19. INVERTER DRIVEN MULTI-INDOOR UNIT CLIMATE CONTROL SYSTEM

(OUTDOOR UNIT)

Refrigerant R22 use models

FDCJ140HKXE2B, 224HKXE2B, 280HKXE2B

Alternative refrigerant R407C use models

FDCP140HKXE2B, 224HKXE2B, 280HKXE2B

(INDOOR UNIT)

FDTJ28HKXE2	FDTWJ28HKXE2B	FDTSJ22HKXE2B	FDRJ22HKXE2
36HKXE2	45HKXE2B	28HKXE2B	28HKXE2
45HKXE2	56HKXE2B	36HKXE2B	45HKXE2
56HKXE2	71HKXE2B	45HKXE2B	56HKXE2
71HKXE2	90HKXE2B	71HKXE2B	71HKXE2
90HKXE2	112HKXE2B		90HKXE2
112HKXE2	140HKXE2B		112HKXE2
140HKXE2			140HKXE2
FDUMJ36HKXE2	FDEJ36HKXE2B	FDKJ22HKXE2	FDFLJ28HKXE2
45HKXE2	45HKXE2B	28HKXE2	45HKXE2
56HKXE2	56HKXE2B	36HKXE2	71HKXE2
71HKXE2	71HKXE2B	45HKXE2	FDFUJ28HKXE2
90HKXE2	112HKXE2B	56HKXE2	45HKXE2
112HKXE2	140HKXE2B	71HKXE2	56HKXE2
140HKXE2			71HKXE2

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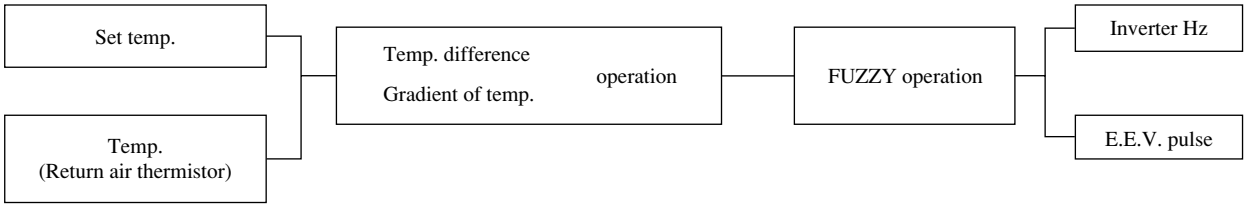
19.1 GENERAL INFORMATION

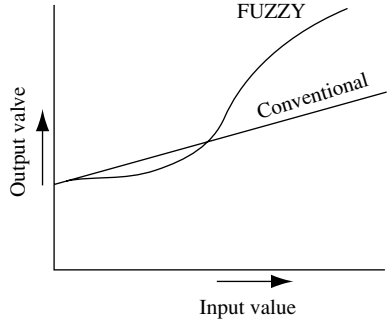
19.1.1 Specific features

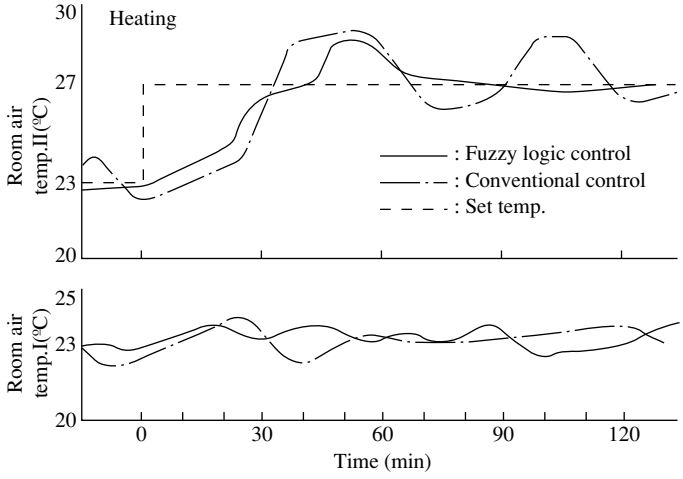
(1) Fuzzy control

(a) Response speed and stability are enhanced.

- The system automatically controls changes of return air temperature, set temperature and room temperature according to the fuzzy control.
- The system response speed, can keep room temperature constant, and can adjust room temperature to set temperature quickly.







(b) Elimination of temperature irregularity as the time of operation ON/OF control

- The system finely controls the compressor to room temperature according to the temperature sensor, air conditions room temperature consistently and improves cooling or heating feeling in each room(or minimize influence of shutdown in other room).

(2) Super lynk system

- Non polar 2-core signal wires for indoor, outdoor units by means of the automatic polarity selection.
- In addition, the max. 48 units can be controlled with a pair of signal wires. The high speed transmission method same as the computer network system [start up of 48 units can be completed within a few seconds by the determination of operation mode and the start of operation].
- As separate power supplies for the indoor and the outdoor units are employed, a pair of 2 signal wires only are required for the inter connecting wiring of indoor and outdoor uniits regardless of the number of units so that the installation work can be simplified, the cost of wiring work can be curtailed and causes of wiring error can be minimized.

(3) Floor layout can be changed by resetting address unit number.

- For change of floor layout, the control group can be recombined only by resetting address unit number.

(4) Installation of automatic address setting function

- The address setting method are divided into three types according to wiring method: “Automatic Address Setting,”“Remote controller Address Setting” and “Manual Address Setting,” In case of the Automatic Address Setting, no address needs be set as usual.

(5) Connectable indoor capacity

Capacity from 50% to 130% is possible.

- FDCJ(P)140 type

  Number of connectable units : 1 to 8 units

  Connectable capacity : 7000 ~ 18200 W

- FDCJ(P)224 type

  Number of connectable units : 1 to 13 units

  Connectable capacity : 11200 ~ 29200 W

- FDCJ(P)280 type

  Number of connectable units : 1 to 16 units

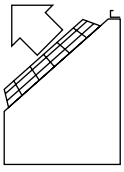
  Connectable capacity : 14000 ~ 36400 W

(6) Cooling opetation down to -5˚C outdoor temperature

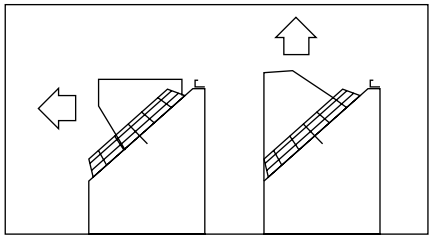
(7) Indoor units are available with 9 capacities, in 9 types and 54 models.

- 9 capacities…22(0.8 HP), 28(1 HP), 36(1.25 HP), 45(1.6 HP), 56(22 HP), 71(2.5 HP), 90(3.2 HP), 112(4 HP) and 140(5 HP).
- 9 types…Ceiling recessed type (FDT), 2-way outlet ceiling recessed type(FDTW), 1-way outlet ceiling recessed type(FDTS), Cassetteria type(FDR), Satellite ducted type(FDUM), Ceiling suspension type(FDE), Wall mounted type(FDK) , Floor standing exposed type(FDFL) and Floor standing hidden type (FDFU).

(8) Vertical blow or horizontal blow type can be selected for the outdoor unit.



Standard



horizontal blow Vertical blow

Using an adapter
(Optional)

(9) Long piping design offeres One way piping length of 100 m

- Indoor and outdoor units can have a level difference of up to 50 m, with a one way piping length of up to 100 m. This is the top-class long piping design in the industry. A level difference of as much as 15 m between indoor units ensures that the system can meet a wide variety of air conditioning requirements in any building.

(10) Layout free refrigerant piping

The branch type piping makes the system flexible enough to satisfy any layout plan on the floor or in a room.

(11) Improvement of serviceability

(a) Failures of indoor unit and outdoor units are shown on the liquid crystal display on the remote controller.

- Failures of indoor unit and outdoor units can be checked by remote controller.

(b) Easy checking of outdoor inspection LED.

- The LED can be checked without removing the service panel, and faulty units can be easily indentified out of several units.

19.1.2 How to read the model name

Example: FDC P 224 H KX E 2 B

- B: CE marking model
- 2: Application power source...See the specifications
- E: Multi KX series
- KX: Heat pump type
- H: Nominal capacity
- 224: P: R407C models
J: R22 models
- P: Model name
  - Indoor unit : FDT, FDTW, FDTS, FDR, FDUM FDE, FDK, FDFL, FDFU
  - Outdoor unit : FDC

19.1.3 Table of models

Model \ Capacity		22	28	36	45	56	71	90	112	140
Ceiling recessed type (FDT)			○	○	○	○	○	○	○	○
2-way outlet ceiling recessed type (FDTW)			○		○	○	○	○	○	○
1-way outlet ceiling recessed type (FDTS)		○	○	○	○		○			
Cassetteria type (FDR)		○	○		○	○	○	○	○	○
Stellite ducted type (FDUM)				○	○	○	○	○	○	○
Ceiling suspension type (FDE)				○	○	○	○		○	○
Wall mounted type (FDK)		○	○	○	○	○	○			
Floor standing exposed type (FDFL)			○		○		○			
Floor standing hidden type (FDFU)			○		○	○	○			
Outdoor units to be combined FDC	R407C models	FDCP140HKXE2B (5 Horse Power)			FDCP224HKXE2B (8 Horse Power)			FDCP280HKXE2B (10 Horse Power)		
	R22 models	FDCJ140HKXE2B (5 Horse Power)			FDCJ224HKXE2B (8 Horse Power)			FDCJ280HKXE2B (10 Horse Power)		

19.1.4 Table of indoor units panel (Optional)

Model		Parts Model
FDT	Capacity:28,36,45,56, 71,90,112,140	T-PSA-32W-E
FDTW (Standard type)	Capacity:28,45,56	TW-PSA-22W-E
	Capacity:71,80	TW-PSA-32W-E
	Capacity:112,140	TW-PSA-42W-E
FDTW (Attachment of ceiling material type)	Capacity:28,45,56	TW-PSB-28W-E
	Capacity:71,90	TW-PSB-38W-E
	Capacity:112,140	TW-PSB-48W-E
FDTS	Capacity:22,28,36,45	TS-PSA-26W-E
	Capacity:71	TS-PSA-36W-E
FDR (Silent type)	Capacity:22,28,45,56	R-PNLS-26W-E
	Capacity:71,90	R-PNLS-36W-E
	Capacity:112,140	R-PNLS-46W-E
FDR (Canvas type)	Capacity:22,28,45,56	R-PNLC-26W-E
	Capacity:71,90	R-PNLC-36W-E
	Capacity:112,140	R-PNLC-46W-E

19.2 SELECTION DATA

19.2.1 Specifications

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models FDTJ28HKXE2, 36HKXE2

Item \ Models		FDTJ28HKXE2(3)	FDTJ36HKXE2(3)
Nominal cooling capacity*1	**W**	**2800**	**3600**
Nominal heating capacity*2	**W**	**3200**	**4000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 37 Me: 34 Lo: 33	
Exterior dimensions Height × Width × Depth	**mm**	**Unit:260 × 840 ×840 Panel:30 × 950 × 950**	
Net weight	**kg**	**Unit:24 Panel:7**	
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Turbo fan × 1	
Motor	**W**	**17×1**	
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 12 Me: 10 Lo: 9**	
Fresh air intake		Possible	
Air filter, Q'ty		Long life filter × 1(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
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:ϕ12.7(1/2")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas line)	
Accessories		**Mounting kit**	
Optional parts		**Decorative Panel**	
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.
FDTJ28,36 type	T-PSA-32W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDTJ45HKXE2, 56HKXE2, 71HKXE2

Item \ Models		FDTJ45HKXE2(3)	FDTJ56HKXE2(3)	FDTJ71HKXE2(3)
Nominal cooling capacity*1	**W**	**4500**	**5600**	**7100**
Nominal heating capacity*2	**W**	**5000**	**6300**	**8000**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 38 Me: 35 Lo: 34		Hi: 40 Me: 38 Lo: 36
Exterior dimensions Height × Width × Depth	**mm**	**Unit:260 × 840 × 840 Panel:30 × 950 × 950**		
Net weight	**kg**	**Unit:24 Panel:7**		
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve +Capillary tube		
Air handling equipment Fan type & Q'ty		Turbo fan × 1		
Motor	**W**	**20×1**		**25×1**
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 15 Me: 12 Lo: 10**		**Hi: 16 Me: 13 Lo: 11**
Fresh air intake		Possible		
Air filter, Q'ty		Long life filter × 1(Washable)		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**		
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:φ12.7(1/2")**	**Liquid line:φ 9.52(3/8") Gas line:φ15.88(5/8")**	
Connecting method		**Flare piping**		
Drain hose		Connectable with VP25		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		**Decorative Panel**		
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**		

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

Item \ Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Item / Model	Panel Part No.
FDTJ45,56,71 type	T-PSA-32W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDTJ90HKXE2, 112HKXE2, 140HKXE2

Item \ Models		FDTJ90HKXE2(3)	FDTJ112HKXE2(3)	FDTJ140HKXE2(3)
Nominal cooling capacity*1	**W**	**9000**	**11200**	**14000**
Nominal heating capacity*2	**W**	**10000**	**12500**	**16000**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 42 Me: 40 Lo: 39	Hi: 49 Me:46 Lo: 42	Hi: 50 Me: 47 Lo: 45
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**	**Unit:24 Panel:7**	**Unit:28 Panel:7**	**Unit:30 Panel:7**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve +Capillary tube		
Air handling equipment Fan type & Q'ty		Turbo fan × 1		
Motor	**W**	**50×1**	**80×1**	**130×1**
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 21 Me: 15 Lo: 12**	**Hi: 28 Me: 24 Lo: 21**	**Hi: 30 Me: 26 Lo: 22**
Fresh air intake		Possible		
Air filter, Q'ty		Long life filter × 1(Washable)		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**		
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**		
Optional parts		**Decorative Panel**		
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**		

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

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.
FDTJ90,112,140 type	T-PSA-32W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(b) 2-way outlet ceiling recessed type (FDTW)

Models FDTWJ28HKXE2B, 45HKXE2B, 56HKXE2B

Item \ Models		FDTWJ28HKXE2B(3)	FDTWJ45HKXE2B(3)	FDTWJ56HKXE2B(3)
Nominal cooling capacity*1	**W**	**2800**	**4500**	**5600**
Nominal heating capacity*2	**W**	**3200**	**5000**	**6300**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 39 Me:36 Lo: 33		
Exterior dimensions Height × Width × Depth	**mm**	**Unit:280× 817×620 Panel:8 ×1055 ×680**		
Net weight	**kg**	**Unit:19 Panel:7**		
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve +Capillary tube		
Air handling equipment Fan type & Q'ty		Turbo fan ×1		
Motor	**W**	**30×1**		
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 10**		
Fresh air intake		Possible		
Air filter, Q'ty		Long life filter × 1(Washable)		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**		
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:ϕ12.7(1/2")**		**Liquid line:ϕ9.52(3/8") Gas line:ϕ15.88(5/8")**
Connecting method		**Flare piping**		
Drain hose		Connectable with VP25		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		**Decorative Panel**		
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**		

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Item / Model	Panel Part No.	
	Standard type	Attachment of ceiling material type
FDTWJ28,45,56 type	TW-PSA-22W-E	TW-PSB-28W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDTWJ71HKXE2B, 90HKXE2B

Item \ Models		FDTWJ71HKXE2B(3)	FDTWJ90HKXE2B(3)
Nominal cooling capacity*1	**W**	**7100**	**9000**
Nominal heating capacity*2	**W**	**8000**	**10000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 41 Me: 38 Lo: 35	Hi: 41 Me: 39 Lo: 36
Exterior dimensions Height × Width × Depth	**mm**	**Unit:330 ×1054× 620**	**Panel:8 ×1300 × 680**
Net weight	**kg**	**Unit:26**	**Panel:9**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillay tube	
Air handling equipment Fan type & Q'ty		Turbo fan × 1	
Motor	**W**	**35×1**	**40×1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 16 Me: 13 Lo: 11**	**Hi: 19 Me: 16 Lo: 12**
Fresh air intake		Possible	
Air filter, Q'ty		Long life filter × 1(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
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")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		**Decorative Panel**	
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Item / Model	Panel Part No.	
	Standard type	Attachment of ceiling material type
FDTWJ71,90 type	TW-PSA-32W-E	TW-PSB-38W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDTWJ112HKXE2B, 140HKXE2B

Item \ Models		FDTWJ112HKXE2B(3)	FDTWJ140HKXE2B(3)
Nominal cooling capacity*1	**W**	**11200**	**14000**
Nominal heating capacity*2	**W**	**12500**	**16000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 44 Me: 41 Lo: 38	Hi: 45 Me: 42 Lo: 39
Exterior dimensions Height × Width × Depth	**mm**	**Unit:345 ×1524 × 620 Panel:8 ×1770 × 680**	
Net weight	**kg**	**Unit:38 Panel:11**	
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Turbo fan ×2	
Motor	**W**	**40 × 2**	**50 × 2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 28 Me: 25 Lo: 23**	**Hi: 32 Me: 28 Lo: 24**
Fresh air intake		Possible	
Air filter, Q'ty		Long life filter × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
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 linse)	
Accessories		**Mounting kit**	
Optional parts		**Decorative Panel**	
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Item / Model	Panel Part No.	
	Standard type	Attachment of ceiling material type
FDTWJ112,140 type	TW-PSA-42W-E	TW-PSB-48W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(c) 1-way outlet ceiling recessed type (FDTS)

Models FDTSJ22HKXE2B, 28HKXE2B, 36HKXE2B

Item \ Model		FDTSJ22HKXE2B(3)	FDTSJ28HKXE2B(3)	FDTSJ36HKXE2B(3)
Nominal cooling capacity*1	**W**	**2200**	**2800**	**3600**
Nominal heating capacity*2	**W**	**2500**	**3200**	**4000**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 39 Lo: 38	Hi: 40 Me: 39 Lo: 38	
Exterior dimensions Height × Width × Depth	**mm**	**Unit:194 × 1040 × 650 Panel:10 × 1290 × 770**		
Net weight	**Kg**	**Unit:26 Panel:6**		
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve +Capillary tube		
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2		
Motor	**W**	**35 × 1**		
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 11 Lo: 8**	**Hi: 12 Me: 11 Lo: 10**	
Fresh air intake		Possible		
Air filter, Q'ty		Long life filter × 1(Washable)		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**		
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:φ12.7(1/2")**		
Connecting method		**Flare piping**		
Drain hose		Connectable with VP25		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		**Decorative Panel**		
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**		

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.
	With Auto Swing
FDTSJ22,28,36 type	TS-PSA-26W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for Europern nations which require CE marking.

Models FDTSJ45HKXE2B, 71HKXE2B

Item \ Model		FDTSJ45HKXE2B(3)	FDTSJ71HKXE2B(3)
Nominal cooling capacity*1	**W**	**4500**	**7100**
Nominal heating capacity*2	**W**	**5000**	**8000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 43 Me: 40 Lo: 38	Hi: 44 Me: 40 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**Unit:194 × 1040 ×650 Panel:10 × 1290 ×770**	**Unit:194 × 1300 ×650 Panel:10 × 1500 ×790**
Net weight	**kg**	**Unit:26 Panel:6**	**Unit:30 Panel:7**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2	Centrifugal fan × 4
Motor	**W**	**40×1**	**25×2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 10**	**Hi: 18 Me: 15 Lo: 12**
Fresh air intake		Possible	
Air filter, Q'ty		Long life filter × 1(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
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:ϕ12.7(1/2")**	**Liquid line:ϕ9.52(3/8") Gas line:ϕ15.88(5/8")**
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		**Decorative Panel**	
Outdoor units to be combined		**FDCJ140HKXE2B, 224HKXE2B, 280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Item / Model	Panel Part No.
	With Auto Swing
FDTSJ45 type	TS-PSA-26W-E
FDTSJ71 type	TS-PSA-36W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(d) Cassetteria type (FDR)

Models FDRJ22HKXE2, 28HKXE2

Item \ Models		FDRJ22HKXE2(4)		FDRJ28HKXE2(4)	
Air inlet panel		**Silent panel**	**Canvas panel**	**Silent panel**	**Canvas panel**
Panel model (Option)		**R-PNLS-26W-E**	**R-PNLC-26W-E**	**R-PNLS-26W-E**	**R-PNLC-26W-E**
Nominal cooling capacity*1	**W**	**2200**		**2800**	
Nominal heating capacity*2	**W**	**2500**		**3200**	
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 41 Me: 39 Lo: 36	Hi: 42 Me: 40 Lo: 37	Hi: 42 Me: 40 Lo: 37	Hi: 43 Me: 41 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**Unit:355 × 750 ×635 Panel:10 × 1040 ×750**	**Unit:355 × 750 ×635 Panel:10 × 864 × 585**	**Unit:355 × 750 ×635 Panel:10 × 1040 ×750**	**Unit:355 × 750 ×635 Panel:10 × 864 × 585**
Net weight	**kg**	**Unit:30 Panel:7**	**Unit:30 Panel:5**	**Unit:30 Panel:7**	**Unit:30 Panel:5**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2			
Motor	**W**	**40×1**		**50×1**	
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 10 Me: 9 Lo: 8**		**Hi: 12 Me: 11 Lo: 10**	
Available static pressure (at Me)	**Pa (mmAq)**	**Standard:45 (4.5), Hi speed:85 (8.5)**			
Fresh air intake		Side or back			
Air filter Q'ty		Long life filter × 1(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**			
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:φ12.7(1/2")**			
Connecting method		**Flare piping**			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		**Silent panel, Canvas panel, Canvas duct**			
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**			

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

Item \ Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2)This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

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

(4)The number "2",following the type of each model,represents"CE-marked model"especially for European Union, and for European nations which require CE marking.

(5)Add the canvas duct lenght to the unit height for the canvas type.

Models FDRJ45HKXE2, 56HKXE2

Item \ Models		FDRJ45HKXE2(4)		FDRJ56HKXE2(4)	
Air inlet panel		**Silent panel**	**Canvas panel**	**Silent panel**	**Canvas panel**
Panel model (Option)		**R-PNLS-26W-E**	**R-PNLC-26W-E**	**R-PNLS-26W-E**	**R-PNLC-26W-E**
Nominal cooling capacity*1	**W**	**4500**		**5600**	
Nominal heating capacity*2	**W**	**5000**		**6300**	
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 43 Me: 40 Lo: 37	Hi: 44 Me: 41 Lo: 38	Hi:43 Me: 40 Lo: 37	Hi: 44 Me: 41 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**Unit:355 × 750 ×635 Panel:10 × 1040 ×750**	**Unit:355 × 750 ×635 Panel:10 × 864 × 585**	**Unit:355 × 750 ×635 Panel:10 × 1040 ×750**	**Unit:355 × 750 ×635 Panel:10 × 864 × 585**
Net weight	**kg**	**Unit:30 Panel:7**	**Unit:30 Panel:5**	**Unit:30 Panel:7**	**Unit:30 Panel:5**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2			
Motor	**W**	**55×1**			
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 11**			
Available static pressure (at Me)	**Pa (mmAq)**	**Standard:50 (5.0), Hi speed:85 (8.5)**			
Fresh air intake		Side or back			
Air filter Q'ty		Long life filter × 1(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**			
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:φ12.7(1/2")**		**Liquid line:φ9.52(3/8") Gas line:φ15.88(5/8")**	
Connecting method		**Flare piping**			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		**Silent panel, Canvas panel, Canvas duct**			
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**			

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2)This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

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

(4)The number "2",following the type of each model,represents"CE-marked model"especially for European Union, and for Europearn nations which require CE marking.

(5)Add the canvas duct lenght to the unit height for the canvas type.

Models FDRJ71HKXE2, 90HKXE2

Item \ Models		FDRJ71HKXE2(4)		FDRJ90HKXE2(4)	
Air inlet panel		**Silent panel**	**Canvas panel**	**Silent panel**	**Canvas panel**
Panel model (Option)		**R-PNLS-36W-E**	**R-PNLC-36W-E**	**R-PNLS-36W-E**	**R-PNLC-36W-E**
Nominal cooling capacity*1	**W**	**7100**		**9000**	
Nominal heating capacity*2	**W**	**8000**		**10000**	
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 43 Me: 40 Lo: 37	Hi: 44 Me: 41 Lo: 38	Hi: 43 Me: 40 Lo: 37	Hi: 44 Me: 41 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**Unit:355 × 950 ×635 Panel:10 × 1240 ×750**	**Unit:355 × 950 ×635 Panel:10 × 1064 × 585**	**Unit:355 × 950 ×635 Panel:10 × 1240 ×750**	**Unit:355 × 950 ×635 Panel:10 × 1064 × 585**
Net weight	**kg**	**Unit:35 Panel:8**	**Unit:35 Panel:6**	**Unit:35 Panel:8**	**Unit:35 Panel:6**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2			
Motor	**W**	**90×1**		**100×1**	
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 18 Me: 16 Lo: 14**		**Hi: 20 Me: 18 Lo: 15**	
Available static pressure (at Me)	**Pa (mmAp)**	**Standard:45 (4.5), Hi speed:80 (8.0)**			
Fresh air intake		Side or back			
Air filter Q'ty		Long life filter × 1(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**			
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")**			
Connecting method		**Flare piping**			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		**Silent panel, Canvas panel, Canvas duct**			
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**			

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

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2)This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

(3)Canvas panel is used in combination with following canvas duct
Canvas duct: HA01490

(4)The number "2",following the type of each model,represents"CE-marked model"especially for European Union, and for European nations which require CE marking.

(5)Add the canvas duct lenght to the unit height for the canvas type.

Models FDRJ112HKXE2, 140HKXE2

Item \ Models		FDRJ112HKXE2(4)		FDRJ140HKXE2(4)	
Air inlet panel		**Silent panel**	**Canvas panel**	**Silent panel**	**Canvas panel**
Panel model (Option)		**R-PNLS-46W-E**	**R-PNLC-46W-E**	**R-PNLS-46W-E**	**R-PNLC-46W-E**
Nominal cooling capacity*1	**W**	**11200**		**14000**	
Nominal heating capacity*2	**W**	**12500**		**16000**	
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 45 Me: 42 Lo: 38	Hi: 46 Me: 43 Lo: 39	Hi: 46 Me: 43 Lo: 39	Hi: 47 Me: 44 Lo: 40
Exterior dimensions Height × Width × Depth	**mm**	**Unit:406 × 1370 ×635 Panel:10 × 1660 ×750**	**Unit:406 × 1370 ×635 Panel:10 × 1484 ×585**	**Unit:406 × 1370 ×635 Panel:10 × 1660 ×750**	**Unit:406 × 1370 ×635 Panel:10 × 1484 × 585**
Net weight	**kg**	**Unit:50 Panel:9**	**Unit:50 Panel:7**	**Unit:52 Panel:9**	**Unit:52 Panel:7**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 3			
Motor	**W**	**45 ×1, 90× 1**		**50 ×1, 100 ×1**	
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 28 Me: 25 Lo: 22**		**Hi: 34 Me: 31 Lo: 27**	
Available static pressure (at Me)	**Pa (mmAq)**	**Standard:50 (5.0), Hi speed:80 (8.0)**			
Fresh air intake		Side or back			
Air filter Q'ty		Long life filter × 2(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**			
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**			
Optional parts		**Silent panel, Canvas panel, Canvas duct**			
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**			

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

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2)This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

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

(4)The number "2",following the type of each model,represents"CE-marked model"especially for European Union, and for European nations which require CE marking.

(5)Add the canvas duct lenght to the unit height for the canvas type.

(e) Satellite ducted type (FDUM)

Models FDUMJ36HKXE2, 45HKXE2

Item \ Models		FDUMJ36HKXE2(3)	FDUMJ45HKXE2(3)
Nominal cooling capacity*1	**W**	**3600**	**4500**
Nominal heating capacity*2	**W**	**4000**	**5000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 34 Me: 32 Lo: 29	Hi: 35 Me: 32 Lo: 29
Exterior dimensions Height × Width × Depth	**mm**	**299 × 750 × 635**	
Net weight	**kg**	**34**	
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2	
Motor	**W**	**50×1**	**55×1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 12 Me: 11 Lo: 10**	**Hi: 14 Me: 12 Lo: 11**
Available static pressure (at Me)	**Pa (mmAq)**	**Standard:50 (5.0), Hi speed:85 (8.5)**	
Fresh air intake		Side	
Air filter, Q'ty		–	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**	
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:φ12.7(1/2")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDUMJ56HKXE2, 71HKXE2, 90HKXE2

Item \ Models		FDUMJ56HKXE2(3)	FDUMJ71HKXE2(3)	FDUMJ90HKXE2(3)
Nominal cooling capacity*1	**W**	**5600**	**7100**	**9000**
Nominal heating capacity*2	**W**	**6300**	**8000**	**10000**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 35 Me: 32 Lo: 29	Hi: 35 Me: 32 Lo: 29	Hi: 36 Me: 33 Lo: 30
Exterior dimensions Height × Width × Depth	**mm**	**299 × 750 × 635**	**299 × 950 × 635**	
Net weight	**kg**	**34**	**40**	
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve +Capillary tube		
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2		
Motor	**W**	**55×1**	**90×1**	**100×1**
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 11**	**Hi: 18 Me: 16 Lo: 14**	**Hi: 20 Me: 18 Lo: 15**
Available static pressure (at Me)	**Pa (mmAq)**	**Standard:50 (5.0), Hi speed:85 (8.5)**		
Fresh air intake		Side		
Air filter, Q'ty		–		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**		
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")**		
Connecting method		**Flare piping**		
Drain hose		Connectable with VP25		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		–		
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**		

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

Item \ Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDUMJ112HKXE2, 140HKXE2

Item \ Models		FDUMJ112HKXE2(3)	FDUMJ140HKXE2(3)
Nominal cooling capacity*1	**W**	**11200**	**14000**
Nominal heating capacity*2	**W**	**12500**	**16000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 38 Me: 35 Lo: 32	Hi: 39 Me: 37 Lo: 34
Exterior dimensions Height × Width × Depth	**mm**	**350 × 1370 × 635**	
Net weight	**kg**	**57**	**59**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 3	
Motor	**W**	**45 ×1, 90× 1**	**50 ×1, 100× 1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 28 Me: 25 Lo: 22**	**Hi: 34 Me: 31 Lo: 27**
Available static pressure (at Me)	**Pa (mmAq)**	**Standard:60 (6.0), Hi speed:90 (9.0)**	**Standard:60 (6.0), Hi speed:85 (8.5)**
Fresh air intake		Side	
Air filter, Q'ty		–	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**	
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**	
Optional parts		–	
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item \ Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616"UNITARY AIR-CONDITIONERS"

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(f) Ceiling suspension type (FDE)

Models FDEJ36HKXE2B, 45HKXE2B

Item \ Models		FDEJ36HKXE2B(3)	FDEJ45HKXE2B(3)
Nominal cooling capacity*1	**W**	**3600**	**4500**
Nominal heating capacity*2	**W**	**4000**	**5000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 43 Me:40 Lo: 38	
Exterior dimensions Height × Width × Depth	**mm**	**184 ×1000 × 650**	
Net weight	**kg**	**22**	
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve + Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2	
Motor	**W**	**40×1**	
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 10**	
Fresh air intake		Not possible	
Air filter, Q'ty		Polypropylene net × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
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:φ12.7(1/2")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP20	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

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Models FDEJ56HKXE2B, 71HKXE2B

Item \ Models		FDEJ56HKXE2B(3)	FDEJ71HKXE2B(3)
Nominal cooling capacity*1	**W**	**5600**	**7100**
Nominal heating capacity*2	**W**	**6300**	**8000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 43 Me:40 Lo: 38	Hi: 44 Me:40 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**184 × 1000 × 650**	**184 × 1260 × 650**
Net weight	**kg**	**22**	**27**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve + Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2	Centrifugal fan × 4
Motor	**W**	**40×1**	**25×2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 10**	**Hi: 18 Me: 15 Lo: 12**
Fresh air intake		Not possible	
Air filter, Q'ty		Polypropylene net × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
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")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP20	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
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Models FDEJ112HKXE2B, 140HKXE2B

Item \ Models		FDEJ112HKXE2B(3)	FDEJ140HKXE2B(3)
Nominal cooling capacity*1	**W**	**11200**	**14000**
Nominal heating capacity*2	**W**	**12500**	**16000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 49 Me:46 Lo: 42	Hi: 50 Me:47 Lo: 42
Exterior dimensions Height × Width × Depth	**mm**	**239 × 1260 × 650**	**239 × 1470 × 650**
Net weight	**kg**	**34**	**40**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 3	Centrifugal fan × 4
Motor	**W**	**35×1 + 55×1**	**55×2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 28 Me: 25 Lo: 22**	**Hi: 34 Me: 30 Lo: 26**
Fresh air intake		Not possible	
Air filter, Q'ty		Polypropylene net × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
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 VP20	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

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(g) Wall mounted type (FDK)

Models FDKJ22HKXE2, 28HKXE2, 36HKXE2, 45HKXE2

Item \ Models		FDKJ22HKXE2(3)	FDKJ28HKXE2(3)	FDKJ36HKXE2(3)	FDKJ45HKXE2(3)
Nominal cooling capacity*1	**W**	**2200**	**2800**	**3600**	**4500**
Nominal heating capacity*2	**W**	**2500**	**3200**	**4000**	**5000**
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 40 Lo: 37	Hi: 42 Me:40 Lo: 37		Hi: 44 Me:41 Lo: 37
Exterior dimensions Height × Width × Depth	**mm**	**375 × 930 × 194**			
Net weight	**kg**	**19**			
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve + Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2			
Motor	**W**	**30×1**			**35×1**
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 9 Lo: 8**	**Hi: 10 Me: 9 Lo: 8**		**Hi: 11.5 Me: 10 Lo: 8**
Fresh air intake		Not possible			
Air filter, Q'ty		Polypropylene net × 2(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**			
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:φ12.7(1/2")**			
Connecting method		**Flare piping**			
Drain hose		Connectable with I.D. 16mm			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		—			
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**			

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

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

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Models FDKJ56HKXE2, 71HKXE2

Item	Model	FDKJ56HKXE2(3)	FDKJ71HKXE2(3)
Nominal cooling capacity*1	**W**	**5600**	**7100**
Nominal heating capacity*2	**W**	**6300**	**8000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 46 Me:43 Lo: 39	Hi: 47 Me:44 Lo: 40
Exterior dimensions Height × Width × Depth	**mm**	**375 ×1148 × 194**	**375 × 1436 × 194**
Net weight	**kg**	**20**	**22**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve + Capillary tube	
Air handling equipment Fan type & Q'ty		Tangential fan ×1	Tangential fan ×2
Motor	**W**	**40×1**	**45×1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 17 Me: 15 Lo: 13**	**Hi: 21 Me: 18 Lo: 15**
Fresh air intake		Not possible	
Air filter, Q'ty		Polypropylene net × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
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")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with I.D. 16mm	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCJ140HKXE2B,224HKXE2B,280HKXE2B,FDCP140HKXE2B,224HKXE2B,280HKXE2B**	

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

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

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(h) Floor standing exposed type (FDFL)

Models FDFLJ28HKXE2, 45HKXE2, 71HKXE2

Item \ Model		FDFLJ28HKXE2(3)	FDFLJ45HKXE2(3)	FDFLJ71HKXE2(3)
Nominal cooling capacity*1	**W**	**2800**	**4500**	**7100**
Nominal heating capacity*2	**W**	**3200**	**5000**	**8000**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 41 Me:38 Lo: 36	Hi: 43 Me:41 Lo: 40	
Exterior dimensions Height × Width × Depth	**mm**	**630 × 1196 × 225**		**630 × 1481 × 225**
Net weight	**kg**	**32**		**40**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve + Capillary tube		
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2		
Motor	**W**	**30×1**	**40×1**	
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 12 Me: 11 Lo: 10**	**Hi: 14 Me: 12 Lo: 10**	**Hi: 18 Me: 15 Lo: 12**
Fresh air intake		Not possible		
Air filter, Q'ty		Polypropylene net × 2(Washable)		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKXFL-E2)**		
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: 6.35(1/4"), Gas line: 12.7(1/2")**		**Liquid line: 9.52(3/8") Gas line: 15.88(5/8")**
Connecting method		**Flare piping**		
Drain hose		Connectable with VP20		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		–		
Outdoor units to be combined		**FDCJ140HKXE2B, 224HKXE2B, 280HKXE2B, FDCP140HKXE2B, 224HKXE2B, 280HKXE2B**		

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

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(i) Floor standing hidden type (FDFU)

Models FDFUJ28HKXE2, 45HKXE2, 56HKXE2, 71HKXE2

Item \ Model		FDFUJ28HKXE2(3)	FDFUJ45HKXE2(3)	FDFUJ56HKXE2(3)	FDFUJ71HKXE2(3)
Nominal cooling capacity*1	**W**	**2800**	**4500**	**5600**	**7100**
Nominal heating capacity*2	**W**	**3200**	**5000**	**6300**	**8000**
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 41 Me:38 Lo: 36	Hi: 43 Me:41 Lo: 40		
Exterior dimensions Height × Width × Depth	**mm**	**630 × 1077 × 225**			**630 × 1362 × 225**
Net weight	**kg**	**25**			**32**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve + Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2			
Motor	**W**	**30×1**	**40×1**		
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 12 Me: 11 Lo: 10**	**Hi: 14 Me: 12 Lo: 10**		**Hi: 18 Me: 15 Lo: 12**
Fresh air intake		Not possible			
Air filter, Q'ty		Polypropylene net × 2(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKXFL-E2)**			
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:ϕ12.7(1/2")**		**Liquid line:ϕ9.52(3/8") Gas line:ϕ15.88(5/8")**	
Connecting method		**Flare piping**			
Drain hose		Connectable with VP20			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		–			
Outdoor units to be combined		**FDCJ140HKXE2B, 224HKXE2B, 280HKXE2B, FDCP140HKXE2B, 224HKXE2B, 280HKXE2B**			

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

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

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(2) Outdoor unit

(a) Alternative refrigerant R407C use models

Models FDCP140HKXE2B, 224HKXE2B, 280HKXE2B

Item \ Models		FDCP140HKXE2B(3)	FDCP224HKXE2B(3)	FDCP280HKXE2B(3)
Power source		**3 Phase 380/415V 50Hz**		
Nominal cooling capacity*1	**W**	**14000**	**22400**	**28000**
Nominal heating capacity*2	**W**	**16000**	**25000**	**31500**
Noise level	dB(A)	56	58	59
Exterior dimensions Height × Width × Depth	**mm**	**1450 × 690 × 600**	**1450 × 1350 × 600**	
Net weight	**kg**	**150**	**250**	**275**
Refrigerant equipment compressor type & Q' ty		GT-A5539HAS51 × 1	GT-A5539HAS52 × 1 GT-A5539HS52 × 1	GT-A5539HAS52 × 1 GU-A5570HS52 × 1
Motor	**kW**	**3.5**	**3.5 × 1, 2.2 × 1**	**3.5 × 1, 3.75 × 1**
Starting method		Direct start		
Capacity control	%	100 ~ 25	100 ~ 16	100 ~ 12
Crankcase heater	W	33	33 × 2	33 × 1, 40 × 1
Heat exchanger		Louver fines & inner grooved tubing		
Refrigerant control		Expansion Valve +Capillary tube		
Refrigerant		**R407C**		
Quantity	**kg**	**9**	**12**	
Refrigerant oil	ℓ	**1.45 (MA32)**	**2.9 (MA32)**	**3.05 (MA32)**
Defrost control		MC controlled De-Icer		
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Centrifugal fan × 2	
Motor	**W**	**100×1**	**100×2**	
Starting method		Direct start		
Air flow(Standard)	**CMM**	**90**	**180**	
Shock & vibration absorber		Rubber mount (for compressor)		
Safety equipment		Compressor overheat protection, overeurrent protection, power transformer overheating protection, abnormal high pressure protection		
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")**	**Liquid line: ϕ12.7(1/2") Gas line: ϕ28.58(11/8")**
Connecting method		**Brazing**		
Drain		Hole for drain(ϕ20 × 4pcs)	Hole for drain(ϕ20 × 8pcs, ϕ50 × 1pcs)	
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		–		
Indoor units to be combined		**FDTJ28, 36, 45, 56, 71, 90, 112, 140type FDTWJ28, 45, 56, 71, 90, 112, 140type FDTSJ22, 28, 36, 45, 71type FDRJ22, 28, 45, 56, 71, 90, 112, 140type FDUMJ36, 45, 56, 71, 90, 112, 140type FDEJ36, 45, 56, 71, 112, 140type FDKJ22, 28, 36, 45, 56, 71type FDFLJ28, 45, 71type**	**FDFUJ28, 45, 56, 71type**	

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in JIS-B8616.

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

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Refrigerant distributor pipe set Number list (Optional)

Outdoor unit	Number of combined indoor units	Flow divider pipe(1) (Total capacity after the flow division)
FDCP140HKXE2B	1~8	Downstream capacity 101 or less : DIS-2KX10-E
FDCP224HKXE2B	1~13(2)	Downstream capacity 180 or less : DIS-2KX20-E
FDCP280HKXE2B	1~16(2)	Downstream capacity 180 or more : DIS-2KX30-E

Notes (1) The flow divider pipe that should be used depends on the indoor unit total downstream capacity. (1 set is required for each flow division.)

(2) When there are 13 or more indoor units there are limits on the length of the piping after the flow division, so refer to the usage range.

(b) Refrigerant R22 use models

Models FDCJ140HKXE2B, 224HKXE2B, 280HKXE2B

Item \ Models		FDCJ140HKXE2B(3)	FDCJ224HKXE2B(3)	FDCJ280HKXE2B(3)
Power source		**3 Phase 380/415V 50Hz**		
Nominal cooling capacity*1	**W**	**14000**	**22400**	**28000**
Nominal heating capacity*2	**W**	**16000**	**25000**	**31500**
Noise level	dB(A)	56	58	59
Exterior dimensions Height × Width × Depth	**mm**	**1450 × 690 × 600**	**1450 × 1350 × 600**	
Net weight	**kg**	**150**	**250**	**275**
Refrigerant equipment compressor type & Q' ty		GT-A5539EAS51 × 1	GT-A5539EAS52 × 1 GT-A5539ES52 × 1	GT-A5539EAS52 × 1 GU-A5570ES52 × 1
Motor	**kW**	**3.5**	**3.5 × 1, 2.2 × 1**	**3.5 × 1, 3.75 × 1**
Starting method		Direct start		
Capacity control	%	100 ~ 25	100 ~ 16	100 ~ 12
Crankcase heater	W	33	33 × 2	33 × 1, 40 × 1
Heat exchanger		Louver fines & inner grooved tubing		
Refrigerant control		Expansion Valve +Capillary tube		
Refrigerant		**R22**		
Quantity	**kg**	**9**	**12**	
Refrigerant oil	ℓ	**1.45 (BARREL FREEZE 32SAM)**	**2.9 (BARREL FREEZE 32SAM)**	**3.05 (BARREL FREEZE 32SAM)**
Defrost control		MC controlled De-Icer		
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Centrifugal fan × 2	
Motor	**W**	**100×1**	**100×2**	
Starting method		Direct start		
Air flow(Standard)	**CMM**	**90**	**180**	
Shock & vibration absorber		Rubber mount (for compressor)		
Safety equipment		Compressor overheat protection, overeurrent protection, power transformer overheating protection, abnormal high pressure protection		
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")**	**Liquid line: ϕ12.7(1/2") Gas line: ϕ28.58(11/8")**
Connecting method		**Brazing**		
Drain		Hole for drain(ϕ20 × 4pcs)	Hole for drain(ϕ20 × 8pcs, ϕ50 × 1pcs)	
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		–		
Indoor units to be combined		**FDTJ28, 36, 45, 56, 71, 90, 112, 140type FDTWJ28, 45, 56, 71, 90, 112, 140type FDTSJ22, 28, 36, 45, 71type FDRJ22, 28, 45, 56, 71, 90, 112, 140type FDUMJ36, 45, 56, 71, 90, 112, 140type FDEJ36, 45, 56, 71, 112, 140type FDKJ22, 28, 36, 45, 56, 71type FDFLJ28, 45, 71type**	**FDFUJ28, 45, 56, 71type**	

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in JIS-B8616.

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

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Refrigerant distributor pipe set Number list (Optional)

Outdoor unit	Number of combined indoor units	Flow divider pipe(1) (Total capacity after the flow division)
FDCJ140HKXE2B	1~8	Downstream capacity 101 or less : DIS-2KX10-E
FDCJ224HKXE2B	1~13(2)	Downstream capacity 180 or less : DIS-2KX20-E
FDCJ280HKXE2B	1~16(2)	Downstream capacity 180 or more : DIS-2KX30-E

Notes (1) The flow divider pipe that should be used depends on the indoor unit total downstream capacity. (1 set is required for each flow division.)

(2) When there are 13 or more indoor units there are limits on the length of the piping after the flow division, so refer to the usage range.

(3) Operation chart

Since the Multi KX series air conditioner units are free multitype to which the indoor units of different capacity and different model can be combined, the operation characteristics of all combinations are very complicated, therefore only the individual operation characteristics of indoor and outdoor units are shown. For the combined operation characteristics, calculate them with the method shown in the next page.

(a) Operating characteristic of outdoor unit

(380 V/415 V)

Item \ Models		FDCJ140HKXE2B	FDCJ224HKXE2B	FDCJ280HKXE2B
Cooling input	kW	6.8/6.8	9.8/9.8	11.7/11.7
Heating input		5.7/5.9	8.3/8.4	9.7/9.8
Cooling running current	A	10.7/10.2	15.7/14.6	19.3/19.0
Heating running current		8.8/8.4	13.0/12.0	15.7/15.7
Inrush current (MAX.)	A	5	48	70
Cooling power factor	%	97/93	95/93	92/86
Heating power factor		98/98	97/97	94/95

(380 V/415 V)

Item \ Models		FDCP140HKXE2B	FDCP224HKXE2B	FDCP280HKXE2B
Cooling input	kW	6.8/6.8	9.8/9.8	11.7/11.7
Heating input		6.0/6.1	9.3/9.4	11.2/11.4
Cooling running current	A	10.7/10.2	15.7/14.6	19.3/19.0
Heating running current		9.3/8.6	14.7/14.0	17.6/16.8
Inrush current (MAX.)	A	5	48	70
Cooling power factor	%	97/93	95/93	92/86
Heating power factor		98/99	96/93	97/94

Note (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616 “UNITARY AIR-CONDITIONERS”

(b) Operating characteristic of indoor unit

FDT Series

(220 V/240 V)

Item \ Models	FDT Series							
	28	36	45	56	71	90	112	140
Power input (kW)	0.09/0.10		0.10/0.12		0.10/0.12	0.11/0.13	0.17/0.20	0.21/0.24
Running current (A)	0.40/0.44		0.45/0.49		0.47/0.50	0.50/0.55	0.75/0.81	0.93/1.02

FDTW Series

(220 V/240 V)

Item \ Models	FDTW Series						
	28	45	56	71	90	112	140
Power input (kW)	0.09/0.10			0.10/0.11	0.12/0.13	0.18/0.20	0.20/0.24
Running current (A)	0.43/0.44	0.43/0.43		0.48/0.50	0.57/0.59	0.86/0.89	0.90/0.98

Notes (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616 “UNITARY AIR-CONDITIONERS”
(2) The values shown in the above table are common to both cooling and heating operations.

FDTS Series (220 V/240 V)

Item \ Models	FDTS Series				
	22	28	36	45	71
Power input (kW)	0.07/0.08			0.09/0.11	0.12/0.15
Running current (A)	0.33/0.36			0.43/0.46	0.58/0.63

FDR, FDUM Series (220 V/240 V)

Item \ Models	FDR, FDUM Series							
	22	28, 36	45	56	71	90	112	140
Power input (kW)	0.09/0.11	0.11/0.13	0.14/0.16		0.15/0.17	0.16/0.19	0.24/0.28	0.28/0.32
Running current (A)	0.41/0.46	0.51/0.56	0.63/0.67		0.68/0.71	0.73/0.79	1.07/1.17	1.28/1.32

FDE Series (220 V/240 V)

Item \ Models	FDE Series					
	36	45	56	71	112	140
Power input (kW)	0.10/0.11			0.12/0.15	0.20/0.24	0.24/0.29
Running current (A)	0.43/0.46			0.58/0.63	0.90/0.98	1.10/1.20

FDK, FDFL, FDFU Series (220 V/240 V)

Item \ Models	FDK Series						FDFL, FDFU Series		
	22	28	36	45	56	71	28	45, 56	71
Power input (kW)	0.05/0.06			0.06/0.07	0.08/0.09	0.09/0.11	0.09/0.10	0.09/0.10	0.09/0.10
Running current (A)	0.26/0.28			0.31/0.33	0.36/0.39	0.41/0.48	0.41/0.42	0.40/0.41	0.40/0.41

Notes (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
JIS B8616 "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-KX 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) × 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: FDCJ224HKXE2B × 1 unit
Indoor unit: FDTJ71HKXE2 × 2 units
FDTJ45HKXE2 × 2 units

Operation characteristics of each unit

(Cooling/Heating)

Item \ Models	FDCJ224HKXE2B	FDTJ71HKXE2	FDTJ45HKXE2
Power input (kW)	9.8/8.3	0.10/0.10	0.10/0.10
Running current (A)	15.7/13.0	0.47/0.47	0.45/0.45

① Total power input (kW)

(Cooling) $9.8 + (0.10 \times 4) = 10.2$ (kW)

(Heating) $8.3 + (0.10 \times 4) = 8.7$ (kW)

② Total running current (A)

(Cooling) $15.7 + (0.47 \times 2 + 0.45 \times 2) \times \frac{2}{3} \fallingdotseq 16.9$ (A)

(Heating) $13.0 + (0.47 \times 2 + 0.45 \times 2) \times \frac{2}{3} \fallingdotseq 14.2$ (A)

③ Total power factor (%)

(Cooling) $\dfrac{10.2 \times 1000}{\sqrt{3} \times 16.9 \times 380} \times 100 \fallingdotseq 92$ %

(Heating) $\dfrac{8.7 \times 1000}{\sqrt{3} \times 14.2 \times 380} \times 100 \fallingdotseq 93$ %

(d) Calculation of system power input for operation hertz of compressor

Note (1) This package air-conditioner in JIS B8616.

System's total power input (kW) = $A \times B + C + (D_1 \times N_1 + D_2 \times N_2 + \ldots)$

For compressor

For outdoor fan

For operation indoor unit

A: Compressor power input in rated operation <kW>

B: Correction factor of power input by operation frequency of compressor.

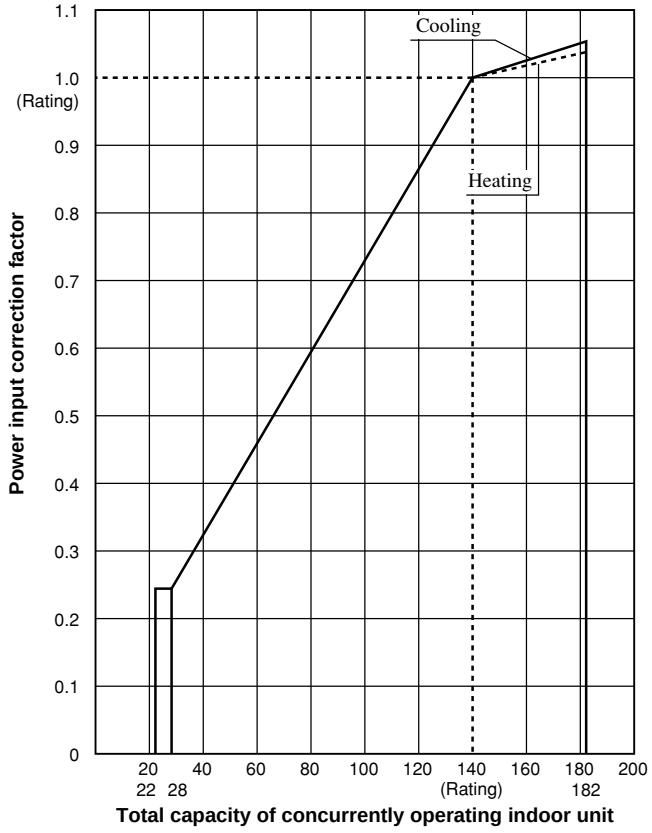
C: Power input of outdoor fan <kW>

D: Power input of a indoor unit <kW>

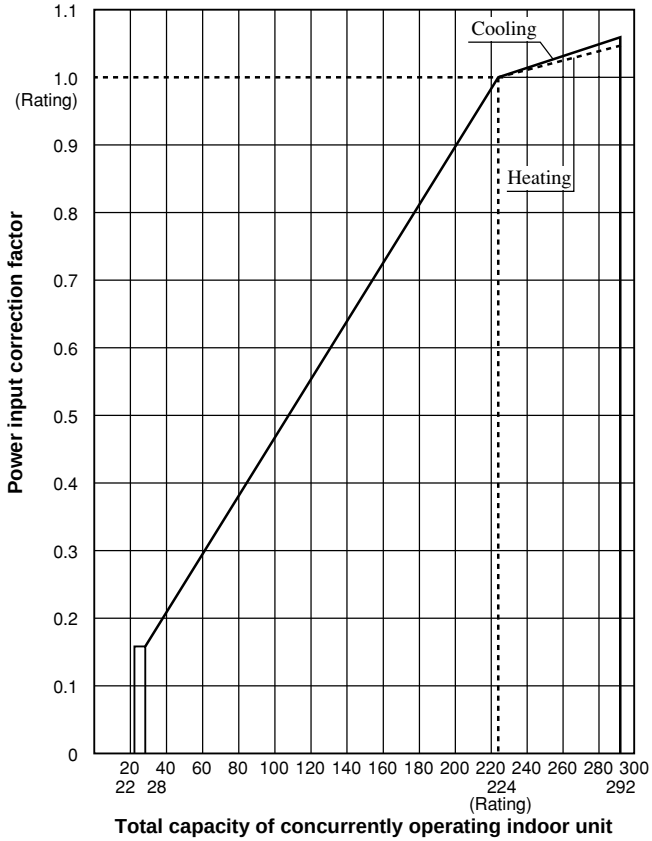
N: Number of operation indoor units.

1) Correction factor of compressor power input

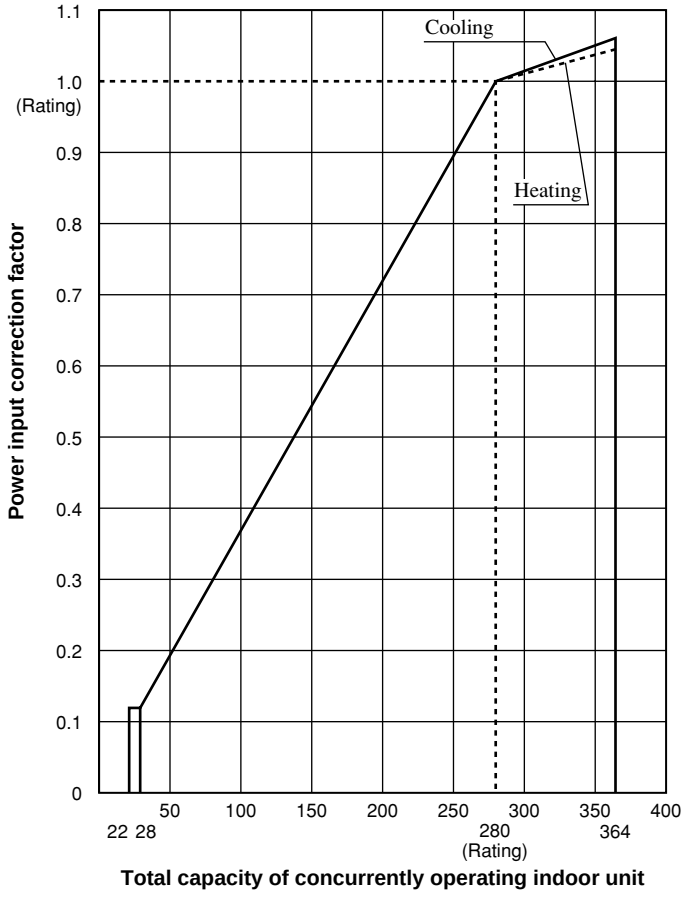
Models FDCJ140HKXE2B, FDCP140HKXE2B



Models FDCJ224HKXE2B, FDCP224HKXE2B



Models FDCJ280HKXE2B, FDCP280HKXEB



2) Compressor and outdoor fan power input in rated operation.

(380 V/415V)

Power input (kW) / Outdoor unit	Compressor		Outdoor fan
	Cooling	Heating	
FDCJ140HKXE2B	6.56/6.56	5.46/5.66	0.24/0.24
FDCJ224HKXE2B	9.33/9.33	7.83/7.93	0.47/0.47
FDCJ280HKXE2B	11.23/11.23	9.23/9.33	0.47/0.47

Power input (kW) / Outdoor unit	Compressor		Outdoor fan
	Cooling	Heating	
FDCP140HKXE2B	6.56/6.56	5.76/5.86	0.24/0.24
FDCP224HKXE2B	9.33/9.33	8.83/8.93	0.47/0.47
FDCP280HKXE2B	11.23/11.23	10.73/10.93	0.47/0.47

3) Power input of indoor unit

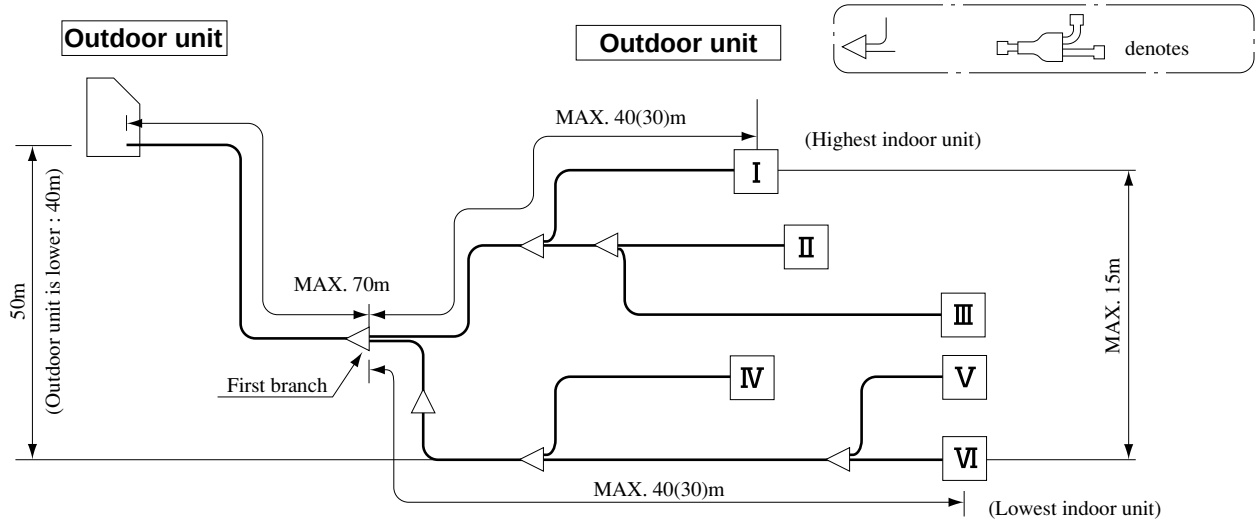
See page 752, operation characteristics of relevant units.

19.2.2 Range of usage & limitations

Item \ System		FDCP140HKXE2B FDCJ140HKXE2B	FDCP224HKXE2B FDCJ224HKXE2B	FDCP280HKXE2B FDCJ280HKXE2B
Indoor intake air temperature (Upper, lower limits)		Refer to the capacity characterstics.		
Outdoor air temperature (Upper, lower limits)				
Indoor units that can be used in combination	Number of connected units	1 to 8 units	1 to 13 units	1 to 16 units
	Total capacity	70 ~ 182	112 ~ 292	140 ~ 364
Single direction piping lenght		Indoor unit MAX. 100m		
Outdoor unit to first branching (main piping)		Max. 70m		
Piping length after the first branching		Max. 40m	Max. 40m when the connected No. of indoor unit are up to 12 units Max. 30m when the connected No. of indoor units are 13 units or more	
Difference in height between indoor and outdoor units	When above outdoor unit	MAX. 50m		
	When below outdoor unit	MAX. 40m		
Difference in height between indoor units		MAX. 15m		
Indoor unit atmosphere (behind ceiling) tempe rature and humidity		Dew point temperature 28℃ or less, relative humidity 80% or less		
Compressor stop/start frequency	1 cycle time	6 min or more(from stop to stop or from start to start)		
	Stop time	3 min or more		
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage		
	Voltage drop during start	Within ±15% of rated voltage		
	Interval unbalance	Within ± 3% of rated voltage		

Allowable length of refrigerant piping, height difference between indoor and outdoor unit

(1) Branch pipe method (using brancn PiPe)



Note (1) Value in ( ) indicates when the connected No. of indoor units are 13 units or more. (FDCJ(P) 224, 280 only)

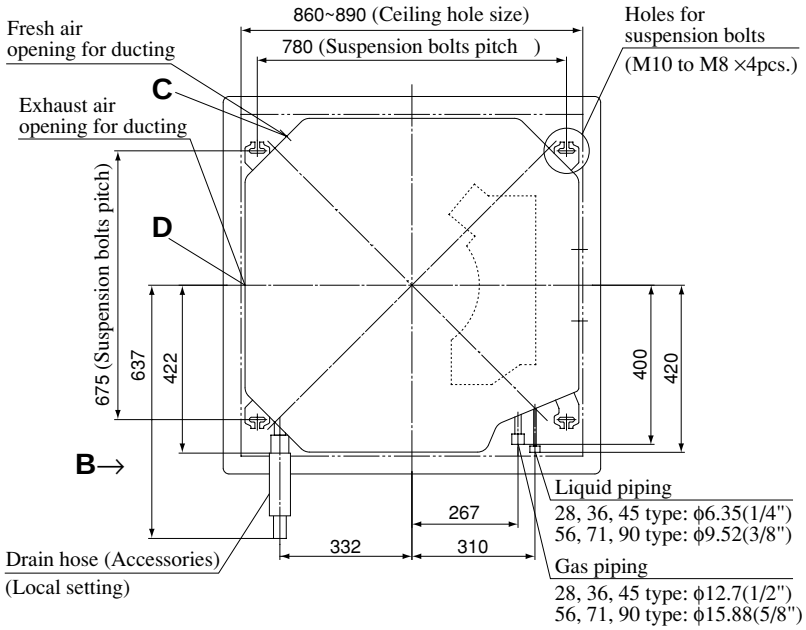
19.2.3 Exterior dimensions

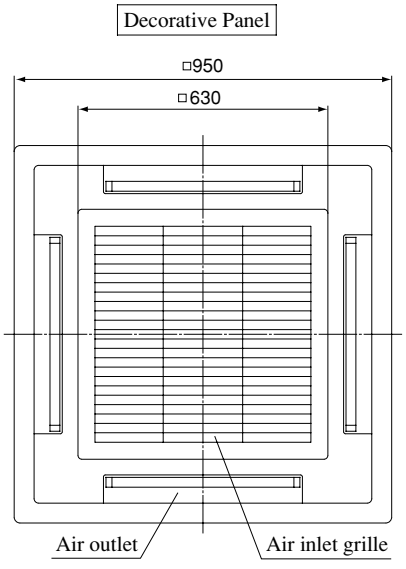
(1) Indoor unit

(a) Ceiling recessed type (FDT)

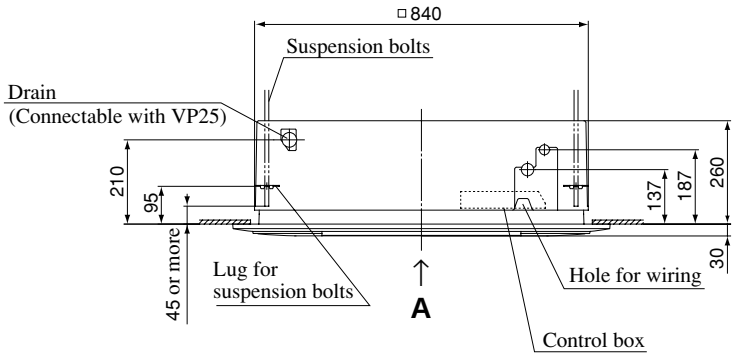
Models FDTJ28HKXE2, 36HKXE2, 45HKXE2, 56HKXE2, 71HKXE2, 90HKXE2

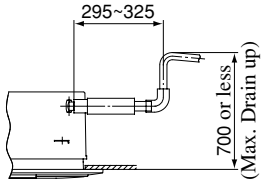
Unit : mm



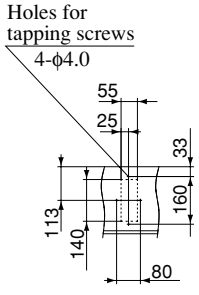


VIEW A

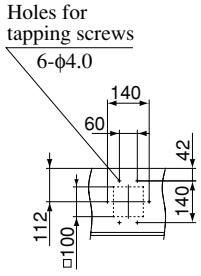




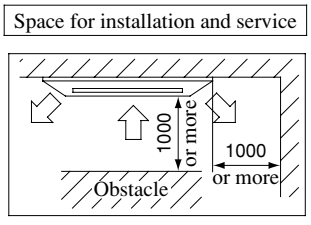
VIEW B



VIEW C

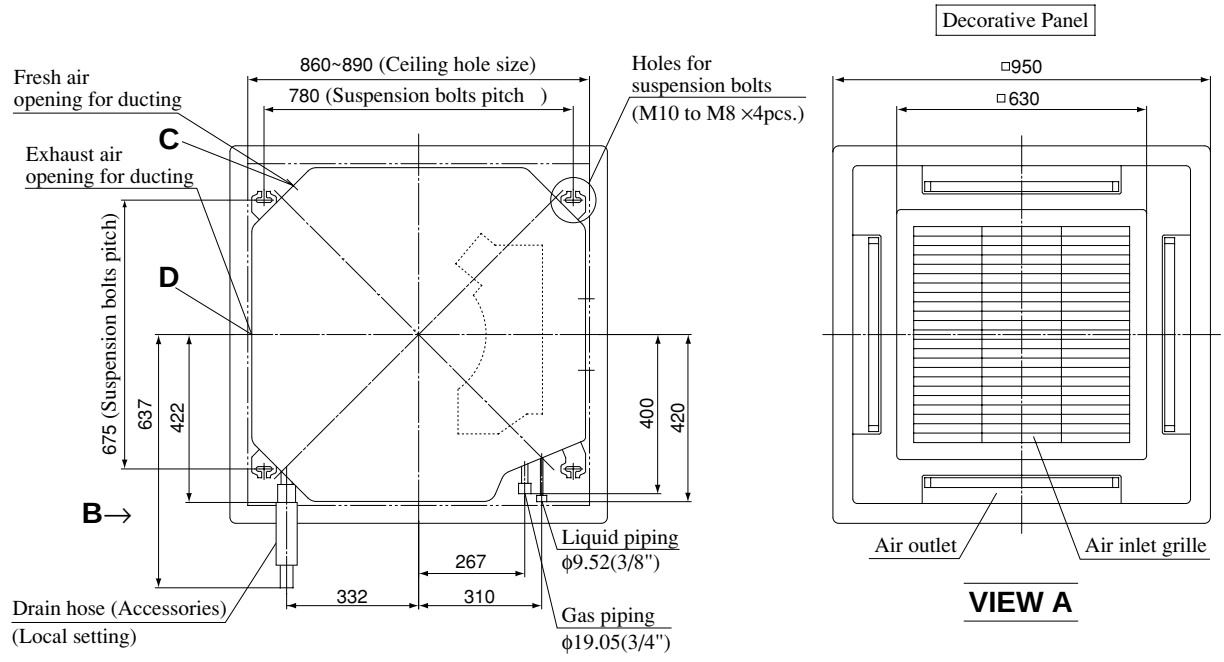


VIEW D

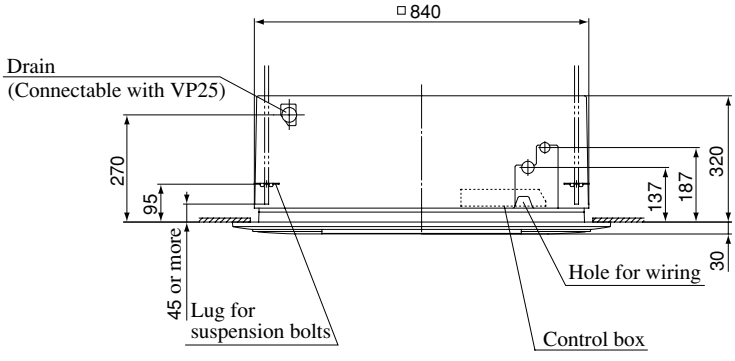


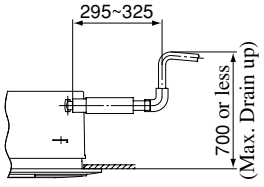
Models FDTJ112HKXE2, 140HKXE2

Unit : mm

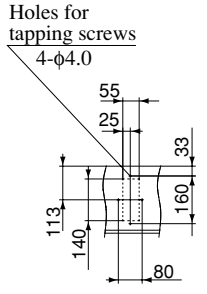


VIEW A





VIEW B



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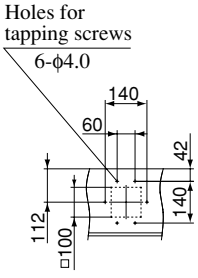

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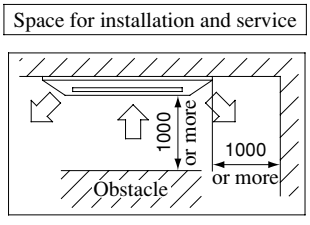
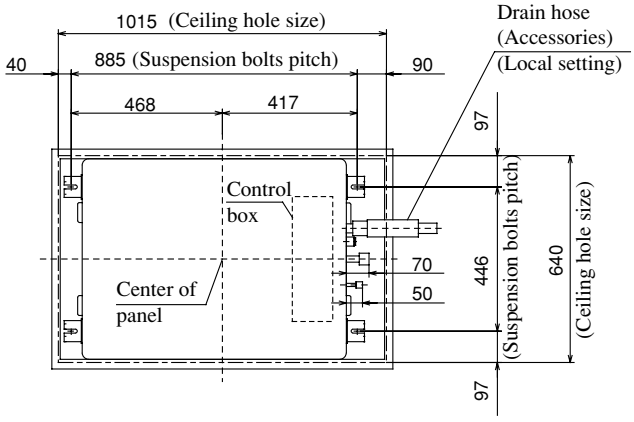
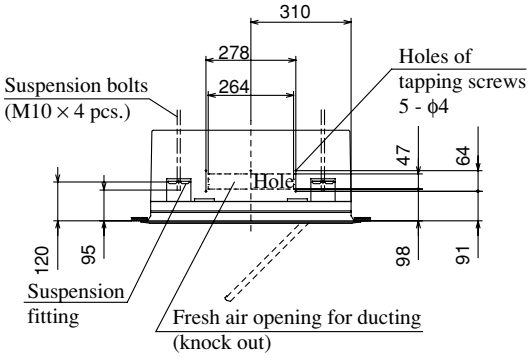


(b) 2-way outlet ceiling recessed type (FDTW)

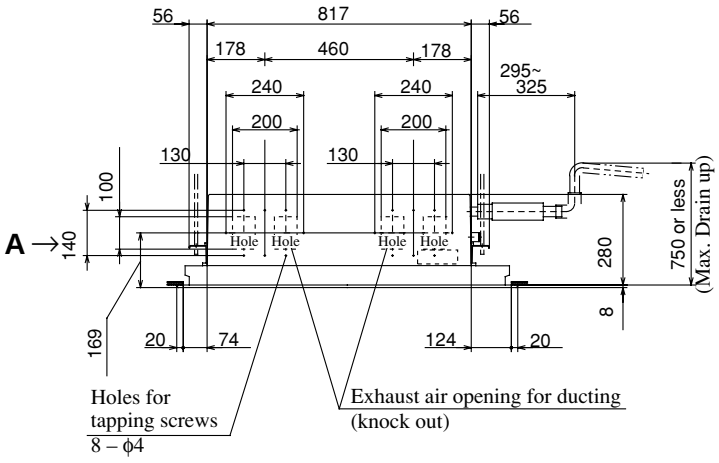
Models FDTWJ28HKXE2B, 45HKXE2B, 56HKXE2B

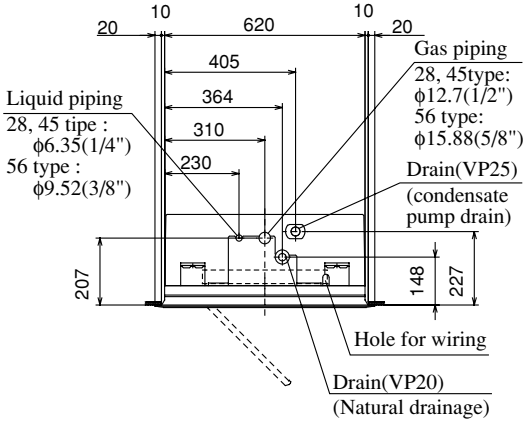
Unit : mm



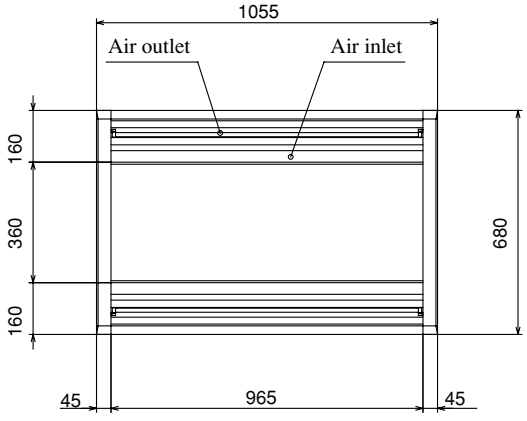


VIEW A

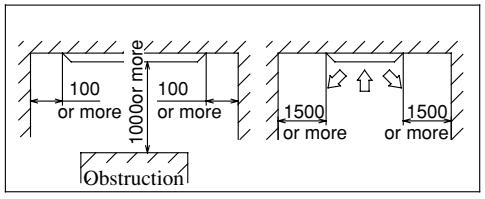




Decorative Panel

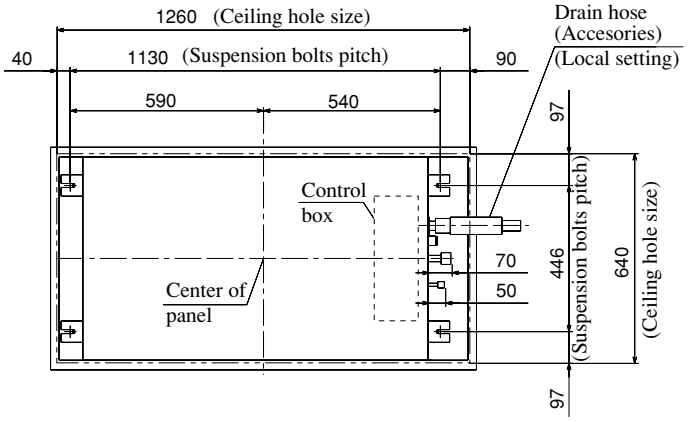


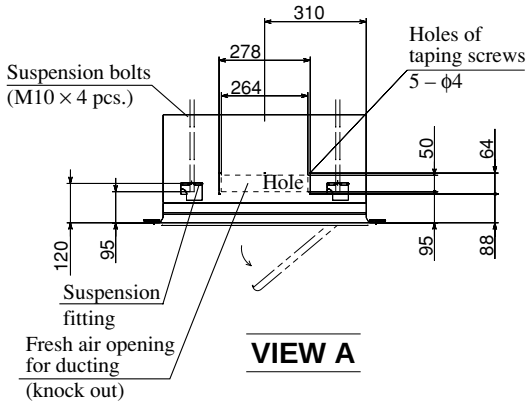
Space for installation and service

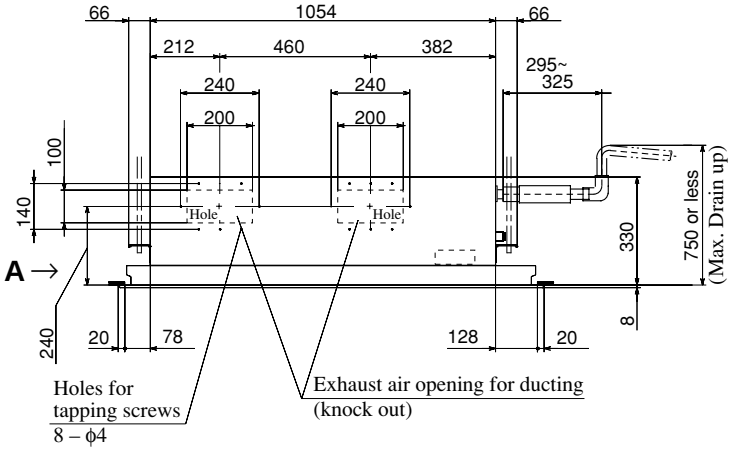


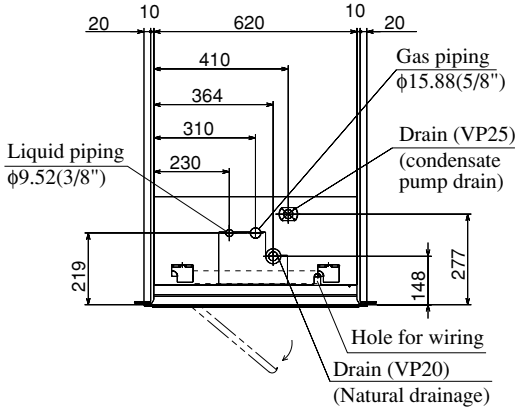
Models FDTWJ71HKXE2B, 90HKXE2B

Unit : mm

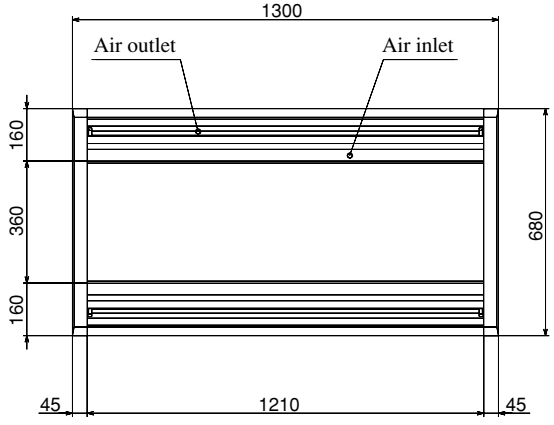




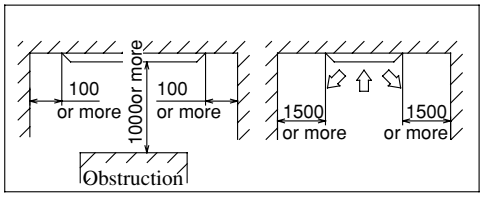




Decorative Panel

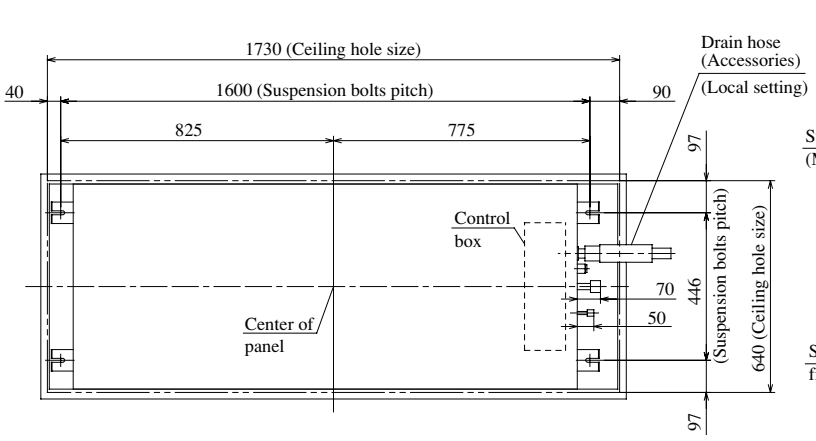


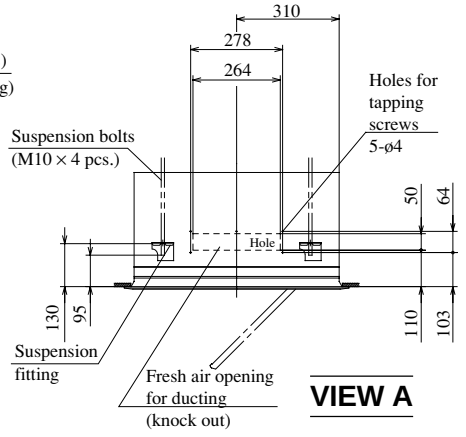
Space for installation and service

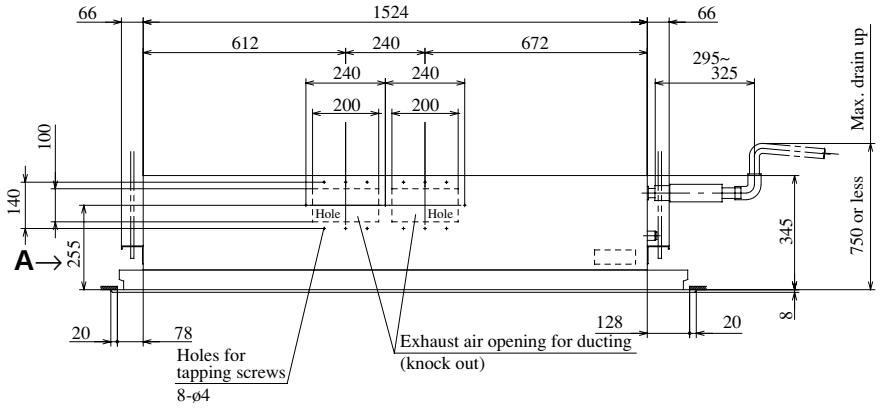


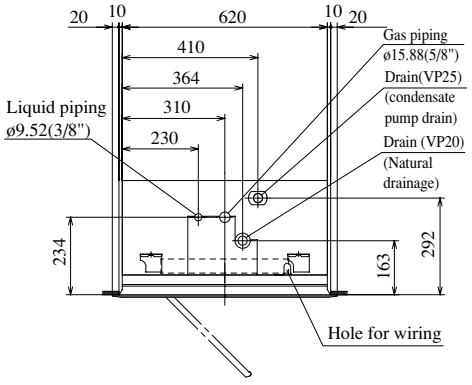
Models FDTWJ112HKXE2B, 140HKXE2B

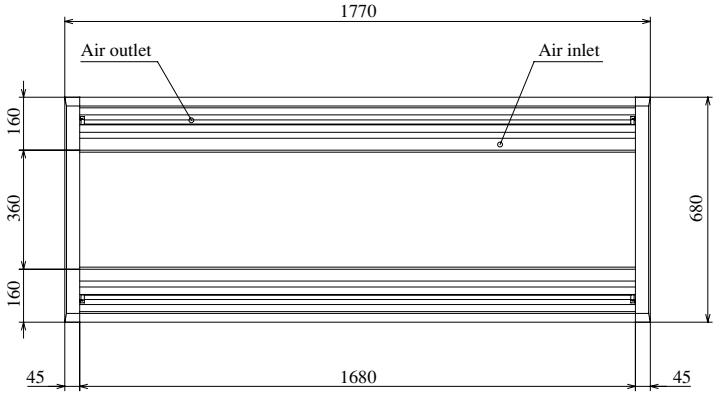
Unit: mm





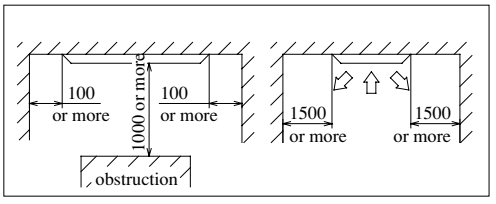






Decorative Panel

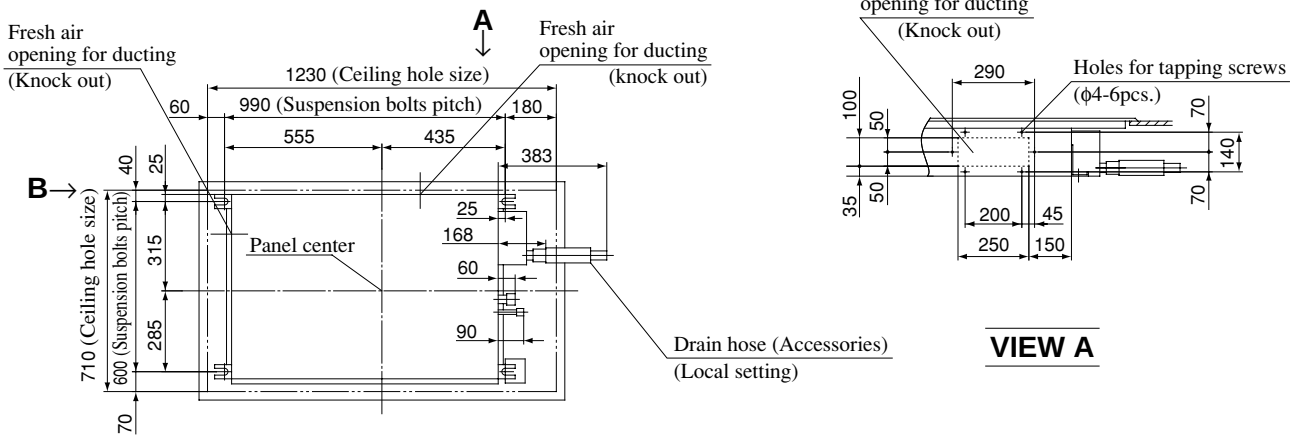
Space for installation and service

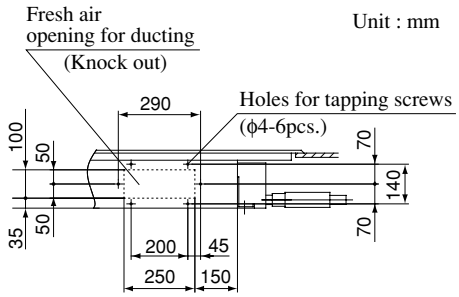


(c) 1-Way outlet ceiling recessed type (FDTS)

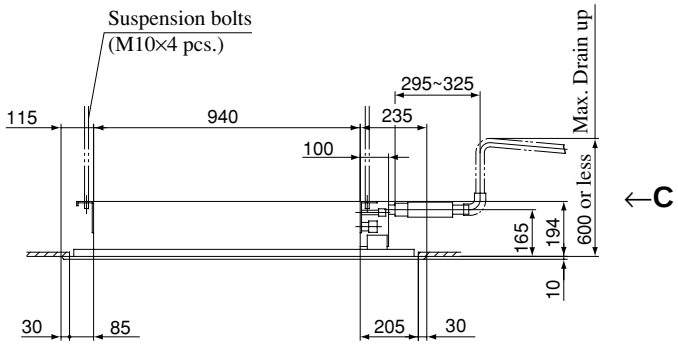
Models FDTSJ22HKXE2B, 28HKXE2B, 36HKXE2B, 45HKXE2B

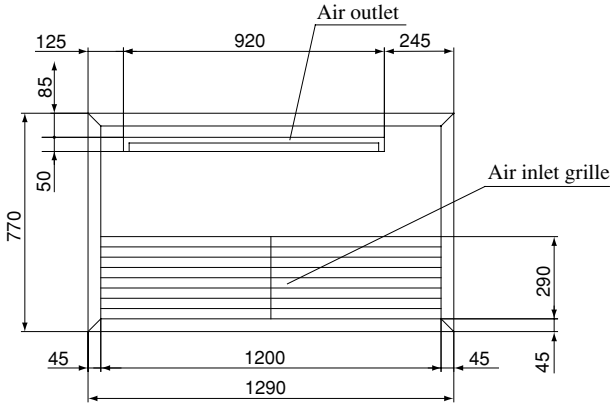
Unit : mm



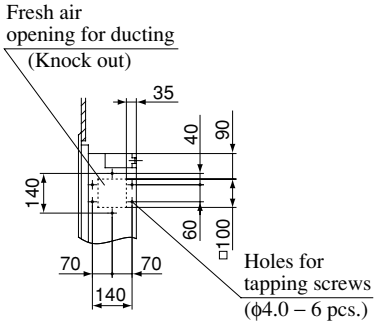


VIEW A

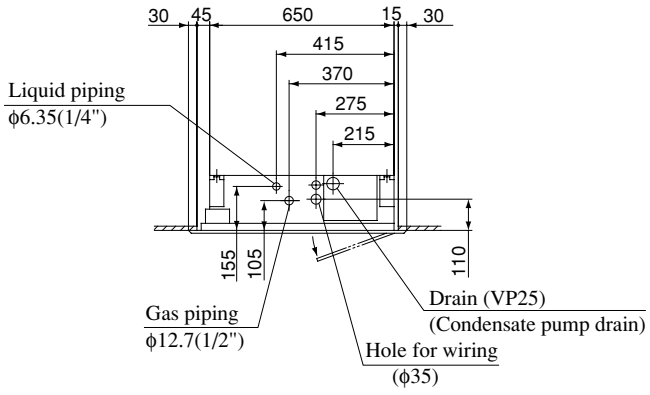




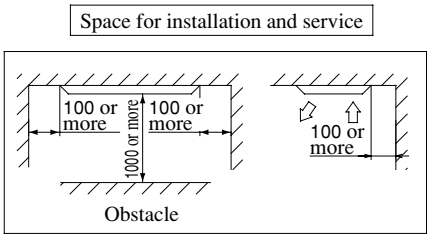
Decorative Panel



VIEW B

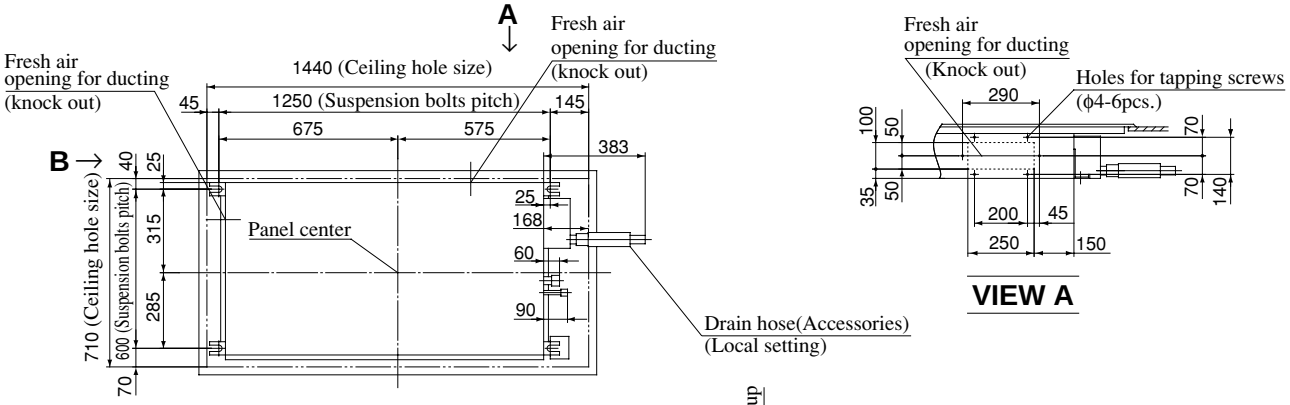


VIEW C

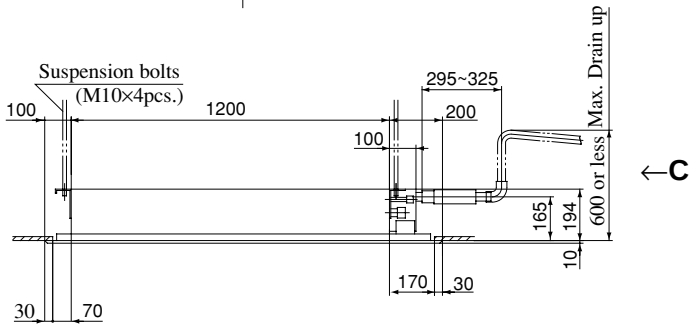


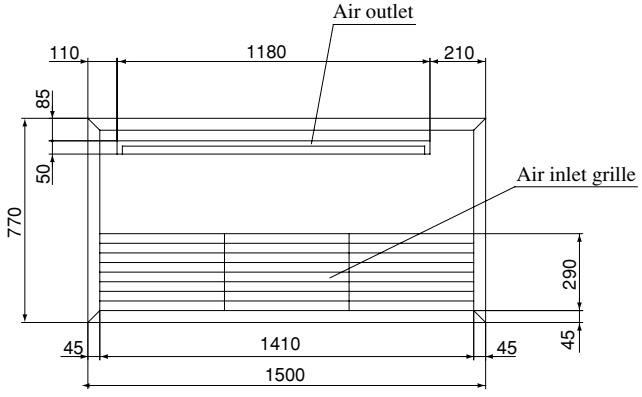
Model FDTSJ71HKXE2B

Unit : mm

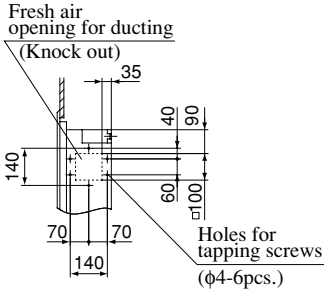


VIEW A

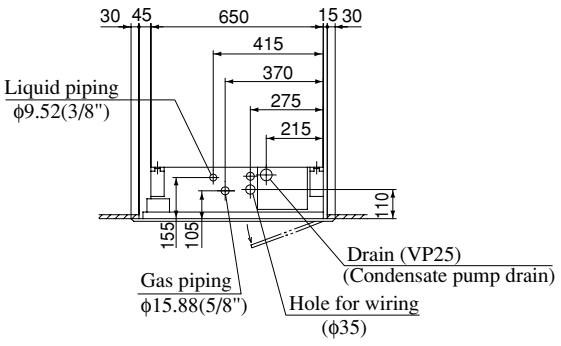




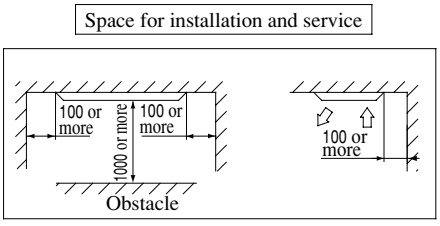
Decorative Panel



VIEW B



VIEW C

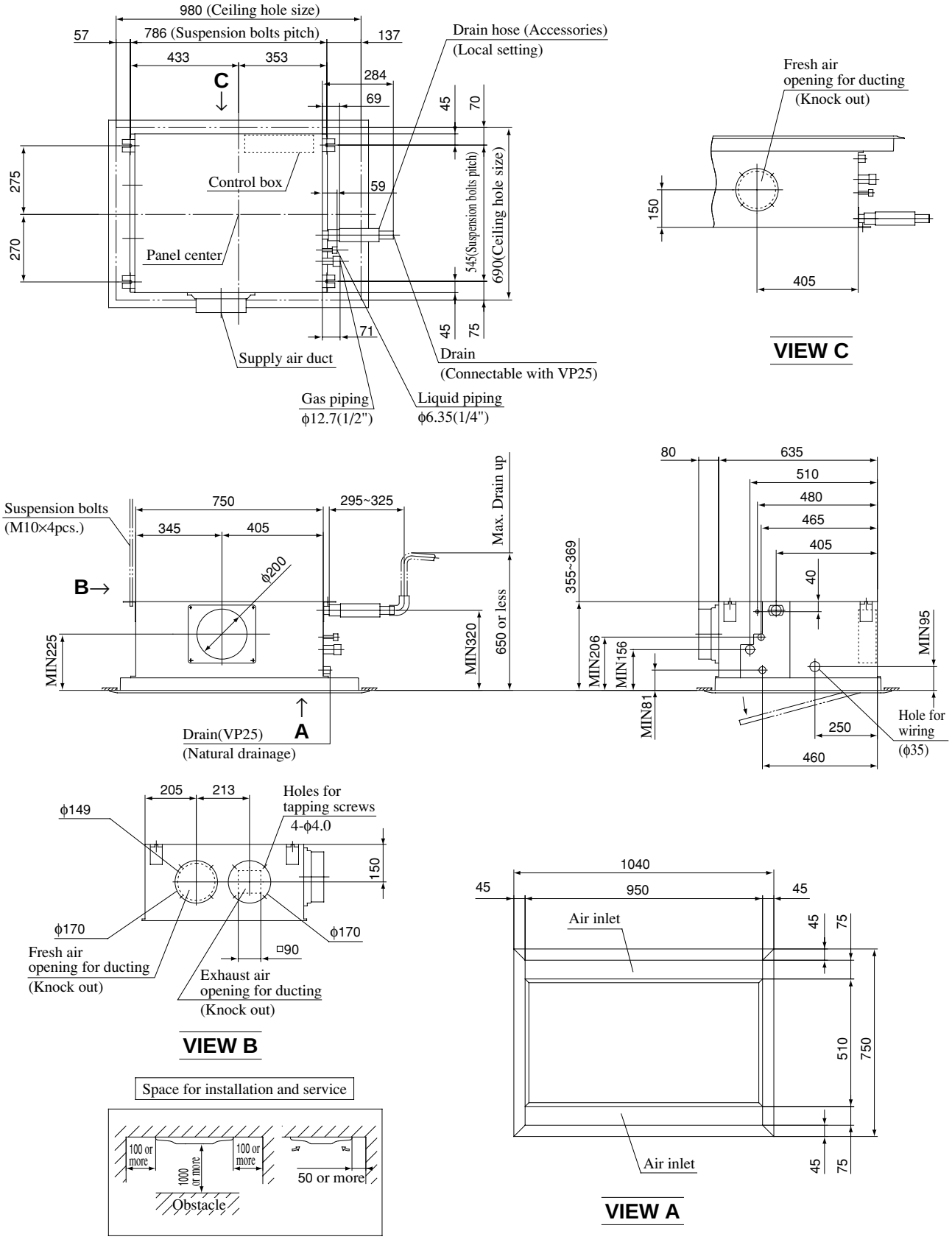


(d) Cassetteria type (FDR)

Model FDRJ22HKXE2

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

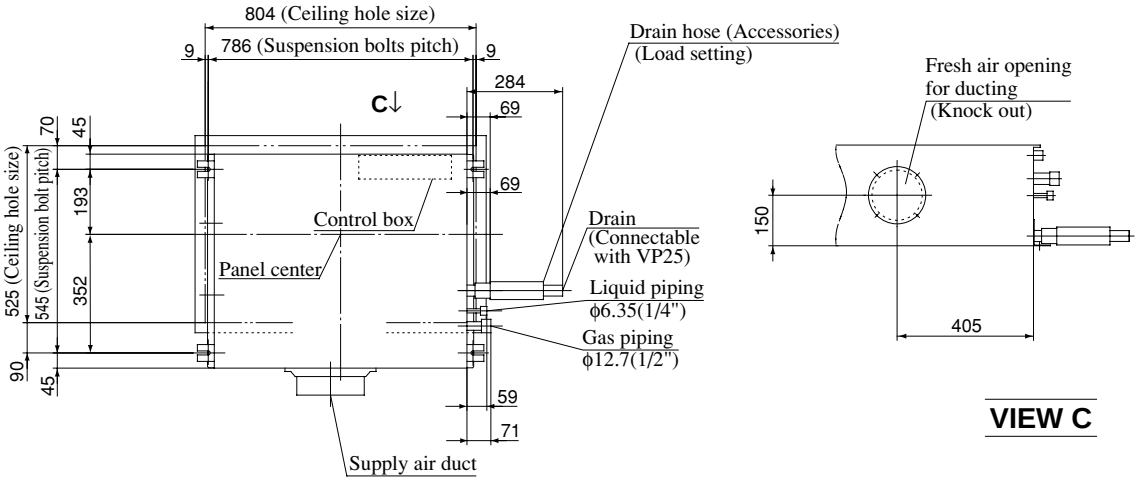
Unit : mm



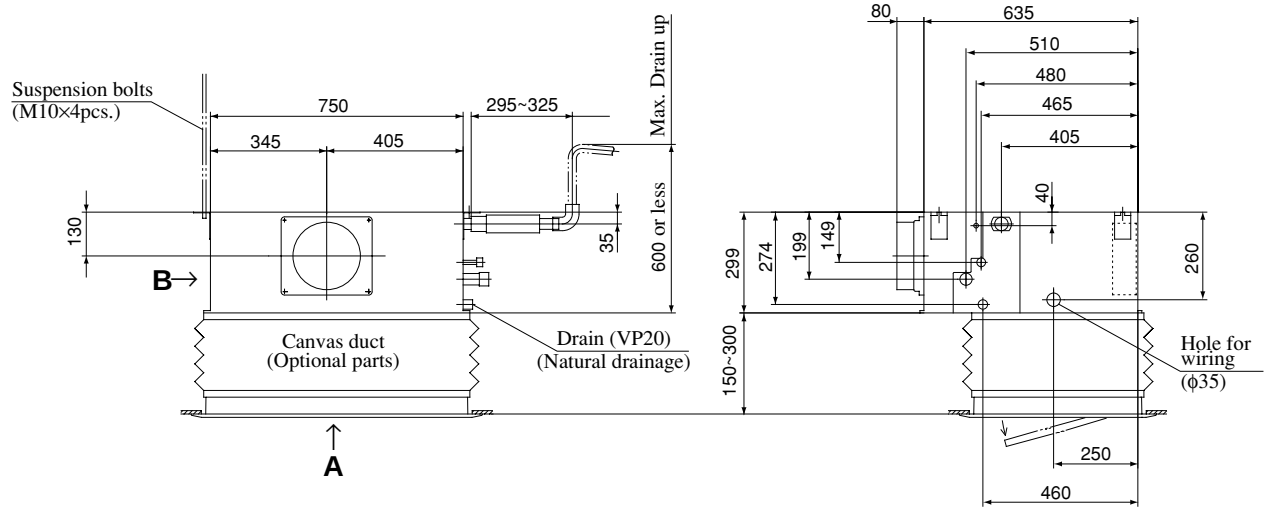
Model FDRJ22HKXE2

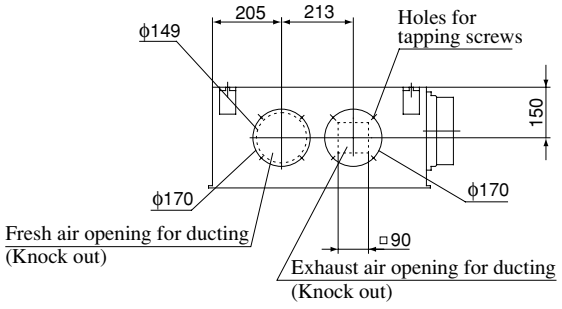
Canvas Panel (Model: R-PNLC -26W-E)

Unit : mm

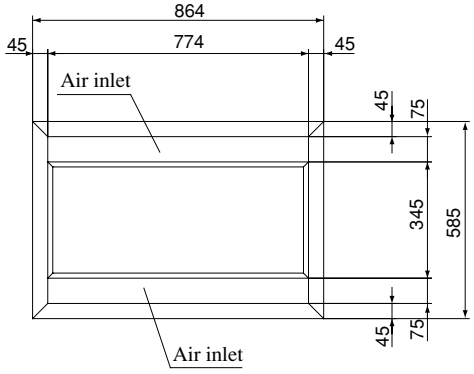


VIEW C



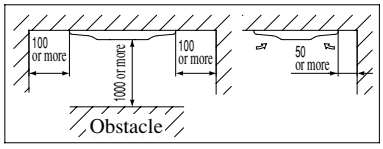


VIEW B



VIEW A

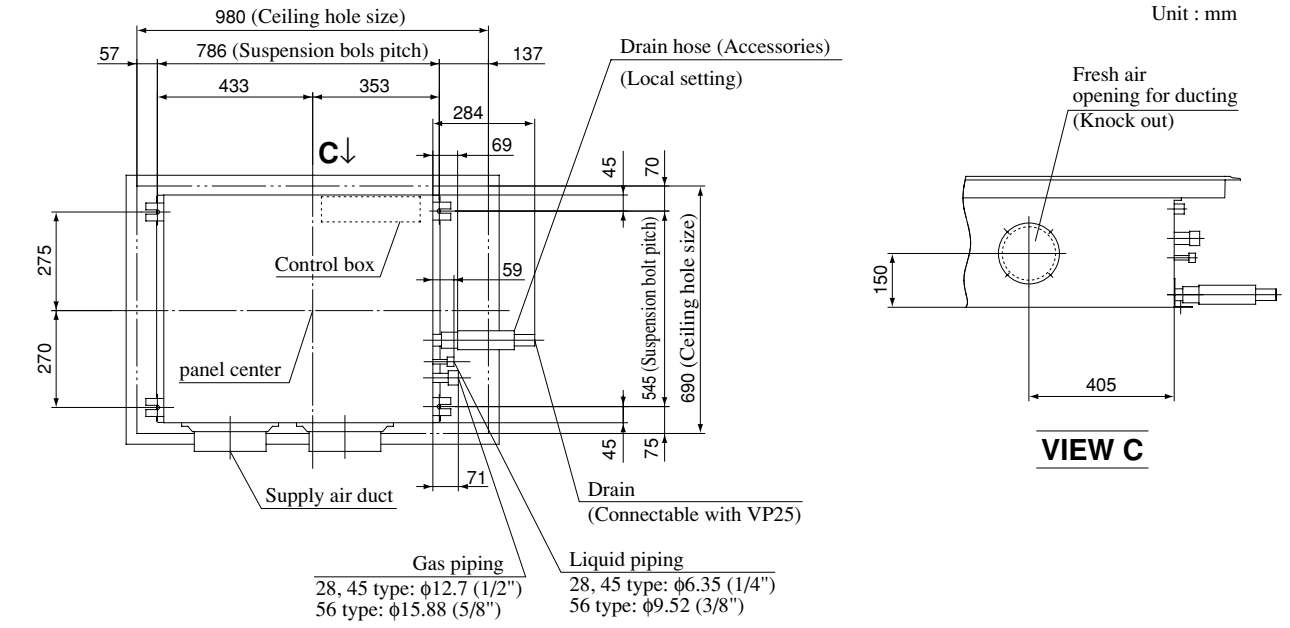
Space for installation and service



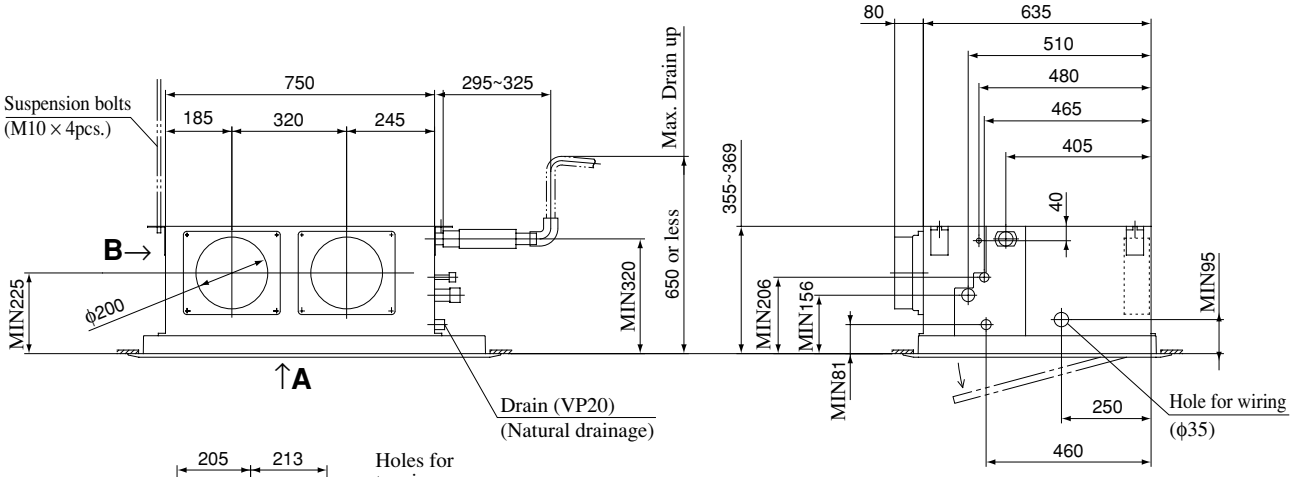
Models FDRJ28HKXE2, 45HKXE2, 56HKXE2

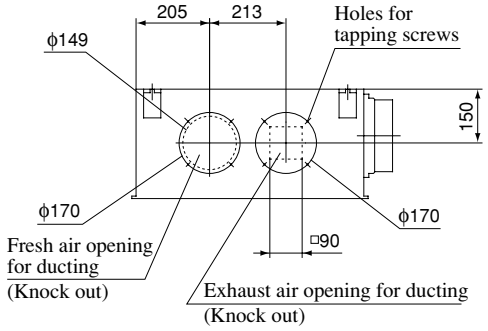
Silent Panel (Model: R-PNLS-26W-E)

Unit : mm

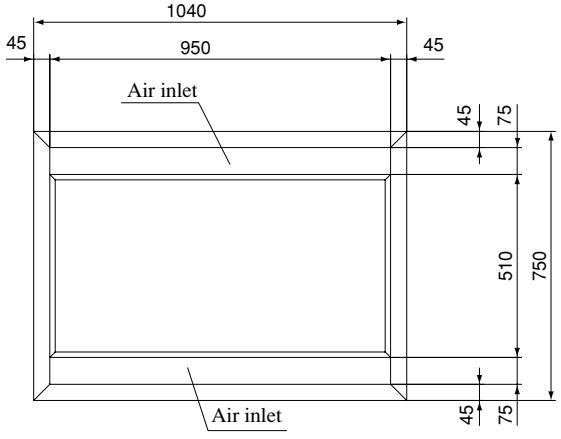


VIEW C

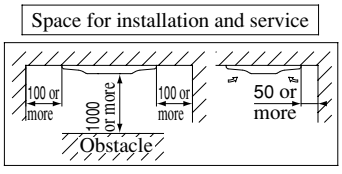




VIEW B



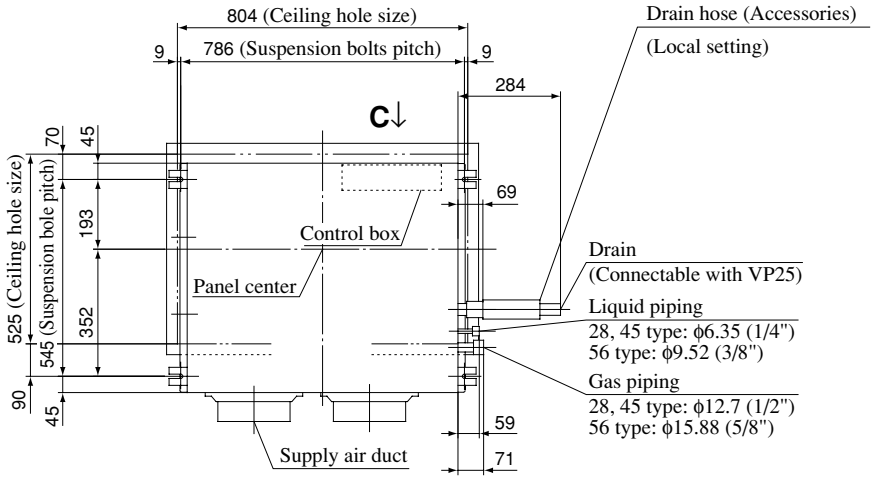
VIEW A

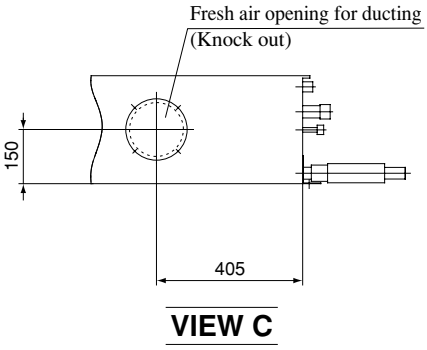


Models FDRJ28HKXE2, 45HKXE2, 56HKXE2

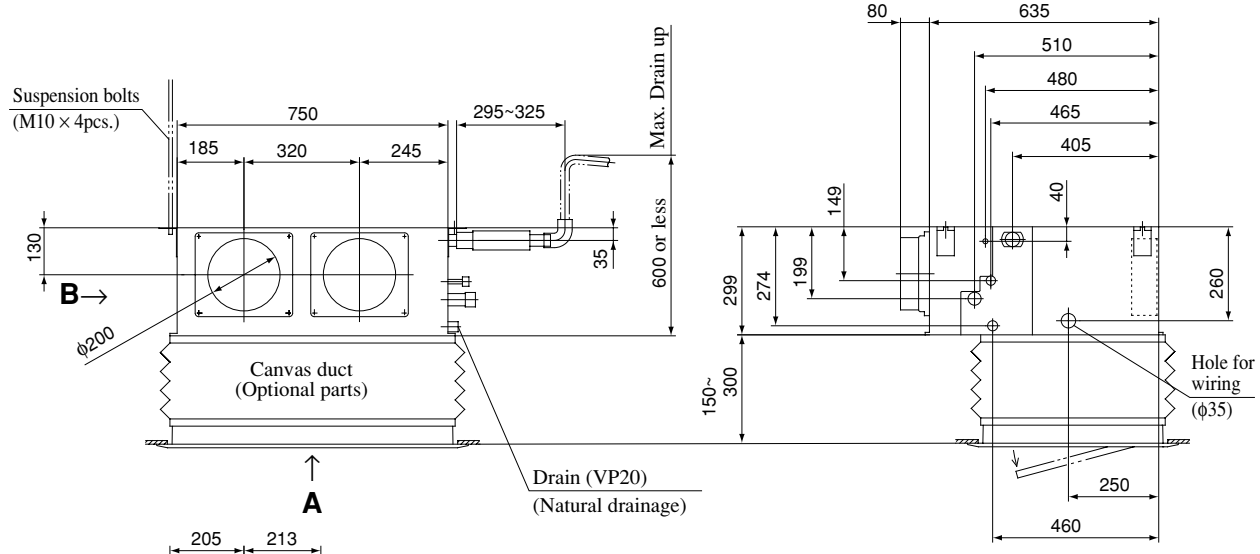
Canvas Panel (Model: R-PNLC-26W-E)

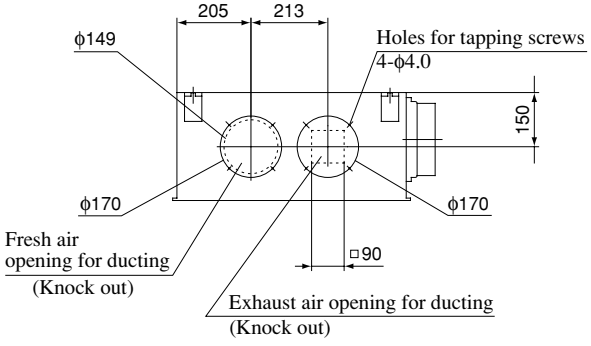
Unit : mm



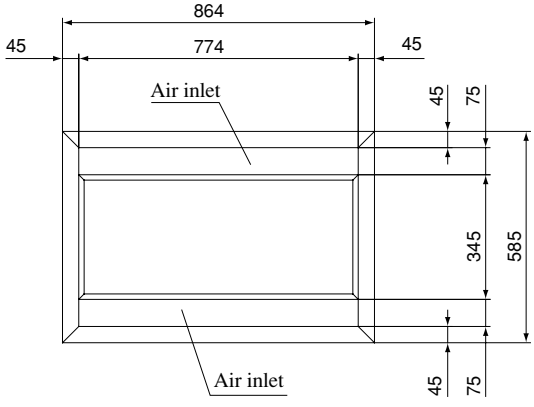


VIEW C

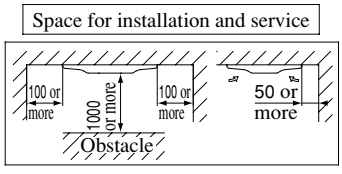




VIEW B



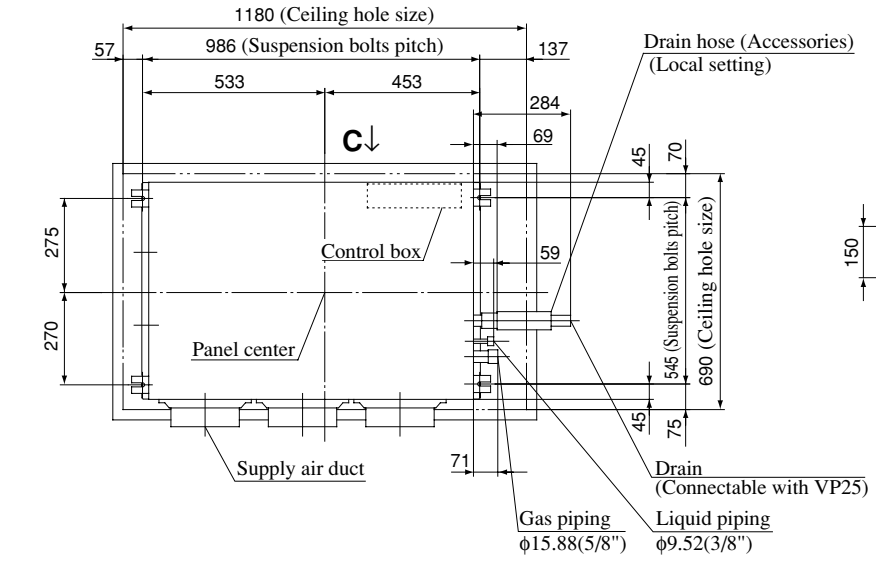
VIEW A

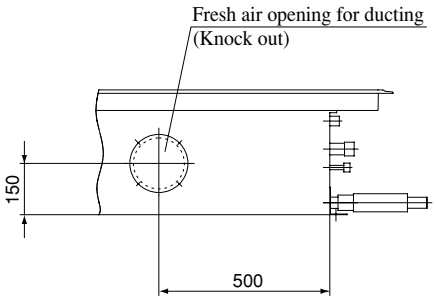


Models FDRJ71HKXE2, 90HKXE2

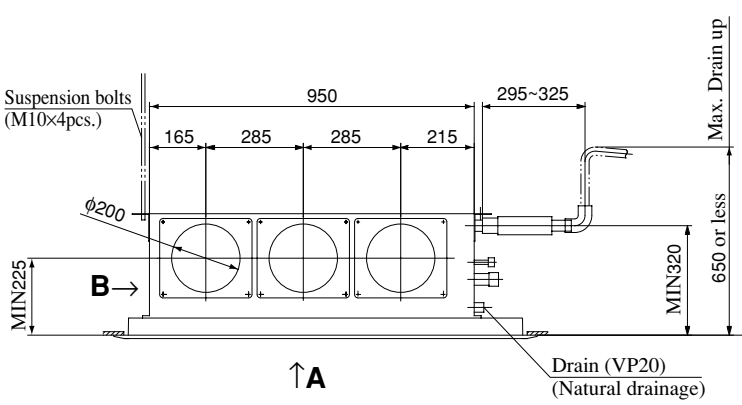
Silent Panel (Model: R-PNLS-36W-E)

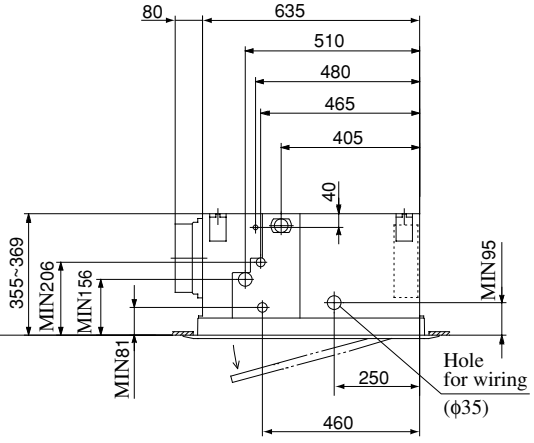
Unit : mm

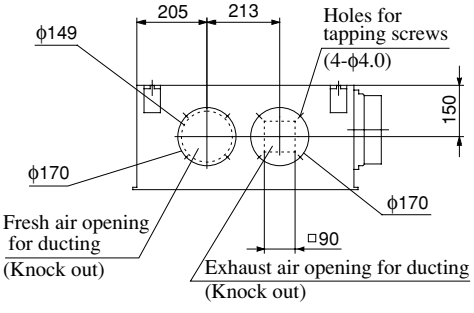




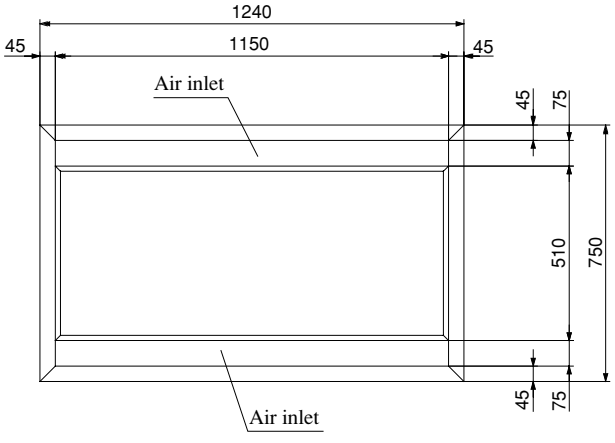
VIEW C



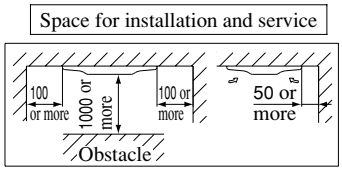




VIEW B



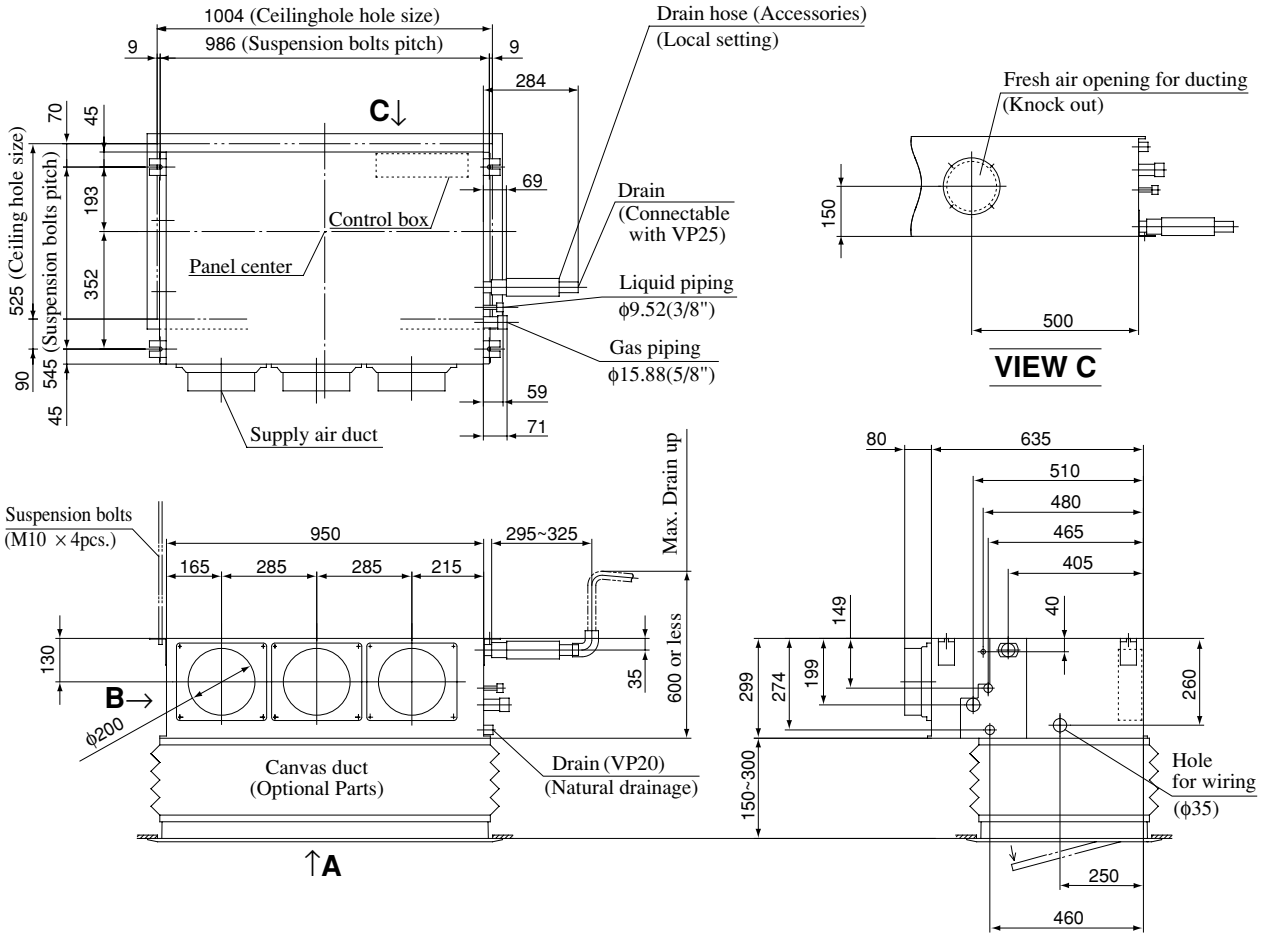
VIEW A

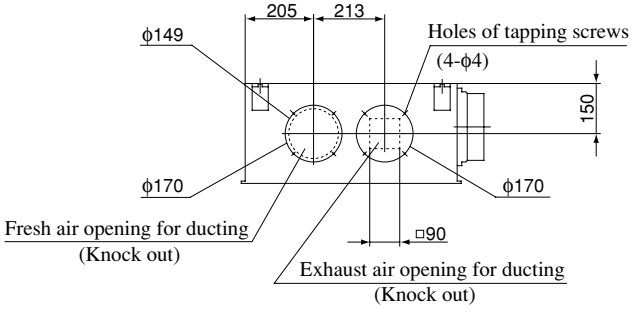


Models FDRJ71HKXE2, 90HKXE2

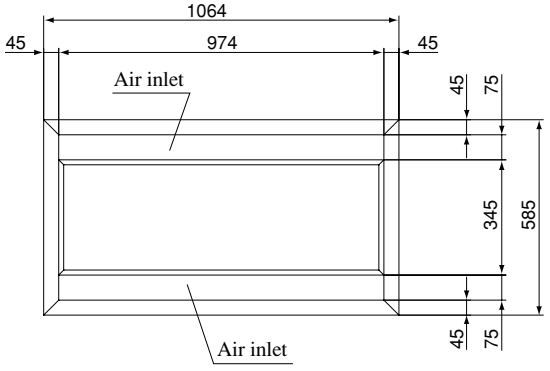
Canvas Panel (Model: R-PNLC-36W-E)

Unit : mm



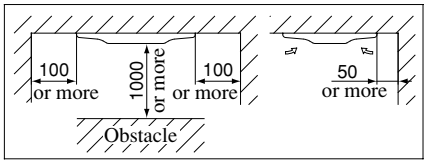


VIEW B



VIEW A

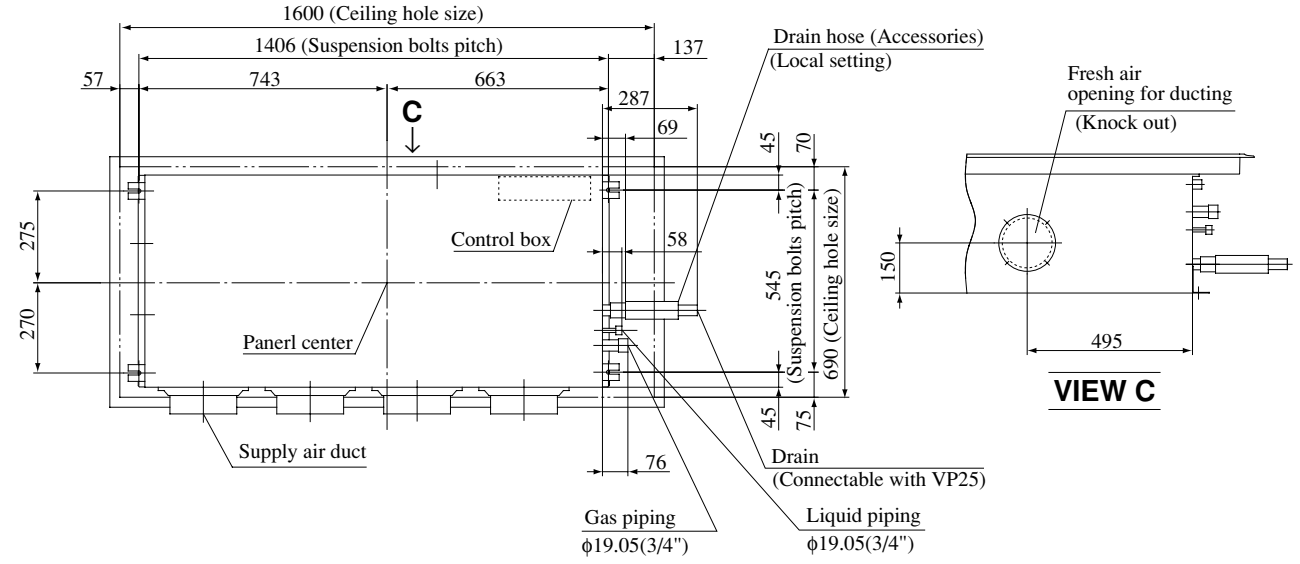
Space for installation and service

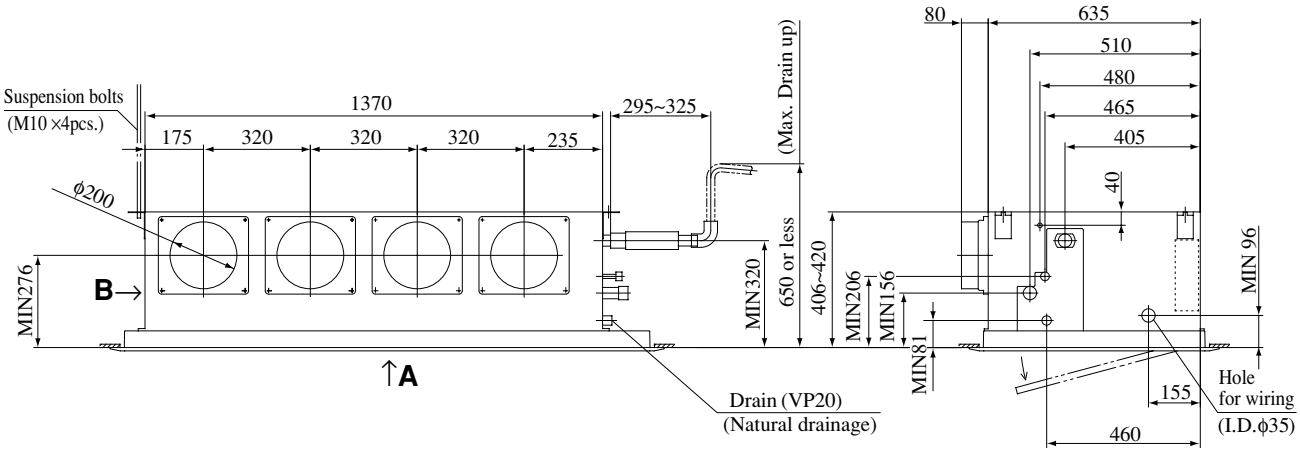


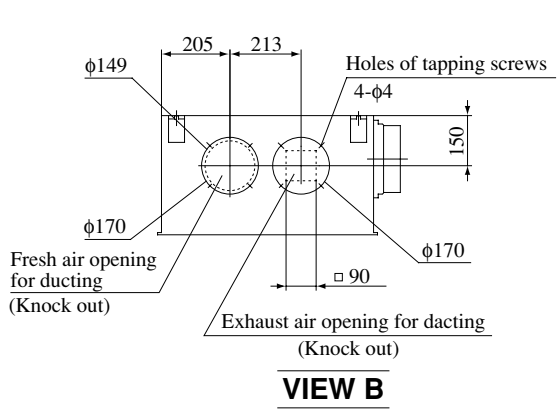
Models FDRJ112HKXE2, 140HKXE2

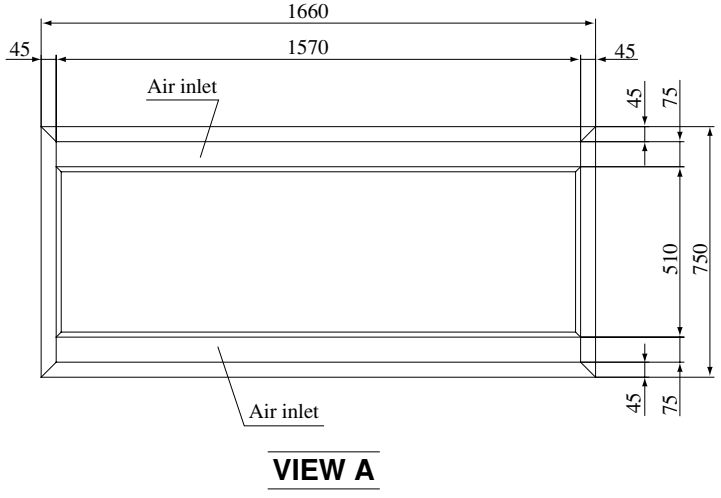
Silent Panel (Model: R-PNLS-46W-E)

Unit : mm

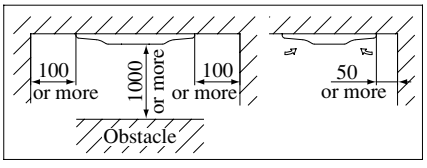








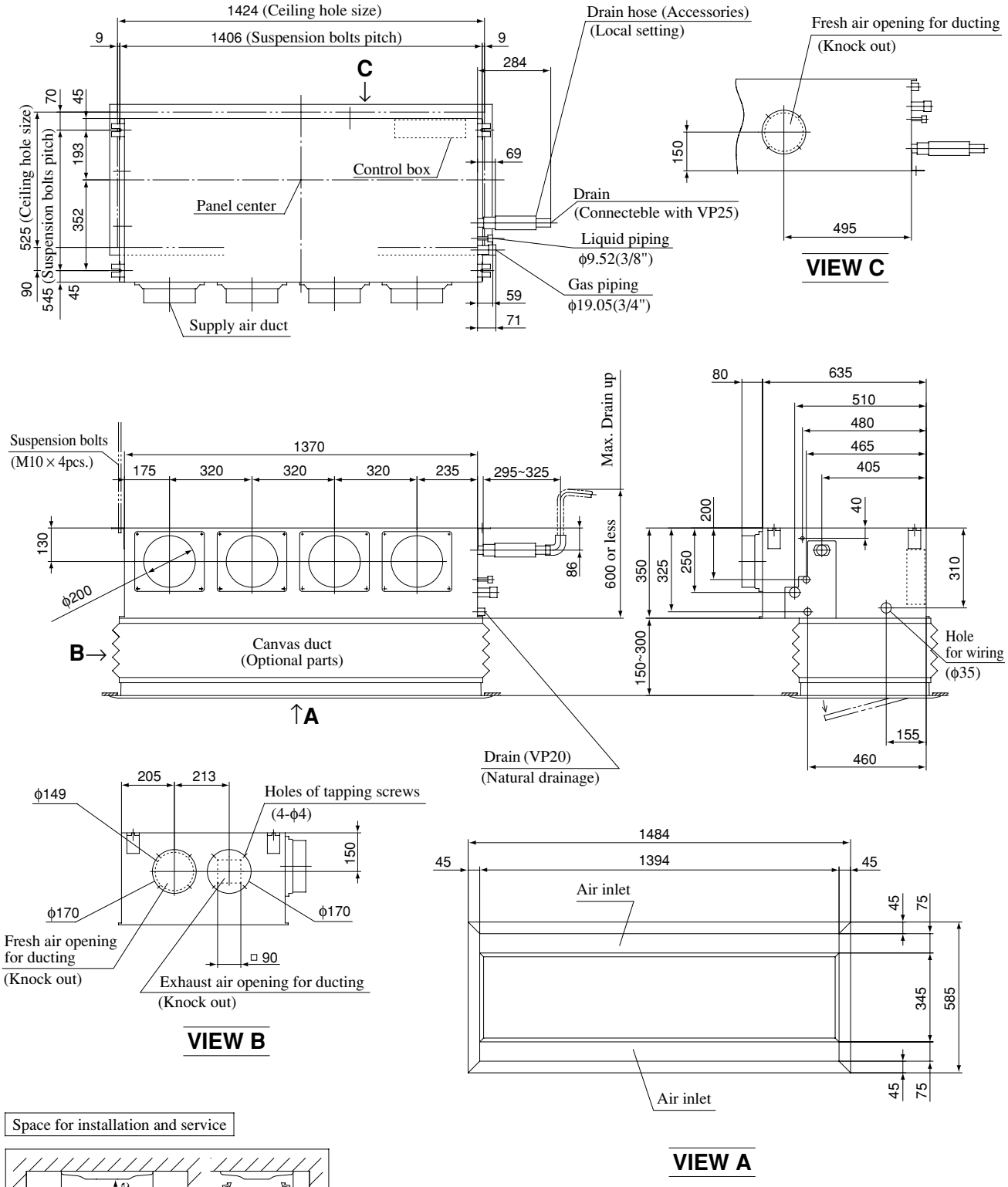
Space for installation and service



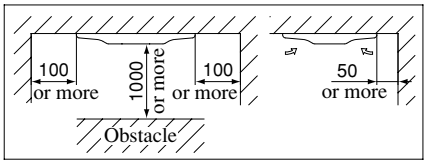
Models FDRJ112HKXE2, 140HKXE2

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

Unit : mm



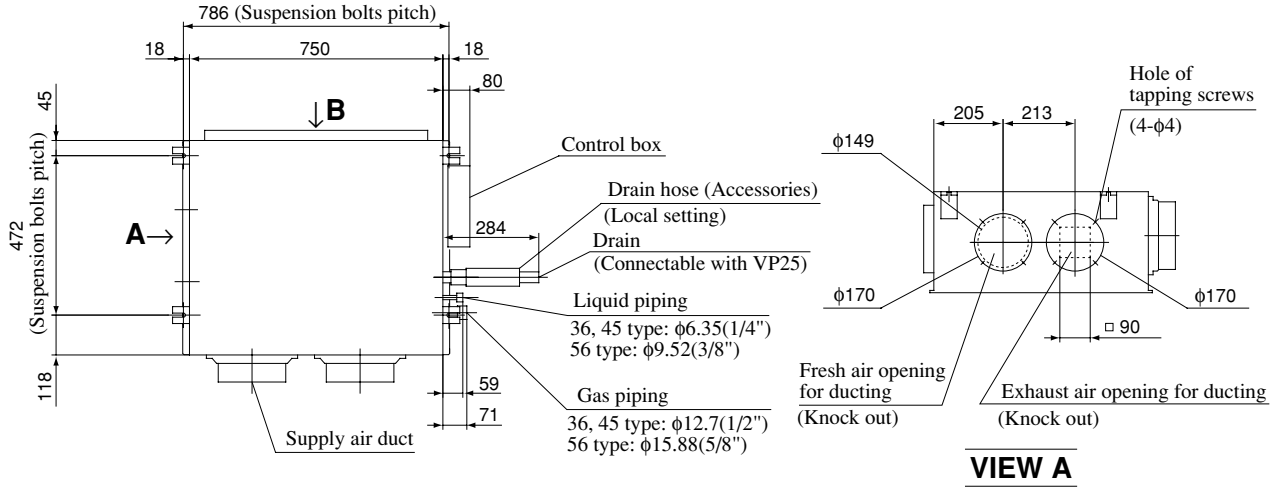
Space for installation and service

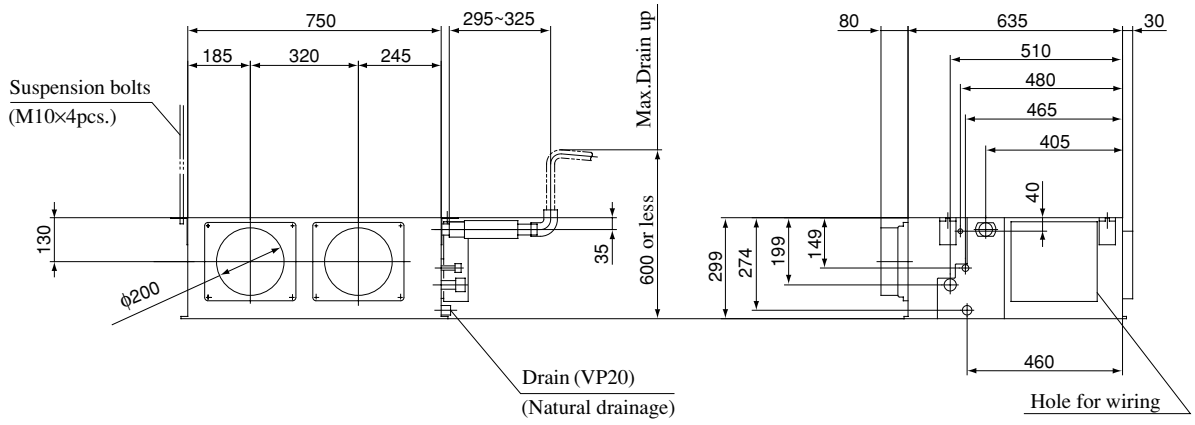


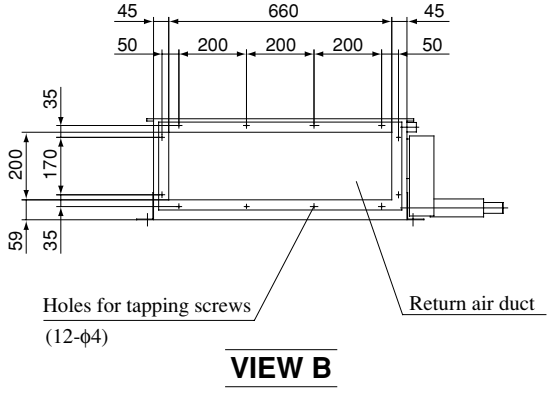
(e) Satellite ducted type (FDUM)

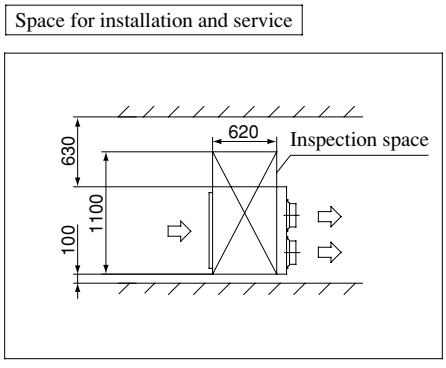
Models FDUMJ36HKXE2, 45HKXE2, 56HKXE2

Unit : mm



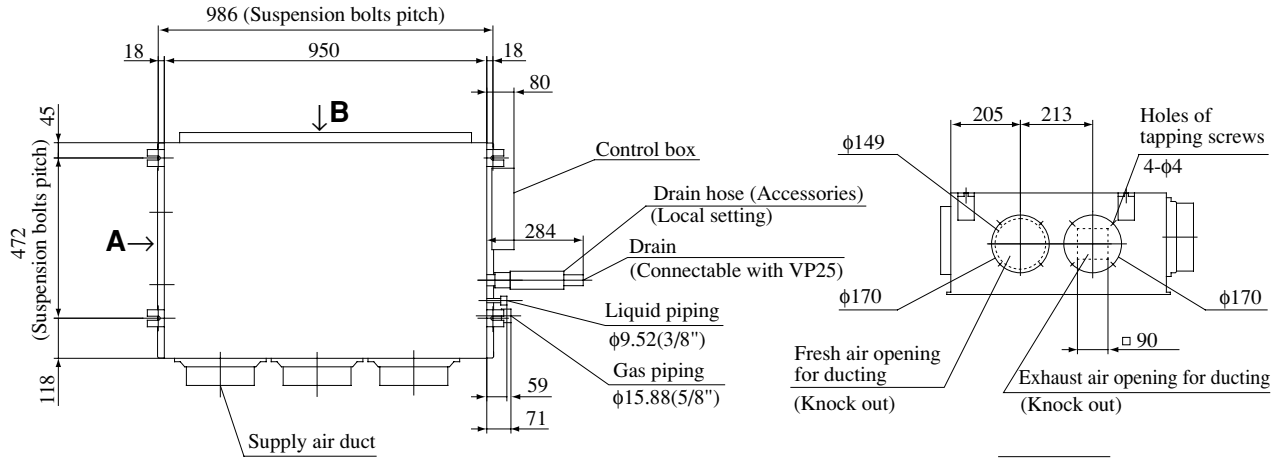




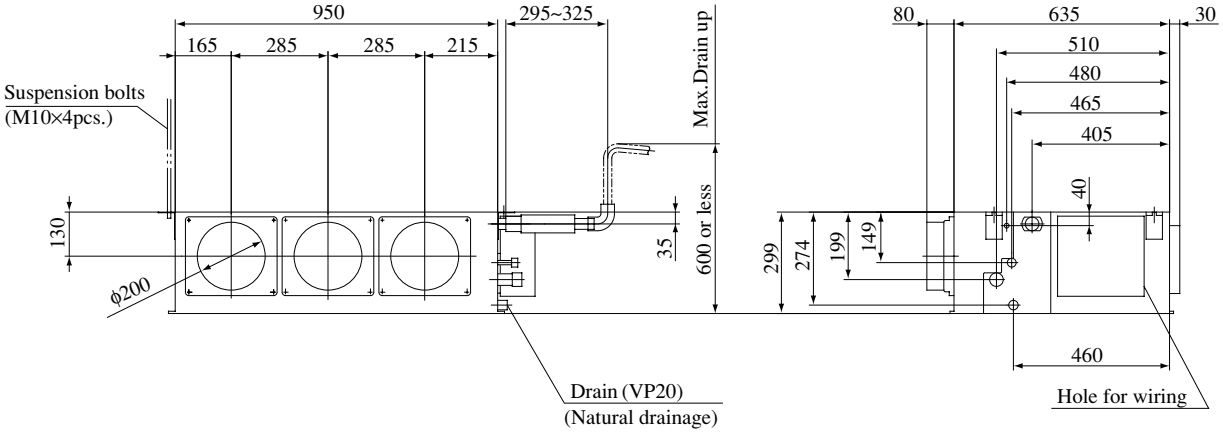


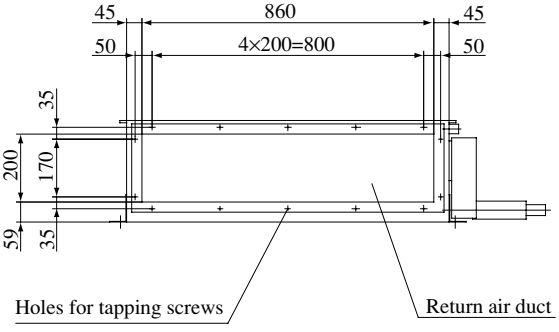
Models FDUMJ71HKXE2, 90HKXE2

Unit : mm



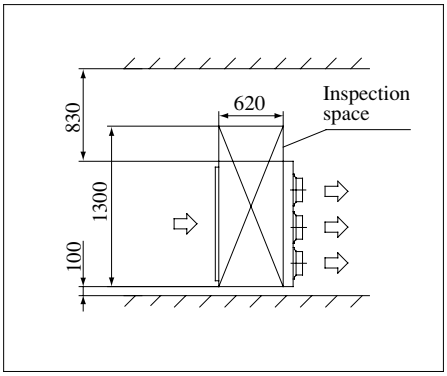
VIEW A





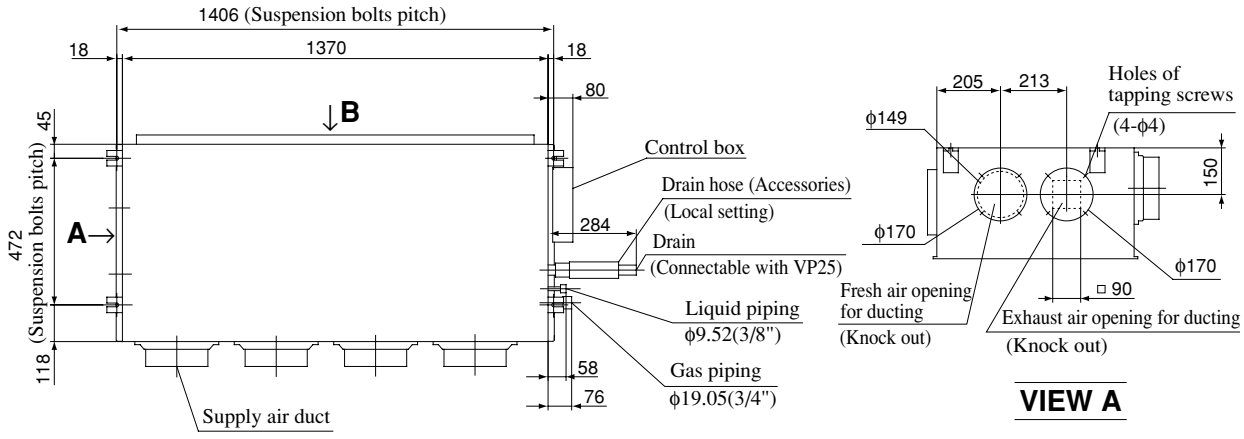
VIEW B

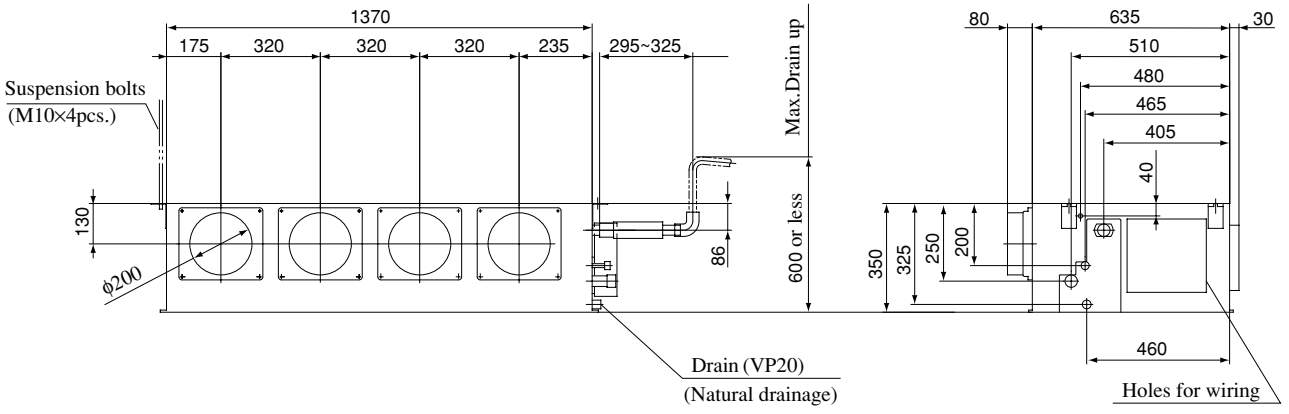
Space for installation and service

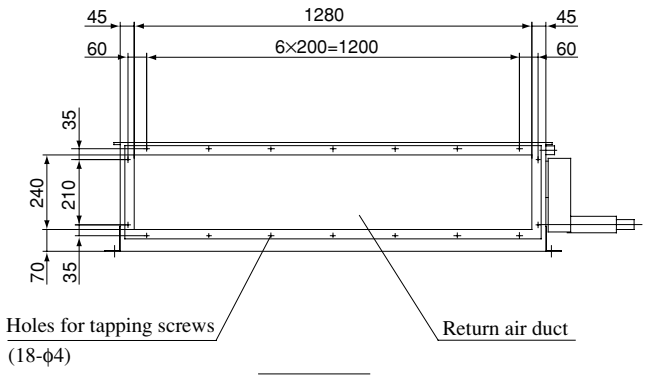


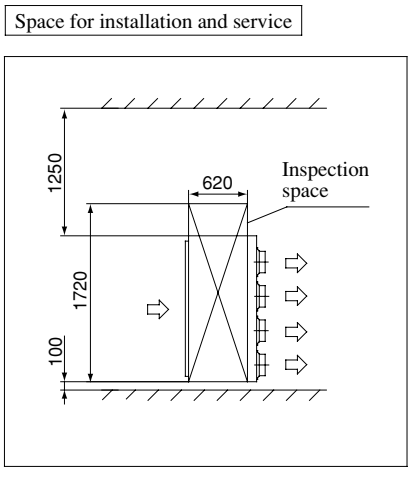
Models FDUMJ112HKXE2, 140HKXE2

Unit : mm





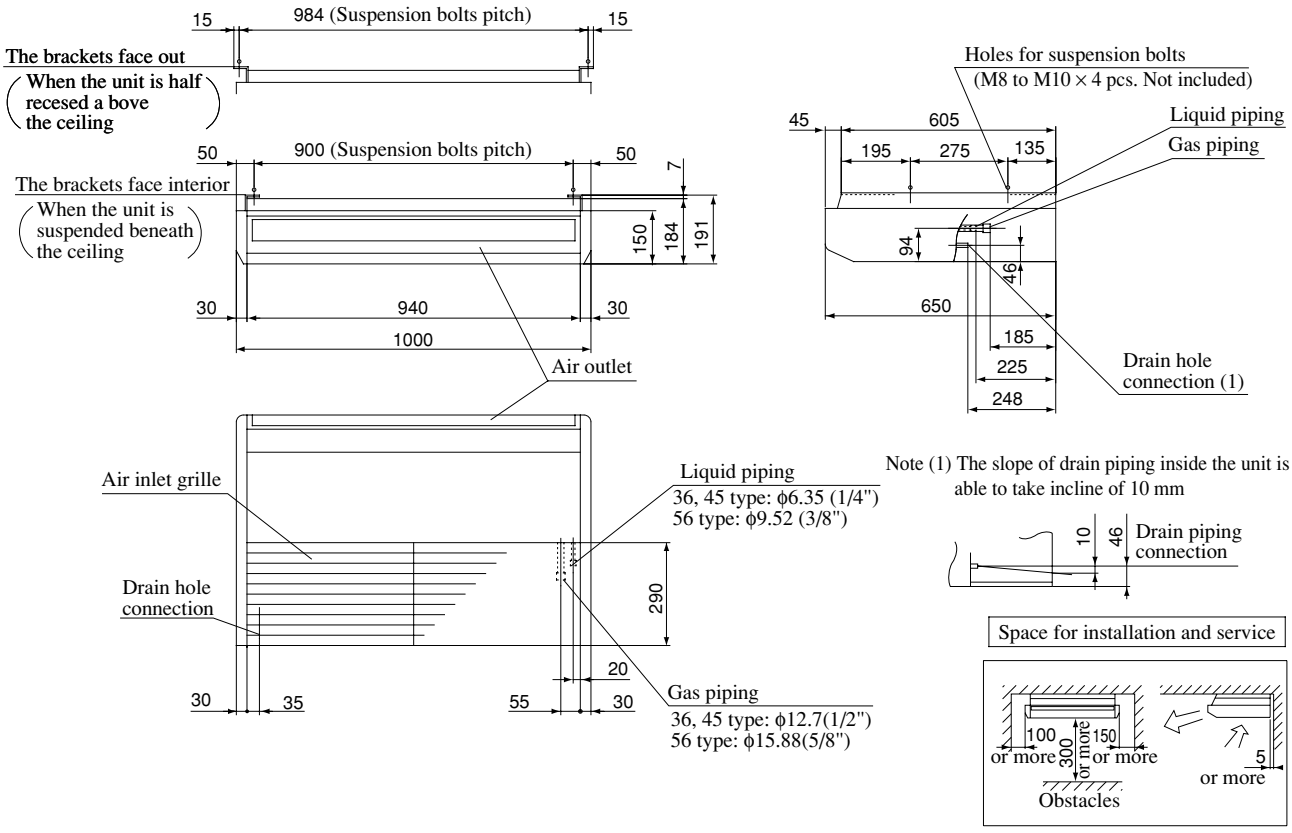




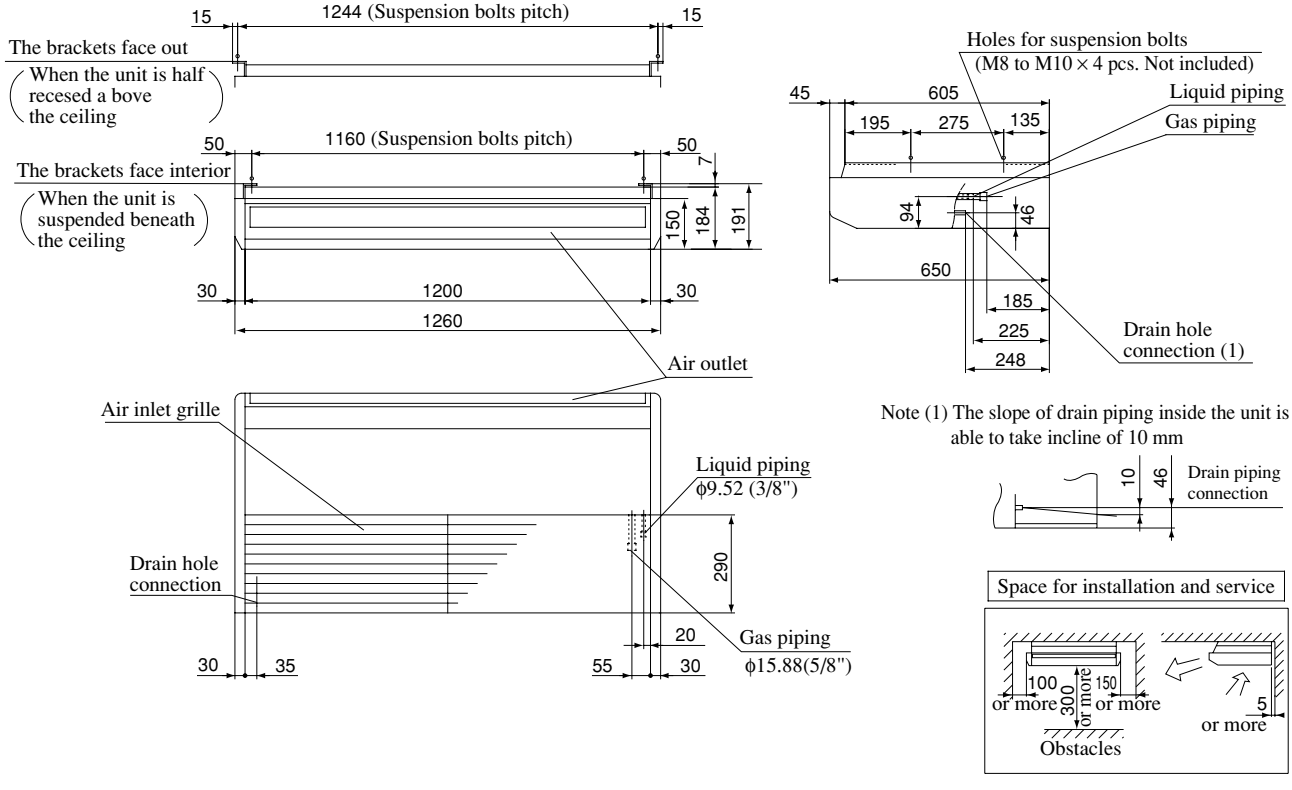
(f) Ceiling suspension type (FDE)

Models FDEJ36HKXE2B, 45HKXE2B, 56HKXE2B

Unit : mm

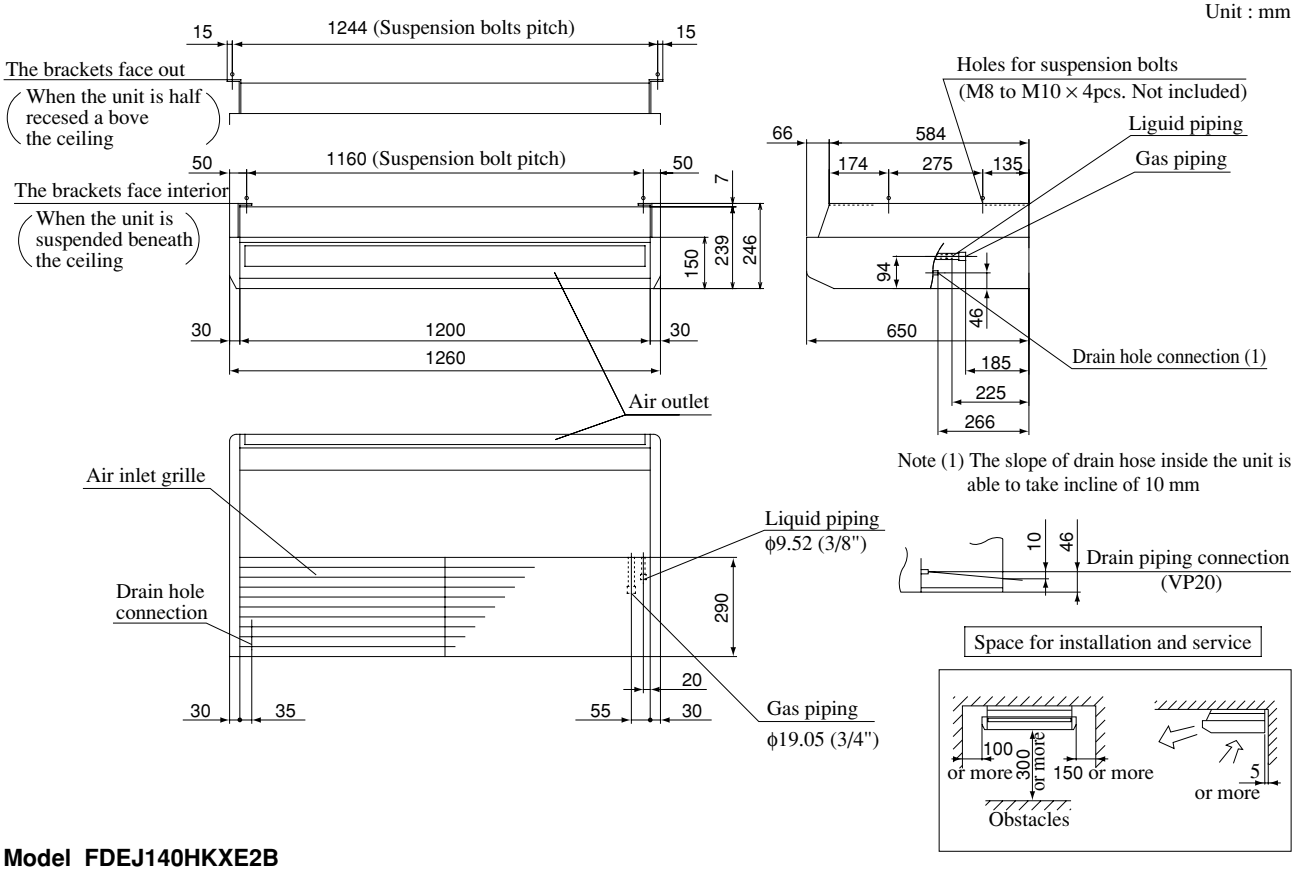


Model FDEJ71HKXE2B



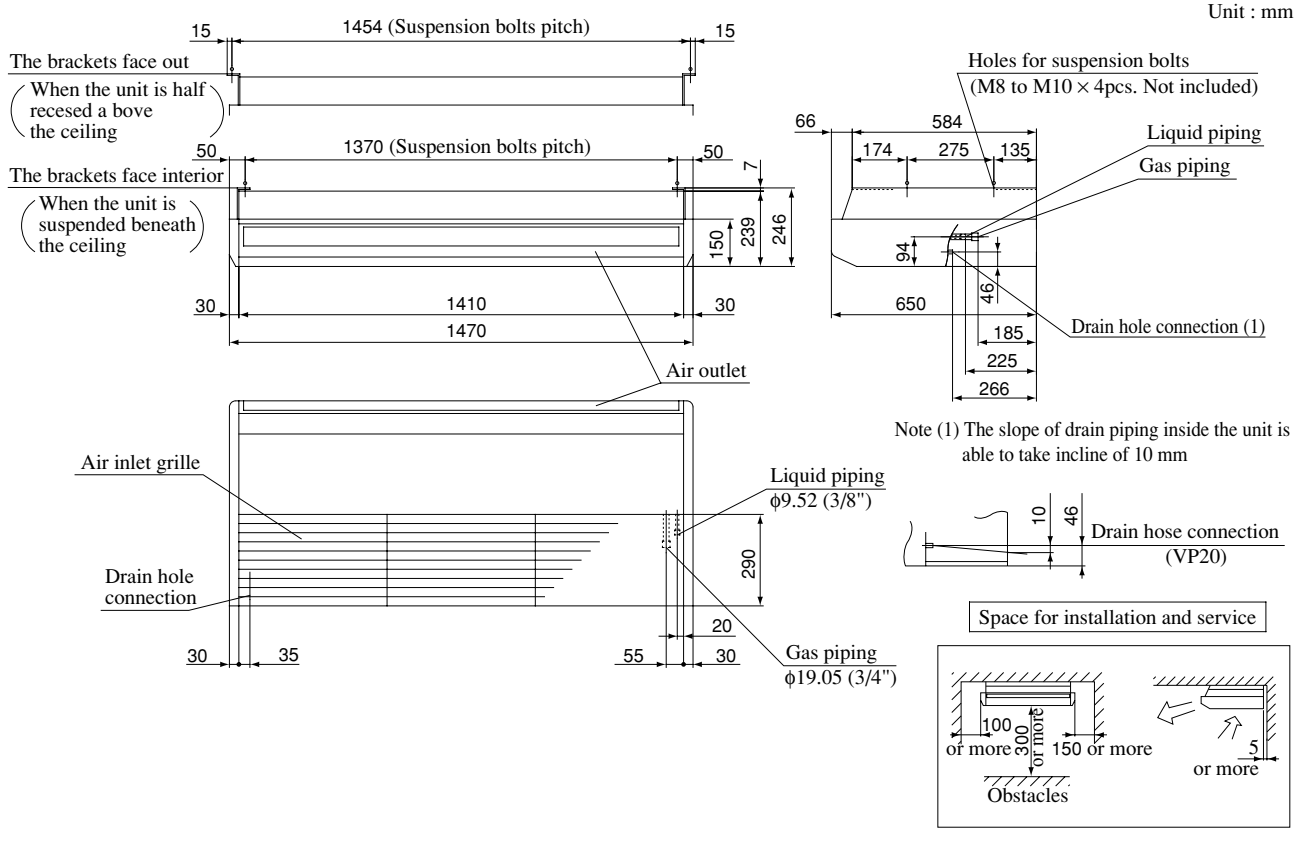
Model FDEJ112HKXE2B

Unit : mm



Model FDEJ140HKXE2B

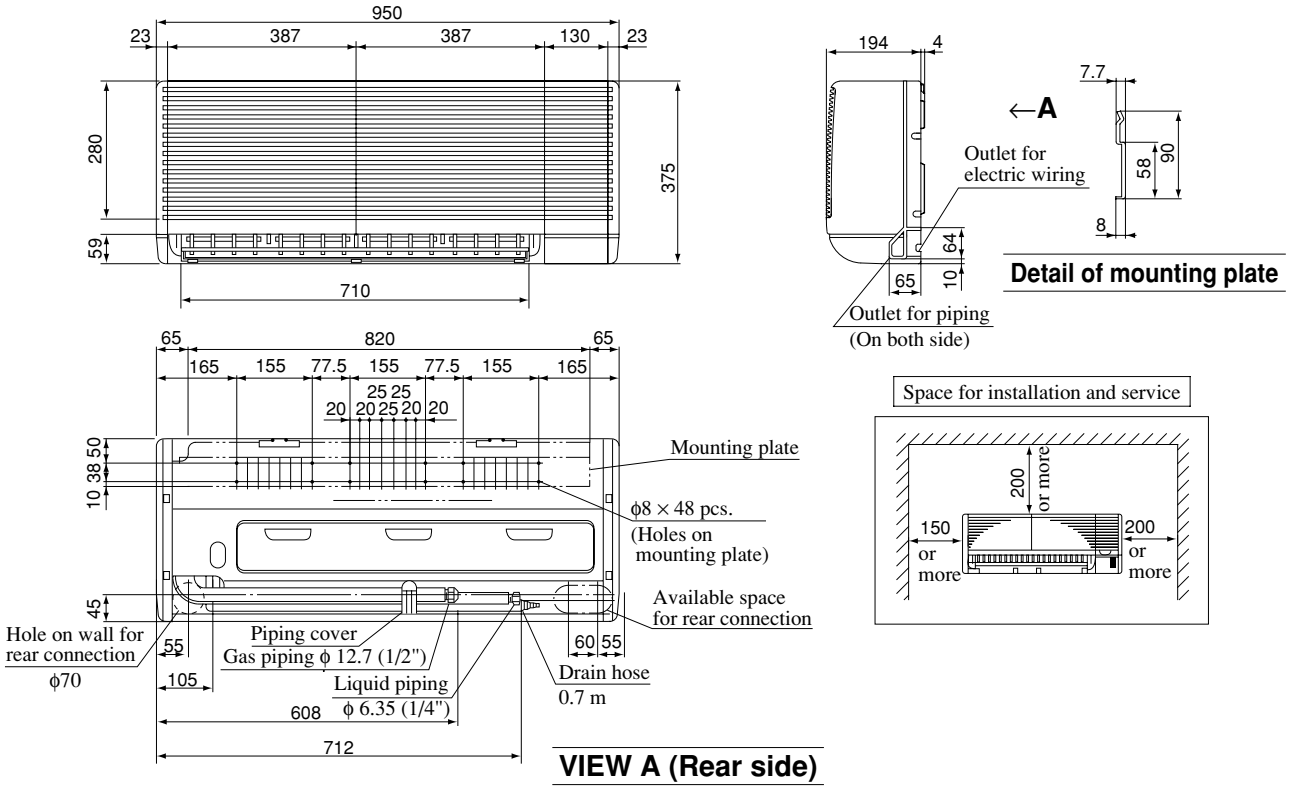
Unit : mm



(g) Wall mounted type (FDK)

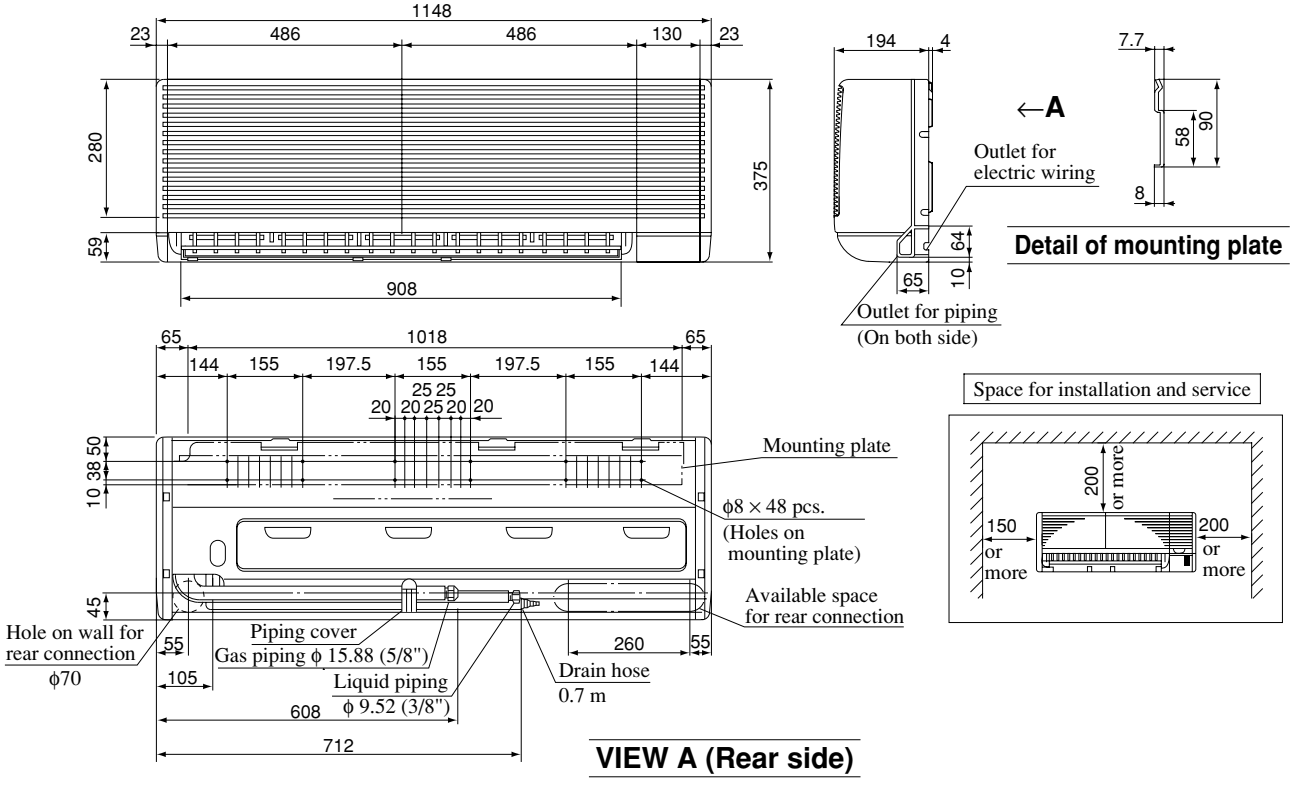
Models FDKJ22HKXE2, 28HKXE2, 36HKXE2, 45HKXE2

Unit : mm



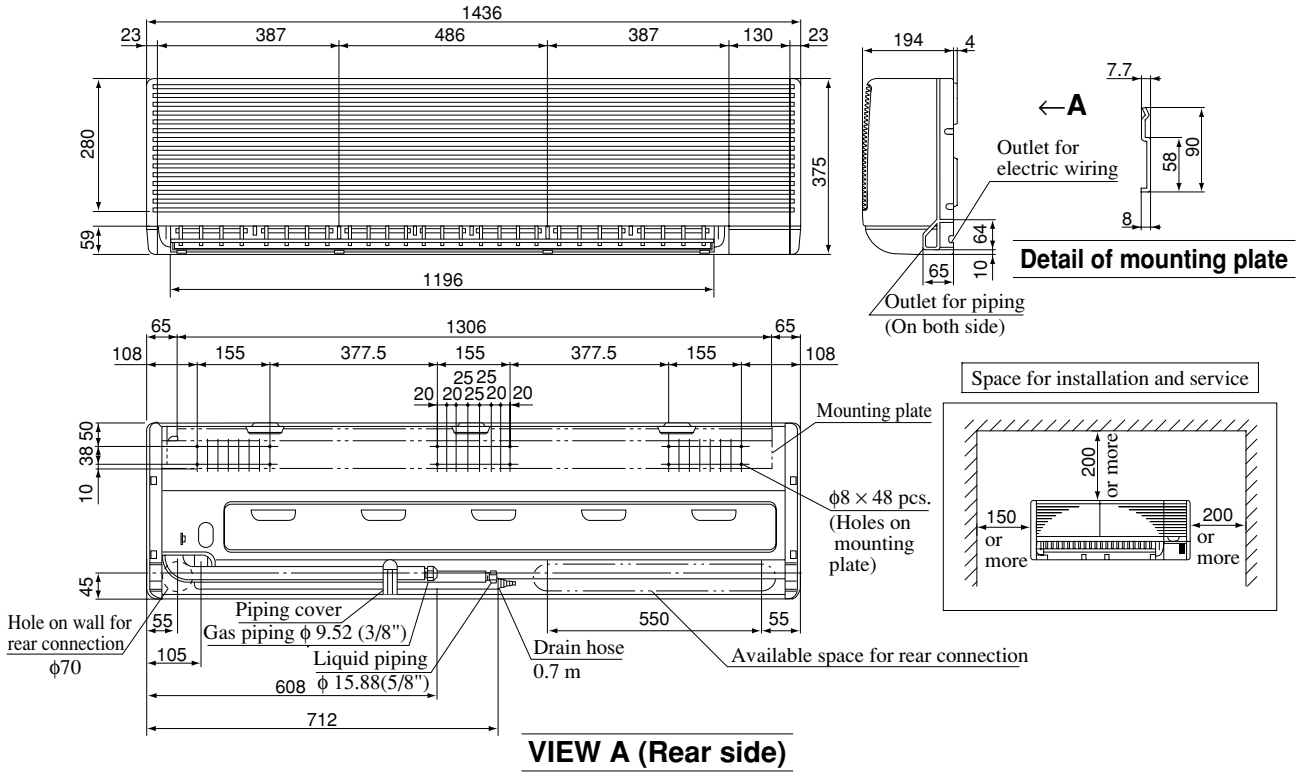
Model FDKJ56HKXE2

Unit : mm



Model FDKJ71HKXE2

Unit : mm

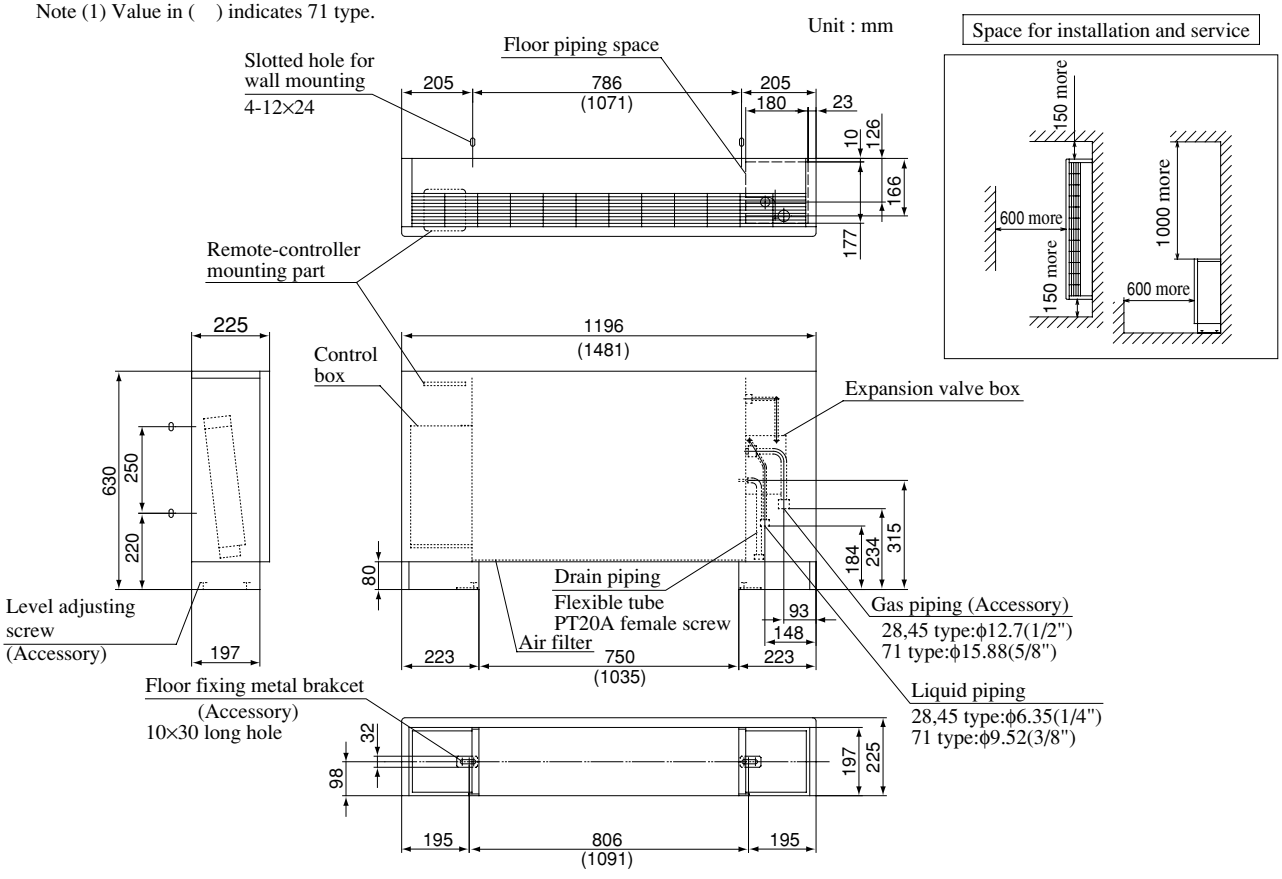


(h) Floor standing exposed type (FDFL)

Models FDFLJ28HKXE2, 45HKXE2, 71HKXE2

Note (1) Value in ( ) indicates 71 type.

Unit : mm

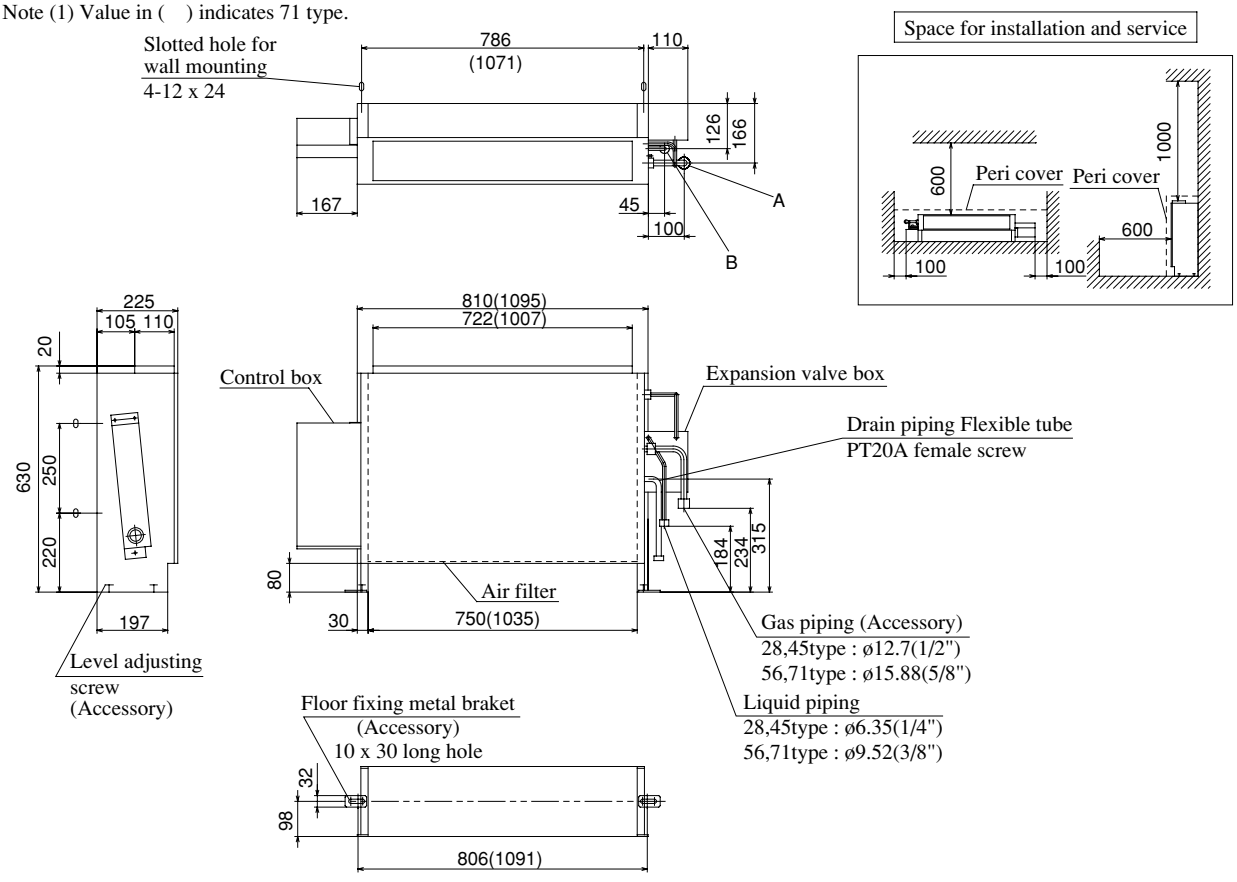


(i) Floor standing hidden type (FDFU)

Models FDFUJ28HKXE2, 45HKXE2, 56HKXE2, 71HKXE2

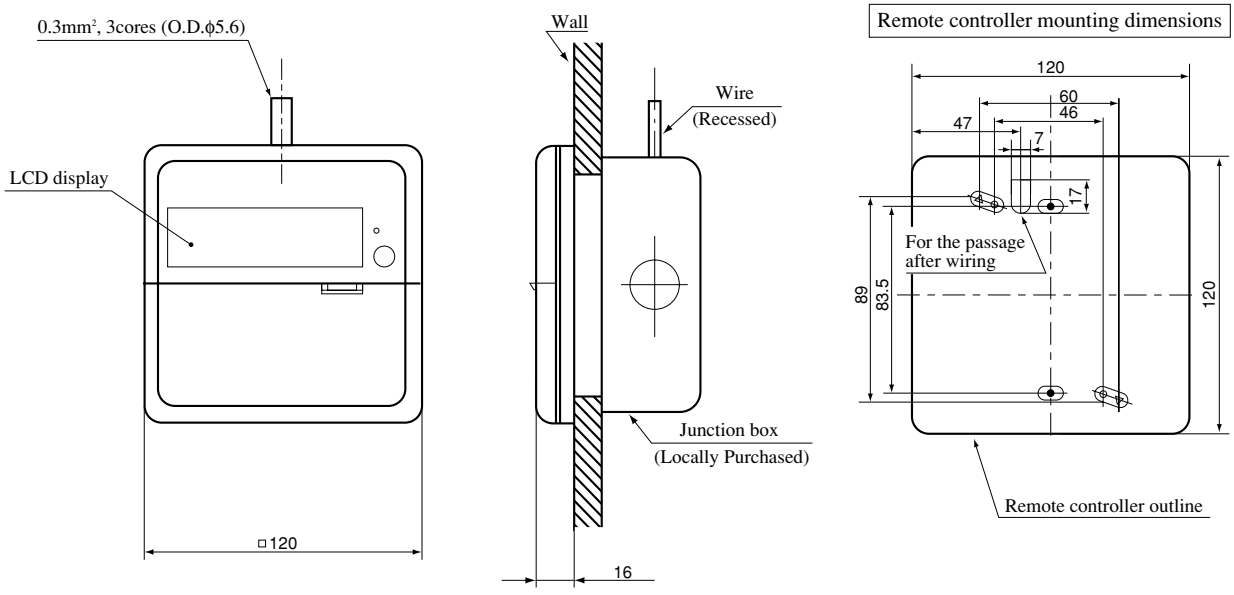
Unit : mm

Note (1) Value in ( ) indicates 71 type.



(2) Remote controller (Optional parts)

Unit: mm



♦ Usable JIS box, JIS C 8336

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

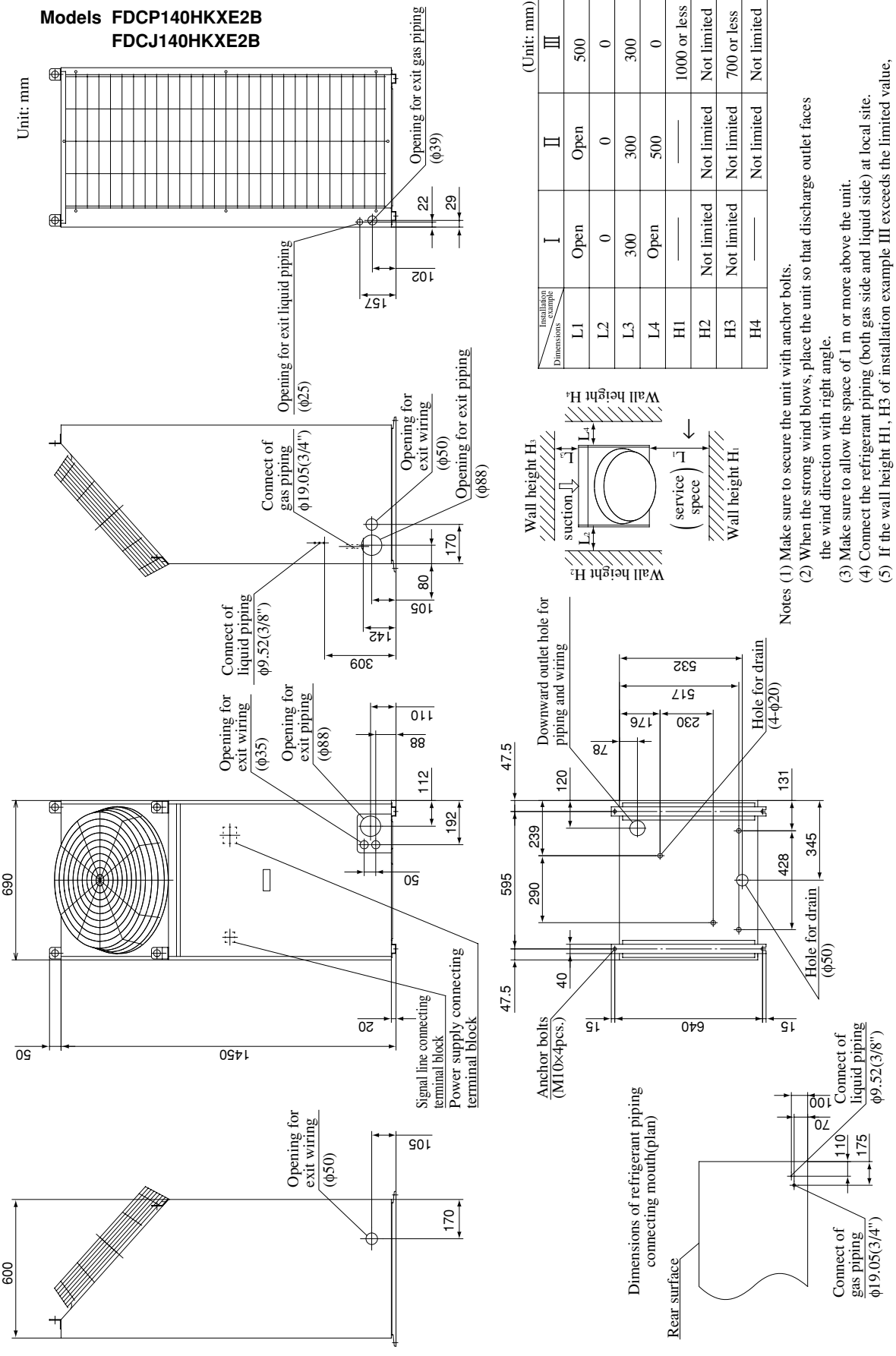
Allowable rang of wire thickness and length

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

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

(3) Outdoor unit

Models FDCP140HKXE2B
FDCJ140HKXE2B



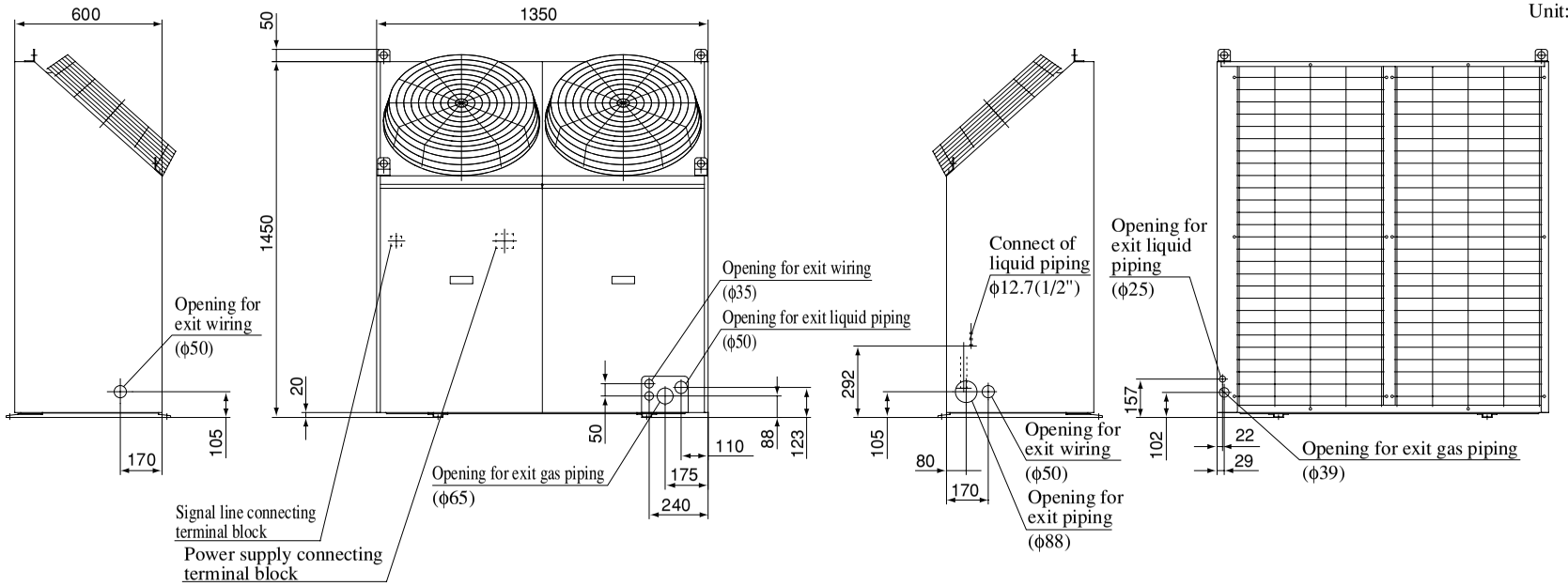
(Unit: mm)

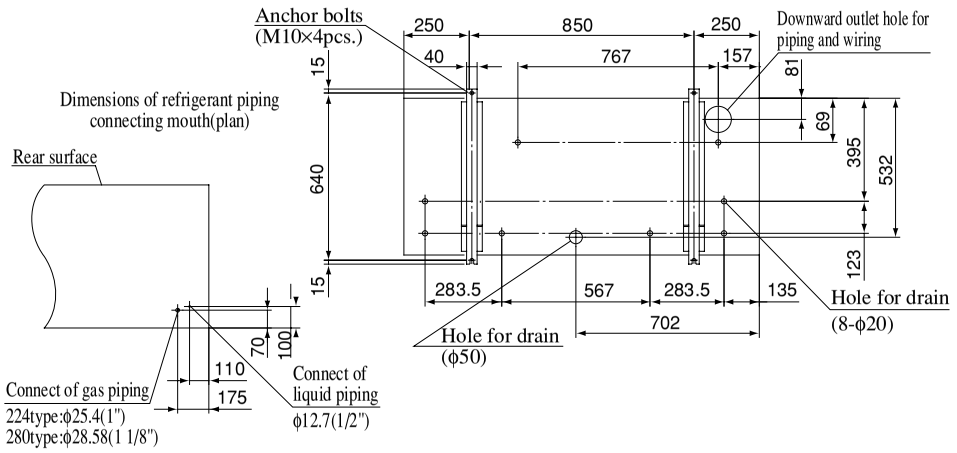
Dimensions \ Installation example	I	II	III
L1	Open	Open	500
L2	0	0	0
L3	300	300	300
L4	Open	500	0
H1	——	——	1000 or less
H2	Not limited	Not limited	Not limited
H3	Not limited	Not limited	700 or less
H4	——	Not limited	Not limited

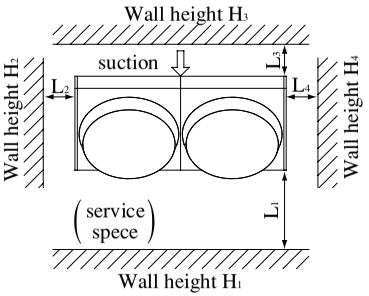
Notes (1) Make sure to secure the unit with anchor bolts.
(2) When the strong wind blows, place the unit so that discharge outlet faces the wind direction with right angle.
(3) Make sure to allow the space of 1 m or more above the unit.
(4) Connect the refrigerant piping (both gas side and liquid side) 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.
L1 = H1 - 500
L3 = 300 + (H3 - 700) / 2, however, if L3 exceeds 600, there is no limit for the wall height H3.

Models FDCP224HKXE2B, 280HKXE2B
FDCJ224HKXE2B, 280HKXE2B

Unit: mm







(Unit: mm)

Dimensions \ Installation 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

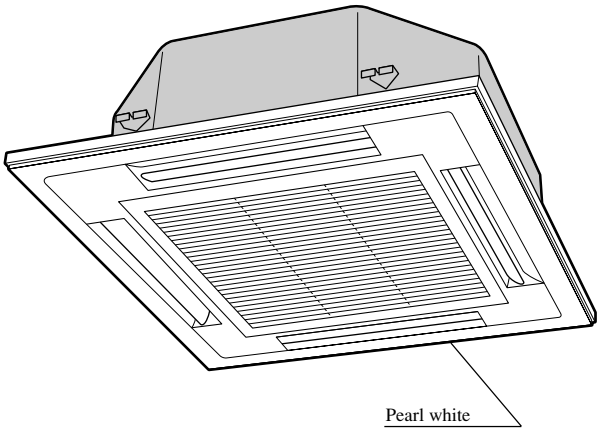
Notes (1) Make sure to secure the unit with anchor bolts.
(2) When the strong wind blows, place the unit so that discharge outlet faces the wind direction with right angle.
(3) Make sure to allow the space of 1 m or more above the unit.
(4) Connect the refrigerant piping (both gas side and liquid side) 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.
L1 = H1 – 500
L3 = 300 + (H3 - 700) / 2, however, if L3 exceeds 600, there is no limit for the wall height H3.

19.2.4 Exterior appearance

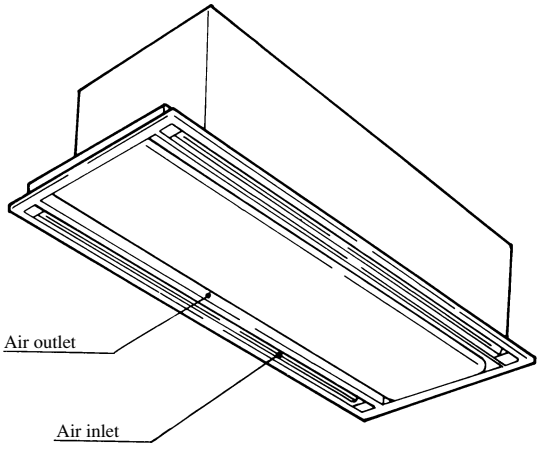
(1) Indoor unit

(a) Ceiling recessed type (FDT)

- Decorative panel



(b) 2-way outlet ceiling recessed type (FDTW)



- Decorative panel

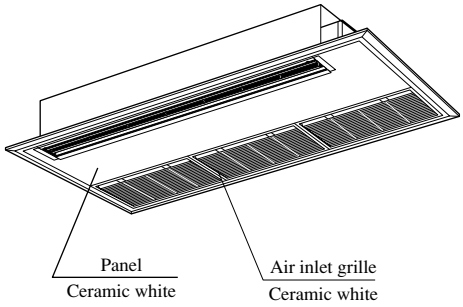
(i) Standard type

Panel part No.	Type	Panel color	Applicable model
TW-PSA-22W-E	With Auto swing	Pearl white	FDTW28, 45, 56 type
TW-PSA-32W-E			FDTW71, 90 type
TW-PSA-42W-E			FDTW112, 140 type

(ii) Attachment of ceiling material type

Panel part No.	Type	Panel color	Applicable model
TW-PSB-28W-E	With Auto swing	Misty white	FDTW28, 45, 56 type
TW-PSB-38W-E			FDTW71, 90 type
TW-PSB-48W-E			FDTW112, 140 type

(c) 1-way outlet ceiling recessed type (FDTS)

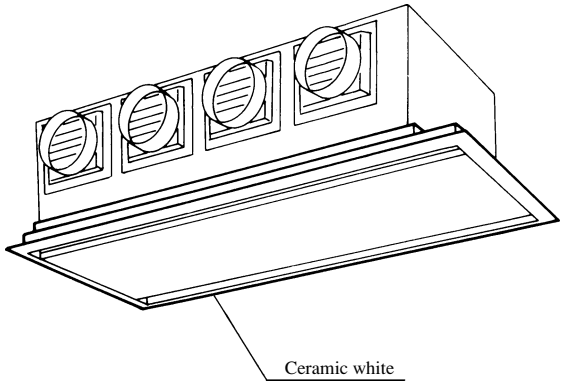


- Decorative panel

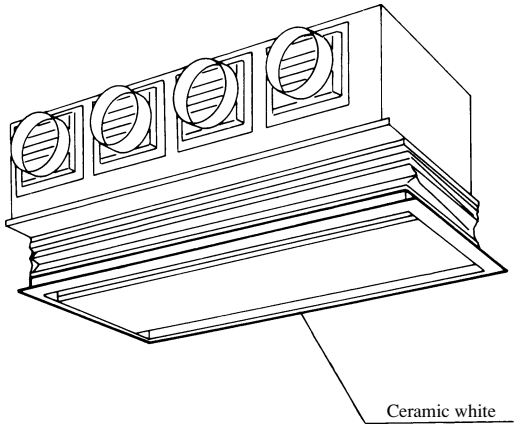
Panel part No.	Type	Panel color	Applicable model
TS-PSA-26W-E	With Auto swing	Misty white	FDTS22, 28, 36, 45 type
TS-PSA-36W-E			FDTS71 type

(d) Cassetteria type (FDR)

Silent panel type

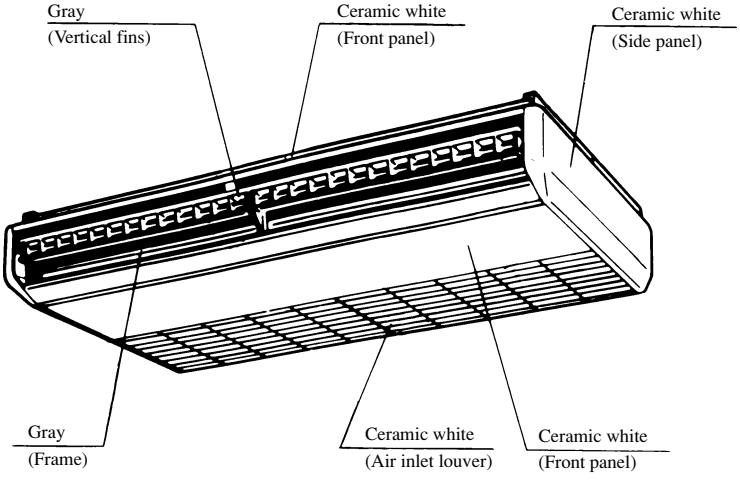


Canvas-duct panel type

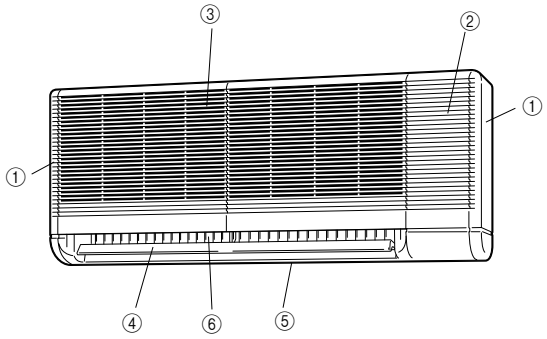


(e) Satellite ducted type (FDUM) ..... Zinc steel plate

(f) Ceiling suspension type (FDE)

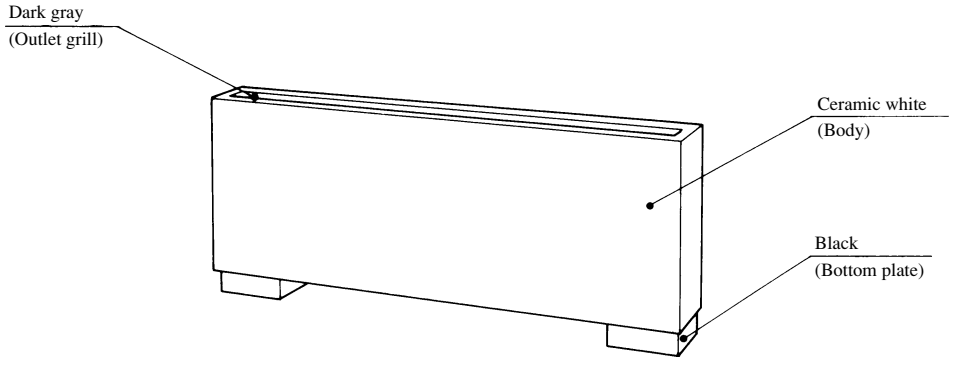


(g) Wall mounted type (FDK)



No.	Parts name	Color
①	Side plate	Ceramic white
②	Front panel	
③	Inlet grill	
④	Outlet grill	
⑤	Bottom plate	
⑥	Right and Left louvers	Light gray

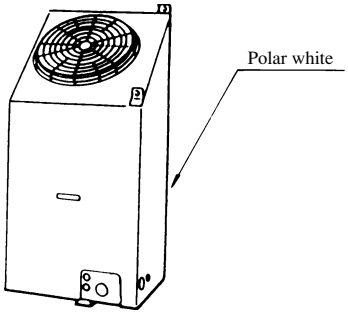
(h) Floor standing exposed type (FDFL)



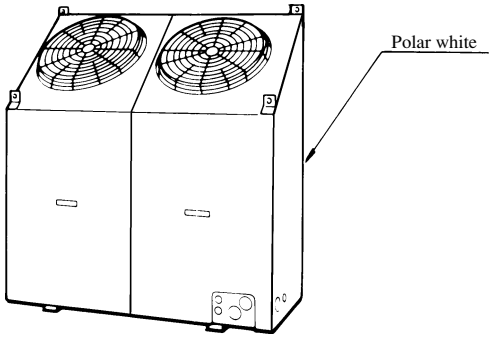
(i) Floor standing hidden type (FDFU) ..... Zinc steel plate

(2) Outdoor unit

Models FDCP140HKXE2B
FDCJ140HKXE2B

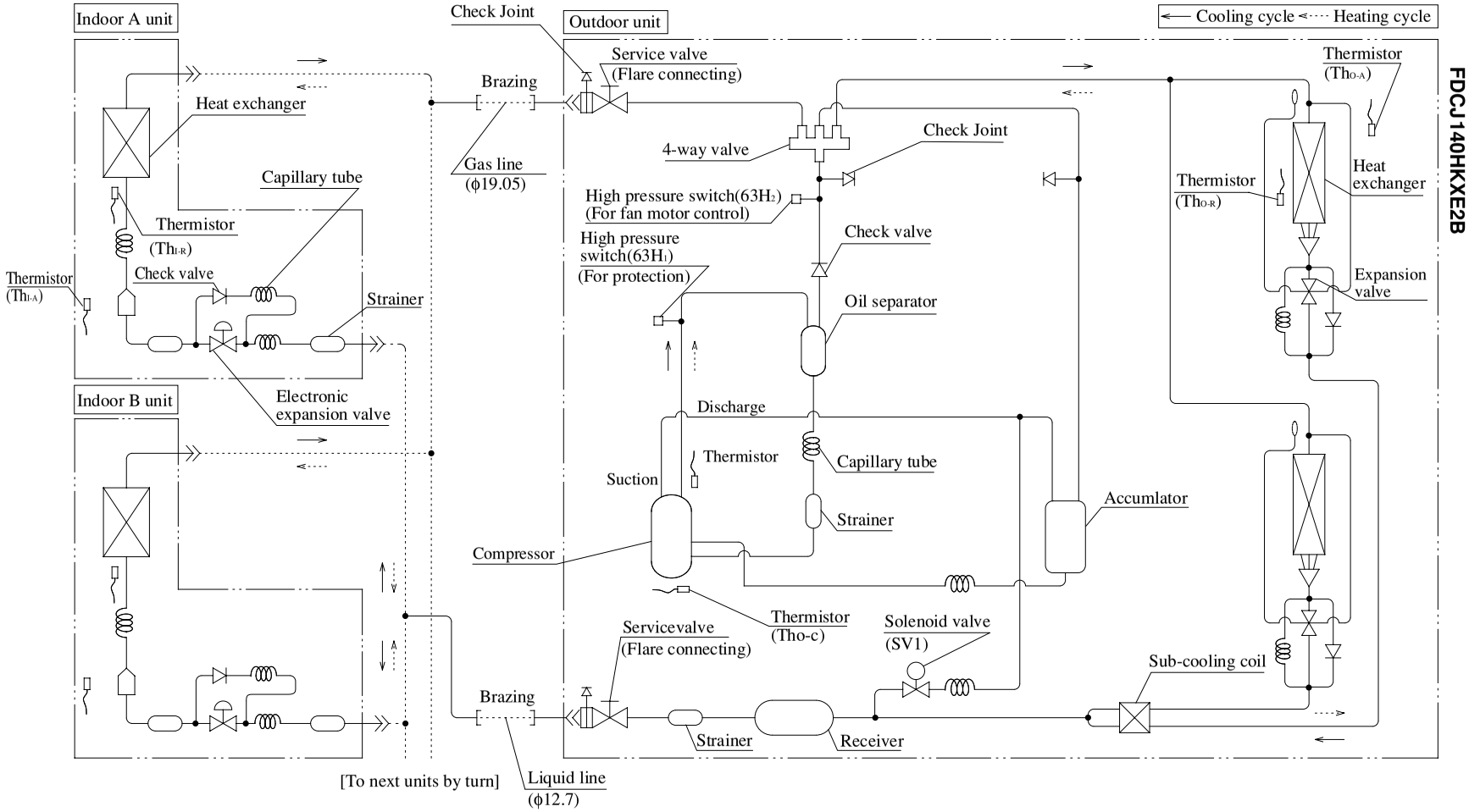


Models FDCP224HKXE2B, 280HKXE2B
FDCJ224HKXE2B, 280HKXE2B



19.2.5 Piping system

Models FDCP140HKXE2B
FDCJ140HKXE2B



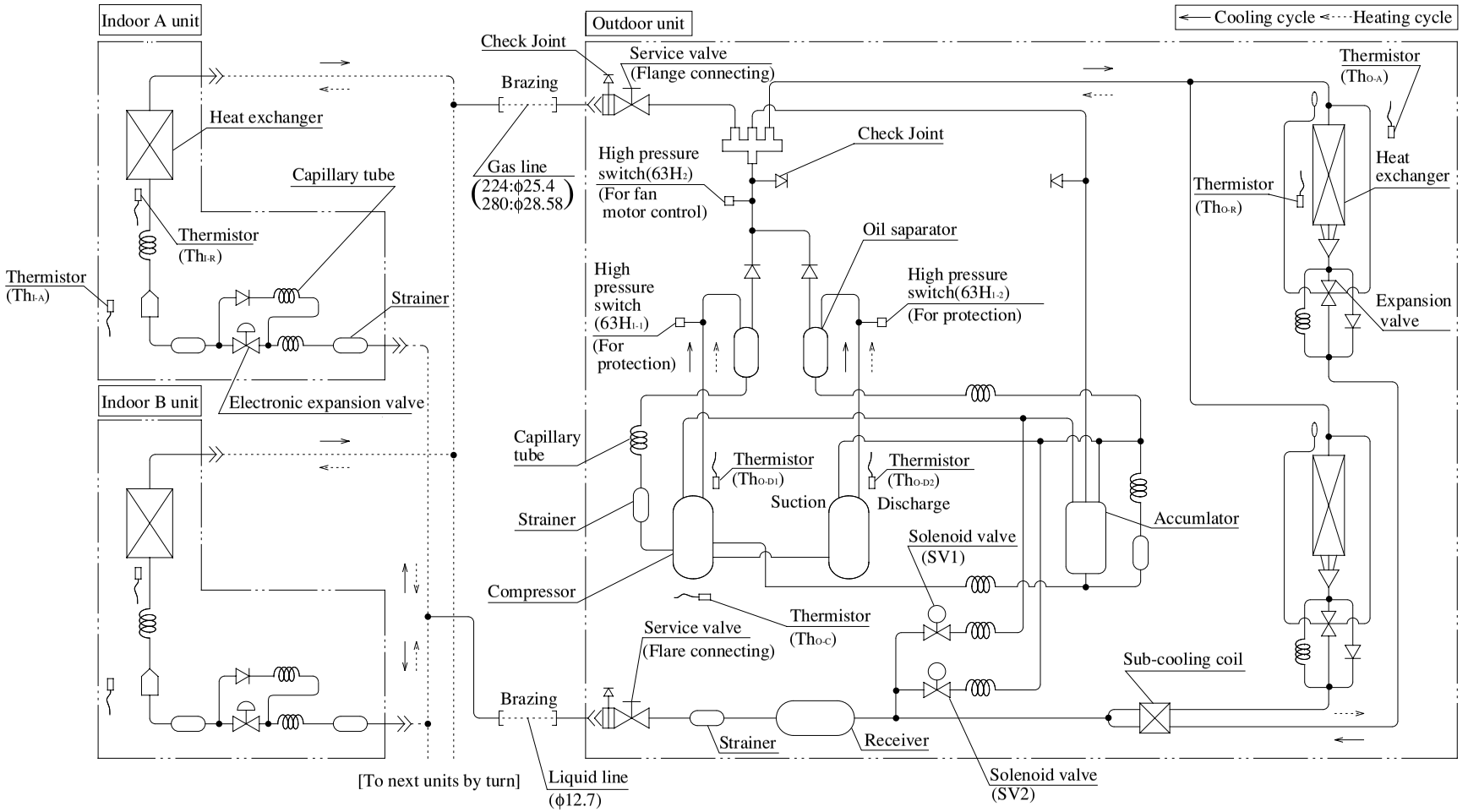
Notes (1) Preset point of protective devices

FDCJ type: $63H_1$ · OFF 2.94 MPa (30kgf/cm²), ON2.35MPa (24kgf/cm²)(For protection)
$63H_2$ · OFF 2.50 MPa (25.5kgf/cm²), ON2.06MPa (21kgf/cm²)(For heating FMo and control of high pressure)

FDCP type: $63H_1$ · OFF 3.24 MPa (33kgf/cm²), ON2.65MPa (27kgf/cm²)(For protection)
$63H_2$ · OFF 2.79 MPa (28.5kgf/cm²), ON2.26MPa (23kgf/cm²)(For heating FMo and control of high pressure)

(2) Function of thermistor

$Th_{I\text{-}R}$: Fan control in heating, or frost prevention in cooling.
$Th_{O\text{-}A}$: For heating and cooling to low outdoor temp., for control of defrosting.
$Th_{O\text{-}R}$: For control of defrosting.
$Th_{O\text{-}D}$: For control of discharge gas temperature.
$Th_{O\text{-}C}$: For control of temperature under the dome.



Notes (1) Preset point of protective devices

FDCJ type: $63H_1$· OFF 2.94 MPa (30kgf/cm²), ON2.35MPa (24kgf/cm²)(For protection)
$63H_2$· OFF 2.50 MPa (25.5kgf/cm²), ON2.06MPa (21kgf/cm²)(For heating FMo and control of high pressure)

FDCP type: $63H_1$· OFF 3.24 MPa (33kgf/cm²), ON2.65MPa (27kgf/cm²)(For protection)
$63H_2$· OFF 2.79 MPa (28.5kgf/cm²), ON2.26MPa (23kgf/cm²)(For heating FMo and control of high pressure)

(2) Function of thermistor

Th_{I-R} : Fan control in heating, or frost prevention in cooling.
Th_{O-A} : For heating and cooling to low outdoor temp., for control of defrosting.
Th_{O-R} : For control of defrosting.
Th_{O-D} : For control of discharge gas temperature.
Th_{O-C} : For control of temperature under the dome.

19.2.6 Selection chart

(1) 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.

Indoor unit

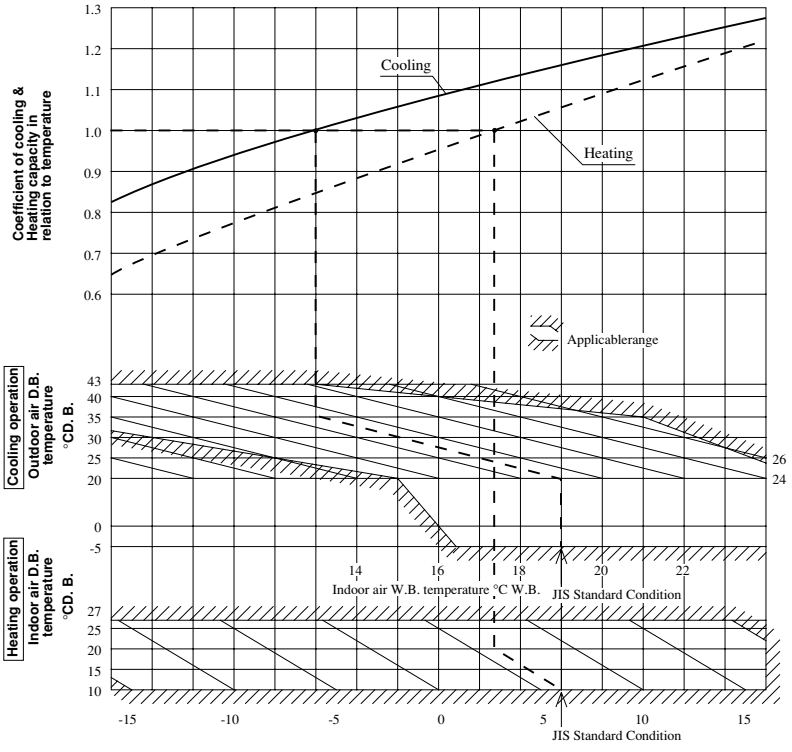
$$\text{Each indoor unit} = \text{System performance} \times \frac{\text{Indoor unit capacity}}{\text{Indoor unit capacity when operating simultaneously.}}$$

Outdoor unit

System performance = Performance from connected capacity × correction coefficient from indoor and outdoor temperature conditions × (correction coefficient from piping distance – correction coefficient from different between indoor and outdoor temperature) × (correction coefficient from condensation when heating

Note(1) Refer to page 788 and 802 for the correction coefficient.

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



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

Equivalent piping length [m](1)	5	10	15	20	25	30	35	40	45	50
Cooling	1.0	0.99	0.975	0.965	0.95	0.94	0.925	0.915	0.9	0.89
Heating	1.0	1.0	1.0	1.0	1.0	0.995	0.995	0.99	0.99	0.985

Equivalent piping length [m]	55	60	65	70	75	80	85	90	95	100
Cooling	0.875	0.865	0.85	0.84	0.825	0.815	0.8	0.79	0.775	0.765
Heating	0.985	0.98	0.98	0.975	0.975	0.97	0.97	0.965	0.965	0.96

Equivalent piping length [m]	105	110	115	120	125
Cooling	0.745	0.74	0.725	0.715	0.7
Heating	0.96	0.955	0.955	0.95	0.95

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

quivalent piping length = Real gas piping length + Number of bends in gas piping × Equivalent piping length of bends.

Equivalent length of each joint Unit : m/one part

Gas piping size	ϕ12.7	ϕ15.88	ϕ19.05	ϕ25.4	ϕ28.58
Joint (90°elbow)	0.10	0.10	0.15	0.15	0.20

(c) 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 subtracvted from the values in the above table.

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

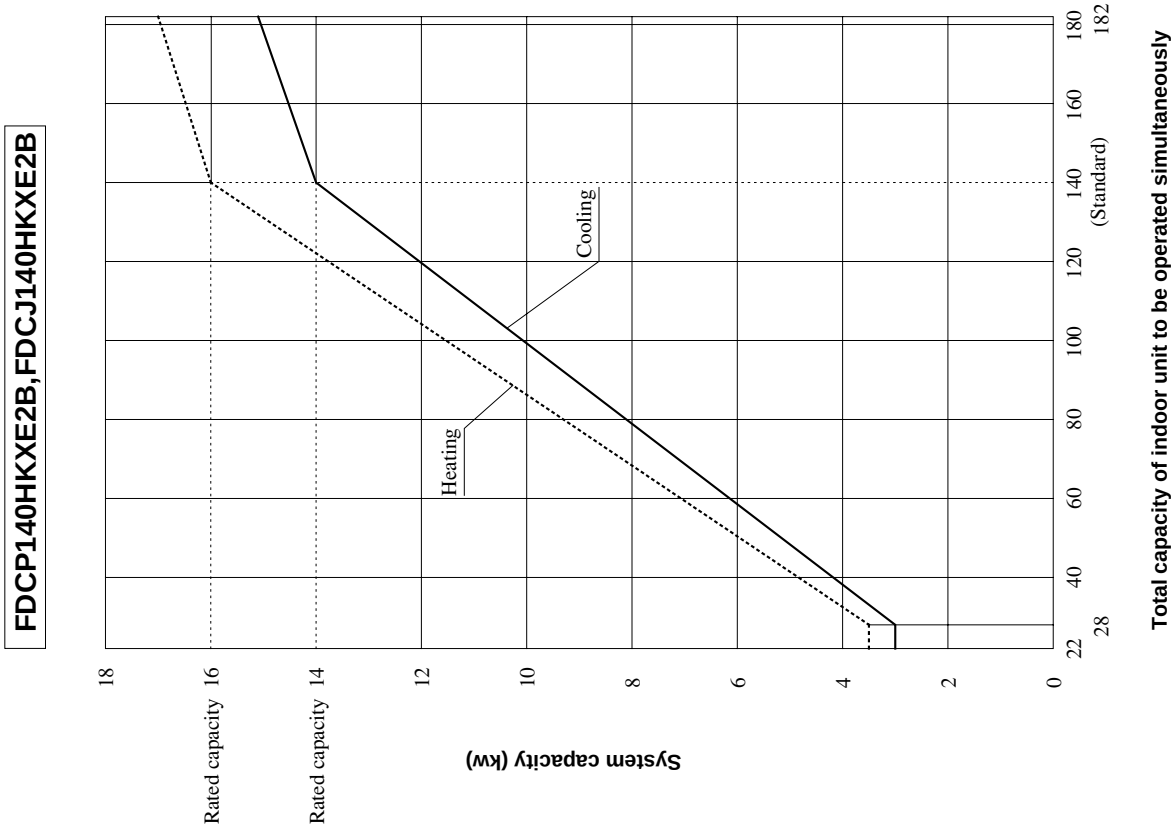
Height difference between the indoor unit and outdoor unit in the vertical height difference	35 m	40 m	45 m	50 m
Adjustment coefficient	0.07	0.08	0.09	0.10

(d) Correction of heating capacity in relation to the frost on the outdoor unit heat exchanger

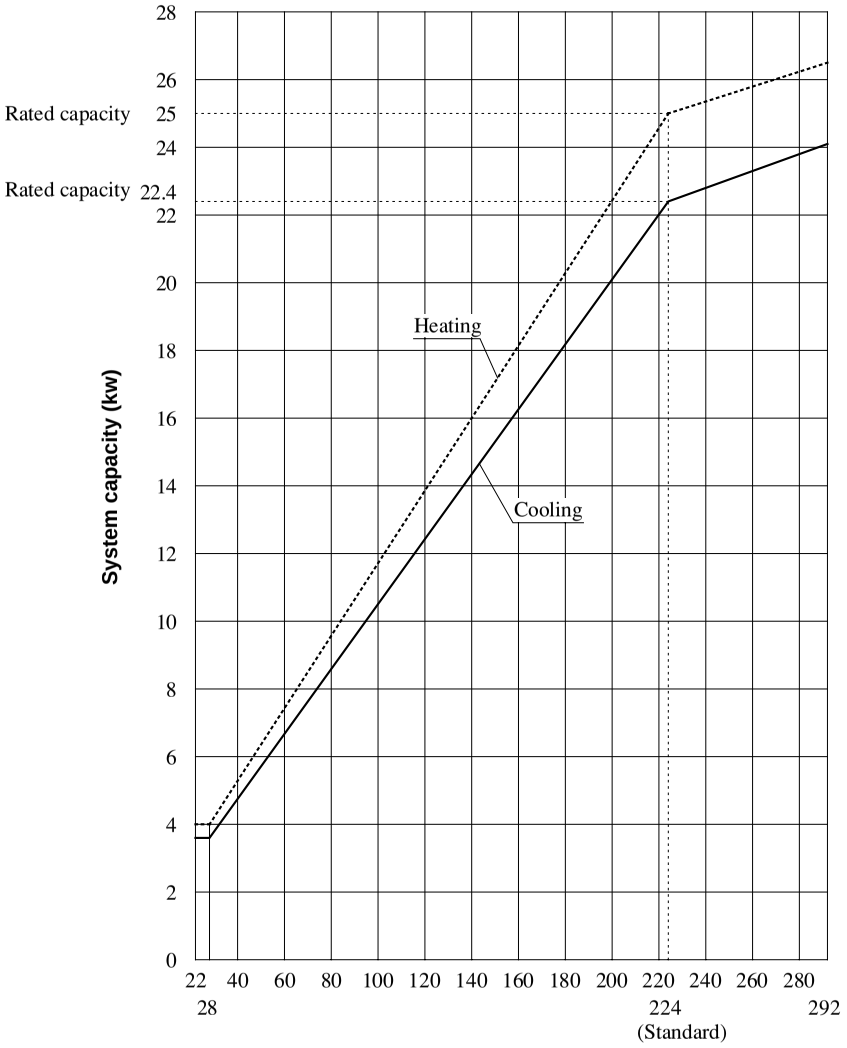
Air inlet temperature of outdoor unit in ˚C WB	-15	-13	-11	-9	-7	-5	-3	-1	1	3	5
Adjustment coefficient	0.96	0.96	0.95	0.94	0.93	0.91	0.88	0.86	0.87	0.92	1.00

The correction factors will change drastically according to weather conditions. So necessary adjustment should be made empirically according to the weather data of the particulsr area.

(2) Correction of outdoor unit capacity according to capacity of indoor unit to be operated simultaneously

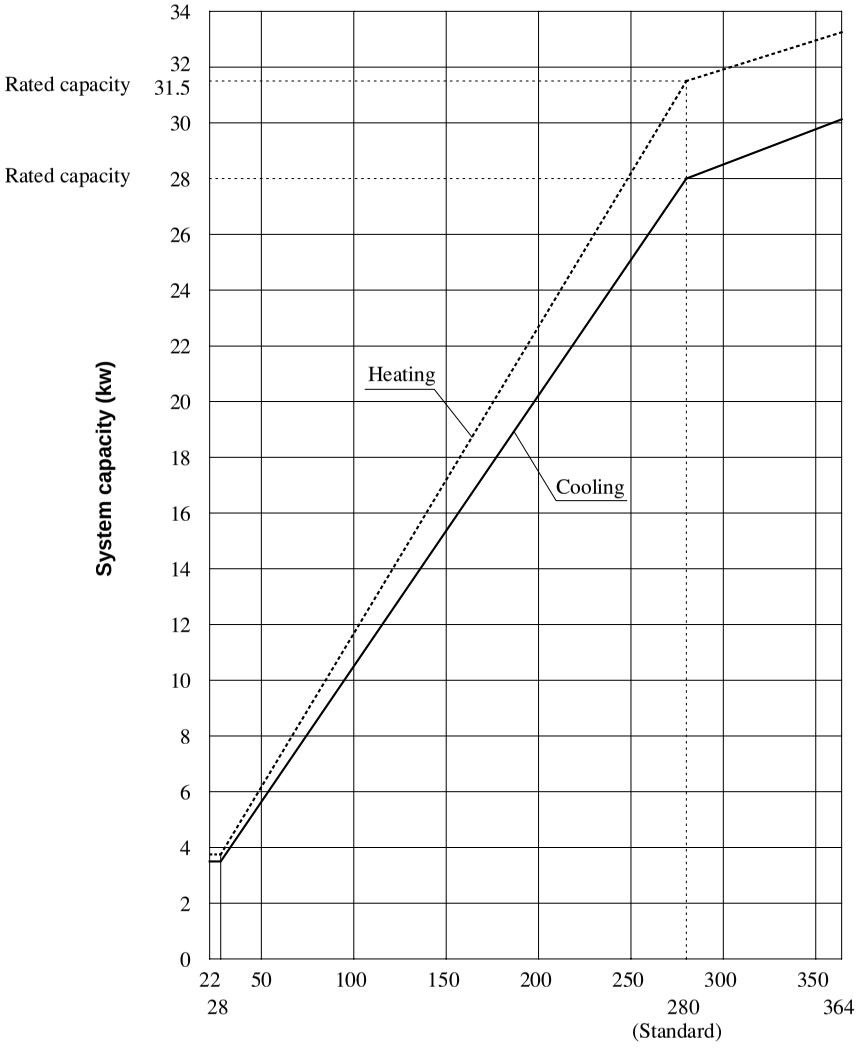


FDCP224HKXE2B,FDCJ224HKXE2B



Total capacity of indoor unit to be operated simultaneously

FDCP280HKXE2B,FDCJ280HKXE2B



Total capacity of indoor unit to be operated simultaneously

Capacity Correction Calculations (The procedure for both cooling and heating is the same.)

Example **Conditions**

- **Unit** (50 Hz)
  Outdoor unit FDCJ280HKXE2B 1 unit
  Indoor unit FDTJ90HKXE2 - 1 unit
  FDTJ140HKXE2 - 1 unit
  FDTWJ28HKXE2B - 1 unit
  FDTSJ22HKXE2B - 1 unit
- **Piping length** (Shall be common among units) ····· 60 meters (suitable length)
- **Difference in height between indoor and outdoor units** ····· 15 meters (Outdoor unit is lower)
- **Air conditions** ····· Outdoor air temperature 33˚CDB
  Indoor temperature 26˚CDB 19 ˚CWB

Corrction when cooling?

Outdoor unit performance correction

① **Total connection capacity from indoor unit** ··· 90 × 1 unit + 140 × 1 unit + 28 × 1 unitt + 22 × 1 unit = 280
≒ 28kW (From table above)

② **Performance correction from indoor and outdoor temperatures**
28 × 1.02 ≒ 28.5kW

③ **Performance correction from piping length and difference in height between indoor and outdoor units**
28.5 (0.865 - 0.03) ≒ **23.8kW** (Actual performance)

Performance correction of indoor unit

$$\textbf{Performance correction of indoor unit} = \textbf{System performance} \times \frac{\textbf{Indoor unit capacity}}{\textbf{Total capacity of indoor units operating simultaneously}}$$

[Example] FDTJ90HKXE2

$$23.8 \times \frac{90}{280} \fallingdotseq 7.65\text{kW}$$

Performance of indoor unit

FDTJ90HKXE2 ····· 7.65kW (Actual performance)
FDTJ140HKXE2 ····· 11.9kW (Actual performance)
FDTWJ28HKXE2B ····· 2.38kW (Actual performance)
FDTSJ22HKXE2B ····· 1.87kW (Actual performance)

(3) Sensible heat capacity

(a) FDT Series

Model FDTJ28HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	2.89	2.58	2.98	2.60	3.05	2.61	3.13	2.63	3.21	2.64	3.28	2.6
	29	2.83	2.55	2.91	2.57	2.99	2.59	3.07	2.61	3.15	2.62	3.22	2.6
	31	2.76	2.52	2.85	2.55	2.92	2.56	3.01	2.58	3.09	2.60	3.16	2.6
	33	2.68	2.49	2.77	2.52	2.86	2.54	2.95	2.56	3.02	2.58	3.10	2.5
	35	2.60	2.46	2.70	2.49	2.80	2.52	2.88	2.54	2.95	2.55	3.04	2.5
	37	2.53	2.43	2.63	2.46	2.72	2.49	2.81	2.51	2.89	2.53	2.98	2.5
	39	2.46	2.40	2.56	2.43	2.64	2.46	2.74	2.49	2.83	2.51	2.91	2.5

Model FDTJ36HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	3.72	3.19	3.83	3.22	3.93	3.24	4.02	3.25	4.12	3.27	4.21	3.2
	29	3.64	3.16	3.75	3.19	3.84	3.20	3.95	3.22	4.05	3.24	4.14	3.2
	31	3.55	3.12	3.66	3.15	3.76	3.17	3.87	3.20	3.97	3.21	4.06	3.2
	33	3.45	3.08	3.57	3.11	3.68	3.14	3.79	3.17	3.88	3.18	3.99	3.2
	35	3.35	3.04	3.47	3.08	3.60	3.11	3.71	3.14	3.80	3.15	3.91	3.1
	37	3.25	3.00	3.38	3.04	3.50	3.07	3.61	3.10	3.72	3.13	3.83	3.1
	39	3.16	2.96	3.29	3.00	3.40	3.04	3.52	3.07	3.64	3.10	3.75	3.1

Model FDTJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
15	27	4.65	3.99	4.78	4.02	4.91	4.05	5.03	4.07	5.15	4.09	5.27	4.1
	29	4.55	3.95	4.68	3.98	4.80	4.01	4.93	4.03	5.06	4.05	5.18	4.0
	31	4.44	3.90	4.58	3.94	4.70	3.97	4.83	3.99	4.96	4.02	5.08	4.0
	33	4.31	3.85	4.46	3.89	4.60	3.93	4.73	3.96	4.86	3.98	4.98	4.0
	35	4.19	3.80	4.34	3.85	4.50	3.89	4.64	3.92	4.75	3.94	4.88	3.9
	37	4.07	3.75	4.23	3.80	4.37	3.84	4.52	3.88	4.65	3.91	4.78	3.9
	39	3.95	3.71	4.11	3.76	4.25	3.80	4.40	3.84	4.55	3.87	4.68	3.9

Model FDTJ56HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
15	27	5.78	4.48	5.95	4.51	6.11	4.53	6.26	4.54	6.41	4.55	6.55	4.5
	29	5.66	4.43	5.83	4.46	5.98	4.47	6.14	4.49	6.30	4.51	6.44	4.5
	31	5.52	4.36	5.70	4.40	5.85	4.42	6.01	4.44	6.18	4.46	6.32	4.4
	33	5.36	4.30	5.55	4.34	5.72	4.37	5.89	4.40	6.04	4.41	6.20	4.4
	35	5.21	4.23	5.40	4.28	5.60	4.32	5.77	4.35	5.91	4.36	6.08	4.3
	37	5.06	4.17	5.26	4.22	5.44	4.26	5.62	4.29	5.78	4.32	5.95	4.3
	39	4.92	4.10	5.11	4.16	5.29	4.19	5.48	4.24	5.66	4.27	5.83	4.2

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDTJ71KHXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
16	27	7.33	5.31	7.55	5.34	7.75	5.35	7.94	5.36	8.13	5.36	8.31	5.3
	29	7.18	5.24	7.39	5.27	7.58	5.28	7.78	5.29	7.99	5.30	8.17	5.3
	31	7.00	5.15	7.22	5.19	7.41	5.21	7.63	5.23	7.83	5.24	8.02	5.2
	33	6.80	5.06	7.04	5.11	7.26	5.14	7.47	5.16	7.66	5.17	7.86	5.1
	35	6.60	4.97	6.85	5.03	7.10	5.07	7.31	5.10	7.49	5.11	7.70	5.1
	37	6.42	4.89	6.67	4.95	6.90	4.99	7.13	5.02	7.33	5.04	7.55	5.0
	39	6.23	4.81	6.48	4.87	6.70	4.91	6.94	4.95	7.16	4.98	7.39	5.0

Model FDTJ90HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
21	27	9.30	6.82	9.57	6.85	9.82	6.87	10.06	6.88	10.31	6.89	10.53	6.8
	29	9.10	6.72	9.37	6.76	9.60	6.78	9.86	6.80	10.13	6.82	10.35	6.8
	31	8.87	6.62	9.15	6.67	9.40	6.69	9.67	6.72	9.93	6.74	10.16	6.7
	33	8.62	6.51	8.92	6.56	9.20	6.61	9.47	6.64	9.71	6.65	9.96	6.6
	35	8.37	6.39	8.69	6.46	9.00	6.52	9.27	6.56	9.50	6.57	9.77	6.5
	37	8.14	6.29	8.45	6.36	8.75	6.42	9.04	6.46	9.30	6.49	9.57	6.5
	39	7.90	6.19	8.22	6.26	8.50	6.31	8.80	6.37	9.10	6.42	9.37	6.4

Model FDTJ112HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
28	27	11.57	8.71	11.91	8.76	12.22	8.79	12.52	8.81	12.82	8.82	13.10	8.8
	29	11.32	8.60	11.66	8.65	11.95	8.68	12.28	8.71	12.60	8.74	12.88	8.7
	31	11.04	8.47	11.39	8.54	11.69	8.57	12.03	8.61	12.35	8.64	12.64	8.6
	33	10.73	8.33	11.10	8.41	11.45	8.47	11.78	8.51	12.08	8.54	12.40	8.5
	35	10.42	8.20	10.81	8.29	11.20	8.37	11.54	8.42	11.82	8.44	12.15	8.4
	37	10.12	8.07	10.52	8.16	10.89	8.24	11.24	8.30	11.57	8.34	11.91	8.3
	39	9.83	7.94	10.23	8.04	10.57	8.11	10.95	8.19	11.32	8.25	11.66	8.2

Model FDTJ140HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
30	27	14.46	10.29	14.88	10.34	15.27	10.36	15.65	10.37	16.03	10.37	16.38	10.3
	29	14.15	10.15	14.57	10.20	14.94	10.21	15.34	10.24	15.75	10.26	16.10	10.2
	31	13.80	9.98	14.24	10.04	14.62	10.07	15.04	10.11	15.44	10.13	15.81	10.1
	33	13.41	9.80	13.87	9.88	14.31	9.94	14.73	9.98	15.11	10.00	15.50	10.0
	35	13.02	9.62	13.51	9.72	14.00	9.81	14.42	9.85	14.77	9.86	15.19	9.8
	37	12.66	9.45	13.15	9.55	13.61	9.64	14.06	9.70	14.46	9.74	14.88	9.7
	39	12.29	9.28	12.78	9.40	13.22	9.47	13.69	9.55	14.15	9.62	14.57	9.6

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

(b) FDTS Series

Model FDTSJ22HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11	27	2.27	2.04	2.34	2.06	2.40	2.08	2.46	2.09	2.52	2.10	2.57	2.11
	29	2.22	2.02	2.29	2.04	2.35	2.06	2.41	2.07	2.48	2.08	2.53	2.09
	31	2.17	2.00	2.24	2.02	2.30	2.04	2.36	2.05	2.43	2.07	2.48	2.08
	33	2.11	1.98	2.18	2.00	2.25	2.02	2.31	2.03	2.37	2.05	2.44	2.06
	35	2.05	1.95	2.12	1.98	2.20	2.00	2.27	2.02	2.32	2.03	2.39	2.04
	37	1.99	1.93	2.07	1.95	2.14	1.98	2.21	2.00	2.27	2.01	2.34	2.03
	39	1.93	1.91	2.01	1.93	2.08	1.95	2.15	1.98	2.22	2.00	2.29	2.01

Model FDTSJ28HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	2.90	2.58	2.98	2.60	3.06	2.62	3.12	2.63	3.21	2.64	3.29	2.66
	29	2.83	2.55	2.92	2.57	3.00	2.59	3.07	2.61	3.14	2.62	3.23	2.64
	31	2.77	2.52	2.85	2.55	2.93	2.57	3.02	2.59	3.09	2.60	3.16	2.61
	33	2.69	2.49	2.78	2.52	2.87	2.54	2.95	2.56	3.04	2.58	3.10	2.59
	35	2.60	2.46	2.72	2.49	2.80	2.52	2.88	2.54	2.97	2.56	3.05	2.58
	37	2.54	2.43	2.63	2.46	2.73	2.49	2.82	2.52	2.90	2.54	2.98	2.55
	39	2.45	2.40	2.55	2.43	2.65	2.46	2.75	2.49	2.83	2.51	2.92	2.53

Model FDTSJ36HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	3.73	3.20	3.84	3.22	3.94	3.24	4.02	3.25	4.13	3.27	4.23	3.28
	29	3.64	3.16	3.75	3.19	3.86	3.21	3.95	3.23	4.04	3.24	4.15	3.26
	31	3.56	3.13	3.66	3.15	3.77	3.18	3.88	3.20	3.97	3.21	4.06	3.23
	33	3.46	3.09	3.58	3.12	3.69	3.15	3.79	3.17	3.90	3.19	3.98	3.20
	35	3.35	3.04	3.49	3.08	3.60	3.11	3.71	3.14	3.82	3.16	3.92	3.18
	37	3.26	3.01	3.38	3.04	3.51	3.08	3.62	3.11	3.73	3.13	3.84	3.15
	39	3.15	2.96	3.28	3.00	3.41	3.04	3.54	3.07	3.64	3.10	3.75	3.12

Model FDTSJ45HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDTSJ71HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

(c) FDR Series

Model FDRJ22HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
10	27	2.28	2.05	2.35	2.06	2.41	2.08	2.46	2.09	2.52	2.10	2.58	2.11
	29	2.23	2.02	2.29	2.04	2.36	2.06	2.42	2.07	2.47	2.08	2.53	2.09
	31	2.17	2.00	2.24	2.02	2.31	2.04	2.37	2.06	2.42	2.06	2.48	2.08
	33	2.12	1.98	2.19	2.00	2.25	2.02	2.32	2.04	2.38	2.05	2.43	2.06
	35	2.05	1.95	2.13	1.98	2.20	2.00	2.27	2.02	2.33	2.03	2.40	2.05
	37	1.99	1.93	2.06	1.95	2.15	1.98	2.21	2.00	2.28	2.01	2.35	2.03
	39	1.93	1.90	2.01	1.93	2.08	1.96	2.16	1.98	2.23	2.00	2.29	2.01

Model FDRJ28HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	2.90	2.58	2.98	2.60	3.06	2.62	3.12	2.63	3.21	2.64	3.29	2.66
	29	2.83	2.55	2.92	2.57	3.00	2.59	3.07	2.61	3.14	2.62	3.23	2.64
	31	2.77	2.52	2.85	2.55	2.93	2.57	3.02	2.59	3.09	2.60	3.16	2.61
	33	2.69	2.49	2.78	2.52	2.87	2.54	2.95	2.56	3.04	2.58	3.10	2.59
	35	2.60	2.46	2.72	2.49	2.80	2.52	2.88	2.54	2.97	2.56	3.05	2.58
	37	2.54	2.43	2.63	2.46	2.73	2.49	2.82	2.52	2.90	2.54	2.98	2.55
	39	2.45	2.40	2.55	2.43	2.65	2.46	2.75	2.49	2.83	2.51	2.92	2.53

Model FDRJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDRJ56HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	5.80	4.36	5.97	4.39	6.13	4.40	6.25	4.40	6.42	4.41	6.57	4.42
	29	5.67	4.30	5.84	4.33	6.00	4.35	6.15	4.36	6.28	4.36	6.45	4.37
	31	5.53	4.24	5.70	4.27	5.87	4.29	6.04	4.32	6.17	4.32	6.32	4.32
	33	5.39	4.18	5.57	4.21	5.73	4.24	5.90	4.26	6.07	4.28	6.19	4.28
	35	5.21	4.10	5.43	4.16	5.60	4.18	5.77	4.21	5.94	4.23	6.10	4.25
	37	5.07	4.04	5.25	4.08	5.47	4.13	5.63	4.16	5.80	4.18	5.97	4.20
	39	4.91	3.97	5.11	4.02	5.30	4.06	5.50	4.10	5.67	4.13	5.84	4.15

Model FDRJ71HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

Model FDRJ90HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
20	27	9.32	6.71	9.59	6.74	9.85	6.76	10.04	6.75	10.31	6.76	10.57	6.76
	29	9.11	6.61	9.38	6.64	9.65	6.67	9.88	6.68	10.10	6.67	10.37	6.69
	31	8.89	6.51	9.16	6.55	9.43	6.58	9.70	6.60	9.92	6.60	10.15	6.60
	33	8.66	6.40	8.95	6.45	9.22	6.49	9.49	6.52	9.76	6.54	9.95	6.53
	35	8.37	6.27	8.73	6.36	9.00	6.39	9.27	6.43	9.54	6.45	9.81	6.47
	37	8.15	6.17	8.44	6.23	8.78	6.30	9.05	6.34	9.32	6.37	9.59	6.39
	39	7.88	6.05	8.21	6.13	8.51	6.19	8.84	6.25	9.11	6.28	9.38	6.31

Model FDRJ112HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
28	27	11.60	8.72	11.94	8.77	12.25	8.80	12.50	8.80	12.84	8.83	13.15	8.84
	29	11.33	8.60	11.67	8.66	12.01	8.70	12.30	8.72	12.57	8.72	12.90	8.75
	31	11.07	8.48	11.40	8.54	11.74	8.59	12.07	8.63	12.34	8.64	12.63	8.65
	33	10.77	8.35	11.13	8.42	11.47	8.48	11.80	8.52	12.14	8.56	12.39	8.56
	35	10.42	8.20	10.86	8.31	11.20	8.37	11.54	8.42	11.87	8.46	12.21	8.49
	37	10.15	8.08	10.51	8.16	10.93	8.26	11.27	8.31	11.60	8.36	11.94	8.39
	39	9.81	7.93	10.21	8.04	10.60	8.12	11.00	8.20	11.33	8.26	11.67	8.30

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDRJ140HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
34	27	14.50	10.78	14.92	10.84	15.32	10.88	15.62	10.87	16.04	10.90	16.44	10.91
	29	14.17	10.63	14.59	10.69	15.01	10.75	15.37	10.77	15.71	10.77	16.13	10.80
	31	13.83	10.48	14.25	10.55	14.67	10.60	15.09	10.65	15.43	10.66	15.79	10.67
	33	13.47	10.31	13.92	10.40	14.34	10.46	14.76	10.52	15.18	10.56	15.48	10.56
	35	13.02	10.12	13.58	10.26	14.00	10.32	14.42	10.38	14.84	10.43	15.26	10.47
	37	12.68	9.97	13.13	10.07	13.66	10.19	14.08	10.25	14.50	10.30	14.92	10.35
	39	12.26	9.78	12.77	9.91	13.24	10.01	13.75	10.12	14.17	10.18	14.59	10.23

(d) FDUM Series

Model FDUMJ36HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	3.73	3.20	3.84	3.22	3.94	3.24	4.02	3.25	4.13	3.27	4.23	3.28
	29	3.64	3.16	3.75	3.19	3.86	3.21	3.95	3.23	4.04	3.24	4.15	3.26
	31	3.56	3.13	3.66	3.15	3.77	3.18	3.88	3.20	3.97	3.21	4.06	3.23
	33	3.46	3.09	3.58	3.12	3.69	3.15	3.79	3.17	3.90	3.19	3.98	3.20
	35	3.35	3.04	3.49	3.08	3.60	3.11	3.71	3.14	3.82	3.16	3.92	3.18
	37	3.26	3.01	3.38	3.04	3.51	3.08	3.62	3.11	3.73	3.13	3.84	3.15
	39	3.15	2.96	3.28	3.00	3.41	3.04	3.54	3.07	3.64	3.10	3.75	3.12

Model FDUMJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Model FDUMJ56HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	5.80	4.36	5.97	4.39	6.13	4.40	6.25	4.40	6.42	4.41	6.57	4.42
	29	5.67	4.30	5.84	4.33	6.00	4.35	6.15	4.36	6.28	4.36	6.45	4.37
	31	5.53	4.24	5.70	4.27	5.87	4.29	6.04	4.32	6.17	4.32	6.32	4.32
	33	5.39	4.18	5.57	4.21	5.73	4.24	5.90	4.26	6.07	4.28	6.19	4.28
	35	5.21	4.10	5.43	4.16	5.60	4.18	5.77	4.21	5.94	4.23	6.10	4.25
	37	5.07	4.04	5.25	4.08	5.47	4.13	5.63	4.16	5.80	4.18	5.97	4.20
	39	4.91	3.97	5.11	4.02	5.30	4.06	5.50	4.10	5.67	4.13	5.84	4.15

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDUMJ71HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

Model FDUMJ90HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
20	27	9.32	6.71	9.59	6.74	9.85	6.76	10.04	6.75	10.31	6.76	10.57	6.76
	29	9.11	6.61	9.38	6.64	9.65	6.67	9.88	6.68	10.10	6.67	10.37	6.69
	31	8.89	6.51	9.16	6.55	9.43	6.58	9.70	6.60	9.92	6.60	10.15	6.60
	33	8.66	6.40	8.95	6.45	9.22	6.49	9.49	6.52	9.76	6.54	9.95	6.53
	35	8.37	6.27	8.73	6.36	9.00	6.39	9.27	6.43	9.54	6.45	9.81	6.47
	37	8.15	6.17	8.44	6.23	8.78	6.30	9.05	6.34	9.32	6.37	9.59	6.39
	39	7.88	6.05	8.21	6.13	8.51	6.19	8.84	6.25	9.11	6.28	9.38	6.31

Model FDUMJ112HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
28	27	11.60	8.72	11.94	8.77	12.25	8.80	12.50	8.80	12.84	8.83	13.15	8.84
	29	11.33	8.60	11.67	8.66	12.01	8.70	12.30	8.72	12.57	8.72	12.90	8.75
	31	11.07	8.48	11.40	8.54	11.74	8.59	12.07	8.63	12.34	8.64	12.63	8.65
	33	10.77	8.35	11.13	8.42	11.47	8.48	11.80	8.52	12.14	8.56	12.39	8.56
	35	10.42	8.20	10.86	8.31	11.20	8.37	11.54	8.42	11.87	8.46	12.21	8.49
	37	10.15	8.08	10.51	8.16	10.93	8.26	11.27	8.31	11.60	8.36	11.94	8.39
	39	9.81	7.93	10.21	8.04	10.60	8.12	11.00	8.20	11.33	8.26	11.67	8.30

Model FDUMJ140HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
34	27	14.50	10.78	14.92	10.84	15.32	10.88	15.62	10.87	16.04	10.90	16.44	10.91
	29	14.17	10.63	14.59	10.69	15.01	10.75	15.37	10.77	15.71	10.77	16.13	10.80
	31	13.83	10.48	14.25	10.55	14.67	10.60	15.09	10.65	15.43	10.66	15.79	10.67
	33	13.47	10.31	13.92	10.40	14.34	10.46	14.76	10.52	15.18	10.56	15.48	10.56
	35	13.02	10.12	13.58	10.26	14.00	10.32	14.42	10.38	14.84	10.43	15.26	10.47
	37	12.68	9.97	13.13	10.07	13.66	10.19	14.08	10.25	14.50	10.30	14.92	10.35
	39	12.26	9.78	12.77	9.91	13.24	10.01	13.75	10.12	14.17	10.18	14.59	10.23

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

(e) FDE Series

Model FDEJ36HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	3.73	3.34	3.84	3.36	3.94	3.39	4.02	3.40	4.13	3.42	4.23	3.44
	29	3.64	3.30	3.75	3.33	3.86	3.36	3.95	3.38	4.04	3.39	4.15	3.41
	31	3.56	3.26	3.66	3.30	3.77	3.32	3.88	3.35	3.97	3.37	4.06	3.38
	33	3.46	3.23	3.58	3.26	3.69	3.29	3.79	3.32	3.90	3.34	3.98	3.35
	35	3.35	3.18	3.49	3.23	3.60	3.26	3.71	3.29	3.82	3.31	3.92	3.34
	37	3.26	3.15	3.38	3.18	3.51	3.23	3.62	3.26	3.73	3.28	3.84	3.31
	39	3.15	3.10	3.28	3.15	3.41	3.19	3.54	3.23	3.64	3.25	3.75	3.28

Model FDEJ45HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Model FDEJ56HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	5.80	4.36	5.97	4.39	6.13	4.40	6.25	4.40	6.42	4.41	6.57	4.42
	29	5.67	4.30	5.84	4.33	6.00	4.35	6.15	4.36	6.28	4.36	6.45	4.37
	31	5.53	4.24	5.70	4.27	5.87	4.29	6.04	4.32	6.17	4.32	6.32	4.32
	33	5.39	4.18	5.57	4.21	5.73	4.24	5.90	4.26	6.07	4.28	6.19	4.28
	35	5.21	4.10	5.43	4.16	5.60	4.18	5.77	4.21	5.94	4.23	6.10	4.25
	37	5.07	4.04	5.25	4.08	5.47	4.13	5.63	4.16	5.80	4.18	5.97	4.20
	39	4.91	3.97	5.11	4.02	5.30	4.06	5.50	4.10	5.67	4.13	5.84	4.15

Model FDEJ71HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDEJ112HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
28	27	11.60	8.72	11.94	8.77	12.25	8.80	12.50	8.80	12.84	8.83	13.15	8.84
	29	11.33	8.60	11.67	8.66	12.01	8.70	12.30	8.72	12.57	8.72	12.90	8.75
	31	11.07	8.48	11.40	8.54	11.74	8.59	12.07	8.63	12.34	8.64	12.63	8.65
	33	10.77	8.35	11.13	8.42	11.47	8.48	11.80	8.52	12.14	8.56	12.39	8.56
	35	10.42	8.20	10.86	8.31	11.20	8.37	11.54	8.42	11.87	8.46	12.21	8.49
	37	10.15	8.08	10.51	8.16	10.93	8.26	11.27	8.31	11.60	8.36	11.94	8.39
	39	9.81	7.93	10.21	8.04	10.60	8.12	11.00	8.20	11.33	8.26	11.67	8.30

Model FDEJ140HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
34	27	14.50	10.78	14.92	10.84	15.32	10.88	15.62	10.87	16.04	10.90	16.44	10.91
	29	14.17	10.63	14.59	10.69	15.01	10.75	15.37	10.77	15.71	10.77	16.13	10.80
	31	13.83	10.48	14.25	10.55	14.67	10.60	15.09	10.65	15.43	10.66	15.79	10.67
	33	13.47	10.31	13.92	10.40	14.34	10.46	14.76	10.52	15.18	10.56	15.48	10.56
	35	13.02	10.12	13.58	10.26	14.00	10.32	14.42	10.38	14.84	10.43	15.26	10.47
	37	12.68	9.97	13.13	10.07	13.66	10.19	14.08	10.25	14.50	10.30	14.92	10.35
	39	12.26	9.78	12.77	9.91	13.24	10.01	13.75	10.12	14.17	10.18	14.59	10.23

(f) FDK Series

Model FDKJ22HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
9	27	2.27	2.04	2.34	2.06	2.40	2.08	2.46	2.09	2.52	2.10	2.57	2.11
	29	2.22	2.02	2.29	2.04	2.35	2.06	2.41	2.07	2.48	2.08	2.53	2.09
	31	2.17	2.00	2.24	2.02	2.30	2.04	2.36	2.05	2.43	2.07	2.48	2.08
	33	2.11	1.98	2.18	2.00	2.25	2.02	2.31	2.03	2.37	2.05	2.44	2.06
	35	2.05	1.95	2.12	1.98	2.20	2.00	2.27	2.02	2.32	2.03	2.39	2.04
	37	1.99	1.93	2.07	1.95	2.14	1.98	2.21	2.00	2.27	2.01	2.34	2.03
	39	1.93	1.91	2.01	1.93	2.08	1.95	2.15	1.98	2.22	2.00	2.29	2.01

Model FDKJ28HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
10	27	2.90	2.58	2.98	2.60	3.06	2.62	3.12	2.63	3.21	2.64	3.29	2.66
	29	2.83	2.55	2.92	2.57	3.00	2.59	3.07	2.61	3.14	2.62	3.23	2.64
	31	2.77	2.52	2.85	2.55	2.93	2.57	3.02	2.59	3.09	2.60	3.16	2.61
	33	2.69	2.49	2.78	2.52	2.87	2.54	2.95	2.56	3.04	2.58	3.10	2.59
	35	2.60	2.46	2.72	2.49	2.80	2.52	2.88	2.54	2.97	2.56	3.05	2.58
	37	2.54	2.43	2.63	2.46	2.73	2.49	2.82	2.52	2.90	2.54	2.98	2.55
	39	2.45	2.40	2.55	2.43	2.65	2.46	2.75	2.49	2.83	2.51	2.92	2.53

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDKJ36HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
10	27	3.73	2.93	3.84	2.95	3.94	2.96	4.02	2.97	4.13	2.98	4.23	2.98
	29	3.64	2.89	3.75	2.91	3.86	2.93	3.95	2.94	4.04	2.95	4.15	2.96
	31	3.56	2.86	3.66	2.88	3.77	2.90	3.88	2.91	3.97	2.92	4.06	2.93
	33	3.46	2.82	3.58	2.84	3.69	2.86	3.79	2.88	3.90	2.89	3.98	2.90
	35	3.35	2.77	3.49	2.81	3.60	2.83	3.71	2.85	3.82	2.86	3.92	2.88
	37	3.26	2.73	3.38	2.76	3.51	2.79	3.62	2.81	3.73	2.83	3.84	2.85
	39	3.15	2.68	3.28	2.72	3.41	2.75	3.54	2.78	3.64	2.80	3.75	2.82

Model FDKJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11.5	27	4.66	3.54	4.80	3.56	4.92	3.57	5.02	3.57	5.16	3.58	5.28	3.59
	29	4.55	3.49	4.69	3.51	4.82	3.53	4.94	3.54	5.05	3.54	5.18	3.55
	31	4.45	3.44	4.58	3.46	4.72	3.48	4.85	3.50	4.96	3.51	5.08	3.51
	33	4.33	3.39	4.47	3.42	4.61	3.44	4.74	3.46	4.88	3.47	4.98	3.47
	35	4.19	3.33	4.37	3.37	4.50	3.40	4.64	3.42	4.77	3.43	4.91	3.45
	37	4.08	3.28	4.22	3.31	4.39	3.35	4.53	3.37	4.66	3.39	4.80	3.41
	39	3.94	3.22	4.10	3.26	4.26	3.30	4.42	3.33	4.55	3.35	4.69	3.37

Model FDKJ56HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
17	27	5.80	4.75	5.97	4.78	6.13	4.81	6.25	4.82	6.42	4.84	6.57	4.86
	29	5.67	4.69	5.84	4.73	6.00	4.76	6.15	4.78	6.28	4.79	6.45	4.81
	31	5.53	4.64	5.70	4.67	5.87	4.71	6.04	4.74	6.17	4.75	6.32	4.77
	33	5.39	4.57	5.57	4.62	5.73	4.65	5.90	4.69	6.07	4.71	6.19	4.72
	35	5.21	4.50	5.43	4.56	5.60	4.60	5.77	4.64	5.94	4.66	6.10	4.69
	37	5.07	4.44	5.25	4.49	5.47	4.55	5.63	4.59	5.80	4.62	5.97	4.65
	39	4.91	4.37	5.11	4.43	5.30	4.48	5.50	4.54	5.67	4.57	5.84	4.60

Model FDKJ71HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
21	27	7.36	5.95	7.57	5.99	7.77	6.02	7.92	6.03	8.14	6.06	8.34	6.07
	29	7.19	5.87	7.40	5.92	7.61	5.96	7.80	5.98	7.97	5.99	8.18	6.02
	31	7.01	5.80	7.23	5.85	7.44	5.89	7.65	5.93	7.82	5.94	8.01	5.96
	33	6.83	5.72	7.06	5.78	7.27	5.82	7.48	5.86	7.70	5.89	7.85	5.90
	35	6.60	5.63	6.89	5.71	7.10	5.75	7.31	5.80	7.53	5.83	7.74	5.86
	37	6.43	5.56	6.66	5.62	6.93	5.69	7.14	5.73	7.36	5.77	7.57	5.81
	39	6.22	5.47	6.48	5.54	6.72	5.61	6.97	5.67	7.19	5.71	7.40	5.75

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

(g) FDFL, FDFU Series

Models FDFLJ28HKXE2, FDFUJ28HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	2.90	2.58	2.98	2.60	3.06	2.62	3.12	2.63	3.21	2.64	3.29	2.66
	29	2.83	2.55	2.92	2.57	3.00	2.59	3.07	2.61	3.14	2.62	3.23	2.64
	31	2.77	2.52	2.85	2.55	2.93	2.57	3.02	2.59	3.09	2.60	3.16	2.61
	33	2.69	2.49	2.78	2.52	2.87	2.54	2.95	2.56	3.04	2.58	3.10	2.59
	35	2.60	2.46	2.72	2.49	2.80	2.52	2.88	2.54	2.97	2.56	3.05	2.58
	37	2.54	2.43	2.63	2.46	2.73	2.49	2.82	2.52	2.90	2.54	2.98	2.55
	39	2.45	2.40	2.55	2.43	2.65	2.46	2.75	2.49	2.83	2.51	2.92	2.53

Models FDFLJ45HKXE2, FDFUJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Models FDFLJ71HKXE2, FDFUJ71HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

19.2.7 Characteristics of fan

(1) Cassetteria type (FDR)

- External static pressure table

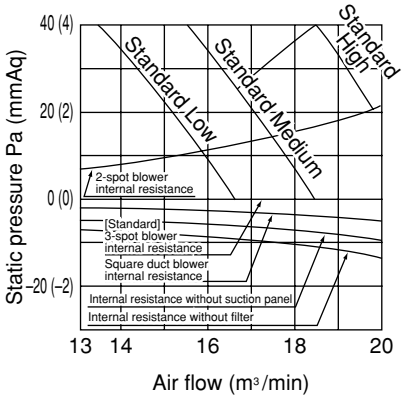
Unit : Pa (mmAq)

Type \ Duct specs. / Air flow (m³/min)		1 spot (1) closing		Standard (2)		Square duct (3)	
		Standard	High(4) speed	Standard	High(4) speed	Standard	High(4) speed
FDR22 type	10	-	-	45 (4.5)	85 (8.5)	50 (5)	90 (9)
FDR28 type	12	-	-	45 (4.5)	85 (8.5)	45 (4.5)	85 (8.5)
FDR45 56 type	14	-	-	50 (5)	85 (8.5)	50 (5)	90 (9)
FDR71 type	18	30 (3)	65 (6.5)	45 (4.5)	80 (8)	50 (5)	85 (8.5)
FDR90 type	20	25 (2.5)	60 (6)	45 (4.5)	80 (8)	50 (5)	85 (8.5)
FDR112 type	28	40 (4)	70 (7)	50 (5)	80 (8)	55 (5.5)	85 (8.5)
FDR140 type	34	40 (4)	70 (7)	50 (5)	80 (8)	55 (5.5)	85 (8.5)

Notes (1) 1 spot closing: Round duct flange at center is removed and shield with a special panel (option).
(2) Standard: Ø200 duct 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

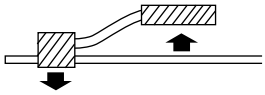
Example : Case of FDRJ71HKXE2



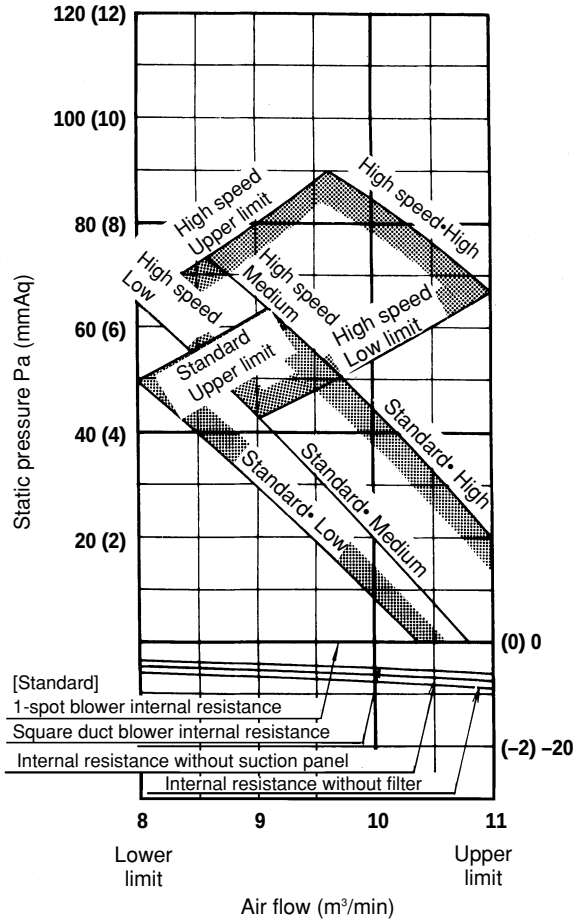
① **2-spot blowout.....**
Internal resistance increases more than the standard 3-spot blowout. Approx. 1.4mmAq at 17m³/min

② **Square duct blowout.....**
Internal resistance decreases more than the standard round duct (ø200 3-spot). 3 Pa (0.3mmAq) at 17 m³/nin. (External static pressure increases in reverse.)

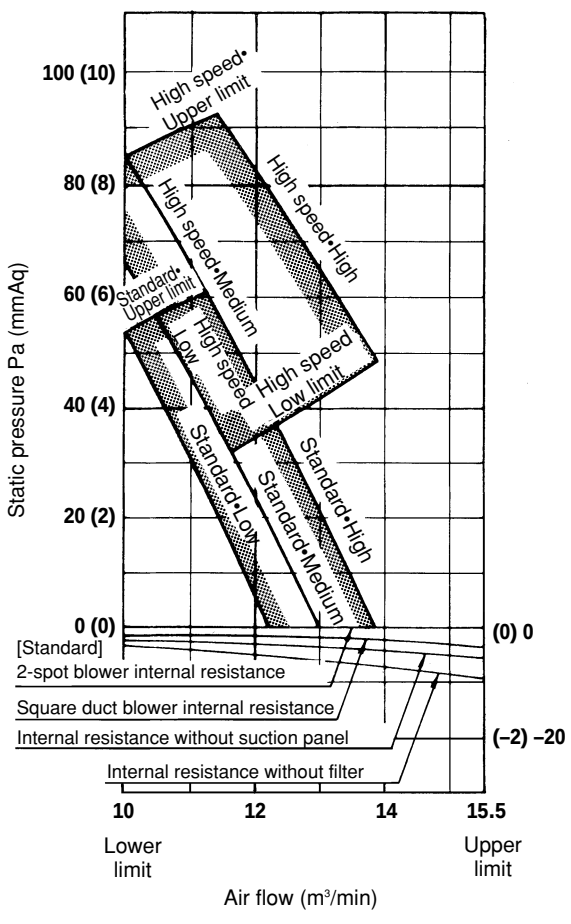
③ **Suction panel.....**
When the suction panel is not used with the ceiling return type, the part of internal resistance related to the panel decrease. 3 Pa (0.3mmAq) (= 0.6–0.3) at 17mm³/min.



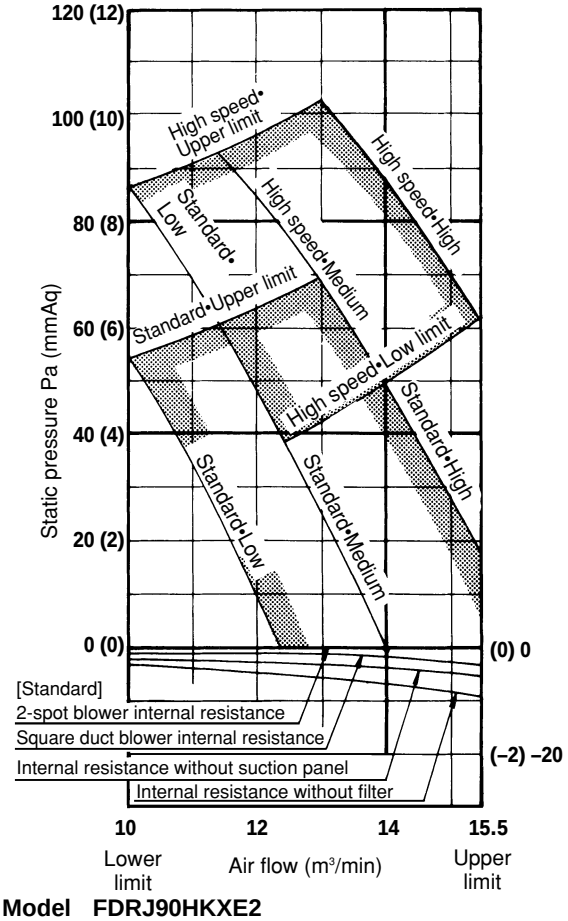
Model FDRJ22HKXE2



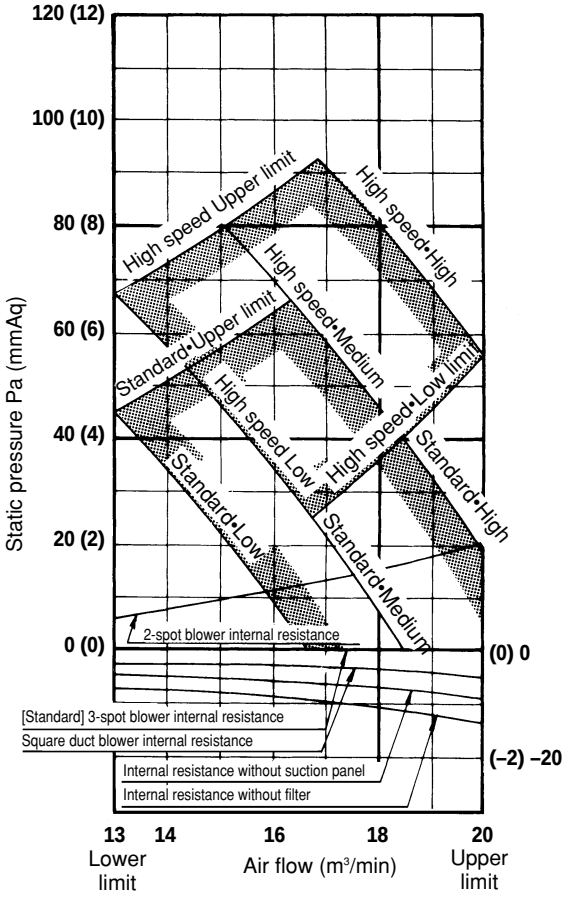
Model FDRJ28HKXE2



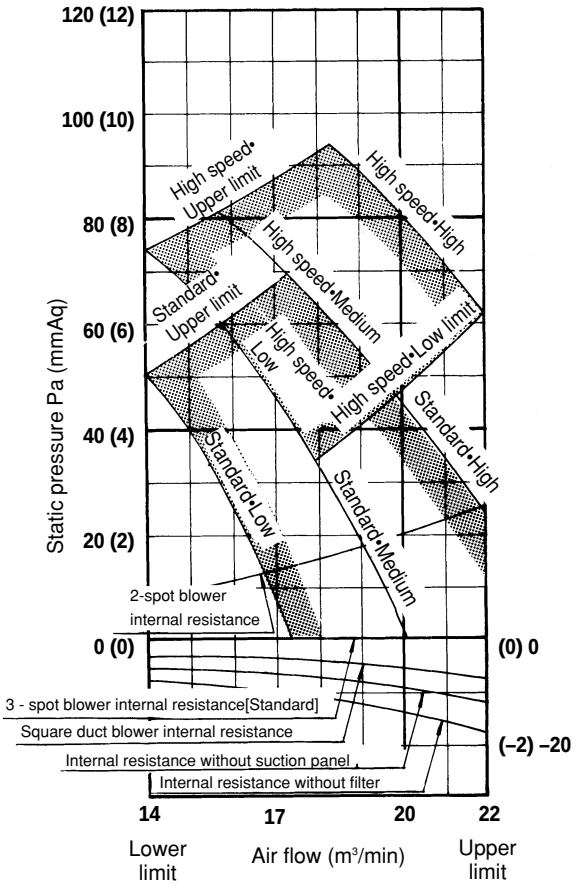
Models FDRJ45HKXE2, 56HKXE2



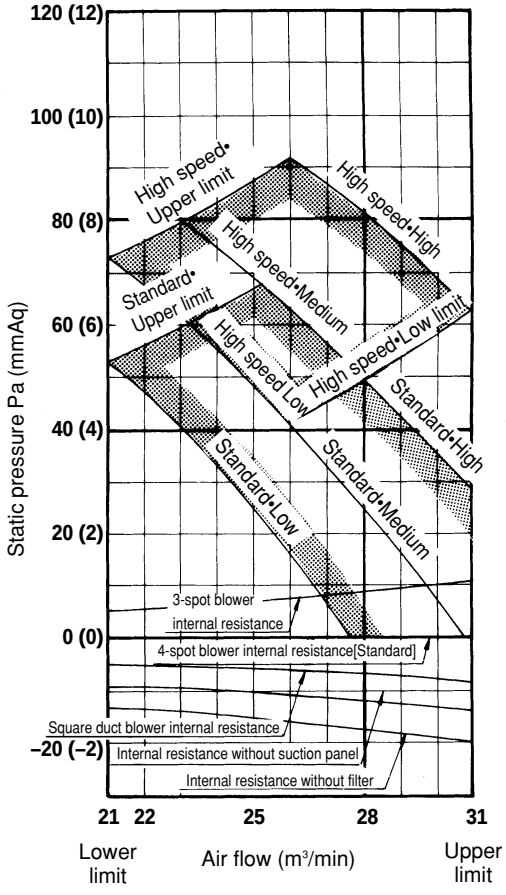
Model FDRJ71HKXE2



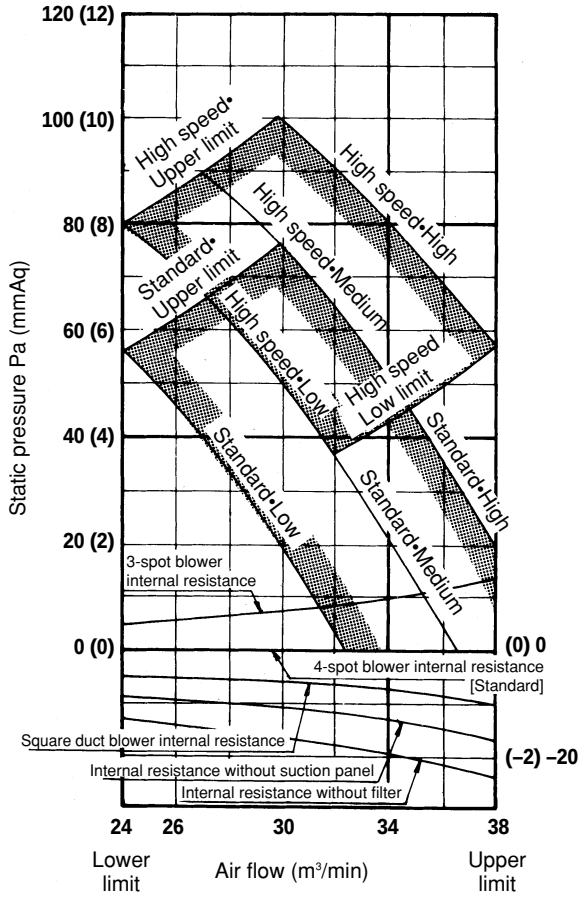
Model FDRJ90HKXE2



Model FDRJ112HKXE2



Model FDRJ140HKXE2



(2) Satellite ducted type (FDUM)

- External static pressure table

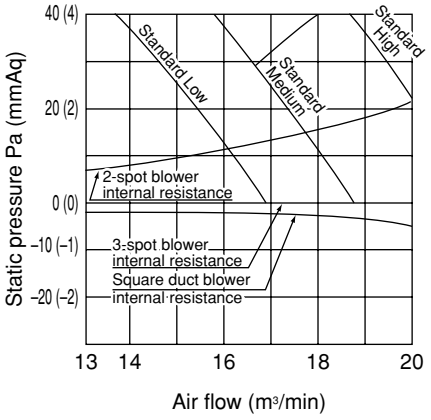
Unit : Pa (mmAq)

Type \ Duct specs. / Air flow (m^3/min)		1 spot closing		Standard		Square duct	
		Stan-dard	High(4) speed	Stan-dard	High(4) speed	Stan-dard	High(1) speed
FDUM36 type	12	-	-	50 (5)	85 (8.5)	50 (5)	90 (9)
FDUM45 56 type	14	-	-	50 (5)	85 (8.5)	50 (5)	90 (9)
FDUM71 type	18	35 (3.5)	70 (7)	50 (5)	85 (8.5)	55 (5.5)	90 (9)
FDUM90 type	20	30 (3)	65 (6.5)	50 (5)	85 (8.5)	55 (5.5)	90 (9)
FDUM112 type	28	50 (5)	80 (8)	60 (6)	90 (9)	65 (6.5)	95 (9.5)
FDUM140 type	34	50 (5)	75 (7.5)	60 (6)	85 (8.5)	65 (6.5)	95 (9.5)

Note (1) For high speed operation, insert the white connector and the red connector beside the control box in other places respectively.

How to interpret the blower characteristics table

Example : Case of FDUMJ71HKXE2



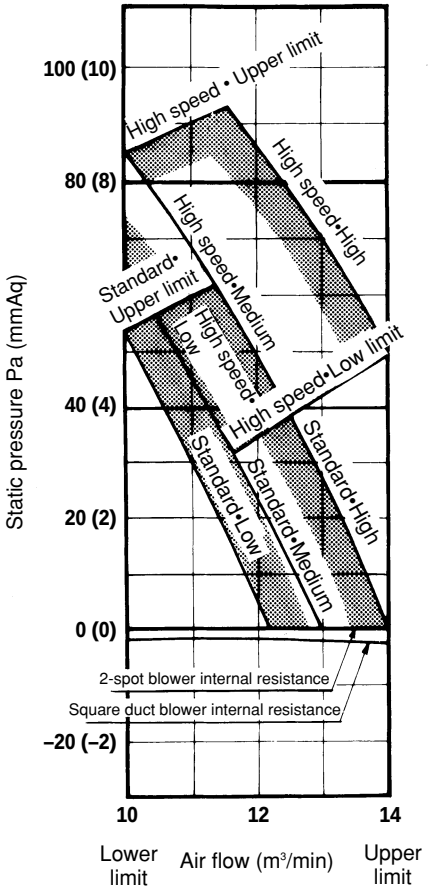
1 **2-spot blowout.....**

Internal resistance increases more than the standard 3-spot blowout. Approx. 14Pa (1.4mmAq) at 17m^3/min

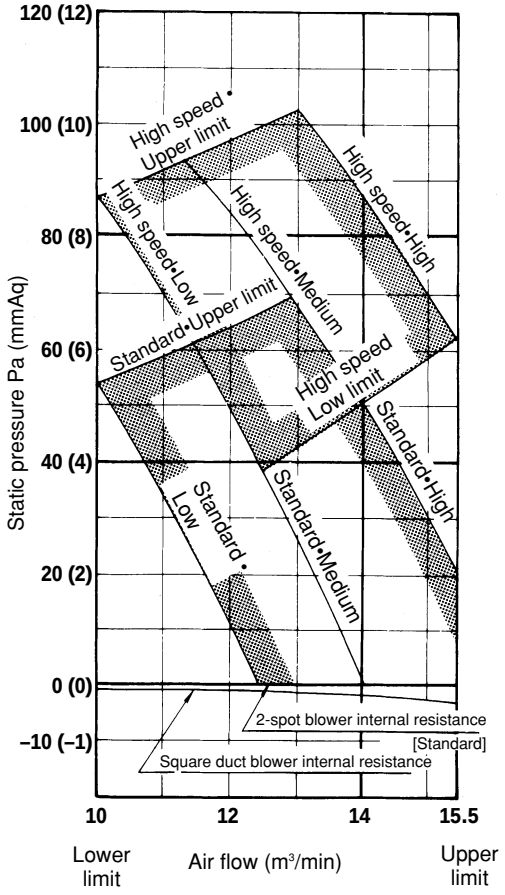
2 **Square duct blowout.....**

Internal resistance decreases more than the standard round duct (ø200 3-spot). 3Pa (0.3mmAq) at 17 m^3/min. (External static pressure increases in reverse.)

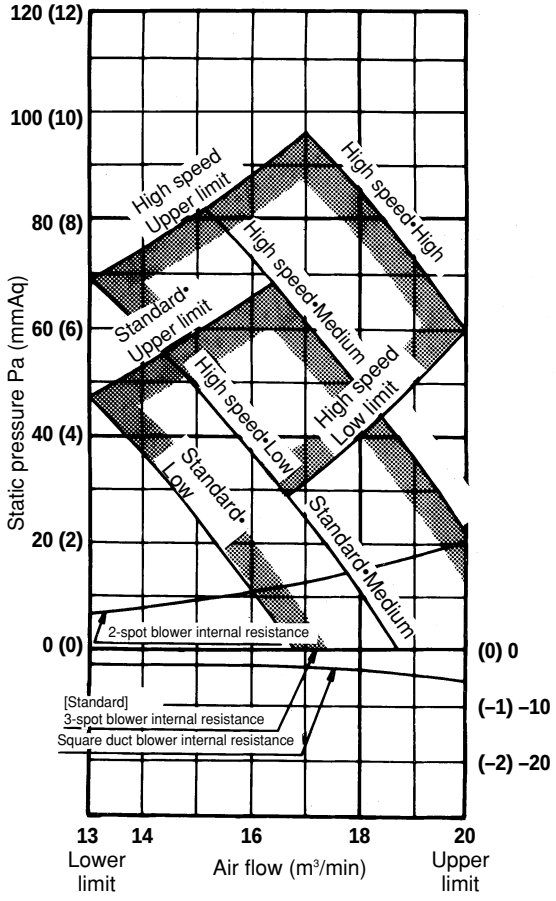
Model FDUMJ36HKXE2



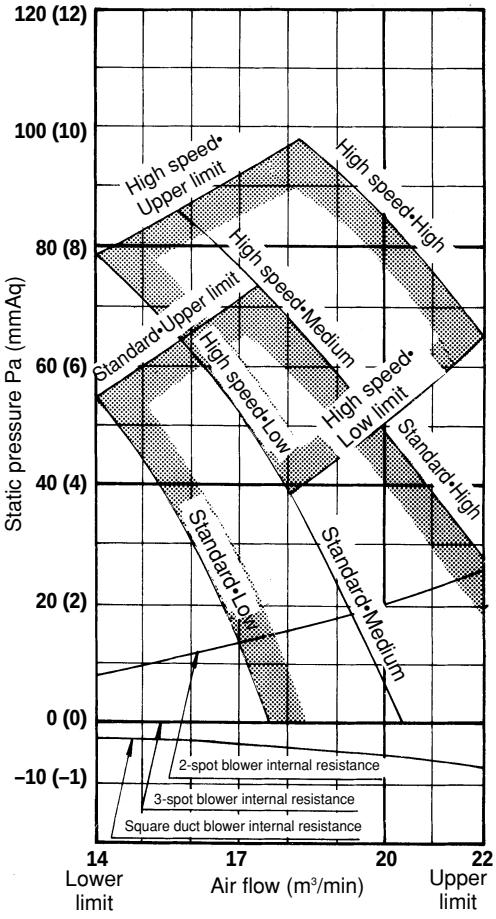
Models FDUMJ45HKXE2, 56HKXE2



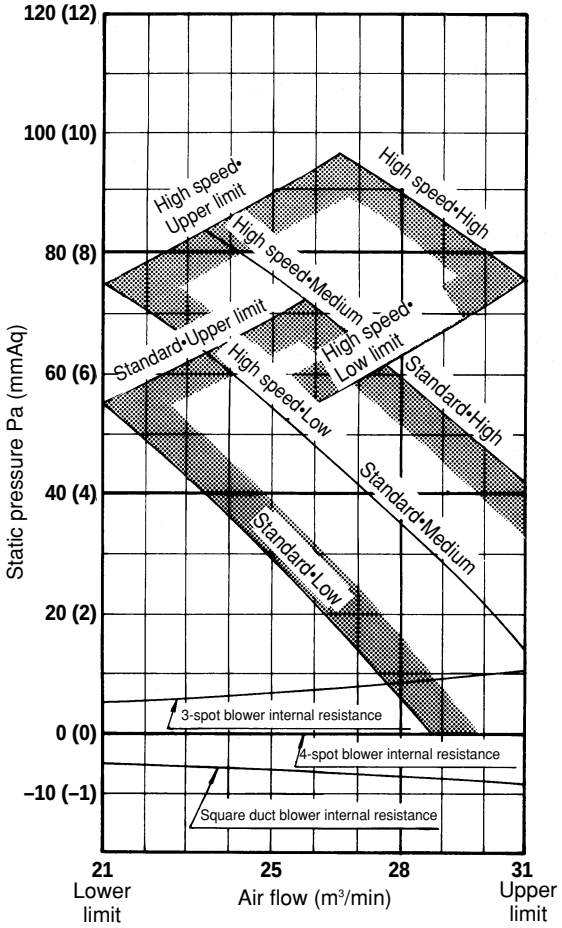
Model FDUMJ71HKXE2



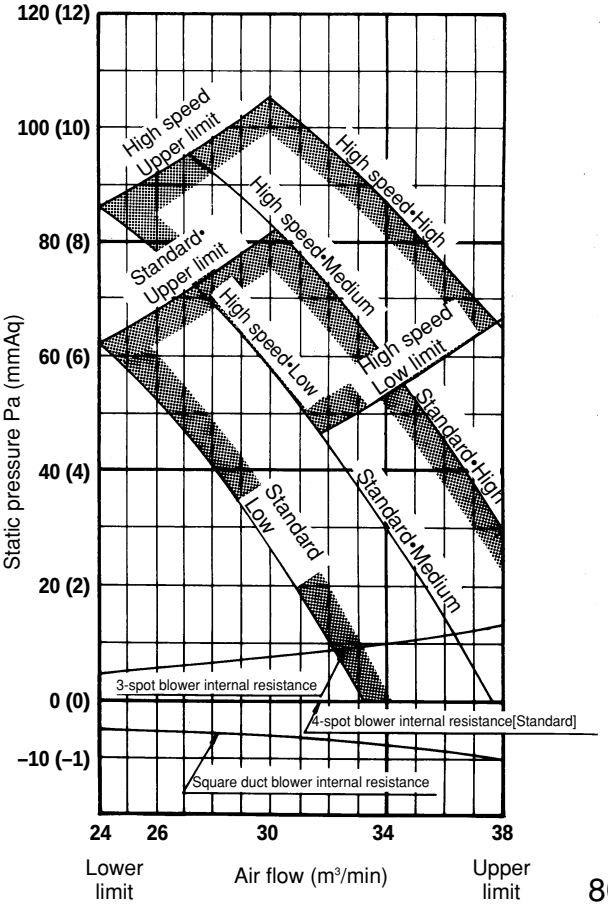
Model FDUMJ90HKXE2



Model FDUMJ112HKXE2



Model FDUMJ140HKXE2



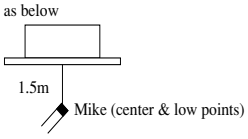
19.2.8 Noise level

Note (1) The data are based on the following conditions.
Ambient air tempetature: Indoor unit 27°C DB, 19°C WB. Outdoor unit 35°C DB
(2) The data in the chart are measuted in an unechonic room.
(3) The noise levels measured in the field are usually higher than the data because of reflection.

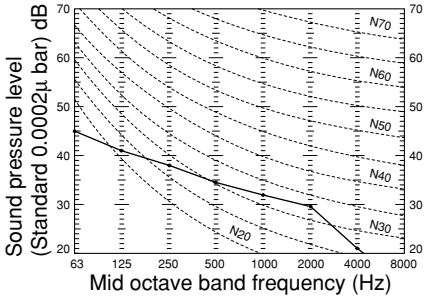
(1) Indoor unit

(a) Ceiling recessed type (FDT)

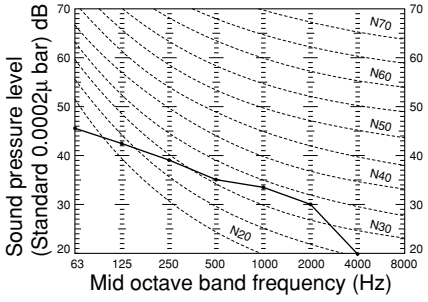
Measured based on JIS B 8616
Mike position as below



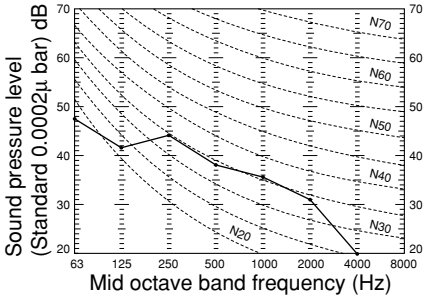
Models FDTJ28HKXE2,36HKXE2
Noise level 37 dB (A) at HIGH
34 dB (A) at MEDIUM
33 dB (A) at LOW



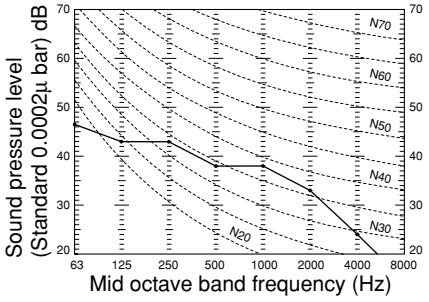
Models FDTJ45HKXE2,56HKXE2
Noise level 38 dB (A) at HIGH
35 dB (A) at MEDIUM
34 dB (A) at LOW



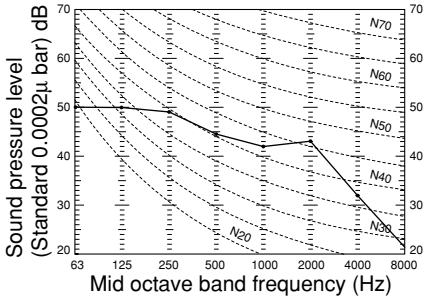
Model FDTJ71HKXE2
Noise level 40 dB (A) at HIGH
38 dB (A) at MEDIUM
36 dB (A) at LOW



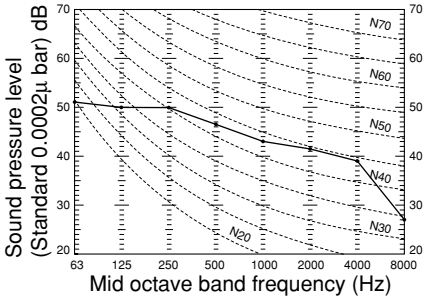
Model FDTJ90HKXE2
Noise level 42 dB (A) at HIGH
40 dB (A) at MEDIUM
38 dB (A) at LOW



Model FDTJ112HKXE2
Noise level 49 dB (A) at HIGH
46 dB (A) at MEDIUM
42 dB (A) at LOW

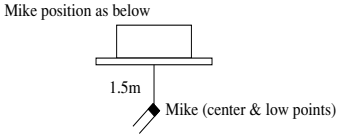


Model FDTJ140HKXE2
Noise level 50 dB (A) at HIGH
47 dB (A) at MEDIUM
45 dB (A) at LOW

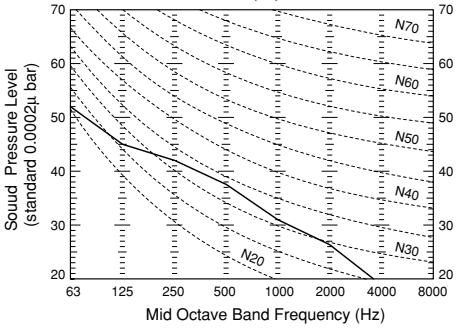


(b) 2-way outlet ceiling recessed type (FDTW)

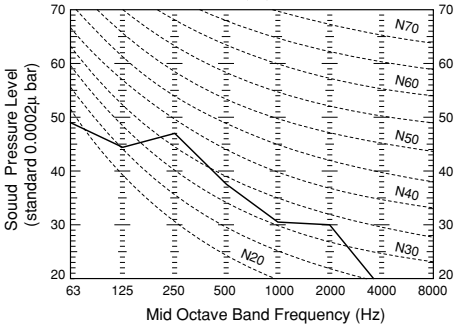
Measured based on JIS B 8616
Mike position as below



Models FDTWJ28HKXE2B, 45HKXE2B 56HKXE2B
Noise level 39 dB (A) at HIGH
36 dB (A) at MEDIUM
33 dB (A) at LOW

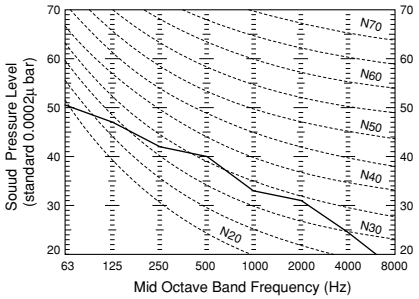


Model FDTWJ71HKXE2B
Noise level 41 dB (A) at HIGH
38 dB (A) at MEDIUM
35 dB (A) at LOW



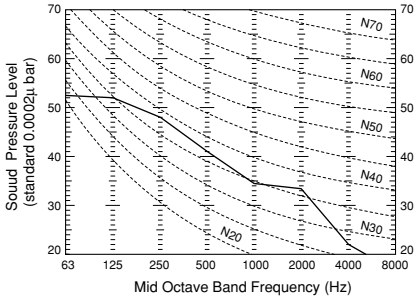
Model FDTWJ90HKXE2B

Noise level 41 dB (A) at HIGH
39 dB (A) at MEDIUM
36 dB (A) at LOW



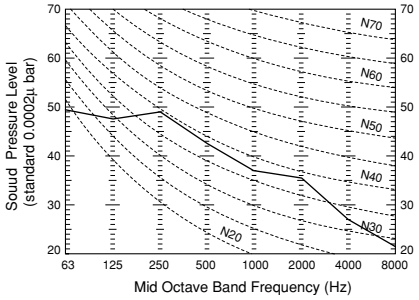
Model FDTWJ112HKXE2B

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



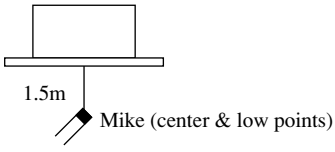
Model FDTWJ140HKXE2B

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



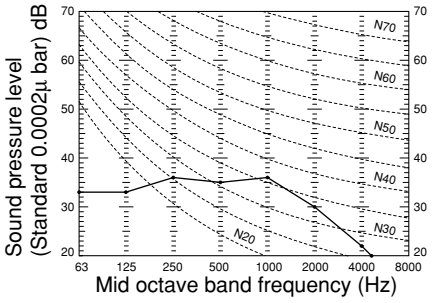
(c) 1-way outlet ceiling recessed type (FDTS)

Measured based on JIS B 8616
Mike position as below



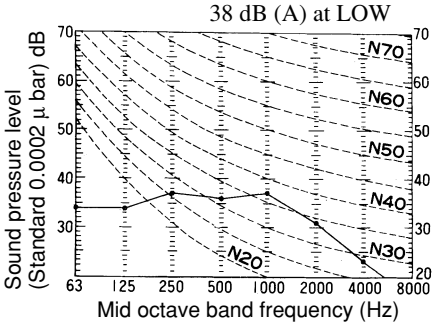
Model FDTSJ22HKXE2B

Noise level 39 dB (A) at MEDIUM
38 dB (A) at LOW



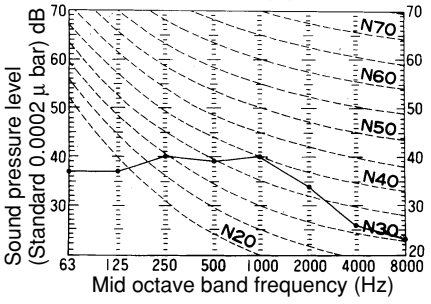
Models FDTSJ28HKXE2B, 36HKXE2B

Noise level 40 dB (A) at HIGH
39 dB (A) at MEDIUM
38 dB (A) at LOW



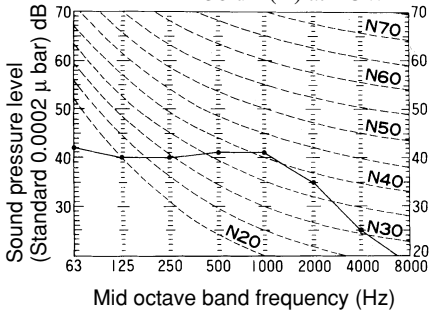
Model FDTSJ45HKXE2B

Noise level 43 dB (A) at HIGH
40 dB (A) at MEDIUM
38 dB (A) at LOW



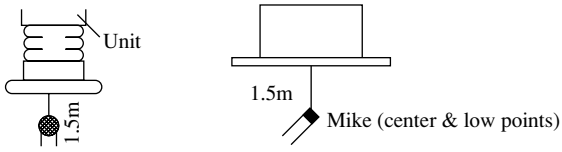
Model FDTSJ71HKXE2B

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



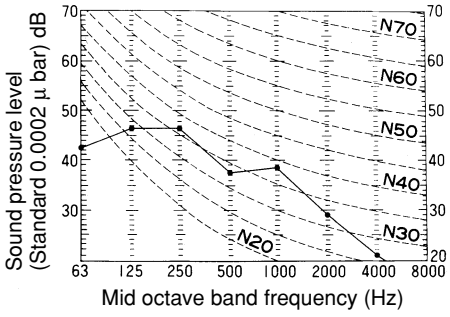
(d) Cassetteria type (FDR)

Measured based on JIS B 8616
Mike position as below

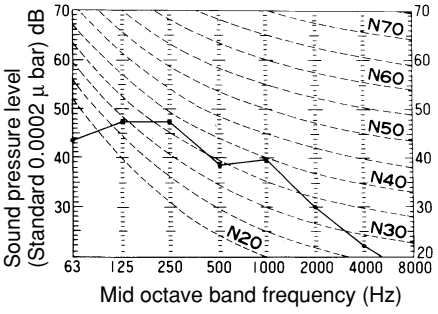


(i) Canvas duct Panel type

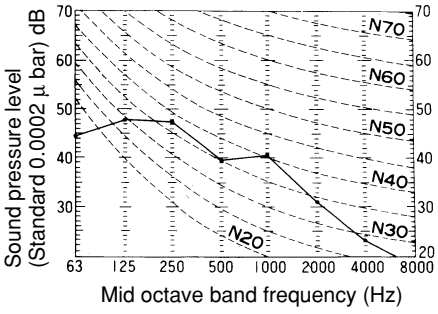
Model FDRJ22HKXE2
Noise level 42 dB (A) at HIGH
40 dB (A) at MEDIUM
37 dB (A) at LOW



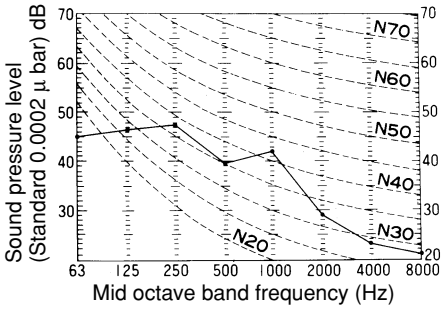
Model FDRJ28HKXE2
Noise level 43 dB (A) at HIGH
41 dB (A) at MEDIUM
38 dB (A) at LOW



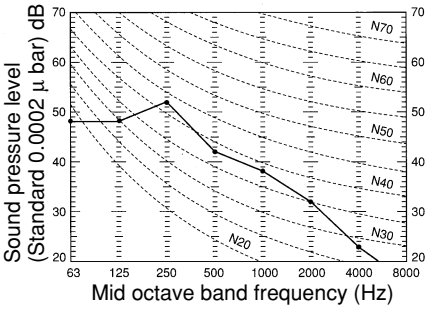
Models FDRJ45HKXE2, 56HKXE2
Noise level 44 dB (A) at HIGH
41 dB (A) at MEDIUM
38 dB (A) at LOW



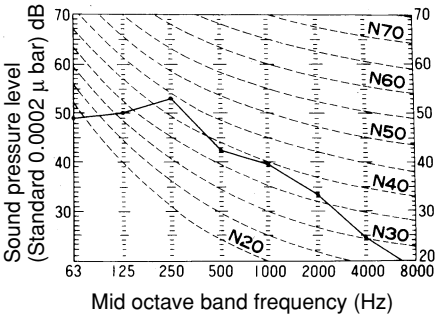
Models FDRJ71HKXE2, 90HKXE2
Noise level 44 dB (A) at HIGH
41 dB (A) at MEDIUM
38 dB (A) at LOW



Model FDRJ112HKXE2
Noise level 46 dB (A) at HIGH
43 dB (A) at MEDIUM
39 dB (A) at LOW

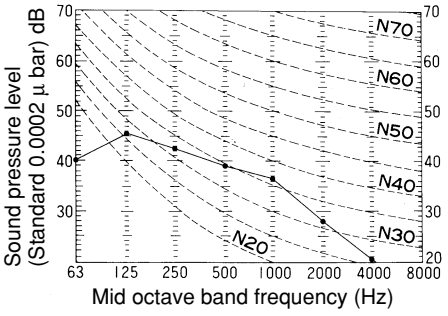


Model FDRJ140HKXE2
Noise level 47 dB (A) at HIGH
44 dB (A) at MEDIUM
40 dB (A) at LOW

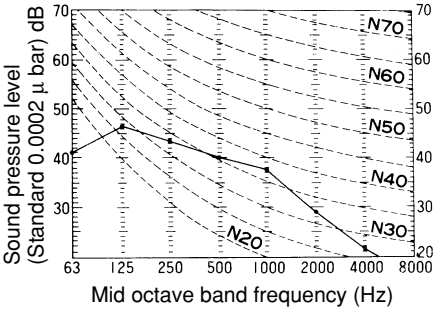


(ii) Silent Panel type

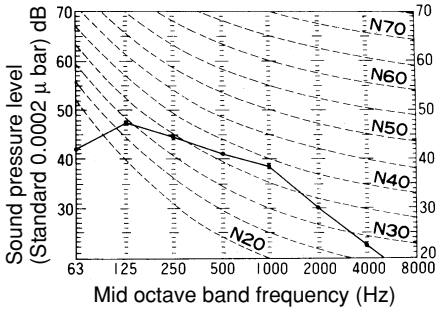
Model FDRJ22HKXE2
Noise level 41 dB (A) at HIGH
39 dB (A) at MEDIUM
36 dB (A) at LOW



Model FDRJ28HKXE2
Noise level 42 dB (A) at HIGH
40 dB (A) at MEDIUM
37 dB (A) at LOW

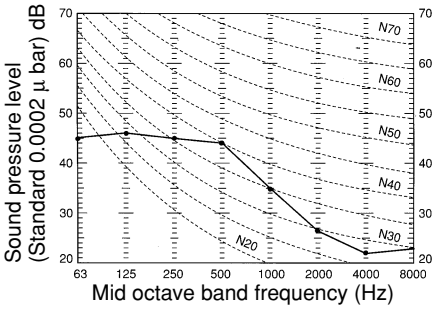


Models FDRJ45HKXE2, 56HKXE2
Noise level 43 dB (A) at HIGH
40 dB (A) at MEDIUM
37 dB (A) at LOW



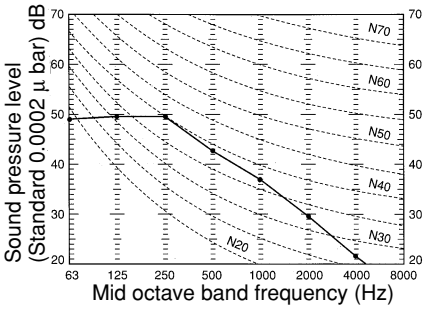
Models FDRJ71HKXE2, 90HKXE2

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



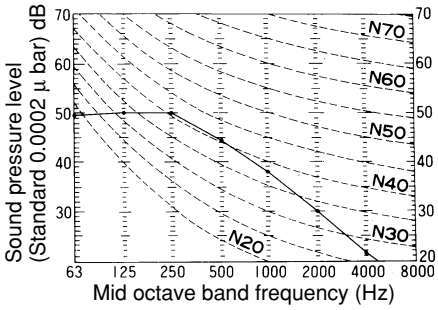
Model FDRJ112HKXE2

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



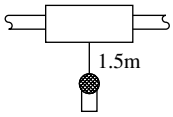
Model FDRJ140HKXE2

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



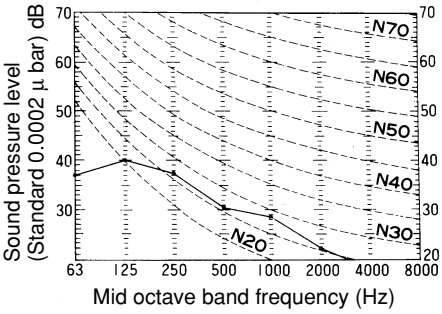
(e) Satellite ducted type (FDUM)

Measured based on JIS B 8616
Mike position as below



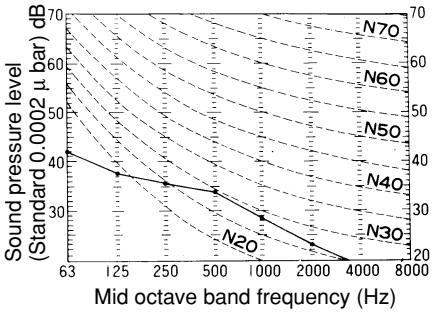
Model FDUMJ36HKXE2

Noise level 34 dB (A) at HIGH
32 dB (A) at MEDIUM
29 dB (A) at LOW



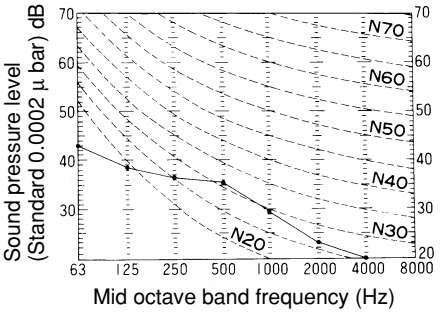
Models FDUMJ45HKXE2, 56HKXE2 71HKXE2

Noise level 35 dB (A) at HIGH
32 dB (A) at MEDIUM
29 dB (A) at LOW



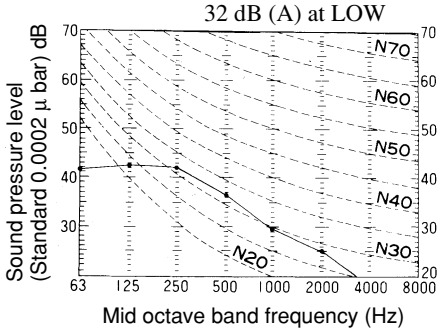
Model FDUMJ90HKXE2

Noise level 36 dB (A) at HIGH
33 dB (A) at MEDIUM
30 dB (A) at LOW



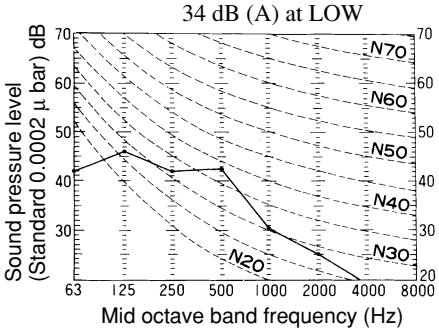
Model FDUMJ112HKXE2

Noise level 38 dB (A) at HIGH
35 dB (A) at MEDIUM
32 dB (A) at LOW

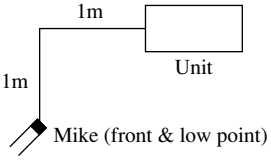


Model FDUMJ140HKXE2

Noise level 39 dB (A) at HIGH
37 dB (A) at MEDIUM
34 dB (A) at LOW



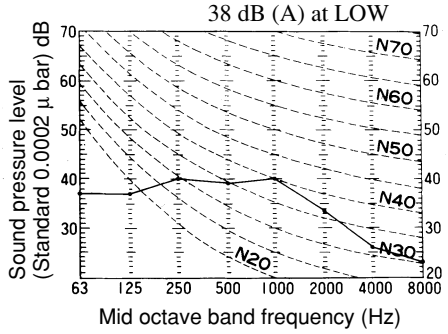
(f) Ceiling suspension type (FDE)



Measured based on JIS B 8616
Mike position as below

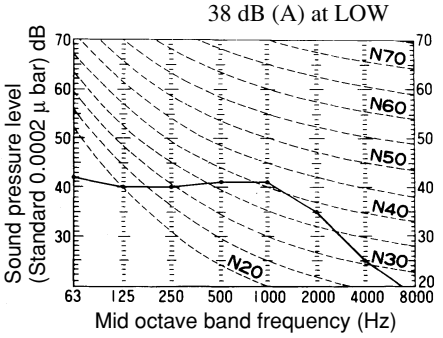
Models FDEJ36HKXE2B, 45HKXE2B 56HKXE2B

Noise level 43 dB (A) at HIGH
40 dB (A) at MEDIUM
38 dB (A) at LOW



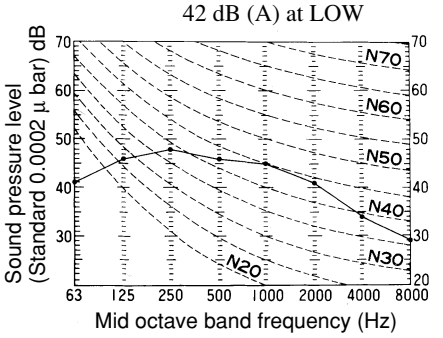
Model FDEJ71HKXE2B

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



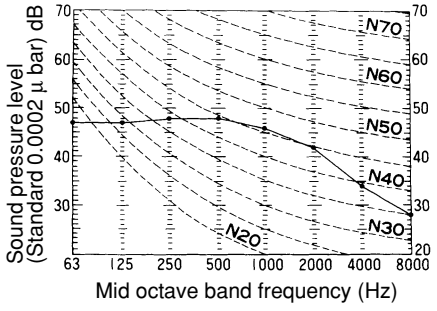
Model FDEJ112HKXE2B

Noise level 49 dB (A) at HIGH
46 dB (A) at MEDIUM
42 dB (A) at LOW

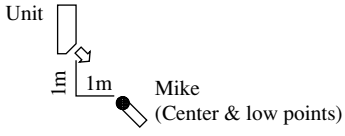


Model FDEJ140HKXE2B

Noise level 50 dB (A) at HIGH
47 dB (A) at MEDIUM
42 dB (A) at LOW



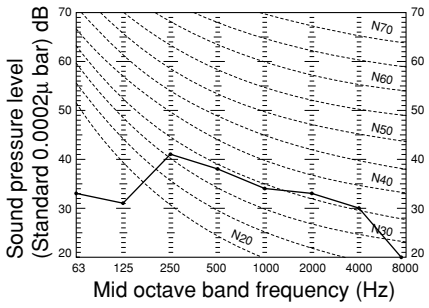
(g) Wall mounted type (FDK)



Measured based on JIS B 8616
Mike position as below

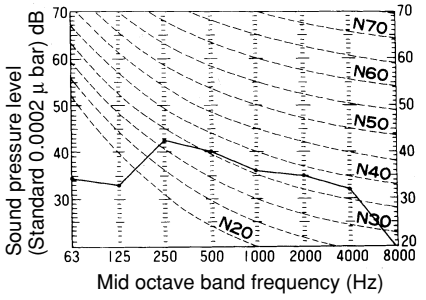
Model FDKJ22HKXE2

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



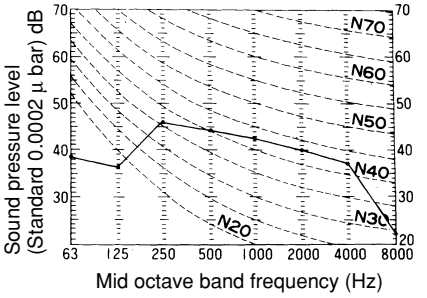
Models FDKJ28HKXE2, 36HKXE2

Noise level 42 dB (A) at HIGH
40 dB (A) at MEDIUM
37 dB (A) at LOW



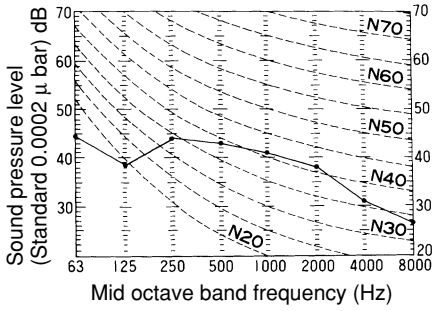
Model FDKJ45HKXE2

Noise level 44 dB (A) at HIGH
41 dB (A) at MEDIUM
37 dB (A) at LOW



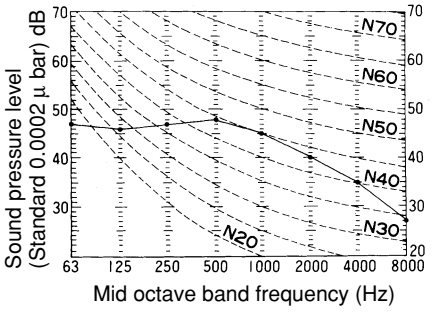
Model FDKJ56HKXE2

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



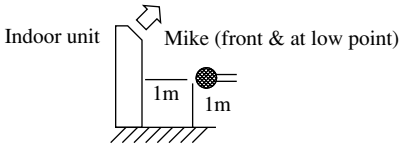
Model FDKJ71HKXE2

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



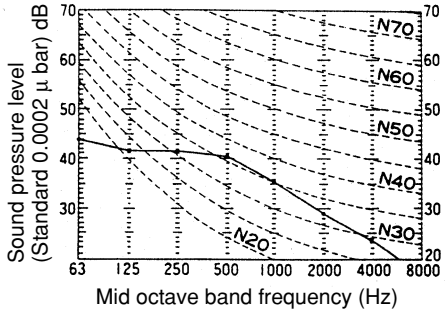
(h) Floor standing type (FDFL, FDFU))

Measured based on JIS B 8616
Mike position as below



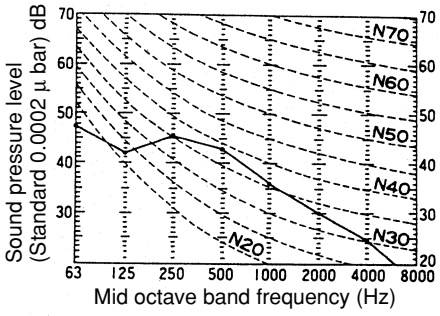
Models FDFLJ28HKXE2, FDFUJ28HKXE2

Noise level 41 dB (A) at HIGH
38 dB (A) at MEDIUM
36 dB (A) at LOW



Models FDFLJ45HKXE2, 71HKXE2
FDFUJ45HKXE2, 56HKXE2, 71HKXE2

Noise level 43 dB (A) at HIGH
41 dB (A) at MEDIUM
40 dB (A) at LOW

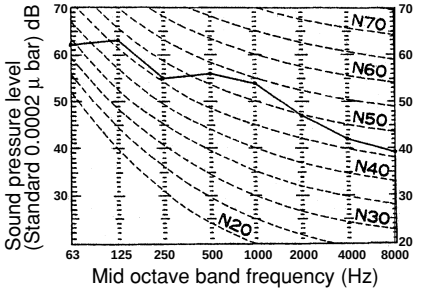


(2) Outdoor unit (FDC)

Note (1) The positions for the microphones are directly in front of the unit, each at a height of 1 meter and this is the measured value.

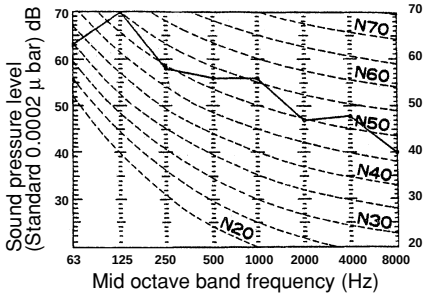
Models FDCP140HKXE2B
FDCJ140HKXE2B

Noise level 56 dB (A)



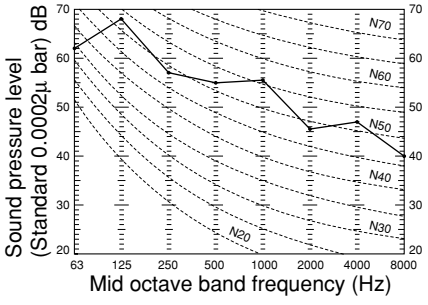
Models FDCP224HKXE2B
FDCJ224HKXE2B

Noise level 58 dB (A)



Models FDCP280HKXE2B
FDCJ280HKXE2B

Noise level 59 dB (A)



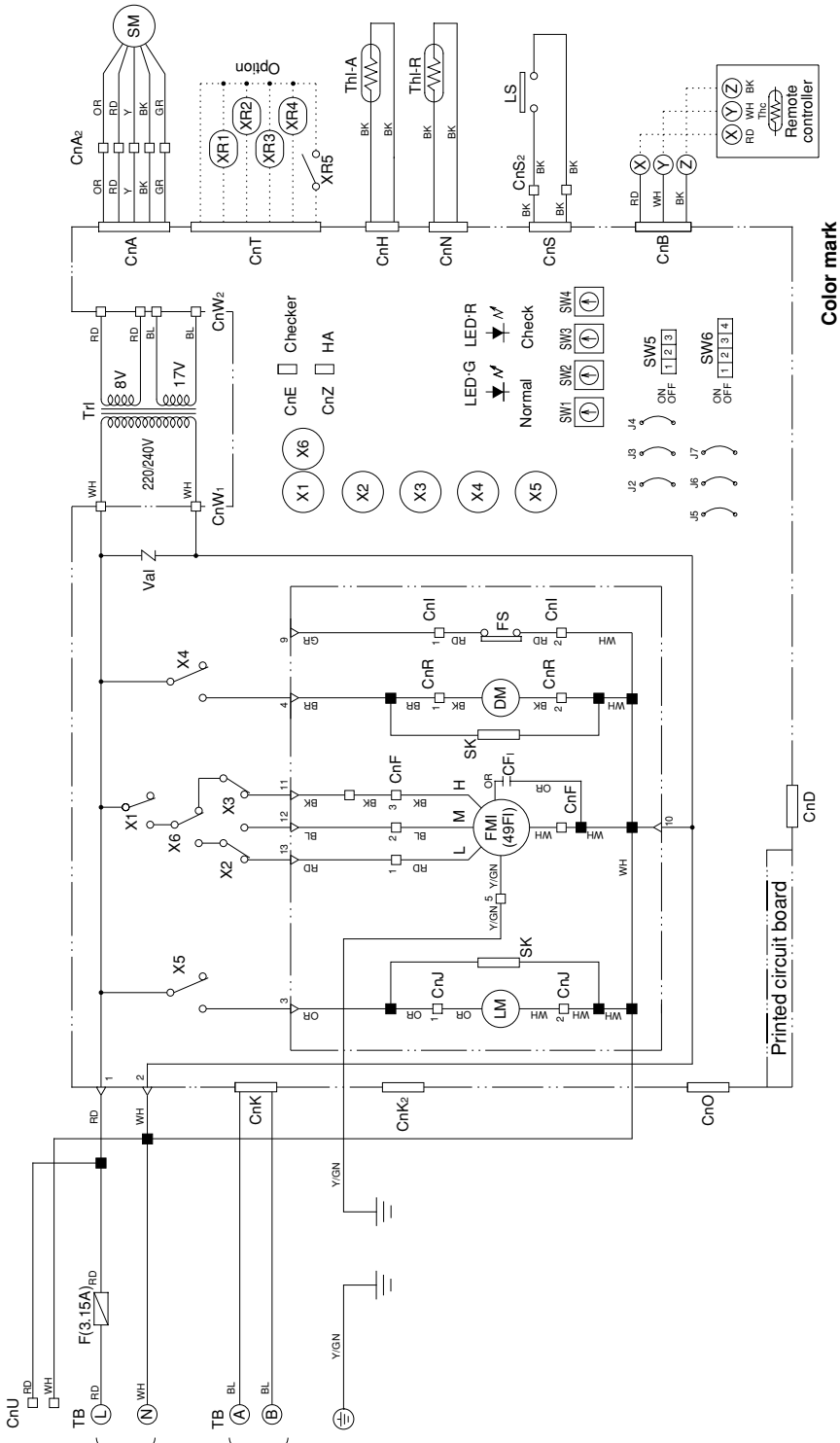
19.3 ELECTRICAL DATA

19.3.1 Electrical wiring

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models All models



Color mark

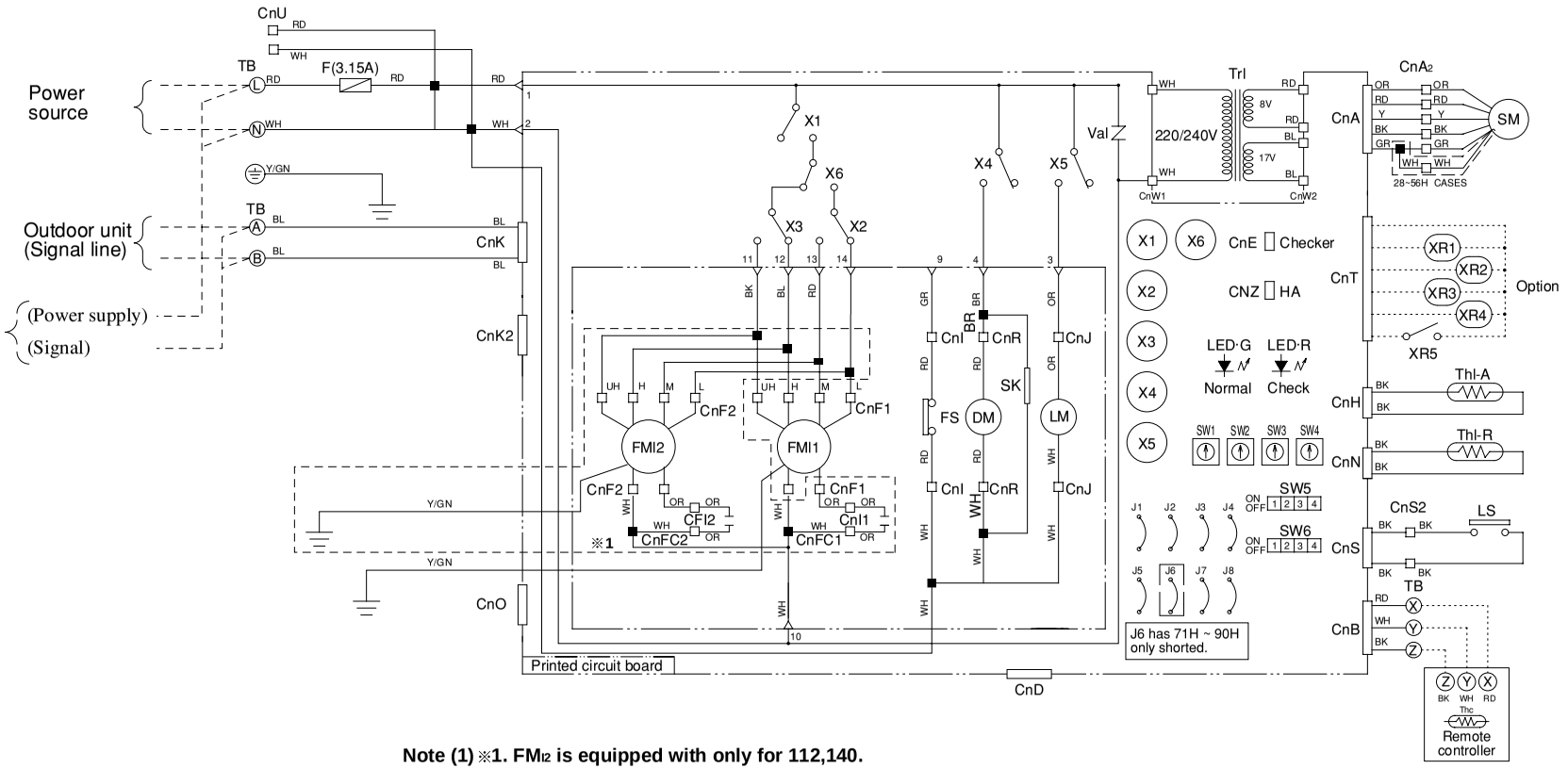
Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
GR	Gray	Y/GN	Yellow/Green
OR	Orange		

Function of switches

Mark		Function	
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3°C	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FMI	Fan motor	ThI-A	Thermistor	F	Fuse
49FI	Internal thermostat for FMI	ThI-R	Thermistor	CnA-Z	Connector (□ mark)
CFI	Capacitor for FMI	SW1	Indoor unit address ten's place	TB	Terminal block
DM	Drain motor	SW2	Indoor unit address unit's place	◁mark	Terminal (F)
FS	Float switch (For overflow prevention)	SW3	Outdoor unit address ten's place	■ mark	Connector
LM	Louver motor	SW4	Outdoor unit address unit's place	XR1	Operation indication (DC12)
LS	Limit switch	SW6	Change of heat pume type	XR2	Heating indication (DC12)
SM	Stepping motor (For Exp.v)	Trl	Transformer	XR3	ON indication for CM (DC12)
X1,2,3,6	Auxiliary relay (For FMI)	Val	Varistor	XR4	Check indication (DC12)
X4	Auxiliary relay (For DM)	LED·R	Indication lamp (Red)	XR5	Distant operation
X5	Auxiliary relay (For LM)	LED·G	Indication lamp (Green)	SK	Spark killer



Note (1) ※1. FM_{I2} is equipped with only for 112,140.

Color mark

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

Meaning of marks

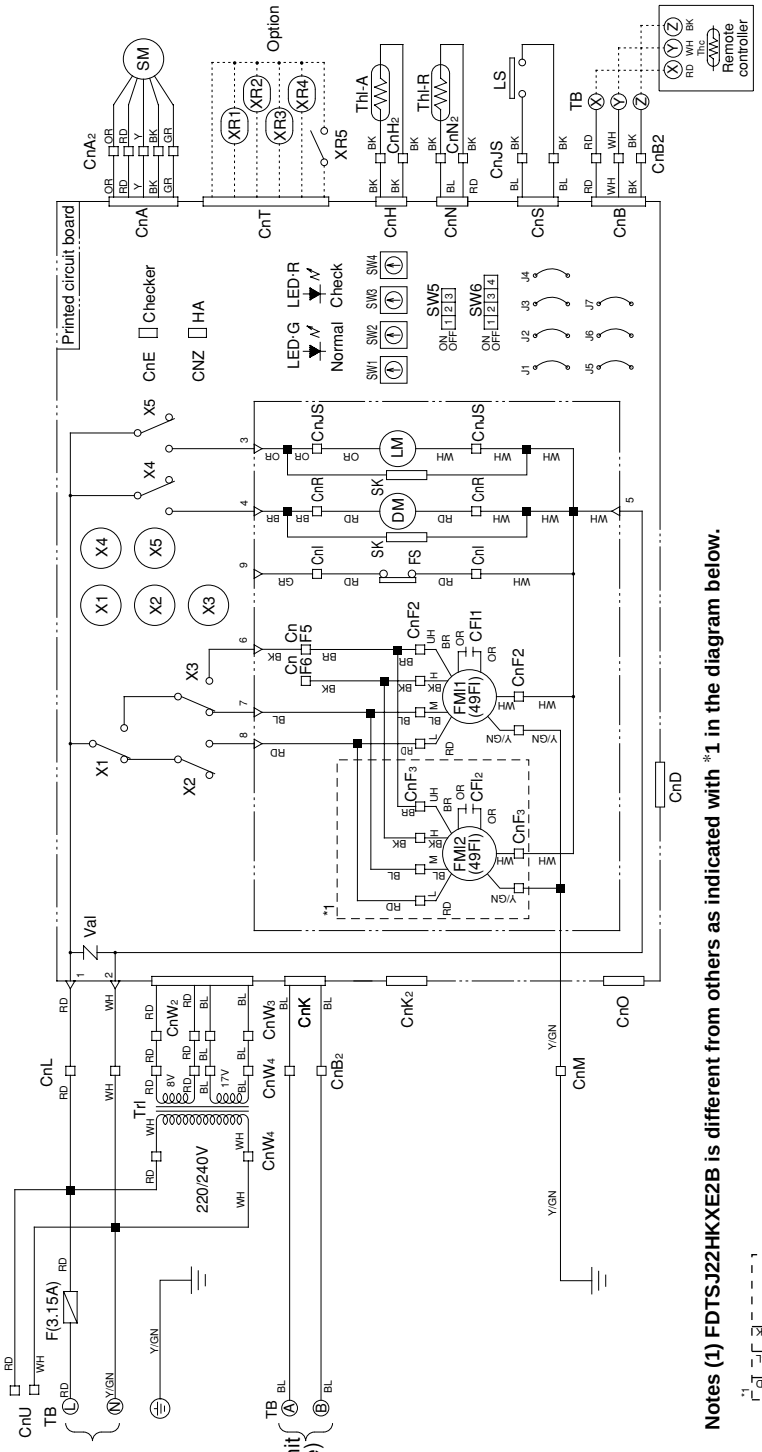
Mark	Parts name	Mark	Parts name	Mark	Parts name
FM_I	Fan motor	**ThI-A**	Thermistor	**F**	Fuse
$49F_I$	Internal thermostat for FM_I	**ThI-R**	Thermistor	**CnA-Z**	Connector (□ mark)
CF_I	Capacitor for FM_I	**SW1**	Indoor unit address ten's place	**TB**	Terminal block
DM	Drain motor	**SW2**	Indoor unit address unit's place	**◀mark**	Terminal (F)
FS	Float switch (For overflow prevention)	**SW3**	Outdoor unit address ten's place	**■ mark**	Connector
LM	Louver motor	**SW4**	Outdoor unit address unit's place	**XR1**	Operation indication (DC12)
LS	Limit switch	**SW6**	Change of heat pume type	**XR2**	Heating indication (DC12)
SM	Stepping motor (For Exp.v)	**TrI**	Transformer	**XR3**	ON indication for CM (DC12)
X1,2,3,6	Auxiliary relay (For FM_I)	**Val**	Varistor	**XR4**	Check indication (DC12)
X4	Auxiliary relay (For DM)	**LED·R**	Indication lamp (Red)	**XR5**	Distant operation
X5	Auxiliary relay (For LM)	**LED·G**	Indication lamp (Green)	**SK**	Spark killer

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3°C	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

(c) 1-way outlet ceiling recessed type (FDTS)

Models All models



Color mark

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

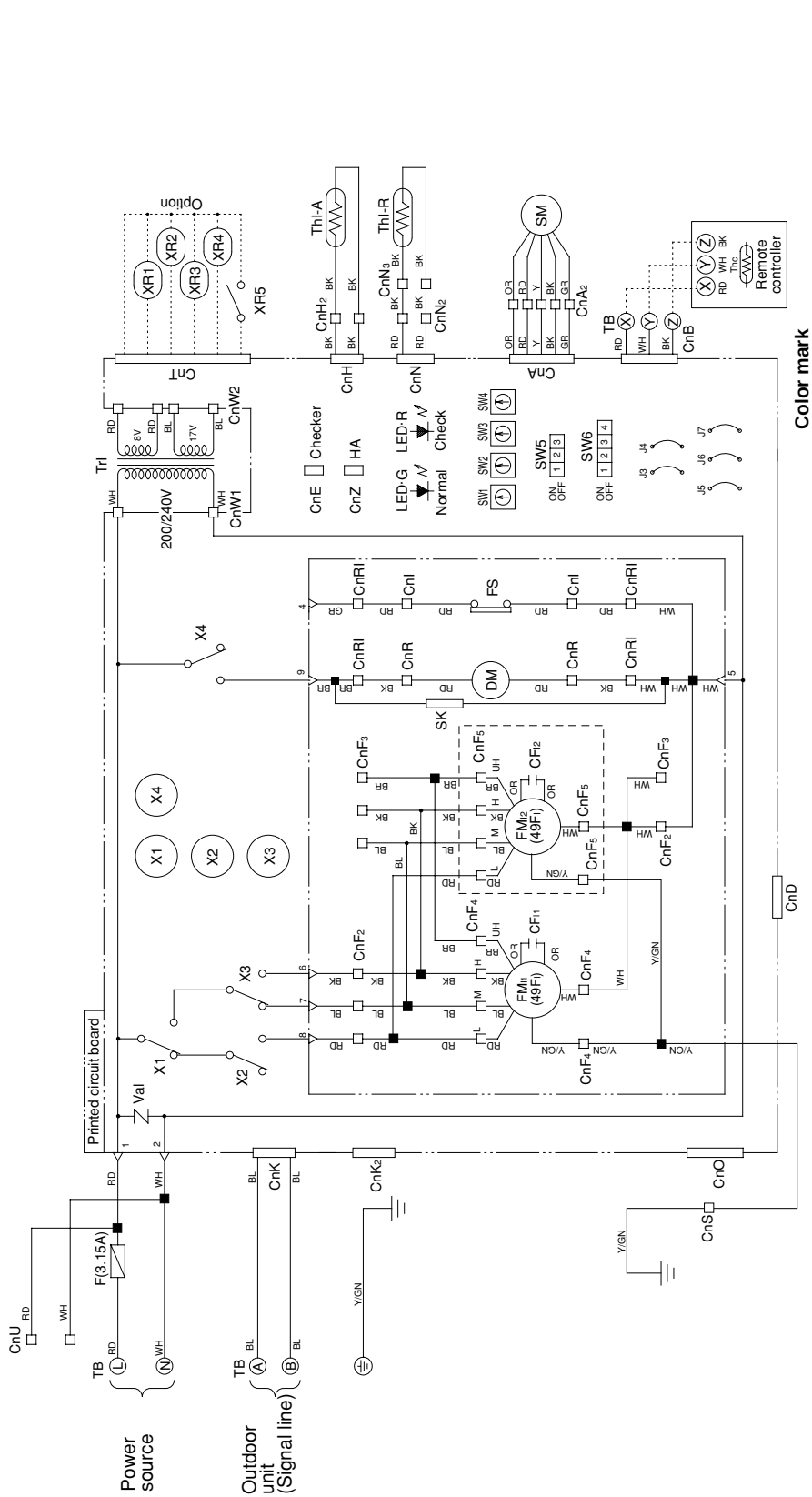
Function of switches

Mark		Function	
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3°C	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
$FM_{1,2}$	Fan motor	Thl-A	Thermistor	F	Fuse
$49F_1$	Internal thermostat for FM_1	Thl-R	Thermistor	CnA-Z	Connector (□ mark)
$CF_{1,2}$	Capacitor for FM_1	SW1	Indoor unit address ten's place	TB	Terminal block
DM	Drain motor	SW2	Indoor unit address unit's place	◀mark	Terminal (F)
FS	Float switch	SW3	Outdoor unit address ten's place	■mark	Connector
LM	Louver motor	SW4	Outdoor unit address unit's place	XR1	Operation indication (DC12)
LS	Limit switch	SW6	Change of heat pume type	XR2	Heating indication (DC12)
SM	Stepping motor (For Exp.v)	Trl	Transformer	XR3	ON indication for CM (DC12)
X1,2,3	Auxiliary relay (For FM_1)	Val	Varistor	XR4	Check indication (DC12)
X4	Auxiliary relay (For DM)	LED·R	Indication lamp (Red)	XR5	Distant operation
X5	Auxiliary relay (For LM)	LED·G	Indication lamp (Green)	SK	Spark killer

(d) Cassetteria type (FDR)
Models All models



Function of switches

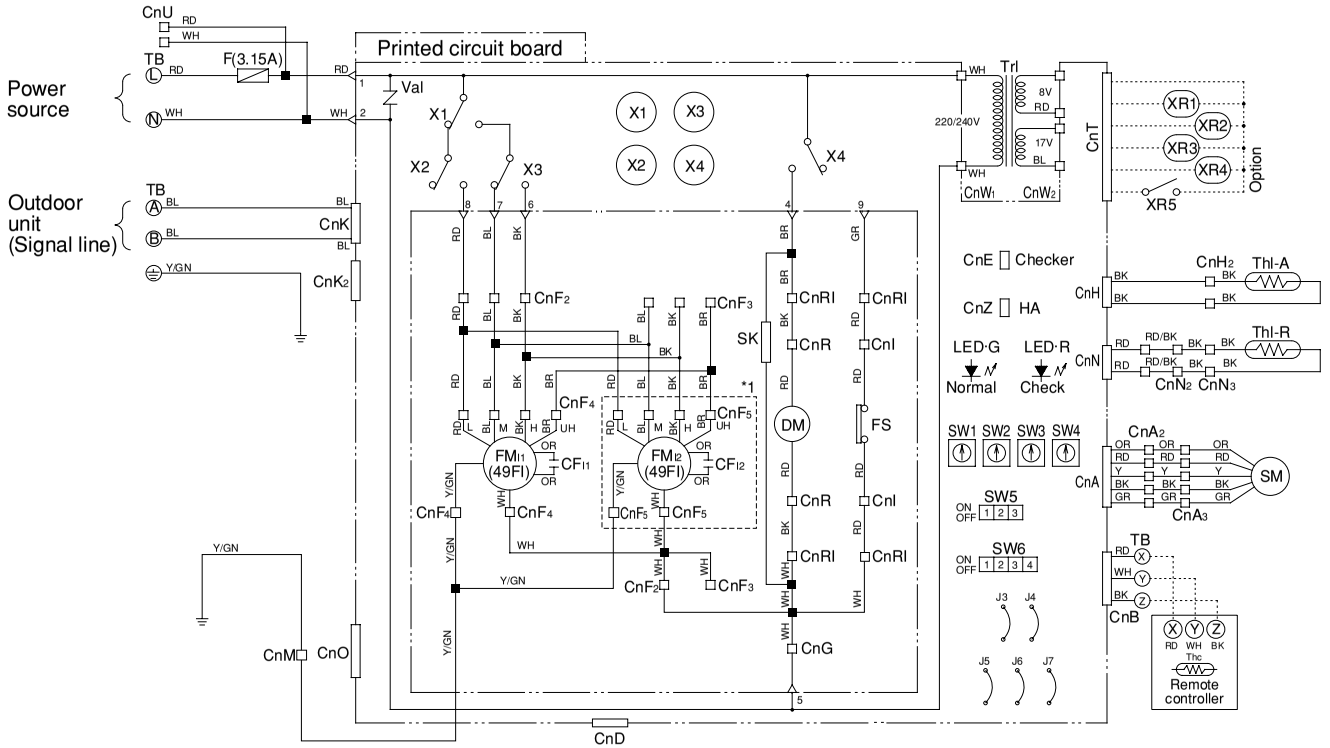
Mark		Function	
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3°C	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

Note (1) *1 FM_{I2} is equipped with only for FDRJ112HKXE2,140HKXE2.

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
$FM_{I1,2}$	Fan motor	Thi-R	Thermistor	CnA-Z	Connector (□ mark)
$CFI_{1,2}$	Capacitor for FM_I	SW1	Indoor unit address ten's place	TB	Terminal block
DM	Drain motor	SW2	Indoor unit address unit's place	◇mark	Terminal (F)
FS	Float switch	SW3	Outdoor unit address ten's place	■mark	Connector
SM	Stepping motor (For Exp.v)	SW4	Outdoor unit address unit's place	XR1	Operation indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	SW6	Change of heat pume type	XR2	Heating indication (DC12)
X4	Auxiliary relay (For DM)	Trl	Transformer	XR3	ON indication for CM (DC12)
$49F_I$	Internal thermostat for FM_I	Val	Varistor	XR4	Check indication (DC12)
Thl-A	Thermistor	LED·R	Indication lamp (Red)	XR5	Distant operation
		LED·G	Indication lamp (Green)	SK	Spark killer
		F	Fuse		

(e) Satellite ducted type (FDUM)
Models All models



Note (1) * 1 FM_{I2} is equipped with only for FDUMJ112HKXE2, 140HKXE2.

Meaning of marks

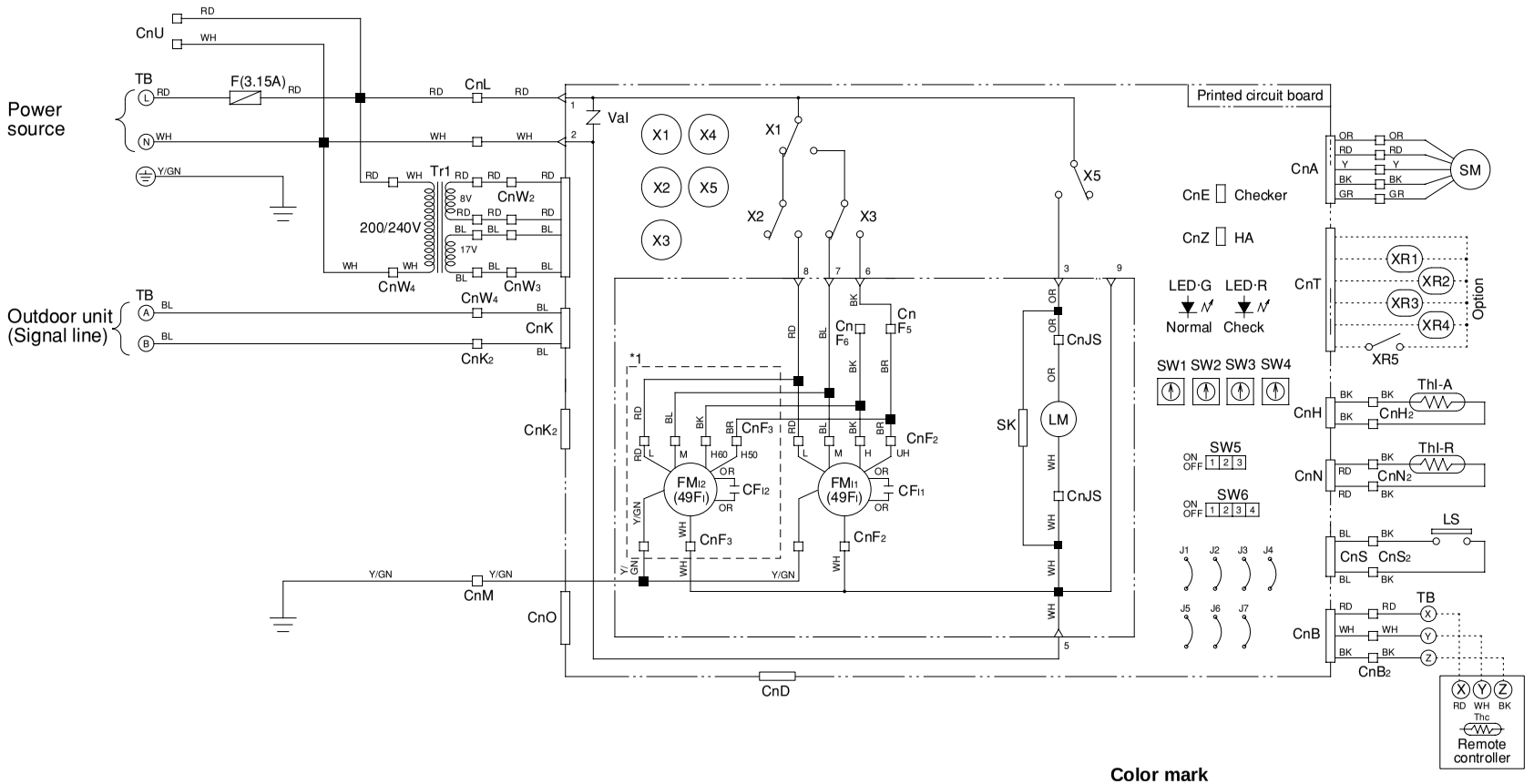
Mark	Parts name	Mark	Parts name	Mark	Parts name
$FM_{I1,2}$	Fan motor	**Thl-R**	Thermistor	**CnA-Z**	Connector (□ mark)
$CF_{I1,2}$	Capacitor for FM_I	**SW1**	Indoor unit address ten's place	**TB**	Terminal block
DM	Drain motor	**SW2**	Indoor unit address unit's place	◁mark	Terminal (F)
FS	Float switch (For overflow prevention)	**SW3**	Outdoor unit address ten's place	■ mark	Connector
SM	Stepping motor (For Exp.v)	**SW4**	Outdoor unit address unit's place	**XR1**	Operation indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	**SW6**	Change of heat pume type	**XR2**	Heating indication (DC12)
X4	Auxiliary relay (For DM)	**Trl**	Transformer	**XR3**	ON indication for CM (DC12)
49F$_I$	Internal thermostat for FM_I	**Val**	Varistor	**XR4**	Check indication (DC12)
Thl-A	Thermistor	**LED·R**	Indication lamp (Red)	**XR5**	Distant operation
		LED·G	Indication lamp (Green)	**SK**	Spark killer
		F	Fuse		

Color mark

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

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3℃	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	



Note(1) *1 FM_{I2} is equipped with only for FDEJ71HKXE2B,112HKXE2B,140HKXE2B.

Color mark

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

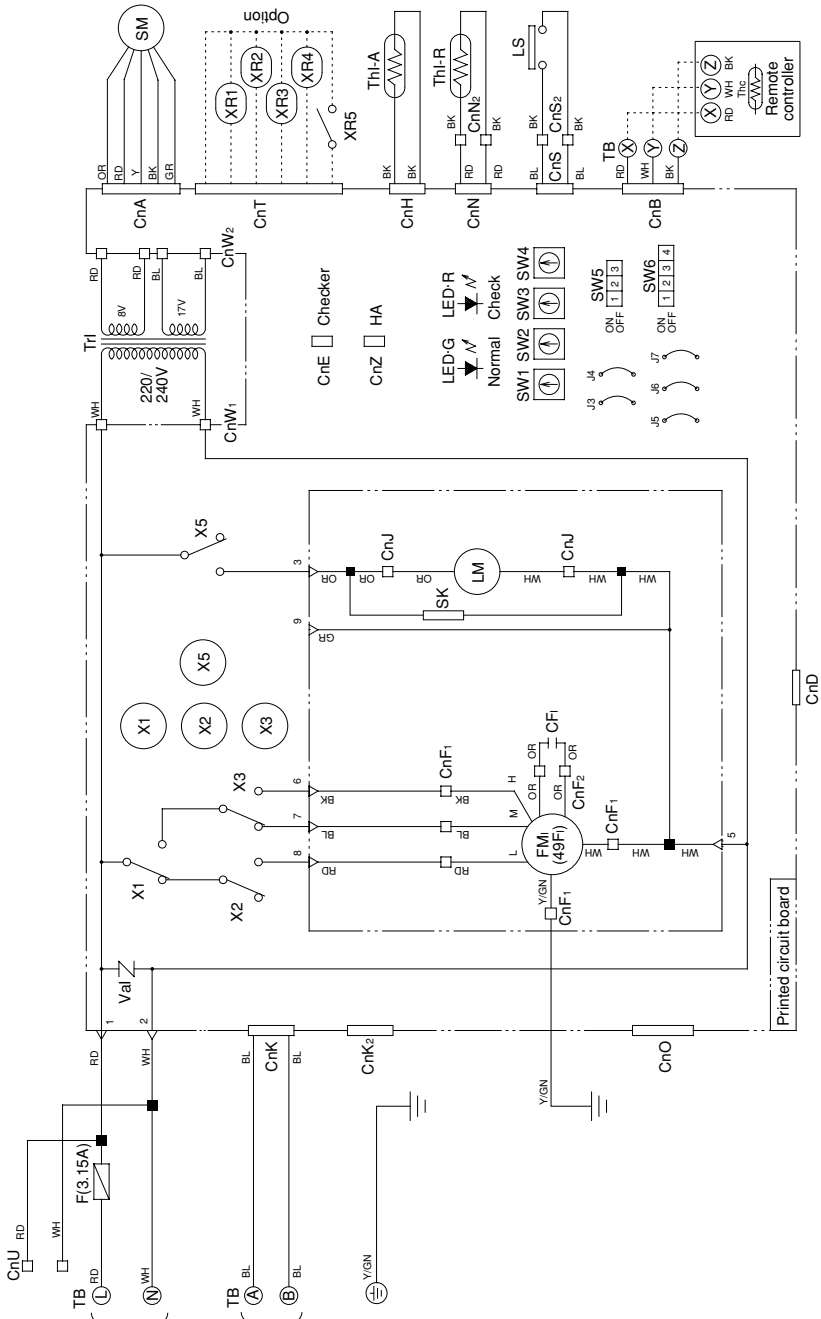
Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
$FM_{I1,2}$	Fan motor	**ThI-R**	Thermistor	**CnA-Z**	Connector (□ mark)
$CF_{I1,2}$	Capacitor for FM_I	**SW1**	Indoor unit address ten's place	**TB**	Terminal block
$49F_I$	Internal thermostat for FM_I	**SW2**	Indoor unit address unit's place	**◁mark**	Terminal (F)
LM	Louver motor	**SW3**	Outdoor unit address ten's place	**■ mark**	Connector
LS	Limit switch	**SW4**	Outdoor unit address unit's place	**XR1**	Operation indication (DC12)
SM	Stepping motor (For Exp.v)	**SW6**	Change of heat pume type	**XR2**	Heating indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	**Trl**	Transformer	**XR3**	ON indication for CM (DC12)
X5	Auxiliary relay (For LM)	**Val**	Varistor	**XR4**	Check indication (DC12)
ThI-A	Thermistor	**LED·R**	Indication lamp (Red)	**XR5**	Distant operation
		LED·G	Indication lamp (Green)	**SK**	Spark killer
		F	Fuse		

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3°C	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

(g) Wall mounted type (FDK)
Models All models



Color mark

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

Function of switches

Mark		Function	
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3°C	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

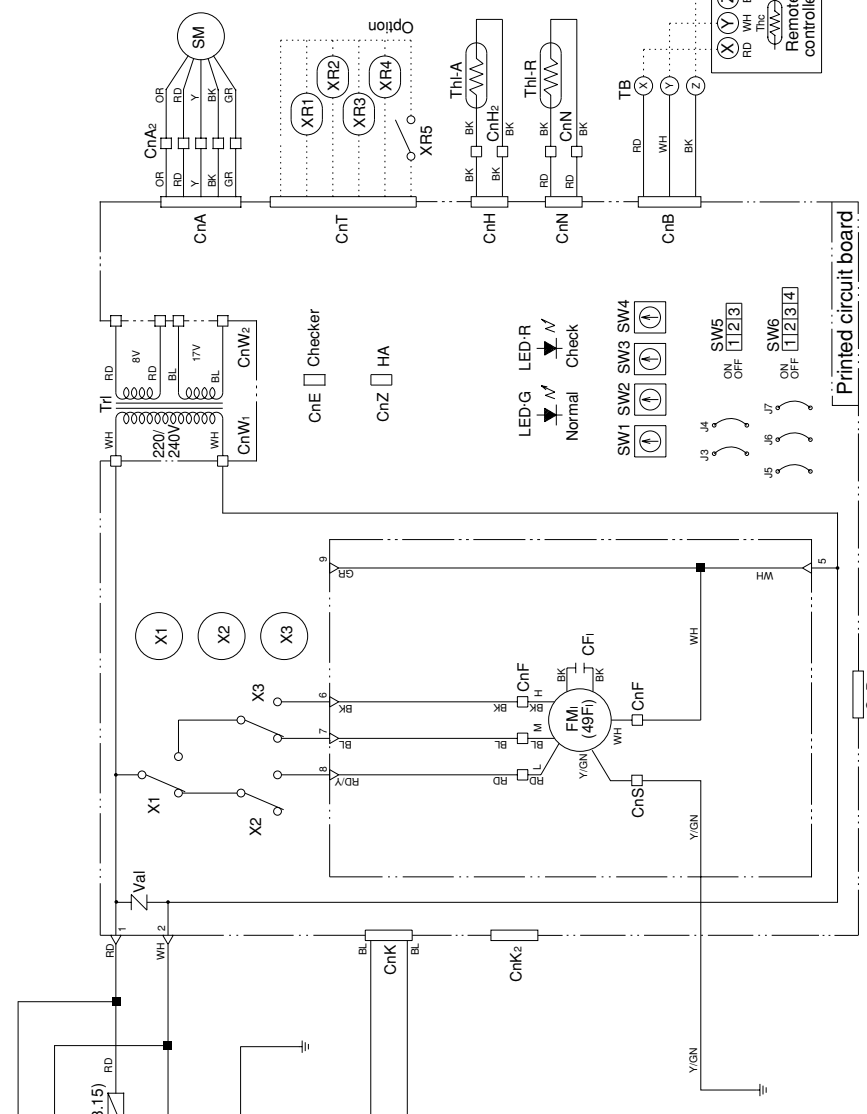
Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FM_I	Fan motor	**Thl-R**	Thermistor	**CnA-Z**	Connector (□ mark)
CF_I	Capacitor for FM_I	**SW1**	Indoor unit address ten's place	**TB**	Terminal block
$49F_I$	Internal thermostat for FM_I	**SW2**	Indoor unit address unit's place	**◁mark**	Terminal (F)
LM	Louver motor	**SW3**	Outdoor unit address ten's place	**■ mark**	Connector
LS	Limit switch	**SW4**	Outdoor unit address unit's place	**XR1**	Operation indication (DC12)
SM	Stepping motor (For Exp.v)	**SW6**	Change of heat pume type	**XR2**	Heating indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	**Trl**	Transformer	**XR3**	ON indication for CM (DC12)
X5	Auxiliary relay (For LM)	**Val**	Varistor	**XR4**	Check indication (DC12)
Thl-A	Thermistor	**LED-R**	Indication lamp (Red)	**XR5**	Distant operation
		LED-G	Indication lamp (Green)	**SK**	Spark killer
		F	Fuse		

(h) Floor standing exposed type (FDFL)

(i) Floor standing hidden type (FDFU)

Models All models



Notes (1) FDTSJ22HKXE2B is different from others as indicated with *1 in the diagram below.

Color mark

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

Function of switches

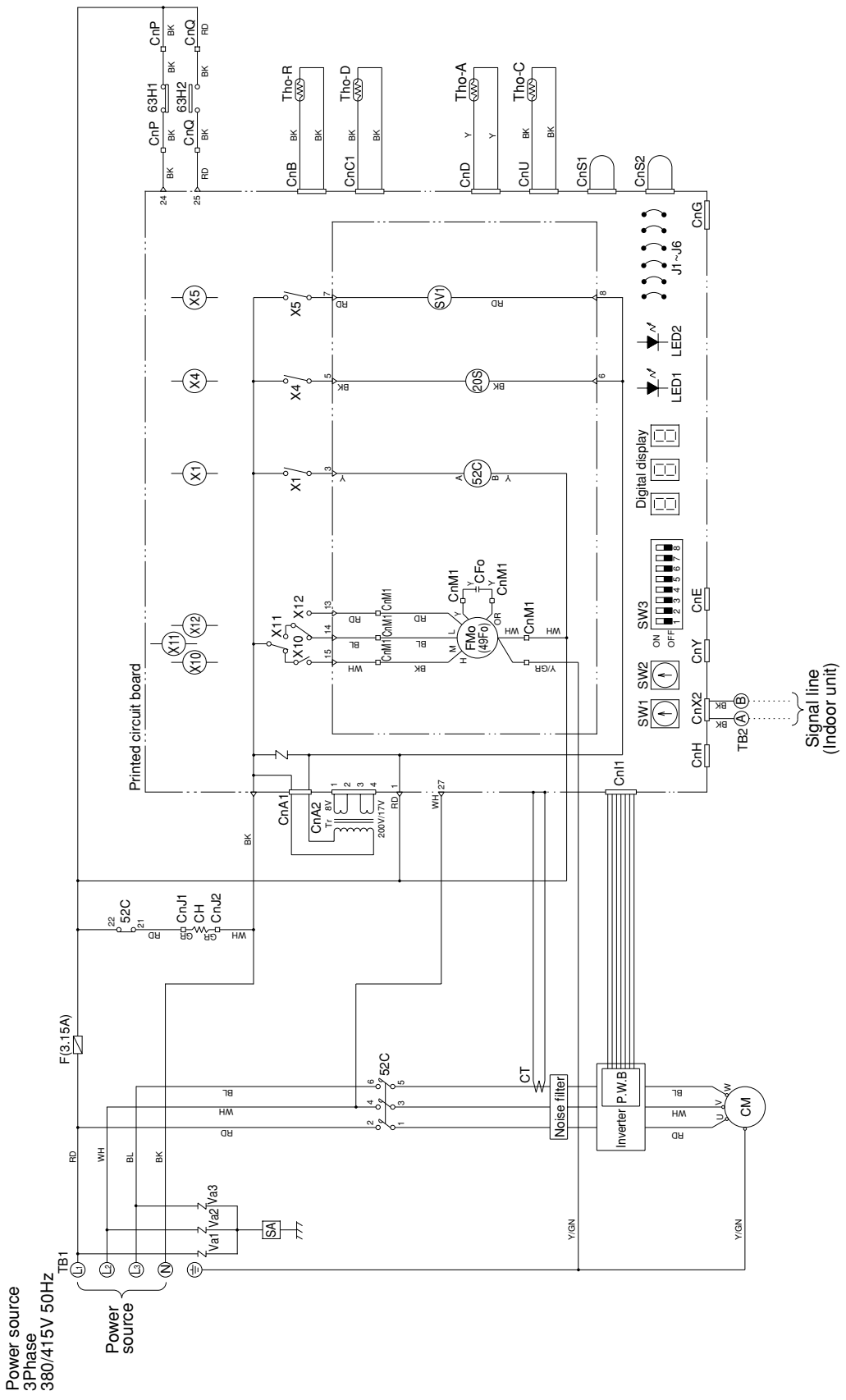
Mark		Function	
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3°C	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FM_i	Fan motor	SW3	Outdoor unit address ten's place	CnA-Z	Connector (□ mark)
CF_i	Capacitor for FM_i	SW4	Outdoor unit address unit's place	TB	Terminal block
$49F_i$	Internal thermostat for FM_i	SW6	Change of heat pume type	◁ mark	Terminal (F)
SM	Stepping motor (For Exp.v)	Trl	Transformer	■ mark	Connector
X1,2,3	Auxiliary relay (For FM_i)	Val	Varistor	XR1	Operation indication (DC12)
ThI-A	Thermistor	LED·R	Indication lamp (Red)	XR2	Heating indication (DC12)
ThI-R	Thermistor	LED·G	Indication lamp (Green)	XR3	ON indication for CM (DC12)
SW1	Indoor unit address ten's place	F	Fuse	XR4	Check indication (DC12)
SW2	Indoor unit address unit's place			XR5	Distant operation

(2) Outdoor unit

Models FDCP140HKXE2B
FDCJ140HKXE2B



Color mark

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

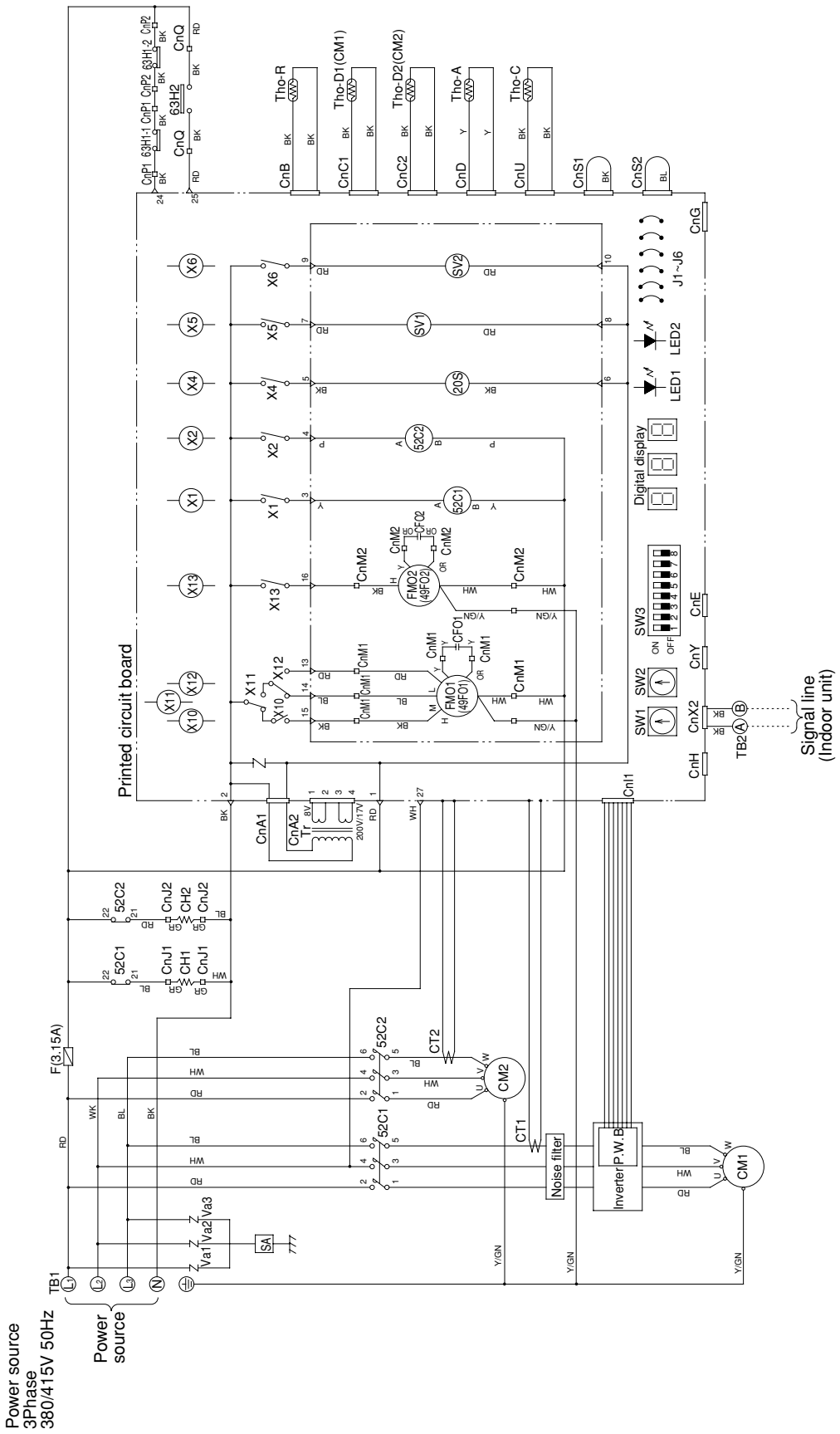
Meaning of marks

Mark	Parts name
CM	Compressor motor
FMo	Fan motor (outdoor unit)
49Fo	Internal thermostat for FMo
52C	Magnetic contactor for CM
CH	Crankcase heater
CFo	Capacitor for FMo
X1	Auxiliary relay (for 52C)
X4	Auxiliary relay (for 20S)
X5	Auxiliary relay (for SV1)
X10-12	Auxiliary relay (for FMo)

Mark	Parts name
20S	4way valve (coil)
SV1	Solenoid valve
63H1	High Pressure switch (for protection)
63H2	High Pressure switch (for control)
Tho-A	Thermistor (outdoor air temp.)
Tho-D	Thermistor (discharge temp.)
Tho-R	Thermistor (outdoor H.X.temp.)
Tho-C	Thermistor (dome temperature.)
CT	Current sensor
SA	Arrestor

Mark	Parts name
Tr	Transformer
Va1-3	Varistor
TB1-2	Terminal block (○ mark)
F	Fuse
SW1	Indoor unit address ten's place
SW2	Indoor unit address unit's place
LED1	Indication lamp (Red)
LED2	Indication lamp (Green)
⏚mark	Terminal (F)
■mark	Connector

Models FDCP224HKXE2B, 280HKXE2B
FDCJ224HKXE2B, 280HKXE2B



Color mark

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

Mark	Color
WH	White
Y	Yellow
Y/GN	Yellow/Green
P	Pink

Meaning of marks

Mark	Parts name
CM	Compressor motor
FMo1,2	Fan motor (outdoor unit)
49Fo1,2	Internal thermostat for FMo
52C	Magnetic contactor for CM
CH1,2	Crankcase heater
CFo1,2	Capacitor for FMo
X1,2	Auxiliary relay (for 52C1, 52C2)
X3,4	Auxiliary relay (for 20S)
X5,6	Auxiliary relay (for SV1, SV2)
X10-12	Auxiliary relay (for FMo1)
X13	Auxiliary relay (for FMo2)

Mark	Parts name
20S	4way valve (coil)
SV1,2	Solemoid valve
63H1-1,2	High Pressure switch (for protection)
63H2	High Pressure switch (for control)
Tho-A	Thermistor (outdoor air temp.)
Tho-C	Thermistor (dome temperature.)
Tho-D1,D2	Thermistor (discharge temp.)
Tho-R	Thermistor (outdoor H.X.temp.)
CT1,2	Current sonsor
SA	Arrestor
Tr	Transformer

Mark	Parts name
Va1~4	Varistor
TB1,2	Terminal block (○ mark)
F	Fuse
SW1	Indoor unit address ten's place
SW2	Indoor unit address unit's place
LED1	Indication lamp (Red)
LED2	Indication lamp (Green)
◁mark	Terminal (F)
■mark	Connector

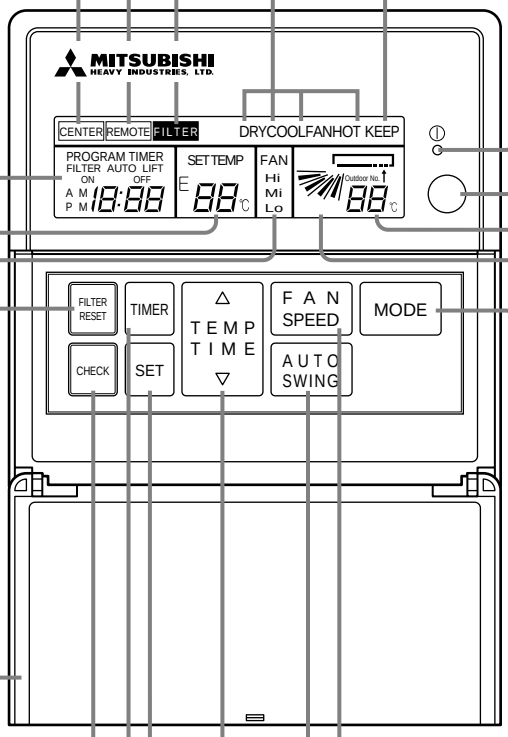
19.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

(1) Remote controller (Optional parts)

FDR, FDUM, FDFL and FDFU 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.



Filter sign
When this sign is indicated, clean the filter.

Remote display
This is displayed when the unit is controlled with an individual controller during normal operation. (Also displayed when the air conditioner is stopped.)

Central display
This is displayed when the unit is controlled with the optional central console.

Timer operation display
Contents of timer operation are displayed. (Also displayed when the air conditioner is stopped.)

Setting temperature display
Displays the temperature that has been set.

Fan speed display
Displays the fan speed that has been set.

Filter reset switch
Use this switch to reset (erase) the filter sign display.
(Press the switch after cleaning the air filter.)

Cover

Inspection switch
Use this switch when servicing the unit.

Timer switch
Use this switch when selecting contents of timer operation.

Set switch
Use this switch to set a time for the timer.

Operation mode display
Displays the operation mode that has been selected.

Heating preparation display

Operation/ Inspection indicator lamp
During operation: Green lamp flashes.
In case of error: Red lamp flashes.

On/Off switch
Use this switch to start or stop the air conditioner. First push on the switch starts the unit and second push stops it. (The switch can be operated without opening the cover.)

Return air temperature display
Displays the return air temperature.

Note

Indicated value may be different from actual reading on a thermometer or other instrument but this is notnecessarily an error.

Auto swing display
Indicates the swing louver condition.

Mode switch
Use this switch to select operation modes.

Fan speed switch
Use this switch to set a fan speed.

Auto swing switch
Use this switch to operate or stop the swing louver.

Temperature/ Time setting switch
Use this switch to set the room temperature or time on the timer.

(2) Operations of major functional items under each operation mode

Operation mode / Functional item	Cooling			Heating			Dehumidifying
	Thermostat ON	Thermostat OFF	Fan Complete stop	Thermostat ON	Thermostat OFF	Defrosting	
Indoor unit fan	Remote controller command	Remote controller command	Remote controller command	Remote controller command	Intermittent operation (3)	○→×	○/×
Indoor unit electronic expansion valve	Selected frequency adaptation	Fully closed	Fully closed	Selected frequency (4) adaptation	Fully closed	Fully opened	Selected frequency adaptation
Compressor 1 (Inverter)	○	×	×	○	×	○	○/×
Compressor 2 (Without inverter)	○/×	×	×	○/×	×	○	○/×
Outdoor unit fan (FMo-1)	○/×	×	×/○	○/×	×	○→×	○/×
Outdoor unit fan (FMo-2)	○/×	×	×/○	○/×	×	○→×	○/×
4-way valve	×	×	×	×	○	○→×	×
Solenoid valve SV1 (Compressor cooling)	○/×	×	×	○/×	×	○/×	○/×
Solenoid valve SV2 (Compressor cooling)	○/×	×	×	○/×	×	○/×	○/×

Notes (1) Compressor 2 is available on FDCJ224, 280, FDCP224 and 280 only.
(2) ○ : ON, ×: OFF, ○/×: ON or OFF
(3) This applies to when the jumper wire is shorted (state at shipping). It is OFF if the connection is open.
(4) It is fully open for one minute when the compressor begins operation.

(3) Cooling operation

(a) Cooling

1) If the sum of selected and required frequencies is not larger than the maximum frequency, the required frequencies listed in the following table apply. If the sum of required frequencies is larger than the maximum frequency, the required frequencies divided proportionally apply.

Frequency bands for indoor unit models

Model (Indoor) / Category	All series								
	22 model	28 model	36 model	45 model	56 model	71 model	90 model	112 model	140 model
Required frequency (Hz)	10 ~ 15	10 ~ 20	10 ~ 25	10 ~ 25	15 ~ 30	15 ~ 40	15 ~ 50	35 ~ 60	35 ~ 70
Selected frequency (Hz)	5 ~ 15	5 ~ 20	5 ~ 25	5~ 25	5 ~ 30	5 ~ 40	5 ~ 50	5 ~ 60	5 ~ 70

Notes (1) Frequency during cooling is 45 Hz.
(2) The required frequency is counted in the unit of 5 Hz and the selected frequency in the unit of 1 Hz.

Frequency bands for outdoor unit models

Item / Capacity	140 model	224 model	280 model
Compressor's total operation frequency (Hz)	20 ~ 80	20 ~ 120	20 ~ 130

Note (1) Frequency is controlled in the unit of 5 Hz.

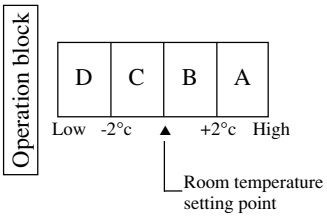
Compressor capacity control (only for 224, 280 models)

Model	Fk (Hz) condition	CM1 (Inverter)	CM (Without inverter)
FDCJ224HKXE2B	Fk < 70Hz	25 ~ 90Hz	OFF
FDCP224HKXE2B	Fk ≥ 70Hz	40 ~ 100Hz	ON
FDCJ280HKXE2B	Fk < 80Hz	25 ~ 95Hz	OFF
FDCP280HKXE2B	Fk ≥ 80Hz	40 ~ 100Hz	ON

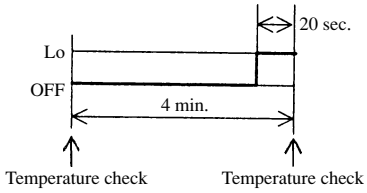
Note (1) In case when CM1 only changes from ON to the CM2 ON range, CM1 is reduced at 40 Hz and then CM2 is turned ON.

(4) Dehumidifying (Thermal dry) [Indoor unit adaptation]

- This cooling operation is mainly for dehumidifying, with which the compressor, indoor and outdoor fans are operated in the patterns as listed in the following table and in accordance with operation blocks switched with the room temperature sensor. The operation blocks are selected by checking the return air temperature at 4-minute intervals. Respective functional items are operated in each operation block as shown by the following table.



- Indoor unit fan will be operated in D block as shown below.



Item \ Operation block		A	B	C	D
Indoor unit frequency (Hz)	22 model	10	10	10	0
	28 model	15	10	10	0
	36 model	20	15	10	0
	45 model	20	15	10	0
	56 model	25	15	15	0
	71 model	30	20	15	0
	90 model	40	25	15	0
	112 model	50	40	35	0
	140 model	60	45	35	0
Compressor		Sum of frequencies on combined indoor units			
Indoor unit electronic expansion valve		Frequency adaptation			
Indoor unit fan		Hi	Lo	Lo	Lo↔OFF
Outdoor unit fan		Operationt	Operationt	Operationt	Stop

(5) Heating operation

(a) Heating

- This is same as the cooling operation.

(b) Heating operation with thermostat OFF

1) Intermittent fan operation control

a) When the jumper wire J3 on the indoor PCB is shorted (installed at shipping),the fan of the unit of which the thermostat is turned OFF during heating is operated in the Lo mode, and the indoor fan is turned OFF if the temperature rises 1˚C or more than the return air temperature at the thermostat OFF.

b) Indoor fan OFF condition is maintained for 5 minutes and then the operation is reset at the Lo mode again. After operating for 2 minutes in the Lo mode, return air temperature is checked and, if it is 1˚C or higher, the indoor fan is turned OFF or, if it is not higher than 1˚C, the Lo mode operation continues.

Notes (1) If the heating thermostat has been turned OFF, the temperature is indicated on the remote controller only when the indoor fan is operated in the Lo mode. When it is OFF, the room temperature at the end of Lo operation is indicated.

(2) If the operation is changed to the defrosting mode while the heating thermostat is at OFF or the thermostat is turned OFF during defrosting, the indoor fan is turned OFF.

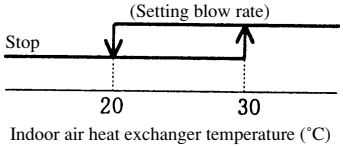
(3) Residual operation of heater is dominant over this control.

2) Fan stop control

a) If the jumper wire J3 on the indoor PCB (installed at shipment) is opened or the thermostat is turned OFF during heating operation with the remote control sensor operating, the fan on the indoor unit is turned OFF.

(c) Hot start (Prevention of cold draft during heating) [Indoor unit adaptation]

If the required frequency in the room is other than 0 Hz at the start of heating operation, the indoor fan is controlled in accordance with the temperature of indoor air heat exchanger (detected with Thı-R).



Notes (1) When the hot start (the compressor is operating and the indoor unit fan is not operating at the setting blow rate) is going on, the heating preparation is displayed (LCD on the remote controller).

(2) When the required frequency is other than 0 Hz, once the blower should start, it will not stop even if the temperature drops below 20˚C.

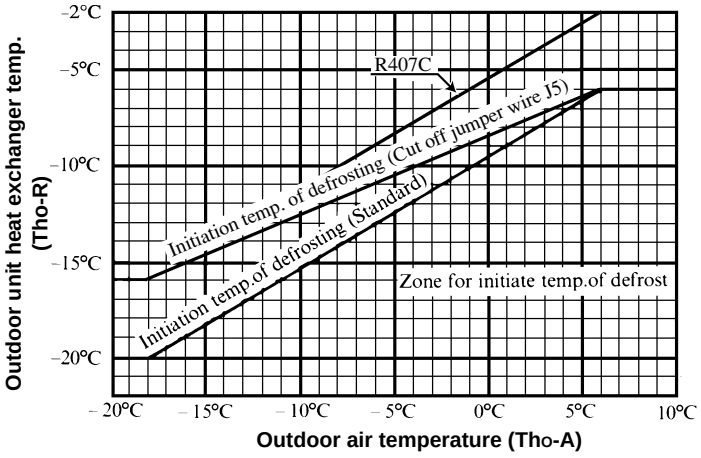
(3) After the blower has been turned OFF for 7 minutes, the blower is operated regardless of the heat exchanger temperature. (For 7 minutes after completion of defrosting during defrosting operation)

(d) Defrosting

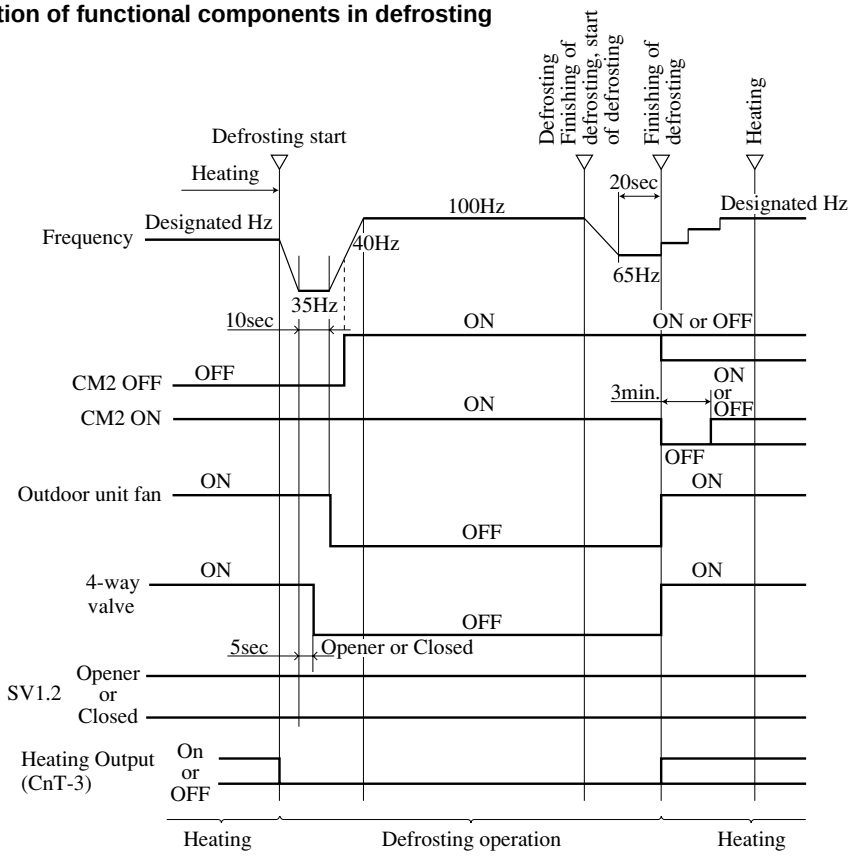
(i) Conditions for starting defrosting

When all the following conditions are met, the defrosting operation will start:

1) The cumulative operating time of the compressor comes up to 48 minutes after completion of a defrosting operation, or it comes up to 33 minutes after a heating operation starts (the remote controller is turned on).
2) Eight minutes has passed after the compressor was turned off and on.
3) Eight minutes has passed after end of outdoor unit fan motor control.
4) After all the above conditions have been met, the temperature of the heat exchanger thermistor (Tho-R) has been below the defrosting start temperature for three minutes in succession.



(ii) Operation of functional components in defrosting



(iii) Conditions for finishing Defrosting

When any of the following conditions is met, the defrosting finishing operation will start.

1) When the temperature of the heat exchanger thermistor (Tho-R) increases adove 14˚C (R407C : 20°C)
2) When 12 minutes has passed after start of defrosting.

(e) Compressor operation frequency UP control

1) If any indoor unit demands the maximum frequency for more than 3 minutes continuously during heating operation (provided either one of the following conditions is met), the compressor operation frequency will be increased by 5 Hz. Further increase of 5 Hz will repeat at each time when the maximum frequency is maintained for 3 minutes. However, the frequency will not rise beyond the upper limit of 30 Hz.
   - When there are more than one units of indoor blower of which the thermostats are turned OFF or which are blowing.
   - When one or more units have stopped heating.
   - When the outdoor temperature is below 0˚C.
2) This control is released when the required frequency becomes lower than the maximum frequency.
3) When the protective function that suppresses the frequency is actuated during the control, the protective motion takes place based on the condition in which the frequency has been raised.

(6) Compressor operation frequency UP/DOWN control

(a) When operation starts from the state that the compressor inverter being stopped (CM1), the frequency starts from 5 Hz and rises in the unit of 1 Hz up to 25 Hz.

(b) The frequency is changed at a rate of 2 Hz per second at the inverter side for both UP and DOWN. However, if the frequency is specified to be 0 Hz, the operation is stopped immediately.

(c) Inverter frequency is fixed in the range of 25 to 100 Hz. Frequency increases at a rate of 5 Hz/sec in this range.

(7) Compressor start/stop control

(a) Inverter compressor (CM1) will be stopped immediately upon receipt of stop command from the indoor unit or by a serial signal error and when the protective function is actuated on the controller of the unit or inverter.

(b) If the inverter compressor (CM1) is stopped, the non-inverter compressor (MC2) (for models 224 and 280) will be stopped simultaneously.

(8) 4-way valve switching assurance

At the start of inverter compressor (CM1), the following operations take place regardless of selected frequency.

(a) 5 ~ 25 Hz operation

It is operated in the range of 5 ~ 25 Hz. In this operation, however, the compressor cannot be operated with the current safe or high pressure controls or discharge pipe control.

(b) 25 ~ 65 Hz operation (only for 224, 280 models)

Maximum frequency is determined based on the temperature detected with the outdoor air temperature sensor (Tho-A).

1) Below 0˚C : Maximum frequency is 90 Hz. Operation takes place at 90 Hz for 45 seconds after the start.
2) Above 0˚C : Maximum frequency is 65 Hz. Operation takes place at 65 Hz for 32.5 seconds after the start.
   However, if conditions to start the current safe or high pressure controls or discharge pipe temperature control are met in the mean time, this control is terminated and substituted with the current safe or high pressure controls or discharge pipe temperature control which determines the compressor frequency. When the latter control is released, the operation returns to the normal mode.

(9) Equipment related to unit protection and maintenance

(a) Test run mode [Outdoor unit adaptation]

1) Test run operation mode is controlled from outdoor using switches SW3-5 , 6 which are provided on the outdoor unit control PCB. (This is independent from CnS.)

Functions of switches

Switch		Function
SW3-5	ON	• All indoor units on the connection are operated. • Indoor unit demands the maximum frequency and the outdoor unit is operated at the maximum frequency ((a) 2) according to the demand from the indoor unit.
	OFF	• Normal operation
SW3-6	ON	SW3-5ON : Cooling operation
	OFF	SW3-5 ON : Heating operation

Note (1) This operation is dominant over other options such as the center console, etc. Operation status is transmitted to the optional equipment.

2) Upper limit of frequency during test run operation
   Upper limit of frequency is equal to the sum of maximum required frequencies (Hz) of units on the connection.
3) During the test run operation, there is no fuzzy control but other controls are effective. Remote controller displays the operation status and a word “Center”.

(b) Compressor protection control

(i) Start of compressor protection

1) Inverter is operated at the frequency not exceeding the upper limit of 65 Hz for 1 minute and 45 seconds after the start in order for protection of compressor and then changes the frequency to the selected frequency. CM2 (for 224, 280) is stopped for the same period of 1 minute and 45 seconds. If the selected frequency is lower than 65 Hz, the operation continues at the same frequency. However, at the initial start of inverter after turning power ON or starting 6 hours or more after stopping the compressor, the frequency is raised at a rate of 5 Hz/minute starting from 25 Hz for 12 minutes.

(ii) Compressor protection at high frequency

If operation is maintained at 95 Hz or higher for 9 minutes continuously, the frequency is reduced to 90 Hz. The operation continues for 1 minute at the frequency and, if the required frequency of indoor unit is reduced to below 90 Hz by the protective control or others in the mean time, the operation continues at such frequency. After operating at 90 Hz, the frequency is raised at a rate of 5 Hz per 10 seconds.

(iii) Compressor start delay (3-minute timer)

When the inverter compressor (CM1) has been stopped due to the cooling (heating) thermostat operation, by the remote controller start switch, error or others, the compressor start is disabled from 3 minutes. However, the 3-minute timer becomes invalid when the power switch has been turned on.

Compressor (CM2) also does not start for 3 minutes after the stop and, if it has been started and stopped, then it cannot be started for 6 minutes after the start.

(iv) Operation with equal amount of oil (Only for 224, 280 models)

After the CM2 has been operated continuously for 3 hours, the following operations take place:

Step 1: CM1 is operated at 40 Hz with CM2 ON for 3 minutes.

Step 2: CM1 is operated at 90 Hz (224) or 95 Hz (280) with CM2 OFF for 3 minutes.

(c) Crankcase heater power on detection control

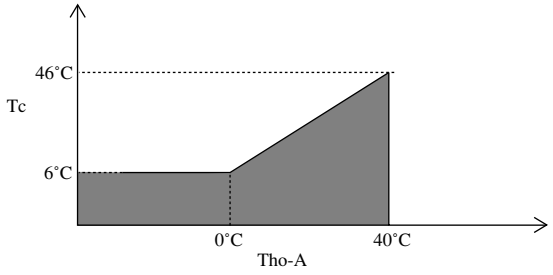
With this control, duration of time when power has been turned ON (CH power on) is accumulated and, when operation is started earlier than 6 hours, frequency is controlled as follows.

(i) Purpose of this control is to protect the compressor dilution ratio at the time of soak out on the compressor.

When the service switch (SW3-3) is turned OFF (setting at shipping), the following controls are performed.

This control is invalid when the switch is turned ON.

① When the external temperature (Tho-A) and under-dome temperature (Tc) are in the shadowed area in the following figure, the compressor will not be started.



② Compressor will be started if either one of the following conditions is met.

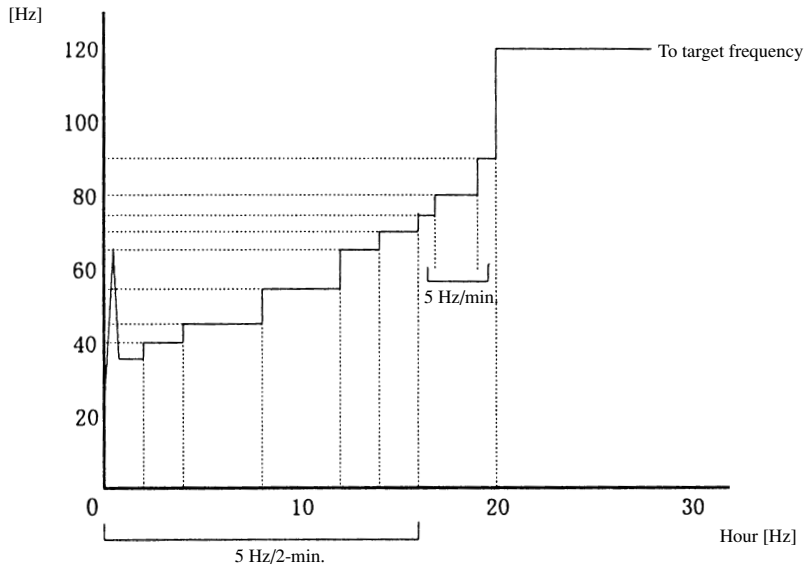
a) 6 hours after power ON

b) Service switch (SW3-3) ON

c) When temperatures run out the shadowed area in the step ①.

③ While the compressor is stopped by this control, the following data are displayed on the 7-segment display regardless of setting of the display selector switch (SW4).

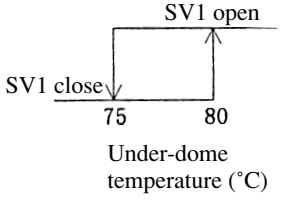
• Immediately after power ON, specify as “360” and the number is reduced by “3” at every 3- minute.
(This corresponds to 6 hours after power ON and indicates remaining number of minutes.)

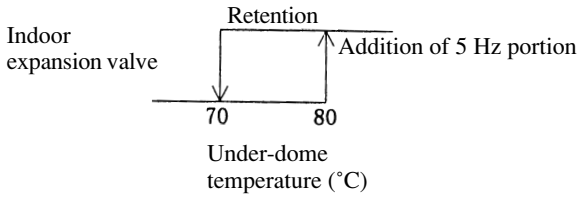


Note (1) If operation is stopped within 20 minutes, second and later starts are subject to this control.

(d) Under-dome temperature control

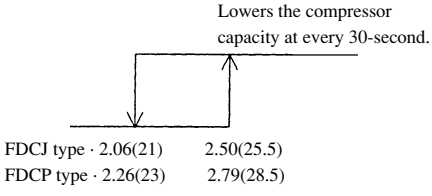
Fluid bypass solenoid valve (SV1) and indoor expansion valve are controlled based on the temperature of under-dome thermistor (Tho-C) assembled on the compressor (CM1).

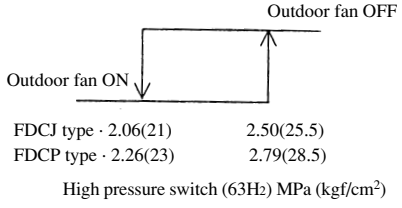




(e) High pressure control

Monitors the high pressure during heating operation so as to turn the outdoor fan OFF and control the compressor capacity.

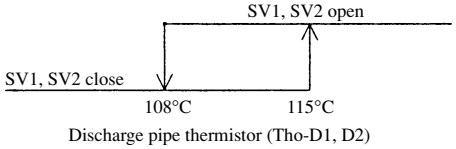


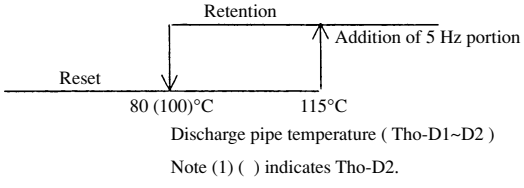


(f) Discharge pipe temperature control

If the discharge pipe temperature (Tho-D1, D2 detection) exceeds the setting value, the temperature rise is suppressed by controlling the liquid bypass solenoid valve, indoor expansion valve and compressor capacity and, if the pressure rises further, the compressor is stopped.

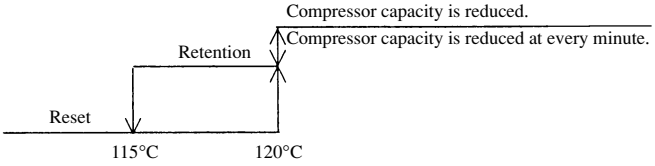
(i) Liquid bypass solenoid valve control





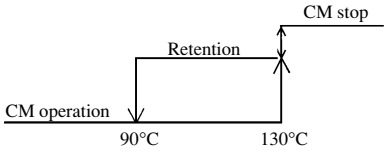
Note (1) ( ) indicates Tho-D2.

(ii) Compressor control



(iii) Discharge pipe temperature error

• When the discharge pipe temperatures (Tho-D1, D2 detection) rise beyond 130˚C and is maintained for 2 seconds, the compressors (CM1, CM2) are stopped but it will be reset if the temperatures drop below 90˚C.



• If the discharge pipe temperature (Tho-D1~D2 detection) occurs twice within 60 minutes or the condition higher than 130˚C has continued for 60 minutes including the duration of time of compressor stop, the unit operation is stopped with the error stop.

Note (1) Unless the temperature of 90˚C or under is maintained for 45 minutes after the discharge pipe error, the unit cannot be started again. (Reset the power supply to clear.)

(g) Current safe control

(i) If the incident current value (T phase of converter entrance) at the inverter entrance exceeds the setting value, the frequency is reduced in the unit of 5 Hz so as to control the operation current.

(ii) If the required frequency becomes lower than the current safe frequency under this control, the latter frequency dominates the operation.

(iii) If the frequency is maintained continuously below the reset value for 3 minutes, the operation enters the frequency release mode. If it fails to reduce the frequency for 6 minutes continuously, this control is released and the operation returns to the normal mode.

(h) Current cut control

Current cut protects the inverter from overcurrent. If current exceeds the setting value, it stops the inverter immediately and resets the inverter automatically 3 minutes later. After the automatic reset, the inverter starts at 35 Hz and raises the frequency by 5 Hz at every 30-second till the frequency reaches the target value. If the current cut function is actuated four times within 15 minutes, it turns OFF the 52C and stops the operation with the error stop.

(i) Power transistor overheat protection.

If the power transistor is heated up to the setting temperature (118˚C), the inverter is stopped immediately but reset automatically 3 minutes later or if the temperature drops to the normal level

If the control is actuated again within 2 hours or has continued for one hour, the inverter is stopped with the error stop.

(j) Expansion valve control for oil return

When the compressor is started initially after turning power ON or accumulated time of compressor ON exceeds 10 hours, this control stops the compressor, turns the thermostat and blowing OFF and fully opens expansion valves, one by one at intervals of 4 minutes, of the unit stopped with the error stop, in order to collect lubrication oil.

Notes (1) Expansion valves are opened fully in the order of registration of addresses on the outdoor unit not in the order of address No.

(2) Expansion valves are opened for 1 minute on the unit in the cooling or dehumidifying mode or 4 minutes on the unit in the heating mode.

(k) Abnormal high pressure rise protection

If either one of high pressure switches [63H1-1, 63H1-2, FDCJ: 2.94 open/2.35 close MPa (30 open/24 close kgf/cm^2) , FDCP: 3.24 open/2.65 close MPa (33 open/27 close kgf/cm^2)] is actuated twice within 40 minutes, the compressor stops with the error stop.

[However, when the switch is actuated initially, the compressor stops for a delay of 3 minutes and then returns to the normal operation.]

(l) Non-inverter compressor (CM2) overcurrent protection (Only for 224, 280 models)

If the T phase current at the secondary side of 52C2 is detected exceeding the setting value for approx. 0.5 second, the compressor stops. The compressor is reset automatically after a 3-minute delay. If the error is detected at second time within 40 minutes after the initial detection, the unit stops with the error stop.

(m) Compressor oil level protection

When operation has continued at less than 30 Hz for 9 minutes or more, and if operation at 35 Hz per minute continued for 30 minutes or more, CM1 is stopped forcibly for 3 minutes.

However, when the frequency is at less than 30 Hz the protective control has been actuated, its control dominates.

(n) Compressor (CM1) motor lock protection

If the current value exceeds the setting value for 0.5 seconds continuously during operation, the compressor stops. If the current detected after a 3- minute delay is less than 2A, the compressor can be started again.

If the detection is repeated 5 times within 60 minutes after the initial detection or the condition that the current does not drop below 2A continues for 10 minutes after the first to fourth stops of compressor, the compressor stops with the error stop.

(o) Open phase protection

(i) When CM1 is on (≧ 20Hz) and there is L3-phase current of 0.5 A or less for 10 continuous seconds, it is determined to be a phase fault and CM1 and CM2 are set to off.

(ii) If this is detected 5 times within 60 minutes of the first detection, an error stop is performed. If (i) is detected when CM1 is on within 10 minutes of the power being turned on, an error stop is performed on the first detection.

(iii) If the CM2 L3-phase current is 2 A or less for 5 continuous sections after CM2 has gone on, it is determined to be a phase fault and an error stop is performed.

(p) Antiphase protection and open L2 phase at 52C1 primary side

This function monitors the phase order on the primary side of 52C1 (whenever power is turned ON) and judges L1 → L3 → L2 → L3 as the antiphase (monitors simultaneously also open phase of L2 phase at the primary side). If the antiphase continues for 2 seconds, the compressor is stopped with the error stop.

(q) Indoor unit connection number protection

If the number of indoor units on the connection exceeds the number as listed below, the compressor stops with the error stop.

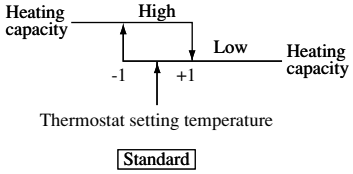
Item \ model	140 model	224, 280 model
Number of units on connection	10 units	16 units

Note (1) They are the numbers of units used for judgement of error for the purpose of control and not equal to the numbers of units which can be connected.

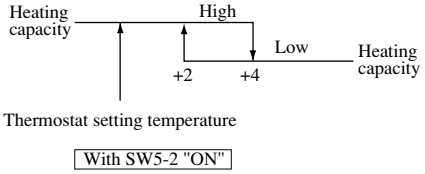
(10) Value shift adjustment of room air temperature detection in heating

Under the standard specifications, the room temperature is adjusted at the setting temperature by controlling the indoor unit capacity based on the setting temperature of thermostat and the suction air temperature.

However, where the unit is installed in the ceiling and warm air tends to stay around the ceiling, temperature in the living space may not be adjusted at the setting temperature. In such occasion, it is recommended to change the setting of dip switch SW5-2, which is found on the PCB of the indoor unit, to ON position so that the capacity control is tripped at +3 above the setting temperature of thermostat and thus the heating feeling will improve.



Standard

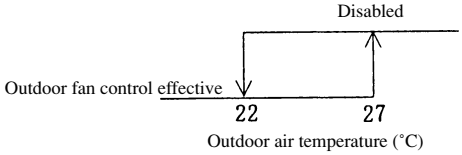


With SW5-2 "ON"

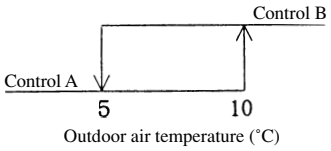
Note (1) Refer to page 911 for position of SW

(11) Cooling operation control at lower outdoor air temperature (down to –5˚C)

(a) This control starts 1 minute after starting compressor during cooling or dehumidifying operation, controls the outdoor fan at the outdoor temperature (Tho-A) being below 22˚C and enables the cooling operation.



(b) Outdoor fan control



• Control A
For 140 : OFF, 1 ~ 2 speed control ranges
For 224, 280 : OFF, 1 ~ 3 speed control ranges

• Control B
For 140 : 1 ~ 3 speed control ranges
For 224, 280 : 1 ~ 4 speed control ranges

Outdoor fan tap

140 model

Fan tap	3 speed	2 speed	1 speed	OFF
FM_{01}	Hi	Me	Lo	OFF

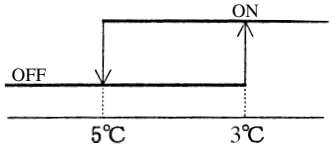
224,280 models

Fan tap	4 speed	3 speed	2 speed	1 speed	OFF
FM_{01}	Hi	Hi	Me	Lo	OFF
FM_{02}	ON	OFF	OFF	OFF	OFF

(c) In cases of 224 and 280 only, the low outdoor air cooling control is releases temporarily when the number of operating compressors is changed (1 unit → 2 unit) and the outdoor fan is operated in the Hi mode. The low outdoor air temperature cooling control becomes effective 2 minutes later.

(12) Snow protection fan control

If J6 on the outdoor unit PCB is opened, the outdoor fans on the units which have been stopped with the total or error stop are operated in the Hi mode once at every 10-minute while the outdoor temperature is lower than 3˚C.



(13) Forced heating/cooling operation

With this control, SW3-7 on the outdoor unit PCB is turned on and CnG (equipped with short circuit pin) is shorted or opened so as to forcibly determine whether the indoor unit is operated for cooling or heating. If any operation mode other than the forcible mode is commanded from the indoor unit, the mode unmatch message is displayed on the remote controller or others and the operation enters in the blowing mode.

SW3-7	CnG	Operation
OFF	Open/short	Normal operation
ON	Open	Cooling
	Short	Heating

Note (1) SW-7 is at OFF and CnG is open at the shipping from factory.

(14) Silent mode control

Silent mode is selected if the CnG (equipped with short circuiting pin) is shorted during normal operation.

(a) When the highest speed for the specific model of outdoor fan (140 : 3 speed, 224, 280 : 4 speed) is selected, the speed is stepped down by one step.

However, the following cases are excluded:

① For 30 seconds after starting operation

② For 30 minutes after the compressor stop due to actuation of 63H1 or CT2 during cooling

③ For 2 minutes after changing the number of operating compressors from 1 to 2 units

(b) Upper limits of compressor operation frequency are specified as follows. (Excluding during defrosting)

140: 65 Hz (CM1 - 90 Hz)

224: 100 Hz (CM1 -80 Hz, CM2 - ON)

280: 115 Hz (CM1 - 80 Hz, CM2 - ON)

(15) Backup operation (Only for 224, 280 models)

If the dip switch SW3-2 is turned ON, operation continues with CM1 (inverter compressor) only for emergency when CM2 (without inverter) is stopped by trouble.

(a) Upper limit of operating frequency is set at 90 Hz for 224 or 95 Hz for 280 and distributed to indoor units proportionally divided.

(b) Overcurrent error, open T phase error, discharge temperature error (Tho-D2) and discharge pipe sensor error (Tho-D2) on CM2 are not detected.

(16) Indoor/outdoor connection unmatch check function

If dip switches SW3-4, 5 and 6 are turned ON, a test run operation is performed from outdoor so as to inspect the unmatch in the connection between indoor and outdoor.

(a) When crankcase heater power ON control is effective

1) Both in- and outdoor units are stopped after a cooling test run operation till the operation time of compressor (CM1) is accumulated at 16 minutes.
(Indoor expansion valve fully open, indoor fan OFF, “Center” display on remote control)

2) Heat exchanger temperatures on all indoor units are checked 3 minutes later or after release of 6-minute start delay of CM2. Then outdoor units only are started to check, at intervals of 20 seconds, if the indoor heat exchanger temperatures have dropped 7 degrees or more compared with those before the re-start.

3) If there is any unit on which the temperature does not drop 7 degrees or more after continuing the check for 5 minutes, the error is displayed on the remote controller and the outdoor unit.
If it is normal, “- - -” is flashed on the 7-segment indicator and the unit is stopped.
Flashing on the 7-segment indicator can be returned to the normal display by turning SW3-4 to OFF.

(b) When the crankcase heater power ON control is not operating

(i) During normal operation

1) Both indoor and outdoor units are stopped after cooling test operation for 3 minutes. (Indoor expansion valve fully open, indoor fan OFF and “Center” display on remote controller)

2) Heat exchanger temperatures on all indoor units are checked 3 minutes later or after release of 6-minute start delay of CM2. Then outdoor units only are started to check, at intervals of 20 seconds, if the indoor heat exchanger temperatures have dropped 7 degrees or more compared with those before the re-start.

3) Detail of display is same as (a), 3) above.

(ii) When the compressor has been stopped for more than 6 hours

1) Cooling test run operation is continued till the compressor (CM1) operation time is accumulated at 8 minutes and then both in- and outdoor units are stopped.
(Indoor expansion valve fully open, indoor fan OFF, “Center” display on remote controller)

2) Heat exchanger temperatures on all indoor units are checked 3 minutes later or after release of 6-minute start delay of CM2. Then outdoor units only are started to check, at intervals of 20 seconds, if the indoor heat exchanger temperatures have dropped 7 degrees or more compared with those before the re-start.

3) Detail of display is same as (a), 3) above.

(17) FILTER sign

When the operation time (time when the ON/OFF switch is turned to ON) is counted up at 600 hours (1), the filter sign on the remote controller flickers.

This condition can be reset any time with the "Filter reset" switch. It is effective also to turn power OFF to reset.

Note (1) The function is invalidated if the jumper wire (J4) is opened. (See page 911 for the location of PCB.)

(18) Auto Swing Control (Excepted FDR, FDUM, FDFL, FDFU models)

(a) Have a louver motor to move the louvers up and down for the so called "AUTO SWING" function.

(b) The louver auto swing starts when the AUTO SWING switch is pressed once and stops when the AUTO SWING switch 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 swing3-4 times per minute but the display changes once per second.)

(c) **Stopping the louvers**

When the AUTO SWING switch 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 J2 on the indoor unit printed circuit borad is cut, the louvers stop immediately at the AUTO SWING switch is pressed to stop them and the LCD display changes to show this posiition. Refer to page 911 for position of jumper wire J2.

(d) **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 luver 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.

(e) **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 switch (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 louver and the LCD display return to their previous positions. (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 setting of the ON/OFF or AUTO SWING switches.)

(19) Condensate pump motor (DM) control (Only FDT, FDTW, FDTS, FDR, FDUM models)

(a) Drain motor is started no sooner than the compressor is turned ON during cooling or dehumidifying operation. The drain motor continues to operate for 2 minutes after the stop of unit operation, stop with the error stop, thermostat stop and at switching from cooling or dehumidifying operation to blowing or heating operation. When there is any unit subjected to oil return control, the drain motor is operated for 3 minutes at such occasion.

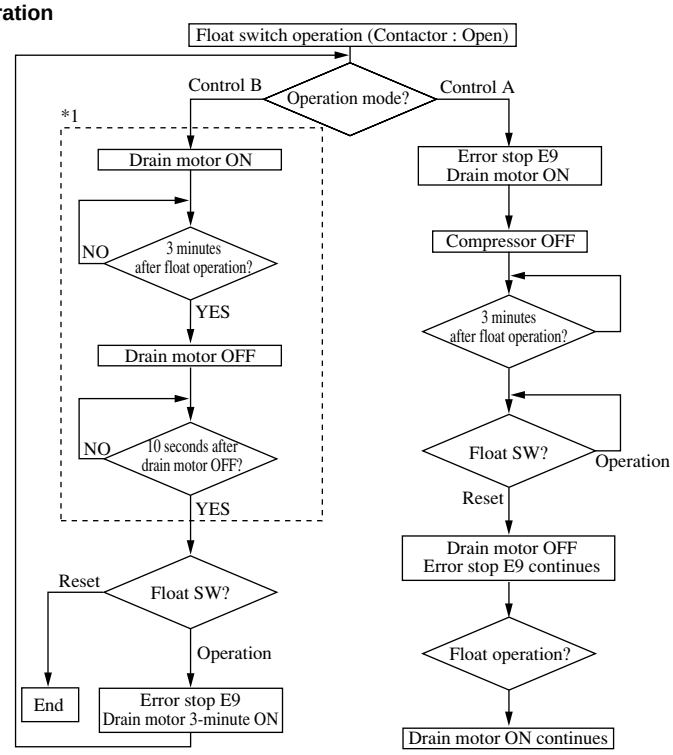
Note (1) Drain motor may be operated forcibly by turning ON the dip switch $SW_{5\text{-}3}$ on the PCB. Turn the switch OFF to stop the drain motor.

(b) Overflow detection is always operable by means of the float switch regardless of operation modes. If the overflow is detected (or when the float switch is disconnected or its wire is broken), operation is stopped with the error stopped. (FDT, FDTW, FDTS, FDR and FDUM) If the overflow is detected while the drain motor is stopped, the drain motor is operated for 3 minutes and then the overflow detection is performed to judge whether it is normal or not.

	Indoor unit operation mode				
	OFF (1)	COOL	DRY	FAN (2)	HEAT
During compressor ON		Control A			
During compressor OFF		Control B			

Notes (1) Including OFF and error stop during COOL, DRY, FAN and HEAT.
(2) Including "FAN" operation due to unmatch of operation mode.

• Flow chart of drain motor operation



* 1 In the flow in the frame of broken line, operations of operation mode change and thermostat reset are effective and operated immediately upon selection. However, the compressor ON command is not transmitted.

(1) Control A

a) If the float switch detects the draining, operation is stopped with the error stop (E9 is displayed) and operate the drain pump.

b) Float switch is checked 3 minutes later on the unit stopped by the error and, if the error persists still, the drain motor is left at ON but, if the error has already been reset, the drain motor is turned OFF. E9 is displayed till the error is reset.

(2) Control B

a) If the float switch detects the draining, the expansion valve is closed, the drain motor is turned ON for 3 minutes and, as 10 seconds elapses after the drain motor OFF, the float switch is checked. If the result is normal, the operation stops in the normal way while, if it is not normal, E9 is displayed, the drain motor is turned ON and the operation stops with the error stop with the expansion valve being closed completely. (It is left at ON while the draining is detected.)

(20) 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.

(i) Operation output: Power to engage DC 12V relay (provided by the customer) is outputted during operation.

(ii) Heating output: Power to engage DC 12V relay (provided by the customer) is outputted during the heating operation.

(iii) Compressor ON output: Power to engage DC 12V relay (provided by the customer) is outputted while the compressor is operating.

(iv) Error output: When any error occurs, the power to engage DC 12V relay (provided by the customer) is outputted.

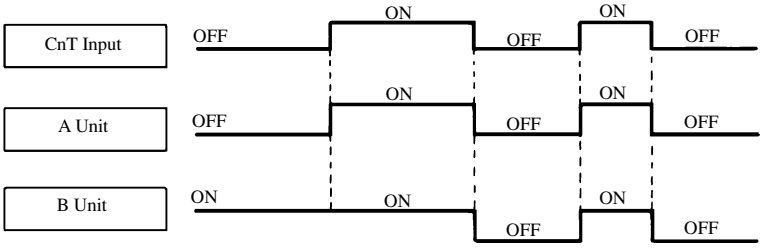
(b) Control of input signal

(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.

(i) At shipping from factory (SW_{5-1} on PCB OFF)

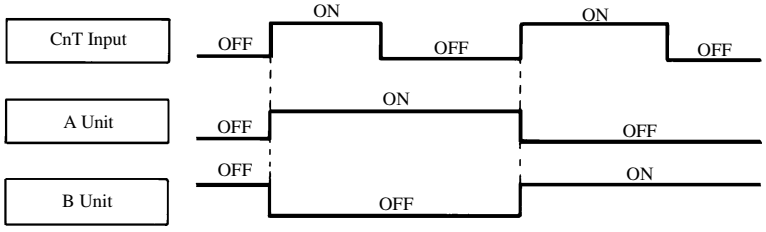
1) Input signal to CnT OFF → ON [Edge input] Air conditioner ON

2) Input signal to CnT ON → OFF [Edge input] Air conditioner OFF



(ii) When SW_{5-1} on the PCB of indoor unit is turned on at the field.

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



(21) Multiple Units Control-Simultaneous Control of 16 unit with one remote controller

(a) Function

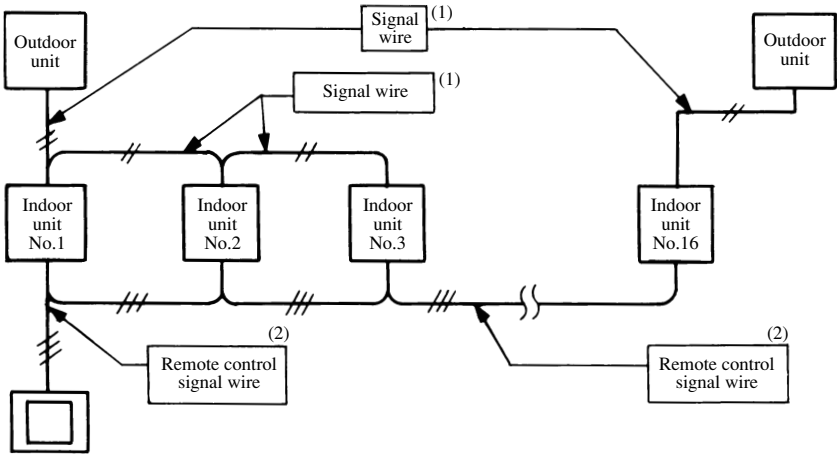
Multiple units (even of outdoor different systems, 16 units maximum) can be simultaneously controlled by using a remote control switch (a special order item). The remote control switch is used to set the "operation mode", and all the unit can be operated and stopped at intervals of 0.5 to 1 second in the order of unit number. Thermostat and protective functions of each unit functions independently.

Note(1) When part of the group gets out of order (the protective device operates), the relevant unit comes to an abnormal stop, but other normal units keep operating.

(b) Wiring Procedures

(i) Lay power cable of each unit and signal wire as usual. (Remove the remote control switches from all units excluding only one unit.) Lay wiring for the remote controller separately from power cable and wires for all other electrical equipment.

(ii) Arrange the terminal block (X, Y, Z) of the remote controller as shown next page for the simultaneous control, and lay cross over in each indoor unit.



Notes (1) The overall length of the signal wire shall be less than 1000m.

(2) The length of remote control signal wire and crossover for remote controller between room shall be less than 600m.

(22) External input operation

External input: From CnS1, operation permission/prohibition control; From CnS2: Demand control/normal operation switching.

- J1: Switches between CnS1 and CnS2 input method.

  J1 short circuit: Level input by CnS1 and CnS2.

  J1 open: Pulse input by CnS1 and CnS2.

(a) From CnS1, operation permission/prohibition control

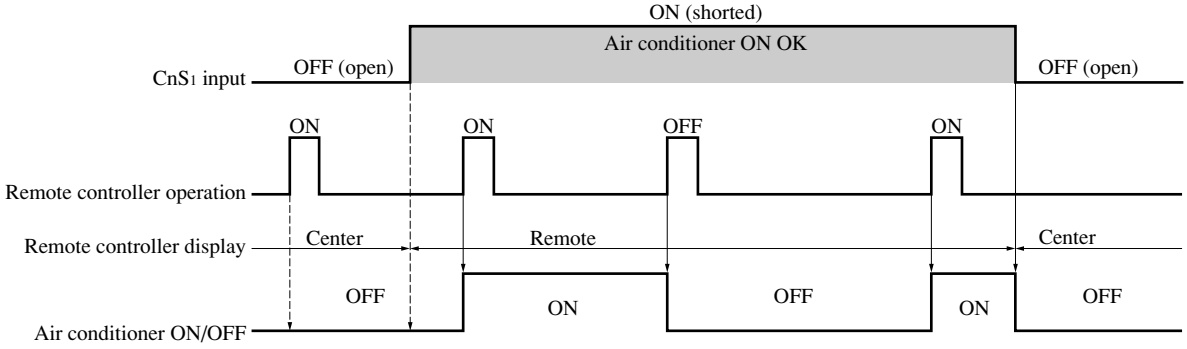
Input : CnS1	CnS1 input method change: J1	CnS1 : Operation permission/ Prohibition mode change
Short circuit → Disconnection	J1; Short circuit Lever input	Operation prohibition mode → Operation permission mode
	J1; Disconnection Pulse input	Operation permission/Prohibition model change (Reversal)
Short circuit → Disconnection	J1; Short circuit	Operation permission mode → Operation prohibition mode
	J1; Disconnection	— (NOP)

1) The remote controller displays the operating mode. “To Option” sends the operating mode.

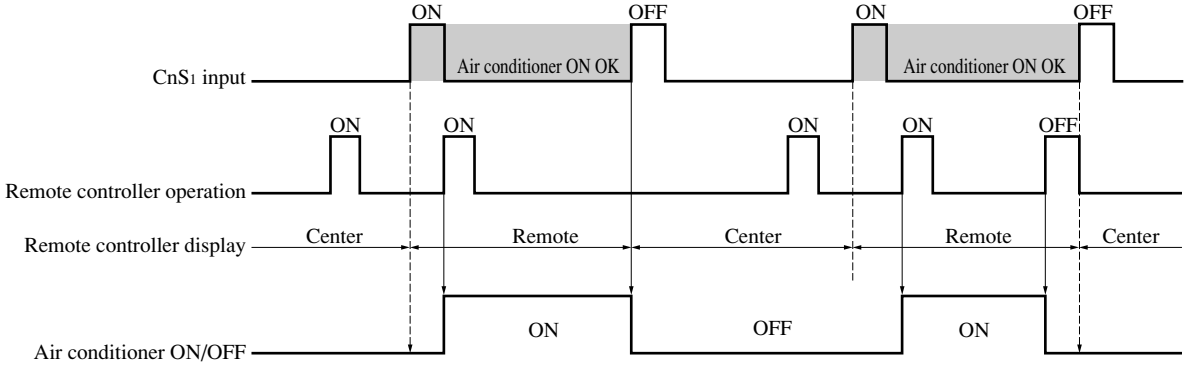
2) CnS1, performs the following operations by the changing of jumper wire J1 from short circuit to open circuit.

   If pulse input, the pulse duration is 500 ms or more.

   ① Opreation with J1 short circuit



   ② Opreation with J1 disconnection



(b) From CnS2, operation permission/prohibition control

Input : CnS2	CnS2 input method Formula switching: J1	CnS2 : Demand control/normal operating switching
Short circuit / Open circuit	J1; Short circuit Level input	Demand control → Normal operation
	J1; Open circuit Pulse input	Normal operation/Demand control switching (Reversal)
Short circuit / Open circuit	J1; Short circuit	Normal operation → Demand control
	J1; Open circuit	— (NOP)

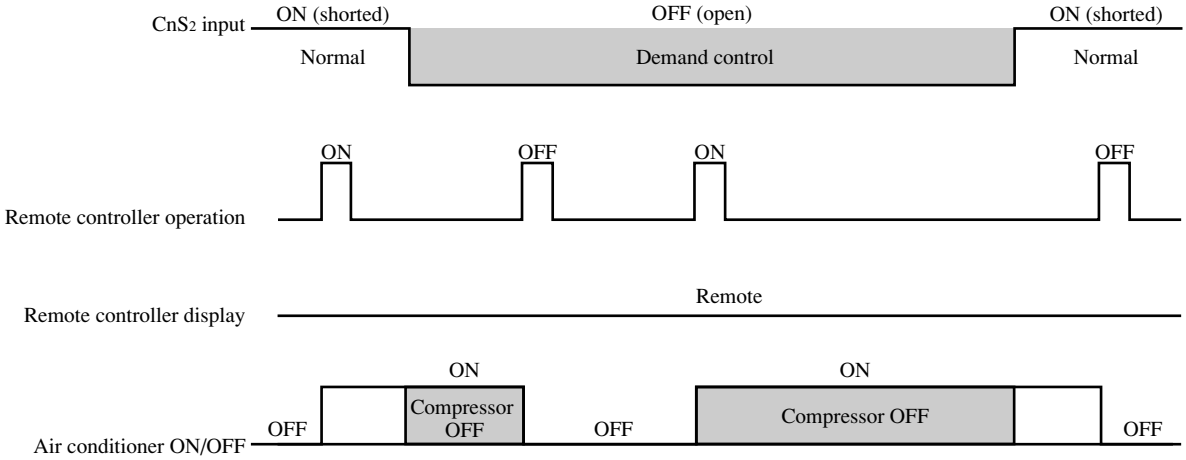
Note (1) The factory settings are: J1 - short circuit; CnS2 - short circuit (short pin connection)

1) The remote controller displays the operating mode. “To Option” sends the operating mode.
2) Demand control

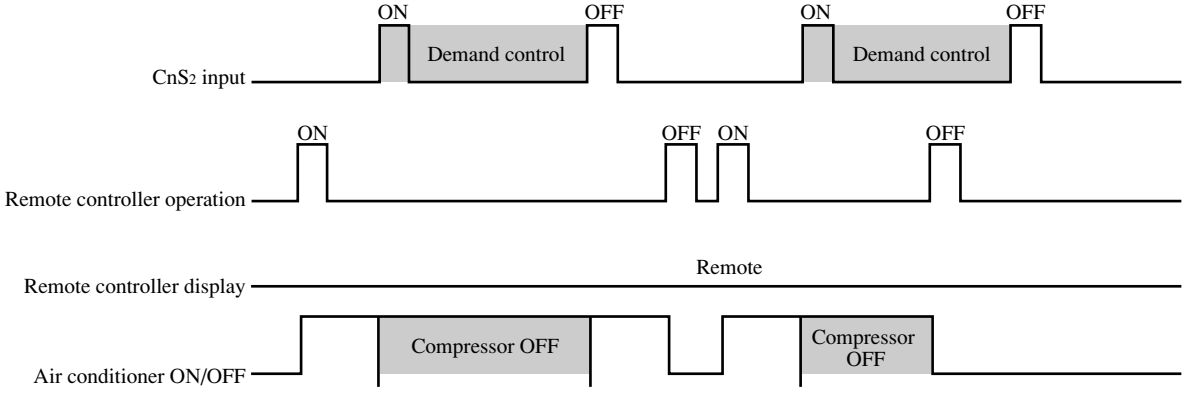
   Sets all compressors to OFF.
3) CnS2, performs the following operations by the changing of jumper wire J1 from short circuit to open circuit.

   If pulse input, the pulse duration is 500 ms or more.

① J1 - Short circuit



② J1 - Open circuit



19.5 APPLICATION DATA

SAFETY PRECAUTIONS

- Please read these "Safety Precautios" 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, restautant, 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 refrigetant leakage and exceeding of threshold concentration does occur, there is the danger of a resullant 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 followig the safety standards related to electrical equipment, and local requlations 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.**
- **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 reslut 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.**

19.5.1 Installation of indoor unit

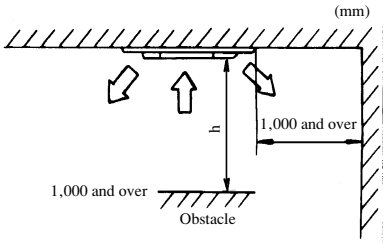
(1) Ceiling recessed type (FDT)

(a) Selection of installation location

Type	Space above ceiling (h)
FDT28, 36, 45, 56, 71, 90	Over 270mm
FDT112, 140	Over 330mm

1) Select location where the space above ceiling is larger than those mentioned below and perfect draining can be assured.
2) Places where perfect drainage can be prepared and sufficient drainage gradient is available.
3) Places free from air distrubances to the air inlet and outlet of the indoor unit.
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.)
5) Do not place where the unit is exposed to oil splashes or steam (e.g. kitchens and machine plants). (Istallation and use at such places will causes the performance drop, corrosion in the heat exchanger and damage in molded synthetic resin parts.)
6) 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.

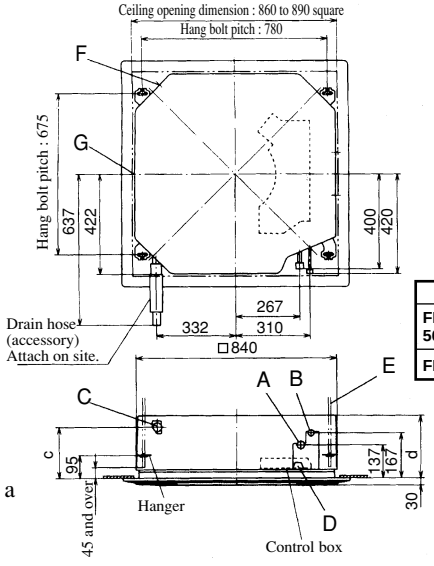
• Installtation space



7) 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.

(b) Preparation for installation

1) Ceiling hole size and Position of suspension bolts.
   a) The pattern sheet may shrink or expand as humidity changes, so check the actual size before use.
   b) 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.
   c) The size of the pattern sheet equals to the maximum size of the square ceiling opening.
2) 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

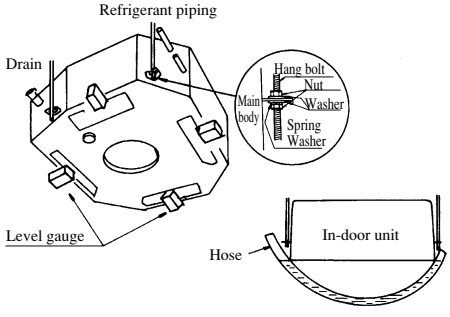
Model	c	d
FDT28, 36, 45, 56, 71, 90	210	260
FDT112, 140	270	320

(c) Hanging

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

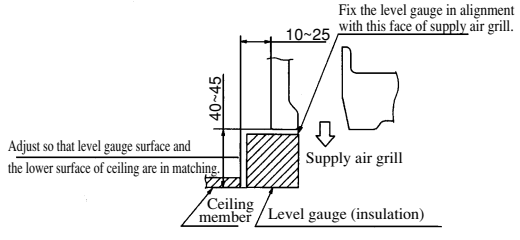
When there is the ceiling

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).
3. Use four hang bolts and fix them so that each bolt can resist the pull out load of 50 kgf.
4. Decide the length of hang bolt to approx. 70 mm 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 3 mm.)



Request

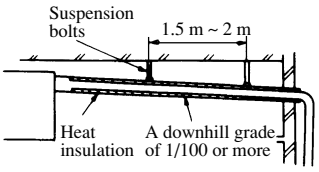
• For the hang bolt whose length exceeds 1.3m, use the M10 size hang bolt and moreover combine a diagonal member to the hang bolt for reinfocement.



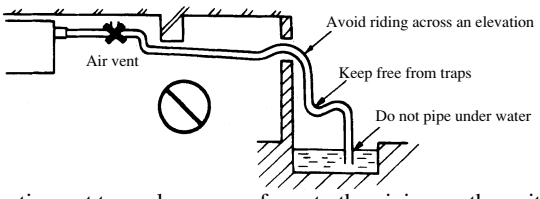
(d) Drain Piping

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

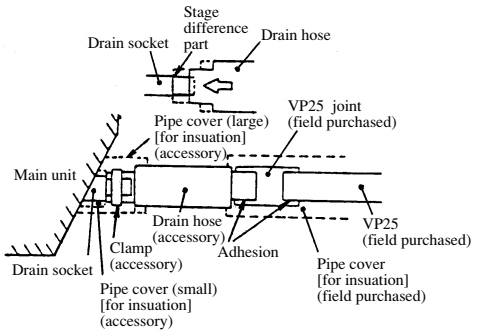
• Good piping

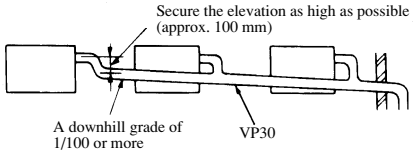


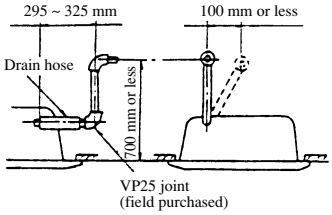
• Improper piping



2) When connecting the drain pipe to unit, pay sufficient attention not to applay excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.
3) 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).
4) When consturcting 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(11/4") or thicker pipe for this purpes.
5) Be sure to provide heat insulation to hard PVC pipes of indoor placement.
6) Do not ever provide an air vent.
7) The height of the drain head can be elevated up to a point 700 mm ablve the ceiling and, when an obstacle exisits 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 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 sketeh below.
8) 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.
9) 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.





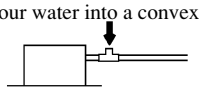


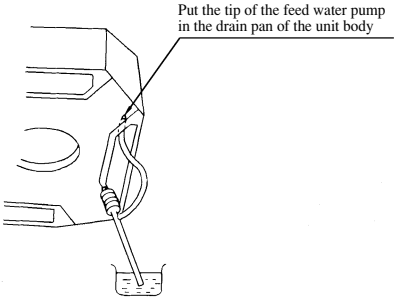
Drainage Test

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.





(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.

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

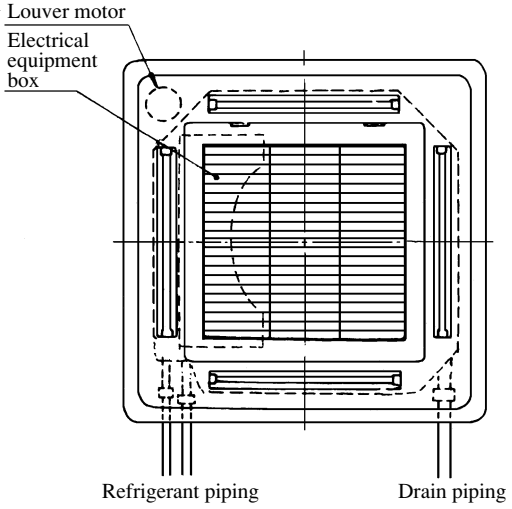
1) Check with the accessory level gauges that indoor unit height and the size of ceiling hole are correct.
   • Remove the level gauges from the indoor unit before fixing the decorative panel.
2) Screw two bolts out of four accessory bolts less than 5 mm in the indoor unit diagonally.
3) Hang the panel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

Panel Joint Setting

- The panel can turn 30 mm to the left and to the right in all (approx 2°), and the indoor unit turns 30 mm to the left and to the right in all (approx 3°), But, it cannot turn if the panel is secured.

Limit in 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.

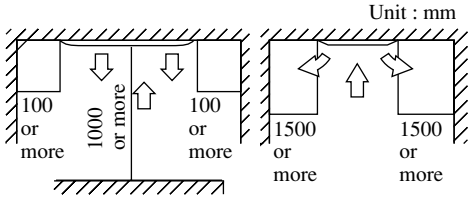


(2) 2-way outlet ceiling recessed type (FDTW)

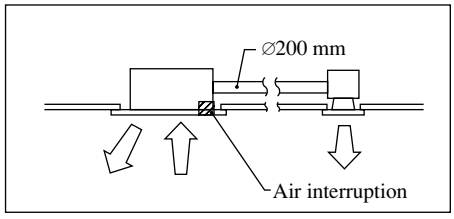
(a) Selection of installation location

1) This unit is a ceiling surface direct return air and direct supply air type.
Install the unit a place the allows air to reach every part of the room, in accordance with the shape and heigh of the room.

• Installation space



2) This unit permits connecting a branch duct (B 200 mm) according to the method shown in the figure below so that air disribution may be improved to the shape of the room. (For the connecting port of the duct, refer to the exterior dimension on page 760.)



3) Cold air throw

Unit : m

Item \ Models	FDTW28, 45, 56 type	FDTW71, 90 type	FDTW112 type	FDTW140 type
Standerd	4.0	4.5	4.7	5.0
UHi	4.5	5.0	5.2	5.5

Note (1) The cold air throw is the same in 2 directions.
Conditions:
1.Unit height: 3.0 m above the floor
2.Fan speed: Hi
3.Location: Freee space without obstacle
4.The throw is as the per the table above.
5.Air velocity at the throw: 0.3(m/s)

4) Places where chilied or heated air circulates freely. When the installation heiht exceeds 3.5m, warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.

5) Places where perfect drainage can be prepared and sufficient drainage gradient is available.

6) 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.

7) 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 suffcient attention to prevention of dewing such as thermally insulating the unit properly.)

8) 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.

9) 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.

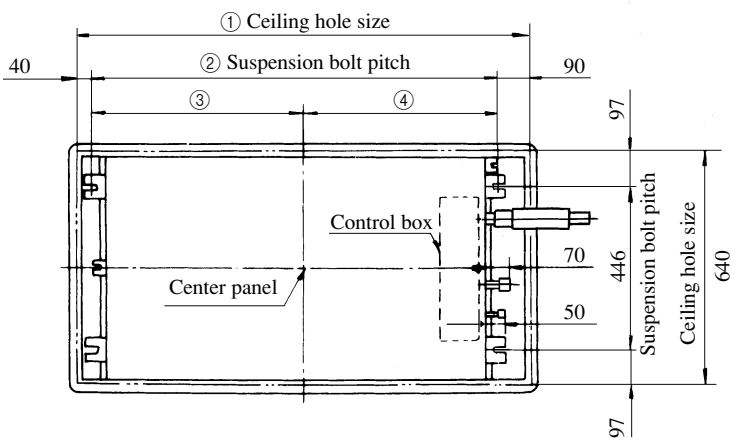
10) Place adjacent to equipment generating electromagnetic waves or high-frquency waves such sa in hospitals. Generated noise may cause malfunctioning of the controller.

(b) Preparations for installation

1) Ceiling hole and suspension bolt positions

a) The pattern sheet shrinks or expands as humidity changes, so check the actual size before use.

b) The ceiling hole sizes and suspension bolt sizes are shown in the following figure.



Dimension table

Unit : mm

Mark / Models	①	②	③	④
FDTW28, 45, 56 type	1015	885	468	417
FDTW71, 90 type	1260	1130	590	540
FDTW112, 140 type	1730	1600	825	775

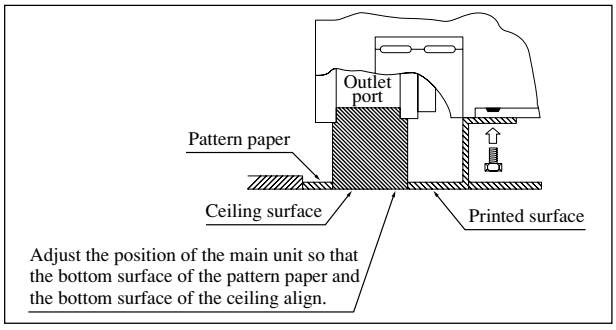
(c) Installation

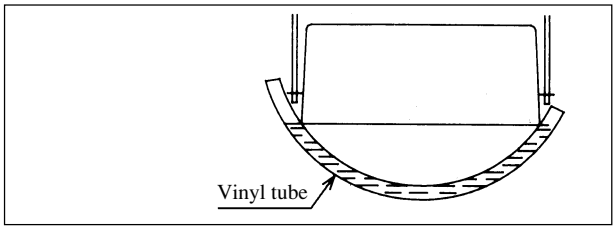
For the suspension bolt, use four M10 or W 3/8 bolts and secure so that each bolt can withstand a 50 kg/f pullout load.

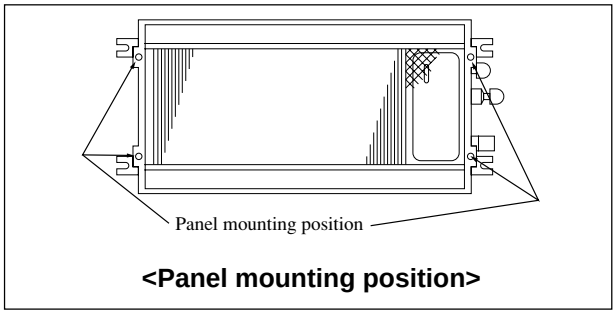
Use a suspension bolt length that extends approximately 95 mm for the ceiling surface.

A. If there is a ceiling

1) Open the hole in the installation location to the ceiling opening dimensions.
2) Install the suspension bolts (procured locally) at the designated locations.
   (Use care as the center of the spacing for the suspension bolts is not at the center of the panel.)
3) Hang the unit, use the four bolts to mount the pattern paper provided to the panel mounting section and adjust the height.
4) Use a level or transparent hose with water in it to confirm that the unit is level. If the unit is not level, problems such as water leakage or improper operation of the float switch could occur.
5) After confirming the above, secure the unit in position.



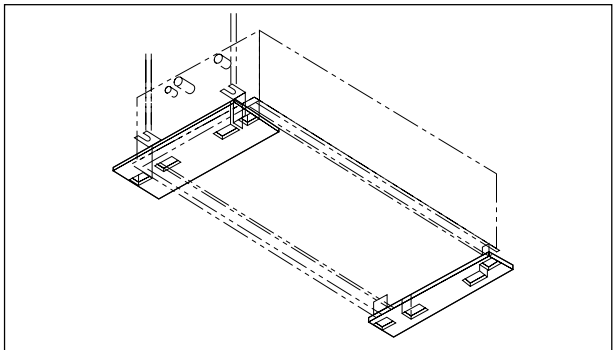




<Panel mounting position>

B. If ceiling is to be installed later

1) Follow steps A2 to A4 in the previous section "A. If there is a ceiling" to install the unit and mount the pattern paper.
2) When the ceiling is installed, the outer perimeter of the pattern paper can be referred to for making the opening in the ceiling.
3) After checking the height and that the unit is level, secure the unit in position.

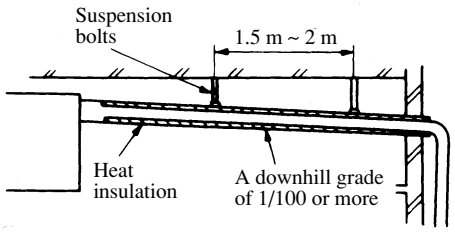


<Pattern paper mounting configuration>

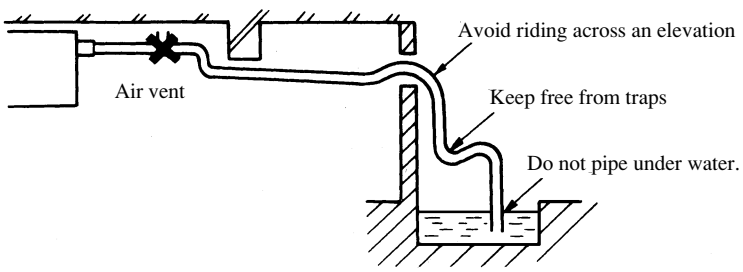
(d) Drain piping

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

- **Good piping**

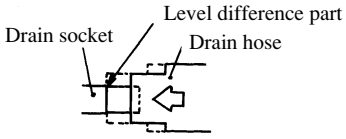


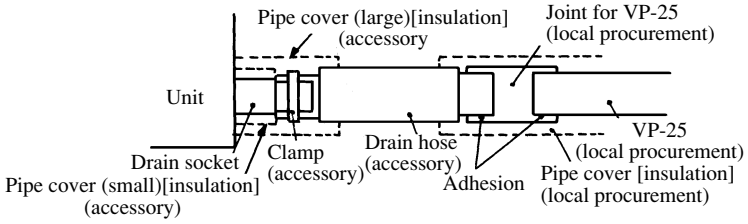
- **Improper piping**



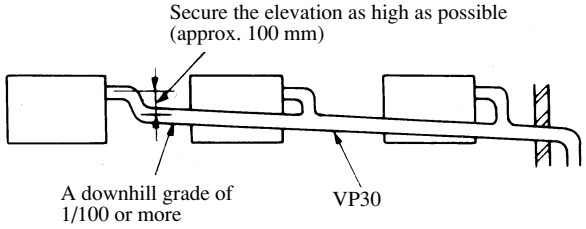
2) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

3) For drain pipe, use hard PVC ganeral 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 securly using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).





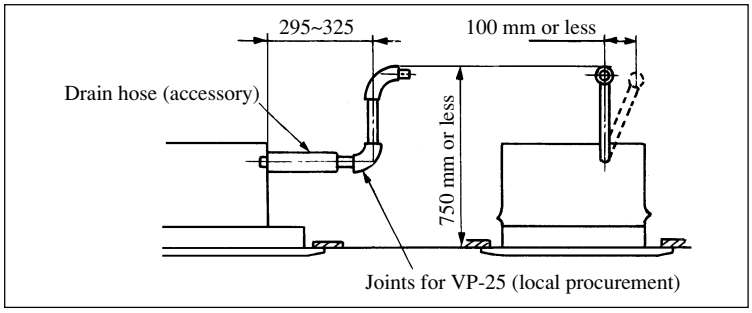
4) When constructing drain piping for several units, position the common pipe about 100mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicker pipe for this pupose.



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

6) Do not ever provide an air vent.

7) The height of the drain head may be elevated up to a point 750mm 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 too high, the back-fiow 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.

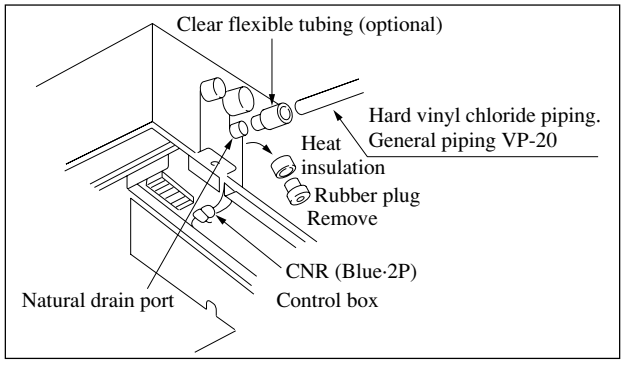


8) Avoid positioning the drain piping outlet at a place where ganeration of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

When Using a Natural Drain Port

1) Remove the heat insulating material and rubber plug of the natural drain port.
2) By using the natural drain connecting tube (option), connect the drain pipe (VP-20) and completely clamp it with a clamp.
   Note (1) If the drain pipe is directly connected to the natural drain port, the drain pan becomes unremovable.
3) Disconnect the connector CNR (blue, 2P) for the drain motor.

Note (1) If the connector remains connected, drain water is discharged from the standard pipe connecting port, leading to water leakage.



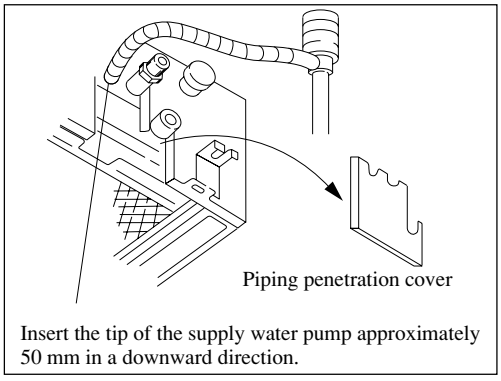
Drainage Test

When using the standard drain port, execute a drainage test after completion of electric work.

① During the test run, make sure that drain flows properly through the piping and that no water leaks from connections.

② Be sure to conduct this test even when the unit is installed in the heating season.

③ In case of a new building, conduct the test before it is furnished with the ceiling.



1) Inject about 1,000cc by using a feed water pump from the grommet on the drain pump side.
2) At the drain port (transparent portion), check if drainage is performed.
3) After completion of the drain test, completely perform heat insulation fot the drain pipe up to the main unit.

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

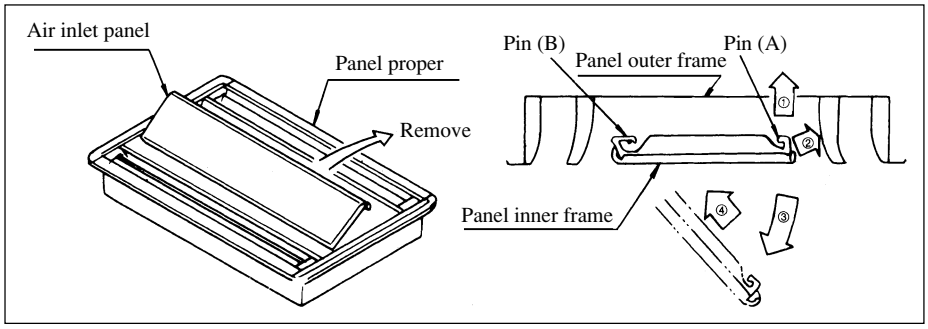
Note (1) Care should be exercised in handling the supply air port on the panel because it is easily depressed by finger nail.

1) Check with the accessory level gauges that the indoor unit height and the size of ceiling hole are correct.

Notes (1) Remove the level gauge from the indoor unit befroe fixing the panel.

(2) Remove the Air inlet panel from the panel proper.

Procedure for Dismounting the Air inlet Panel



a) Remove the panel from the pin (A) in the order of the arrows ① and ②.

b) Open the panel slightly as shown by the arrow ③ and move it to the arrow ④. Then remove it from the pin (B).

2) Screw two bolts out of four accessory bolts less than 5mm in the panel diagonally.

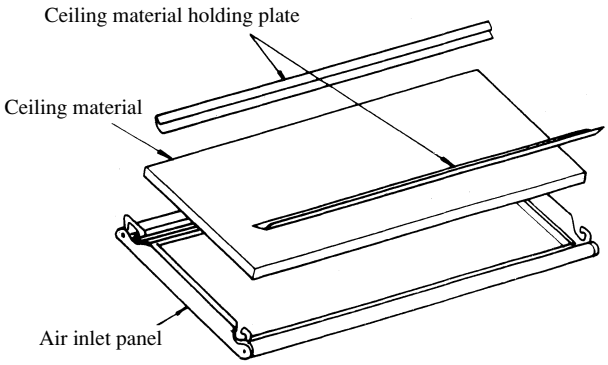
3) Hook the panel on the two bolts and set it temporarily.

4) Tighten the bolts fixed temporarily and the remaining two bolts.

5) Connect the louver motor connector (white, 3P) and the limit switch connector (white, 2P) to the panel respectively.

6) When the louver motor cannot be operated by remote controller operation, check the connector connections and turn off the power suppy for 10 sceonds or more for restting.

For Ceiling Material Inlaid Panel



● **Ceiling Material Dimensions**

Unit : mm

Item \ Models	FDTW28, 45, 56 type	FDTW71, 90 type	FDTW112, 140 type
Width	300	300	300
Length	970	1215	1685

① Remove the air inelt panel from panel proper.

② Remove the ceiling holding plates (2 sheets) temporarily set on the suction panel with screws.

③ Install the ceiling material on the air intel panel and fix it with the ceiling holding plates so as not to produce any play.

Note (1) Use a ceiling material with a thickness of 6-15mm and a side length of 300mm or more.

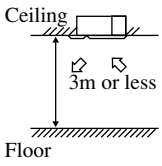
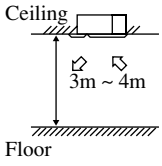
Ceiling material thickness : 6-10 mm 10 ~ 15 mm

Ceiling Material Instaling Direction

(3) 1-way outlet ceiling recessed type (FDTS)

Preparation of indoor unit

It can be installed by either one of the following methods. Select the most adequate method for your particular case.

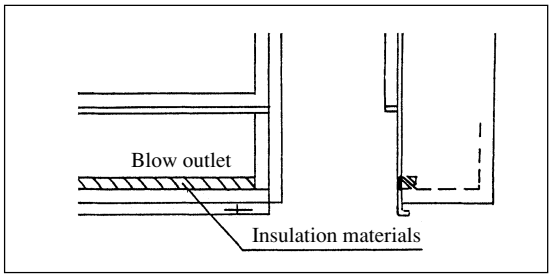
	Ⓐ Standard installation	Ⓑ Higher ceiling
Installation example and limitation		

Note (1) In the case of installing on the high ceiling, part of indoor unit requires some modification.

Procedures of rework

Installation on higher ceiling

Adhere the insulation materials attached to the direct blow panel on the blow outlet of indoor unit.



(a) Selection of installation location

1) Where cool and hot air will be distributed sufficiently.

Where the installation heigh exceeds 3m, warmed air is likely to concentrate close to the ceiling. In such case, you should install also a circulator.

Reference **• Cooled (warmed) air throw**

Unit : m

Item / Models	Reaching distance	
	Standard	Higher ceiling
All models	7	

[Conditions] 1. Unit heigh

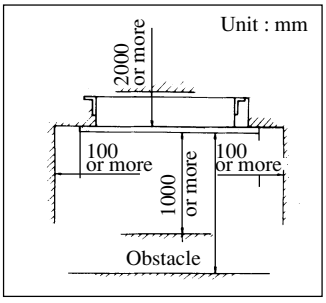
Standard ceiling: 2.4--3.0(m) above floor Higher ceiling: 3.0--4.0(m) above floor

2. Kind of operation: Hi
3. Place: Free space without obstruction;
4. Reaching distance means the horizontal distance for the wind to reach the floor.
5. Wind velocity at the reaching distance: 0.5m/s

Note (1) Wind capacity is UHi in case of a higher ceiling. It is value of Hi for other cases.

2) Where the ceiling has sufficient rigidity.
3) Where there is no obstacles in front of the suction intel and blow outlet.
4) It should be avoided such places as kitchen, machine factory, etc. where there profuse liquid splashes or thick steam.
5) Where the height of ceiling exceeds 200mm.

6) Where a space as shown below can be secured.



7) It should be avoided where a machine generating high frequency waves is installed.

8) Select a place to branch the piping so that same distance will be a obtained for each of one way piping.

9) Where humidity may exceed 80% behind the ceiling or the dew point may exceed 28°C, adhere polyurethane foam materials (t 10 or more) over the insulation materials on the external plate.

10) Where it is convenient for the piping and wiring to the outdoor.

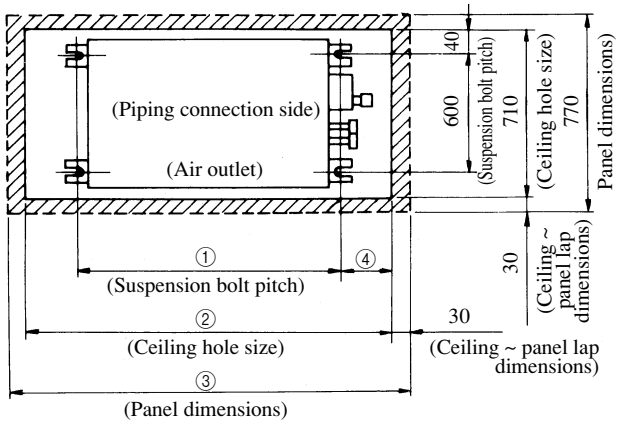
11) Where protected from direct exposure to sun beams.

12) Where it is free from volatile gas generation.

(b) Standard location

1) Installation

a) Ceiling hole size and position of suspension bolt

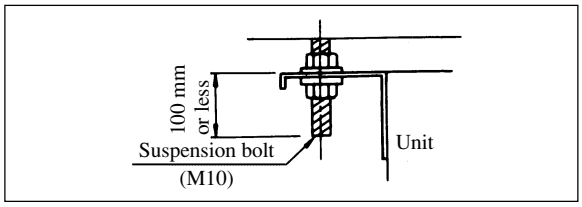


Unit : mm

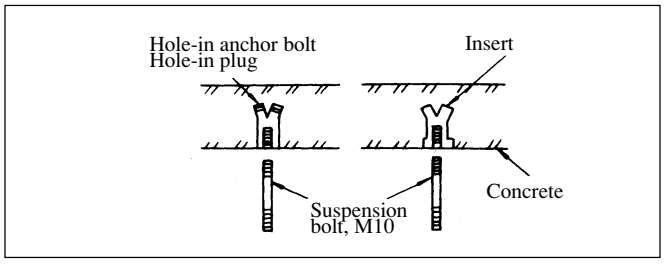
Models / Mark	①	②	③	④
FDTS22, 28, 36, 45 type	990	1230	1290	180
FDTS71 type	1250	1440	1500	145

b) Length of fixed suspension bolt (customer orderd parts M10)

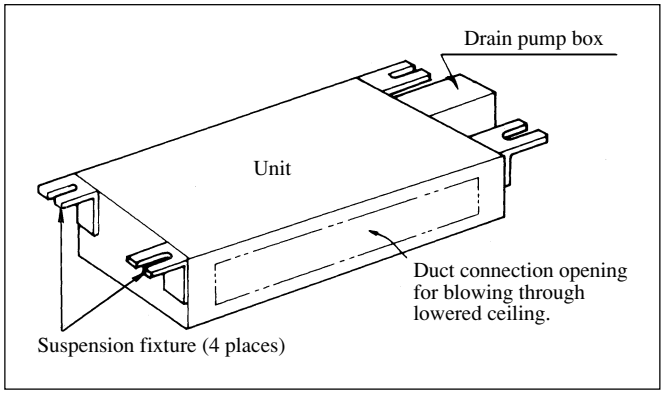
[Reference] Suspension bolt pitch is adjustable within ± 10mm in sidewise direction. Since there is no adjustment allowance in back and forth direction, determine the position exactly with a measure. (Lap margin between ceiling and panel is 30mm.)



c) Fixing of Suspension bolt. Fix the bolts securely as shown below or by any other adequate means.



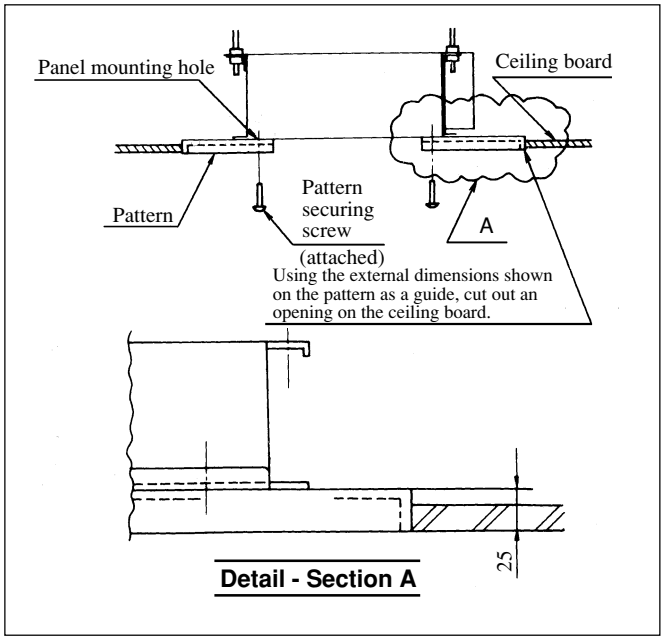
d) Installation



Procedures

① Install nuts on the Suspension bolts at onside. Suspension the suspension fixtures on the Suspension bolts first and then insert the remaining fixtures on the remaining Suspension bolts at and lock them with nuts.

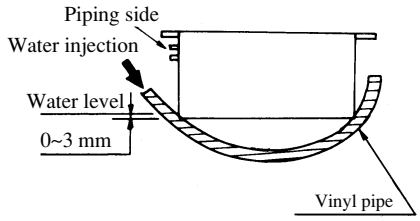
② Since the indoor unit and the panel height cannot be adjusted, adjust the height using an attached pattern before fixing the indoor unit.



Check of levelness

Check the levelness as follows. Use a level gauge or adjust the levelness with the following method.

Adjust the bottom of main unit and the water level as shown below.

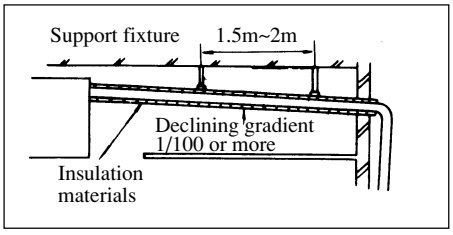


Slightly lower the piping side

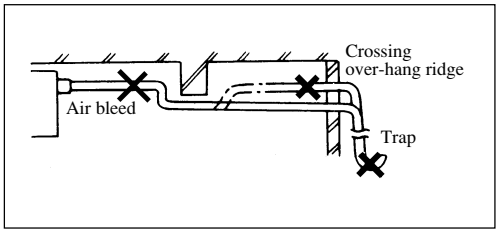
2) Drain pipe

a) Set the drain pipe as a declining gradient (1/50 ~ 1/100) and avoid to cross an over-hand ridge or to allow a trap on the way.

● **Good piping**



● **Improper piping**



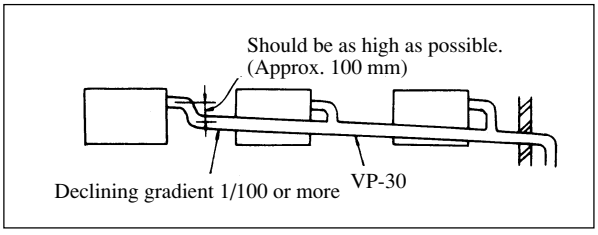
b) When connecting the drain pipe, avoid undue stress being applied to the pipe at the unit side and fix the pipe at a point as close as possible to the unit.

c) A hard vinyl chloride pipe, general VP-25, which is available from markets is ideal for the drain pipe.

d) When installing the drain pipe, make sure to use the attached drain pipe, drain pipe clamp, and insulation materials for drain pipe clamp.

- Insert the drain pipe to the base of outlet.
- Securely tighten the drain pipe clamp.
- Make sure to insulate the drain pipe clamp.

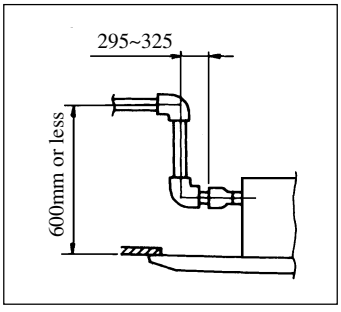
e) When there are plural number of drain pipes, arrange to position the converging pipe at about 100mm below the drain outlet as shown below. Use a pipe of VP-30 or higher for the converging pipe.



f) Make sure to provide the thermal insulation for the hard vinyl chloride pipe and drain socket provided indoor.

g) Air bleed should not be provided in any event.

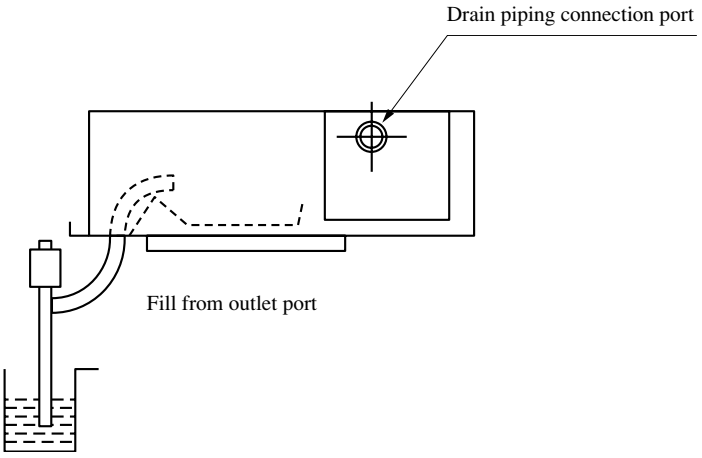
- When it is necessary to raise the drain head, the limitation is up to 600mm below the bottom face of ceiling where the unit is installed. The distance is the dimension of the pipe which is installed perpendicularly from a point close to the output for drain pipe connection.

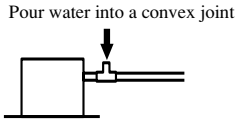


Drain test

[Perform this before installing the ornament panel]

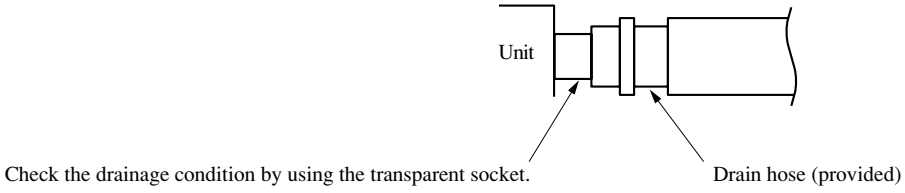
- Perform this upon completion of electrical work.
- Gradually introduce 2,000~3,000cc of water as shown below.





(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.)

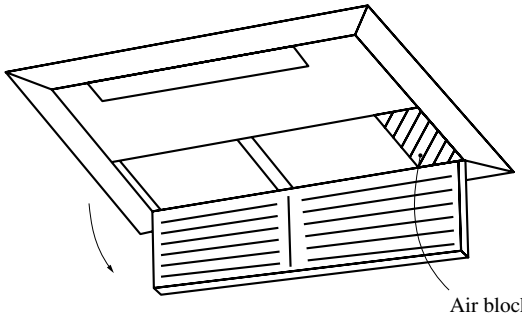
- Connect the remote control switch and set to cooling operation. The drain pump will operate with the compressor on.
- Test whether or not the water is draining while listening to the operating sounds of the electric motor for the drain water.



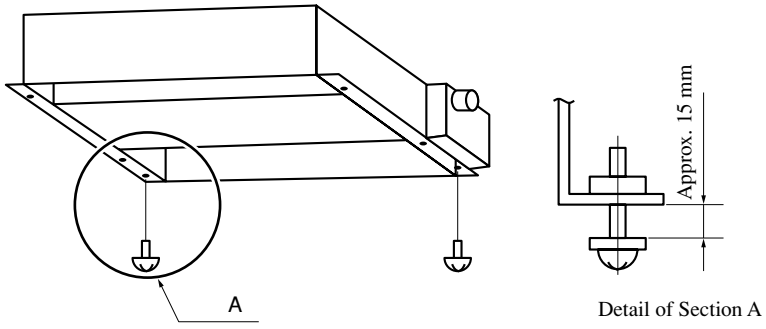
- Check that water is draining smoothly and that there is no water dripping from the connections or other areas.

Mounting the Panel

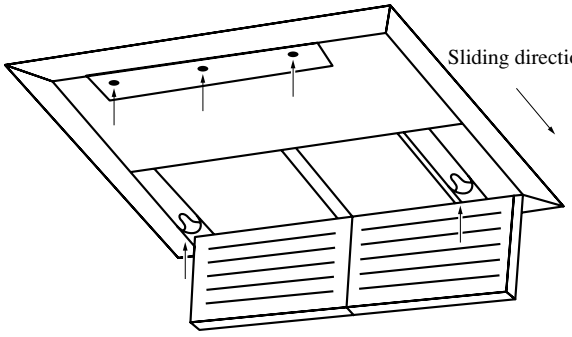
① Open the inlet grille and remove the air block panel from the inside. (Remove the 2 screws.)



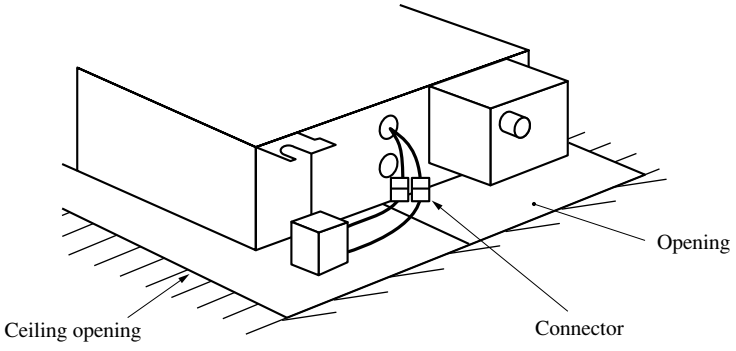
② Mount the two (M5 x 35) panel mounting screws to the indoor unit



③ Hang the panel on the two mounting screws on the indoor unit by using the two ♁ shaped holes. Slide the panel approximately 10 mm. Use the 5 panel mounting screws to secure the panel.



④ Use the opening to connect the connectors for the louver motor and limit switches.



⑤ Reinstall the wind shield plate.

(c) Installation on higher ceiling

Adhere the insulation materials on the blow outlet of the indoor unit. All others are same as the standard installation.

(4) Cassetteria type (FDR)

(a) Preparation of indoor unit

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

(b) Select places for installation satisfying 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 3 m, 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.
3) 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.
4) Places with the environmental dew-point temperature is lower that 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 insulation of the unit prperly.)

(c) Avoid installation and use at those place listed below.

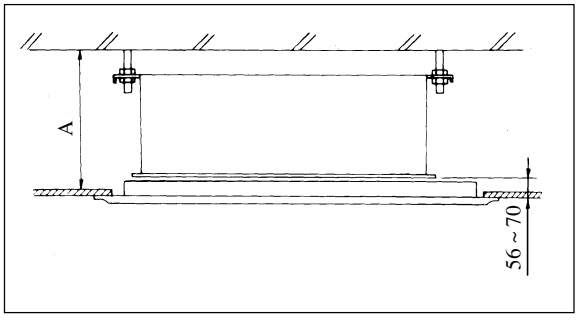
1) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
   Installation and use at such places incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic vesin parts.
2) Places where corrosive gas (such as sulfurous acid gas) or inflammable 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.
3) Places adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals.
   Generated noise may cause malfunctioning of the controller.

(d) Preparation for installation

1) Selection of suspension pattern

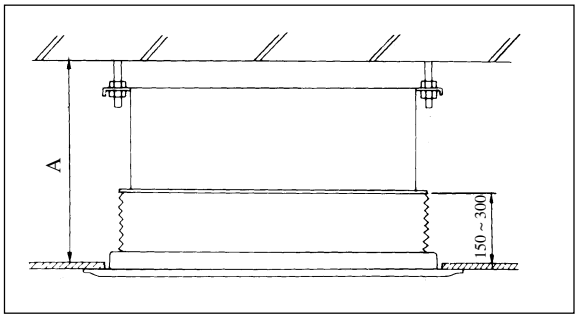
When the unit is hanged from ceiling, select one of following patterns depending on the dimensions of the ceiling.

< Combination with silent panel >



Models \ Mark	A
FDR22, 28, 45, 56 71, 90 type	365 mm or more
FDR112, 140 type	416 mm or more

< Combination with canvas panel >



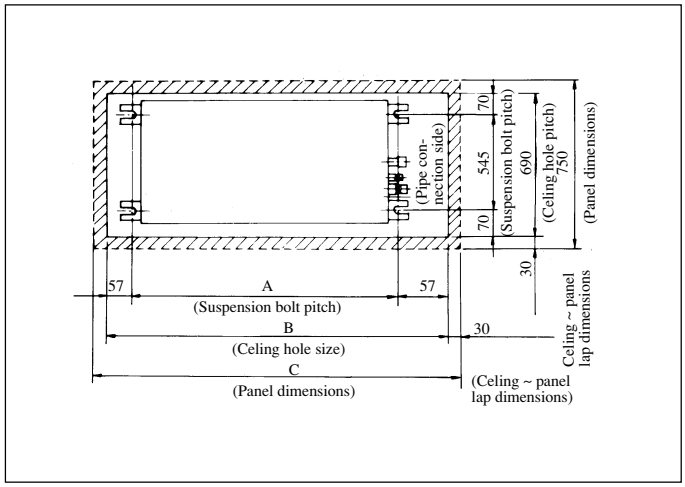
Models \ Mark	A
FDR22, 28, 45, 56 71, 90 type	495 mm or more
FDR112, 140 type	510 mm or more

2) Ceiling hole size and position of suspersion bolt

When boring at the ceiling, use the pattern sheet included in the accessory of the unit.

Leave the pattern sheet on the unit till decorative panel is installed.

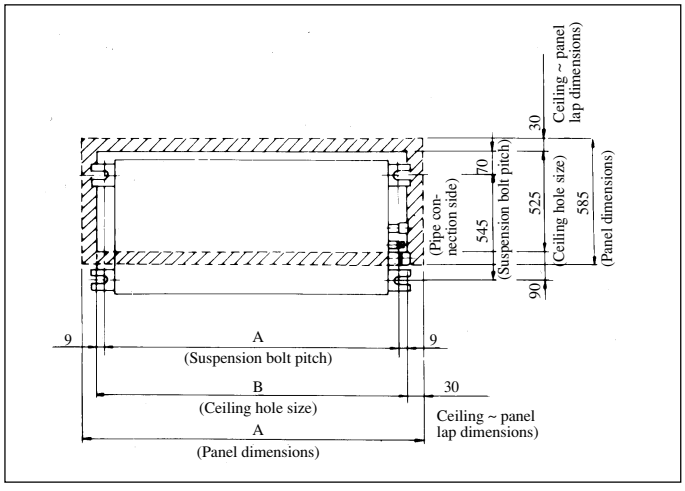
< Combination with silent panel >



Unit : mm

Mark / Models	A	B	C
FDR22, 28, 45, 56 type	786	980	1040
FDR71, 80 type	986	1180	1240
FDR112, 140 type	1406	1600	1660

< Combination with canvas panel >



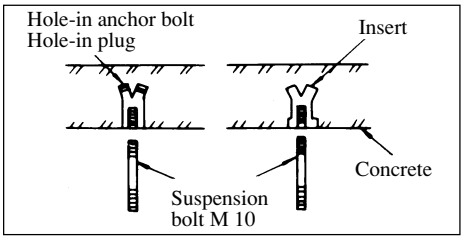
Unit : mm

Mark / Models	A	B	C
FDR22, 28, 45, 56 type	786	804	864
FDR71, 80 type	986	1004	1064
FDR112, 140 type	1406	1424	1484

3) Suspension bolts installation

- Locate the suspension bolts position by using the pattern sheet

  (Use care of the piping direction when the unit is installed)

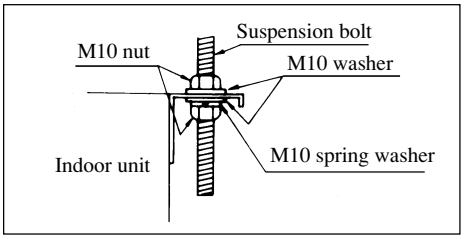


(e) Installation of indoor unit

1) Fix the indoor unit to the suspension bolts.

   If required, it is possible to suspend the unit to the beam, etc.

   Directly by use of the bolts without using the suspension bolts.

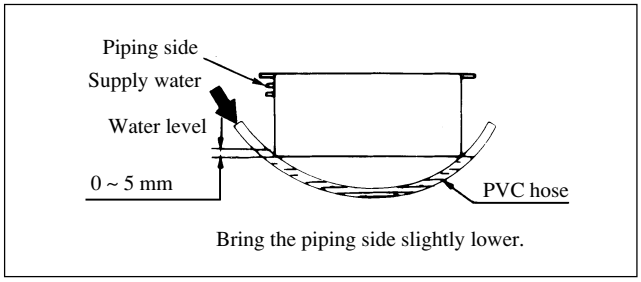


Note (1) When the dimensions of indoor unit and ceiling holes does not match, it can be adjusted with the slot holes of mounting bracket.

2) Adjusting the unit's levelness

① Adjust the out-of levelness using a level vial or by following method.

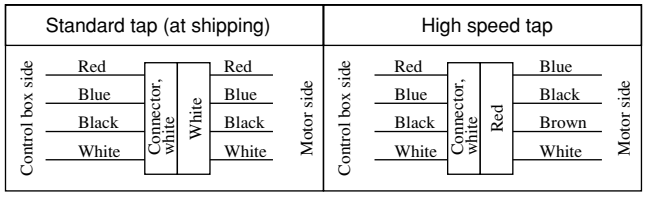
- Make adjustment so that the relation between the lower surface of the unit proper and water level in the hose becomes as given below.



② Unless the adjustment to the levelness is made properly, malfunctioning or failure of the float switch may occur.

3) Tap selection on blower unit

Taps of 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.



(f) Installation of decorative panel

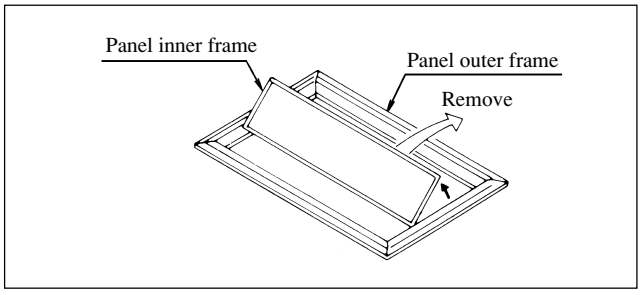
1) Case of silent panel

a) Accessory

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

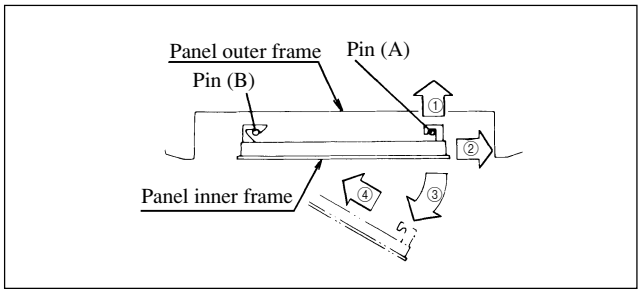
b) Installation procedures

① Remove the inner frame of panel

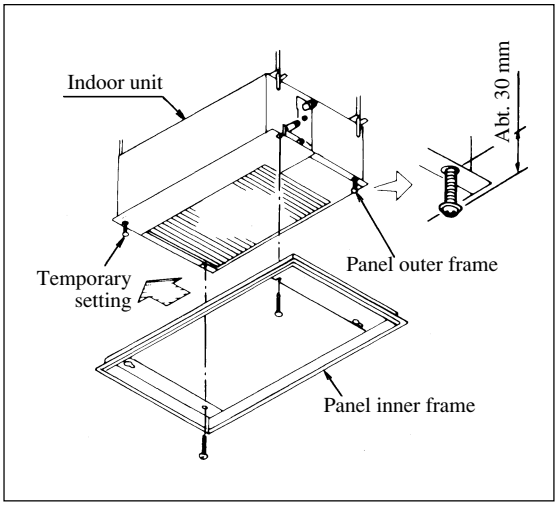


< How to remove the panel inner frame >

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



② **Install the panel outer frame on the Indoor unit.**



Procedures 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 (1) 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.

2) Case of canvas panel

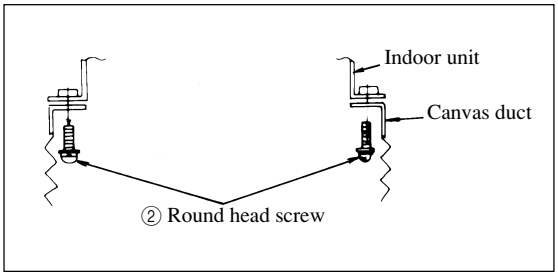
(Canvas duct (option) is necessary to install the canvas panel.)

a) Accessory

Symbol	Name	Q' ty	Position
①	Round head machine screw (M4 x 16)	4	Panel securing
②	Round head machine screw (M5 x 16)	8	Canvas duct securing
③	Round head machine screw (M5 x 25)	4	Chain securing
④	Holder	4	
⑤	Chain	4	

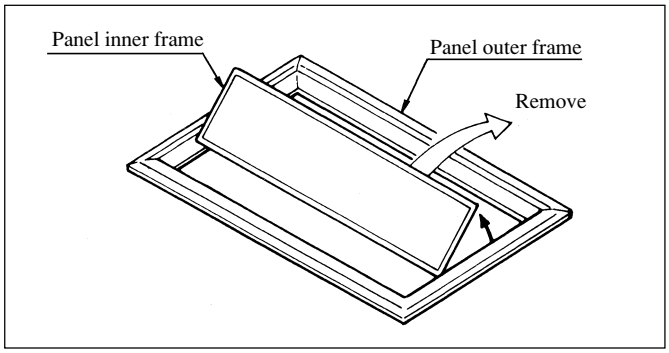
b) Mounting procedures

① **Install the canvas duct (option, 4 places) on the Indoor unit.**

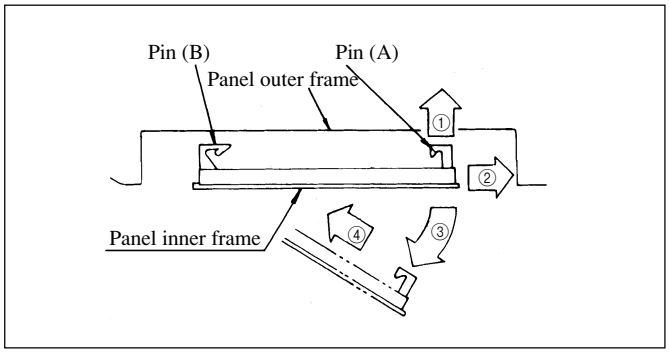


② **Remove the panel inner frame.**

It can be removed same as the silent panel.

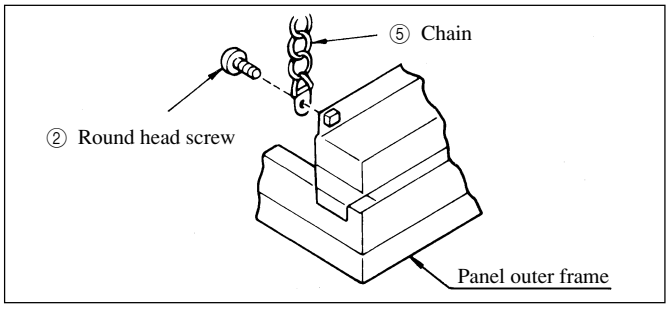


< How to remove the panel inner frame >



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

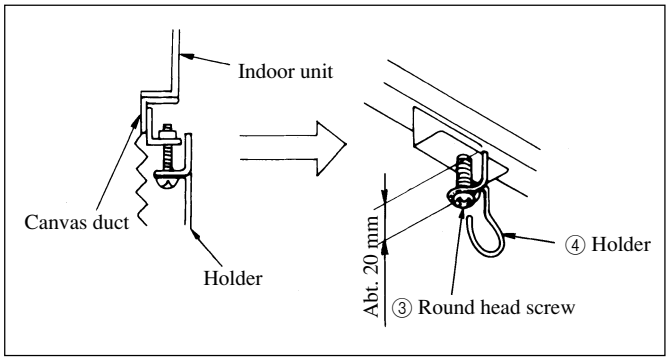
③ **Install the chains on the panel outer frame. (4 places)**



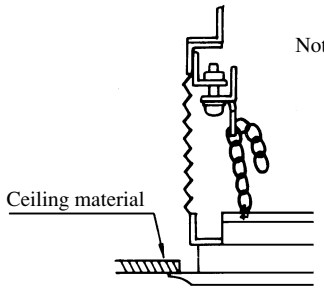
④ **Install the panel outer frame.**

Procedures of installation

- Secure the holder tentatively as shown below. (4 places)

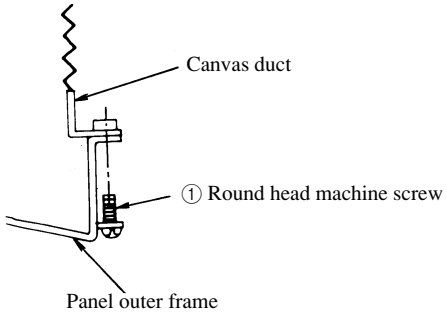


- Hook the chain of panel outer panel on the holder.



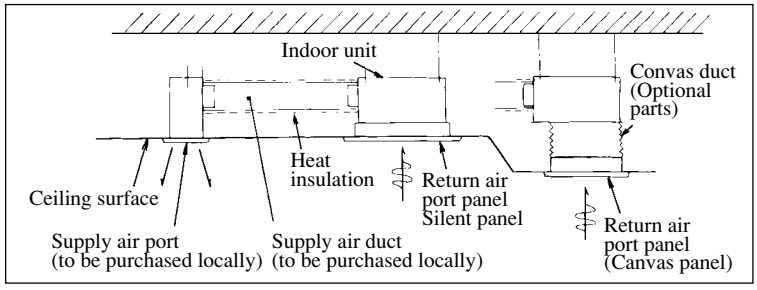
Note (1) When hooking the chain. make sure to avoid slackness on it by pushing hard the panel outer frame against the ceiling material.

- Tighten ③ screw in the step ① till the panel outer frame contacts closely with the ceiling material.
- Secure the canvas duct and the panel outer frame with screws.



⑤ Remove the panel inner frame and install in the reverse order of removal.

⑥ Cautions for duct installation work



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

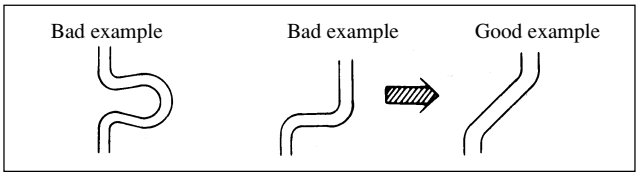
◆ Supply air duct

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

FDR22 type	FDR28, 45, 56 type	FDR71, 90 type	FDR112, 140 type
1-spot	2-spot	2 ~ 3-spot (1)	3 ~ 4-spot (1)

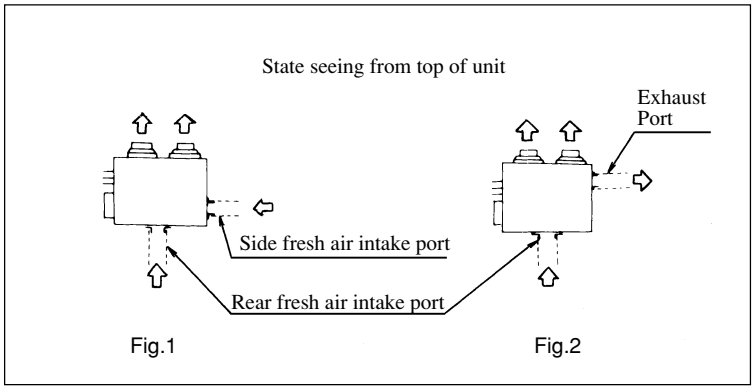
Notes (1) Shield the central supply air port for 2-spot.
(2) Shield the supply air port around the center for 3-spot.

- 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 indoor unit and the supply air duct flange.
- Conduct the duct installation work before finshing the ceiling.

(g) Connection of air inteke and exhaust ducts.



1) Duct connecting position

a) Fresh air intake

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

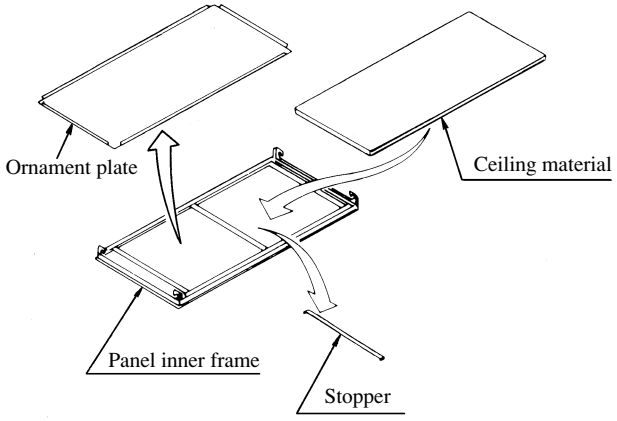
b) Exhaust (Make sure to use also the air intake.)

Use the side exhaust port.

Attachment of ceiling material

Ceiling material can be attached to the panel innern frame.

(Plate thickness max. 15mm)



Attachment procedures

① Remove the stopper.

② Remove the ornament plate and attach the ceiling material.

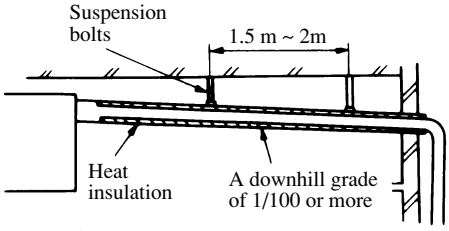
③ Hold down the ceiling material and return the stopper in position.

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

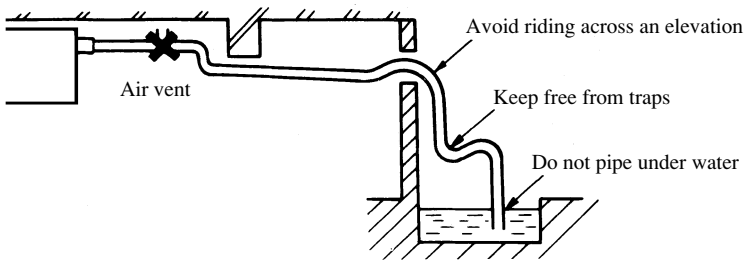
(h) Drain piping

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

● **Good piping**

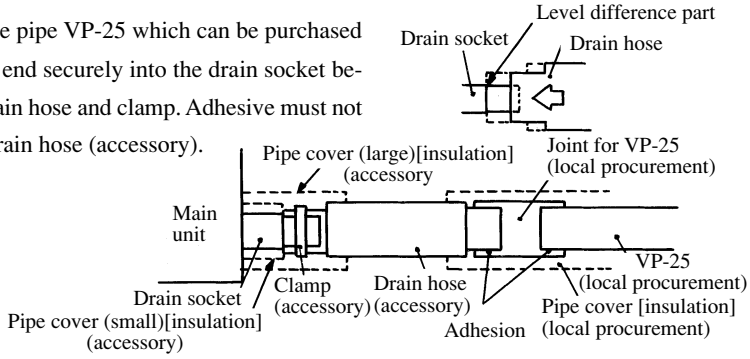


● **Improper piping**

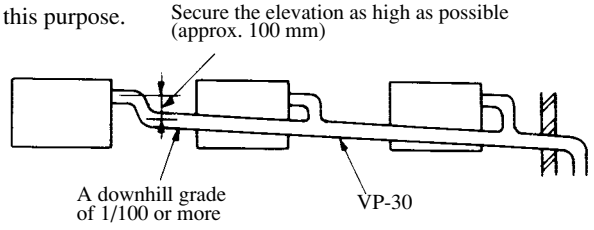


2) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as possible to the unit.

3) 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).



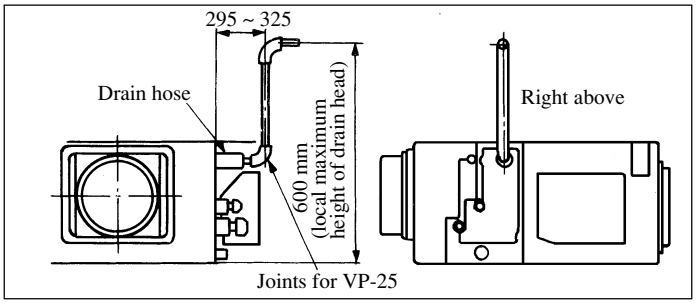
4) When constructing drain piping for several units, position the common pipe about 100mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicker pipe for this purpose.



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

6) Do not ever provide an vent.

7) The height of the drain head may 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 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.



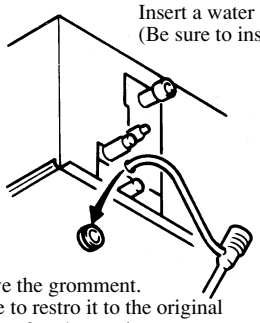
8) Avoid positioning the drain piping outlet at a place where ganeration of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may ganerate.

9) Drainage test

a) During trial operation, make sure that drainage is properly execued and check that leakage is not found at connections.

b) Be sure to carry out a drainage test when installing the system during a heating season.

c) When installing the system in a building under construction, carry out the drainage test before ceiling tiles are installed.



① Supply approx 1000cc of water through the outlet of the unit using a feed water pump.

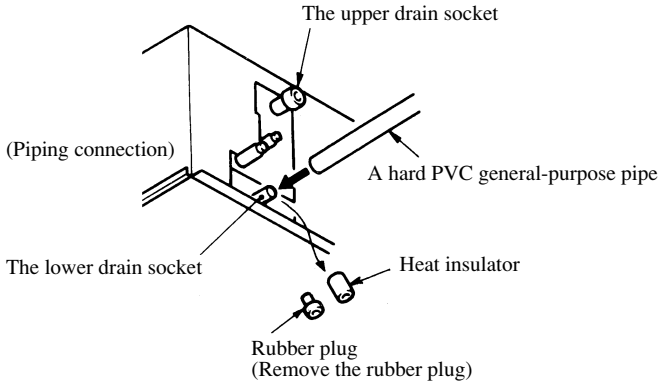
② Make sure that drainage is proceeding properly at the see-through outlet of the unit.

*Also confirm the revolving sound of the condensate motor when checking the drainage.

③ Then remove the drain plug at lower section of the unit to drain water off. After making sure water is not left, restore the drain plug to the original position.

10) Drainage from the lower drain socket

Only if the drain pipe can be installed in a downhill grade (1/50-1/100), the lower drain socket can be used for connecting to the drain pipe as illustrated.

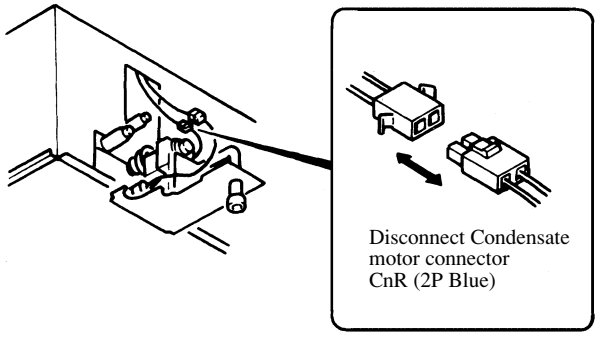


(Disconnect the connector for the drain motor)

As shown in the sketch to the right, disconnect the drain motor connector CnR (blue color coding).

Caution:

If the system is started with this connector connected as is, drain water is discharged out of the upper drain socket causing a heavy water lekage.



(5) Satellite ducted type (FDUM)

(a) Selection of installation location

1) 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 will 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.) is gnerated or remains.
Installation and use at such places will 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.

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

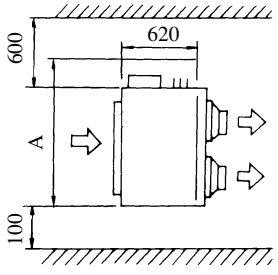
a) Places where chilled or heated air circulates freely. When the installation height exceeds 3m, warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.

b) Places where perfect drainage can be prepared and sufficient drainage gradient is available.

c) 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.

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 to prevention of dewing such as thermally insulating the unit properly.)

3) Check if the selected place for installation is rigid enough to stand the weight of thew unit.
Otherwise, apply reinforcement using boards and beams before starting the installation work.



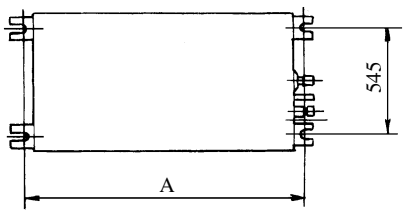
Unit : mm

Models \ Mark	A
FDUM36, 45, 56 type	1100
FDUM71, 90 type	1300
FDUM112, 140 type	1720

(b) Suspension

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

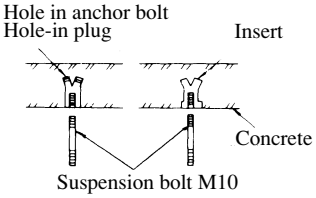
Unit : mm

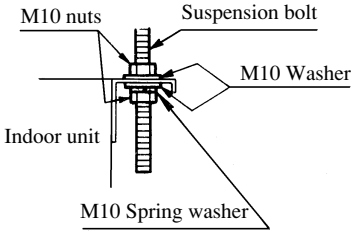


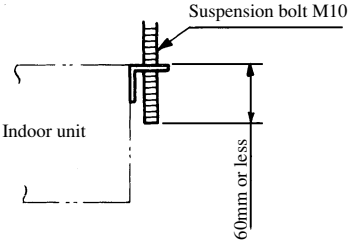
Mark / Models	A
FDUM36, 45, 56 type	786
FDUM71, 90 type	986
FDUM112, 140 type	1406

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

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



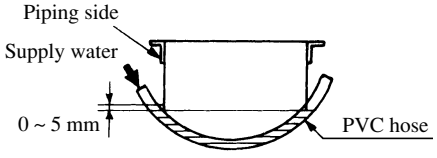




2) Adjusting the unit's levelness

a) 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.

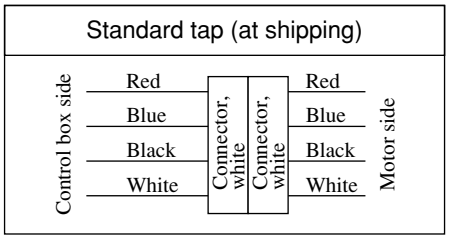


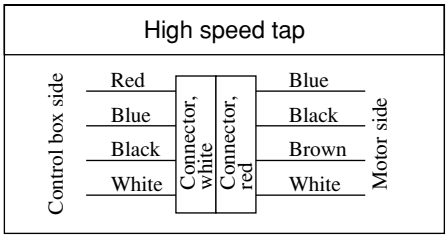
Bring the piping side slightly lower

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

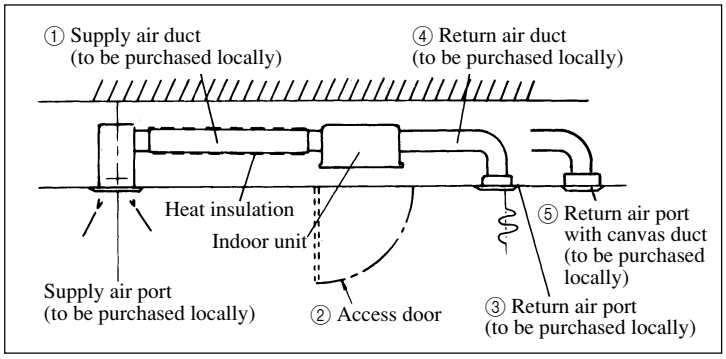
3) Tap selection on blower unit.

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





(c) Duct installation



① Supply air duct

Same as FDR series. Refer to page 861.

② Access door

Access door must be provided without fail.

● Dimensions of access door and service space

(See exterior dimensions in page 773 to 775.)

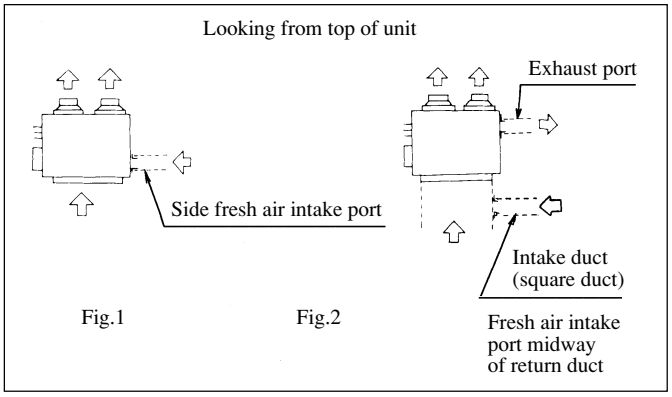
③ Return air port

An air filter is not included in the indoor unit. Use the return air port with air filter.

④ Return air duct: Use square duct.

⑤ Return air port with canvas duct

1) Connection of intake and exhaust ducts.



2) Duct connecting position.

< Fresh air intake >

a) Use side air intake port.

b) In case of simultaneous intake and exhaust, the side air intake port cannot be used, therefore, take air from the midway air intake port along the intake duct.

< Exhaust > Make sure to use suction as well.

c) Use a side exhaust port.

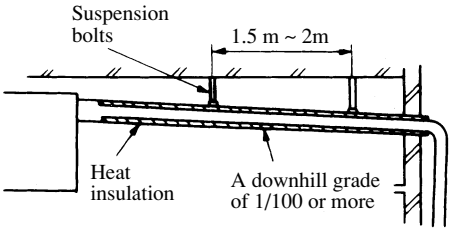
3) Duct connection

Use intake and exhaust duct flange of separately sold (for connection of ∅125mm round duct) to connect ∅125mm round duct. The duct clamped by bands must be thermally insulated to prevent dew condensation.

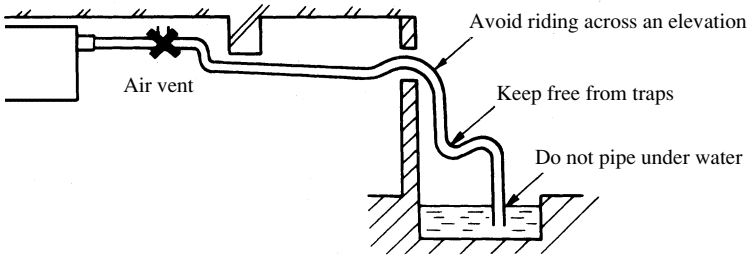
(d) Drain piping

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

● **Good piping**

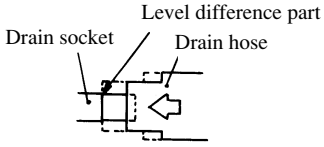


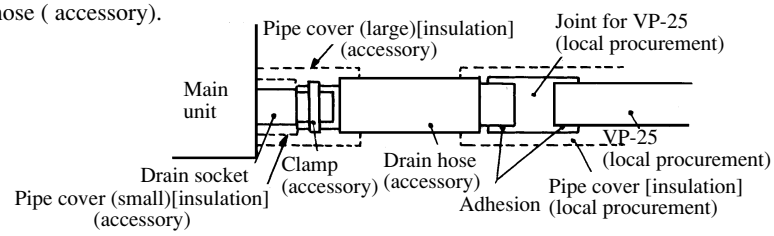
● **Improper piping**



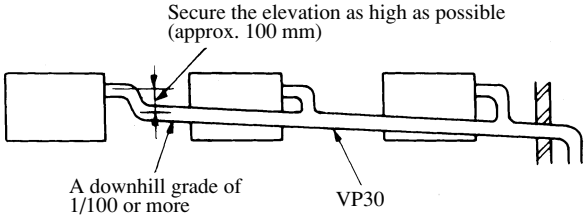
2) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

3) 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).





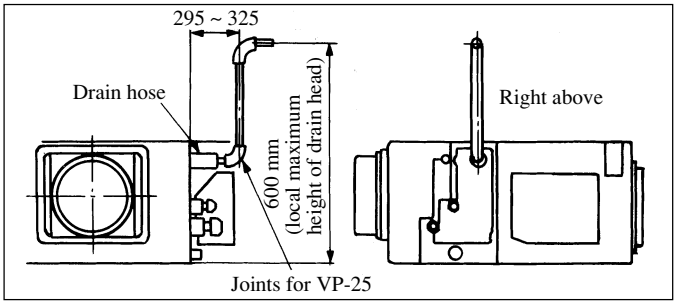
4) When constructing drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicher pipe for this purpose.



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

6) Do not ever provide an air vent.

7) 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. Therfore, make the height of the drain pipe withing the distance given in the drawing below.



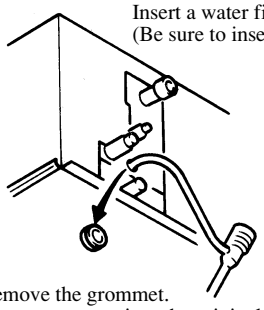
8) Avoid positioning the drain piping outlet at a place where generation of odor may stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

9) Drainage test

a) During trial operation, make sure that drainage is properly execued and check that leakage is not found at connections.

b) Be sure to carry out a drainage test when installing the system during a heating season.

c) When installing the system in a building under construction, carry out the drainage test before ceiling tiles are installed.



① Supply approx 1000cc of water through the outlet of the unit using a feed water pump.

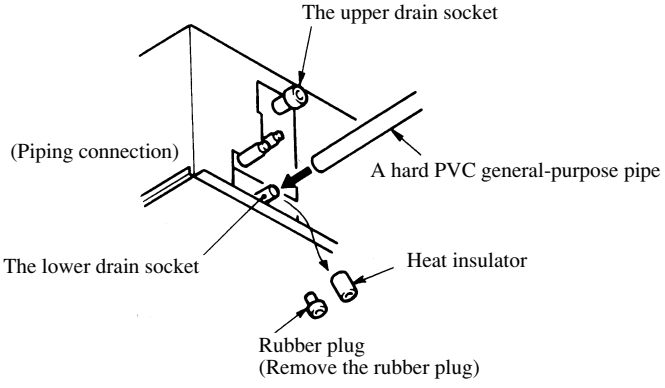
② Make sure that drainage is proceeding properly at the see-through outlet of the unit.

* Also confirm the revolving sound of the condensate motor when checking the drainage.

③ Then remove the drain plug at lower section of the unit to drain water off. After making sure water is not left, restore the drain plug to the original position.

10) Drainage from the lower drain socket

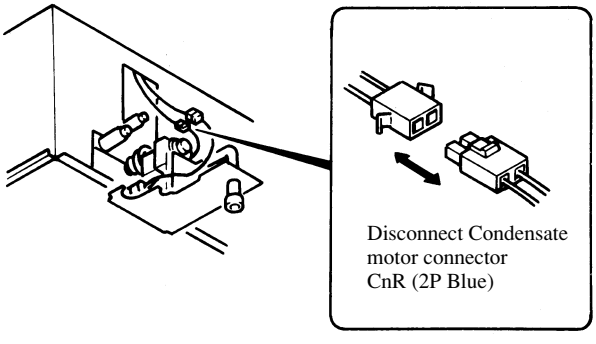
Only if the drain pipe can be installed in a downhill grade (1/50-1/100), the lower drain socket can be used for connecting to the drain pipe as illustrated.



(Disconnect the connector for the drain motor)

As shown in the sketch to the right, disconnect the drain motor connector CnR (blue color coding).

If the system is started with this connector connected as is, drain water is discharged out of the upper drain socket causing a heavy water lekage.



(6) Ceiling Supension type (FDE)

(a) Selection of installation location

1) A place where good air circulation and delivery can be obtained.

Cold air throw

Unit : m

Models	FDE36, 45, 56 type	FDE71 type	FDE112 type	FDE140 type
Air throw	7.5	8	9.5	10

Conditions

(1) Installation height: 2.4 ~ 3.0 m above the floor

(2) Fan speed: Hi

(3) Location: Free space without obstacles

(4) Distance of reach indicates the horizontal distance after the wind touched down the floor.

(5) Air velocity at the throw: 0.5 (m/sec.)

2) A place where ceiling has enough strength to support the unit.

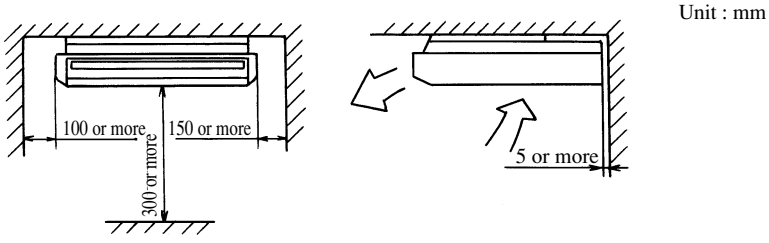
3) A place where there is no obstruction to the return air inlet and supply air outlet ports.

4) 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.

5) A place where the space shown below may be secured.

Ceiling mouting installation

Unit : mm



Obstacle

6) This unit uses a mincrocomputer as a control device. Therefore avoid installing the unit near the equipment that generates strong electromagnetic waves and noise.

(b) Installation preparation

1) Drilling of holes for interconnecting piping and wiring.

a) Drill a hole through the wall in accordance with the piping diameter. We recommend using a hole saw drill of 70 ~ 86 mm diameter and the hole should be drilled on an incline from inside to outside.

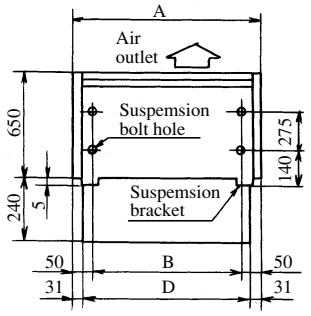
b) Insert the accessory piping sleeve into the hold and cut it to the proper length in accordance with wall thickness.

2) Installation of suspension bolts

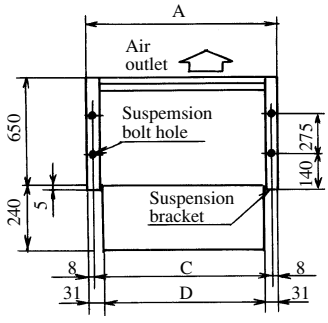
a) Use the template sheet to determine the positions of suspension bolts and refrigerant pipings. The refrigerant piping can be routed either to the right, left, top or rear.

b) Positions of suspension bolts are as in the drawing below.

● **When the suspension brackets face in**



● **When the suspension brackets face out**

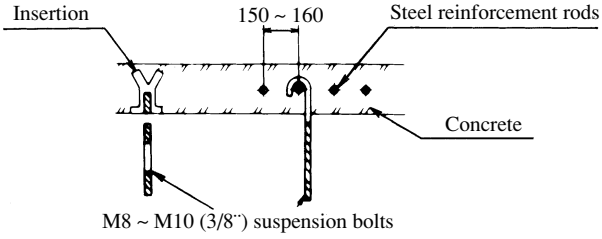


Unit : mm

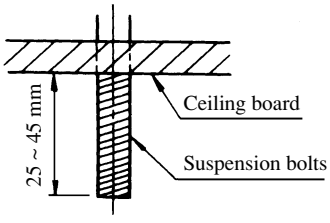
Mark / Models	A	B	C	D
FDE36, 45, 56 type	1000	900	984	938
FDE71, 112 type	1260	1160	1244	1198
FDE140 type	1470	1370	1454	1408

c) In case of ferro-concrete buildings

Fix the suspension bolts in the following way.



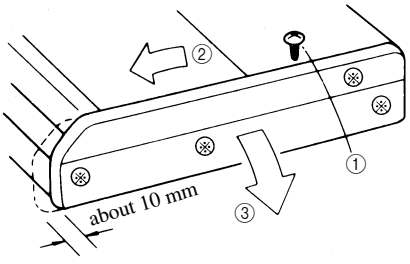
d) Length of suspension (in cace of exposed type installtion)



Notes (1) In case the susprnsion bracket face in, and the supension bolts are made to the length as shown in the left drawing the bolts ends will be put in the plasitics cap of the indoor unit top panel.
(2) Don't remove the plastics cap.

(c) Installation of indoor unit

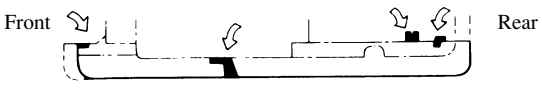
1) Detach the inside panel and suspension bracket



① Remove a fixing bolt of the side panel.

② Unhook four hooks (marked ※) by sliding the side panel in front side about 10mm, and detach the side panel from the unit.

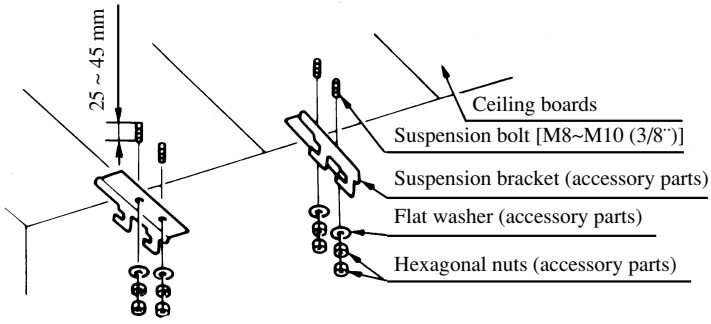
• Position of the hooks



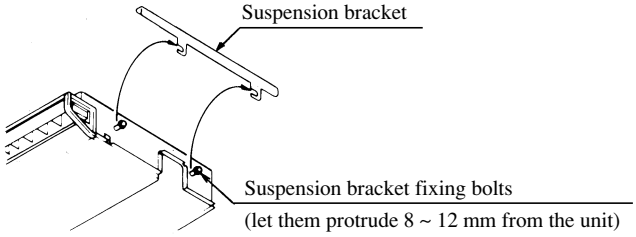
⇦ Slide for front side about 10 mm

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

a) Fix the suspension brackets to suspension bolts

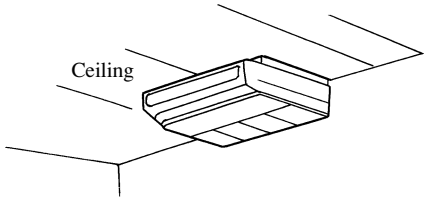


b) Hook the unit to suspension brackers



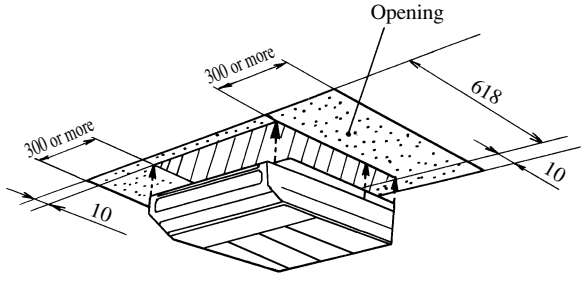
c) Fix unit securely in place by tightening the suspension bracket fixing bolts.

d) Attach the side panels and installation is finished.



3) In case the unit is half recessed into the ceiling (the suspension brackets facing outside)

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

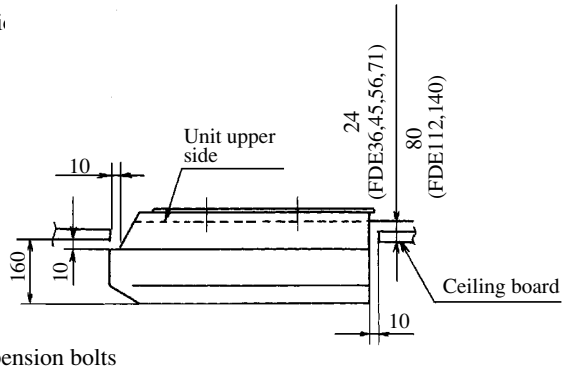


Unit : mm

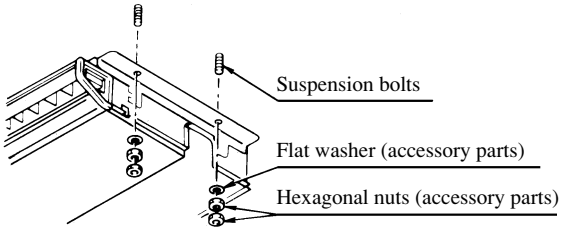
b) Installation space dimensi

Unit: mm

(Plug in dimensions)

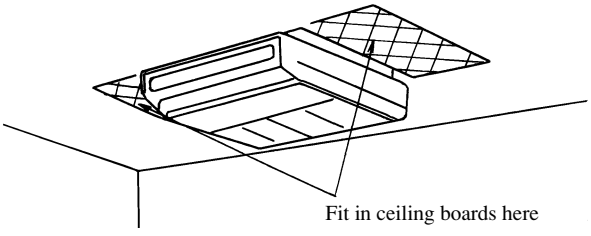


c) Mount the unit using suspension bolts



d) Securely tighten the nuts and fix the indoor unit place.

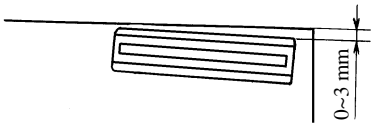
e) Attach the side panels and fit in ceilling board in the space around the unit and the work is finished.



4) Gradient for drainage

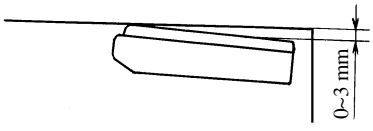
Mounting with proper gradient for drainage is needed as shown below.

● In right and left directions



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

● Front and rear directions



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

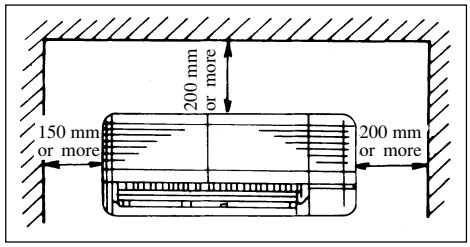
(7) Wall mounted type (FDK)

(a) Selection of installation location

1) Select the best position and direction depending on the shape of room and height of ceiling to ensure that the cooled or warmed air will be circulated sufficiently.

cooled air throw Unit : m

Item \ Models	FDK22 type	FDK28 type	FDK36, 45 type	FDK56, 71 type
Air throw	5	6	7	8



[Conditions]

a) Fan speed: Hi

b) Location: Free space without obstacles

c) Distance of reach indicates the horizontal distance after the wind touched down the floor.

d) Air yelocity at the throw:0.5 (m/sec.)

2) Where there is no obstacle around the Air inlet port or Air outlet port.

3) Where a sufficient space can be reserved for the service of air filter and the attachment/removal of panels.

4) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
Installation and use at such place will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.

5) Where pipes and wires can be arranged conveniently.

6) On the solid floor

7) Where the unit is not exposed directly to sun light.

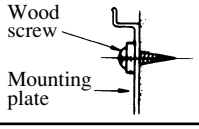
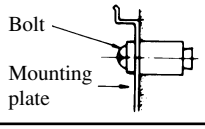
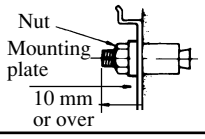
8) Place where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains.
Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.

9) Where a complete draining can be assured.

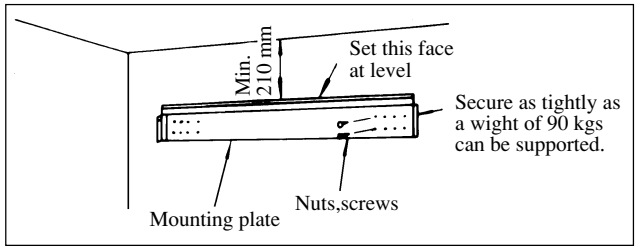
10) Where a sufficient space can be reserved for service.

(b) Method to install the mounting plate

1) Indoor unit weighs about 20 kgs. Be sure to check closely the installation place and, if any risk is expected, provide a sufficient reinforcement with plates or beams. Indoor unit cannot be secured directly on the wall, etc.
Attached mounting plate must be used.

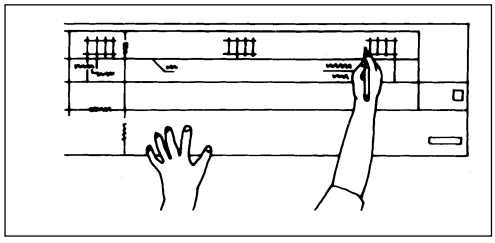
Wooden wall	Concrete wall (Use marketed anchors (M6)	
	Example of nut anchor	Example of bolt anchor
		

2) When installing a mounting plate on the wall, adjust it at level precisely and fix securely. Use the marketed anchor bolts (M6) when the wall is made of concrete.

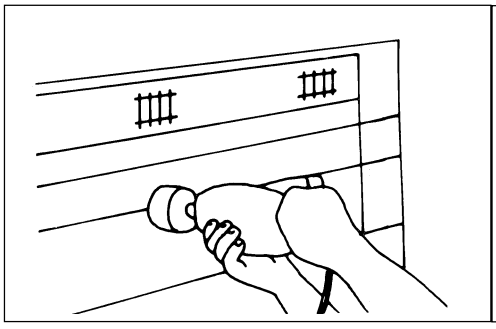


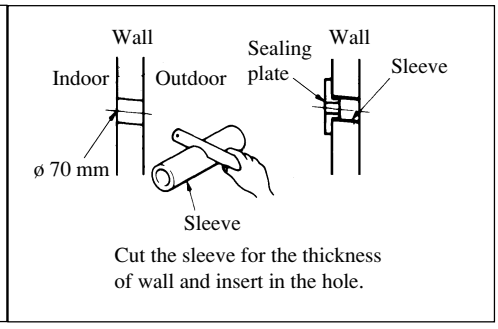
(c) Installation

1) Use an attached pattern sheet and mark the position of screws to attach the mounting plate.

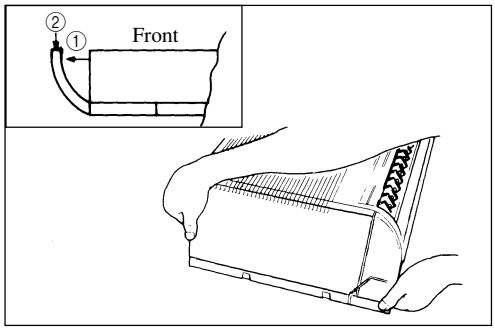


2) Determine the direction to lead the pipe and bore a through hole on the wall aligning with the pipe hole of unit.

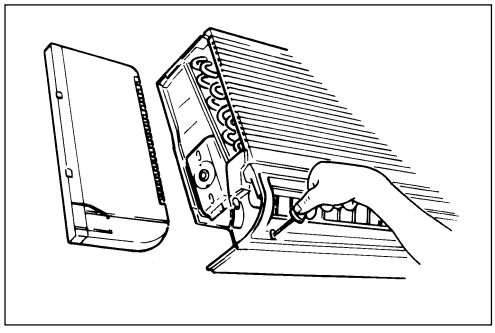




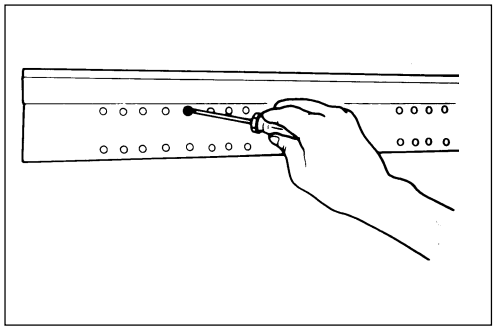
3) Remove screws (2 pcs.) and remove the right and left panels from the Indoor unit. (Remove screws first, move slightl to remove.)



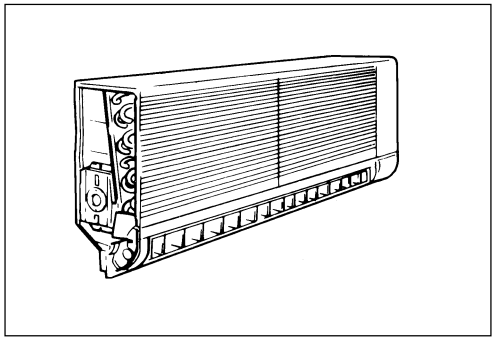
4) Remove the lower panel from the Indoor unit. It can be remove if 3 screws are loosened but not removed.



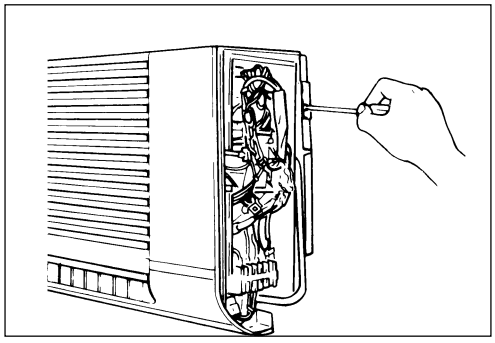
5) Secure the mounting plate with screws at a selected place on the wall. When the wall is made of concrete, use the marketed anchor bolts (M6)



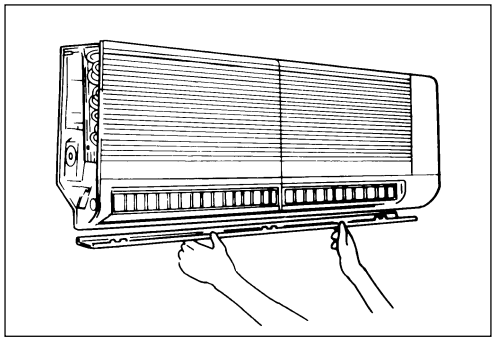
6) Hook and install the indoor unit on the mounting plate from top. Hook slightly at left at first and return to right.



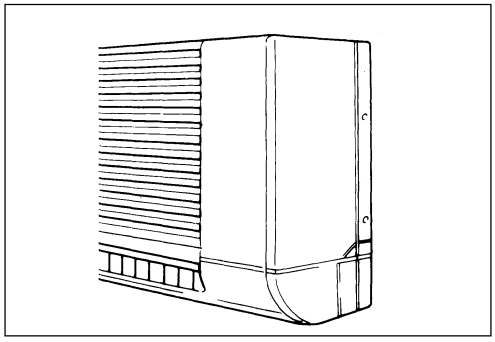
7) Fix the indoor unit on the mounting plate with a screw.



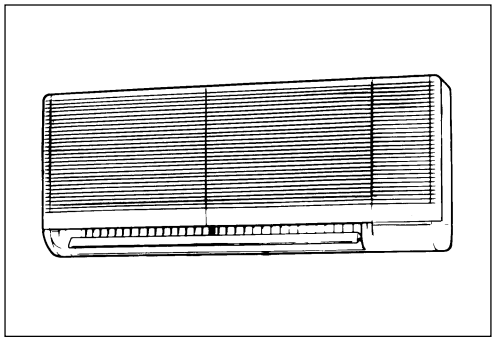
8) Install the lower panel at the original position.



9) Install the right and left side panels at their original position.



10) This is all for the installation.



(8) Floor standing exposed type (FDFL)

(a) Selection of installation location

1) A place where good air circulation and delivery can be obtained.

Cooled (warmed) air throw Unit : m

Models	All models
Air throw	4

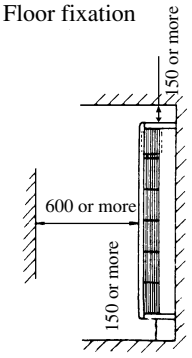
[Conditions]

(1) Fan speed: Hi
(2) Location: Free space without obstacles
(3) Distance of reach indicates the horizontal distance after the wind touched down the floor.
(4) Air velocity at the throw: 0.5 (m/sec.)

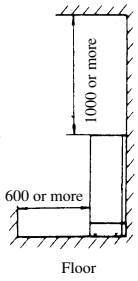
2) Where there is no obstacle around the Air inlet port or Air outlet port.
3) Where a sufficient space can be reserved for the service of air filter and the attachment/removal of panels.
4) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
Installation and use at such places will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.
5) Where pipes and wires can be arranged conveniently.
6) On the solid floor
7) Where the unit is not exposed directly to sun light.
8) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains.
Installation and use at such place will cause corrosion in the heat exchanger and damage in molded synthtic resin parts.
9) Where a complete draining can be assured.
10) Where a sufficient space can be reserved for service.

Floor standing installation

• Floor fixation



• Wall fixation



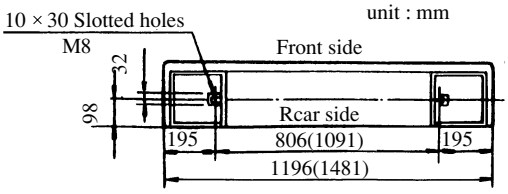
Unit : mm

(b) Bolt positions

1) Bolt positions for metal settings used for floor fixation.

• Metal fitting used for floor fixation (accessories).

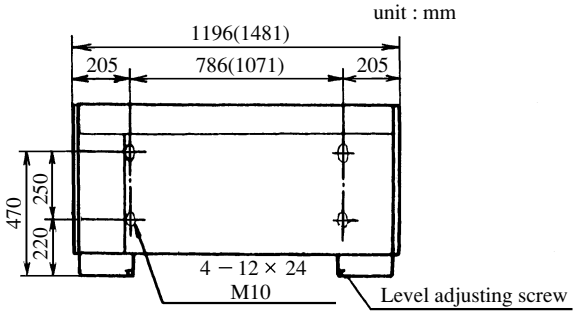
unit : mm



View from the floor

2) Bolt positions for wall fixation

unit : mm



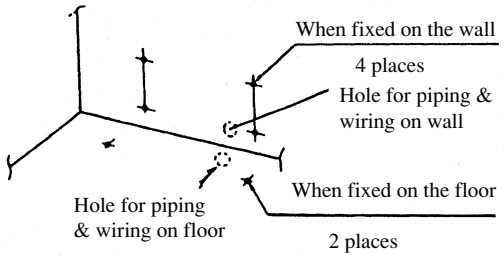
Slotted holes for wall mounting

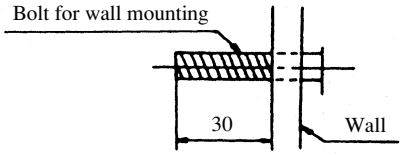
Note (1) Value in ( ) indicates 71 type.

(c) Installation of unit

1) Floor standing installation

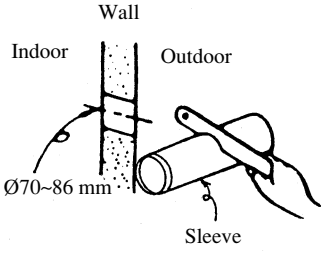
a) Position of mounting bracket fixing bolts Drill holes by referring to figures below.

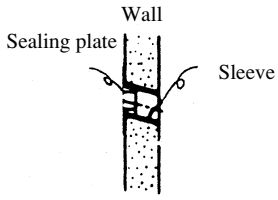




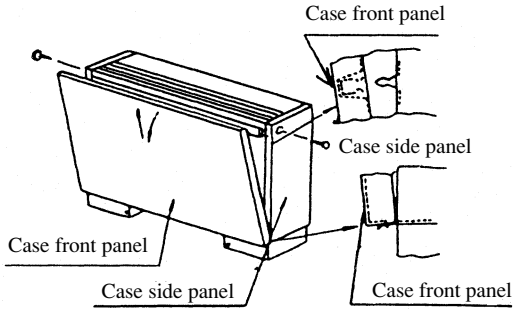
Note (1) Be sure to use a bolt of the length for wall mouning.

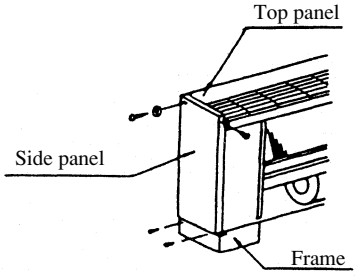
b) The methed of drilling the wall is as follows.





c) Remove the front and side panels.

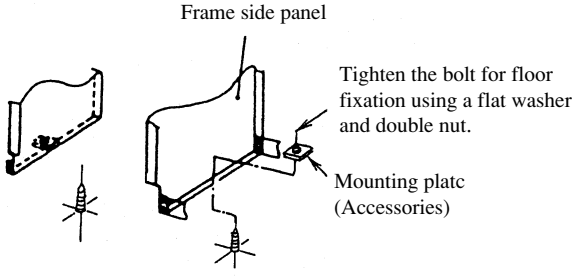




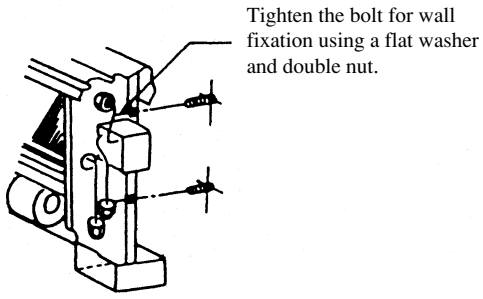
d) Level the unit using the level adjusting screw. Installation will be complrted after attaching side and front panel.

e) Exceute fixation following the directions described below.

- When fixed on the floor



- When fixed on the wall



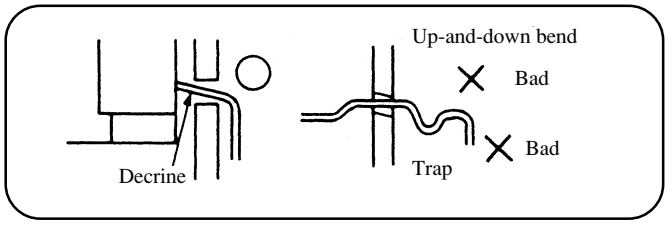
(d) Drain piping

The drain piping can be directed to the floor or rear sides as follows.

(a) Connect a drain piping to the drain outlet and fix it by use of tigghening band.

(b) Indoor side drain piping must be thermally insulated.

(c) After finishing the drain piping, check the drainage by pouring some water in the drain pan.



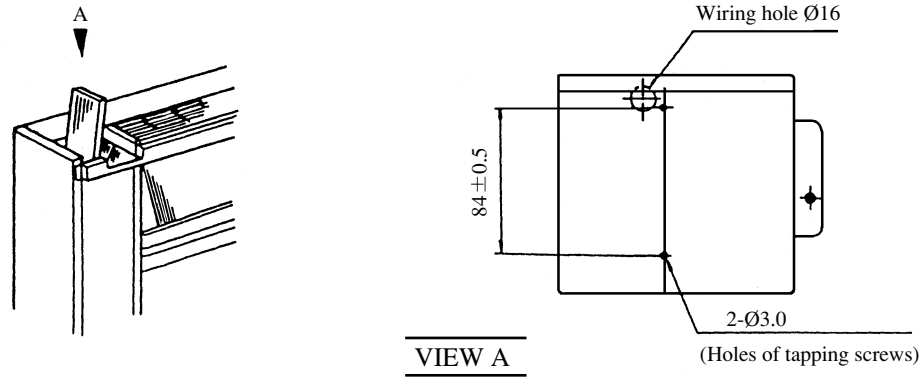
(e) Installation of remote controller (on the indoor unit)

Attached remote controller may be installed on the indoor unit as shown below. The work can be done on the spot when the customer asks so or by other reasons.

Refer to the page 779 when it is instralled on the wall.

1) Detach the front panel.

Unit: mm



2) Remote controller installation.

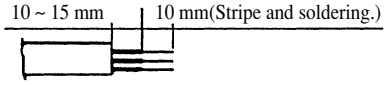
● Attach the lower case with the screws (M4 × 128) accessory.

3) Remote controller wiring.

a) Connect the terminals between the remote controller and the control box as per these wire color codes:[(X) (red). (Y) (white), (Z) (biack)], using the wires included in the kit.

b) The wires should have a surplus length of approximately 30 cm. (Necessary when servicing with the front panel detached.)

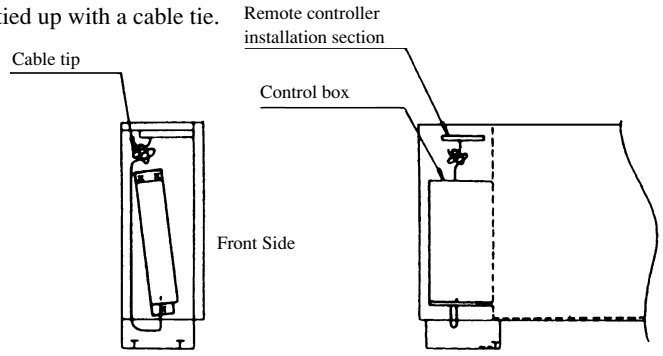
c) Strip and solder as shown below when cutting the wire. (Omitting the soldering process may cause looseness of the wiring.)



4) Wiring route.

a) Wire from the wiring hole through the rear side of the control box to the terminal block.

b) Any suplus wires should be tied up with a cable tie.



(8) Floor standing hidden type (FDFU)

(a) Selection of installation hidden location

1) A place where good air circulation and delivery can be obtained.

Cooled (warmed) air throw Unit : m

Models	All models
Air throw	**4**

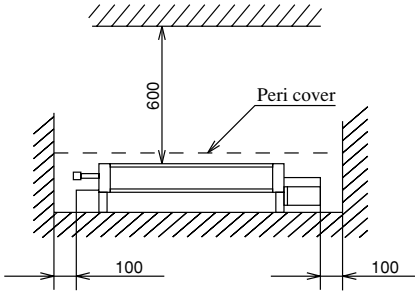
[Conditions]

(1) Fan speed: Hi
(2) Location: Free space without obstacles
(3) Distance of reach indicates the horizontal distance after the wind touched down the floor.
(4) Air velocity at the throw: 0.5 (m/sec.)

2) Where there is no obstacle around the Air inlet port or Air outlet port.
3) Where a sufficient space can be reserved for the service of air filter and the attachment/removal of panels.
4) 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.
5) Where pipes and wires can be arranged conveniently.
6) On the solid floor
7) Where the unit is not exposed directly to sun light.
8) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains.
Installation and use at such place will cause corrosion in the heat exchanger and damage in molded synthtic resin parts.
9) Where a complete draining can be assured.
10) Where a sufficient space can be reserved for service.

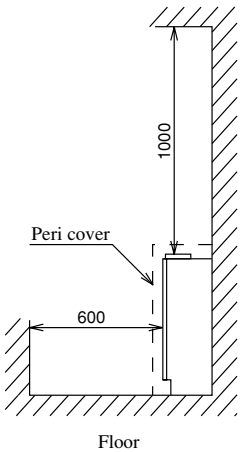
Floor standing installation

• Floor fixation



• Wall fixation

unit : mm



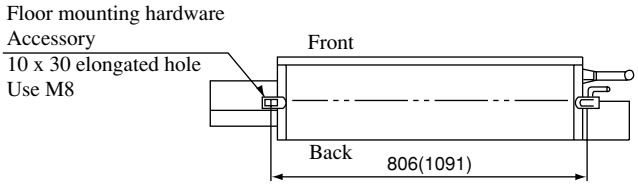
(b) Bolt positions

1) Bolt positions for metal settings used for floor fixation.

• Metal fitting used for floor fixation (accessories).

unit : mm

Bolt positions for floor mounting hardware

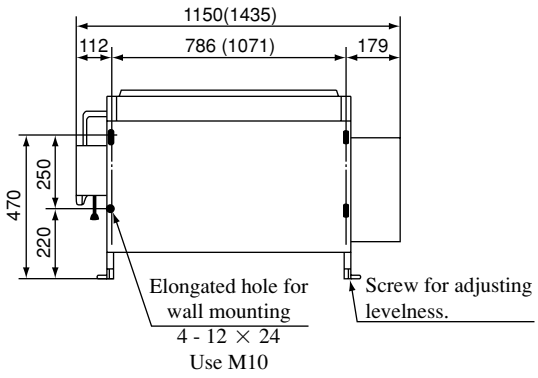


As viewed from floor side.

Note (1) Value in ( ) indicates 71 type.

2) Bolt positions for wall fixation

unit : mm

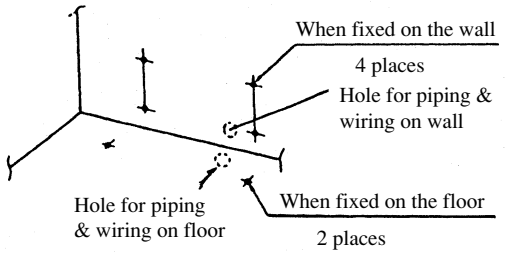


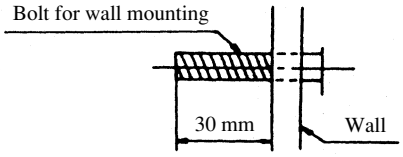
(c) Installation of unit

1) Floor standing installation

a) Position of mounting bracket fixing bolts

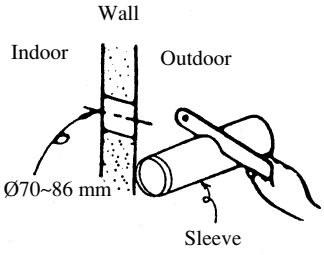
Drill holes by referring to figures below.

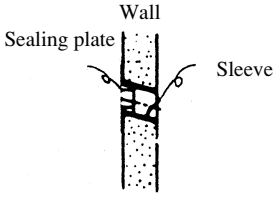




Note (1) Be sure to use a bolt of the length for wall mouning.

b) The methed of drilling the wall is as follows.

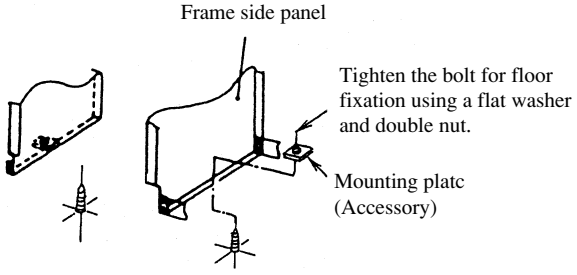




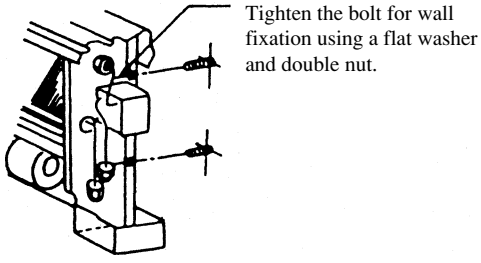
c) Level the unit using the level adjusting screw. Installation will be complrted after attaching side and front panel.

d) Exceute fixation following the directions described below.

● When fixed on the floor



● When fixed on the wall



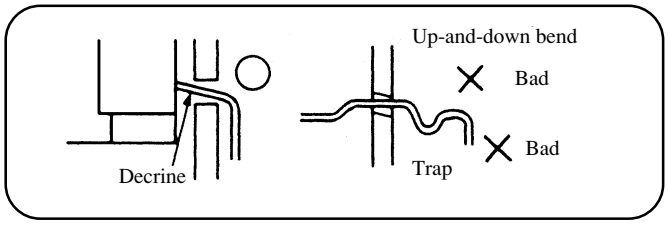
(d) Drain piping

The drain piping can be directed to the floor or rear sides as follows.

(a) Connect a drain piping to the drain outlet and fix it by use of tigghening band.

(b) Indoor side drain piping must be thermally insulated.

(c) After finishing the drain piping, check the drainage by pouring some water in the drain pan.



19.5.2 Installation of the remote controller (Optional parts)

(1) Selection of installation location

Following locations should be avoided:

(a) Where exposed to direct sunlight

(b) Near the heat source

(c) Highly humid area or where splashed with water

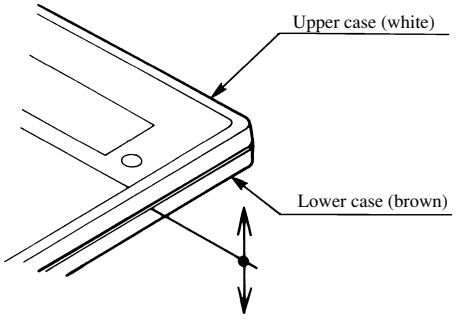
(d) Uneven installation surface

(2) Selection of installation location

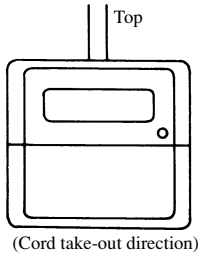
Exposed installation

(a) Remove the remote controller case.

- Insert finger nails between the upper (white) and lower (brown) cases and ply them to open.

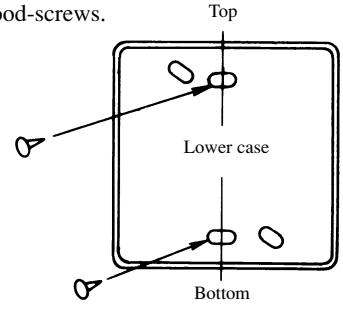


(b) Remote controller cords can be taken out upward only as shown below.



- 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.

(c) Secure the remote controller lower case on the wall with 2 pieces of wood-screws.



(d) 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

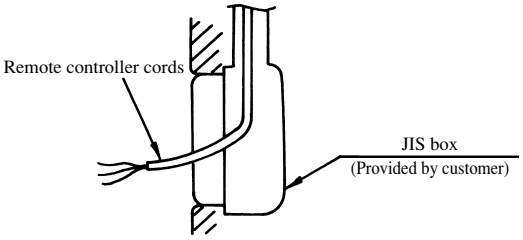
(e) Set necessary functions in accordance with the model of indoor unit. Refer to (c) for the setting of functions.

(f) Couple the upper case with the lower case as they were.

(g) Secure the remote controller cords on the wall or other using cord clamps.

Embedded installation

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



Adequate JIS box

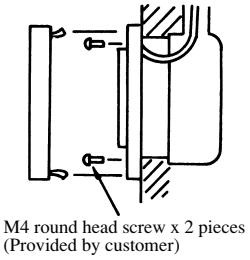
- JIS C 8336 Single switch box (without cover)
- JIS C 8336 Medium size square outlet box and two-switch cover with paint margin

2) Remove the upper case from the remote controller.

3) Secure the remote controller body on the JIS box with 2 pieces of M4 round head screw (provided by customer).

4) Connect remote controller cords with the remote controller. (Refer to the section regarding the exposed installation.)

5) Couple the upper case with the lower case as it was to finish up the installation.



Cautions for extension of remote controller cords

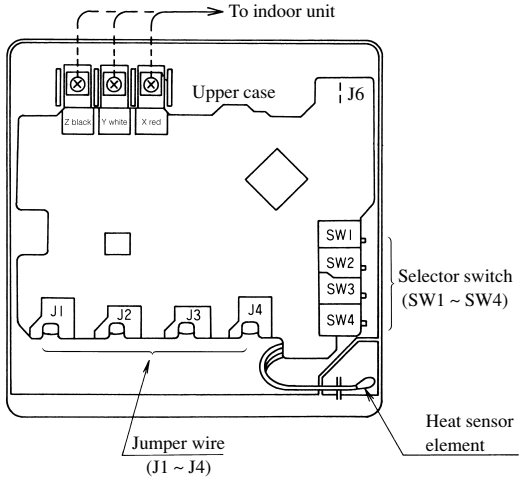
- **Make sure to use shielding wires only.**
  - **All models: 0.3 mm² x 3 core wires [MVVS3C, products of Keihan Cables]**

Note (1) When the extension distance exceeds 100 m, change the wire size as follows:
100 ~ 200 m ... 0.50 mm² × 3 core wires
~ 300 m ... 0.75 mm² × 3 core wires
~ 400 m ... 1.25 mm² × 3 core wires
~ 600 m ... 2.00 mm² × 3 core wires

- **Make sure to ground one side only of the shielding wire.**

(3) Setting the functions

Change the setting of selector switches (WS1~ SW4) and jumper wires (J1~ J4) in accordance the functions of indoor unit and purposes of use.



Functions of selector switches

Switch		Function
SW1	C	Model type - Cooling only
	H	Model type - Heat pump model
SW2	ON	Remote control sensor - Valid
	OFF	Remote control sensor - Invalid
SW3	ON	Power failure compensation - Provided
	OFF	Power failure compensation - Not provided
SW4	S	Remote controller selector - Slave
	M	Remote controller selector - Master

Functions of jumper wires

Name		Function
J1	With	Return air temperature display - Valid
	None (1)	Return air temperature display - Invalid
J2	With	Blow rate display - 3 speed
	None (1)	Blow rate display - 2 speed
J3	With	Timer function - Valid (Normal)
	None (1)	Timer function - Invalid
J4	With	Auto swing display-With
	None (1)	Auto swing display - None
J6	With	For KX multi
	None (1)	For KXR multi

Note (1) "None" means it is not installed on the PCB or open.

19.5.3 Installation of outdoor unit

(1) Selection of installation location

(a) A place where air will not be stagnant.

(b) A place where the exhaust air will not be shortcycled.

(c) A place with enough space for air flow around the unit.

(d) A place where the unit will not be affected by other heat sources.
(when there are multiple units installed or when units have another heat source)

(e) A void installing the unit in places that are subject to sea air, sulfureous gas of the type found in hot springs, or any other corrosive or flammable gas.

(f) A place where smooth drainage of rain water and water formed by defrosting is acceptable.

(g) **In heating operation**, snow deposit on the heat-exchanger of outdoor unit must be prevented for keeping the normal performance capacity.

- **Snow-hood on outdoor unit as in drawing, will reduce the frequency of defrost operation.**
  When installing the snow hood, take care so that their outlet of the snow hood will not face directly into the most windy direction.
- **Design the base higher than possible snow deposit.**

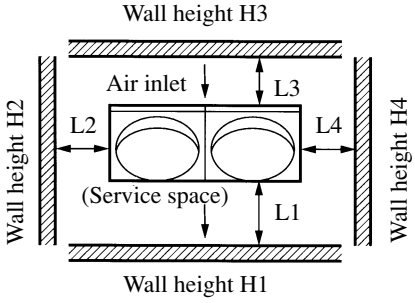
(h) A place where air outlet port is not exposed to strong wind.)

(2) Installation space

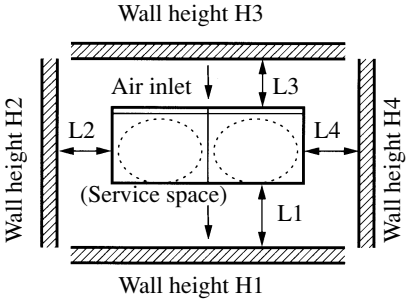
A place with enough space for air inlet, air outlet and service space.

(a) Independent installation

1) Standard oblique blow or up blow



2) Side blow



(Unit : mm)

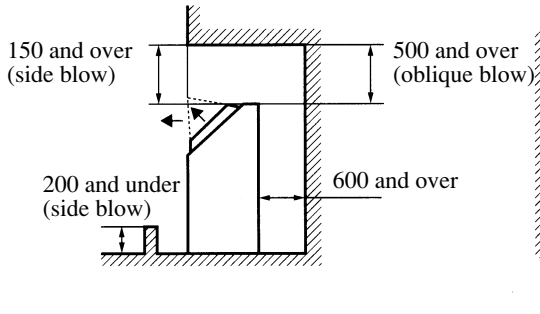
Dimensions \ Installation example	Ⅰ	Ⅱ	Ⅲ
L_1	Open	Open	500
L_2	0	0	0
L_3	300	300	300
L_4	Open	500	0
H_1	—	—	1000 or less
H_2	Not limited	Not limited	Not limited
H_3	Not limited	Not limited	700 or less
H_4	—	Not limited	Not limited

Note (1) When the wall heights H1 and H3 exceed the limited value, keep dimensions for L1 and L3 as shown below.
L1 = H1 – 500 (In the case of side blow, H1≦1,000 irrespective of L1 dimension)
L3 = 300 + (H3-700) / 2
However, there is no limitation in wall height H3 if L3 exceeds 600.

(b) In the case that there is a wall above the unit

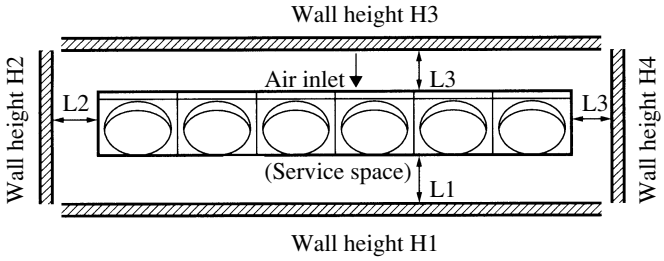
No. of units that can be installed are limited up to 3 units.

(Example : 5HP × 3 units, 10HP × 1 units + 5HP × 1 unit)



5 HP	L1 or L2≧0
(One-blower unit)	L1 + L2 ≧500
8 or 10HP	L1 or L2≧350
(Two-blower unit)	L1 + L2 ≧750

(c) Plural units installation (Single crosswise row installtion : No limitation in No. of units)



L1≧500	H1≦1,000
L2≧0	H2 No limitation
L3≧300	H3≦700
L4≧0	H4 No limitation

Note (1) When the wall heights H1 and H3 exceed the limited value, keep dimensions for L1 and L3 as shown below.

L1 = H1 – 500(In the case of side blow, H1≦ 1,000 irrespective of L1 dimension)

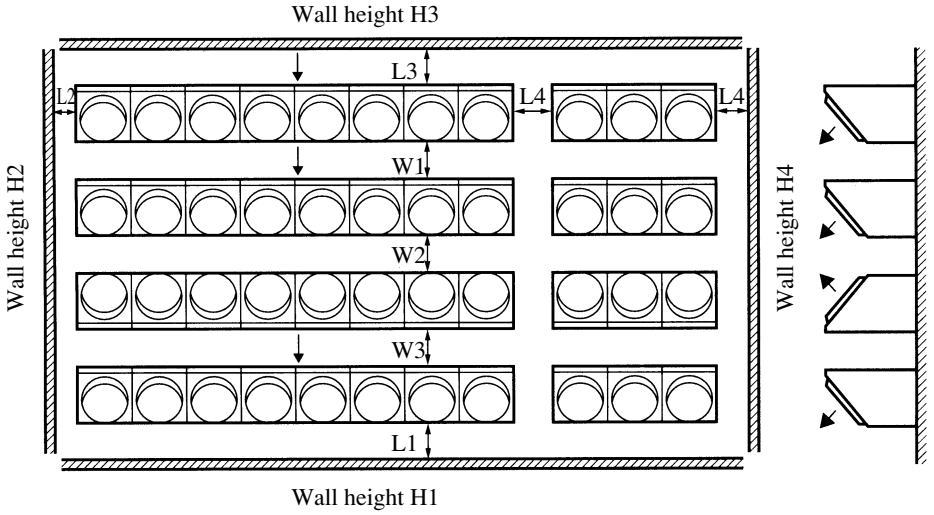
L3 = 300 + (H3–700) / 2

However, there is no limitation in wall height H3 if L3 exceeds 600.

(d) Plural units installation (Plural installation in lengthwise and crosswise rows)

Notes (1) Side blow is not allowed.

(2) Secure dimensions L1 and H1 at the service space side. Secure dimensions L3 and H3 at the suction side.



L1≧500
L2≧1,000
L3≧300
L4≧1,000

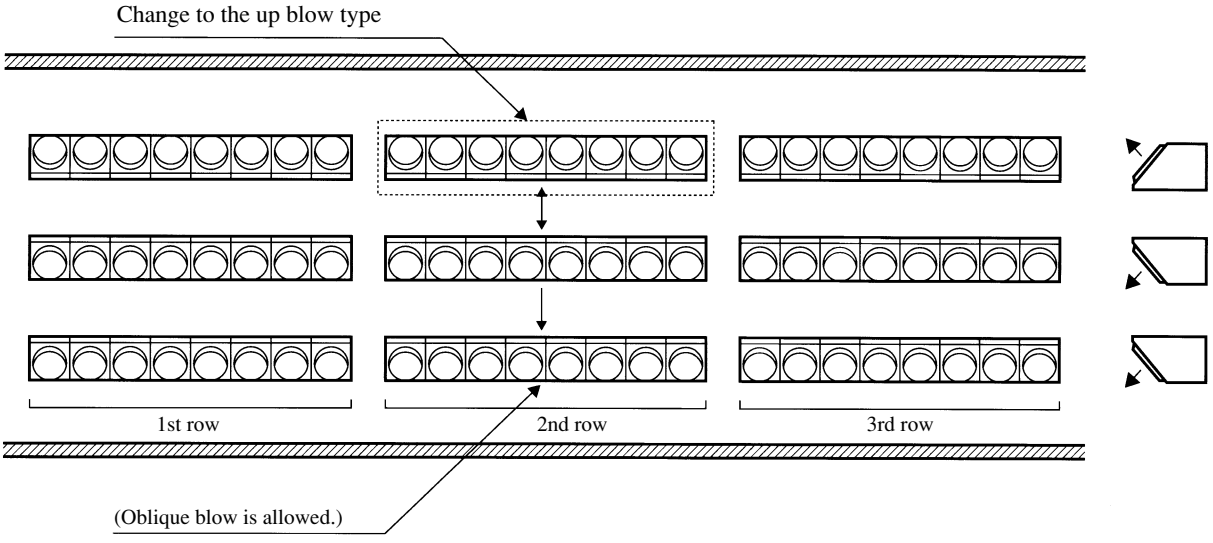
H1≦1,000
H2 No limitation
H3≦700
H4 No limitation

(3) When the wall heights H1 and H3 exceed the limited value, keep dimensions for L1 and L3 as shown below.
L1 = H1 – 500
L3 = 300 + (H3–700) / 2
However, there is no limitation in wall height H3 if L3 exceeds 600.

	W1	W2	W3	W4
Oblique blow (standard)	1,500 and over	800 and over	1,500 and over	1,500 and over
Up blow (option)	800 and over	800 and over	1,500 and over	1,500 and over

(4) The space of 1,500 mm per a series of 8 blower units is required for W4.
(Example : 5HP × 8units in series installation, 10HP × 4 units in series installation)

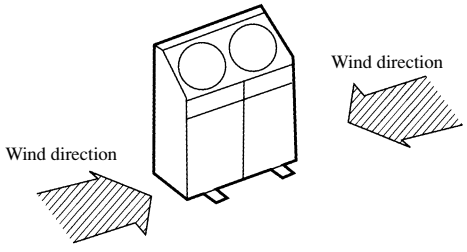
(5) When installing more than 3 rows with the oblique blow in lengthwise, change the blow direction of the group in the central row units, excluding the both end rows, to the up blow (option). This group blows to the wall and also opposes to the units at the rear in the suction face. For the example shown below, the uppermost group in the second row falls under the above notes.



(6) Install the rack that stores the piping, etc. so that it does not interfere with the airflow entering into the heat exchanger.

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

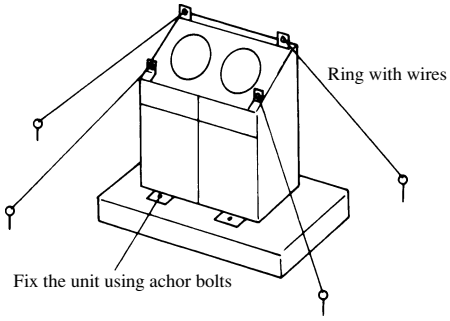
- Face the unit air outlet at a 90 ˚angle from the direction of the wind.



(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 strengh.
For example SUS304-W1, wire thickness 2.9 mm)

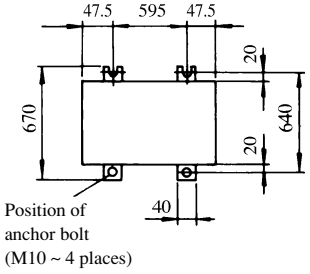
(4) Installation

Fix the unit in a proper way according to the condition of a place where it is installed by referring to the following.

(a) Fix the unit to the foundation with anchor bolts.

FDC140 type

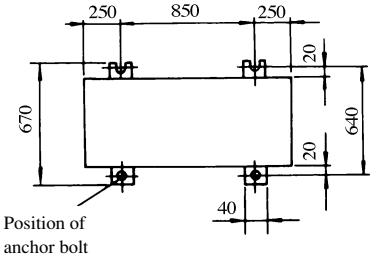
unit : mm



[Service panel side]

FDC224, 280 type

unit : mm



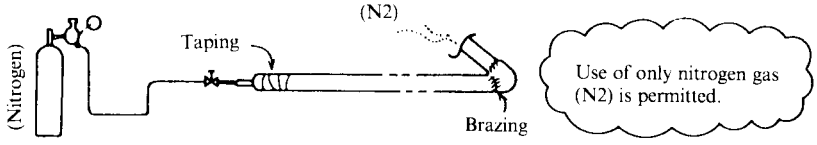
[Service panel side]

19.5.4 Refrigerant piping

(1) Precautions no refrigerant piping work for prevention against compressor lock

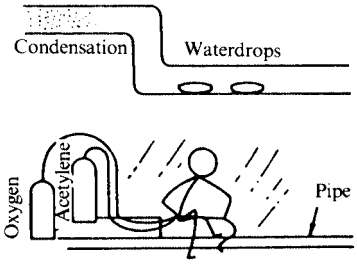
Compressor trouble including lock and motor burn-out is due to faulty parts but mainly concerned in installation and refrigerant piping conditions, The precautions for refrigerant piping are as belows.

(a) Be sure to perform brazing while flowing nitrogen.



1) Without flowing nitrogen gas, a lot of oxide film (CU_2O) is generated. In particular, in case of for building with many brazed portions, oxide film is so much generated that this causes a fatal failure in the air conditioning system.
2) A foreign material (oxide film) causes clogging of the capillary tube or expansion valve, leading to non-cooling (non-heating), abnormal discharge temperature, compressor lock due to a faulty oil return. In some cases, a lot of foreign materials block the oil return hole of the accumulator, thereby causing a compressor lock. (This lock trouble may occur repeatedly 2 or 3 times.)

(b) Don't admit water (waterdrops, condensation) into the piping.



1) Use a copper piping that is free from water (waterdrops, condensation).
2) Don't perform refrigerant piping work while it rains.
3) To suspend outdoor piping work, perform curing to prevent water admission.

Bad effects of water

- Capillary tube and expansion valve clogging
- Refrigerant hydrolysis → "Acid" generation
  → Iron/copper corrosion
- Crystal foreign material (clathrate compound) generation resulting from reaction on refrigerating machine oil

There will be directly conected to serious trouble such as compressor lock or burn-out of the compressor motor.

(c) Don't admit dust or foreign particles in the pipe.

Various foreign particles are included in air conditioners that caused trouble. Be careful about them.
(Concrete fragments, cement, sand, paint, metal powder (copper refuse after deburring, etc.), etc.

(d) Adopt the specified dimensions for pipes.

Too thick:
- Improper charge volume
- Faulty oil return (insufficient gas flow rate)

→ **Compressor lock**

Too long (L):
- Overcharge → Liquid back
- Faulty oil return

→ **Compressor lock**

(e) Be sure to support the refrigerant piping with support fittings.

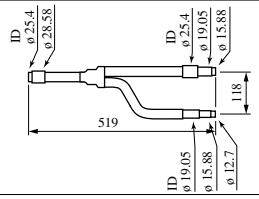
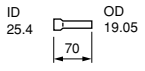
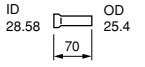
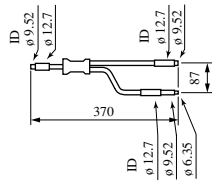
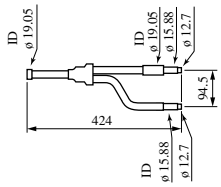
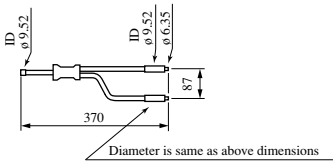
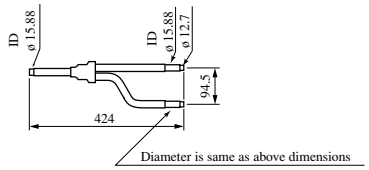
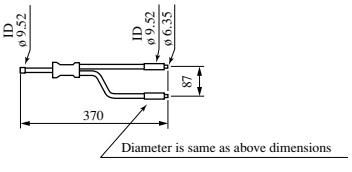
1) The pipe vibrates and expands/shinks during operation. Without proper supports, a load is concentrated partially and cracks and collapse occur on the piping, thereby causing a unit failure.
2) A support should be provided at intervals of 2 or 3 m so as not to partially concentrate a load.

(2) Table for selection of piping size

Item \ Model		FDC 140 type			FDC 224 type			FDC 280 type		
		Gas line	Liquid line	Branch used	Gas line	Liquid line	Branch used	Gas line	Liquid line	Branch used
Outdoor unit		ϕ19.05	ϕ9.52		ϕ25.4	ϕ12.7		ϕ28.58	ϕ12.7	
Main piping		ϕ19.05	ϕ9.52		ϕ25.4	ϕ12.7		ϕ28.58	ϕ12.7	
No. 1 branch		ϕ19.05	ϕ9.52	DIS-2KX20-E	ϕ25.4	ϕ12.7	DIS-2KX30-E	ϕ28.58	ϕ12.7	DIS-2KX30-E
Total indoor unit down-flow capacity after the second branch.	Less than 101	ϕ15.88	ϕ9.52	DIS-2KX10-E	ϕ15.88	ϕ9.52	DIS-2KX10-E	ϕ15.88	ϕ9.52	DIS-2KX10-E
	101 to less than 180	ϕ19.05		DIS-2KX20-E	ϕ19.05		DIS-2KX20-E	ϕ19.05		DIS-2KX20-E
	180 or more				ϕ25.4	ϕ12.7	DIS-2KX30-E	ϕ25.4	ϕ12.7	DIS-2KX30-E

Notes (1) If adjustment is required between the branch connection and the unit port, always make the adjustment on the branch connection side.
(2) The selection of piping size and branch piping, total all the indoor unit down flow capacity for that piping and branch piping.

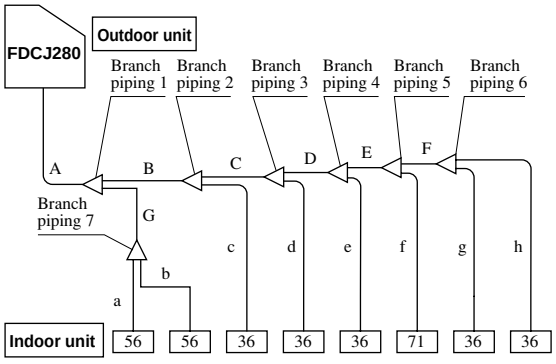
- **Branch pipe set shapes**

Model	Item	Mark	Branch pipe	Item	Mark	Reducer
DIS-2KX30-E	Gas line	①		Gas line	⑦	
					⑧	
	Liquid line	②		Liquid line	—	—
DIS-2KX20-E	Gas line	③		Gas line	—	—
	Liquid line	④		Liquid line	—	—
DIS-2KX10-E	Gas line	⑤		Gas line	—	—
	Liquid line	⑥		Liquid line	—	—

Notes (1)The gas side flow divider pipe is insulated.
(2)Cut piping in the center on site in the area it will be used.

Example of piping

Outdoor unit: FDCJ280HKXE2B
Indoor unit: Combination of 8 units
[Branch pipe set : DIS-2KX10-E × 1 set, DIS-2KX20-EX × 3 set, DIS-2KX30-E × 3 set]
[Total capacity: 363 (36300W)]



• Selecting piping size

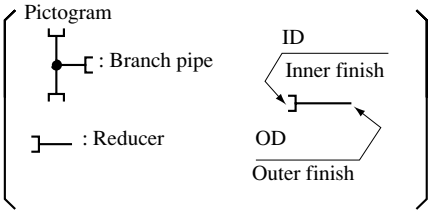
Item	Selection procedure	Piping size (in)	
		Gasline	Liquid line
A	Same as the outdoor unit piping size	ø28.58	ø12.7
B	Total capacity of the connected indoor units 251	ø25.4	ø12.7
C	Total capacity of the connected indoor units 215	ø19.05	ø9.52
D	Total capacity of the connected indoor units 179	ø19.05	ø9.52
E	Total capacity of the connected indoor units 143	ø19.05	ø9.52
F	Total capacity of the connected indoor units 72	ø15.88	ø9.52
G	Total capacity of the connected indoor units 112	ø19.05	ø9.52
a	Indoor unit piping size (56).	ø15.88	ø9.52
b	Indoor unit piping size (56).	ø15.88	ø9.52
c	Indoor unit piping size (36).	ø12.7	ø6.35
d	Indoor unit piping size (36).	ø12.7	ø6.35
e	Indoor unit piping size (36).	ø12.7	ø6.35
f	Indoor unit piping size (71).	ø15.88	ø9.52
g	Indoor unit piping size (36).	ø12.7	ø6.35
h	Indoor unit piping size (36).	ø12.7	ø6.35

• Selection of branch piping size.

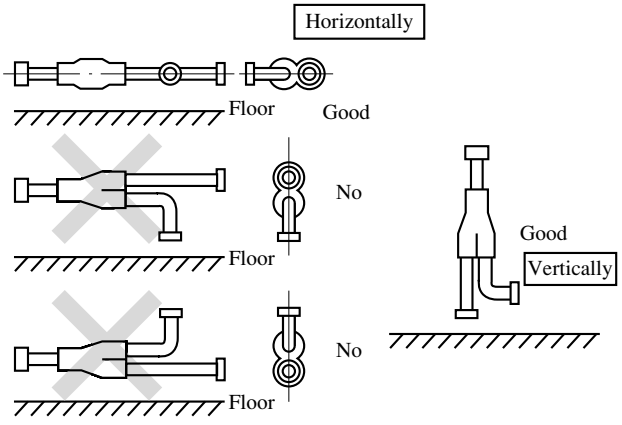
Item	Selection procedure	Branch piping set
Branch piping 1	Total capacity of the connected indoor units 363	DIS-2KX30-E
Branch piping 2	Total capacity of the connected indoor units 251	DIS-2KX30-E
Branch piping 3	Total capacity of the connected indoor units 215	DIS-2KX30-E
Branch piping 4	Total capacity of the connected indoor units 179	DIS-2KX20-E
Branch piping 5	Total capacity of the connected indoor units 143	DIS-2KX20-E
Branch piping 6	Total capacity of the connected indoor units 72	DIS-2KX10-E
Branch piping 7	Total capacity of the connected indoor units 112	DIS-2KX20-E

Notes (1) Make the selection based on the size of each piping for branch piping sets with different size connections.
(2) If diameter adjustment is need for branch connection and on the indoor unit side, always makes the adjustment at the branch connection.

Reference: The shape of the flow divider pipe and reducer is shown on the 889 page.



Notes (1) Use the designated piping size for the piping between the outdoor unit and the first branch.
(2) Choose the appropriate sized reducer for piping between the branch pipe and the indoor unit.
The size of reducer should match the piping size of the indoor unit.
(3) Locate the branch pipe horizontally or vertically as illustrated to the right.



(3) Specification of unit piping (Pipe diameter, Connecting method)

(a) Unit

1) Outdoor unit

Unit: mm(in)

Item / Model	Gas line		Liquid line	
	Pipe diameter	Connecting method	Pipe diameter	Connecting method
FDC140 type	ϕ19.05 (3/4 ")	Flare	ϕ9.52 (3/8 ")	Flare
FDC224 type	ϕ25.4 (1 ")	Brazing	ϕ12.7 (1/2 ")	
FDC280 type	ϕ28.58 (1 1/8 ")		ϕ12.7 (1/2 ")	

Unit: mm(in)

2) Indoor unit

Item / Model	Gas line		Liquid line	
	Pipe diameter	Connecting method	Pipe diameter	Connecting method
22, 28 type	ϕ12.7 (1/2 ")	Flare	ϕ6.35 (1/4 ")	Flare
36 type	ϕ12.7 (1/2 ")		ϕ6.35 (1/4 ")	
45 type	ϕ12.7 (1/2 ")		ϕ6.35 (1/4 ")	
56,71,90 type	ϕ15.88 (5/8 ")		ϕ9.52 (3/8 ")	
112,140 type	ϕ19.05 (3/4 ")		ϕ9.52 (3/8 ")	

3) Connection piping specification: Outer diameter and wall thickness (mm)

For R22

Outer diameter (mm)	Wall thickness (mm)	Outer diameter (mm)	Wall thickness (mm)
ϕ6.35	0.8	ϕ19.05	1.0
ϕ9.52	0.8	ϕ25.4	1.2
ϕ12.7	1.0	ϕ28.58	1.4
ϕ15.88	1.0		

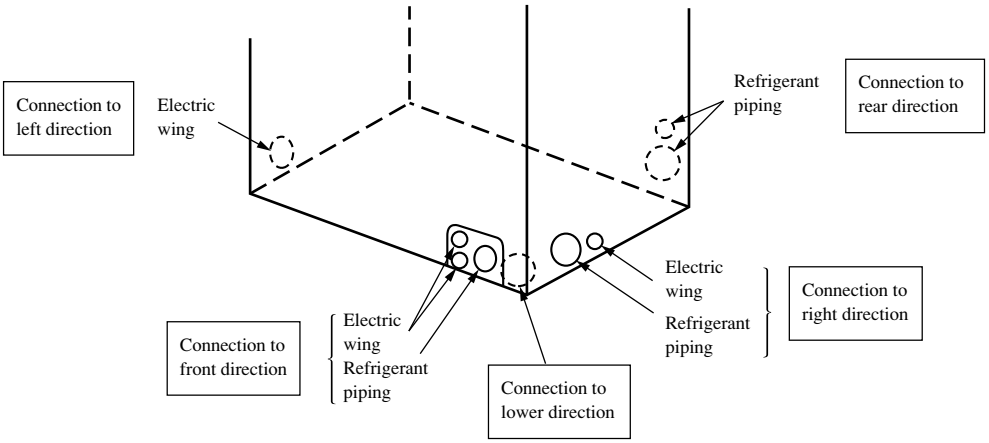
For R407C

Outer diameter (mm)	Wall thickness (mm)	Outer diameter (mm)	Wall thickness (mm)
ϕ6.35	0.8	ϕ19.05	1.2
ϕ9.52	0.8	ϕ25.4	1.4
ϕ12.7	1.0	ϕ28.58	1.4
ϕ15.88	1.0		

4) Tightening torque

ϕ 6.35(1/4 ") Flare nut	16 ~ 20 N • m (1.6 ~ 2.0 kg • m)
ϕ 9.52(3/8 ") Flare nut	40 ~ 50 N • m (4 ~ 5 kg • m)
ϕ 12.7(1/2 ") Flare nut	40 ~ 50 N • m (4 ~ 5 kg • m)
ϕ 15.88(5/8 ") Flare nut	90 ~ 120 N • m (9 ~ 12 kg • m)
ϕ 19.05(3/4 ") Flare nut	100 ~ 140 N • m (10 ~ 14 kg • m)

(b) Refrigerant connection piping.



(c) Connection to rear, right and front directions.

1) See page 781 to 782 for locations of connecting holes and service valves.

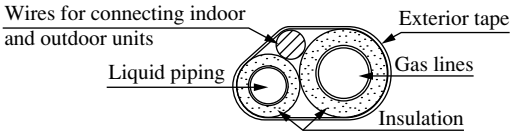
(4) Heat insulation

(i) There is a need to insulate both gas and liquid piping with heat insulation for protection against heat and condensation.

1) Always use heat insulation to prevent condensation on the gas piping from becoming drain water and causing leakage during cooling and to prevent people from being burned by the high temperature of the surface of the gas piping as discharge gas flows through it.

2) Use heat insulation (pipe cover) on the flare connection sections of the indoor unit.
(Insulate both the gas and liquid piping.)

3) Insulate both the gas and liquid piping. Apply the insulation so that is tight against the piping and free of gaps. Route the connecting wires with the insulation and wrap the entire bundle with exterior tape.

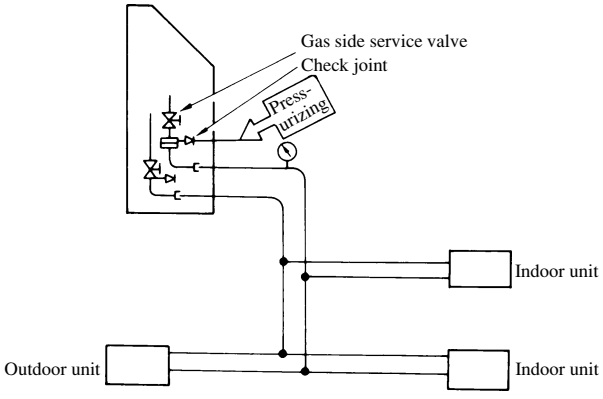


※Use insulation material with good resistance heat properties (120 ˚C or more).

(5) Air-tight test

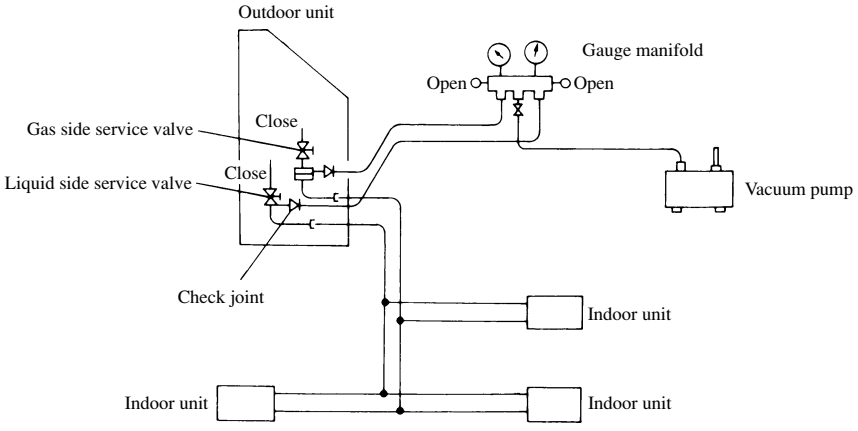
(a) When conducting an air-tight test of local piping, connect the piping to the check joint of the evacuating pipe connected to the gas side service valve, and keep the service valve closed. The air-tight test pressure shall be 2.94MPa [R407C : 3.23MPa]

(b) To conduct the test, pressurize the check joint of evacuating pipe by nitrogen gas as shown below. The local piping including indoor units can be tested as for airtightness.



(6) Evacuating

Evacuating can be completed faster by evacuating both the check joint on the liquid side service valve and the check joint of the evacuating gas pipe (accessory) connected to the gas side operation valve at the same time. (Of course, evacuating is possible even through the liquid side check joint only.)



(7) Refrigerant charge amount

(a) Additional charge amount

Item / Model	Additional charge amount per 1 m of liquid pipe			Factory charge amount at time of shipment		
	ϕ12.7	ϕ9.52	ϕ6.35	Outdoor unit	Indoor unit	Remarks
FDC140 type	0.12 kg/m	0.06 kg/m	0.03 kg/m	9.0 kg	Holding charged	Additional refrigeramt Charge is not required
FDC224 type FDC280 type				12.0 kg		

Notes (1) When the refrigerant piping length exceeds the length that additional refrigerant charge is not required, charge additional refrigerant based on to calculated amount of refrigerat per unit piping length.

(2) The unit is holding charge type that all of the refrigerant is charged in the outdoor unit and in the indoor unit only a small amount of refrigerant is filled for prevention of the air entry.

Calculation of amount of refrigerant to be charged in local piping

The amount refrigerat additionally charged in local piping depends on connection pipe size but not on indoor unit type.

[Amount of refrigerant to be charged in the local piping = Actual length of liquid pipe × Amount of refrigerant additionally charged per meter of liquid pipe]

[Example] Amount of refrigerant additionally charged = (1_1 × 0.12) + (1_2 × 0.06) + (1_3 × 0.03)

1_1: Overall length (m) of ϕ 12.7 liquid pipe

1_2: Overall length (m) of ϕ 9.52 liquid pipe

1_3: Overall length (m) of ϕ 6.35 liquid pipe

Following precautions must be observed when the model is adapted to R407C.

(1) Tools and related components should be changed when handling a different kind of refrigerant in order to prevent mixing of different oils. Gauge manifold and charge hose, particularly, should never be used after using them for R22.
(2) Charge cylinder should not be used. Otherwise, the refrigerant composition may change when charging R407C into the cylinder.
(3) Refrigerant should be charged in the liquid phase from the container. Charging the refrigerant in the gaseous phase could change the refrigerant composition substantially.
(4) Volume of refrigerant to be taken out in the liquid phase from the container should be up to 90% of necessary quantity (in weight percent) as a standard.
(5) Refrigerant should not be replenished even if a leakage is discovered because it could change the refrigerant composition substantially. When a leakage is discovered, replace with new refrigerant in the specified volume. However, it could be replenished temporarily in case of an emergency.

19.5.5 Electric wiring

(1) Power supply wiring

(a) Outdoor unit power supply

• Use separate power supplies for the outdoor and indoor unit respectively. (Standard specification)

• The table below shows the power specification for outdoor unit only.

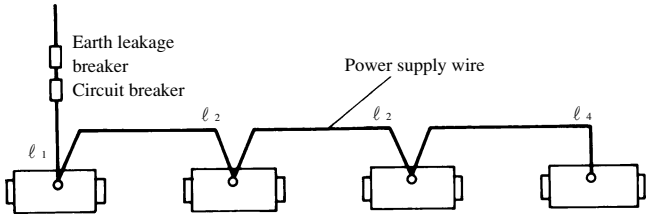
Item / Model	Power source	Power supply wire size (mm^2)	Wire length (m)	Circuit breaker			Grounding wire size (mm^2)
				Switch capacity (A)	Reted current (A)	Earth leakage breaker (A)	
FDC140 type	3 phase 380/415V 50Hz	3.5	38	30	25	30A 30mA 0.1 sec. or less	2.0
FDC224 type		5.5	46	40	30	40A 100mA 0.1 sec. or less	2.0
FDC280 type		8.0	47	60	50	60A 100mA 0.1 sec. or less	3.5

Notes (1) The above table shows the power specification of outdoor unit when separate powers are use for outdoor unit and indoor units.
(2) The wire thickness and distance indicated above are for when voltage drop is 2%.

(b) Indoor unit power supply

Indoor unit / Item		Power supply wire size (mm^2)	Wire length (m)	Wire circuit breaker (A)		Signal wire thickness (mm)	
				Rated current	Circuit breaker (Use for both ground/overload and short-circuit production)	Outdoor · Indoor	Indoor · Outdoor
Total power supply for indoor unit	Less than 10A	2	23	20	20A100mA 0.1 sec. or less	2 core x 0.75 · 2.0	2 core x 0.75 · 2.0
	10A or more, less than 15A	3.5	27	30	30A100mA 0.1 sec. or less		

Notes (1) The wire length covers values when necessary indoor units are connected in series with the unit power supply wire as shown below. Also, the wire thickness and distance indicated above are for when voltage drop is 2%.
(2) These values are based on the conditions that indoor units are connected so that the total capacity becomes the mximum against each outdoor unit.



(2) Precaution in electric wiring.

(a) Use separate power supplies for the outdoor and indoor units respectiveliy (Standard specification)

(b) Signal wiring (for indoor and outdoor units)

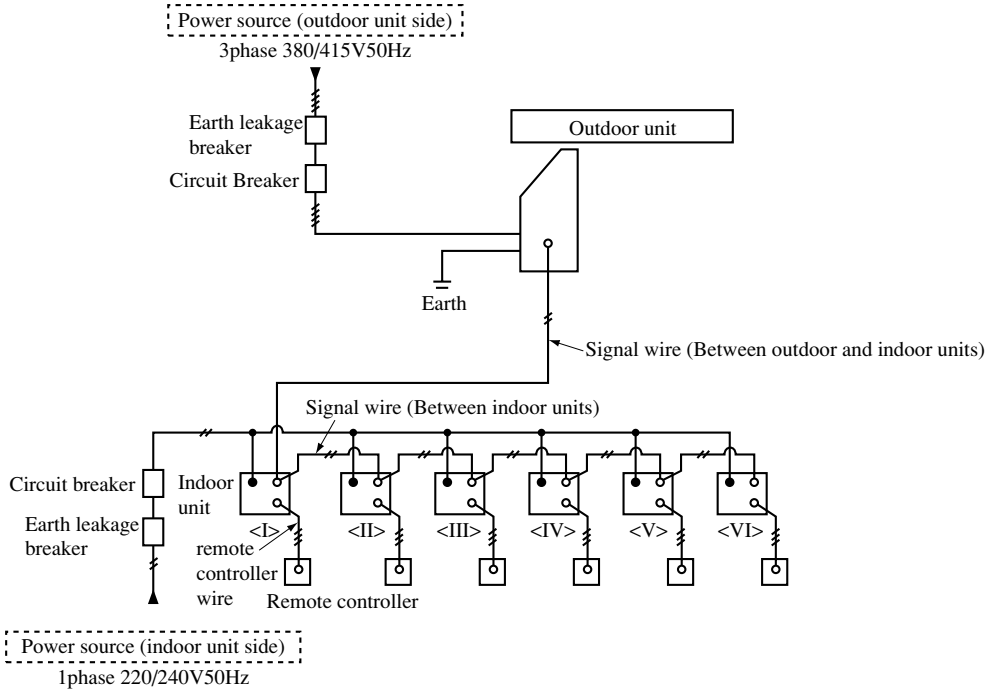
- Double-core cable with a diameter 0.75 to 2 mm^2 should be used for the signal wires.
- **Never make the indoor and outdoor connecting signal line use “co-axial cable” or “strand” with the power wiring for indoor and outdoor unit and other ower line.**
  (Never use a multiconductor wire together with power line. It may cause erroneous operation.)
- Do not connect high voltage wires 220/240 V or 380/415 V to signal wires. as these wires are DC 5V. Signal wires should be connected so that the terminal Nos. conform with each other for between outdoor and between indoor units. However, they will work properly if different polarities are connected.
  (Connect (A) and (A), (B)and (B).)
- **Do not strand or run the remote control cord with power line, electric line, etc.**
- The total length of the signal wires Should be 1000m or less.
- **Recommended signal wire list**

No.	Name	Symbol
1	Vinyl cabtire round cord	VCTF double-core 0.75 to 2 mm^2
2	Vinyl cabtire round cable	VCT double-core 0.75 to 2 mm^2
3	Control vinyl insulated, vinyl sheathed cable	CVV double-core 0.75 to 2 mm^2
4	Shielding wire	MVVS double-core 0.75 to 2 mm^2

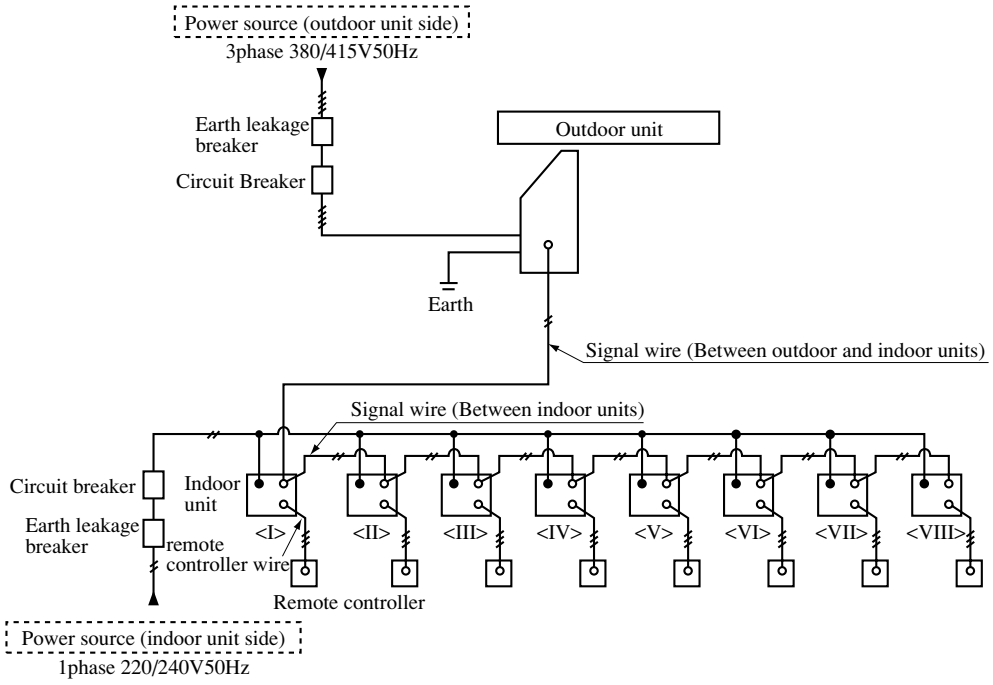
When No. 4 shielding wire is used, always ground the single wire side of the shielding wire . In addition, using the shielding wire is helpful to prevent the incorrect connection between 5V DC and 220/240V or 380/415V AC because the discrimination from the power supply wire is clear.

(3) Wiring system Diagram

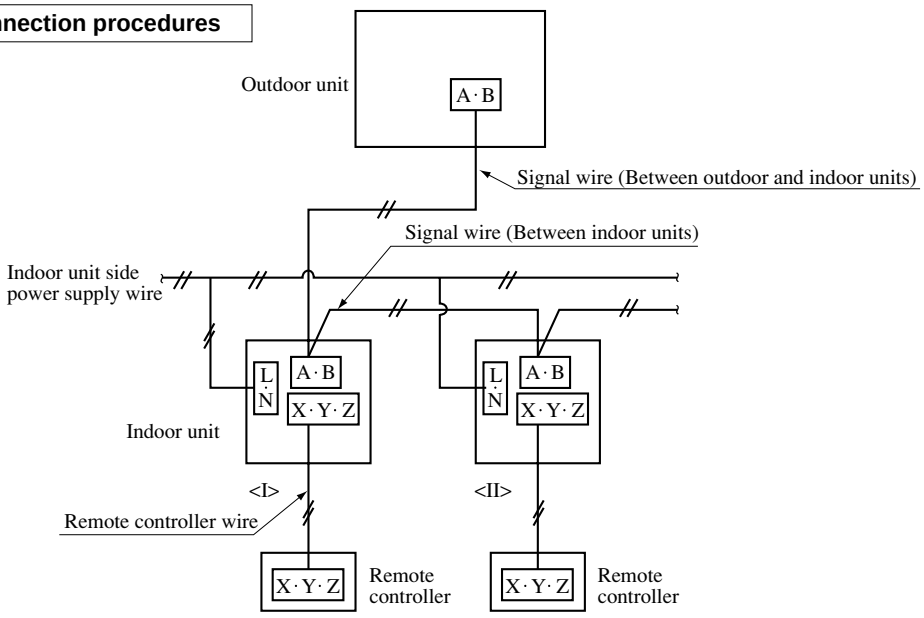
Model FDC140type



Models FDC224, 280type



Outdoor/Indoor units connection procedures

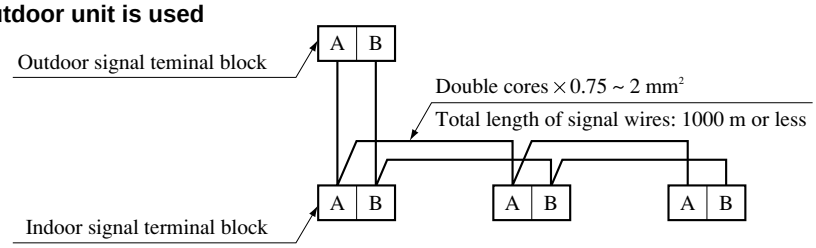


Signal wire

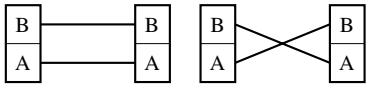
- Do not connect high voltage wire 380/415V to signal wires, as these wires are DC 5V. Signal wires should be connected so that the terminal Nos. conform with each other for between outdoor and between indoor units. However, they will work properly if different polarities are connected. (Connect (A) and (A), (B) and (B).)

(4) Indoor and outdoor signal wiring

(a) If only one Outdoor unit is used

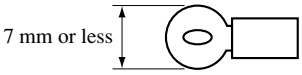


Notes (1) The indoor and outdoor signal wiring are without polarity



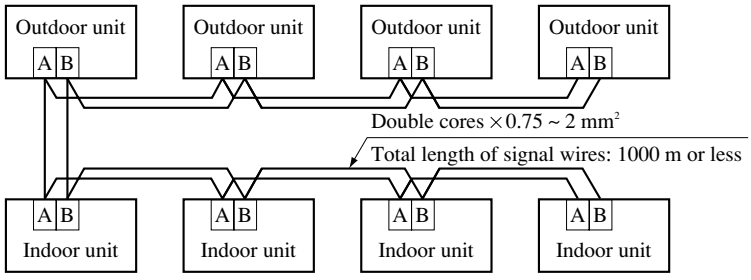
Either of the above wiring is correct.

(2) For connection to the terminal block, use as M3.5 (5/32) round eye-let terminal is shown below.

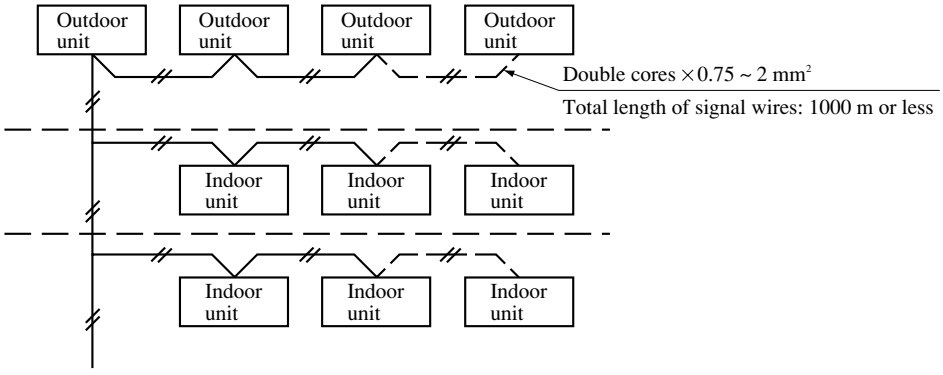


(b) If plural outdoor units are used

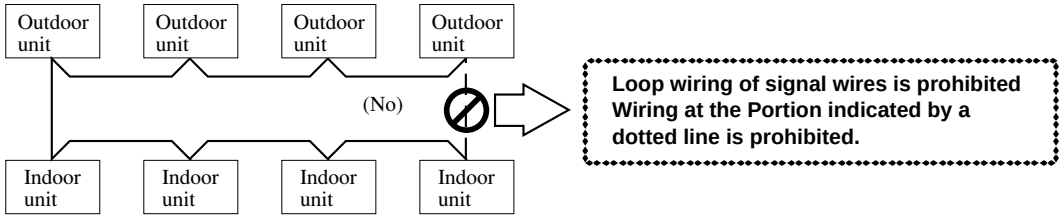
1) A maximum of 48 indoor units can be connected by using the crossover wiring method, with 2 wires for each side of the outdoor and indoor units.



2) Indoor/outdoor wiring method for multiple floors.

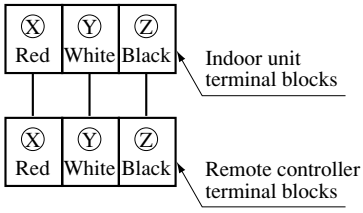


3) Loop wiring is prohibited



(5) Remote controller wiring

(a) Wiring for controlling only one indoor unit.

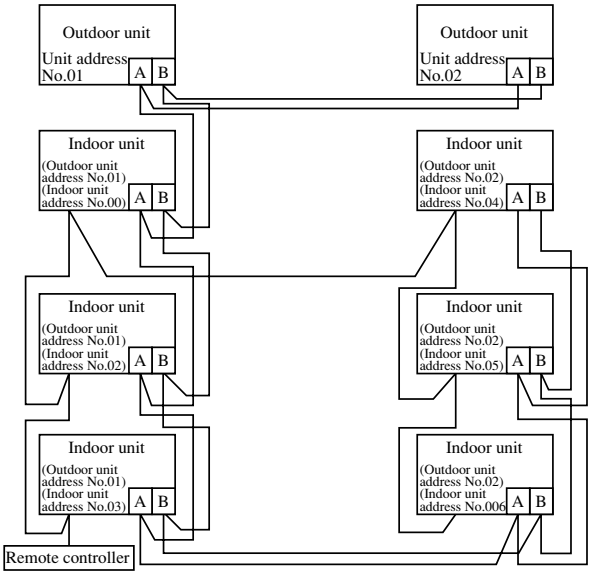


Note (1) Cables for the remote controller have polarity. Be sure to connect terminal blocks with the same numbers. If mis wiring occurs, E1 is displayed and disables the unit from operating.

(b) When controlling plural units.

1) Use the same procedure shown in the drawing above for the wiring of the power supply, both indoor and outdoor units and remote controller
   When the wiring length for the remote controller exceeds 100 m, use the wiring procedure shown in the drawing below.
2) Connect each of the indoor units for group controlling (3 cables)
   a) Connect the cables to the terminal blocks of X, Y, and Z for the indoor unit remote controller. Since the cables have polarity, be sure to connect them to terminal blocks with the same numbers.
   b) Use cables of more than 0.5 mm2 (Flexible and easily moved)
   c) The total length of cables for crossover connection and the remote controller should be less than 600 m.
   Note (1) Refer to the wire size chart on page 851 for any wiring exceeding 100 meters.
3) When there is more than one outdoor unit, they can be controlled by one remote controller.
4) One remote controller is capable of controlling up to 16 units in group.

Note (1) Use shielded cables, when wiring in parallel with cables for other power supply or when there is a possibility of being affected by outer noise such as noise from a high-frequency unit.

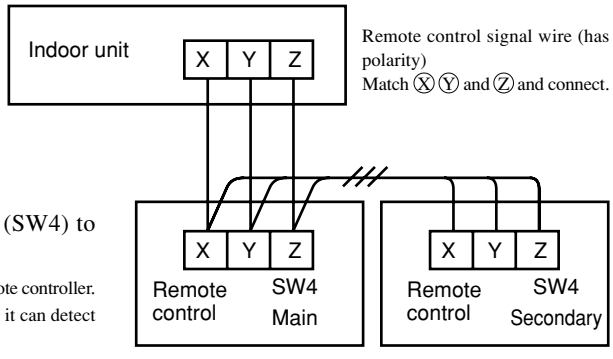


(c) Settings for main and secondary units when multiple remote controllers are used.

Up to two remote controllers can be used for each indoor unit (or each group of indoor units).

1) There are two methods for arranging this. One method is to take a remote control connection wire (3-strand) from the indoor unit for the secondary remote control. The other method is to use a jumper wire from the main remote control.
2) Set the remote control switch for the secondary unit (SW4) to secondary unit. (It was set to main unit a the factory.)

Note (1) The remote controller sensor setting is only enabled on the main remote controller. Be sure to position the main remote controller in a location where it can detect the room temperature.



(6) Setting of unit address

Addresses can be set either with the automatic address setting, remote control address setting or manual address setting depending on the combinations of address switches (see table) of the indoor and outdoor units. Operate the address switches before turning power on.

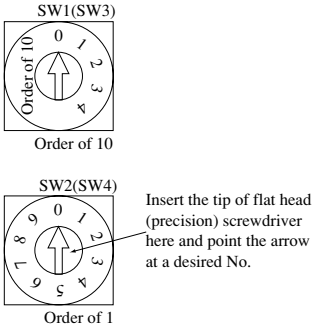
Address setting method	Outdoor unit	Indoor unit	
	Outdoor No.	Outdoor No.	Indoor No.
Auto address	49	49	49
Remote control address	00 ~ 47	49	49
Manual address	00 ~ 47	00 ~ 47	00 ~ 47

At the shipment from factory, outdoor Noș. of the outdoor unit are set at 49, both the output and indoor Nos. of the indoor units are set at 49 and the setting method is set for the automatic addressing.

Address No. setting

Set the setting SW1 - 4 on the indoor PCB and the setting SW1 and 2 on the outdoor PCB as listed below.

On indoor PCB	SW1, 2 (blue)	For setting of indoor No. (orders of 10 and 1)
	SW3, 4 (green)	For setting of outdoor No. (orders of 10 and 1)
On outdoor PCB	SW1, 2 (green)	For setting of outdoor No. (orders of 10 and 1)



SW1 (SW3) order of 10 \ SW2 (SW4) Order of 1	0	1	2	3	4	5	6	7	8	9
0	00	01	02	03	04	05	06	07	08	09
1	10	11	12	13	14	15	16	17	18	19
2	20	21	22	23	24	25	26	27	28	29
3	30	31	32	33	34	35	36	37	38	39
4	40	41	42	43	44	45	46	47	48	49

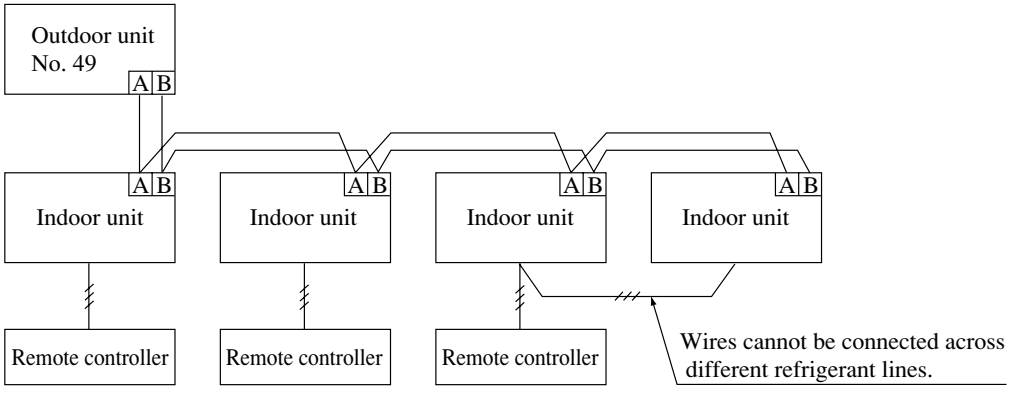
Use 48 and 49 for setting the auto or remote control address.

Notes (1) Outdoor No. is provided on the outdoor and indoor PCB's and indicates which outdoor unit is connected with which indoor unit via a refrigerant pipe. Indoor and outdoor units connected with a refrigerant pipe must have the same No.

(2) Indoor No. is used to identify a particular indoor unit. The No. should never be duplicated.

(a) Auto address setting

This setting is used when wiring on the basis of outdoor unit.



1) Set the address switch of outdoor unit at 49. (This is set at 49 at shipment from factory.)

2) Set the address switch of indoor unit at 49. (This is set at 49 at shipment from factory)

3) Turn power on for the indoor and outdoor units. Addresses are set automatically. (No. in a range of 0 - 7 is set for J140H or No. in a range of 0 - 11 for J224 and 280H.)

For the auto address setting, power must be ON for both the indoor and outdoor units. If power is supplied to the indoor unit only, "Outdoor No." is indicated on the remote controller. In such occasion, turn power ON also for the outdoor unit.

4) No. will be set within approx. 1 minute after turning power on.

5) If you press the inspection switch of the remote controller after setting the No., the address of indoor unit will be displayed.

The outdoor unit No. 49 will also be displayed.

6) Auto address setting is allowed also when controlling plural number of units with single remote controller. However, the connection cannot be made across different refrigeration lines.

Information 1) Once addresses are set, they are retained on the microcomputer even after turning power off.

2) Even if the wiring is arranged on the basis of outdoor units, (2) remote control address setting and (3) manual address setting can be used.

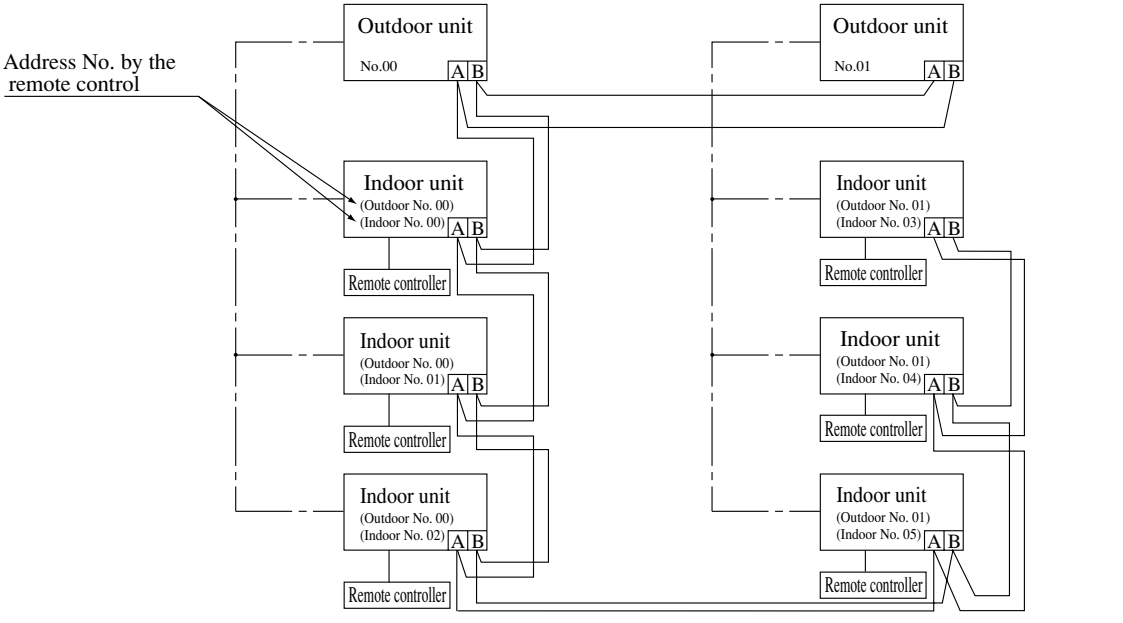
○ **Erasing of addresses set with the automatic address setting**

On the remote controller, press the "Fan speed" switch while holding down both the switches "Check" and "Timer". Memory of address is erased. If the power supply to the indoor and outdoor units is turned off later, the system returns to the state of no address setting. Then one of the three address setting methods can be selected by changing combinations of the address switches.

(b) Setting of remote control addresses

This setting is used when connecting a plural number of indoor and outdoor units with the super link. This is applicable when using single remote controller.

Figures in ( ) indicate address No.
by the remote control
ine "---" shows the refrigerant piping.



1) Set the address of outdoor unit with a number in a range of 0 - 47 avoiding duplication with any other outdoor unit.
2) Leave intact the address switch on the indoor unit PCB at 49 as set at the shipment from factory.
3) Turn power on. Then you can proceed the remote control address setting.
4) Set the outdoor No. corresponding to each indoor unit, using the remote controller. Set next the indoor No. of indoor unit in a range or 0 - 47 avoiding duplication with any other unit connected in the group.

○ **Detail of setting from the remote controller**

1) If the power switch is turned on, the outdoor No. on the display flashes, and "--" on the return air temperature display section and "U--" on the time display section are lit.
   If power is not supplied to the outdoor unit, the outdoor No. only lights and you cannot set the address. In such occasion, to turn power on also for the outdoor unit.
2) Indoor No. increases 0, 1, 2, ... and up at each push on the room temperature setting ▲ switch. Press the room temperature setting ▼ to reduce the outdoor No. 0, 47, 46, 45 ... and down. Stop to press the switches when a desired No. is indicated.
3) Press the Set switch so that the outdoor unit display changes from flashing to firm lighting and the outdoor No. is set. Simultaneously, "U" indicating the indoor unit No. starts to flash.
4) Set the indoor No. in the same way with the room temperature setting switches ▲ and ▼.
5) After completing the setting, press the Set switch so that the "U" display changes from flashing to firm lighting and the figures of outdoor No. and indoor No. on display start to flash.
6) Confirming the outdoor No. and indoor No. being correct, press the Set switch again.
   If you like to change these Nos., press the "Check" switch so that it returns to the state of the step 2) and you can resume the address setting.
7) This is all for the address setting. The address display will go off 5 seconds later.
   Note (1) Once the addresses are set, they are retained on the microcomputer even after turning power off. If you need to change the address, proceed as follows.

○ **Change of address**

Hold down the "Check" switch on the remote controller for more than 5 seconds. Outdoor No. on display flashes and you can set new addresses. Set the outdoor and indoor address Nos. same as described above. New addresses can be set.

○ **Erasing the addresses set by the remote control address setting**

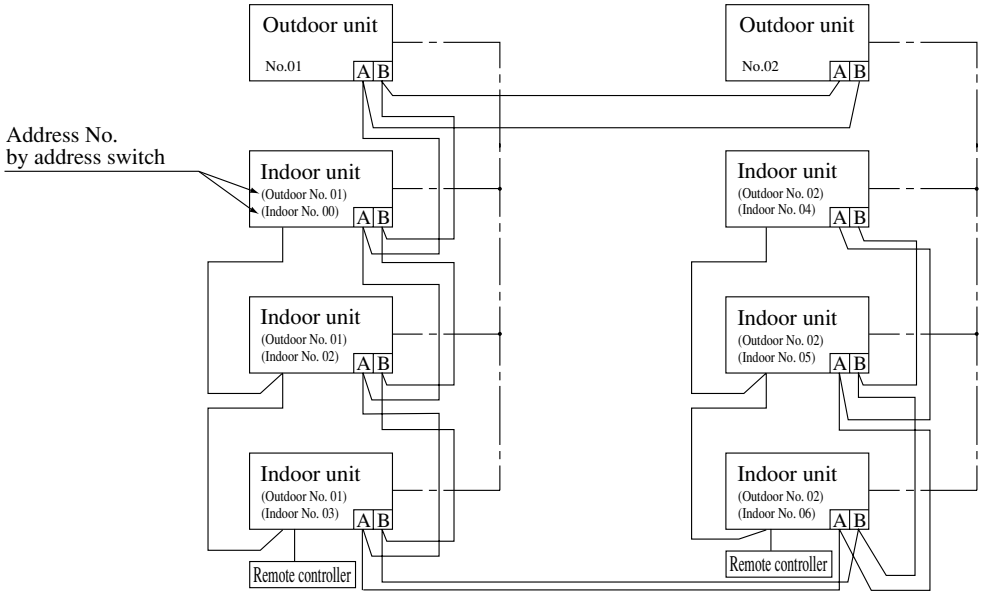
Holding down both the switches "Check" and "Timer", press the "Fan speed" switch. Addresses in the memory are erased. Turn power off on the indoor and outdoor units so that it returns to the no address setting condition and you can set the addresses with one of the three methods of address setting by changing combinations of the address switches.

(c) Manual address setting

This setting is used when connecting plural number of outdoor and indoor units with the super link, and is applicable when controlling with more than one remote controller. (You can use only one remote controller of course.)

○ Turn power off before operating the address switches. Change of address is disabled when power is supplied.

Line "---" indicates the refrigerant piping. Figure in the figure indicates the address number determined with the address switch.



1) Using the address switch (green) on the outdoor unit PCB, set the address of the outdoor unit in a range of 00 - 47 avoiding duplication with any other outdoor unit.
2) Using the address switch (green) on the indoor unit PCB, set the outdoor No. at the same No. as the outdoor unit which is connected with a refrigerant pipe.
3) Using the address switch (blue), set the indoor No. of indoor unit in a range of 00 - 47 avoiding duplication with any other unit on the connection.

(7) Change of control

Details of control for outdoor units are selectable with the methods as listed below.

Selecting method of control	Detail of selected control
PCB (SW-3) No. 2 ON	Backup operation with inverter compressor only
PCB (SW-3) No. 3 ON	Cancel of compressor dilution protection control
PCB (SW-3) No. 4 ON	Mismatch check of indoor-outdoor connection (Only when No. 5 and No. 6 of SW-3 are ON.)
PCB (SW-3) No. 5 ON	Test run from outdoor unit
PCB (SW-3) No. 6 ON	Cooling or heating selection at test run from outdoor unit
PCB (SW-3) No. 7 ON	Forced cooling/heating mode (Allows to fixe at cooling or heating by a signal from CnG.)
PCB (J1) OFF	Selection of external input (CnS1) Pulse input with the level input at-shipment-from-factory off
PCB (J5) OFF	Defrosting off (makes easier to start defrosting)
PCB (J6) OFF	Countermeasure for snow (Turns the outdoor fan ON for 10 sec. at every 10-min. at outdoor temperature 3˚C or under.)

19.5.6 Test run

(1) Before starting operation

(a) Measure resistances between the electrical parts terminal blook and ground grounded area using a 500V Megger, insulator. Resistance must be higher than 1M Ω.

(b) Confirm whether the power source breaker (main switch) of the unit has been turned on for over 12 hours to energize the crankcase heater in advance of operation.

(c) Make sure that the compressor bottom has been warmed.

(d) Be sure to fully open the service valves (on both the gas and liquid sides) of the outdoor unit. if being operated without opening, the valve may be got out of order.

Note (1) When the service valve is closed, be sure to check that evacuation is completed or a refrigerant is charged.

(2) Test run

(a) If it is impossible, a test run of indoor units can be conducted by using the switches No.5 and No.6 of [SW-3] on the outdoor unit circuit board irrespective of ON/OFF conditions of CnS and the remote controller.

No.5 of [SW3] Test run (ON) ↕ Normal (OFF)	• All connected indoor units operate when the switch is set to ON. • Indoor units request the maximum frequency and the outdoor unit operates with the maximum frequency shown in the table below according to requents from indoor units. • Select cooling or heating according to input to No.6 of [SW3].	• When the switch is set to OFF, these units can be operated with the remote controller or by external input.
No.6 of [SW3]	• When No.5 of [SW3] is ON when No.6 of [SW3] is set to ON, a cooling operation starts.	• When No.5 of [SW3] is on when No.6 of [SW3] is set to OFF, a heating operation starts.

[Remark]

This operation has priority over other option commands with the center console.

At the time of trial operation, the maximum frequencies are follows. Protective devices are effectively controlled, and frequencies are controlled to become smaller.

(3) Cooling test run operation (Cooling test run can be performed in winter.)

(a) Operating method

- In the normal cooling mode, while holding down the ∇ Temperature set" switch, press the "Set" switch.
- Setting temperature is changed at 5˚C and the cooling test run is operated for 30 minutes. It stops after 30 minutes.

(b) During cooling test run operation

- If ON/OFF switch is pressed or a mode other than the cooling is selected by the "Mode" switch, the cooling test run operation is released or returns to the specified operation mode.
- If the "Temperature set Δ switch is pressed, the setting temperature changed at 18˚C and the cooling test run operation is released but the cooling operation continues.
- It is effective when any switches other than the above are pressed.

(c) During the cooling test run operation, the setting temperature changes at 5˚C but any other control and protective functions are operable just like in the normal operation.

- If any error occurs, the location of error is indicated on the remote controller display or with the condition of flashing of inspection lamp (red) on the main unit controller. Remove the cause of trouble before starting operation again.

(4) Delivery

(a) Explain how to operate the indoor unit to your customer according to the accessory owner's manual.

(b) Persuade the customer not to turn off the power switch even if the unit is not used for along time. The air conditioner can start operation any time when your customer want to heating or cooling his room. (The bottom of the compressor is heated with the crank case heater, and compressor troubles can be prevented when the cooling or heating season sets in.)

19.6 MAINTENANCE DATA

(1) Before starting troubleshooting

(a) Confirmation of the error code on the remote controller (by pressing the inspection switch) and the inspection display and normal display lamps on PCBs (Printed circuit board) of indoor/outldoor units

The microcomputer detects errors on electrical components, which include the microcomputer itself, errors on the power supply line and errors (overload, etc.) on the refrigerant circuit and the location of trouble is displayed (with the commbination of error symbols of remote controller, normal (green) and inspection (red) display LED on PCBs of indoor/outdoor units). When any error occurs, check first the inspection display. It will guide you to trouble point and assist you to complete the repair work quickly.
Error code of the remote controller is recorded on microcomputer after the trouble has been reset automatically so that, if you press the inspection switch of remote controller, the error code and the number of unit in trouble are displayed for 10sec.. The inspection display lamp on the indoor/outdoor unit PCB keeps flashing (glowing) even after the trouble was reset automatically. Inspection lamp on the indoor unit PCB is turned off if the remote controller is reset.

1) Inspection/normal: List of power display

Section	Display Section	Display	Contents of display
Remote controller	Power supply display	LCD	At power ON : Displays always the return air temperature and Center/Remote.
	Error code	LCD	At error : Displays E1 ~ E46 or blank depending on the kings of error.
	Inspection display	Red-LED	At error : Flash continuously (indicates the occurence of error).
Indoor/outdoor unit	Normal display	Green-LED	At power ON (normal) : Flash continuously. At error : Off or continuous glowing or irregular illumination.
	Error display	Red-LED	At error : Flash 1 ~ 3 times/5 sec for indoor unit depending on the kinds of error, continuous flash, irregular illumination or off. At error : Flash 1 ~ 9 times/10 sec for outdoor unit depending on the kinds of error, continuous flash, irregular illumination or off.
Invertes	Normaly display	Green-LED1	At power ON (normal) : Flash continuously. At error : Off or continuous glowing or irregular illumination.
	Error display	Red-LED2	1 time flash : Power transistor overheat • Stop operation and wait till temperature drops. 2 time flash : Current cut (Over-current on power transistor) • Short circuit on compressor wiring • Trouble on inverter PCB • Trouble on power transistor Keeps flashing : Transmission error between inverter and outdoor unit • Connector CN11 or CN12 is disconnected, or broken wire between connectors. • Error on outdoor unit control PCB • Error on inverter PCB

2) Check Indicator Table

Whether a failure exists or not on the indoor unit and outdoor unit can be know by the contents of remote controller eroor code, indoor/outdoor unit green LED (power pilot lamp and microcomputer normality pilot lamp) or red LED (check pilot lamp).

Remote controller error code	Indoor unit LED		Outdoor unit LED		Cause
	Green	Red	Green	Red	
No-indication	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Normal
	Stays OFF	Stays OFF	Stays OFF	Stays OFF	Power OFF, T phase wiring is open, power source failure
	Keeps flashing	*3 time flash	Keeps flashing	Stays OFF	Remote controller wires X and Y are reversely connected. *For wire breaking at power ON, the LED is OFF. Remote controller wire is open. (X wire breaking : A beep is produced and no indication is made. Z wire breaking : No beep and no indication) The remote controller wires Y and Z are reversely connected.
E1	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	The remote controller wires are connected to A and B on the terminal block. The indoor/outdoor signal wire are connected in loop form. The indoor unit micro-computer runs away.
	Stay OFF or Lights continously	Stay OFF or Lights continuously	Keeps flashing	Stays OFF	Indoor unit PCB fault
	Keeps flashing	(1)3 time flash	Keeps flashing	Stays OFF	The PAC remote controller is connected to the KX. The remote controller wire Y is open. The remote controller wires X and Y are reversely connected. (The LED flash twice a second.) Two remote controllers are provided. *For wire breaking at power ON, the LED is OFF.
E2	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	No. duplication at indoor unit addressing. More than 49 indoor unit are connected.
E3	Keeps flashing	2 time flash	Stays OFF	Stays OFF	Outdoor unit power supply OFF (detected only during operation)
	Keeps flashing	2 time flash	Keeps flashing	Stays OFF	The corresponding outdoor unit address No. is not found. (Detected only during operation)
	Keeps flashing	2 time flash	Stay OFF	Stay OFF	Outdoor unit power OFF (Detected only during operation)
E5	Keeps flashing	2 time flash	Keeps flashing	Stays OFF	Indoor / outdoor transmission error. Wire A and B swapping after power ON.
	Keeps flashing	2 time flash	Stays OFF	Stays OFF	Outdoor power unit failure (when the indoor power supply is different from the outdoor one).
	Keeps flashing	2 time flash	Stays OFF or Keeps flashing	Stays OFF or Lights continuously	Outdoor unit microcomputer failure
E6	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Indoor unit heat exchanger thermistor failure
E7	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Indoor unit return air thermi stor failure
E9	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	The float SW operates (with FS only). Drain up kit wiring fault.
E10	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	When multi-unit control by remote controller is performed, the number of units is over (more than 17 units). Two remote controller are provided for one controller is perfirmed.
E11	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Remote control addresses have been set while more than one units of remote controller are connected.

Remote controller error code	Indoor unit LED		Outdoor unit LED		Cause	
	Green	Red	Green	Red		
E12	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Address No. combination error or addressing is performed with the following combinations.	
					Outdoor No,	Indoor No,
					0 ~ 47	48, 49
					48, 49	0 ~ 47
E28	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Remote controller thermistor failure	
E30	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Indoor/outdoor unit connected error	
E31	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outdoor unit No. duplication. Outdoor unit address No. is not set for super lynk wiring. Outdoor unit address No. is changed in the power ON status.	
E32	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	52C1 primary side L2-phase wiring is open or reversal phase	
E33	Keeps flashing	Stays OFF	Keeps flashing	(2) 1 time flash	Abnormal current cut of compressor (CM2) Locking of compressor motor (CM1)	
E34	Keeps flashing	Stays OFF	Keeps flashing	(2) 1 time flash	52C1, or 52C2 secondary side L3-phase wiring is open. Inverters error.	
E36	Keeps flashing	Stays OFF	Keeps flashing	(2) 1 time flash	Discharge temperature abnormality.	
E37	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outdoor unit heat exchanger thermistor failure	
E38	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outside temperature sensor failure	
E39	Keeps flashing	Stays OFF	Keeps flashing	(2) 1 time flash	Discharge temperature thermistor failure	
E40	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	63H1 operation	
E41	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Power transistor overheat	
E42	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Abnormal current cut of compressor (CM1)	
E43	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	The number of connectable units is exceeded.	
E45	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Transmission error between inverter and outdoor unit PCB	
E46	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Automatic address setting and remote controller address setting or manual address setting coexists in the same network.	

Notes (1) Lamp is off if wires are broken at power ON.

(2) When plural numbers of compressor and discharge sensor are installed, single flashing of outdoor unit LED (red) indicates CM_1 (Th_0-D_1) and double flashing indicates CM_2 (Th_0-D_2).

3) Display sequence of error, inspection display lamp

a) One kind error

Display corresponding to the error is shown.

b) More than one errors.

Section	Display section
Error code of remote controller	• Displays the error of higher priority (When plural errors are persisting) E1>E10>E11>E2>E3>E5>E7>E9>E12 ..... E46 • Displays the present errors. (When a new error has occurred after the former error was reset.)
Inspection LED (red) of indoor unit PCB	
Inspection LED (red) of outdoor unit PCB	

c) Timing of error detection

- **Indoor unit side.**

Error detail	Error code	Timing of error detection
Transmission error of remote controller indoor unit	E1	When the transmission error continuously for 2 min.
CPU is out of control		Resetting was performed at the rate of 1 time per second. An abnormal stop occured 32-sec time flash.
Transmission error between indoor/outdoor units	E5	A check was made once every 20 second. An abnormal stop occured 7 time running.
Broken wire of heat exchanger thermistor	E6	After a compressor ON command, this failure was detected for 5 second in the period of 2 minutes to 2 minutes and 20 seconds.
Broken wire of indoor unit return air thermistor	E7	This failure was detected continuously for 5 seconds.
Drain error (float switch motion)	E9	At the thermostat ON state, an abnormal stop occured immediately after the float swicth operated. - At a stop or the thermostat OFF state, the condensate motor was turned on for 3 minutes after the float switch operated. After that, an abnormal stop occurred when the float switch operated in 10 seconds.

- **Outdoor unit side.**

Error detail	Error code	Timing of error detection
CM1 motor lock protection	E33	When the compressor has been operating at 25 Hz and a current in excess of 10A is detected for 0.5 continuous seconds. • 5detectins in 60 minutes • After compressor has stopped and current had not fallen below 2A for 10 minutes.
Compressor (CM2) over-current protection		When the L3 phase current on the secondary side of 52C2 exceeds the setting for 0.5 seconds continuously 2 times in 40 minutes.
52C1, or 52C2 secondary side L3-phase wiring is open.	E34	When CM1 is on and there is L3-phase current of 0.5 A or less for 10 continuous seconds. When the CM2 L3-phase current is 2 A or less for 5 continuous sections after CM2 has gone on.
Discharge temperature abnormality	E36	A stop occurs when this abnormality occurs for 2 seconds running at 130°C. After a stop for 3 minutes, an recovery is automatically made. An abnormal stop occurs when this abnormality occurs twice for 60 minutes. (The abnormal state is held for 45 minutes.)
Broken wire of heat exchanger thermister	E37	This failure is detected when it occurs for 5 seconds running in the period of 2 minutes to 2 minutes and 20 seconds with the compressor ON. An abnormal stop occurs when this failure occurs 3 times for 40 minutes.
Broken wire of outdoor temperature thermistor	E38	
Broken wire of discharge thermistor	E39	This failure is detected when it occurs for 5 seconds running in the period of 10 minutes to 10 minutes and 20 seconds with the compressor ON. An abnormal stop occurs when this failure occurs 3 times for 40 minutes.
High pressure cut	E40	An abnormal stop occurs when this abnormality occurs 2 times for 40 minutes.
Power transistor overheat	E41	A stop occurs at 118°C or more. After 3 minutes, a recovery was automatically made at 100°C or less. Abnormal stop occurs when this abnormality occurs 2 times for 2 hours.
Current cut	E42	An abnormal stop occurs when this abnormality occurs 4 times for 15 minutes.
Excessive number of indoor and outdoor units	E43	This error is detected when the number of connectable units is set over the specified value at remote control addressing.
Transmission error between inverter and outdoor unit PCB	E45	When an transmission error continues for 10 seconds, the 52C is turned off. With a delay of 3 minutes, a recovery is automatically made. An abnormal stop occurs when this errors occurs 4 times for 15 minutes.

d) Recording and reset of error

Error display	Memory	Reset
Error code	• Saves in memory the mode (1) of higher priority	• Stop the unit operation by pressing the ON/OFF switch of remote controller. • Operation can be started again if the error has been reset. (2)
Indoor unit inspection lamp (red)	• Cannot save in memory	
Outdoor unit inspection lamp (red)	• Saves in memory the mode (1) of higher priority	

Notes (1) Priority is in the order of E1 > ... > E10 > ... > 45.
(2) Reset is disabled for 45min. at the error of outdoor unit or compressor overcurrent or the discharge gas temperature error.

e) Reset of error code in memory (when the error has been reset.)

Indoor unit: Press the Timer switch and the Stop switch while the Inspection switch of wired remote controller is held down or detach the power supply connector (CnW_2) of indoor unit PCB and connect again or turn OFF the power.

Outdoor unit: Detach the power supply connector (CNA_2) of outdoor unit PCB and connect again or turn OFF the power supply or turn on and off the SW3-1.

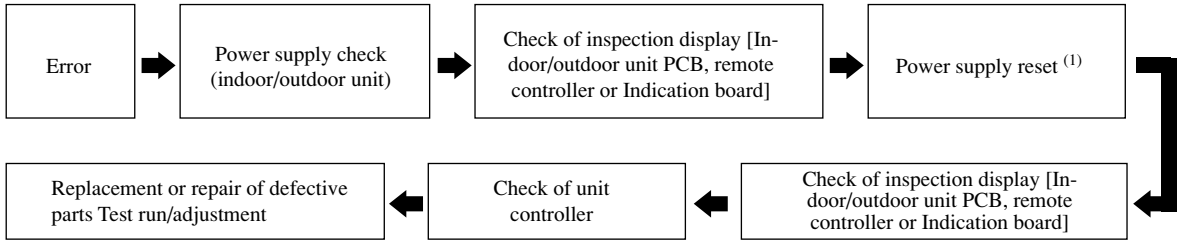
4) Indications with 7-segement indicator

Following data are indicated by changing the setting of selector switches.

SW-4	Indication data	Description
0	Inverter operation frequency or error code	Normally frequency (Hz) is indicated. When it is abnormal E?? is indicated.
1	Heat exchanger temperature	[L] is indicated when the temperature is -26°C or below and the actual temperature is indicated when it is higher than -26°C and up to 73°C.
2	Outdoor temperature	[L] is indicated when the temperature is -21°C or below and the actual temperature is indicated when it is higher than -21°C and up to 43°C.
3	Dome lower (CM_1) temperature	[L] is indicated when the temperature is 6°C or below and the actual temperature is indicated when it is higher than 6°C and up to 80°C.
4	Discharge pipe (CM_1) temperature	[L] is indicated when the temperature is 30°C or below and the actual temperature is indicated when it is higher than 30°C and up to 136°C.
5	Discharge pipe (CM_2) temperature	[L] is indicated when the temperature is 30°C or below and the actual temperature is indicated when it is higher than 30°C and up to 136°C. No indication for 140 type.
6	CT (CM_1) current	Indicates 0 to 47A.
7	CT (CM_2) current	Indicates 0 to 40A. (No indication for 140 type)
8	SV1	0 : OFF 1 : ON
9	SV2	0 : OFF 1 : ON (No indication for 140 type)
10	$63H_1$	0 : Close 1 : Open
11	$63H_2$	0 : Open 1 : Close
13	Number of connected indoor units	Indicates 0 to 16 units.
14	Compressor operation Hz (full load convertion value) Fk	Indicates frequency [Hz].
15	Indicates 0 ~ 14 orderly	Channels 0 ~ 14 are indicated sequencially as follows. CXX : Channel indication for 1 second. XXX : Data indication for 3 seconds.

(2) Procedures of trouble diagnosis

When any error occurs, inspect in following sequence. Detailed explanation on each step is given later in this text.

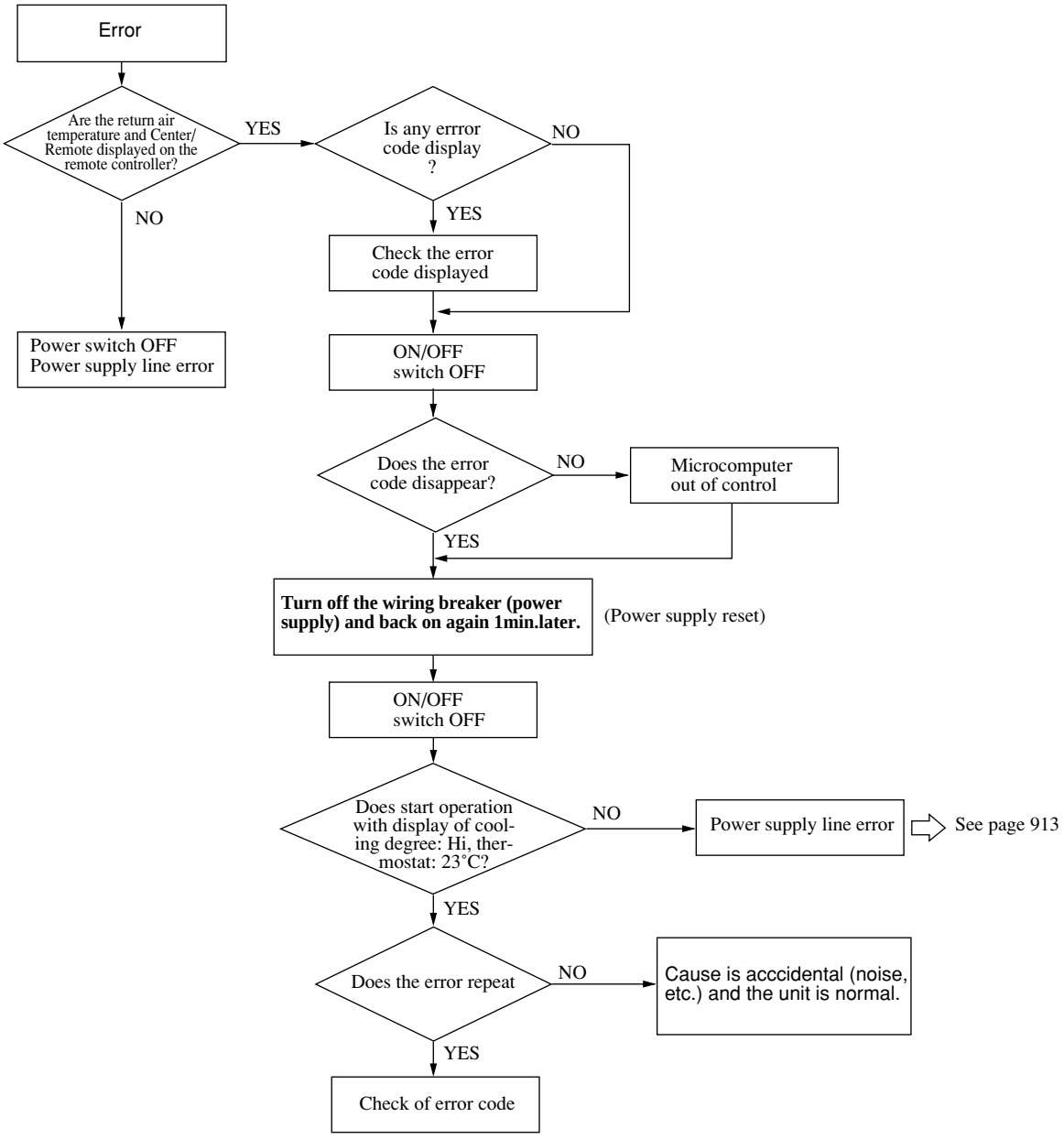


Note (1) It means the operation to turn off the power and back on again more than 1 min. later in order to reset the malfunction of microcomputer due to the effect of power supply conditions or accidental noise.

(a) Diagnosis by the power supply reset

When any error occurs, reset the power supply as described below to see if it is the result of accidental noise, etc.

Check at the indoor unit side.



Errors due to external noise, etc.

Error code may be displayed or the error may not be displayed normally even if the controller is normal because of external noise source(1) or joined or parallel arrangement of power cables and singal wires. It is because the wire of remote controller, wired remote controller signal wires for multiple units or the network signal wires may be influenced by external noises whitch are judged as signals by the microcomputer whitch reacts mistakenly.

When there is any noise source, it is necessary to the shield wire for the remote controller and signal wires.

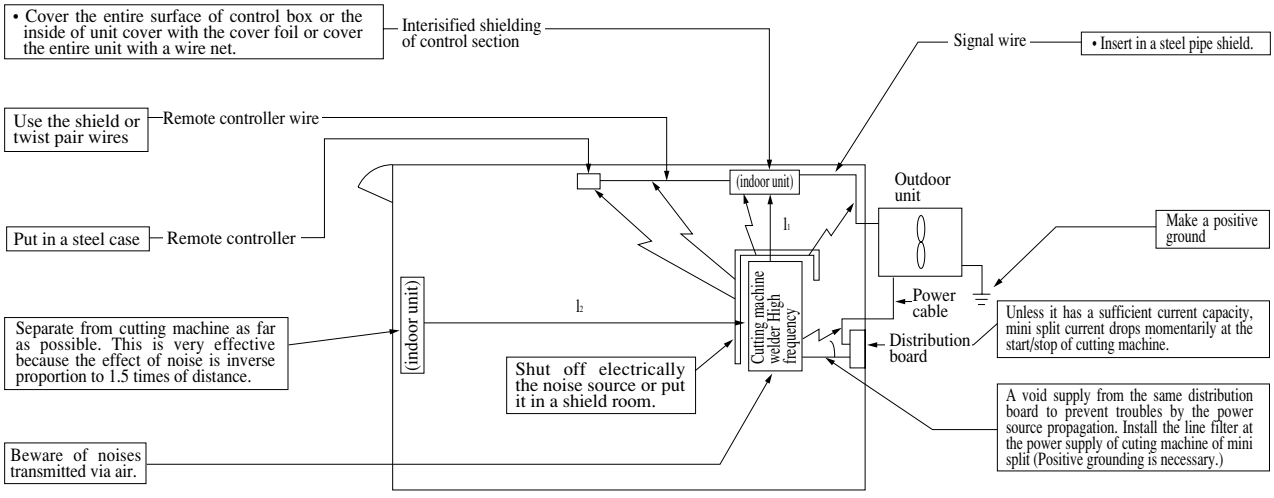
Note (1) High frequency medical machine, rectifier motor application device, thyristor, broadcast transmission tower, power transmission line, power line of electric train, automatic door motor, elevator (voltage drop), wireless telephone, high voltage power distribution line, computer, personal computer and their cables.

These do not necessarily always cause problems but they can be a source of electrical noise.

(2) Reference Effect of noise

- When noises inturude into remote controller.
  Abnormal or irregular display such as the flashing of irrelevant display (lamp) (for example, LEDs of cooling and heating illuminated simultaneously or the like) is observed even if the remote controller is not operated or the remote or the remote controller and, as the result, the operation of units may be disabled or similar abnormal phenomenons are observed.
- When noises intruded into the microcomputer of printed circuit board; State of operation becomes abnormal such as the units perform irregular operation while the remote controller is not operated, the operation cannot be stopped with the remote controller, etc.

Electro magnetic noise prevention (example)



(b) Error diagnosis procedures at the indoor unit side

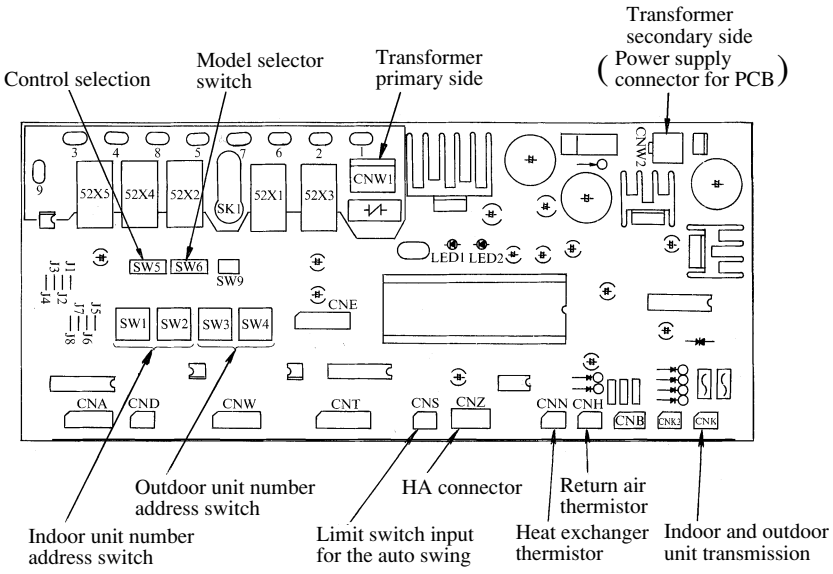
To diagnose the error, measure the voltage (AC,DC), resistance, etc. at each connector around the printed circuit board of indoor unit PCB on the inspection display or the operation state of unit (no operation of comressor or blower, no switching of 4-way valve, etc.). If any defective parts are discovered,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

(i) Unit of replacement parts releated to indoor unit printed circuit board (Electric components on and around the microcomputer)

Indoor unit printed circuit board, thermistor (Return air, heat exchanger), remote controller switch, limit switch, transformer, fuse

Note (1) Judges the troubles on the parts of driving power circuit or cooling cycle with the ordinary check method.

(ii) Parts layout on the indoor unit printed circuit board



- Function of jumper wires

Name		Function
J1	With	Setting of 4 position angle of louver
	None (1)	Setting of 4 position angle of louver
J2	With	4 position louver control : Valid
	None (1)	4 position louver control : Invalid
J3	With	Heating thermostat OFF - Intermittent operation
	None (1)	Heating thermostat OFF - Stop
J4	With	Filter sign : Valid
	None (1)	Filter sign : Invalid
J5	With	Normal operation operable
	None (1)	Operation permission prohibited
J6 (2)	With	Expansion valve aperture - Fixed at current aperture.
	None (1)	Expansion valve aperture - Fixed at new aperture.
J6 (2)	With	Automatic detection of expansion valve aperture opening (only for J71, 90)
	None (1)	Expansion valve aperture - Fixed at new aperture.(except J71, 90)
J7	With	Expansion valve aperture - Normal
	None (1)	Impossibility
J8	With	Spare
	None (1)	Spare

Note (1) "None" means that jumper wire is not provided on the PCB or the connection is cut.
(2) Only FDT series has the following control.

- **Replacement procedure of indoor unit micrcomputer printed circuit board**

Microcomputer printed circuit board can replaced with following procedure.

1) Confirm the parts numbers. (Refer to the following parts layout rdrawing for the location of pats number.)

Parts No.	Model
PJA505A073ZA	FDTS, FDR, FDUM, FDE, FDK, FDFL, FDFU
PJA505A074ZA	FDT, FDTW

- Model select switch (SW6)

Model / Switch	22	28	36	45	56	71	90	112	140
SW6-1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
SW6-2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF
SW6-3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF
SW6-4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

- Function of DIP switches

Switch		Function		Reference page
SW5-1	ON	Input Signal	Reverse Invalid	837
	OFF		Rus stop	
SW5-2	ON	Heating temp. shift + 3°C		832
	OFF	Normal		
SW5-3	ON	Test run of condensate pump motor		835
	OFF	Normal		

(iii) Check method when the error code is displayed

Remote controller or Indication board: Inspection LED, error code

Indoor unit PCB: Red LED (inspcetion display), Green LED (CPU. normal display)

Outdoor unit PCB: Red LED (inspcetion display), Green LED (CPU. normal display)

(iv) Check procedure depending on indication lamps (For the indoor unit)

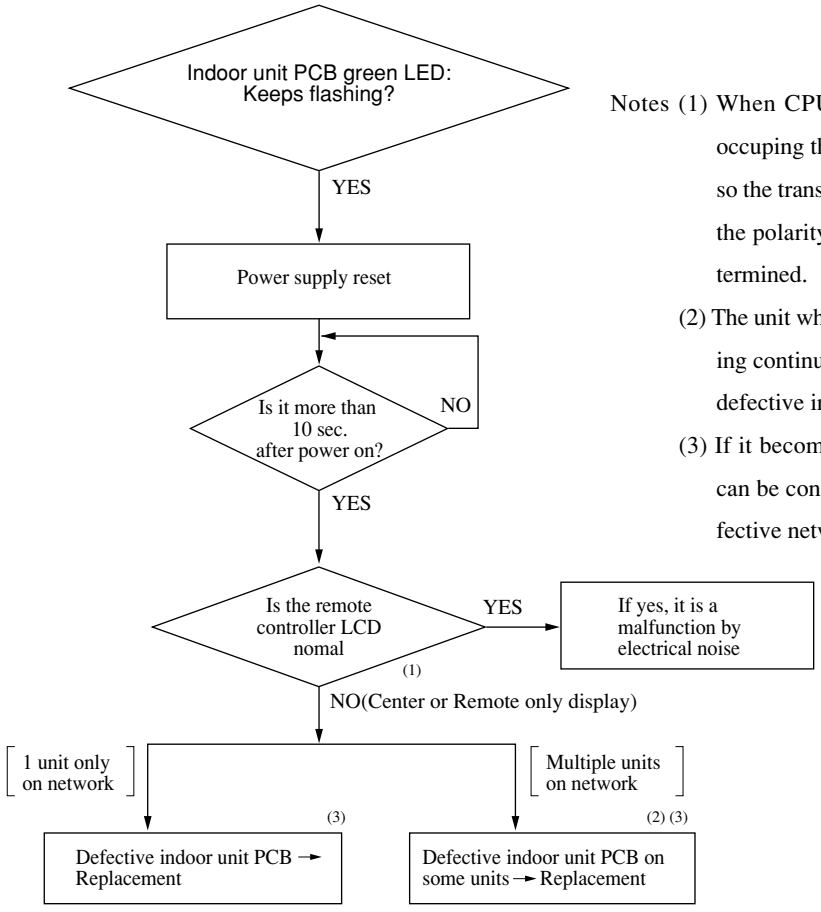
The next page error diagnosis is applicable to cases where only 1 unit is installed in a network unless stated otherwise but the check method is same even if there are multiple units on the network. Except the network occupation state due to out of control indoor unit CPU, the error display indicates the state of respective units. Check each unit specified by the error display as explained on next page.

1 **Error display : No display**
LCD display : No display

[Polarity determination trouble]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Lights continuously	Green LED	Lights continuously

- When the LCD display (Center/Remote, temperature display, etc.) of remote controller flashes, it means the polarity on the unit is not yet determined. Polarity determination is completed within a few seconds after the power on. If it is not completed in time, CPU out of cotnrol, etc. is suspected.



Notes (1) When CPU of one unit goes out of control, it occuping the transmission section of the network, so the transmission of other units are not done and the polarity of the whole network will not be determined.

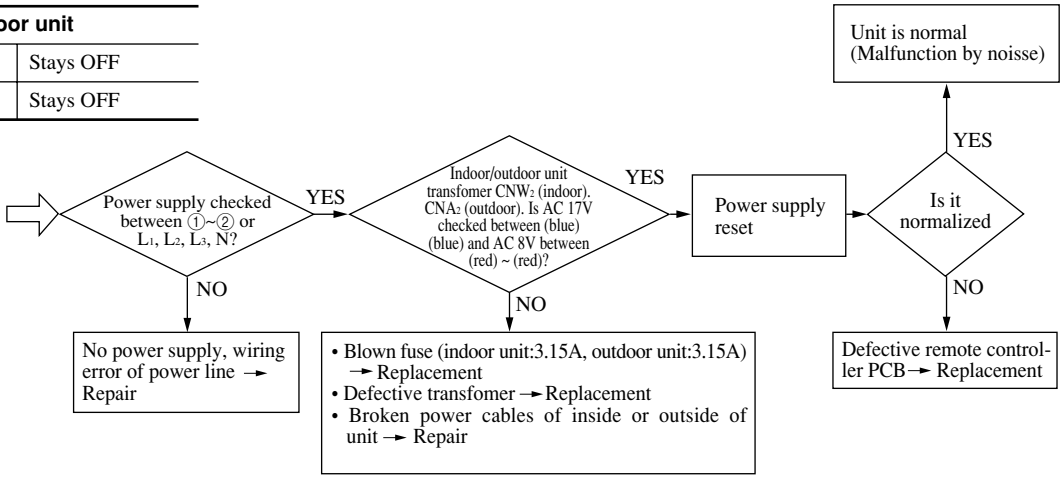
(2) The unit which has its indoor and green LED lighting continuously (or no lighting) is the one with a defective indoor unit PCB.

(3) If it becomes normal after replacing the PCB. it can be considered that the PCB. is defective (defective network transmission circuit).

2 Error display : No display / LCD display : No display [Power supply line error]

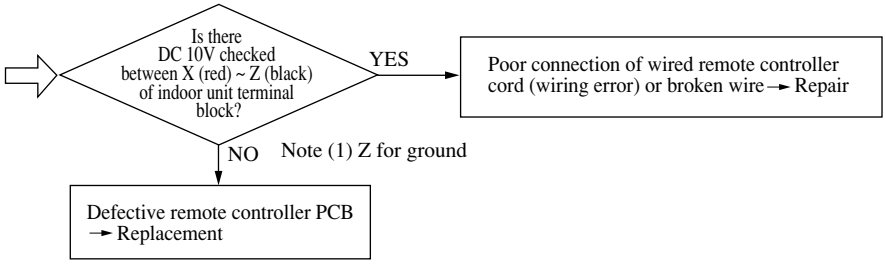
Outdoor unit	
Red LED	Stays OFF
Green LED	Stays OFF

Indoor unit	
Red LED	Stays OFF
Green LED	Stays OFF



Indoor unit	
Red LED	*3 time flash (During unit operation)
Green LED	Keeps flashing

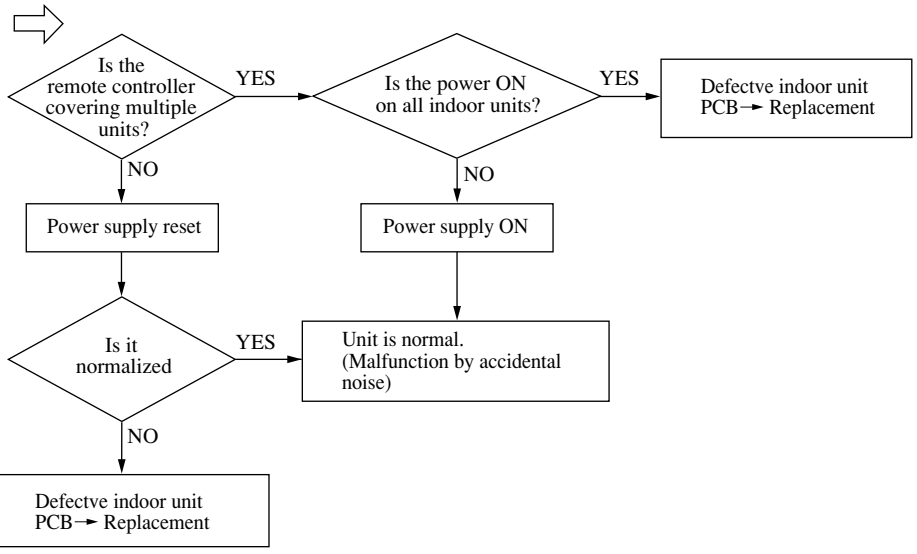
Flash of green LED means CPU is normal.
* If the remote controller wire is broken at the power ON, it does not illuminate.



3 Error display : E1 [Communication error between remote controller~Indoor unit]

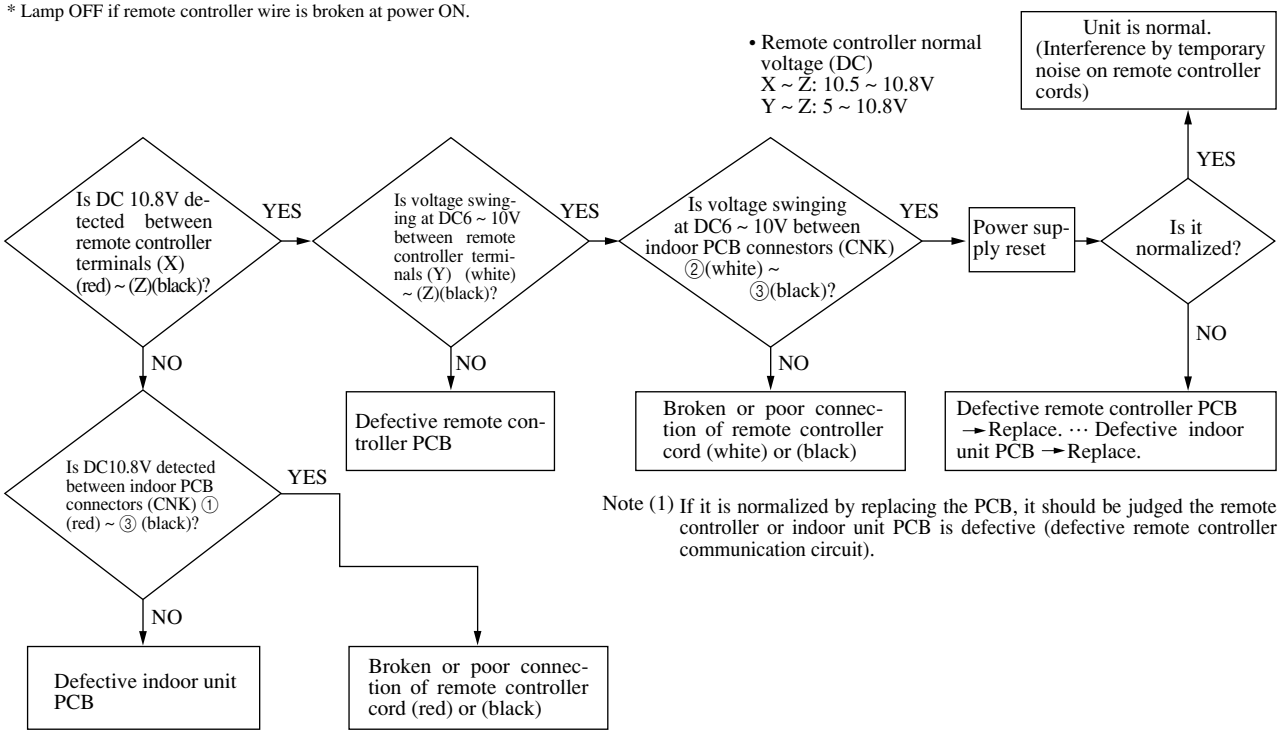
Indoor and outdoor unit	
Red LED	Stays OFF
Green LED	Keeps flashing (1)

Note (1) With the separate power supplies for indoor/outdoor units, the outdoor unit green LED may flash in some cases.



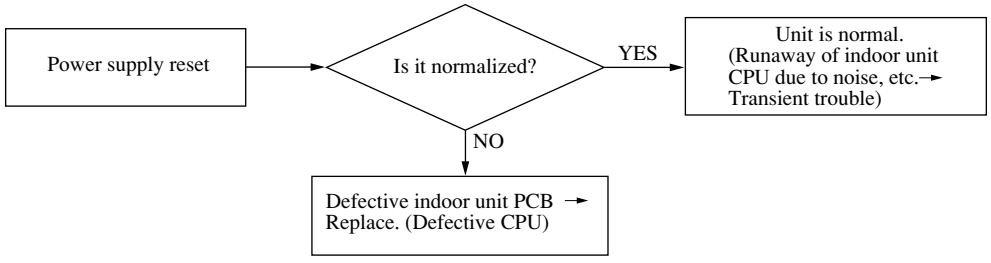
Indoor unit		Outdoor unit	
Red LED	*3 times flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

* Lamp OFF if remote controller wire is broken at power ON.



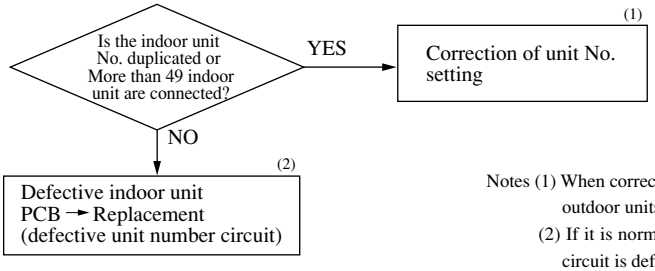
Note (1) If it is normalized by replacing the PCB, it should be judged the remote controller or indoor unit PCB is defective (defective remote controller communication circuit).

Indoor unit		Outdoor unit	
Red LED	Stays OFF or Lights continuously	Red LED	Stays OFF
Green LED	Stays OFF or Lights continuously	Green LED	Keeps flashing



4 Error display : E2 [Duplicated indoor unit No. or More than 49 indoor unit are connected.]

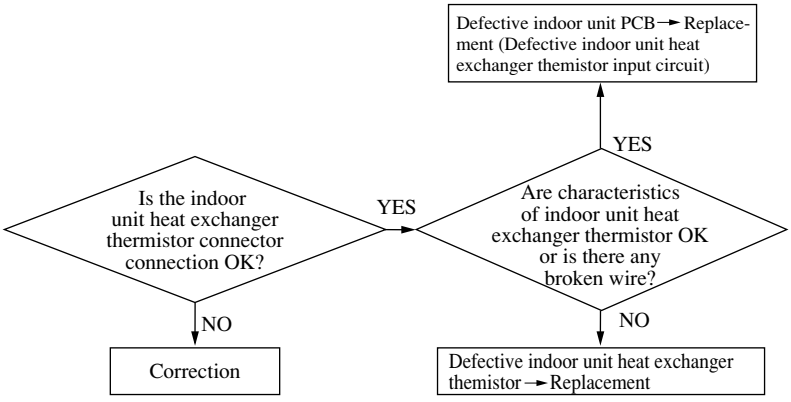
Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



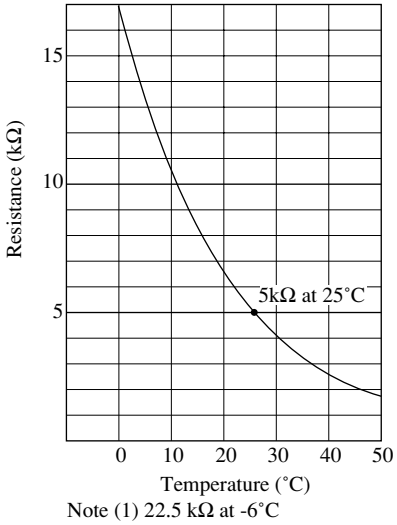
Notes (1) When correcting the unit number, check again the pairing of indoor/outdoor units (same Number assigned to coupled units) is correct.
(2) If it is normalized by changing PCB, judge the unit number input circuit is defective.

5 Error display : E6 [Defective indoor unit heat exchanger thermistor]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



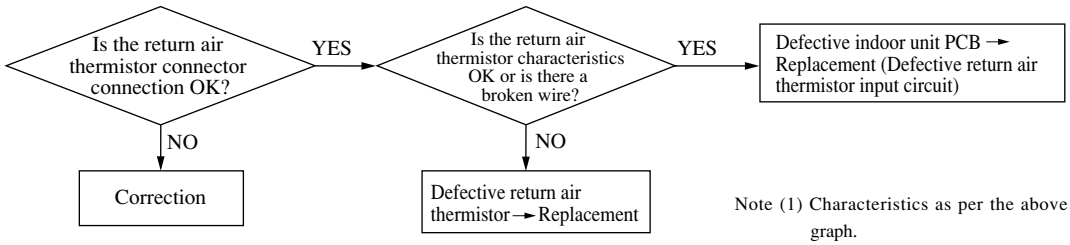
Return air thermistor (Th_{I}-A)
Indoor unit heat exchanger thermistor (Th_{I}-R)
Resistance temperature characteristics



Note (1) 22.5 kΩ at -6°C

6 Error display : E7 [Detective Return air thermistor]

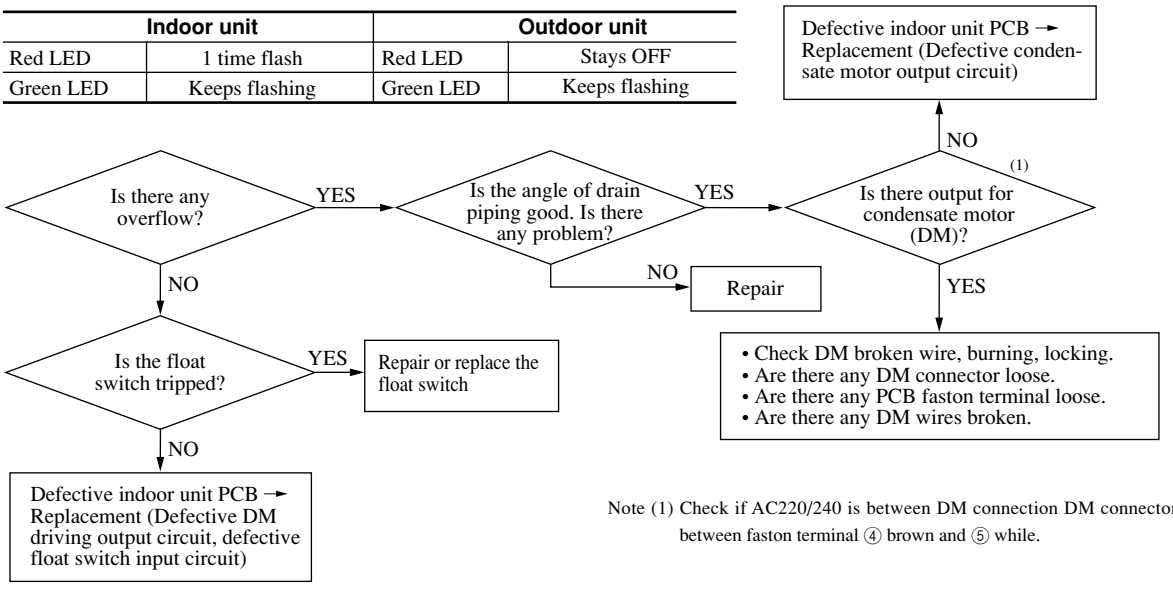
Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



Note (1) Characteristics as per the above graph.

7 Error display : E9 [Drain trouble]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

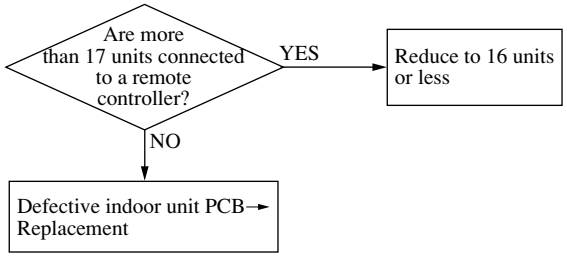


Note (1) Check if AC220/240 is between DM connection DM connectors, between faston terminal ④ brown and ⑤ while.

Remark (1) If an indoor unit is stopped due to the drain error (E9), the outdoor unit fot this stopped unit will come to a normal stop immediately. Other normal indoor units of the same refrigerant system will also come to a normal stop. Even if the swiches of remote controllers for normal indoor units are pressed, these units will come to normal stop automatically within tens of seconds.

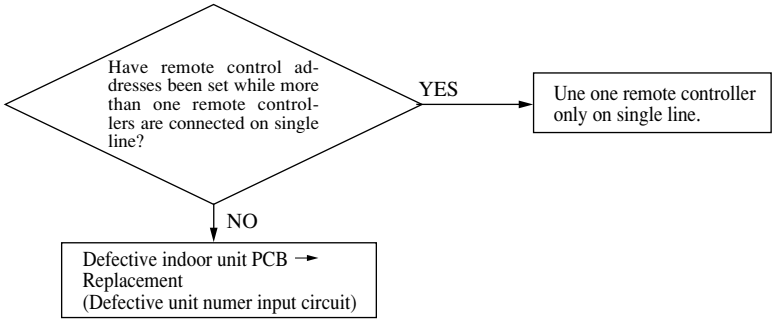
8 Error display : E10 [Control of 1 remote controller VS multiple units— Excessive number of units (more than 17 units)]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



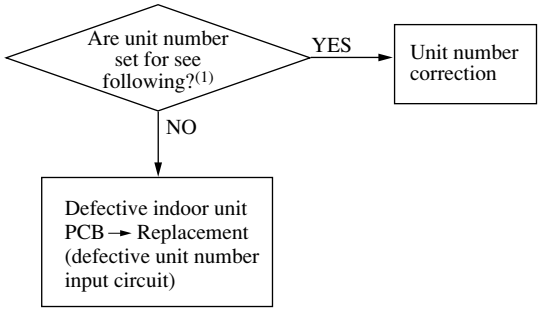
9 Error display : E11 Remote control addresses have been set while more than one units of remote controller are connected.

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



10 Error display : E12 [Address No. combination eroor or addressing is preformed with the following combinations.]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

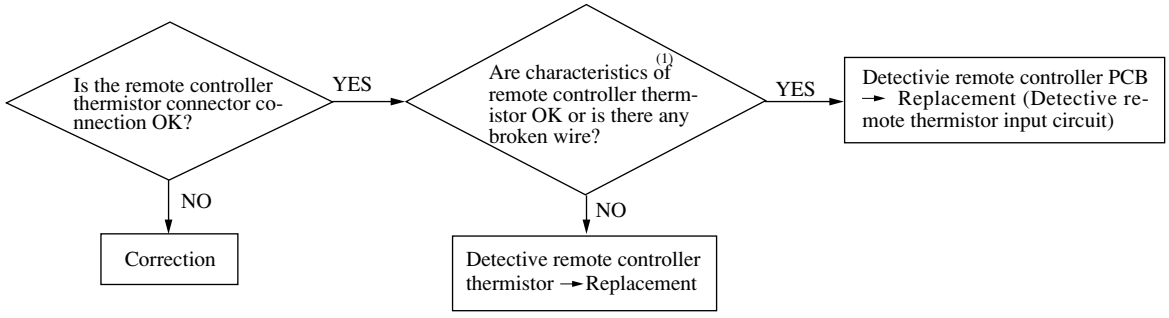


Note (1)

Outdoor unit address No.	Indoor unit address No.
00 ~ 47	48, 49
48, 49	00 ~ 47

11 Error display : E28 [Directive remote controller thermistor.]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



(c) Error diagnosis procedures at the outdoor unit side

At the error diagnosis related to the outdoor unit, check at first the error code of remote controller and the illumination patterns of norma 1 and inspection display lamps in the same manner as the case of indoor unit.

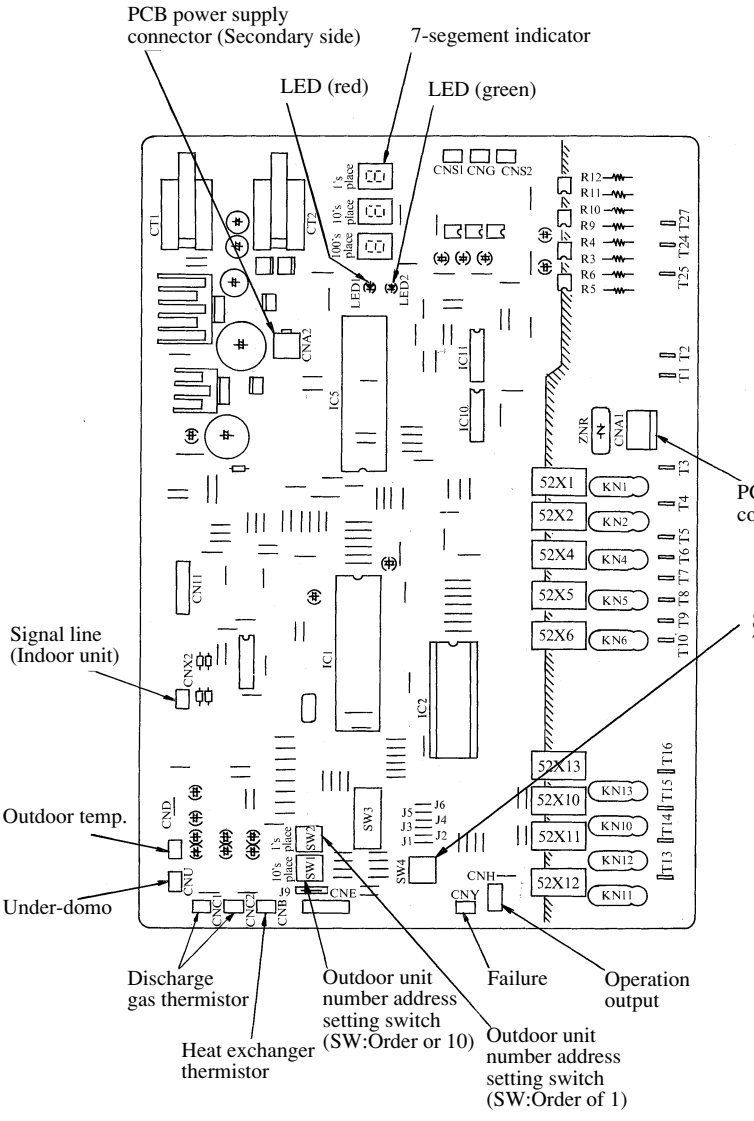
Then estimate the outline, the cause and the location of error based on the pattern and proceed to the inspcetion and repair. Since the self diagnosis function by means of the microcomputers of indoor/outdoor units provide the judgement of error of microcomputers them selves irregularity power supply line, overload, etc. caused by the installation space, inadequate volume of refrigerant etc., the location and cause of trouble will be discovered without difficulty.

In addition, the display lamps error code of indoor/outdoor unit is kept flashing, (except when the power supply is iterrupted) after the irregularity is automatically recovered to give irregularity information to the service presonnel. If any mode of higher priority than the error retained in memory occurs after the reset of error, it is switched to that mode and saved in the memory.

(i) Replacement parts assembly related to the outdoor unit PCB

Outdoor unit PCB, outdoor unit inverter PCB, power transistor module, diode module, capacitor, reactor, noise filter, thermistor, (heat exchanger, discharge pipe, outdoor temperature), fuse, transformer, etc.

(ii) Parts layout on the outdoor unit PCB



• Function of DIP switch

Name		Function
SW3-1	ON	Inspection LED reset
	OFF	Normal
SW3-2	ON	Backup operation - With
	OFF	Backup operation - None
SW3-3	ON	Service
	OFF	Normal
SW3-4	ON	Unmatch check
	OFF	Nromal
SW3-5	ON	Test run operation
	OFF	Normal
SW3-6	ON	Test run operation - Cooling
	OFF	Test run operation - Heating
SW3-7	ON	Forced cooling/heating
	OFF	Normal
SW3-8	ON	Test mode
	OFF	None

Name		Function
J1	With	External input level
	None (1)	External input pulse
J5	With	Defrosting - Normal
	None (1)	Defrosting - Cold weather region
J6	With	Snow protection control - None
	None (1)	Snow protection control - With

Model \ Jumper wire	J2	J3	J4
FDCJ140HKXE2B	None (1)	None (1)	With
FDCJ224HKXE2B	None (1)	With	
FDCJ280HKXE2B	With	With	
FDCP140HKXE2B	None (1)	None (1)	None (1)
FDCP224HKXE2B	None (1)	With	
FDCP280HKXE2B	With	With	

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

- **Replacement procedure of outdoor unit microcomputer printed circuit board.**

Microcomputer printed circuit board can replaced with following procedure.

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

Parts No.	Model
PCB505A026BN	All models

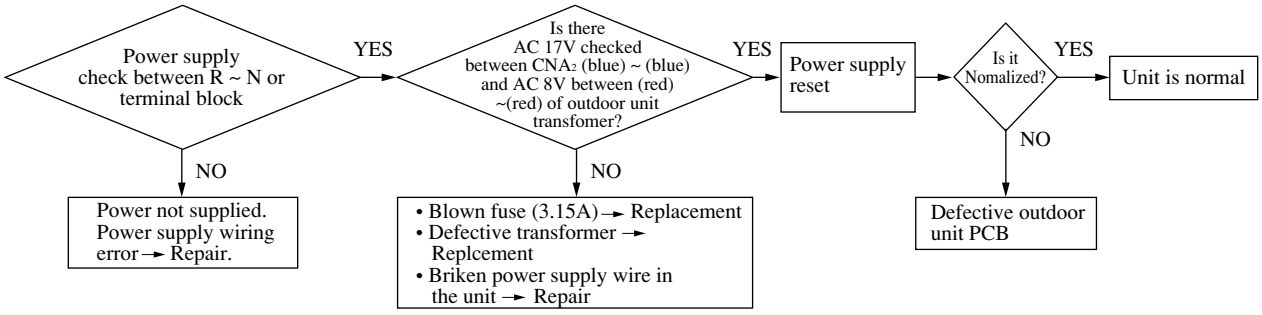
(iv) Check procedure depending on indication lamps (For the outdoor unit)

1 **Error display : E3** **[Error on the outdoor unit signal line]**

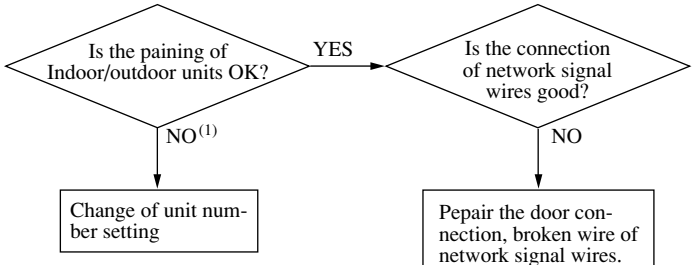
(Detected during operation only)

Indoor unit	
Red LED	2 time flash
Green LED	Keeps flashing

Outdoor unit	
Red LED	Stays OFF
Green LED	Stays OFF



Outdoor unit	
Red LED	Stays OFF
Green LED	Keeps flashing

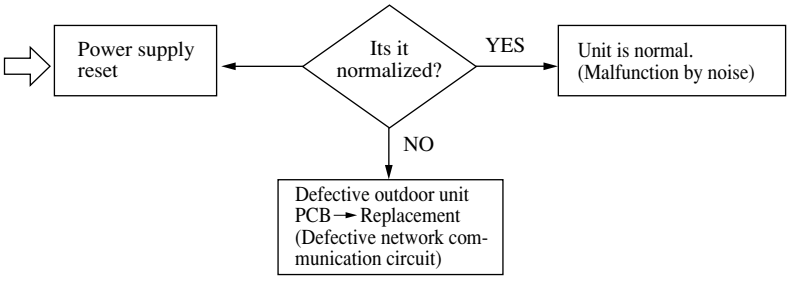


Note (1) No outdoor unit corresponding to the indoor unit.

Error display : E3 **[Error on the outdoor unit signal line]**

(Detection at the power on)

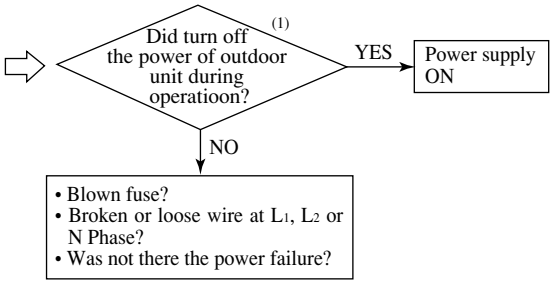
Outdoor unit	
Red LED	Stays OFF
Green LED	Keeps flashing



2 Error display : E5 [Outdoor unit signal line error, power supply error]

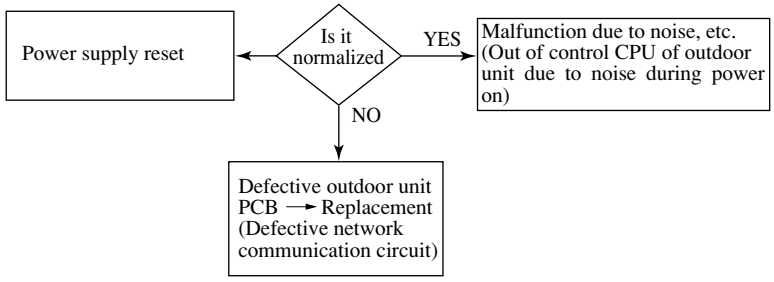
Indoor unit	
Red LED	2 time flash
Green LED	Keeps flashing

Outdoor unit	
Red LED	Stays OFF
Green LED	Stays OFF

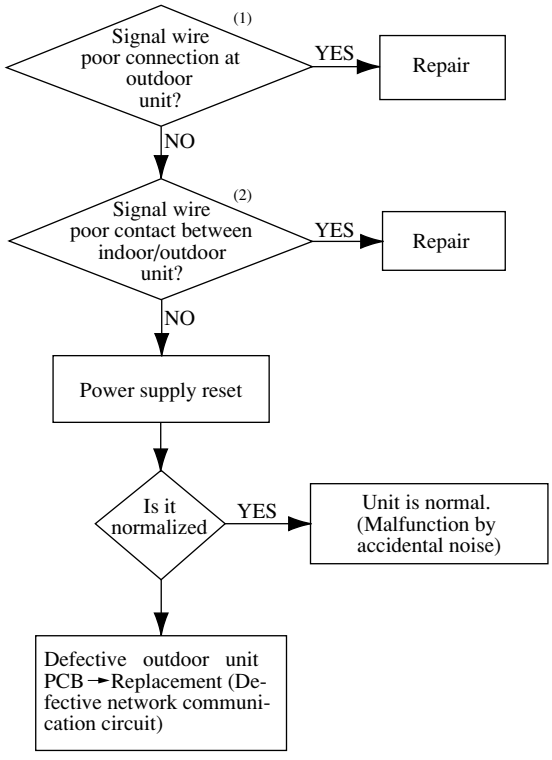


Note (1) This case is limited to the separate power supplies to indoor/outdoor units. (Combination of (indoor unit) red LED 2 time flash and (outdoor unit) green LED stays off means that the power supply to the outdoor unit has been interrupted during operation.)

Outdoor unit	
Red LED	Stays OFF or Keeps flashing
Green LED	Stays OFF or Lights continuously



Outdoor unit	
Red LED	Stays OFF
Green LED	Keeps flashing

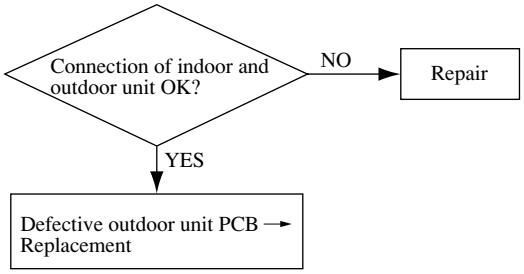


Notes (1) Check for poor connection (looseness, misconnection) at outdoor unit terminal block and droken signal wires between outdoor units.

(2) Check the poor connection or broken signal wires between indoor/outdoor units.

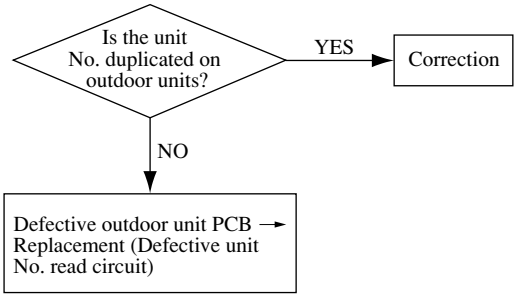
3 Error display : E30 [Connection error indoor and outdoor unit]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



4 Error display : E31 [Duplicated unit No. of outdoor units]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

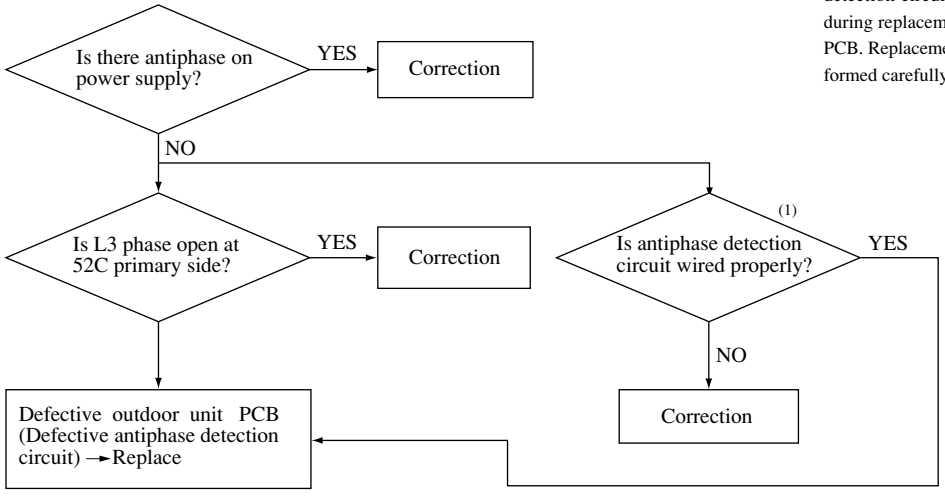


Note (1) When the PCB is defective, the flash patterns of outdoor unit red LED, green LED may become irregular.

5 Error display : E32 [Antiphase on power supply or open 52C L3 phase (primary side) on power supply]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

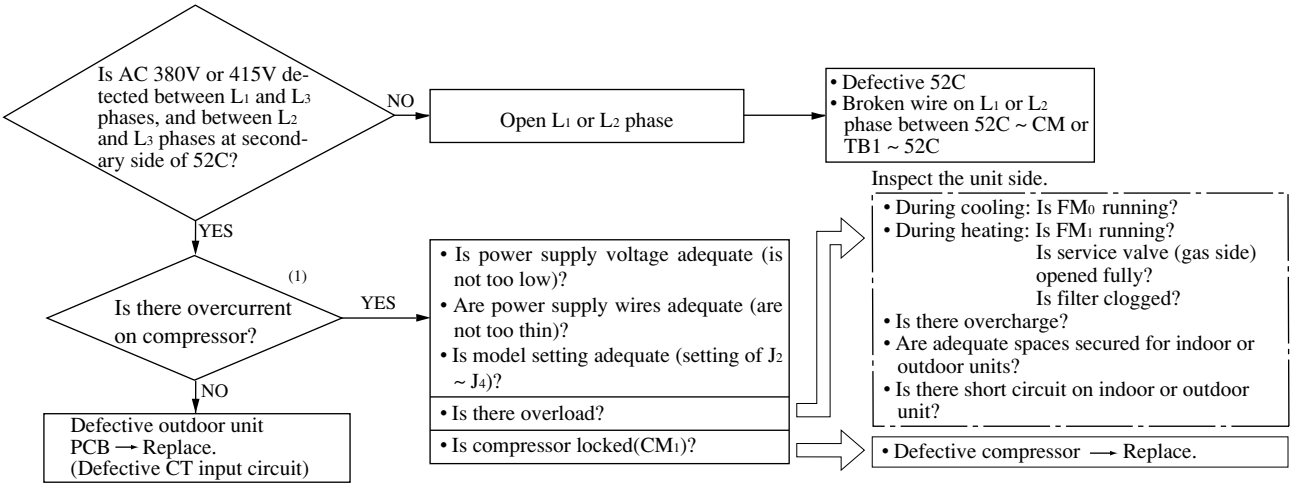
Note (1) Wrong wire connection of the antiphase detection circuit is suspected occured during replacement of the outdoor unit PCB. Replacement work should be performed carefully.



6 Error display : E33 [Or overcurrent error (CM_2), motor lock (CM_1)]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash (1)
Green LED	Keeps flashing	Green LED	Keeps flashing

Note (1) Single flashing of outdoor unit LED indicates CM1 and double flashing indicates CM_2.

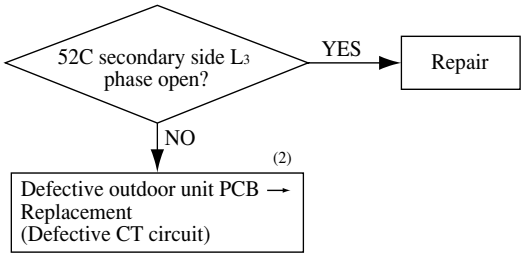


Note (1) Measure the current value for confimation.
Confirm that there is no mistake in the setting of J2~ J4 on the outdoor unit PCB.

7 Error display : E34 [Open phase at L_3 phase of 52C1, 52C2 secondary side (CM_1, CM_2)]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash (1)
Green LED	Keeps flashing	Green LED	Keeps flashing

Note (1) Single flashing of outdoor unit LED indicates CM1 and double flashing indicates CM_2.

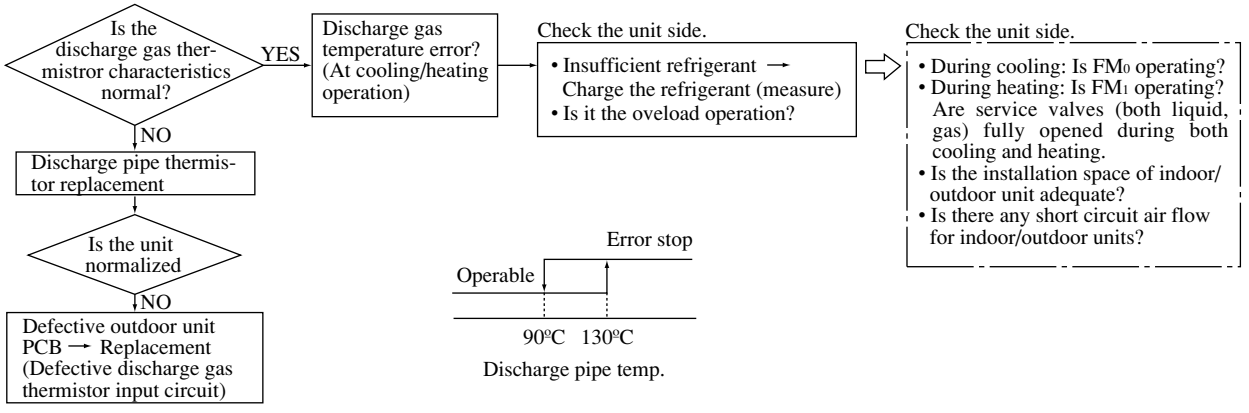


Notes (1) When voltage is detected at 52C primary side but not at the secondary side, check also 52C (broken coil, poor contact).
(2) When voltage is detected at 52C primary side L_3 phase and there is no error at 52C, the outdoor unit PCB (defective $52X_{01}$ circuit or $52X_{01}$) or indoor unit PCB (defective thermostat circuit) is defective.

8 Error display : E36 [Discharge temperature error]

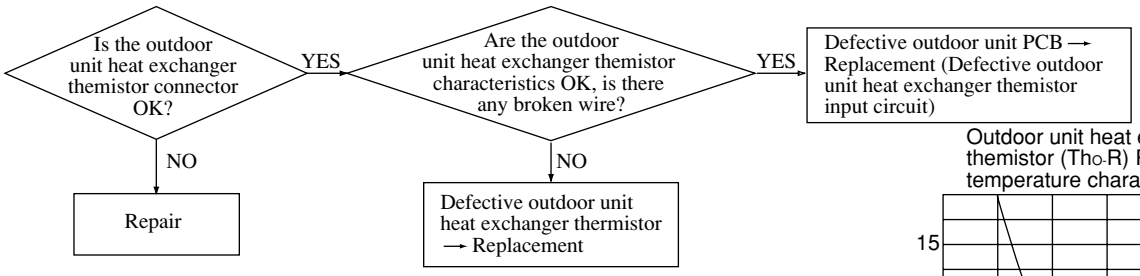
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash (1)
Green LED	Keeps flashing	Green LED	Keeps flashing

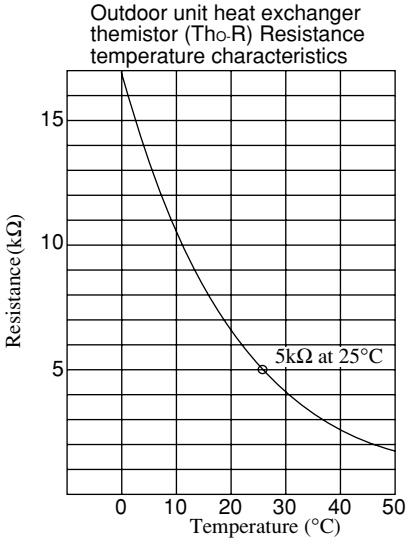
Note (1) Single flashing of outdoor unit LED indicates Th_0-1 and double flashing indicates Th_0-2.



9 Error display : E37 [Defective outdoor unit heat exchanger thermistor]

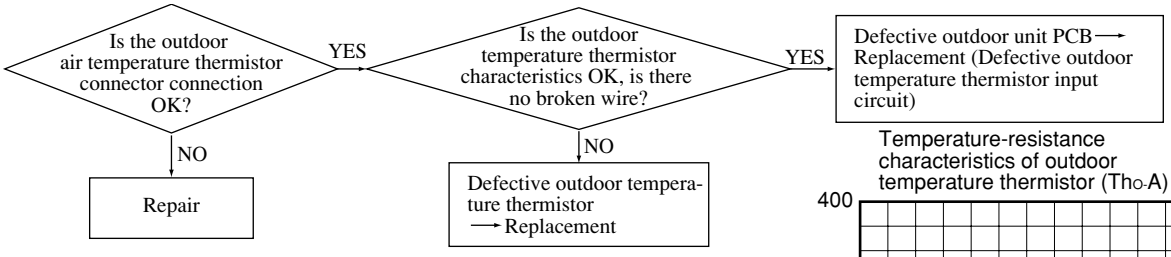
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

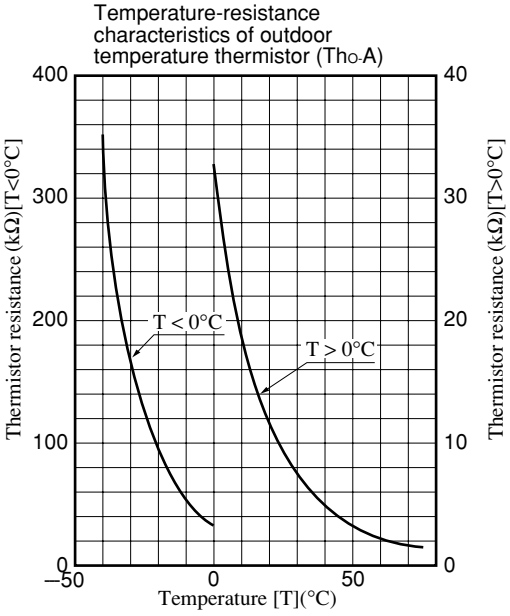




10 Error display : E38 [Defective outdoor temperature thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

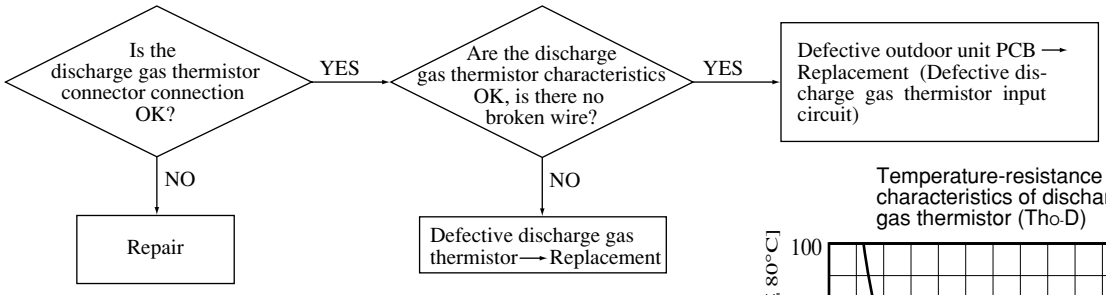


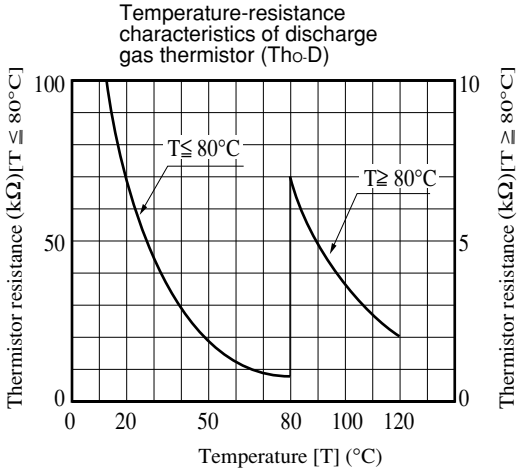


11 Error display : E39 [Defective discharge gas thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash (1)
Green LED	Keeps flashing	Green LED	Keeps flashing

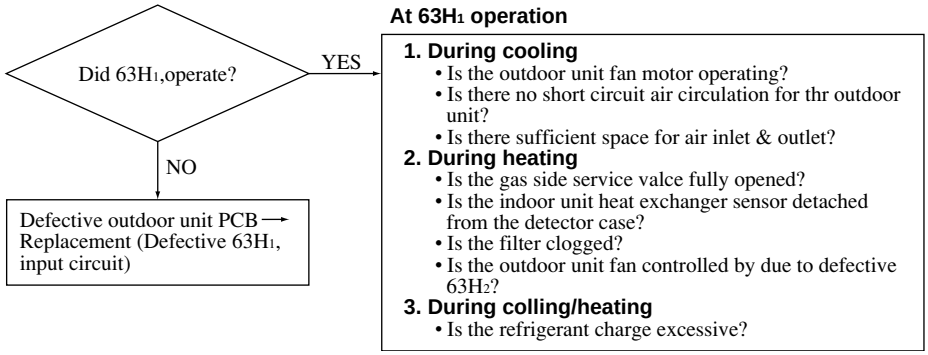
Note (1) Single flashing of outdoor unit LED indicates Th_0-1 and double flashing indicates Th_0-2.





12 Error display : E40 [63H, motion]

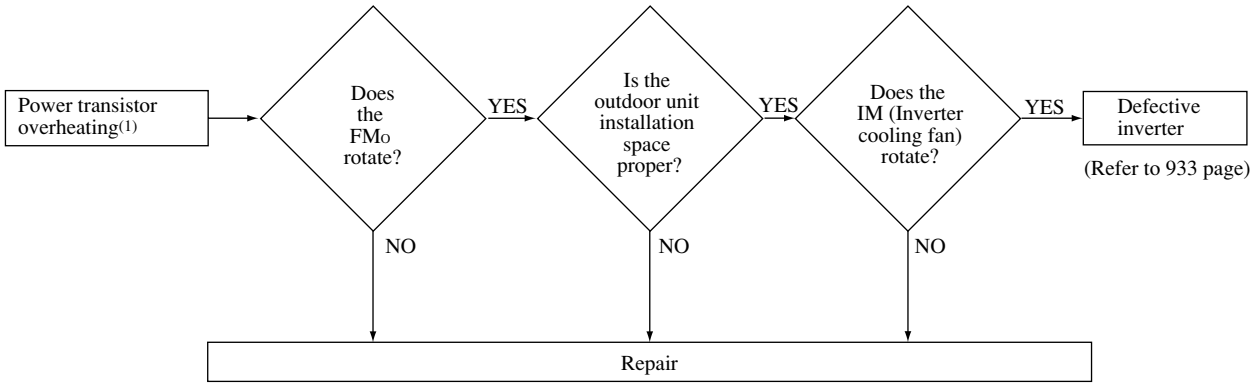
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



Note (1) When the wire of $63H_1$ is broken from the moment of power on, the error E40 is displayed 40 minutes later.
If the operation is started in this period of time, the operation changes to the thermostat OFF state during cooling, and cool wind blow stops during heating operation.

13 Error display : E41 [Power transistor overheating]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

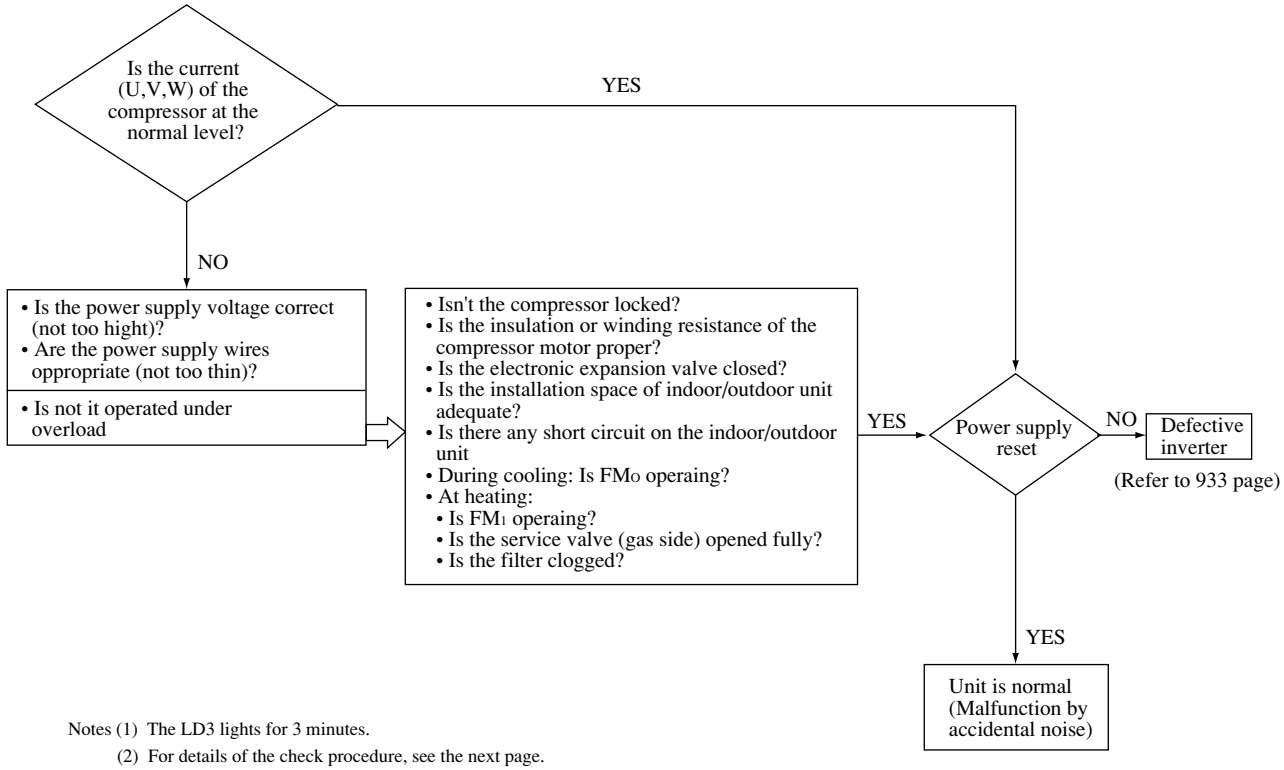


Note (1) The LD2 on the inverter control PCB lights for 3 minutes. Fin thermostat set value : 118°C open

14 Error display : E42 [Current cut (CM_1)]

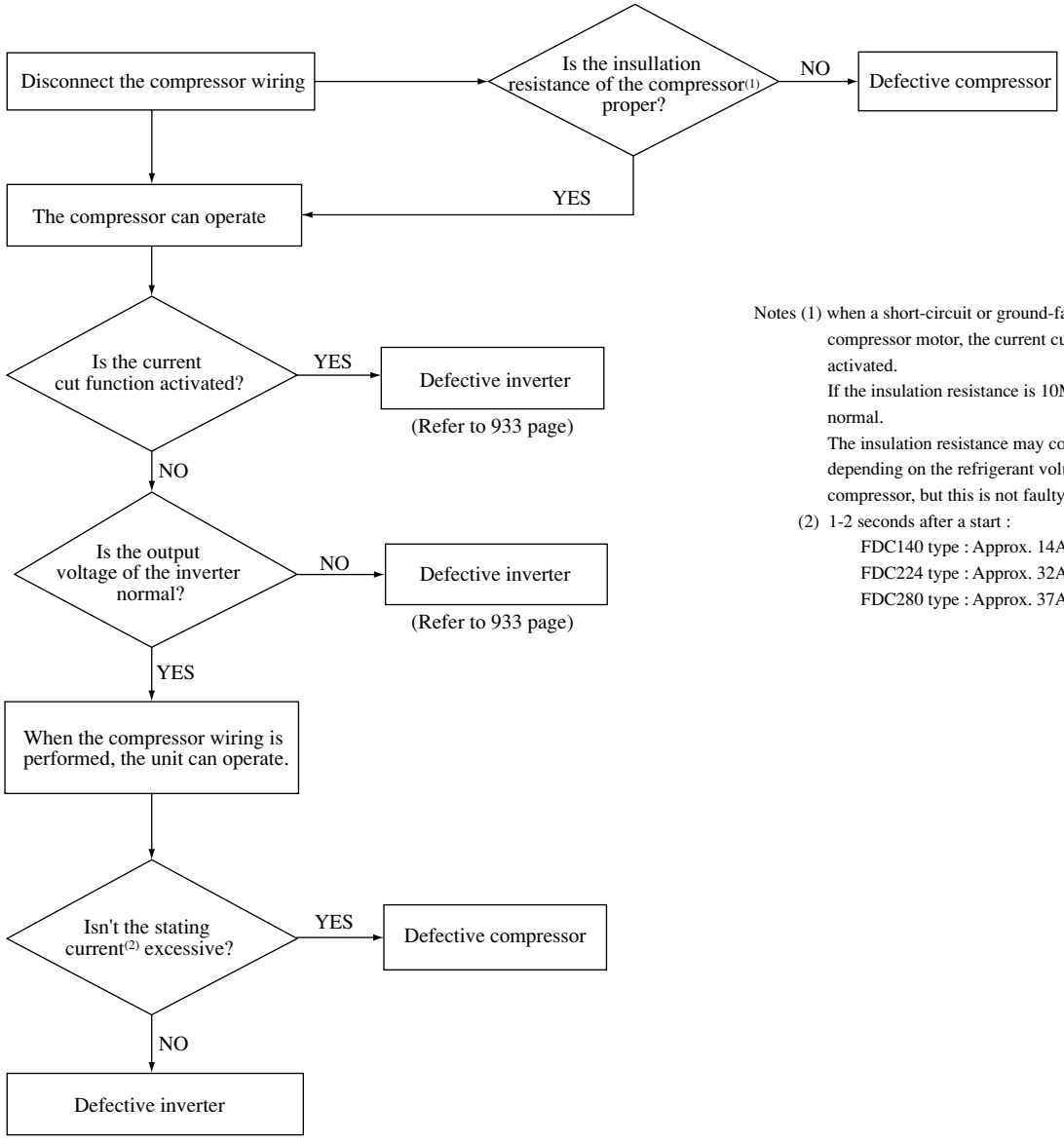
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

Remarks : When current-cut occurs immediately after start (the Hz value does not increase), check the LD3 on the inverter PCB if an error code is not indicated on the remote controller and the compressor does not operate. When this LD3 is ON, see the next page.



Notes (1) The LD3 lights for 3 minutes.
(2) For details of the check procedure, see the next page.

Current cut is indicated and the compressor cannot operate



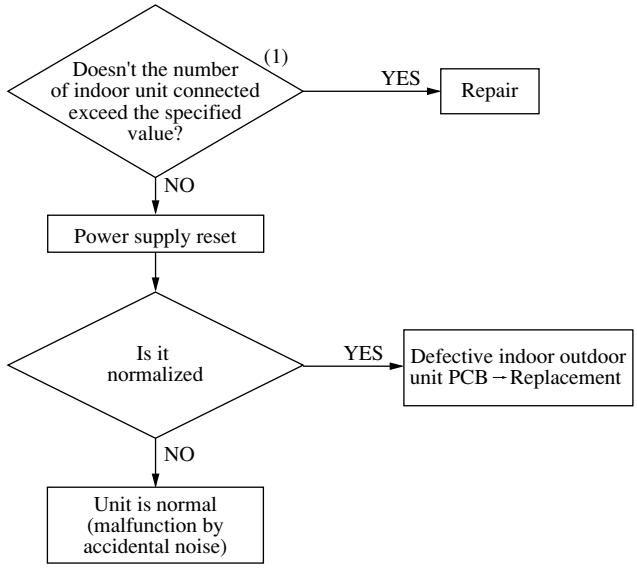
Notes (1) when a short-circuit or ground-fault occurs in the compressor motor, the current cut function is also activated.
If the insulation resistance is 10MΩ or more, it is normal.
The insulation resistance may considerably drop depending on the refrigerant volume in the compressor, but this is not faulty.
(2) 1-2 seconds after a start :
FDC140 type : Approx. 14A
FDC224 type : Approx. 32A
FDC280 type : Approx. 37A

Inverter output voltage — Unit : V (AC)

Model \ Frequency	35Hz	40Hz	65Hz	75Hz	95Hz
All models (outdoor unit)	160 ~ 180	180 ~ 210	290 ~ 320	330 ~ 360	380 ~ 410

15 Error display : E43 [Excessive number of indoor units connected]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

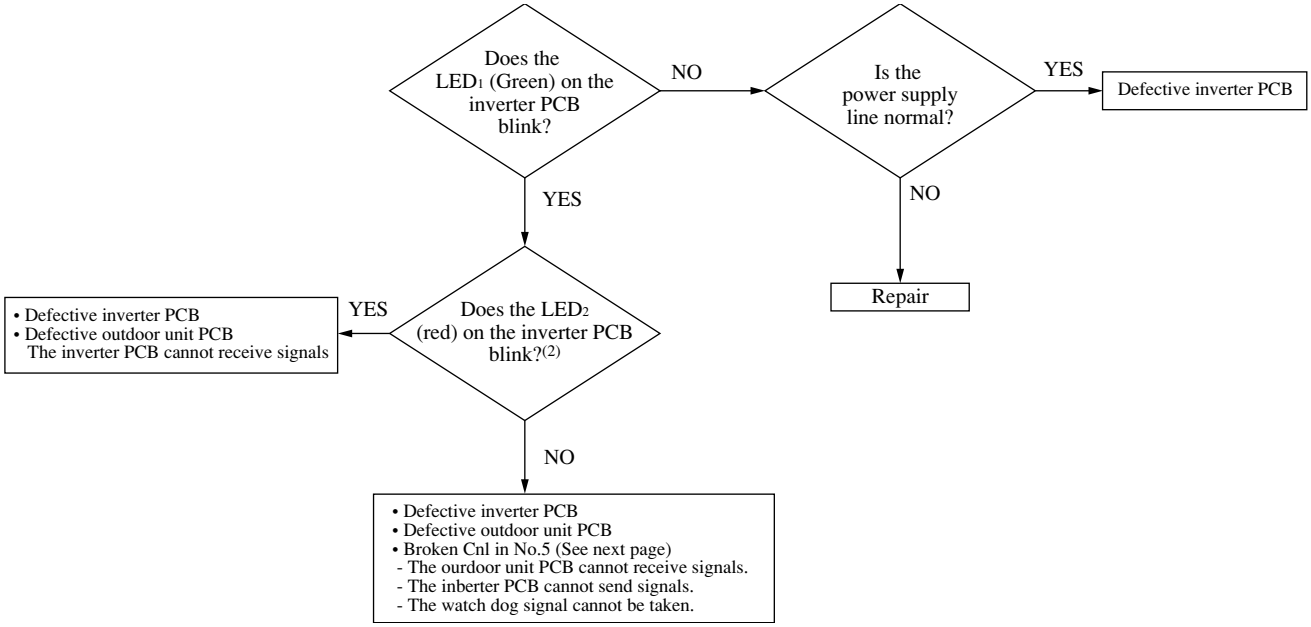


Notes (1) The maximum number of connectable units of each model is as follows : FDC140 type : 10, FDC224, 280 type 16.
(2) Outdoor No. setting check for indoor units (to see if outdoor No. is of other system)
(3) In case of auto addressing erase the addresses stored in memory and perform re-setting

16 Error display : E45 [Transmission error between inverter and Outdoor unit PCB]

Check that the 52C is ON. With the 52C ON, power is supplied to the inverter PCB.

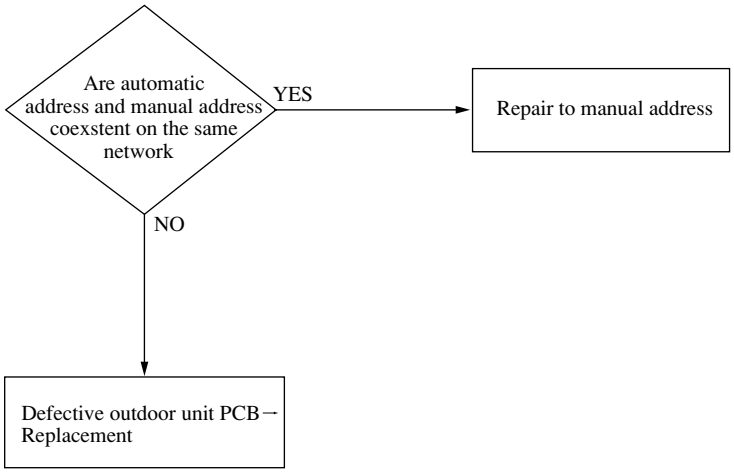
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



Notes (1) Make a check referring to Troubleshooting for Inverter (page 933.)
(2) When receiving fails, the LED2 comes on at once. If the outdoor unit cannot receive signals for 10 seconds, the 52C is turned OFF. Accordingly, the ON state can be checked only in this period of 10 seconds.

17 **Error display : E46** **Automatic address setting and manual address setting coexstents in the same network**

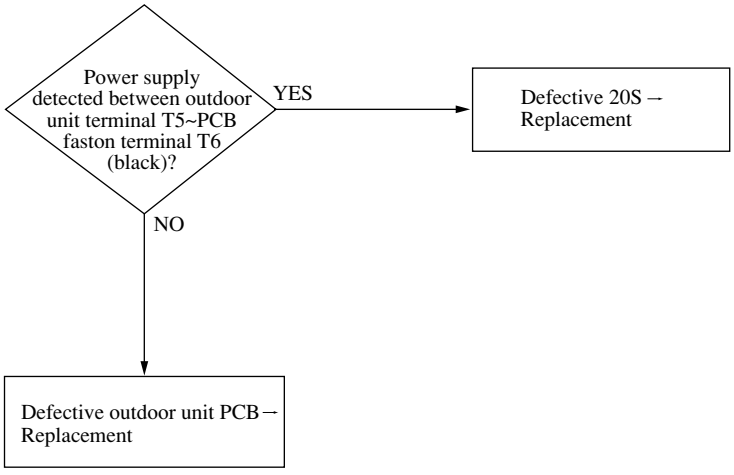
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



(d) How to advance checks for each faulty symptom

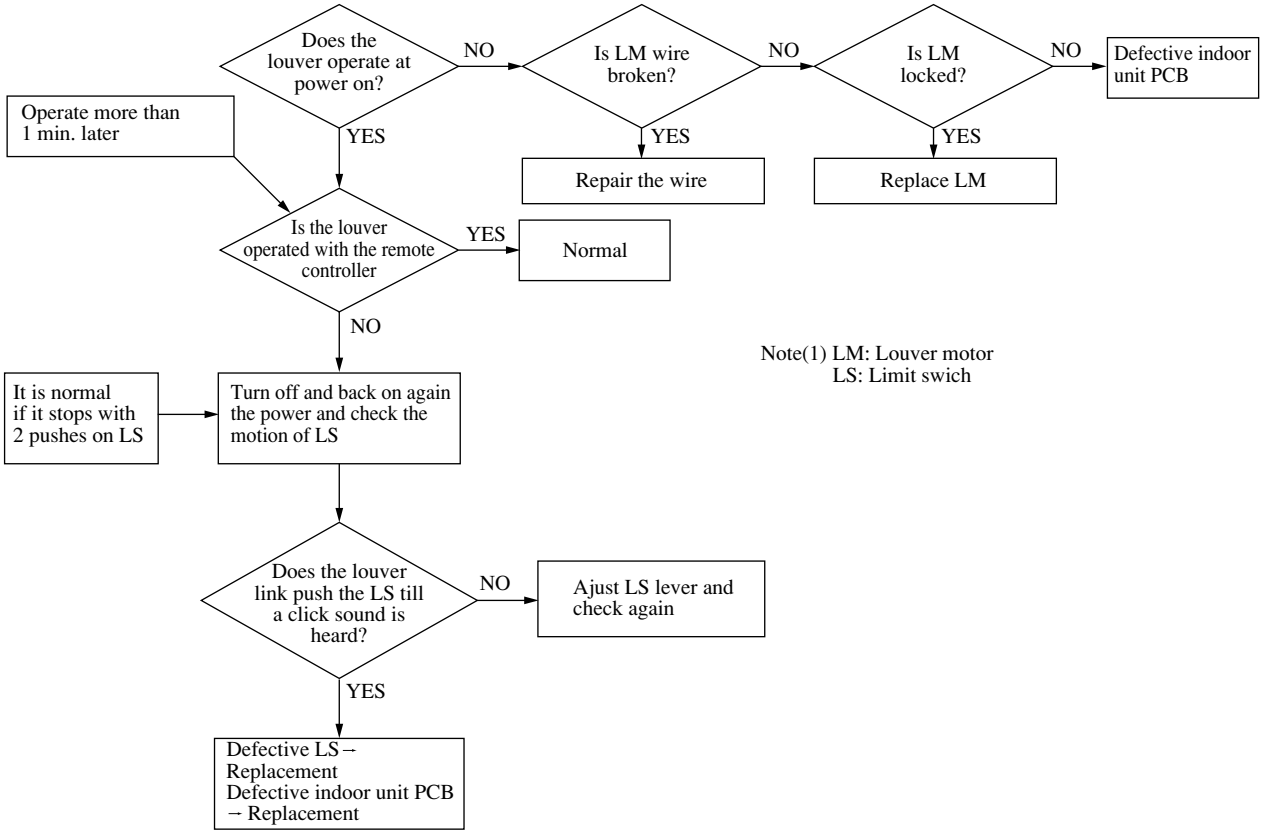
(i) Inspection method when there is no error display

1) Four way valve does not switch during heating operation



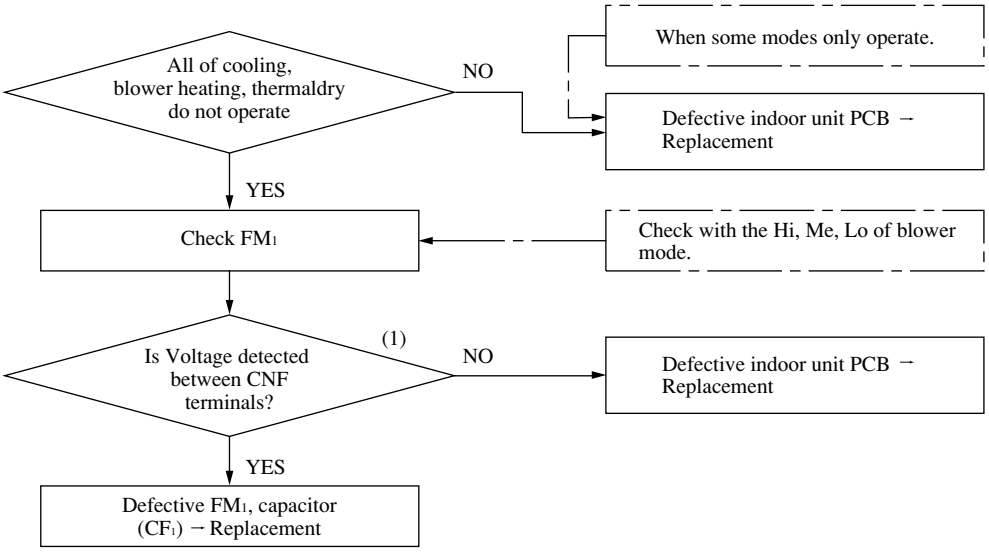
2) Louver motor does not operate

▶ **Inspect at the indoor unit side.**



3) When the indoor unit blower does not operate

▶ **Inspect at the indoor unit side.**

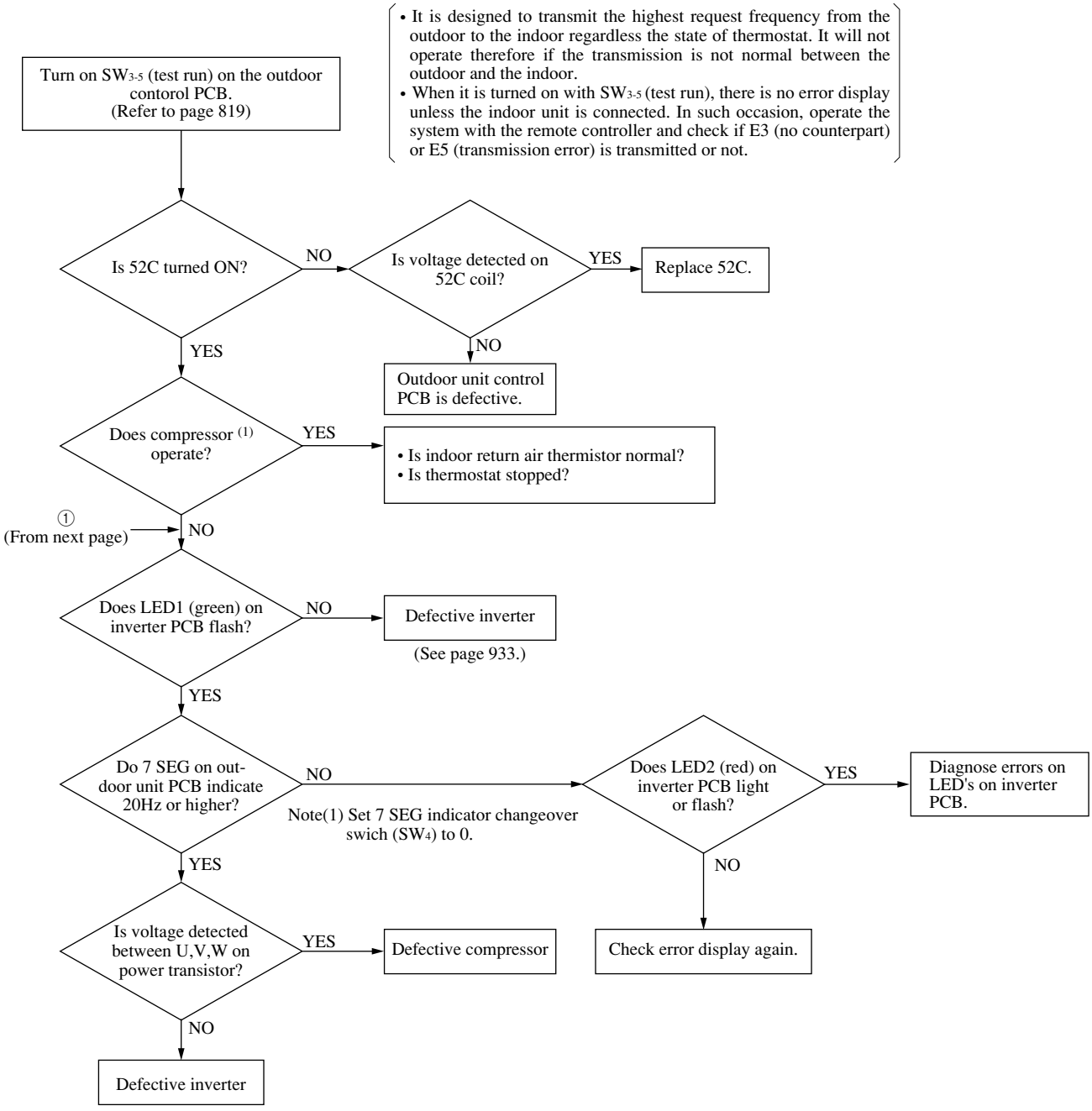


(ii) When the compressor does not operate although the remote controller display is normal (Without the check display)

Take following steps first before confirming the following items:

- Confirm that it is normal at the indoor unit side, LED1 (green) keeps flashing on the outdoor unit control PCB and LED2 (red) is not lit.
- When LED1 (red) is flashing while the remote controller display is normal, LED2 (red) can be turned off if SW_{3-1} is turned ON and turned OFF again.

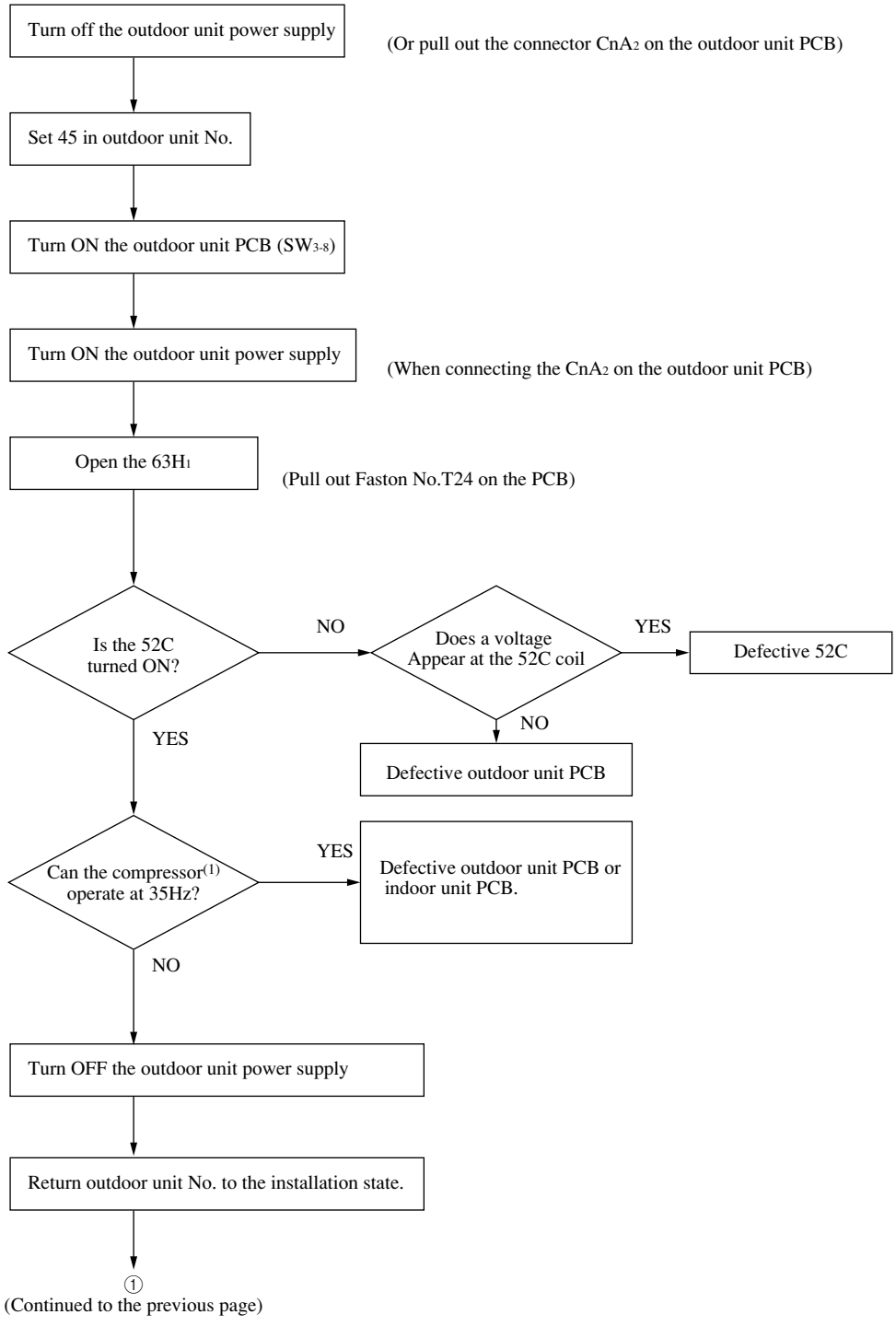
Note (1) Be sure to turn the SW_{3-5} off after the confirmation.



Notes (1) Expansion valve of the indoor unit may be closed or the indoor fan may be stopped. Stop the compressor no sooner than it has started. Neglecting this caution could result in compressor trouble.

(2) Method to check with the outdoor unit only is described on the next page.

2) Procedure for checking the outdoor unit irrespective of indoor/outdoor transmission

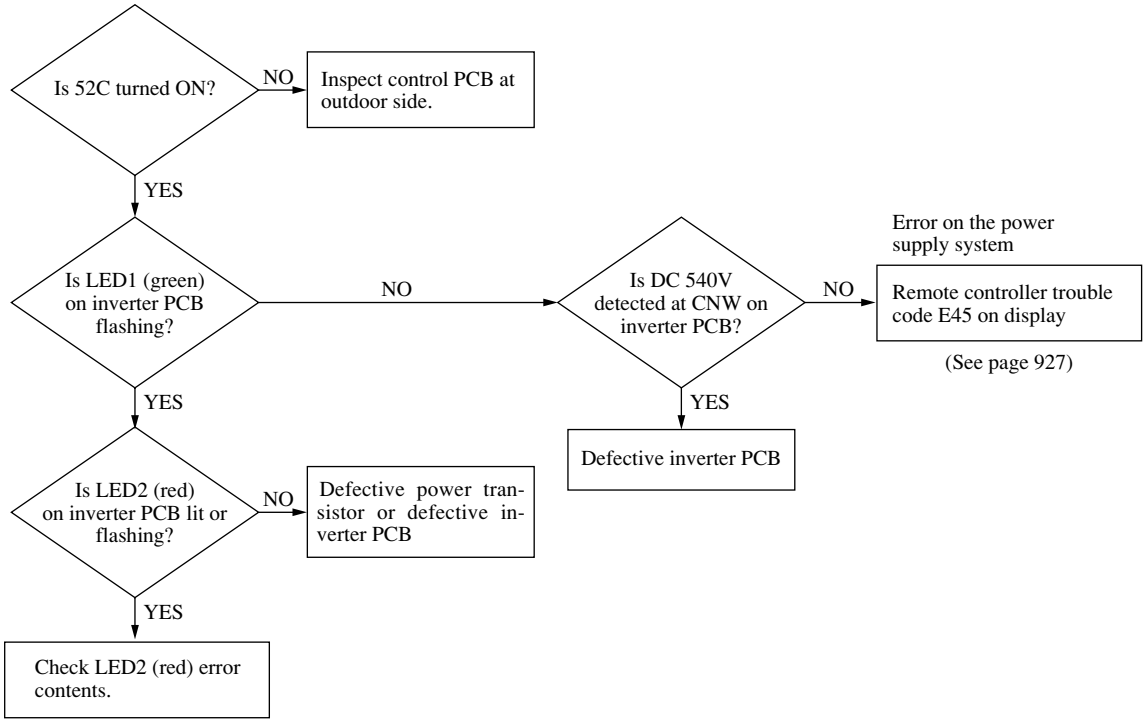


Note (1) When using this procedure, the indoor unit enters a transmission error state. In the indoor unit the expansion valve may be closed or the fan may stop.

After the compressor is operated, stop it at once.

Otherwise, it will cause a failure to the compressor.

3) Inverter inspection procedures (There is no output on the compressor (U,V,W).)



(iii) When the cooling (heating) effect is felt insufficient. (Check also the refrigeration cycle for the refrigerant quantity, etc. in addition to the following.)

1) When the cooling effect is insufficient.

- Check if the protective function has tripped and, as a result, the compressor operation frequency has dropped below the specified frequency
- Does the indoor expansion valve operate properly? Is it clogged?
- Is the frosting prevention function operated?

Check method of the indoor unit electronic expansion valve

Check the indoor controller output to the expansion valve with the following procedures.

▶ Check how much volt is detected at the expansion valve (SM) connector and at the pin at control side of the connector CnA (white, 6P (5 cores)), and measure also how many seconds the voltages are applied.

Orange~Gray
Red~Gray
Yellow~Gray
Black~Gray

Approx. DC 5V(2) is detected for approx. 15 seconds(1) at the power on.

▶ The indoor controller is normal if the seconds and voltages as indicated at left are confirmed.
When the expansion valve does not operate while the voltages are detected (operating sound is not heard), the expansion valve is defective.

▶ If the thermostat setting is changed, the expansion valve will operate approx. 20 seconds later. Then, approx. 5V will be confirmed at the CnA same as above.

Notes (1) 5V is maintained for 8 seconds after the power on, then it drops momentarily and recovers 5V for approx. 7 seconds.

(2) When measured with a digital multi-tester, voltages of approx. 6~3V are output one after another.

2) When the heating effect is insufficient

• Check if the protective function (1) has operated and, as a result, the compressor operation frequency has dropped below the specified frequency.

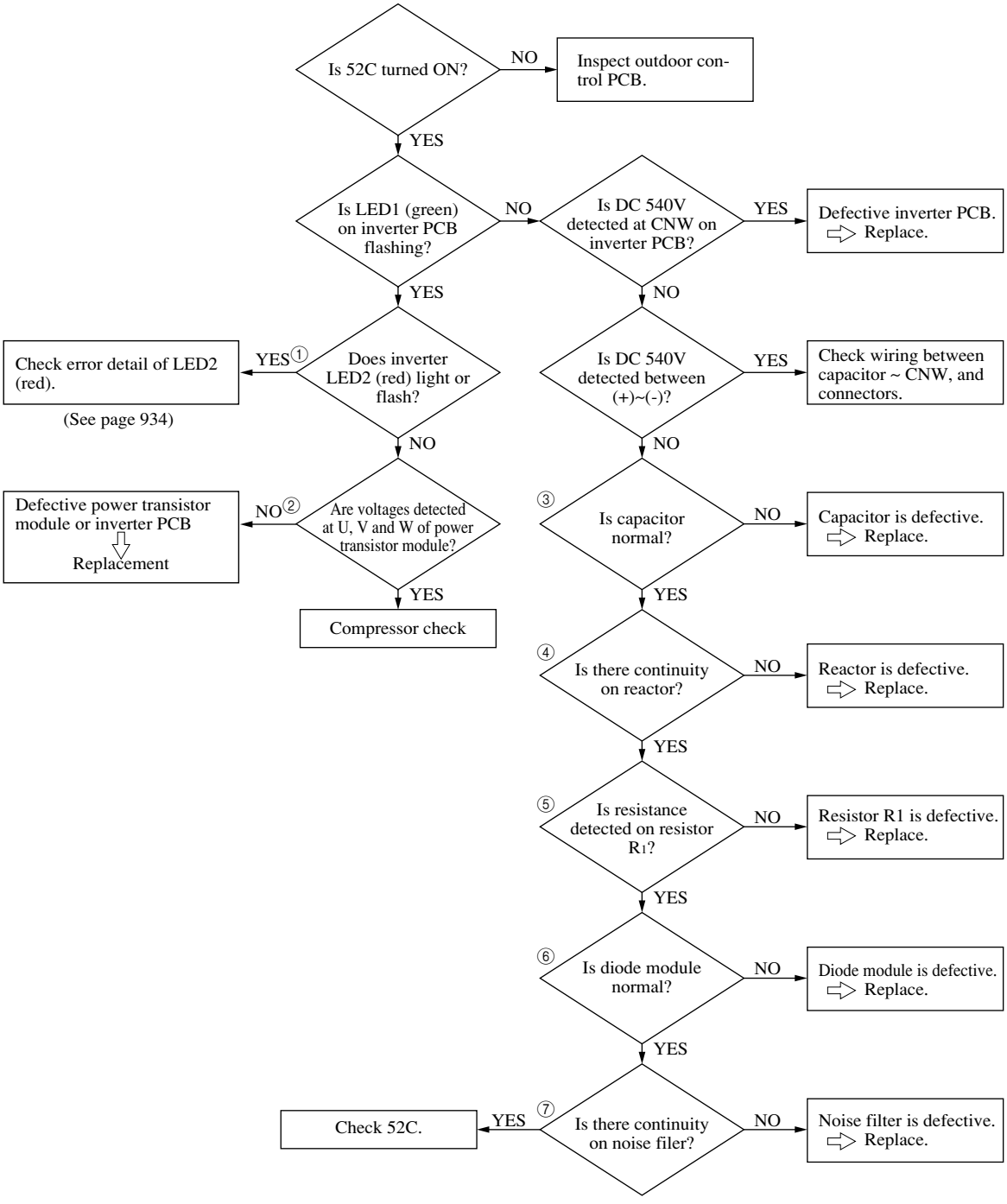
Note (1) The frequency drops when the high pressure control (Operated at 63H2:2.50 open/2.06 close, Mpa (25.5 open/21close kgf/cm^2)[FDCP:2.79open/2.26 clope, MPa(28.5open/23 cloes kgf/cm^2)], current safe control or discharge temperature control is operated.

• Does the indoor expansion valve operate normally? Is the valve clogged?

(3) Trouble diagnosis at the inverter side

When any defect is found at the inverter side as a result of the trouble diagnosis of (2), (c), inspect with the following procedures.

(a) Diagnosis procedures (Regarding the ditails of ①~⑦, refer to the inspection points of indoor unit on the next page.)



* Check points of outdoor unit
  - ▷ Check with power ON at the points marked with *.
  - ▷ Turn power OFF before starting inspection. Also remove each part before starting inspection.
  - ▷ Inspection of power cables: There must be continuity on the cables. Cables must be connected properly.

⑦ Noise filter check: There must be a continuity.

Fuse check: There must be continuity.

* Check of power supply
  - Check the power supply on L1, L2 and L3 of terminal block TB. (It is normal if AC 380V is detected.)

⑥ Diode module check

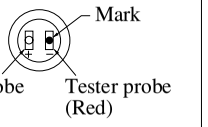
Tester probe		
+	-	If good
~	5	Continuity
6	~	

If tester probes are inverted, the connection becomes open.

⑤ Resistor R1 check: Measure the resistance value.

FDC140	30Ω
FDC224	30Ω
FDC280	30Ω

Capacitor check
Check for abnormality in appearance such as damage, swell, etc.
Check the charging characteristics with a tester.
(It is normal if the needle swings followed by a gradual return and, when tested again after changing the polarity, the needle returns again.)

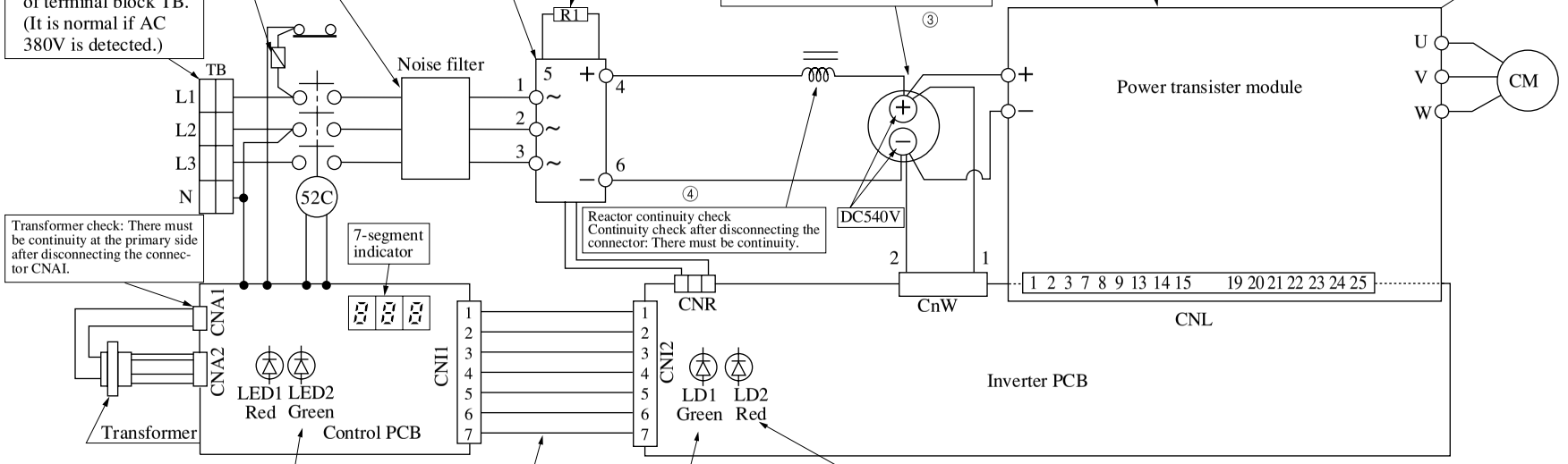


② * Power transistor output check
Measure the output voltage after disconnecting the fasten terminal from the compressor.
(Values of output voltage indicate those obtained when no load is applied to the inverter.)
Unit: V(AC)

Type \ Frequency	35Hz	40Hz	65Hz	75Hz	95Hz
All types (outdoor)	160~180	180~210	290~320	330~360	380~410

Notes (1) Confirm that all voltages measured between U-K, V-W and W-U are same.
(2) Values listed above are those obtained using a digital tester after disconnecting the terminals on the compressor. The values vary depending on the kinds of measuring instrument.

Are there any abnormality such as crack, burn, etc. in appearance?



* Normal LED2 check: If it flashes, the microcomputer operates normally.

* LED1 (Green)
It is normal if it flashes at each 0.5-second.

LED2 (red) check
1 time flash : Power transistor overheat
- Stop operation and wait till temperature drops.

2 time flashes : Current cut (power transistor over-current)
- Short-circuited compressor wiring
- Trouble on inverter PCB
- Trouble on power transistor

Keeps flashing: Transmission error between inverter and outdoor unit
- Connector CN11 or CN12 is disconnected or broken wire between connectors.
- Error on outdoor control PCB
- Error on inverter PCB

• Communication checked at the CN11 will show the following values.

Connector		Detail of communication	V (Analog tester)
CN11	1	Common	0V
	2	12V power supply	12V
	3	Transmission to inverter	Swings between 11 ~ 11.5V
	4	Receiving from inverter	Swings between 4.5 ~ 5V
	5	Watchdog (Communication from invert PCB to outdoor PCB)	Swings between 2 ~ 4V
	6	Inverter overheat	It is normal if 5V or abnormal if 0V
	7	Current cut	It is normal 5V or abnormal if OV