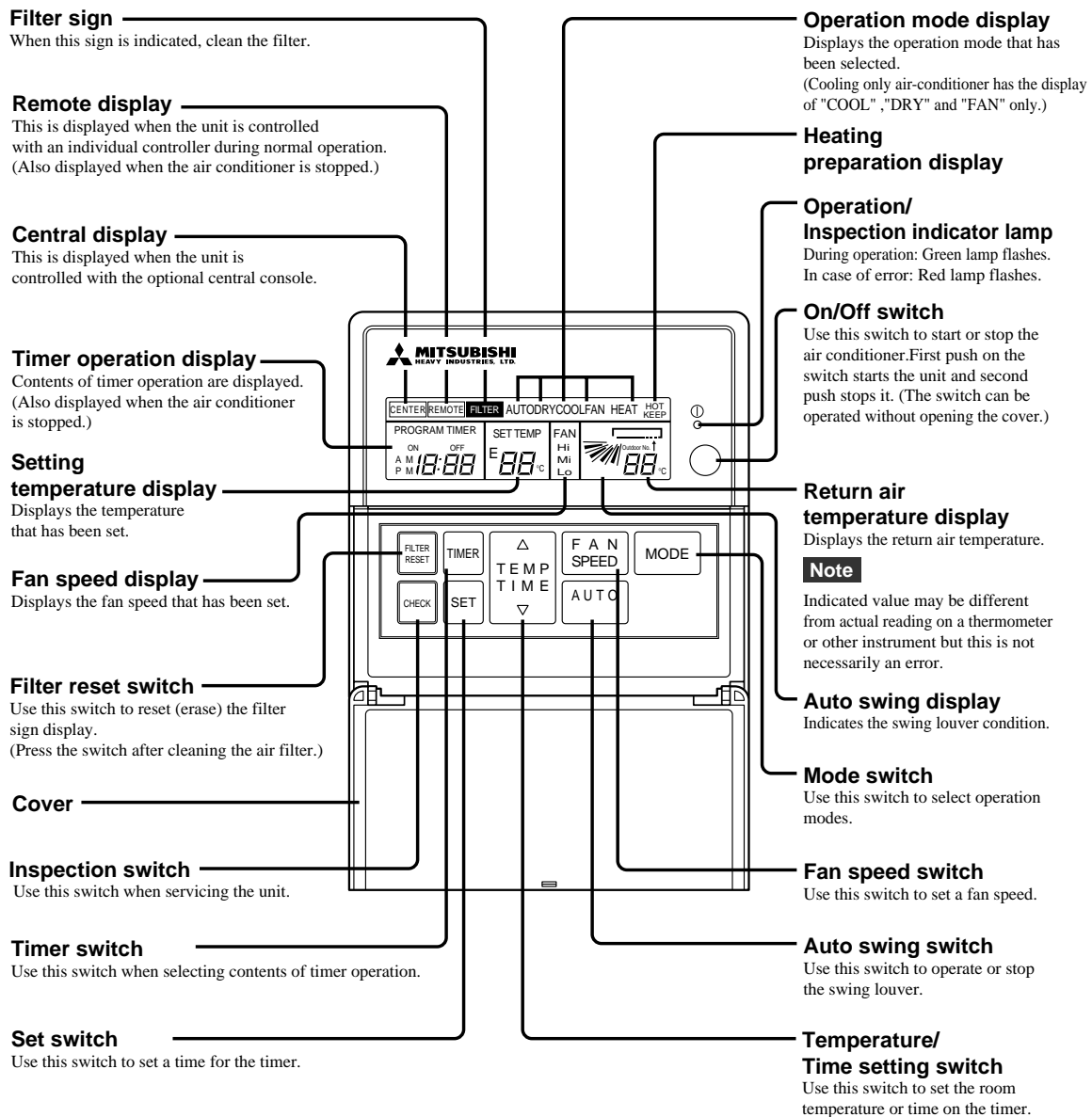
4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

(1) Wired remote controller Models FDT, FDR, FDUR series

FDR and FDUR series are not provided with AUTO SWING switch.

Panel shown below will appear if you open the cover. All contents of display on the LCD are indicated simultaneously for the purpose of explanation.

Pull the knob on the cover to this side to open it downward.

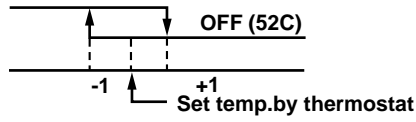


(2) Outline of microcomputer control function

(a) Operation control function by the indoor controller

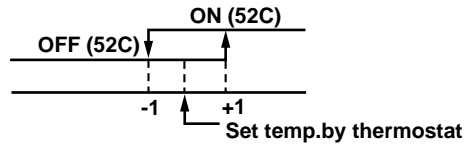
1) Room temperature control (Differential of thermostat)

Heating operation



Temperature difference between thermostat set temp. and return air temp. (Detected by Th_{I-A})

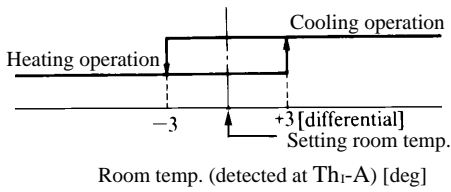
Cooling operation



Temperature difference between thermostat set temp. and return air temp. (Detected by Th_{I-A})

2) Automatic operation

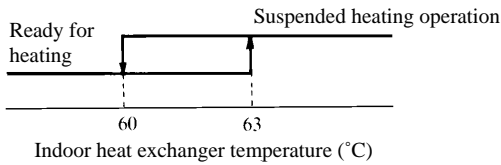
If the Auto mode is selected on the remote control device, the selection of cooling or heating can be made automatically depending on the room temperature (and the temperature of indoor heat exchanger). (When the switching between the cooling and the heating is made within 3 minutes, the compressor will not operate for 3 minutes.) This will make much easier the switching of cooling/heating at the change of season and can be adapted to the unmanned operation at bank cash dispenser.



Room temp. (detected at Th_{I-A}) [deg]

Notes (1) During the automatic switching of cooling/heating the room temperature is controlled based on the setting of room temperature.

(2) If the temperature of indoor heat exchanger rises beyond 63°C during the heating operation, it is switched automatically to the cooling operation. For an hour after this switching, the heating operation is suspended regardless of the temperature as shown at left.



Indoor heat exchanger temperature (°C)

3) Control parts operation during cooling and heating

Function	Cooling		Fan	Heating				Dry	
	Thermostat ON	Thermostat OFF		Thermostat ON	Thermostat OFF	Defrost	HOT START	Thermostat ON	Thermostat OFF
Compressor	○	×	×	○	×	○	○	○	×
4-way valve	×	×	×	○	×	×	○	×	×
Outdoor fan	○	×	×	○	×	×	○	○	×
Indoor fan	○		○	○/×				○	
Louver motor					○/×				
Condensate motor	○	×(2min. ON)	×(2min. ON)	×(2min. ON)				○	×(2min. ON)

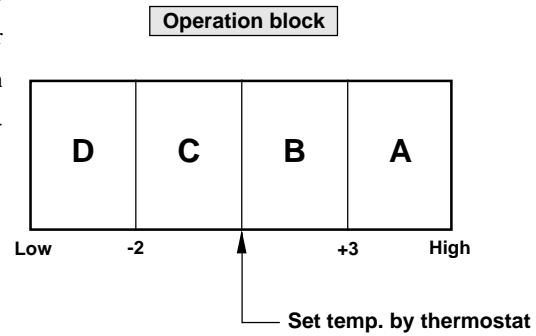
Note (1) ○ :ON

× :OFF

○/× :According to control other than temperature control.

4) **Dehumidifying operation (“THERMAL DRY”)**

The compressor, the indoor fan motor and the outdoor fan motor are operated intermittently under thermostat (Thr-A) control according to the appropriate operation block, to provide cooling operation for the dehumidifying.



Pattern of operation

CM, FM_o: ON (stippled pattern) FM_i: ON (hatched pattern)

Operation block	Thermal drying starting (for 8 or 16 minutes after operation started)	Normal thermal dry operation (after completion of thermal drying)
A	(16 minutes)	(8 minutes) Continuous cooling operation (FM _i :Lo)
B	<ul style="list-style-type: none"> Cooling operation (Thermostat ON) Indoor fan operating with the setting air flow. When the thermostat is turned off, the indoor fan operates for 30 seconds with the Lo operation in the wind blowing mode and then stops. 	(8 minutes)
C	(8 minutes) 	(8 minutes)
D		(8 minutes) All stoppage

Notes (1) **Operation block (A)(B) : Normal cooling operation for 16 minutes after operation is started.**

Operation stops by thermostat when the set temperature is reached.

After 16 minutes, normal thermal drying operation starts.

Operation block (C)(D) : Operation as above is performed for 8 minutes.

After 8 minutes, normal thermal drying operation starts.

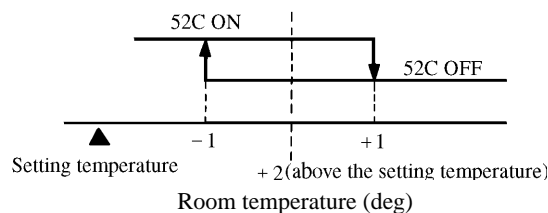
(2) **In normal operation, the temperature is checked at 8 minute intervals** after normal thermal drying operation is started, **to determine which operation block is to be selected.**

Operation block (A) thermal drying is carried out if the thermostat set temperature is constant.

5) **Hot spurt**

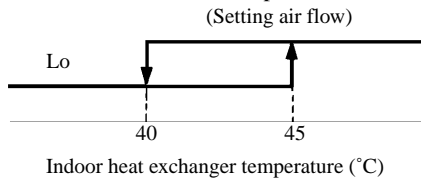
In the hot spurt mode, the control is conducted at the level +2 higher than the setting temperature at the start of heating operation.

The hot spurt is canceled either after the initial thermostat OFF, when the indoor heat exchanger temperature reaches 61°C or 60 minutes after the start of the mode.



6) FM control with the heating thermostat turned off (For cold draft prevention)

In order to prevent a cold draft while the heating thermostat is turned off, the indoor blower is controlled in response to the temperature of the indoor heat exchanger as illustrated below. It should be noted that if SW3-4 on the indoor PCB is turned off, the indoor blower will stop so far as the temperature of the indoor heat exchanger is lower than 40°C. It will be turned to the Lo operation 5 minutes later.



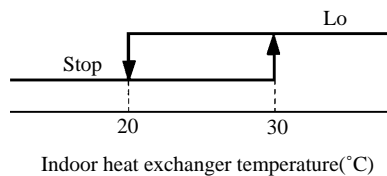
Note (1) After the thermostat is reset, it returns to the hot start control.

7) Hot start (Cold draft prevention during heating)

- 1) If the indoor heat exchanger temperature is lower than 30°C when the heating operation has started, the following indoor blower control is performed.
 - (1) In case of the thermostat off condition: Lo operation
 - (2) In case of the thermostat on condition : Stop
 - (3) If the indoor heat exchanger temperature exceeds 30°C or 7 minutes after the beginning of hot start, the hot start terminates and it returns to the setting airflow of the blower.
- 2) If the indoor heat exchanger temperature is lower than 30°C when the unit is heating under the thermo-ON condition, the indoor fan operates in the Lo mode. As the temperature rises higher than 30 °C or 7 minutes after the beginning of hot start, the hot start terminates and it returns to the setting air flow.

8) Indoor fan control during defrost operation

- 1) The indoor fan operation is changed from the setting airflow to the Lo operation 40 seconds before the start of defrost operation (when the defrost thermostat is turned ON) and stops if the indoor heat exchanger temperature drops below 20°C.
- 2) After the stop as described in 1)-above, the control will be conducted as illustrated below depending on the indoor heat exchanger temperature.



- 3) If the indoor heat exchanger temperature rises beyond 30°C of 7 minutes after the end of defrosting, the indoor fan control related to the defrosting is completed.

9) Condensate pump motor (DM) control

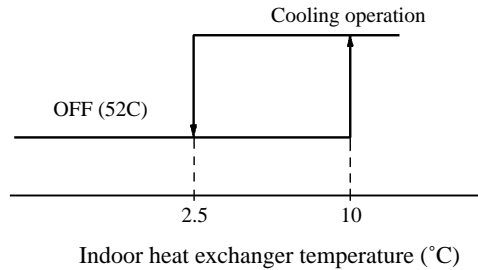
During the cooling or Dehumidifying operation, the condensate pump motor (DM) is synchronized with the start of compressor operation. If the operation is switched from the operation stop, error stop, thermostat stop and the cooling of defrosting operation to the fan or heating operation, the drain motor continues to operate for 2 minutes after the switching.

Overflow detection by means of the float switch is always on regardless of the operation mode. If an overflow occurs (or the float switch is not connected or the wire is broken), the operation is interrupted as the error stop and the drain motor is operated until the state of float switch is normalized.

10) Frost prevention during cooling

In order to prevent the frosting during cooling operation, the temperature of indoor unit heat exchanger (detected by Thi-R) is checked 9 min, after the compressor operation start and the unit operation.

This cycle is not operated for 9 min. after the resetting of this frost prevention mechanism.



11) Compressor inching prevention control

a) Compressor 3 minutes delay control

The compressor will remain in stop state for three minutes. When the compressor is stopped by thermostat, ON/OFF switch, and/or by occurrence of trouble.

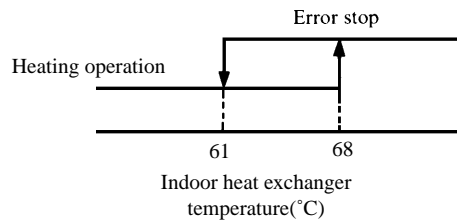
b) Compressor 3 minutes forced operation control

Compressor cannot be stopped for 3 minutes after it started. However, it will be stopped immediately when the thermostat is turned off due to the operation stop initiated by the ON/OFF switch or the change of operation mode.

Note (1) Both the error control and the protective control take priority over this control.

12) Overload protection during heating

If an overload condition has been detected by the indoor heat exchanger temperature and it has continued for more than 2 seconds during heating, the compressor is stopped. The compressor is started after a delay of 3 minutes and, if the overload condition is detected again within 60 minutes after the initial detection, the compressor is stopped with the error stop.



13) Automatic restart control

If there is interruption of power while the unit is operating, the unit operates after power restoration under the same condition as prior to the power interruption. However the compressor will only be able to start three minutes after the power restoration. Furthermore, if the timer was operating prior to the power interruption, the unit remains stopped even after the restoration of service.

Note (1) Becomes invalid if the dip switch SW3-1 on the indoor PC board is at OFF (SW3-1 is set at ON when unit is shipped from the factory).

14) Thermistor disconnection detection control

a) Detection of indoor return air thermistor disconnection

- If there is detection of a disconnection on the return air thermistor in 10 seconds after turning the power ON, the compressor is stopped. If there is a second disconnection on the return air thermistor detected within 60 minutes, there is emergency stop.

Note (1) If the first disconnection on the return air thermistor is detected for a period of 6 continuous minutes, there is emergency stop. If there is no detection of a second disconnection on the return air thermistor within 60 minutes, the first detection becomes invalid.

- b) Detection of heat exchanger thermistor disconnection
- If a disconnection is detected on the heat exchanger thermistor in 20 seconds after the compressor has been operating for 2 minutes, the compressor is stopped. If a second disconnection on the heat exchanger thermistor line is detected within 60 minutes, there is emergency stop.

Note (1) If the first disconnection on the heat exchanger thermistor is detected for a period 6 continuous minutes, there is emergency stop.

If there is no detection of second disconnection on the heat exchanger thermistor within 60 minutes, the first detection becomes invalid.

15) Drain detection

- a) If there is detection of a drain abnormality during cooling operation, the drain pump goes ON for 5 minutes and the compressor which had been running comes to a stop.
- Overflow detection is carried out at all times with the float switch regardless of operational mode. If an overflow is generated (or if the float switch is not yet connected or has been disconnected), there is emergency stop (E9 is displayed) the drain motor operates until reset of the float switch.
- b) If a drain abnormality is detected during cooling operation, there is emergency stop (E9 is displayed) to stop the compressor, and the drain pump is operated with the drain motor until reset of the float switch.
- c) If a drain abnormality is detected during a stop state or fan operation, there is forced operation of the drain pump for 5 minutes. After 5 minutes have elapsed, the drain motor stops if the float switch is reset. Otherwise, there is emergency stop (E9 is displayed) and the drain motor operates until the float switch is reset.
- d) If the float switch is not connected or if there is a disconnection, there is emergency stop.

16) Low voltage guard control

If the power source voltage remains at a value of 80% of rating or less for 3 continuous minutes during operation of the compressor, the compressor stops (52C OFF). Furthermore, if the power source voltage remains at a figure of 15% of rating or greater after 3 minutes have elapsed since stopping the compressor, there is restarting of the compressor (52C ON). Moreover, during stoppage of the compressor.

Note (1) When starting the compressor for the first time after turning the operational switch ON, there is starting regardless of the power source voltage.

Furthermore, if dip switch SW 3-2 on the internal substrate is OFF, this becomes invalid. (Switch SW 3-2 is set to ON upon shipment from the factory).

17) Refrigerant shortage error

When 52C is ON when operating in cooling (including automatic cooling), if heat exchanger sensor temperature for the indoor unit (Thi -R) does not drop to 25 °C or less for 40 minutes 5 minutes or more after the start of operation, an abnormal stop due to insufficient refrigerant is performed.

18) External control (remote display)/control of input signal

- a) **External control (remote display) output**

Following output connectors (CNT) are provided on the control circuit board of indoor unit.

- Operation output: Power to engage DC 12V relay (provided by the customer) is outputted during operation.
- Heating output: Power to engage DC 12V relay (provided by the customer) is outputted during the heating operation.
- Compressor ON output: Power to engage DC 12V relay (provided by the customer) is outputted while the compressor is operating.
- Error output: When any error occurs, the power to engage DC 12V relay (provided by the customer) is outputted.

b) Control of input signal

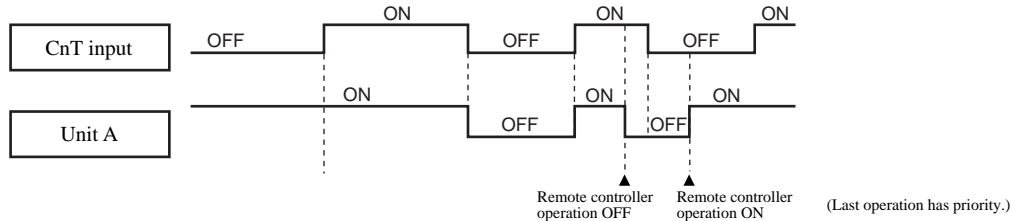
(Make sure to connect the standard remote control unit. Control of input signal is not available without the standard remote control unit.)

Control of input signal (switch input, timer input) connectors (CNT) are provided on the control circuit board of the indoor unit.

However, when the operation of air conditioner is under the Center Mode, the remote control by CnT is invalid.

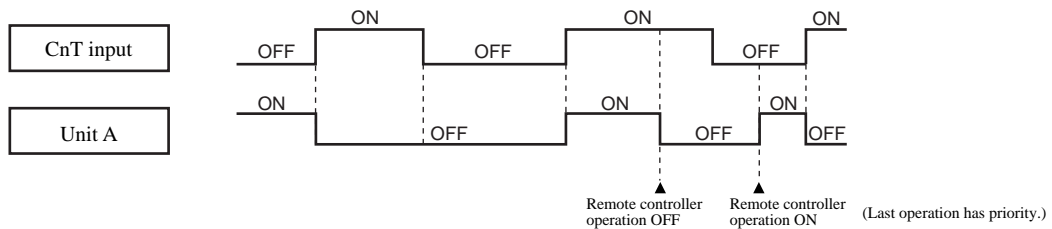
◆ At shipping from factory (J5 (SW5-2) on PCB OFF)

- Input signal to CnT OFF → ON [Edge input] ... Air conditioner ON
- Input signal to CnT ON → OFF [Edge input] ... Air conditioner OFF



◆ When J5 (SW5-2) on the PCB of indoor unit is turned on at the field.

Input signal to CnT becomes Valid at OFF Æ ON only and the motion of air conditioner [ON/OFF] is inverted.



19) Auto Swing Control (Only FDT models)

- Have a louver motor to move the louvers up and down for the so called “auto swing” function.
- The louver auto swing starts when the AUTO SWING key is pressed once and stops when the AUTO SWING key is pressed again. The louver position is displayed on the LCD on the remote controller. During auto swing, the position displayed on the LCD changes, but the positions of the louvers and the display are not coordinated. (The louvers swing 3 - 4 times per minute but the display changes once per second.)

● **Stopping the louvers**

When the AUTO SWING key is pressed to stop the louver movement, the LCD louver-position display stops and the louvers stop when they come to the position displayed on the LCD. There are four louver stop position on the LCD. (When jumper wire J3 on the indoor unit printed circuit board is cut, the louvers stop immediately at the AUTO SWING key is pressed to stop them and the LCD display changes to show this position.)

● **Movement of louver when the power supply to the controller controlling 4 positions of the louver is switched on.**

When power supply is switched on, the louver will automatically swing about 2 times (without operating remote controller). This is an action for the microcomputer to confirm the louver position in order to input the cycle of the louver motor (LM) to the microcomputer with the limit switch (LS) pushing the louver motor (LM). If the LS action is not input to the microcomputer, the louver will stop within 1 minute after the power supply is switched on and will not move from then on.

- **Keeping the louvers horizontal during heating**

While HOT KEEP is displayed (during hot start operation or when the thermostat has turned off during heating operation), the louvers stay in the horizontal position to prevent cold drafts, independent of the setting of the AUTO SWING key (auto swing or stop). The louver position display of LCD displays continuously the original position before this control operation.

When the HOT KEEP display goes out, both the louvers and the LCD display return to their previous position. (However, after the power supply to the unit is switched on, the louvers swing two times as a check of the power source frequency, regardless of the settings of the ON / OFF or AUTO SWING keys).

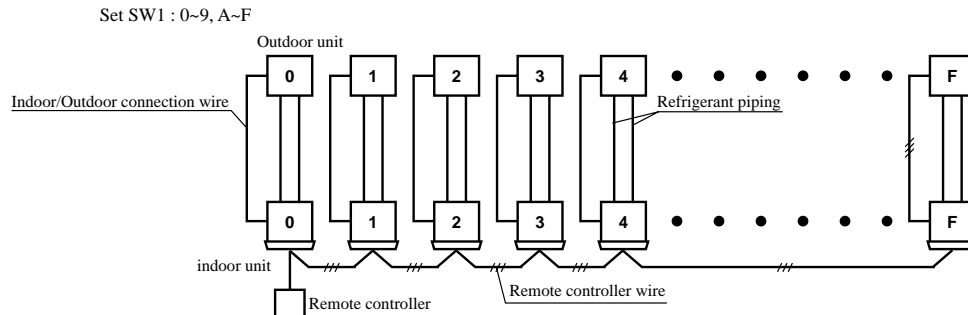
20) Using 1 remote controller to control multiple units (indoor units - up to 16 units)

a) Function

A single remote control switch can be used for group control of multiple units (indoor units - up to 16 units). All units in the group that have had the remote control switch set at [Operating Mode] can be turned on and off in order of the unit number.

This functions independently of the thermostat and protection functions of each unit.

Notes (1) The unit number is set by a switch (SW1) on the circuit board for the indoor unit.



(2) If unit number is not important, random can be used. However, setting in order from 0, 1, 2, to F will ensure setting without error.

b) Display to remote controller

(i) **Return air temperature, by remote or center and heating preparation:** Displays for the youngest unit for the remote mode (center mode if there is no remote mode) of the units in operation.

(ii) **Inspection and filter sign:** Displays either to the first corresponding unit.

c) Confirmation of connected units

Each push of the inspection switch on the remote control displays the units connected in sequential order from the youngest unit.

d) Error

(i) If an error occurs (protection device activation) with some of the units in the group, those units will have an error stop, but the properly operating units will continue operation.

(ii) **Wiring outline**

Route the wire connecting each of the indoor and outdoor units as it would be for each unit. Use the terminal block (X, Y, Z) for the remote control for the group controller and use a jumper wire among each of the rooms.

(b) Operation control function by the wired remote controller

(i) The following is the sequence of operation for the remote controller operation mode switch.



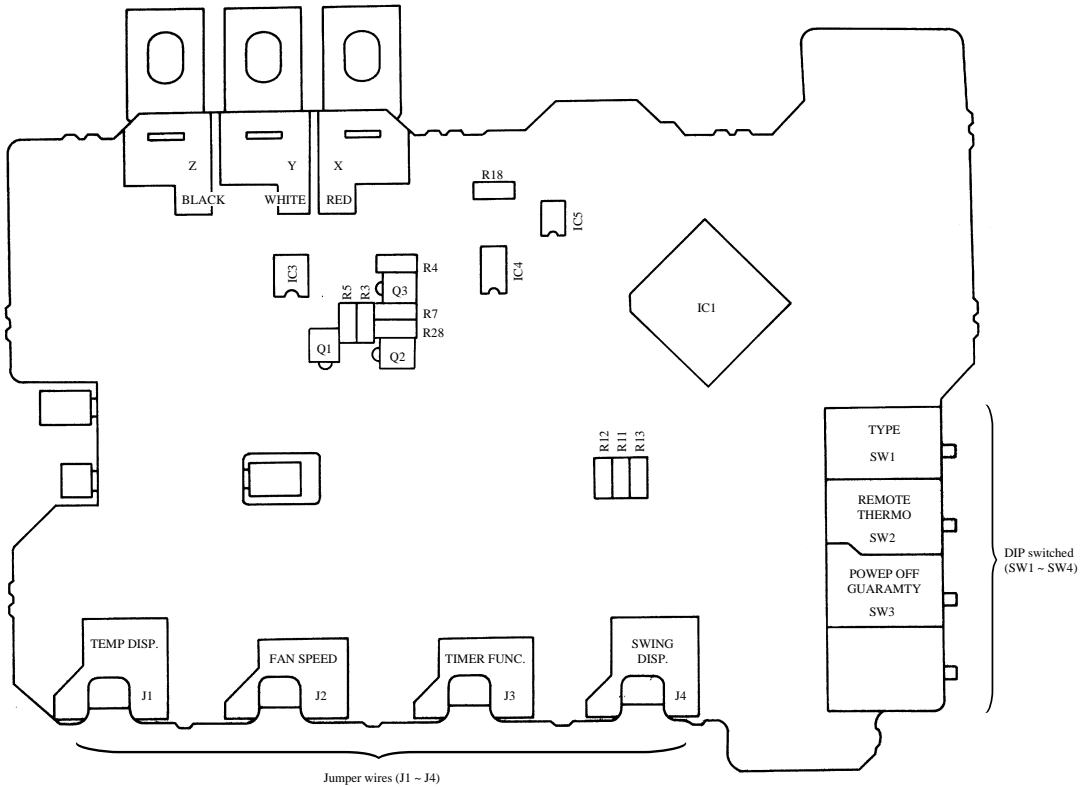
(ii) CPU reset

This functions when the " inspection " and " filter reset switch " on the remote controller are pushed simultaneously. It operates in the same manner as the power reset.

(iii) Power outage compensation function.

- This is enabled by setting dip switch SW3 on the remote control circuit board to ON.
- It records the normally used remote control modes. Once power has been restored, it restarts operation by using the contents of the memory. Note that the stop positions for auto swing and the timer mode are cancelled.

Parts layout on the remote controller PCB



• Function of DIP switched

Switch	Function
SW1	ON Cooling only type
	OFF Heat pump type
SW2	ON Remote control sensor - Enabled
	OFF Remote control sensor - Disabled
SW3	ON Power outage compensation - ON
	OFF Power outage compensation - OFF

• Function of Jumper wires

Switch	Function
J1	Wich Inlet temperature display - Enabled
	None ⁽¹⁾ Inlet temperature display - Disabled
J2	Wich Fan display - 3 speeds
	None ⁽¹⁾ Fan display - 2 speeds
J3	Wich Timer function - Enabled (Normal)
	None ⁽¹⁾ Timer function - Disabled
J4	Wich Auto swing display - ON
	None ⁽¹⁾ Auto swing display - OFF

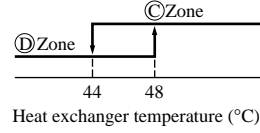
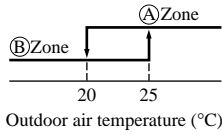
Note (1) 'None' means that jumper wire is not provided on the PCB or the connection ic cut.

(c) Operation control function by the outdoor controller

1) **Control for outdoor unit fan**

a) **Cooling Operation**

The speed of the fan for the outdoor unit is controlled by the temperature of the heat exchanger (Tho-R detection) and the outdoor air temperature (Tho-A).



Description of control for fan for outdoor unit

Fan motor		FM01(Left)	FM02(Right)
Zone	Ⓐ Zone	Hi	Hi
	Ⓑ Zone	Ⓒ Zone	OFF
		Ⓓ Zone	Lo

b) **Heating Operation**

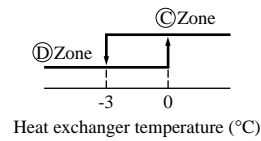
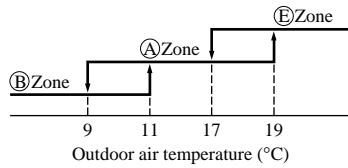
① Stop control for outdoor fan

When the high pressure switch (63H2) operates, the fan for the outdoor unit is stopped to control the high pressure switch.

63H2 settings : 2.79 OFF/2.26 ON (Mpa)

② Tap control for outdoor fan

When the high pressure switch (63H2) is closed, the outdoor fan is controlled by the detected heat of the outdoor heat exchanger thermistor (Tho-R) and the detected heat of the outdoor air temperature thermistor (Tho-A).



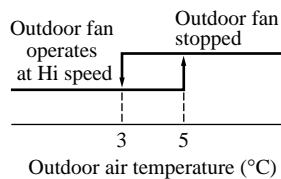
Description of control for fan for outdoor unit

Fan motor		FM01(Left)	FM02(Right)
Zone	Ⓐ Zone	Ⓒ Zone	OFF
		Ⓓ Zone	Hi
	Ⓑ Zone	Ⓒ Zone	Hi
		Ⓓ Zone	Hi
	Ⓔ Zone	Ⓒ Zone	OFF
		Ⓓ Zone	Hi

Note (1) When the fan for the outdoor unit is started when the outdoor air temperature is more than 12 °C, it will operate at high speed for 3 seconds and then switch to low speed. After operating a low speed for 4 minutes, it will be transferred to controlled speed.

2) **Snow protection fan control**

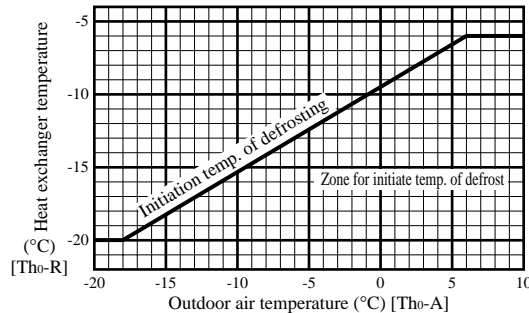
If DIP switch SW5-2 on the printed circuit board for the outdoor unit is set to on, the fan on the outdoor unit which has been stopped will operate for 10 seconds at Hi speed every 10 minutes when the outdoor air temperature is 3 °C or less.



3) **Defrost control (Only heat pump type)**

Defrost operation will start when the temperature of the heat exchanger for the outdoor unit (Tho-R detection) and the outdoor air temperature (Tho-A detection) enter the start of defrost range shown in the figure below.

Initiation temp. of defrosting (Detected by Tho-R, Tho-A)



Note (1) If DIP switch SW5-1 on the printed circuit board for the outdoor unit is set to on, defrost operation will begin when temperature of the heat exchanger for the outdoor unit reaches -7 °C.

a) **Defrost finished**

- (i) Once defrost operation has started, it will finish after the cumulative operating time of the compressor has reached 12 minutes (factory setting: SW5-1 OFF).
Note (1) This time will become 14 minutes if the DIP switch (SW5-1) on the printed circuit board on the outdoor unit is set to on.
- (ii) Patterns of defrost control can be changed by changing the setting of J18 on the PCB of outdoor unit.
 - J18 (SW6-2) with: Normal defrost control
 - J18 (SW6-2) none: Forced defrost control

4) **Compressor protecting function (Microcomputer and phase protection relay)**

a) **Overcurrent control**

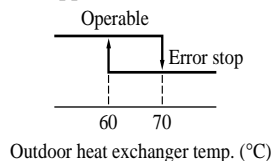
- (i) When a 52C secondary L1-phase continues for 0.5 seconds and when it is more than the set value (detection at current sensor CT), the compressor is stopped. The compressor is restarted after a 3-minute delay if the detection current is less than 1.5 to 2A. If this condition is re-detected 5 times within 60 minutes of the first occurrence, an abnormal stop of the unit is performed.
- (ii) If 60 minutes passes and the detected current after the first to the fourth stoppage is not less than 1.5~2A, an abnormal stop of the unit is performed.

b) **Open-phase protection**

When a 52C secondary detection current continues for 4 seconds when the compressor is on and when it is less than 1.5 to 2 A, it is determined to be a open-phase of the 52C secondary N-phase, and the compressor is stopped. The compressor is restarted after a 3-minute delay and if this condition is re-detected within 60 minutes of the first occurrence, an abnormal stop of the unit is performed.

c) **Cooling overload protection**

State of overload during cooling operation is detected (with Tho-R) based on the temperature of outdoor heat exchanger and the unit operation is stopped / Immediate reset after repair



d) **Thermistor (Heat exchanger and outdoor air thermistor) disconnected wire**

- (i) If there is a disconnected wire or if there is a big difference in performance characteristics, an abnormal stop of the unit is performed. ⇨ Restore after repairing.

5) **Abnormal high-pressure protection**

- a) If the pressure rises and 63H1 is operated (opened), the compressor is stopped. After a 3-minute delay, the compressor is restarted. An abnormal stop is performed when 63H1 is opened 5 times within 60 minutes of the first operation. ⇨ Restore after repairing.
- b) An abnormal stop is performed at the first occurrence if 63H1 remains open after 60 minutes have passed from the first time the compressor was stopped.

Note (1) Once 63H1 has been restored after an abnormal stop, the unit can be restarted using the remote control.

6) **Compressor motor protection**

The same detection control as 63H1 will be performed when the internal thermostat 49C operates due to a rise in the windings of the compressor motor. The setting values of the internal thermostat 49C are 90 °C open and 73 °C close.

7) **Control of the closing and opening of the service valve**

- a) When the compressor is ON for the first time after turning on the power, the heating operation starts regardless of any setting.
- b) If the 63H2 turns OFF(open) within 10 seconds after the compressor is ON, the power will turn off as abnormal stop.
- c) To recover from the abnormal stop, turn on the power again after the 63H2 is ON(closed).
- d) If the 63H2 doesn't turn OFF(open) within 10 seconds after the compressor is ON, the operation immediately changes to the "set mode" to start normal operation.

8) **Test run**

- a) For a test run, it is possible to use the dip switches SW5-3 and SW5-4 on the printed circuit board in the outdoor unit.

SW5-3	ON	SW5-4	OFF	Test run for cooling
			ON	Test run for heating
	OFF	Normal		

- b) Test run time is 30 minutes. Protective devices are effectively controlled.

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.

5.1 Installation of indoor unit

⚠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.

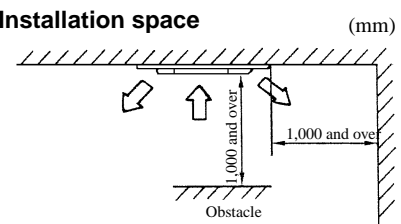
Ceiling recessed type (FDT)

(1) Selection of installation location

- Select location where the space above ceiling is larger than those mentioned below and perfect draining can be assured.
- Places where perfect drainage can be prepared and sufficient drainage gradient is available.
- Places free from air disturbances to the air inlet and outlet of the indoor unit.
- Places with the environmental dew-point temperature is lower than 28°C and the relative humidity is less than 80%. (When installing at a place under a high humidity environment, pay sufficient attention to prevention of dewing such as thermally insulating the unit properly.)
- Do not place where the unit is exposed to oil splashes or steam (e.g. kitchens and machine plants). (Installation and use at such places will causes the performance drop, corrosion in the heat exchanger and damage in molded synthetic resin parts.)
- Do not place where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains. Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.
- Do not place adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals, Generated noise may cause malfunctioning of the controller.

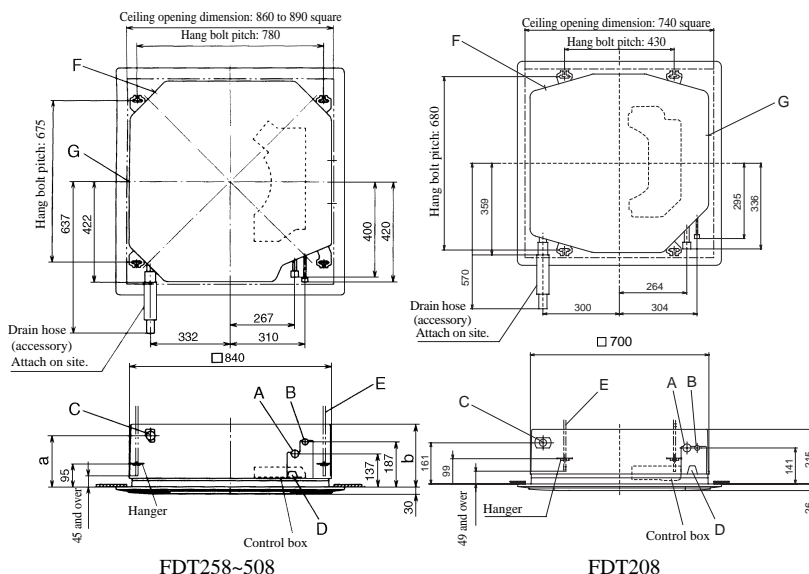
Model	Space above ceiling
FDT208	Over 225 mm
FDT258, 308	Over 270 mm
FDT408, 508	Over 330 mm

● Installation space



(2) Preparation for installation

- Ceiling hole size and Position of suspension bolts.
 - The pattern sheet may shrink or expand as humidity changes, so check the actual size before use.
 - The size of ceiling opening can be adjusted within the range shown below. Bring the unit body to the ceiling opening right in the center so as not to be set aside and so that space between a ceiling opening end and the outside of the unit body becomes equal to that on the opposite side.
 - The size of the pattern sheet equals to the maximum size of the square ceiling opening.
- Location of Pipes
For the location of pipe, see the exterior dimension.



A	Gas refrigerant piping
B	Liquid refrigerant piping
C	Drain piping connecting hole
D	Power intake hole
E	Hang bolt
F	Outside air intake hole
G	Supply air branch duct connecting hole

Unit: mm

Model	a	b
FDT258, 308	210	260
FDT408, 508	270	320

(3) Hanging

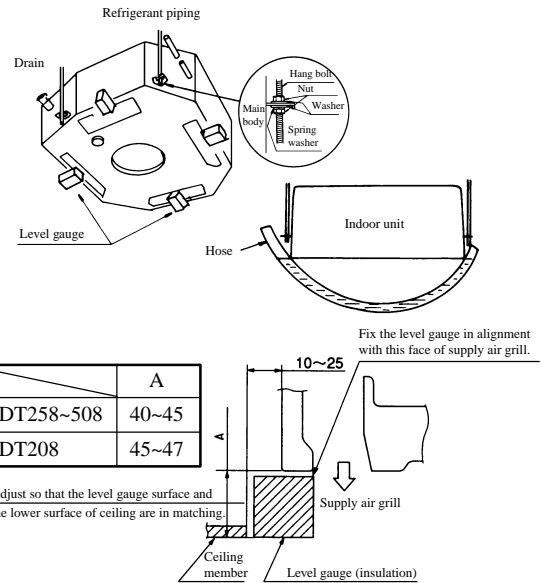
- Arrange four sets of a hang bolt (M10 or M8), a nut for it, a plain washer and a spring washer on site.

When there is the ceiling

1. Make an 860 to 890 mm-square cutout on the ceiling.
Refer to the outside dimensions of packing cardboard container.
▶ Align the center of ceiling cutout and the center of unit.
2. Decide the hang bolt position 675×780 in the case of 258 ~ 508, and 430×680 in the case of 208.
3. Use four hang bolts and fix them so that each bolt can resist the pull out load of 50kgf.
4. Decide the length of hang bolt to approx. 70mm above the ceiling surface.
5. After hanging in the unit, fix the attached level gauge and secure the height of unit.
6. Use a transparent hose filled with water to check the levelness of unit. (The maximum allowable height difference between both ends of unit is 3mm.)

Request

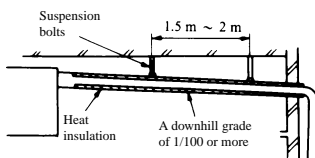
- For the hang bolt whose length exceeds 1.3m, use the M10 size hang bolt and moreover combine a diagonal member to the hang bolt for reinforcement.



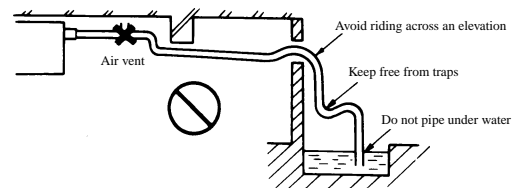
(4) Drain Piping

- (a) Drain piping should always be in a downhill grade (1/50~1/100) and avoid riding across an elevation or making traps.

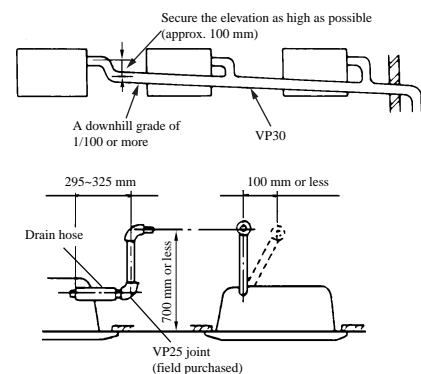
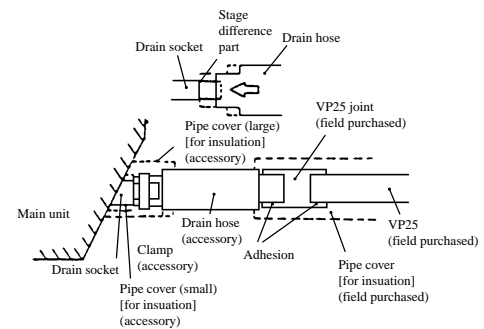
● Good piping



● Improper piping



- (b) When connecting the drain pipe to unit, pay sufficient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.
- (c) For drain pipe, use hard PVC general purpose pipe VP-25 (I.D.1") which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).
- (d) When constructing drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch. Use VP-30 (1 1/4") or thicker pipe for this purpose.
- (e) Be sure to provide heat insulation to hard PVC pipes of indoor placement.
- (f) Do not ever provide an air vent.
- (g) The height of the drain head can be elevated up to a point 700 mm above the ceiling and, when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is higher than 500 mm, the back-flow quantity of drain at the event of interruption of the operation gets too much and it may cause overflow at the drain pan. Therefore, make the height of the drain pipe within the distance given in the sketch below.
- (h) Avoid positioning the drain piping outlet at a place where generation of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.
- (i) The purpose of drain hose is to absorb minute discrepancy of the unit or the drain piping occurred when they are installed. Therefore, when it is bent intentionally or used under expanded condition, it may be damaged and result in water leakage.



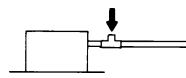
Drainage Test

- ① Conduct a drainage test after completion of the electrical work.
- ② During the trial, make sure that drain flows properly through the piping and that no water leaks from connections.
- ③ In case of a new building, conduct the test before it is furnished with the ceiling.
- ④ Be sure to conduct this test even when the unit is installed in the heating season.

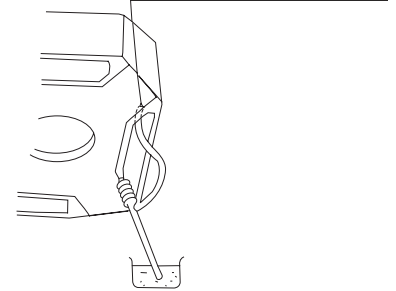
Procedures

- ① Supply about 1000 cc of water to the unit through the air outlet by using a feed water pump.

Pour water into a convex joint



Put the tip of the feed water pump in the drain pan of the unit body



(If the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet. Then, check if water leaks from the piping system and that drain flows through the drain pipe normally.

- ② Check at the exhaust port if drain is flowing.

(Note) Conduct this test paying attention to rotating sound of the drain motor.

- ③ Remove the drain plug located on the bottom of the drain pan when the water has to be evacuated from the unit.
- ④ After the test, fit the drain plug to the original place and turn off the power source.

(5) Fixing of Decorative Panel (The panel fixing bolts are attached on the panel.)

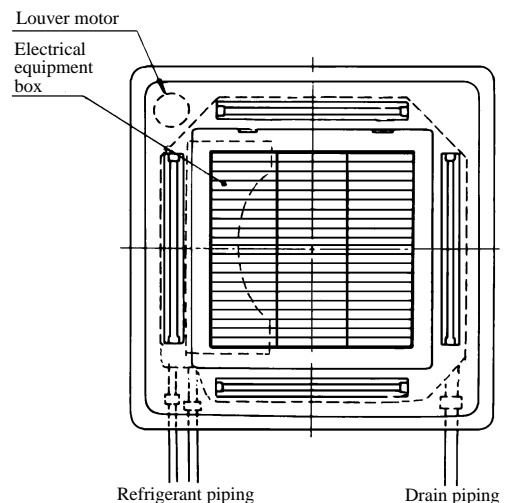
- (a) Check with the accessory level gauges that the indoor unit height and the size of ceiling hole are correct.
 - Remove the level gauges from the indoor unit before fixing the decorative panel.
- (b) Screw two bolts out of four accessory bolts less than 5 mm in the indoor unit diagonally.
- (c) Hang the panel on the two bolts and fix them temporarily.
- (d) Tighten the bolts fixed temporarily and the remaining two bolts.
Screw the remaining two bolts, and tighten all (four) bolts.
- (e) Connect the louver motor connector (red) to the panel respectively.
- (f) If the louver motor is not operated by remote control, check if the connector is connected correctly, and turn off the power for more than 10 seconds, then reset it.

Panel Joint Setting

- The panel can turn 30 mm to the left and to the right in all, and the indoor unit turns 30 mm to the left and to the right in all in the case of 258~508, and 20 mm in the case of 208.

Limit Fixing Panel

- ① Fix the panel only in the direction shown in the figure.
- ② If it is fixed in other way, air will leak. Also, wires cannot be connected for auto swing and receiver amp.



Casseteria type (FDR)

(1) Preparation of indoor unit

Before of during the installation of the unit, assemble necessary optional panel, etc. depending on the specific type.

(2) Select places for installation satisfying following conditions and, at the same time, obtain the consent on the part of your client user.

- (a) Places where chilled or heated air circulates freely.

When the installation height exceeds 3m warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.

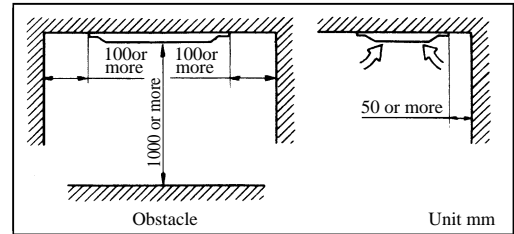
- (b) Places where perfect drainage can be prepared and sufficient drainage.
- (c) Places free from air disturbances to the suction port and blowout hole of the indoor unit, places where the fire alarm may not malfunction or short-circuit.
- (d) Places with the environmental dew-point temperature is lower than 28°C and the relative humidity is less than 80%.

(When installing at a place under a high humidity environment, pay sufficient attention the prevention of dewing such as thermal insnlation of the unit proper.)

- (e) Ceiling height shall have the following height.

Panel	Models	FDR208,258,308	FDR408,508
Combination with silent panel		365mm	416mm
Combination with canvas panel		459mm	510mm

● Installation space.



(3) Avoid installation and use at those places listed below.

- (a) Places exposed to oil splashes or steam (e.g. kitchens and machine plants.)

Installation and use at such places incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.

- (b) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc) in generated or remains. Installation and use at such places cause corrosion in the heat exchanger and damage in molded synthetic resin parts.

- (c) Places adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals.

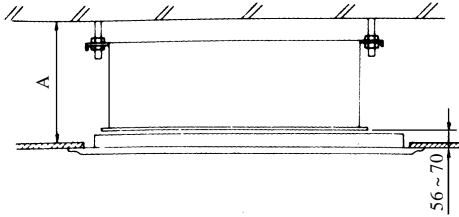
Generated noise may cause malfunctioning of the controller.

(4) Preparation for suspending the unit

(a) Selection of hanging pattern

When the unit is hung from ceiling, select one of following patterns depending on the dimensions of the ceiling.

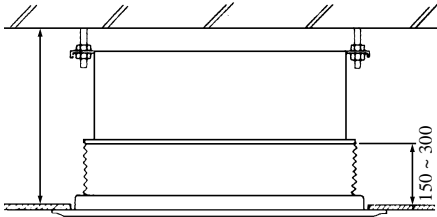
< Combination with silent panel >



Unit: mm

Dimensions	A
Models	
FDR208,258,308	365 or over
FDR408,508	416 or over

< Combination with canvas panel >

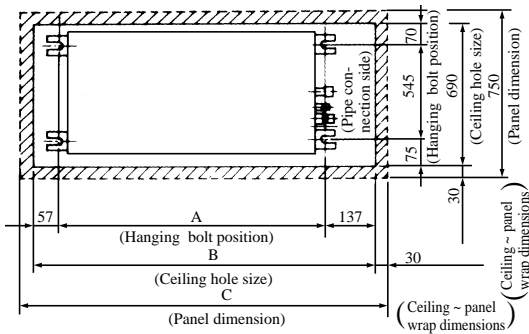


Unit: mm

Dimensions	A
Models	
FDR208,258,308	459 or over
FDR408,508	510 or over

(b) Size of hole at ceiling and position of hanging bolts

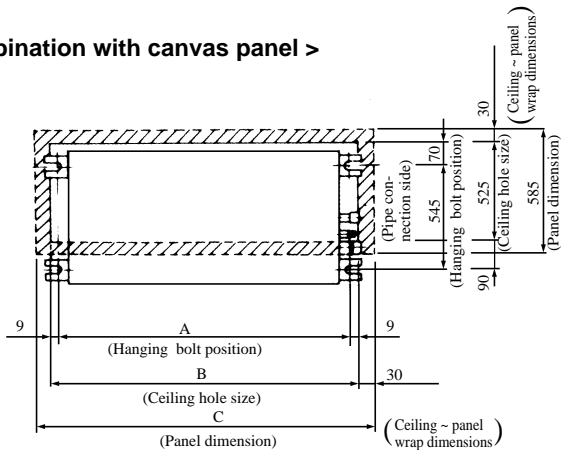
< Combination with silent panel >



Unit: mm

Dimensions	A	B	C
Models			
FDR208	786	980	1040
FDR258,308	986	1180	1240
FDR408,508	1406	1600	1660

< Combination with canvas panel >

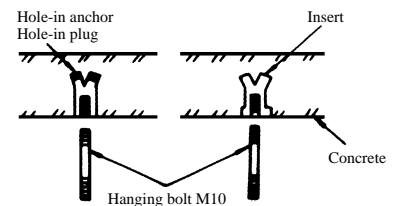


Unit: mm

Dimensions	A	B	C
Models			
FDR208	786	804	864
FDR258,308	986	1004	1064
FDR408,508	1406	1424	1484

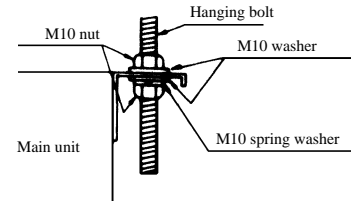
(c) Hanger bolts installation

- Use care of the piping direction when the unit is installed.



(5) Installation of indoor unit

- Fix the indoor unit to the hanger bolts.
- If required, it is possible to suspend the unit to the beam, etc.
- Directly by use of the bolts without using the hanger bolts.

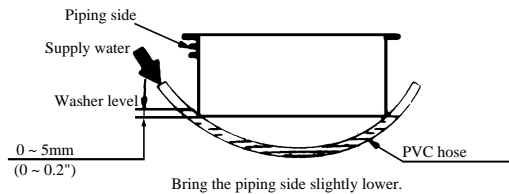


Note

When the dimensions of main unit and ceiling holes does not match, it can be adjusted with the slot holes of hanging bracket.

Adjusting to the levelness

- Adjust the out-of levelness using a level or by the following method.
 - Make adjustment so that the relation between the lower surface of the unit proper and water level in the hose becomes as given below.



- Unless the adjustment to the levelness is made properly, malfunctioning or failure of the float switch may occur.

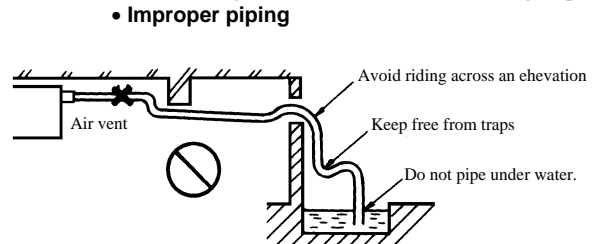
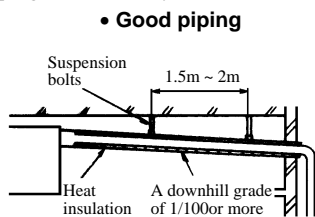
Tap selection on blower unit (When the high performance filter is used.)

Taps of blower unit are set at the standard selection at the shipping from factory. Where the static pressure is raised by employing such option as the high performance filter, etc., change the connection of connectors provided at the flank of control box as shown below.

Standard tap (at shipping)			High speed tap		
Control box side	Red	White	Control box side	Red	Blue
	Black	White		Blue	Black
	White	White		Black	Brown
				White	White
			Motor side		Motor side

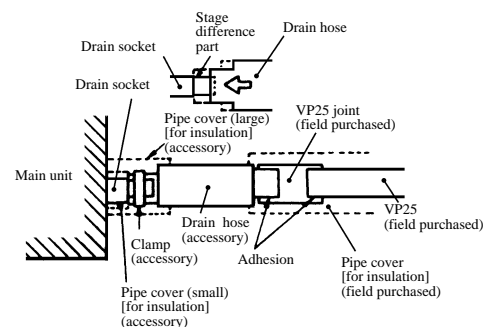
(6) Drain Piping

- Drain piping should always be in a downhill grade (1/50~1/100) and avoid riding across an elevation or making traps.

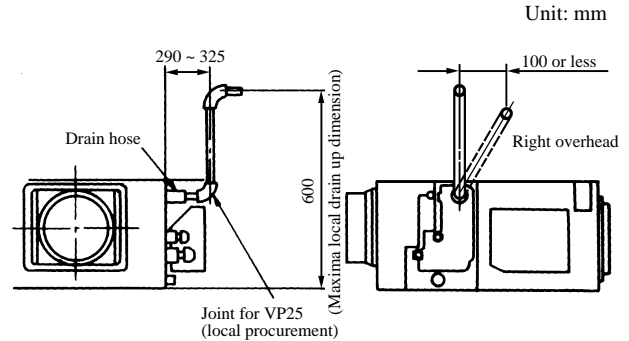
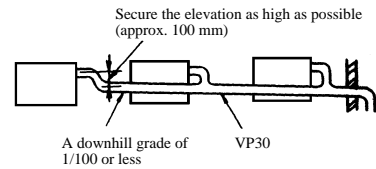


- When connecting the drain pipe to unit, pay sufficient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

- For drain pipe, use hard PVC general purpose pipe VP-25(I.D.1") which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).



- (d) When constructing drain piping for several units, position the common pipe about 100mm below the drain outlet of each unit as shown in the sketch. Use VP-30(1 1/4") or thicker pipe for this purpose.
- (e) Be sure to provide heat insulation to hard PVC pipes of indoor placement.
- (f) Do not ever provide an air vent.
- (g) The height of the drain head can be elevated up to a point 600mm from the bottom of unit, and when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is higher than 600mm, the back-flow quantity of drain at the event of interruption of the operation gets too much and it may cause overflow at the drain pan. Therefore, make the height of the drain pipe within the distance given in the sketch below.
- (h) Avoid positioning the drain piping outlet at a place where generation of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

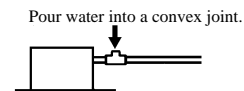
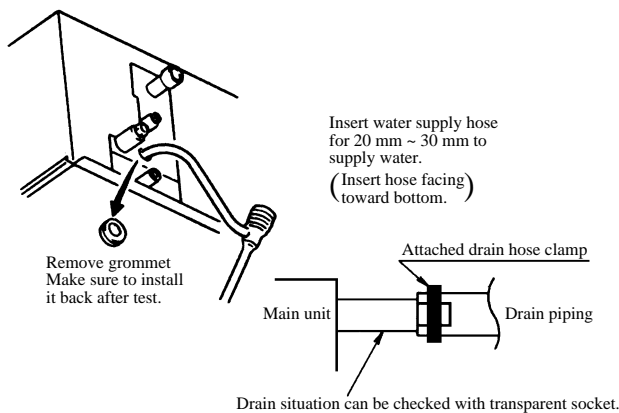


Drainage Test

- ① Conduct a drainage test after completion of the electrical work.
- ② During the trial, make sure that drain flows properly through the piping and that no water leaks from connections.
- ③ In case of a new building, conduct the test before it is furnished with the ceiling.
- ④ Be sure to conduct this test even when the unit is installed in the heating season.

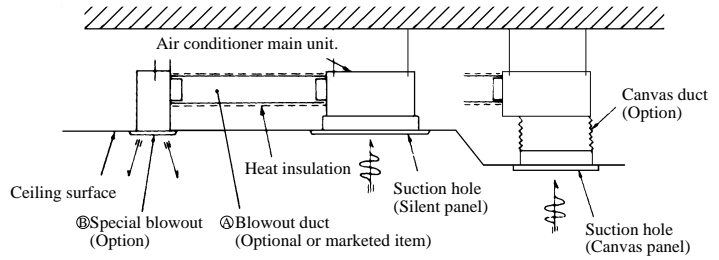
Procedures

- ① Supply about 1000cc of water to the unit through the air outlet using a feed water pump.
- ② Check the drain while cooling operation.



(In the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet. Then, check if water leaks from the piping system and that drain flows through the drain pipe normally.)

(7) Installation work for air outlet ducts



Calculate the draft and external static pressure and select the length, shape and blowout.

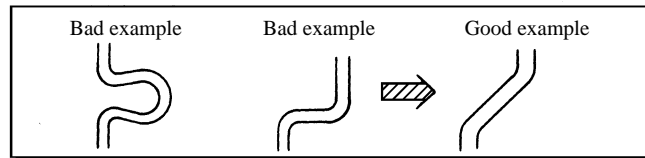
(A) Blowout duct

- 2-spot, 3-spot and 4-spot with ϕ 200 type duct are the standard specifications. Determine the number of spots based on following table.

FDR208	FDR258,308	FDR408,508
2-spot	2~3-spot ⁽¹⁾	3~4-spot ⁽²⁾

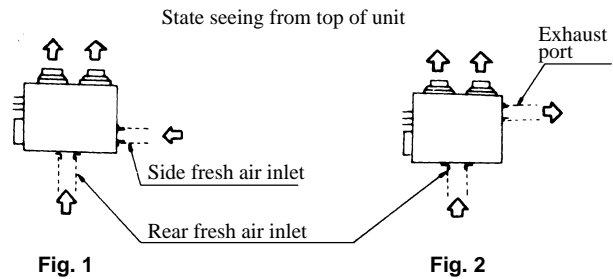
Notes (1) Shield the central blowout hole for 2-spot.
 (2) Shield the blowout hole around the center for 3-spot.

- Limit the difference in length between spots at less than 2 : 1.
- Reduce the length of duct as much as possible.
- Reduce the number of bends as much as possible. (Corner R should be as larger as possible.)



- Use a band, etc. to connect the main unit and the blowout duct flange.
- Conduct the duct installation work before finishing the ceiling.

(8) Connection of suction, exhaust ducts



(a) Duct connecting position

i) Fresh air inlet

- Inlet can be selected from the side or rear faces depending on the working conditions.
- Use the rear fresh air inlet when the simultaneous intake and exhaust is conducted. (Side inlet cannot be used.)


ii) Exhaust (Make sure to use also the suction.)

Use the side exhaust port.

(9) Installation of ornament panel

<Case of silent panel>

i) Accessory

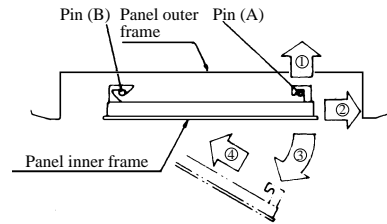
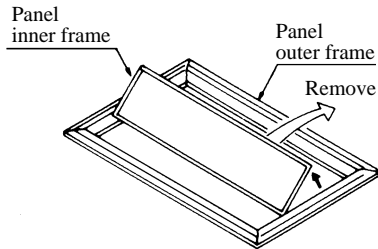
Name	Q'ty	Position
Round head set screw (M5 × 35) 	4 pcs.	Securing the panel

ii) Installation procedures

(a) Remove the inner frame of panel

• **How to remove the panel inner frame**

- ① Detach from pins (A) in the order of arrow ①→②.
- ② Open slightly as the arrow ③ and move toward the arrow ④ and detach from pin (B).



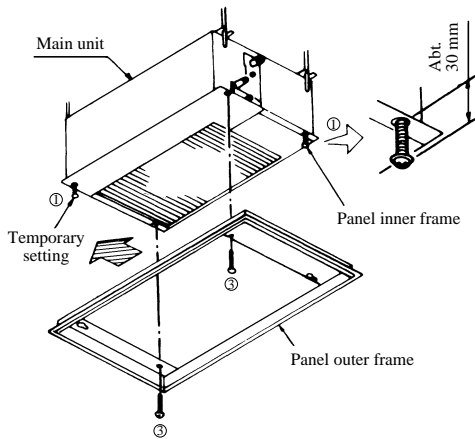
(b) Install the panel outer frame on the main unit.

• **Steps of installation**

- ① Secure the panel tentatively with 2 of 4 panel set screws (panel accessory) as shown above.
- ② When the panel is supported with a pair of set screws, slide it in the arrow direction.

[Note: Panel outer frame has the orientation.]

- ③ Lock the former 2 and remaining 2 set screws.
- ④ Install the panel inner frame in the reverse order of removal.



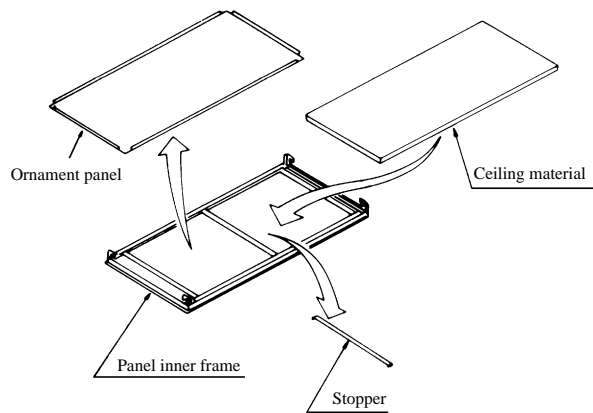
<Case of canvas panel>

See installation manual which is equipped with canvas panel.

Attachment of ceiling material

Ceiling material can be attached to the panel inner frame.

(Plate thickness max. 15mm)



Attachment procedures

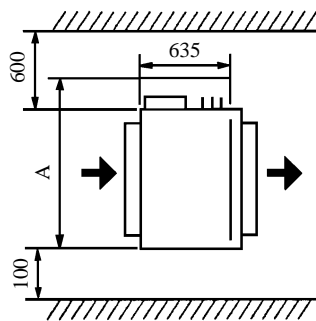
- ① Remove the stopper.
- ② Remove the ornament plate and attach the ceiling material.
- ③ Hold down the ceiling material and return the stopper in position.

Note (1) If the ceiling material is attached, the ornament plate is not used.

Ceiling mounted duct type

(1) Selection of installation location

- (a) Avoid installation and use at those places listed below.
- 1) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
Installation and use at such places will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.
 - 2) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains. Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.
 - 3) Places adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals. Generated noise may cause malfunctioning of the controller.
- (b) Select places for installation satisfying the following conditions and, at the same time, obtain the consent on the part of your client user,.
- 1) Places where chilled or heated air circulates freely. When the installation height exceeds 3m, warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.
 - 2) Places where perfect drainage can be prepared and sufficient drainage gradient is available.
 - 3) Places free from air disturbances to the return air port and supply hole of the indoor unit, places where the fire alarm may not malfunction to short circuit.
 - 4) Places with the environmental dew-point temperature is lower than 28°C and the relative humidity is less than 80%.
(When installing at a place under a high humidity environment, pay sufficient attention to prevention of dewing such as thermally insulating the unit properly.)
- (c) Check if the selected place for installation is rigid enough to stand the weight of the unit.
Otherwise, apply reinforcement using boards and beams before starting the installation work.

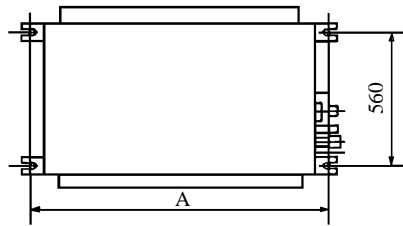


Unit : mm

Models	Mark	A
FDUR208, 258, 308		1200
FDUR408, 508		1720

(2) Suspension

Be sure to observe the finished length of the suspension bolts given below.

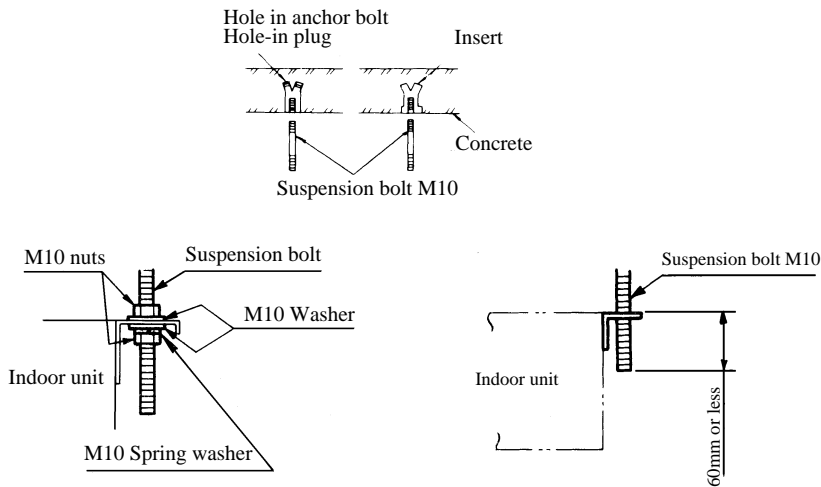


Unit : mm

Models	Mark	A
FDUR208, 258, 308		886
FDUR408, 508		1406

(a) Fixing the suspension bolt (customer ordered parts M10)

Securely fix the suspension bolt as illustrated below or in another way.



(3) Installation of indoor unit

Packing hardware

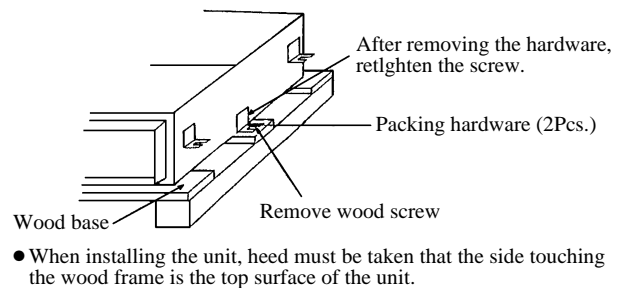
Two pieces of packing hardware are used.

Discard them after unpacking.

- Fix the indoor unit to the hanger bolts.
If required, it is possible to suspend the unit to the beam, etc.
Directly by use of the bolts without using the hanger bolts.

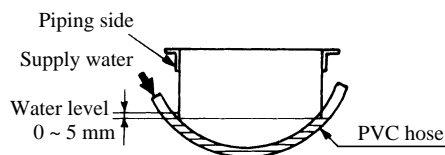
Note

When the dimensions of indoor unit and ceiling holes does not match, it can be adjusted with the slot holes of hanging bracket.



(a) Adjusting the unit's levelness

- 1) Adjust the out-levelness using a level vial or by the following method.
- Make adjustment so that the relation between the lower surface of the unit proper and water level in the hose becomes given below.



Bring the piping side slightly lower

- 2) Unless the levelness is adjusted properly, the malfunction of the float switch will occur.

(b) Tap selection on blower unit.

Taps of on blower unit are set at the standard selection at the shipping from factory. Where the static pressure is raised by changing the connection of connectors provided at the flank of control box as shown below.

Standard tap(at shipping)				High speed tap			
Motor side	Yellow/Green	Connector white	White	Yellow/Green	Motor side	Connector white	Red
	Red			Red			
	Blue			Blue			
	Black			Black			
	White			White			
			Control box side				Control box side

Unit : Pa

Models	Static Pressure	Standard tap	High tap
FDUR208,258		50	85
FDUR308,408,508		50	130

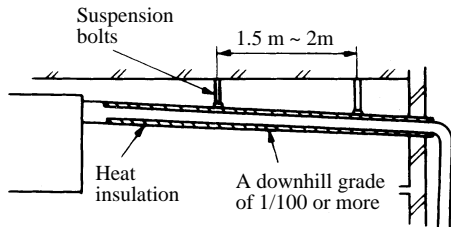
⚠ CAUTION

- Taps should not be used under static pressure outside the unit mentioned above. Dew condensation may occur with the unit and wet the ceiling or furniture.
- Do not use under static pressure outside the unit of 50Pa or less. Water drops may be blown from the diffuser outlet of the unit and wet the ceiling or furniture.

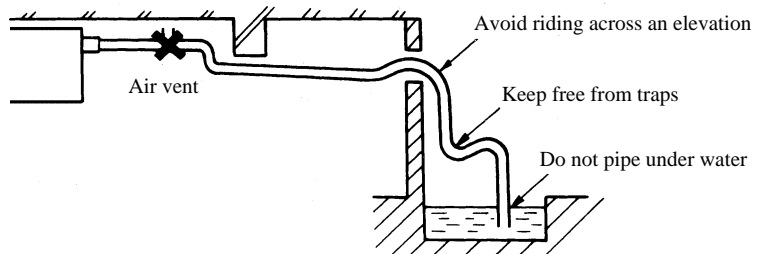
(4) Drain piping

(a) Drain piping should always be in a downhill grade (1/50-1/100) and avoid riding across an elevation or making traps.

• **Good piping**

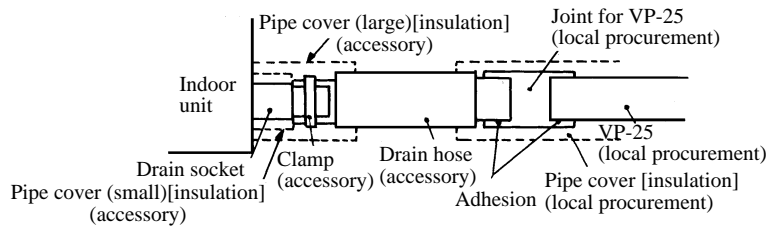
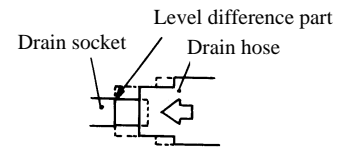


• **Improper piping**

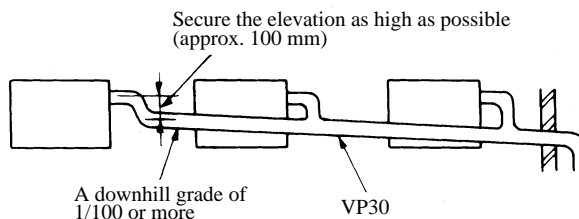


(b) When connecting the drain pipe to the unit, pay sufficient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

(c) For drain pipe, use hard PVC general purpose pipe VP-25 which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).



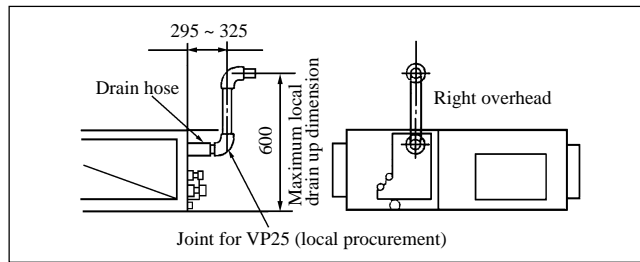
(d) When constructing drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicker pipe for this purpose.



(e) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

(f) Do not ever provide an air vent.

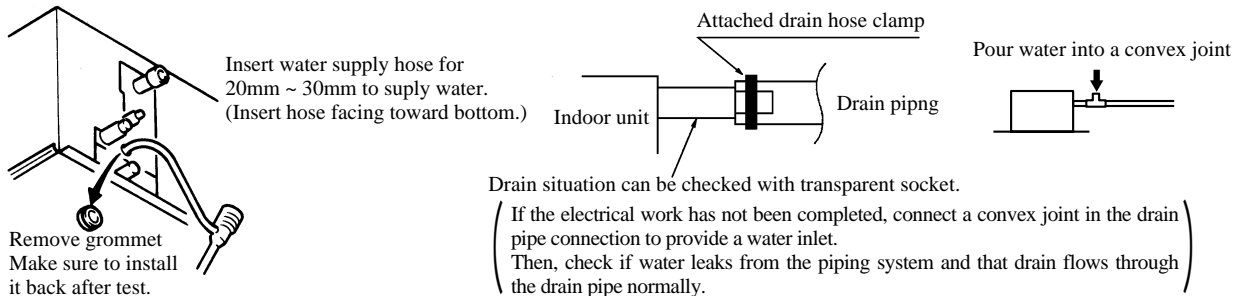
- (g) The height of the drain head may be elevated up to a point 600 mm from the bottom of unit and, when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is too high, the back-flow quantity of drain at the time of interruption of the operation gets too much and it may cause overflow at the drain pan. Therefore, make the height of the drain pipe withing the distance given in the drawing below.



- (h) Avoid positioning the drain piping outlet at a place where generation of odor may stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.
- (i) Drainage test
- 1) Conduct a drainage test after completion of the electrical work.
 - 2) During the trial, make sure that drain flows properly through the piping and that no water leaks from connections.
 - 3) In case of a new building, conduct the test before it is furnished with the ceiling.
 - 4) Be sure to conduct this test even when the unit is installed in the heating season.

Procedures

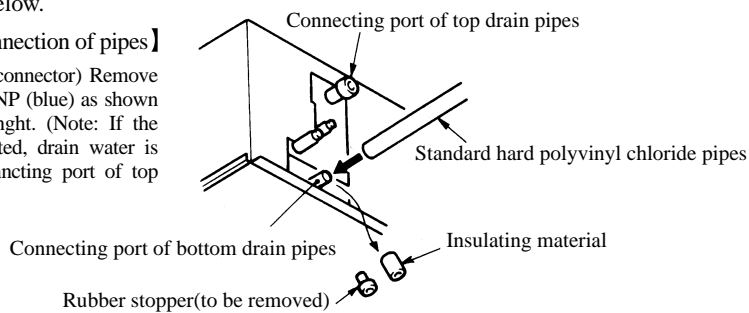
- ① Supply about 1000 cc of water to the unit through ghe air outlet by using a feed water pump.
- ② Check the drain while cooling operation.



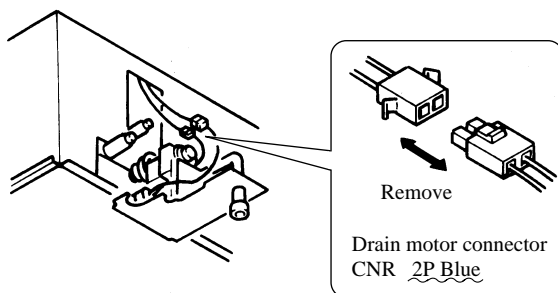
- (j) Outline of bottom drain piping work

- 1) If the bottom drain piping can be done with a descending gradient (1/50-1/100), it is possible to connect the pipes as shown in the drawing below.

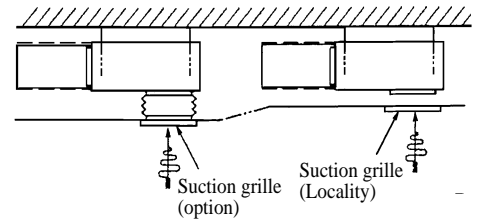
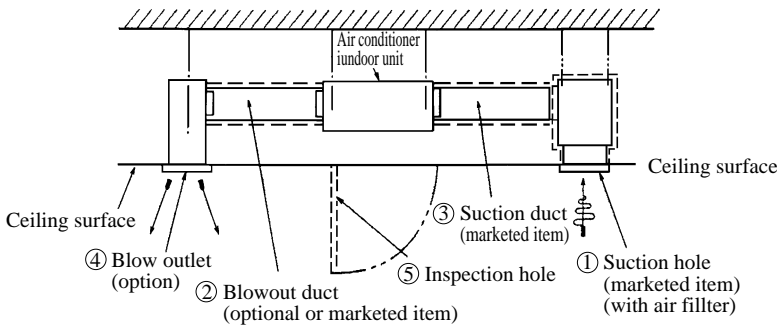
【Connection of pipes】
 (Removing drain motor connector) Remove drain motor connector CNP (blue) as shown in the drawing on the nght. (Note: If the connector is left connected, drain water is discharged from the connecting port of top pipes, causing leakage.)



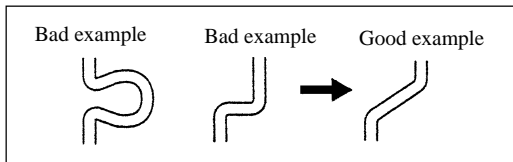
- 2) Do not use acetone-based adhesives to connect to the drain socket.



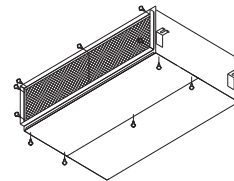
(5) Duct work



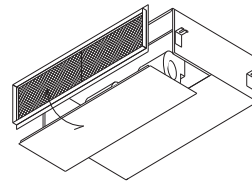
- (a) A corrugated board (for preventing sputtering) is attached to the main body of the air conditioner (on the outlet port). Do not remove it until connecting the duct.
 - 1) An air filter is provided on the main body of the air conditioner (on the inlet port). Remove it when connecting the duct on the inlet port.
- (b) Blowout duct
 - 1) Reduce the length of duct as much as possible.
 - 2) Reduce the number of bends as much as possible.
 - 3) (Corner R should be as larger as possible.)



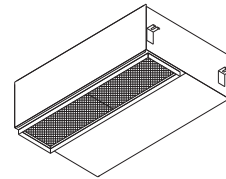
- 4) Conduct the duct installation work before finishing the ceiling.
- (c) Inlet port
 - 1) When shipped, the inlet port lies on the back.
 - 2) When connecting the duct to the inlet port, remove the air filter fitted to the inlet port.
 - 3) When placing the inlet port to carry out suction from the bottom side, use the following procedure to replace the suction duct joint and the bottom plate.
- (d) Make sure to insulate the duct to prevent dewing on it.
- (e) Location and form of blow outlet should be selected so that air from the outlet will be distributed all over the room, and equipped with a device to control air volume.
- (f) Make sure provide an inspection hole on the ceiling. It is indispensable to service electric equipment, motor, functional components and cleaning of heat exchanger.



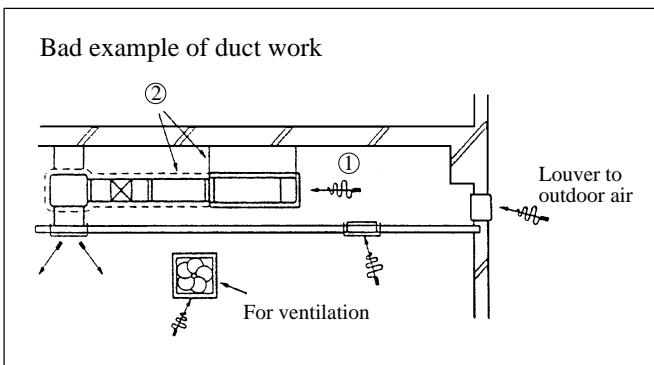
- Remove the screws which fasten the bottom plate and the duct joint on the inlet port side of the unit.



- Replace the removed bottom plate and duct joint



- Fit the duct joint with a screw, fit the bottom plate.



(g) If a duct is not provided at the suction side but it is substituted with the space over the ceiling, humidity in the space will increase by the influence of capacity of ventilation fan, strength of wind blowing against the out door air louver, weather (rainy day) and others.

1) Moisture in air is likely to condense over the external plates of the unit and to drip on the ceiling.

Unit should be operated under the conditions as listed in the above table and within the limitation of wind volume.

When the building is a concrete structure, especially immediately after the construction, humidity tends to rise even if the space over the ceiling is not substituted in place of a duct.

In such occasion, it is necessary to insulate the entire unit with glass wool (25mm). (Use a wire net or equivalent to hold the glass wool in place.)

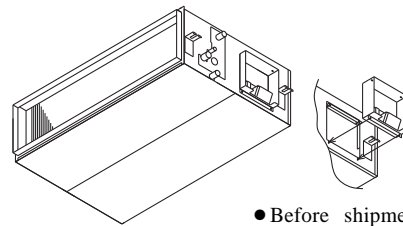
2) It may run out the allowable limit of unit operation (Example: When outdoor air temperature is 35°C DB, suction air temperature is 27°C WB) and it could result in such troubles as compressor overload, etc..

3) There is a possibility that the blow air volume may exceed the allowable range of operation due to the capacity of ventilation fan or strength of wind blowing against external air louver so that drainage from be heat exchanger may fail to reach the drain pan but leak outside (e. g. drip on to the ceiling) with consequential water leakage in the room.

(6) Control box (Only case of FDUR408-A, 508-A)

- During bottom side suction, the orientation of the control box can be changed to allow the control box to be maintained from the inlet port.

(a) Remove the bottom plate (on the inlet port side), and all wiring connectors from the control box.



- Before shipment from the plant, arrangements are made to enable maintenance from the sides of the unit.

(b) Remove the three screws that fasten the cabinet inside the control box.

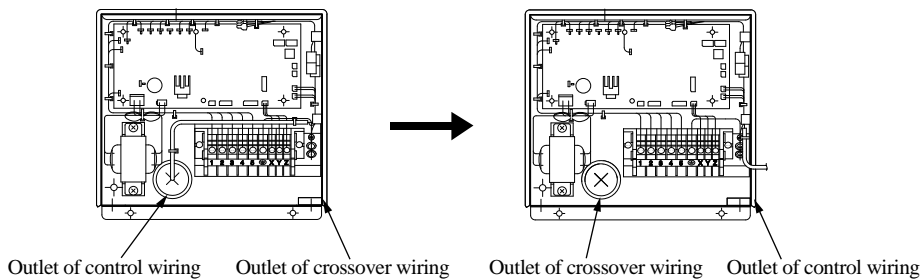
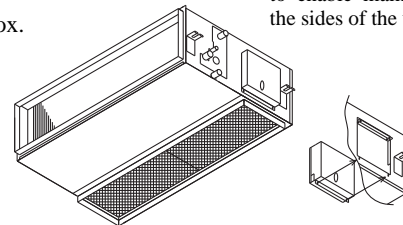
(c) Pull the control box toward the outside of the unit.

(d) Change the ejection of the wiring inside the control box.

(e) Fit the control box from the inside of the unit.

(f) Fit the three screws that fasten the cabinet.

(g) Correctly connect all wiring connectors.



5.2 Installation of remote controller (Optional parts)

(1) Selection of installation location

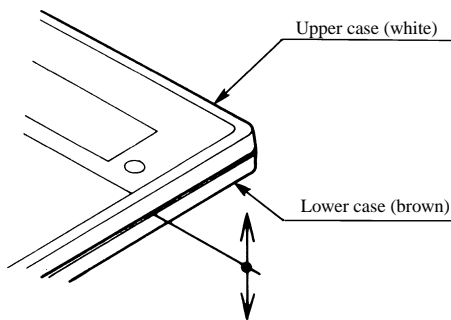
Following locations should be avoided:

- Where exposed to direct sunlight
- Near the heat source
- Highly humid area or where splashed with water
- Uneven installation surface

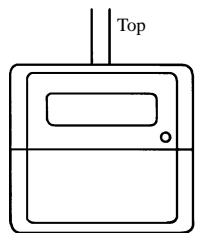
(2) Selection of installation location

(i) Exposed installation

- Remove the remote controller case.
 - Insert finger nails between the upper (white) and lower (brown) cases and pry them to open.

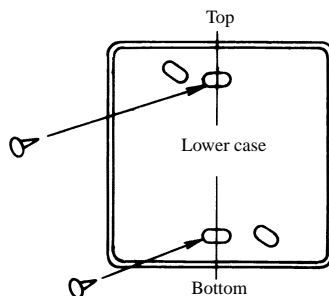


- Remote controller cords can be taken out upward only as shown below.



(Cord take-out direction)

- Cut the remote controller lower case off at the top and thin section with a nipper, knife or other and remove burrs from the cut with a file or other.
- Secure the remote controller lower case on the wall with 2 pieces of wood-screws.

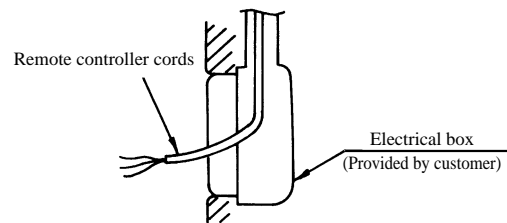


- Connect the remote controller cords with the terminal block. Make sure to align the terminal numbers on the indoor unit and the remote controller. Polarities are specified on the terminal block so that the unit will not be operated if the cords are connected improperly.
Terminals: (X) red wire, (Y) white wire, (Z) black wire

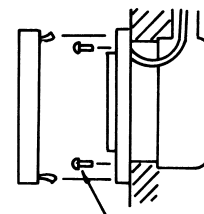
- Set necessary functions in accordance with the model of indoor unit.
- Couple the upper case with the lower case as they were.
- Secure the remote controller cords on the wall or other using cord clamps.

(ii) Exposed installation

- Have a Electrical box and remote controller cords (use shielding wires or twisted pair wires for extension) embedded in the wall in advance.



- Remove the upper case from the remote controller.
- Secure the remote controller body on the Electrical box with 2 pieces of M4 round head screw (provided by customer).
- Connect remote controller cords with the remote controller. (Refer to the section regarding the exposed installation.)
- Couple the upper case with the lower case as it was to finish up the installation.



M4 round head screw x 2 pieces
(Provided by customer)

Cautions for extension of remote controller cords

- Make sure to use shielding wires only.
 - All models: 0.3 mm² x 3 core wires [MVVS3C, products of Keihan Cables]
- Note (1) When the extension distance exceeds 100 m, change the wire size as follows:
- 100 ~ 200 m ... 0.50 mm² x 3 core wires
 - ~ 300 m ... 0.75 mm² x 3 core wires
 - ~ 400 m ... 1.25 mm² x 3 core wires
 - ~ 600 m ... 2.00 mm² x 3 core wires
- Make sure to ground one side only of the shielding wire.

5.3 Installation of outdoor unit

⚠WARNING

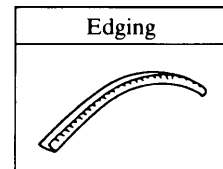
BE SURE TO READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD CAUSE SERIOUS INJURY OR DEATH, EQUIPMENT MALFUNCTION AND/OR PROPERTY DAMAGE.

(1) Installation

(a) Accessories

Confirm accessories shown below are attached in the bag with this installation manual.

- 1) "Edging" for protection of electric wires from opening edge.



(b) Selection of installation location

Select the installation location after obtaining the approval of customer.

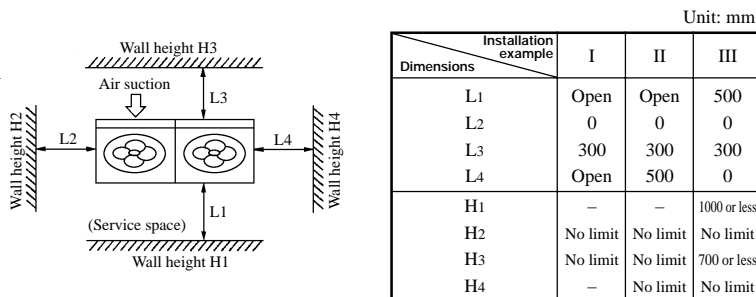
- 1) The place where the foundation can bear the weight of Outdoor unit.
- 2) The place where there is no concern about leakage of combustible gas.
- 3) The place where it is not stuffy.
- 4) The place where free from thermal radiation of other thermal source.
- 5) The place where flow of drain is allowed.
- 6) The place where noise and hot air blast do not trouble neighboring houses.
- 7) The place where there is no obstruction of wind at the intake air port and discharge air port.
- 8) When the unit is installed at the particular location as shown below, corrosion or failure may be caused. Please consult the dealer from which you purchased the air-conditioner.
 - a) The place where corrosive gas is generated (hot spring, etc.).
 - b) The place where wind containing salt blows (seaside area).
 - c) The place where enveloped by oil mist.
 - d) The place where there is a machine that radiates electromagnetic wave.

Request

- Restrict the height of obstruction wall in front of the discharge air port to the height of unit or less.
- Do not enclose around the unit by the obstruction. Secure the top space for 1 m or more.
- When installing the units side by side in series, secure a space of 10 mm between units.
- When installing the unit where there is a concern about the short circuit, attach the guide louver in front of discharge air port to prevent the short circuit.
- When installing plural units in a group, secure sufficient intake space to prevent the short circuit.
- When installing the unit where it is covered by snow, provide appropriate snow break means.
- When installing the unit where it is subject to strong wind, execute wind-breaking work.

(c) The minimum space for installation

Select the space considering the direction of refrigerant piping.



Note (1)

If the wall height H1 and H3 in installation example III exceed the limit, make L1 and L3 as follow.

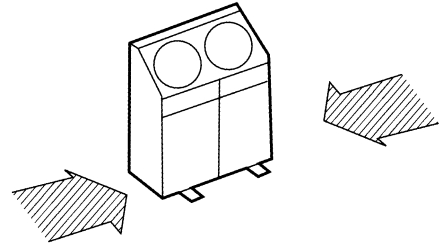
$$L1 = H1 - 500$$

$$L3 = 300 + (H3 - 700) / 2$$

However, if L3 is larger than 600, there is no limit on wall height H3.

(d) In the case where the unit is exposed to strong wind.

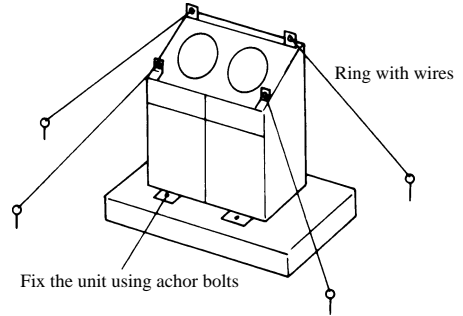
- Face the unit air outlet at a 90° angle from the direction of the wind.



(c) Securing outdoor unit (in the case of exposure to severe weather conditions)

Fix the unit in the following way.

- Use overturning prevention brackets.
- Rig with wires.



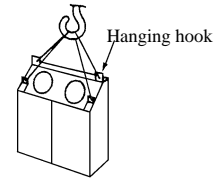
(Use rigging wires that are resistant to corrosion and sufficient in strength. For example SUS304-W1, wire thickness 2.9 mm)

(2) Carry-in and installation of unit

Pay sufficient attention to the carry-in and moving work of the unit, and always execute work by two persons or more.

(a) Carry-in

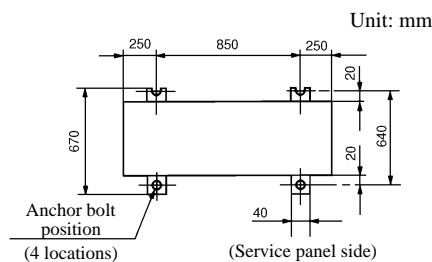
- 1) When carrying-in the unit, carry it in as packed condition to the installation site as near as possible.
- 2) If you are compelled to carry-in the unit unpacked condition, lift the unit by the rope using a nylon sling or applying protection plates so that the unit is not marred.



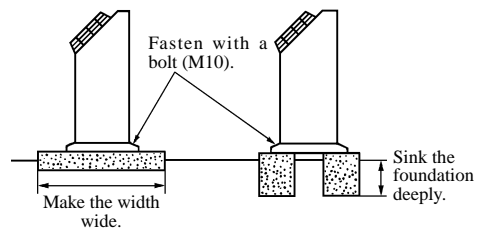
CAUTION

- Rope the unit taking the discrepancy of center of gravity into consideration.

(b) Bolt securing position



- 1) Use anchor bolts (M10) to secure the unit's legs.
- 2) Securely install the unit so that it does not fall over during earthquakes or strong winds, etc.
- 3) Refer to the above illustrations for information regarding concrete foundations.
- 4) Install the unit in a level area. (With a gradient of 1/100 or less.)

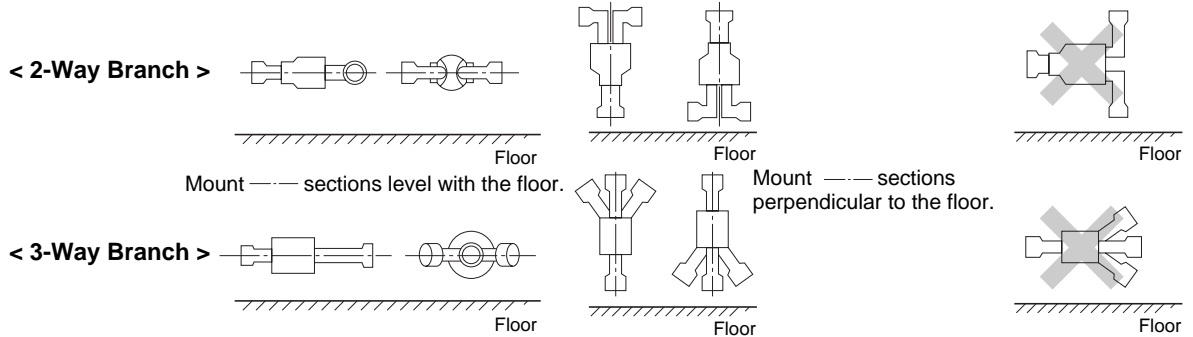


(3) Refrigerant piping work

Select the piping specification to fit the specification of Indoor unit and installation location.

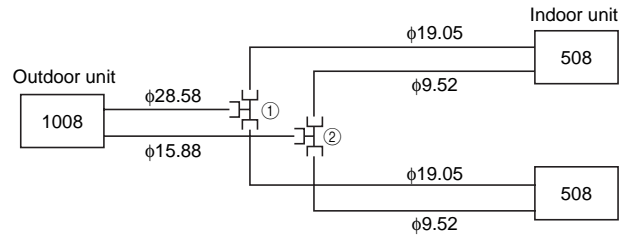
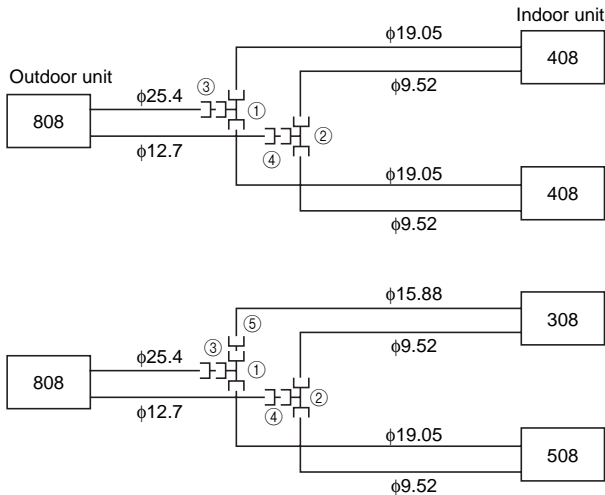
(a) Decision of piping specification

- The branch piping (both gas and liquid lines) should always be arranged to have a level or perpendicular branch.



(i) Twin type

- FDCP808HES3 [Branch pipe set: DIS-WB]
- FDCP1008HES3 [Branch pipe set: DIS-WB]



Notes (1) ① to ⑤ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
 (2) Branch piping should always be arranged to have level or perpendicular branch.

Chart of shapes of branch piping parts (DIS-WB)

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
	①		②		③
					④
					⑤

(ii) Triple type

- FDCP808HES3 [Branch pipe set: DIS-TB]
- FDCP1008HES3 [Branch pipe set: DIS-TB]

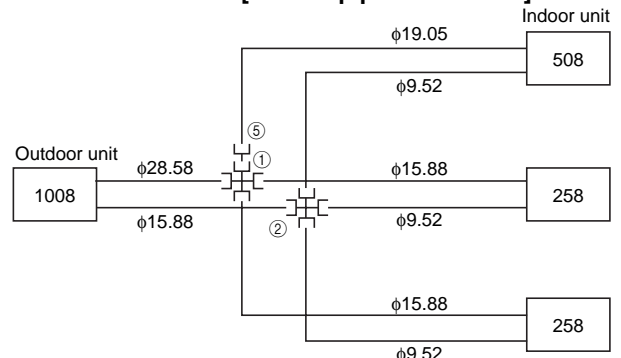
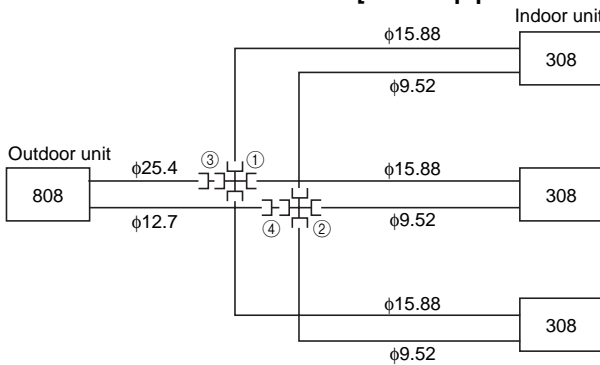
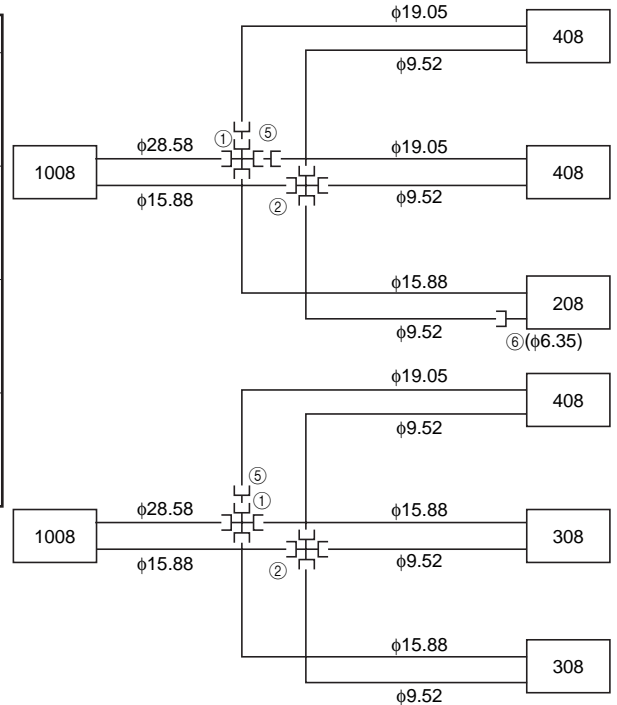


Chart of shapes of branch piping parts (DIS-TB)

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
					③
					④
					⑤
					⑥



- Notes (1) ① to ⑥ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
- (2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the 72 page for details.)
 - (3) If the indoor unit is the 208 type, always use a ø 9.52 size branch piping (branch piping to indoor unit) .

(iii) Double twin

- FDCP808HES3 [Branch pipe set: DIS-WA × 2set, DIS-WB × 1set]

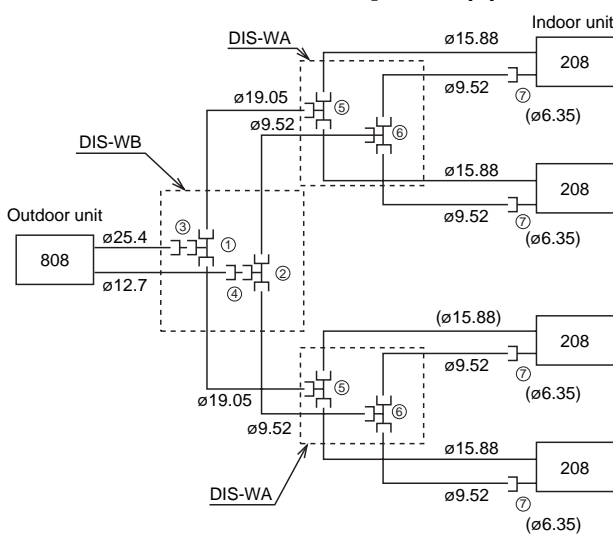


Chart of shapes of branch piping parts

• DIS-WB

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
					③
					④

• DIS-WA

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
					⑦

- Notes (1) ① to ⑦ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
- (2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the 72 page for details.)
 - (3) If the indoor unit is the 208 type, always use a ø 9.52 size branch piping (branch piping to indoor unit).

- FDCP1008HES3 [Branch pipe set: DIS-WA × 2set, DIS-WB × 1set]

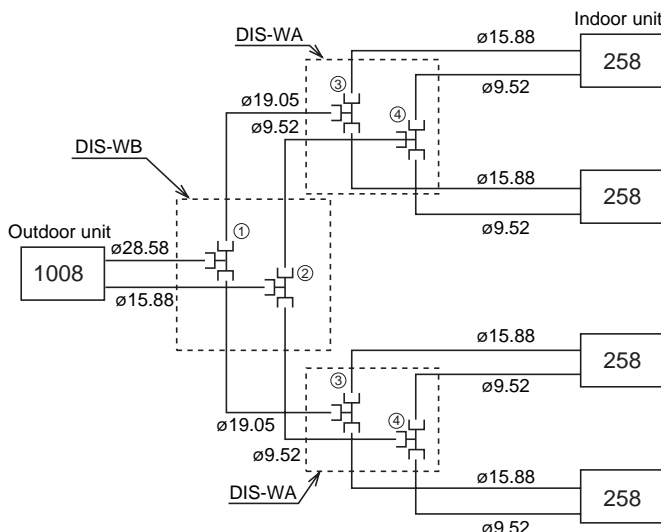


Chart of shapes of branch piping parts

• DIS-WB

Gas pipe	Mark	Liquid pipe	Mark
	①		②

• DIS-WA

Gas pipe	Mark	Liquid pipe	Mark
	③		④

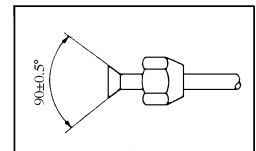
Notes (1) ① to ④ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.

(2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the 72 page for details.)

(b) Piping work

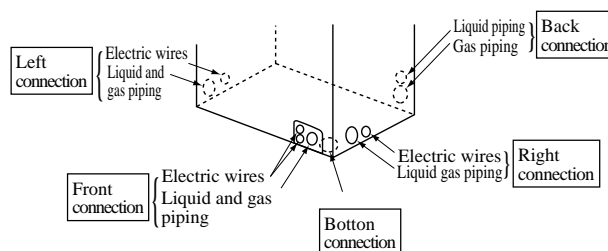
Request

- Use the pipe made of following material. Moreover, it is very convenient for you to use the separately sold piping kit.
Material: Phosphor deoxidized seamless copper tube (C1220T, JIS H3300)
- In the case of this unit, condensation water is also generated on the liquid piping. Insulate both of the liquid piping and gas piping perfectly.
- In the case of heat pump type unit, the maximum temperature of the gas piping reaches approx. 120°C, therefore use the insulation material which has sufficient heat resistance.
- When bending the pipe, bend it with large radius as much as possible. Do not bend the same portion of pipe repeatedly.
- Do not let dust, chips or water enter the pipe while pipe working.
- The flared connection for refrigerant piping is required. Flare the pipe after inserting the flared nut into the pipe.
- Tighten the flared connection firmly using 2 of spanners. Comply with the following value for tightening torque of the flared nut.
ø 6.35: 16 to 20 (N·m) ø 9.52, ø 12.7: 40 to 50 (N·m) ø 15.88: 90 to 120 (N·m) ø 19.05: 100 to 140 (N·m)
- In the case of brazing connection, perform brazing while flowing nitrogen gas in the pipe to prevent generation of oxide film inside the pipe without fail.



1) Refrigerant pipe connection

- The piping can be taken out to the right, left front, rear and bottom directions.
- Cut the plate at the knockout portion on the piping penetration section with necessary minimum size.
- Mount the attached edging by cutting it to the appropriate length before connecting the pipe.



! IMPORTANT

- Take care so that the piping to be worked does not contact the parts contained in the unit. If it contacts the inner parts, abnormal sound or vibration may occur.

(c) Leak test and air purge

Perform the procedure according to the following instructions.

Request

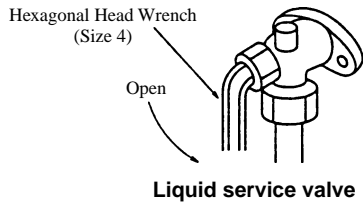
- Perform the air purge of Indoor unit and refrigerant piping by vacuuming method without fail.

Leak test

(1) The unit's air-tightness test has been conducted but after completing the piping connections conduct an air-tightness test of the connected piping and the indoor units using the outdoor gas side service valve check joint. Be sure to conduct this test with the service valve closed.

- ① When the pressure has been increased to 0.5 MPa stop increasing the pressure and maintain this state for at least 5 min. to check if the pressure drops.
- ② Next, increase the pressure to 1.5 MPa and again maintain this state for at least 5 min. to check if the pressure drops.
- ③ Then increase the pressure to 3.3 MPa and maintain this state for approx. one day to check if the pressure drops.

Use nitrogen gas for the air-tightness check.



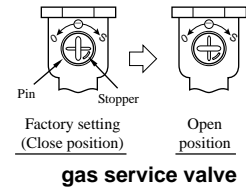
Liquid service valve

Air purge

(2) Extract air from the service valve charge port with the outdoor unit service valves (both liquid and gas sides) shut until the pressure drops to -101 kPa (-755mmHg) or lower, and continue to extract air for at least one hour thereafter.

(3) After completion of vacuuming, remove the cap nut for the valve stem and fully open the service valve (for both of liquid and gas) as shown in the right illustration.

After confirming that the valve is fully open, tighten the cap nuts (for valve stem and charge port).



gas service valve

(d) Charging with additional refrigerant

The length of piping will require charging with additional refrigerant. Refer to the table below for making the additional charge. If your calculations show that the additional charge amount is a minus number, charging is not required.

		Amount	FDCP808	FDCP1008
Item				
A	Piping length already charged with refrigerant. (m)	(m)	5	5
B	Standard refrigerant volume. (When piping is 0 meters.) (kg)	(kg)	4.73	6.75
C	Additional charge volume per 1 meter of main piping. (kg/m)	(kg/m)	0.045	0.07
D	Amount of charge at time of shipping (kg)	(kg)	4.95	7.10

Note (1) Use the table above to find the amount of additional charge (kg/m) C per 1 meter of piping.

- f = Additional charge amount per 1 meter of branch piping
208, 258, 308: 0.025kg/m
408, 508: 0.035kg/m

Method of Calculation

Refer to the example of calculation on the next page for the piping length code in the formula (L, ℓ₁, ~ ℓ₃).

For additional charging G = Amount of additional charge (kg.)

Twin and triple specifications

$$G = \text{main piping } L \text{ (m)} \times C + \text{branch piping length } \ell_1 \text{ (m)} \times f + \text{branch piping length } \ell_2 \text{ (m)} \times f + \text{branch piping } \ell_3 \text{ (m)} \times f - (D - B)$$

(only for triple specifications)

Double twin specification

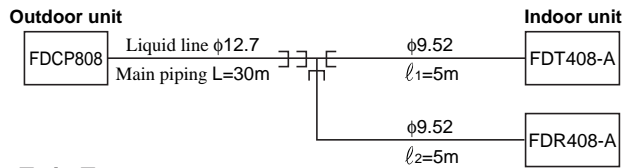
$$G = \text{main piping } L \text{ (m)} \times C + \text{branch piping } \ell_1 \text{ (m)} \times f + \text{branch piping } \ell_2 \text{ (m)} \times f + \text{branch piping } \ell_3 \text{ (m)} \times f + \text{branch piping } \ell_4 \text{ (m)} \times f - (D - B)$$

[Example of Calculation]

1) For twin type

Outdoor Unit: FDCP808HES3

Indoor Unit: FDT408-A + FDR408-A



Twin Type

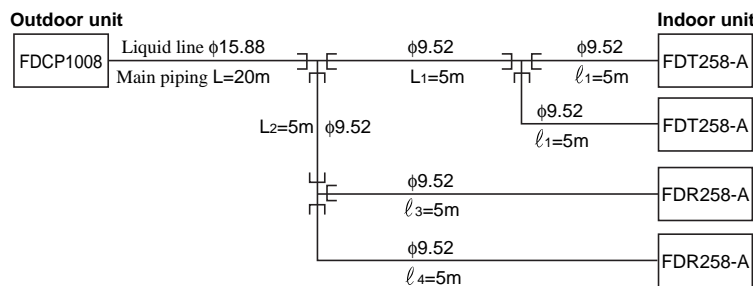
$$G = 30m(L) \times 0.045kg/m + 5m(l_1) \times 0.035kg/m + 5m(l_2) \times 0.035kg/m - (4.95 - 4.73) = 1.48kg$$

Amount of additional charge: 1.48 kg

2) For double twin type

Outdoor Unit: FDCP1008HES3

Indoor Unit: FDT258-A + FDT258-A + FDR258-A + FDR258-A



Double twin Type

$$G = 20m(L) \times 0.07kg/m + 10m(L_1+L_2) \times 0.025kg/m + 20(l_1+l_2+l_3+l_4) \times 0.025kg/m - (7.1 - 6.75) = 1.8kg$$

Amount of additional charge: 1.8 kg

For recharging If vacuum extracted and recharging.

Twin & triple specifications

$$G = B + \text{main piping } L \text{ (m)} \times C + \text{branch piping } l_1 \times f + \text{branch piping } l_2 \text{ (m)} \times f + \text{branch piping } l_3 \text{ (m)} \times f$$

(only for triple specifications)

Double twin specification

$$G = \text{main piping } L \text{ (m)} \times C + \text{branch piping } L_1 \text{ (m)} \times f + \text{branch piping } L_2 \text{ (m)} \times f + \text{branch piping } l_1 \text{ (m)} \times f + \text{branch piping } l_2 \text{ (m)} \times f + \text{branch piping } l_3 \text{ (m)} \times f + \text{branch piping } l_4 \text{ (m)} \times f$$

(4) Electrical wiring

- This air conditioning system should be notified to supply authority before connection to power supply system.
- (a) Selection of size of power supply and interconnecting wires.

IMPORTANT

- Electric wiring work should be conducted only by authorized personnel.
- Use copper conductor only.
- Power source wires and Interconnecting wires shall not be lighter than polychloroprene sheathed flexible cord (design HO5RN-F IEC 57).
- Do not connect more than three wires to the terminal block.
- Use round type crimped terminal lugs with insulated grip on the end of the wires.

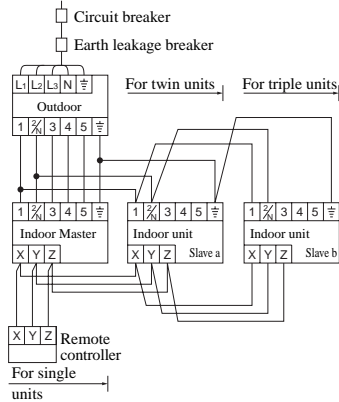
- Select wire sizes and circuit protection from Table 2.

Table 2 (This table shows 20m length wires with less than 2% voltage drop.)

Model	Item	Phase	Circuit breaker		Power source wires (minimum)	Interconnecting and grounding wires (minimum)
			Switch breaker (A)	Over-current protector rated capacity (A)		
FDCP808HES3	3	3	50	50	5.5mm ²	2.0mm
FDCP1008HES3					8.0mm ²	

(b) Wiring connection.

- Connect the same terminal number between the Indoor unit and Outdoor unit as shown in the following diagram.
- Make wiring to supply to the Outdoor unit, so that the power for the Indoor unit is supplied by ① and ② terminals.
- Secure the wiring with wiring clamp so that no external force is transmitted to the connecting portion of terminal.
- There is a ground (Earth) terminal in the control box.



- 1) Between the indoor Master and Slave units connect to the same No. as for terminal blocks ① ② ③ and ④ ⑤ ⑥.
- 2) Use rotary SW2 on the indoor circuit board to set the same remote controller communication address for both the indoor Master and Slave units.
- 3) Set the indoor Slave units to Slave a to Slave c using the plural address switches SW2-3, and SW2-4 on the indoor circuit board.
- 4) After turning on the power, press the remote controller's "Air-conditioner No./Check" switch and then confirm that the connected indoor Master and Slave units are displayed on the remote controller.

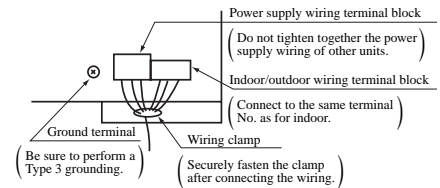
(c) Plural Master / Slave setting

Set the plural address switches SW2-3 and SW2-4 on the indoor circuit board as shown in the table below.

Plural address switch	Master setting at time of factory shipment	Indoor unit			
		Master	Slave a	Slave b	Slave c
SW2-3	OFF	OFF	ON	ON	
SW2-4	OFF	ON	OFF	ON	

(d) Wiring out take direction

- The four directions of front, left, right, and bottom are possible.



- When connecting piping on site, remove the outside panel's knock out plate. After removing the knock out plate, install the included edging around the edge of the hole in the panel.

(5) Test run

CAUTION

THIS UNIT WILL BE STARTED INSTANTLY WITHOUT "ON" OPERATION WHEN ELECTRIC POWER IS SUPPLIED.

BE SURE TO EXECUTE "OFF" OPERATION BEFORE ELECTRIC POWER IS DISCONNECTED FOR SERVICING.

- This unit has a function of automatic restart system after recovering power stoppage.

DO NOT LEAVE OUTDOOR UNIT WITH THE SERVICE PANEL OPENED.

- When the service panel is removed, high voltage portion and high temperature areas are exposed.

IMPORTANT

- Check that the service valves are fully opened without fail before operation.

- Turn on the power for over 12 hours to energize the crankcase heater in advance of operation.
- Wait more than 3 minutes to restart the unit after stop.

- Run the unit continuously for about 30 minutes, and check the following.
 - Suction pressure at check joint on the compressor suction pipe.
 - Discharge pressure at check joint on the compressor discharge pipe .
 - Temperature difference between return air and supply air for Indoor unit.
- Refer to "Check Indicator Table" on wiring diagram of Outdoor unit or "User's manual" of Indoor unit for diagnosis of operation failure.

6 MAINTENANCE DATA

6.1 Servicing

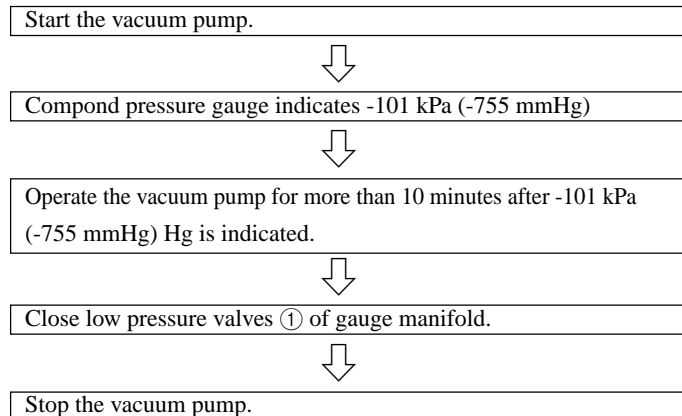
(1) Evacuation

The evacuation is a procedure to purge impurities, such as noncondensable gas, air, moisture from the refrigerant equipment by using a vacuum pump. Since the refrigerant R407C is very insoluble in water, even a small amount of moisture left in the refrigerant equipment will freeze, causing what is called ice clogging.

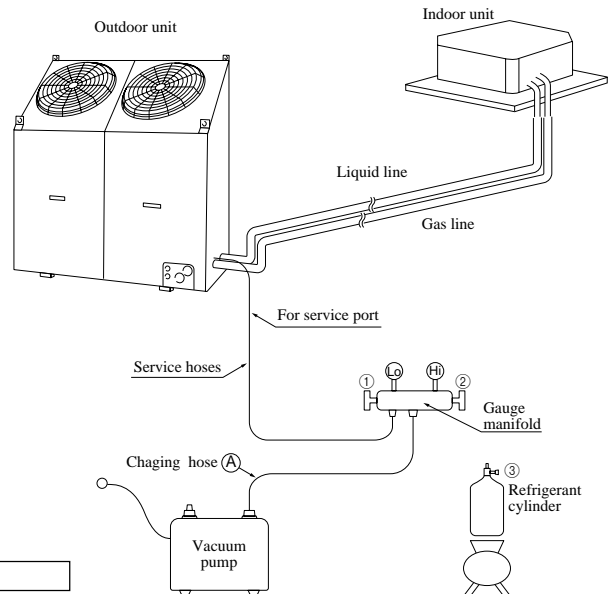
Evacuation procedure

Make sure that the both service valves of gas and liquid line are fully opened.

- (a) Check to ensure that there is no internal pressure in the unit. If there is an internal pressure, it should be relieved through the service port.
- (b) Connect the charging hose of the gauge manifold to the service port of the gas piping.
Close high pressure valve ② of gauge manifold.
- (c) Connect the charging hose ① to a vacuum pump.
Repeat evacuation in the following sequence.



- Notes (1) Do not use the refrigerant pressure to expel air.
 (2) Do not use the compressor for evacuation.
 (3) Do not operate the compressor in a vacuum condition.



- Notes (1) Refer to the exterior-view drawing for the position of the service valve.
 (2) When connecting of the service valve, flare connection for both the indoor and outdoor unit.

(2) Refrigerant charging

- (a) After the evacuation shown in the above, change the connection of the charge hose ① to the refrigerant cylinder.
 (b) Purge air from the charge hose ② .

First loosen the connecting portion of the charge hose at the gauge manifold side and open valve ③ for a few seconds, and then immediately retighten it after observing that gas has blown out from loosened connecting portion.

- (c) Open valves ① and ③ then gas refrigerant begins flowing from the cylinder into the unit.

When refrigerant has been charged into the unit to some extent, refrigerant flow becomes stagnant. When that happens, start the compressor in cooling cycle until the system is filled with the specified amount of gas, then close valves ① and ③ and remove the gauge manifold. Cover the service port with caps and tighten them securely.

- (d) Check for gas leakage by applying a gas leak detector around the piping connection.
 (e) Start the air conditioner and make sure of its operating condition.

6.2 Trouble shooting for refrigerant circuit

(1) Judgement of operating condition by operation pressure and temperature difference

Making an accurate judgement requires a skill that is acquired only after years of experience, one trouble may lead to another trouble from a single trouble source and several other troubles may exist at the same time which comes from a undetected different trouble source.

Filtering out the trouble sources can be done easier by comparing with daily operating conditions. Some good guides are to judge the operating pressure and the temperature difference between suction air and delivery air.

Following are some pointers,

Cir- cuit	Pressure						Trouble cause
	Indi- cation	Too low	A little low	Normal	A little high	Too high	
High side Low side						●	1) Excessive overcharging of refrigerant 2) Mixture of non condensable gas (air etc.)
High side Low side	●					●	Ineffective compression (defective compressor)
High side Low side	●	●					1) Insufficient refrigerant in circuit 2) Clogging of strainer 3) Gas leakage 4) Clogging of air filter (in cooling) 5) Decrease in heat load (in cooling) 6) Locking of indoor fan (in cooling)
High side Low side					●	●	1) Locking of outdoor unit fan (in cooling) 2) Dirty outdoor heat exchanger (in cooling) 3) Mixture of non condensable gas (air etc.)
High side Low side				●		●	1) Too high temperature of room

6.3 Diagnosing of microcomputer circuit

(1) Selfdiagnosis function

(a) Indoor unit side

Table of inspection items based on error codes

Error Code	Failure at:	Contents of the failure
E1	Control switch wire (signal noise)	<ul style="list-style-type: none"> Defective connection or broken wire for control switch signal wire. Signal noise has entered the control switch wire.
	Circuit board for control switch or indoor unit	<ul style="list-style-type: none"> Is the circuit board for the control switch or the circuit board for the indoor unit is defective (communication circuit defective)?
E6	Indoor unit heat exchanger thermistor	<ul style="list-style-type: none"> Indoor unit heat exchanger thermistor defective (element defective or broken wire). Defective connection of connector for thermistor.
	Indoor unit circuit board	<ul style="list-style-type: none"> Indoor unit circuit board defective (defective thermistor input circuit)?
E7	Indoor unit air inlet thermistor	<ul style="list-style-type: none"> Indoor unit return thermistor defective (element defective or broken wire). Defective connection of connector for thermistor.
	Indoor unit circuit board	<ul style="list-style-type: none"> Indoor unit circuit board defective (defective thermistor input circuit)?
E8	Installation and operating conditions	<ul style="list-style-type: none"> Heating overload (temperature of heat exchanger for indoor unit abnormally high)
	Indoor unit heat exchanger thermistor	<ul style="list-style-type: none"> Indoor unit heat exchanger thermistor defective (short circuit).
	Indoor unit circuit board	<ul style="list-style-type: none"> Indoor unit circuit board defective (defective thermistor input circuit)?
E9	Failure in drainage	<ul style="list-style-type: none"> Failure with the condensate pump (DM), or open circuit or disconnection of connector with the condensate pump.
	Float switch	<ul style="list-style-type: none"> Malfunctioning of the float switch (erroneous functioning)
	Indoor circuit board	<ul style="list-style-type: none"> Indoor unit circuit board defective (defective float switch input circuit) Indoor unit circuit board defective (defective DM driving output circuit)
E10	Number of indoor units connected	<ul style="list-style-type: none"> 1 Remote controller for multiple unit control, 17 or more indoor units connected
E57	Insufficient refrigerant	<ul style="list-style-type: none"> Gas leak.
	Indoor unit heat exchanger thermistor	<ul style="list-style-type: none"> Indoor unit heat exchanger thermistor defective (short circuit).
	Indoor unit circuit board	<ul style="list-style-type: none"> Indoor unit circuit board defective (defective thermistor input circuit)?

(2) Error diagnosis procedures at the indoor unit side

To diagnose the error, measure the voltage (AC, DC), resistance, etc. at each connector around the circuit board of indoor unit based on the inspection display or the operation state of unit (no operation of compressor or blower, no switching of 4-way valve, etc.). If any defective parts are discovered, replace with the assembly of parts as shown below.

(a) Single-unit replacement parts for circuit board of indoor unit. (Peripheral electric parts for circuit board.)

Indoor unit printed circuit board, thermistor (return, heat exchanger), operating switches, limit switches, transformers, fuses.

Note (1) Use normal inspection methods to determine the condition of strong electrical circuits and frozen cycle parts.

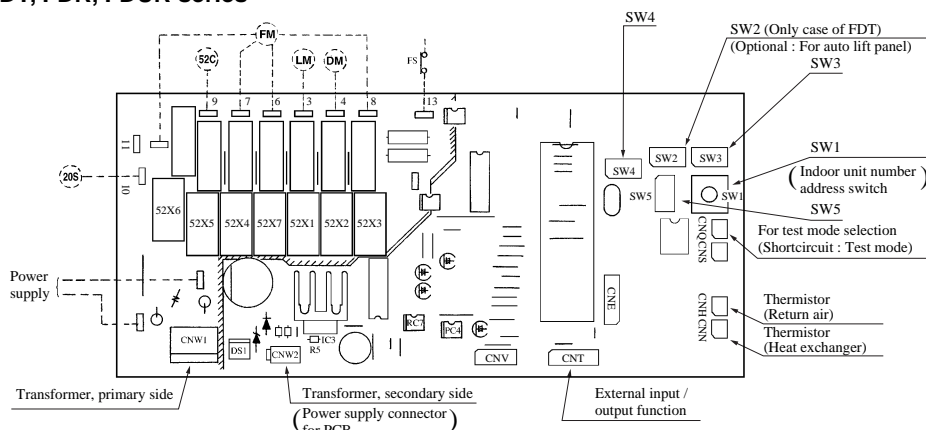
(b) Replacement procedure of indoor unit microcomputer printed circuit board

Microcomputer printed circuit board can be replaced with following procedure.

- (i) Confirm the parts numbers. (Refer to the following parts layout drawing for the location of parts number.)

Model	Parts number
FDT, FDR, FDUR	PJA505A092Z

Parts layout on the indoor unit PCB
Model: FDT, FDR, FDUR series



• Function of DIP switched (SW3)

Switch	Function
SW3-1	ON: Power off guaranteed
	OFF: No power off guaranteed
SW3-2	ON: With low-voltage detection control
	OFF: Without low-voltage detection control
SW3-3	ON: Power up mode (UHi-Lo)
	OFF: Mild mode (Hi-Lo)
SW3-4	ON: Indoor fan is Lo when heating thermostat is OFF.
	OFF: Indoor fan is OFF when heating thermostat is OFF.

• Function of DIP switched (SW4, 5)

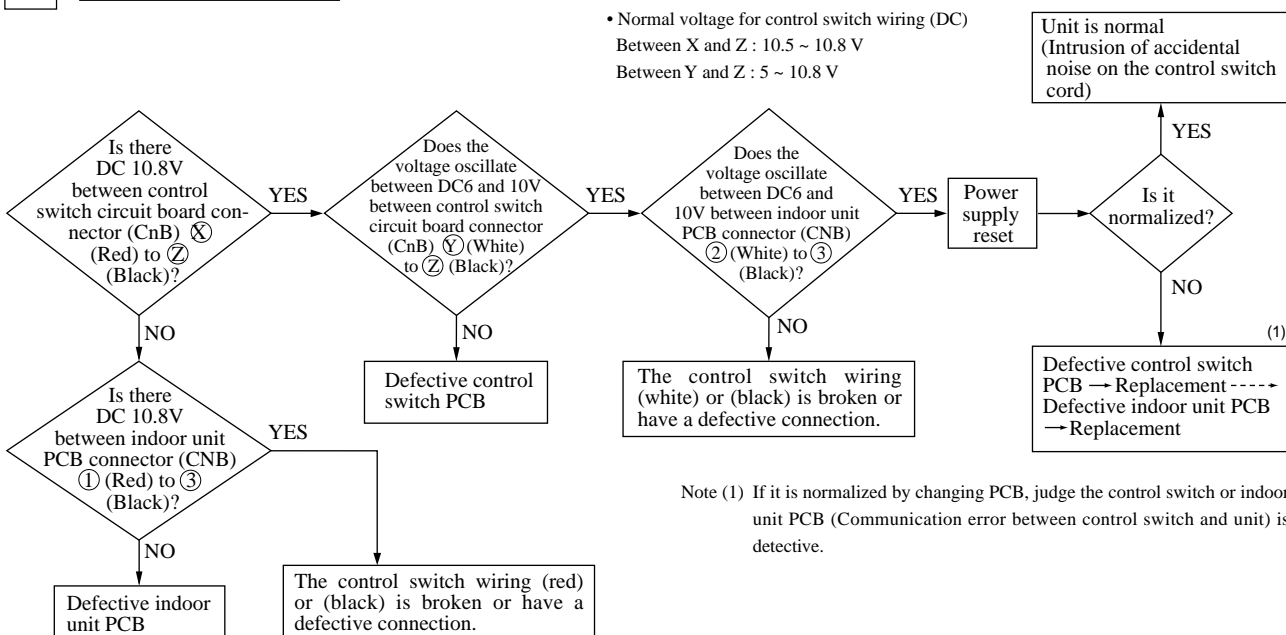
Switch	Function
SW4-1(J1)	ON: Antifrost 2.5°C
	OFF: Antifrost 1°C
SW4-2(J2)	ON: With abnormality resetting
	OFF: Without abnormality resetting
SW4-3(J3)	ON: 4 position louver control: valid
	OFF: 4 position louver control: invalid
SW5-1(J4)	ON: 1 Phase model
	OFF: 3 Phase model
SW5-2(J5)	ON: Step input
	OFF: Pulse input

- (ii) Please match the settings of control switching switches (SW3, SW4, SW5) to the settings they had before they were replaced. With these switches, if the printed circuit had a jumper wire before being replaced, set to jumper wire ON if there was a jumper wire and jumper OFF if there was not.
- (iii) Connect the fast-on terminals and connectors that are to the circuit board for the micro-computer. Connect by matching the wire color of the fast-on terminal with the color printed on the circuit board for the micro-computer.

Note (1) When connecting to the fast-on connection for the circuit board for the micro-computer, use care so as not to excessively distort the circuit board.

(c) Inspection method when error code is displayed

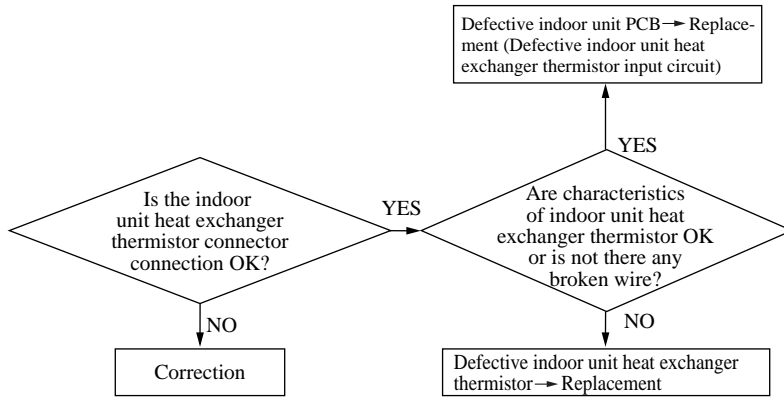
1 Error display : E1 [Communication error between control switch ~ Indoor unit PCB]



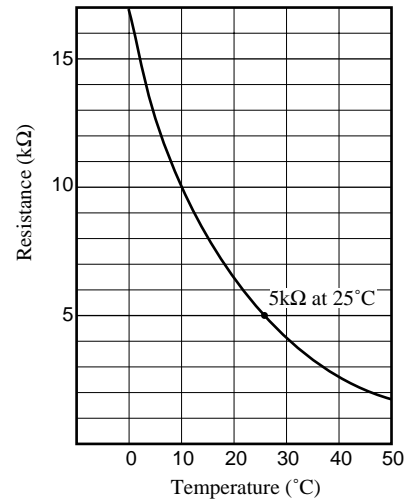
2

Error display : **E6**

[Defective indoor unit heat exchanger thermistor]



Return air thermistor (Th-A)
Indoor unit heat exchanger thermistor (Th-R)
Resistance temperature characteristics

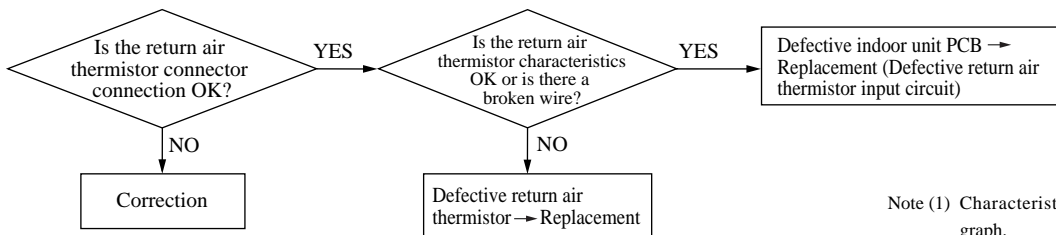


Note (1) 22.5 kΩ at -6°C

3

Error display : **E7**

[Defective return air thermistor]

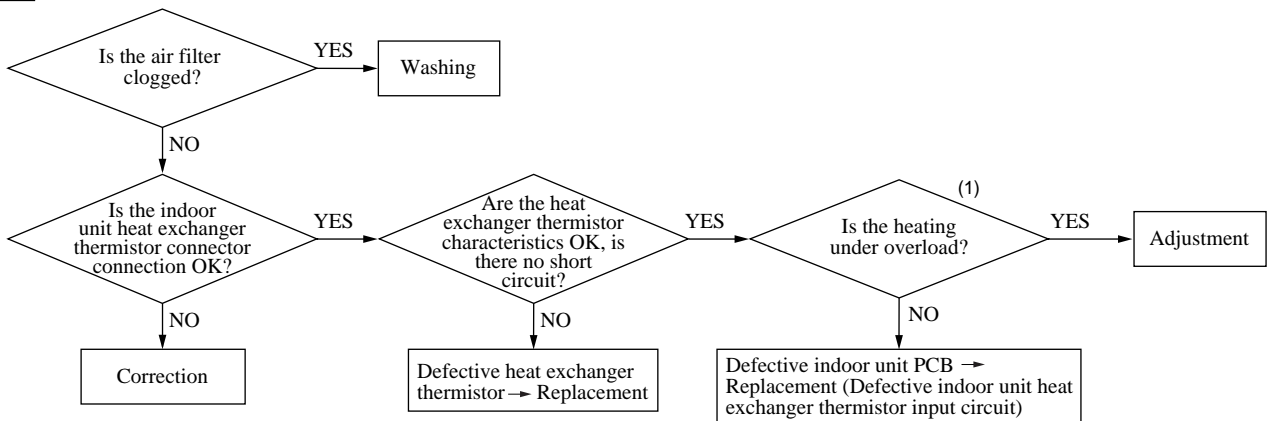


Note (1) Characteristics as per the above graph.

4

Error display : **E8**

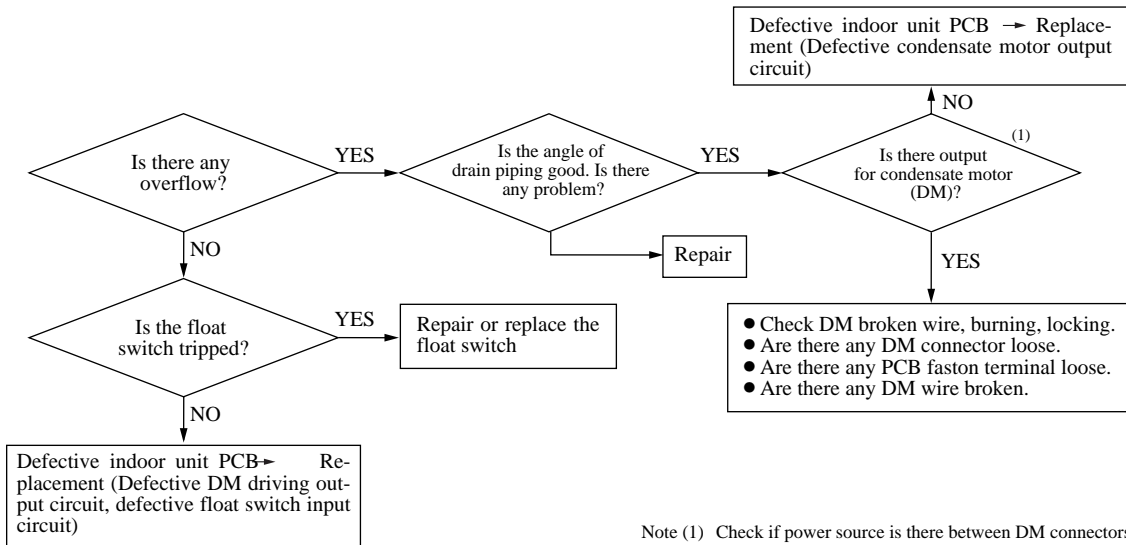
[Heating overload]



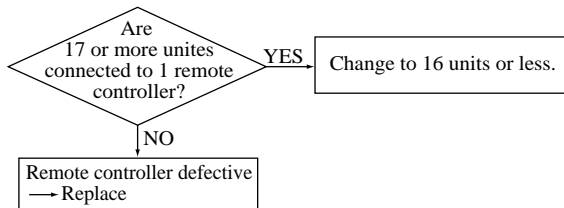
Note (1) To see whether or not it is overloaded, check the following:

- ▶ Is the inside/outside air temperature too high?
- ▶ Is there any short circuit?
- ▶ Is the refrigerant overcharge?

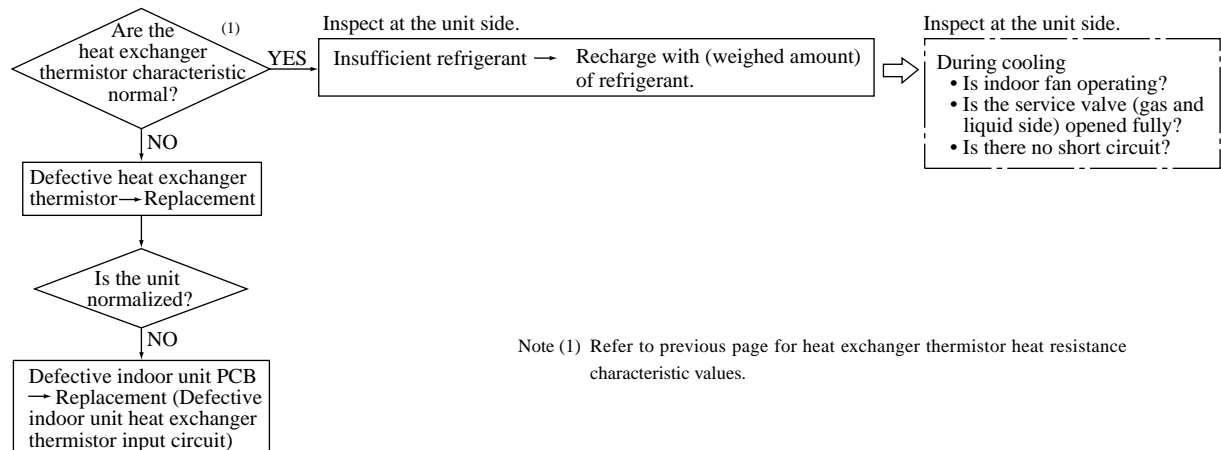
5 Error display : **E 9** [Failure in drainage]



6 Error display : **E 10** [1 Remote controller for multiple unit control Exceeding connected units (17 units or more)]



7 Error display : **E 57** [Insufficient refrigerant]



(3) Outdoor unit side

Check Indicator Table

Failure mode on the outdoor unit is indicated by flashing both Green LED (LED-G) and Red LED (LED-R) on the printed circuit board.

Outdoor unit LED		Failure at:	Contents of the failure
Green	Red		
Keeps flashing	Stays OFF	—————	Normal/Power is supplied.
Stays OFF	2 time flashes	Installation or operation status	<ul style="list-style-type: none"> Over current of the compressor motor. Open phase at L2 phase (secondary wiring of 52C) of compressor. Defective outdoor unit PCB.
Stays OFF	3 time flashes	CM wiring	<ul style="list-style-type: none"> The wiring (secondary wiring of 52C) to the compressor is open.
Stays OFF	4 time flashes	Installation or operation status	<ul style="list-style-type: none"> The outdoor heat exchanger temperature is too high [70°C or over].
		Outdoor heat exchanger thermistor	<ul style="list-style-type: none"> Failure with the outdoor heat exchanger thermistor.
1 time flash	1 time flash	Outdoor heat exchanger thermistor	<ul style="list-style-type: none"> Failure or open circuit with the outdoor heat exchanger thermistor or imperfect connection of the connector.
1 time flash	2 time flashes	Outdoor temperature thermistor	<ul style="list-style-type: none"> Failure or open circuit with the outdoor temperature thermistor or imperfect connection of the connector.
1 time flash	4 time flashes	Installation or operation status	<ul style="list-style-type: none"> The high pressure is too high or it went up (63H1, 49C).
1 time flash	5 time flashes	Failure to open the service valve	<ul style="list-style-type: none"> Closing of the service valve on the liquid/gas side.

“Check Indicator” is resetted when power supply is turned off once and the failure is fixed.

(a) Procedure for diagnosing trouble for outdoor unit

When diagnosing trouble for the outdoor unit, check the flashing and turns of the inspection indicator lamp (red LED) and fault indicator lamp (green LED) to obtain a general concept of the nature of the problem. Then inspect and perform repair.

1) Unit replacement parts related to printed circuit board for outdoor unit.

Micro-computer for outdoor unit, microcomputer, printed circuit board, thermistor (heat exchanger, discharge piping and outdoor air), fuses and transformer.

2) Summary of replacement for micro-computer for outdoor unit

a) Check the following part number

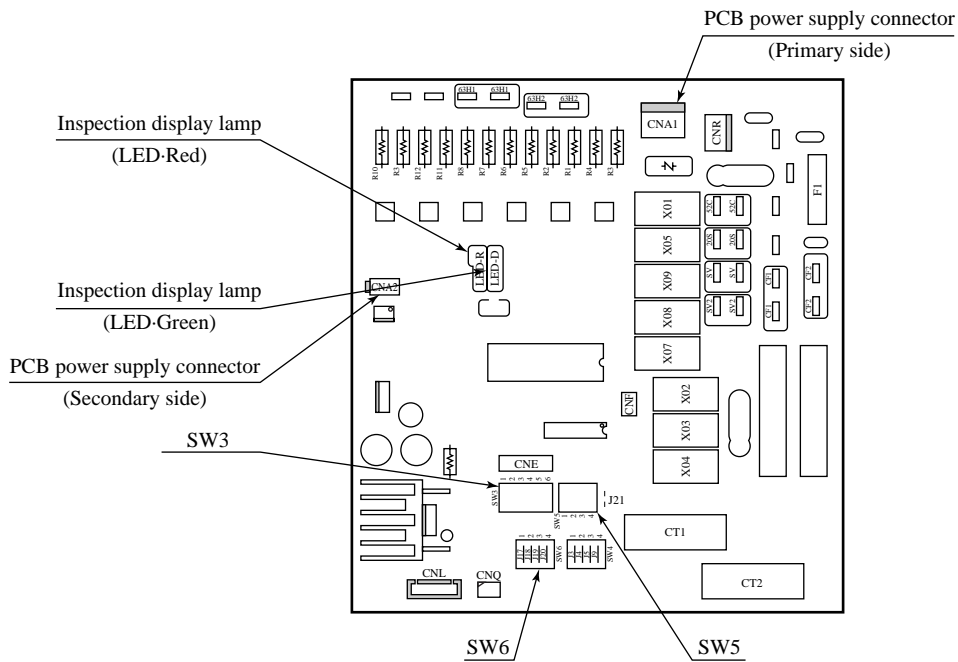
Model	Parts No.
FDCP808, 1008HES3	PCA505A046ZD

b) Set the overcurrent value using the overcurrent setting switch (SW3) for CM. Refer to the following table at the setting.

• Table of switch (SW3) setting

Model	FDCP808HES3	FDCP1008HES3
Setting value (A)	24	34
Table of switch setting Make ON/OFF setting for each switch No. (■: ON, □: OFF)		

Parts layout on the outdoor unit PCB



• Function of DIP switched (SW6)

SW6		Function	
2 (J18)	ON	Defrost control switching	Normal defrost control
	OFF		Forced defrost control
3 (J19)	ON	63HI Abnormal detection switching	Enabled
	OFF		Disabled
4 (J20)	ON	3 minute delay when power is turned on Switching	Enabled
	OFF		Disabled

• Function of DIP switched (SW5)

SW5		Function	
1	ON	Defrost Switching	Actual spot
	OFF		Ordinary
2	ON	Snow protection control	Enabled
	OFF		Disabled
3	ON	Test run Switch	Test run
	OFF		Normal
4	ON		Test run for heating
	OFF		Test run for cooling

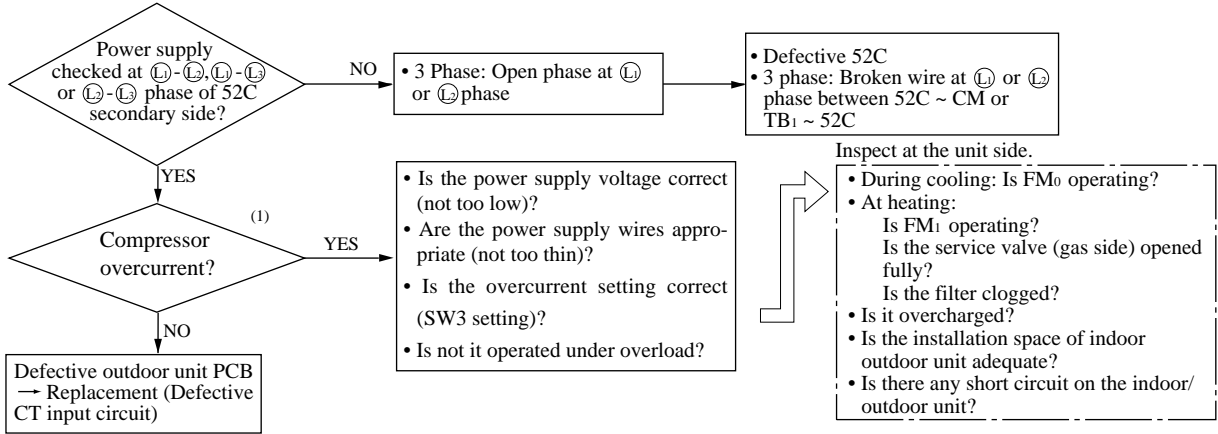
• Function of jumper wire

Name		Function
J21	With	Service valve open/close check control enabled.
	None	Service valve open/close check control disabled.

(b) Inspection method when there are fault lamps (outdoor unit LED)

1 Overcurrent of the compressor motor

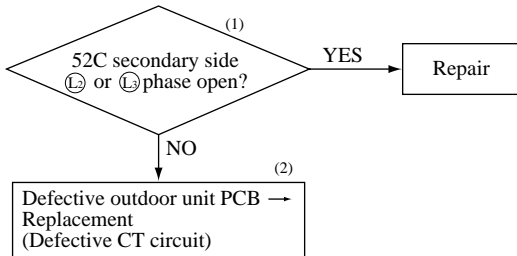
Outdoor unit	
Red LED	2 time flashes
Green LED	Stays OFF



Note (1) Measure and check the current value.
Confirm that the overcurrent setting by SW3 of outdoor unit PCB is correct.

2 The wiring (secondary wiring of 52C) to the compressor is open.

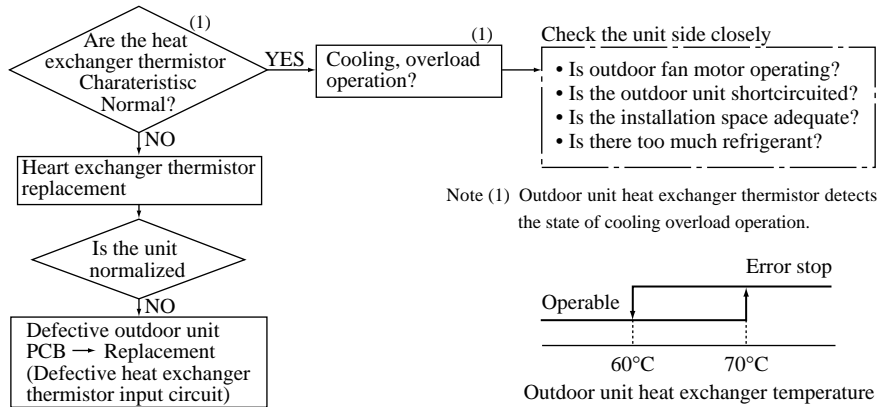
Outdoor unit	
Red LED	3 time flashes
Green LED	Stays OFF



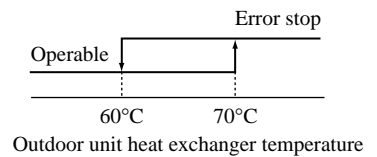
Notes (1) When voltage is detected at 52C primary side (L2) or (L3) phase but not at the secondary side, check also 52C (broken coil, poor contact).
(2) When voltage is detected at 52C primary side (L2) or (L3) phase and there is no error at 52C (52C is energized if TB1 (L2) or (L3) terminal and 52C coil secondary side connector are short circuited), the outdoor unit PCB (defective X01 circuit or X01).

3 The outdoor heat exchanger temperature is too high (70°C or over)

Outdoor unit	
Red LED	4 time flashes
Green LED	Stays OFF

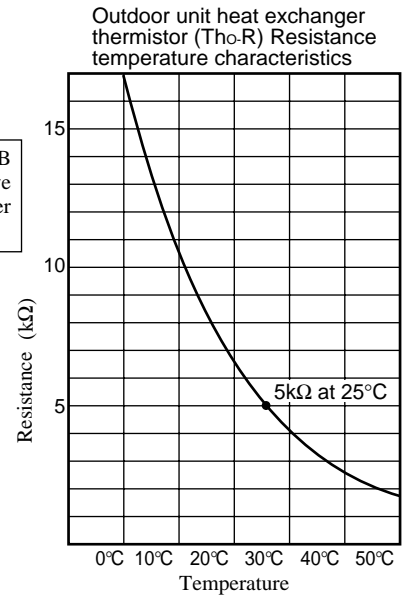
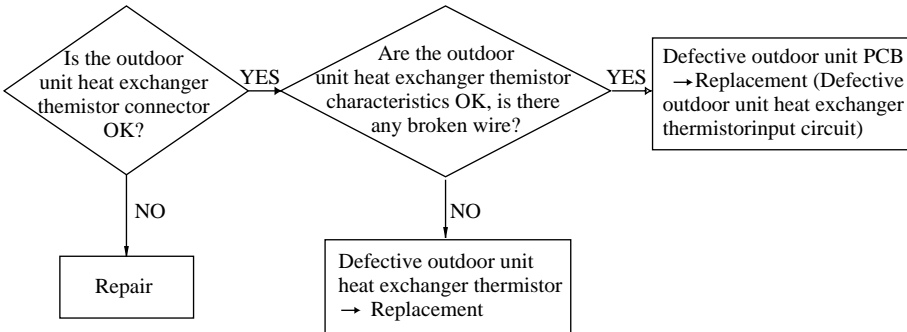


Note (1) Outdoor unit heat exchanger thermistor detects the state of cooling overload operation.



4 Defective outdoor unit heat exchanger thermistor

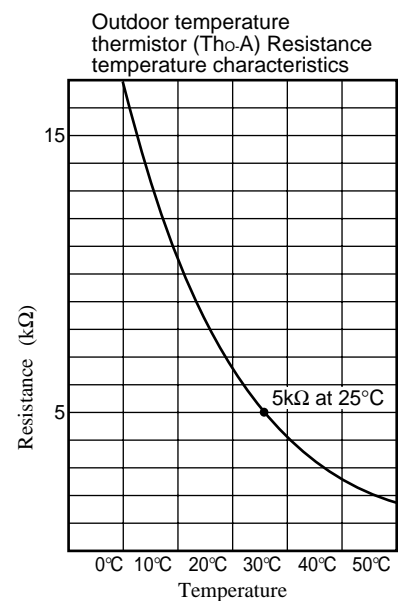
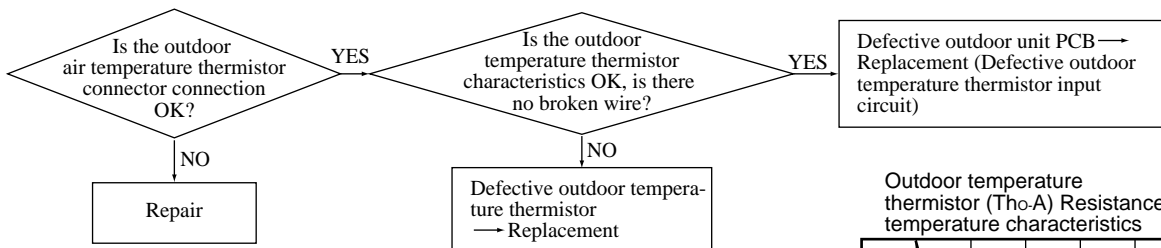
Outdoor unit	
Red LED	1 time flash
Green LED	1 time flash



Note (1) 22kΩ at -6°C

5 Defective outdoor temperature thermistor

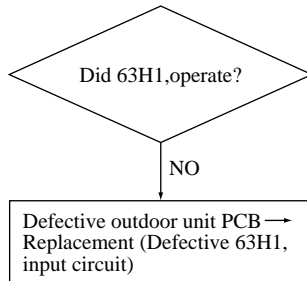
Outdoor unit	
Red LED	2 time flashes
Green LED	1 time flash



Note (1) 22kΩ at -6°C

6 63H1, 49C operation

Outdoor unit	
Red LED	4 time flashes
Green LED	1 time flash



At 63H1 operation

1. During cooling

- Is the outdoor unit fan motor operating?
- Is there no short circuit air circulation for thr outdoor unit?
- Is there sufficient space for air inlet & outlet?

2. During heating

- Is the gas side service valve fully opened?
- Is the indoor unit heat exchanger thermistor detached from the detector case?
- Is the filter clogged?
- Is the outdoor unit fan controlled by due to defective 63H2?

3. During colling/heating

- Is the refrigerant overcharge?

At 49C operation

During cooling/heating

- Isn't there insufficient refrigerant?
(Isn't there gas leakage?)
- Isn't there a missing phase (L₁) or (L₂) phase?)

7 Failure to open the service valve

Outdoor unit	
Red LED	5 time flashes
Green LED	1 time flash

This abnormality will be indicated only when the compressor is ON for the time after turning on the power. (Refer to page 51)