

TECHNICAL MANUAL

Collection data

PACKAGED AIR-CONDITIONER

(Split system, Air to air heat pump type)

CEILING RECESSED TYPE

FDTVA302HEN1R

CEILING SUSPENDED TYPE

FDENVA302HEN1R

SATELLITE DUCTED TYPE

FDUMVA302HEN2R

MULTI-TYPE (V-MULTI)

PACKAGED AIR-CONDITIONER

(OUTDOOR UNIT)

FDCVA302HENR

(INDOOR UNIT)

FDTCA151R

FDTA151R

FDENA151R

FDKNA151R

TABLE OF CONTENTS

1. PACKAGED AIR-CONDITIONER.....	2
2. MULTI-TYPE (V MULTI) PACKAGED AIR-CONDITIONER	122
3. WIRELESS KIT (OPTIONAL PARTS)	190

1. PACKAGED AIR-CONDITIONER

CONTENTS

1.1 GENERAL INFORMATION.....	4
1.1.1 Specific features	4
1.1.2 How to read the model name	4
1.2 SELECTION DATA	5
1.2.1 Specifications	5
(1) Ceiling recessed type (FDT)	5
(2) Ceiling suspended type (FDEN)	6
(3) Satellite ducted type (FDUM).....	7
1.2.2 Range of usage & limitations	8
1.2.3 Exterior dimensions	9
(1) Indoor unit	9
(2) Remote controller (Optional parts)	12
(3) Outdoor unit	14
1.2.4 Inside view	15
1.2.5 Exterior appearance	16
1.2.6 Piping system	17
1.2.7 Selection chart	18
1.2.8 Characteristics of fan	23
1.2.9 Noise level	23
(1) Indoor unit	23
(2) Outdoor unit	24
1.3 ELECTRICAL DATA	25
1.3.1 Electrical wiring	25
(1) Indoor unit	25
(2) Outdoor unit	28
1.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER	29
(1) Remote controller	29
(2) Operation control function by the indoor unit controller	31
(3) Operation control function by the wired remote controller	38
(4) Operation control function by the outdoor unit controller	39

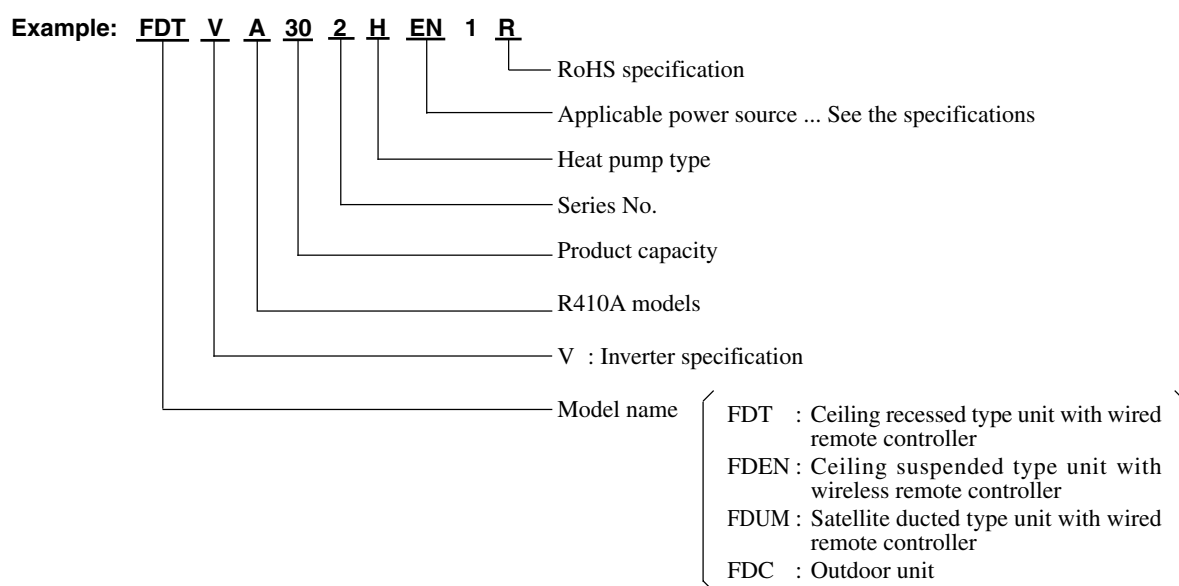
1.5 APPLICATION DATA	49
1.5.1 Installation of indoor unit	50
(1) Ceiling recessed type (FDT)	50
(2) Ceiling suspended type (FDEN)	56
(3) Satellite ducted type (FDUM)	61
1.5.2 Installation of wired remote controller	68
1.5.3 Installation of outdoor unit	69
(1) Installation	69
(2) Refrigerant piping work	71
(3) Air tightness test and air purge	72
(4) Refrigerant quantity	73
(5) Drain piping work	73
(6) Electrical wiring	74
(7) Setting functions using the wired remote controller	76
(8) Checking operation data	80
(9) Test run	81
1.6 MAINTENANCE DATA	82
1.6.1 Servicing	82
1.6.2 Trouble shooting for refrigerant circuit	83
1.6.3 Diagnosing of microcomputer circuit	84
(1) Selfdiagnosis function	84
(2) Procedures of trouble diagnosis	87
(3) Error diagnosis procedures at the indoor unit side	87
(4) Error diagnosis procedures at the outdoor unit side	104
(5) Check method in the case of the failure display in the remote controller	119
(6) Check abnormal operation data with the wired remote controller	120
1.6.4 Check display on wireless specification models (FDEN · FDT)	121

1.1 GENERAL INFORMATION

1.1.1 Specific features

- (1) A new refrigerant, R410A, which causes no damage to the earth's ozone layer, is used. R410A is a pseudoazeotropic refrigerant, so there is little formation of separate vapor and liquid layers, and it is possible to add refrigerant on-site.
- (2) Less refrigerant charge amount due to use of double phase refrigerant flow system. The total refrigerant charge amount has been reduced by more than 50%.
- (3) The microcomputer chip is installed in the indoor unit and outdoor unit. There is no need for the unit to communicate between the outdoor and indoor units so the unit is more resistant to electromagnetic noise thus the incidence of microcomputer malfunction has been reduced. The compressor in the outdoor unit has its own self protection function, that reacts according to abnormal high pressure and excessive high temperature.
- (4) There are only three power lines between the outdoor and indoor unit. One cable with 3 wires encased in one sheath is enough for conducting the wiring work between the outdoor unit and the indoor unit. This contributes to simpler wiring work in the field.
- (5) All air supply ports have auto swing louvers. (Only case of FDT and FDEN models). The indoor fan motor has three speeds of high, medium and low.
- (6) All models have service valves protruding from the outdoor unit for faster flare connection work in the field.
- (7) The size and weight of the outdoor units in the FDCVA 302 series have been greatly reduced. Use of an inverter has also improved energy conservation and economy.

1.1.2 How to read the model name



1.2 SELECTION DATA

1.2.1 Specifications

(1) Ceiling recessed type (FDT)

Model FDTVA302HEN1R

Item		Model	FDTVA302HEN1R	
			FDTA301R	FDCVA302HENR
Nominal cooling capacity⁽¹⁾		kW	7.1[3.9~8.0]	
Nominal heating capacity⁽¹⁾		kW	8.0[4.0~9.0]	
Power source			1 Phase, 220/230/240V 50Hz	
Operation data⁽³⁾	Cooling power consumption	kW	1.90	
	Running current (Cooling)	A	8.3	
	Power factor (Cooling)	%	99	
	Heating power consumption	kW	2.07	
	Running current (Heating)	A	9.0	
	Power factor (Heating)	%	99	
	Inrush current (L.R.A)	A	5	
Noise level		dB(A)	Powerful mode Hi:38 Me:35 Lo:33 Mild mode Hi:35 Me:33 Lo:31	48
Exterior dimensions				
Height × Width × Depth		mm	Unit 270 × 840 × 840 Panel 30 × 950 × 950	750 × 880 (+88) × 340
Net weight		kg	31 (Unit:24 Panel:7)	60
Refrigerant equipment				
Compressor type & Q'ty			–	2YC45DXD × 1
Starting method			–	Direct line start
Heat exchanger			Louver fin & inner grooved tubing	Straight fin & inner grooved tubing
Refrigerant control			–	Electronic expansion valve
Refrigerant			R410A	
Quantity		kg	–	2.95 [Pre-charged up to the piping length of 30m]
Refrigerant oil		ℓ	–	0.65 (FVC50K)
Defrost control			Microcomputer controlled de-icer	
Air handling equipment				
Fan type & Q'ty			Turbo fan × 1	Propeller fan × 1
Motor		W	20 × 1	120 × 1
Starting method			Direct line start	
Air flow		CMM	Powerful mode Hi:20 Me:17 Lo:15 Mild mode Hi:17 Me:15 Lo:13	Cooling:60 Heating:48.5
Outside air intake			Available	–
Air filter, Q'ty			Long life filter ×1(washable)	–
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	–	20 (Crank case heater)
Operation control			Wired remote control switch (Optional : RC-E1R)	– (Indoor unit side)
Operation switch			Wireless remote control switch (Optional : RCN-T-35W-ER)	
Room temperature control			Thermostat by electronics	–
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
Installation data		mm	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")	
Refrigerant piping size		(in)		
Connecting method			Flare piping	
Drain hose			Connectable with VP25 (I.D.25mm, O.D.32mm)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit, Drain hose	
Optional parts			Decorative Panel	

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

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

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

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

(2) Ceiling suspended type (FDEN)

Model FDENVA302HEN1R

Item		Model	FDENVA302HEN1R	
			FDENA301R	FDCVA302HENR
Nominal cooling capacity⁽¹⁾		kW	7.1[3.5~8.0]	
Nominal heating capacity⁽¹⁾		kW	8.0[4.0~9.0]	
Power source			1 Phase, 220/230/240V 50Hz	
Operation data⁽³⁾	Cooling power consumption	kW	2.06	
	Running current (Cooling)	A	9.1	
	Power factor (Cooling)	%	98	
	Heating power consumption	kW	2.21	
	Running current (Heating)	A	9.8	
	Power factor (Heating)	%	98	
	Inrush current (L.R.A)	A	5	
Noise level		dB(A)	Powerful mode Hi:44 Me:41 Lo:39 Mild mode Hi:41 Me:39 Lo:38	48
Exterior dimensions				
Height × Width × Depth		mm	210 × 1320 × 690	750 × 880 (+88) × 340
Net weight		kg	36	60
Refrigerant equipment				
Compressor type & Q'ty			–	2YC45DXD × 1
Starting method			–	Direct line start
Heat exchanger			Louver fin & inner grooved tubing	Straight fin & inner grooved tubing
Refrigerant control			–	Electronic expansion valve
Refrigerant			R410A	
Quantity		kg	–	2.95 [Pre-charged up to the piping length of 30m]
Refrigerant oil		ℓ	–	0.65 (FVC50K)
Defrost control			Microcomputer controlled de-icer	
Air handling equipment				
Fan type & Q'ty			Multiblade centrifugal fan × 4	Propeller fan × 1
Motor		W	25 × 2	120 × 1
Starting method			Direct line start	
Air flow		CMM	Powerful mode Hi:20 Me:18 Lo:14 Mild mode Hi:18 Me:14 Lo:12	Cooling:60 Heating:48.5
Outside air intake			Unavailable	–
Air filter, Q'ty			Polypropylene net ×2(washable)	–
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	–	20 (Crank case heater)
Operation control			Wireless remote control switch (Optional: RCN-E1R) Wired remote control switch (Optional: RC-E1R)	– (Indoor unit side)
Operation switch				
Room temperature control			Thermostat by electronics	–
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
Installation data		mm	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")	
Refrigerant piping size		(in)		
Connecting method			Flare piping	
Drain hose			Connectable with VP20 (I.D.20mm, O.D.26mm)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit. Drain hose	
Optional parts			–	

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

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

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

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

(3) Satellite ducted type (FDUM)

Model FDUMVA302HEN2R

Item		Model	FDUMVA302HEN2R	
			FDUMA302R	FDCVA302HENR
Nominal cooling capacity⁽¹⁾		kW	7.1[3.5~8.0]	
Nominal heating capacity⁽¹⁾		kW	8.0[4.0~9.0]	
Power source			1 Phase, 220/230/240V, 50Hz	
Operation data⁽³⁾	Cooling power consumption	kW	2.08	
	Running current (Cooling)	A	9.2	
	Power factor (Cooling)	%	98	
	Heating power consumption	kW	2.21	
	Running current (Heating)	A	10.2	
	Power factor (Heating)	%	94	
	Inrush current (L.R.A)	A	5	
Noise level		dB(A)	Hi:35 Me:32 Lo:29	48
Exterior dimensions				
Height × Width × Depth		mm	299 × 950 × 635	750× 880 (+88)× 340
Net weight		kg	40	60
Refrigerant equipment				
Compressor type & Q'ty			—	2YC45DXD × 1
Starting method			—	Direct line start
Heat exchanger			Louver fin & inner grooved tubing	Straight fin & inner grooved tubing
Refrigerant control			—	Electronic expansion valve
Refrigerant			R410A	
Quantity		kg	—	2.95 [Pre-charged up to the piping length of 30m]
Refrigerant oil		ℓ	—	0.48 (BR68A)
Defrost control			Microcomputer controlled de-icer	
Air handling equipment				
Fan type & Q'ty			Multiblade centrifugal fan × 2	Propeller fan × 1
Motor		W	100 × 1	120 × 1
Starting method			Direct line start	
Air flow		CMM	Hi: 20 Me:18 Lo:15	Cooling:60 Heating:48.5
Available static pressure		Pa	Standard: 50, Max: 85	—
Outside air intake			—	—
Air filter, Q'ty			—	—
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	—	20(Crank case heater)
Operation control			Wired remote control switch (Optional: RC-E1R)	— (Indoor unit side)
Operation switch			Wireless kit (Optional: RCND-KIT-HER)	—
Room temperature control			Thermostat by electronics	—
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
Installation data		mm	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")	
Refrigerant piping size		(in)		
Connecting method			Flare piping	
Drain hose			Connectable with VP25 (I.D.25mm, O.D.32mm)	—
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit, Drain hose	
Optional parts			Filter kit (UM-FL2E)	

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

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

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.

ISO-T1 "UNITARY AIR-CONDITIONERS"

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

1.2.2 Range of usage & limitations

Model		302 series
Item		
Limitations Return air temp	Cooling	Indoor unit: 18~30°C.D.B Outdoor unit: -15~43°C.D.B
	Heating	Indoor unit: 18~30°C.D.B Outdoor unit: -10~24°C.D.B
Indoor unit atmosphere (behind ceiling) temperature and humidity		Dew point temperature: 28°C or less, relative humidity: 80% or less
Refrigerant line (one way) length		Max. 50m
Vertical height difference between outdoor unit and indoor unit		Max. 30m (Outdoor unit is higher) Max. 15m (Outdoor unit is lower)
Power source voltage		Rating \pm 10%
Voltage at starting		Min. 85% of rating
Compressor stop/start Frequency	Cycle Time	7 minutes or more (4 minutes or more from start to stop) or (3 minutes or more from stop to start)
	Stop Time	3 minutes or more

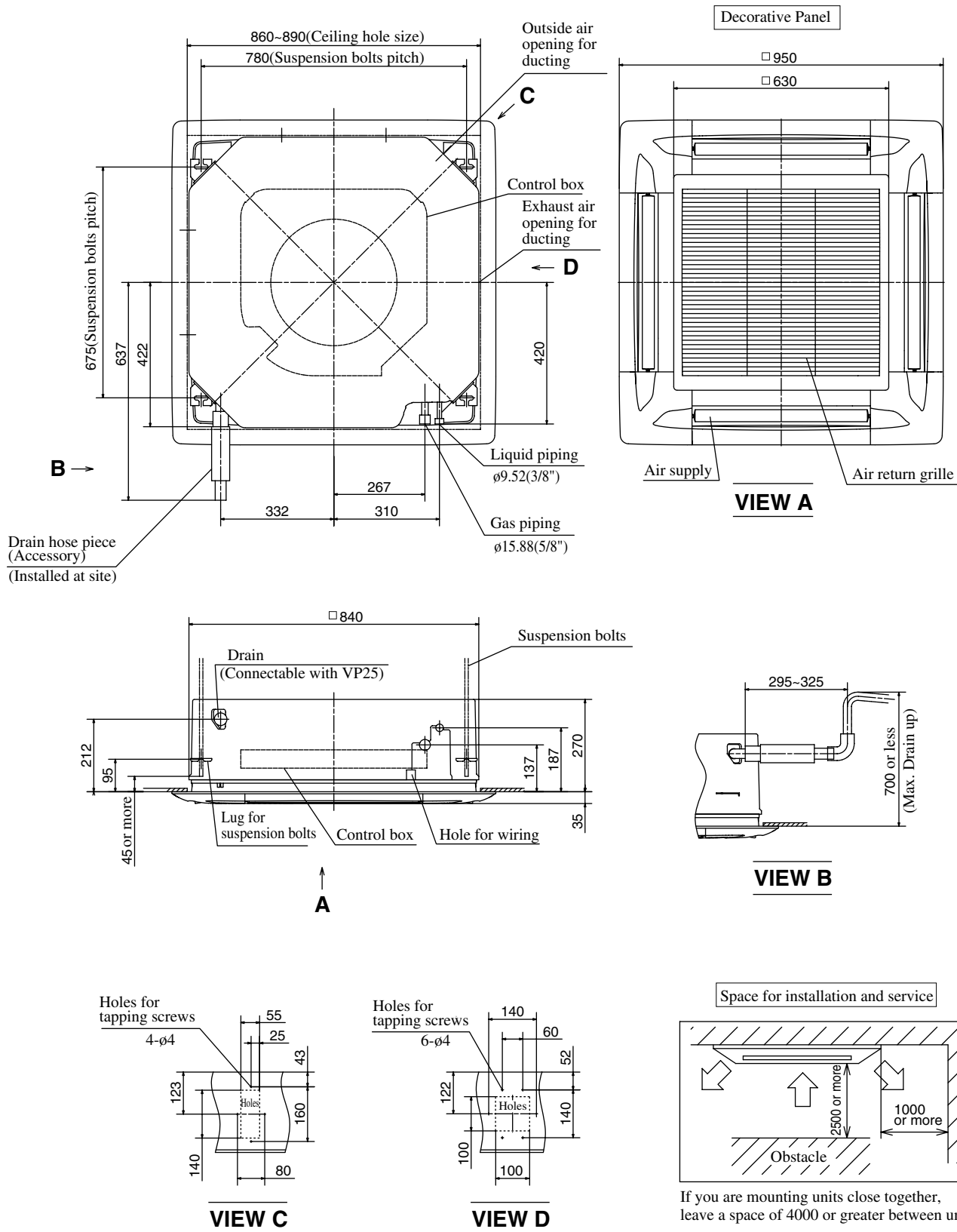
1.2.3 Exterior dimensions

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Model FDTA301R

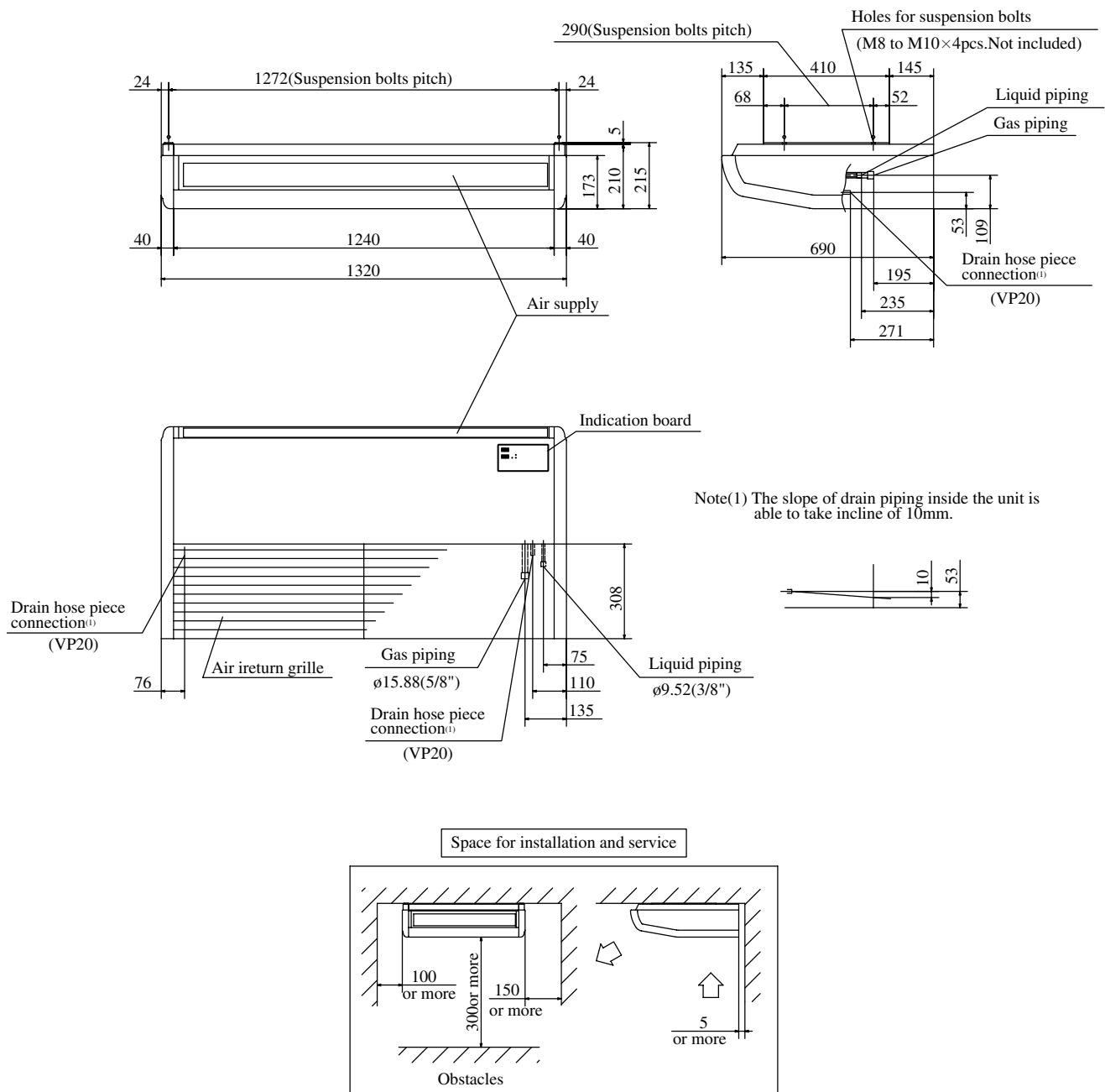
unit : mm



(b) Ceiling suspended type (FDEN)

Model FDENA301R

Unit : mm

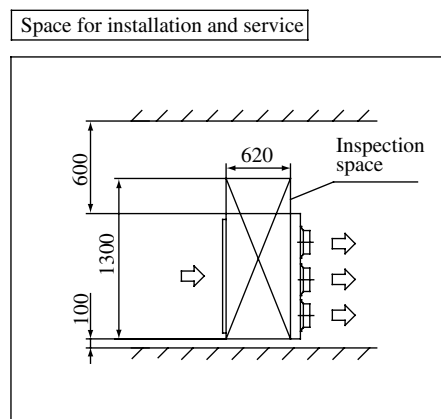
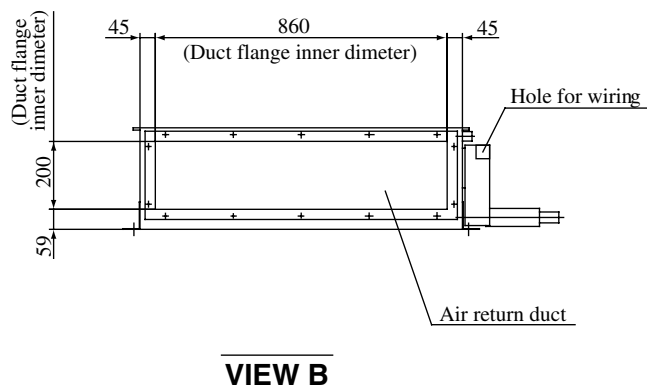
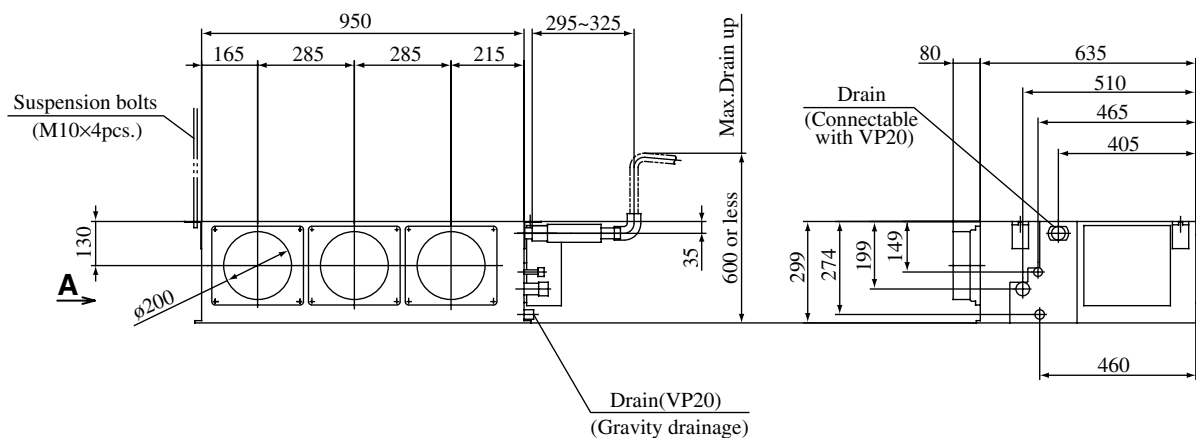
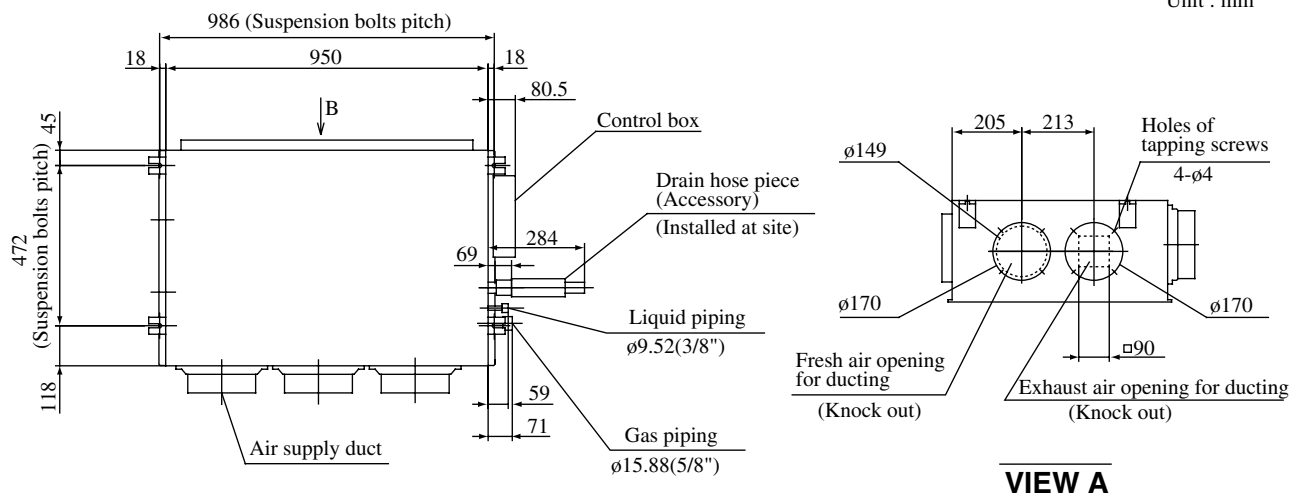


If you are mounting units close together, leave a space of 4500 or greater between unit.

(C) Satellite ducted type (FDUM)

Model FDUMA302R

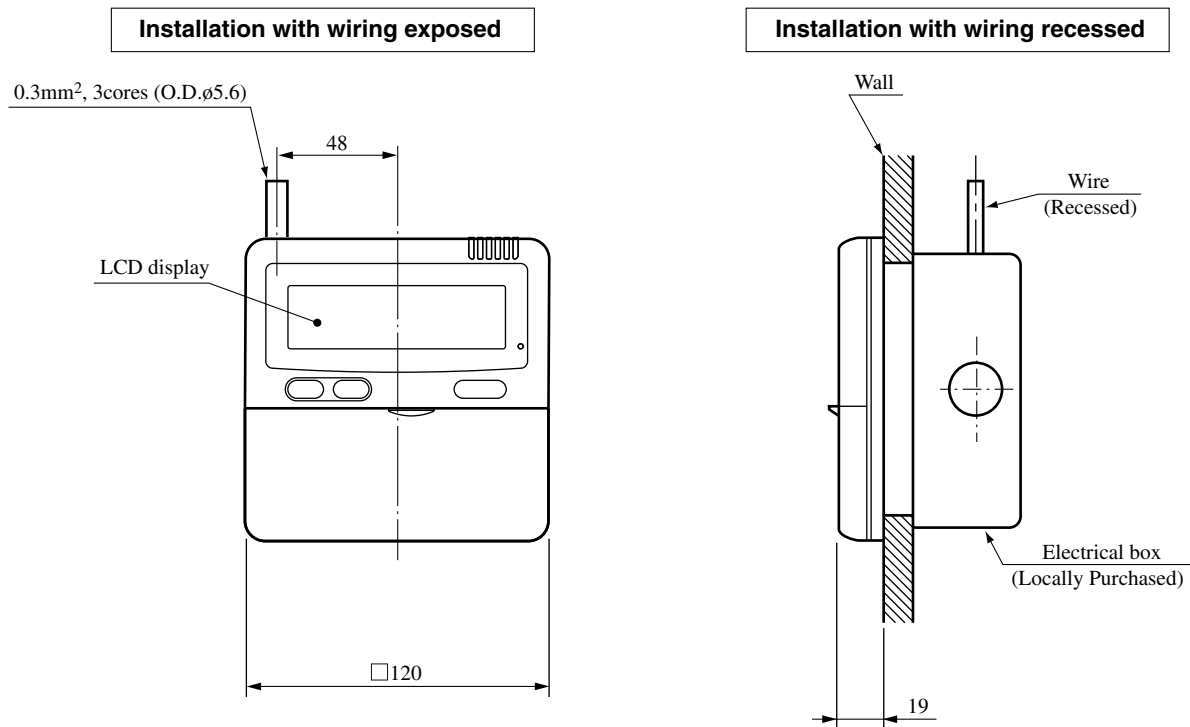
Unit : mm



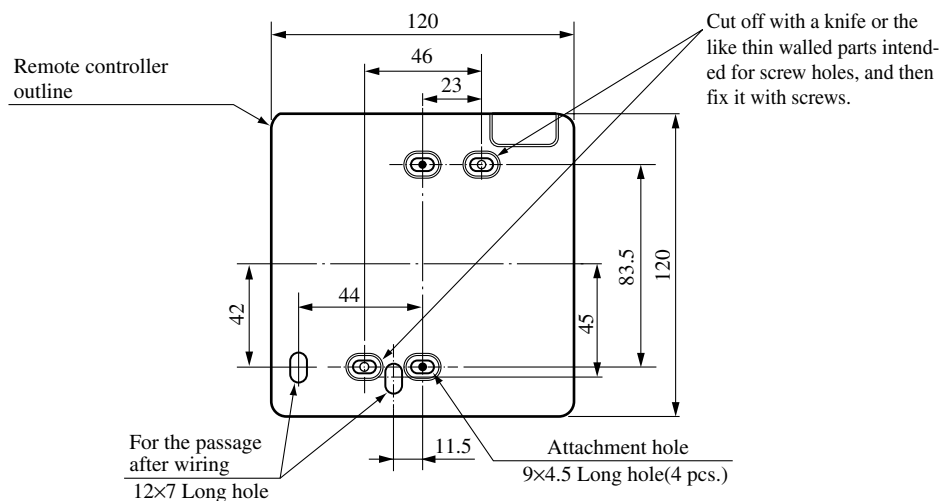
(2) Remote controller (Optional parts)

(a) Wired remote controller

Unit : mm



Remote controller mounting dimensions



Precation in Extending the Remote control cord

► Maximum total extension 600m.

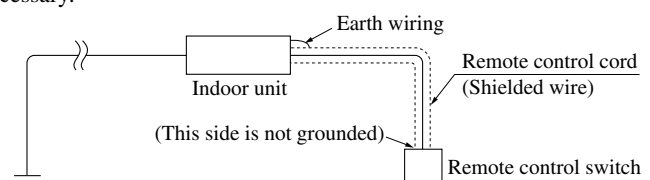
The cord should be a shielded wire.

● For all types : 0.3 mm² × 3 cores

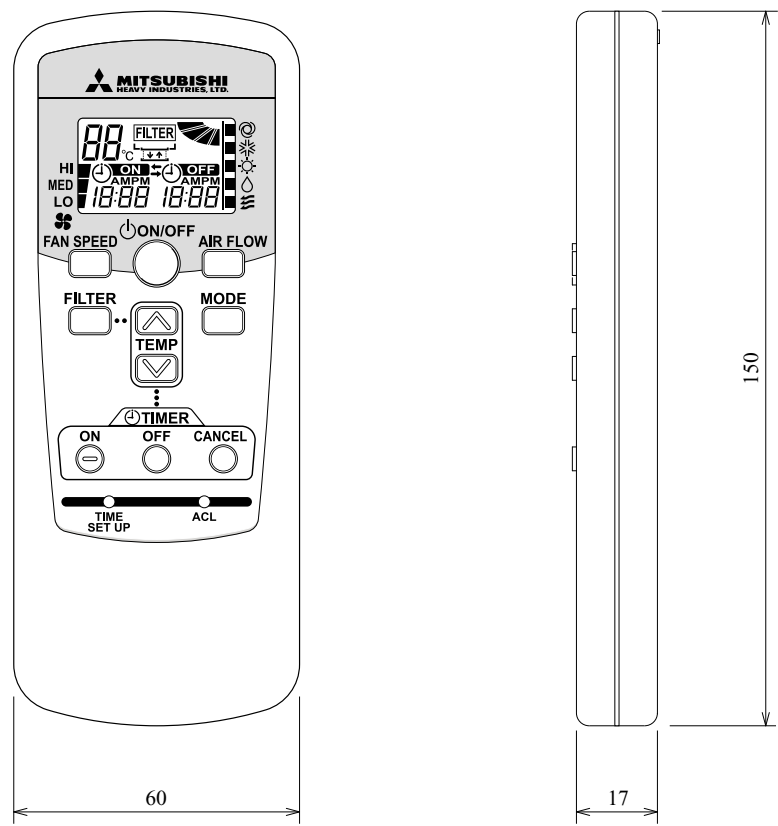
Note: (1) Use cables up to 0.5 mm² (maximum) for those laid inside the remote control unit casing and connect to a different size cable at a vicinity point outside the remote control unit, if necessary.

Within 100-200m.....	0.5 mm² × 3 cores
Within 300m.....	0.75 mm² × 3 cores
Within 400m.....	1.25 mm² × 3 cores
Within 600m.....	2.0 mm² × 3 cores

● The shielded wire should be grounded at one side only.



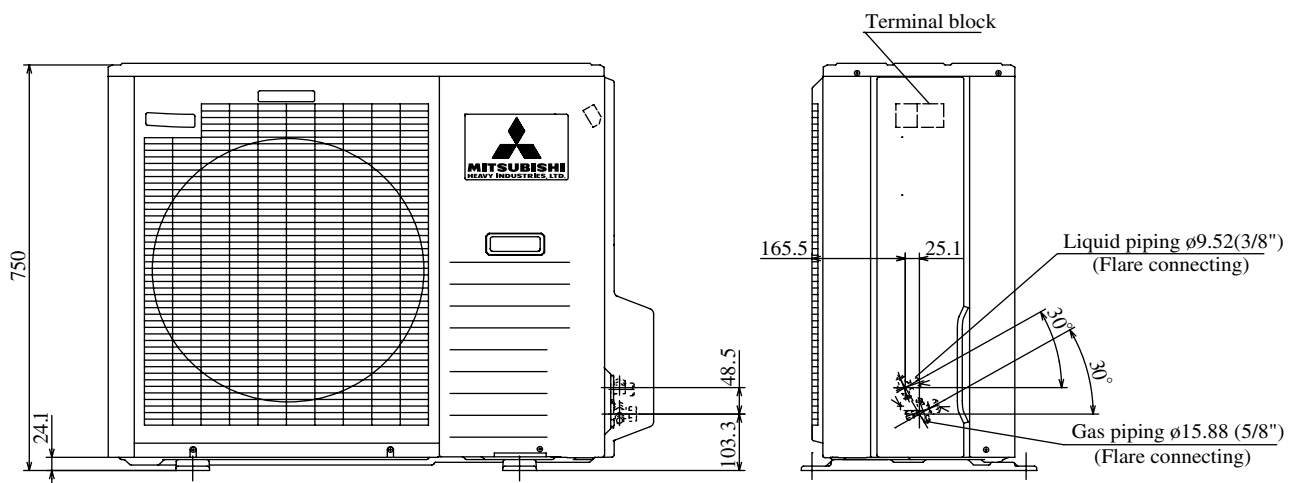
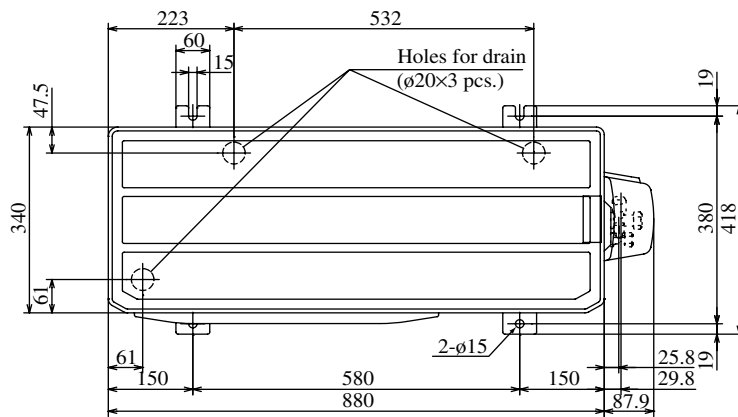
(b) Wireless remote controller



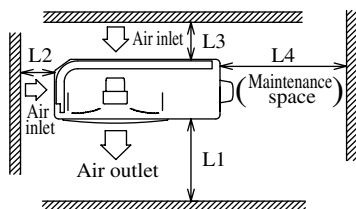
(3) Outdoor unit

Model FDCVA302HENR

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

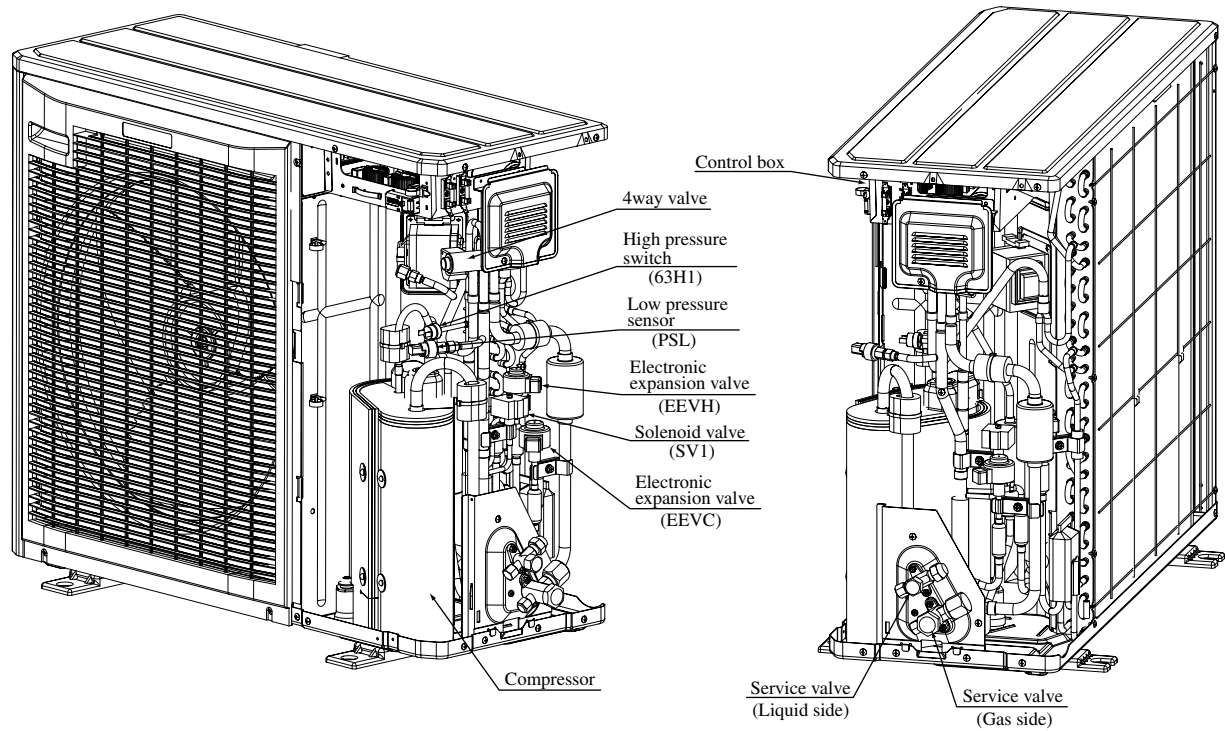
Unit:mm			
Installation type	1	2	3
Mark			
L1	Open	Open	500
L2	300	250	Open
L3	100	150	100
L4	250	250	250

Notes

- (1) It is prohibited to install in a space enclosed with walls at four sides.
- (2) Unit must be secured with anchor bolts.
Anchor bolt should not protrude more than 15 mm above the surface.
- (3) Where strong winds blow, the blow outlet must be oriented at right angle against the wind direction.
- (4) Secure a space of 1 m or more above the unit.
- (5) Barrier standing in front of the blow outlet must be lower than the height of unit.

1.2.4 Inside view

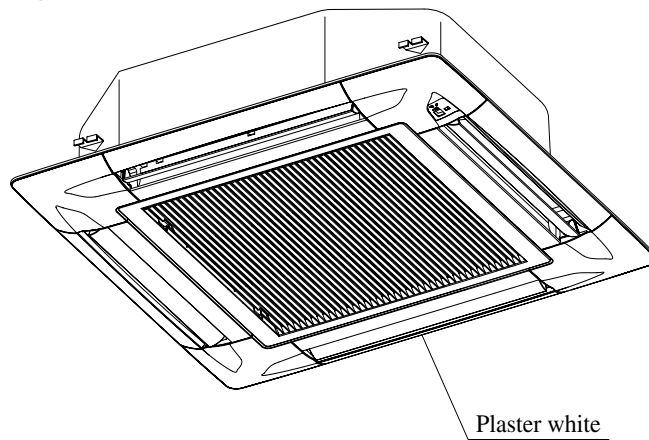
Outdoor unit



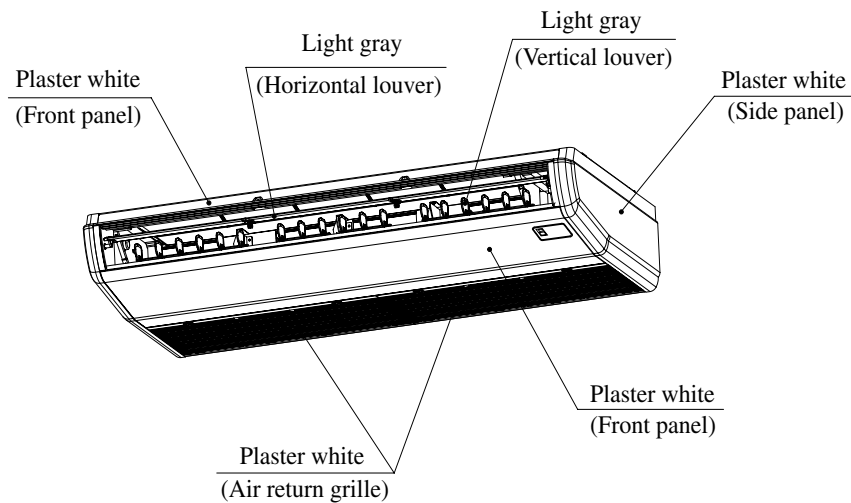
1.2.5 Exterior appearance

(1) Indoor unit

(a) Ceiling recessed type (FDT)

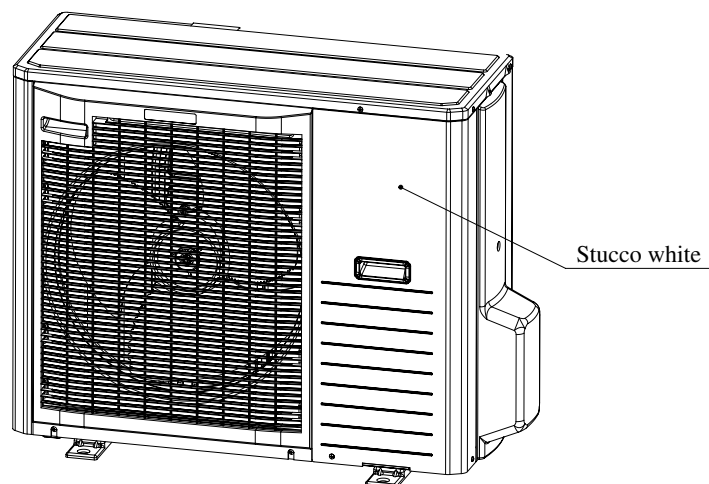


(b) Ceiling suspended type (FDEN)



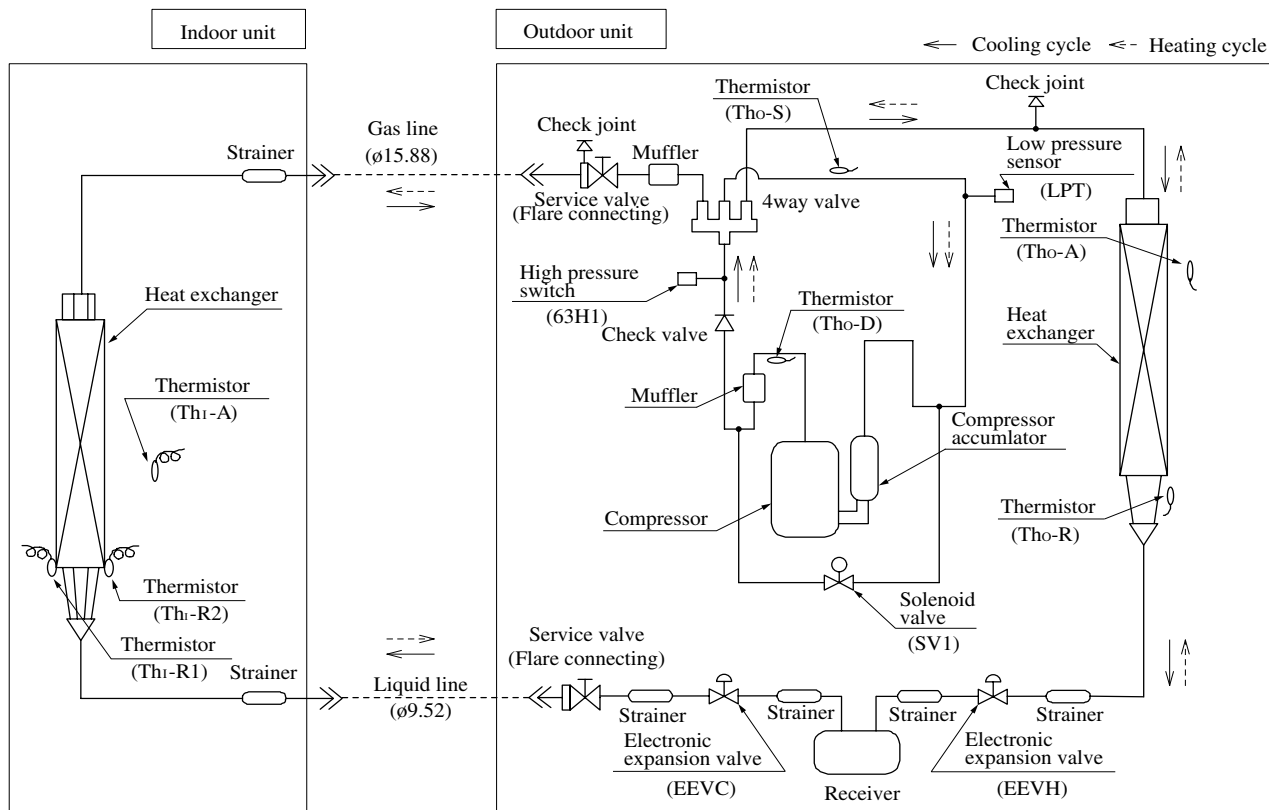
(c) Satellite ducted type (FDUM) Zinc steel plate

(2) Outdoor unit



1.2.6 Piping system

Model 302 series



Note(1) A FDEN type strainer only should be used for the indoor unit

Preset point of the protective devices

Parts name	Mark	Equipped unit	302 series
Thermistor (for protection over-loading in heating)	Thi-R	Indoor unit	OFF 63℃ ON 56℃
Thermistor (for frost prevention)			OFF 1.0℃ ON 10℃
Thermistor (for detecting discharge pipe temp.)	Tho-D	Outdoor unit	OFF 115℃ ON 85℃
High pressure switch (for protection)	63H1	Outdoor unit	OFF 4.15MPa ON 3.15MPa
Low pressure sensor (for protection)	LPT	Outdoor unit	OFF 0.227MPa ON 0.079MPa

1.2.7 Selection chart

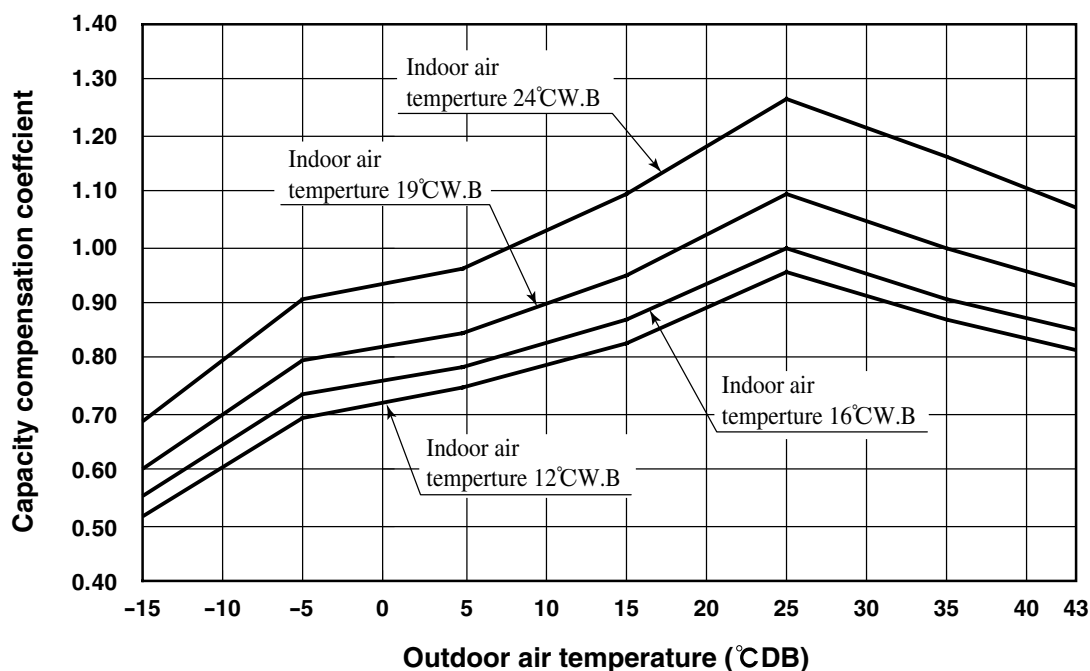
Correct the cooling and heating capacity in accordance with the conditions as follows. The net cooling and heating capacity can be obtained in the following way.

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

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

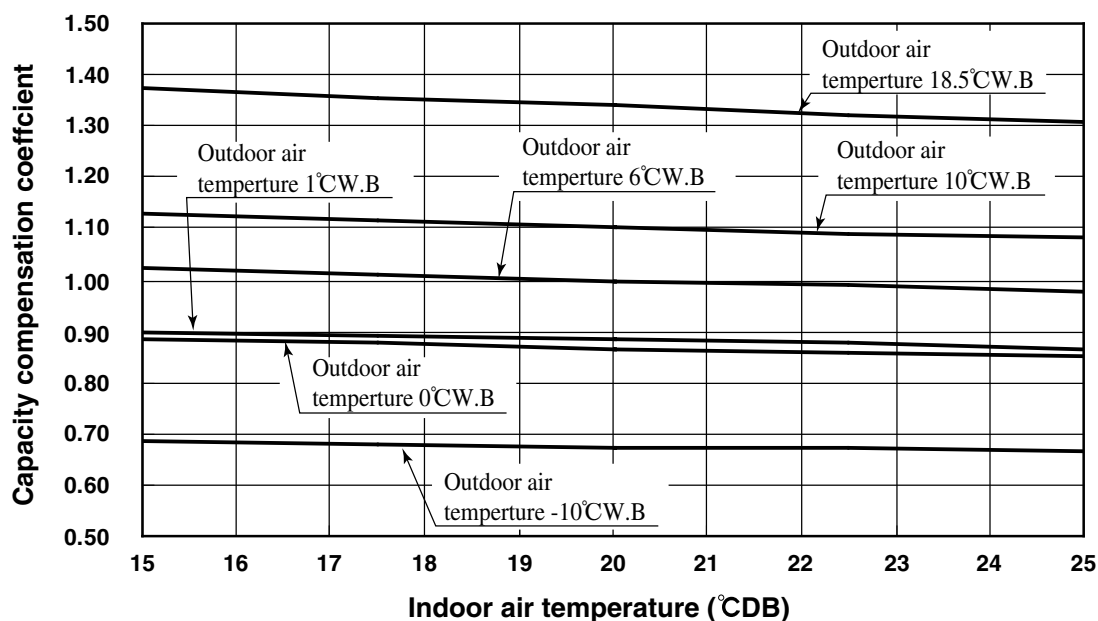
(a) Capacity compensation coefficient

1) Cooling



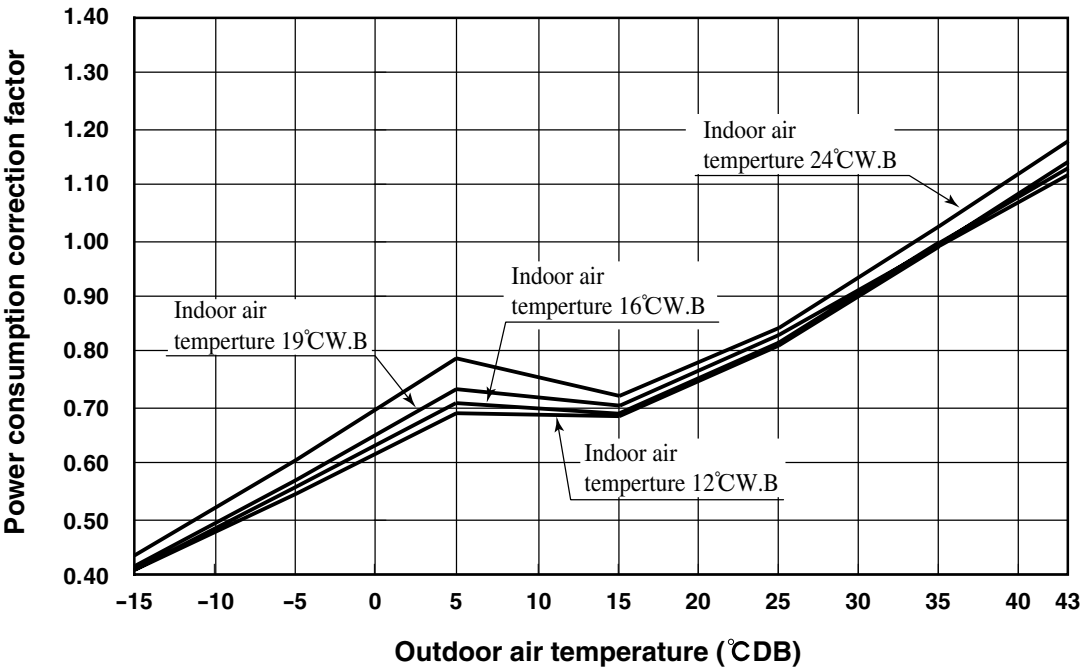
Caution: If a cooling operation is done when the outdoor air temperature is -5°C or lower, as much as possible, the outdoor unit should be installed in a condition where it is not going to be influenced by natural wind. If it is hit by the wind, the compressor stop frequency will be high because of the drop in the low pressure, the capacity will drop even further and it could cause the unit to break down.

2) Heating

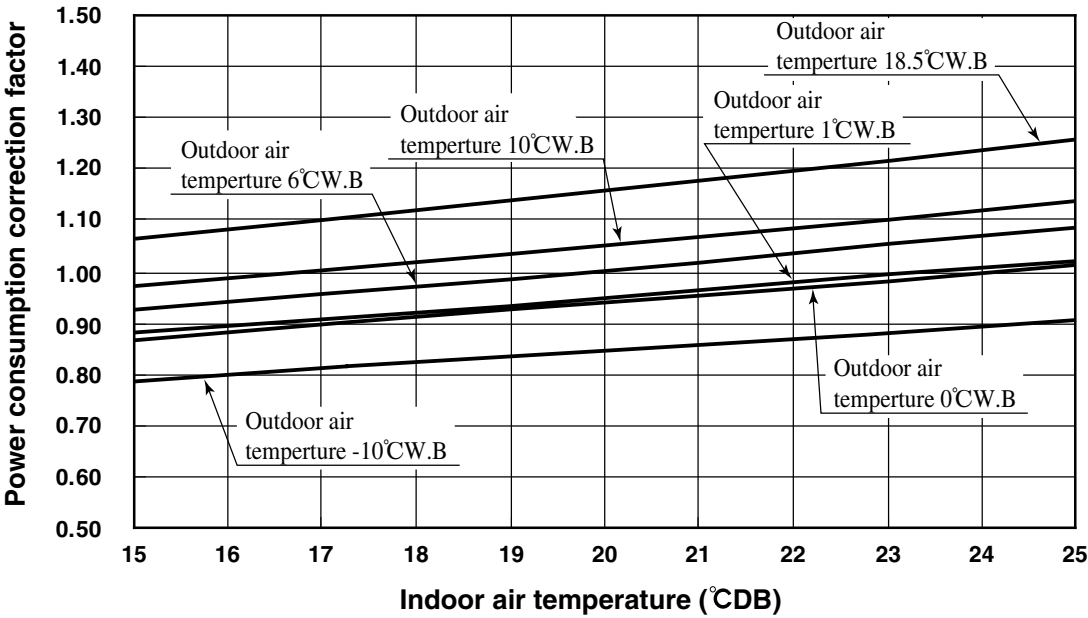


(b) Power consumption correction factor

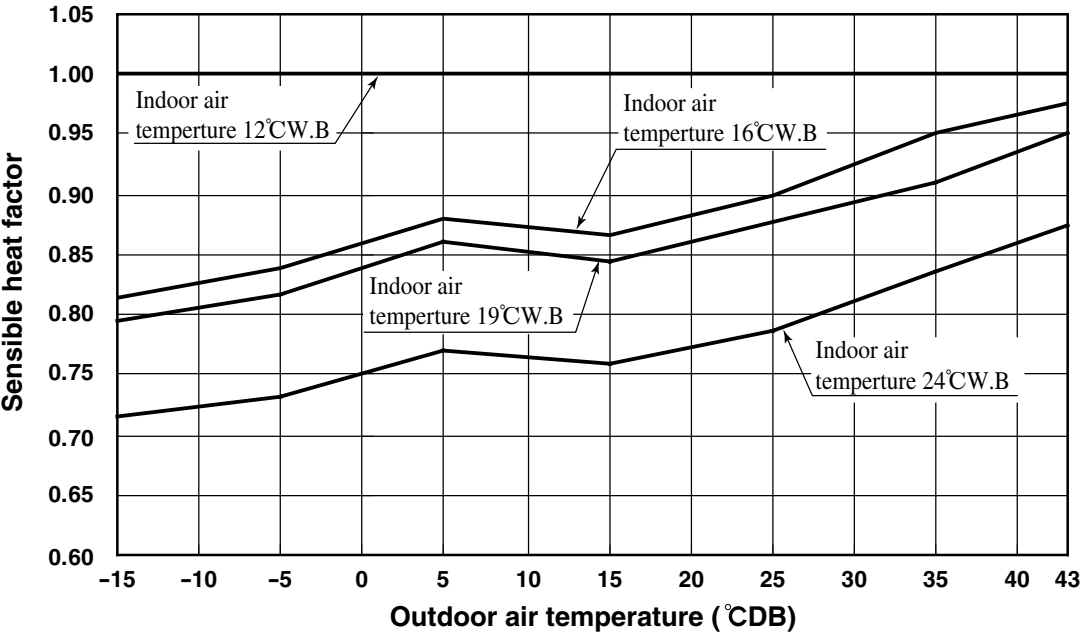
1) Cooling



2) Heating



(c) Sensible heat factor



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

Coefficient: 1.00 at High, 0.95 at Low

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

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

• Outdoor air temperature degree 5°C or more

Equivalent piping length ⁽¹⁾ (m)		7.5	10	15	20	25	30	35	40	45	50	55
Heating		1	1	1	1	1	0.998	0.998	0.993	0.993	0.988	0.988
Cooling	ø 15.88	1	0.996	0.989	0.982	0.975	0.968	0.961	0.954	0.947	0.940	0.933
	ø 19.05	1.008	1.006	1.003	1	0.997	0.994	0.991	0.988	0.985	0.982	0.979

• Outdoor air temperature degree -5°C or more

Equivalent piping length ⁽¹⁾ (m)		7.5	10	15	20	25	30	35	40	45	50	55
Heating		1	1	1	1	1	0.998	0.998	0.993	0.993	0.988	0.988
Cooling	ø 15.88	0.800	0.793	0.779	0.765	0.751	0.738	0.724	0.710	0.696	0.682	0.669
	ø 19.05	0.806	0.798	0.786	0.774	0.762	0.750	0.738	0.727	0.715	0.703	0.691

• Outdoor air temperature degree -15°C or more

Equivalent piping length ⁽¹⁾ (m)		7.5	10	15	20	25	30	35	40	45	50	55
Heating		1	1	1	1	1	0.998	0.998	0.993	0.993	0.988	0.988
Cooling	ø 15.88	0.600	0.590	0.569	0.549	0.528	0.507	0.487	0.466	0.446	0.425	0.404
	ø 19.05	0.605	0.590	0.569	0.548	0.527	0.507	0.486	0.465	0.444	0.424	0.403

Note (1) Calculate the equivalent length using the following formula.

However, install the piping so that the equivalent length is within +5 m of the piping distance limit (actual length) for each respective piping system.

- Equivalent length = Actual length + (equivalent length of bends x number of bends in the piping)

Equivalent length for 1 bend

Gas pipe diameter (mm)	ø9.52	ø15.88
Bend equivalent length	0.15	0.25

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

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

Piping length limitations

Item	Model	302 services
Max. one way piping length		50m
Max. vertical height difference		Outdoor unit is higher 30m Outdoor unit is lower 15m

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

How to obtain the cooling and heating capacity

Example : The net cooling capacity of the model FDTVA302HEN1R with the air flow “High”, the piping length of 15m, the outdoor unit located 5m lower than the indoor unit, indoor wet-bulb temperature at 19.0 °C and outdoor dry-bulb temperature 35 °C is

$$\text{Net cooling capacity} = \frac{7.1}{\text{FDTVA302HEN1R}} \times \frac{1.00}{\text{Air flow "High"}} \times \frac{(0.989 - 0.01)}{\text{Length 15m. Height difference 5 m}} \times \frac{1.0}{\text{Factor by air temperatures}} \div 7.0 \text{ kW}$$

1.2.8 Characteristics of fan

(1) Satellite ducted type (FDUM)

• External static pressure table

		Unit : Pa					
Model	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
FDUMA302R	20	30	65	50	85	55	90

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

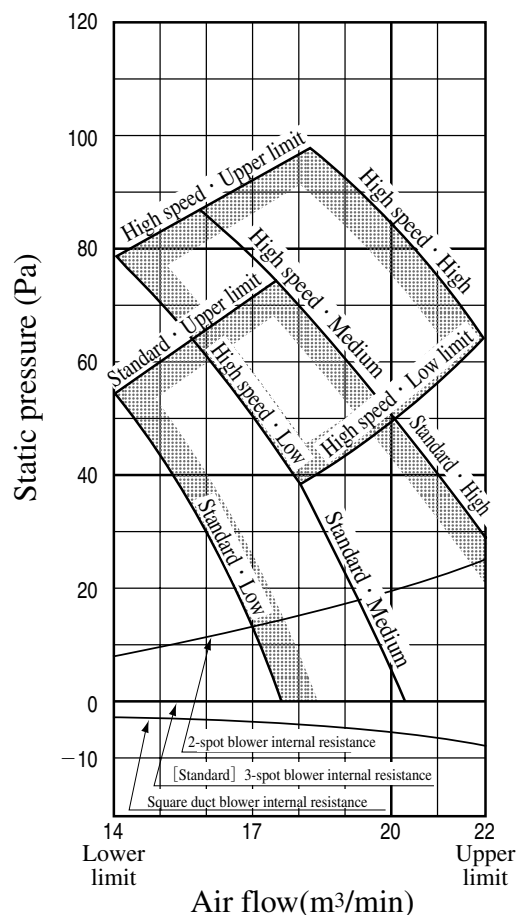
(2) Standard: ø200 duct are installed at all blowout holes.

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

(4) When using the high speed setting, turn the dip switch SW9-4 on the indoor PCB to the ON position.

(When setting from the remote controller, select "Hi CEILING 1")

Model **FDUMA302R**



1.2.9 Noise level

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

Ambient air temperature: Indoor unit 27°C DB, 19°C WB. Outdoor unit 35°C DB.

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

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

(4) Noise levels for the FDT and FDEN series show the noise level when in the Powerful mode.

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Measured based on JIS B 8616

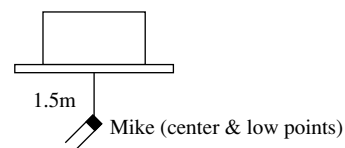
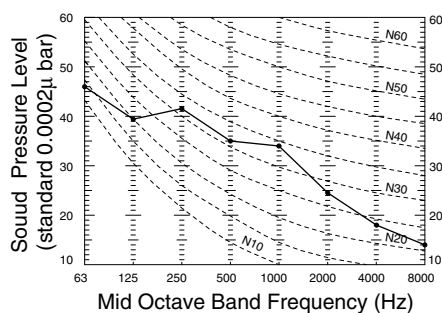
Mike position as right

Model **FDTA301R**

Noise level 38 dB (A) at HIGH

35 dB (A) at MEDIUM

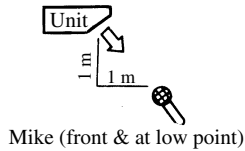
33 dB (A) at LOW



(b) Ceiling suspended type (FDEN)

Measured based on JIS B 8616

Mike position as right

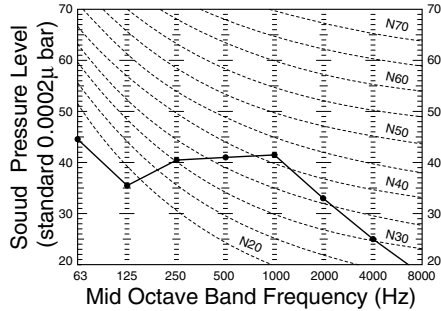


Model FDENA301R

Noise level 44 dB (A) at HIGH

41 dB (A) at MEDIUM

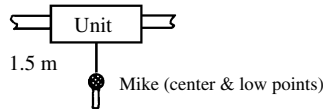
39 dB (A) at LOW



(c) Satellite ducted type (FDUM)

Measured based on JIS B 8616

Mike position as right

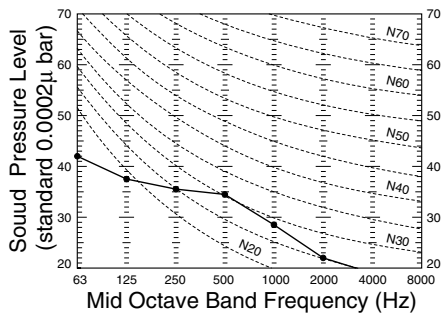


Model FDUMA302R

Noise level 35 dB (A) at HIGH

32 dB (A) at MEDIUM

29 dB (A) at LOW



(2) Outdoor unit

Measured based on JIS B 8616

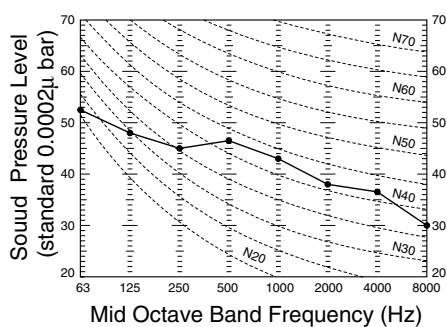
Mike position: at highest noise level in position as below

Distance from front side 1m

Height 1m

Model FDCVA302HENR

Noise level 48 dB (A)



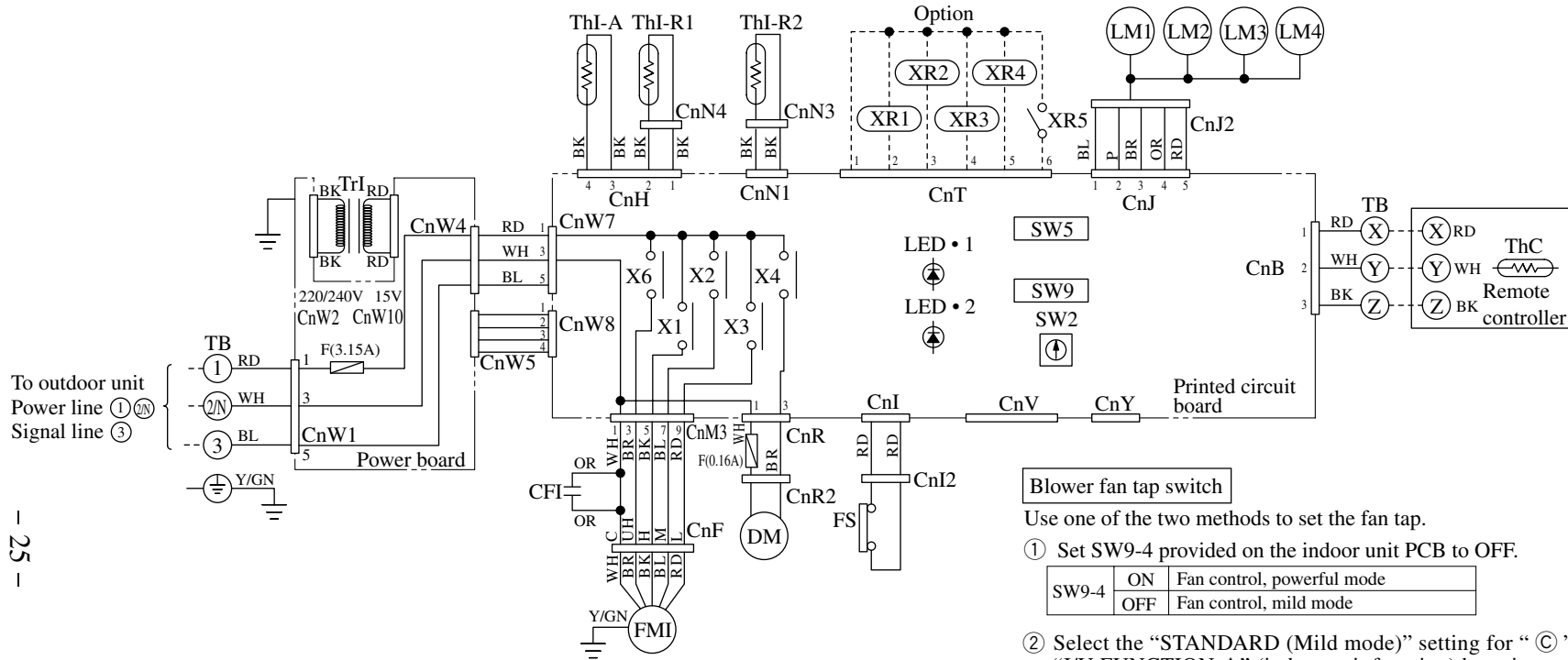
1.3 ELECTRICAL DATA

1.3.1 Electrical wiring

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Model FDTA301R



Blower fan tap switch

Use one of the two methods to set the fan tap.

① Set SW9-4 provided on the indoor unit PCB to OFF.

SW9-4	ON	Fan control, powerful mode
	OFF	Fan control, mild mode

② Select the “STANDARD (Mild mode)” setting for “©” in #01 of “I/U FUNCTION ▲” (indoor unit function) by using remote controller function setting.

Function number (A)	Function description (B)	Setting (C)
01	Hi CEILING SET	STANDARD (Mild mode)

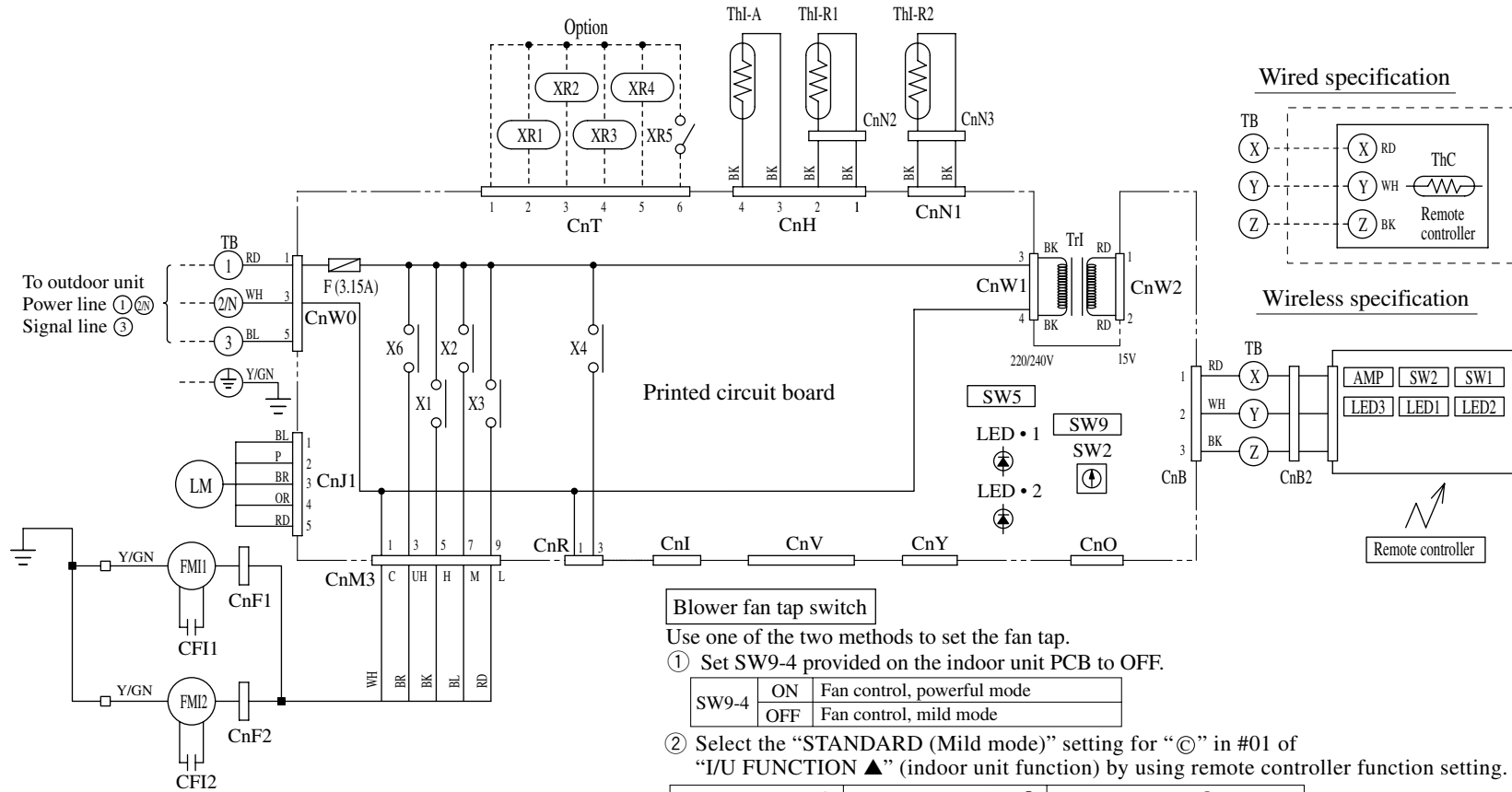
Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FMI	Fan motor	SW5-3,4	Filter sign	XR5	Remote operation input(volt-free contact)
CFI	Capacitor for FMI	SW9-3	Emergency operation	X1,2,3,6	Auxiliary relay(For FM)
DM	Drain motor	TrI	Transformer	X4	Auxiliary relay(For DM)
FS	Float switch	F	Fuse	TB	Terminal block(○ mark)
LM1~4	Louver motor	LED1	Indication lamp(Red)	CnB~Z	Connector
ThI-A	Thermistor	LED2	Indication lamp(Green)	■mark	Closed-end connector
ThI-R1	Thermistor	XR1	Operation output(DC12V output)		
ThI-R2	Thermistor	XR2	Heating output(DC12V output)		
ThC	Thermistor	XR3	Thermo ON output(DC12V output)		
SW2	Remote controller communication address	XR4	Inspection output(DC12V output)		

Color marks

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

(b) Ceiling suspended type (FDEN)
Model FDENA301R



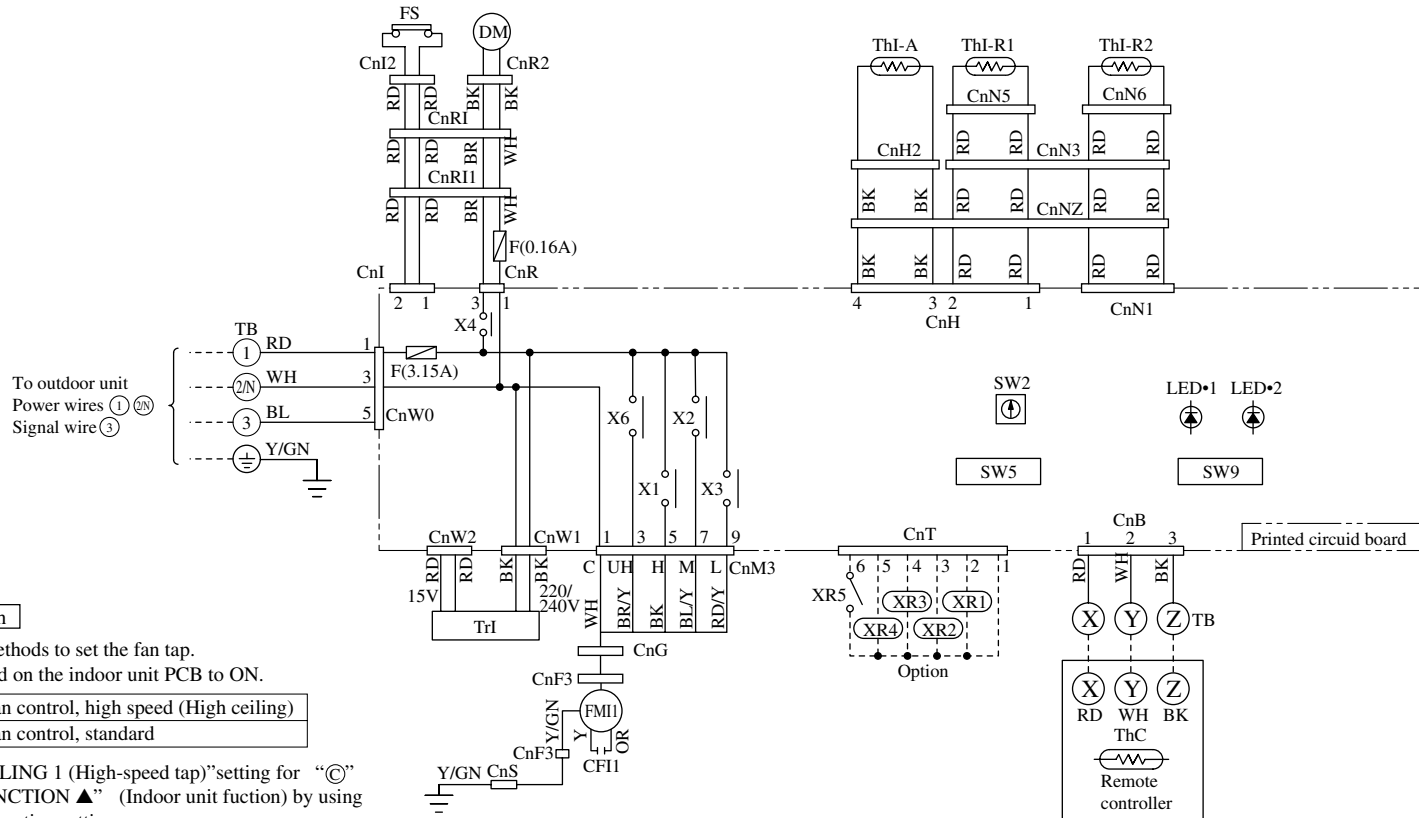
Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FM1,2	Fan motor	F	Fuse	mark	Closed-end connector
CF1,2	Capacitor for FMI	LED1	Indication lamp(Red)	LED•1	Indication lamp(Green-Operation)
LM	Louver motor	LED2	Indication lamp(Green)	LED•2	Indication lamp(Yellow-Timer/Check)
ThI-A	Thermistor	XR1	Operation output(DC12V output)	LED•3	7-segement indicator(For check)
ThI-R1	Thermistor	XR2	Heating output(DC12V output)	SW1	Switch(For setting)
ThI-R2	Thermistor	XR3	Thermo ON output(DC12V output)	SW2	Backup switch(Operation/Stop)
ThC	Thermistor	XR4	Inspection output(DC12V output)		
SW2	Remote controller communication address	XR5	Remote operation input(volt-free contact)		
SW5-3,4	Filter sign	X1,2,3,6	Auxiliary relay(For FM)		
SW9-3	Emergency operation	TB	Terminal block(○ mark)		
TrI	Transformer	CnB~Z	Connector		

Color marks

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

(c) Satellite ducted type (FDUM)
Model FDUMA302R



Blower fan tap switch

Use one of the two methods to set the fan tap.

①Set SW9-4 provided on the indoor unit PCB to ON.

SW9-4	ON	Fan control, high speed (High ceiling)
	OFF	Fan control, standard

②Select the “Hi CEILING 1 (High-speed tap)” setting for “C” in #01 of “I/U FUNCTION ▲” (Indoor unit function) by using remote controller function setting.

Function number ①	Function description ②	Setting ③
01	Hi CEILING SET	Hi CEILING 1

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FMI1	Fan motor	SW5-3,4	Filter sign	XR4	Inspection output(DC12V output)
CFI1	Capacitor for FMI	SW9-3	Emergency operation	XR5	Remote operation input(volt-free contact)
DM	Drain motor	TrI	Transformer	X1,2,3,6	Auxiliary relay(For FM)
FS	Float switch	F	Fuse	X4	Auxiliary relay(For DM)
ThI-A	Thermistor	LED•1	Indication lamp(Red:inspection)	TB	Terminal block(○ mark)
ThI-R1	Thermistor	LED•2	Indication lamp(Green:normal operation)	CnA~Z	Connector(□ mark)
ThI-R2	Thermistor	XR1	Operation output(DC12V output)	■mark	Closed-end connector
ThC	Thermistor	XR2	Heating output(DC12V output)		
SW2	Remote control communications address	XR3	Thermo ON output(DC12V output)		

Color marks

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

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

1.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

(1) Remote controller

(a) Wired remote controller

The figure below shows the remote controller with the cover opened. Note that all the items that may be displayed in the liquid crystal display area are shown in the figure for the sake of explanation.

Characters displayed with dots in the liquid crystal display area are abbreviated.

Pull the cover downward to open it.

Central control display

Displayed when the air conditioning system is controlled by the option controller.

Timer operation display

Displays the settings related to timer operation.

Temperature setting switches

These switches are used to set the temperature of the room.

TIMER switch

This switch is used to select a timer mode.

Timer setting switches

These switches are used to set the timer mode and time.

GRILL switch

This switch has no function. When this switch is pressed, "INVALID OPER (Invalid Operation)" is displayed, but it does not mean a failure.

AIR CON No. (Air conditioning system No.) switch

Displays the number of the connected air conditioning system.

CHECK switch

This switch is used at servicing.

TEST switch

This switch is used during test operation.

Vent Indicator

Indicates operation in the Ventilation mode.

Weekly timer display

Displays the settings of the weekly timer.

Operation setting display area

Displays setting temperature, airflow volume, operation mode and operation message.

Operation/Check indicator light

During operation: Lit in green
In case of error: Flashing in red

ON/OFF switch

This switch is used to operate and stop the air conditioning system. Press the switch once to operate the system and press it once again to stop the system.

MODE switch

This switch is used to switch between operation modes.

FAN SPEED switch

This switch is used to set the airflow volume.

VENT switch

Switch that operates the connected ventilator.

LOUVER switch

This switch is used to operate/stop the swing louver.

SET switch

This switch is used to apply the timer operation setting. This switch is also used to make silent mode operation settings.

RESET switch

The switch which returns to a previous step.

*If you press any of the switches above and "INVALID OPER" is display, the switch has no function. But it does not mean a failure.



(b) Wireless remote controller

Indication section

- ROOM TEMP. indicator**
Indicates set temperature.
- FAN SPEED indicator**
Indicates the selected blow rate.
- ON-TIMER indicator**
Indicated when ON-TIMER is set.
- ON-TIMER setting time indicator**
Indicates the ON-TIMER setting time.
Indicates nothing when ON-TIMER is not set.

- AIR FLOW indicator**
Indicates the condition of swing flap.
- OPERATION MODE indicator**
Indicates selected operation with ■ lamp.
- FILTER indicator**
Indicates for 2 seconds when FILTER button is pressed.
- OFF-TIMER indicator**
Indicated when OFF-TIMER set.
- OFF-TIMER setting time indicator**
Indicates OFF-TIMER setting time. Indicates the current time when the OFF-TIMER is not set.

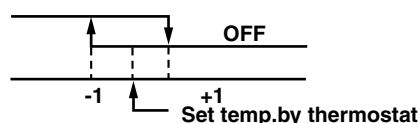
Operation section

- Signal sender**
Signal are sent to the air conditioner from here.
- FAN SPEED button**
Every time when the button is pressed, the mode is sequentially changed in order.
→ HI → MED → LO →
- FILTER button**
Used to reset (turn off) the filter sign. Press the button only after completing the filter cleaning.
- ON-TIMER button**
This button selects ON-TIMER operation.
- OFF-TIMER button**
This button selects OFF-TIMER operation.
- TIME SET UP switch**
This switch for setting the time.
- ON/OFF button**
When the button is pressed, the air conditioner is started, and when the button is pressed once again, it is stopped.
- AIR FLOW button**
Used to start or stop the swing flap.
- OPERATION MODE select button**
The operation mode on the side of the ■ indicator is the currently selected operation mode. It will switch in order.
→ (AUTO) → (COOL) → (HEAT) → (FAN) → (DRY) →
- ROOM TEMP. button**
Press either the  or  button to set the room temperature.
- TIMER CANCEL button**
This button cancels the timer settings.
- ACL switch**
This is a switch to reset the microcomputer.

(2) Operation control function by the indoor unit controller

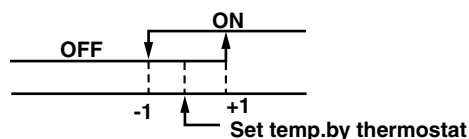
(a) Room temperature control (Differential of thermostat)

Heating operation



Temperature difference between thermostat set temp. and return air temp. (Detected by Th_1-A)

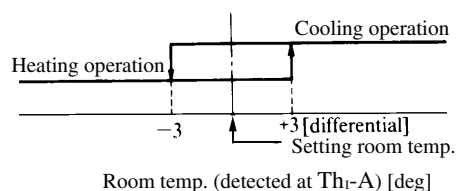
Cooling operation



Temperature difference between thermostat set temp. and return air temp. (Detected by Th_1-A)

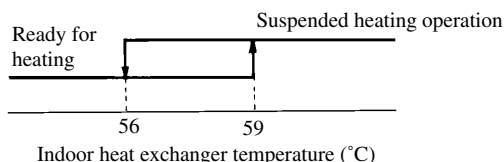
(b) Automatic operation

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



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

(2) If the temperature of indoor heat exchanger rises beyond 59°C during the heating operation, it is switched automatically to the cooling operation. For an hour after this switching, the heating operation is suspended regardless of the temperature as shown at left.



(c) Control parts operation during cooling and heating

Function	Cooling		Fan	Heating			Dry	
	Thermostat ON	Thermostat OFF	—	Thermostat ON	Thermostat OFF	Hot start (Defrost)	Thermostat ON	Thermostat OFF
Control part								
Compressor	○	×	×	○	×	○	○	×
4-way valve	×	×	×	○	○	○	×	×
Outdoor fan	○	×	×	○	×	○	○	×
Indoor fan	○		○	○	○	○ / ×	○ / ×	
Louver motor	○ / ×							
Condensate motor	○	×(5min. ON)	×(5min. ON)	× (5min. ON)			○	× (5min. ON)

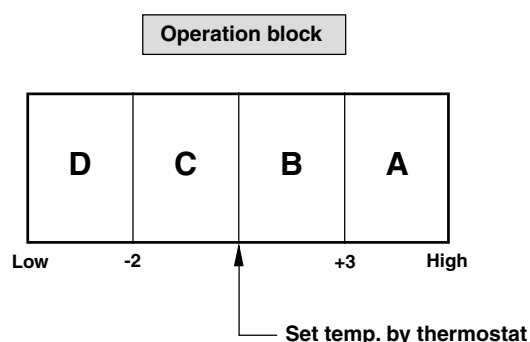
Note (1) ○ : ON

× : OFF

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

(d) Dehumidifying operation (“THERMAL DRY”)

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



Pattern of operation

CM, FM_o: ON FM_i: ON

Operation block	Thermal drying starting (for 8 or 16 minutes after operation started)	Normal thermal dry operation (after completion of thermal drying)
A	(16 minutes) Normal cooling operation • The air flow is set at 1 speed lower than the set air flow.	(8 minutes) Continuous cooling operation (FM _i :Lo)
B		(8 minutes)
C	(8 minutes) 	(8 minutes)
D		(8 minutes) All stoppage

Notes (1) Blocks (A) and (B): Normal cooling operation for 16 minutes after operation starts, then when the set temperature is reached, the thermostat stops. 16 minutes later, it switches to normal operation.

Blocks (C) and (D): The operation mode shown in the table above is performed for 8 minutes. After 8 minutes, it switches to normal operation.

(2) Under normal operation, the temperature is checked every 8 minutes after normal operation starts to determine which block is operating, then the operation mode is decided.

(e) Timer Operation

1) Simple Timer

This sets the amount of time from the current time that the air conditioner goes OFF.

The off time can be selected in 10 steps, from “Off 1 hour from now” to “Off 10 hours from now.” After the simple timer is set, the number of hours until the air conditioning goes off is displayed in one hour units from the current time.

2) Time Off Timer

The time the air conditioner goes OFF can be set in 10-minute increments.

3) Time On Timer

The time the air conditioner goes ON can be set in 10-minute increments. The set temperature can also be set at the same time.

4) Weekly timer

Each day, it is possible to set this timer's operation up to 4 times (ON time, or OFF timer).

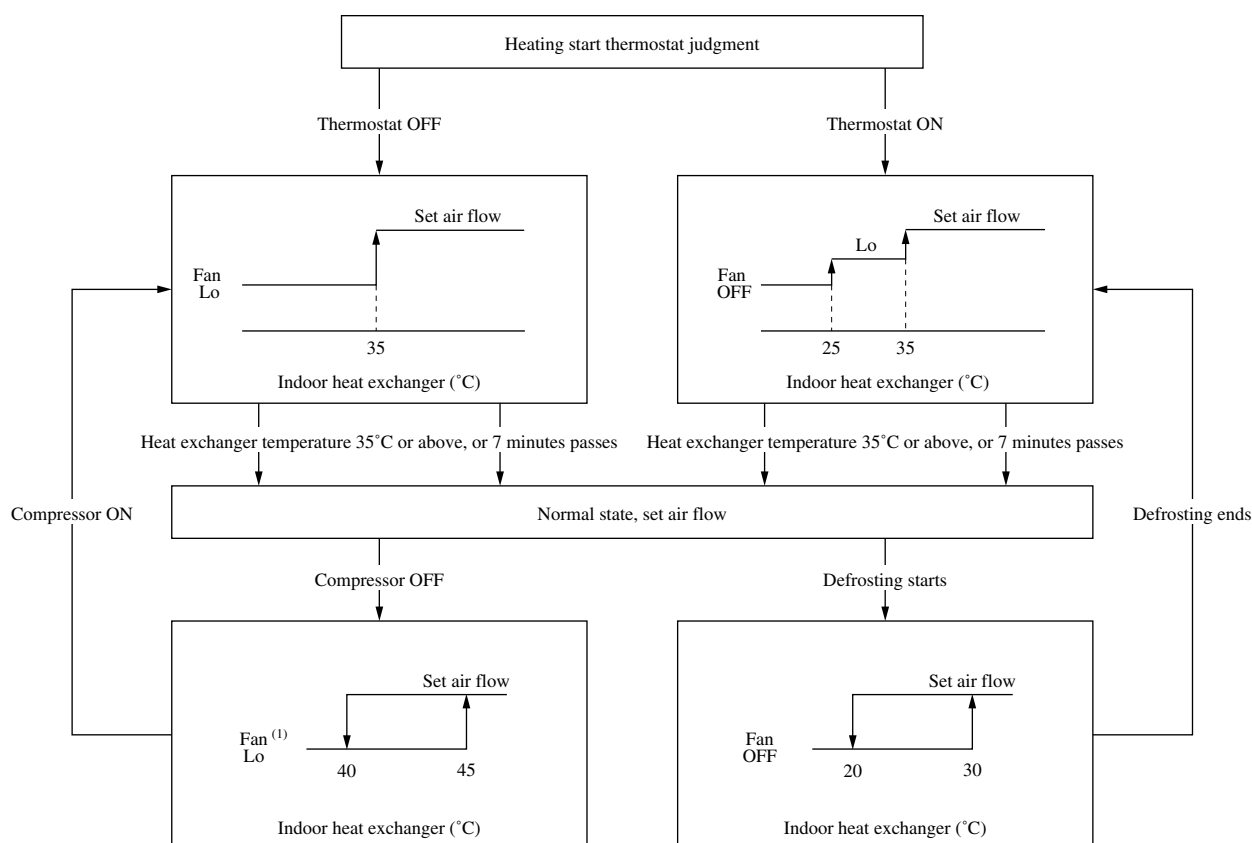
5) Possible joint use timer operation setting combinations

	Simple timer	Time OFF timer	Time ON timer	Weekly timer
Simple timer		×	○	×
Time OFF timer	×		○	×
Time ON timer	○	○		×
Weekly timer	×	×	×	

Note (1) ○: Possible, ×: Impossible

(f) Hot start (Cold draft prevention during heating)

When heating operation starts, when the thermostat is reset, during a defrosting operation or when resetting a heating operation, in order to prevent a cold draft, the indoor heat exchanger (sensed by Thi-R1 and R2) control the indoor fan.

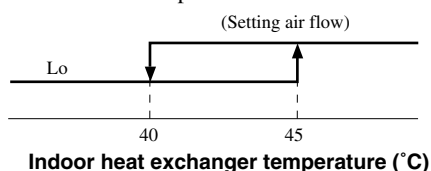


Notes (1) If J2 starts, it changes from OFF to Lo for 5 minutes.

(2) During Hot Start (the compressor is operating and the indoor fan is not operating at the set air flow), Heating preparation is displayed.

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

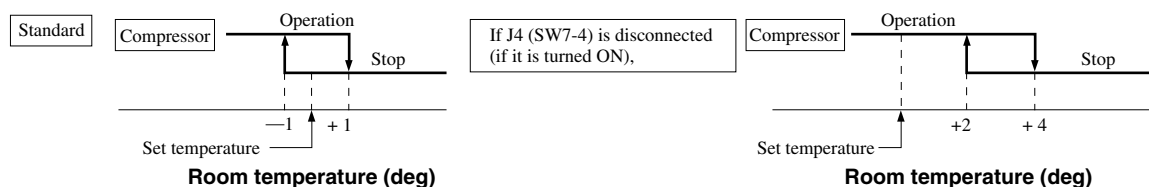
In order to prevent a cold draft while the heating thermostat is turned off, the indoor blower is controlled in response to the temperature of the indoor heat exchanger as illustrated below. It should be noted that if jumper wire J2 (SW7-2) on the indoor PCB is turned off, the indoor blower will stop so far as the temperature of the indoor heat exchanger is lower than 40°C. It will be turned to the Lo operation 5 minutes later.



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

(h) Room temperature sensing temperature compensation during heating

In the standard specifications, the temperature set on the thermostat is used to turn the compressor on and off, but in cases where the warm air easily escapes to the ceiling and the thermostat ends up turning off too soon, Jumper wire J4 (SW7-4) on the indoor PCB can be disconnected. When this is done, the compressor can be turned ON and OFF at the set temperature +3 degrees, and the feeling that the room is heated can be improved. However, the upper limit for the set temperature is 30°C.



(i) Filter sign

If operating time (the length of time the ON/OFF switch is ON) totals 180 hours⁽¹⁾, “FILTER CLEANING” is displayed on the remote control unit. (This is displayed whether the system is running or not, when the unit is broken down, and when there is central control.)



Notes (1) The following controls are enabled by the combination of the ON/OFF settings of 2 switches on the indoor unit PCB, SW5-3 and SW5-4. (They are switched OFF when the unit is shipped from the factory. The setting time is 180 hours.)


Switch	Function
SW5-3 OFF	Setting time: 180 hrs. (when shipped from factory)
SW5-4 OFF	
SW5-3 OFF	Setting time: 600 hrs. (Display)
SW5-4 ON	
SW5-3 ON	Setting time: 1000 hrs. (Display)
SW5-4 OFF	
SW5-3 ON	Setting time: 1000 hrs. (Unit stop)
SW5-4 ON	

(2) When SW5-3, SW5-4 is switched ON, the message “FILTER CLEANING” is displayed after the setting time has passed, then the unit stops after another 24 hours have passed (including stop time).


(j) Auto swing control (Except the FDUR model)


1) Louver Control

- While the air conditioner is operating, press the “LOUVER” switch.
“AUTO  ” is displayed for 3 seconds and the swing louvers move up and down continuously.
- When fixing the position of the swing louvers, press the “LOUVER” switch once while the swing louvers are moving. 4 stop positions are displayed in sequence at 1-second intervals.
When the display comes to the position where you would like to stop the louvers, press the “LOUVER” switch once more. The display will stop the message (ex. “STOP 1- ”) will be displayed for 3 seconds, then the swing louvers will stop.
- Louver operation when the louver 4-position controller’s power goes On
When the power is turned ON, the louvers automatically swing 1 time automatically (without remote control operation). This is done so that the microcomputer can confirm the louver’s position and input the louver motor’s (LM) position to the microcomputer.

Note (1) When the “LOUVER” switch is turned ON, the louver position LCD display displays the swing operation for 10 seconds.
Then “AUTO  ” is displayed for 3 seconds.

2) Auto louver horizontal set during heating

During display of “ ” (Heating Preparation) (during hot start and heating thermostat OFF), the louvers are in the horizontal position regardless of the operation of the auto swing switch (auto swing and louver stop). (In order to prevent cold drafts.) Also, the louver position display LCD continues the previous display from before this control started.

If the “ ” (Heating Preparation) display goes off, the LCD display also returns to the original display.

3) Louver free stop control

Setting an open circuit with jumper wire J5 (SW8-1), used for setting louver free stop, causes the louver motor to stop if there is a stop signal from the remote control unit and saves the position of the louver in memory. Then if there is an auto swing signal from the remote control unit, auto swing control starts from the previous stop position.

(k) Condensate pump motor (DM) Control [FDT and FDUM models only]

- (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 5 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 5 minutes at such occasion.
- (b) Overflow detection is performed by the float switch at all times regardless of the operating mode. If the float switch circuit is detected to be open continuously for 3 seconds (or when the float switch is disconnected or a wire is broken), an abnormal stop (E9) is performed and the condensate pump motor runs until the float switch recovers.

(l) Air flow mode control

Air flow mode control can be changed using DIP switch SW9-4 on the indoor PCB.

FDT, FDEN models

DIP SW Item	SW9-4 OFF (Mild Mode Control)	SW9-4 ON (Powerful mode Control)
Air flow mode	Hi, Me, Lo	UHi, Hi, Me

Notes (1) When the unit is shipped, SW9-4 is turned ON.

(2) If SW9-4 is ON, the fan operates in Me even during hot start and when the heating thermostat is OFF.

FDUM model

DIP SW Item	SW9-4 OFF (Standard)	SW9-4 ON (High speed)
Air flow mode	Hi, Me, Lo	UHi, Hi, Me

Notes (1) When the unit is shipped, SW9-4 is turned OFF.

(2) If SW9-4 is ON, the fan operates in Hi even during hot start and when the heating thermostat is OFF.

(m) Compressor inching prevention control

1) 3-minute timer

If the compressor stops due to operation of the thermostat, the Run switch on the remote controller or some trouble, it is not restarted after 3 minutes. However, when the power is turned ON, the 3-minute timer becomes inactive.

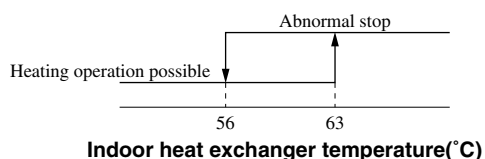
2) 3-minute forced operation timer

- a) For 3 minutes after the compressor goes ON, it does not stop. However, it will stop if the Run/Stop button is pressed and through a change in the operation mode, it still stop immediately when the thermostat goes OFF.
- b) During 3-minute forced operation timer control in heating operation, if the thermostat goes OFF, the louver position is set in the horizontal position.

Note (1) The compressor stops when protection control starts.

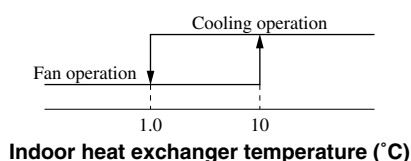
(n) Heating overload protection

If an overload condition is sensed continuously for 2 seconds by the indoor heat exchanger temperature during heating (sensed by Thi-R1 or R2), the compressor is stopped. After a 3-minute delay, the compressor is restarted. If the overload is sensed 5 times within 60 minutes of the first time it was detected, an abnormal stop is performed (E8). Also, if the overload state is sensed continuously for 6 minutes, it results in an abnormal stop.



(o) Frost prevention during cooling, dehumidification

In order to prevent frost during cooling and dehumidification, 3 minutes after compressor operation starts, if the indoor heat exchanger temperature (sensed by Thi-R1 or R2) is 3.5°C or lower for 30 seconds, the compressor's speed is lowered. 30 seconds later, if the indoor heat exchanger temperature is 3.5°C or lower, the speed is reduced still more. If the temperature becomes lower than 3.5°C continuously, this control is terminated. Furthermore, even if the compressor's speed is lowered, if the indoor heat exchanger becomes as shown in the diagram below, the unit switches to fan operation.



(p) Thermistor (Air return, heat exchanger) disconnected wire detection.

If the temperature sensed by the thermistor is -50°C or lower continuously for 5 seconds, the compressor stops. After a 3-minute delay, the compressor is restarted, but if a recurrence is detected within 60 minutes of the 1st time, or if it is sensed continuously for 6 minutes, it results in an abnormal stop (E6, E7).

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

1) Function

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

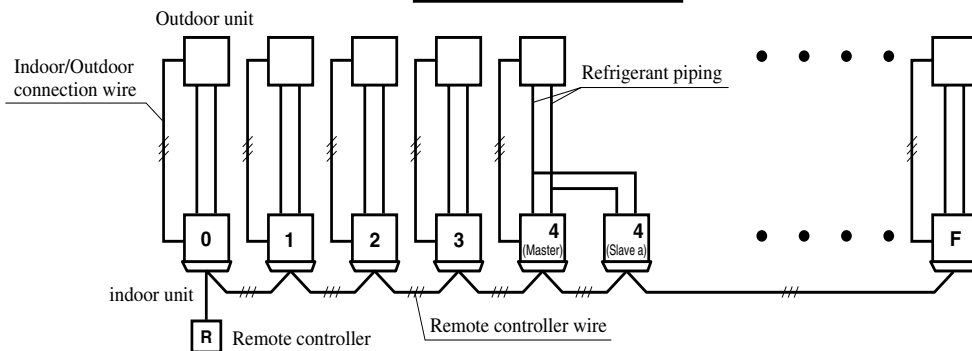
This functions independently of the thermostat and protection functions of each unit.

Notes (1) The unit No. is set using SW2 on the indoor unit control PCB. The SW2 unit No. setting only needs to be performed at the indoor units. For twin, triple or double twin specifications, setting of the master unit and slave units is necessary. This can be done using SW5. (All the units are set as the master unit at the factory.)

SW2: Set 0~9 and A~F.
SW5: Set as the master or slave unit.
(See the table at right.)

SW5 Setting

Switch Unit	SW5-1	SW5-2
Master	OFF	OFF
Slave a	OFF	ON



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

2) Display to remote controller

- a) Remote or center and heating preparation:** Displays for the youngest unit for the remote mode (center mode if there is no remote mode) of the units in operation.
- b) Inspection and filter sign:** Displays either to the first corresponding unit.

3) Confirmation of connected units

Pressing the "AIR CON No." switch on the remote control unit displays the indoor unit address. Pressing the ▲ or ▼ button displays the indoor units in the order of lowest to highest assigned No.

4) Error

- a)** If an error occurs (protection device activation) with some of the units in the group, those units will have an error stop, but the properly operating units will continue operation.
- b) Wiring outline**

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

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

1) External control (remote display) output

Following output connectors (CnT) are provided on the control PCB of indoor unit.

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

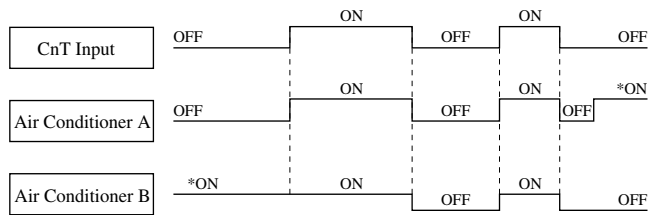
2) Control of input signal

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

Control of input signal (switch input, timer input) connectors (CnT) are provided on the control PCB of the indoor unit. However, when the operation of air conditioner is under the Center Mode, the remote control by CnT is invalid.

a) At shipping from factory J1 on PCB OFF

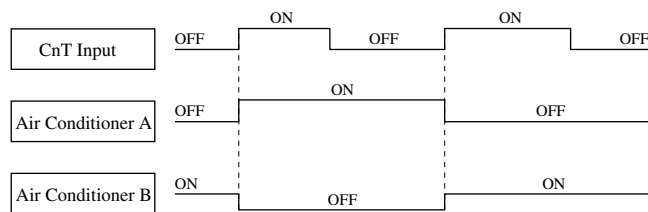
- Input signal to CnT OFF → ON [Edge input] ... Air conditioner ON
- Input signal to CnT ON → OFF [Edge input] ... Air conditioner OFF



Note (1) The ON at the * mark indicates ON using the remote control switch, etc.

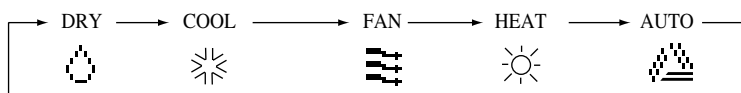
b) When J1 on the PCB of indoor unit is turned on at the field.

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



(3) Operation control function by the wired remote controller

(a) Remote controller operation mode switching sequence



(b) CPU reset

If the “GRILL” switch and “CHECK” switch on the remote controller are pressed at the same time, this function is activated. Power supply reset and run are the same.

(c) Power failure compensation function

- By setting the remote control functions, setting of the “POWER FAILURE COMPENSATION SETTING” is enabled.
- The remote controller’s status is always stored in memory, and after the unit is reset following a power failure, operation is resumed using the memory contents. However, the auto swing stop position and timer mode are cancelled, but the weekly timer setting is reset on both friday and holidays.

After power is restored, by resetting the clock, then canceling each day’s holiday setting, the weekly timer’s setting is enabled.

- Contents stored in memory for power failure compensation are as follows.

Note (1) Items ⑥, ⑦ and ⑧ are stored in memory regardless of whether power failure compensation is enabled or disabled, and the quiet mode setting is cancelled regardless of whether power failure compensation is enabled or disabled.

① When there is a power failure running/Stopped

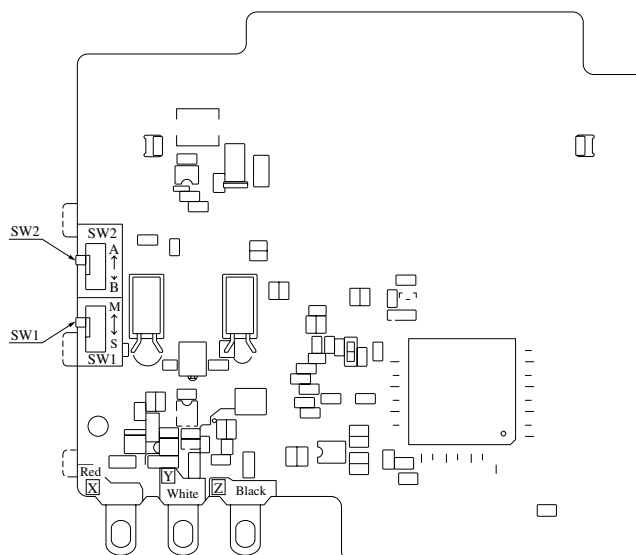
During operation in the off time timer mode and simple timer mode, the setting changes to stopped. (The timer mode is cancelled when power is restored, but the weekly timer setting for all days is changed to the holiday setting.)

- ② Operation mode
- ③ Fan speed mode
- ④ Room temperature setting
- ⑤ Louver auto swing/stop

However, the stop position (position 4) is cancelled and it becomes the horizontal position (1).

- ⑥ The remote control function item, set in accordance with the remote control setting (“Indoor unit function items” are stored in the indoor unit’s memory.)
- ⑦ Upper limit and lower limit values set by temperature setting control.
- ⑧ Weekly timer settings (other timer settings are not stored in memory).

Remote controller PCB parts arrangement



Control select switch (SW1)

Switch		Function
SW1	M	Master remote controller
	S	Slave remote controller

Note (1) SW2 is not normally used, so do not change the selection.

(4) Operation control function by the outdoor unit controller

(a) Deciding the compressor speed

The indoor unit's return air temperature and the set temperature are used to carry out fuzzy calculations, then the required speed is decided. Speed control compensation is then activated to decide the speed.

Unit required speed

(i) Dehumidify and cooling operation

Units: rps

Item	Model	Outdoor unit
	302 series	
Maximum required speed	88	
Minimum required speed	20	

(ii) Heating operation

Units: rps

Item	Model	Outdoor unit
	302 series	
Maximum required speed	95	
Minimum required speed	20	

(b) Compressor start control

At the point when compressor operating conditions are established, the control in either item (i) or item (ii) is executed.

- (i) The first time the compressor starts after the power is turned ON, or when the operating mode is the same as the operating mode the previous time the compressor ran, the compressor starts 5 seconds after the compressor ON conditions are established.
- (ii) If the mode reverses from the previous operating mode, the 4-way valve is switched 10 seconds after the compressor's ON conditions are established, then 10 seconds after that, the compressor starts.

(c) Compressor soft start control

(i) Compressor protective start I

- 1) Compressor protective start I is executed when the compressor starts.
- 2) Control contents
 - a) The commanded speed is set at 42 rps 30 seconds after the compressor starts, and the increase in speed at this time is 6 rps / 30 seconds.
 - b) 4 (2:Heating) minutes after the compressor starts, the speed is set at the target speed.

(ii) Compressor protective start III

- 1) The first additional time the compressor starts after the power is turned ON, compressor protective start III is executed.
- 2) Control content
 - a) Momentary stop judgment control
When 3 minutes have passed since the power was turned ON, the following judgment is implemented.
 - i) When the discharge pipe temperature (Tho-D) is 15°C or more higher than the outdoor air temperature (Tho-A), it is judged that an instantaneous stop is required. This control is stopped and the compressor is started under compressor protective start I.
 - ii) When the discharge pipe temperature (Tho-D) is less than 15°C above the outdoor air temperature (Tho-A), control changes to the operation mode judgment control in item b).

Note (1) The compressor is not started for 3 minutes after the power supply is ON.

b) Operation mode judgment control

Control changes to the following control required from the indoor units or in accordance with the SW5-4 setting (switching between cooling/heating) in test run control.

- When in the cooling and dehumidifying mode, control is switched to cooling start conditions judgment control in item i).
 - When in the heating mode, control is switched to high dilution operation prevention control in item v).
- i) Cooling start conditions judgment

If any of the following conditions is established, control is switched to low speed operation control in item iv). Also, if none of these conditions is established, control is switched to high dilution operation prevention control in item ii).

Conditions

- ① 6 hours have passed since the power was turned ON.
- ② The outside temperature (Tho-A) is 5°C or higher.

- ii) High dilution operation prevention control
If any of the following conditions is established, operation changes to forced heating operation in item iii).
- Conditions
- ① 30 minutes have passed since the power was turned ON.
 - ② SW8-2 (Compressor dilution timer cancel) is ON.
- iii) Forced heating operation
- ① In the heating mode, the speed is set at the starting speed in compressor protective start I, 42 rps, and at this time, the speed is increased by 6 rps every 30 seconds.
 - ② 2 minutes after starting, operation is in accordance with the target speed, but if the compressor stops during this control (including when the remote control is used to turn it OFF), this control is repeated.
 - ③ After 10 minutes, control is switched to low speed operation control in item iv).
- iv) Low speed operation control (Cooling, Dehumidifying mode)
- ① Compressor protective start I is implemented at the following compressor speeds and times.
Specified speed: 20 rps, Time: 10 min.
Note (1) During this control, if the compressor is stopped using a remote controller, etc., this control is repeated.
 - ② This control ends after 10 minutes of operation.
 - ③ **If the conditions of the following are established, it is judged that the service valve is closed and abnormal stop occurs (E49).**
 - When the low pressure sensor (LPT) measures 0.079 MPa or lower continuously for 15 seconds.
- v) High dilution operation prohibition control (Heating mode)
If any of the following conditions is established, control changes to the low speed operation control in item vi).
- 30 min. has passed since the power was turned ON.
 - SW8-2 is ON (for emergency measures)
- vi) Low speed operation control (Heating mode)
- ① Compressor protective start I is implemented at the following compressor speeds and times.
Specified speed: 42 rps, Time: 10 min.
Note (1) During this control, if the compressor is stopped by the remote controller, etc., this control is repeated.
 - ② This control is stopped after 10 minutes of operation.
 - ③ If the high pressure switch (63H1) is turned OFF, it is judged that the operation valve is closed and an abnormal stop (E40) occurs.

(d) Outdoor unit fan control

(i) Contents of fan tap and fan motor control during control

Unit: min⁻¹

Fan tap \ Model	302 series	
	Cooling	Heating
	FM01	FM01
6th speed	850	870
5th speed	810	760
4th speed	740	650
3th speed	600	500
2th speed	400	350
1th speed	200	200

(ii) Fan tap control when started

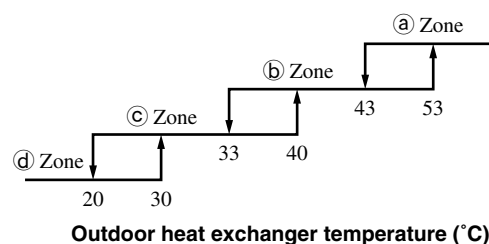
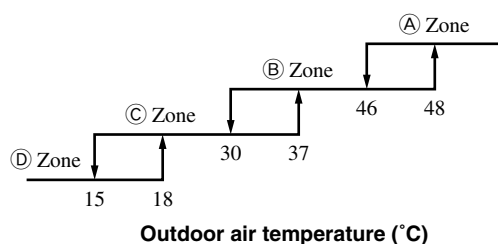
- 1) During heating and defrosting fan control
 - a) The outdoor unit's fan is started in 4th speed simultaneously with the start of compressor operation.
 - b) After 20 seconds of operation in 4th speed, outdoor fan control in item (iii) is executed.
- 2) During cooling, dehumidifying
 - a) When the outdoor air temperature (Tho-A) is 20°C or higher, the outdoor unit fan starts simultaneously with the compressor. The fan tap runs in 4th speed when starting and after 20 seconds, outdoor unit fan control in item (iii) is executed. (Normal control)
 - b) When the outdoor air temperature (Tho-A) is lower than 20°C, the outdoor unit fan starts 10 seconds after the compressor starts. The fan tap runs in 3rd speed when starting and after 20 seconds, outdoor unit fan control in item (iii) is executed.
 - c) When the outdoor air temperature (Tho-A) is lower than 10°C, the outdoor unit fan starts 10 seconds after the compressor starts. The fan tap runs in 2nd speed when starting and after 20 seconds, outdoor unit fan control in item (iii) is executed.
 - d) When the outdoor air temperature (Tho-A) is less than -5°C, the outdoor unit fan starts 10 seconds after the compressor starts. The fan tap runs in 1st speed when starting and after 20 seconds, outdoor unit fan control in items (iii) and (iv) is executed.

(iii) Outdoor unit fan control

1) Fan tap control during cooling and dehumidifying

The fan tap's speed is changed in accordance with the outdoor unit heat exchanger temperature (Tho-R1) and outdoor air temperature (Tho-A).

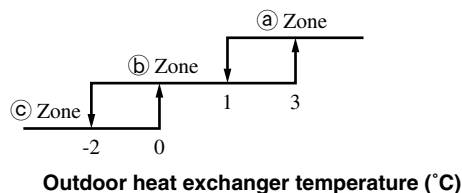
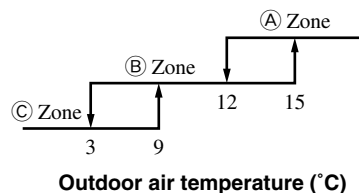
	Ⓐ Zone	Ⓑ Zone	Ⓒ Zone	Ⓓ Zone
Ⓐ Zone	6th Speed	6th Speed	5th Speed	4th Speed
Ⓑ Zone	5th Speed	5th Speed	4th Speed	3th Speed
Ⓒ Zone	4th Speed	4th Speed	3th Speed	2th Speed
Ⓓ Zone	3th Speed	3th Speed	2th Speed	1th Speed



2) Fan tap control during heating

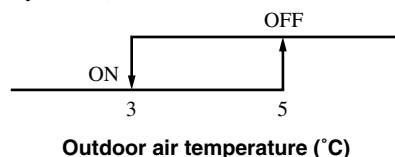
The fan tap's speed is changed in accordance with the outdoor unit heat exchanger temperature (Tho-R1) and outdoor air temperature (Tho-A).

	Ⓐ Zone	Ⓑ Zone	Ⓒ Zone
Ⓐ Zone	2th Speed	3th Speed	4th Speed
Ⓑ Zone	3th Speed	4th Speed	5th Speed
Ⓒ Zone	4th Speed	5th Speed	6th Speed



3) Snow protection fan control

When DIP switch (SW3-2) on the outdoor unit's control PCB is ON or when in the stop mode or the abnormal stop mode, the outdoor unit's fan runs at 4th speed for 1 minute and 30 seconds every ten minutes in accordance with the outdoor air temperature (sensed by Tho-A).



4) Cautions concerning outdoor unit fan start control

Before the compressor starts, if the outdoor unit's fan runs for 400 min⁻¹ or longer (including in reverse), the compressor may run by itself without the outdoor unit fan starting. This is not a breakdown.

5) If the outdoor unit's fan motor is sensed to be abnormal

- If the compressor is ON and the outdoor unit fan motor is turning at 100 min⁻¹ or less or is turning in reverse for 30 seconds or longer, the compressor stops instantly. After the compressor is stopped for 3 minutes, if the thermostat's ON conditions are established, the compressor starts.
- If it is detected 5 times within 60 minutes after the first detection, an abnormal stop (E48) occurs.

6) Outdoor unit fan control by power transistor cooling fan temperature

If all the following conditions are established 3 minutes after the compressor starts, the following control is implemented.

a) Cooling, Dehumidifying

- Outdoor air temperature $Tho-A \geq 33^{\circ}C$
- Actual compressor speed ≥ 60 rps
- Power transistor cooling fan temperature $\geq 80^{\circ}C$

b) Heating

- Outdoor air temperature $Tho-A \geq 16^{\circ}C$
- Actual compressor speed ≥ 70 rps
- Power transistor cooling fan temperature $\geq 80^{\circ}C$

c) Control contents

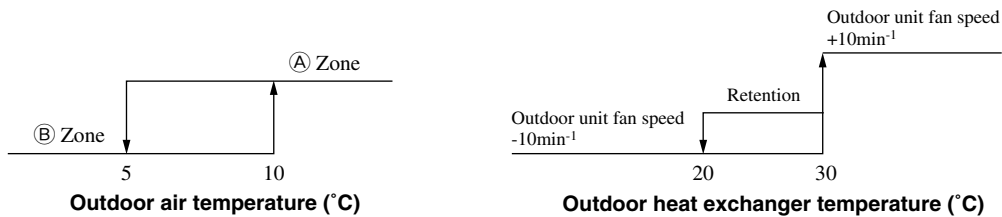
- i) The outdoor unit fan tap speed is increased by 1 speed.
- ii) When sampling is done once every 60 seconds and the power transistor cooling fan temperature ($Tho-P$) value is as follows.
 - ① If the power transistor cooling fan temperature ($Tho-P$) is $\geq 80^{\circ}C$, the outdoor unit fan tap's speed increases by 1 speed.
 - ② If $80^{\circ}C > Tho-P \geq 75^{\circ}C$, the current outdoor unit fan tap speed is maintained.
 - ③ If the power transistor cooling fan temperature ($Tho-P$) is $\leq 75^{\circ}C$, the outdoor unit fan tap speed is lowered by 1 speed.

d) End conditions

When the conditions in item ③ above and the outdoor unit fan tap speed determined in item (i) are sensed 2 times in succession.

(e) Outdoor unit fan control during cooling when the outdoor air temperature is low

- (i) When cooling or defrosting, if the outdoor air temperature ($Tho-A$) is in Zone B and when the outdoor unit's fan has run for 20 seconds since starting and is running at 1 speed, the outdoor unit's fan speed is controlled in accordance with the outdoor heat exchanger temperature ($Tho-R1$).



- (ii) If the rotational speed drops, the speed is held constant for 20 seconds, then if the conditions in (i) exist after 20 seconds, the speed is lowered further. The same is true in the case that the speed is increased. The speed is held constant for 20 seconds, then if the conditions in (i) exist 20 seconds later, the speed is increased further.

- Speed lower limit: 130 rpm
- Speed upper limit: 500 rpm

- (iii) If any of the following conditions is established, this control ends and the fan runs at the fan tap set in item (d). (iii).
- 1) The outdoor air temperature (Tho-A) is in Zone A and the outdoor heat exchanger temperature (Tho-R1) is sensed to be 30°C or higher continuously for 40 seconds or longer.
 - 2) The outdoor unit's fan speed is 500 min⁻¹, and the outdoor heat exchanger temperature (Tho-R1) is sensed to be 30°C or higher continuously for 40 seconds or longer.
 - 3) The outdoor heat exchanger temperature (Tho-R1) is sensed to be 45°C or higher continuously for 40 seconds or longer.

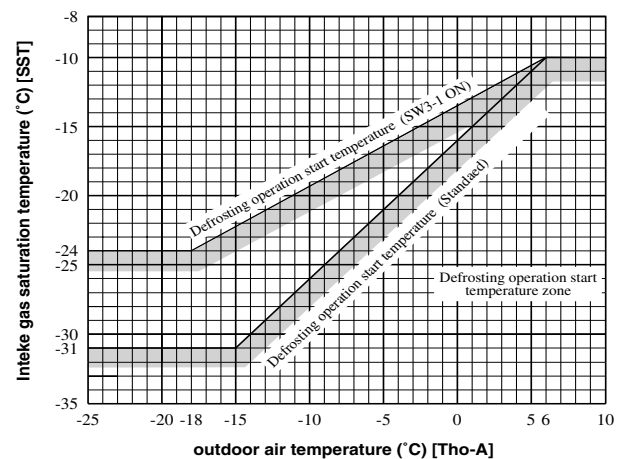
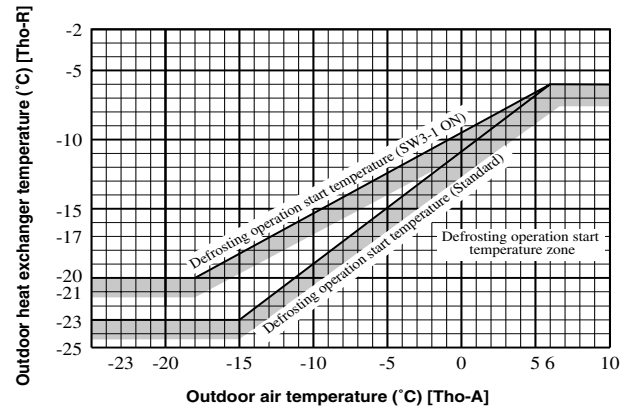
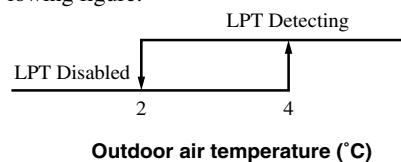
(f) Defrosting

(i) Defrosting start conditions

If all the following defrosting conditions A and B are satisfied, defrosting operation starts.

1) Defrosting conditions A

- a) If 30 minutes of cumulative compressor operation passes and after defrosting ends and if there is 37 minutes of cumulative compressor operating time after heating begins (with the remote control ON).
- b) 5 minutes passes after the compressor goes ON.
- c) 5 minutes passes after the outdoor unit fan runs.
- d) After all the above conditions are satisfied, if the temperature sensed by the outdoor heat exchanger thermistor (Tho-R1) and outdoor air temperature thermistor (Tho-A) remains at the defrosting start temperature or lower as shown in the figure at right for 15 seconds continuously, or the intake gas saturation temperature (SST), obtained from the low pressure sensor's (LPT) detected value and outdoor air temperature (Tho-A) are within a range that is below the defrosting start temperature range shown in the figure at right for 3 minutes. However, when 10 minutes have passed since the compressor started and the outdoor air temperature is as shown in the following figure.



2) Defrosting conditions B

- a) The conditions for ending the previous defrosting operation are a defrosting operation time up and a heating operation after a compressor running time of 30 minutes after defrosting ends.
- b) 5 minutes have passed since the compressor started.
- c) 5 minutes have passed since the outdoor unit's fan started running.

(ii) Changing the defrosting start temperature

Turn the DIP switch (SW3-1) on the outdoor unit's control PCB ON.

1) Defrosting condition A

After defrosting ends, 30 minutes passes cumulatively of the compressor running in a heating operation.

2) Defrosting condition B

After defrosting ends, 25 minutes passes cumulatively of the compressor running in a heating operation.

3) Other than items 1) and 2) above, other conditions are the same as the standard conditions.

(iii) Defrosting end conditions

If any of the following conditions is satisfied, the defrosting end operation starts.

1) 10 minutes and 20 seconds have passed since defrosting started.

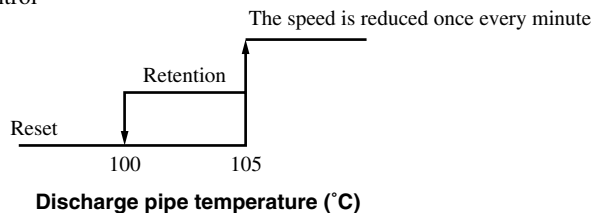
2) When the outdoor heat exchanger temperature (sensed by Tho-R1, whichever one senses the lower temperature) is 12°C or higher continuously for 10 seconds.

(g) Compressor protective control

(i) Discharge pipe temperature control

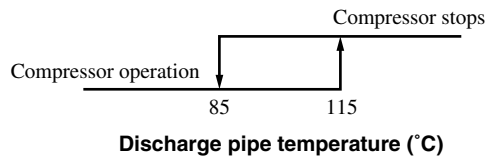
If the discharge pipe temperature (Tho-D) after the compressor starts becomes higher than the set temperature, the compressor's speed is controlled to suppress the rise in the discharge pipe temperature. If it rises still higher, the compressor is stopped.

1) Compressor speed control



2) Discharge pipe temperature abnormal

a) If the discharge pipe temperature has risen to 115°C or higher, the compressor is stopped. If it drops to 85°C or lower, the compressor restarts automatically.

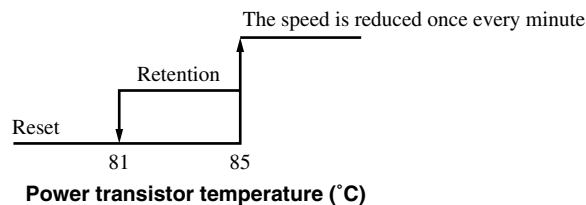


b) If the discharge pipe temperature is sensed to be 115°C or higher 2 times within a period of 60 minutes, or for 60 minutes continuously while the compressor is stopped, an abnormal stop (E36) is carried out.

Note (1) If the temperature does not drop to 85°C or lower continuously for 45 minutes after a discharge pipe temperature error occurs, operation cannot be restarted. (This can be set using the remote controller.)

(ii) Power transistor temperature control

If the power transistor temperature (Tho-TR) rises to 85°C or higher, the compressor speed is controlled. If the power transistor temperature drops to 81°C or lower, this control ends and the speed protection cancel operation starts.



(iii) Current safe control

- 1) If the inverter inflow current (CT current) becomes higher than the following set value, the compressor's speed is lowered. If the current is still above the set value after the speed is lowered, the speed is lowered still further.

Model	Set valve (A)
302 series	15(16)

Note (1) Values in () show the values during heating.

- 2) If the current value drops to or below the cancellation value continuously for 3 minutes, this control is ended and the speed protection cancel operation is started.

(iv) High pressure control

- 1) Compressor speed control during heating

If the compressor's speed exceeds the speed in the following table, the compressor's speed is controlled at the upper limit value in accordance with the indoor heat exchanger temperature (ThI-R1) during operation.

Item	Model	302 series
Compressor rotational speed (rps)		20
Indoor heat exchanger temp (°C)		52 ~ 58

- 2) Compressor speed control during cooling

If the compressor's speed exceeds the speed in the following table, the compressor's speed is controlled at the upper limit value in accordance with the outdoor heat exchanger temperature (Tho-R1) during operation.

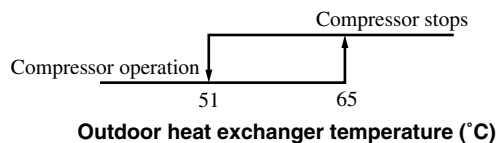
Item	Model	302 series
Compressor rotational speed (rps)		20
Outdoor heat exchanger temp (°C)		52 ~ 58

- 3) Operation stop control according to indoor heat exchanger temperature

If an indoor heat exchanger temperature (sensed by ThI-R1) of 65°C or higher is detected continuously for 2 seconds during compressor operation in the heating mode, the compressor's speed is controlled. If the indoor heat exchanger's temperature drops to 47°C or lower, this control ends and the speed protection cancellation operation starts.

- 4) Control according to the outdoor heat exchanger temperature

- a) If an outdoor heat exchanger temperature (sensed by Tho-R1) that is higher than the set value is detected, during compressor operation in the cooling mode, the compressor is stopped. When the temperature drops to or below the set value, compressor operation resumes automatically.



- b) If the outdoor heat exchanger temperature exceeds the set value 5 times within a period of 60 minutes or continuously for 60 minutes even when the compressor is stopped, the unit is subjected to an abnormal stop. (E35).

Note (1) If an outdoor heat exchanger temperature abnormal stop occurs and the temperature does not drop to 51°C or lower for 3 minutes continuously, operation cannot be resumed.

- 5) Abnormality detected by the high pressure switch (63H1)

If the pressure rises and the high pressure switch (4.15 open/3.15 closed MPa) operates (opens) 5 times within 60 minutes or operates (remains open) continuously for 60 minutes even when the compressor is stopped, the compressor performs an abnormal stop (E40).

(v) Low pressure control (LPT)

- 1) Compressor speed protective control

- a) If all the following conditions are satisfied 5 minutes or more after the compressor starts or after a defrost reset, the compressor's speed is lowered.
 - ① If the low pressure is 0.15 MPa or lower continuously for 10 seconds.
 - ② If the compressor speed is 20 rps or higher.
- b) The low pressure is detected again 30 seconds later, and if it is lower than 0.15 MPa, the compressor speed is lowered again.
- c) If the low pressure becomes 0.189 MPa or higher, this control ends and the speed protection cancel operation begins.

2) Low pressure error detection

a) If either of the following conditions is satisfied, the compressor is stopped.

- ① If the low pressure is 0.079 MPa or lower continuously for 15 seconds after the compressor starts.
- ② If the low pressure is 0.15 MPa after 10 minutes have passed since the compressor started and superheating at 30°C continues for 60 seconds.

b) Operation resumes automatically when the low pressure becomes 0.227 MPa or higher.

c) If the conditions in ① or ② of item a) above occur 3 times within 60 minutes or if the low pressure drops to 0.079 MPa or lower for 6 minutes or longer continuously, including when the compressor is stopped, the unit is subjected to an abnormal stop (E49).

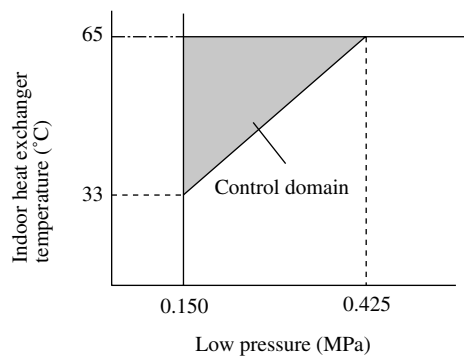
(iv) High pressure ratio protection control

During a heating operation, the compressor's speed is controlled in accordance with the low pressure (LPT) and indoor heat exchanger temperature (ThI-R1).

1) Start conditions

When all the following conditions are satisfied

- a) 10 minutes have passed since the compressor started.
- b) The outdoor unit fan is ON and 10 minutes have passed since the outdoor unit fan started.
- c) 10 minutes have passed since defrosting ended.
- d) When the low pressure and indoor heat exchanger temperature detected values are within the control region shown in the following figure for 30 seconds.



2) Control contents

The compressor's speed is lowered. 1 minute later, detection is repeated and if the conditions in item d) continue to exist, the speed is lowered still further.

3) End conditions

When operation is outside the control region shown in item d) above for 6 minutes continuously.

(h) Inverter protection control

(i) Current cut control

This prevents overcurrent at the inverter. If the current exceeds the set value, the compressor stops. It restarts automatically 3 minutes later, but if the current is cut 4 times within a period of 30 seconds, an abnormal stop (E42) occurs.

(ii) Power transistor overheating protection

- 1) If the power transistor's temperature rises to 110°C or higher, the compressor stops. If the temperature drops to 90°C or lower after 3 minutes, the compressor restarts automatically.
- 2) If this operation is repeated 5 times within 60 minutes, or the temperature rises to 110°C or higher for 15 minutes continuously, an abnormal stop occurs.

(i) Open phase protection

If the voltage of either the L1, L2 or L3 phase is 0 V for 5 seconds continuously after the power is turned ON, it is judged that there is an open phase state in the power supply, and 1 second later, an abnormal stop (E34) occurs.

(j) Temperature thermistor (outdoor heat exchanger, outdoor air, discharge pipe, suction pipe) and low pressure sensor disconnection sensing

(i) Outdoor heat exchanger temperature thermistor, outdoor air temperature thermistor, low pressure sensor

If the conditions on the following page are detected for 5 seconds continuously between 2 minutes to 2 minutes 20 seconds after the compressor goes ON, the compressor goes off. After a 3-minute delay, the compressor is restarted, but if this state is detected 3 times within a 40-minute period, an abnormal stop occurs.

Note (1) This is not detected during defrosting and for 3 minutes after defrosting.

- Outdoor heat exchanger thermistor: -50°C or lower
 - Outdoor temperature thermistor: -30°C or lower
 - Low pressure sensor: 0 V or lower, or 3.49 V or higher.
- (ii) Discharge pipe temperature thermistor, suction pipe temperature thermistor
- After the compressor goes ON, if the following is detected for 5 seconds continuously between 10 minutes and 10 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3-minute delay, the compressor is restarted, but if this state is detected 3 times within a 40-minute period, an abnormal stop occurs.

Note (1) This is not detected during defrosting and for 3 minutes after defrosting.

- Discharge pipe temperature thermistor: -10°C or lower
- Suction pipe temperature thermistor: -50°C or lower

(k) Test operation

- (i) It is possible to operate the outdoor unit using SW5-3 and SW5-4 on the outdoor unit PCB.

SW5-3	ON	SW5-4	OFF	Cooling test operation
			ON	Heating test operation
	OFF	Normal or test operation end		

Be sure to turn SW5-3 OFF when operation ends.

- (ii) Test operation control
- 1) Operates the air conditioner at the predetermined maximum speed for each model.
 - 2) Each protective control and abnormal sensing control is activated.
 - 3) If the setting of SW5-4 is changed during trial operation, stop control is performed, and the compressor is stopped temporarily, and operation is switched between cooling and heating.
 - 4) Remote control settings and display during trial operation.

Item \ Capacity	Remote controller settings, display contents
Cooling test operation	The set temperature is 5°C.
Heating test operation	The set temperature is 30°C.

(l) Silent mode control

Silent operation according to the remote control function setting.

- (i) It runs at a speed that is lower than the outdoor fan control speed in item (d).
- 1) Fan tap during cooling and dehumidifying operation

	(A) Zone	(B) Zone	(C) Zone	(D) Zone
(a) Zone	6th Speed	5th Speed	5th Speed	4th Speed
(b) Zone	5th Speed	5th Speed	3th Speed	3th Speed
(c) Zone	4th Speed	3th Speed	3th Speed	2th Speed
(d) Zone	3th Speed	3th Speed	2th Speed	1th Speed

- 2) Fan tap during heating

	(A) Zone	(B) Zone	(C) Zone
(a) Zone	3th Speed	3th Speed	3th Speed
(b) Zone	3th Speed	3th Speed	5th Speed
(c) Zone	4th Speed	5th Speed	6th Speed

(m) Pump down control

If the pump down switch SW9 is turned on for 2 seconds during an operation stop and abnormal stop (not including when the thermostat is OFF), pump down operation starts. (It is disabled during indoor unit operation. It is enabled during an abnormal stop of the indoor unit and during power OFF.)

(i) Control contents

- 1) Close the liquid side service valve. (Leave the gas side fully open.)
- 2) In the cooling mode, set the target speed at 62 rps and start the compressor.
- 3) The red and green indicators (LED) on the outdoor unit's control PCB keeps flashing.
- 4) Except for low pressure control, each protective and abnormal sensing control is enabled.
- 5) The outdoor fan is controlled the same as normal.
- 6) The electronic expansion valve (cooling, heating) is fully opened.
- 7) The solenoid valve (SV1) goes on for 2 minutes after the pump down operation starts and after that, it goes OFF.

(ii) Control end conditions

Stop control is executed according to any of the following conditions.

- 1) A low pressure of 0.087 MPa or lower is detected continuously for 5 seconds.
 - Ⓐ Red LED: On, Green LED: flashing, Remote controller: displays stopped.
 - Ⓑ Restarting is possible when low pressure exceeds 0.087 MPa.
 - Ⓒ The electronic expansion valves (cooling, heating) remain fully open.
- 2) Stop according to error detection control
 - Ⓐ Red LED: On, Green LED: flashing is displayed.
 - Ⓑ Restarting is not possible. ordinary operation is restored by resetting the power supply.
 - Ⓒ The electronic expansion valves (cooling, heating) remain fully open.
- 3) When the cumulative compressor operating time by pump down control is 5 minutes.
 - Ⓐ Red LED: Off, Green LED: flashing, Remote controller: Stop.
 - Ⓑ Pump down repeat is possible.
 - Ⓒ The electronic expansion valves (cooling, heating) remain fully open.

Note (1) Close the gas side operating valve after the compressor stops.

Caution: If the pump down switch is pressed, communications with the indoor units is cancelled, so the message "communications error – E5" is displayed on the indoor unit and the remote controller, but there is no error.

1.5 APPLICATION DATA

SAFETY PRECAUTIONS

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



WARNING

- Installation should be performed by the dealer or a company specializing in this type of installation. If you install the equipment yourself, installation errors could result in water leaks, electric shock, and/or a fire, as well as other hazards.
- Conduct installation work in accordance with the instructions in this installation manual. Installation errors could result in water leaks, electric shock, or fire.
- Sling the unit at the specified points with ropes properly rated for the weight in lifting it for portage. An improper manner of portage can result in a fall of the unit resulting in an accident involving personal death or injury.
- When installing a unit in a small room, take measure so that if the refrigerant leaks, it does not exceed the concentration limit. For information regarding measures to prevent the concentration limit from being exceeded, please contact the dealer.
- If refrigerant leaks and the concentration limit is exceeded, suffocation could occur.
- Install the equipment in a location that can sufficiently support the weight of the equipment. If the area is not strong enough, an accident could result from the unit falling.
- Install the equipment in a location that can withstand strong winds, such as typhoons, and earthquakes. If the installation is not secure, an accident could result from the unit falling.
- Always turn off power before work is performed inside the unit such as for installation or servicing. A failure to observe this instruction can cause a danger or electric shock.
- Electrical work should be done by a licensed electrician who shall do the work in accordance with the Technical Standards Regarding Electrical Equipment, Indoor Wiring Provisions, and this installation manual. The electrician shall use specified circuits for the equipment. If the power supply circuit capacity is insufficient or the work is not done correctly, it could result in electric shock or a fire.
- For wiring, the specified cable should be used, the connections should be secure, and the fixtures shall be strong enough to prevent cables from being pulled out from the terminal connections. Incorrect connections or work fixtures could result in heat generation or a fire.
- In cabling, arrange cables suitably so that they may not get off their support and then fix the service panel securely. Improper installation can cause heat generation and a resultant fire. Please prevent any substance other than the specified refrigerant (R410A) such as air from entering the refrigerant cycle in installing or moving the air conditioning system. Contamination by air or a foreign substance can cause an abnormal pressure build-up inside the refrigerant cycle and a resultant explosion and personal injury.
- Use only parts supplied with the unit and specified supply parts for installation. The use of unauthorized parts may cause the leaking of water or electricity causing a danger of electric shock or a fire, a refrigerant leak, performance degradation, and control failures.
- Do not open operation valves (either liquid or gas or both) until refrigerant piping, an air-tightness test and an air purge are completed. When a leak of refrigerant gas occurs during piping work, stop brazing pipes and ventilate the room. Refrigerant gas, when it comes into contact with bare fire, can generate a toxic gas.
- When installation is completed, check for refrigerant gas leaks. If the refrigerant gas leaks indoors, it could come in contact with a fan heater, burner, or hot plate, which could generate a poisonous gas.



CAUTION

- Ground the equipment. Do not connect the ground wire to gas piping, water piping, a lightning rod, or telephone ground wires. If grounding is not performed correctly electric shock could occur.
- Depending on the installation location, a circuit breaker may need to be installed. If a circuit breaker is not installed, electric shock may occur.
- Please follow this manual faithfully in performing installation work. Improper installation work can cause abnormal vibrations and noise generation.
- Do not install the equipment in areas where there is danger of flammable gas leaks. If such gas does leak it could collect around the units and cause a fire.
- Install the drain piping in accordance with the installation manual so that it properly discharges waste water and is maintained at a temperature that prevents condensation.
- Do not install the outdoor unit where winds from its fan blow directly onto a plant, etc. Winds can affect adversely to the plant, etc.
- Secure a space for inspection and maintenance as specified in the manual. An insufficient space can result in an accident such as a fall from the installation point and a resultant personal injury.
- When the outdoor unit is installed on a roof or at an elevated point, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.
- In tightening a flare nut, use a double spanner and observe the specified tightening torque. Care must be taken so as not to over-tighten a nut and damage the flare part. (Please refer to the tightening torque) The loosening or damage of the flare part can cause a refrigerant gas leak and a resultant lack-of-oxygen accident.
- Please dress the refrigerant piping with a heat insulation material for prevention of dew condensation. Improper heat insulation for prevention of dew condensation can cause the leaking or dripping of water and a resultant soaking of household effects.
- When refrigerant piping is completed, check its air-tightness with nitrogen gas to make sure it does not have a leak. A leak of refrigerant gas in a narrow room beyond the safety limit concentration can cause a lack-of oxygen accident.
- If the humidity exceeds 80% or the drain or piping become clogged, condensation from the indoor unit could drip and cause damage. Please do not install the indoor units above items of furniture, etc. that you do not want to get wet. Also, do not place items that you do not want to get wet underneath the indoor units.



1.5.1 Installation of indoor unit

(1) Ceiling recessed type (FDT)

(a) Selection of installation location

- 1) Select location where the space above ceiling is larger than those mentioned right side and perfect draining can be assured.
- 2) With the customer's consent, select a location with following suitable conditions.
 - a) Where cool air or hot air can easily pass through.
If the height of the location exceeds 3 m, hot air will gather in the ceiling. Suggest to the customer to also install a circulator.
 - b) Where water can be completely drained. A sloping location for drainage.
 - c) Where there are no wind disturbances to the suction inlet and blowing outlet, where the fire alarm will not be set off erroneously, where no short circuits occur.
 - d) Where there is no direct sunlight.
 - e) Where the dew point temperature is below 28°C and the relative humidity is below 80%.

Model	Space above ceiling
FDTA301R	Over 290mm

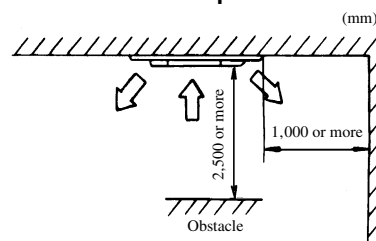
The unit has been tested according to JIS dew point conditions and has been confirmed to operate without any problems. However, if the unit is operated in an environment with the humidity higher than the above limit, water condensation may occur. Accordingly, all pipes and drain pipes should be further covered with insulation materials of 10 - 20 mm thick.

- 3) Consider the supporting strength of the location. If the strength is not sufficient to sustain the unit weight, use reinforcing materials.

(b) Installation space for unit

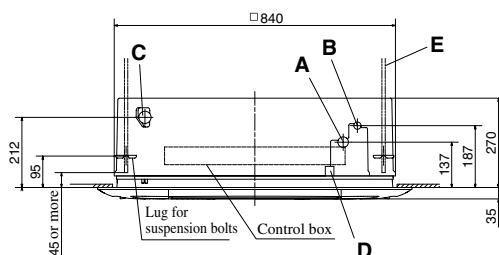
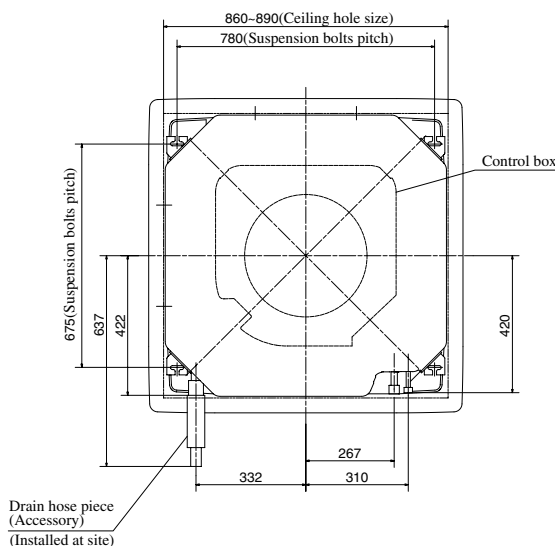
- a) When a sufficient interval cannot be secured between the unit and a wall or another unit, shut up diffusers on that side to block winds and make sure that no short-circuiting is occurring. (A wind blocking material is available as an optional part)
 - Do not use the unit in the “Lo” wind mode when winds are blown into two or three directions.
- b) When the unit has 2500 mm or less clearance, attach a fan guard (option part) on the intake side of the fan.

• Installation space



Note (1) In the case of neighboring installations, separate the units by the following dimensions or greater.

Item	Dimensions
Model	
FDTA301R	4000



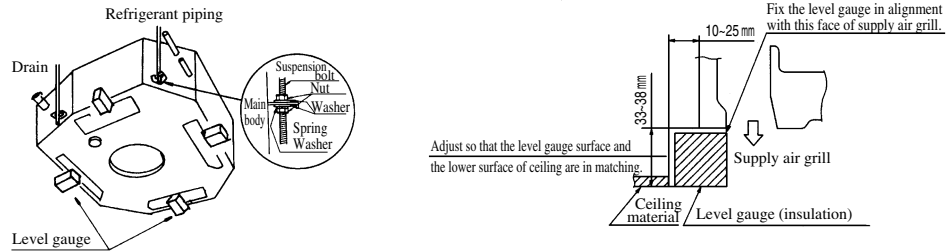
A	Gas tube connecting port
B	Liquid tube connecting port
C	Drain line connecting port
D	Power intake
E	Hanging bolt

(c) Suspension

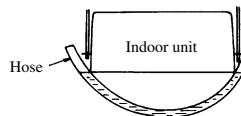
- Please arrange four sets of a suspension bolt (M10 or M8), a nut matching the bolt, a flat washers and a spring washer on the installation site.

When suspension from the ceiling

- 1) In the case of the standard series: Cut and opening of □860 ~ □890.
In cutting an opening on the ceiling, use the unit's cardboard container for shipment as a reference of the size of opening.
 - The center of the opening on the ceiling must accord with the center of the unit.
- 2) Determine the positions of suspension bolts (675 × 780).
- 3) Use four suspension bolts, each fastened in such a manner that it can withstand pull force of 50 kgf.
- 4) Make suspension bolts to the length that leaves approximately 70 mm of them above the ceiling.
- 5) After hoisting in the unit, attach level gauges supplied as accessories and determine the unit position (height).



- 6) Use a transparent tube with water filled inside to check the level of the unit. (A tolerable height difference at an end of the unit is within 3 mm)



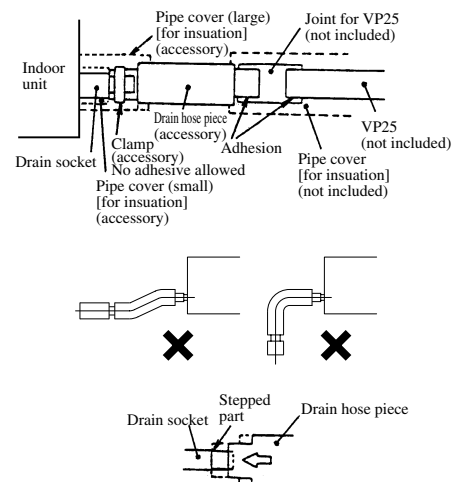
When embedded into ceiling

- 1) Determine the positions of suspension bolts (675 × 780).
 - The pitch center of a suspension bolt must accord with the center of the unit.
- 2) Use four suspension bolts, each fastened in such a manner that it can withstand pull force of 50 kgf.
- 3) In cutting an opening on the ceiling, use the unit's cardboard container for shipment as a reference of the size of opening.
- 4) Fix the unit as per A-5 and 6 above.
 - The unit's cardboard container for shipment can be used to cover the indoor unit.

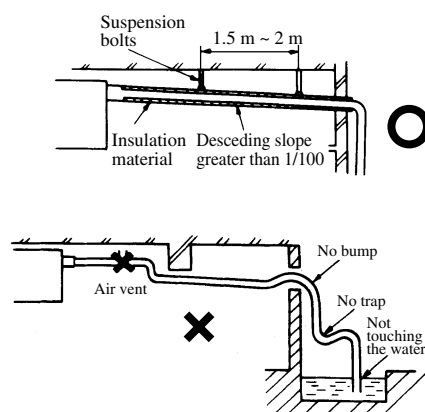
Note (1): When a hanging bolt exceeds 1.3 m in length, use an M10 bolt and give it reinforcements such as braces.

(d) Drain Piping

- 1) Glue the drain hose supplied as an accessory and a VP-25 joint before lifting the unit.
- 2) The drain hose is to provide a buffer to absorb a slight dislocation of the unit or the drain piping during installation work. If it is subject to abuse such as being bent or pulled deliberately, it may break, which will result in a water leak.
- 3) Care must be taken so as not to allow an adhesive to run into the drain hose. When it is hardened, it can cause a breakage of a flexible part, if the flexible part receives stress.
- 4) Use VP-25 general-purpose hard PVC pipes for drain piping.
- 5) Insert the drain hose supplied as an accessory (soft PVC end) to the stepped part of the unit's drain socket and then fasten it with the clamp also supplied as an accessory.
- 6) Adhesive must not be used.
 - a) Glue a VP-25 joint (to be procured locally) to joint it with the drain hose (hard PVC end) and then glue a VP-25 (to be procured locally) to the joint.



- b) Give the drain piping a descending grade (1/50-1/100) and never create a bump to go over or a trap.
- c) In connecting drain pipes, care must be taken so as not to apply force to the unit side piping and fix the pipe at a point as close to the unit as possible.
- d) Do not create an air vent under any circumstances.
- e) When drain piping is implemented for more than one unit, provide a collecting main about 100 mm below the units' drain outlets from which it collects drain. Use a VP-30 or larger pipe for a collecting main.
- f) Do not fail to provide heat insulation at the following two points because they can cause dew condensation and a resultant water leak.



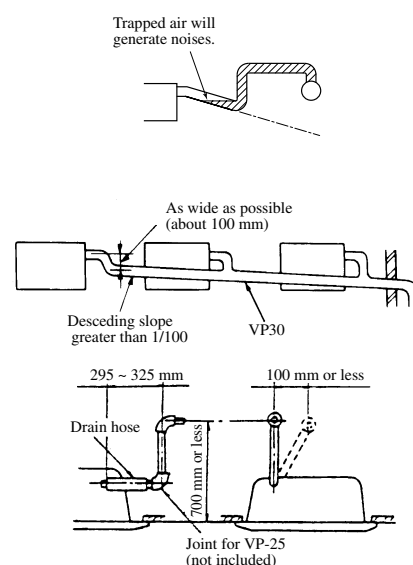
7) Drain socket

After a drain test is completed, apply a pipe cover (small: accessory) onto the drain socket, cover the pipe cover (small), the clamp and part of the drain hose with a pipe cover (large: accessory) and wrap it with a tape completely without leaving any gaps.

(Cut pipe covers into appropriate shapes)

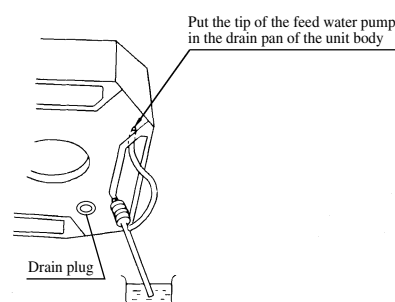
8) Hard PVC pipes laid indoor

- a) Since a drain pipe outlet can be raised up to 700 mm from the ceiling, use elbows, etc. to install drain pipes, if there are obstacles preventing normal drain pipe arrangement. When the drain pipe is raised at a point far from a unit, it can cause an overflow due to a back flow of drain upon stoppage, so arrange piping to keep the dimensions specified in the illustration shown on the left.
- b) Install the drain pipe outlet where no odor is likely to be generated.
- c) Do not lead the drain pipe into a ditch where the generation of harmful gas such as sulfuric gas or flammable gas is expected. A failure to observe this instruction may cause such harmful or flammable gas to flow into the room.



Drainage test

- ① Check that water is draining thoroughly during test run, and that there are no water leaks from the joints and the drain pan.
- ② The test has to be performed even if the unit is installed in the season when the unit is used for heating.
- ③ In a new house, perform the test before the ceiling is fitted.
 - Using a water pump, pour about 1000 cc of water to the drain pan through the blowing outlet.
 - Check the transparent drain-out section of the drain hose for normal flow of drainage.
 - * While observing the noise from the drain motor, test drain operation.
 - Take off the drain plug to release the water. After the water is drained, place the drain plug back where it was.
 - * Be careful not to get splashed when pulling the drain plug.



Forced drain pump operation

- ◆ Setup from a unit side.
- ① Turn power on after selecting the emergency operation mode with a setting on the indoor unit control PCB (SW9-3 ON) and disconnecting the CnB connector on the board. Then, the drain pump will start a continuous operation 15 seconds later. (Note: The blower will also start operation in tandem)
- ② When a drain test is completed, reinstate the setting to cancel the emergency operation mode (SW9-3 OFF) and plug in the CnB connector on the board. (When electrical work is not completed, connect a convex joint to the drain pipe joint area, arrange an inlet and check leaks and drain connections of the pipe)

◆ Setup from a remote controller side.

Drain pump operation from a remote controller unit is possible. Operate a remote controller unit by following the steps described below.

1. To start a forced drain pump operation.

- ① Press the TEST button for three seconds or longer.

The display will change from “▲ SELECT ITEM ”→ “○ SET ”→ “☼ TEST RUN ▼ ”

- ② Press the ▼ button once while “☼ TEST RUN ▼ ” is displayed, and cause “ DRAIN PUMP ◆ ” to be displayed.

- ③ When the SET button is pressed, a drain pump operation will start.

Display: “ DRAIN PUMP RUN ”→ “○ SET → STOP ”

2. To cancel a drain pump operation.

- ④ If either SET or ON/OFF button is pressed, a forced drain pump operation will stop.

The air conditioning system will become OFF.

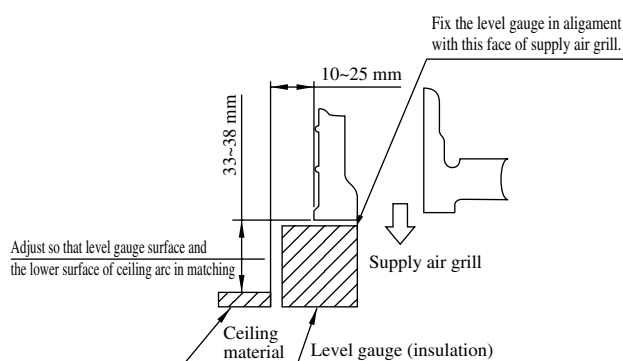
(e) Panel installation

1) Accessories

Name	Quantity
Air inlet grille	1
Air filter	1
Suspension bolts	4

2) Confirm the unit's installation level.

- Make sure from the level gauge (insulation) packed with the air conditioner unit that the installation height of the unit and the dimensions of the opening in the ceiling are correct.
- Confirm the installation level of the air conditioner unit and ceiling material.
- Affix the level gauge included with the air conditioner unit and fix the unit's installation height.
- Remove the level gauge before installing the unit.
- The unit's installation height can be minutely adjusted by means of the corner openings after the panel is installed. (For details, see 6) “Installing the Panel.”)



Note (1) : If the installation level of the air conditioner unit and ceiling material exceed the proper range, it will cause an undue load to be broken during installation of the panel and could cause damage.

3) Unit installation direction and panel and air return grille direction

- (a) The unit and panel installation orientation is directional.
- Match up the outlet (small) parts with the refrigerant piping direction.
 - Make sure of the motor and switch connector connection directions.
- (b) The panel and air return grille installation orientation is not directional.

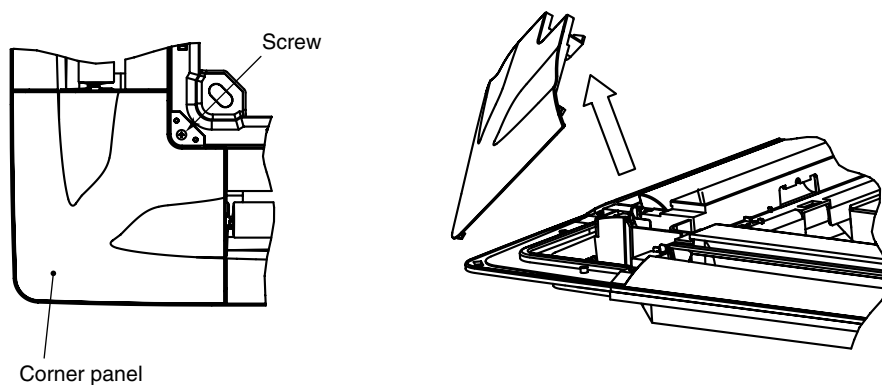
If you are changing the direction of the air return grille, change the panel's striker installation position to the “Pull” character position direction on the surface of the grille.

4) Removing the air return grille

- ① Raise up the notched portion of the air return grille and open it.
- ② With the air return grille open, remove the air return grille hinge from the decorator panel.

5) Removing the corner panel

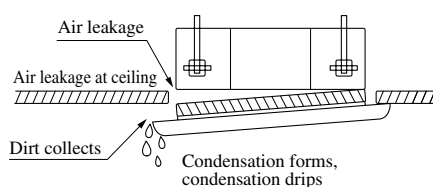
- Take out the screw in the corner, then lift up the corner panel in the arrow direction and remove it.



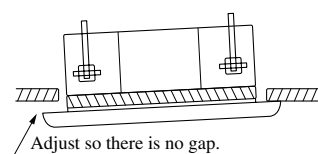
6) Panel installation

- ① Screw in lightly 2 of the 4 air conditioner unit suspension bolts in opposite corners from each other by about 5 mm.
(Fasten the drain piping side and the opposite corner temporarily.)
- ② Hang the panel on the two suspension bolts to install it temporarily.
- ③ Install the two remaining suspension bolts and tighten all four of the bolts.

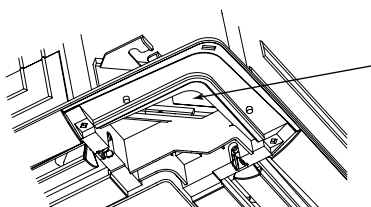
Notes (1) : If the suspension bolts are not tightened sufficiently, it could cause the following trouble, so tighten the bolts securely.



(2) : If there is still a gap between the ceiling and the decorator panel even after the suspension bolts are tightened, readjust the height of the indoor unit.



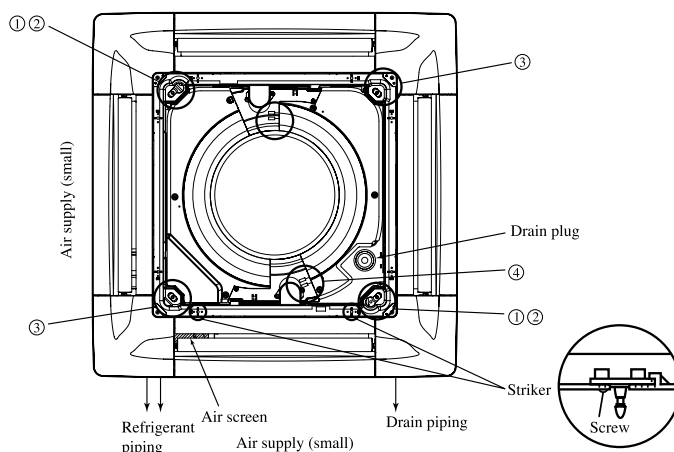
(3) : The unit's installation height can be minutely adjusted with the decorator panel as is as long as the indoor unit is level and drain piping are not affected.



- ④ Connect the (white, 5p) louver motor connector.

- ⑤ Place each of the connectors inside the control box.

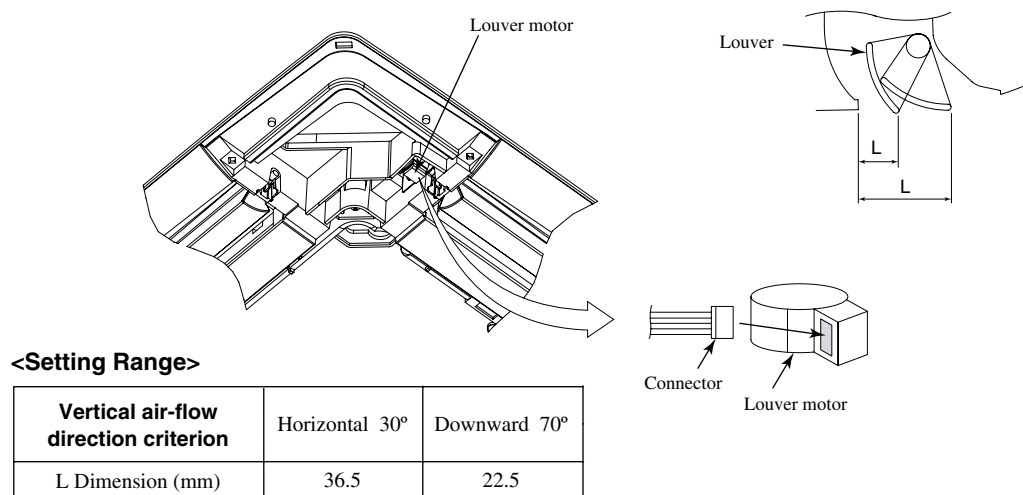
Note (1) : If the air outlet louver does not operate using the remote controller, check the connector's connection, then turn the main power supply OFF for 10 seconds or longer and turn the power ON again.



7) If the vertical air-flow direction is fixed

- This decorator panel is designed so that you can fix the vertical air-flow direction at each air supply to match the environment at your installation location. Set it as required by the customer. Furthermore, when the vertical air-flow direction is fixed, remote control operation and all automatic controls are disabled. The actual setting may also differ from the LCD display in the remote controller.

- ① Turn off the main power supply (turn it off at the ground fault circuit breaker).
- ② Disconnect the connector to the louver motor at the air supply you want to fix the position of.
Wrap vinyl electrical tape around the disconnected connector to insulate it.
- ③ Slowly move the vertical air-flow louver you want to fix the position of by hand and set the vertical air-flow direction so that it is within the range shown in the table below.



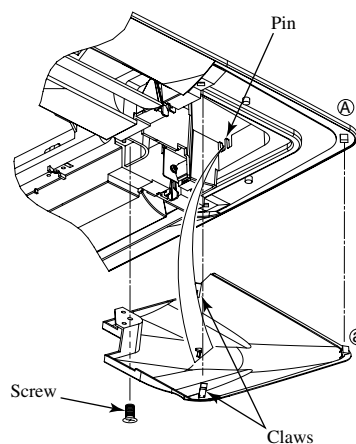
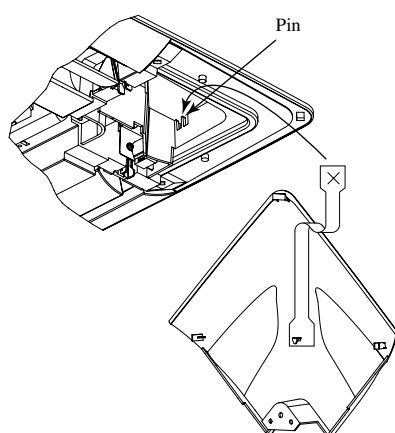
* It can be set anywhere desires as long as it is within a range of 22.5 and 36.5 mm.

Note (1) : Do not set the position outside this range.

Doing so causes condensate to drip and to form as well as dirtying of the ceiling surface, and could cause abnormal operation.

8) Corner panel installation

- ① Hook the corner panel strap to the pin on the decorator panel as shown in the figure.
- ② Insert part ② on the corner panel in part ① on the decorator panel, then fit the 2 claws and fasten the corner panel screw.



9) Installing the air return grille

- Install the air return grille by following the removal procedure (item 4) in reverse order.

Note (1) : Match up the installation position of the panel's striker and the "Pull" character position direction on the surface of the grille. If these do not match, the striker could be damaged.

(2) Ceiling suspended type (FDEN)

(a) Selection of installation location

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

Cold air throw

Unit : m

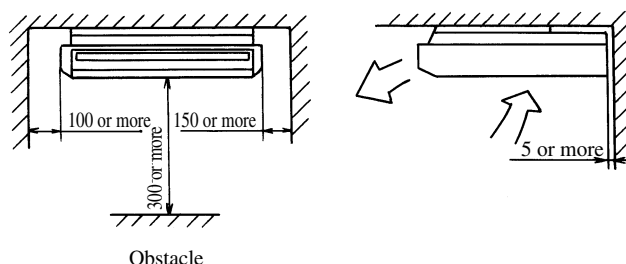
Model	FDENA301R
Air throw	8

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 return and supply air supply 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



Note (1) In the case of neighboring installations, separate the units by the following dimensions or greater.

Item	Dimensions
Model	
FDENA301R	4500

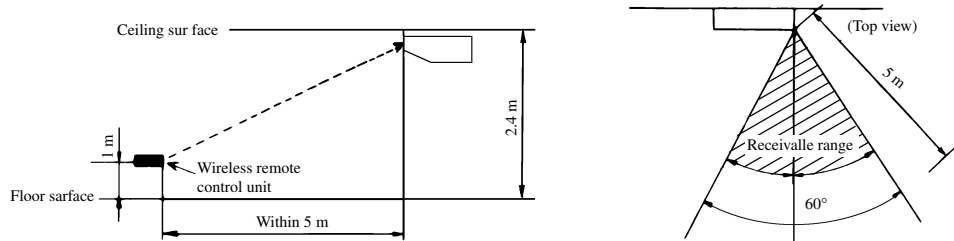
- 6) This unit uses a microcomputer as a control device. Therefore avoid installing the unit near the equipment that generates strong electromagnetic waves and noise.

(b) Wireless remote control unit operation distance.

1) Standard signal receiving range.

[Condition] Illuminance at the receiver area: 360 lux.

(When no lighting fixture is located within 1 m of indoor unit in an ordinary office)

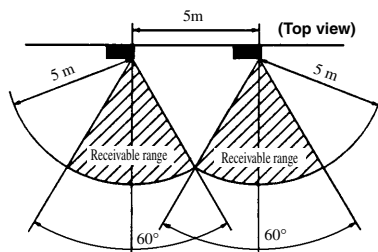


2) Points for attention in connecting a plural number of indoor units.

[Condition] Illuminance at the receiver area: 360 lux.

(When no lighting fixture is located within 1 m of indoor unit in an ordinary office)

When the remote control unit is used with the aforementioned interference-prevention setting, a minimum distance guaranteeing the prevention of unintended unit responses is 5 m

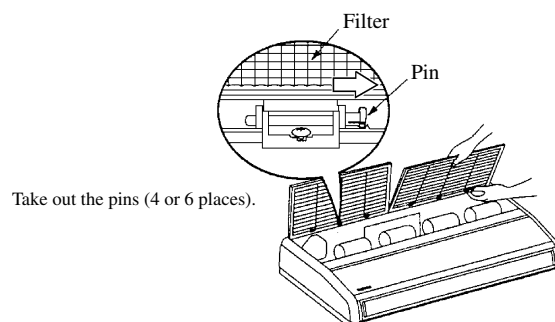
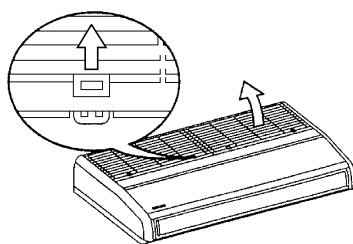


- Please operate remote control unit switches with the unit faced correctly toward the indoor unit's receiver section.
- Effective operation distance can vary with the luminance around the receiver and the reflection from walls of the room.
- When the receiver is exposed to intensive light such as from the direct sun or a strong light, it may become operable only from a short distance or unable to receive signals at all.

(c) Installation preparation

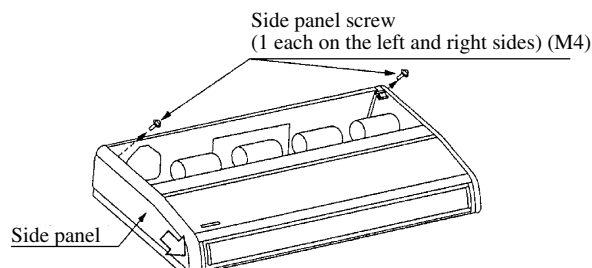
1) Remove the air return grille.

Slide the stoppers (4 places).



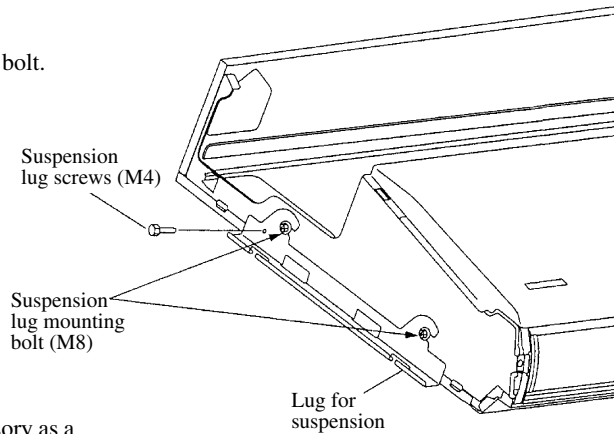
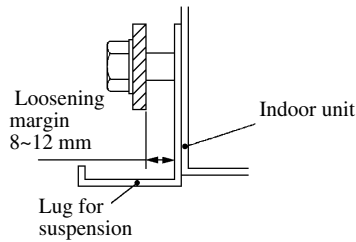
2) Remove the side panels.

Take out the screws, then slide the side panels in the arrow direction to remove them.



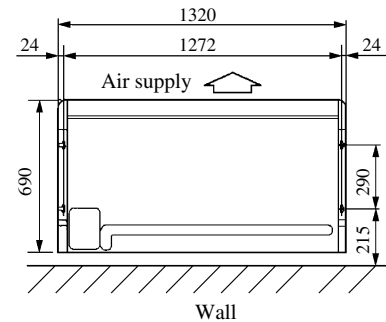
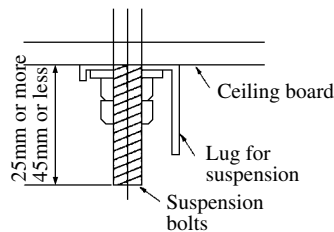
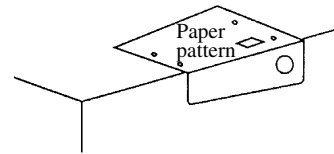
3) Remove the suspension lug.

Take out the screws, then loosen the installation bolt.



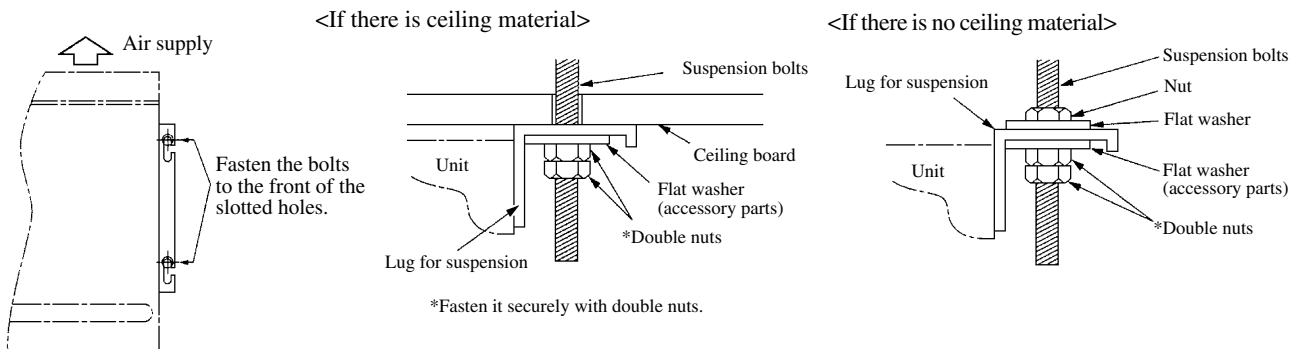
4) Suspension bolt position

- Using the paper pattern supplied as an accessory as a criterion, select suspension bolt positions and piping hole positions, then install the suspension bolts and make holes for piping. After positioning, remove the paper pattern.
- Keep strictly to the suspension bolt lengths specified below.



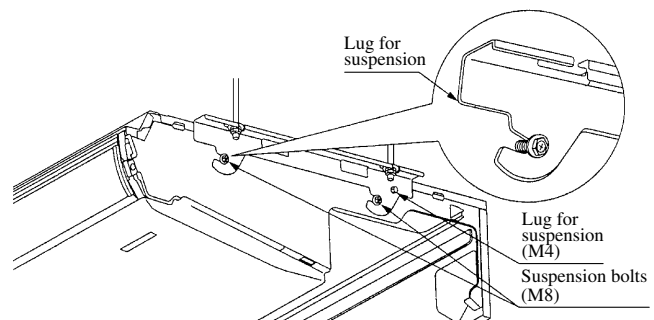
(d) Installation

1) Fasten the suspension lugs to the suspension bolts.



2) Attach the unit to the suspension lugs.

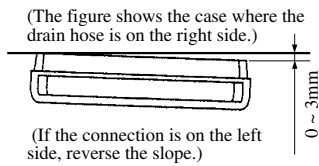
- Slide the unit onto the suspension lugs from the front, hanging it on the bolts.
- Fasten the unit securely on the left and right sides with 4 suspension bolts (M8).
- Tighten the 2 screws (M4) on the left and right sides.



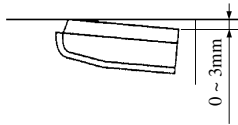
⚠ After sliding the side panels on from the front to rear, fasten them securely with the screws.

- 3) In order to make it easier for water to drain out, install the unit so that the water drain side slopes downward.

● Left-right direction



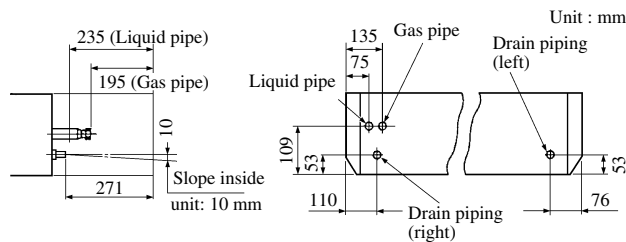
● Front-rear direction



⚠ If the slope is reversed, there is danger of water leaking out.

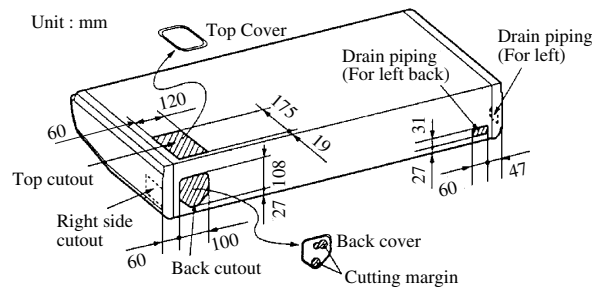
(e) Refrigerant piping

1) Piping position



2) Piping connection position

Piping can be connection from 3 different directions. Remove the cutout from hole where the piping will be connected using side cutters or similar tool. Cut a hole for the piping connection in the back cover according to the cutting margin shown. Cut a hole in the ceiling side in accordance with the position of the piping. Also, after the piping is installed, seal the space around the piping with putty, etc. to keep dust from getting inside the unit.
(In order to prevent damage to wires from the edges, be sure to use the back cover.)



(f) Drain piping

1) Drain piping can be connected from the back, right and left sides.

2) When installing drain piping, be sure to use the insulating material supplied for the drain hose and drain hose clamp.

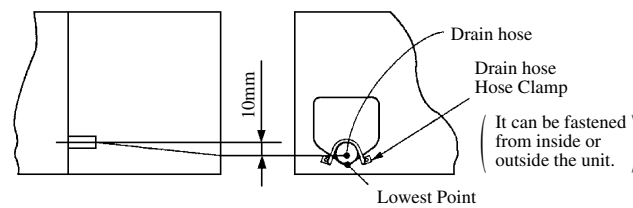
- Connect the drain hose fully all the way to the base of the fitting.
- Fasten the hose securely with the drain hose clamp.
- Keep strictly within the lengths specified below for the suspension bolts.

3) If drain piping is installed on the left side, change the rubber plug and insulating material (tubular) from the left side piping connection port to the right side.

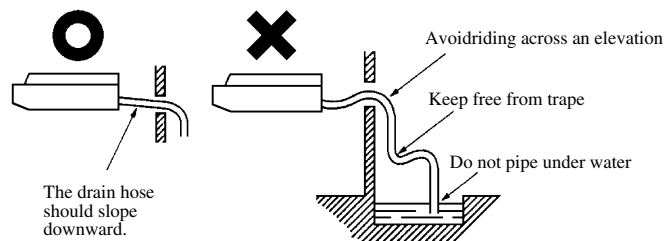
⚠ Be careful that water doesn't pour out when the drain plug is removed.

⚠ WARNING

Use the fitting supplied with the unit to connect the drain hose, fastening it at the lowest point so that there is no slack, and establishing a 10 mm drain slope. * Keep electrical wiring from running beneath the drain hose.



⚠ Be sure to fasten the drain hose down with a clamp.
There is danger of water overflowing the drain hose.

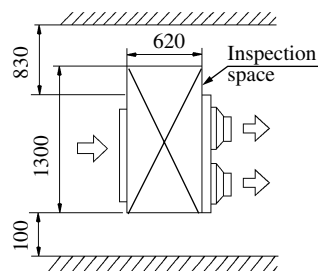


After piping has been installed, check to make sure water drains well and that there is no overflow.

(3) Satellite ducted type (FDUM)

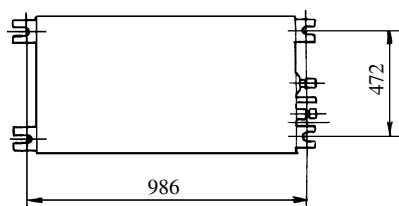
(i) Selection of installation location

- 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 generated 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 the unit.
Otherwise, apply reinforcement using boards and beams before starting the installation work.



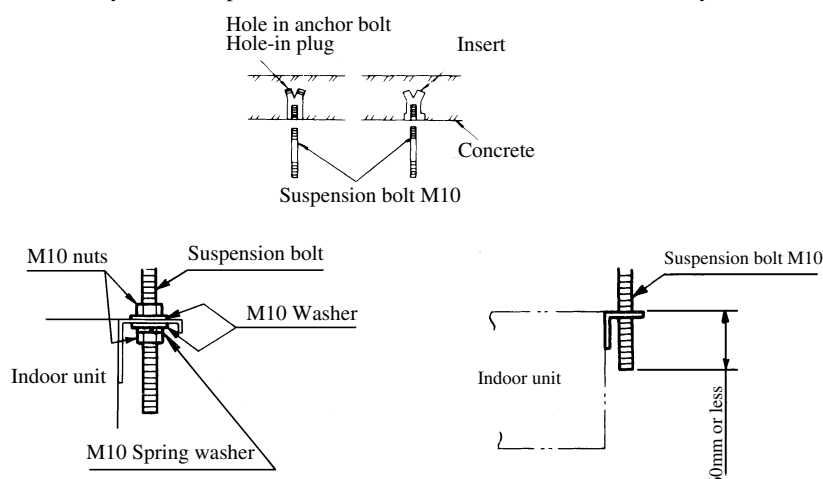
(ii) Suspension

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



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

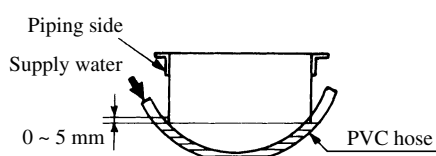
Securely fix the suspension bolt as illustrated below or in another way.



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 indoor 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) Blower fan tap switch

The following two methods are available in switching the blower fan tap. Switch to the high-speed tap with one of these methods.

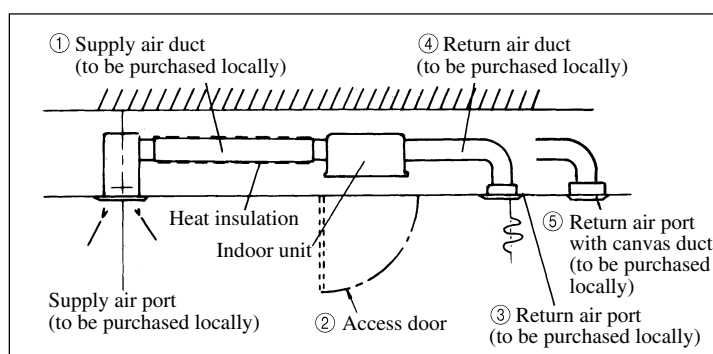
- ① Set SW9-4 provided on the indoor unit PCB to ON.
- ② By means of function setting from the remote control unit, set the setting ③ of "I/U FUNCTION ▲" (indoor unit function) to "Hi CEILING 1" (high-speed tap) as shown right.

SW9-4	ON	Fan control,high speed (High ceiling)
	OFF	Fan control

Function number ①	Function description ②	Setting ③
01	Hi CEILING SET	Hi CEILING 1

For the details of operating procedures, please refer to the installation manual of your remote control unit.

(iii) Duct installation



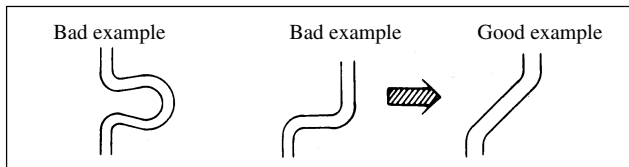
① Supply air duct

- 3-spot with $\varnothing 200$ type duct are the standard specifications. Determine the number of spots based on following table.

FDUMA302R
2 ~ 3-spot ⁽¹⁾

Notes (1) Shield the central supply air port for 2-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 finishing the ceiling.

② Access door

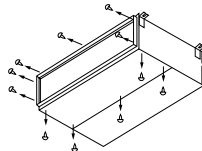
Access door must be provided without fail.

• Dimensions of access door and service space

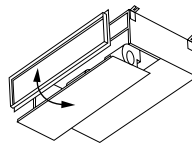
(See exterior dimensions in page 11)

③ Return air port

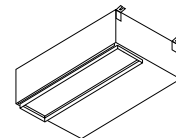
- When shipped, the return air port lies on the back.
- When connecting the duct to the return air port, remove the air filter if it is fitted to return air port.
- When placing the return air port to carry out suction from the bottom side, use the following procedure to replace the return air duct joint and the bottom plate.



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



- Replace the removed bottom plate and duct joint.

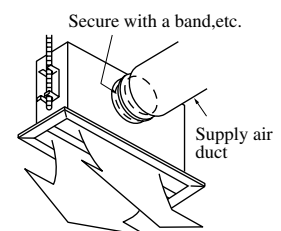


- Fit the duct joint with a screw, fit the bottom plate.

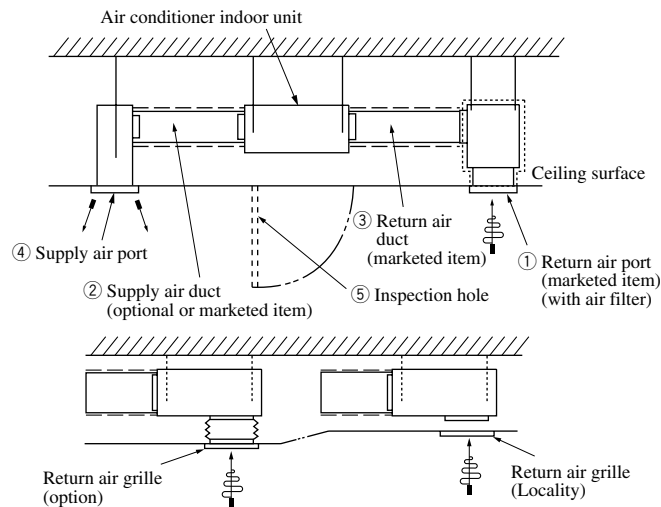
- Make sure to insulate the duct to prevent dewing on it.

④ Install the specific supply air duct in a location where the air will circulate to the entire room.

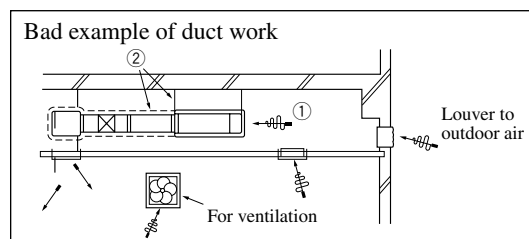
- The duct connection is specific to the 200 circular duct.
- Conduct the installation of the specific supply air hole and the connection of the duct before attaching them to the ceiling.
- Insulate the area where the duct is secured by a band for dew condensation prevention.



- ⑤ Make sure provide an inspection hole on the ceiling. It is indispensable to service electric equipment, motor, functional components and cleaning of heat exchanger.



- ⑥ If a duct is not provided at the return air side but it is substituted with the space over the ceiling, humidity in the space will increase by the influence of capacity of ventilation fan, strength of wind blowing against the outdoor air louver, weather (rainy day) and others.
- Moisture in air is likely to condense over the external plates of the unit and to drip on the ceiling. Unit should be operated under the conditions as listed in the above table and within the limitation of wind volume. When the building is a concrete struction immediately after the construction, humidity tends to rise if the space over the ceiling is not substituted in place of a duct. In such occasion, it is necessary to insulate the entire unit with glass wool (25mm). (Use a wire net or equivalent to hold glass wool in place.)
 - It may run out the allowable limit of unit operation (Example: When outdoor air temperature is 35°C D.B, return air temperature is 27°C W.B) and it could result in such troubles as compressor overload, etc..
 - There is a possibility that the supply air volume may exceed the allowable range of operation due to the capacity of ventilation fan or strength of wind blowing against external air louver so that drainage from the heat exchanger may fail to reach the drain pan leak outside (e.g. drip on to the with consequential water leakage in the room.)



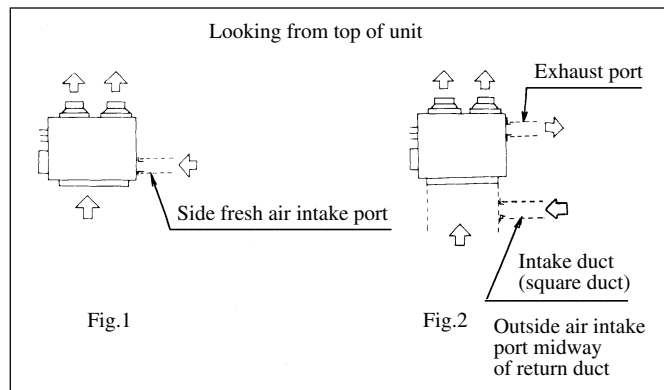
Notice: A specific cover plate is available when changing the 4 spot to the 3 spot, or when changing the 3 spot to the 2 spot.

Note (1) Do not change from 2 spot to 1 spot.

⑦ **Return air duct: Use square duct.**

⑧ **Return air port with canvas duct**

1) Connection of intake and exhaust ducts.



2) Duct connecting position.

< Outside 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.

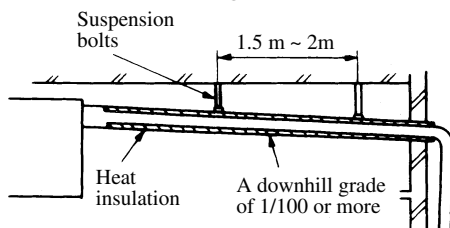
3) Duct connection

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

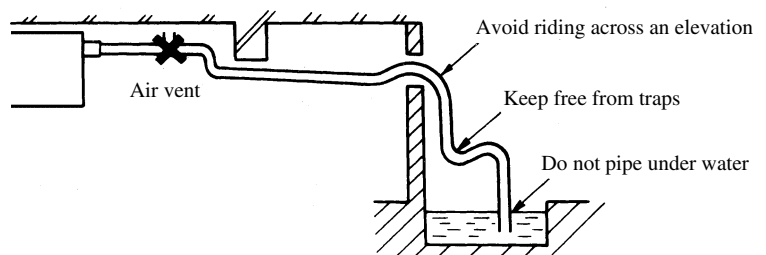
(iv) Drain piping

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



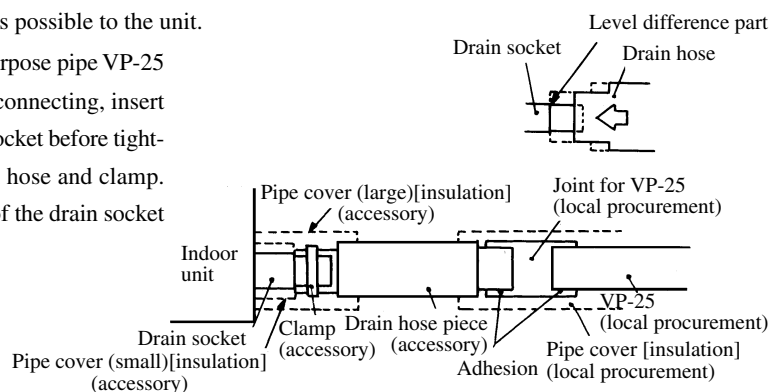
• Improper piping



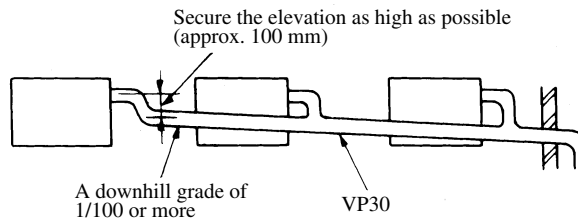
2) When connecting the drain pipe to the unit, pay sufficient attention not to apply excess force to the piping on the unit side.

Also, fix the piping at a point as close as possible to the unit.

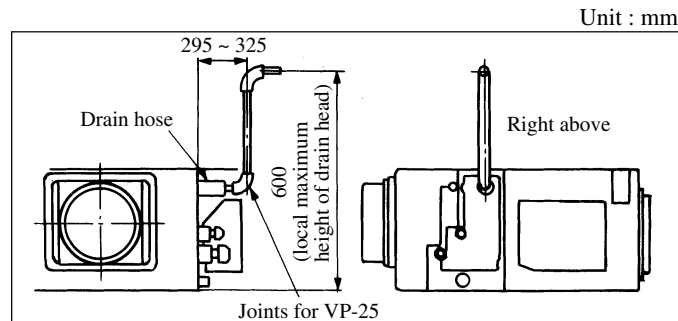
3) For drain pipe, use hard PVC general purpose pipe VP-25 which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose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



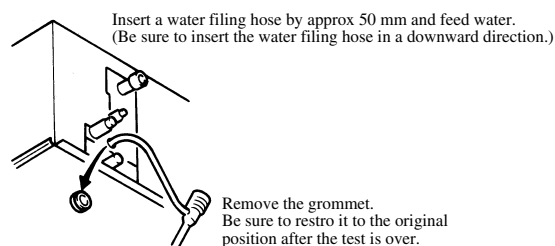
- 5) Be sure to provide heat insulation to hard PVC pipes of indoor placement.
- 6) Do not ever provide an air vent.
- 7) The height of the drain head may be elevated up to a point 600 mm from the bottom of unit and, when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle 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. Therefore, make the height of the drain pipe within the distance given in the drawing 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) Drainage test

- a) During trial operation, make sure that drainage is properly executed 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.

Forced drain pump operation

◆ Setup from a unit side.

- ① Turn power on after selecting the emergency operation mode with a setting on the indoor unit control PCB (SW9-3 ON) and disconnecting the CnB connector on the board. Then, the drain pump will start a continuous operation 15 seconds later.

(Note: The blower will also start operation in tandem)

- ② When a drain test is completed, reinstate the setting to cancel the emergency operation mode (SW9-3 OFF) and plug in the CnB connector on the board.

(When electrical work is not completed, connect a convex joint to the drain pipe joint area, arrange an inlet and check leaks and drain connections of the pipe)

◆ Setup from a remote controller side.

Drain pump operation from a remote controller unit is possible. Operate a remote controller unit by following the steps described below.

1. To start a forced drain pump operation

- ① Press the TEST button for three seconds or longer.

The display will change from “ SELECT ITEM” → “ SET” → “ TEST RUN ▼”

- ② Press the button once while “ TEST RUN ▼” is displayed, and cause “DRAIN PUMP ◆” to be displayed.

- ③ When the SET button is pressed, a drain pump operation will start.

Display: “DRAIN PUMP RUN” → “ → STOP”

2. To cancel a drain pump operation.

- ① If either SET or ON/OFF button is pressed, a forced drain pump operation will stop.

The air conditioning system will become OFF.

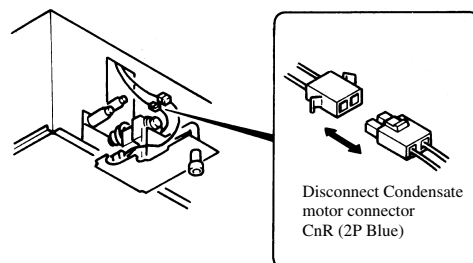
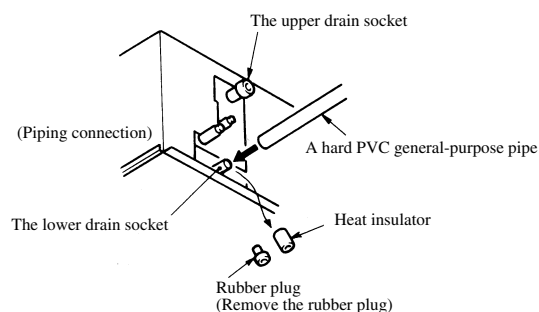
10) Drainage from the lower drain socket

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 leakage.



1.5.2 Installation of wired remote controller

(1) Selection of installation location

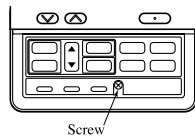
Avoid the following locations

- 1) Direct sunlight.
- 2) Close to heating device.
- 3) Highly humid or water splashing area.
- 4) Uneven surface.

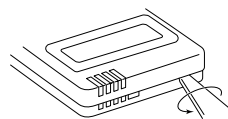
(2) Installation procedure

(a) Exposed fitting

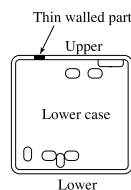
- 1) Open the remote controller cover and unscrew the screw located beneath the switch.



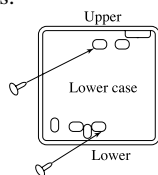
- 2) Open the remote controller case.



- Put a screw driver (flat-head) into the concavity made on the upper part of a remote controller and twist it lightly to open the casing.
- 3) The cord of a remote controller can only be pulled out in the upward direction.

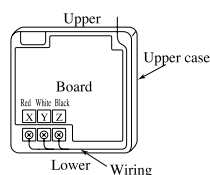


- Cut off with nippers or a knife a thin walled part made on the upper end of the remote controller bottom casing, and then remove burrs with a file or the like.
- 4) Fix the remote controller bottom casing onto a wall with two wood screws supplied as accessories.



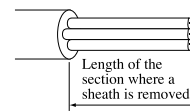
- 5) Connect the remote controller to the terminal block. Connect the terminals of the remote controller to the indoor unit with the same numbers. Because the terminal block has polarity, the device becomes inoperative if there are wrong connections.

Terminals: ⓧ Red wire, Ⓨ White wire, Ⓩ Black wire



- Use a cord of 0.3mm² (recommended) - 0.5mm² (maximum) for a remote controller cord. Remove a sheath of the remote controller cord for the section laid within the remote controller casing.

The length of each wire that should be left after a sheath is removed is as follows:

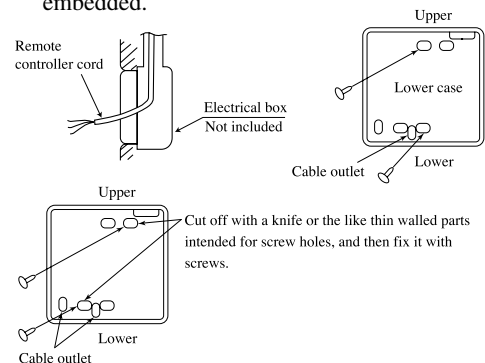


Black: 195mm, White: 205mm, Red: 125mm

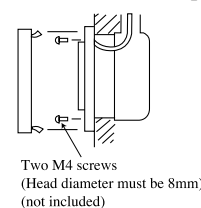
- 6) Replace the top casing as before.
- 7) Use a cord clamp to attach the remote controller cord to the wall.
- 8) Set the functions according to the types of indoor unit. See Section "Function Setting".

(b) Recessed fitting

- 1) The Electrical box and remote controller (shield wire must be use in case of extension) are first embedded.



- 2) Remove the upper case to the remote controller.
- 3) Attach the lower case to the Electrical box with two M4 screws. (Head diameter must be 8 mm). Choose either of the following two positions in fixing it with screws.
- 4) Connect the remote controller cord to the remote controller. Refer to [Exposed fitting].
- 5) Installation work is completed by replacing the top casing onto the bottom casing as before.
- 6) Set the function switch according to the type of the indoor unit. (Refer to 76 page)



Precaution in extending the remote controller cord

- ▶ Maximum total extension 600m.

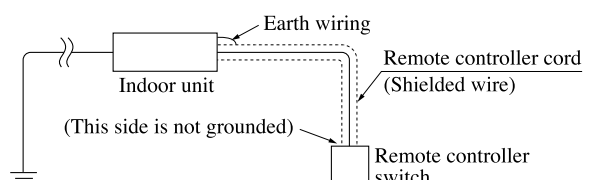
The cord should be a shielded wire.

- For all types : 0.3mm² × 3 cores

Note (1) Use cables up to 0.5mm² (maximum) for those laid inside the remote controller unit casing and connect to a different size cable at a vicinity point outside the remote controller unit, if necessary.

Within 100-200m.....	0.55 mm ² × 3 cores
Within 300m.....	0.75 mm ² × 3 cores
Within 400m.....	1.25 mm ² × 3 cores
Within 600m.....	2.05 mm ² × 3 cores

- The shielded wire should be grounded at one side only.



1.5.3 Installation of outdoor unit

Special instructions for R410A air conditioning systems

- Use only R410A refrigerant. R410A refrigerant is operated at about 1.6 times as high pressure as the conventional refrigerant is.
- Air conditioning systems using R410A are equipped with different-diameter outdoor unit service valve charge ports and check joints provided in the units so as to prevent wrong refrigerant from being charged by mistake. To achieve higher strength resistible to refrigerant pressure, the dimensions of flaring and the across-the-flats measurement of a flare nut have been changed for refrigerant piping. Therefore, please arrange dedicated R410A tools as listed in the table shown on the below before you set to installation or service work.
- Do not use a charge cylinder. The use of a charge cylinder will cause the refrigerant composition to change, resulting in performance degradation falling short of the rated capacity.
- In charging refrigerant, always take out refrigerant from a cylinder in the liquid phase.

	Dedicated R410 tools
Ⓐ	Gauge manifold
Ⓑ	Charge hose
Ⓒ	Electronic scale for refrigerant charging
Ⓓ	Torque wrench
Ⓔ	Flare tool
Ⓕ	Protrusion control copper pipe gauge
Ⓖ	Vacuum pump adapter
Ⓗ	Gas leak sensor

(1) Installation

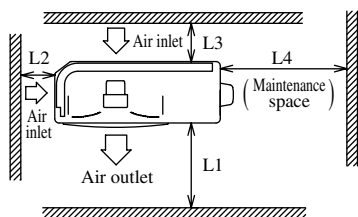
(a) In selecting an installation location, please pay attention to the following conditions and obtain the customer's consent.

- 1) The place where the foundation can bear the weight of Outdoor unit.
- 2) The place where there is no concern about leakage of combustible gas.
- 3) The place where it is not stuffy.
- 4) The place where free from thermal radiation of other thermal source.
- 5) The place where flow of drain is allowed.
- 6) The place where noise and hot air blast do not trouble neighboring houses.
- 7) The place where there is no obstruction of wind at the air inlet port and air outlet port.
- 8) A place where it is not subject to strict rules regulating electrical noises.
- 9) A place at least 5m away from a TV or radio set. (If electrical noises interfere with such an instrument, move it further away from it)
- 10) When the unit is installed at the particular location as shown below, corrosion or failure may be caused. Please consult the dealer from which you purchased the air-conditioner.
 - a) The place where corrosive gas is generated (hot spring, etc.).
 - b) The place where wind containing salt blows (seaside area).
 - c) The place where enveloped by oil mist.
 - d) The place where there is a machine that radiates electromagnetic wave.
 - e) A place where inverter-equipped equipment, a captive generator, high-frequency medical equipment, wireless communication equipment or other equipment generating electromagnetic waves is installed.

(b) The minimum space for installation

Select the space considering the direction of refrigerant piping.

- Restrict the height of obstruction wall in front of the air outlet port to the height of unit or less.
- Do not enclose around the unit by the obstruction. Secure the top space for 1 m or more.
- When more than one unit are installed side by side, provide a 250mm or wider interval between them as a service space. In order to facilitate servicing of controllers, please provide a sufficient space between units so that their top plates can be removed easily.
- When installing the unit where there is a concern about the short circuit, attach the guide louver in front of air outlet port to prevent the short circuit.
- When installing plural units in a group, secure sufficient intake space to prevent the short circuit.
- When installing the unit where it is covered by snow, provide appropriate snow break means.



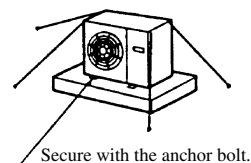
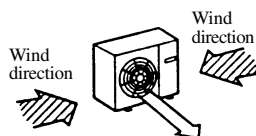
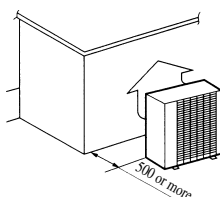
Unit:mm			
Installation type	1	2	3
Mark			
L1	Open	Open	500
L2	300	250	Open
L3	100	150	100
L4	250	250	250

(c) Location where strong wind blows against the unit

- Where the unit is likely to be subjected to strong winds, guard it from winds with the following measures.

A failure to give protection against winds may cause performance degradation, a rise of high pressure resulting in an operation interruption, a broken fan, etc.

- 1) Install the unit directing the air out-let port to the wall.
- 2) Install the unit directing the air out-let port at a right angle to the wind direction.
- 3) Where the foundation is not stable, secure the unit with wire, etc.

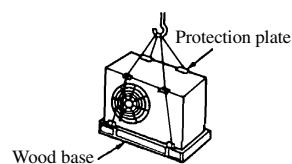


(d) Carry-in and installation of unit

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

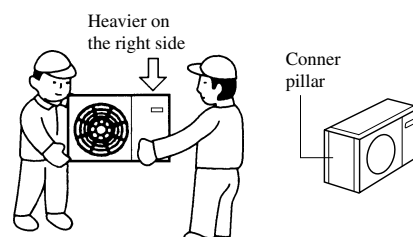
1) Carry-in

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

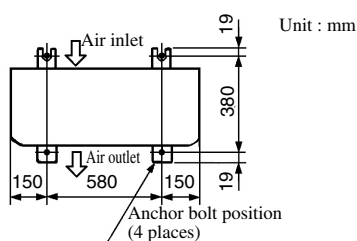


2) Moving

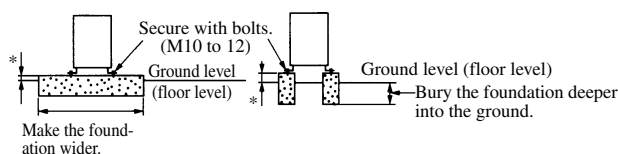
- The unit is heavier on the right side looking from the front of unit (air outlet port side). Therefore, sufficient caution is required for the person who carries the right side of unit. The person who carries the left side must hold the handle of front panel and the corner pillar with both hands.



3) Bolt securing position



- To install the unit, secure the legs of unit by below mentioned bolts without fail.

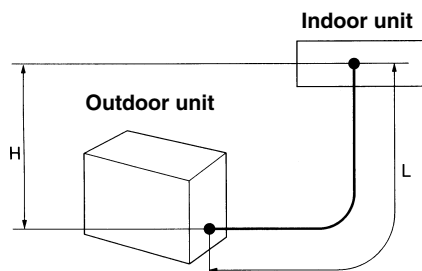


- b) Limit the protrusion height of front side anchor bolts to 15 mm at the maximum.
- c) Install the unit firmly so that it does not fall by earthquake and strong wind.
- d) Make the concrete foundation by referring the above illustration.
- e) Install the unit in level. (The height difference between right and left is within 5 mm.)
- f) In an area where temperature drops below zero for several days in a row, install the unit on the concrete base of which top is elevated by 30mm or more from the ground level (measurement marked with * in the drawing).
(Because of freezing, drain water could otherwise be blocked from running freely).

(2) Refrigerant piping work

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

(a) Decision of piping specification



Piping specification

Unit : mm

Outdoor unit model	Gas pipe	Liquid pipe
FDCVA302HENR	ø 15.88 × t1.0	ø 9.52 × t0.8

Maximum one way length

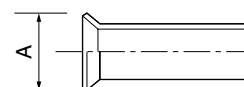
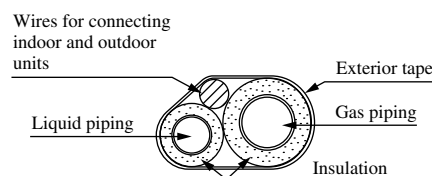
L=50 m or less

Height difference

- When the position of outdoor unit is higher than that of the indoor unit, keep the difference H=30 m or less.
- When the position of outdoor unit is lower than that of the indoor unit, keep the difference H=15 m or less.

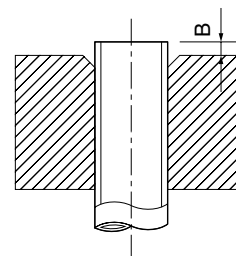
(b) Points for attention in installing refrigerant piping

- Use pipes made of the following material
Material: Phosphorus deoxidized copper seamless pipes (C1220T, JIS H3300)
- Please dress the refrigerant piping (both gas and liquid pipes) with a heat insulating material for prevention of dew condensation. Improper heat insulation incapable of preventing dew condensation can cause the leaking or dripping of water and a resultant soaking of household effects.
- Use only a good heat insulating material (120°C or higher) for heat insulation. A poor heat insulating material offers only poor heat insulation and can cause cable deterioration.
 - The gas pipes can cause dew condensation during a cooling operation, which may become drain water causing a water-leak accident, or a risk of burns during a heating operation, if touched accidentally, with its surface reaching a high temperature because of discharged gas flowing inside. So, do not fail to dress it with a heat insulating material to prevent such mishap.
 - Dress the flare joints of the indoor units with a heat insulating material (pipe covers) (for both gas and liquid pipes).
 - Dress both gas and liquid pipes with a heat insulating material. In doing so, leave no gaps between the pipe and the heat insulating material and wrap them, together with the connecting cable, with a dressing tape.
- When you need to bend a pipe, bend it to the largest possible radius (R100-R150) permitted. Do not bend a pipe repeatedly in an effort to shape it appropriately.
- In laying pipes, take care to avoid debris, chips or water from entering the piping system.
- A unit and a refrigerant pipe are to be flare connected. Flare a pipe after you have attached a flare nut to the pipe. The dimensions of flaring for R410A are different from those for the conventional R407C refrigerant. Although we recommend the use of flare tools developed specifically for R410A, conventional flare tools can also be used, if the measurement of protrusion B is adjusted with a protrusion control copper pipe gauge.
- Tighten a flare joint securely with double spanners. Observe the following tightening torque values for flare nuts:
- A branching pipe set (option part supplied separately) and refrigerant piping should be connected by blazing.
- In blazing pipes, keep nitrogen gas flowing inside the pipes so that an oxide film may not form on the inner surfaces of the pipes.



Flared pipe end: A (mm)

Copper pipe outer diameter	A
ø9.52	0 -0.4
ø15.88	13.2
	19.7



Copper pipe protrusion for flaring: B (mm)

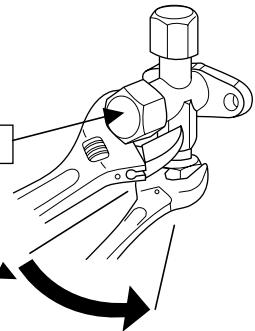
Copper pipe outer diameter	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
ø9.52	0~0.5	1.0~1.5
ø15.88		

- 10) Tighten a flare joint securely with a double spanner.
- Do not apply force beyond proper fastening torque in tightening the flare nut.
 - Fix both liquid and gas service valves at the valve main bodies as illustrated on the lower, and then fasten them, applying appropriate fastening torque.

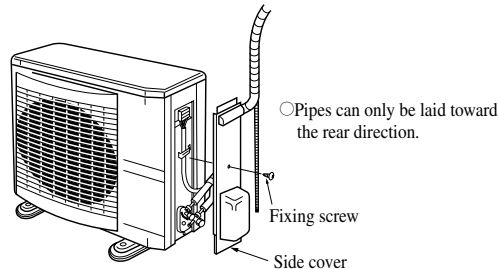
Operation valve size (mm)	Tightening torque (N·m)	Tightening angle (°)	Recommended length of a tool handle (mm)
ø9.52 (3/8")	34~42	30~45	200
ø15.88 (5/8")	68~82	15~20	300

Do not hold the valve cap area with a spanner.

Please use a torque wrench. If a torque wrench is not available, fasten the flare nut manually first and then tighten it further, using the left table as a guide.



(c) How to remove the side cover Unscrew a screw from the side cover



(d) Refrigerant pipe connection

- Install a pipe carefully so that it may not touch the unit's internal components.
- A pipe touching with an internal component can generate abnormal noises or vibrations.

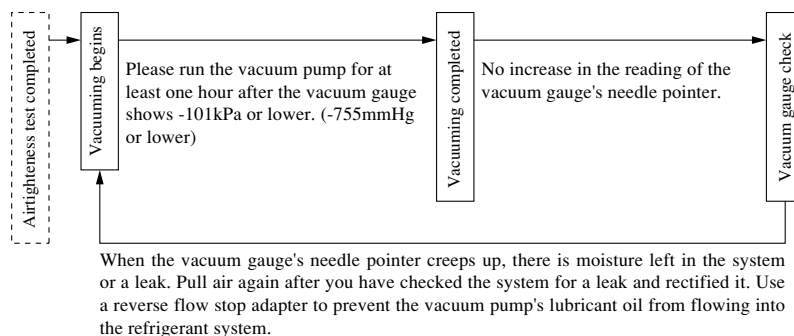
(3) Air tightness test and air purge

- Always use a vacuum pump to purge air trapped within an indoor and the refrigerant piping.

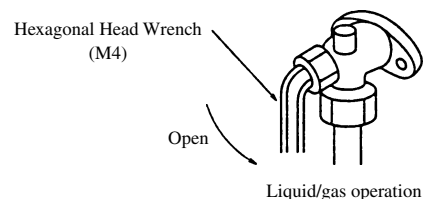
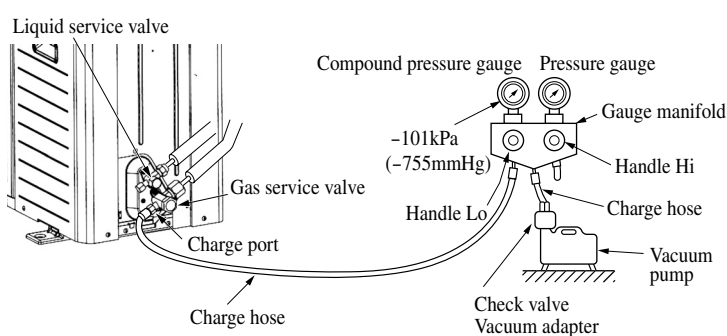
(a) Air tightness test

- When all the flare nuts on both indoor and outdoor unit sides are fastened. Conduct an air-tightness test from the service valves charge port with the outdoor unit service valves (on both liquid and gas sides) closed tightly to check whether the system has no leaks.
- Use nitrogen gas in the air-tightness test. Do not use gas other than nitrogen gas under any circumstances. Conduct the air-tightness test by applying 4.15MPa (42kg/cm²G) of pressure.
- Do not apply the specified pressure at once, but increase pressure gradually.
 - Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes to see if the pressure drops.
 - Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes to see if the pressure drops.
 - Then raise the pressure to the specified level (4.15 MPa), and record the ambient temperature and the pressure.
 - If the pressure does not drop after the units is left for approximately one day, the airtightness is acceptable. When the ambient temperature changes 1°C, the pressure also changes approximately 0.01 MPa. The pressure, if changed, should be compensated for.

(b) Air purge



When a vacuum air purge is completed, remove the valve rod cap nuts and open the service valves (both liquid and gas sides) as illustrated below. After you have made sure that the valves are in the full-open position, tighten the cap nuts (for the valve rods and charge ports).



- Open the valve rod until it touches the stopper. You need not apply force to push it further.
- When an operation is completed, replace the cap nut and tighten it as before.

(4) Refrigerant quantity

- This unit is shipped from the factory with the refrigerant sufficient for an installation involving 30m of piping, and does not necessitate additional refrigerant charge as long as the pipe length is 30m or less.
- When the pipe length exceeds 30m but remains within 50m, add refrigerant according to the table below (showing an additional quantity required for each meter of the pipe exceeding 30m) by metering for the quantity determined by the actual pipe length.

Item	Model	302 series
Quantity charged for shipment (for 30m of piping)(kg)		2.95
Additional charge quantity per meter	(kg/m)	0.06

(Example) When 302 model unit is used in a new installation involving 45m of piping
 Additional charge quantity: $0.9\text{kg} = (45-30)\text{m} \times 0.06\text{kg/m}$

(c) Charging refrigerant

- Since R410A refrigerant must be charged in the liquid phase, you should charge it, keeping the container cylinder upside down or using a refrigerant cylinder equipped with a siphon tube.
- Charge refrigerant always from the liquid side service port with the service valve shut. When you find it difficult to charge a required amount, fully open the outdoor unit valves on both liquid and gas sides and charge refrigerant from the gas (suction) side service port, while running the unit in the cooling mode. In doing so, care must be taken so that refrigerant may be discharged from the cylinder in the liquid phase all the time. When the cylinder valve is throttled down or a dedicated conversion tool to change liquid-phase refrigerant into mist is used to protect the compressor, however, adjust charge conditions so that refrigerant will gasify upon entering the unit.
- In charging refrigerant, always charge a calculated volume by using a scale to measure the charge volume.
- When refrigerant is charged with the unit being run, complete a charge operation within 30 minutes. Running the unit with an insufficient quantity of refrigerant for a long time can cause a compressor failure.

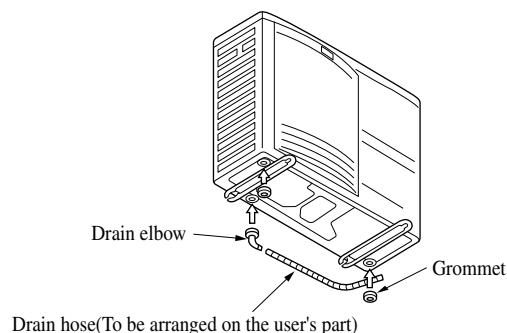
NOTE Put down the refrigerant volume calculated from the pipe length onto the caution label attached on the back side of the side cover.

(5) Drain piping work

- Execute drain piping by using a drain elbow and drain grommets supplied separately as optional parts, where water drained from the outdoor unit is a problem.

In an area where temperature drops below zero for several days in a row, do not install a drain elbow or grommets. (Because of freezing, drain water could be blocked from running freely.)

- There are 3 drain holes provided on the bottom plate of an outdoor unit to discharge condensed water.
- When condensed water needs to be led to a drain, etc., install the unit on a flat base (supplied separately as an optional part) or concrete blocks.
- Connect a drain elbow as shown in the illustration and close the other two drain holes with grommets.



(6) Electrical wiring

Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country. Electrical installation work must be executed according to the technical standards and other regulations applicable to electrical installations in the country.

① Do not use any supply cord lighter than one specified in parentheses for each type below.

- braided cord (code designation 60245 IEC 51),
- ordinary tough rubber sheathed cord (code designation 60245 IEC 53)
- flat twin tinsel cord (code designation 60227 IEC 41);

Do not use anything lighter than polychloroprene sheathed flexible cord (code designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.

② Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire.

If improperly grounded, an electric shock or malfunction may result.

③ A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.

④ The installation of an impulse withstanding type earth leakage breaker is necessary. A failure to install an earth leakage breaker can result in an accident such as an electric shock or a fire.

⑤ Do not turn on the power until the electrical work is completed.

⑥ Do not use a condensive capacitor for power factor improvement under any circumstances. (It does not improve power factor, while it can cause an abnormal overheat accident)

⑦ For power supply cables, use conduits.

⑧ Do not lay electronic control cables (remote control and signaling wires) and other cables together outside the unit. Laying them together can result in the malfunctioning or a failure of the unit due to electric noises.

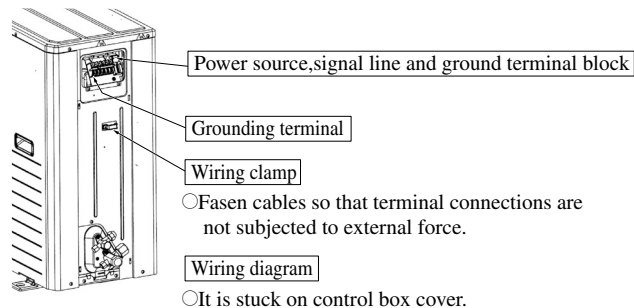
⑨ Fasten cables so that may not touch the piping etc.

⑩ When cables are connected, please make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection and then attach the cover securely. (Improper cover attachment can result in malfunctioning or a failure of the unit, if water penetrates into the box.)

(a) Connect a pair bearing a common terminal number with an indoor-outdoor connecting wire.

(b) In cabling, fasten cables securely with cable clamps so that no external force may work on terminal connections.

(c) Grounding terminals are provided in the control box.

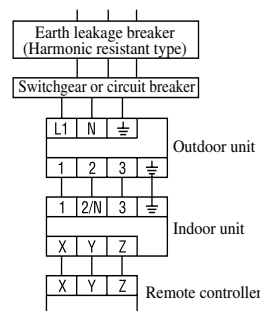


Power cable, indoor-outdoor connecting wires

- Always perform grounding system installation work with the power cord unplugged.

⚠ CAUTION

Always use an earth leakage circuit breaker designed for inverter circuits to prevent a faulty operation.



Model	Power source	Power cable thickness (mm ²)	Max. over current (A)	Cable length (m)	Grounding wire thickness	Indoor-outdoor wire thickness × number
302 series	1phase 220-240V 50Hz	3.5	16	20	ø1.6 mm	ø1.6 mm × 3

Notes (1) The specifications shown in the above table are for units without heaters. For units with heaters, Please refer to the installation instructions or the construction instructions of the indoor unit.

(2) Switchgear or circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.

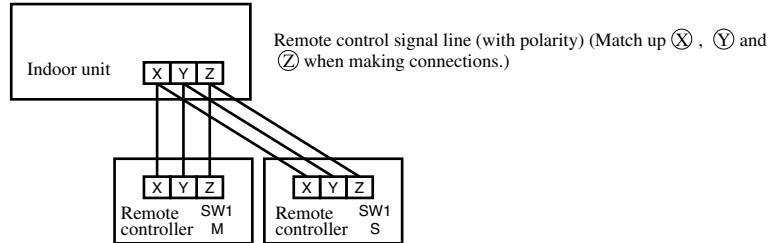
(3) The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

(d) Remote controller wiring and connection procedure

1) Master-slave settings when using multiple remote controllers

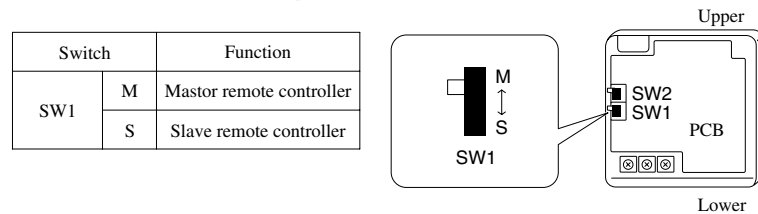
- Up to 2 remote controllers can be connected for each indoor unit (or group).

- a) There are two methods, one where the remote controller signal line (3-wire) for the slave remote controller is taken from the indoor unit and the other where the signal lines are taken from the master remote controller.



- b) Set the SW1 select switch on the slave remote controller on the Slave setting. (It is set on the Master setting at the factory.)

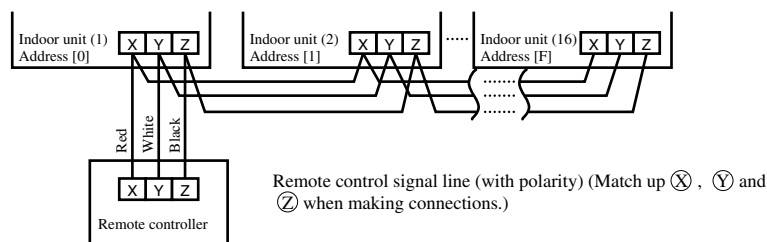
Note (1) Remote controller sensor activation settings are possible only with the master remote controller. Install the master remote controller in a location where it can sense the room temperature.



2) Controlling multiple indoor units using a single remote controller.

- Up to 16 indoor units can be controlled with a single remote controller.

- a) Run 3-wire remote control lines between each of the indoor units. See “Precaution in extending the remote control cord” on page 68 concerning extended remote control lines.
- b) Set the remote controller communications address on “0” ~ “F” using rotary switch SW2 on the indoor unit’s control board, taking care not to overlap the addresses of any of the units.



- c) After turning the power on, press the AIR CON No. button to display the indoor unit’s address. Be sure to confirm that the settings are displayed correctly in the remote controller by using the ▲ and ▼ buttons to display the address of each connected indoor unit.

(7) Setting functions using the wired remote controller

- (a) The default settings of this unit's functions are as follows: If you want to change a setting, follow the procedure found in the installation manual and set to your desired setting.

For the method of setting, please refer to the installation manual of a remote controller unit.

① Remote controller unit functions (FUNCTION ▼)

Function number (A)	Function description (B)	Setting (C)	Default setting
01	GRILLE ↑↓ SET (Grille lift panel setting)	↑↓ INVALID	○
		50Hz AREA ONLY	
		60Hz AREA ONLY	
02	AUTO RUN SET	AUTO RUN ON	*
		AUTO RUN OFF	
03	☑/☒ TEMP S/W	☑/☒ VALID	○
		☑/☒ INVALID	
04	⏻ MODE S/W	⏻ VALID	○
		⏻ INVALID	
05	① ON/OFF S/W	① VALID	○
		① INVALID	
06	⚙ FANSPEED S/W	⚙ VALID	○
		⚙ INVALID	
07	⚙ LOUVER S/W	⚙ VALID	*
		⚙ INVALID	
08	⌚ TIMER S/W	⌚ VALID	○
		⌚ INVALID	
09	📡 SENSOR S/W (Remote control sensor setting)	📡 SENSOR OFF (Invalid)	○
		📡 SENSOR ON (Valid)	
10	POWER FAILURE COMPENSATION SET	INVALID	○
		VALID	
11	VENTI SET	NO VENTI	○
		VENTI LINK SET	
		NO VENTI LINK	
12	TEMP RANGE SET	DISP CHANGE	○
		NO DISP CHANGE	
13	I/U FAN SPEED (Indoor unit fan speed setting)	3 FAN SPEED	*
		2 FAN SPEED	
		1 FAN SPEED	
14	MODEL TYPE	HEAT PUMP	*
		COOLING ONLY	
15	EXTERNAL CONTROL SET	INDIVIDUAL OPERATION	○
		SAME OPERATION FOR ALL UNITS	
16	ERROR DISP SET	ERROR DISP	○
		NO ERROR DISP	
17	⚙ POSITION (Louver control setting)	FIX (1 OF 4) (4 position stop)	○
		IN MOTION (Free stop)	
18	°C/°F SET	°C	○
		°F	

② Indoor unit functions (I/U FUNCTION ▲)

Function number (A)	Function description (B)	Setting (C)	Default setting
01	Hi CEILING SET	STANDARD (Mild mode)	*
		Hi CEILING 1 (Powerful mode)	
03	FILTER SIGN SET	NO DISPLAY	*
		AFTER 180H	
		AFTER 600H	
		AFTER 1000H	
04	⚙ POSITION (Louver control setting)	1000H→STOP	○
		FIX (1 OF 4) (4 position stop)	
05	EXTERNAL INPUT SET	IN MOTION (Free stop)	○
		LEVEL INPUT	
06	OPERATION PERMISSION PROHIBITED	PULSE INPUT	○
		NORMAL OPERATION	
07	☀ ROOM TEMP OFFSET (Heating room temperature offset)	VALID	○
		TEMP SHIFT +3°C	
08	☀ FAN CONTROL (Heating fan control)	NORMAL OPERATION	*
		LOW FAN	
09	FREEZE PREVENT TEMP	STOP→LOW FAN (Intermittent operation)	○
		TEMP Hi	
10	FREEZE PREVENT CONTROL	TEMP Lo	○
		FAN CONTROL ON	
		FAN CONTROL OFF	

Notes(1) Setting marked with [○] are the default setting.

- (2) Setting marked with [*] are those that are set automatically according to an indoor unit or an outdoor unit connected. Please check default settings with the indoor unit's installation manual.

Notes(1) Setting marked with [○] are the default setting.

- (2) Setting marked with [*] are those that are set automatically according to an indoor unit or an outdoor unit connected. Please check default settings with the indoor unit's installation manual.
- (3) When Item 17 : “⚙ POSITION” is changed, please also change Item 04 “⚙ POSITION” setting found in “Indoor unit functions”.

(b) Function setting method

- 1) Stop the air conditioner
- 2) Press the SET and MODE buttons simultaneously for 3 seconds or longer.

The screen display will be switched as follows:

“SELECT ITEM” →

“SET” →

“FUNCTION SET ▼”



- 3) Press the SET button.
The unit will enter the function setting mode. The screen display will change to “FUNCTION ▼”.
- 4) Check which category your desired setting belongs to, “FUNCTION ▼ (Remote controller unit function)” or “I/U FUNCTION ▲” (Indoor unit function).
- 5) Press either ▲ or ▼ button.
Select either “FUNCTION ▼” or “I/U FUNCTION ▲”.

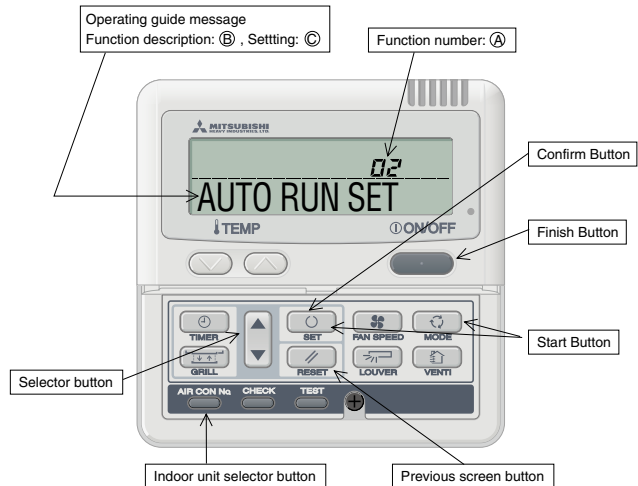


- 6) Press the SET button.
- 7) When “FUNCTION ▼” is selected.
 - ① “DATA LOADING” (blinking) → “FUNCTION” →
“01 GRILLE ↑↓ SET” (Function number: ①, Function description: ②)
The screen display will be switched like this.
 - ② Press either ▲ or ▼ button.
“Function number: ①, Function description: ②” from the list of remote controller unit functions will be displayed one by one. Select a desired function.
 - ③ Press the SET button.
The screen display will be switched as follows:
“SETTING” → “Setting: ③” (ex. “AUTO RUN ON”)
 - ④ Press either ▲ or ▼ button.
A list of “Settings: ③” will be displayed one by one. Select your desired setting.
 - ⑤ Press the SET button.

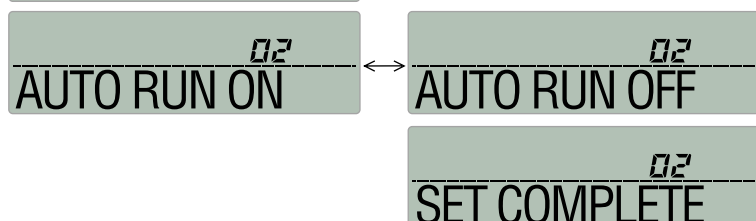
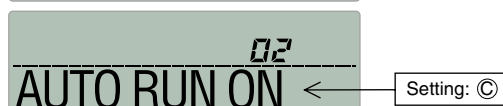
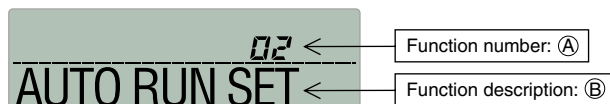
The selected setting is displayed for 2 seconds, then followed by “SET COMPLETE” and the function setting process is completed.

Then the screen display will be switched to “Function number: ①, Function description: ②,” so if you want to continue to set another function, repeat the steps as explained above.

To finish the function setting process, please proceed to Step 8).



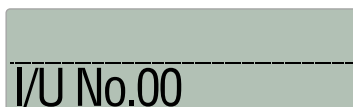
* When “02 AUTO RUN SET” is selected.



When "I/U FUNCTION ▲" is selected.

- ① The screen display will be switched as follows:

"◆ I/U SELECT" → "○ SET" → "I/U No.00" (blinking)



- ② Press either ▲ or ▼ button.

Select the indoor unit number that you want to change settings. If only one indoor unit is connected, the indoor unit number will not change, so please proceed to Step ③.

If "ALL I/U ▼" is selected while indoor group control is in effect, you can set all units to the same settings.

- ③ Press the SET button.

Indoor unit number indication will change from blinking to lit continuously, The screen display will be switched as follows:

"DATA LOADING" (blinking for about 2 to 23 seconds) → "◆ I/U FUNCTION" → "01 Hi CEILING SET"

(Function number: ①, Function description: ②)

* When "01 Hi CEILING SET" is selected.

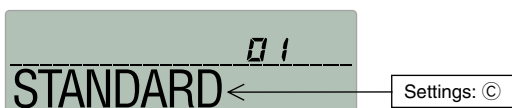


- ④ Press either ▲ or ▼ button.

"Function number: ①, Function description: ②" from the list of indoor unit functions will be displayed one by one. Select a desired function.

- ⑤ Press the SET button.

The screen display will be switched as follows: "◆ I/U SETTING" → "Setting: ③" (ex. "STANDARD")



- ⑥ Press either ▲ or ▼ button.

A list "Setting: ③" will be displayed one by one. Select your desired setting.

- ⑦ Press the SET button.

The selected setting is displayed for 2 seconds, then followed by "SET COMPLETE" and the function setting process is completed.

Then the screen display will be switched to "Function number: ①, Function description: ②" so if you want to continue to set another function, repeat the steps as explained above. To finish the function setting process, please proceed to Step 8).

- ⑧ Press AIR CON No. button.

The screen display will go back to the indoor unit selection screen (e.g. "I/U No.00").

If you want to continue to set another indoor unit, please follow the steps explained above.

- 8) Press the ON/OFF button.

This ends a function setting process. Even if a function setting process is not completed, this ends the process.

Please note that any setting that is not completed will become void.





















- **Pressing the RESET button during a function setting process will allow you to go back the previous step. Please note that any setting that is not completed will become void.**

- **Method of checking the current setting**

While following the above mentioned step, the setting that appears when the SET button is pressed for each "Function number: ①, Function description: ②" is the current setting "Setting: ③". (When "ALL I/U ▼" is selected, the setting of the indoor unit with the lowest number is displayed)

- **Settings are stored in the controller and not lost even a power outage occurs.**

(c) Changing the remote control set temperature range

- 1) It is possible to change the set temperature range using the remote control.
 - a) The upper and lower set temperature limits can be set from the remote control.
Upper limit value setting: Effective during heating. The temperature can be set within a range of 20~30°C.
Lower limit value setting: Effective when running in modes other than the heating mode (AUTO, COOL, FAN, DRY): The temperature can be set within a range of 18~26°C.
 - b) If the upper and lower limits are set using this function, the following controls are active.
- 2) When and ⑫TEMP RANGE SET under “ FUNCTION” the function setting mode is DISP CHANGE
 - a) If you are setting the upper limit,
 - ① If a temperature that is greater than the upper limit during heating is set from the remote control.
The unit runs for 30 minutes at the set temperature, then it automatically transmits the upper limit temperature. The display on the remote control also approaches that temperature.
 - ② During heating, if the upper limit value is set at a temperature below the upper limit value:
The set temperature is transmitted.
 - b) If the lower limit is set
 - ① If a temperature that is lower than the lower limit value is set from the remote control. When running in an operation mode other than the heating mode: the unit runs at the set temperature for 30 minutes, then it automatically transmits the lower limit temperature.
 - ② If a temperature that is higher than the lower limit value is set when running in a mode other than the heating mode:
It transmits the set temperature.
- 3) When and ⑫TEMP RANGE SET under the “ FUNCTION” the function setting mode is NO DISP CHANGE.
 - a) If the upper limit is set
 - ① During heating, if a temperature that is higher than the upper limit is set from the remote control:
The upper limit value is transmitted. However, the remote control display does not approach the upper limit value, but remains on the set temperature.
 - ② During heating, if the temperature is set at a value lower than the upper limit value:
The set temperature is transmitted.
 - b) If the lower limit is set
 - ① When in an operating mode other than the heating mode, if a temperature that is lower than the lower limit value is set from the remote control:
The lower limit value is transmitted. However, the remote control display does not approach the lower limit value, but remains on the set temperature.
 - ② When in an operating mode other than the heating mode, if a temperature that is higher than the lower limit value is set:
The set temperature is transmitted.
- 4) Setting the upper and lower limit values
 - a) Stop the air conditioner, then press the SET and MODE buttons simultaneously for 3 seconds or longer. If you press “ SELECT ITEM” → “ SET” → “FUNCTION SET ▼” the display changes.
 - b) Press the  button, then change the “TEMP RANGE ▲” display.
 - c) Press the SET button and enter the temperature range setting mode.
 - d) Using the   buttons, select the “Hi LIMIT SET ▼” or “Lo LIMIT SET ▲,” then fix it by pressing SET.
 - e) If you selected “Hi LIMIT SET,” (enabled during heating)
 - ① “  SET UP” → “Hi LIMIT 28°C ” (blinking) is displayed.
 - ② Using the “ ” temperature setting buttons, select the upper limit value. Display Example: “Hi LIMIT 26°C ” (blinking)
 - ③ Press the SET button to fix the setting. Display example: “Hi LIMIT 26°C” (lights up for 2 seconds)
After the fixed upper limit value lights up for 2 seconds, the display returns to the “Hi LIMIT SET ▼” display in item d).
 - f) If “Lo LIMIT SET ▲” was selected (enabled during COOL, DRY and FAN)
 - ① “  SET UP” → “Lo LIMIT 20°C ” (blinking) is displayed.
 - ② Using the “ ” temperature setting buttons, select the lower limit. Display example: “Lo LIMIT 24°C  ” (blinking)
 - ③ Press the SET button to fix the setting. Display example: “Lo LIMIT 24°C” (lights up for 2 seconds)
After the fixed lower limit value lights up for 2 seconds, the display returns to the “Lo LIMIT SET ▲” display in item d).
 - g) Pressing the ON/OFF button stops the operation.
(Operation stops even if the ON/OFF button is pressed during setting, and the stopped state returns. However, if setting is not completed, it is not valid, so use caution.)
- ◆ If the RESET button is pressed during setting, the previous setting screen is displayed.

- If the RESET button is pressed during a setting operation, the display returns to the previously displayed setting screen. However, settings which have not been fixed become invalid, so exercise caution.
- * If “NO DISP CHANGE” is selected in No. 12, “TEMP RANGE SET” of the remote controller’s functions, of the function setting modes, the remote controller’s display does not change even if the temperature range has been changed.

(Example) If the upper limit is set at 28°C

Function No. A	Function Contents B	Setting Contents C	Control Contents
12	TEMP RANGE SET	DISP CHANGE	The remote controller’s display and sent data upper limit changes to 28°C.
		NO DISP CHANGE	The remote controller’s display upper limit remains at 30°C and only the upper limit of the sent data is changed to 28°C.

(8) Checking operation data

Operation data can be checked with remote controller unit operation.

- ① Press the CHECK button.

The display change from “ SELECT ITEM” → “ SET” → “OPERATION DATA ▼”.

- ② Press the SET button while “OPERATION DATA ▼” is displayed.

- ③ The display will change to “I/U No. 00 ▲” (blinking indication).

Select the indoor unit number you want to have data displayed with the button.

(When only one indoor unit connected, the indoor unit number displayed on the screen will not change.)

- ④ Determine the indoor unit number will the SET button.

(The indoor unit number changes from blinking indication to continuous indication.)

“DATA LOADING” (A blinking indication appears while data is loaded)

↓

“OPERATION DATA ” appears and data number 01 is displayed.

- ⑤ Upon operation of the button, the current operation data is displayed in order from Data number 01.

The items displayed are as follows:

* Depending on models, the items that do not have corresponding data are not displayed.

- ⑥ To display the data of a different indoor unit, press the AIR CON No. button, which allows you to go back to the indoor unit selection screen.
- ⑦ Pressing the ON/OFF button will stop displaying data.

Pressing the RESET button during remote controller unit operation will undo your last operation and allow you to go back to the previous screen.

Number	Data item
01	(Operation mode)
02	SET TEMP
03	RETURN AIR
04	I/U HEAT EXCH 1 (Indoor unit heat exchanger temperature 1)
05	I/U HEAT EXCH 2 (Indoor unit heat exchanger temperature 2)
07	I/U FAN (Indoor unit fan speed)
11	TOTAL I/U RAN (Indoor unit operation hours)
21	OUTDOOR (Outside air temperature)
22	O/U HEAT EXCH 1 (Outdoor unit heat exchanger temperature 1)
23	O/U HEAT EXCH 2 (Outdoor unit heat exchanger temperature 2)
24	COMP HERTZ
27	DISCHARGE (Discharge pipe temperature)
28	DOME BOTTOM
29	CT
31	O/U FAN (Outdoor unit fan speed)
32	SILENT MODE ON/OFF
34	63H1 ON/OFF
35	DEFROST ON/OFF
36	TOTAL COMP RUN (Compressor operation hours)
37	EEV 1 (Expansion valve opening 1)

(9) Test run

(a) Test run from an outdoor unit.

1) Test run method

- A test run can be initiated from an outdoor unit by using SW5-3 and SW5-4 for on-site setting.
- Switching SW5-3 to ON will start the compressor.
- The unit will start a cooling operation, when SW5-4 is OFF, or a heating operation, when SW5-4 is ON.
- Do not fail to switch SW5-3 to OFF when a test run is completed.

SW5-3	SW5-4	Function
ON	OFF	Cooling during a test run
	ON	Heating during a test run
OFF	—	Normal or After the test operation

(b) Test run from remote controller.

1) Cooling test operation procedure

Carry out the following test operation procedure using the remote controller.

a) Starting the cooling test operation

- Press the ON/OFF button to start operation.
- Press the MODE button and select “ (COOL)”.
- Press the TEST button continuously for 3 seconds or longer.
The display changes from “ SELECT ITEM” → “ SET” → “ TEST RUN ▼”.
- When “ TEST RUN ▼” is displayed, press the SET button to begin the cooling test operation.
The display shows “ TEST RUN.”

b) Canceling the cooling test operation

Pressing the ON/OFF button or the TEMP button ends the cooling test operation.
The “ TEST RUN” display is cleared.

1.6 MAINTENANCE DATA

1.6.1 Servicing

(1) Evacuation

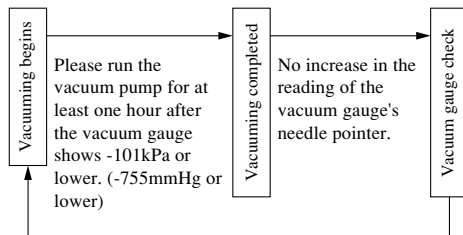
The evacuation is a procedure to purge impurities, such as noncondensable gas, air, moisture from the refrigerant equipment by using a vacuum pump. Since the refrigerant R410A is very insoluble in water, even a small amount of moisture left in the refrigerant equipment will freeze, causing what is called ice clogging.

Evacuation procedure

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

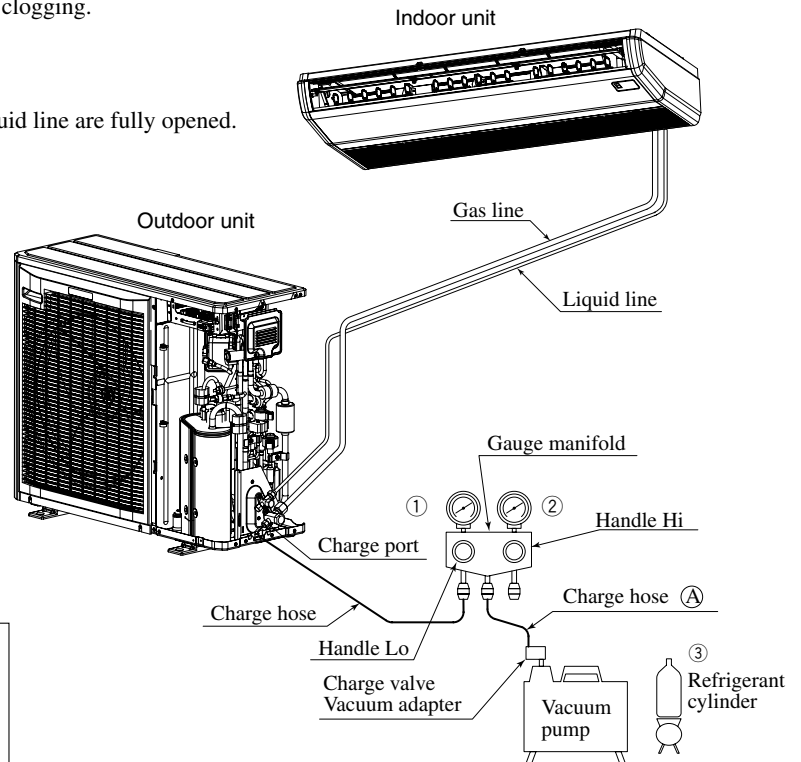
- Check to ensure that there is no internal pressure in the unit. If there is an internal pressure, it should be relieved through the service port.
- Connect the charging hose of the gauge manifold to the service port of the gas piping. Close high pressure valve ② of gauge manifold.
- Connect the charging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

Repeat evacuation in the following sequence.



When the vacuum gauge's needle pointer creeps up, there is moisture left in the system or a leak. Pull air again after you have checked the system for a leak and rectified it. Use a reverse flow stop adapter to prevent the vacuum pump's lubricant oil from flowing into the refrigerant system.

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



(2) Refrigerant charging

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

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

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

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

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

1.6.2 Trouble shooting for refrigerant circuit

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

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

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

Following are some pointers,

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

(1) Selfdiagnosis function

(a) 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 error code, indoor/outdoor unit green LED (power pilot lamp and microcomputer normality pilot lamp) or red LED (check pilot lamp).

1) Indoor unit side

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, L 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.
LCD flashes continuously or is off.	Keeps flashing	Stays OFF	Keeps flashing	2 time flash	Poor connection or disconnection in wires connecting the indoor and outdoor units.
E1	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	When multiple remote controllers are used for control, the power supply to some indoor units is OFF.
	Stay OFF or Lights continuously	Stay OFF	Keeps flashing	Stays OFF	Indoor unit PCB fault
E5	Keeps flashing	2 time flash	Keeps flashing	2 time flash	Indoor / outdoor transmission error.
	Keeps flashing	2 time flash	Stays OFF	Stays OFF	Outdoor unit control PCB is faulty when the power is turned on, or the inverter parts are faulty.
	Keeps flashing	2 time flash	Keeps flashing	Stays OFF	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 thermistor failure
E8	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Heating overload (indoor heat exchanger temperature is abnormally high) and indoor heat exchanger thermistor is faulty.
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 performed.
E14	Keeps flashing	3 time flash	Keeps flashing	Stays OFF	Communications are faulty between master and slave indoor units
E16	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Fan motor is faulty (FDTC or FDKN type).
E28	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Remote controller thermistor failure

2) Outdoor unit side

Remote controller error code	Indoor unit LED		Outdoor unit LED		Cause
	Green	Red	Green	Red	
E34	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outdoor unit power supply open phase, Noise filter defect
E35	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outdoor heat exchanger temperature is high or outdoor heat exchanger thermistor is faulty.
E36	Keeps flashing	Stays OFF	Keeps flashing	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	Outdoor air temperature thermistor failure
E39	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Discharge pipe thermistor failure
E40	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	63H1 operation, Operation with service valve open
E42	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Current (Abnormalities in a compressor over current)
E45	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Inverter communications error
E47	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	A/F module over-current error
E48	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	DC fan motor abnormal.
E49	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Low voltage abnormal or low voltage sensor disconnected
E51	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Inverter PCB abnormal
E53	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Suction pipe temperature thermistor disconnected
E54	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Low pressure sensor disconnected or abnormal
E59	Keeps flashing	Stays OFF	Keeps flashing	5 time flash	Compressor start up error

(b) Display sequence of error, inspection display lamp

1) One kind error



Display corresponding to the error is shown.

2) More than one errors.

Section	Display section
Error code of remote controller	• Displays the error of higher priority (When plural errors are persisting)
Inspection LED (red) of indoor unit PCB	<i>E1 > E5 > E10 > E32 E59</i>
Inspection LED (red) of outdoor unit PCB	• Displays the present errors. (When a new error has occurred after the former error was reset.)

3) Timing of error detection

• Indoor unit side.

Error detail	Error code	Timing of error detection
Drain error (float switch motion)	<i>E9</i>	Normally, 30 seconds after the power is turned ON.
Wrong connection between the indoor and outdoor units.	“  WAIT  ”	No communications even once with the outdoor unit.
Transmission error of remote controller indoor unit	<i>E1</i>	After 1 or more communications of the indoor unit with the remote controller following power on, transmission errors cause an interruption for 2 minutes.
Transmission error between indoor/outdoor units	<i>E5</i>	After communications with the outdoor unit 1 or more times, communications are abnormal continuously for 2 minutes.
The number of connected indoor units exceeds the connection limit (when multiple units are control by a single remote controller).	<i>E10</i>	Normally after the power is turned ON (during communications).
Broken wire of indoor unit return air thermistor	<i>E7</i>	When an input temperature of -50°C or lower is measured by the return air thermistor is measured for 5 seconds or longer within 60 minutes after the first detection.
Broken wire of heat exchanger thermistor	<i>E6</i>	When an input temperature of -50°C or lower is measured by the heat exchanger thermistor is measured for 5 seconds or longer within 60 minutes after the first detection.

• Outdoor unit side.

Error detail	Error code	Timing of error detection
Broken wire of outdoor air temperature thermistor	<i>E38</i>	When a thermistor input temperature of -30°C or lower is measured for 5 seconds or longer 3 times within 40 minutes after the 1st detection between 2 minutes and 2 minutes 20 seconds after compressor operation starts.
Broken wire of heat exchanger thermistor	<i>E37</i>	When a thermistor input temperature of -50°C or lower is measured for 5 seconds or longer 3 times within 40 minutes after the 1st detection between 2 minutes and 2 minutes 20 seconds after compressor operation starts.
Broken wire of discharge pipe thermistor	<i>E39</i>	When a thermistor input temperature of -10°C or lower is measured for 5 seconds or longer 3 times within 40 minutes after the 1st detection between 10 minutes and 10 minutes 20 seconds after compressor operation starts.
Broken wire of suction pipe thermistor	<i>E53</i>	When a thermistor input temperature of -50°C or lower is measured for 5 seconds or longer 3 times within 40 minutes after the 1st detection between 10 minutes and 10 minutes 20 seconds after compressor operation starts.
Broken wire of low pressure sensor	<i>E54</i>	When a sensor is OV or lower or 3.49V or higher continuously for 5 seconds or longer 3 times within 40 minutes after the 1st detection between 2 minutes and 2 minutes 20 seconds after compressor operation starts.

4) Recording and reset of error

Error display	Memory	Reset
Error code of remote controller	• Saves in memory the mode ⁽¹⁾ of higher priority	<ul style="list-style-type: none"> • Stop the unit operation by pressing the ON/OFF switch of remote controller. • Operation can be started again if the error has been reset.
Indoor unit inspection lamp (red)	• Cannot save in memory	
Outdoor unit inspection lamp (red)	• Saves in memory the mode ⁽¹⁾ of higher priority	

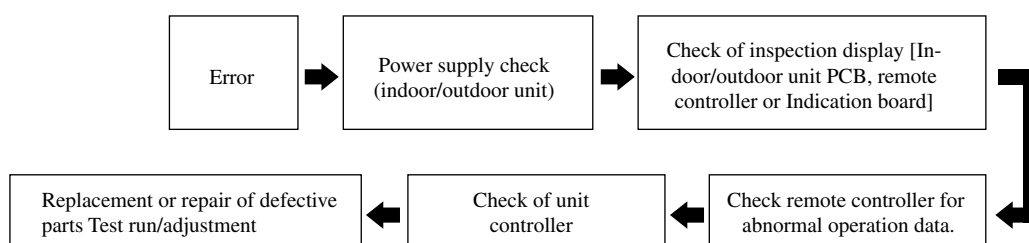
Notes (1) Priority is in the order of E1 > ... > E10 > ... > E59.

Indoor unit : Press the ON/OFF button on the remote controller. Or disconnect and reconnect the power supply connector (CNW1 or CNW0) on the indoor unit control PCB or turn the main power supply OFF.

Outdoor unit : Turn the main power supply OFF.

(2) Procedures of trouble diagnosis

When any error occurs, inspect in following sequence. Detailed explanation on each step is given later in this text.



(3) Error diagnosis procedures at the indoor unit side

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

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

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

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

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

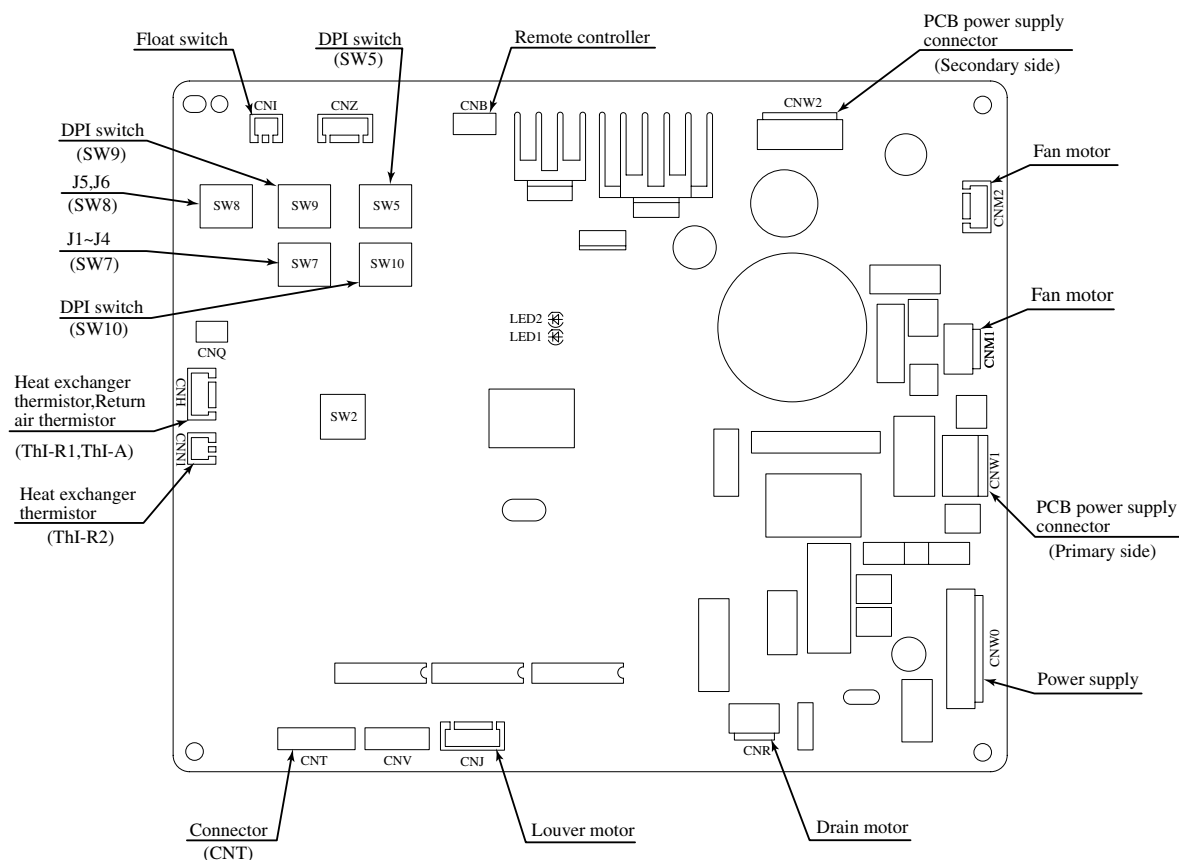
Microcomputer printed circuit board can be replaced with following procedure.

(i) Confirm the parts numbers.

Model	Parts number	Model	Parts number
FDTC	PJA505A142ZA	FDUM	PJA505A131ZC
FDT	PJA505A122ZD	FDKN	PHA505A018ZF
FDEN	PJA505A128ZC	—	—

Parts layout on the indoor unit PCB

Model: FDTC series



• Change by the jumper wire

Name	Function
J1 (SW7-1)	With None ⁽¹⁾
J2 (SW7-2)	With None ⁽¹⁾
J3 (SW7-3)	With None ⁽¹⁾
J4 (SW7-4)	With None ⁽¹⁾
J5 (SW8-1)	With None ⁽¹⁾
J6 (SW8-2)	With None ⁽¹⁾
J7 (SW8-3)	With None ⁽¹⁾

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

(2) The replacement board is not equipped with jumpers J1 ~ J7. Instead, SW7 and 8, with the same functions as jumpers J1~J7, are used in the position where the jumpers were previously. Set SW7 and 8 locally in accordance with the above table.

• Control change switch (SW5, SW9, SW10)

Function of DIP switch SW5 (Usually all turned OFF)

Switch	Function
SW5-1	ON Slave c OFF Slave b ON Slave a OFF Master
SW5-3	ON Setting time : 1000hrs. (Unit stop) OFF Setting time : 1000hrs. (Display) ON Setting time : 600hrs. (Display) OFF Setting time : 180hrs. (when shipped from factory)

Function of DIP switch SW9

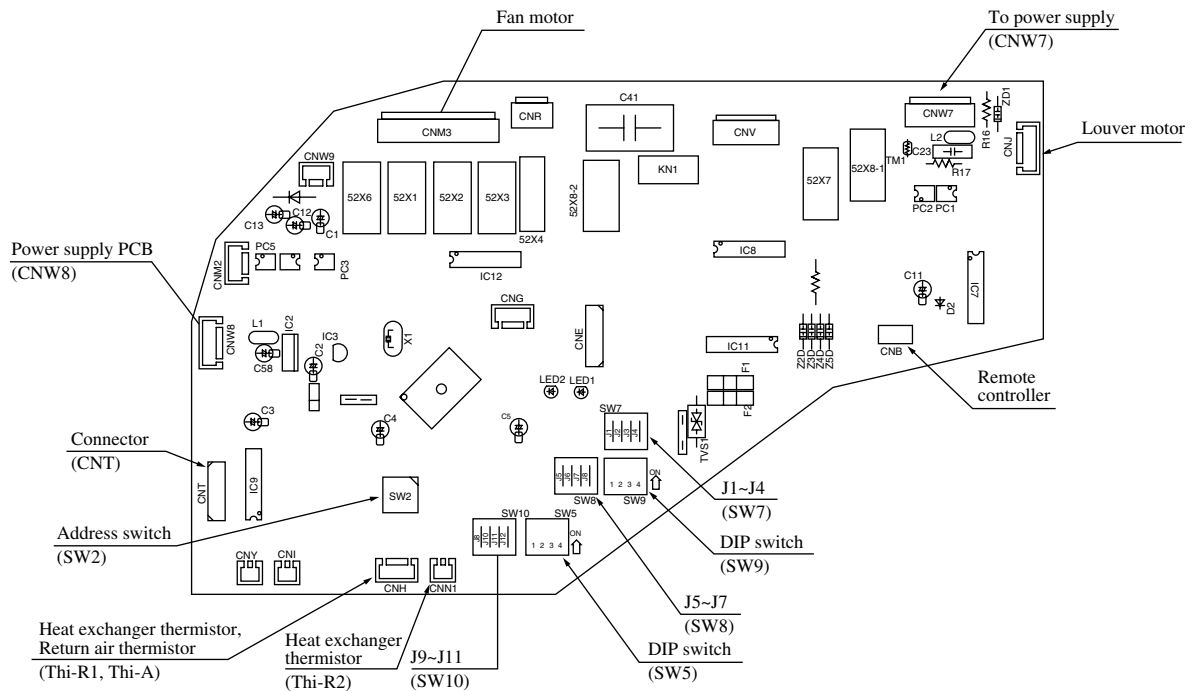
Switch	Function
SW9-3	ON Emergency operation OFF Normal
SW9-4	ON Fan control : Powerful mode OFF Fan control : Mild mode

Note (1) It is normally ON only in the case of SW9-4.

Function of DIP switch SW10 (Usually all turned ON)

Switch	Function
SW10-1 (J9)	OFF Auto swing function - None ON Auto swing function - With
SW10-2 (J10)	OFF Remote controller air flow - ON Remote controller air flow 1 speed OFF Remote controller air flow 2 speed ON Remote controller air flow 3 speed

Model: FDT series



• Change by the jumper wire

Name	Function
J1 (SW7-1)	With: Input signal - Reverse invalid None ⁽¹⁾ : Input signal - Run stop
J2 (SW7-2)	With: Heating thermostat OFF-Lo None ⁽¹⁾ : Heating thermostat OFF-Stop, Lo
J3 (SW7-3)	With: Normal operation operable None ⁽¹⁾ : Operation permission prohibited
J4 (SW7-4)	With: Normal None ⁽¹⁾ : Heating temp. +3
J5 (SW8-1)	With: Louver free stop control - Invalid None ⁽¹⁾ : Louver free stop control - Effective
J6 (SW8-2)	With: Freeze prevention fan control activated. None ⁽¹⁾ : Freeze prevention fan control deactivated.
J7 (SW8-3)	With: Louver position : Normal None ⁽¹⁾ : Louver position : For wind 1

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

(2) The replacement PCB is not equipped with jumpers J1 ~ J7. Instead, SW7 and 8, with the same functions as jumpers J1~J7, are used in the position where the jumpers were previously. Set SW7 and 8 locally in accordance with the above table.

• Control change switch (SW5, SW9, SW10)

Function of DIP switch SW5 (Usually all turned OFF)

Switch	Function
SW5-1	ON: Slave c OFF: Slave b ON: Slave a OFF: Master
SW5-3	ON: Setting time : 1000hrs. (Unit stop) OFF: Setting time : 1000hrs. (Display) ON: Setting time : 600hrs. (Display) OFF: Setting time : 180hrs. (when shipped from factory)

Function of DIP switch SW9 (Usually all turned OFF)

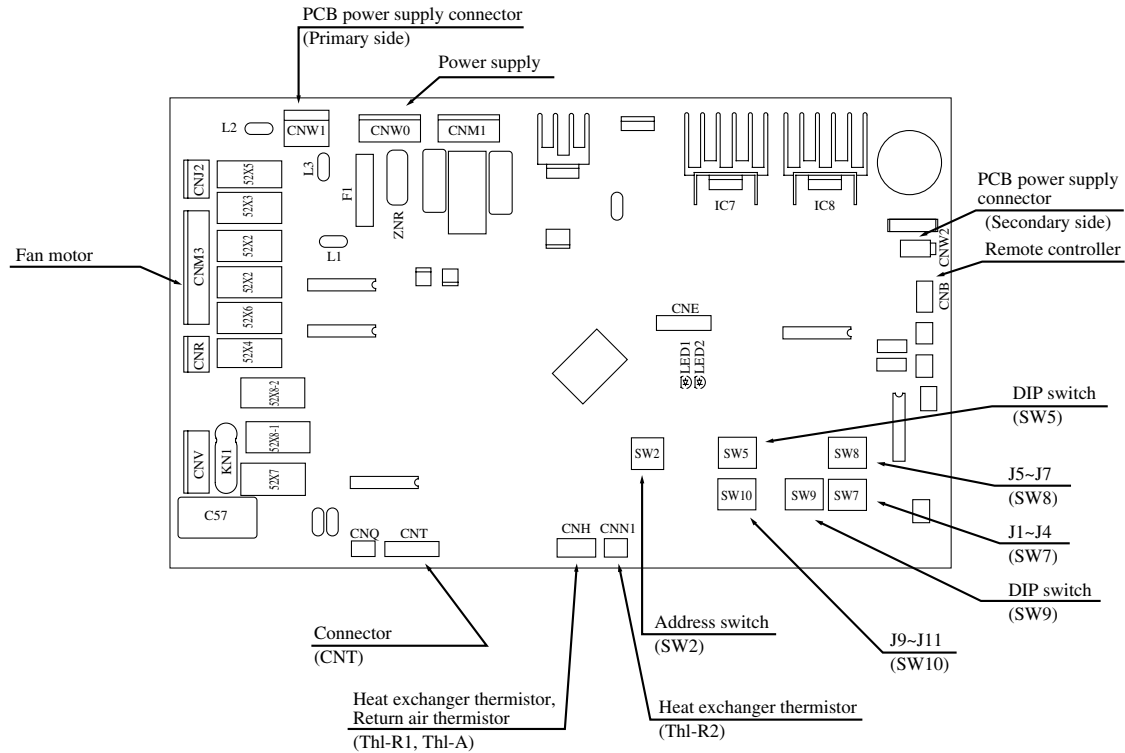
Switch	Function
SW9-3	ON: Emergency operation OFF: Normal
SW9-4	ON: Fan control : Powerful mode OFF: Fan control : Mild mode

Note (1) It is normally ON only in the case of SW9-4.

Function of DIP switch SW10 (Usually all turned OFF)

Switch	Function
SW10-1 (J9)	OFF: Auto swing function - None ON: Auto swing function - With
SW10-2 (J10)	OFF: Remote controller air flow - ON: Remote controller air flow 1 speed OFF: Remote controller air flow 2 speed ON: Remote controller air flow 3 speed

Model: FDEN series



● Change by the jumper wire

Name	With	Function
J1 (SW7-1)	With	Input signal - Reverse invalid
	None ⁽¹⁾	Input signal - Run stop
J2 (SW7-2)	With	Heating thermostat OFF-Lo
	None ⁽¹⁾	Heating thermostat OFF-Stop, Lo
J3 (SW7-3)	With	Normal operation operable
	None ⁽¹⁾	Operation permission prohibited
J4 (SW7-4)	With	Normal
	None ⁽¹⁾	Heating temp. +3
J5 (SW8-1)	With	Louver free stop control - Invalid
	None ⁽¹⁾	Louver free stop control - Effective
J6 (SW8-2)	With	Freeze prevention fan control activated.
	None ⁽¹⁾	Freeze prevention fan control deactivated.
J7 (SW8-3)	With	Louver position : Normal
	None ⁽¹⁾	Louver position : For wind 1

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

(2) The replacement PCB is not equipped with jumpers J1 ~ J7. Instead, SW7 and 8, with the same functions as jumpers J1~J7, are used in the position where the jumpers were previously. Set SW7 and 8 locally in accordance with the above table.

● Control change switch (SW5, SW9, SW10)

Function of DIP switch SW5 (Usually all turned OFF)

Switch	Function
SW5-1	ON Slave c
	OFF Slave b
	ON Slave a
	OFF Master
SW5-3	ON Setting time : 1000hrs. (Unit stop)
	OFF Setting time : 1000hrs. (Display)
	ON Setting time : 600hrs. (Display)
	OFF Setting time : 180hrs. (when shipped from factory)

Function of DIP switch SW9 (Usually all turned OFF)

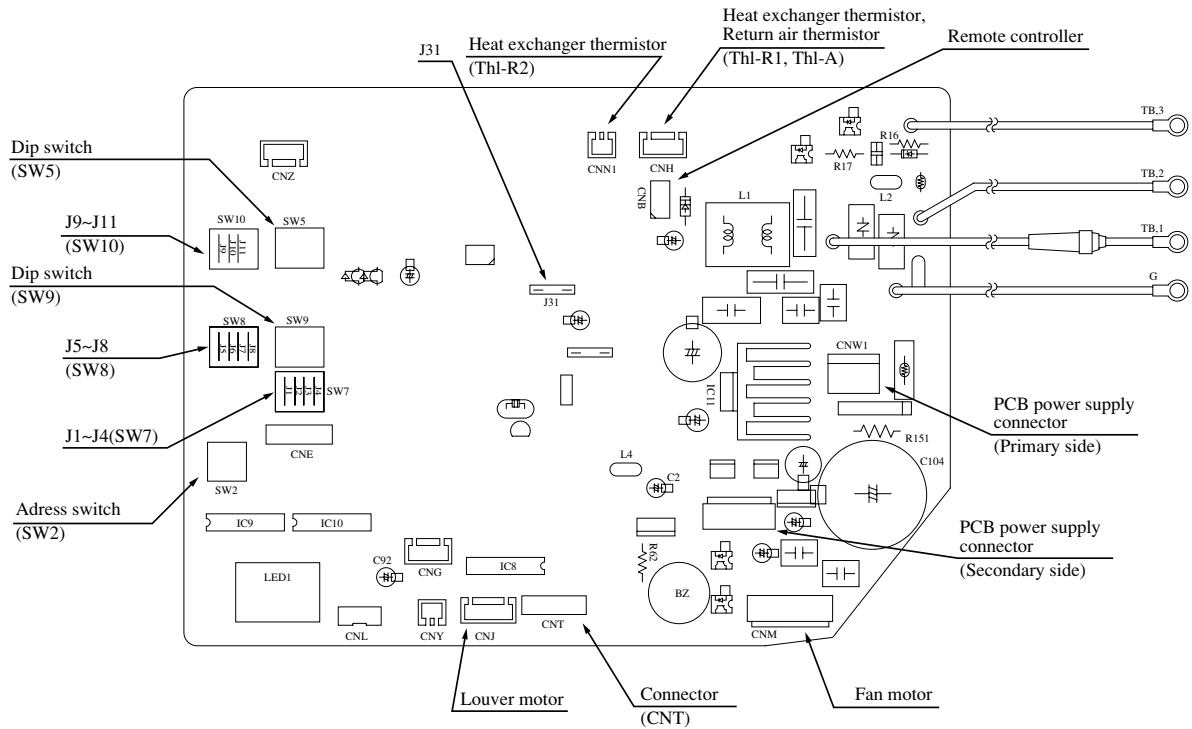
Switch	Function
SW9-3	ON Emergency operation
	OFF Normal
SW9-4	ON Fan control : Powerful mode
	OFF Fan control : Mild mode

Note (1) It is normally ON only in the case of SW9-4.

Function of DIP switch SW10 (Usually all turned OFF)

Switch	Function
SW10-1 (J9)	OFF Auto swing function - None
	ON Auto swing function - With
SW10-2 (J10)	OFF Remote controller air flow -
	ON Remote controller air flow 1 speed
	OFF Remote controller air flow 2 speed
	ON Remote controller air flow 3 speed

Model: FDKN series



• Change by the jumper wire

Name		Function
J1 (SW7-1)	With	Input signal - Reverse invalid
	None ⁽¹⁾	Input signal - Run stop
J2 (SW7-2)	With	Heating thermostat OFF-Lo
	None ⁽¹⁾	Heating thermostat OFF-Stop, Lo
J3 (SW7-3)	With	Normal operation operable
	None ⁽¹⁾	Operation permission prohibited
J4 (SW7-4)	With	Normal
	None ⁽¹⁾	Heating temp. +3
J5 (SW8-1)	With	Louver free stop control - Invalid
	None ⁽¹⁾	Louver free stop control - Effective
J6 (SW8-2)	With	Freeze prevention fan control activated.
	None ⁽¹⁾	Freeze prevention fan control deactivated.
J7 (SW8-3)	With	Louver position : Normal
	None ⁽¹⁾	Louver position : For wind 1
J8 (SW8-4)	With	Model 151~251
	None ⁽¹⁾	-
J31	With	Wireless remote controller
	None ⁽¹⁾	Wired remote controller

Notes (1) "None" means that jumper wire is not provided on the PCB or the connection is cut

(2) The replacement PCB is not equipped with jumpers J1 ~ J8. Instead, SW7 and 8, with the same functions as jumpers J1~J8, are used in the position where the jumpers were previously. Set SW7 and 8 locally in accordance with the above table.

• Control change switch (SW5, SW9, SW10)

Function of DIP switch SW5 (Usually all turned OFF)

Switch	Function
SW5-1	ON Slave c
	OFF Slave b
	ON Slave a
	OFF Master
SW5-3	ON Setting time : 1000hrs. (Unit stop)
	OFF Setting time : 1000hrs. (Display)
	ON Setting time : 600hrs. (Display)
	OFF Setting time : 180hrs. (when shipped from factory)

Function of DIP switch SW9 (Usually all turned OFF)

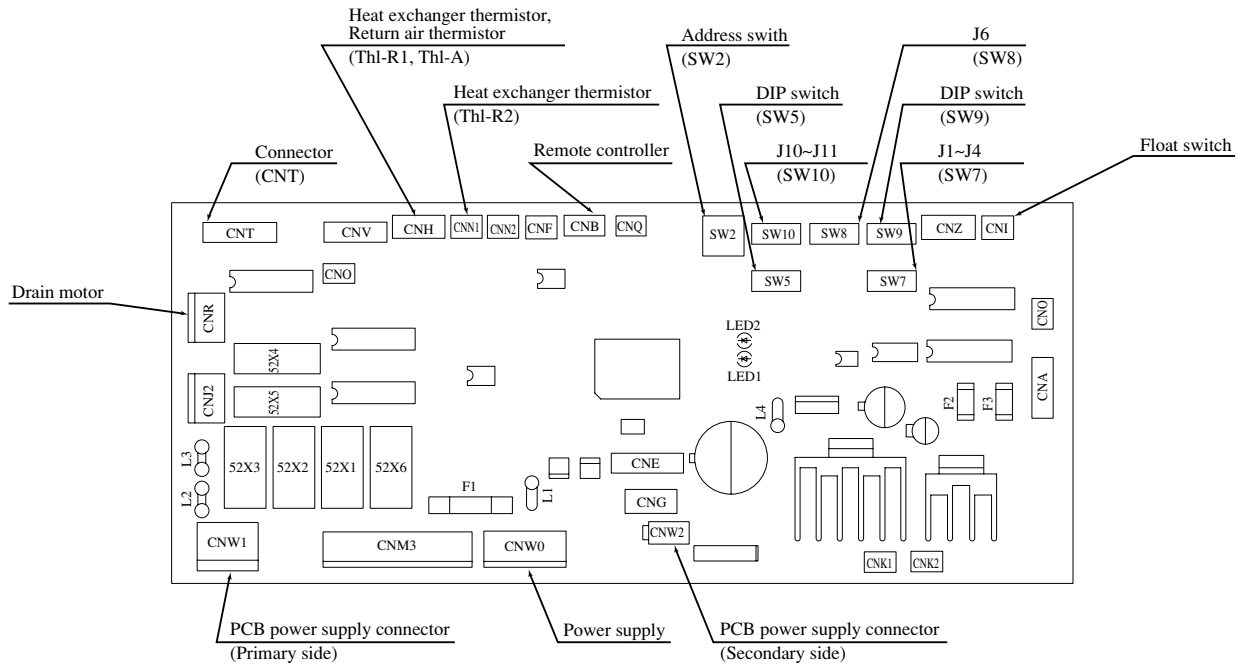
Switch	Function
SW9-1	OFF Custom code - Change
	ON Custom code - Normal
SW9-2	OFF Power failure security - Effective
	ON Power failure security - Invalid
SW9-3	ON Emergency operation
	OFF Normal
SW9-4	ON Fan control : Powerful mode
	OFF Fan control : Mild mode

Note (1) It is normally ON only in the case of SW9-4.

Function of DIP switch SW10 (Usually all turned OFF)

Switch	Function
SW10-1 (J9)	OFF SW10-2 (J10) OFF Dryness operation: 120 minutes (Louver level)
	ON SW10-2 (J10) ON Dryness operation: 60 minutes (Louver close)
	ON SW10-2 (J10) OFF Dryness operation: 120 minutes (Louver close)
	ON SW10-2 (J10) ON Dryness operation: Invalid

Model: FDUM series



● Change by the jumper wire

Name	With	Function
J1 (SW7-1)	With	Input signal - Reverse invalid
	None ⁽¹⁾	Input signal - Run stop
J2 (SW7-2)	With	Heating thermostat OFF-Lo
	None ⁽¹⁾	Heating thermostat OFF-Stop, Lo
J3 (SW7-3)	With	Normal operation operable
	None ⁽¹⁾	Operation permission prohibited
J4 (SW7-4)	With	Normal
	None ⁽¹⁾	Heating temp. +3
J6 (SW8-2)	With	Freeze prevention fan control activated
	None ⁽¹⁾	Freeze prevention fan control deactivated

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

(2) The replacement PCB is not equipped with jumpers J1 ~ J4, J6. Instead, SW7 and 8, with the same functions as jumpers J1~J4, J6, are used in the position where the jumpers were previously. Set SW7 and 8 locally in accordance with the above table.

● Control change switch (SW5, SW9, SW10)

Function of DIP switch SW5 (Usually all turned OFF)

Switch	Function
SW5-1	ON Slave c
	OFF Slave b
	ON Slave a
	OFF Master
SW5-3	ON Setting time : 1000hrs. (Unit stop)
	OFF Setting time : 1000hrs. (Display)
	ON Setting time : 600hrs. (Display)
	OFF Setting time : 180hrs. (when shipped from factory)

Function of DIP switch SW9 (Usually all turned OFF)

Switch	Function
SW9-3	ON Emergency operation
	OFF Normal
SW9-4	ON Fan control : High speed (High Ceiling)
	OFF Fan control : Standard

Function of DIP switch SW10 (Usually all turned OFF)

Switch	Function
SW10-2 (J10)	OFF Remote controller air flow -
	ON Remote controller air flow 1 speed
	OFF Remote controller air flow 2 speed
	ON Remote controller air flow 3 speed

(c) Check method when the error code is display

Remote controller or indication board: Inspection LED, error code

Indoor unit PCB: Red LED (inspection display), Green LED (CPU. normal display)

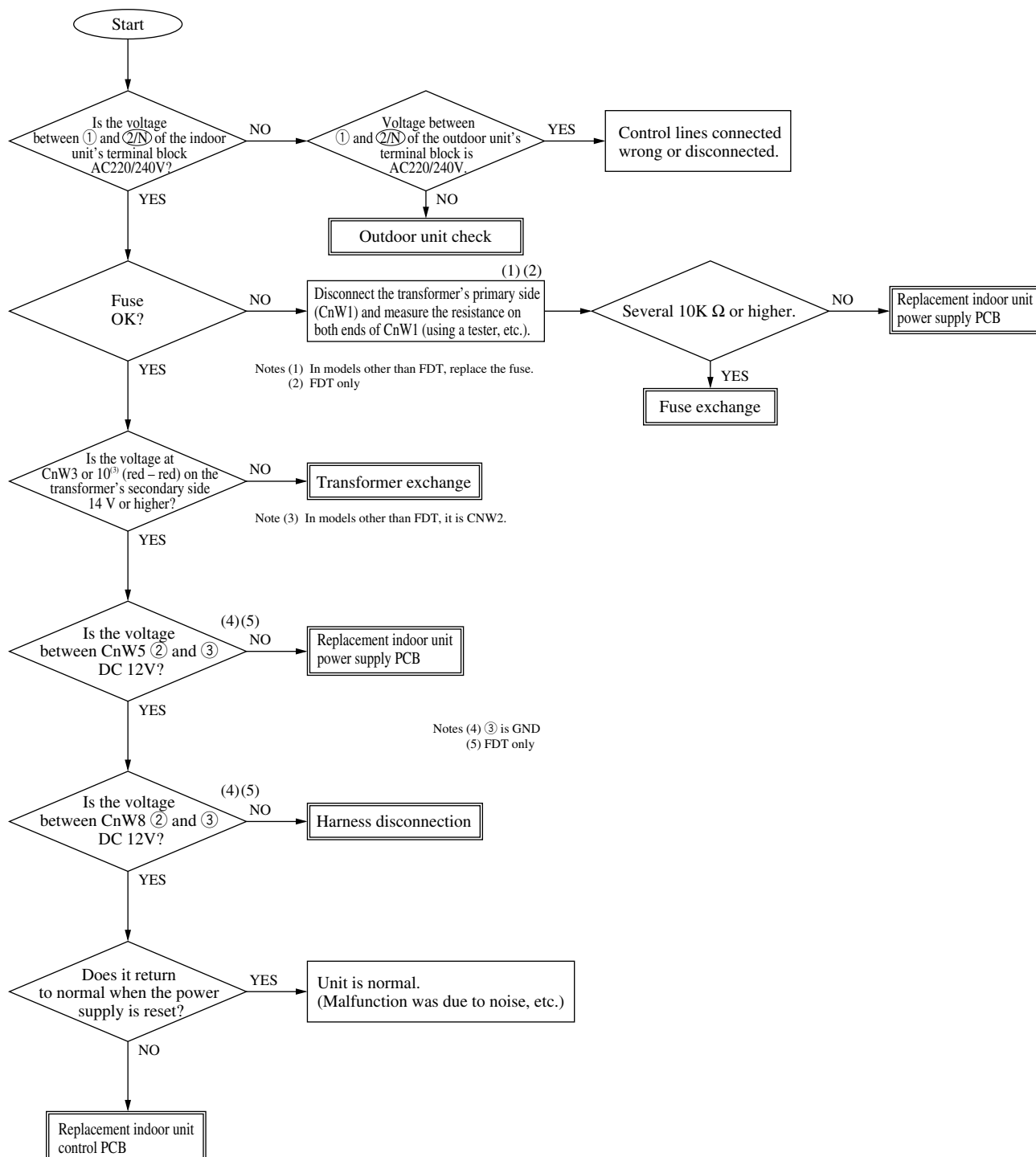
Outdoor unit PCB: Red LED (inspection display), Green LED (CPU. normal display)

1

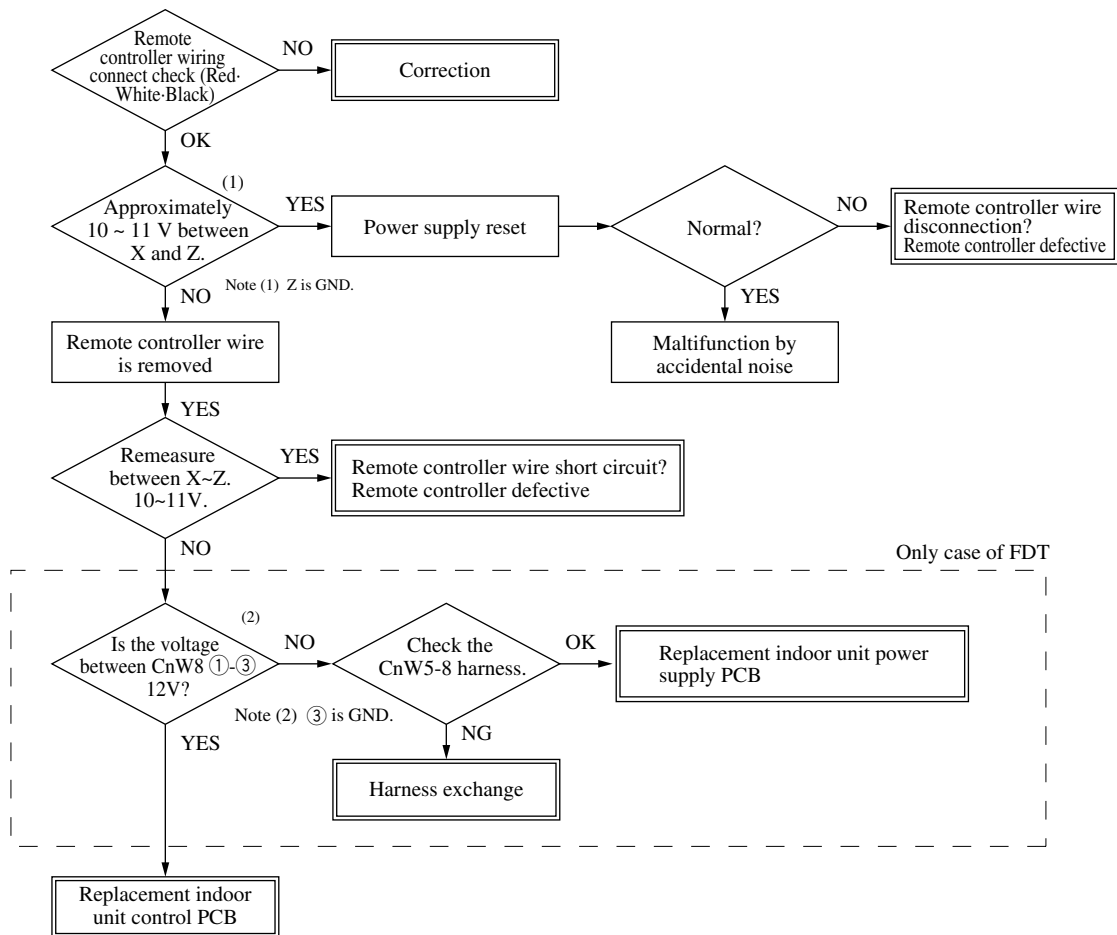
Error display : No display
LCD display : No display

[Power supply line error]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Stays OFF	Green LED	Stays OFF



Indoor unit		Outdoor unit	
Red LED	3 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

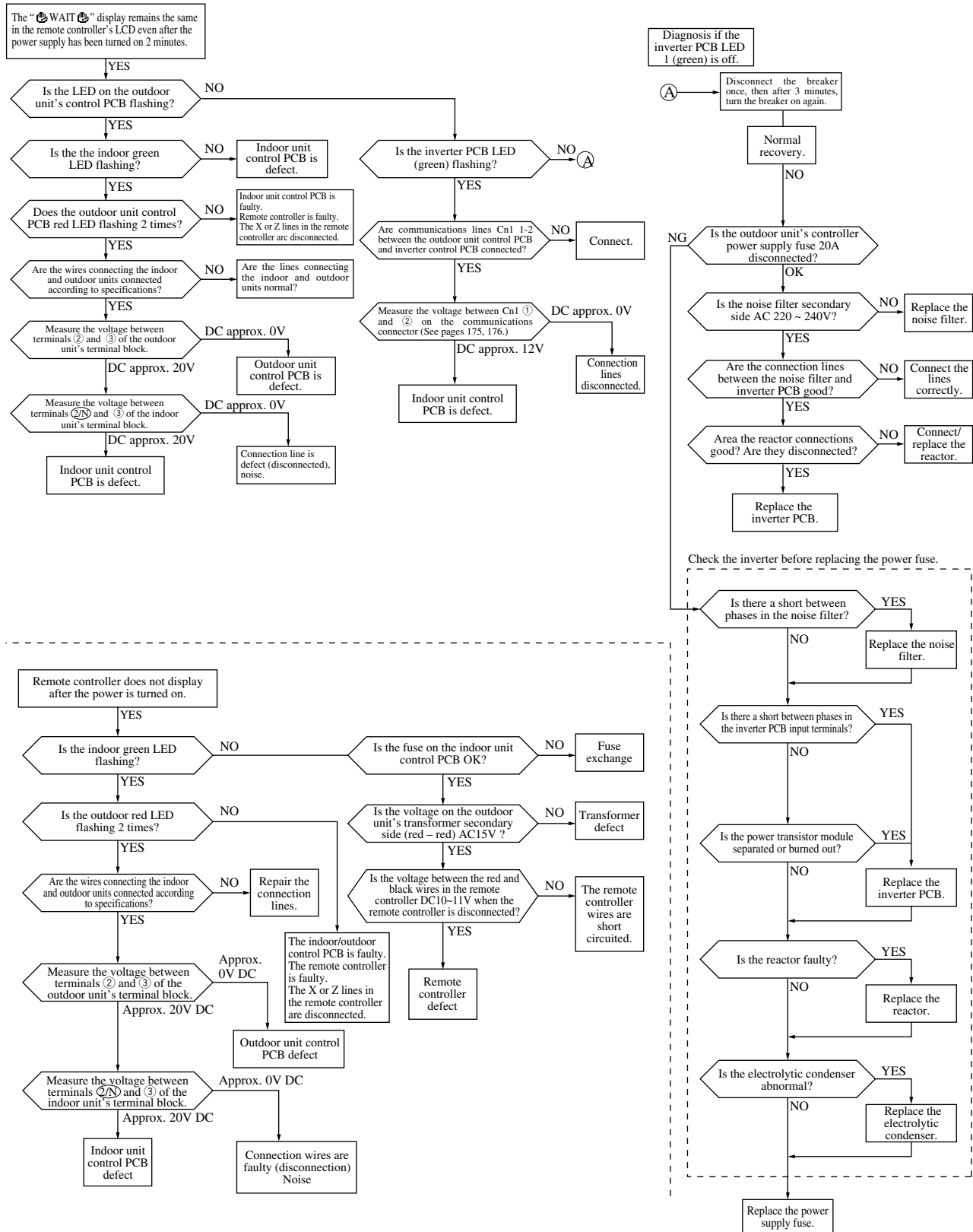


Indoor – outdoor communications trouble (Initial (when the power is turned on))

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	2 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

If the breaker power supply is turned on again in a short time (within 1 minute), a “WAIT” message may be displayed. In this case, turn the breaker OFF and wait 3 minutes.

Notes (1) If trouble occurs during communications, the error code E5 is displayed (Outdoor, Red LED flashes 2 times). The check procedure is as shown below. (However, excluding connection related problems) Also, if the power supply is reset after E5 occurs, if the trouble is intermittent, it will be displayed in the LCD (“WAIT”).



● Check display when there are 3-wire wrong connections.

No.	Item	Wrong connection example	Check display
1	① and ②/N reversing		Remote Control: "⌚WAIT⌚" Indoor: Run LED keeps flashing. Check LED stays OFF. Outdoor: Run LED keeps flashing. Check LED 2 time flash.
2	① and ③ reversing		Remote Control: No-indication. Indoor: Run LED stays OFF. Check LED stays OFF. Outdoor: Run LED keeps flashing. Check LED 2 time flash. The power supply is not supplied to the indoor unit's controller.
3	②/N and ③ reversing		Remote Control: "⌚WAIT⌚" Indoor: Run LED keeps flashing. Check LED stays OFF. Outdoor: Run LED keeps flashing. Check LED 2 time flash.
4	①, ②/N and ③, wrongly connected		Remote Control: No-indication. Indoor: Run LED stays OFF. Check LED stays OFF. Outdoor: Run LED keeps flashing. Check LED 2 time flash. The power supply is not supplied to the indoor unit's controller.
5	①, ②/N and ③, wrongly connected		Remote Control: "⌚WAIT⌚" Indoor: Run LED keeps flashing. Check LED stays OFF. Outdoor: Run LED keeps flashing. Check LED 2 time flash.

Remarks: If the remote control wires (red and black wires) are connected, the green indoor unit LED is stays OFF and the remote controller does not work.

● Operation when address setting is wrong

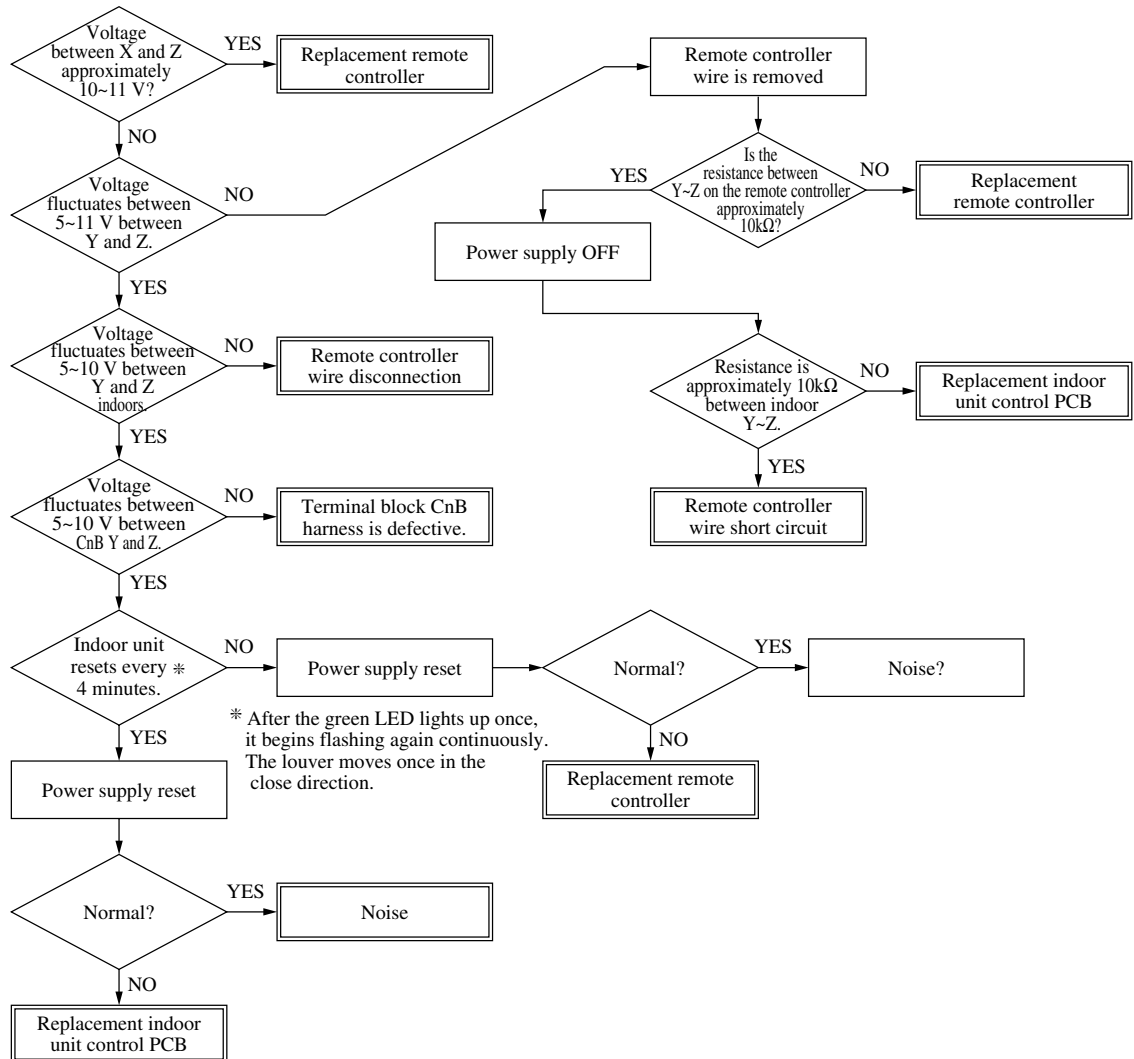
No.	Setting Method	Result	No.	Setting Method	Result
1	If address setting is forgotten when there are multiple slave units. 	<ul style="list-style-type: none"> Remote controller display is normal. Only those indoor units that are connected directly to the outdoor unit run. <p>Outdoor unit runs normally.</p> <p>Press the check SW and check the indoor units that are registered.</p>	5	If indoor unit address setting was forgotten when controlling multiple indoor units with one remote controller. 	<p>Remote controller continues to show "⌚WAIT⌚."</p> <p>Remote controller display is normal.</p> <p>Press the check SW and check the registered indoor units.</p>
2	If address setting is forgotten when there are multiple slave units. 	<ul style="list-style-type: none"> Remote controller continues to show "⌚WAIT⌚." <p>The outdoor check LED 2 time flash.</p>	6	If the address setting method for multiples slave units was mistaken. 	<ul style="list-style-type: none"> The remote controller display is normal. Only the indoor units that are connected directly to the outdoor unit operate. <p>The outdoor unit operates normally.</p> <p>Press the check SW and check the registered indoor units.</p>
3	If slave remote controller address setting was forgotten. 	<ul style="list-style-type: none"> Remote controller continues to show "⌚WAIT⌚." 	7	If the method for setting multiple slave unit addresses was mistaken. 1 of 3 wires between indoor units. 	<ul style="list-style-type: none"> Remote controller continues to show "⌚WAIT⌚." <p>The outdoor unit's check LED 2 time flash.</p>
4	If multiple slave units are set for a single unit. 	<ul style="list-style-type: none"> Remote controller continues to show "⌚WAIT⌚." <p>Indoor unit's check LED 3 time flash (E14).</p>	8	If the method for setting multiple slave unit addresses was mistaken. 	<ul style="list-style-type: none"> Remote controller display is normal. Only the indoor units that are connected directly to the outdoor unit operate. <p>The outdoor unit operates normally.</p> <p>Press the check SW and check the registered indoor units.</p>

3

Error display : E1

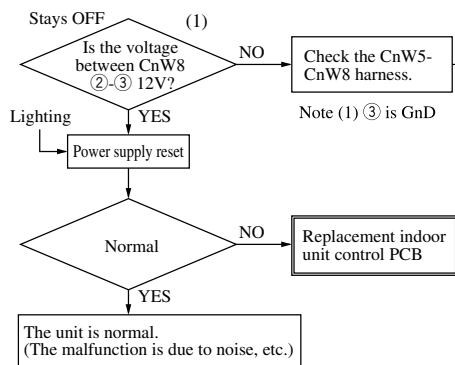
[Communication error between remote controller-Indoor unit]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

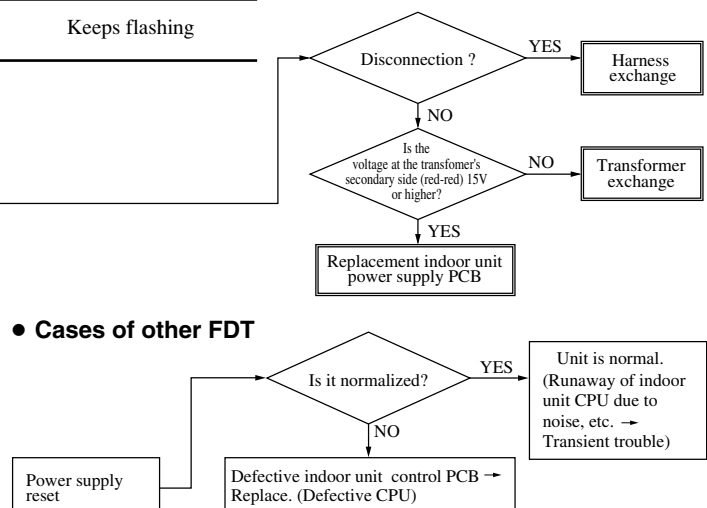


Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Stays OFF or Lights continuously	Green LED	Keeps flashing

• Only case of FDT



• Cases of other FDT

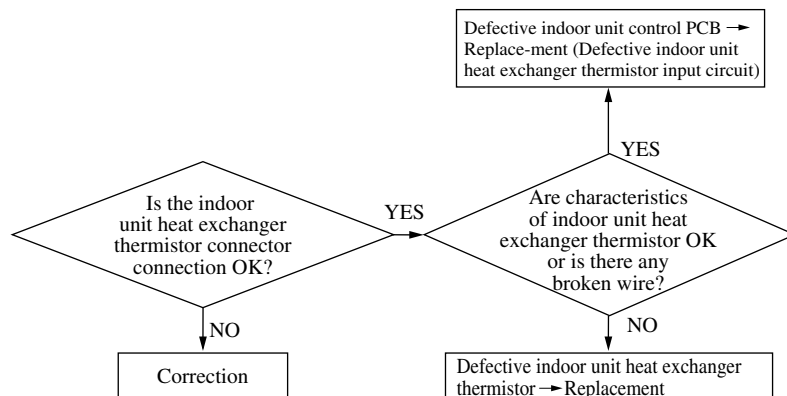


4

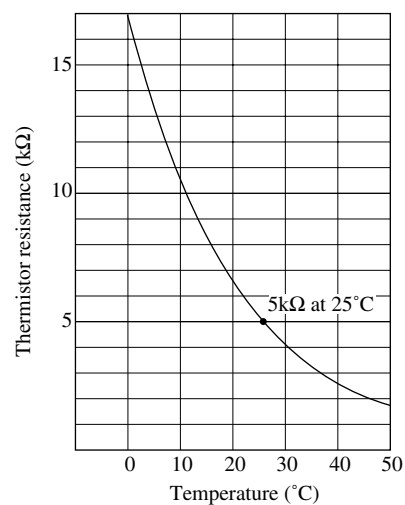
Error display : E6

[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



Air return thermistor (Th:A)
Indoor unit heat exchanger thermistor (Th:R1, R2)
Resistance temperature characteristics



Note (1) 22.5 kΩ at -6°C

- Display condition

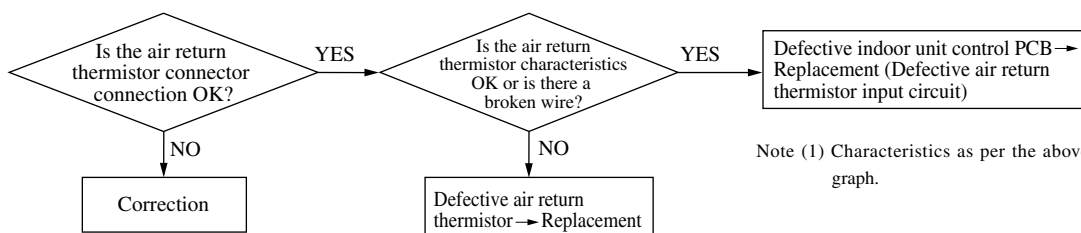
If a temperature of -50°C or lower is detected continuously for 5 seconds or longer by the thermistor, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected again within 60 minutes after the first detection.

5

Error display : E7

[Detective air return 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.

- Display condition

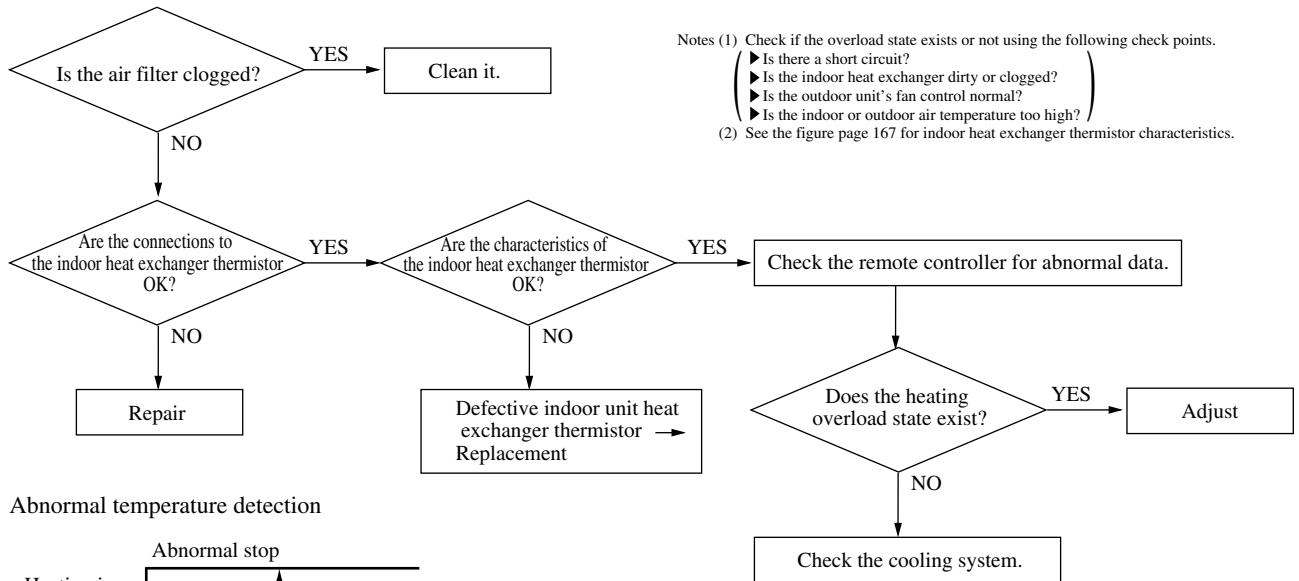
If a temperature of -50°C or lower is detected continuously for 5 seconds or longer by the thermistor, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected again within 60 minutes after the first detection.

6

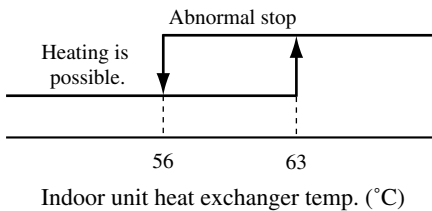
Error display : *EB*

[Heating overload]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



• Abnormal temperature detection



• Display condition

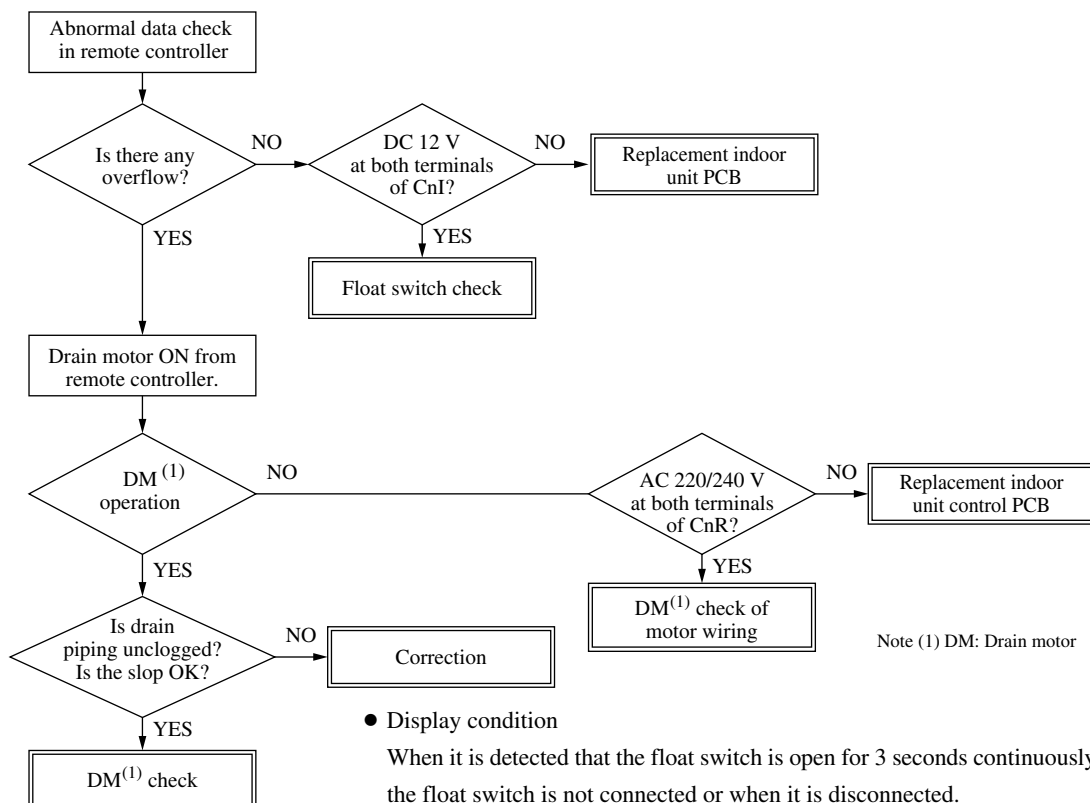
An abnormal stop occurs if this state is detected 5 times within 60 minutes of the first detection, or if the overload state is detected continuously for 6 minutes.

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



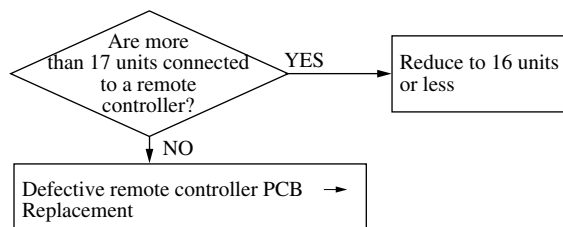
• Display condition

When it is detected that the float switch is open for 3 seconds continuously, when the float switch is not connected or when it is disconnected.

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

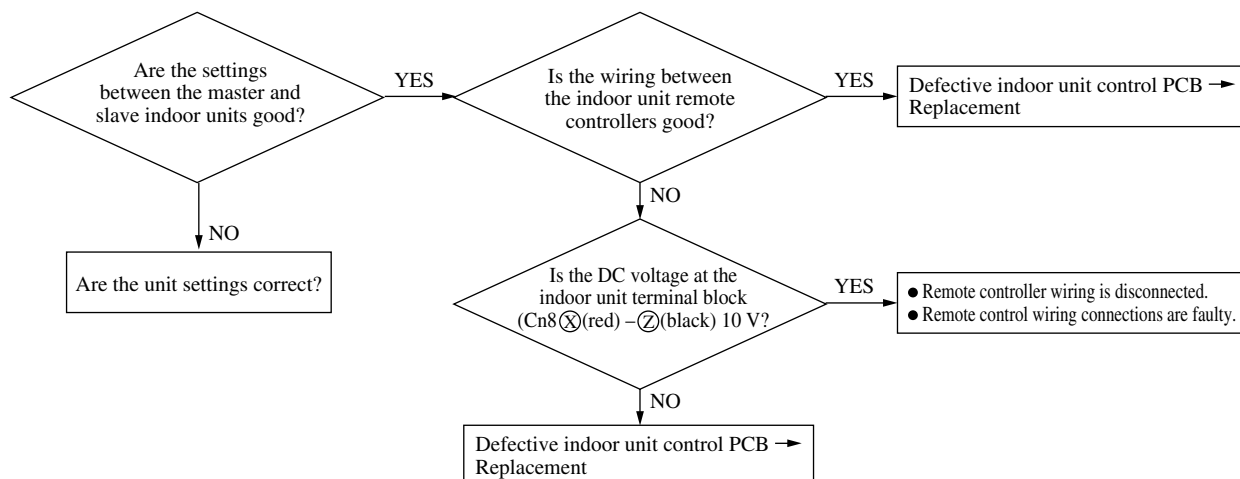


9

Error display : *E14*

[Communications are faulty between master and slave indoor units]

Indoor unit		Outdoor unit	
Red LED	3 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

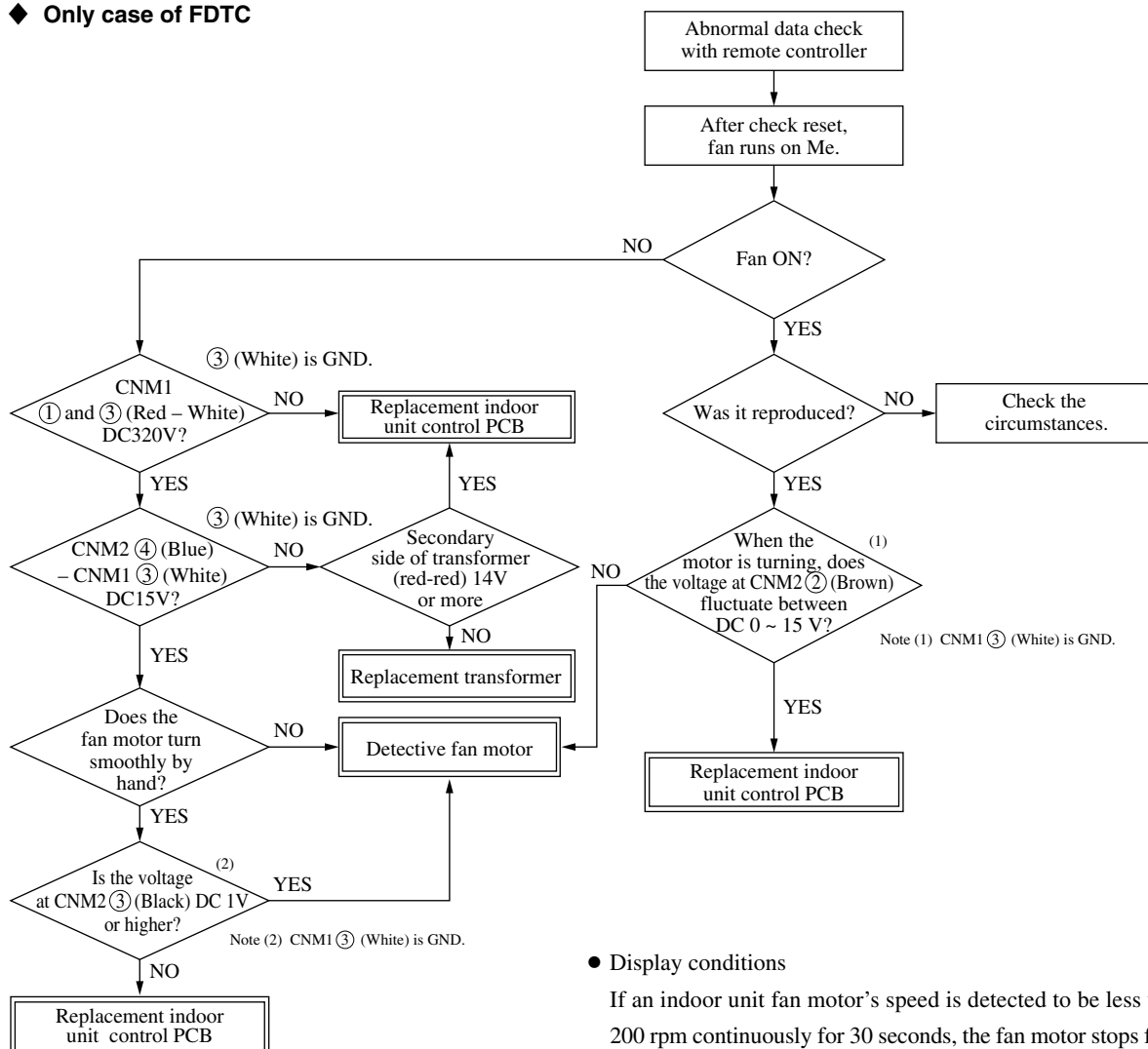
Master setting at time of
factory shipment

		Indoor unit	
		Master	Slave a
DIP switch	SW5-1	OFF	OFF
	SW5-2	OFF	ON

Note (1) Set DIP switches SW5-1 and SW5-2 on the indoor unit control PCB as shown in the above table.

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

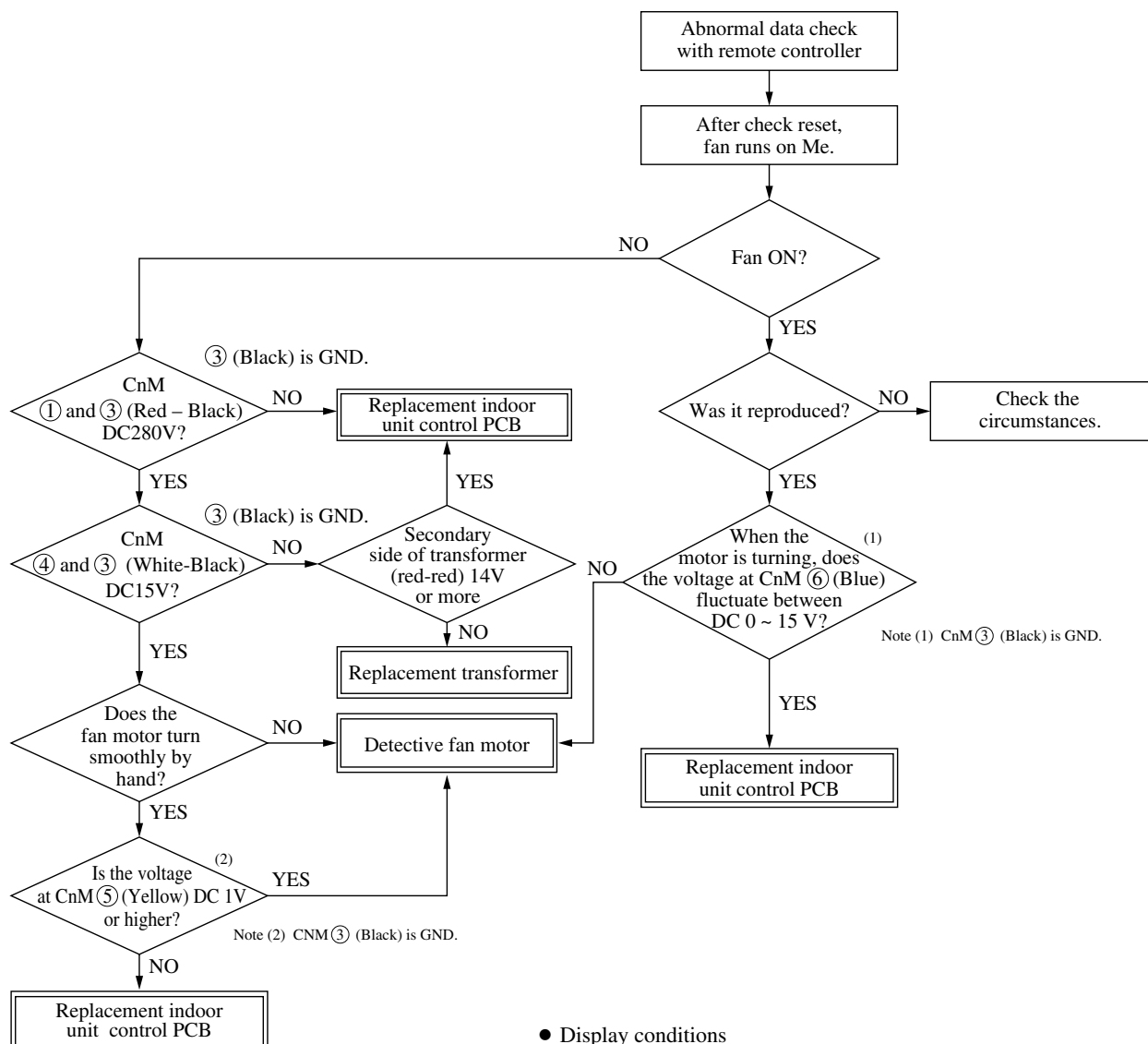
◆ Only case of FDTC



● Display conditions

If an indoor unit fan motor's speed is detected to be less than 200 rpm continuously for 30 seconds, the fan motor stops for 2 seconds. After 2 seconds, it starts again, but this occurs 4 times within a period of 1 hour.

◆ Only case of FDKN



● Display conditions

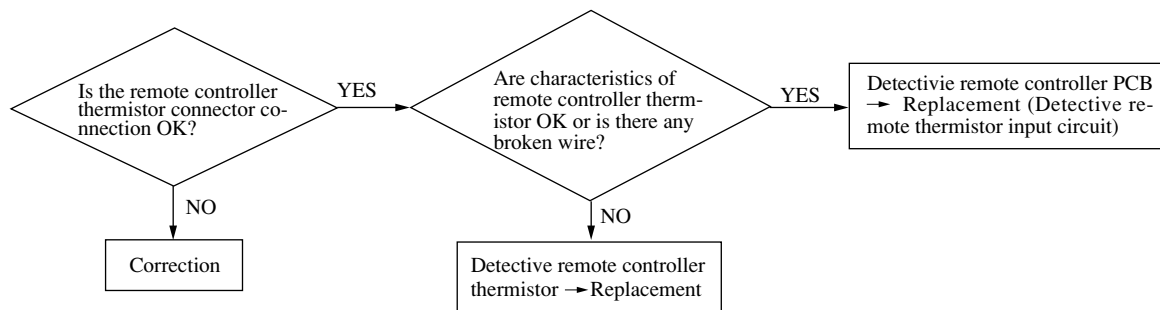
If an indoor unit fan motor's speed is detected to be less than 200 rpm continuously for 30 seconds, the fan motor stops for 2 seconds. After 2 seconds, it starts again, but this occurs 4 times within a period of 1 hour.

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



Resistance-temperature characteristic of remote controller thermister

Temperrature(°C)	Resistance value (kΩ)	Temperrature(°C)	Resistance value (kΩ)	Temperrature(°C)	Resistance value (kΩ)	Temperrature(°C)	Resistance value (kΩ)
0	65	14	33	30	16	46	8.5
1	62	16	30	32	15	48	7.8
2	59	18	27	34	14	50	7.3
4	53	20	25	36	13	52	6.7
6	48	22	23	38	12	54	6.3
8	44	24	21	40	11	56	5.8
10	40	26	19	42	9.9	58	5.4
12	36	28	18	44	9.2	60	5.0

(4) 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 normal 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 inspection and repair.

Since the self diagnosis function by means of the microcomputers of indoor/outdoor units provide the judgement of error of microcomputers themselves 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 interrupted) after the irregularity is automatically recovered to give irregularity information to the service personnel. 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.

(a) Replacement parts assembly related to the outdoor unit controller

Outdoor unit PCB, power transistor module, capacitor, noise filter, thermistor, (heat exchanger, discharge pipe, outdoor temperature, power transistor), fuse, transformer, etc.

(b) Replacement procedure of outdoor unit microcomputer printed circuit board.

Microcomputer printed circuit board can be replaced with following procedure.

- 1) Confirm the parts numbers.

Parts No.	Applicable Model
PCA505A102ZZ	FDCVA302HENR

- 2) Set the model using the model setting switch (SW4).

Switch setting table (All switches are set in the OFF position when shipped from the factory.)

Model	FDCVA 302HENR
Switch setting table Set the switches ON or OFF for each switch No. (■ ON, □ OFF)	

- 3) Set the control select switch to match the previously set settings on the previous PCB.

If the previously set settings were set with jumper wires, the control select switch should be set in the ON position if there was a jumper wire and in the OFF position if there wasn't a jumper wire.

- 4) Connect the faston terminals and connectors to the control PCB.

When connecting the wires to the faston terminals, connect each wire to the terminal printed with the same color on the PCB.

Note (1) When connecting the faston terminals to the control PCB, connect them so that there is no deformation of the far end of the PCB.

(c) Parts layout on the outdoor unit inverter PCB

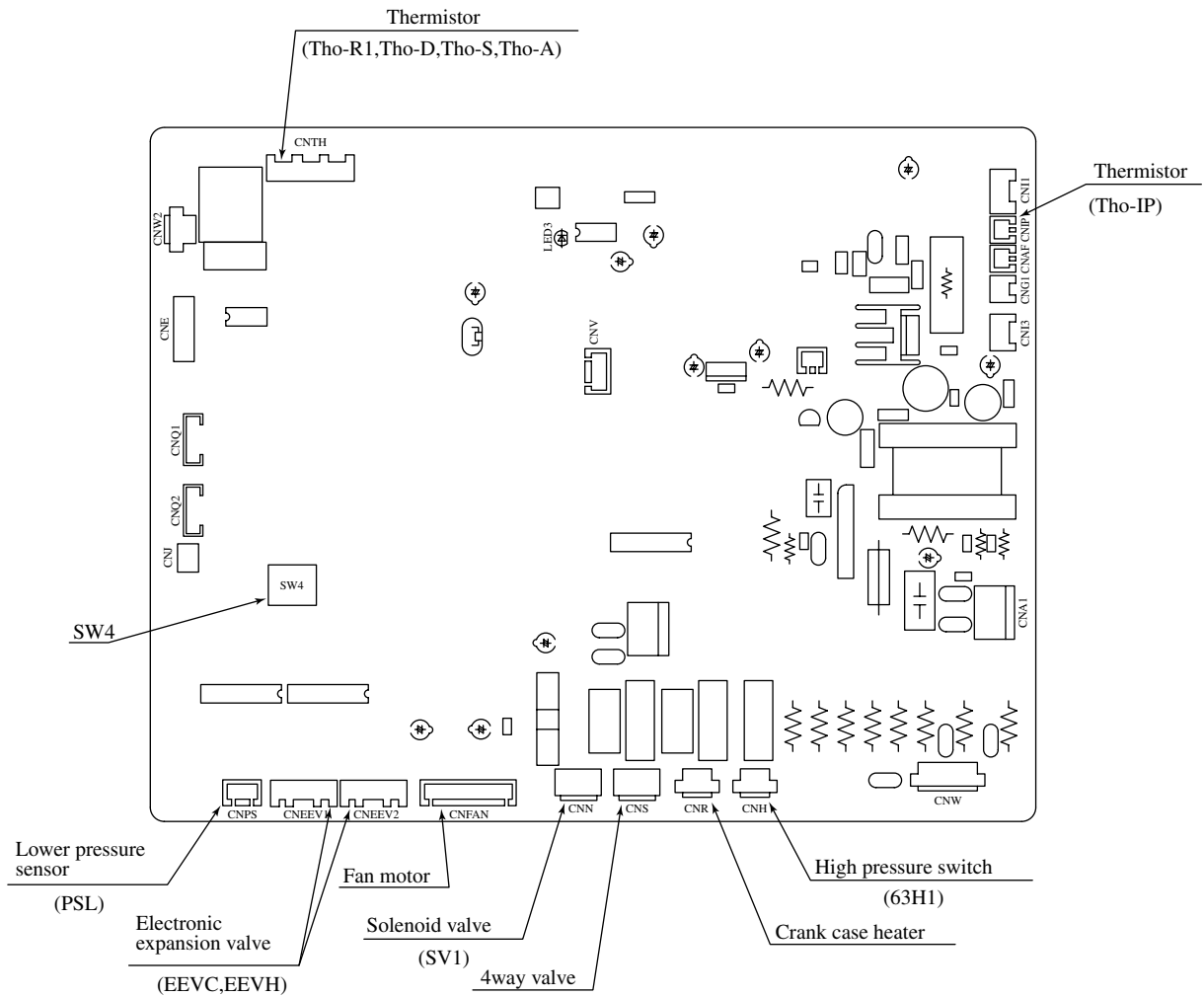
● Replacement procedure of outdoor unit inverter PCB

Inverter PCB can be replaced with following procedure.

- 1) Confirm the parts numbers.

Parts No.	Model
PCA505A103ZY	FDCVA302HENR

Parts layout on the outdoor unit PCB



• Function of DIP switch (SW3, 5, 7, 8)

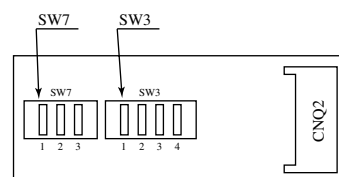
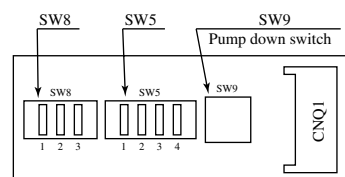
Switch	Function
SW3-1	ON Defrost setting select for Cold regions OFF Defrost setting select for Normal
SW3-2	ON Snow-guard fan control Effective OFF Snow-guard fan control Invalid
SW3-4	ON Defrost prohibited temperature 37 min. OFF Defrost prohibited temperature 45 min.
SW5-3	ON Test run operation OFF Normal
SW5-4	ON Test run operation Heating OFF Test run operation Cooling

Note (1) Usually all turned OFF.

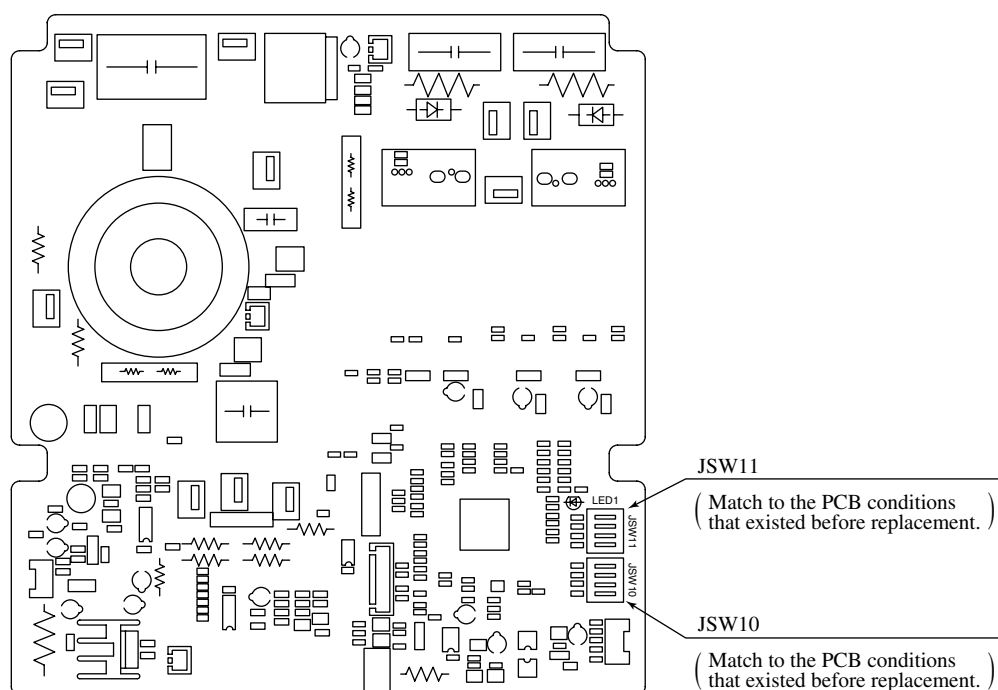
Switch	Function
SW7-1	ON Changes the fan control at installation of wind direction duct. OFF Normal
SW7-2	ON Anti-defrost : Enabled OFF Anti-defrost : Disabled
SW8-2	ON Cancels compressor dilution protection timer. OFF Normal
SW8-3	ON Cancels compressor starter III. OFF Normal

Note (1) Usually all turned OFF.

External PCB



Parts layout on the outdoor unit inverter PCB



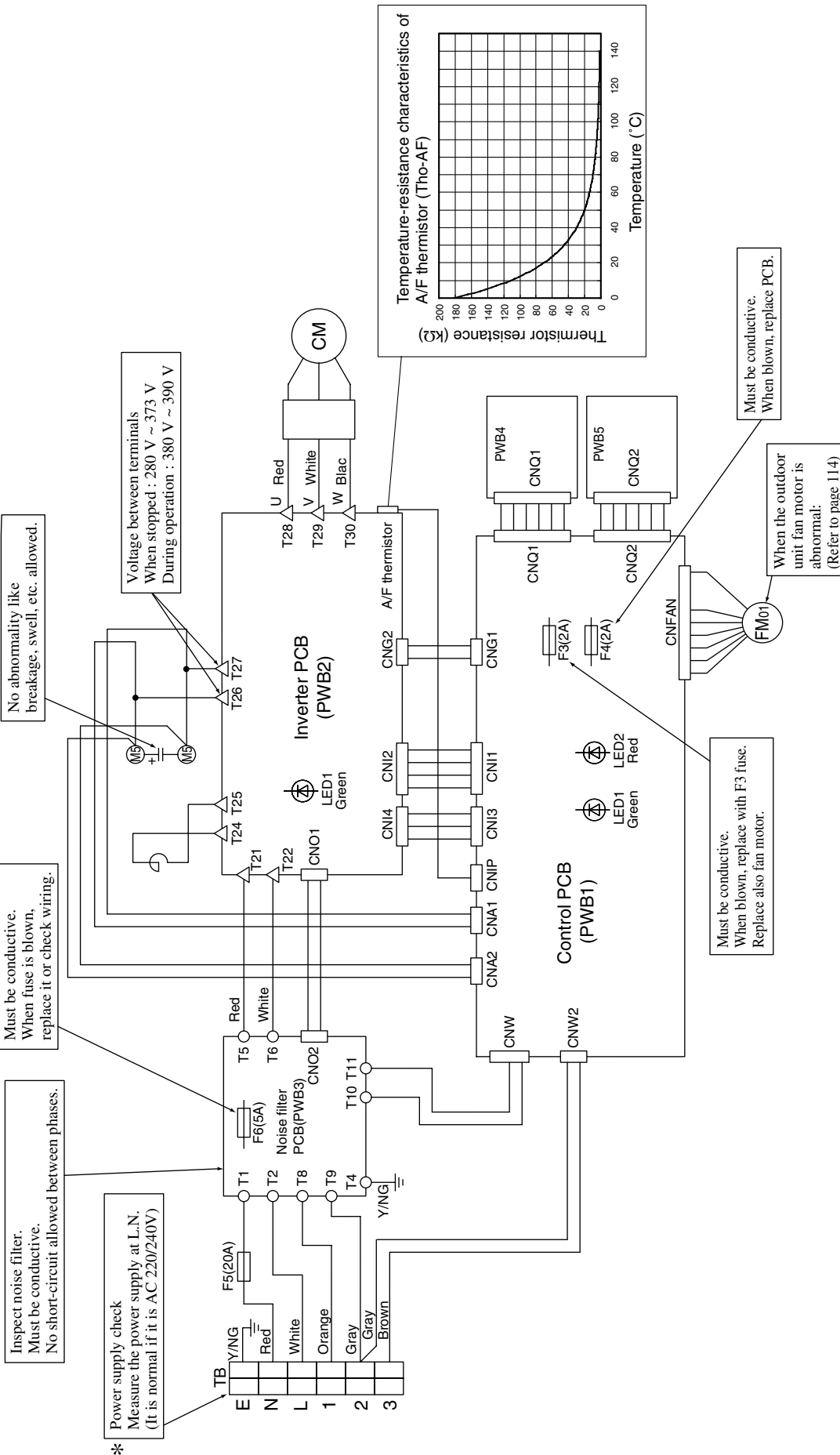
- Notes(1) Apply the silicone grease supplied with the component uniformly to the surface of the power transistor on the new PCB, then mount it on the PCB. If the grease is not applied, the power transistor may be damaged. Use all the silicone grease.
- (2) Tighten the power transistor mounting screws of the inverter PCB, and connect the terminal block, faston terminals and connectors. After connection, make sure tightening was not forgotten and parts were not partially inserted only. In particular, make sure the power transistor is not loose by tightening the mounting screws securely. If they are not tightened, the power transistor may be damaged.

Outdoor unit controller failure diagnosis circuit diagram

◆ FDCVA302HENR

● Outdoor unit check points

Check items with the *mark when the power is ON.

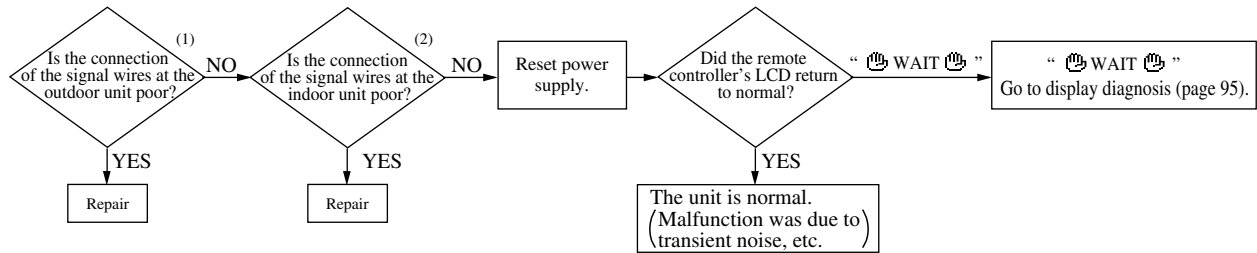


1

Error display : E5

[Communications error during operation]

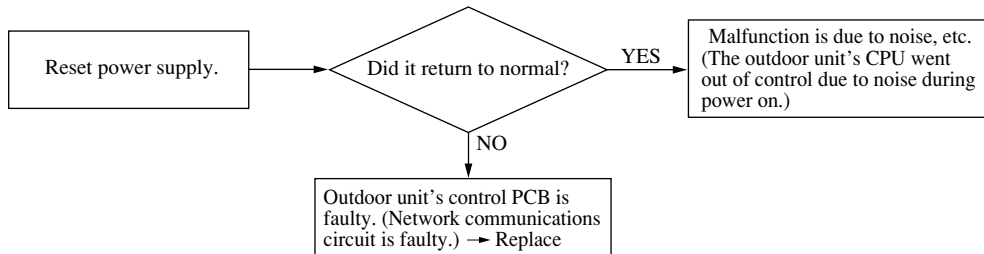
Indoor unit		Outdoor unit	
Red LED	2 time flash	Red LED	2 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



Notes (1) Check for poor connections (disconnection, looseness) on the outdoor unit's terminal block.

(2) Check for poor connections or disconnection of the signal lines between the indoor and outdoor units.

Indoor unit		Outdoor unit	
Red LED	2 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

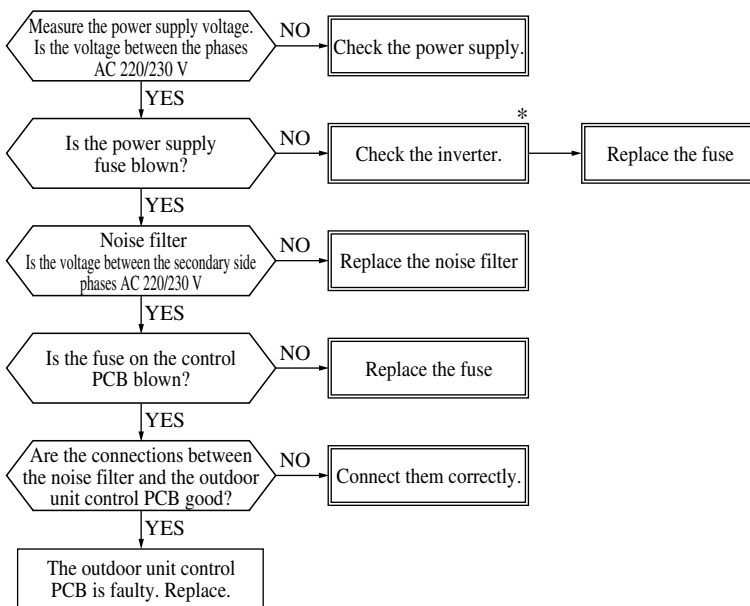


2

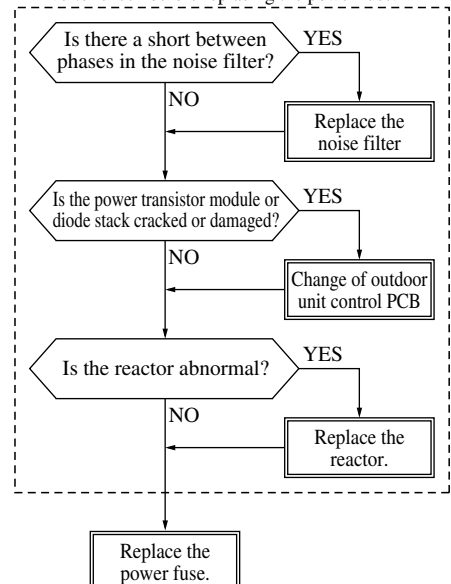
Error display : E34

[Power supply open phase]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



* Inverter check before replacing the power fuse.

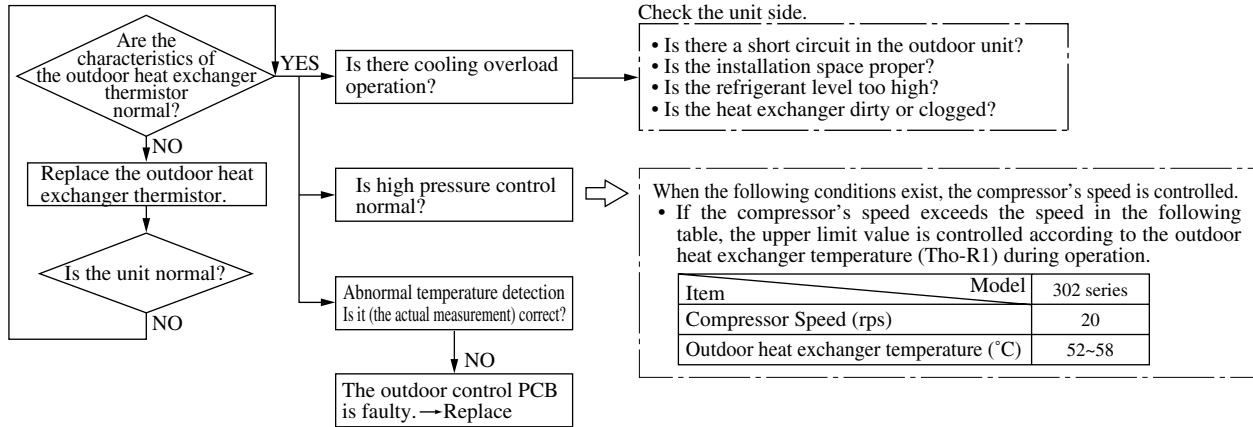


• Display Conditions
After the power goes ON, if the power supply is 0 V at either L1, N phase.

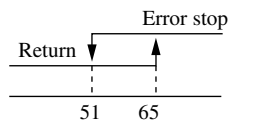
3

Error display : *E35* [Cooling overload operation]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



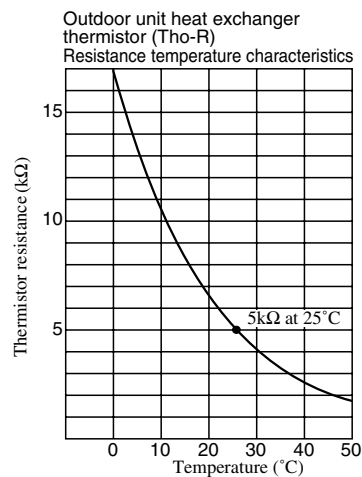
◆ Abnormal temperature detection



Outdoor heat exchanger temp. (°C)

● Display Conditions

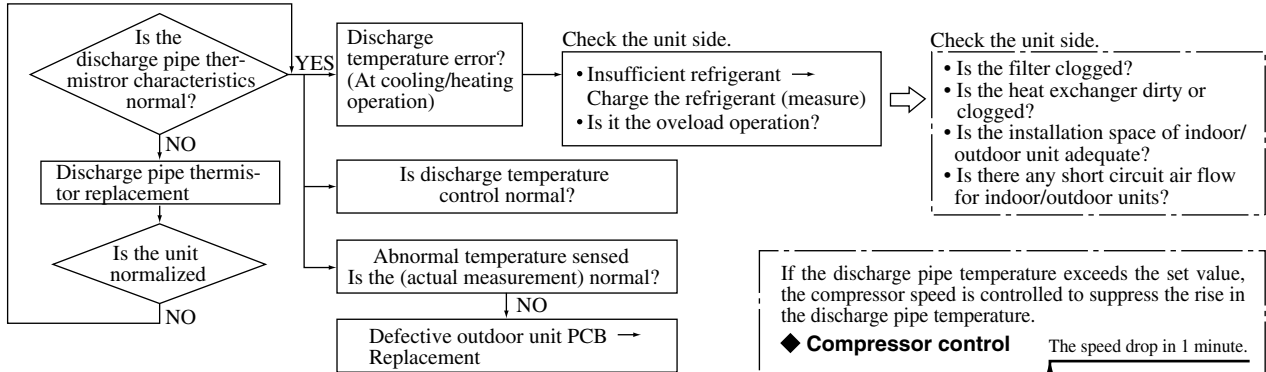
If the outdoor heat exchanger is abnormal 5 times within 60 minutes, or is 65°C or higher continuously for 60 minutes, including when the compressor is stopped.



4

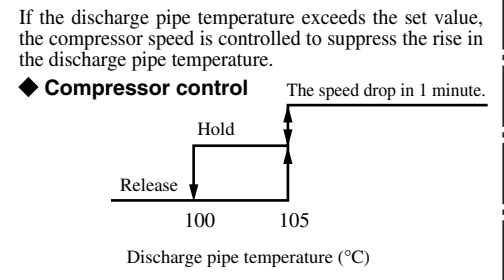
Error display : E36 [Discharge temperature error]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

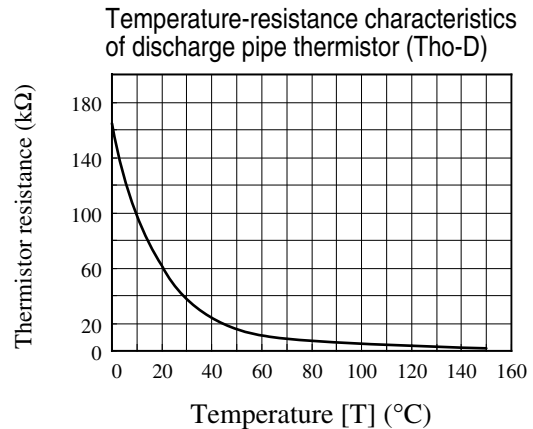
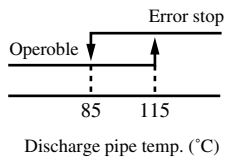


• Display conditions

If the discharge temperature is as shown at left 2 times within 60 minutes, or continuously for 60 minutes, including when the compressor is stopped.



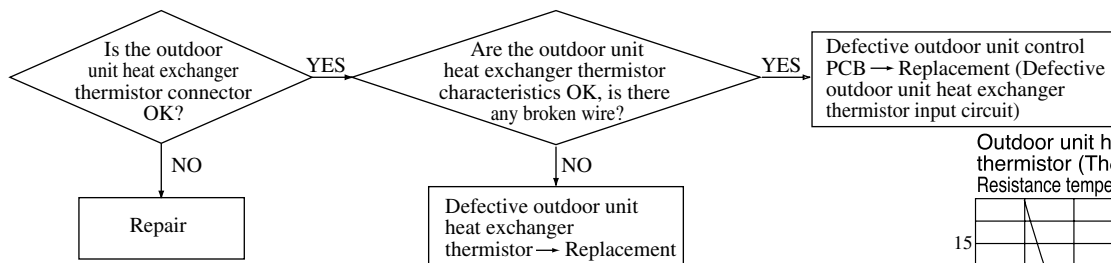
◆ Abnormal temperature detection



5

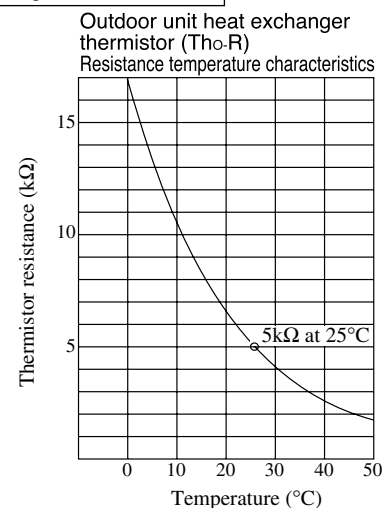
Error display : E37 [Defective outdoor unit heat exchanger thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



- Display conditions

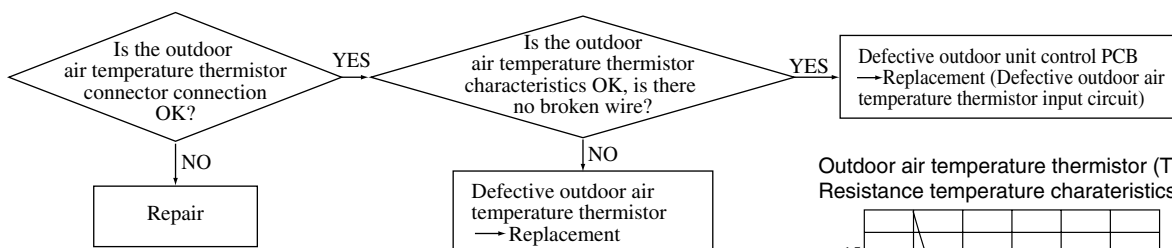
If the temperature sensed by the thermistor is -50°C or lower continuously for 5 seconds between 2 minutes and 2 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected 3 times in 40 minutes.



6

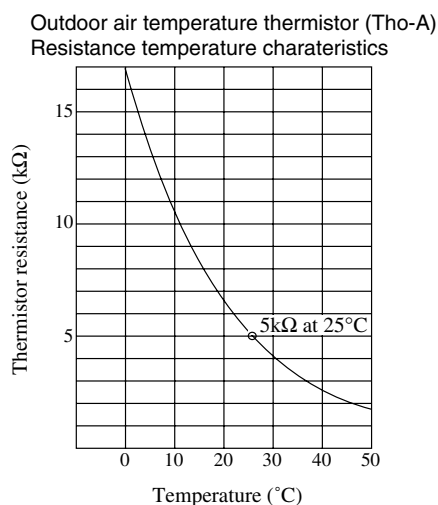
Error display : E38 [Defective outdoor air temperature thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



- Display conditions

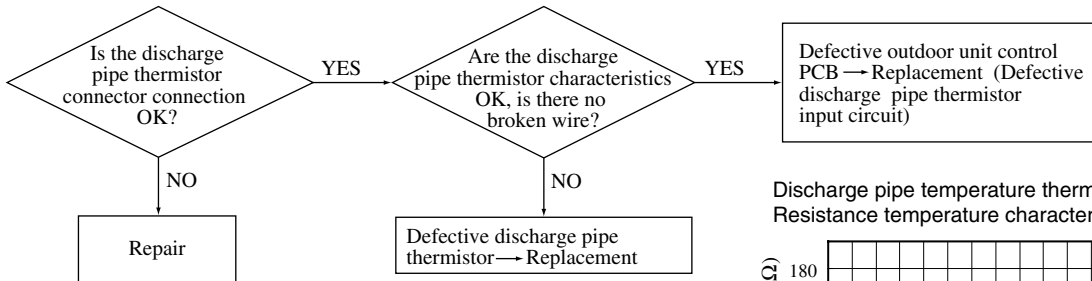
If the temperature sensed by the thermistor is -30°C or lower continuously for 5 seconds between 2 minutes and 2 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected 3 times in 40 minutes.



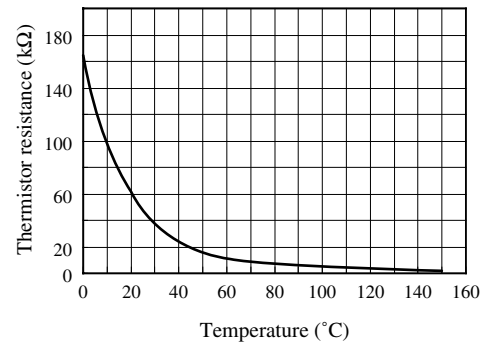
7

Error display : E39 [Defective discharge pipe thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



Discharge pipe temperature thermistor (Tho-D)
Resistance temperature characteristics



● Display conditions

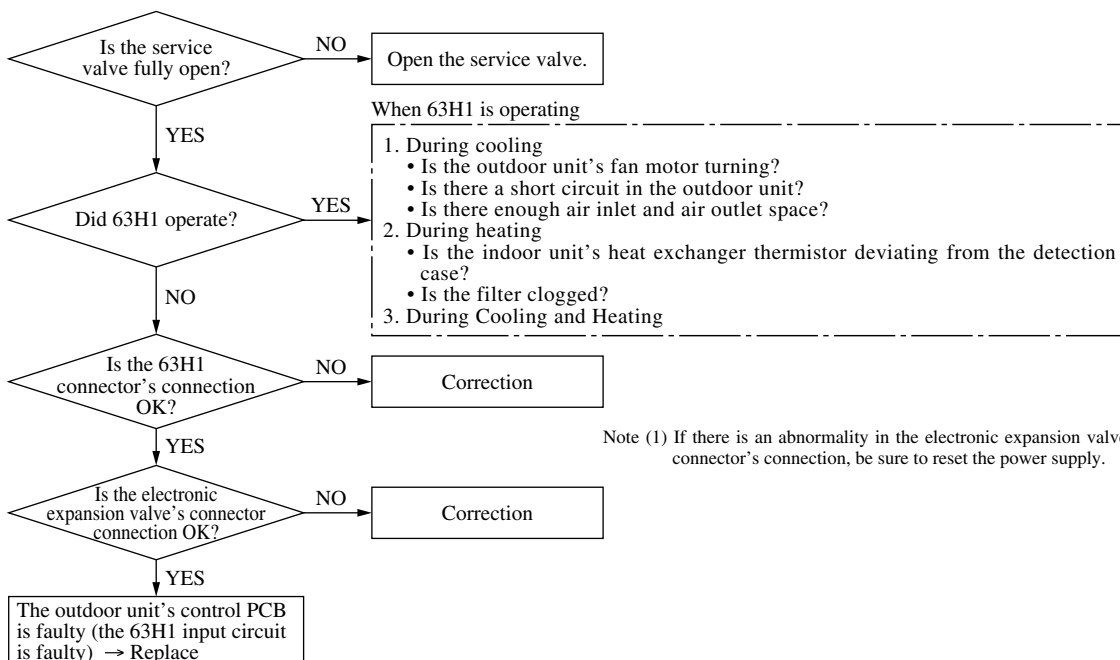
If the temperature sensed by the thermistor is -30°C or lower continuously for 5 seconds between 10 minutes and 10 minutes 20 seconds (2minutes and 2minutes 20seconds) after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected 3 times in 40 minutes.

8

Error display : E40 [63H1 operation]

If the power supply breaker is turned from OFF to ON quickly, E40 may be displayed. This is not abnormal.

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

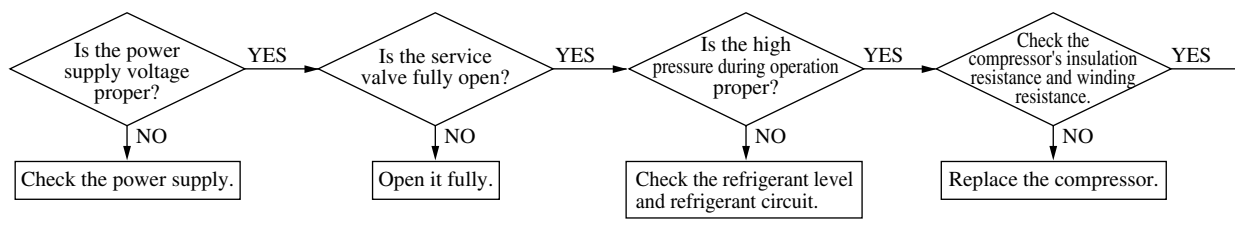


Note (1) If there is an abnormality in the electronic expansion valve connector's connection, be sure to reset the power supply.

9

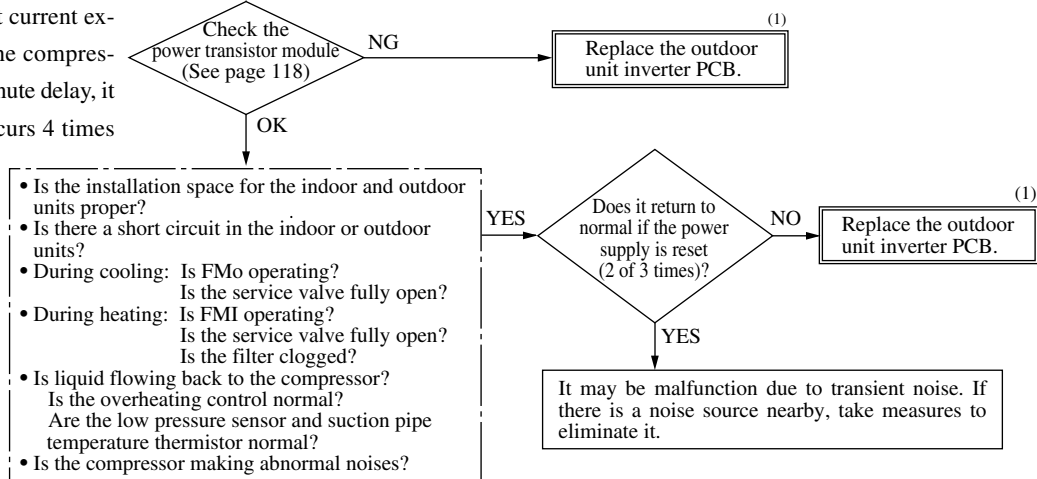
Error display : E42 [Current cut]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



● Display conditions

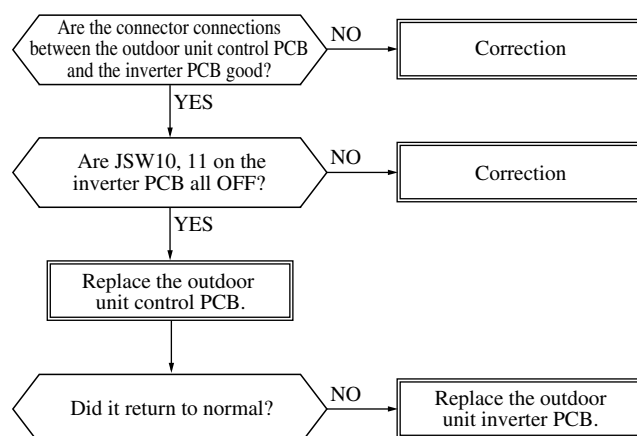
If the inverter's output current exceeds the set value, the compressor stops. After a 3-minute delay, it restarts, but if this occurs 4 times within 30 minutes.



10

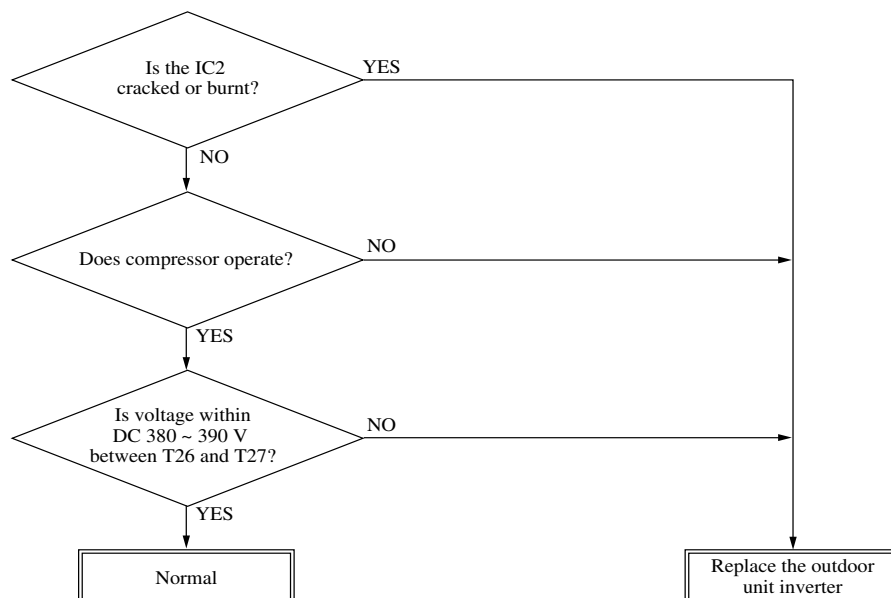
Error display : E45 [Inverter communications are abnormal]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



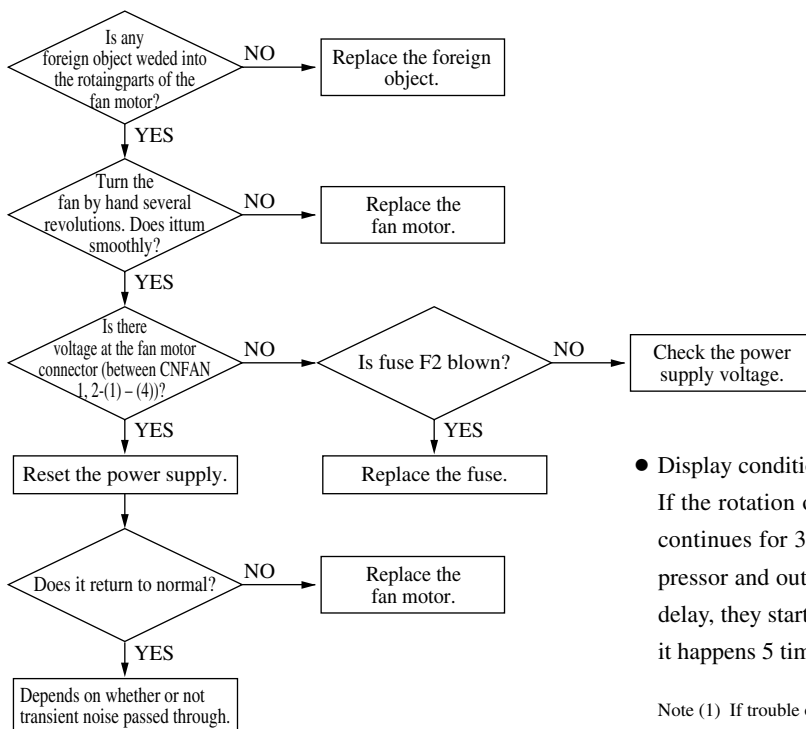
11 Error display : E47 [Over-current error on A/F (active filter) module]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



12 Error display : E48 [DC Fan motor abnormal]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



● Display conditions

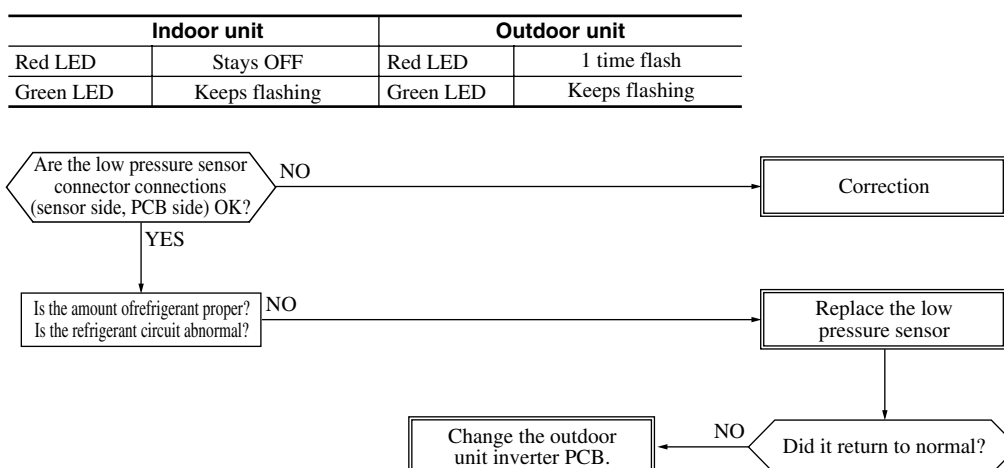
If the rotation of the outdoor unit's fan motor (FM01, 2) continues for 30 seconds at 100 min⁻¹ or lower, the compressor and outdoor unit fan motor stop. After a 3-minute delay, they start again automatically, but in the case where it happens 5 times within 60 minutes.

Note (1) If trouble occurs even when the fan motor is replaced, replace the control board.

13

Error display : E49

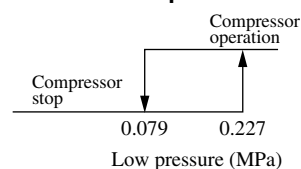
[Low pressure abnormal or low pressure sensor disconnected.]



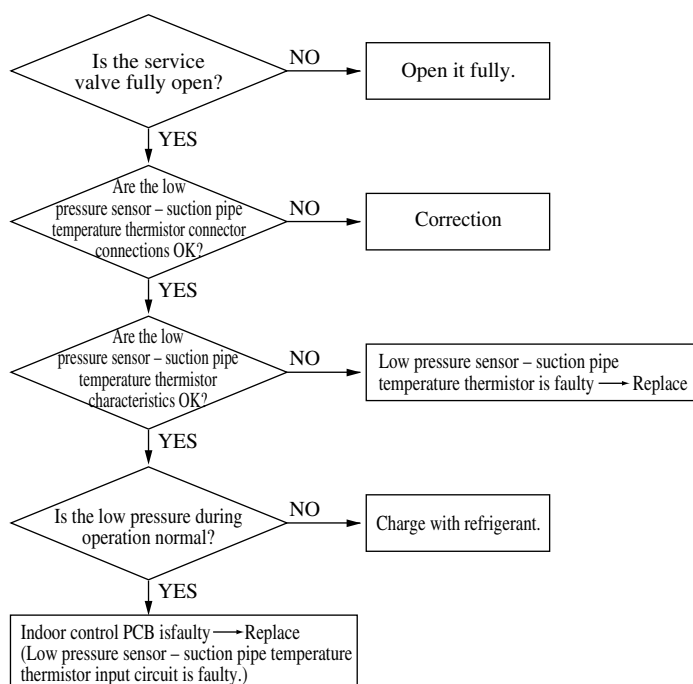
• Display Conditions

If the pressure sensed by the low pressure sensor is 0.079 MPa or lower continuously for 15 seconds, the compressor stops. After a 3-minute delay, the compressor starts again, but if it happens 3 times within 60 minutes.

• Abnormal temperature detection

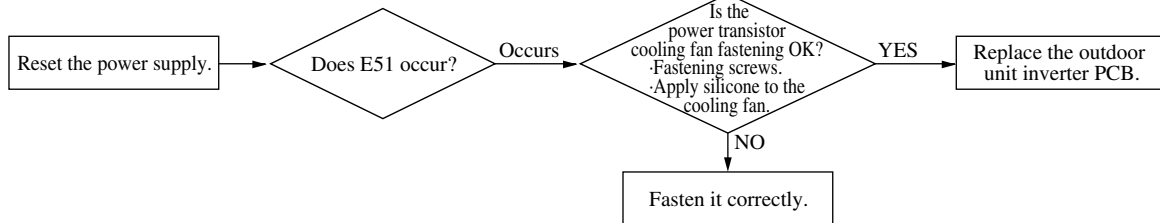


Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



14 Error display : **E51** [Inverter, fan motor abnormal]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Lights contiously
Green LED	Keeps flashing	Green LED	Keeps flashing

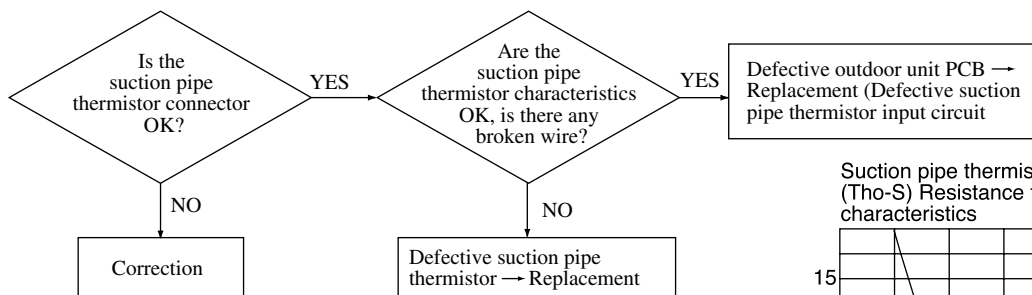


• Display conditions

When the power transistor temperature is 110°C or higher continuously for 15 minutes.

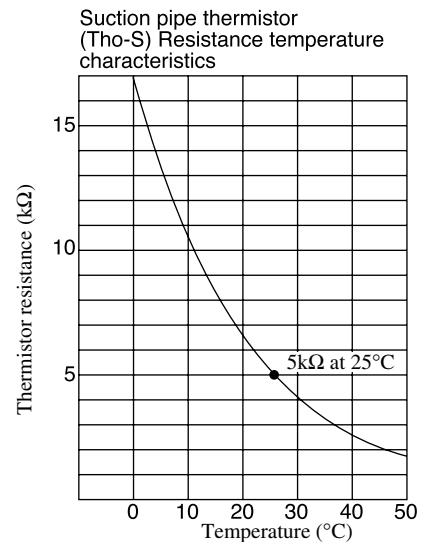
15 Error display : **E53** [Defective suction pipe temperature thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



• Display conditions

If the temperature detected by the thermistor is -50°C or lower continuously for 5 seconds between 10 minutes and 10 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts. If this condition is detected 3 times within 40 minutes.

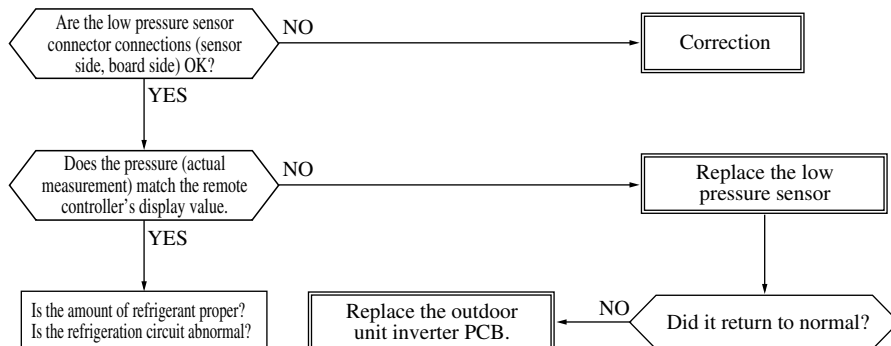


16

Error display : *E54*

[Low pressure sensor is faulty]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



Note (1) See page 120 concerning the operation data display method in the remote controller.

● Display Conditions

If the voltage sensed by the voltage sensor is 0 V or lower, or 3.49 V or higher continuously for 5 seconds between 2 minutes and 2 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3-minute delay, the compressor starts again, but if it occurs 3 times in 40 minutes.

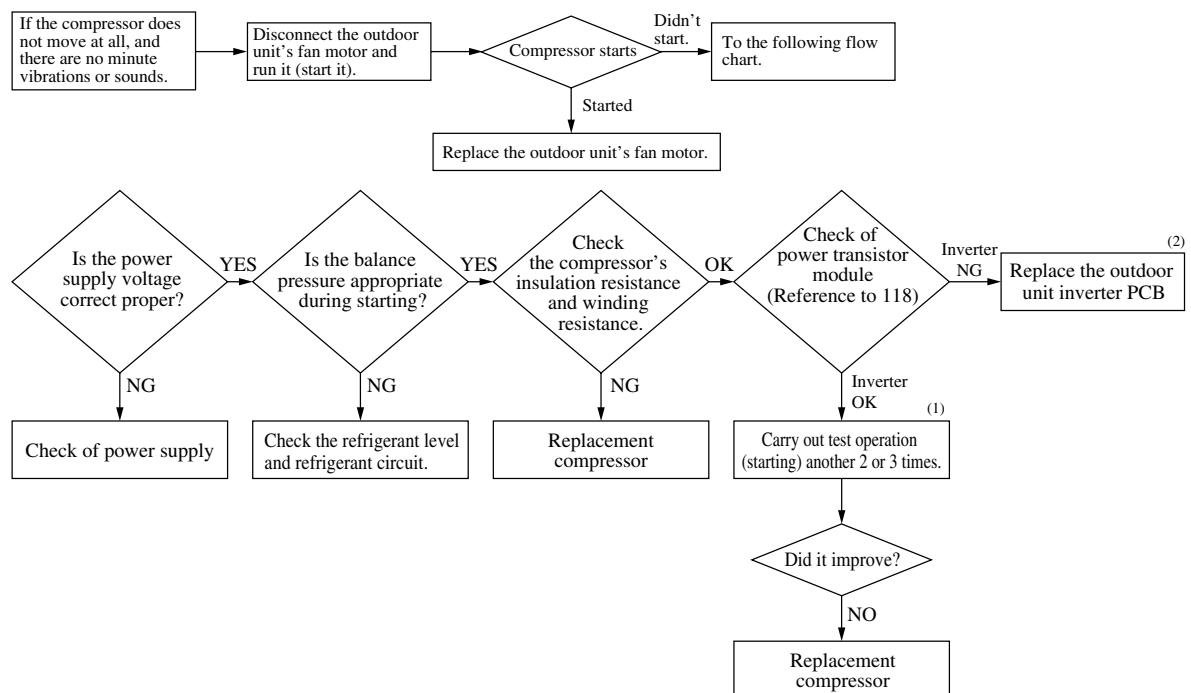
17

Error display : *E59*

[Abnormalities in compressor starting]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	5 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

Note (1) Check if the power supply system is normal.



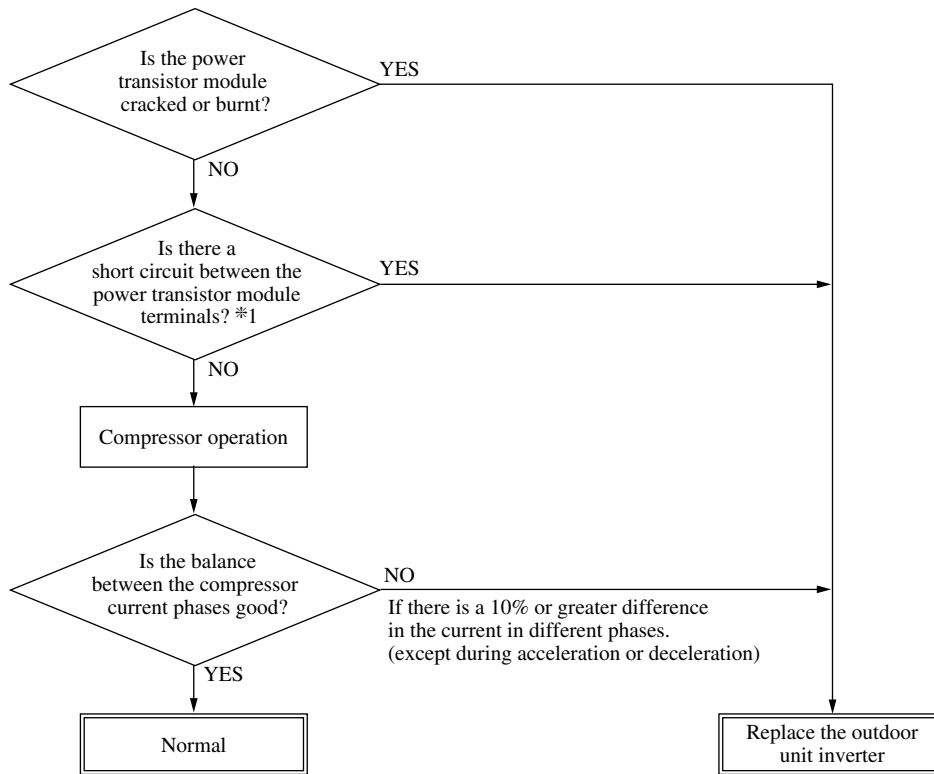
Note (1) If the test operation is repeated 2 or 3 times, the liquid refrigerant inside the compressor may be expelled from the compressor may recover from its starting abnormality.

● Display conditions

(1) If it won't start 10 times out of 20 attempted starts.

(2) Remote controller reset is possible after 3 minutes have passed.

Power transistor module (including drive circuit) check method



*1 Power transistor module terminal short circuit check procedure

Disconnect the compressor wiring, then conduct a short circuit check.

P-U, P-V, P-W

N-U, N-V, N-W

Check between the P-N terminals.

Bring the tester probes in contact with the following places on each terminal.

P: Power transistor P terminal, U: End of red harness to compressor

N: Power transistor N terminal, V: End of white harness to compressor

W: End of black or blue harness to compressor

Check for a power transistor short circuit.

- When you do not have a diagnostic checker for judging if the inverter is defective, measure between the terminals of the power transistor parts, judge whether the power transistor is defective or not.
- Disconnect the compressor, then measure with the controller incorporated.

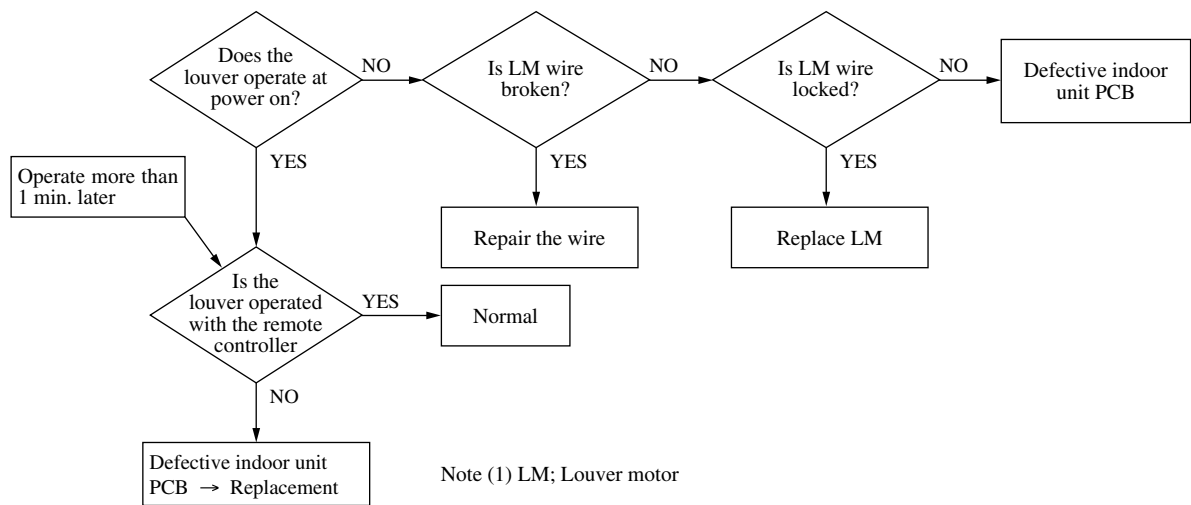
Tester		Normal values (Ω)
Terminal (+)	Terminal (-)	302
P	N	0 ~ (Numerical value rises.)
N	P	
P	U	Several M (Numerical value rises.)
P	V	
P	W	
N	U	Approx. 650 k
N	V	
N	W	
U	P	Approx. 670 k
V	P	Approx. 4.4 M
W	P	Approx. 4.4 M
U	N	Approx. 650 k
V	N	Approx. 4.8 M
W	N	Approx. 4.9 M

If the measured values range from 0 ~ several kΩ, there is a possibility that the elements are damaged, so replace the power transistor parts.

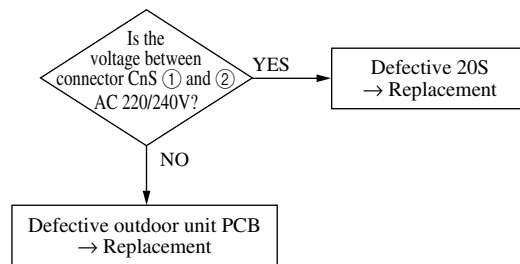
(5) Check method in the case of the failure display in the remote controller

(a) Louver motor does not operate

► Inspect at the indoor unit side.



(b) 4 way valve does not switch during heating operation



(6) Check abnormal operation data with the wired remote controller

Operation data are recorded when there is an abnormal state and these data can be displayed in the remote controller by operating the remote controller buttons.

- (1) Press the CHECK button.

The display will change from “ FUNCTION” → “ SET ” → “OPERATION DATA ”

- (2) Press the button once. The display will change to “ERROR DATA ”.

- (3) Press the SET button to enter the abnormal operation data display mode.

- (4) If there are abnormalities from the past, they will be displayed by an error code and unit No.

(Example) “E8” (Lighted up)

“I/U No. 00 ” (Flashing)

- (5) Using the or button, select the indoor unit No. you want to display the error data for.

If only one indoor unit is connected, the indoor unit No. does not change.

- (6) Fix the selection using the SET button. (The displayed indoor unit No. will change from flashing to light up continuously.)

(Example) “E8”

“DATA LOADING” (This message flashes while data are being read.)

↓

“E8”

“ERROR DATA ”

The data are then displayed beginning with item No. 01.

Displayed items are as shown below.

- (7) Display the other data for when the error occurred in order from the currently displayed operation data No. 01 using the or button.

* Depending on the model, items for which corresponding data do not exist are not displayed.

- (8) To change the indoor unit, press the AIR CON No. button and return to the indoor unit selection display.

- (9) Press the ON/OFF button to end the abnormal operation data check.

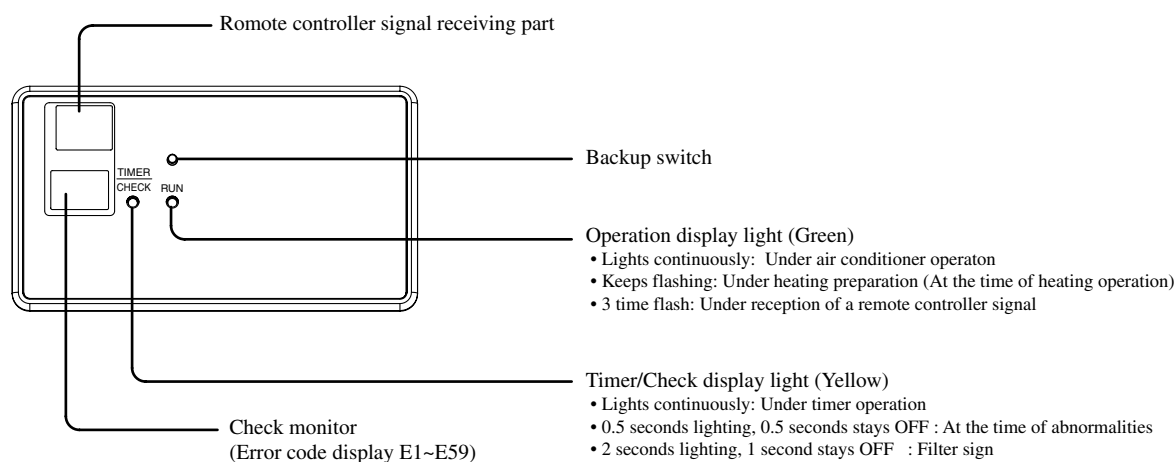
If you press the RESET button during the settings, the display returns to the previous setting screen.

No.	Data item
01	(Operation mode)
02	SET TEMP
03	RETURN AIR
04	I/U HEAT EXCH1
05	I/U HEAT EXCH2
07	I/U FAN
11	TOTAL I/U RUN
21	OUTDOOR
22	O/U HEAT EXCH1
24	COMP HERTZ
26	Lo PRESSURE
27	DISCHARGE
29	CT
31	O/U FAN
32	SILENT MODE ON/OFF
34	63H1 ON/OFF
35	DEFROST ON/ OFF
36	TOTAL COMP RUN
37	EEV1

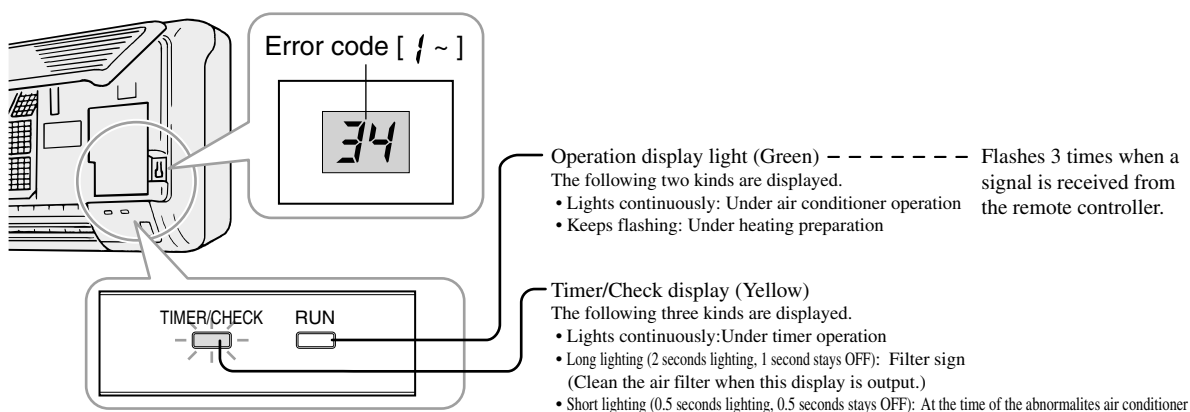
1.6.4 Check display on wireless specification models (FDEN · FDKN · FDT)

(1) Indication board

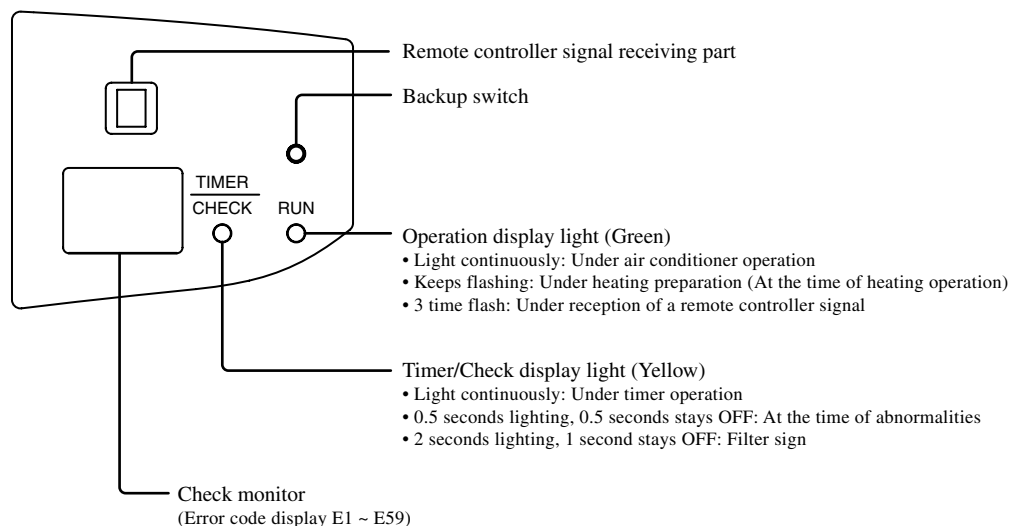
(a) FDEN Series



(b) FDKN Series



(c) FDT (Wireless kit)



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

CONTENTS

2.1 GENERAL INFORMATION	124
2.1.1 Specific features	124
2.1.2 How to read the model name	124
2.1.3 Table of models	125
2.1.4 Table of system combinations	125
2.2 SELECTION DATA	126
2.2.1 Specifications	126
(1) Indoor unit.....	126
(2) Outdoor unit	130
(3) Operation chart.....	131
2.2.2 Range of usage & limitations	133
2.2.3 Exterior dimensions	134
(1) Indoor unit.....	134
(2) Remote controller (Optional parts)	137
(3) Outdoor unit	139
2.2.4 Inside view	140
2.2.5 Exterior appearance	141
2.2.6 Piping system	143
2.2.7 Selection chart	144
2.2.8 Noise level	149
(1) Indoor unit.....	149
(2) Outdoor unit	150
2.3 ELECTRICAL DATA	151
2.3.1 Electrical wiring	151
(1) Indoor unit.....	151
(2) Outdoor unit	155

2.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER	156
2.5 APPLICATION DATA	156
2.5.1 Installation of indoor unit	157
2.5.2 Installation of wired remote controller	175
2.5.3 Installation of outdoor unit	176
(1) Installation	176
(2) Refrigerant piping work.....	178
(3) Air tightness test and air purge	180
(4) Refrigerant quantity	180
(5) Drain piping work	181
(6) Electrical wiring	181
(7) Setting functions using the wired remote controller	184
(8) Checking operation data	188
(9) Test run	189
2.6 MAINTENANCE DATA	189

2.1 GENERAL INFORMATION

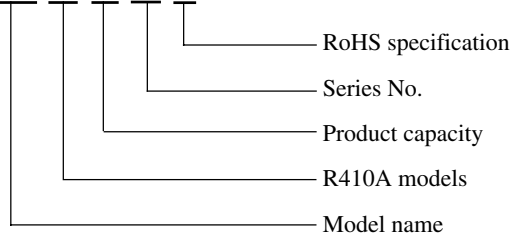
2.1.1 Specific features

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

- (1) A new refrigerant, R410A, which causes no damage to the earth's ozone layer, is used. R410A is a pseudoazeotropic refrigerant, so there is little formation of separate vapor and liquid layers, and it is possible to add refrigerant on-site.
- (2) Less refrigerant charge amount due to use of double phase refrigerant flow system. The total refrigerant charge amount has been reduced by more than 50%.
- (3) The microcomputer chip is installed in the indoor unit and outdoor unit. There is no need for the unit to communicate between the outdoor and indoor units so the unit is more resistant to electromagnetic noise thus the incidence of microcomputer malfunction has been reduced. The compressor in the outdoor unit has its own self protection function, that reacts according to abnormal high pressure and excessive high temperature.
- (4) There are only three power lines between the outdoor and indoor unit. One cable with 3 wires encased in one sheath is enough for conducting the wiring work between the outdoor unit and the indoor unit. This contributes to simpler wiring work in the field.
- (5) All air supply ports have auto swing louvers. (Only case of FDTC, FDT, FDEN and FDKN models). The indoor fan motor has three speeds of high, medium and low.
- (6) All models have service valves protruding from the outdoor unit for faster flare connection work in the field.
- (7) Compared to the previous models, a single fan is used in the 302 outdoor unit model, resulting in markedly reduced weight and greater compactness. In addition, use of an inverter makes these units much more economical compared to the previous fixed speed units.

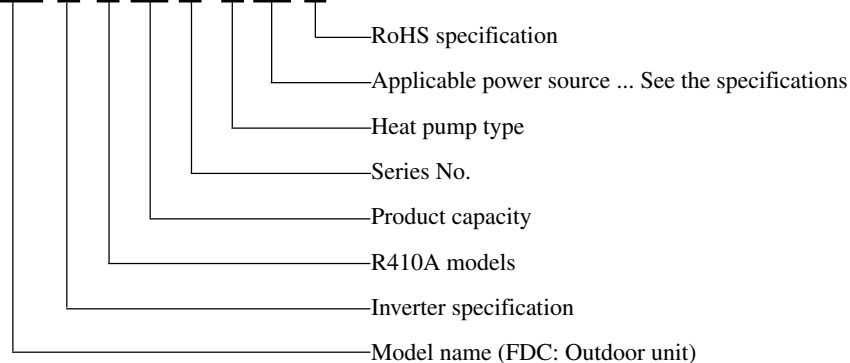
2.1.2 How to read the model name

Example: **FDT A 15 1 R**



FDTC : Ceiling recessed compact type unit with wired remote controller
 FDT : Ceiling recessed type unit with wired remote controller
 FDEN : Ceiling suspended type unit with wireless remote controller
 FDKN : Wall mounted type unit with wireless remote controller

Example: **FDC V A 30 2 H EN R**



2.1.3 Table of models

Model \ Capacity	151
Ceiling recessed compact type (FDTC)	○
Ceiling recessed type (FDT)	○
Ceiling suspended type (FDEN)	○
Wall mounted type (FDKN)	○
Outdoor unit to be combined (FDC)	FDCVA302HENR (3 Horse Power)

2.1.4 Table of system combinations

Outdoor unit	Type	Indoor unit assembly capacity	Branch pipe set (Optional)
FDCVA302HENR	Twin	151+151	DIS-WA1

2.2 SELECTION DATA

2.2.1 Specifications

(1) Indoor unit

(a) Ceiling recessed compact type (FDTC)

Model FDTCA151R

Item		Model	FDTCA151R
Nominal cooling capacity ⁽¹⁾		kW	4.0
Nominal heating capacity ⁽¹⁾		kW	4.5
Power source			1 Phase, 220/230/240V 50Hz
Noise level		dB(A)	Powerful mode Hi: 46 Me : 42 Lo: 38 Mild mode Hi: 42 Me : 38 Lo: 35
Exterior dimensions Height × Width × Depth		mm	Unit:248 × 570 × 570 Panel:35 × 700 × 700
Net weight		kg	19.5 (Unit: 16 Panel: 3.5)
Refrigerant equipment Heat exchanger			Louver fin & inner grooved tubing
Refrigerant control			—
Air handling equipment Fan type & Q'ty			Turbo fan × 1
Motor		W	50 × 1
Starting method			Direct line start
Air flow(Standard)		CMM	Powerful mode Hi: 13.5 Me : 11.5 Lo: 10 Mild mode Hi: 11.5 Me : 10 Lo: 8
Outside air intake			Available
Air filter, Q'ty			Long life filter × 1 (Washable)
Shock & vibration absorber			Rubber sleeve (for fan motor)
Operation control Operation switch			Wired remote control switch (Optional: RC-E1R) Wireless kit (Optional:RCND-KIT-HER)
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 (I.D.25 mm, O.D.32 mm)
Insulation for piping			Necessary (both Liquid & Gas lines)
Accessories			Mounting kit. Drain hose
Optional parts			Decorative Panel

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

Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

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

- Decorative Panel model or Wireless kit (Optional)

Item		Panel Part No.
Model	FDTCA151R	TC-PSA-24W-ER

(b) Ceiling recessed type (FDT)**Model FDTA151R**

Item		Model	FDTA151R
Nominal cooling capacity ⁽¹⁾		kW	4.0
Nominal heating capacity ⁽¹⁾		kW	4.5
Power source			1 Phase, 220/230/240V 50Hz
Noise level		dB(A)	Powerful mode Hi: 36 Me : 33 Lo: 32 Mild mode Hi: 33 Me : 32 Lo: 31
Exterior dimensions Height × Width × Depth		mm	Unit:270 × 840 × 840 Panel:35 × 950 × 950
Net weight		kg	31 (Unit: 24 Panel: 7)
Refrigerant equipment Heat exchanger			Louver fin & inner grooved tubing
Refrigerant control			—
Air handling equipment Fan type & Q'ty			Turbo fan × 1
Motor		W	14 × 1
Starting method			Direct line start
Air flow(Standard)		CMM	Powerful mode Hi: 18 Me : 15 Lo: 14 Mild mode Hi: 15 Me : 14 Lo: 13
Outside air intake			Available
Air filter, Q'ty			Long life filter × 1 (Washable)
Shock & vibration absorber			Rubber sleeve (for fan motor)
Operation control Operation switch			Wired remote control switch (Optional: RC-E1R) Wireless remote control switch (Optional: RCN-T-35W-ER)
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 (I.D.25 mm, O.D.32 mm)
Insulation for piping			Necessary (both Liquid & Gas lines)
Accessories			Mounting kit. Drain hose
Optional parts			Decorative Panel

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Operation					
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

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

- Decorative Panel model or Wireless kit (Optional)

Item	Panel Part No.	Wireless kit
Model		
FDTA151R	T-PSA-35W-ER	RCN-T-35W-ER

(c) Ceiling suspended type (FDEN)**Model FDENA151R**

Item		Model	FDENA151R
Nominal cooling capacity ⁽¹⁾		kW	4.0
Nominal heating capacity ⁽¹⁾		kW	4.5
Power source			1 Phase, 220/230/240V 50Hz
Noise level		dB(A)	Powerful mode Hi: 42 Me : 39 Lo: 38 Mild mode Hi: 39 Me : 38 Lo: 37
Exterior dimensions Height × Width × Depth		mm	210 × 1070 × 690
Net weight		kg	30
Refrigerant equipment Heat exchanger			Louver fin & inner grooved tubing
Refrigerant control			—
Air handling equipment Fan type & Q'ty			Multiblade centrifugal fan × 2
Motor		W	30×1
Starting method			Direct line start
Air flow(Standard)		CMM	Powerful mode Hi: 12 Me : 11 Lo: 9 Mild mode Hi: 11 Me : 9 Lo: 7
Outside air intake			Unavailable
Air filter, Q'ty			Polypropylene net × 2 (Washable)
Shock & vibration absorber			Rubber sleeve (for fan motor)
Operation control Operation switch			Wireless remote control switch (Optional: RCN-E1R) Wired remote control switch (Optional: RC-E1R)
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 (I.D.20 mm, O.D.26 mm)
Insulation for piping			Necessary (both Liquid & Gas line)
Accessories			Mounting kit. Drain hose
Optional parts			—

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Operation					
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

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

(d) Wall mounted type (FDKN)**Model FDKNA151R**

Item		Model	FDKNA151R
Nominal cooling capacity ⁽¹⁾		kW	4.0
Nominal heating capacity ⁽¹⁾		kW	4.5
Power source			1 Phase, 220/230/240V 50Hz
Noise level		dB(A)	Powerful mode Hi: 44 Me: 42 Lo: 40 Mild mode Hi: 42 Me: 40 Lo: 37
Exterior dimensions Height × Width × Depth		mm	298 × 840 × 240
Net weight		kg	12
Refrigerant equipment Heat exchanger			Slitted fin & inner grooved tubing
Refrigerant control			—
Air handling equipment Fan type & Q'ty			Tangential fan × 1
Motor		W	33 × 1
Starting method			Direct line start
Air flow(Standard)		CMM	Powerful mode Hi: 12 Me: 11 Lo: 10 Mild mode Hi: 11 Me: 10 Lo: 9
Outside air intake			Unavailable
Air filter, Q'ty			Long life filter × 2 (Washable)
Shock & vibration absorber			Rubber sleeve (for fan motor)
Operation control Operation switch			Wireless remote control switch (Optional: RCN-E1R) Wired remote control switch (Optional: RC-E1R)
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 VP16 (I.D.16 mm, O.D.22 mm)
Insulation for piping			Necessary (both Liquid & Gas lines)
Accessories			Mounting kit. Drain hose
Optional parts			—

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Operation					
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

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

(2) Outdoor unit

Models FDCVA302HENR

Item		Model	FDCVA302HENR
Power source			1 Phase, 220/230/240V 50Hz
Nominal cooling capacity ⁽¹⁾		kW	7.1 [3.5~8.0]
Nominal heating capacity ⁽¹⁾		kW	8.1 [4.0~9.0]
Noise level		dB(A)	48
Exterior dimensions Height × Width × Depth		mm	750 × 880(+88) × 340
Net weight		kg	60
Refrigerant equipment compressor type & Q'ty			2YC45DXD × 1
Starting method			Direct line start
Crankcase heater		W	22
Heat exchanger			Straight fin & inner grooved tubing
Refrigerant control			Electronic expansion valve
Refrigerant			R410A
Quantity		kg	2.95 (Pre-charged up to the piping length of 30m)
Refrigerant oil		ℓ	0.65 (EVC50K)
Defrost control			Microcomputer controlled de-icer
Air handling equipment Fan type & Q'ty			Propeller fan × 1
Motor		W	120 × 1
Starting method			Direct line start
Air flow(Standard)		CMM	Cooling: 60, Heating: 48.5
Shock & vibration absorber			Rubber mount (for compressor)
Safety equipment			Internal thermostat for fan motor. Abnormal discharge temperature protection.
Installation data Refrigerant piping size		mm(in)	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")
Connecting method			Flare piping
Drain			Hole for drain (φ20 × 3pcs.)
Insulation for piping			Necessary (both Liquid & Gas lines)
Accessories			—

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

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

(3) Values in [~] show the minimum and maximum capacities.

(3) Operation chart

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

(a) Operating characteristic of outdoor unit (220/240 V)

Item		Model	FDCVA302HENR
Cooling power consumption	kW		2.02
Heating power consumption			2.16
Cooling running current	A		10.4
Heating running current			11.1
Inrush current (L.R.A)	A		5

(b) Operating characteristic of indoor unit

FDTC 151R (220/240 V)

Item		Model	FDTCA151R
Cooling power consumption	kW		0.046/0.046
Heating power consumption			0.046/0.046
Cooling running current	A		0.15/0.14
Heating running current			0.15/0.14

FDT 151R (220/240 V)

Item		Model	FDTA151R
Cooling power consumption	kW		0.046/0.075
Heating power consumption			0.061/0.071
Cooling running current	A		0.32/0.34
Heating running current			0.30/0.33

FDEN 151R (220/240 V)

Item		Model	FDENA151R
Cooling power consumption	kW		0.054/0.061
Heating power consumption			0.050/0.056
Cooling running current	A		0.25/0.26
Heating running current			0.23/0.24

FDKN 151R (220/240 V)

Item		Model	FDKNA151R
Cooling power consumption	kW		0.02/0.02
Heating power consumption			0.02/0.02
Cooling running current	A		0.2/0.2
Heating running current			0.2/0.2

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

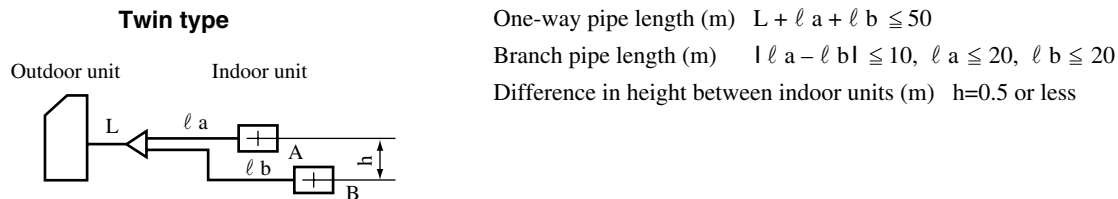
(2) The values shown in the above table are common to both cooling and heating operations.

2.2.2 Range of usage & limitations

Item		Model	FDCVA302HENR
Limitations Return air temp	Cooling		Indoor unit : 18~30°C.D.B Outdoor unit : -15~43°C.D.B
	Heating		Indoor unit : 18~30°C.D.B Outdoor unit : -10~24°C.D.B
Indoor unit atmosphere (behind ceiling) temperature and humidity			Dew point temperature: 28°C or less, relative humidity: 80% or less
Refrigerant line (one way) length ⁽¹⁾			Max. 50m
Vertical height difference between outdoor unit and indoor unit			Max. 30m (Outdoor unit is higher) Max. 15m (Outdoor unit is lower)
Difference in after branch piping lengths between indoor units			Max. 20m
Difference in height between indoor units			Max. 0.5m
Power source voltage			Rating ± 10%
Voltage at starting			Min. 85% of rating
Compressor stop/start Frequency	Cycle Time		7 minutes or more (4 minutes or more from start to stop) or (3 minutes or more from stop to start)
	Stop Time		3 minutes or more

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

Height and length restrictions for refrigerant piping



In the illustration the L is main piping and ℓa and ℓb are branch piping.

Request

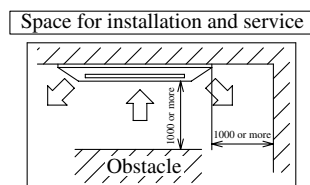
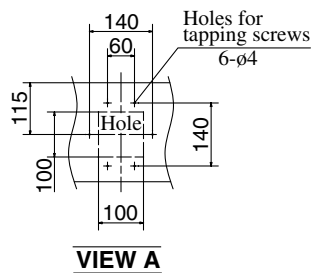
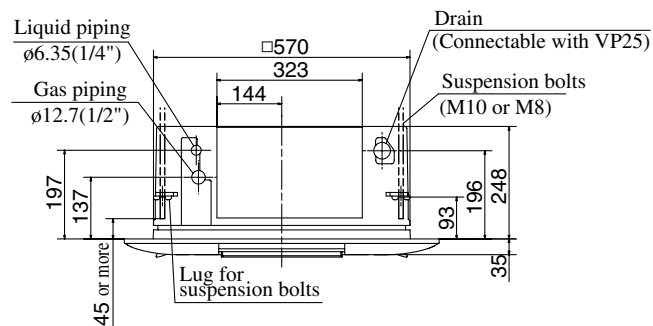
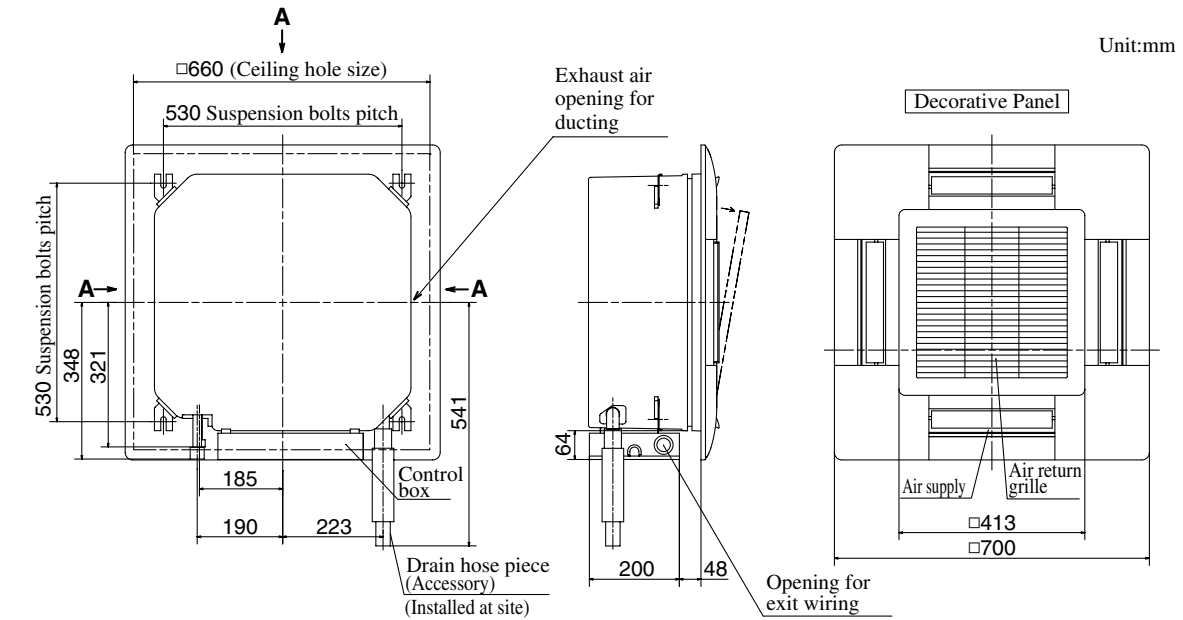
- (1) When the capacity of the indoor unit to be connected is 151 or less, be sure to use a pipe diameter of $\phi 9.52$ for the size of the liquid piping of branch piping (between branch and indoor units). For connections to indoor units (liquid piping side dia. $\phi 6.35$) use the different diameter adapter coupling that is included in the branch piping kit.
- (2) For the branch be sure to select the specified branch pipe set (sold separately) and then to follow the directions of the instruction manual included in the branch pipe set when installing the piping. Be sure to install the branch piping so that the branch is level.

2.2.3 Exterior dimensions

(1) Indoor unit

(a) Ceiling recessed compact type (FDTC)

Models FDTCA151R

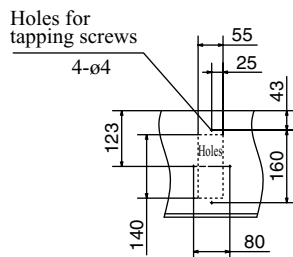
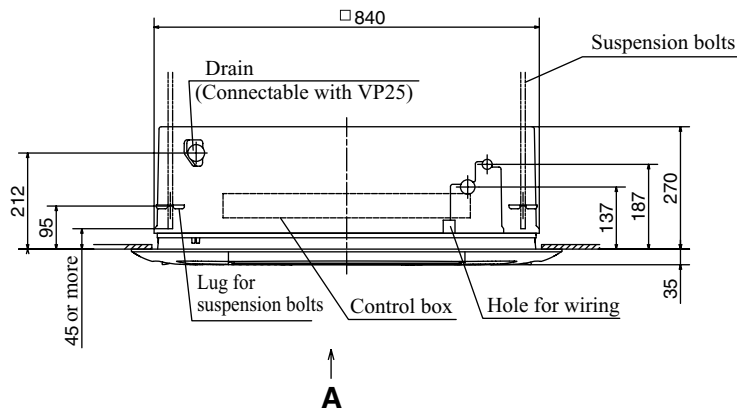
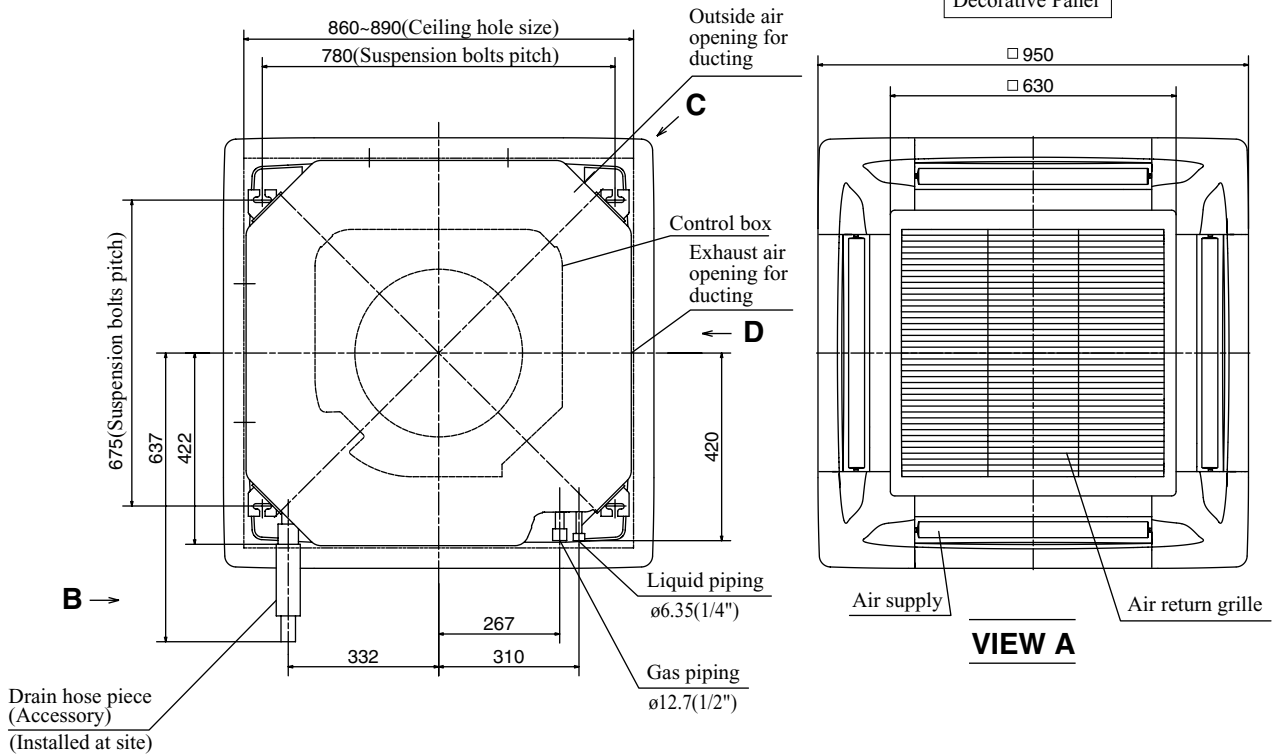


If you are mounting units close together, leave a space of 4000 or greater between unit.

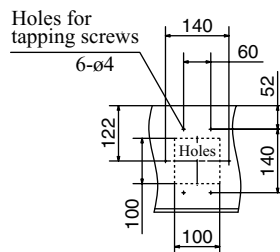
(b) Ceiling recessed type (FDT)

Model FDTA151R

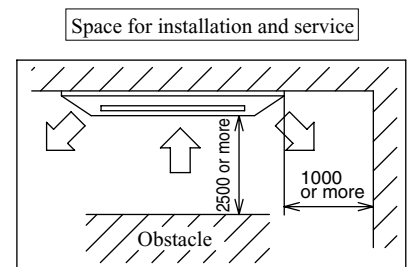
unit : mm



VIEW C



VIEW D

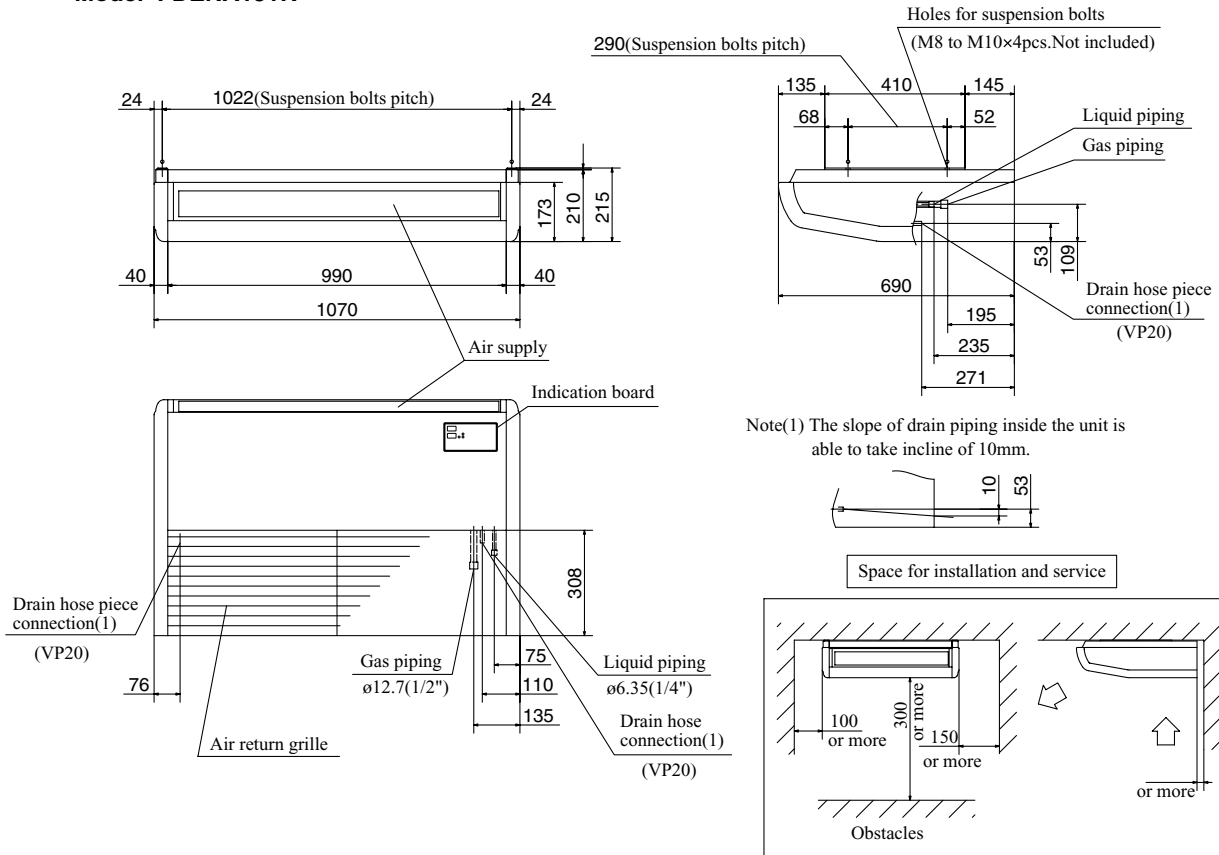


If you are mounting units close together, leave a space of 4000 or greater between unit.

(c) Ceiling suspended type (FDEN)

Model FDENA151R

Unit : mm

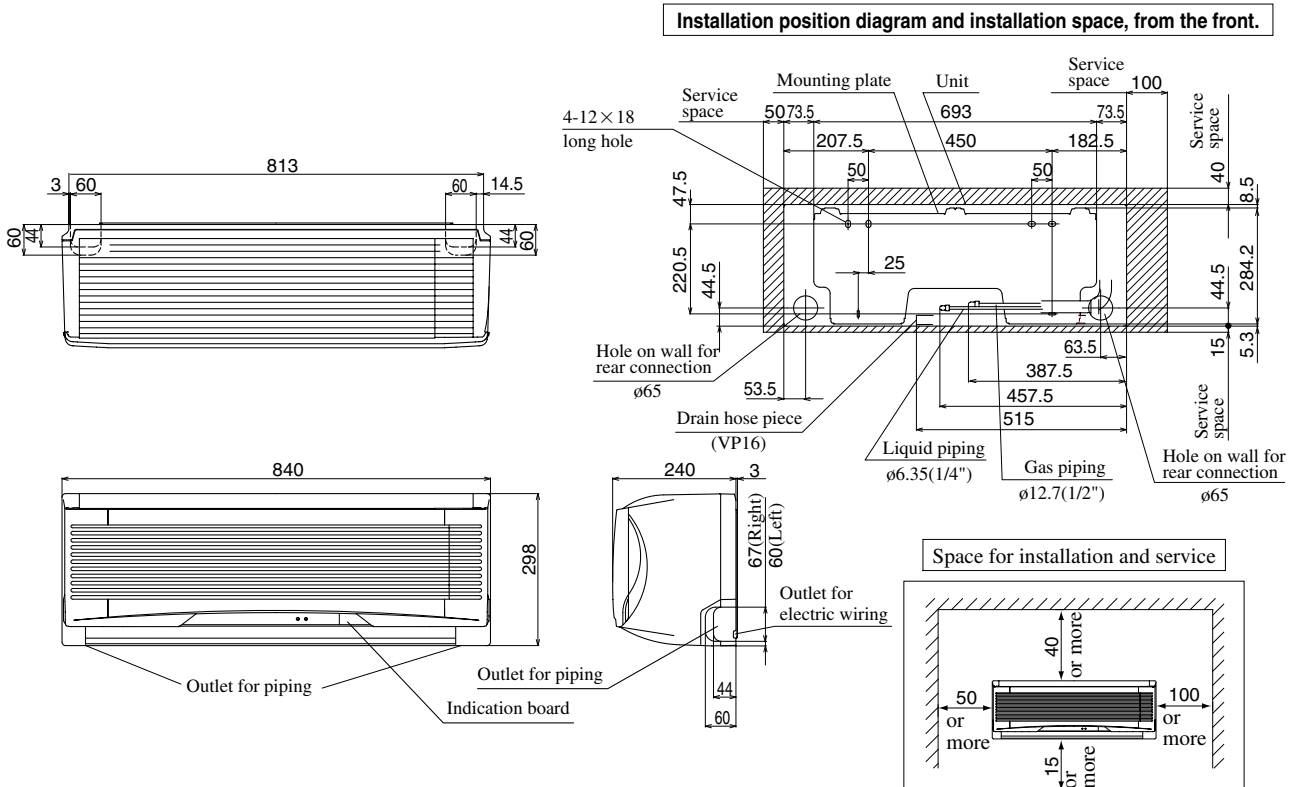


If you are mounting units close together, leave a space of 4000 or greater between unit.

(d) Wall mounted type (FDKN)

Model FDKNA151R

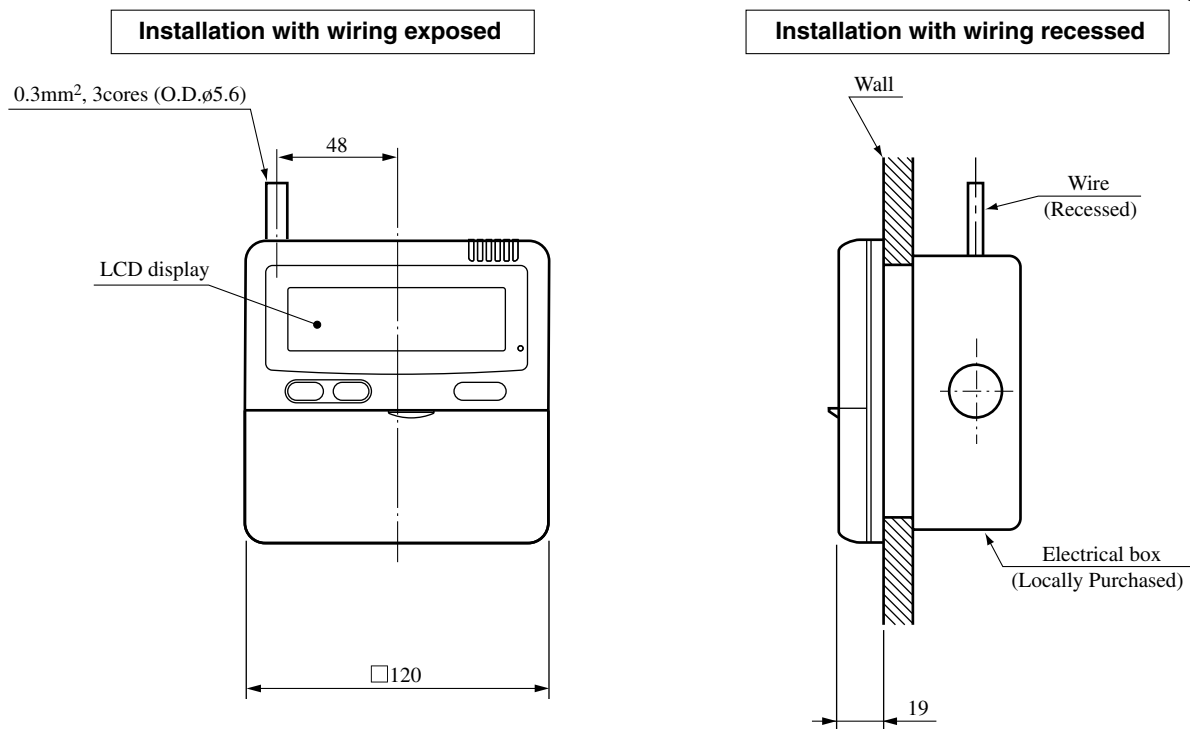
Unit : mm



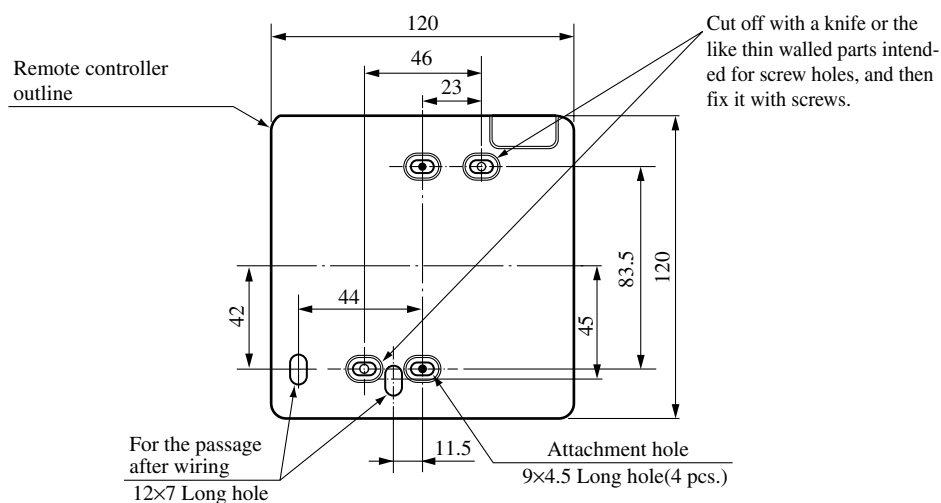
(2) Remote controller (Optional parts)

(a) Wired remote controller

Unit : mm



Remote controller mounting dimensions



Precaution in Extending the Remote control cord

► Maximum total extension 600m.

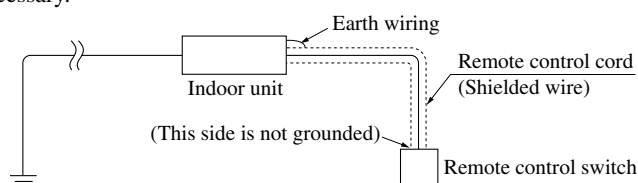
The cord should be a shielded wire.

● For all types : 0.3mm² × 3 cores

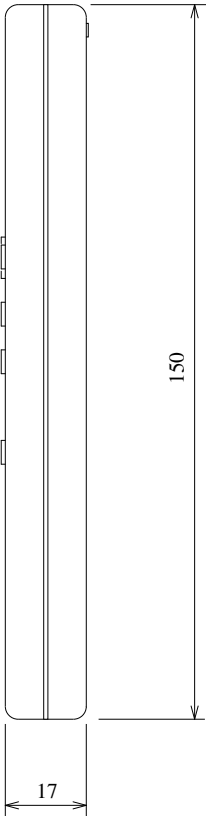
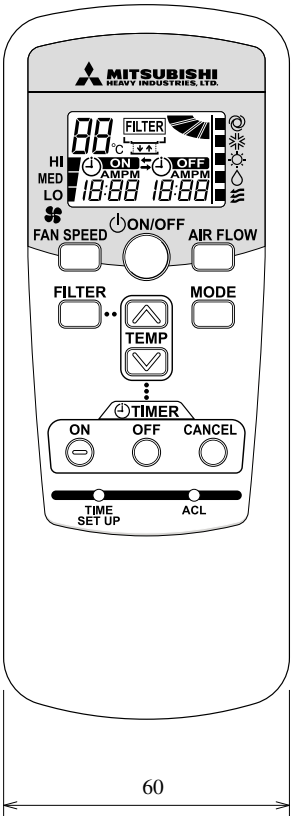
Note: (1) Use cables up to 0.5mm² (maximum) for those laid inside the remote control unit casing and connect to a different size cable at a vicinity point outside the remote control unit, if necessary.

Within 100-200m.....	0.5 mm ² × 3 cores
Within 300m.....	0.75 mm ² × 3 cores
Within 400m.....	1.25 mm ² × 3 cores
Within 600m.....	2.0 mm ² × 3 cores

● The shielded wire should be grounded at one side only.



(b) Wireless remote controller

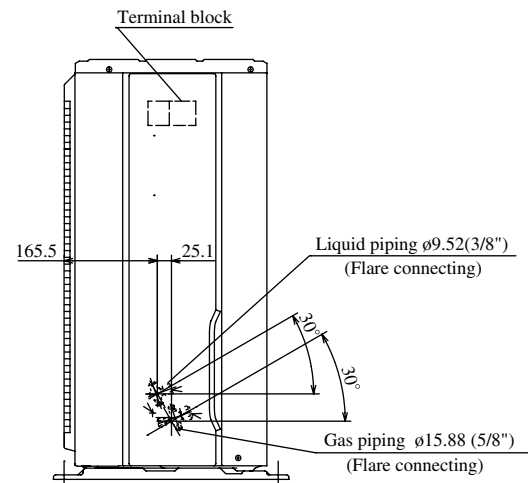
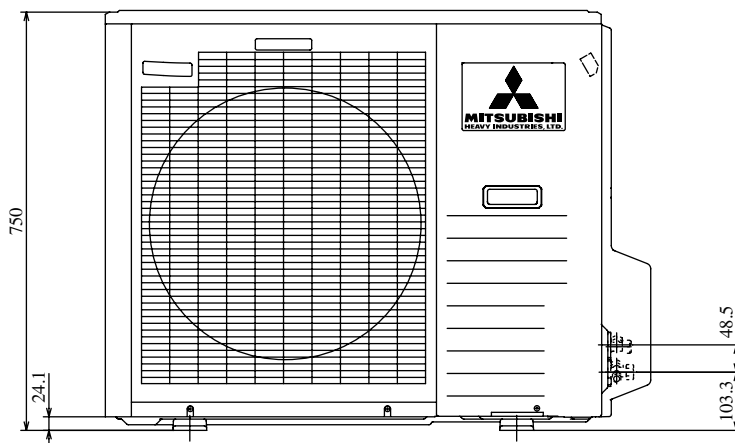
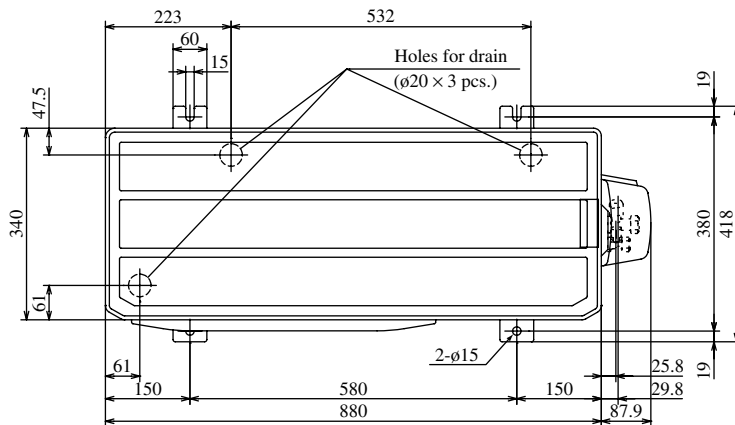


Unit: mm

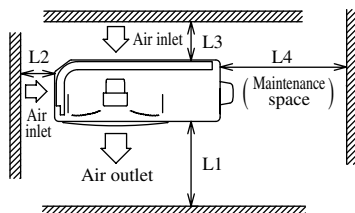
(3) Outdoor unit

Model FDCVA302HENR

Unit : mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

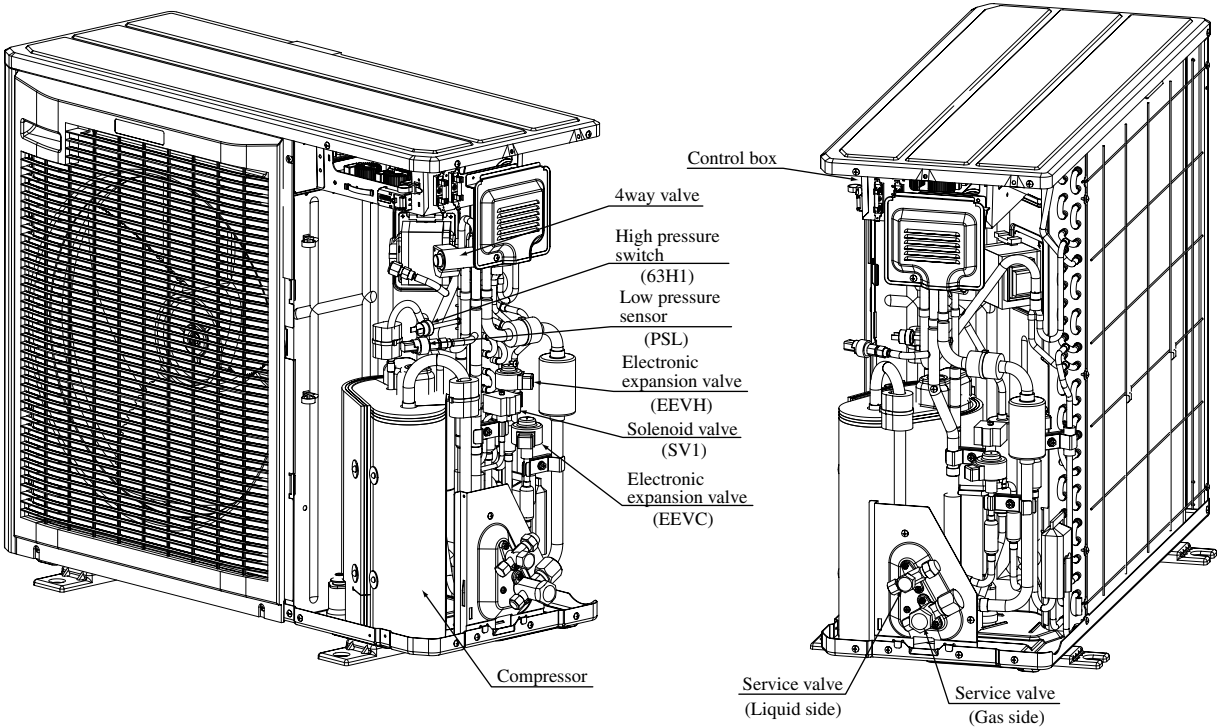
Unit:mm			
Installation type	1	2	3
Mark			
L1	Open	Open	500
L2	300	250	Open
L3	100	150	100
L4	250	250	250

Notes

- (1) It is prohibited to install in a space enclosed with walls at four sides.
- (2) Unit must be secured with anchor bolts.
Anchor bolt should not protrude more than 15 mm above the surface.
- (3) Where strong winds blow, the blow outlet must be oriented at right angle against the wind direction.
- (4) Secure a space of 1 m or more above the unit.
- (5) Barrier standing in front of the blow outlet must be lower than the height of unit.

2.2.4 Inside view

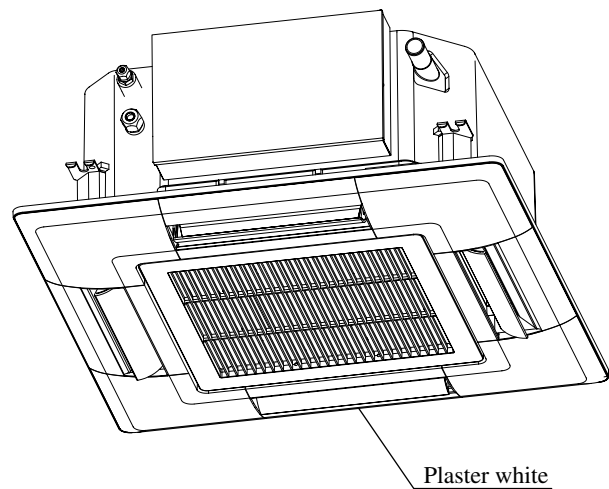
Outdoor unit



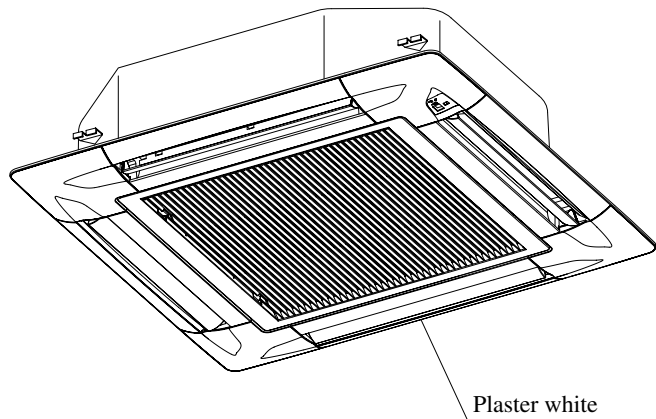
2.2.5 Exterior appearance

(1) Indoor unit

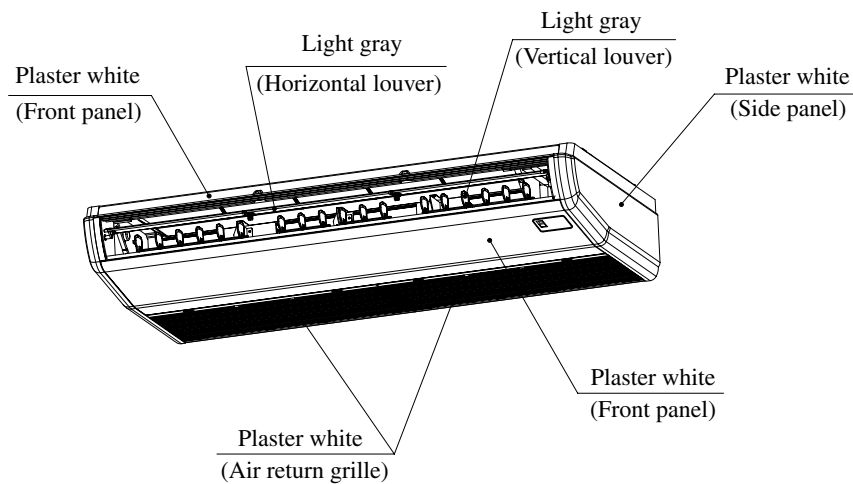
(a) Ceiling recessed compact type (FDTC)



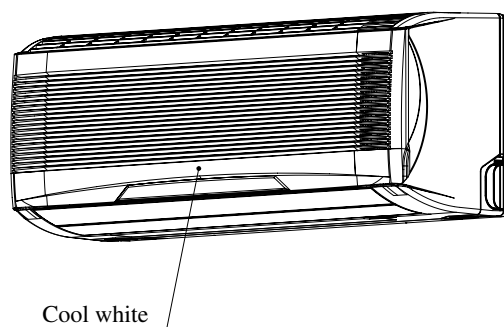
(b) Ceiling recessed type (FDT)



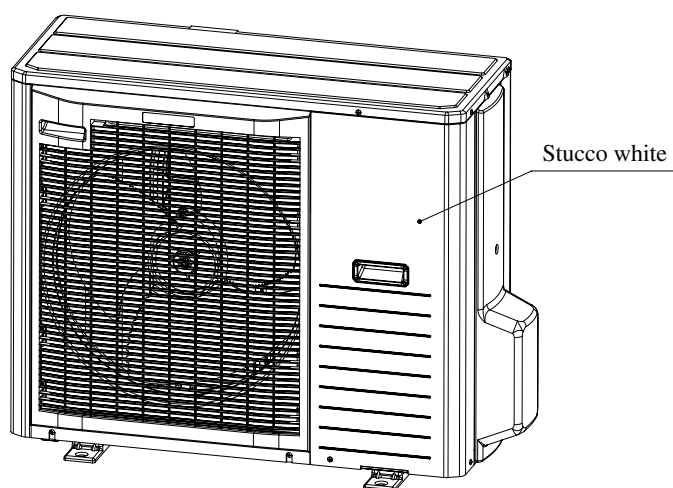
(C) Ceiling suspended type (FDEN)



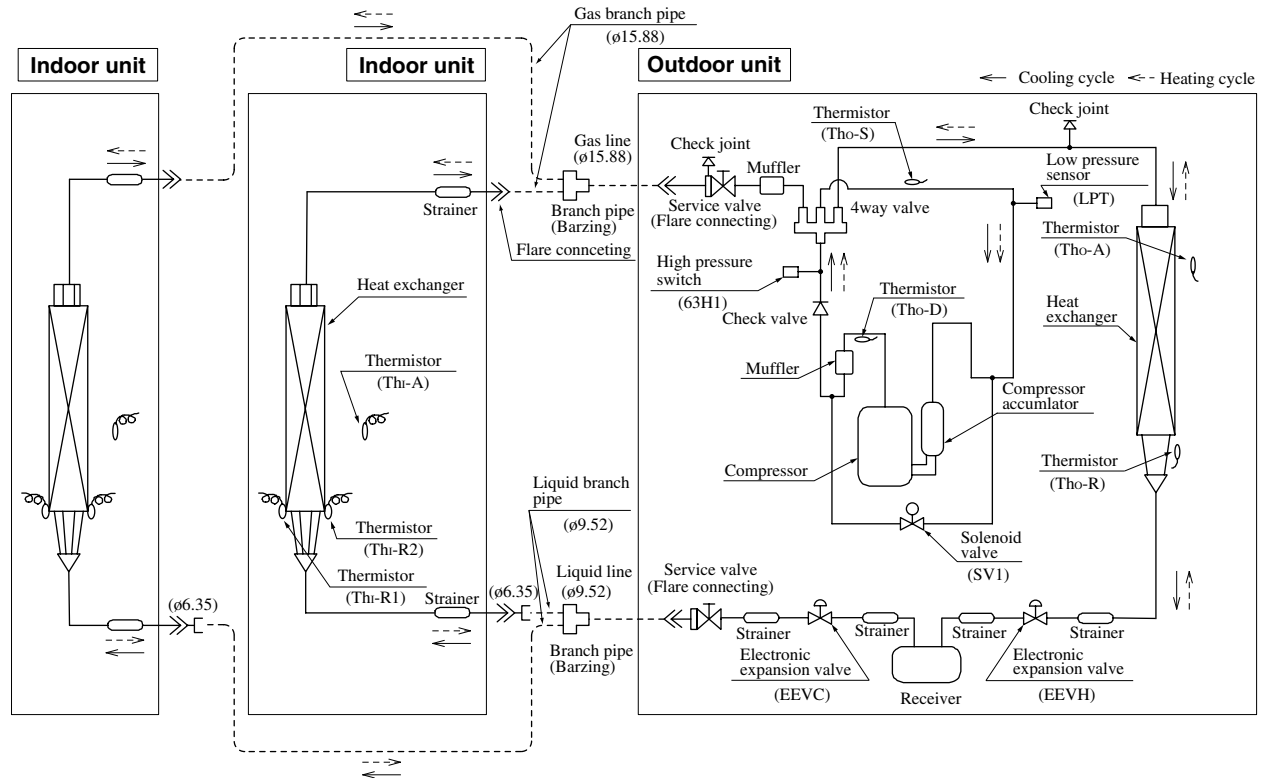
(d) Wall mounted type (FDKN)



(2) Outdoor unit



2.2.6 Piping system



- Notes (1) If used in combination with 151 series indoor units, make the fluid pipe size on the branch piping (branch to indoor unit) ø9.52.
 (2) A FDEN type strainer only should be used for the indoor unit.

Preset point of the protective devices

Parts name	Mark	Equipped unit	FDCVA302HENR
Thermistor (for protection over-loading in heating)	Thi-R	Indoor unit	OFF 63C ON 56C
Thermistor (for frost prevention)			OFF 1.0C ON 10C
Thermistor (for detecting discharge pipe temp.)	Tho-D	Outdoor unit	OFF 115C ON 85C
High pressure switch (for protection)	63H1	Outdoor unit	OFF 4.15MPa ON 3.15MPa
Low pressure sensor (for protection)	LPT	Outdoor unit	OFF 0.227MPa ON 0.079MPa

2.2.7 Selection chart

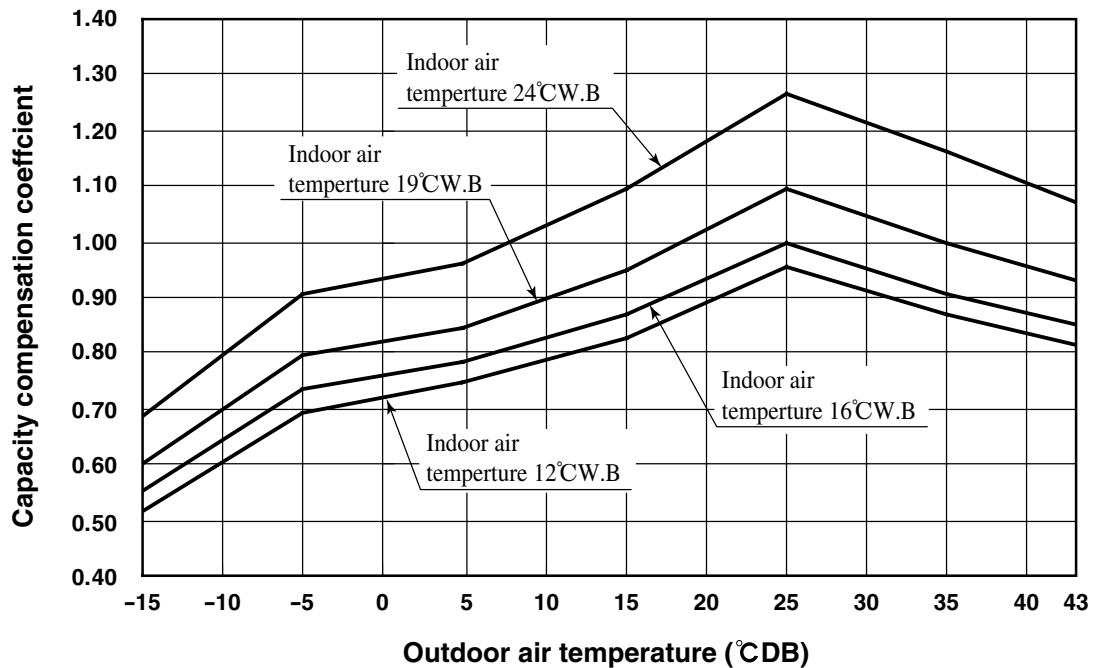
Correct the cooling and heating capacity in accordance with the conditions as follows. The net cooling and heating capacity can be obtained in the following way.

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

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

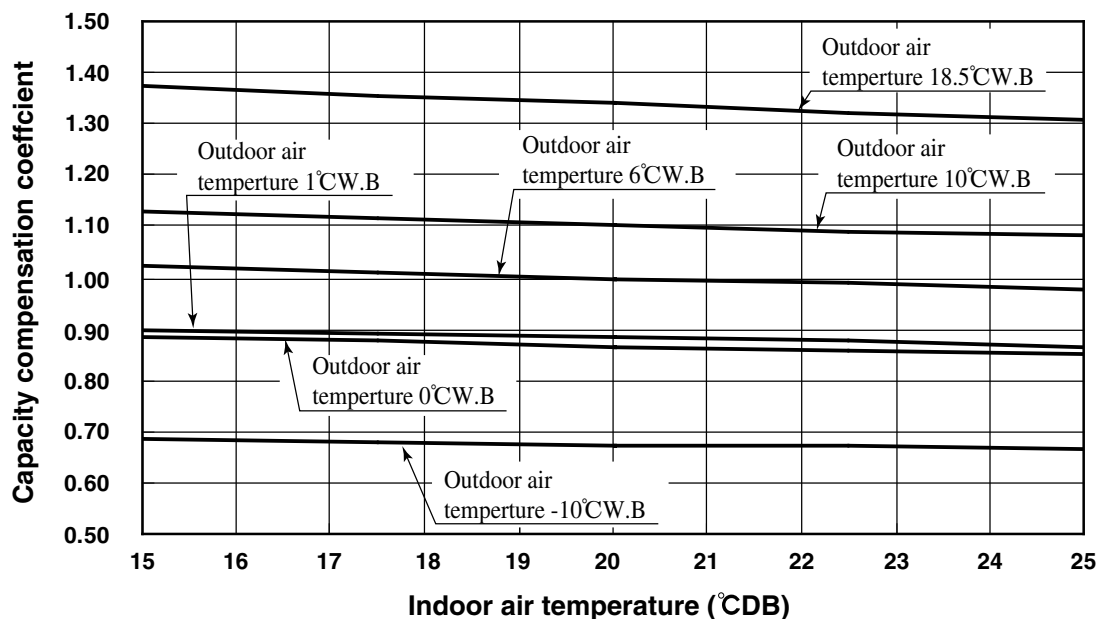
(a) Capacity compensation coefficient

1) Cooling



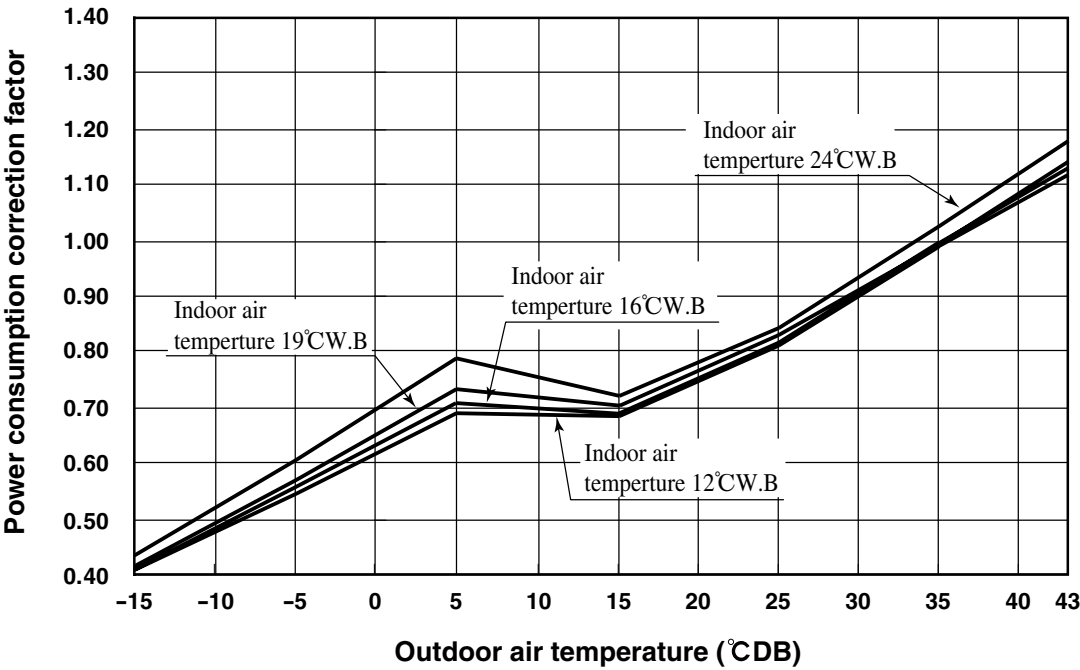
Caution: If a cooling operation is done when the outdoor air temperature is -5°C or lower, as much as possible, the outdoor unit should be installed in a condition where it is not going to be influenced by natural wind. If it is hit by the wind, the compressor stop frequency will be high because of the drop in the low pressure, the capacity will drop even further and it could cause the unit to break down.

2) Heating

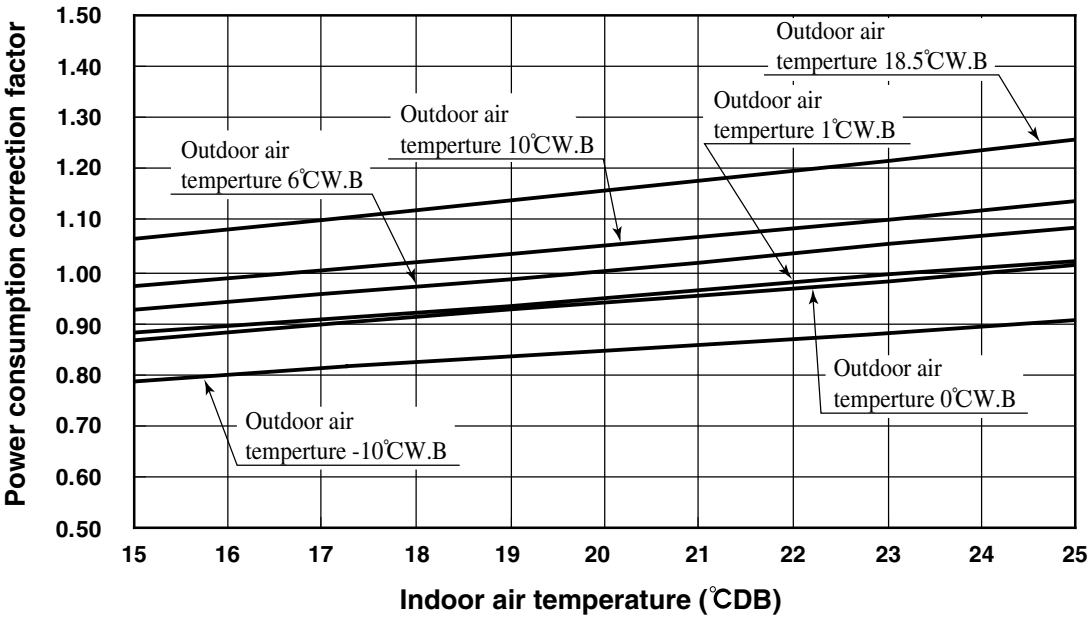


(b) Power consumption correction factor

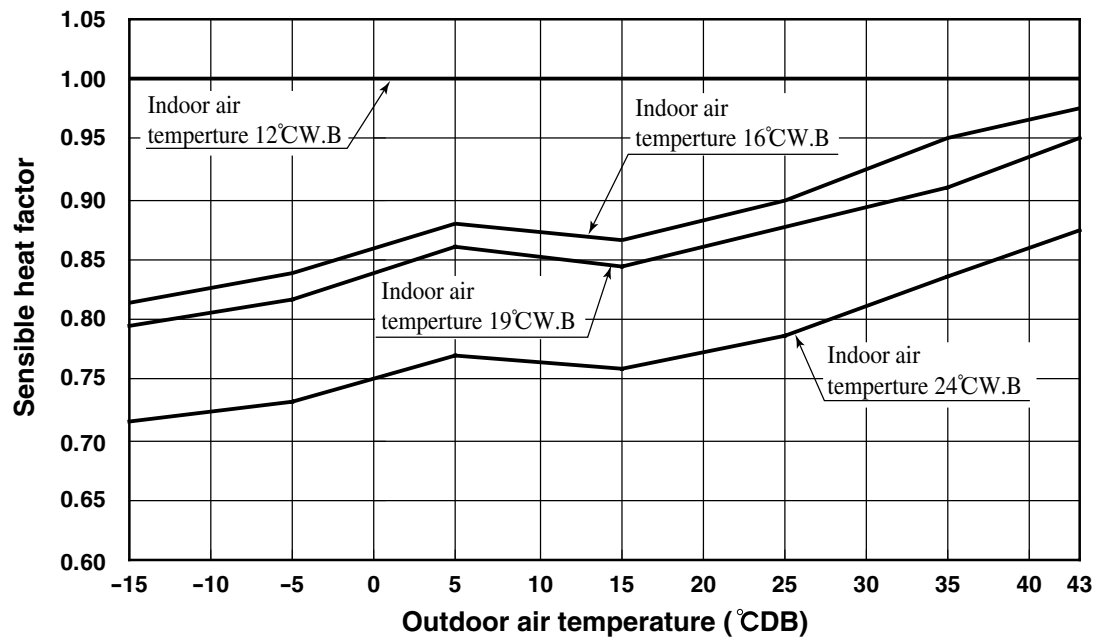
1) Cooling



2) Heating



(c) Sensible heat factor



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

Coefficient: 1.00 at High, 0.95 at Low

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

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

• Outdoor air temperature degree 5°C or more

Equivalent piping length ⁽¹⁾ (m)		7.5	10	15	20	25	30	35	40	45	50	55
Heating		1	1	1	1	1	0.998	0.998	0.993	0.993	0.988	0.988
Cooling	ø 15.88	1	0.996	0.989	0.982	0.975	0.968	0.961	0.954	0.947	0.940	0.933
	ø 19.05	1.008	1.006	1.003	1	0.997	0.994	0.991	0.988	0.985	0.982	0.979

• Outdoor air temperature degree -5°C or more

Equivalent piping length ⁽¹⁾ (m)		7.5	10	15	20	25	30	35	40	45	50	55
Heating		1	1	1	1	1	0.998	0.998	0.993	0.993	0.988	0.988
Cooling	ø 15.88	0.800	0.793	0.779	0.765	0.751	0.738	0.724	0.710	0.696	0.682	0.669
	ø 19.05	0.806	0.798	0.786	0.774	0.762	0.750	0.738	0.727	0.715	0.703	0.691

• Outdoor air temperature degree -15°C or more

Equivalent piping length ⁽¹⁾ (m)		7.5	10	15	20	25	30	35	40	45	50	55
Heating		1	1	1	1	1	0.998	0.998	0.993	0.993	0.988	0.988
Cooling	ø 15.88	0.600	0.590	0.569	0.549	0.528	0.507	0.487	0.466	0.446	0.425	0.404
	ø 19.05	0.605	0.590	0.569	0.548	0.527	0.507	0.486	0.465	0.444	0.424	0.403

Note (1) Calculate the equivalent length using the following formula.

However, install the piping so that the equivalent length is within +5 m of the piping distance limit (actual length) for each respective piping system.

- Equivalent length = Actual length + (equivalent length of bends x number of bends in the piping)

Equivalent length for 1 bend

Gas pipe diameter (mm)	ø9.52	ø15.88
Bend equivalent length	0.15	0.25

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

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

Piping length limitations

Item	Model	FDCVA302HENR
Max. one way piping length		50m
Max. vertical height difference		Outdoor unit is higher 30m Outdoor unit is lower 15m

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

How to obtain the cooling and heating capacity

Example : The net cooling capacity of the model FDCVA302HENR with the air flow “High”, the piping length of 15m, the outdoor unit located 5m lower than the indoor unit, indoor wet-bulb temperature at 19.0 °C and outdoor dry-bulb temperature 35 °C is

$$\text{Net cooling capacity} = \frac{7.1}{\text{FDCVA302HENR}} \times \frac{1.00}{\text{Air flow "High"}} \times \frac{(0.989 - 0.01)}{\text{Length 15m. Height difference 5 m}} \times \frac{1.0}{\text{Factor by air temperatures}} \approx 7.0 \text{ kW}$$

2.2.8 Noise level

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

Ambient air temperature: Indoor unit 27°C DB, 19°C WB. Outdoor unit 35°C DB.

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

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

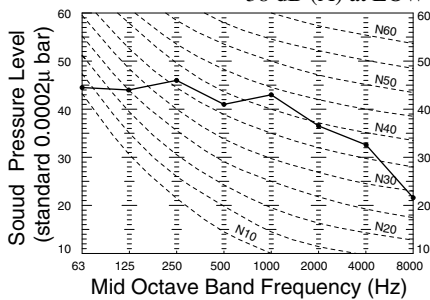
(4) The noise level when in the powerful mode.

(1) Indoor unit

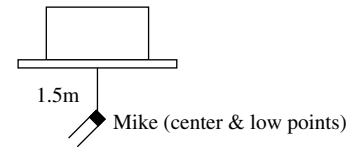
(a) Ceiling recessed compact type (FDTC)

Model FDTCA151R

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



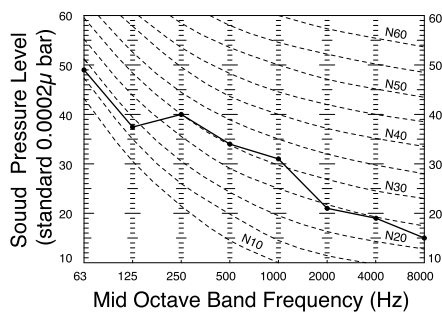
Measured based on JIS B 8616
Mike position as right



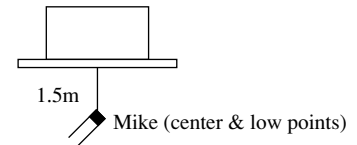
(b) Ceiling recessed type (FDT)

Model FDTA151R

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



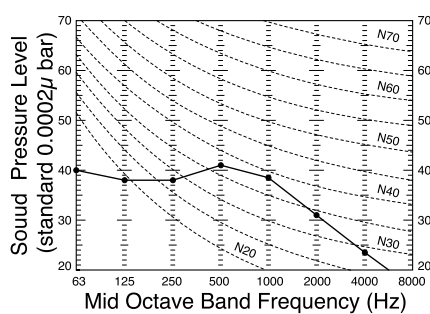
Measured based on JIS B 8616
Mike position as right



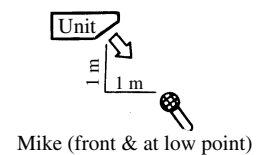
(c) Ceiling suspended type (FDEN)

Model FDENA151R

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



Measured based on JIS B 8616
Mike position as right

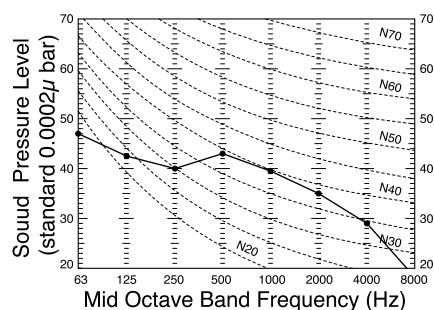


(d) Wall mounted type (FDKN)

Model FDKNA151R

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

Measured based on JIS B 8616
Mike position as right



(2) Outdoor unit

Measured based on JIS B 8616

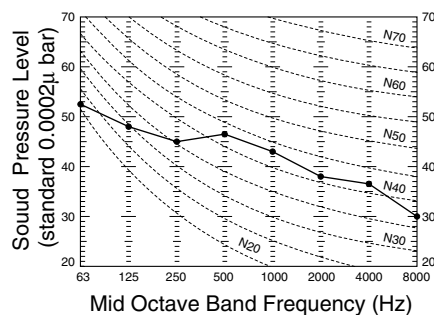
Mike position: at highest noise level in position as below

Distance from front side 1m

Height 1m

Model FDCVA302HENR

Noise level 48 dB (A)

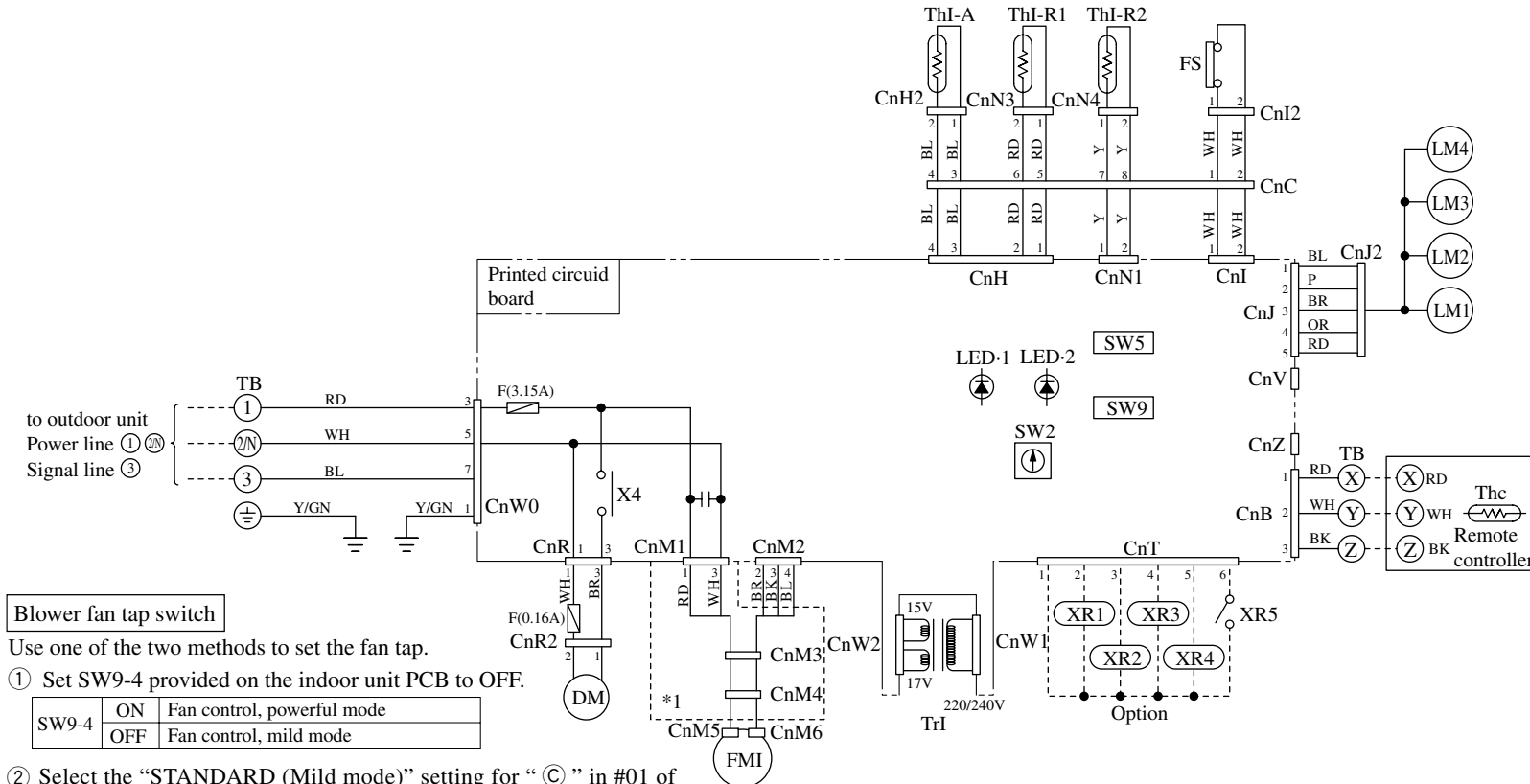


2.3 ELECTRICAL DATA

2.3.1 Electrical wiring

(1) Indoor unit

(a) Ceiling recessed compact type (FDTC)
Model FDTCA151R

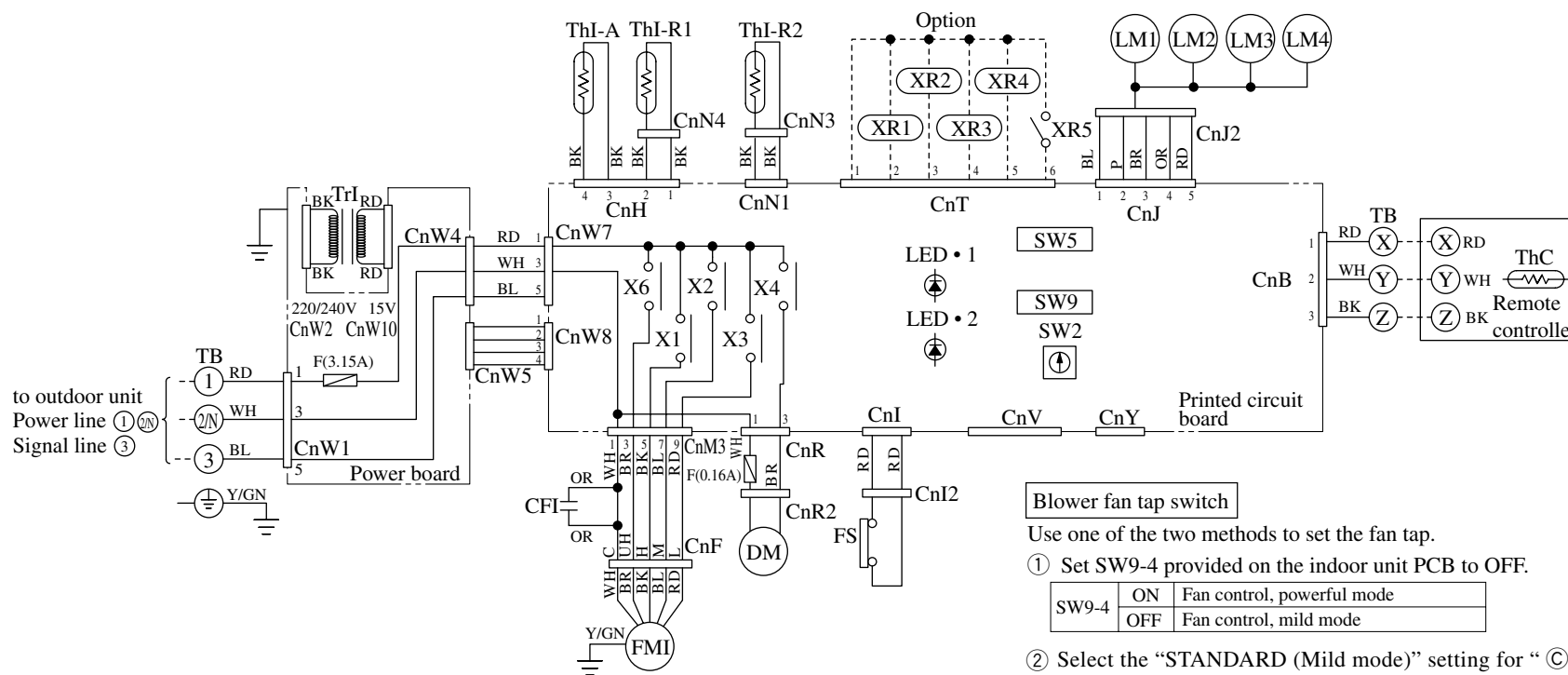


Note (1) Always turn off power before you unplug the fan motor connector shown in an area *1 delineated by a dotted line, otherwise a breakdown of the fan motor may result.

Color marks

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

(b) Ceiling recessed type (FDT)
Model FDTA151R



Blower fan tap switch

Use one of the two methods to set the fan tap.

- ① Set SW9-4 provided on the indoor unit PCB to OFF.

SW9-4	ON	Fan control, powerful mode
	OFF	Fan control, mild mode

- ② Select the “STANDARD (Mild mode)” setting for “©” in #01 of “I/U FUNCTION ▲” (indoor unit function) by using remote controller function setting.

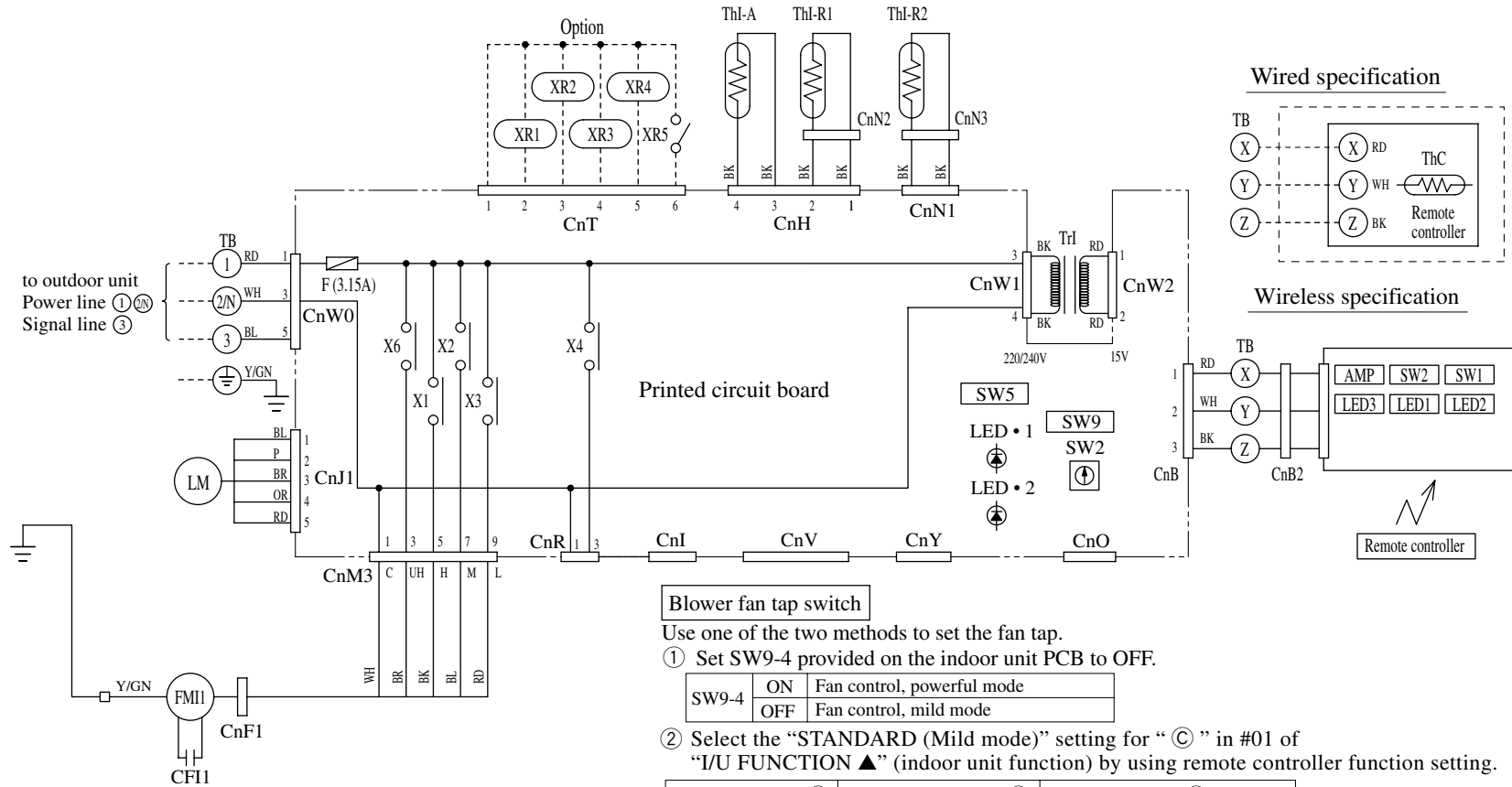
Function number (A)	Function description (B)	Setting (C)
01	Hi CEILING SET	STANDARD (Mild mode)

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FMI	Fan motor	SW5-3,4	Filter sign	XR5	Remote operation input(volt-free contact)
CFI	Capacitor for FMI	SW9-3	Emergency operation	X1,2,3,6	Auxiliary relay(For FM)
DM	Drain motor	TrI	Transformer	X4	Auxiliary relay(For DM)
FS	Float switch	F	Fuse	TB	Terminal block(○ mark)
LM1~4	Louver motor	LED1	Indication lamp(Red)	CnB~Z	Connector
ThI-A	Thermistor	LED2	Indication lamp(Green)	■mark	Closed-end connector
ThI-R1	Thermistor	XR1	Operation output(DC12V output)		
ThI-R2	Thermistor	XR2	Heating output(DC12V output)		
ThC	Thermistor	XR3	Thermo ON output(DC12V output)		
SW2	Remote controller communication address	XR4	Inspection output(DC12V output)		

Color marks

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



Meaning of marks

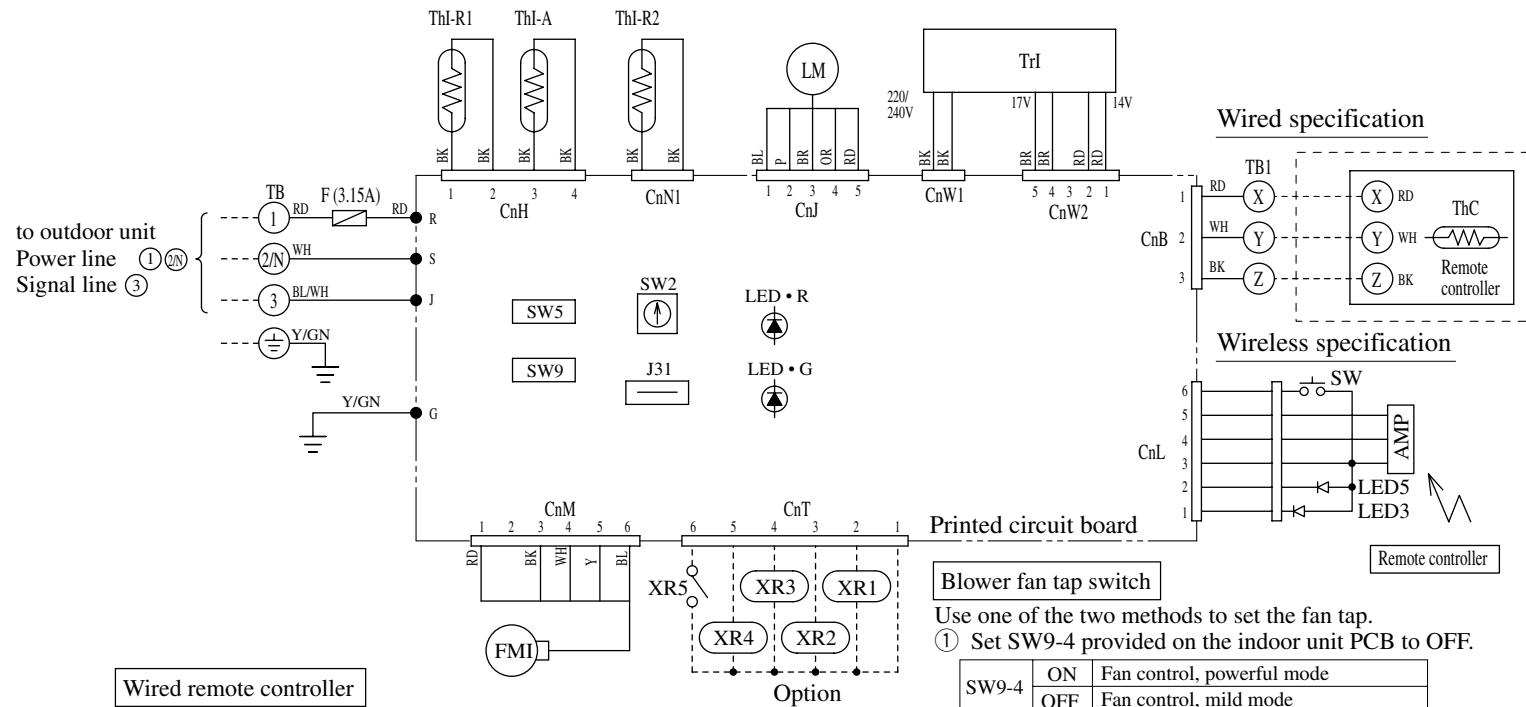
Mark	Parts name	Mark	Parts name	Mark	Parts name
FM1	Fan motor	F	Fuse	mark	Closed-end connector
CF1	Capacitor for FM1	LED1	Indication lamp(Red)	LED•1	Indication lamp(Green-Operation)
LM	Louver motor	LED2	Indication lamp(Green)	LED•2	Indication lamp(Yellow-Timer/Check)
ThI-A	Thermistor	XR1	Operation output(DC12V output)	LED•3	7-segement indicator(For check)
ThI-R1	Thermistor	XR2	Heating output(DC12V output)	SW1	Switch(For setting)
ThI-R2	Thermistor	XR3	Thermo ON output(DC12V output)	SW2	Backup switch(Operation/Stop)
ThC	Thermistor	XR4	Inspection output(DC12V output)		
SW2	Remote controller communication address	XR5	Remote operation input(volt-free contact)		
SW5-3,4	Filter sign	X1,2,3,6	Auxiliary relay(For FM)		
SW9-3	Emergency operation	TB	Terminal block(○ mark)		
Trl	Transformer	CnB-Z	Connector		

Color marks

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

(c) Ceiling suspended type (FDEN)
Model FDENA151R

(d) Wall mounted type (FDKN)
Model FDKNA151R

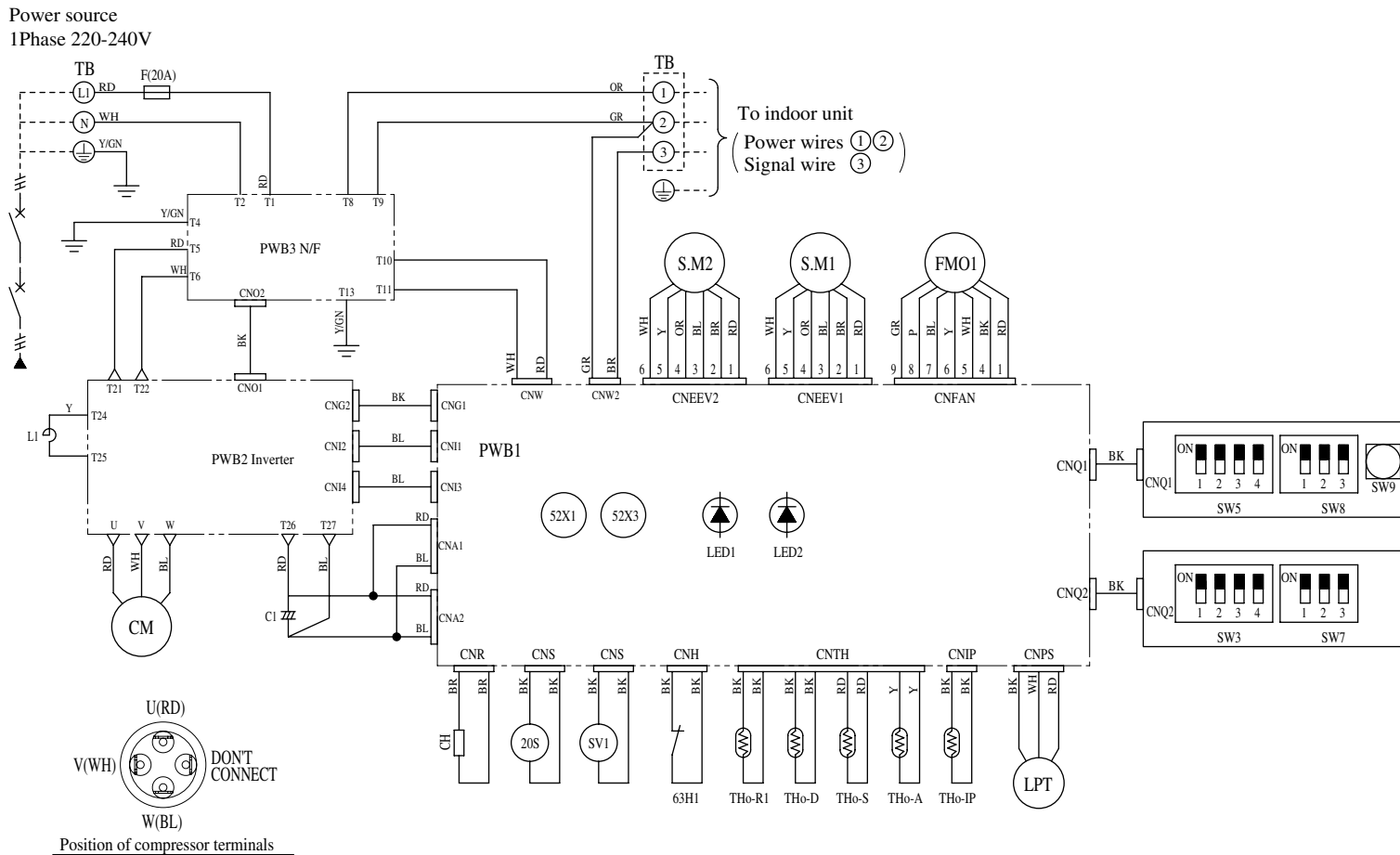


Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FMI	Fan motor	SW9-3	Emergency operation	XR3	Thermo ON output(DC12V output)
LM	Louver motor	LED3	Indication lamp(Green-Run)	XR4	Inspection output(DC12V output)
ThI-A	Thermistor	LED5	Indication lamp(Yellow-Inspection alert)	XR5	Remote operation input(volt-free contact)
ThI-R1	Thermistor	TrI	Transformer	TB	Terminal block(○ mark)
ThI-R2	Thermistor	F	Fuse	CnA~Z	Connector
ThC	Thermistor	LED • R	Indication lamp(Red)	AMP	Wirelss receiver
SW	Backup switch(ON/OFF)	LED • G	Indication lamp(Green)		
SW2	Remote controller communication address	XR1	Operation output(DC12V output)		
SW5-3,4	Filter sign	XR2	Heating output(DC12V output)		

Color marks

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



Meaning of marks					
Mark	Parts name	Mark	Parts name	Mark	Parts name
CM	Compressor motor	Tho-A	Thermistor (Outdoor air temp.)	CnA~Z	Connector
FMO1	Fan motor	Tho-D	Thermistor (discharge temp.)	SW9	Pump down switch
CH	Crankcase heater	Tho-R1	Thermistor (H.X. temp.)	SW3,5,7,8	Local setting switch
52X1	Auxillary relay (for CH)	Tho-S	Thermistor (suction temp.)	LED1	Indication lamp (GREEN)
52X3	Auxillary relay (for 20S)	Tho-IP	Thermistor (IPM)	LED2	Indication lamp (RED)
20S	Solenoid valve for 4 way valve	LPT	Low pressure sensor	DM	Diode module
SM1	Expansion valve for cooling	SV1	Solnoid valve	L1	Reactor
SM2	Expansion valve for heating	TB	Terminal block		
63H1	High pressure switch	F	Fuse		

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

2.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

Details are the same as in chapter 1.4 see page 29.

2.5 APPLICATION DATA

SAFETY PRECAUTIONS

- Please read these “Safety Precautions” first then accurately execute the installation work.
- Though the precautionary points indicated herein are divided under two headings, **⚠ WARNING** and **⚠ CAUTION**, those points which are related to the strong possibility of an installation done in error resulting in death or serious injury are listed in the **⚠ WARNING** section. However, there is also a possibility of serious consequences in relationship to the points listed in the **⚠ CAUTION** section as well.

In either case, important safety related information is indicated, so by all means, properly observe all that is mentioned.

- After completing the installation, along with confirming that no abnormalities were seen from the operation tests, please explain operating methods as well as maintenance methods to the user (customer) of this equipment, based on the owner’s manual. Moreover, ask the customer to keep this sheet together with the owner’s manual.



WARNING

- Installation should be performed by the dealer or a company specializing in this type of installation. If you install the equipment yourself, installation errors could result in water leaks, electric shock, and/or a fire, as well as other hazards.
- Conduct installation work in accordance with the instructions in this installation manual. Installation errors could result in water leaks, electric shock, or fire.
- Sling the unit at the specified points with ropes properly rated for the weight in lifting it for portage. An improper manner of portage can result in a fall of the unit resulting in an accident involving personal death or injury.
- When installing a unit in a small room, take measure so that if the refrigerant leaks, it does not exceed the concentration limit. For information regarding measures to prevent the concentration limit from being exceeded, please contact the dealer.
- If refrigerant leaks and the concentration limit is exceeded, suffocation could occur.
- Install the equipment in a location that can sufficiently support the weight of the equipment. If the area is not strong enough, an accident could result from the unit falling.
- Install the equipment in a location that can withstand strong winds, such as typhoons, and earthquakes. If the installation is not secure, an accident could result from the unit falling.
- Always turn off power before work is performed inside the unit such as for installation or servicing. A failure to observe this instruction can cause a danger or electric shock.
- Electrical work should be done by a licensed electrician who shall do the work in accordance with the Technical Standards Regarding Electrical Equipment. Indoor Wiring Provisions, and this installation manual. The electrician shall use specified circuits for the equipment. If the power supply circuit capacity is insufficient or the work is not done correctly, it could result in electric shock or a fire.
- For wiring, the specified cable should be used, the connections should be secure, and the fixtures shall be strong enough to prevent cables from being pulled out from the terminal connections. Incorrect connections or work fixtures could result in heat generation or a fire.
- In cabling, arrange cables suitably so that they may not get off their support and then fix the service panel securely. Improper installation can cause heat generation and a resultant fire. Please prevent any substance other than the specified refrigerant (R410A) such as air from entering the refrigerant cycle in installing or moving the air conditioning system. Contamination by air or a foreign substance can cause an abnormal pressure build-up inside the refrigerant cycle and a resultant explosion and personal injury.
- Use only parts supplied with the unit and specified supply parts for installation. The use of unauthorized parts may cause the leaking of water or electricity causing a danger of electric shock or a fire, a refrigerant leak, performance degradation, and control failures.
- Do not open operation valves (either liquid or gas or both) until refrigerant piping, an air-tightness test and an air purge are completed. When a leak of refrigerant gas occurs during piping work, stop brazing pipes and ventilate the room. Refrigerant gas, when it comes into contact with bare fire, can generate a toxic gas.
- When installation is completed, check for refrigerant gas leaks. If the refrigerant gas leaks indoors, it could come in contact with a fan heater, burner, or hot plate, which could generate a poisonous gas.



CAUTION

- Ground the equipment. Do not connect the ground wire to gas piping, water piping, a lightning rod, or telephone ground wires. If grounding is not performed correctly electric shock could occur.
- Depending on the installation location, a circuit breaker may need to be installed. If a circuit breaker is not installed, electric shock may occur.
- Please follow this manual faithfully in performing installation work. Improper installation work can cause abnormal vibrations and noise generation.
- Do not install the equipment in areas where there is danger of flammable gas leaks. If such gas does leak it could collect around the units and cause a fire.
- Install the drain piping in accordance with the installation manual so that it properly discharges waste water and is maintained at a temperature that prevents condensation.
- Do not install the outdoor unit where winds from its fan blow directly onto a plant, etc. Winds can affect adversely to the plant, etc.
- Secure a space for inspection and maintenance as specified in the manual. An insufficient space can result in an accident such as a fall from the installation point and a resultant personal injury.
- When the outdoor unit is installed on a roof or at an elevated point, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.
- In tightening a flare nut, use a double spanner and observe the specified tightening torque. Care must be taken so as not to over-tighten a nut and damage the flare part. (Please refer to the tightening torque) The loosening or damage of the flare part can cause a refrigerant gas leak and a resultant lack-of-oxygen accident.
- Please dress the refrigerant piping with a heat insulation material for prevention of dew condensation. Improper heat insulation for prevention of dew condensation can cause the leaking or dripping of water and a resultant soaking of household effects.
- When refrigerant piping is completed, check its air-tightness with nitrogen gas to make sure it does not have a leak. A leak of refrigerant gas in a narrow room beyond the safety limit concentration can cause a lack-of oxygen accident.
- If the humidity exceeds 80% or the drain or piping become clogged, condensation from the indoor unit could drip and cause damage. Please do not install the indoor units above items of furniture, etc. that you do not want to get wet. Also, do not place items that you do not want to get wet underneath the indoor units.



2.5.1 Installation of indoor unit

(1) Ceiling recessed compact type (FDTC)

(a) Selection of installation location

- 1) Select location where the space above ceiling is larger than those mentioned below and perfect draining can be assured.
- 2) With the customer's consent, select a location with following suitable conditions.

- a) Where cool air or hot air can easily pass through.

If the height of the location exceeds 3 m, hot air will gather in the ceiling. Suggest to the customer to also install a circulator.

- b) Where water can be completely drained. A sloping location for drainage.
- c) Where there are no wind disturbances to the suction inlet and blowing outlet, where the fire alarm will not be set off erroneously, where no short circuits occur.
- d) Where there is no direct sunlight.
- e) If the humidity above the ceiling exceeds 80% or the condensation temperature above the ceiling exceeds 28°C, affix polyurethane foam (with a thickness to 10 or greater) above the insulation in the ceiling panels.

Carry out tests of the main unit under the above conditions and confirm that there is no failure. However, if the environment where the unit is installed exceeds the above conditions and the unit is operated in high humidity conditions, there is danger of water drops dripping down. If there is a possibility that the unit will be used under such conditions, install 10 to 20 mm of insulation material to the main unit, piping and drain pipes.

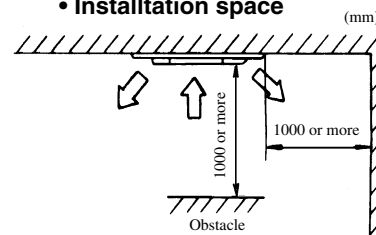
- 3) Consider the supporting strength of the location. If the strength is not sufficient to sustain the unit weight, use reinforcing materials.

(b) Installation space for unit

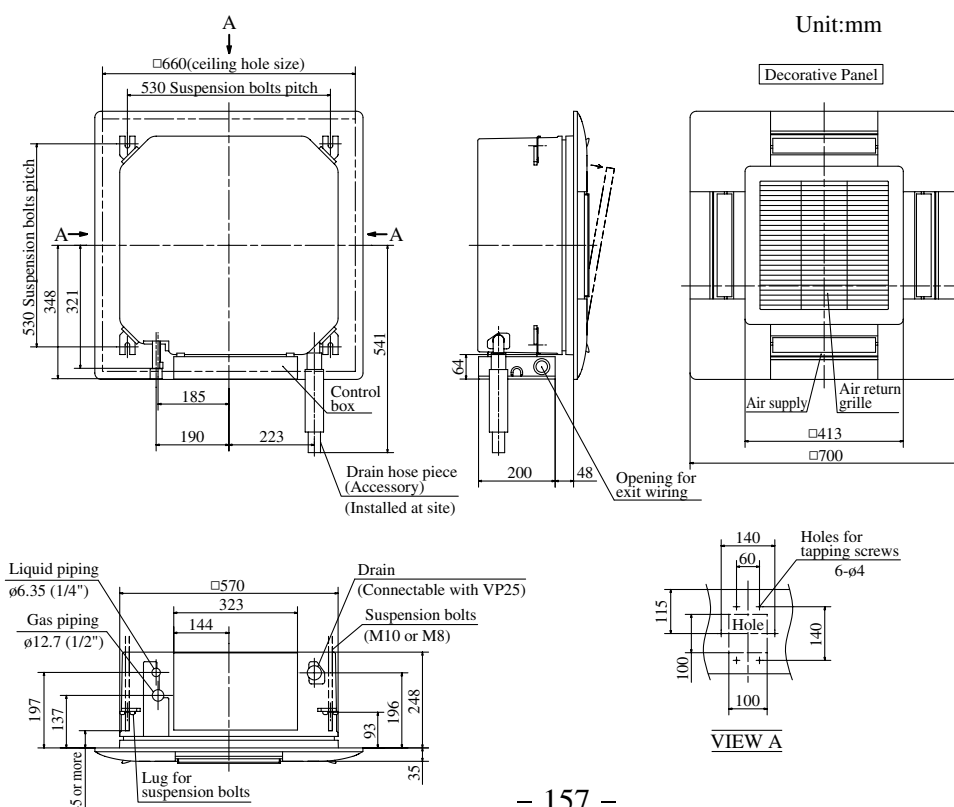
- a) When a sufficient interval cannot be secured between the unit and a wall or another unit, shut up diffusers on that side to block winds and make sure that no short-circuiting is occurring. (A wind blocking material is available as an optional part)

- Do not use the unit in the "Lo" wind mode, when winds are blown into two or three directions.

• Installation space



Note (1) In the case of neighboring installations, separate the units by the following dimensions or greater.
FDTC151R:4000mm



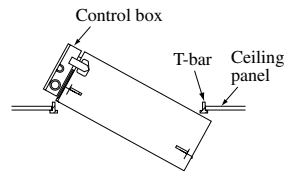
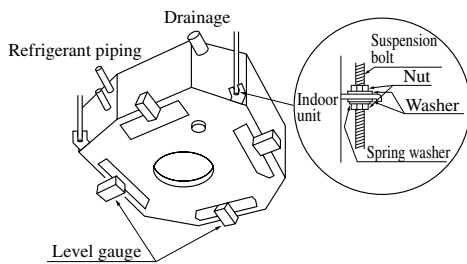
(c) Suspension

- Please arrange four sets of a suspension bolt (M10 or M8), a nut matching the bolt, a flat washers and a spring washer on the installation site.

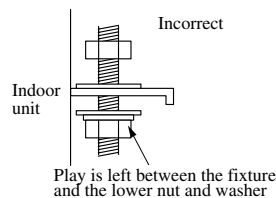
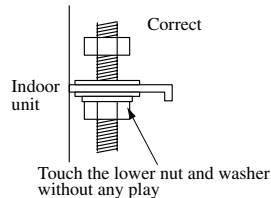
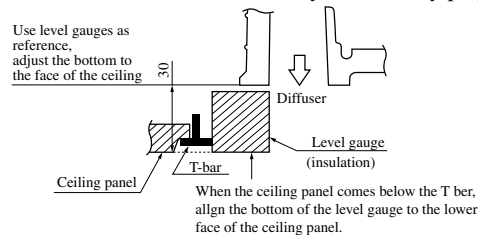
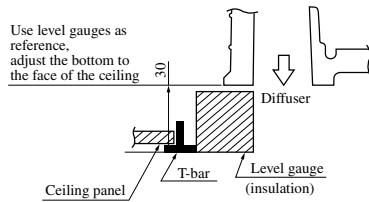
When suspension from the ceiling

- This unit is designed for installation on a 2×2 grid ceiling.
If necessary, please detach the T bar temporarily before you install it.
(When it is installed on a ceiling other than 2×2 grid ceiling, please do not fail to provide an inspection port on the control box side.)
- Determine the positions of suspension bolts (530×530).
- Use four suspension bolts, each fastened in such a manner that it can withstand pull force of 50kgf.
- Make suspension bolts to the length that leaves approximately 45mm of them above the ceiling. In hoisting the unit main body in, temporarily fasten the four lower nuts of the suspension bolts approx. 93 mm from the ceiling and the four upper nuts at positions sufficiently far from the lower nuts so that they may not hamper installation work when the unit is hoisted in or the height is adjusted.

- Put in the unit on an angle.



- After hoisting in the unit, attach level gauges supplied as accessories and determine the unit position (height). To adjust height, use the four lower nuts with the four upper nuts left loose. Please make sure that the unit's four hanging fixtures touch the four lower nuts and washers evenly without any play.



- Please make sure that the unit main body is installed levelly. Level must be checked with a level or a clear hose filled with water. (A tolerable height difference at an end of the unit is within 3 mm)
- After you have adjusted the height and level of the unit, fasten the four upper nuts to fix the unit.

Note (1) Do not adjust the height with the upper nuts. It may cause deformation due to excessive force working on the unit main body, which can result in such problems that you cannot attach the panel or noises are generated from the interfering fan.

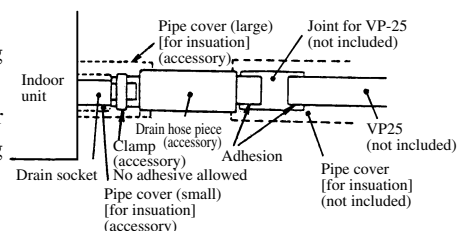
When embedded into ceiling

- Determine the positions of hanging bolts (530×530).
 - The pitch center of a suspension bolt must accord with the center of the unit.
- Use four suspension bolts, each fastened in such a manner that it can withstand pull force of 50 kgf.
- Fix the unit as per (c) 5) and 7) above.

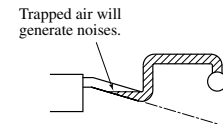
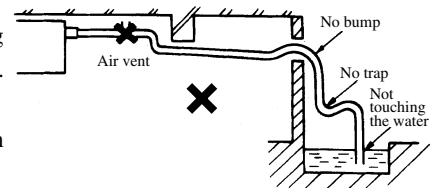
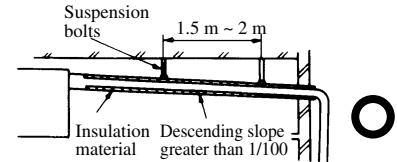
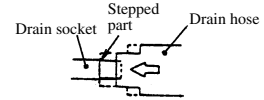
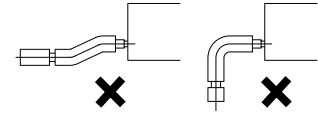
Note (1): When a suspension bolt exceeds 1.3 m in length, use an M10 bolt and give it reinforcements such as braces.

(d) Drain Piping

- Glue the drain hose supplied as an accessory and a VP-25 joint before lifting the unit.
- The drain hose is to provide a buffer to absorb a slight dislocation of the unit or the drain piping during installation work. If it is subject to abuse such as being bent or pulled deliberately, it may break, which will result in a water leak.



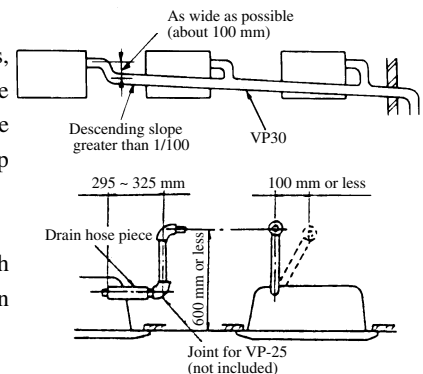
- 3) Care must be taken so as not to allow an adhesive to run into the drain hose. When it is hardened, it can cause a breakage of a flexible part, if the flexible part receives stress.
- 4) Use VP-25 general-purpose hard PVC pipes for drain piping.
- 5) Insert the drain hose supplied as an accessory (soft PVC end) to the stepped part of the unit's drain socket and then fasten it with the clamp also supplied as an accessory.
- 6) Adhesive must not be used.
 - a) Glue a VP-25 joint (to be procured locally) to joint it with the drain hose (hard PVC end) and then glue a VP-25 (to be procured locally) to the joint.
 - b) Give the drain piping a descending grade (1/50-1/100) and never create a bump to go over or a trap.
 - c) In connecting drain pipes, care must be taken so as not to apply force to the unit side piping and fix the pipe at a point as close to the unit as possible.
 - d) Do not create an air vent under any circumstances.
 - e) When drain piping is implemented for more than one unit, provide a collecting main about 100 mm below the units' drain outlets from which it collects drain. Use a VP-30 or larger pipe for a collecting main.
 - f) Do not fail to provide heat insulation at the following two points because they can cause dew condensation and a resultant water leak.



- 7) Drain socket
After a drain test is completed, apply a pipe cover (small: accessory) onto the drain socket, cover the pipe cover (small), the clamp and part of the drain hose with a pipe cover (large: accessory) and wrap it with a tape completely without leaving any gaps. (Cut pipe covers into appropriate shapes)

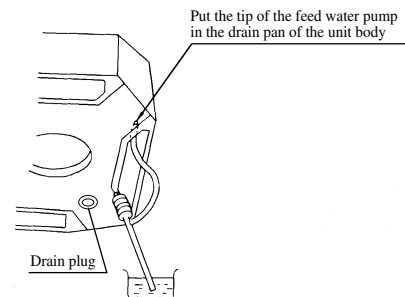
8) Hard PVC pipes laid indoor

- a) Since a drain pipe outlet can be raised up to 600 mm from the ceiling, use elbows, etc. to install drain pipes, if there are obstacles preventing normal drain pipe arrangement. When the drain pipe is raised at a point far from a unit, it can cause an overflow due to a back flow of drain upon stoppage, so arrange piping to keep the dimensions specified in the illustration shown on the left.
- b) Install the drain pipe outlet where no odor is likely to be generated.
- c) Do not lead the drain pipe into a ditch where the generation of harmful gas such as sulfuric gas or flammable gas is expected. A failure to observe this instruction may cause such harmful or flammable gas to flow into the room.



Drainage test

- ① Check that water is draining thoroughly during test run, and that there are no water leaks from the joints and the drain pan.
- ② The test has to be performed even if the unit is installed in the season when the unit is used for heating.
- ③ In a new house, perform the test before the ceiling is fitted.
 - Using a water pump, pour about 1000 cc of water to the drain pan through the blowing outlet.
 - Check the transparent drain-out section of the drain hose for normal flow of drainage.
 - * While observing the noise from the drain motor, test drain operation.
 - Take off the drain plug to release the water. After the water is drained, place the drain plug back where it was..
 - * Be careful not to get splashed when pulling the drain plug.



Forced drain pump operation

- ◆ Set up from a unit side.
- ① Turn DIP switch SW9-3 on the indoor unit's PCB ON, then after disconnecting the remote control's communications line CnB connector, turn the power ON again.
 - ② After the test, be sure to turn off the DIP switch. Also restore the remote control communications line's CnB connector to its original condition.
- (When electrical work is not completed, connect a convex joint to the drain pipe joint area, arrange an inlet and check leaks and drain connections of the pipe)

◆ Setup from a remote controller side.

Drain pump operation from a remote controller unit is possible. Operate a remote controller unit by following the steps described below.

1. To start a forced drain pump operation.

- ① Press the TEST button for three seconds or longer.

The display will change from “◆ SELECT ITEM” → “○ SET” → “※ TEST RUN ▼”

- ② Press the ▼ button once while “※ TEST RUN ▼” is displayed, and cause “DRAIN PUMP ◆” to be displayed.

- ③ When the SET button is pressed, a drain pump operation will start.

Display: “DRAIN PUMP RUN” → “○ → STOP”






2. To cancel a drain pump operation.

- ① If either SET or ON/OFF button is pressed, a forced drain pump operation will stop.

The air conditioning system will become OFF.

(e) Panel installation

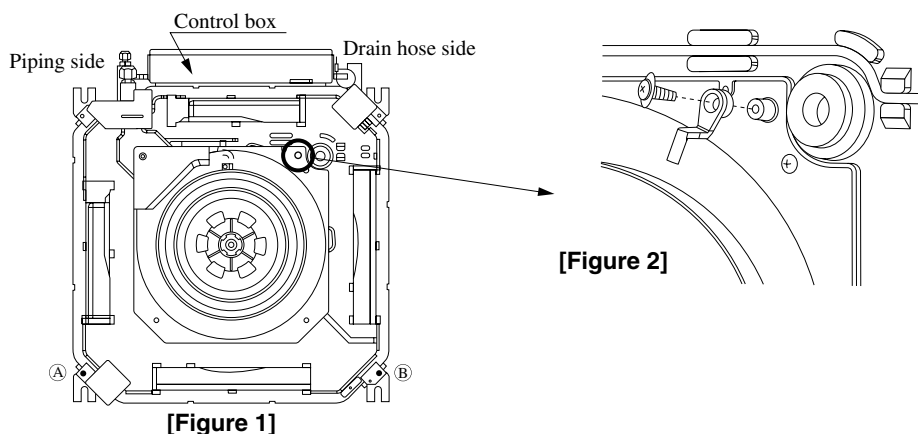
1) Accessories (It is attach to the panel)

1	Hook		1 piece	For fixing temporarily
2	Chain		2 piece	
3	Screw		4 piece	For hoisting the panel
4	Screw		1 piece	For attaching a hook
5	Screw		2 piece	For attaching a chain

- 2) Make sure that the unit main body is positioned at the correct height and the opening on the ceiling is made to the correct dimensions with the level gauge supplied with the main body.

Remove the level gauge before you attach the panel.

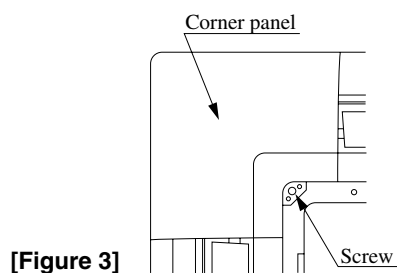
- 3) Screw in two bolts out of the four supplied with the panel by about slightly less than 5mm. (● mark (A)(B)) [Figure 1]



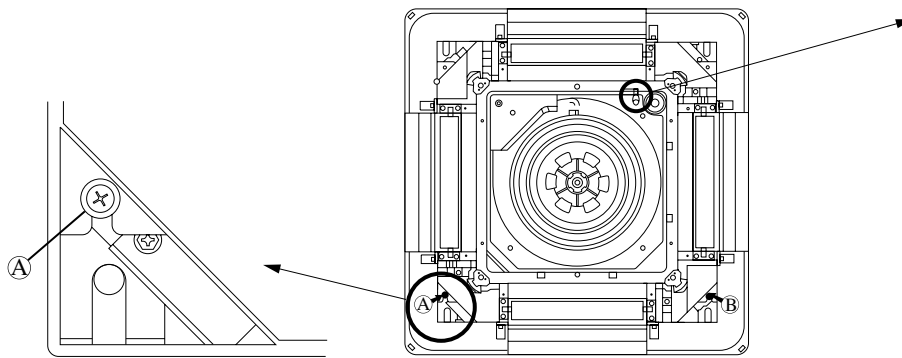
- 4) Attach the hook supplied with the panel to the main body with the hook fixing screw (1 screw). [Figure 2]

- 5) Open the air return grille.

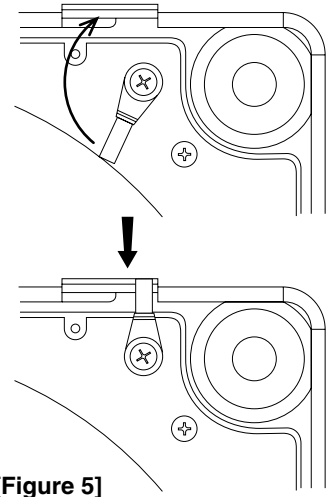
- 6) Please remove the screw of a corner panel and remove a corner panel. (four places) [Figure 3]



7) A panel is hooked on two bolts (● mark (A)(B)) [Figure 4]



[Figure 4]



[Figure 5]

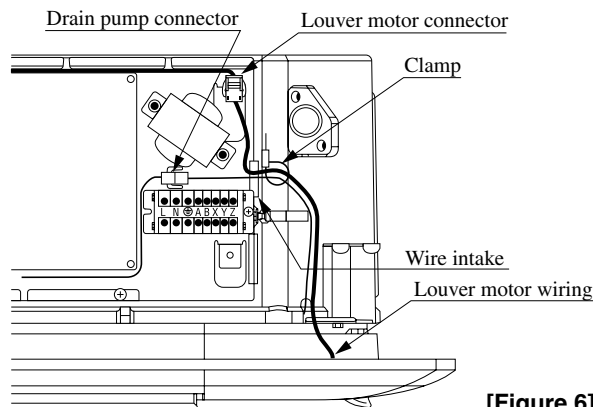
8) Please rotate a hook, put in the slot on the panel, and carry out fixing the panel temporarily. [Figure 5]

9) Tighten the two bolts used for fixing the panel temporarily and the other two.

10) Please open the lid of a control box.

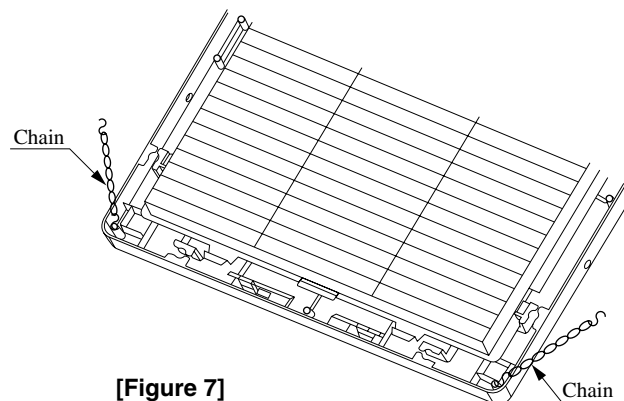
11) Like drain pump wiring, please band together by the clamp and put in louver motor wiring into a control box. [Figure 6]

12) Please connect a louver motor connector. [Figure 6]



[Figure 6]

13) Attach two chains to the air return grille with two screws. [Figure 7]



[Figure 7]

14) Replace the corner panels. Please also close a chain with a screw together then.

15) Close the air return grille.

(2) Ceiling recessed type (FDT)

(a) Selection of installation location

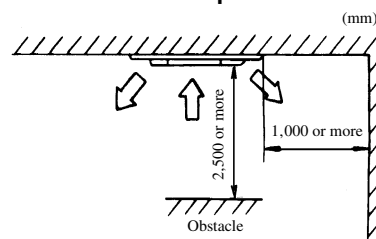
- 1) Select location where the space above ceiling is larger than those mentioned right side and perfect draining can be assured.
- 2) With the customer's consent, select a location with following suitable conditions.
 - a) Where cool air or hot air can easily pass through.
If the height of the location exceeds 3 m, hot air will gather in the ceiling. Suggest to the customer to also install a circulator.
 - b) Where water can be completely drained. A sloping location for drainage.
 - c) Where there are no wind disturbances to the suction inlet and blowing outlet, where the fire alarm will not be set off erroneously, where no short circuits occur.
 - d) Where there is no direct sunlight.
 - e) Where the dew point temperature is below 28°C and the relative humidity is below 80%.

The unit has been tested according to JIS dew point conditions and has been confirmed to operate without any problems. However, if the unit is operated in an environment with the humidity higher than the above limit, water condensation may occur. Accordingly, all pipes and drain pipes should be further covered with insulation materials of 10 - 20 mm thick.
- 3) Consider the supporting strength of the location. If the strength is not sufficient to sustain the unit weight, use reinforcing materials.

(b) Installation space for unit

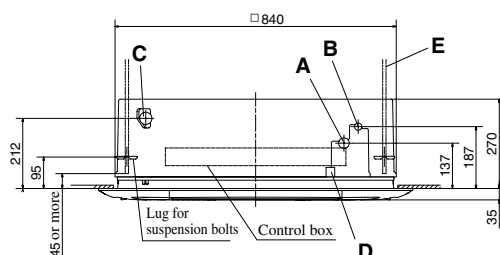
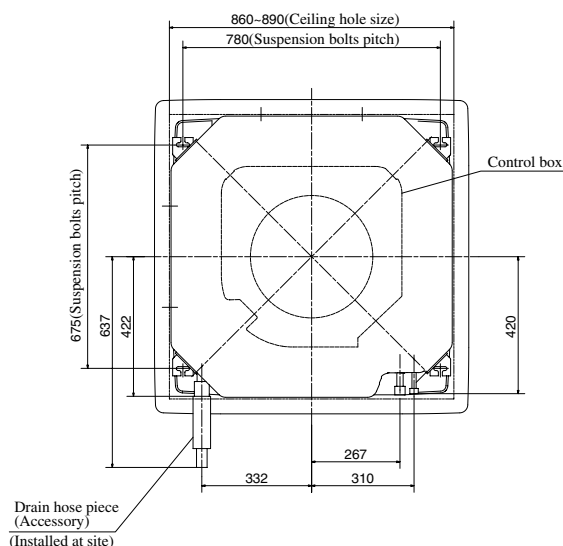
- a) When a sufficient interval cannot be secured between the unit and a wall or another unit, shut up diffusers on that side to block winds and make sure that no short-circuiting is occurring. (A wind blocking material is available as an optional part)
 - Do not use the unit in the "Lo" wind mode when winds are blown into two or three directions.
- b) When the unit has 2500 mm or less clearance, attach a fan guard (option part) on the intake side of the fan.

• Installation space



Note (1) In the case of neighboring installations, separate the units by the following dimensions or greater.

Item	Dimensions
Model	
FDTA151R	4000



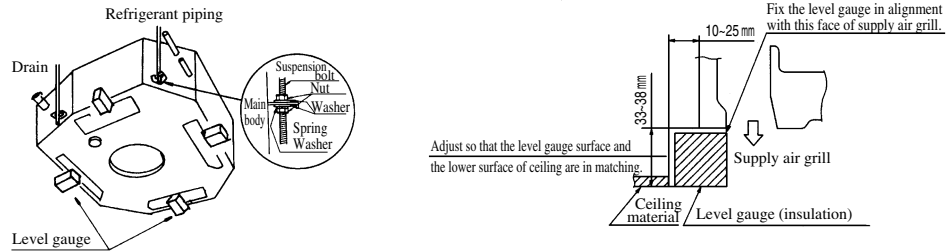
A	Gas tube connecting port
B	Liquid tube connecting port
C	Drain line connecting port
D	Power intake
E	Hanging bolt

(c) Suspension

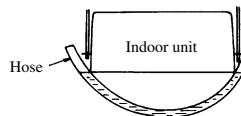
- Please arrange four sets of a suspension bolt (M10 or M8), a nut matching the bolt, a flat washers and a spring washer on the installation site.

When suspension from the ceiling

- 1) In the case of the standard series: Cut and opening of □860 ~ □890.
In cutting an opening on the ceiling, use the unit's cardboard container for shipment as a reference of the size of opening.
 - The center of the opening on the ceiling must accord with the center of the unit.
- 2) Determine the positions of suspension bolts (675 × 780).
- 3) Use four suspension bolts, each fastened in such a manner that it can withstand pull force of 50 kgf.
- 4) Make suspension bolts to the length that leaves approximately 70 mm of them above the ceiling.
- 5) After hoisting in the unit, attach level gauges supplied as accessories and determine the unit position (height).



- 6) Use a transparent tube with water filled inside to check the level of the unit. (A tolerable height difference at an end of the unit is within 3 mm)



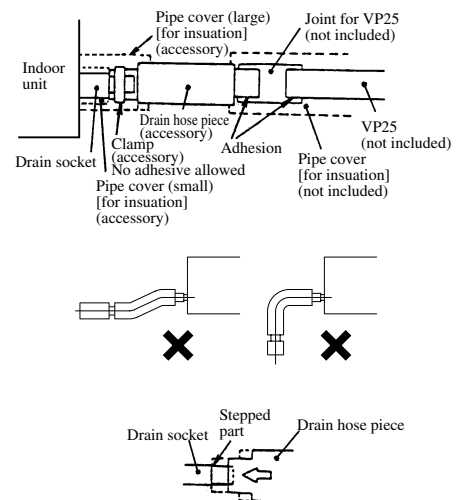
When embedded into ceiling

- 1) Determine the positions of suspension bolts (675 × 780).
 - The pitch center of a suspension bolt must accord with the center of the unit.
- 2) Use four suspension bolts, each fastened in such a manner that it can withstand pull force of 50 kgf.
- 3) In cutting an opening on the ceiling, use the unit's cardboard container for shipment as a reference of the size of opening.
- 4) Fix the unit as per A-5 and 6 above.
 - The unit's cardboard container for shipment can be used to cover the indoor unit.

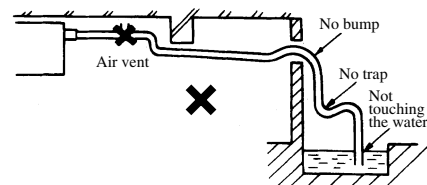
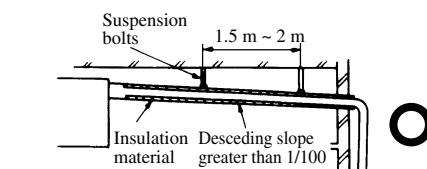
Note (1) When a hanging bolt exceeds 1.3 m in length, use an M10 bolt and give it reinforcements such as braces.

(d) Drain piping

- 1) Glue the drain hose supplied as an accessory and a VP-25 joint before lifting the unit.
- 2) The drain hose is to provide a buffer to absorb a slight dislocation of the unit or the drain piping during installation work. If it is subject to abuse such as being bent or pulled deliberately, it may break, which will result in a water leak.
- 3) Care must be taken so as not to allow an adhesive to run into the drain hose. When it is hardened, it can cause a breakage of a flexible part, if the flexible part receives stress.
- 4) Use VP-25 general-purpose hard PVC pipes for drain piping.
- 5) Insert the drain hose supplied as an accessory (soft PVC end) to the stepped part of the unit's drain socket and then fasten it with the clamp also supplied as an accessory.
- 6) Adhesive must not be used.
 - a) Glue a VP-25 joint (to be procured locally) to joint it with the drain hose (hard PVC end) and then glue a VP-25 (to be procured locally) to the joint.



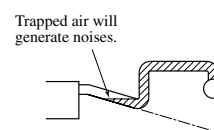
- b) Give the drain piping a descending grade (1/50-1/100) and never create a bump to go over or a trap.
- c) In connecting drain pipes, care must be taken so as not to apply force to the unit side piping and fix the pipe at a point as close to the unit as possible.
- d) Do not create an air vent under any circumstances.
- e) When drain piping is implemented for more than one unit, provide a collecting main about 100 mm below the units' drain outlets from which it collects drain. Use a VP-30 or larger pipe for a collecting main.
- f) Do not fail to provide heat insulation at the following two points because they can cause dew condensation and a resultant water leak.



7) Drain socket

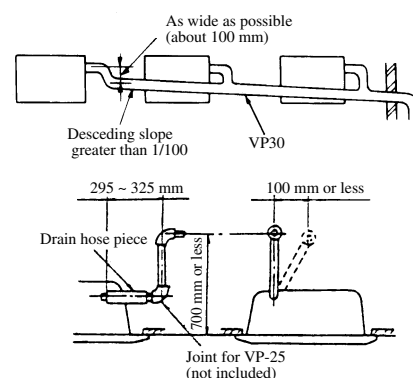
After a drain test is completed, apply a pipe cover (small: accessory) onto the drain socket, cover the pipe cover (small), the clamp and part of the drain hose with a pipe cover (large: accessory) and wrap it with a tape completely without leaving any gaps.

(Cut pipe covers into appropriate shapes)



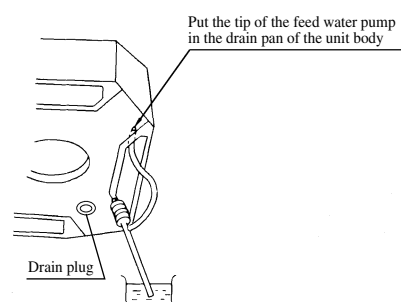
8) Hard PVC pipes laid indoor

- a) Since a drain pipe outlet can be raised up to 700 mm from the ceiling, use elbows, etc. to install drain pipes, if there are obstacles preventing normal drain pipe arrangement. When the drain pipe is raised at a point far from a unit, it can cause an overflow due to a back flow of drain upon stoppage, so arrange piping to keep the dimensions specified in the illustration shown on the left.
- b) Install the drain pipe outlet where no odor is likely to be generated.
- c) Do not lead the drain pipe into a ditch where the generation of harmful gas such as sulfuric gas or flammable gas is expected. A failure to observe this instruction may cause such harmful or flammable gas to flow into the room.



Drainage test

- ① Check that water is draining thoroughly during test run, and that there are no water leaks from the joints and the drain pan.
- ② The test has to be performed even if the unit is installed in the season when the unit is used for heating.
- ③ In a new house, perform the test before the ceiling is fitted.
 - Using a water pump, pour about 1000 cc of water to the drain pan through the blowing outlet.
 - Check the transparent drain-out section of the drain hose for normal flow of drainage.
 - * While observing the noise from the drain motor, test drain operation.
 - Take off the drain plug to release the water. After the water is drained, place the drain plug back where it was.
 - * Be careful not to get splashed when pulling the drain plug.



Forced drain pump operation

- ◆ Set up from a unit side.
- ① Turn power on after selecting the emergency operation mode with a setting on the indoor unit board (SW9-3 ON) and disconnecting the CnB connector on the board. Then, the drain pump will start a continuous operation 15 seconds later. (Note: The blower will also start operation in tandem)
- ② When a drain test is completed, reinstate the setting to cancel the emergency operation mode (SW9-3 OFF) and plug in the CnB connector on the board. (When electrical work is not completed, connect a convex joint to the drain pipe joint area, arrange an inlet and check leaks and drain connections of the pipe)

◆ Setup from a remote controller side.

Drain pump operation from a remote controller unit is possible. Operate a remote controller unit by following the steps described below.

1. To start a forced drain pump operation.

- ① Press the TEST button for three seconds or longer.

The display will change from “▲ SELECT ITEM ”→ “○ SET ”→ “☼ TEST RUN ▼ ”

- ② Press the ▼ button once while “☼ TEST RUN ▼ ” is displayed, and cause “ DRAIN PUMP ◆ ” to be displayed.

- ③ When the SET button is pressed, a drain pump operation will start.

Display: “ DRAIN PUMP RUN ”→ “○ SET → STOP ”

2. To cancel a drain pump operation.

- ④ If either SET or ON/OFF button is pressed, a forced drain pump operation will stop.

The air conditioning system will become OFF.

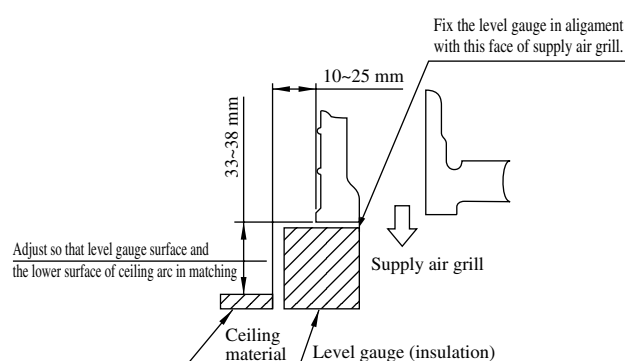
(e) Panel installation

1) Accessories

Name	Quantity
Air return grille	1
Air filter	1
Suspension bolts	4

2) Confirm the unit's installation level.

- Make sure from the level gauge (insulation) packed with the air conditioner unit that the installation height of the unit and the dimensions of the opening in the ceiling are correct.
- Confirm the installation level of the air conditioner unit and ceiling material.
- Affix the level gauge included with the air conditioner unit and fix the unit's installation height.
- Remove the level gauge before installing the unit.
- The unit's installation height can be minutely adjusted by means of the corner openings after the panel is installed. (For details, see 6) “Installing the Panel.”)



Note (1) : If the installation level of the air conditioner unit and ceiling material exceed the proper range, it will cause an undue load to be broken during installation of the panel and could cause damage.

3) Unit installation direction and panel and air return grille direction

- (a) The unit and panel installation orientation is directional.
- Match up the outlet (small) parts with the refrigerant piping direction.
 - Make sure of the motor and switch connector connection directions.
- (b) The panel and air return grille installation orientation is not directional.

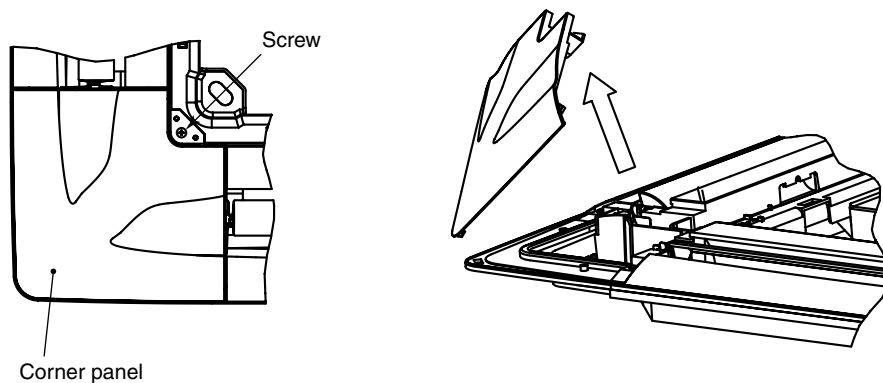
If you are changing the direction of the air return grille, change the panel's striker installation position to the “Pull” character position direction on the surface of the grille.

4) Removing the air return grille

- ① Raise up the notched portion of the air return grille and open it.
- ② With the air return grille open, remove the air return grille hinge from the decorator panel.

5) Removing the corner panel

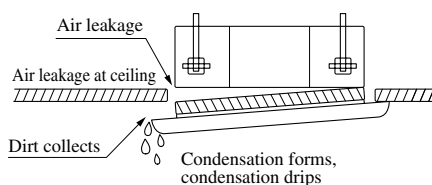
- Take out the screw in the corner, then lift up the corner panel in the arrow direction and remove it.



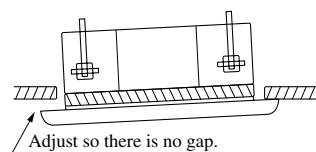
6) Panel installation

- ① Screw in lightly 2 of the 4 air conditioner unit suspension bolts in opposite corners from each other by about 5 mm.
(Fasten the drain piping side and the opposite corner temporarily.)
- ② Hang the panel on the two suspension bolts to install it temporarily.
- ③ Install the two remaining suspension bolts and tighten all four of the bolts.

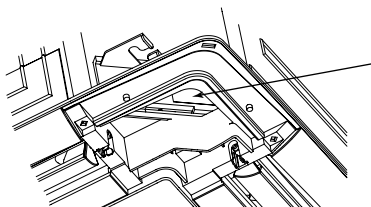
Notes (1) : If the suspension bolts are not tightened sufficiently, it could cause the following trouble, so tighten the bolts securely.



(2) : If there is still a gap between the ceiling and the decorator panel even after the suspension bolts are tightened, readjust the height of the indoor unit.



(3) : The unit's installation height can be minutely adjusted with the decorator panel as is as long as the indoor unit is level and drain piping are not affected.

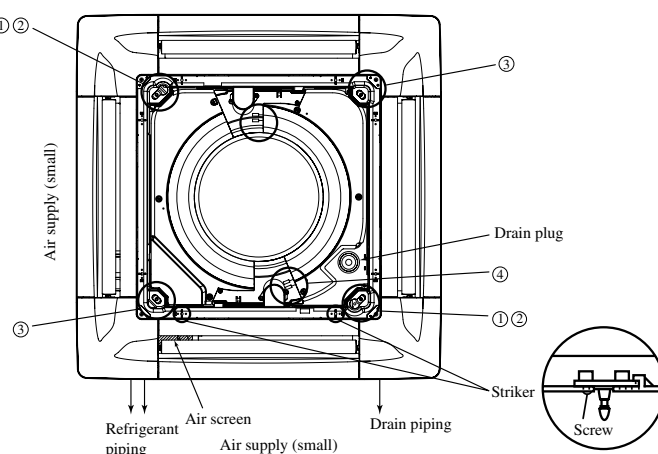


Carry out minute adjustments by turning the indoor unit's nut using a spanner or similar tool from the corner opening.

- ④ Connect the (white, 5p) louver motor connector.

- ⑤ Place each of the connectors inside the control box.

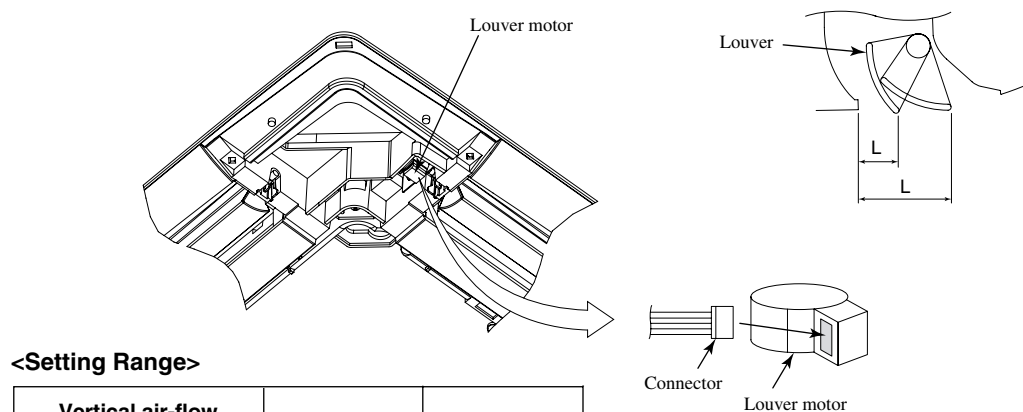
Note (1) : If the air supply louver does not operate using the remote controller, check the connector's connection, then turn the main power supply OFF for 10 seconds or longer and turn the power ON again.



7) If the vertical air-flow direction is fixed

- This decorator panel is designed so that you can fix the vertical air-flow direction at each air supply to match the environment at your installation location. Set it as required by the customer. Furthermore, when the vertical air-flow direction is fixed, remote control operation and all automatic controls are disabled. The actual setting may also differ from the LCD display in the remote controller.

- ① Turn off the main power supply (turn it off at the ground fault circuit breaker).
- ② Disconnect the connector to the louver motor at the air supply you want to fix the position of.
Wrap vinyl electrical tape around the disconnected connector to insulate it.
- ③ Slowly move the vertical air-flow louver you want to fix the position of by hand and set the vertical air-flow direction so that it is within the range shown in the table below.



<Setting Range>

Vertical air-flow direction criterion	Horizontal 30°	Downward 70°
L Dimension (mm)	36.5	22.5

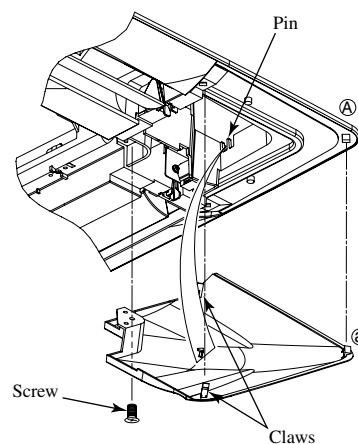
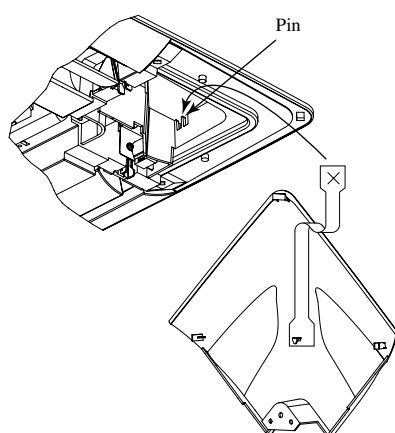
* It can be set anywhere desires as long as it is within a range of 22.5 and 36.5 mm.

Note (1) : Do not set the position outside this range.

Doing so causes condensate to drip and to form as well as dirtying of the ceiling surface, and could cause abnormal operation.

8) Corner panel installation

- ① Hook the corner panel strap to the pin on the decorator panel as shown in the figure.
- ② Insert part ② on the corner panel in part ① on the decorator panel, then fit the 2 claws and fasten the corner panel screw.



9) Installing the air return grille

- Install the air return grille by following the removal procedure (item 4) in reverse order.

Note (1) : Match up the installation position of the panel's striker and the "Pull" character position direction on the surface of the grille. If these do not match, the striker could be damaged.

(2) Ceiling suspended type (FDEN)

(a) Selection of installation location

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

Cold air throw

Unit : m

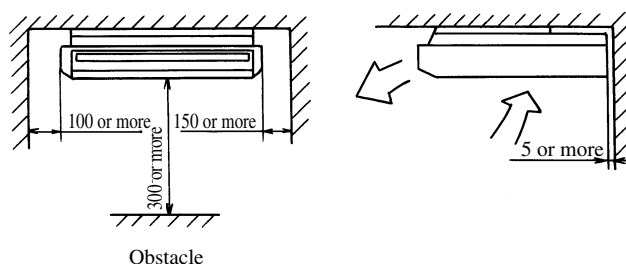
Model	FDENA151R
Air throw	7.5

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



Note (1) In the case of neighboring installations, separate the units by the following dimensions or greater.

Item	Dimensions
Model	
FDEA151R	4000

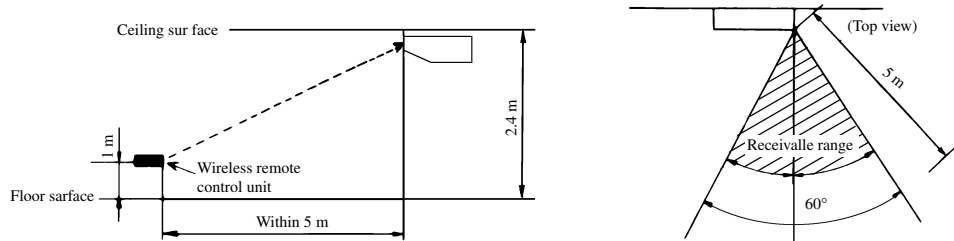
- 6) This unit uses a microcomputer as a control device. Therefore avoid installing the unit near the equipment that generates strong electromagnetic waves and noise.

(b) Wireless remote control unit operation distance.

1) Standard signal receiving range.

[Condition] Illuminance at the receiver area: 360 lux.

(When no lighting fixture is located within 1 m of indoor unit in an ordinary office)

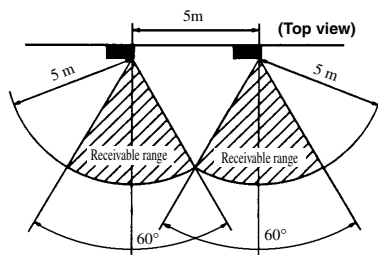


2) Points for attention in connecting a plural number of indoor units.

[Condition] Illuminance at the receiver area: 360 lux.

(When no lighting fixture is located within 1 m of indoor unit in an ordinary office)

When the remote control unit is used with the aforementioned interference-prevention setting, a minimum distance guaranteeing the prevention of unintended unit responses is 5 m

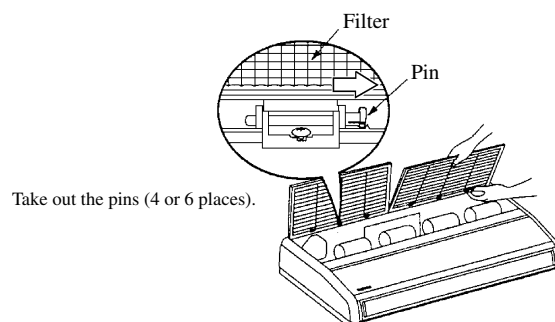
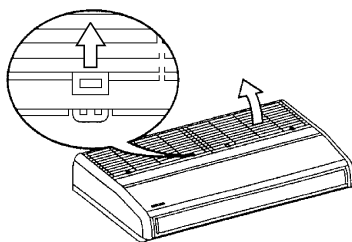


- Please operate remote control unit switches with the unit faced correctly toward the indoor unit's receiver section.
- Effective operation distance can vary with the luminance around the receiver and the reflection from walls of the room.
- When the receiver is exposed to intensive light such as from the direct sun or a strong light, it may become operable only from a short distance or unable to receive signals at all.

(c) Installation preparation

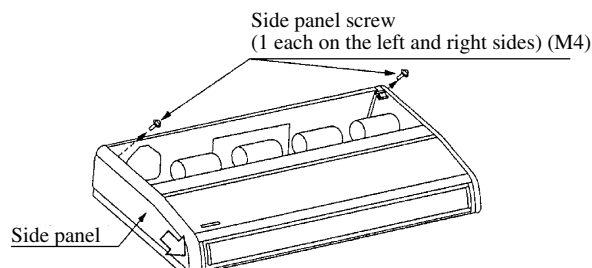
1) Remove the air return grille.

Slide the stoppers (4 places).



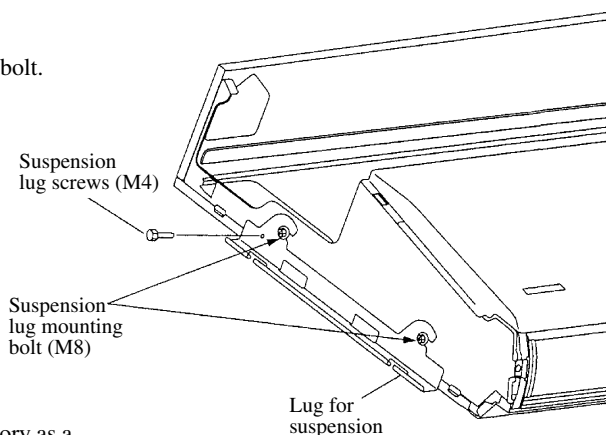
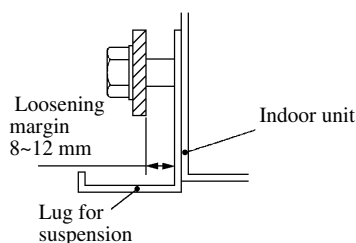
2) Remove the side panels.

Take out the screws, then slide the side panels in the arrow direction to remove them.



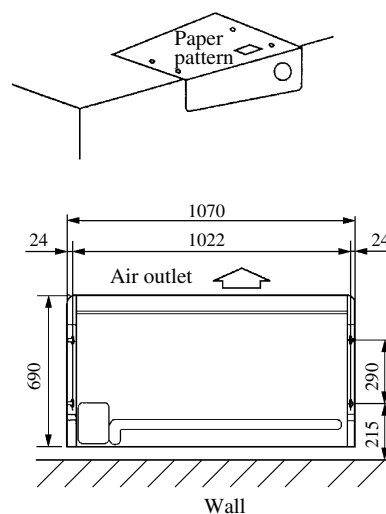
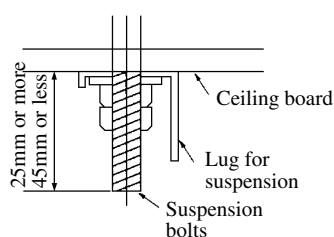
3) Remove the suspension lug.

Take out the screws, then loosen the installation bolt.



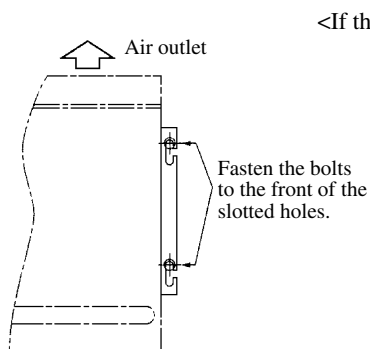
4) Suspension bolt position

- Using the paper pattern supplied as an accessory as a criterion, select suspension bolt positions and piping hole positions, then install the suspension bolts and make holes for piping. After positioning, remove the paper pattern.
- Keep strictly to the suspension bolt lengths specified below.

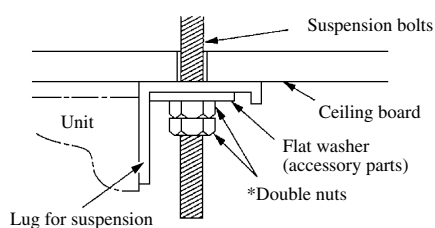


(d) Installation

1) Fasten the suspension lugs to the suspension bolts.

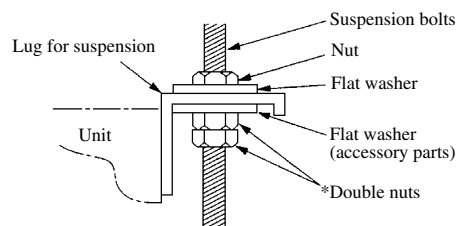


<If there is ceiling material>



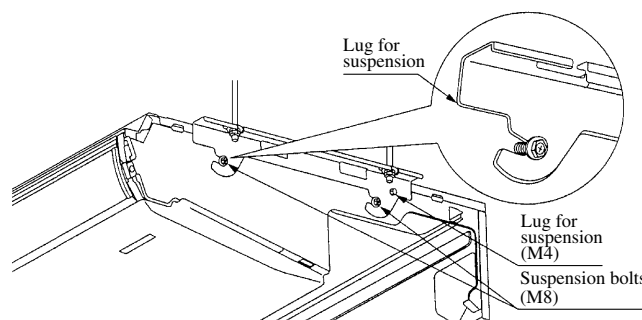
*Fasten it securely with double nuts.

<If there is no ceiling material>



2) Attach the unit to the suspension lugs.

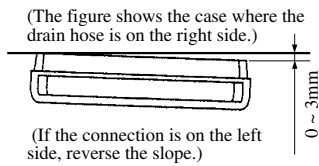
- Slide the unit onto the suspension lugs from the front, hanging it on the bolts.
- Fasten the unit securely on the left and right sides with 4 suspension bolts (M8).
- Tighten the 2 screws (M4) on the left and right sides.



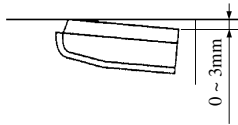
⚠ After sliding the side panels on from the front to rear, fasten them securely with the screws.

- 3) In order to make it easier for water to drain out, install the unit so that the water drain side slopes downward.

● Left-right direction



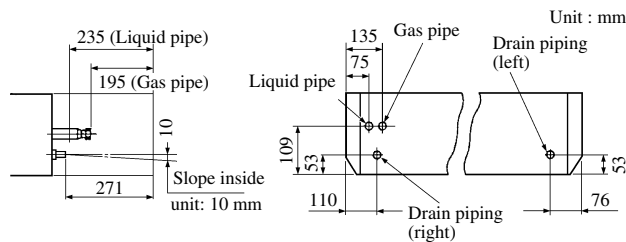
● Front-rear direction



⚠ If the slope is reversed, there is danger of water leaking out.

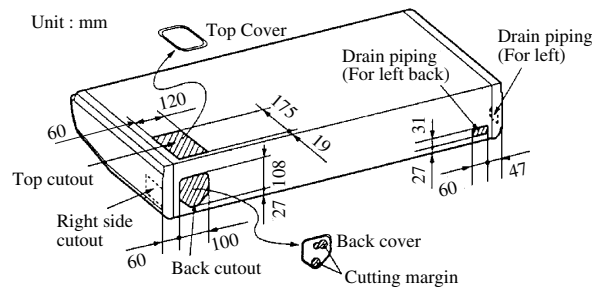
(e) Refrigerant piping

1) Piping position



2) Piping connection position

Piping can be connection from 3 different directions. Remove the cutout from hole where the piping will be connected using side cutters or similar tool. Cut a hole for the piping connection in the back cover according to the cutting margin shown. Cut a hole in the ceiling side in accordance with the position of the piping. Also, after the piping is installed, seal the space around the piping with putty, etc. to keep dust from getting inside the unit.
(In order to prevent damage to wires from the edges, be sure to use the back cover.)



(f) Drain piping

1) Drain piping can be connected from the back, right and left sides.

2) When installing drain piping, be sure to use the insulating material supplied for the drain hose and drain hose clamp.

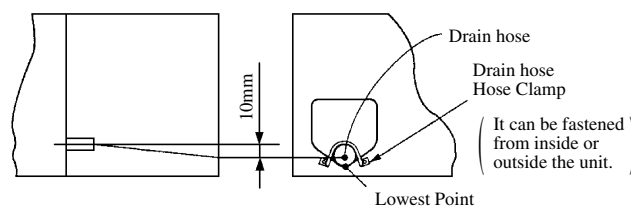
- Connect the drain hose fully all the way to the base of the fitting.
- Fasten the hose securely with the drain hose clamp.
- Keep strictly within the lengths specified below for the suspension bolts.

3) If drain piping is installed on the left side, change the rubber plug and insulating material (tubular) from the left side piping connection port to the right side.

⚠ Be careful that water doesn't pour out when the drain plug is removed.

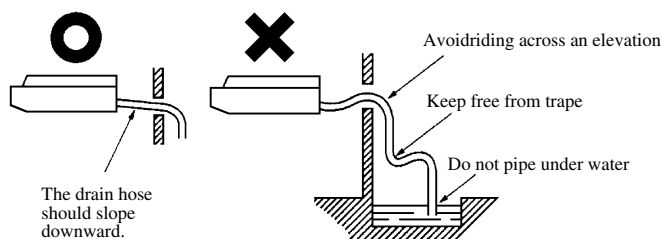
⚠ WARNING

Use the fitting supplied with the unit to connect the drain hose, fastening it at the lowest point so that there is no slack, and establishing a 10 mm drain slope. * Keep electrical wiring from running beneath the drain hose.



Be sure to fasten the drain hose down with a clamp.

There is danger of water overflowing the drain hose.

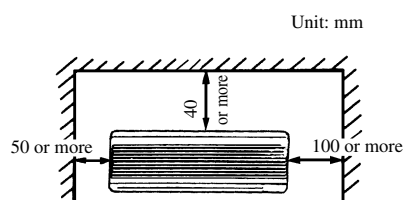


After piping has been installed, check to make sure water drains well and that there is no overflow.

(4) Wall mounted type (FDKN)

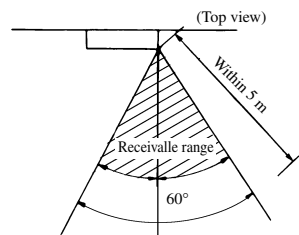
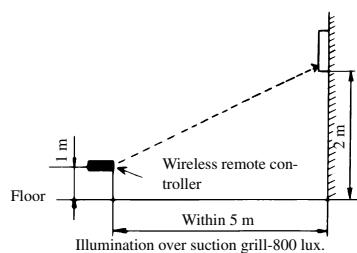
(a) Selection of installation location

- 1) Select the installation location that meets the following conditions and obtain the customer's consent.
 - a) Location where cold and warm air spread all over the room
 - b) Location where piping and wiring to the outdoors can easily be laid down.
 - c) Location where the drain can be discharged completely.
 - d) Location where the wall to mount the unit is rigid.
 - e) Location where there is no wind obstruction to the air return and air supply grills.
 - f) Location not exposed to direct sunshine.
 - g) Avoid the location exposed to oil splash or vapor.
 - h) Avoid the location near to the machine emitting high-frequency radio wave.
 - i) Avoid the location where the receiver of remote control is subject to strong illumination.
- 2) Select the location where the unit can securely be operated by the wireless remote controller referring to the Article "Effective distance of wireless remote controller" indicated at the backside.
- 3) Secure the space for inspection and maintenance work.

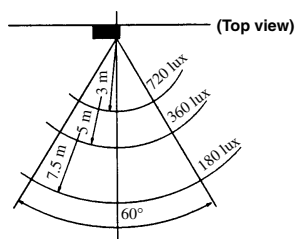


(b) Cautions for use of wireless remote controller

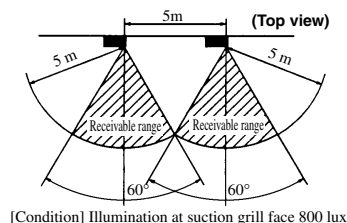
- 1) Operating distance of wireless remote controller



Relation between illumination at receiver unit and operating distance



Caution item for close installation of multiple units



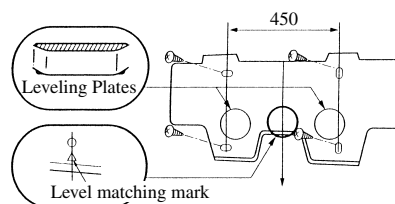
2) Cautions for operation

- Orient the remote control switch properly toward the receiver of the unit.
- Operating distance is as shown above but it may vary largely depending on the conditions.
- Effective distance may be shortened and the receiving may be disturbed when the receiver is under the condition of direct exposure to sunlight or other strong light like electric bulb, dust is accumulated on it and it is shielded with a curtain, etc.

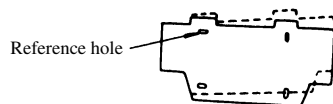
(c) Attaching of mounting plate

- The indoor unit weighs approx, 12kg. Therefore, check whether the portion to install the unit can bear the weight of unit. If it seems to be danger, reinforce the portion by a plate or a beam before installing the unit. It is not allowed to install the unit directly on the wall. Whenever you install the unit, use the attached mounting plate.
- Find structural members (Intermediate pillar, etc.) suitable for mounting the unit, then install the unit firmly while checking levelness.

Unit: mm



- Adjust the level of mounting plate under the condition that four screws are tightened temporarily.



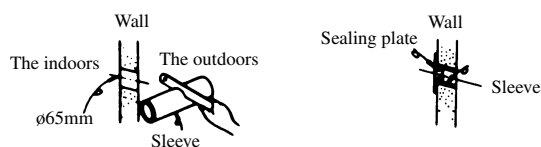
- Turn the mounting plate around the reference hole to adjust the levelness.

⚠ WARNING

Install the unit where it can bear the weight with sufficient strength margin. In the case of insufficient strength or insufficient installation work, the unit may fall and cause injury.

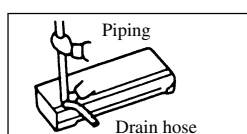
(d) Procedure for making hole on the wall

- Make a downgrade (5°) from the indoors toward the outdoors.



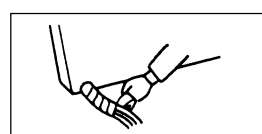
(e) Forming of piping and drain hose

- Rear take out case
 - Forming of piping



- Hold the root portion of piping, change the direction then expand and make forming.

- Tape winding

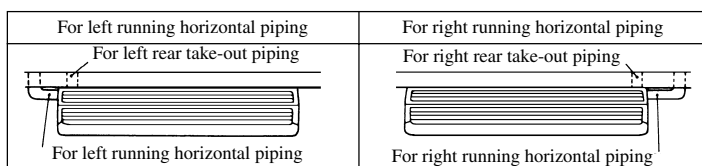


- Wind the tape on the portion which passes through the hole on the wall.
- Always make taping on the wiring which crosses with the piping, if any.

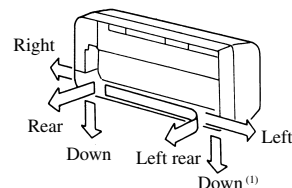
Note (1) After forming of piping and before tape winding, confirm that the connecting wire is securely fixed to the terminal block.

2) Cautions for left take-out and rear take-out case

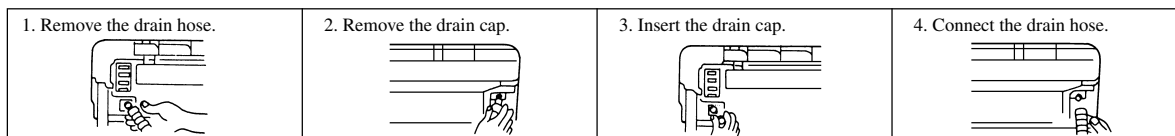
a) Looking down



b) The piping can be taken out from the rear, left, left rear, right and down.



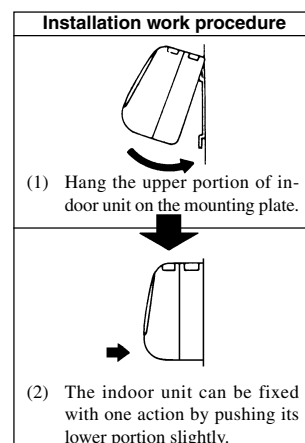
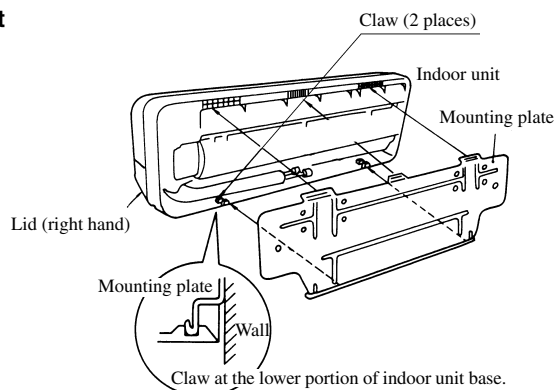
b) Procedure for changing drain hose



- Pull the drain hose off while turning the end around.
- Remove by hand or pliers.
- Insert the drain cap which was removed in procedure 2 securely using a hexagonal wrench, etc.
Note(1) When it is not inserted securely, water leakage may occur.
- Push the end of the drain hose onto the fitting while turning it around.
Note(1) When it is not inserted securely, water leakage may occur.

(f) Installation of unit

- To remove the unit from the mounting plate, remove the right and left lids then remove the claw at the lower portion of base.



(g) Drain piping

- 1) Lay the drain piping with downgrade to facilitate flow of drain, and do not make a trap or chevron-shaped bend. (The drain piping can be taken out from the unit to the left, right, rear and down direction.)
- 2) Wrap the thermal insulator on the hard vinyl chloride pipe (VP-16) laid in the room.
- 3) Run the drain piping in a place where there is no fear of abnormal odors being generated at the end of the drain hose.
- 4) Do not run the drain piping directly into a sewer where sulfur-based poisonous or flammable gases are generated. There is danger of poisonous or flammable gases penetrating into the building through the drain piping.
- 5) Pour water into the drain pan below the heat exchanger to check that water is drained outdoors.

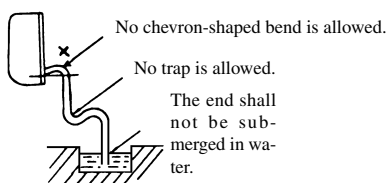
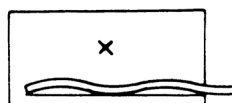


Illustration showing the end of drain hose



2.5.2 Installation of wired remote controller

(1) Selection of installation location

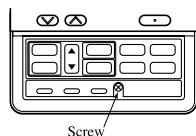
Avoid the following locations

- 1) Direct sunlight.
- 2) Close to heating device.
- 3) Highly humid or water splashing area.
- 4) Uneven surface.

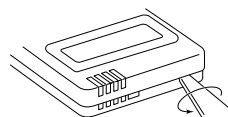
(2) Installation procedure

(a) Exposed fitting

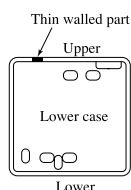
- 1) Open the remote controller cover and unscrew the screw located beneath the switch.



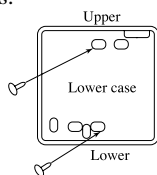
- 2) Open the remote controller case.



- Put a screw driver (flat-head) into the concavity made on the upper part of a remote controller and twist it lightly to open the casing.
- 3) The cord of a remote controller can only be pulled out in the upward direction.

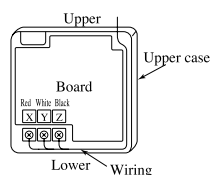


- Cut off with nippers or a knife a thin walled part made on the upper end of the remote controller bottom casing, and then remove burrs with a file or the like.
- 4) Fix the remote controller bottom casing onto a wall with two wood screws supplied as accessories.



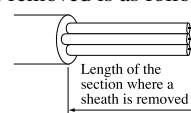
- 5) Connect the remote controller to the terminal block. Connect the terminals of the remote controller to the indoor unit with the same numbers. Because the terminal block has polarity, the device becomes inoperative if there are wrong connections.

Terminals: ⓧ Red wire, Ⓨ White wire, Ⓩ Black wire



- Use a cord of 0.3mm² (recommended) - 0.5mm² (maximum) for a remote controller cord. Remove a sheath of the remote controller cord for the section laid within the remote controller casing.

The length of each wire that should be left after a sheath is removed is as follows:

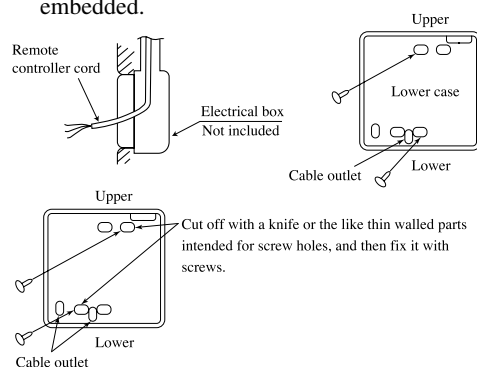


Black: 195mm, White: 205mm, Red: 125mm

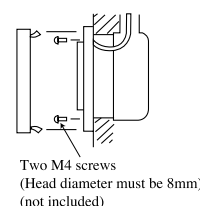
- 6) Replace the top casing as before.
- 7) Use a cord clamp to attach the remote controller cord to the wall.
- 8) Set the functions according to the types of indoor unit. See Section "Function Setting".

(b) Recessed fitting

- 1) The Electrical box and remote controller (shield wire must be use in case of extension) are first embedded.



- 2) Remove the upper case to the remote controller.
- 3) Attach the lower case to the Electrical box with two M4 screws. (Head diameter must be 8 mm). Choose either of the following two positions in fixing it with screws.
- 4) Connect the remote controller cord to the remote controller.
- Refer to [Exposed fitting].
- 5) Installation work is completed by replacing the top casing onto the bottom casing as before.
- 6) Set the function switch according to the type of the indoor unit. (Refer to 184 page)



Precation in extending the remote controller cord

- ▶ Maximum total extension 600m.

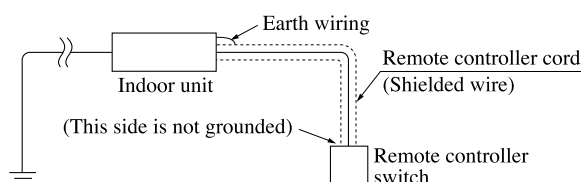
The cord should be a shielded wire.

- For all types : 0.3mm² × 3 cores

Note (1) Use cables up to 0.5mm² (maximum) for those laid inside the remote controller unit casing and connect to a different size cable at a vicinity point outside the remote controller unit, if necessary.

Within 100-200m.....	0.55 mm ² × 3 cores
Within 300m.....	0.75 mm ² × 3 cores
Within 400m.....	1.25 mm ² × 3 cores
Within 600m.....	2.05 mm ² × 3 cores

- The shielded wire should be grounded at one side only.



2.5.3 Installation of outdoor unit

Special instructions for R410A air conditioning systems

- Use only R410A refrigerant. R410A refrigerant is operated at about 1.6 times as high pressure as the conventional refrigerant is.
- Air conditioning systems using R410A are equipped with different-diameter outdoor unit service valve charge ports and check joints provided in the units so as to prevent wrong refrigerant from being charged by mistake. To achieve higher strength resistible to refrigerant pressure, the dimensions of flaring and the across-the-flats measurement of a flare nut have been changed for refrigerant piping. Therefore, please arrange dedicated R410A tools as listed in the table shown on the below before you set to installation or service work.
- Do not use a charge cylinder. The use of a charge cylinder will cause the refrigerant composition to change, resulting in performance degradation falling short of the rated capacity.
- In charging refrigerant, always take out refrigerant from a cylinder in the liquid phase.

	Dedicated R410 tools
Ⓐ	Gauge manifold
Ⓑ	Charge hose
Ⓒ	Electronic scale for refrigerant charging
Ⓓ	Torque wrench
Ⓔ	Flare tool
Ⓕ	Protrusion control copper pipe gauge
Ⓖ	Vacuum pump adapter
Ⓗ	Gas leak sensor

(1) Installation

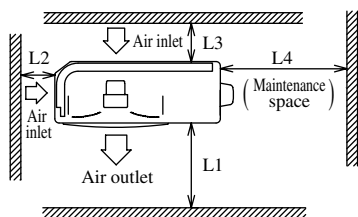
(a) In selecting an installation location, please pay attention to the following conditions and obtain the customer's consent.

- 1) The place where the foundation can bear the weight of Outdoor unit.
- 2) The place where there is no concern about leakage of combustible gas.
- 3) The place where it is not stuffy.
- 4) The place where free from thermal radiation of other thermal source.
- 5) The place where flow of drain is allowed.
- 6) The place where noise and hot air blast do not trouble neighboring houses.
- 7) The place where there is no obstruction of wind at the air inlet port and air outlet port.
- 8) A place where it is not subject to strict rules regulating electrical noises.
- 9) A place at least 5m away from a TV or radio set. (If electrical noises interfere with such an instrument, move it further away from it)
- 10) When the unit is installed at the particular location as shown below, corrosion or failure may be caused. Please consult the dealer from which you purchased the air-conditioner.
 - a) The place where corrosive gas is generated (hot spring, etc.).
 - b) The place where wind containing salt blows (seaside area).
 - c) The place where enveloped by oil mist.
 - d) The place where there is a machine that radiates electromagnetic wave.
 - e) A place where inverter-equipped equipment, a captive generator, high-frequency medical equipment, wireless communication equipment or other equipment generating electromagnetic waves is installed.

(c) The minimum space for installation

Select the space considering the direction of refrigerant piping.

- Restrict the height of obstruction wall in front of the air outlet port to the height of unit or less.
- Do not enclose around the unit by the obstruction. Secure the top space for 1 m or more.
- When more than one unit are installed side by side, provide a 250mm or wider interval between them as a service space. In order to facilitate servicing of controllers, please provide a sufficient space between units so that their top plates can be removed easily.
- When installing the unit where there is a concern about the short circuit, attach the guide louver in front of air outlet port to prevent the short circuit.
- When installing plural units in a group, secure sufficient intake space to prevent the short circuit.
- When installing the unit where it is covered by snow, provide appropriate snow break means.



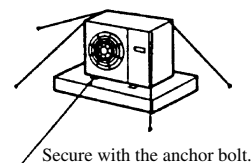
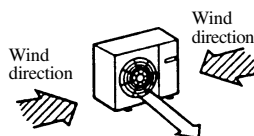
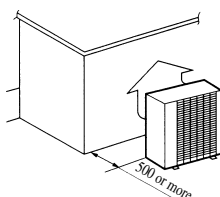
Unit:mm			
Installation type	1	2	3
Mark			
L1	Open	Open	500
L2	300	250	Open
L3	100	150	100
L4	250	250	250

(c) Location where strong wind blows against the unit

- Where the unit is likely to be subjected to strong winds, guard it from winds with the following measures.

A failure to give protection against winds may cause performance degradation, a rise of high pressure resulting in an operation interruption, a broken fan, etc.

- 1) Install the unit directing the air out-let port to the wall.
- 2) Install the unit directing the air out-let port at a right angle to the wind direction.
- 3) Where the foundation is not stable, secure the unit with wire, etc.

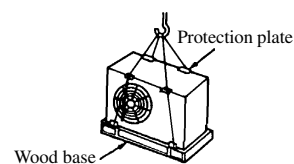


(d) Carry-in and installation of unit

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

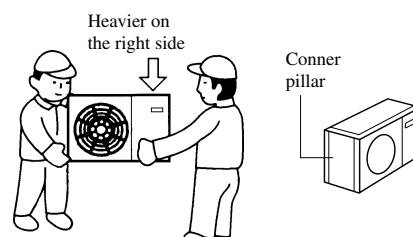
1) Carry-in

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

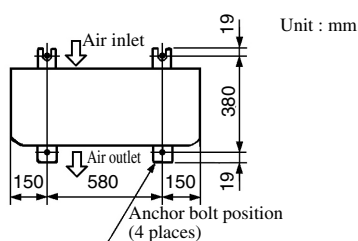


2) Moving

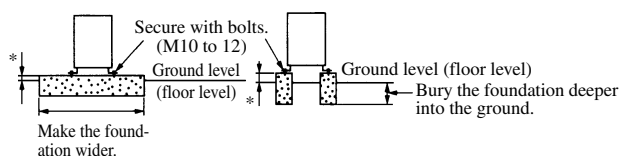
- The unit is heavier on the right side looking from the front of unit (air outlet port side). Therefore, sufficient caution is required for the person who carries the right side of unit. The person who carries the left side must hold the handle of front panel and the corner pillar with both hands.



3) Bolt securing position



- To install the unit, secure the legs of unit by below mentioned bolts without fail.



- b) Limit the protrusion height of front side anchor bolts to 15 mm at the maximum.
- c) Install the unit firmly so that it does not fall by earthquake and strong wind.
- d) Make the concrete foundation by referring the above illustration.
- e) Install the unit in level. (The height difference between right and left is within 5 mm.)
- f) In an area where temperature drops below zero for several days in a row, install the unit on the concrete base of which top is elevated by 30mm or more from the ground level (measurement marked with * in the drawing).
(Because of freezing, drain water could otherwise be blocked from running freely).

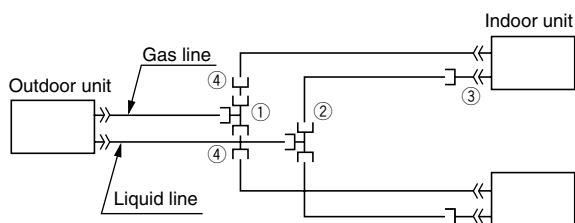
(2) Refrigerant piping work

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

(a) Decision of piping specification

Height difference

- When the position of outdoor unit is higher than that of the indoor unit, keep the difference $H=30$ m or less.
- When the position of outdoor unit is lower than that of the indoor unit, keep the difference $H=15$ m or less.



(Example)

Item Model	Indoor unit combinations	Liquid pipe		Gas pipe	
		Main pipe	Branch pipe	Main pipe	Branch pipe
FDCVA302	151 + 151	$\phi 9.52 \times t 0.8$	$\phi 9.52 \times t 0.8$	$\phi 15.88 \times t 1.0$	$\phi 12.7 \times t 0.8$

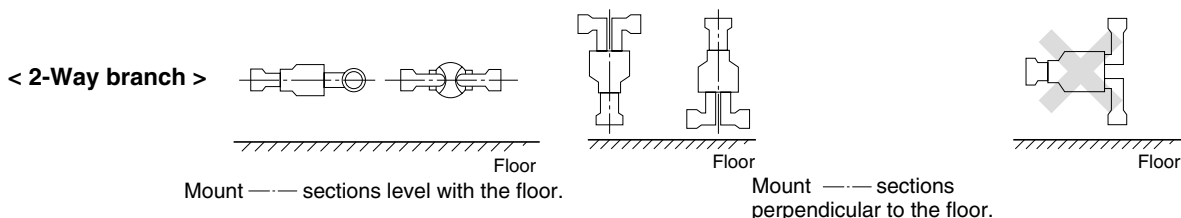
Note (1) If you are using this model in combination with the 151 Series indoor units, use the irregular fittings ③ supplied with the branch piping set and make the branch piping (branch ~ indoor unit) liquid piping size $\phi 9.52$.

Chart of shapes of branch piping parts (DIS-WA1)

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

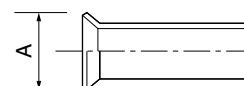
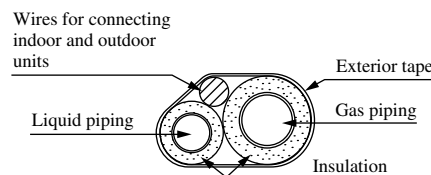
Note (1) ① to ④ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.

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



(b) Points for attention in installing refrigerant piping

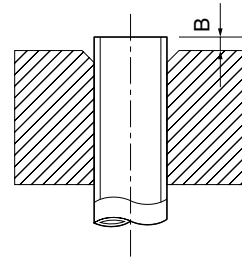
- 1) Use pipes made of the following material
Material: Phosphorus deoxidized copper seamless pipes (C1220T, JIS H3300)
- 2) Please dress the refrigerant piping (both gas and liquid pipes) with a heat insulating material for prevention of dew condensation. Improper heat insulating material incapable of preventing dew condensation can cause the leaking or dripping of water and a resultant soaking of household effects.
- 3) Use only a good heat insulating material (120°C or higher) for heat insulation. A poor heat insulating material offers only poor heat insulation and can cause cable deterioration.
 - a) The gas pipes can cause dew condensation during a cooling operation, which may become drain water causing a water-leak accident, or a risk of burns during a heating operation, if touched accidentally, with its surface reaching a high temperature because of discharged gas flowing inside. So, do not fail to dress it with a heat insulating material to prevent such mishap.
 - b) Dress the flare joints of the indoor units with a heat insulating material (pipe covers) (for both gas and liquid pipes).
 - c) Dress both gas and liquid pipes with a heat insulating material. In doing so, leave no gaps between the pipe and the heat insulating material and wrap them, together with the connecting cable, with a dressing tape.



Flared pipe end: A (mm)

Copper pipe outer diameter	A
$\phi 6.35$	9.1
$\phi 9.52$	13.2
$\phi 12.7$	16.6
$\phi 15.88$	19.7

- 4) When you need to bend a pipe, bend it to the largest possible radius (R100-R150) permitted. Do not bend a pipe repeatedly in an effort to shape it appropriately.
- 5) In laying pipes, take care to avoid debris, chips or water from entering the piping system.
- 6) A unit and a refrigerant pipe are to be flare connected. Flare a pipe after you have attached a flare nut to the pipe. The dimensions of flaring for R410A are different from those for the conventional R407C refrigerant. Although we recommend the use of flare tools developed specifically for R410A, conventional flare tools can also be used, if the measurement of protrusion B is adjusted with a protrusion control copper pipe gauge.
- 7) Tighten a flare joint securely with double spanners. Observe the following tightening torque values for flare nuts:
- 8) A branching pipe set (option part supplied separately) and refrigerant piping should be connected by blazing.
- 9) In blazing pipes, keep nitrogen gas flowing inside the pipes so that an oxide film may not form on the inner surfaces of the pipes.
- 10) Tighten a flare joint securely with a double spanner.
 - a) Do not apply force beyond proper fastening torque in tightening the flare nut.
 - b) Fix both liquid and gas service valves at the valve main bodies as illustrated on the lower, and then fasten them, applying appropriate fastening torque.



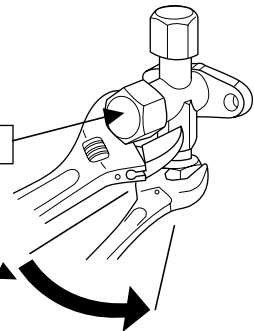
Copper pipe protrusion for flaring: B (mm)

Copper pipe outer diameter	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
ø6.35	0~0.5	1.0~1.5
ø9.52		
ø12.7		
ø15.88		

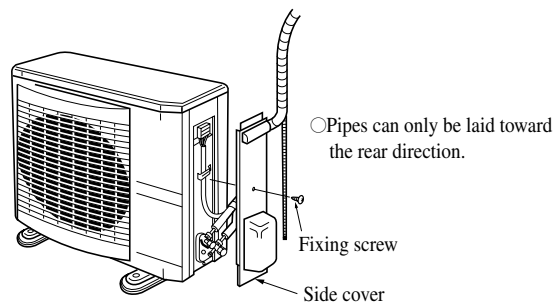
Operation valve size (mm)	Tightening torque (N·m)	Tightening angle (°)	Recommended length of a tool handle (mm)
ø6.35 (1/4")	14~18	45~60	150
ø9.52 (3/8")	34~42	30~45	200
ø12.7 (1/2")	49~61	30~45	250
ø15.88 (5/8")	68~82	15~20	300

Do not hold the valve cap area with a spanner.

Please use a torque wrench. If a torque wrench is not available, fasten the flare nut manually first and then tighten it further, using the left table as a guide.



(c) How to remove the side cover Unscrew a screw from the side cover



(d) Refrigerant pipe connection

- Install a pipe carefully so that it may not touch the unit's internal components.
- A pipe touching with an internal component can generate abnormal noises or vibrations.

(3) Air tightness test and air purge

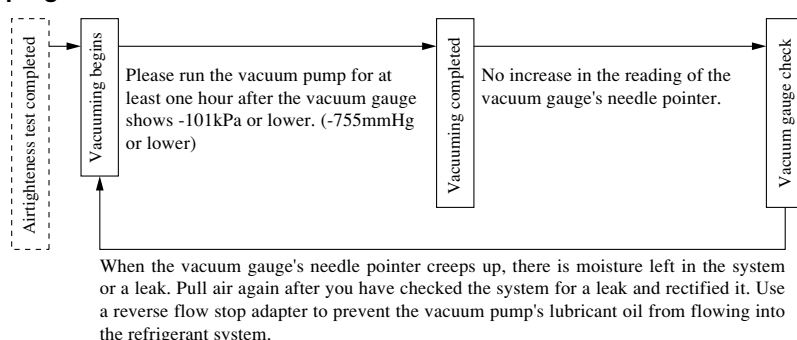
- Always use a vacuum pump to purge air trapped within an indoor and the refrigerant piping.

(a) Air tightness test

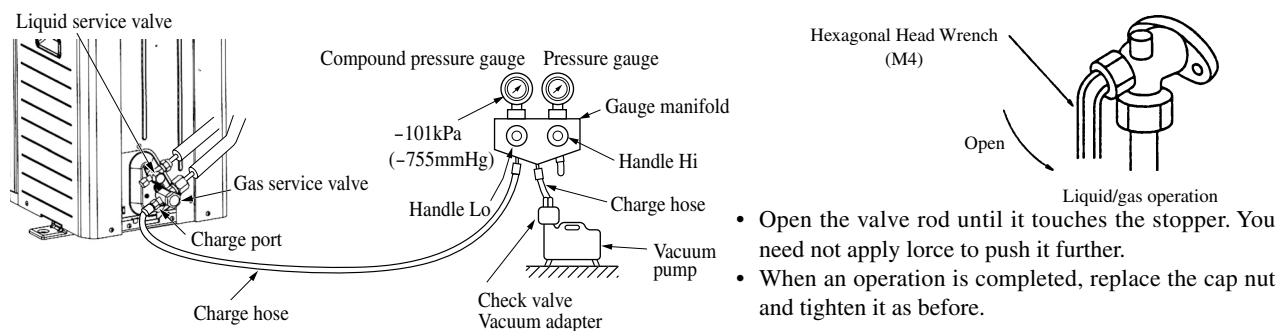
- When all the flare nuts on both indoor and outdoor unit sides are fastened. Conduct an air-tightness test from the service valves charge port with the outdoor unit service valves (on both liquid and gas sides) closed tightly to check whether the system has no leaks.
- Use nitrogen gas in the air-tightness test. Do not use gas other than nitrogen gas under any circumstances. Conduct the air-tightness test by applying 4.15MPa (42kg/cm²G) of pressure.
- Do not apply the specified pressure at once, but increase pressure gradually.
 - Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes to see if the pressure drops.
 - Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes to see if the pressure drops.
 - Then raise the pressure to the specified level (4.15 MPa), and record the ambient temperature and the pressure.
 - If the pressure does not drop after the units is left for approximately one day, the airtightness is acceptable.

When the ambient temperature changes 1°C, the pressure also changes approximately 0.01 MPa. The pressure, if changed, should be compensated for.

(b) Air purge



When a vacuum air purge is completed, remove the valve rod cap nuts and open the service valves (both liquid and gas sides) as illustrated below. After you have made sure that the valves are in the full-open position, tighten the cap nuts (for the valve rods and charge ports).



(4) Refrigerant quantity

- This unit is shipped from the factory with the refrigerant sufficient for an installation involving 30m of piping, and does not necessitate additional refrigerant charge as long as the pipe length is 30m or less.
- When the pipe length exceeds 30m but remains within 50m, add refrigerant according to the table below (showing an additional quantity required for each meter of the pipe exceeding 30m) by metering for the quantity determined by the actual pipe length.

Mark	Model	302
Quantity charged for shipment (for 30m of piping)(kg)		2.95
Additional charge quantity per meter	(kg/m)	0.06

(Example) When 302 model unit is used in a new installation involving 45m piping
 Additional charge quantity: $0.9\text{kg} = (45-30)\text{m} \times 0.06\text{kg/m}$

(C) Charging refrigerant

- 1) Since R410A refrigerant must be charged in the liquid phase, you should charge it, keeping the container cylinder upside down or using a refrigerant cylinder equipped with a siphon tube.
- 2) Charge refrigerant always from the liquid side service port with the service valve shut. When you find it difficult to charge a required amount, fully open the outdoor unit valves on both liquid and gas sides and charge refrigerant from the gas (suction) side service port, while running the unit in the cooling mode. In doing so, care must be taken so that refrigerant may be discharged from the cylinder in the liquid phase all the time. When the cylinder valve is throttled down or a dedicated conversion tool to change liquid-phase refrigerant into mist is used to protect the compressor, however, adjust charge conditions so that refrigerant will gasify upon entering the unit.
- 3) In charging refrigerant, always charge a calculated volume by using a scale to measure the charge volume.
- 4) When refrigerant is charged with the unit being run, complete a charge operation within 30 minutes. Running the unit with an insufficient quantity of refrigerant for a long time can cause a compressor failure.

NOTE

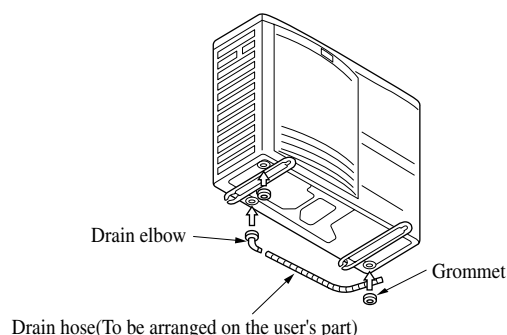
Put down the refrigerant volume calculated from the pipe length onto the caution label attached on the back side of the side cover.

(5) Drain piping work

- Execute drain piping by using a drain elbow and drain grommets supplied separately as optional parts, where water drained from the outdoor unit is a problem.

In an area where temperature drops below zero for several days in a row, do not install a drain elbow or grommets. (Because of freezing, drain water could be blocked from running freely.)

- There are 3 drain holes provided on the bottom plate of an outdoor unit to discharge condensed water.
- When condensed water needs to be led to a drain, etc., install the unit on a flat base (supplied separately as an optional part) or concrete blocks.
- Connect a drain elbow as shown in the illustration and close the other two drain holes with grommets.

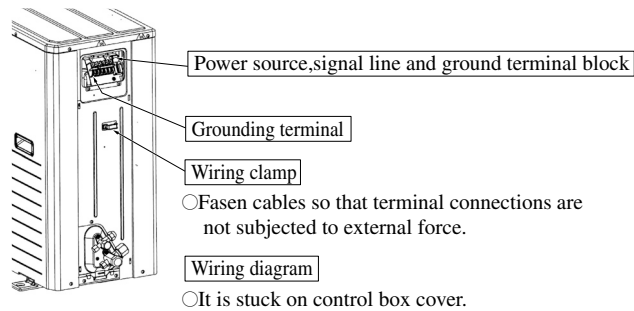


(6) Electrical wiring

Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country. Electrical installation work must be executed according to the technical standards and other regulations applicable to electrical installations in the country.

- ① Do not use any supply cord lighter than one specified in parentheses for each type below.
 - braided cord (code designation 60245 IEC 51),
 - ordinary tough rubber sheathed cord (code designation 60245 IEC 53)
 - flat twin tinsel cord (code designation 60227 IEC 41);Do not use anything lighter than polychloroprene sheathed flexible cord (code designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.
- ② Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire. If improperly grounded, an electric shock or malfunction may result.
- ③ A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.
- ④ The installation of an impulse withstanding type earth leakage breaker is necessary. A failure to install an earth leakage breaker can result in an accident such as an electric shock or a fire.
- ⑤ Do not turn on the power until the electrical work is completed.
- ⑥ Do not use a condensive capacitor for power factor improvement under any circumstances. (It does not improve power factor, while it can cause an abnormal overheat accident)
- ⑦ For power supply cables, use conduits.
- ⑧ Do not lay electronic control cables (remote control and signaling wires) and other cables together outside the unit. Laying them together can result in the malfunctioning or a failure of the unit due to electric noises.
- ⑨ Fasten cables so that may not touch the piping etc.
- ⑩ When cables are connected, please make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection and then attach the cover securely. (Improper cover attachment can result in malfunctioning or a failure of the unit, if water penetrates into the box.)

- Connect a pair bearing a common terminal number with an indoor-outdoor connecting wire.
- In cabling, fasten cables securely with cable clamps so that no external force may work on terminal connections.
- Grounding terminals are provided in the control box.

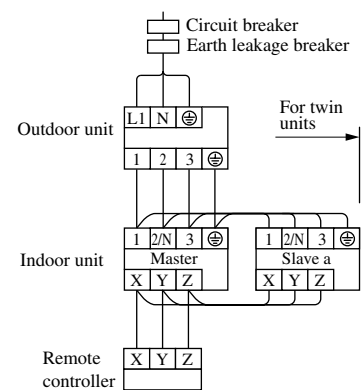


Power cable, indoor-outdoor connecting wires

- Always perform grounding system installation work with the power cord unplugged.

CAUTION

Always use an earth leakage circuit breaker designed for inverter circuits to prevent a faulty operation.



Model	Power source	Power cable thickness (mm ²)	Max. over current (A)	Cable length (m)	Grounding wire thickness	Indoor-outdoor wire thickness × number
302	1phase 220-240V 50Hz	3.5	16	20	ø1.6 mm	ø1.6 mm × 3

- Notes (1) The specifications shown in the above table are for units without heaters. For units with heaters, Please refer to the installation instructions or the construction instructions of the indoor unit.
- (2) Switchgear or circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- (3) The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

(d) Plural Master / Slave setting

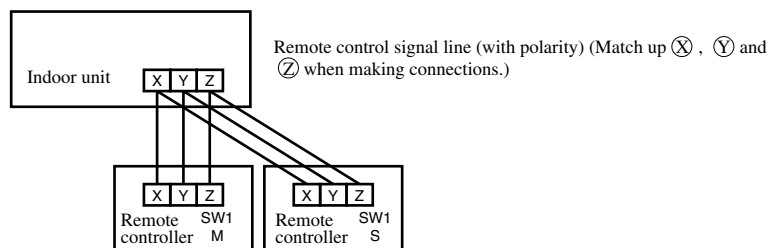
Set the plural address switches SW5-1 and SW5-2 on the indoor control PCB as shown in the table below.

Master setting at time of factory shipment		Indoor unit	
		Master	Slave a
Plural address switch	SW5-1	OFF	OFF
	SW5-2	OFF	ON

(e) Remote controller wiring and connection procedure

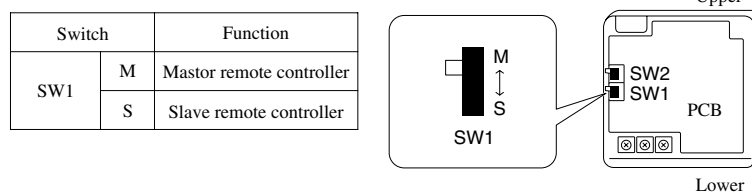
1) Master-slave settings when using multiple remote controllers

- Up to 2 remote controllers can be connected for each indoor unit (or group).
- There are two methods, one where the remote controller signal line (3-wire) for the slave remote controller is taken from the indoor unit and the other where the signal lines are taken from the master remote controller.



- b) Set the SW1 select switch on the slave remote controller on the slave setting. (It is set on the master setting at the factory.)

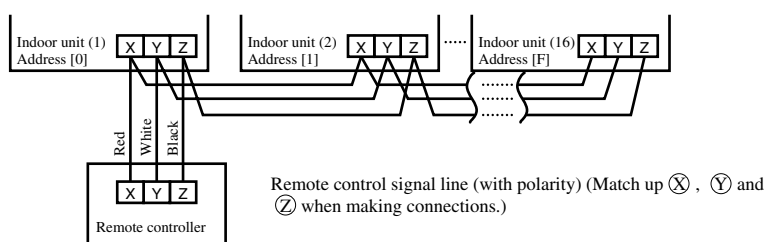
Note (1) Remote controller sensor activation settings are possible only with the master remote controller. Install the master remote controller in a location where it can sense the room temperature.



2) Controlling multiple indoor units using a single remote controller.

- Up to 16 indoor units can be controlled with a single remote controller.

- Run 3-wire remote control lines between each of the indoor units. See "Precaution in extending the remote controller cord" on page 175 concerning extended remote control lines.
- Set the remote controller communications address on "0" ~ "F" using rotary switch SW2 on the indoor unit's control board, taking care not to overlap the addresses of any of the units.



- After turning the power on, press the AIR CON No. button to display the indoor unit's address. Be sure to confirm that the settings are displayed correctly in the remote controller by using the ▲ and ▼ buttons to display the address of each connected indoor unit.

(7) Setting functions using the wired remote controller

- (a) The default settings of this unit's functions are as follows: If you want to change a setting, follow the procedure found in the installation manual and set to your desired setting.

For the method of setting, please refer to the installation manual of a remote controller unit.

① Remote controller unit functions (FUNCTION ▼)

Function number (A)	Function description (B)	Setting (C)	Default setting
01	GRILLE ↑↓ SET (Grille lift panel setting)	↑↓ INVALID	○
		50Hz AREA ONLY	
		60Hz AREA ONLY	
02	AUTO RUN SET	AUTO RUN ON	*
		AUTO RUN OFF	
03	☑/☒ TEMP S/W	☑/☒ VALID	○
		☑/☒ INVALID	
04	⏻ MODE S/W	⏻ VALID	○
		⏻ INVALID	
05	① ON/OFF S/W	① VALID	○
		① INVALID	
06	⚙ FANSPEED S/W	⚙ VALID	○
		⚙ INVALID	
07	🔧 LOUVER S/W	🔧 VALID	*
		🔧 INVALID	
08	⌚ TIMER S/W	⌚ VALID	○
		⌚ INVALID	
09	📡 SENSOR S/W (Remote control sensor setting)	📡 SENSOR OFF (Invalid)	○
		📡 SENSOR ON (Valid)	
10	POWER FAILURE COMPENSATION SET	INVALID	○
		VALID	
11	VENTI SET	NO VENTI	○
		VENTI LINK SET	
		NO VENTI LINK	
12	TEMP RANGE SET	DISP CHANGE	○
		NO DISP CHANGE	
13	I/U FAN SPEED (Indoor unit fan speed setting)	3 FAN SPEED	*
		2 FAN SPEED	
		1 FAN SPEED	
14	MODEL TYPE	HEAT PUMP	*
		COOLING ONLY	
15	EXTERNAL CONTROL SET	INDIVIDUAL OPERATION	○
		SAME OPERATION FOR ALL UNITS	
16	ERROR DISP SET	ERROR DISP	○
		NO ERROR DISP	
17	🔧 POSITION (Louver control setting)	FIX (1 OF 4) (4 position stop)	○
		IN MOTION (Free stop)	
18	°C/°F SET	°C	○
		°F	

Notes(1) Setting marked with [○] are the default setting.

- (2) Setting marked with [*] are those that are set automatically according to an indoor unit or an outdoor unit connected. Please check default settings with the indoor unit's installation manual.

- (3) When Item 17 : “🔧 POSITION” is changed, please also change Item 04 “🔧 POSITION” setting found in “Indoor unit functions”.

② Indoor unit functions (I/U FUNCTION ▲)

Function number (A)	Function description (B)	Setting (C)	Default setting
01	Hi CEILING SET	STANDARD (Mild mode)	*
		Hi CEILING 1 (Powerful mode)	
03	FILTER SIGN SET	NO DISPLAY	*
		AFTER 180H	
		AFTER 600H	
		AFTER 1000H	
04	🔧 POSITION (Louver control setting)	1000H→STOP	○
		FIX (1 OF 4) (4 position stop)	
05	EXTERNAL INPUT SET	IN MOTION (Free stop)	○
		LEVEL INPUT	
06	OPERATION PERMISSION PROHIBITED	PULSE INPUT	○
		NORMAL OPERATION	
07	☀ ROOM TEMP OFFSET (Heating room temperature offset)	VALID	○
		TEMP SHIFT +3°C	
08	☀ FAN CONTROL (Heating fan control)	NORMAL OPERATION	○
		TEMP SHIFT +3°C	
09	FREEZE PREVENT TEMP	LOW FAN	*
		STOP→LOW FAN (Intermittent operation)	
10	FREEZE PREVENT CONTROL	TEMP Hi	○
		TEMP Lo	
10	FREEZE PREVENT CONTROL	FAN CONTROL ON	○
		FAN CONTROL OFF	

Notes(1) Setting marked with [○] are the default setting.

- (2) Setting marked with [*] are those that are set automatically according to an indoor unit or an outdoor unit connected. Please check default settings with the indoor unit's installation manual.

(b) Function setting method

- 1) Stop the air conditioner
- 2) Press the SET and MODE buttons simultaneously for 3 seconds or longer.

The screen display will be switched as follows:

“ SELECT ITEM” →

“ SET” →

“FUNCTION SET ▼”



- 3) Press the SET button.

The unit will enter the function setting mode. The screen display will change to “ FUNCTION ▼”.

- 4) Check which category your desired setting belongs to, “ FUNCTION ▼ (Remote controller unit function)” or “I/U FUNCTION ▲” (Indoor unit function).

- 5) Press either or button.

Select either “ FUNCTION ▼ ” or “I/U FUNCTION ▲”.



- 6) Press the SET button.

- 7) When “ FUNCTION ▼” is selected.

- ① “DATA LOADING” (blinking) → “ FUNCTION” →

“01 GRILLE ↑↓ SET” (Function number: ①, Function description: ②)

The screen display will be switched like this.

- ② Press either or button.

“Function number: ①, Function description: ②” from the list of remote controller unit functions will be displayed one by one. Select a desired function.

- ③ Press the SET button.

The screen display will be switched as follows:

“ SETTING” → “Setting: ③” (ex. “AUTO RUN ON”)

- ④ Press either or button.

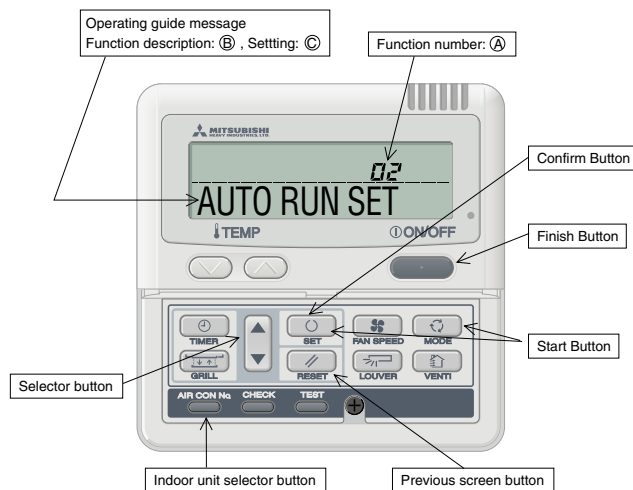
A list of “Settings: ③” will be displayed one by one. Select your desired setting.

- ⑤ Press the SET button.

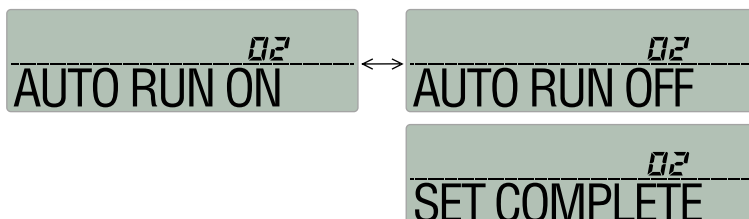
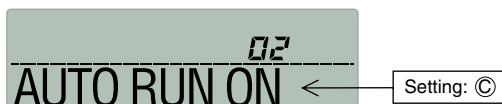
The selected setting is displayed for 2 seconds, then followed by “SET COMPLETE” and the function setting process is completed.

Then the screen display will be switched to “Function number: ①, Function description: ②,” so if you want to continue to set another function, repeat the steps as explained above.

To finish the function setting process, please proceed to Step 8).



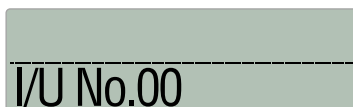
* When “02 AUTO RUN SET” is selected.



When "I/U FUNCTION ▲" is selected.

- ① The screen display will be switched as follows:

"◆ I/U SELECT" → "○ SET" → "I/U No.00" (blinking)



- ② Press either ▲ or ▼ button.

Select the indoor unit number that you want to change settings. If only one indoor unit is connected, the indoor unit number will not change, so please proceed to Step ③.

If "ALL I/U ▼" is selected while indoor group control is in effect, you can set all units to the same settings.

- ③ Press the SET button.

Indoor unit number indication will change from blinking to lit continuously, The screen display will be switched as follows:

"DATA LOADING" (blinking for about 2 to 23 seconds) → "◆ I/U FUNCTION" → "01 Hi CEILING SET"

(Function number: ①, Function description: ②)

* When "01 Hi CEILING SET" is selected.

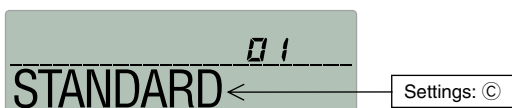


- ④ Press either ▲ or ▼ button.

"Function number: ①, Function description: ②" from the list of indoor unit functions will be displayed one by one. Select a desired function.

- ⑤ Press the SET button.

The screen display will be switched as follows: "◆ I/U SETTING" → "Setting: ③" (ex. "STANDARD")



- ⑥ Press either ▲ or ▼ button.

A list "Setting: ③" will be displayed one by one. Select your desired setting.

- ⑦ Press the SET button.

The selected setting is displayed for 2 seconds, then followed by "SET COMPLETE" and the function setting process is completed.

Then the screen display will be switched to "Function number: ①, Function description: ②" so if you want to continue to set another function, repeat the steps as explained above. To finish the function setting process, please proceed to Step 8).

- ⑧ Press AIR CON No. button.

The screen display will go back to the indoor unit selection screen (e. g. "I/U No.00").

If you want to continue to set another indoor unit, please follow the steps explained above.

- 8) Press the ON/OFF button.

This ends a function setting process. Even if a function setting process is not completed, this ends the process.

Please note that any setting that is not completed will become void.

























- **Pressing the RESET button during a function setting process will allow you to go back the previous step. Please note that any setting that is not completed will become void.**

- **Method of checking the current setting**

While following the above mentioned step, the setting that appears when the SET button is pressed for each "Function number: ①, Function description: ②" is the current setting "Setting: ③". (When "ALL I/U ▼" is selected, the setting of the indoor unit with the lowest number is displayed)

- **Settings are stored in the controller and not lost even a power outage occurs.**

(c) Changing the remote control set temperature range

- 1) It is possible to change the set temperature range using the remote control.
 - a) The upper and lower set temperature limits can be set from the remote control.
Upper limit value setting: Effective during heating. The temperature can be set within a range of 20~30°C.
Lower limit value setting: Effective when running in modes other than the heating mode (AUTO, COOL, FAN, DRY): The temperature can be set within a range of 18~26°C.
 - b) If the upper and lower limits are set using this function, the following controls are active.
- 2) When and ⑫TEMP RANGE SET under “ FUNCTION” the function setting mode is DISP CHANGE
 - a) If you are setting the upper limit,
 - ① If a temperature that is greater than the upper limit during heating is set from the remote control.
The unit runs for 30 minutes at the set temperature, then it automatically transmits the upper limit temperature. The display on the remote control also approaches that temperature.
 - ② During heating, if the upper limit value is set at a temperature below the upper limit value:
The set temperature is transmitted.
 - b) If the lower limit is set
 - ① If a temperature that is lower than the lower limit value is set from the remote control. When running in an operation mode other than the heating mode: the unit runs at the set temperature for 30 minutes, then it automatically transmits the lower limit temperature.
 - ② If a temperature that is higher than the lower limit value is set when running in a mode other than the heating mode:
It transmits the set temperature.
- 3) When and ⑫TEMP RANGE SET under the “ FUNCTION” the function setting mode is NO DISP CHANGE.
 - a) If the upper limit is set
 - ① During heating, if a temperature that is higher than the upper limit is set from the remote control:
The upper limit value is transmitted. However, the remote control display does not approach the upper limit value, but remains on the set temperature.
 - ② During heating, if the temperature is set at a value lower than the upper limit value:
The set temperature is transmitted.
 - b) If the lower limit is set
 - ① When in an operating mode other than the heating mode, if a temperature that is lower than the lower limit value is set from the remote control:
The lower limit value is transmitted. However, the remote control display does not approach the lower limit value, but remains on the set temperature.
 - ② When in an operating mode other than the heating mode, if a temperature that is higher than the lower limit value is set:
The set temperature is transmitted.
- 4) Setting the upper and lower limit values
 - a) Stop the air conditioner, then press the SET and MODE buttons simultaneously for 3 seconds or longer. If you press “  SET” → “  SET” → “FUNCTION SET ▼ ” the display changes.
 - b) Press the  button, then change the “TEMP RANGE ▲” display.
 - c) Press the SET button and enter the temperature range setting mode.
 - d) Using the   buttons, select the “Hi LIMIT SET ▼ ” or “Lo LIMIT SET ▲,” then fix it by pressing SET.
 - e) If you selected “Hi LIMIT SET,” (enabled during heating)
 - ① “   SET UP” → “Hi LIMIT 28°C  ” (blinking) is displayed.
 - ② Using the “  ” temperature setting buttons, select the upper limit value. Display Example: “Hi LIMIT 26°C  ” (blinking)
 - ③ Press the SET button to fix the setting. Display example: “Hi LIMIT 26°C” (lights up for 2 seconds)
After the fixed upper limit value lights up for 2 seconds, the display returns to the “Hi LIMIT SET ▼” display in item d).
 - f) If “Lo LIMIT SET ▲” was selected (enabled during COOL, DRY and FAN)
 - ① “   SET UP” → “Lo LIMIT 20°C  ” (blinking) is displayed.
 - ② Using the “  ” temperature setting buttons, select the lower limit. Display example: “Lo LIMIT 24°C   ” (blinking)
 - ③ Press the SET button to fix the setting. Display example: “Lo LIMIT 24°C” (lights up for 2 seconds)
After the fixed lower limit value lights up for 2 seconds, the display returns to the “Lo LIMIT SET ▲” display in item d).
 - g) Pressing the ON/OFF button stops the operation.
(Operation stops even if the ON/OFF button is pressed during setting, and the stopped state returns. However, if setting is not completed, it is not valid, so use caution.)
- ◆ If the RESET button is pressed during setting, the previous setting screen is displayed.

- If the RESET button is pressed during a setting operation, the display returns to the previously displayed setting screen. However, settings which have not been fixed become invalid, so exercise caution.
- * If “NO DISP CHANGE” is selected in No. 12, “TEMP RANGE SET” of the remote controller’s functions, of the function setting modes, the remote controller’s display does not change even if the temperature range has been changed.

(Example) If the upper limit is set at 28°C

Function No. A	Function Contents B	Setting Contents C	Control Contents
12	TEMP RANGE SET	DISP CHANGE	The remote controller’s display and sent data upper limit changes to 28°C.
		NO DISP CHANGE	The remote controller’s display upper limit remains at 30°C and only the upper limit of the sent data is changed to 28°C.

(8) Checking operation data

Operation data can be checked with remote controller unit operation.

- ① Press the CHECK button.

The display change from “ SELECT ITEM” → “ SET” → “OPERATION DATA ▼”.

- ② Press the SET button while “OPERATION DATA ▼” is displayed.

- ③ The display will change to “I/U No. 00 ▲” (blinking indication).

Select the indoor unit number you want to have data displayed with the button.

(When only one indoor unit connected, the indoor unit number displayed on the screen will not change.)

- ④ Determine the indoor unit number will the SET button.

(The indoor unit number changes from blinking indication to continuous indication.)

“DATA LOADING” (A blinking indication appears while data is loaded)

↓

“OPERATION DATA ” appears and data number 01 is displayed.

- ⑤ Upon operation of the button, the current operation data is displayed in order from Data number 01.

The items displayed are as follows:

* Depending on models, the items that do not have corresponding data are not displayed.

- ⑥ To display the data of a different indoor unit, press the AIR CON No. button, which allows you to go back to the indoor unit selection screen.
- ⑦ Pressing the ON/OFF button will stop displaying data.

Pressing the RESET button during remote controller unit operation will undo your last operation and allow you to go back to the previous screen.

Number	Data item
01	(Operation mode)
02	SET TEMP
03	RETURN AIR
04	I/U HEAT EXCH 1 (Indoor unit heat exchanger temperature 1)
05	I/U HEAT EXCH 2 (Indoor unit heat exchanger temperature 2)
07	I/U FAN (Indoor unit fan speed)
11	TOTAL I/U RAN (Indoor unit operation hours)
21	OUTDOOR (Outside air temperature)
22	O/U HEAT EXCH 1 (Outdoor unit heat exchanger temperature 1)
23	O/U HEAT EXCH 2 (Outdoor unit heat exchanger temperature 2)
24	COMP HERTZ
27	DISCHARGE (Discharge pipe temperature)
28	DOME BOTTOM
29	CT
31	O/U FAN (Outdoor unit fan speed)
32	SILENT MODE ON/OFF
34	63H1 ON/OFF
35	DEFROST ON/OFF
36	TOTAL COMP RUN (Compressor operation hours)
37	EEV 1 (Expansion valve opening 1)

(9) Test run

(a) Test run from an outdoor unit.

1) Test run method

- A test run can be initiated from an outdoor unit by using SW5-3 and SW5-4 for on-site setting.
- Switching SW5-3 to ON will start the compressor.
- The unit will start a cooling operation, when SW5-4 is OFF, or a heating operation, when SW5-4 is ON.
- Do not fail to switch SW5-3 to OFF when a test run is completed.

SW5-3	SW5-4	
ON	OFF	Cooling during a test run
	ON	Heating during a test run
OFF	—	Normal or After the test operation

(b) Test run from remote controller.

1) Cooling test operation procedure

Carry out the following test operation procedure using the remote controller.

a) Starting the cooling test operation

- Press the ON/OFF button to start operation.
- Press the MODE button and select “ (COOL)”.
- Press the TEST button continuously for 3 seconds or longer.
The display changes from “ SELECT ITEM” → “ SET” → “ TEST RUN ▼”.
- When “ TEST RUN ▼” is displayed, press the SET button to begin the cooling test operation.
The display shows “ TEST RUN.”

b) Canceling the cooling test operation

Pressing the ON/OFF button or the TEMP button ends the cooling test operation.
The “ TEST RUN” display is cleared.

2.6 MAINTENANCE DATA

Please see page 82 of chapter 1.6

3. WIRELESS KIT (OPTIONAL PARTS)

3.1 FDT series

The FDT series is an exclusive series with all wired models. However, these models can also be used as wireless units by using the optional wireless kit.

Model

Model
FDT series all model

(1) Wireless kit model

Model	Paint color
RCN-T-35W-ER	Plaster white

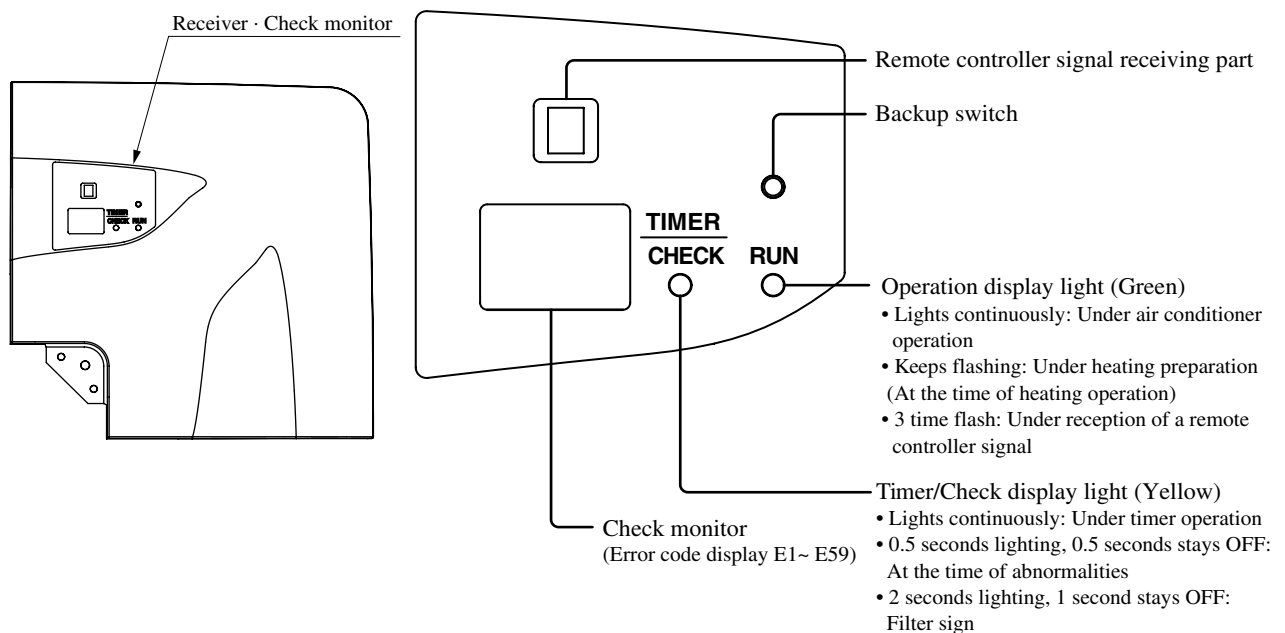
(2) Accessories

Name	Quantity	Name	Quantity
Receiver	1	AAA dry cell battery	2
Wireless remote controller	1	Wood screw for holder	2
Remote controller holder	1	Parts set	1

(3) Receiving outside view and function

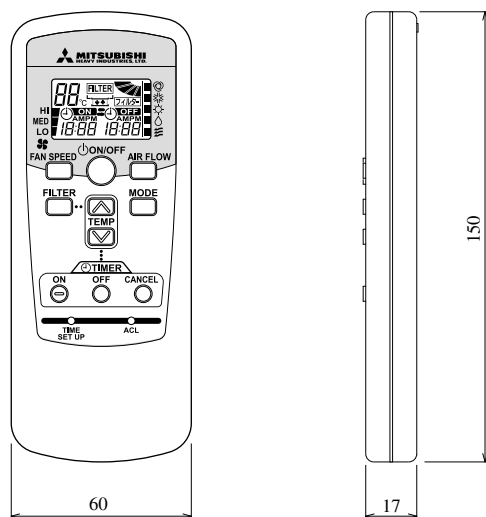
• Corner panel

• Receiver part details



(4) Wireless remote controller

unit: mm

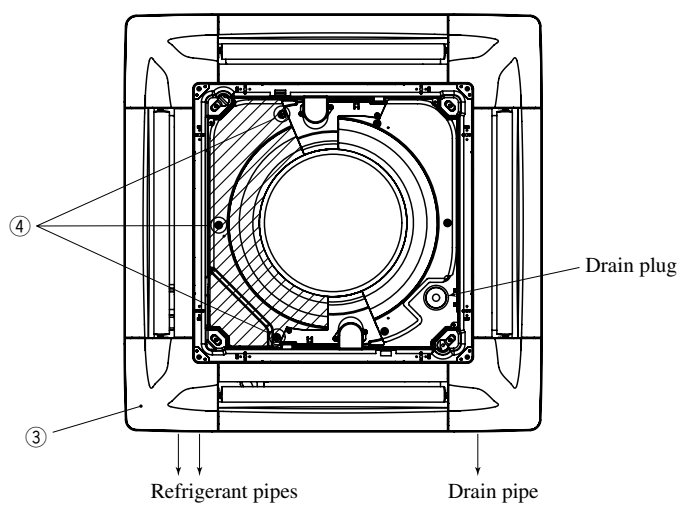


(5) Attachment of wireless kit

(a) Installation of the receiver

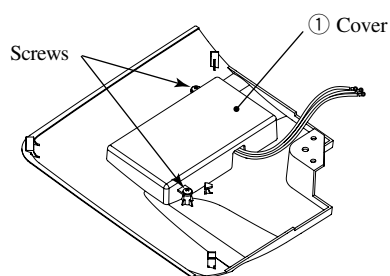
1) Preparation before installation

- ① Attach the cover panel supplied as an accessory onto the indoor unit according to the panel installation. (Refer to 165 page)
- ② Remove the air return grille. (Refer to 166 page)
- ③ Remove a corner panel located on the refrigerant pipe side.
- ④ Remove three screws and detach the cover (indicated as a shadowed area) from the indoor unit control box.



2) Local setup

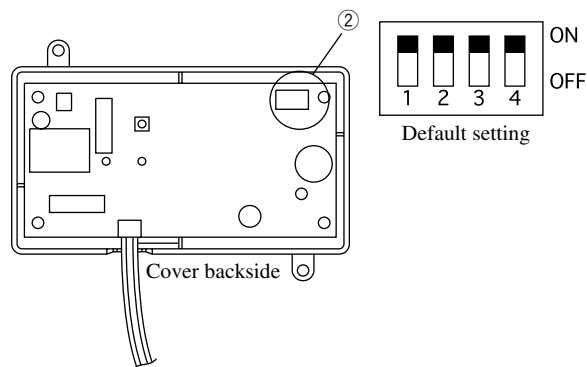
- ① Remove the cover by unscrewing two screws from the back of the receiver



Wireless kit backside

- ② Turn switches provided on the back of the PCB.
Switches (SW1-4) provided on the receiver PCB are for setting the following.
All switches are set to the ON position for shipment.

SW1	Prevention of unintended movement caused by interference.	ON:Normal OFF:Remote
SW2	Receiver master/slave setting	ON:Master OFF:Slave
SW3	Buzzer valid/invalid	ON:Valid OFF:Invalid
SW4	Cooling only/heat pump switching	ON:Heat pump OFF:Cooling only



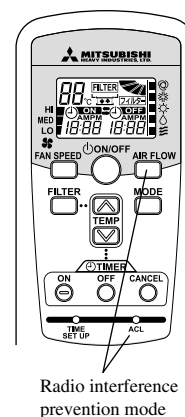
- ③ When SW1 is turned to the OFF position, change the corresponding remote controller setting as follows.

Wireless remote controller setting change

Either pressing the “ACL” switch or inserting batteries with the “AIR FLOW” button depressed will change the mode setting to the radio interference prevention mode.

(*When batteries are removed, the setting will be reset to the default setting.)
(When batteries are removed, please follow the above procedure again.)

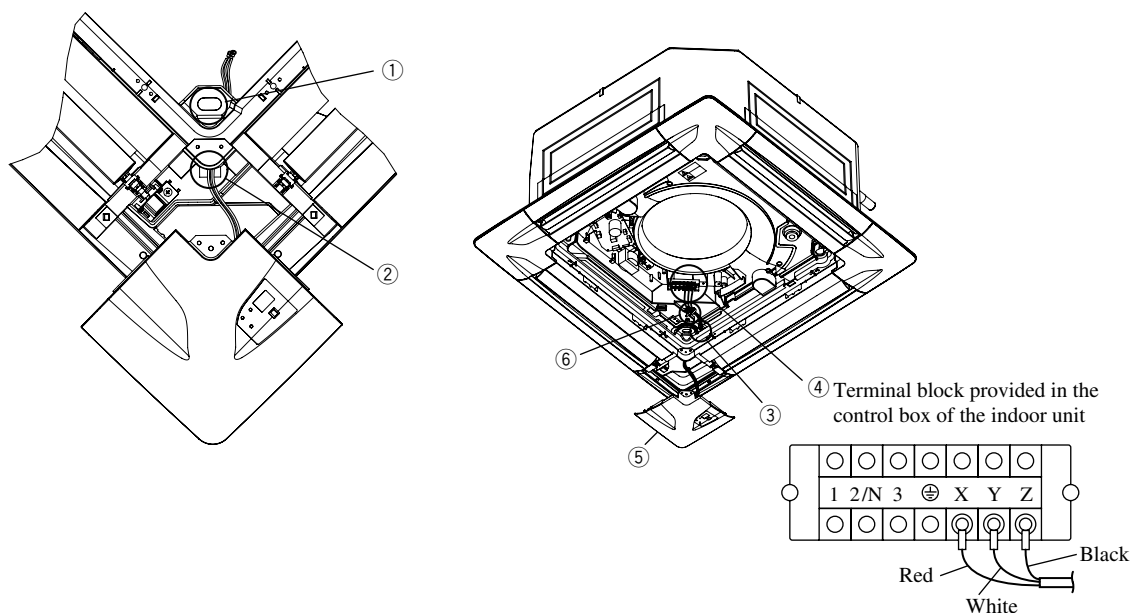
Please do not forget to explain the abovementioned operation method to the customer.
The operation method is also set out in the instruction manual supplied with the indoor unit.



3) Attachment of wireless kit

- ① By loosening the panel hanger bolt, create a gap between the panel and the indoor unit.
- ② Lay the wireless kit wiring through the opening.
- ③ lace the wiring together with other wiring laid on site into the indoor unit.
- ④ Connect the wiring to the terminal block provided in the control box as follows.
X-Red, Y-White, Z-Black.
- ⑤ Attach the wireless kit to the panel according to the panel installation. (Refer to 166 page)
- ⑥ Bundle redundant wiring together with other wiring laid on site.

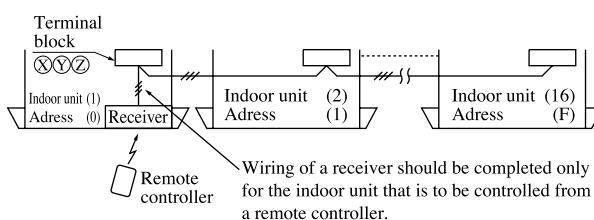
Note (1) Ensure that wirings are not caught between the receiver and the panel in attaching the receiver.



(6) Control of a plural number of indoor units with one remote controller

(a) Up to 16 indoor units can be connected.

- ① Connect indoor unit's (X), (Y) and (Z) terminal with 3-core connecting wires (remote controller signal wires). For a connecting wire, please refer to the "Restrictions on the thickness and length of a connecting wire".



- ② The receiver wiring must be connected only for the indoor unit that will be operated by the remote controller directly.
- ③ Set the address of remote controller communication to [0] through [F] avoiding overlap with the rotary switch SW2 provided on the indoor unit's PCB.

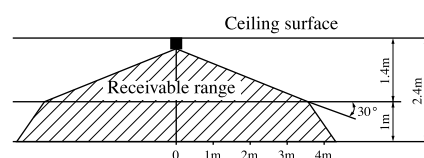
Note (1) Up to two receivers can be installed. When two receivers are used, it is necessary to turn SW2 provided on the PCB of one of the two receivers to the OFF position as a slave.

(b) Wireless remote controller operation distance

- ① Standard signal receiving range

[Condition] Illuminance at the receiver area: 300 lux.

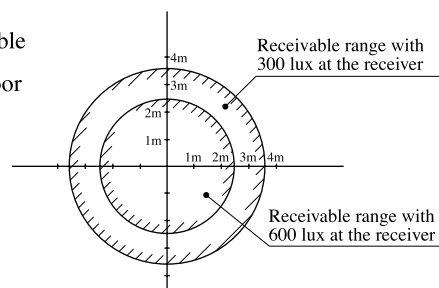
(When no lighting fixture is located within 1m of PAC in an ordinary office)



- ② Relation between illuminance at the receiver and the receivable range viewed from above

[Condition] Relation between illuminance at the receiver and the receivable range when a remote controller is operated 1m above the floor under the ceiling that is 2.4m above the floor.

When illuminance doubles, the receivable range drops to two thirds.



- ③ Points for attention in connecting a plural number of indoor units

[Condition] Illuminance at the receiver area: 300 lux.

(When no lighting fixture is located within 1m of PAC in an ordinary office)

[When more than one unit are installed close each other]

Distance between units that can prevent them from making the same movement is 5m.

(7) Check display list

Display	LED		Display method
	RUN	TIMER/CHECK	
Reception	Green	—	3 time flash (ON-0.25 seconds, OFF-0.25 seconds)
Hot keep	Green	—	Keeps flashing (ON-0.5 seconds, OFF-0.5 seconds)
Operation	Green	—	Lights continuously
Stop	Green	—	Stays OFF
Center mode	—	Yellow	3time flash (ON-0.25 seconds, OFF-0.25 seconds)
Check	—	Yellow	Keeps flashing (ON-0.5 seconds, OFF-0.5 seconds)
Filter sign	—	Yellow	Keeps flashing (ON-2 seconds, OFF-1 seconds)
Timer	—	Yellow	Lights continuously

3.2 FDTC • FDUM series

This product is dedicated for heat pump unit. Never install on the unit dedicated for cooling.

SAFETY PRECAUTIONS

- Always read these “Safety Precautions” thoroughly before starting installation work.
- These precautions describe important information related to safety. Always observe these precautions.
- Refer to the installation manual enclosed with the indoor unit for the indoor unit installation methods.
- After completing the installation, carry out a test operation, and confirm that there are no abnormalities.

Also, explain the usage method to the user. Have the user store this manual for future reference.



WARNING

- Contact the installation to your dealer or a specialist. Incorrect installation by the user could cause electric shocks and fires.
- Always follow this instruction manual and accurately carry out the installation work. Incorrect installation could cause electric shocks and fires.
- The electric work must be carried out by a qualified electrician according to the Electrical Installation Technical Standards, Wiring Regulations and Instruction Manual. Incorrect work could cause electric shocks or fires.
- Use the designated cable for the wiring and make sure that it is securely connected. Fix the cable so that the external force of the cable is not applied on the terminal connection section. Incomplete connections or fixing could cause heating and fires.
- Always use the enclosed parts and designated parts for the installation work parts. Use of parts not designated by Mitsubishi could cause electric shocks or fires.

(1) Wireless kit model

RCND-KIT-HER

(2) Accessories (Confirm the following accessories).

① Light detection adaptor		1
② Wiring (3m)		1
③ Parts set (A)		1
④ Parts set (B)		1
⑤ Parts set (C)		1
⑥ Wireless remote controller		1
⑦ User's manual		1

① Screw for light detection adaptor		2
② Fixing band		1
③ Clamp		5
④ Screw for clamp		5

① Remote controller holder		1
② Screw for holder		2
③ Dry cell for remote controller		1

① Light detection section installation bracket		1
② Screw for the bracket		2
③ Installation fitting		2

(3) Setting of jumper wire

a) Method to prevent the malfunction due to the interference

Perform both procedures ① and ②.

This setting is made to prevent the interference with other household electric appliances or the interference occurred when two light detection adaptors are located closely.

① Setting change of the wireless remote controller

While pressing the button, press button or load the battery. The setting changes to the interference prevention setting.

② Modification of light detection adaptor substrate

Turn SW1-1 OFF (remote).

b) Changeover of Master/slave remote controller

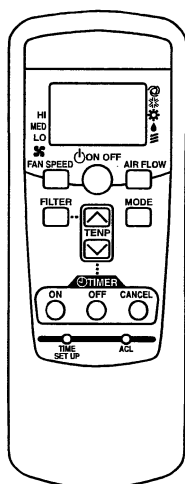
When you use the wireless remote controller as the slave remote controller, Turn light detection adaptor SW1-2 OFF (slave).

c) How to set the 3 air-blow speeds

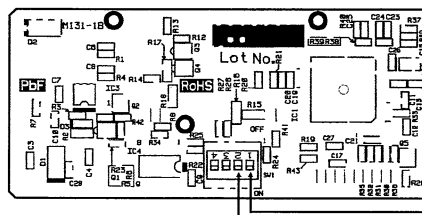
To change to 3-speed air blow, press the switch while holding down the button; or insert the batteries in the remote control while holding down the button. (In that case, set the temperature range from 16 to 30°C if using the heating mode; or set from 18 to 30°C if not using the heating mode.)

Note (1) To cancel all the remote control settings, press the switch. All remote control settings are then reset to initial (factory) settings.

● Wireless remote controller



● Light detection adaptor substrate



SW1-1
(Mixed signal prevention)

SW1-2
(Master/slave switching)

SW1-1	Prevention of malfunction from mixed signals	O N : Normal OFF : Remote
SW1-2	Receiver master/slave switching	O N : Master OFF : Slave

All switches are turned ON when the product is shipped from the factory.

⚠ CAUTION

* When the battery is once removed, the setting returns to the initial setting condition (setting at factory shipping). Therefore, when the battery has been removed, perform the above mentioned wireless remote controller setting change work again.

Ensure to explain the handling method to the customer.
(The handling method is also mentioned in the operation manual.)

(4) Installation work

⚠ Avoid installing the receiver amp in the following positions, as faults may occur or light detection adaptor may be obstructed.

- ① Places subject to direct sunlight.
- ② Places near heat generating appliances.
- ③ Places with high humidity levels or where water may come in contact.
- ④ Places with bumpy surfaces.
- ⑤ Places near fluorescent lights (especially the inverter type) or where light may directly contact the light detection surface.
- ⑥ Places hidden by the indoor unit, etc., when looking from the wireless remote controller operation positions.
- ⑦ Places subject to the air blow off by the indoor unit.

The following two installation methods can be used to install the light detection adaptor onto the ceiling. Select a method according to the installation position.

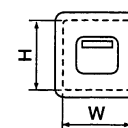
<Installation method>

- Installation with enclosed bracket.
- Direct installation onto the ceiling with wood screws.

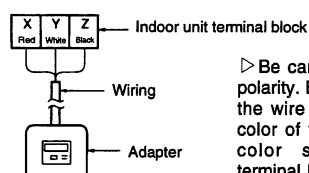
a) Drilling of the ceiling (ceiling opening)

Drill the light detection adaptor installation holes with the following dimensions at a the ceiling position where wires can be connected.

(A) Installation with enclosed bracket.	108 mm (H) × 108 mm (W)
(B) Direct installation onto with wood screws.	88 mm (H) × 101 mm (W)



b) Wiring connected to the light detection adaptor



▷ Be careful of the wiring polarity. Ensure to connect the wire by matching the color of the wire with the color shown on the terminal block.

⚠ CAUTION

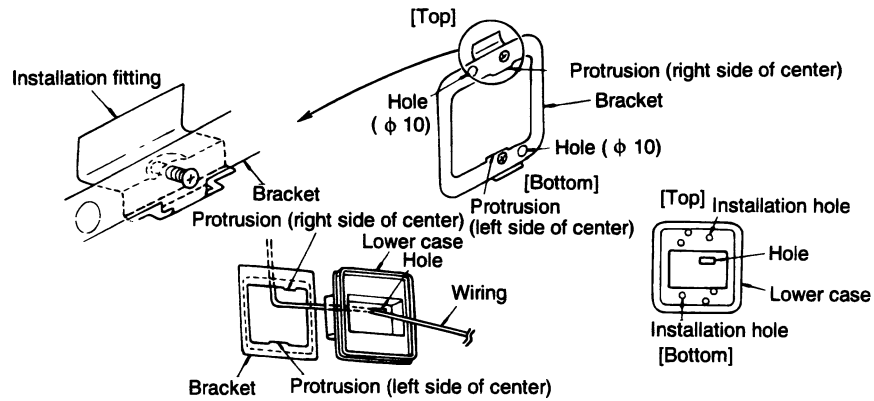
Do not connect the wiring to the power supply part of the terminal block.
If it is connected, printed board will be damaged.

c) Installation for light detection adaptor

Remove the screw on the side of the light detection adaptor, and split it into the upper case and lower case.
Install the receiver with one of the four installation methods (A) or (B) shown below.

d) Installation with enclosed bracket

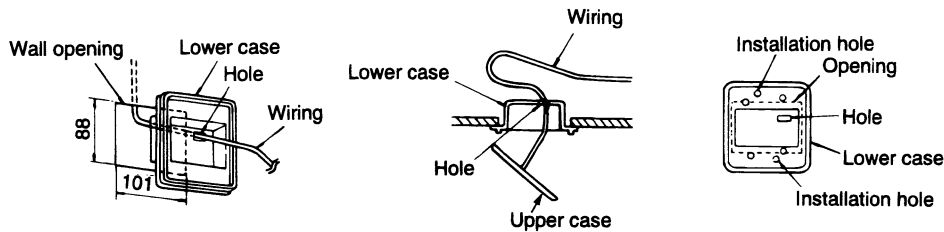
Use this method when installing onto a gypsum board (7 or 18 mm), etc.



- ① Catch the two protrusion of the enclosed bracket onto the fitting as shown above, and temporarily fix with the screws.
(The bracket has an up/down and front/back orientation. Confirm the top/bottom protrusion positions and the positional relation of the $\phi 10$ holes on the bracket and the installation hole on the lower case with the above drawing.)
- ② Insert the end of the installation fitting into the back of the ceiling from the opening, and tighten the screws to fix the bracket onto the ceiling.
- ③ Pass the wiring from the rear side through the hole on the lower case.
- ④ Fit the lower case onto the bracket, and fix the lower case to the bracket using the two installation holes shown above.
(The other four holes are not used.)
- ⑤ Follow steps ① to ③ for (B) to complete the installation.

e) Direct installation onto the ceiling with wood screws

▷ Use this installation method when the ceiling is wooden, and there is no strength-wise problem in installing directly with wood screws.



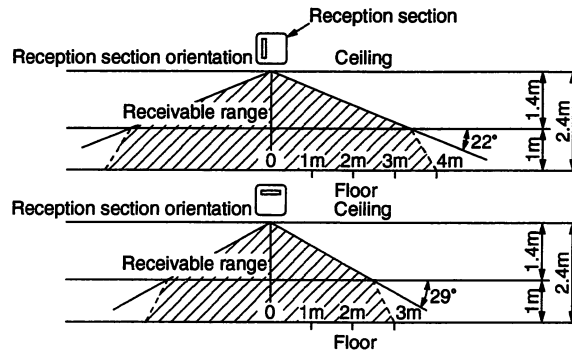
- ① Fit the lower case into the ceiling opening. Make sure that the convex section on the back of the lower case and the clearance with the ceiling opening are as equal as possible on both sides.
- ② Using the two installation holes shown above, fix the lower case onto the ceiling with the enclosed wood screws.
(The other four holes are not used.)
- ③ Fit the upper case onto the lower case, and tighten the screw.

(5) Wireless remote controller operation distance

a) When installed on ceiling

① standard reception distance

Conditions	Reception section illuminance <u>300 lux</u> (When there are no lights on the ceiling within 1 m or the reception adaptor in a general office.)
------------	---

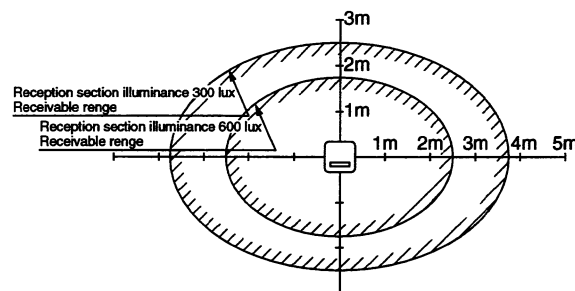


② Relation of reception section illuminance and reception distance looking from flat plane

Conditions	Relation of the reception section illuminance and reception distance when the remote controller is operated at a height of 1 m from the floor with a ceiling height of 2.4 m. The reception distance becomes 2/3 when the illuminance is double.
------------	---

b) When installed on wall

Conditions	Reception section illuminance <u>800 lux</u>
------------	--

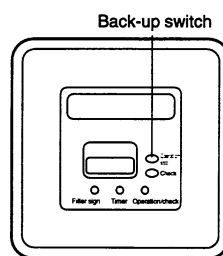


(6) Installation of remote controller

- Refer to the installation manual of remote controller

(7) Trial run of cooling operation

- While pressing the back-up switch on the receiver unit, transmit the signal of cooling operation from the wireless remote controller.



- If the unit does not operate normally at the trial run, check the unit referring to the inspection items shown on the wiring diagram plate stuck on the indoor and outdoor unit.

PACKAGED AIR-CONDITIONER



MITSUBISHI HEAVY INDUSTRIES, LTD.

Air-Conditioning & Refrigeration Systems Headquarters

16-5, 2-chome, Kounan, Minato-ku, Tokyo, 108-8215, Japan

Fax : (03) 6716-5926