19. MULTI-TYPE(V MULTI) PACKAGED AIR-CONDITIONER

(Split system, Air to air heat pump type)

OUTDOOR UNIT

FDC508HES3B

808HES3B

INDOOR UNIT

FDT208-A	**FDR208-A**
258-A	**258-A**
308-A	**308-A**
408-A	**408-A**
508-A	**508-A**

CONTENTS

19.1 GENERAL INFORMATION 619
19.1.1 Specific features 619
19.1.2 How to read the model name 619
19.1.3 Table of models 620
19.1.4 Table of system combinations 620
19.2. SELECTION DATA 621
19.2.1 Specifications 621
19.2.2 Range of usage & limitations 628
19.2.3 Exterior dimensions 630
19.2.4 Exterior appearance 642
19.2.5 Piping system 643
19.2.6 Selection chart 645
19.2.7 Characteristic of fan 647
19.2.8 Noise level 649
19.3. ELECTRICAL DATA 651
19.3.1 Electrical wiring 651
19.4. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER 653
19.5. APPLICATION DATA 653
19.5.1 Installation of indoor unit 653
19.5.2 Installation of remote controller (Optional parts) 653
19.5.3 Installation of outdoor unit 653
19.6. MAINTENANCE DATA 661

19.1 GENERAL INFORMATION

19.1.1 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) Simaltaneous 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) All models have service valves protruding from the outdoor unit for faster flare connection work in the field.

(c) Low sound level

Operating noise has been remarkably reduced due to adoption of the crescent turbo fan which cuts off wind-blowing noise and also console type of cabinet which is highly effective to protect vibration.

(d) 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) Quiet sound design

(i) Noise reducing effect has been improved significantly with the employment of large silent steam fans which are free from the wind swishing sound, and the special designing of noise shielding and acoustic suction panel.

(ii) Ideal adaptation to the need for quiet sound at conference rooms, offices, etc.

(b) 2 types of optional decorative panel

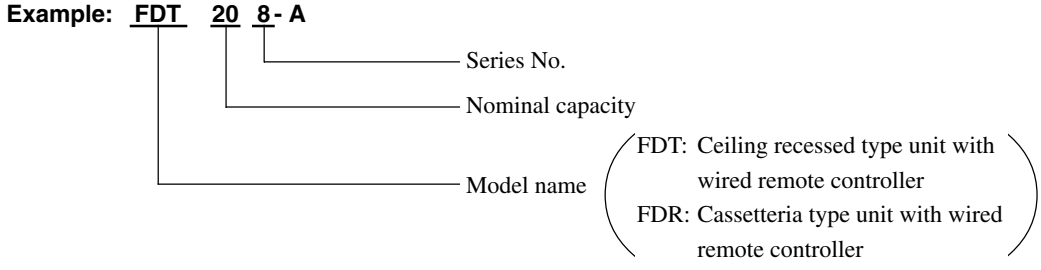
(i) Optional decorative panel consists of silent panel and a canvas duct panel. [has smaller sizes and is prepared with canvas duct panel which provides higher drain head.]

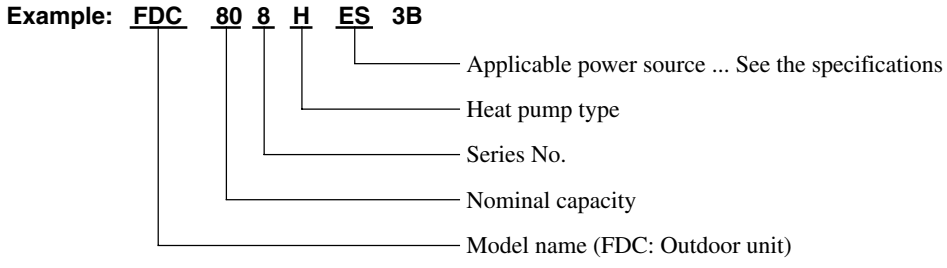
(ii) Flexibility of installation is increased with 2 type panels.

(c) External static pressure

High external static pressure type (Refer to the specification in clause 2 for the external static pressure.)

19.1.2 How to read the model name





19.1.3 Table of models

Model \ Capacity	208	258	308	408	508
Ceiling recessed type (FDT)	○	○	○	○	○
Cassetteria type (FDR)	○	○	○	○	○
Outdoor unit to be combined(FDC)	FDC508HES3B (5 Horse Power)		FDC808HES3B (8 Horse Power)		

19.1.4 Table of system combinations

Outdoor unit	Type	Indoor unit assembly capacity	Branch pipe set (Optional)
FDC508HES3B	Twin	258+258	DIS-WA
FDC808HES3B	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

Notes (1) It is possible to used different models (FDT, FDR) when combining indoor units.
(2) Always use the branch piping set (optional) at branches in the refrigerant piping.

19.2 SELECTION DATA

19.2.1 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 & Q'ty		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, 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: 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 / Operation	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"

● 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, 408-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 / Operation	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"

● Decorative Panel model (Optional)

Model \ Item	Panel Part No.
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	
Decorative panel		**Silent panel**	**Canvas panel**	**Silent panel**	**Canvas 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.

Item / Operation	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) Indoor unit height of canvas specification type is higher than the other type for canvas duct portion.

Models FDR308-A, 408-A

Item \ Model		FDR308-A		FDR408-A	
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 & Q'ty		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: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, Canvas panel, Canvas duct**			

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

Item / Operation	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) Indoor unit height of canvas specification type is higher than the other type for canvas duct portion.

Model FDR508-A

Item \ 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 / Operation	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: HA01484

(4) Indoor unit height of canvas specification type is higher than the other type for canvas duct portion.

(2) Outdoor unit

Models FDC508HES3B, 808HES3B

Item \ Model		FDC508HES3B	FDC808HES3B
Power source		**3 Phase 380/415V 50Hz**	
Nominal cooling capacity(1)	**W**	**12500**	**20000**
Nominal heating capacity(1)	**W**	**14000**	**21200**
Noise level	dB(A)	55	58
Exterior dimensions Height × Width × Depth	**mm**	**1250 × 920 × 340**	**1450 × 1350 × 600**
Net weight	**kg**	**101**	**185**
Refrigerant equipment compressor type & Q' ty		GU-A5570ES41 × 1	CB90 × 1
Motor	**kW**	**3.75**	**6.5**
Starting method		Line starting	
Crankcase heater	W	70	
Heat exchanger		Slitted fines & bare tubing	
Refrigerant control		Capillary tube	
Refrigerant		**R22**	
Quantity	**kg**	**1.9(Pre-charged up to the piping length of 5m)**	**5.33(Pre-charged up to the piping length of 5m)**
Refrigerant oil	ℓ	**1.6 (BARREL FREEZE 32SAM)**	**4.4 (BARREL FREEZE 32SAM)**
Defrost control		IC controlled De-Icer	
Air handling equipment Fan type & Q'ty		Propeller fan × 2	
Motor	**W**	**65×2**	**100×2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**110**	**180**
Shock & vibration absorber		Rubber mount (for compressor)	
Safety equipment		Internal thermostat for fan motor. Abnormal for discharge temperature protection.	Internal thermostat for fan motor. High pressure protection switch
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ9.52 (3/8") Gas line: ϕ19.05 (3/4")**	**Liquid line: ϕ12.7 (1/2") Gas line: ϕ25.4 (1")**
Connecting method		**Flare piping**	**Liquid line: Flare piping Gas line: Brazing**
Drain		Hole for drain(ϕ20 × 3pcs)	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

The Multi series is a system that allows for different models and capacities of indoor units to be combined so the individual operating characteristics of the indoor and outdoor are provided. Use the procedure shown in Item (c) to calculate the combined operating characteristics.

(a) Operating characteristic of outdoor unit

(380 V/415 V)

Item \ Model		FDC508HES3B	FDC808HES3B
Cooling input	kW	5.03/5.28	8.44/8.54
Heating input		4.58/4.71	6.44/6.64
Cooling running current	A	8.6/9.4	14.2/13.5
Heating running current		8.1/9.0	11.6/11.2
Inrush current (L.R.A)	A	74	99
Cooling power factor	%	89/78	90/88
Heating power factor		86/73	84/82

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

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) / $\sqrt{3}$ $\times$ Total running current (A) $\times$ Power source] $\times$ 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: FDC808HES3B $\times$ 1 unit
Indoor unit: FDT308-A $\times$ 1 units, FDT508-A $\times$ 1 units

Operation characteristics of each unit

(Cooling/Heating)

Item \ Model	FDC808HES3B	FDT308-A	FDT508-A
Power input (kW)	8.44/6.44	0.11/0.11	0.27/0.27
Running current (A)	14.2/11.6	0.6/0.6	1.4/1.4

① Total power input (kW)

(Cooling) 8.44 + 0.11+ 0.27 = 8.82 (kW)

(Heating) 6.44 + 0.11+ 0.27 = 6.82 (kW)

② Total running current (A)

(Cooling) $14.2 + (0.6+1.4 \times \frac{2}{3}) \fallingdotseq 15.5$ (A)

(Heating) $11.6 + (0.6 + 1.4 \times \frac{2}{3}) \fallingdotseq 12.9$ (A)

③ Total power factor (%)

(Cooling) $\frac{8.82 \times 1000}{\sqrt{3} \times 15.5 \times 380} \times 100 \fallingdotseq 86$ %

(Heating) $\frac{6.82 \times 1000}{\sqrt{3} \times 12.9 \times 380} \times 100 \fallingdotseq 80$ %

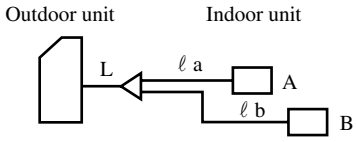
19.2.2 Range of usage & limitations

Item \ Model	FDC508HES3B	FDC808HES3B
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. 1m	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

Twin type



FDC508HES3B

One-way pipe length (m) $L + \ell a + \ell b \leqq 50$

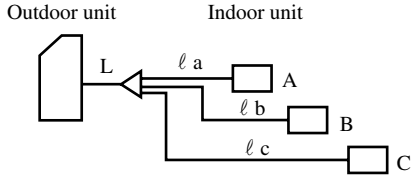
Branch pipe length (m) $|\ell a - \ell b| \leqq 10,\ \ell a \leqq 30,\ \ell b \leqq 30$

FDC808HES3B

One-way pipe length (m) $L + \ell a \leqq 50,\ L + \ell b \leqq 50$

Branch pipe length (m) $|\ell a - \ell b| \leqq 10,\ \ell a \leqq 30,\ \ell b \leqq 30$

Triple type



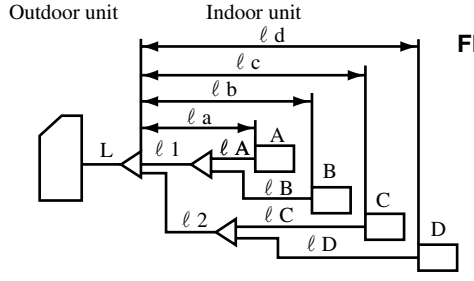
FDC808HES3B

One-way pipe length (m) $L + \ell a \leqq 50,\ L + \ell b \leqq 50,\ L + \ell c \leqq 50$

Branch pipe length (m) $|\ell a - \ell b| \leqq 10,\ |\ell a - \ell c| \leqq 10,\ |\ell b - \ell c| \leqq 10$

$\ell a \leqq 30,\ \ell b \leqq 30,\ \ell c \leqq 30$

Double-twin type



FDC808HES3B

One-way pipe length (m) $L + \ell a \leqq 50,\ L + \ell b \leqq 50,\ L + \ell c \leqq 50,\ L + \ell d \leqq 50$

Branch pipe length (m) $|\ell a - \ell b| \leqq 10,\ |\ell a - \ell c| \leqq 10,\ |\ell b - \ell c| \leqq 10$

$|\ell a - \ell d| \leqq 10,\ |\ell b - \ell d| \leqq 10,\ |\ell c - \ell d| \leqq 10$

$\ell a \leqq 30,\ \ell b \leqq 30,\ \ell c \leqq 30,\ \ell d \leqq 30$

$\ell A + \ell B \leqq 15,\ \ell C + \ell D \leqq 15$

In the illustration the L is main piping and a, b, c, and d are branch piping.

Request

(1) When the capacity of the indoor unit to be connected is 208 or less, be sure to use a pipe diameter of ø9.52 for the size of the liquid piping of branch piping (between branch and indoor units). (for double-twin only) For connections to indoor units (liquid piping side dia. ø6.35) use the different diameter adapter coupling that is included in the branch piping kit.

(2) Check to make sure the following pipe length limits are followed.
Refer to the above illustration.

(3) 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.

19.2.3 Exterior dimensions

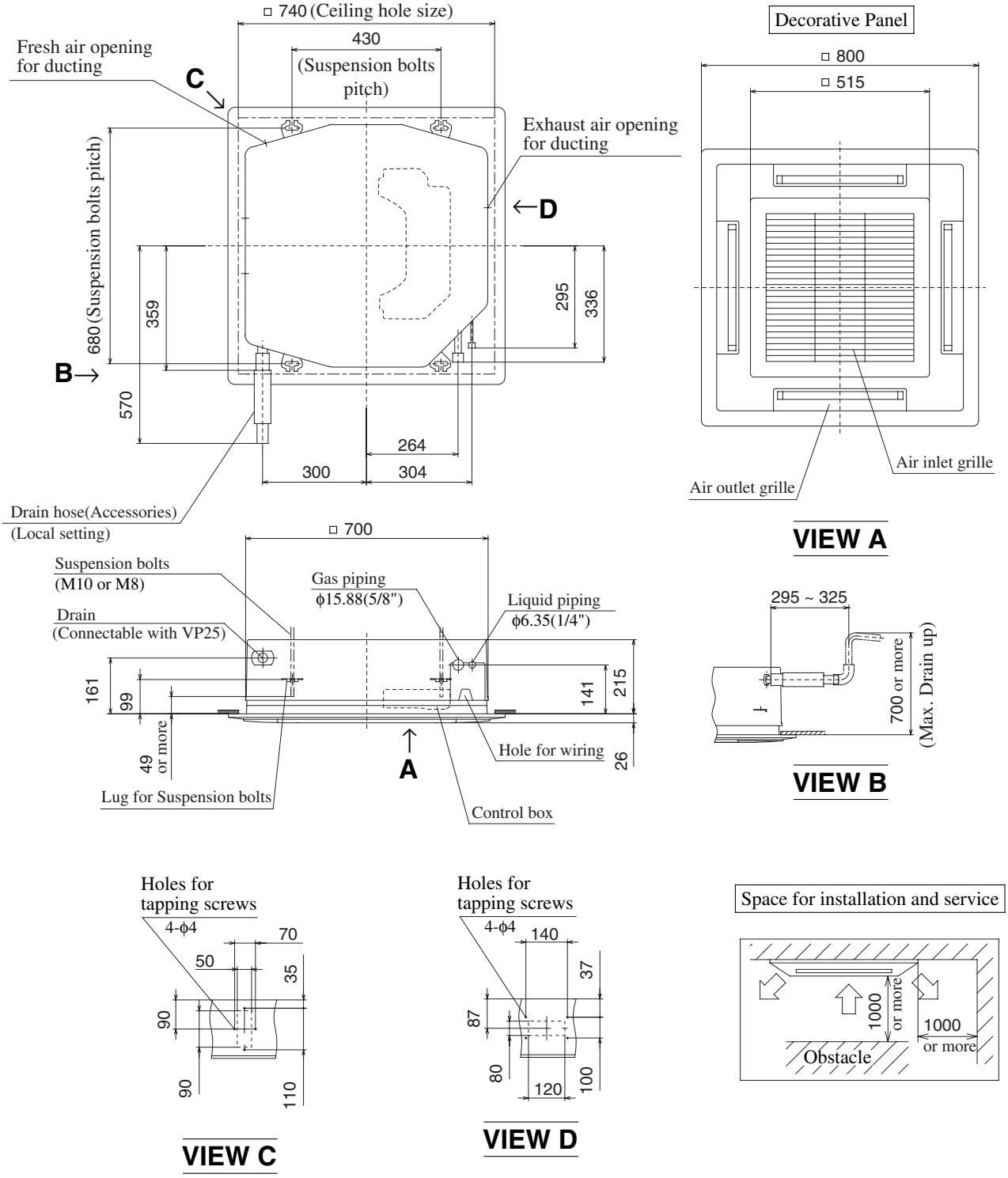
(1) Indoor unit

(a) Ceiling recessed type (FDT)

Model FDT208-A

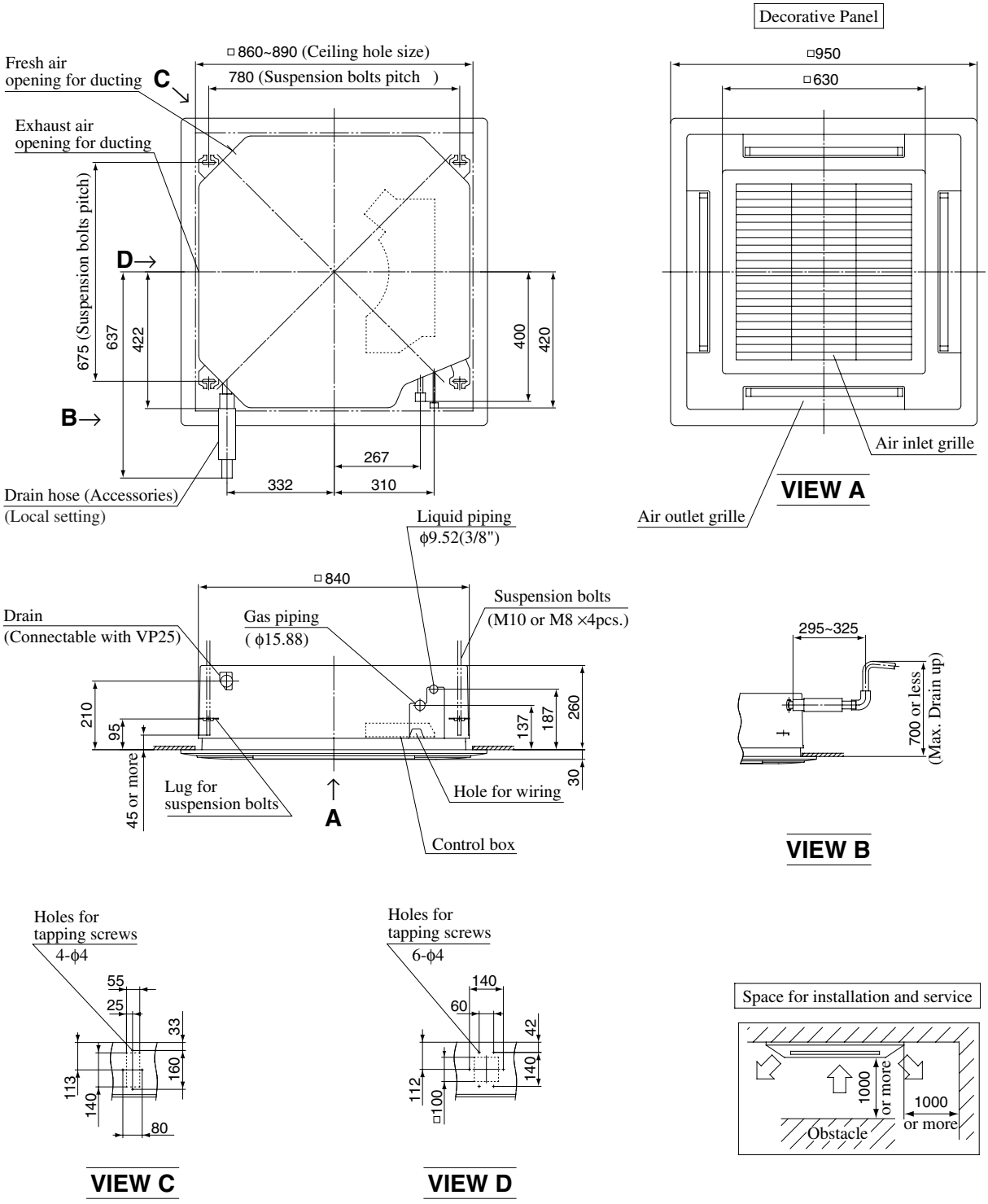
Note (1) When using the 208-A for the double twin, ensure to step up/down the liquid pipe size of the branch piping to ϕ9.52 (from the branch section to the indoor unit) using a reducer attached in the branch pipe set.

Unit : mm



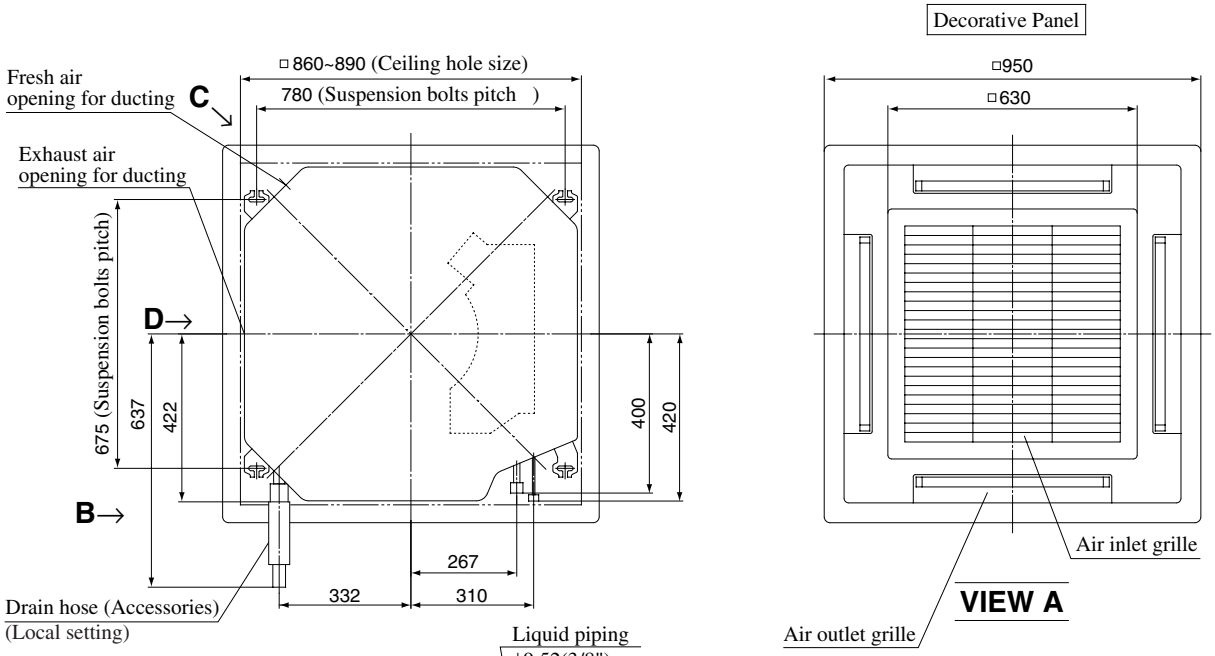
Models FDT258-A, 308-A

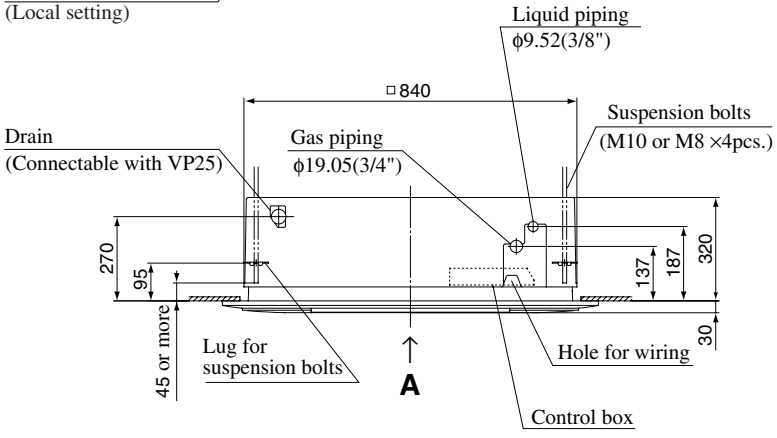
Unit : mm

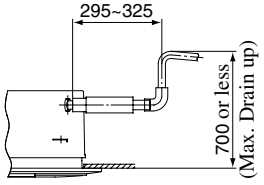


Models FDT408-A, 508-A

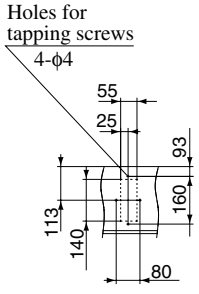
Unit : mm



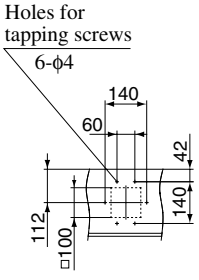




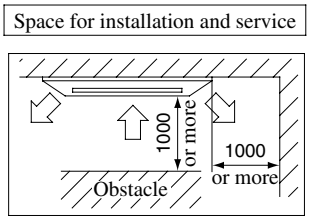
VIEW B



VIEW C



VIEW D



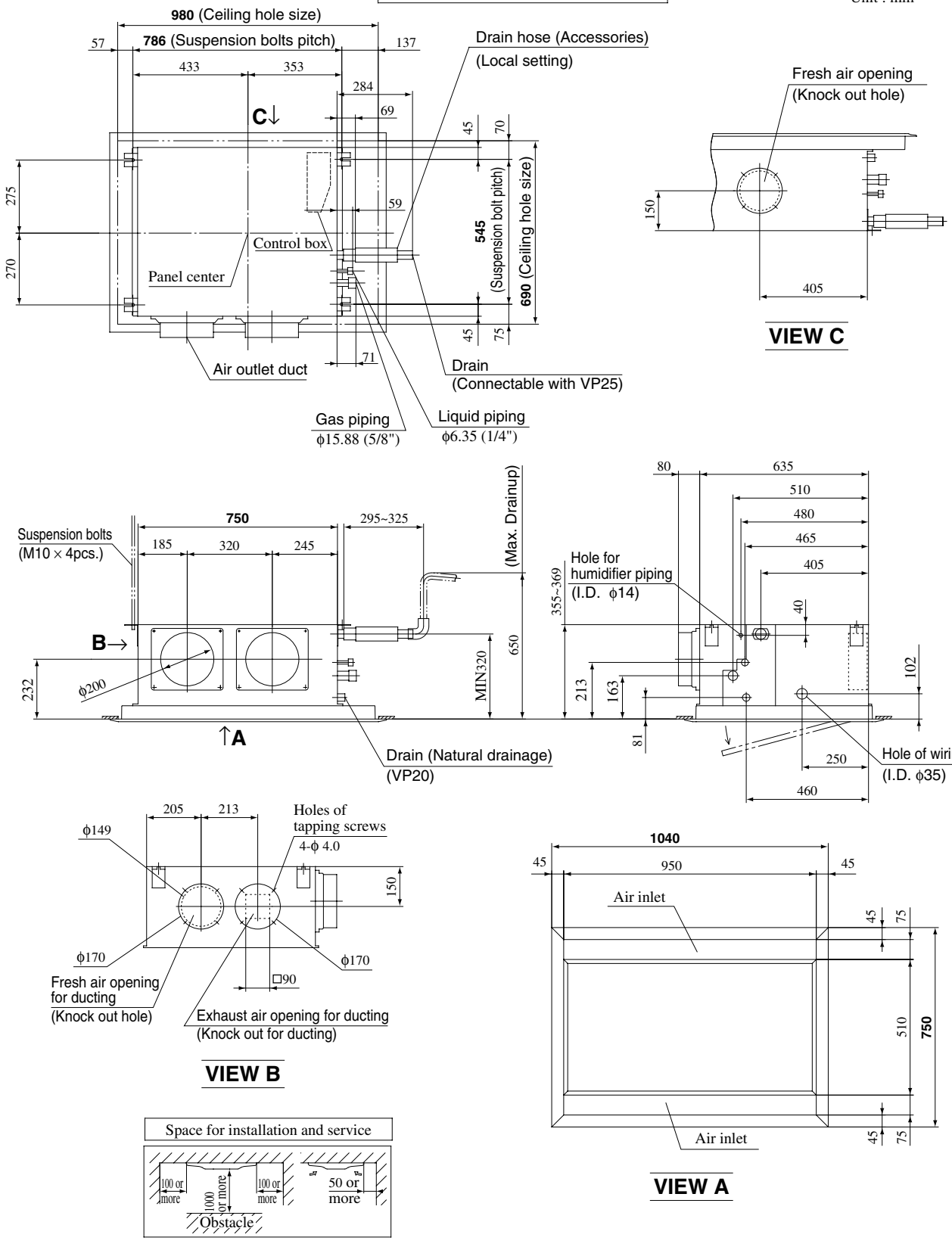
(b) Cassetteria type (FDR)

Model FDR208-A

Note (1) When using the 208-A for the double twin, ensure to step up/down the liquid pipe size of the branch piping to ϕ9.52 (from the branch section to the indoor unit) using a reducer attached in the branch pipe set.

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

Unit : mm

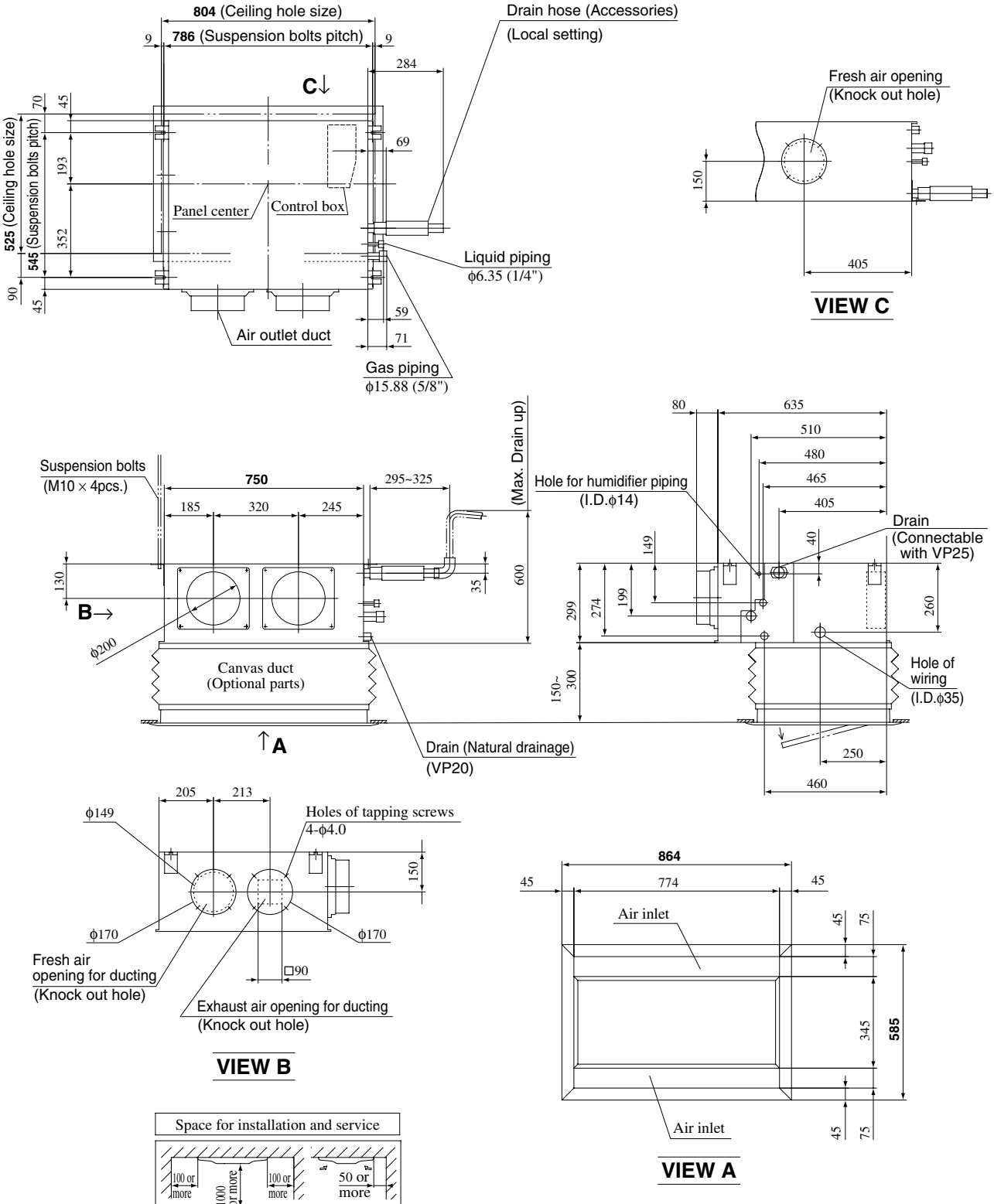


Model FDR208-A

Note (1) When using the 208-A for the double twin, ensure to step up/down the liquid pipe size of the branch piping to ϕ9.52 (from the branch section to the indoor unit) using a reducer attached in the branch pipe set.

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

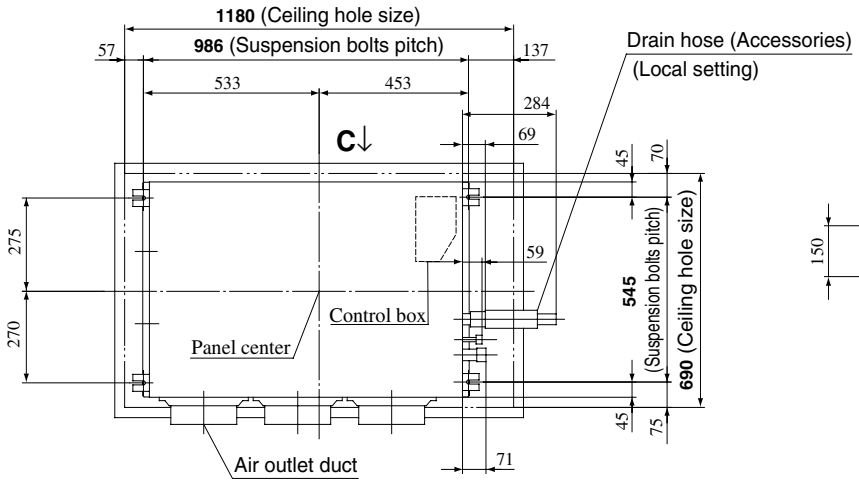
Unit : mm

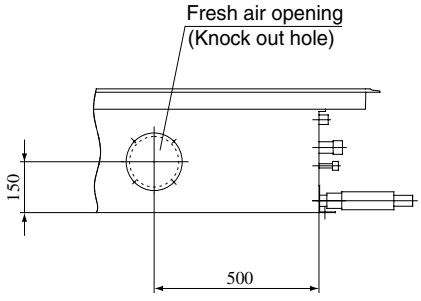


Models FDR258-A, 308-A

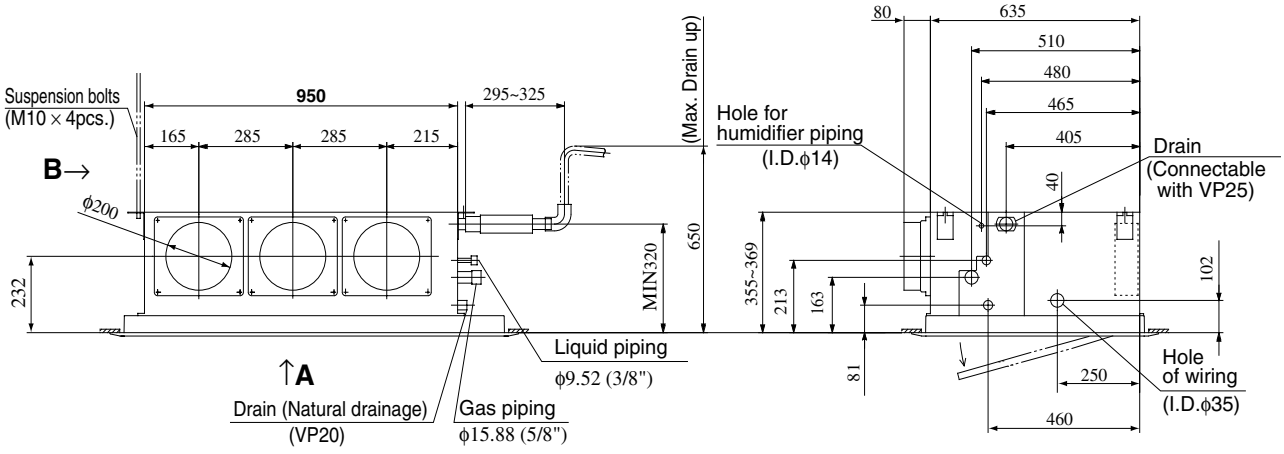
Silent Panel (Model: R-PNLS-36W-E)

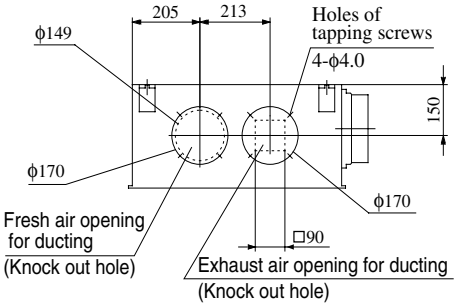
Unit : mm



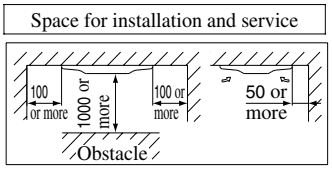


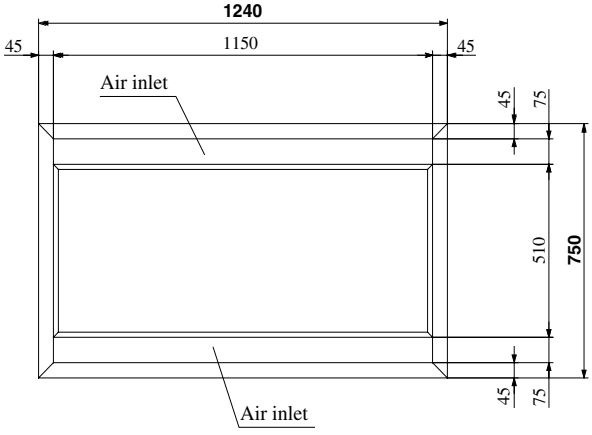
VIEW C





VIEW B



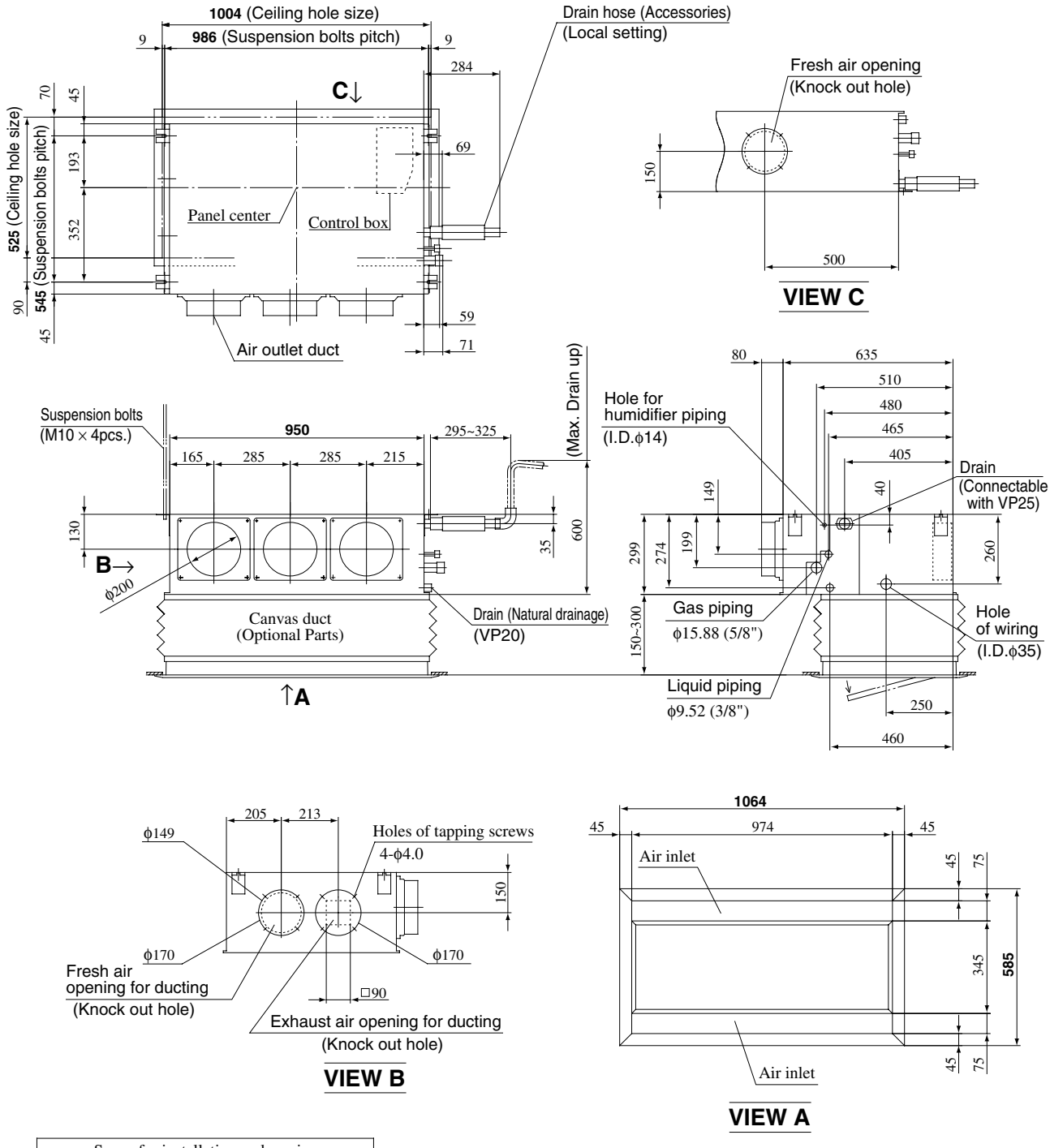


VIEW A

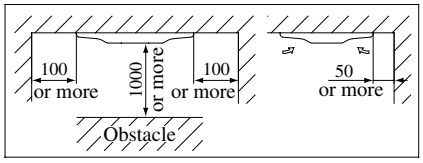
Models FDR258-A, 308-A

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

Unit : mm



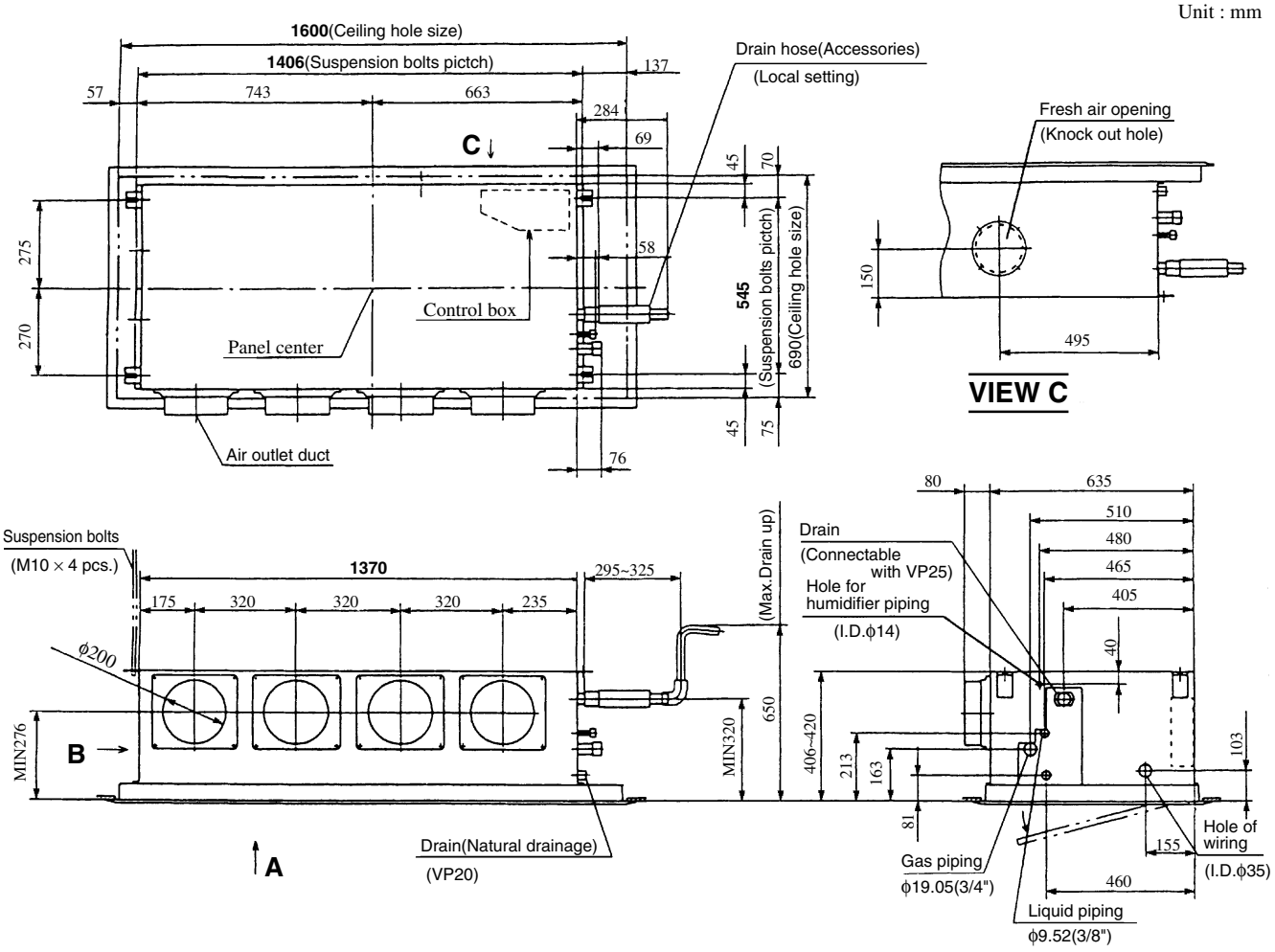
Space for installation and service



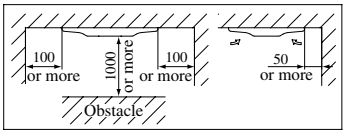
Models FDR408-A, 508-A

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

Unit : mm



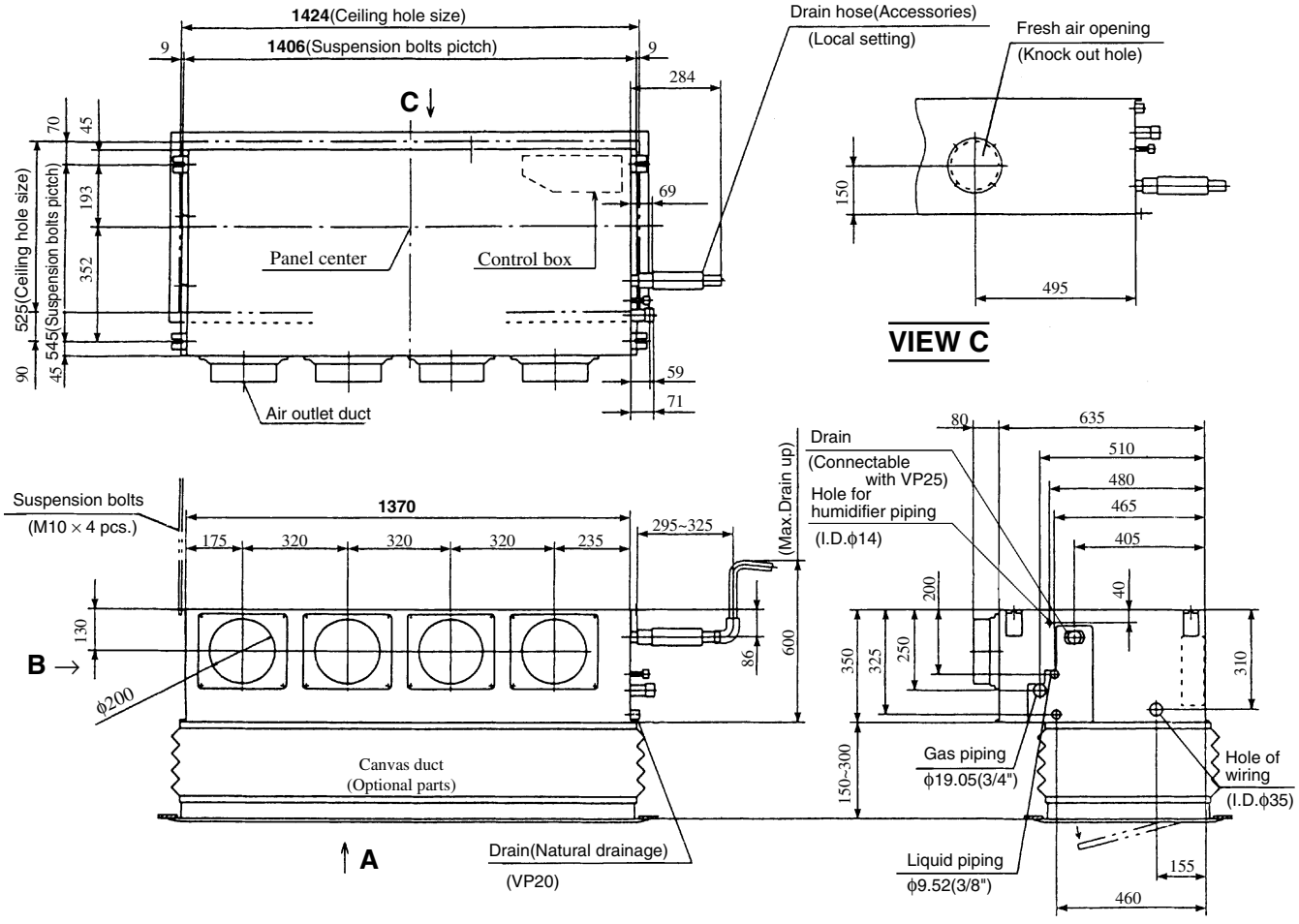
Space for installation and service

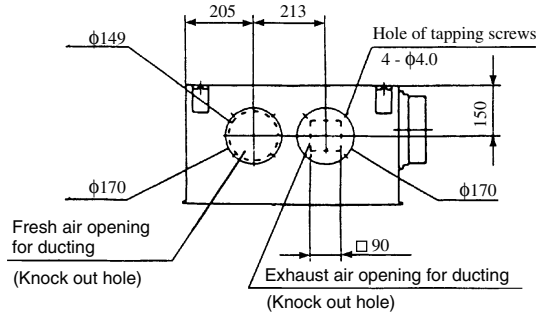


Models FDR408-A, 508-A

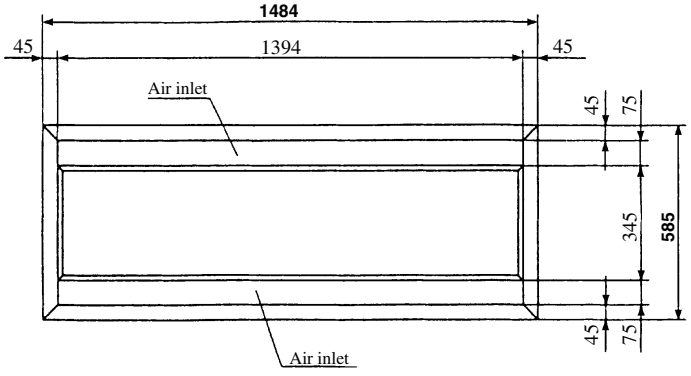
Canvas Panel (Model: R-PNLC-46W-E)

Unit : mm



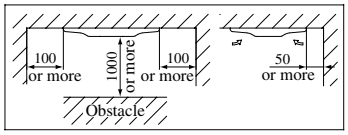


VIEW B



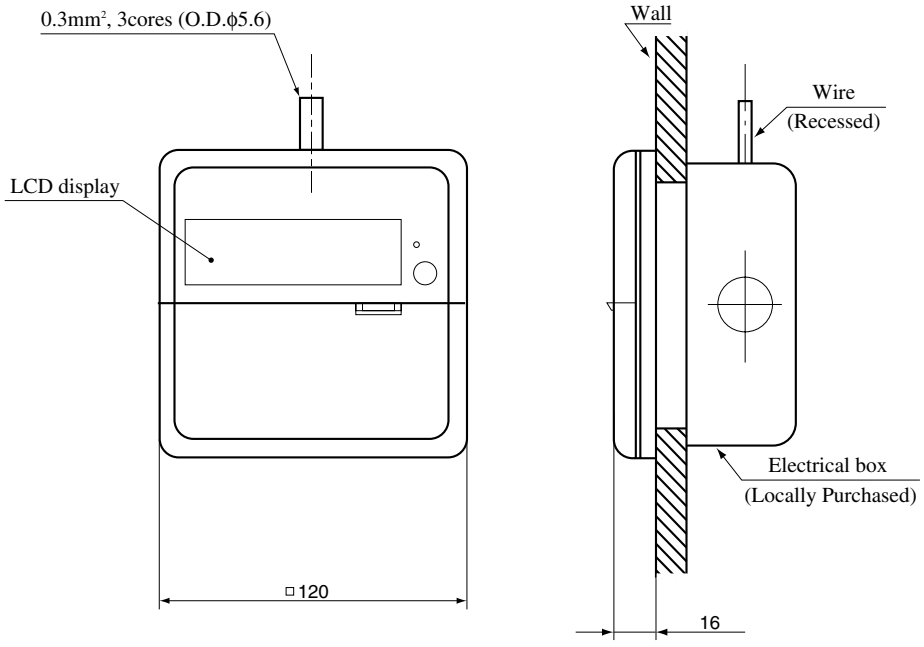
VIEW A

Space for installation and service

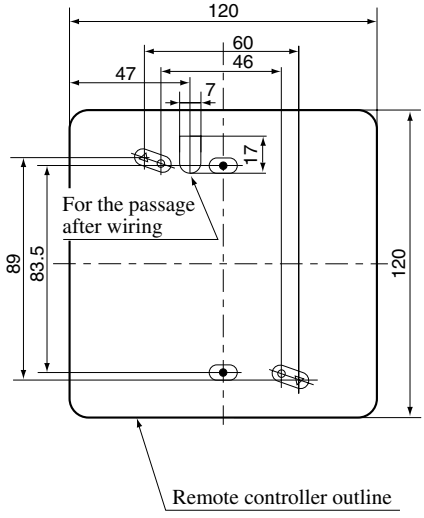


(2) Remote controller (Optional parts)

Unit : mm



Remote controller mounting dimensions



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

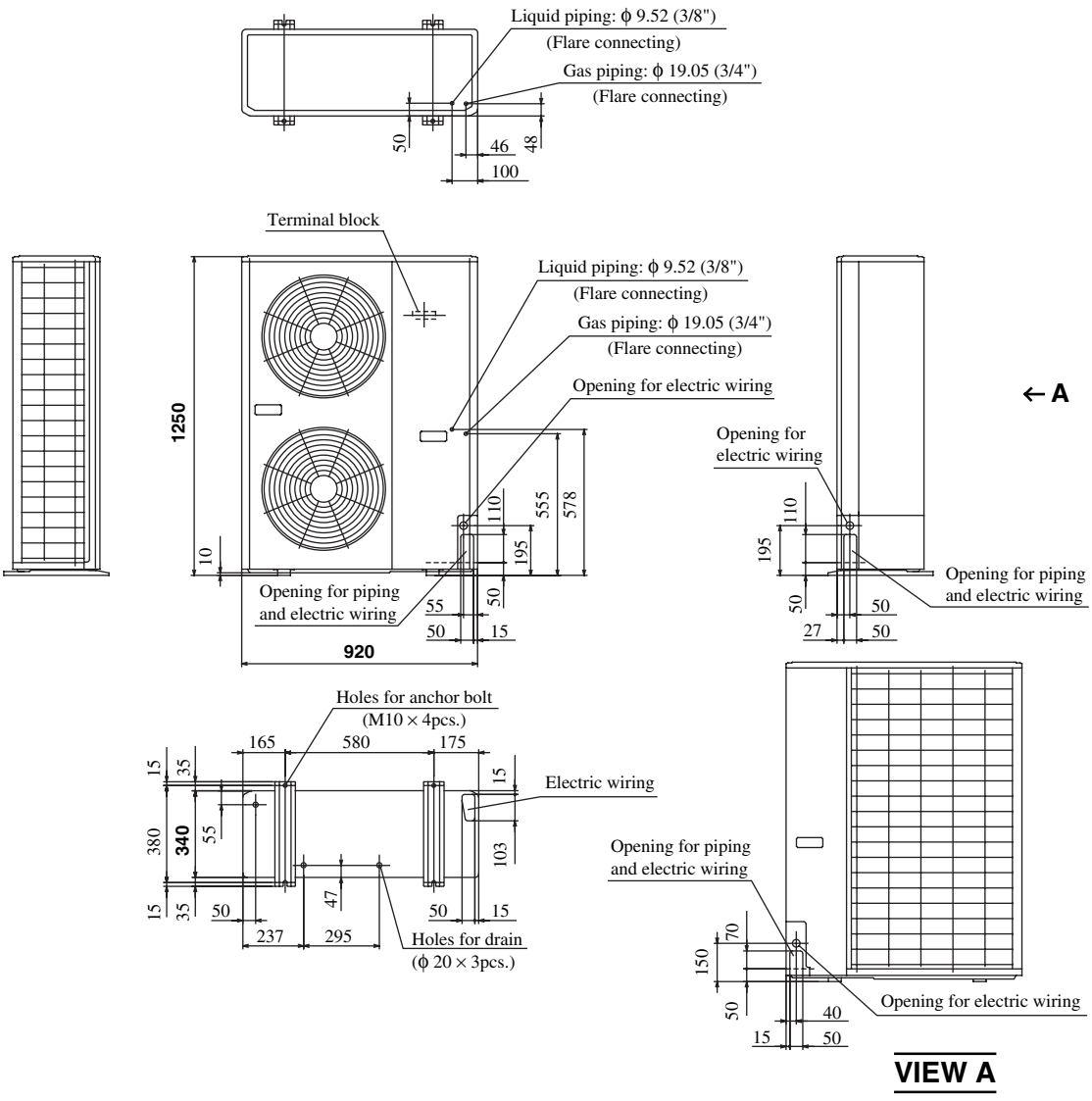
Allowable rang of wire thickness and length

Standard Within	0.3 mm²	× Within 100 m
	0.5 mm²	× Within 200 m
	0.75 mm²	× Within 300 m
	1.25 mm²	× Within 400 m
	2 mm²	× Within 600 m

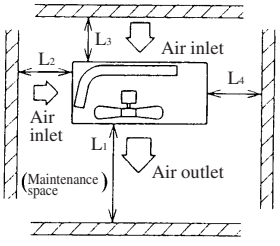
(3) Outdoor unit

Model FDC508HES3B

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

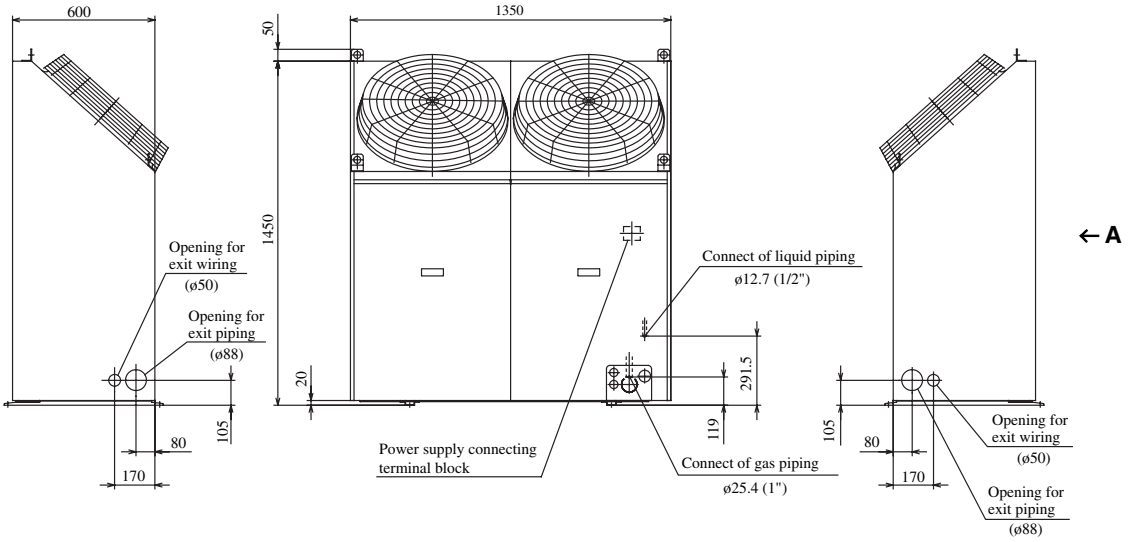
Mark \ Installation type	Ⅰ	Ⅱ	Ⅲ
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	5	5	5

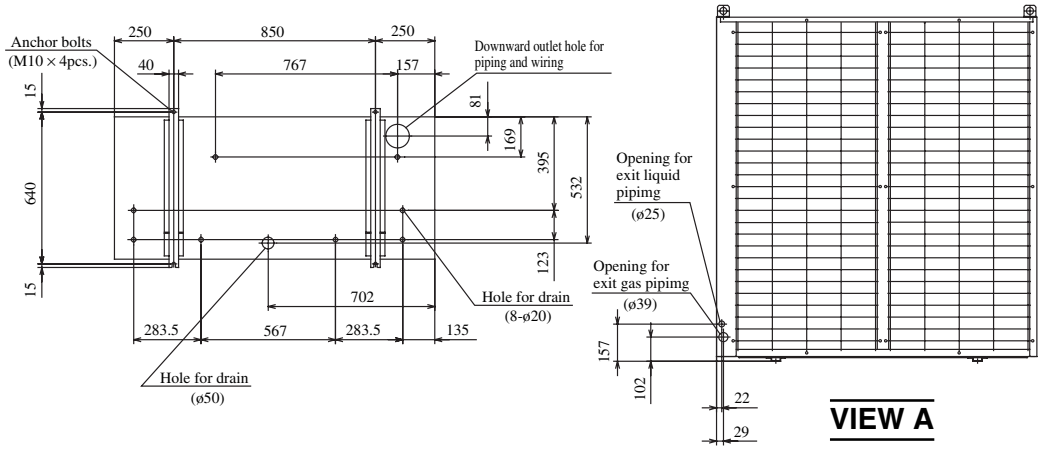
Notes

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

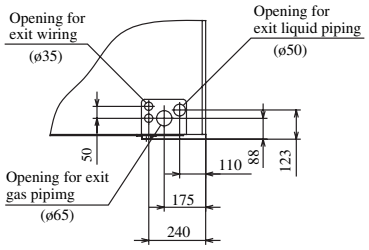
Model FDC808HES3B

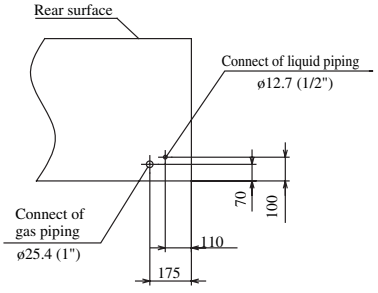
Unit: mm

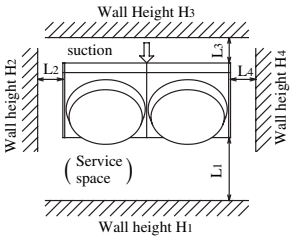




Dimentions of refrigerant piping connecting mouth (Front)







(Unit:mm)

Installation example / Dimensions	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

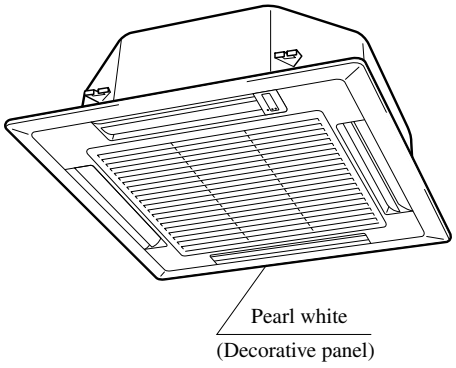
Notes (1) Make sure to secure the unit with anchor bolts.
(2) When the strong wind blows, place the unit so that discharge outlet faces the wind direction with right angle.
(3) Make sure to allow the space of 1 m or more above the unit.
(4) Connect the refrigerant piping (both gas side and liquid side)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

19.2.4 Exterior appearance

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models All models

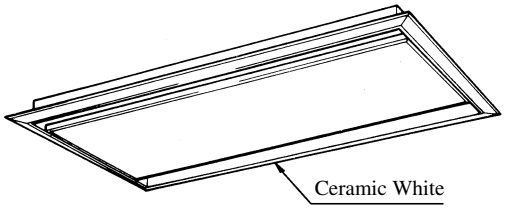


Type \ Item	Panel model	Remarks
FDT208-A	T-PSA-22W-E	Without swing
FDT258-A~508-A	T-PSA-32W-E	

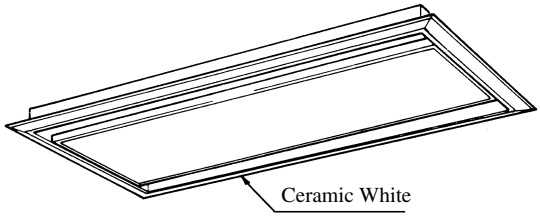
(b) Cassetteria type (FDR)

Models All models

Silent panel type

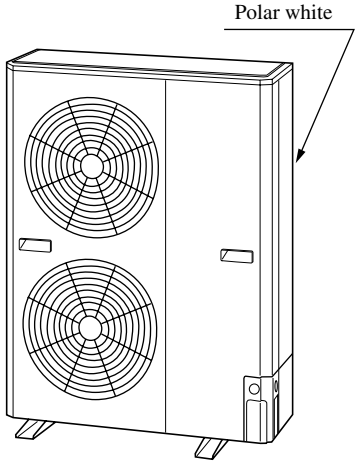


Canvas-duct panel type

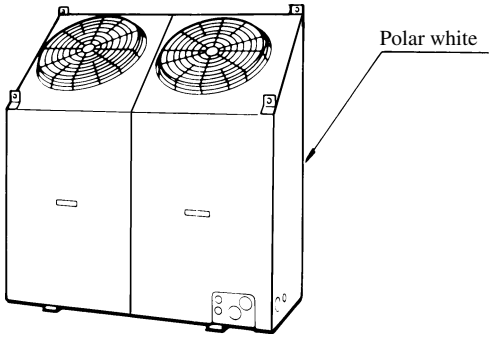


(2) Outdoor unit

Model FDC508HES3B



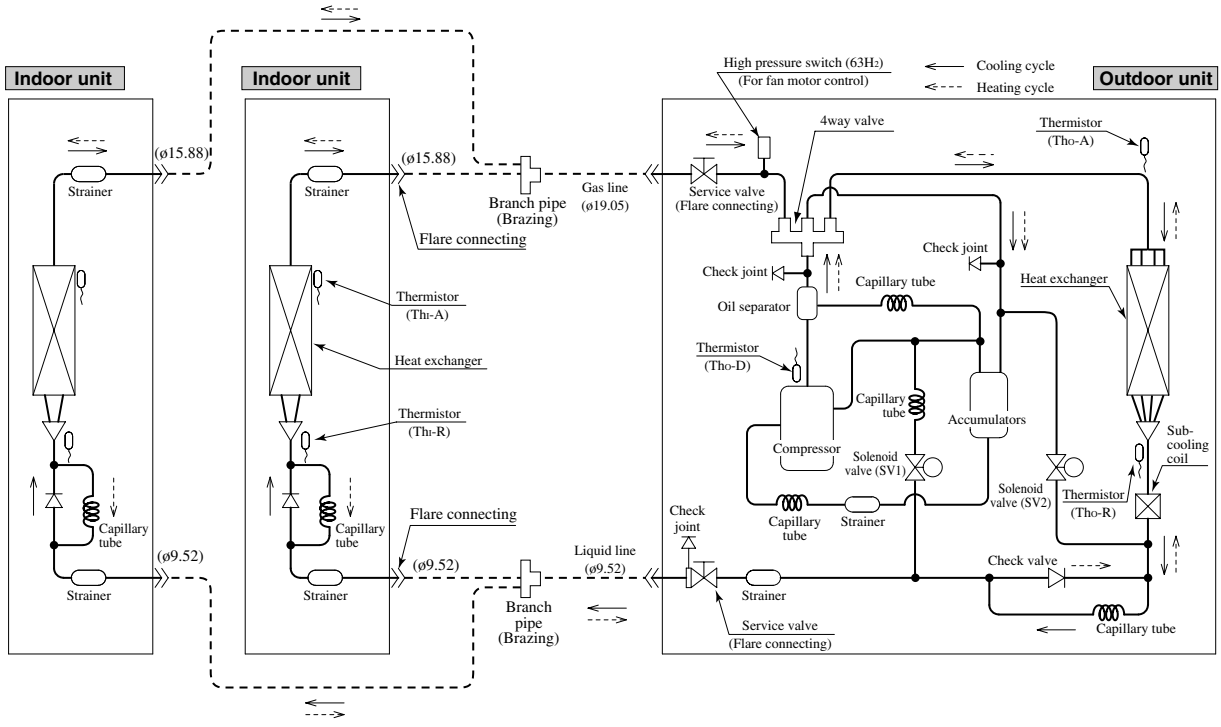
Model FDC808HES3B



19.2.5 Piping system

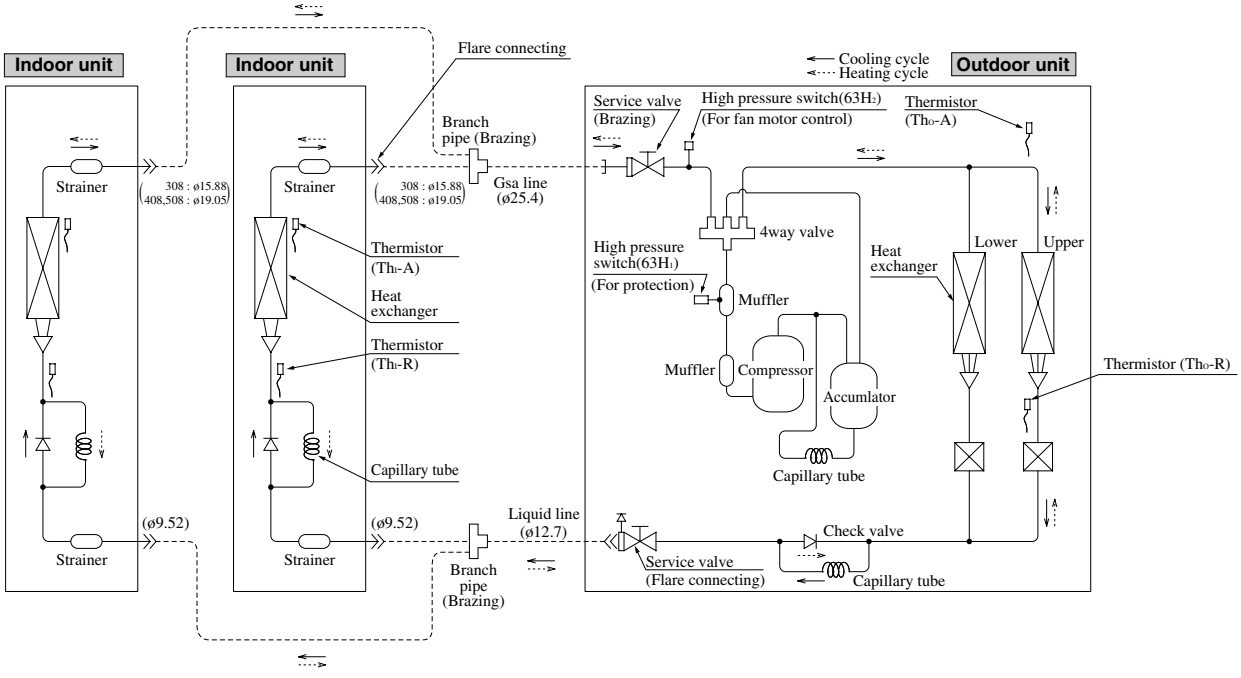
(1) Twin type

Model FDC508HES3B



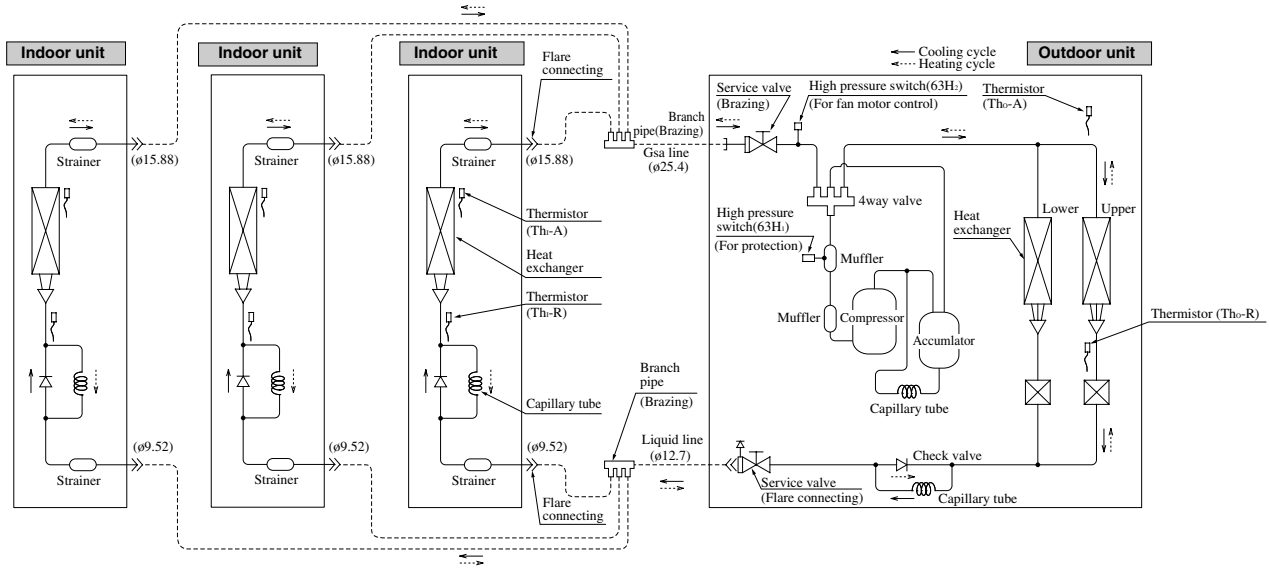
Note (1) Refer to page 655 for piping size after branching.

Model FDC808HES3B



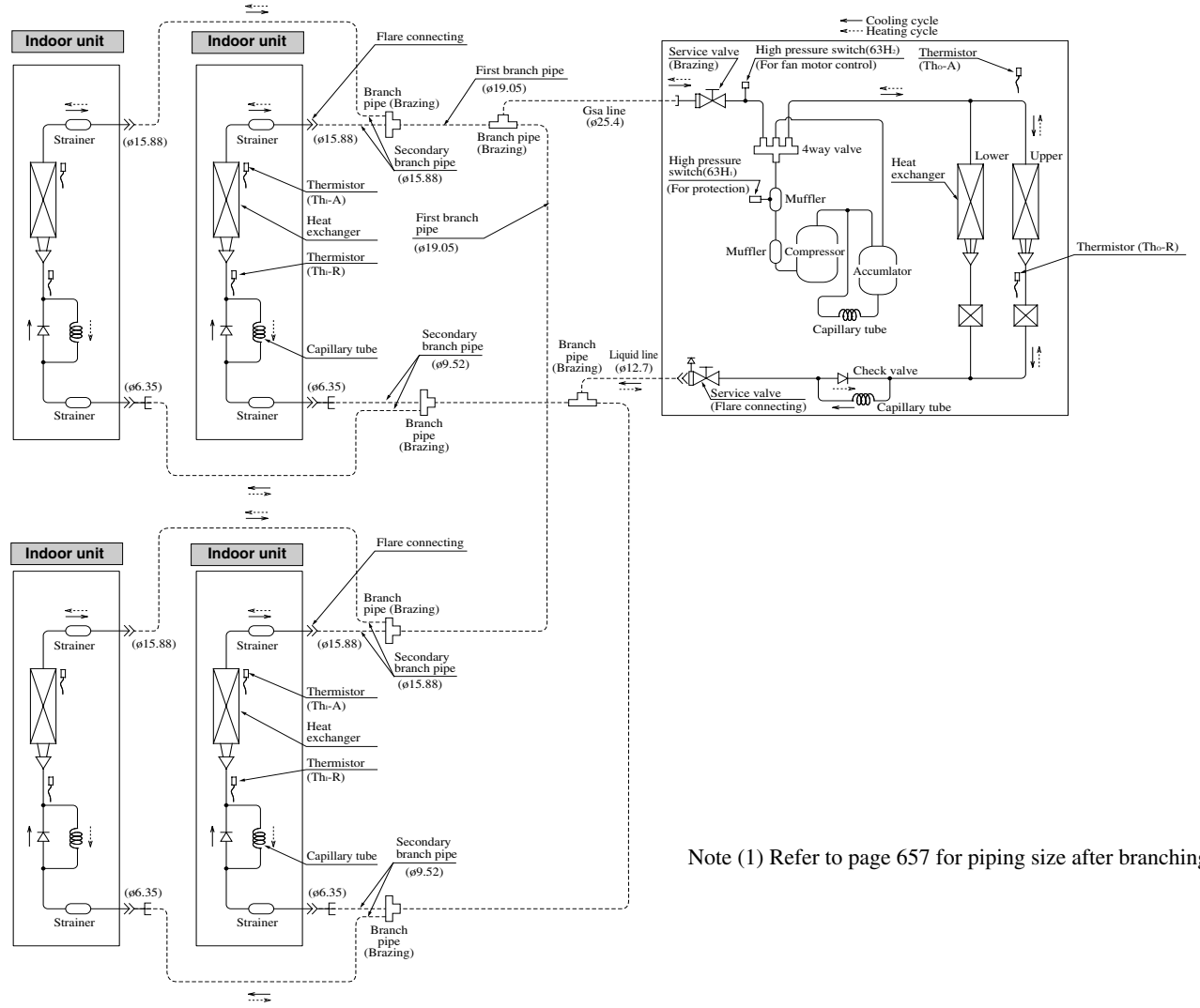
Note (1) Refer to page 656 for piping size after branching.

(2) Triple type
Model FDC808HES3B



Note (1) Refer to page 656 for piping size after branching.

(3) Double twin type
Models FDC808HES3B



Note (1) Refer to page 657 for piping size after branching.

Preset point of the protective devices

Parts name	Mark	Equipped unit	FDC508HES3B	FDC808HES3B
Thermistor (for protection over-loading in heating)	**Th_{I}-R**	Indoor unit	OFF 68˚C ON 61˚C	
Thermistor (for frost prevention)			OFF 2.5˚C ON 10˚C	
Thermistor (for detecting dis-charge pipe temp.)	**Tho-D**	Outdoor unit	OFF 135˚C ON 90˚C	——
Thermistor (for detecting heat exchange temp.)	**Tho-R**	Outdoor unit	OFF 70˚C ON 60˚C	
High pressure switch (for controlling FM_0)	**$63H_2$**	Outdoor unit	OFF 2.50MPa ON 2.06MPa	OFF 2.41MPa ON 1.86MPa
High pressure switch (for protection)	**$63H_1$**	Outdoor unit	——	OFF 2.75MPa ON 2.16MPa

19.2.6 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

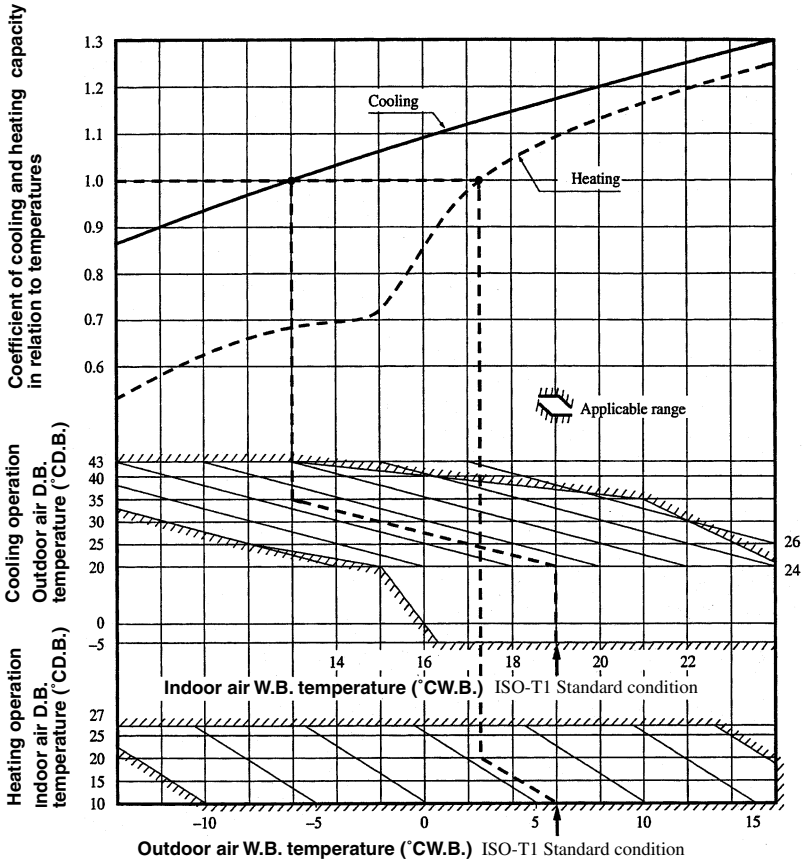


Table of bypass factor

FDT series

Item \ 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

Item \ 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

(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	FDC508	1.0	0.995	0.980	0.970	0.955	0.945	0.930	0.920	0.905	0.895	0.880
	FDC808	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.
508 [ϕ19.05 (3/4″)] : Equivalent piping length = Real piping length + (0.15 × Number of bends in piping)
808 [ϕ25.4 (1″)] : Equivalent piping length = Real piping length + (0.15 × Number of bends in piping)
[Equivalent piping length < Limitation length of piping + 5m]

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

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

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 FDC808HES3B 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

Net cooling capacity = $\underline{20000}$ × $\underline{1.00}$ × $\underline{(0.935 - 0.01)}$ × $\underline{1.0}$ = 18500 w

- 20000 : FDC808HES3B
- 1.00 : Air flow "High"
- (0.935 - 0.01) : Length 40 m. Height difference 5 m
- 1.0 : Factor by air temperatures

19.2.7 Characteristics of fan

• External static pressure table

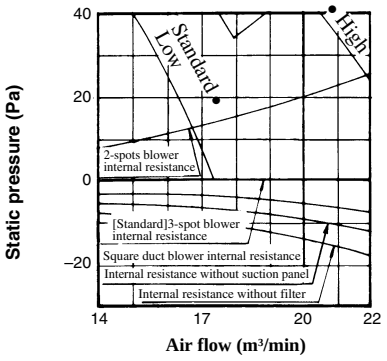
Unit: Pa

Type \ Duct specs. / Air flow (m³/min)		1 spot closing(1)		Standard(2)		Square duct(3)	
		Stan-dard	High speed(4)	Stan-dard	High speed(4)	Stan-dard	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

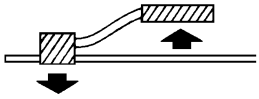
Example : Case of FDR308-A



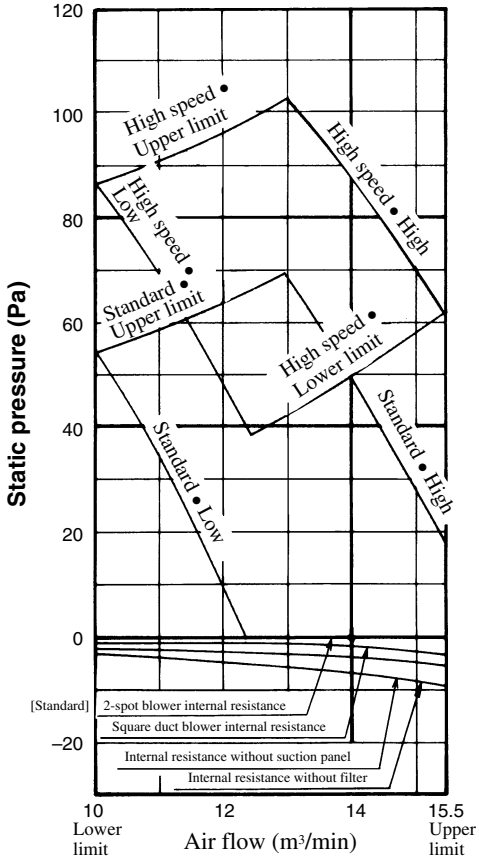
① **2-spot blowout.....**
Internal resistance increases more than the standard 3-spot blowout. Approx. 14 Pa at 17m³/min.

② **Square duct blowout.....**
Internal resistance decreases more than the standard round duct (ø200 3-spot). 3 Pa at 17 m³/nin. (External static pressure increases in reverse.).

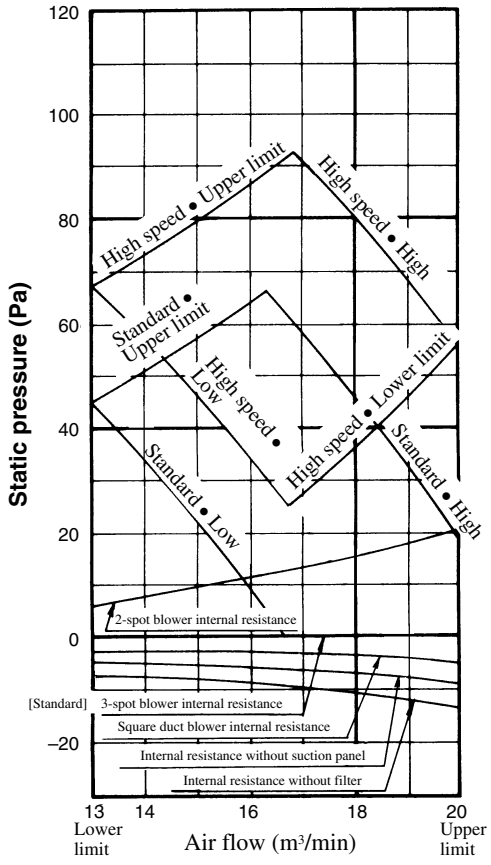
③ **Decorative panel.....**
When the decorative panel is not used with the ceiling return type, the part of internal resistance related to the panel decrease. 3 Pa at 17mm³/min.



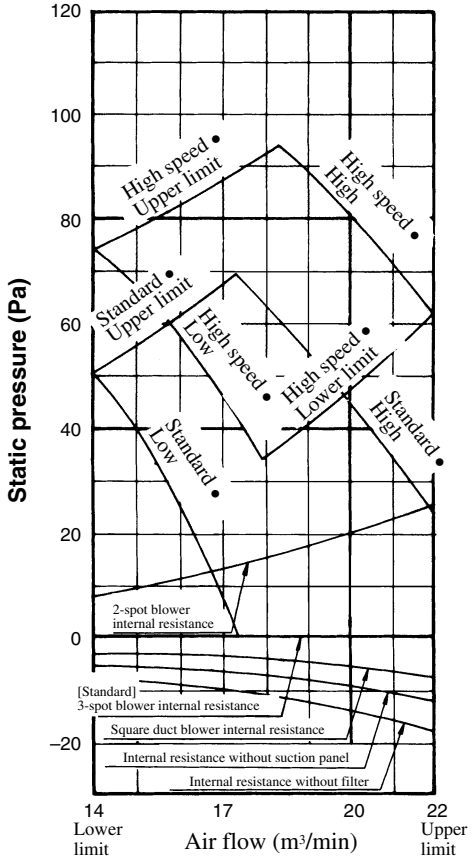
Model FDR208-A



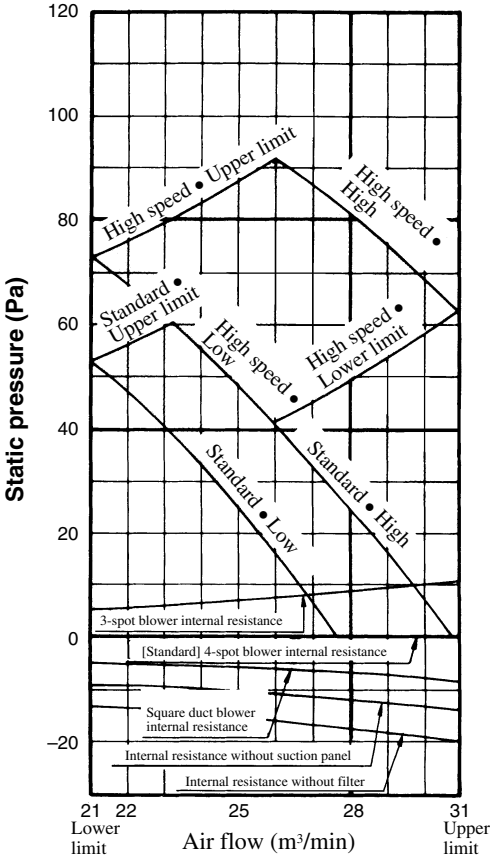
Model FDR258-A



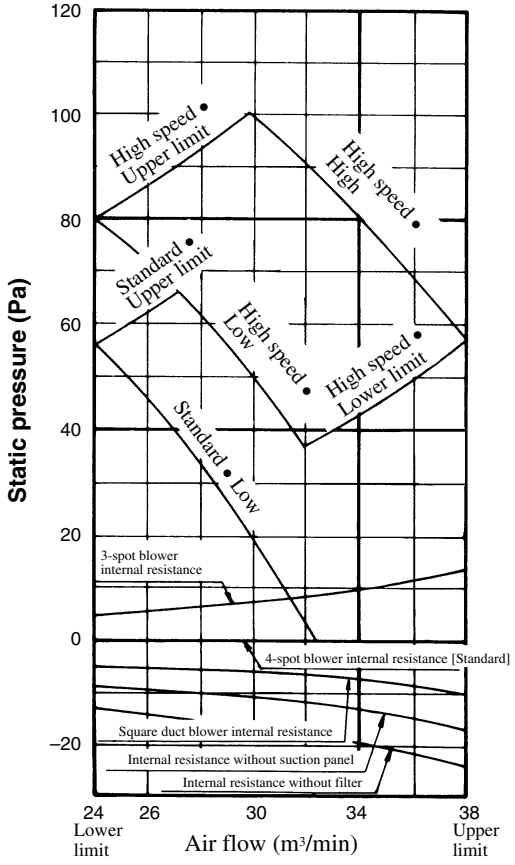
Model FDR308-A



Model FDR408-A



Model FDR508-A



19.2.8 Noise level

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

Ambient air temperature:

Indoor unit 27˚C DB, 19˚C WB.

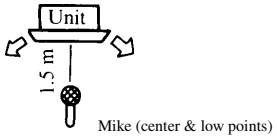
Outdoor unit 35˚C DB.

Indoor unit

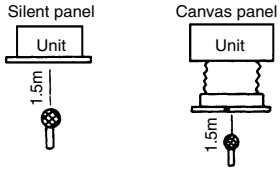
Measured based on JIS B 8616

Mike position as below

FDT series



FDR series



Outdoor unit

Only case of FDC508

Measured based on JIS B 8616

Mike position: at highest noise level in position as below

Distance from front side 1 m

Height 1 m

Only case of FDC808

Mike position: front height is 1 meter.

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

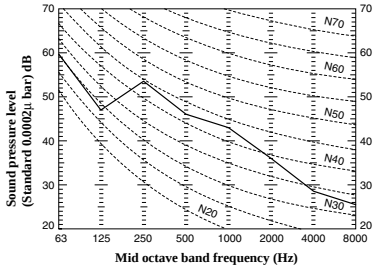
(3) The noise levels measured in the field are usually higher than the data because of reflection.

(1) Indoor unit

(a) Ceiling recessed type (FDT)

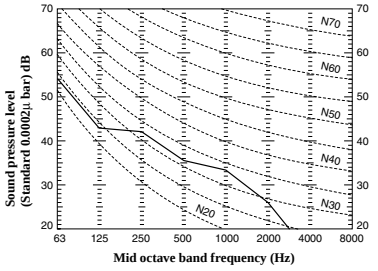
Model FDT208-A

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



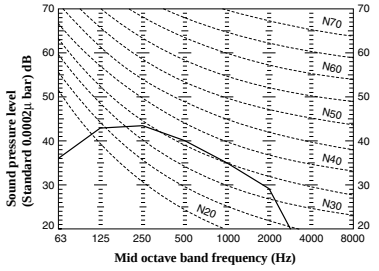
Model FDT258-A

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



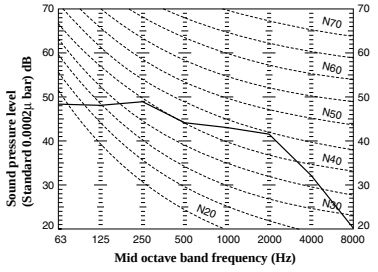
Model FDT308-A

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



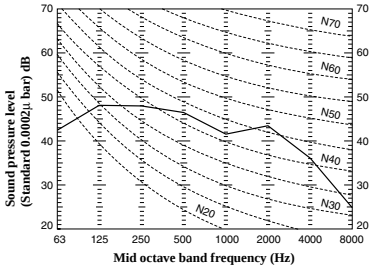
Model FDT408-A

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

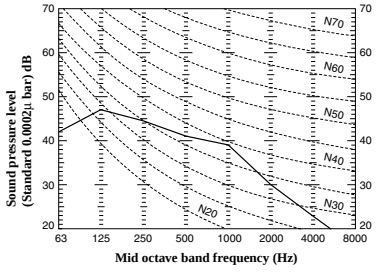


(b) Cassetteria type (FDR)

1) Silent panel

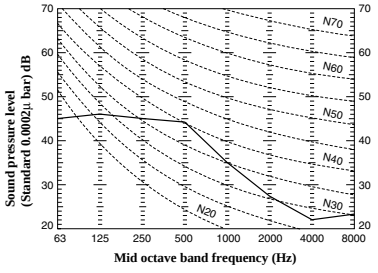
Model FDR208-A

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



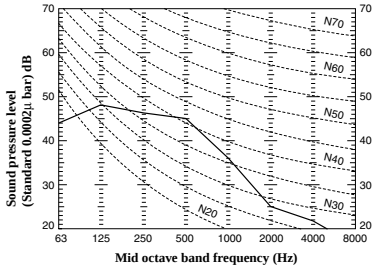
Model FDR258-A

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



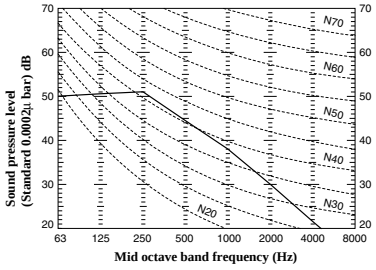
Model FDR308-A

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



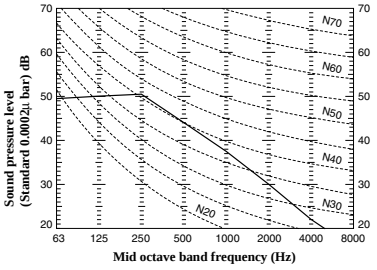
Model FDR408-A

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



Model FDR508-A

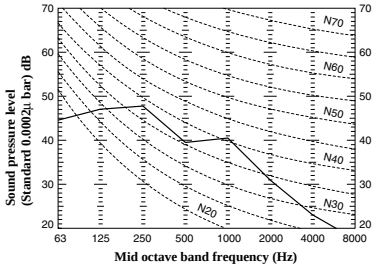
Noise level 46 dB (A) at HIGH
39 dB (A) at LOW



2) Canvas panel

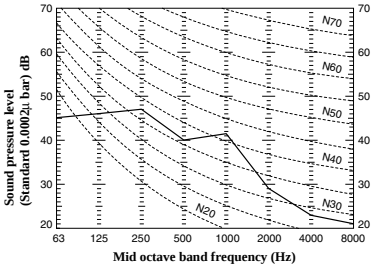
Model FDR208-A

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



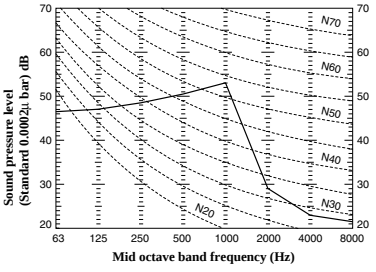
Model FDR258-A

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



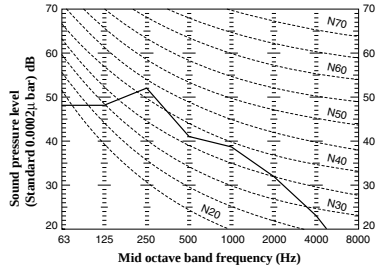
Model FDR308-A

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



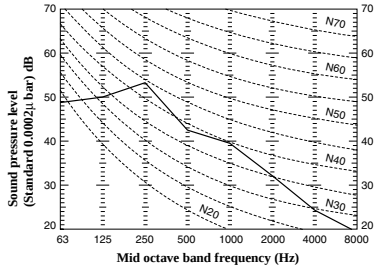
Model FDR408-A

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



Model FDR508-A

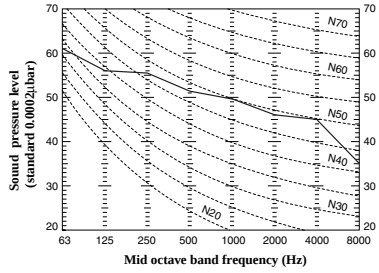
Noise level 47 dB (A) at HIGH
40 dB (A) at LOW



(2) Outdoor unit

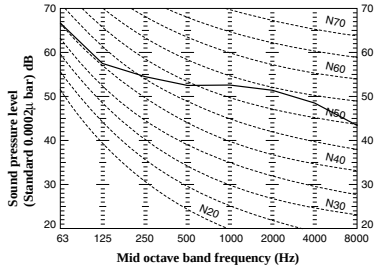
Model FDC508HES3B

Noise level 55 dB (A)



Model FDC808HES3B

Noise level 58 dB (A)



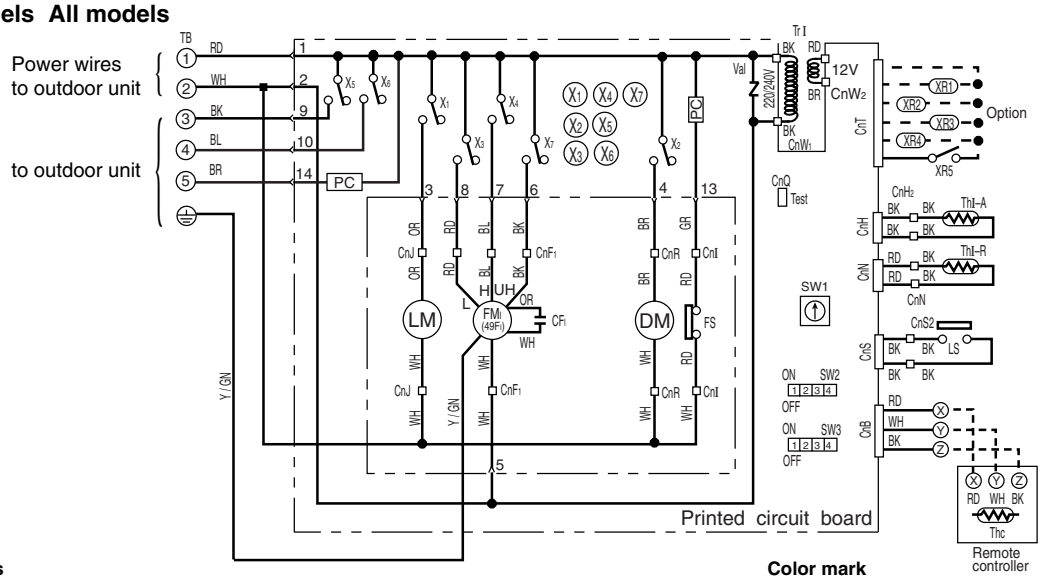
19.3 ELECTRICAL DATA

19.3.1 Electrical wiring

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models All models



Meaning of marks

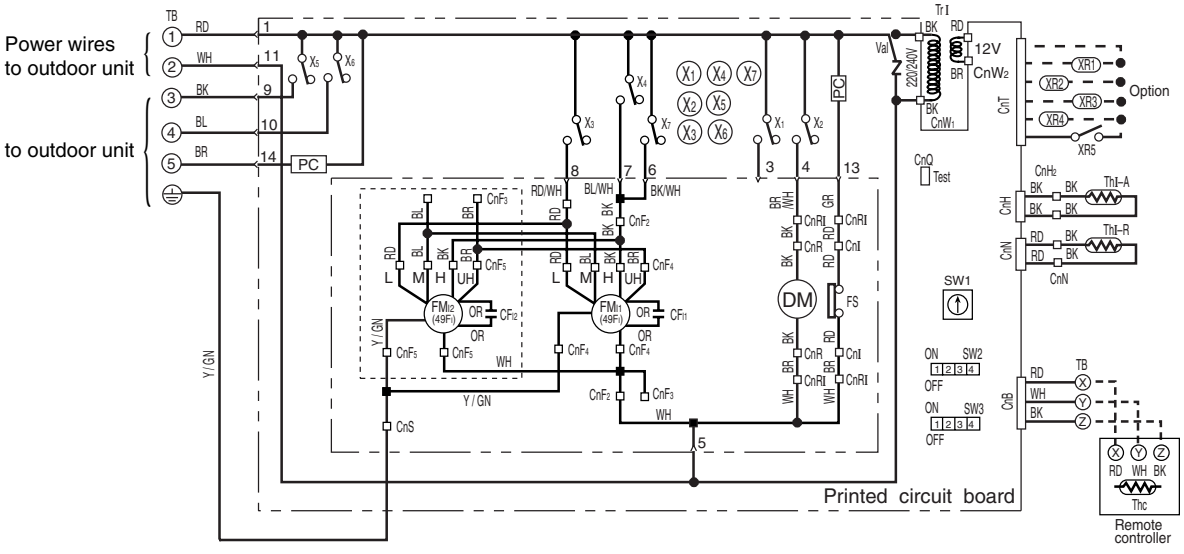
Mark	Parts name	Mark	Parts name	Mark	Parts name
FMI	Fan motor (indoor unit)	**X3, 4, 7**	Auxiliary relay (for LM)	**CnA-W**	Connector
49FI	Internal thermostat for FMI	**X5**	Auxiliary relay (for 52C)	**TB**	Terminal block
CFI	Capacitor for FMI	**X6**	Auxiliary relay (for 20S, 52Fo)	■	Connector
LM	Louver motor	**Thc**	Thermistor	◁	Terminal (F)
LS	Limit switch	**ThI-A**	Thermistor	**LED-1**	Indication lamp (Green-Run)
DM	Drain motor	**ThI-R**	Thermistor	**LED-2**	Indication lamp (Yellow-Check)
FS	Float switch	**TrI**	Transformer	**SW1**	Switch (Address set)
X1	Auxiliary relay (for LM)	**VaI**	Varistor	**SW2, 3**	Changeover switch
X2	Auxiliary relay (for DM)	**PC**	Photo coupler		

Color mark

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

(b) Cassetteria type (FDR)

Models All models



Note(1) "FMI2" and the following wires (shown in [- - -]) are equipped only for FDR408, 508.

Meaning of marks

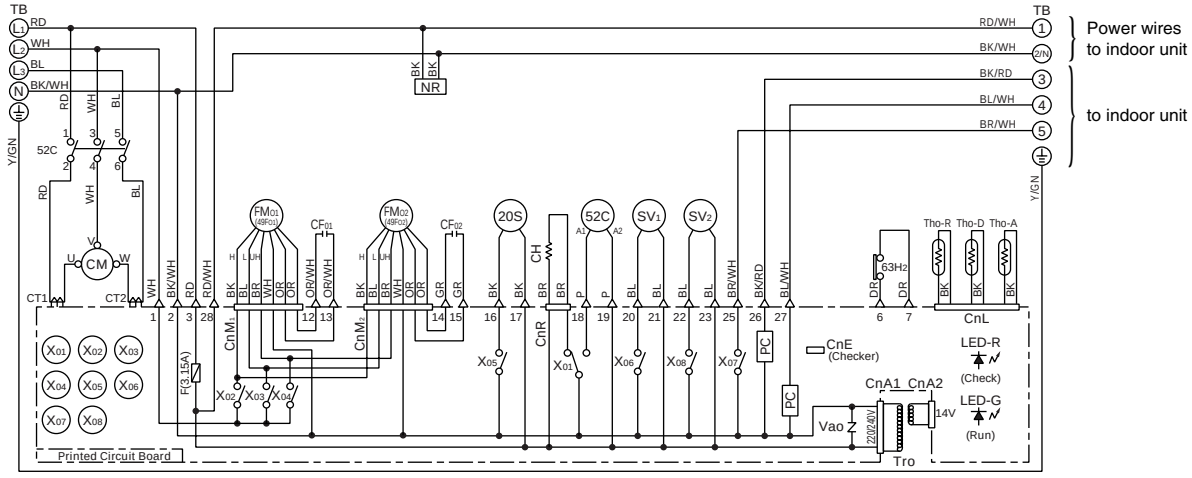
Mark	Parts name	Mark	Parts name	Mark	Parts name
FMI1, 2	Fan motor (indoor unit)	**X5**	Auxiliary relay (for 52C)	**CnA-W**	Connector
49FI	Internal thermostat for FMI	**X6**	Auxiliary relay (for 20S, 52Fo)	**TB**	Terminal block
CFI1, 2	Capacitor for FMI	**Thc**	Thermistor	■	Connector
DM	Drain motor	**ThI-A**	Thermistor	◁	Terminal (F)
FS	Float switch	**ThI-R**	Thermistor	**LED-1**	Indication lamp (Green-Run)
X1	Auxiliary relay (for LM)	**TrI**	Transformer	**LED-2**	Indication lamp (Yellow-Check)
X2	Auxiliary relay (for DM)	**VaI**	Varistor	**SW1**	Switch (Address set)
X3 4, 7	Auxiliary relay (for FMI)	**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

(2) Outdoor unit

Model FDC508HES3B
Power source
3Phase 380-415V 50Hz



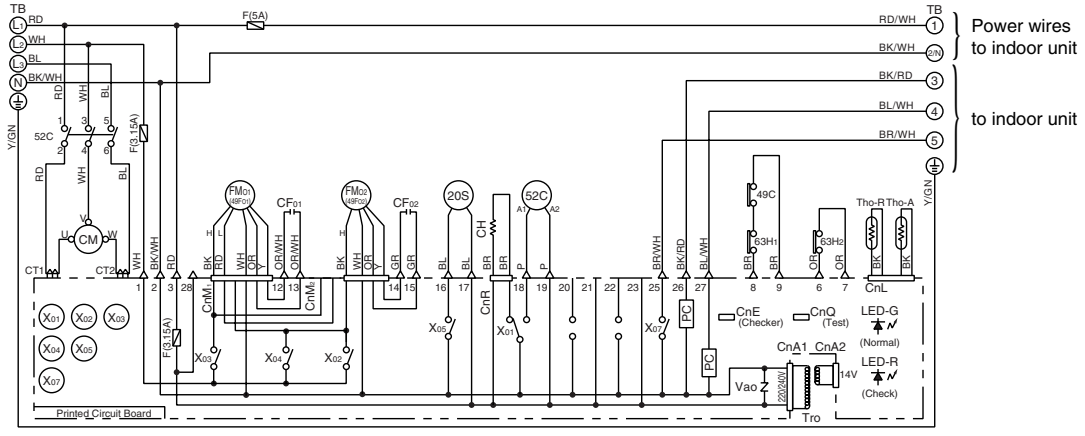
Meaning of marks

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.)
49Fo1,2	Internal thermostat for FMo	**Tho-D**	Thermistor (discharge temp.)
CH	Crankcase heater	**Tho-A**	Thermistor (outdoor air temp.)
CFo1,2	Capacitor for FMo	**Tro**	Transformer
Xo1~8	Auxiliary relay	**Vao**	Varistor
63H2	High pressure switch (for control)	**PC**	Photo coupler
20S	4 way valve solenoid coil	**CnA~R**	Connector
SV1,2	Solenoid coil (for control)	**TB**	Terminal block
F	Fuse (3.15A)	**NR**	Surge suppressor
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		

Model FDC808HES3B
Power source
3Phase 380-415V 50Hz



Meaning of marks

Mark	Parts name	Mark	Parts name
CM	Compressor motor	**LED-G**	Indication lamp (Green)
FMo1,2	Fan motor (outdoor unit)	**LED-R**	Indication lamp (Red)
52C	Magnetic contactor for CM	**CT1,2**	Current sensor
49C	Internal thermostat for CM	**Tho-R**	Thermistor (outdoor H.Ex.temp.)
49Fo1,2	Intrnal themostat for FMo	**Tho-A**	Thermistor (outdoor air temp.)
CH	Crankcase heater	**Tro**	Transformer
CFo1,2	Capacitor for FMo	**Vao**	Varistor
Xo1~7	Auxiliary relay	**PC**	Photo coupler
63H1	High pressure switch (for protection)	**CnA~R**	Connector
63H2	High pressure switch (for control)	**TB**	Terminal block
F	Fuse		

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		

19.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

This is same as FDUR heat pump series. See page 306.

19.5 APPLICATION DATA

19.5.1 Installation of indoor unit

(1) Ceiling recessed type (FDT)

This is same as FDT(N) heat pump series. See page 413.

(2) Cassetteria type(FDR)

This is same as FDR heat pump series. See page 516.

19.5.2 Installation of remote controller(Optional parts)

This is same as FDUR heat pump series. See page 329.

19.5.3 Installation of outdoor unit

⚠WARNING

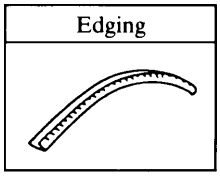
BE SURE TO READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD CAUSE SERIOUS INJURY OR DEATH, EQUIPMENT MALFUNCTION AND/OR PROPERTY DAMAGE.

(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.

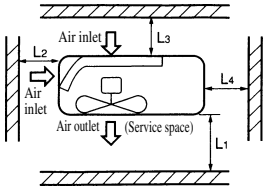
Request

- 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.

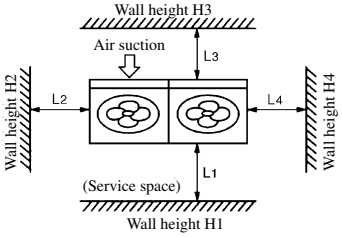
Model FDC508HES3B



Unit: mm

Distance \ Installation example	I	II	III
L1	Open space	Open space	500
L2	300	5	Open space
L3	150	300	150
L4	5	5	5

Model FDC808HES3B



Unit: mm

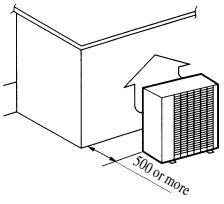
Dimensions \ Installation example	I	II	III
L1	Open	Open	500
L2	0	0	0
L3	300	300	300
L4	Open	500	0
H1	–	–	1000 or less
H2	No limit	No limit	No limit
H3	No limit	No limit	700 or less
H4	–	No limit	No limit

Note (1)
If the wall heightH1 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.

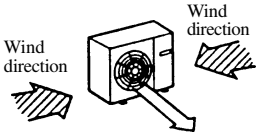
(d) Location where strong wind blows against the unit

1) Install the unit directing the discharge air port to the wall.

(Only case of FDC508HES3B)

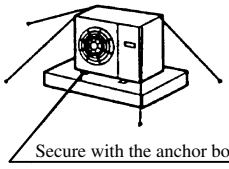


2) Install the unit directing the discharge air port at a right angle to the wind direction.

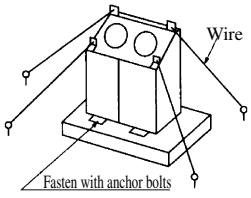


3) Where the foundation is not stable, secure the unit with wire, etc.

Model FDC508HES3B



Model FDC808HES3B



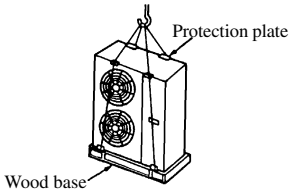
(2) Carry-in and installation of unit

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

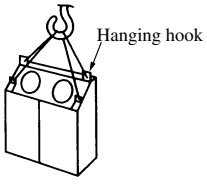
(a) Carry-in

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.

Model FDC508HES3B



Model FDC808HES3B



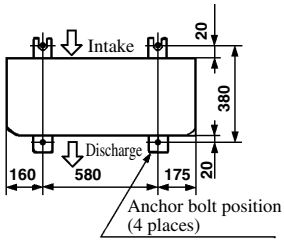
⚠ CAUTION

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

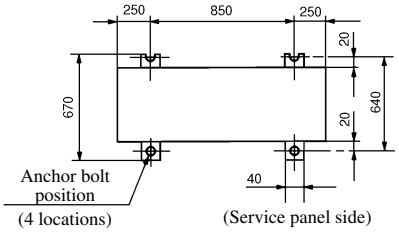
Unit: mm

(c) Bolt securing position

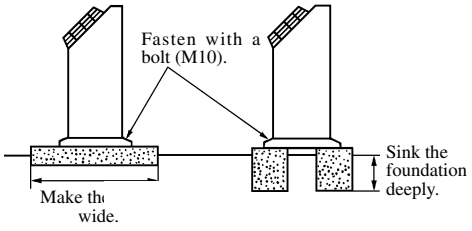
Model FDC508HES3B



Model FDC808HES3B



1) Use anchor bolts (M10) to secure the unit's legs.
2) Securely install the unit so that it dose 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

(i) Twin type

- **FDC508HES3B [Branch pipe set: DIS-WA]**

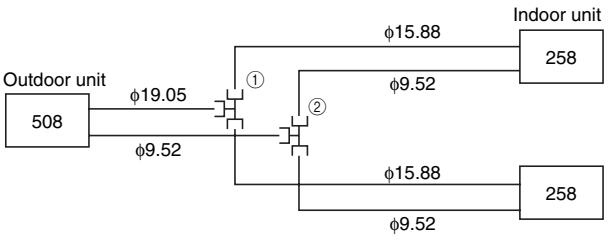
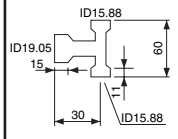
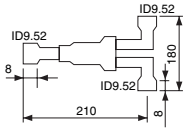
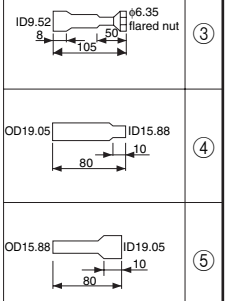
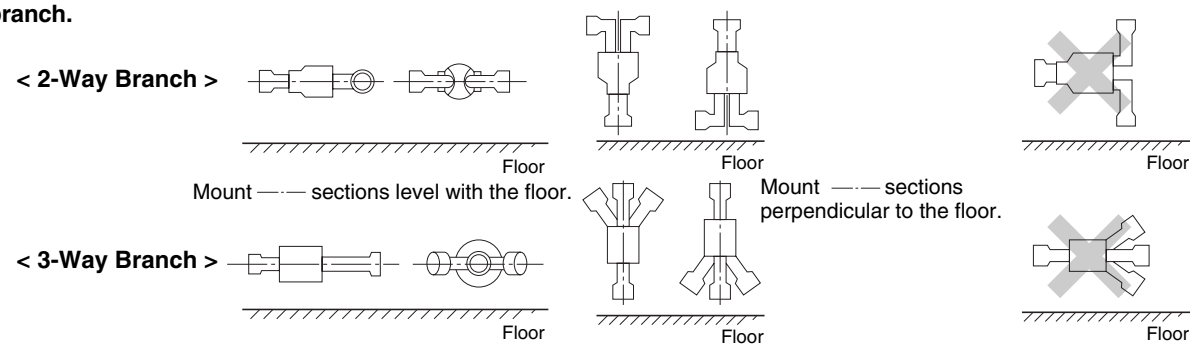


Chart of shapes of branch piping parts (DIS-WA)

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

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. (Refer to the drawing below for details.)

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



• **FDC808HES3B [Branch pipe set: DIS-WB]**

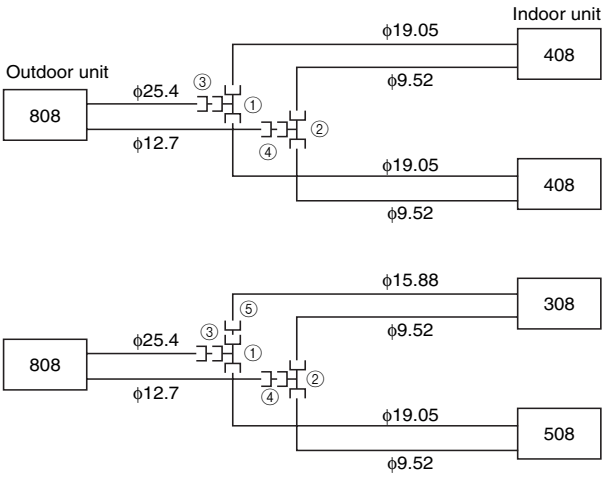
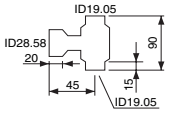
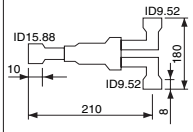
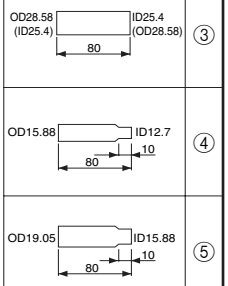


Chart of shapes of branch piping parts (DIS-WB)

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

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.
(Refer to the preceding page for details.)

(ii) Triple type

• **FDC808HES3B [Branch pipe set: DIS-TB]**

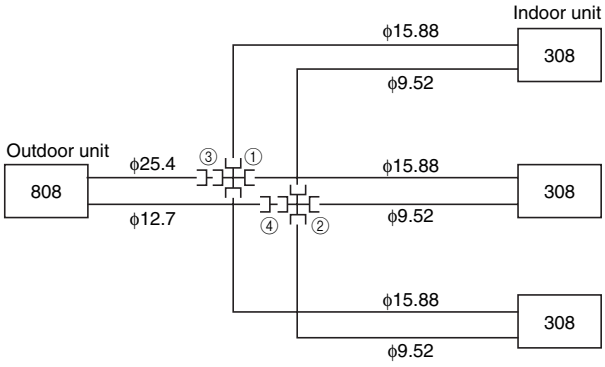
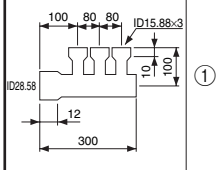
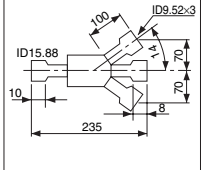
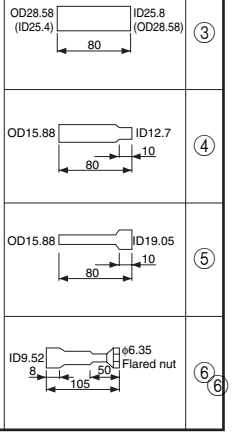


Chart of shapes of branch piping parts (DIS-TB)

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
	①		②		③ ④ ⑤ ⑥ 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 preceding page for details.)

(iii) Double twin

- **FDC808HES3B [Branch pipe set: DIS-WA × 2set, DIS-WB × 1set]**

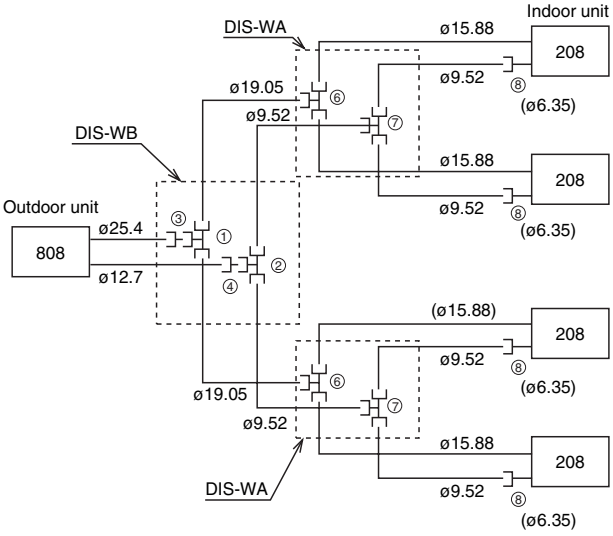
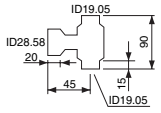
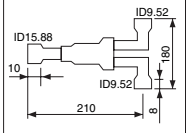
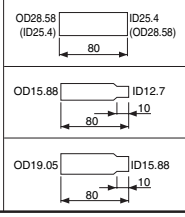
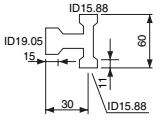
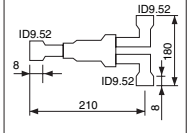
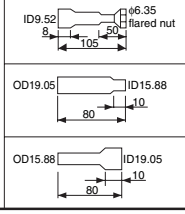


Chart of shapes of branch piping parts

●DIS-WB

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

●DIS-WA

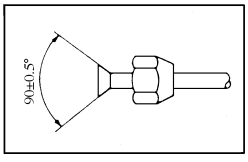
Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
	⑥		⑦		⑧ ⑨ ⑩

Notes (1) ①to⑩in 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 655 page for details.)
(3) If the indoor unit is the 208 type, always ues a ø 9.52 size branch piping (branch piping to indoor unit).

(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.
- 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.

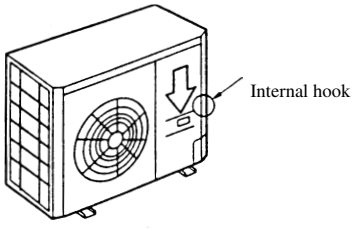


ø 6.35: 14 to 18 (N·m), ø 9.52, ø 12.7: 34 to 42 (N·m), ø 15.88: 68 to 82 (N·m), ø 19.05: 100 to 120 (N·m),

- 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) How to remove the service panel (Only case of FDC508HES3)

Remove screws on the service panel, pull down the panel toward the arrow direction, and then remove the panel toward you.



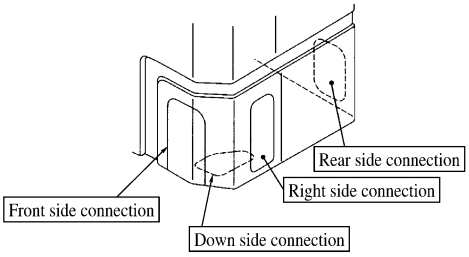
2) Refrigerant pipe connection

a) The piping can be taken out to the right, left (FDC808 type) front, rear and botton directions.

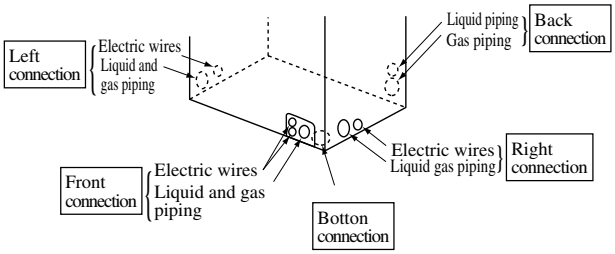
b) Cut the plate at the knockout portion on the piping penetration section with necessary minimum size.

c) Mount the attached edging by cutting it to the appropriate length before connecting the pipe.

Model FDC508HES3B



Model FDC808HES3B



⚠ 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.

Model FDC508HES3B

Leak test

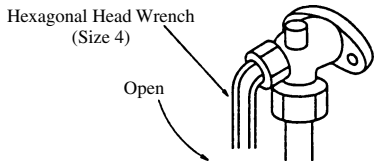
1) After tightening all flared nuts on the Indoor unit and Outdoor unit, hold the service valves (both of liquid and gas sides) of the Outdoor unit in fully closed position and perform the leak test from the charge port of service valve to confirm that there is no leakage.

(Use nitrogen gas for leak test. Execute the test at the pressure of 3.0 MPa .)

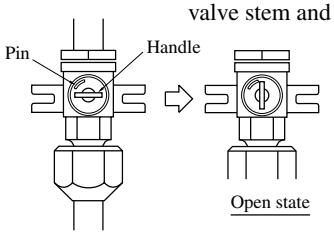
Air purge

2) While holding the service valves (both of liquid and gas sides) of the Outdoor unit at fully closed position, perform vacuuming at –0.1 MPa or under from the service valve charge port.

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).



Liquid service valve



Gas service valve

Model FDC808HES3B

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.

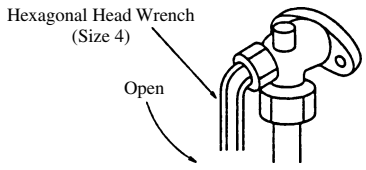
③ Then increase the pressure to 3.0 MPa and maintain this state for approx. one day to check if the pressure drops.

Use nitrogen gas for the air-tightness check.

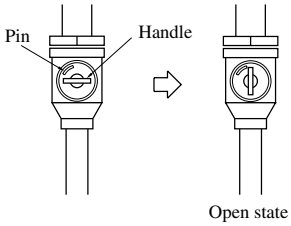
Air purge

(2) While holding the service valves (both of liquid and gas sides) of the Outdoor unit at fully closed position, perform vacuuming at –0.1 MPa or under from the servi-ce valve charge port.

(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).



Liquid service valve



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.**

Item \ Model		FDC508	FDC808
A Piping length already charged with refrigerant.	(m)	5	5
B Standard refrigerant volume. (When piping is 0 meters.)	(kg)	1.73	5.11
C Additional charge volume per 1 meter of main piping.	(kg/m)	0.02 (0.035)	0.045
D Amount of charge at time of shipping	(kg)	1.90	5.33
E Maximum permissible charge volume.	(kg)	3.18	–

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

Notes (1) Use the table above to find the amount of additional charge (kg/m) C per 1 meter of piping.
(2) The value in ( ) indicates the amount of additional charge per 1 meter of piping for main piping up to 30 meters.

Method of Calculation

Refer to the example of calculation on the next page for the piping length code in the formula (L, ℓ_1, ~ ℓ_3).

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

Twin and triple specifications

G = main piping L (m) × C + branch piping length ℓ_1 (m) × f + branch piping length ℓ_2 (m) × f + branch piping ℓ_3 (m) × f – (D – B)

(only for triple specifications)

Confirm for additional charge volume (FDC508HES3B only)

- If the calculated required charge is greater than the maximum permissible charge volume shown in the table above, use the following formula to find the amount of the insufficient refrigerant amount for the weight of the additional charge.
  G (kg) = E (kg) – D (kg)
- If the calculated required charge is less than the maximum permissible charge volume shown in the table above as well as greater than amount of charge at the time of shipment, use the following formula to find the amount of the insufficient refrigerant amount for the weight of the additional charge.
  G (kg) = Reguired charge amount (kg) – D (kg)

Double twin specification (FDC808HES3B only)

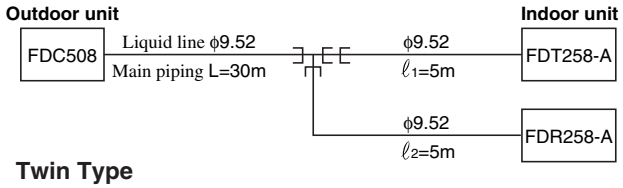
G = main piping L (m) × C + branch piping L_1(m) × f + branch piping L_2 (m) × f + branch piping ℓ_1 (m) × f
+ branch piping ℓ_2 (m) × f + branch piping ℓ_3 (m) × f + branch piping ℓ_4 (m) × f - (D - B)

Example of Calculation

1) For twin type

Outdoor Unit: FDC508HES3B

Indoor Unit: FDT258-A + FDR258-A



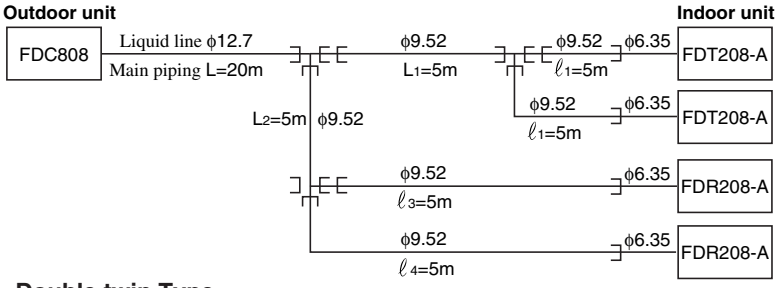
Twin Type

G=30m(L) × 0.035kg/m + 5m(ℓ_1) × 0.025kg/m + 5m(ℓ_2) × 0.025kg/m - (1.90 - 1.73)
=1.13kg **Amount of additional charge: 1.13 kg**

2) For double twin type

Outdoor Unit: FDC808HES3B

Indoor Unit: FDT208-A + FDT208-A + FDR208-A + FDR208-A



Double twin Type

G=20m(L) × 0.07kg/m + 10m(L_1+L_2) × 0.025kg/m + 20(ℓ_1+ℓ_2+ℓ_3+ℓ_4) × 0.025kg/m
- (7.6 - 7.25)=1.8kg **Amount of additional charge: 1.8 kg**

For recharging If vacuum extracted and recharging.

Twin & triple specifications

G = B + main piping L (m) × C + branch piping ℓ_1 × f + branch piping ℓ_2 (m) × f + branch piping ℓ_3 (m) × f
(only fortriple specifications)

Double twin specification (FDC808HES3B only)

G = main piping L (m) × C + branch piping L_1(m) × f + branch piping L_2 (m) × f + branch piping ℓ_1 (m) × f
+ branch piping ℓ_2 (m) × f + branch piping ℓ_3 (m) × f + branch piping ℓ_4 (m) × f

(4) Electrical wiring

○ This air conditioning system should be notificated 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.**

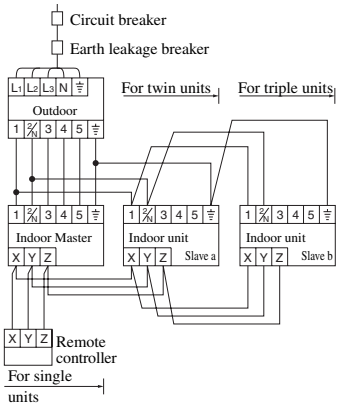
- Select wire sizes and circuit protection from Table 2.

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

Item / Model	Phase	Circuit breaker		Power source wires (minimum)	Interconnecting and grounding wires (minimum)
		Switch breaker (A)	Over-current protector rated capacity (A)		
FDC508HES3B	3	30	20	5.5mm²	1.6mm
FDC808HES3B		50	50		2.0mm

(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 ①②③ and X Y Z .
2) Use rotary SW2 on the indoor circuit board to set the same remote controller communi-cation 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.

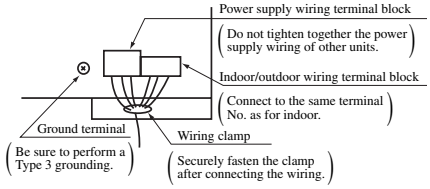
(c) Plural Master / Slave setting

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

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

(d) Wiring out take direction

- The four directions of front, left (FDC808 type), 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.

19.6 MAINTENANCE DATA

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

MEMO