

2019

R410A

TECHNICAL & SERVICE MANUAL

Models

PFFY-P20VCM-E

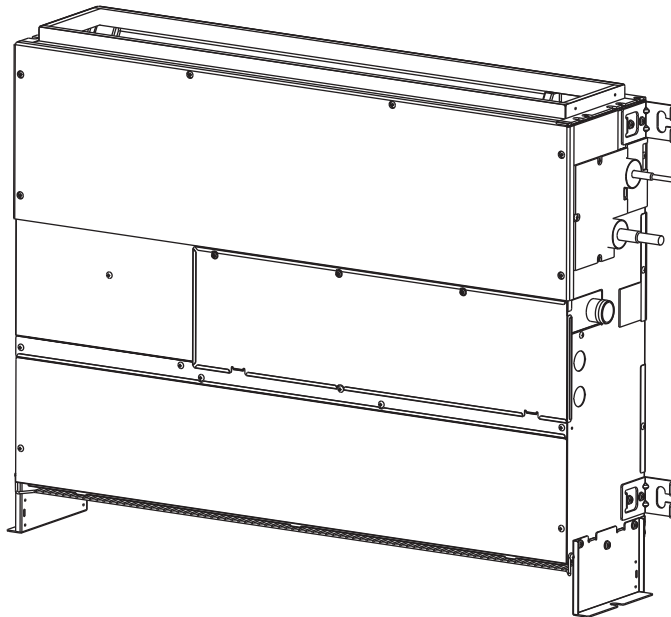
PFFY-P40VCM-E

PFFY-P25VCM-E

PFFY-P50VCM-E

PFFY-P32VCM-E

PFFY-P63VCM-E



CITY MULTI

Safety Precautions

Read before installation and performing electrical work

- Thoroughly read the following safety precautions prior to installation.
- Observe these safety precautions for your safety.
- This equipment may have adverse effects on the equipment on the same power supply system.
- Contact the local power authority before connecting to the system.

Symbol explanations

WARNING

This symbol indicates that failure to follow the instructions exactly as stated poses the risk of serious injury or death.

CAUTION

This symbol indicates that failure to follow the instructions exactly as stated poses the risk of serious injury or damage to the unit.



Indicates an action that must be avoided.



Indicates important instructions.



Indicates a parts that requires grounding.



Indicates that caution must be taken with rotating parts. (This symbol is on the main unit label.) <Color: Yellow>



Indicates that the parts that are marked with this symbol pose a risk of electric shock. (This symbol is on the main unit label.) <Color: Yellow>

WARNING

Carefully read the labels affixed to the main unit.

WARNING

- Ask your dealer or a qualified technician to install the unit.**
 - Improper installation by the user may result in water leakage, electric shock, or fire.
- Properly install the unit on a surface that can withstand its weight.**
 - Unit installed on an unstable surface may fall and cause injury.
- Only use specified cables. Securely connect each cable so that the terminals do not carry the weight of the cable.**
 - Improperly connected cables may produce heat and start a fire.
- Take appropriate safety measures against wind gusts and earthquakes to prevent the unit from toppling over.**
 - Improper installation may cause the unit to topple over and cause injury or damage to the unit.
- Only use accessories (i.e., air cleaners, humidifiers, electric heaters) recommended by Mitsubishi Electric.**
- Do not make any modifications or alterations to the unit. Consult your dealer for repair.**
 - Improper repair may result in water leakage, electric shock, or fire.
- Do not touch the heat exchanger fins with bare hands.**
 - The fins are sharp and pose a risk of cuts.
- In the event of a refrigerant leak, thoroughly ventilate the room.**
 - If gaseous refrigerant leaks out and comes in contact with an open flame, toxic gases will be generated.
- Properly install the unit according to the instructions in the Installation Manual.**
 - Improper installation may result in water leakage, electric shock, or fire.
- Have all electrical work performed by an authorized electrician according to the local regulations and the instructions in this manual. Use a dedicated circuit.**
 - Insufficient power supply capacity or improper installation of the unit may result in malfunctions of the unit, electric shock, or fire.
- Keep electrical parts away from water.**
 - Wet electrical parts pose a risk of electric shock, smoke, or fire.
- Securely attach the control box cover.**
 - If the cover is not installed properly, dust or water may infiltrate and pose a risk of electric shock, smoke, or fire.
- Only use the type of refrigerant that is indicated on the unit when install-**

ing or relocating the unit.

- Infiltration of any other types of refrigerant or air into the unit may adversely affect the refrigerant cycle and may cause the pipes to burst or explode.
- When installing the unit in a small space, take appropriate precautions to prevent leaked refrigerant from reaching the limiting concentration.**
 - Leaked refrigerant gas will displace oxygen and may cause oxygen starvation. Consult your dealer before installing the unit.
- Consult your dealer or a qualified technician when moving or reinstalling the unit.**
 - Improper installation may result in water leakage, electric shock, or fire.
- After completing the service work, check for a refrigerant leak.**
 - If leaked refrigerant is exposed to a heat source, such as a fan heater, stove, or electric grill, toxic gases will be generated.
- Do not try to defeat the safety features of the unit.**
 - Forced operation of the pressure switch or the temperature switch by defeating the safety features for these devices, or the use of accessories other than the ones that are recommended by Mitsubishi Electric may result in smoke, fire, or explosion.
- Consult your dealer for proper disposal method.**
- Do not use a leak detection additive.**

Precautions for handling units for use with R410A

CAUTION

- Do not use the existing refrigerant piping.**
 - A large amount of chlorine that may be contained in the residual refrigerant and refrigerator oil in the existing piping may cause the refrigerator oil in the new unit to deteriorate.
- Use refrigerant piping materials made of phosphorus deoxidized copper. Keep the inner and outer surfaces of the pipes clean and free of such contaminants as sulfur, oxides, dust, dirt, shaving particles, oil, and moisture.**
 - Contaminants in the refrigerant piping may cause the refrigerator oil to deteriorate.
- Store the piping materials indoors, and keep both ends of the pipes sealed until immediately before brazing. (Keep elbows and other joints wrapped in plastic.)**
 - Infiltration of dust, dirt, or water into the refrigerant system may cause the refrigerator oil to deteriorate or cause the compressor to malfunction.
- Use a small amount of ester oil, ether oil, or alkyl benzene to coat flares and flanges.**
 - Infiltration of a large amount of mineral oil may cause the refrigerator oil to deteriorate.
- Charge the system with refrigerant in the liquid phase.**
 - If gaseous refrigerant is drawn out of the cylinder first, the composition of the remaining refrigerant in the cylinder will change and become unsuitable for use.
- Only use R410A.**
 - The use of other types of refrigerant that contain chloride may cause the refrigerator oil to deteriorate.
- Use a vacuum pump with a check valve.**
 - If a vacuum pump that is not equipped with a check valve is used, the vacuum pump oil may flow into the refrigerant cycle and cause the refrigerator oil to deteriorate.
- Prepare tools for exclusive use with R410A. Do not use the following tools if they have been used with the conventional refrigerant: gauge manifold, charging hose, gas leak detector, check valve, refrigerant charge base, vacuum gauge, and refrigerant recovery equipment.**
 - If the refrigerant or the refrigerator oil that may be left on these tools are mixed in with R410A, it may cause the refrigerator oil in the new system to deteriorate.
 - Infiltration of water may cause the refrigerator oil to deteriorate.
 - Leak detectors for conventional refrigerants will not detect an R410A leak because R410A is free of chlorine.
- Do not use a charging cylinder.**
 - If a charging cylinder is used, the composition of the refrigerant in the cylinder will change and become unsuitable for use.

♦**Exercise special care when handling tools for use with R410A.**

- Infiltration of dust, dirt, or water into the refrigerant system may cause the refrigerator oil to deteriorate.

CONTENTS

I Features

| | |
|-------------------|---|
| [1] Features..... | 1 |
|-------------------|---|

II Components and Functions

| | |
|-----------------------------------|---|
| [1] Components and Functions..... | 2 |
|-----------------------------------|---|

III Specifications

| | |
|--|---|
| [1] Specifications..... | 5 |
| 1.Specifications..... | 5 |
| 2.Electrical component specifications..... | 7 |

IV Outlines and Dimensions

| | |
|----------------------------------|---|
| [1] Outlines and Dimensions..... | 8 |
|----------------------------------|---|

V Wiring Diagram

| | |
|-------------------------|----|
| [1] Wiring Diagram..... | 12 |
|-------------------------|----|

VI Refrigerant System Diagram

| | |
|-------------------------------------|----|
| [1] Refrigerant system diagram..... | 13 |
|-------------------------------------|----|

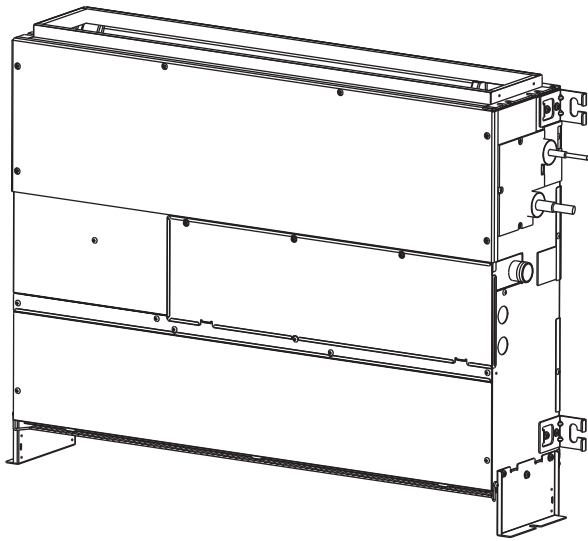
VII Troubleshooting

| | |
|---|----|
| [1] Troubleshooting..... | 14 |
| 1.Check methods..... | 14 |
| 2.DC fan motor (fan motor/indoor control board)..... | 18 |
| 3.Setting of address switch..... | 19 |
| 4.Voltage test points on the control board..... | 20 |
| 5.Setting of Dip-switch (at delivery)..... | 21 |
| 6.Function setting..... | 21 |
| 7.Selecting the external static pressure..... | 22 |
| 8.Setting addresses..... | 23 |
| 9.Setting of intermittent fan control..... | 23 |
| 10.Function the LED of the indoor unit service board..... | 23 |

VIII Disassembly Procedure

| | |
|--|----|
| [1] Disassembly Procedure..... | 24 |
| 1.Control box..... | 24 |
| 2.Thermistor (Intake air)..... | 25 |
| 3.Drain pan..... | 26 |
| 4.LEV, thermistor (Liquid/Gas piping temperature detection)..... | 27 |
| 5.Fan and fan motor..... | 28 |
| 6.Bearing..... | 29 |
| 7.Heat exchanger..... | 30 |
| 8.Control box inside layout..... | 32 |
| 9.Sensor position..... | 33 |

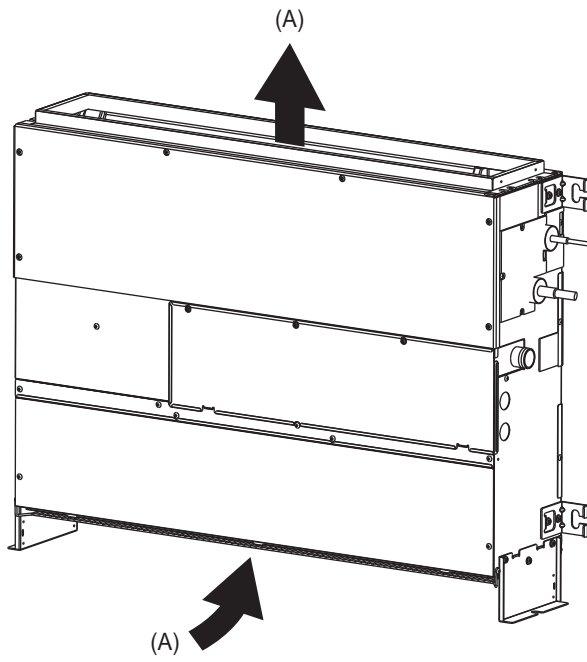
[1] Features



| Model | Cooling capacity/Heating capacity |
|---------------|-----------------------------------|
| | kW |
| PFFY-P20VCM-E | 2.2/2.5 |
| PFFY-P25VCM-E | 2.8/3.2 |
| PFFY-P32VCM-E | 3.6/4.0 |
| PFFY-P40VCM-E | 4.5/5.0 |
| PFFY-P50VCM-E | 5.6/6.3 |
| PFFY-P63VCM-E | 7.1/8.0 |

[1] Components and Functions

1. Indoor (Main) Unit



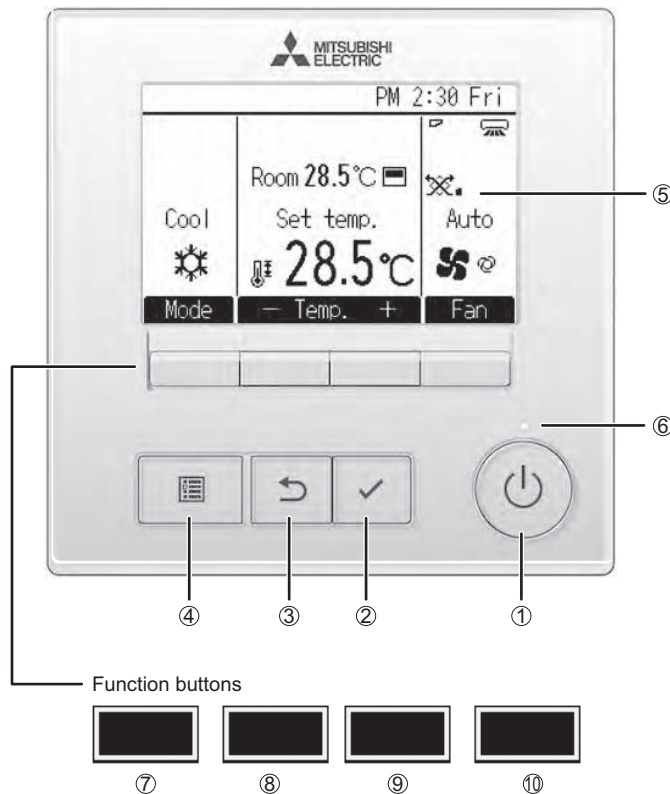
(A) Air

2. Remote Controller

[PAR-40MAA]

Once the operation mode is selected, the unit will remain in the selected mode until changed.

(1) Remote Controller Buttons



① [ON/OFF] button

Press to turn ON/OFF the indoor unit.

② [SELECT/HOLD] button

Press to save the setting.

③ [RETURN] button

Press to return to the previous screen.

④ [MENU] button

Press to bring up the Main menu.

⑤ Backlit LCD

Operation settings will appear. When the backlight is off, pressing any button turns the backlight on and it will stay lit for a certain period of time depending on the screen.

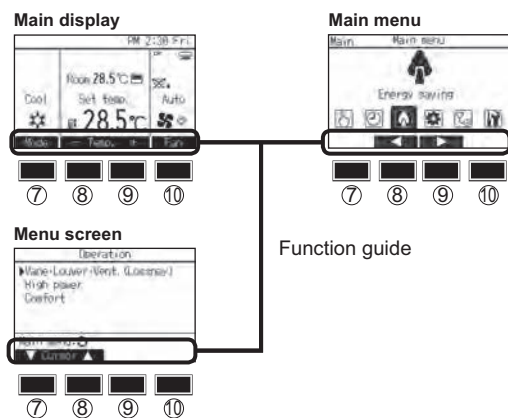
When the backlight is off, pressing any button turns the backlight on and does not perform its function. (except for the [ON/OFF] button)

⑥ ON/OFF lamp

This lamp lights up in green while the unit is in operation. It blinks while the remote controller is starting up or when there is an error.

The functions of the function buttons change depending on the screen. Refer to the button function guide that appears at the bottom of the LCD for the functions they serve on a given screen.

When the system is centrally controlled, the button function guide that corresponds to the locked button will not appear.



⑦ Function button [F1]

Main display: Press to change the operation mode.
Menu screen: The button function varies with the screen.

⑧ Function button [F2]

Main display: Press to decrease temperature.
Main menu: Press to move the cursor left.
Menu screen: The button function varies with the screen.

⑨ Function button [F3]

Main display: Press to increase temperature.
Main menu: Press to move the cursor right.
Menu screen: The button function varies with the screen.

⑩ Function button [F4]

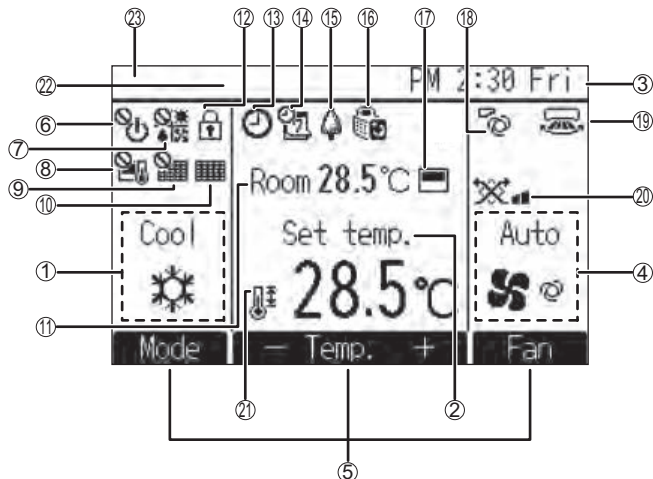
Main display: Press to change the fan speed.
Menu screen: The button function varies with the screen.

(2) Remote Controller Display

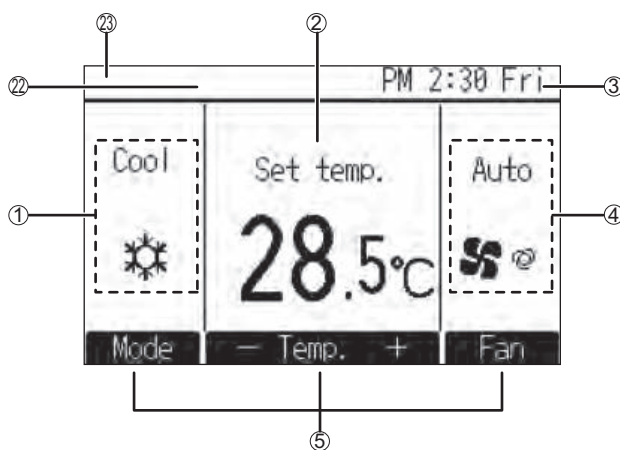
The main display can be displayed in two different modes: "Full" and "Basic."
 The factory setting is "Full." To switch to the "Basic" mode, change the setting on the Main display setting.

Full mode

* All icons are displayed for explanation.



Basic mode



① Operation mode

② Preset temperature

③ Clock

See the Installation Manual.

④ Fan speed

⑤ Button function guide

Functions of the corresponding buttons appear here.



Appears when the ON/OFF operation is centrally controlled.



Appears when the operation mode is centrally controlled.



Appears when the preset temperature is centrally controlled.



Appears when the filter reset function is centrally controlled.



Indicates when filter needs maintenance.

⑪ Room temperature

See the Installation Manual.



Appears when the buttons are locked.



Appears when the On/Off timer, Night setback, or Auto-off timer function is enabled.

appears when the timer is disabled by the centralized control system.



Appears when the Weekly timer is enabled.



Appears while the units are operated in the energy-save mode. (Will not appear on some models of indoor units)



Appears while the outdoor units are operated in the silent mode.



Appears when the built-in thermistor on the remote controller is activated to monitor the room temperature (⑪).



appears when the thermistor on the indoor unit is activated to monitor the room temperature.



Indicates the vane setting.



Indicates the louver setting.



Indicates the ventilation setting.



Appears when the preset temperature range is restricted.

⑫ Centrally controlled

Appears for a certain period of time when a centrally-controlled item is operated.

⑬ Preliminary error display

An error code appears during the preliminary error.

Most settings (except ON/OFF, mode, fan speed, temperature) can be made from the Main menu.

[1] Specifications**1. Specifications**

| Model name | | | PFFY-P20VCM-E | PFFY-P25VCM-E | PFFY-P32VCM-E |
|--------------------------------|--|---------------------|--|---------------|---------------|
| Power source | | | ~ 220-240V 50Hz/60Hz | | |
| Cooling capacity ^{*1} | kW | | 2.2 | 2.8 | 3.6 |
| Heating capacity ^{*1} | | | 2.5 | 3.2 | 4.0 |
| Power consumption | Cooling | kW | 0.022 | 0.026 | 0.031 |
| | Heating | | 0.022 | 0.026 | 0.031 |
| Current | Cooling | A | 0.25 | 0.30 | 0.34 |
| | Heating | | 0.25 | 0.30 | 0.34 |
| External finish | | | Galvanized steel plate | | |
| Dimension | Height ^{*2} | mm | 615 (690) | | |
| | Width | | 700 | | |
| | Depth | | 200 | | |
| Net weight | | kg | 18 | 18 | 18.5 |
| Heat exchanger | | | Cross fin (Aluminum fin and copper tube) | | |
| Fan | Type x Quantity | | Sirocco fan x 2 | | |
| | Airflow rate (Lo-Mid-Hi) | m ³ /min | 5.0-6.0-7.0 | 5.5-6.5-8.0 | 5.5-7.0-8.5 |
| | External static pressure ^{*3} | Pa | 0/10/40/60 | | |
| Motor | Type | | DC motor | | |
| | Output | kW | 0.096 | | |
| Air filter | | | PP honeycomb fabric. | | |
| Refrigerant pipe diameter | Gas (Brazed) | mm | ø6.35 | | |
| | Liquid (Brazed) | mm | ø12.7 | | |
| Drain pipe dimensions | | mm | 32 (1-1/4 inch) | | |
| Noise level (Lo-Mid-Hi) | | dB (A) | 21-23-26 | 22-25-29 | 23-26-30 |

^{*1} Cooling/Heating capacity indicates the maximum value at operation under the following condition.
Cooling: Indoor 33°CDB/28°CWB, Outdoor 33°CDB. The set temperature of the remote controller is 18°C.
Heating: Indoor 0°CDB/-2.9°CWB, Outdoor 0°CDB/-2.9°CWB. The set temperature of the remote controller is 25°C.

^{*2} The values in () show the height of unit with leg.

^{*3} The external static pressure is set to 10Pa at factory shipment.

^{*4} The noise level in operation is measured at 1.5m apart from the front side and the bottom side of the unit in anechoic room. (Noise meter A-scale value) Connect the duct of 1m in length to the air outlet.

| Model name | | | PFFY-P40VCM-E | PFFY-P50VCM-E | PFFY-P63VCM-E |
|---------------------------|-----------------------------|---------------------|--|----------------|-----------------|
| Power source | | | ~ 220-240V 50Hz/60Hz | | |
| Cooling capacity *1 | kW | | 4.5 | 5.6 | 7.1 |
| Heating capacity *1 | | | 5.0 | 6.3 | 8.0 |
| Power consumption | Cooling | kW | 0.038 | 0.052 | 0.058 |
| | Heating | | 0.038 | 0.052 | 0.058 |
| Current | Cooling | A | 0.38 | 0.50 | 0.49 |
| | Heating | | 0.38 | 0.50 | 0.49 |
| External finish | | | Galvanized steel plate | | |
| Dimension | Height *2 | mm | 615 (690) | | |
| | Width | | 900 | | 1100 |
| | Depth | | 200 | | |
| Net weight | | kg | 22.5 | 22.5 | 25.5 |
| Heat exchanger | | | Cross fin (Aluminum fin and copper tube) | | |
| Fan | Type x Quantity | | Sirocco fan x 3 | | Sirocco fan x 4 |
| | Airflow rate (Lo-Mid-Hi) | m ³ /min | 8.0-9.5-11.0 | 10.0-11.5-13.5 | 12.0-14.0-16.5 |
| | External static pressure *3 | | Pa | 0/10/40/60 | |
| Motor | Type | | DC motor | | |
| | Output | kW | 0.096 | | |
| Air filter | | | PP honeycomb fabric. | | |
| Refrigerant pipe diameter | Gas (Brazed) | mm | ø6.35 | | ø9.52 |
| | Liquid (Brazed) | mm | ø12.7 | | ø15.88 |
| Drain pipe dimensions | | mm | 32 (1-1/4 inch) | | |
| Noise level (Lo-Mid-Hi) | | dB (A) | 25-27-30 | 28-31-34 | 28-32-35 |

*1 Cooling/Heating capacity indicates the maximum value at operation under the following condition.
Cooling: Indoor 33°CDB/28°CWB, Outdoor 33°CDB. The set temperature of the remote controller is 18°C.
Heating: Indoor 0°CDB/-2.9°CWB, Outdoor 0°CDB/-2.9°CWB. The set temperature of the remote controller is 25°C.

*2 The values in () show the height of unit with leg.

*3 The external static pressure is set to 10Pa at factory shipment.

*4 The noise level in operation is measured at 1.5m apart from the front side and the bottom side of the unit in anechoic room. (Noise meter A-scale value) Connect the duct of 1m in length to the air outlet.

2. Electrical component specifications

| Component | Sym- bol | PFFY-P20VCM-E | PFFY-P25VCM-E | PFFY-P32VCM-E |
|-----------------------------|-------------|---|---------------|---------------|
| Room temperature thermistor | TH21 | Resistance 0°C/15kΩ, 10°C/9.6kΩ, 20°C/6.3kΩ, 25°C/5.4kΩ, 30°C/4.3kΩ, 40°C/3.0kΩ | | |
| Liquid pipe thermistor | TH22 | Resistance 0°C/15kΩ, 10°C/9.6kΩ, 20°C/6.3kΩ, 25°C/5.4kΩ, 30°C/4.3kΩ, 40°C/3.0kΩ | | |
| Gas pipe thermistor | TH23 | Resistance 0°C/15kΩ, 10°C/9.6kΩ, 20°C/6.3kΩ, 25°C/5.4kΩ, 30°C/4.3kΩ, 40°C/3.0kΩ | | |
| Fuse | FUSE | 250VAC 6.3A | | |
| Fan motor | | 8-pole, Output 96W SIC-70CW-D8114-1 | | |
| Linear expansion valve | LEV | 12VDC Stepping motor (0~1800 pulse) | | |
| Power supply terminal block | TB2 | (L, N, ⊕) 330V 30A | | |
| Transmission terminal block | TB5 TB15 | (1, 2), (M1, M2, S) 250V 20A | | |

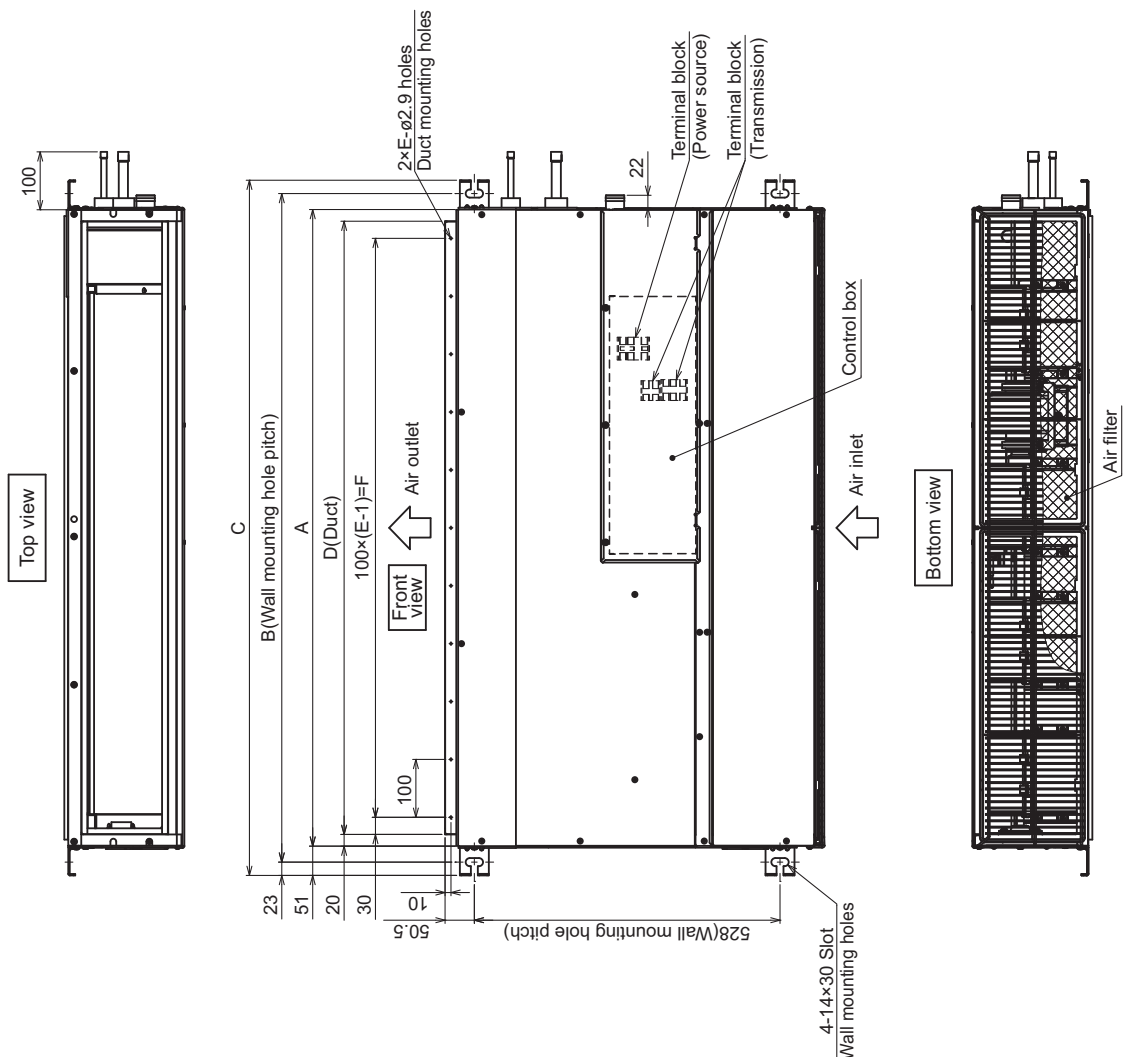
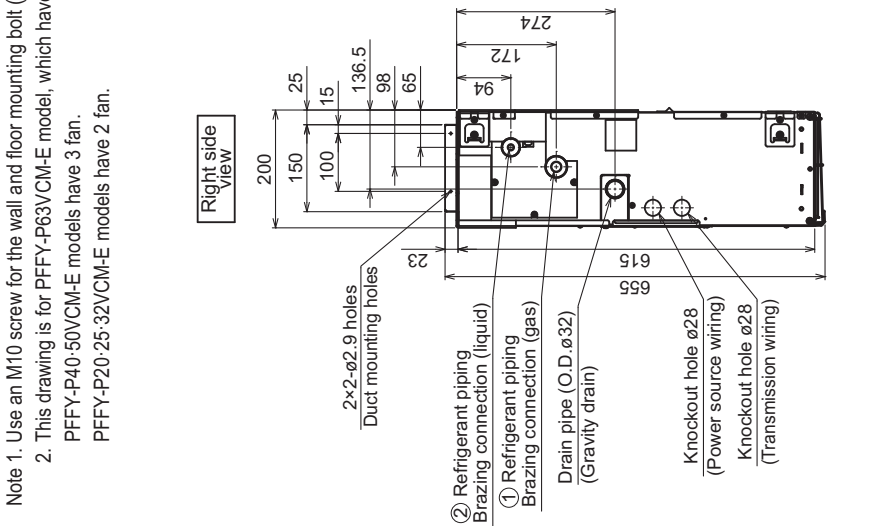
| Component | Sym- bol | PFFY-P40VCM-E | PFFY-P50VCM-E | PFFY-P63VCM-E |
|-----------------------------|-------------|---|---------------|---------------|
| Room temperature thermistor | TH21 | Resistance 0°C/15kΩ, 10°C/9.6kΩ, 20°C/6.3kΩ, 25°C/5.4kΩ, 30°C/4.3kΩ, 40°C/3.0kΩ | | |
| Liquid pipe thermistor | TH22 | Resistance 0°C/15kΩ, 10°C/9.6kΩ, 20°C/6.3kΩ, 25°C/5.4kΩ, 30°C/4.3kΩ, 40°C/3.0kΩ | | |
| Gas pipe thermistor | TH23 | Resistance 0°C/15kΩ, 10°C/9.6kΩ, 20°C/6.3kΩ, 25°C/5.4kΩ, 30°C/4.3kΩ, 40°C/3.0kΩ | | |
| Fuse | FUSE | 250VAC 6.3A | | |
| Fan motor | | 8-pole, Output 96W SIC-70CW-D896-2 | | |
| Linear expansion valve | LEV | 12VDC Stepping motor (0~1800 pulse) | | |
| Power supply terminal block | TB2 | (L, N, ⊕) 330V 30A | | |
| Transmission terminal block | TB5 TB15 | (1, 2), (M1, M2, S) 250V 20A | | |

[1] Outlines and Dimensions

1. PFFY-P20, 25, 32, 40, 50, 63VMC-E Bottom suction · wall mounting

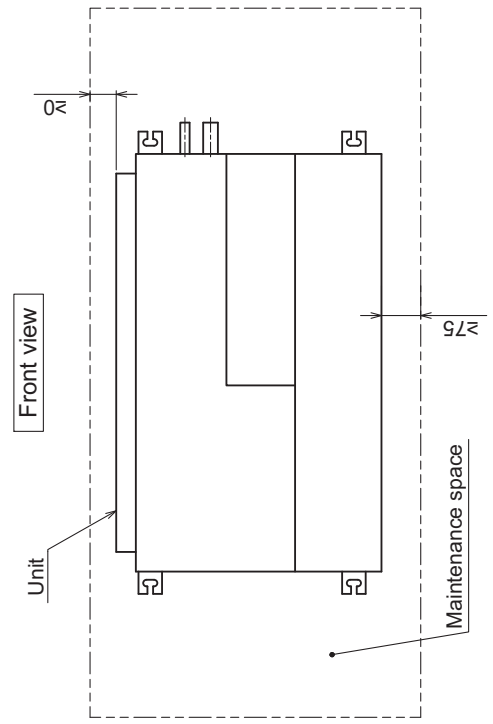
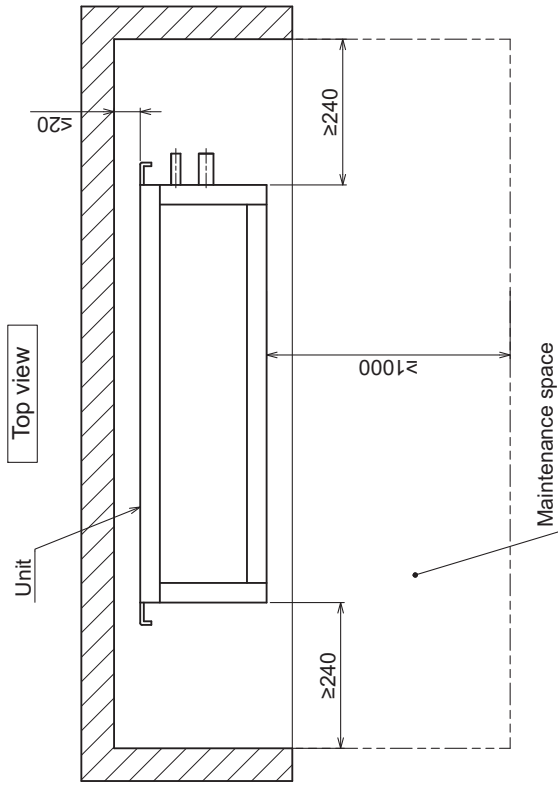
Unit: mm

- Note 1. Use an M10 screw for the wall and floor mounting bolt (field supply).
- 2. This drawing is for PFFY-P63VMC-E model, which have 4 fans.
PFFY-P40-50VMC-E models have 3 fan.
PFFY-P20-25-32VMC-E models have 2 fan.



| Model | A | B | C | D | E | F | ① Gas pipe | ② Liquid pipe |
|---------------------|------|------|------|------|----|------|------------|---------------|
| PFFY-P20-25-32VMC-E | 700 | 756 | 802 | 660 | 7 | 600 | ø12.7 | ø6.35 |
| PFFY-P40-50VMC-E | 900 | 956 | 1002 | 860 | 9 | 800 | ø15.88 | ø9.52 |
| PFFY-P63VMC-E | 1100 | 1156 | 1202 | 1060 | 11 | 1000 | ø15.88 | ø9.52 |

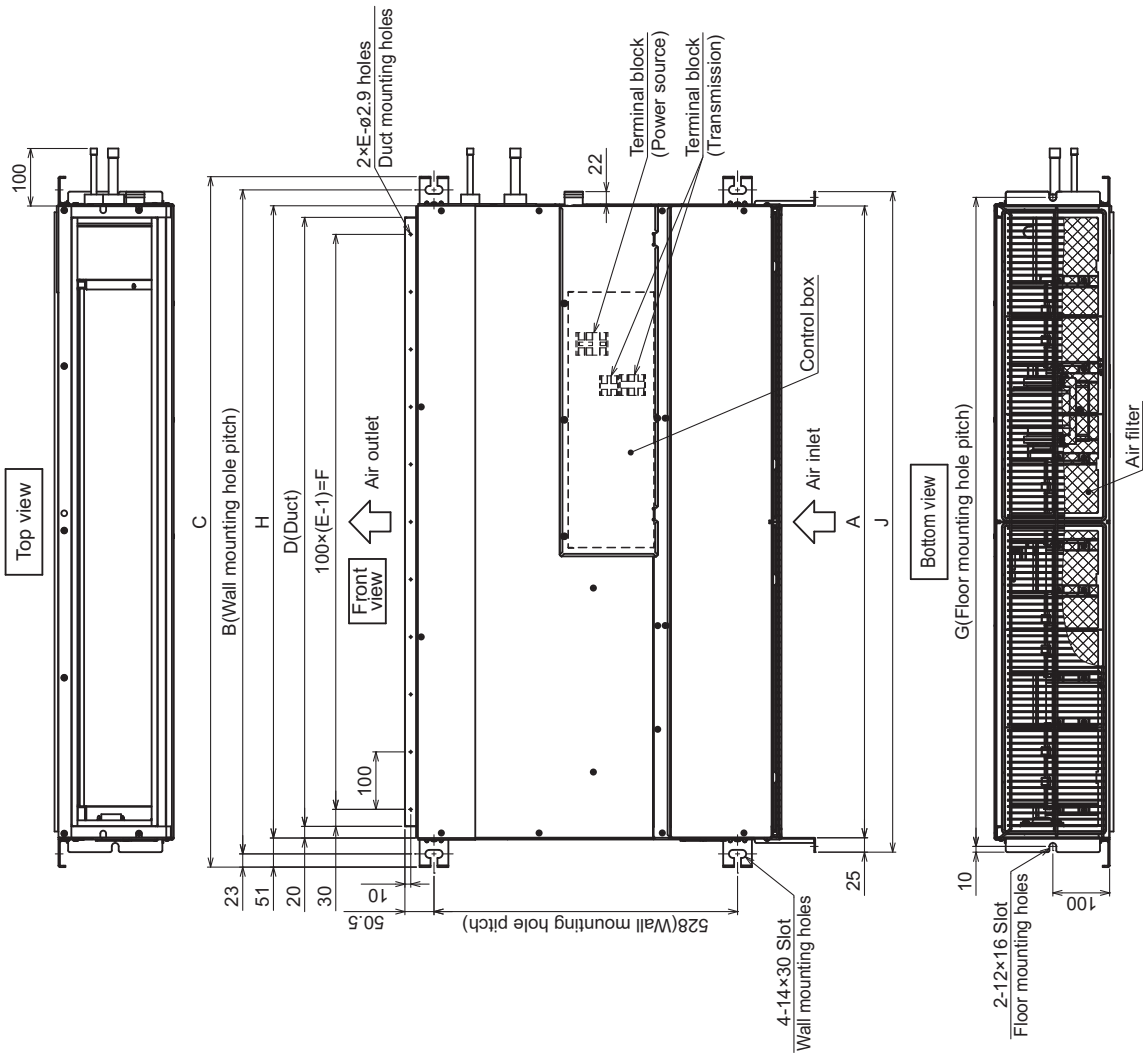
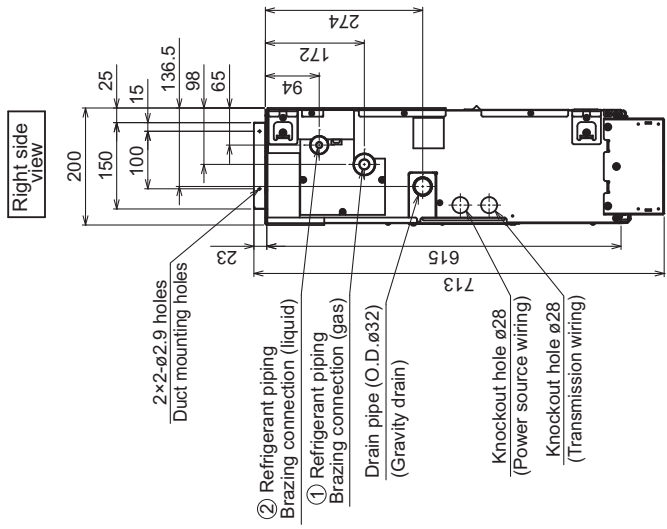
[Maintenance access space]
 Secure enough access space to allow for the maintenance, inspection,
 and replacement of the motor, fan, heat exchanger, drain pan and control box.



2. PFFY-P20, 25, 32, 40, 50, 63VMC-E Bottom suction · floor mounting

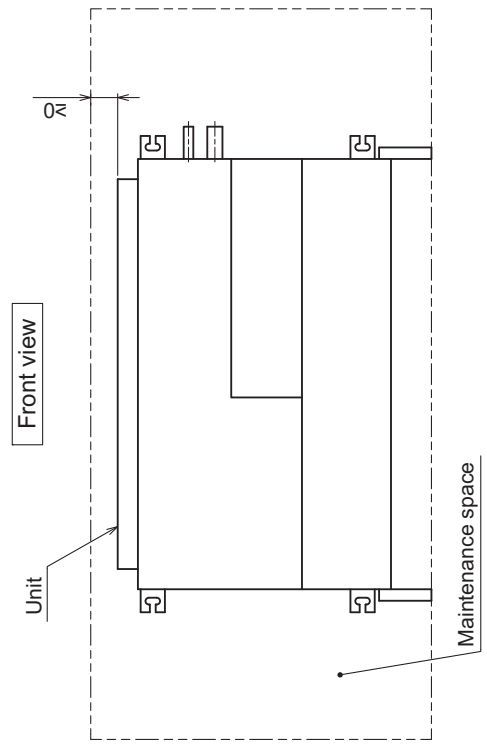
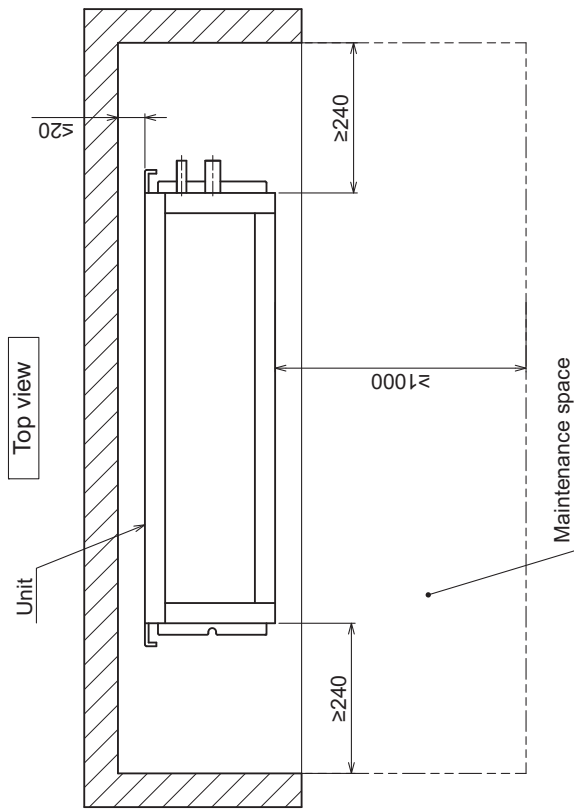
Unit: mm

- Note 1. Use an M10 screw for the wall and floor mounting bolt (field supply).
 2. This drawing is for PFFY-P63VMC-E model, which have 4 fans.
 PFFY-P40-50VMC-E models have 3 fan.
 PFFY-P20-25-32VMC-E models have 2 fan.



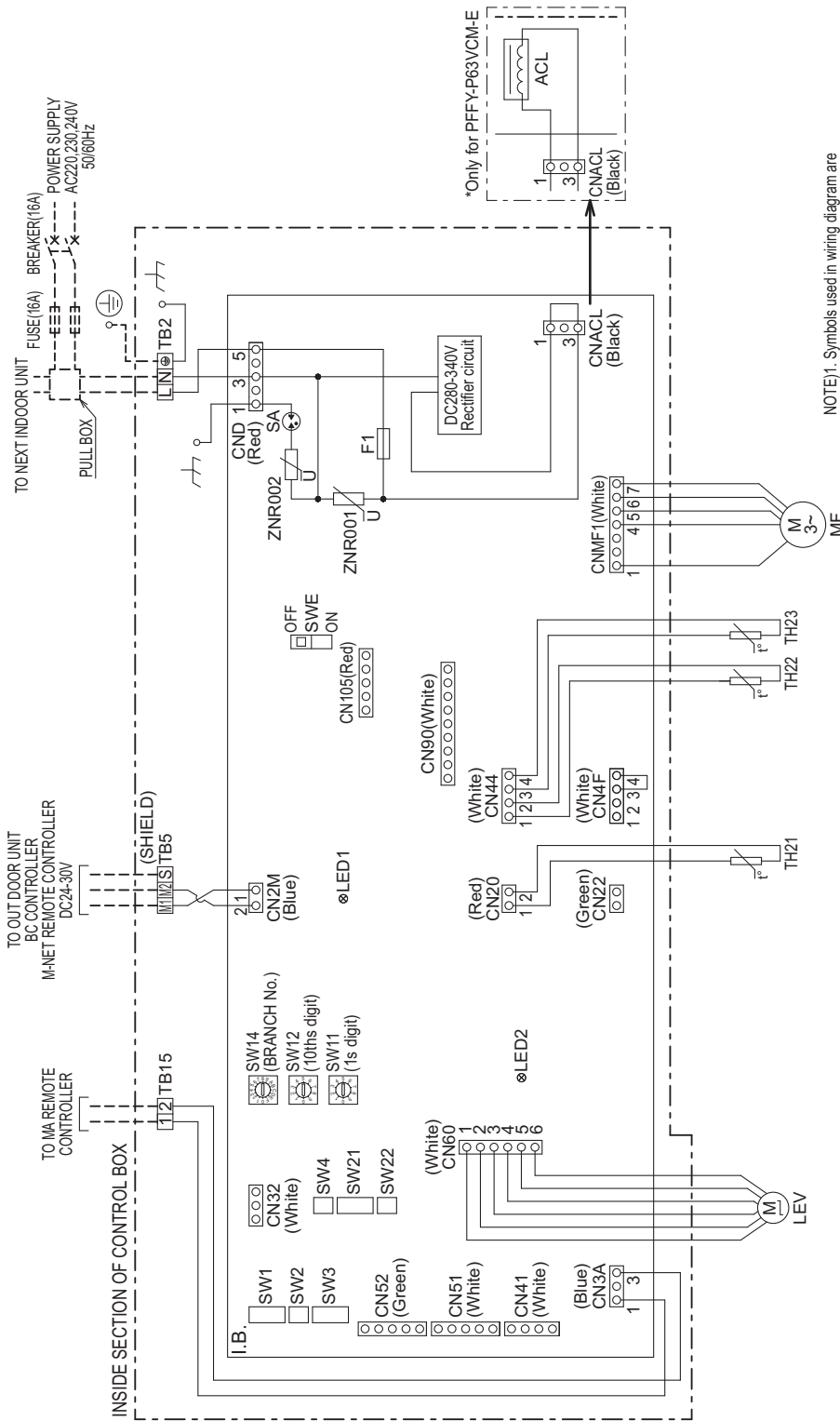
| Model | A | B | C | D | E | F | G | H | J | ① Gas pipe | ② Liquid pipe |
|---------------------|------|------|------|------|----|------|------|------|------|------------|---------------|
| PFFY-P20-25-32VMC-E | 700 | 756 | 802 | 660 | 7 | 600 | 730 | 700 | 750 | ø12.7 | ø6.35 |
| PFFY-P40-50VMC-E | 900 | 956 | 1002 | 860 | 9 | 800 | 930 | 900 | 950 | | |
| PFFY-P63VMC-E | 1100 | 1156 | 1202 | 1060 | 11 | 1000 | 1130 | 1100 | 1150 | ø15.88 | ø9.52 |

[Maintenance access space]
 Secure enough access space to allow for the maintenance, inspection,
 and replacement of the motor, fan, heat exchanger, drain pan and control box.



[1] Wiring Diagram

1. PFFY-P20,25,32,40,50,63VCM-E

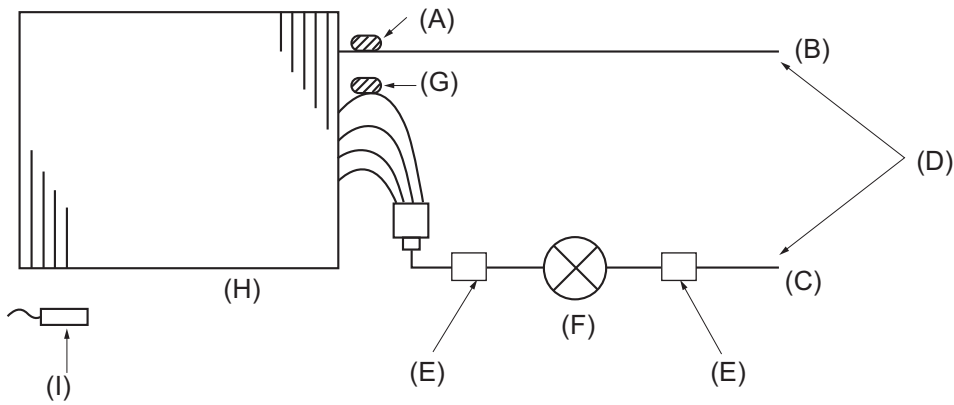


NOTE 1. Symbols used in wiring diagram are
 ○ ○ ○ ○ : Connector, □ : Terminal,
 --- (Heavy dotted line) : Field wiring,
 - - - (Thin dotted line) : Optional parts.
 2. Have all electric work done by a licensed electrician according to the local regulations.
 3. Earth leakage circuit breaker should be set up on the wiring of the power supply.

SYMBOL EXPLANATION

| SYMBOL | NAME | SYMBOL | NAME | SYMBOL | NAME |
|--------|---|--------|---------------------------------|--------|--|
| ACL | AC reactor(Power factor improvement) | I.B. | Indoor controller board | I.B. | Indoor controller board |
| MF | Fan Motor | SA | Arrester | SW1 | Switch (for mode selection) |
| LEV | Electrical linear expansion valve | F1 | Fuse AC250V 6.3A | SW2 | Switch (for capacity code) |
| TB2 | Power source terminal block | ZNR001 | Varistor | SW3 | Switch (for mode selection) |
| TB5 | Transmission terminal block | ZNR002 | Varistor | SW4 | Switch (for mode selection) |
| TB15 | Transmission terminal block | CN22 | Connector (Optional Thermistor) | SW11 | Switch (1s digit address set) |
| TH21 | Thermistor (inlet air temp. detection) | CN32 | Connector (Remote switch) | SW12 | Switch (10ths digit address set) |
| TH22 | Thermistor (piping temp.detection/liquid) | CN41 | Connector (HA terminal-A) | SW14 | Switch (BRANCH No.) |
| TH23 | Thermistor (piping temp.detection/gas) | CN51 | Connector (Centrally control) | SW21 | Switch (for static pressure selection) |
| | | CN52 | Connector (Remote indication) | SW22 | Switch (Wireless pair No.) |
| | | CN90 | Connector (Wireless) | SWE | Connector (emergency operation) |
| | | CN105 | Connector (IT terminal) | LED1 | LED(Power supply) |
| | | | | LED2 | LED(Remote controller supply) |

[1] Refrigerant system diagram



- (A) Gas pipe thermistor TH23
- (B) Gas pipe
- (C) Liquid pipe
- (D) Brazed connections
- (E) Strainer (#100 mesh)
- (F) Linear expansion valve
- (G) Liquid pipe thermistor TH22
- (H) Heat exchanger
- (I) Room temperature thermistor TH21

| Capacity | PFFY-P20, 25, 32, 40, 50VCM-E | PFFY-P63VCM-E |
|-------------|-------------------------------|---------------|
| Gas pipe | ø12.7 [1/2] | ø15.88 [5/8] |
| Liquid pipe | ø6.35 [1/4] | ø9.52 [3/8] |

[1] Troubleshooting

1. Check methods

1. Component and check points

(1) Thermistor

- Room temperature thermistor (TH21)
- Liquid pipe thermistor (TH22)
- Gas pipe thermistor (TH23)

Disconnect the connector and measure the resistance between terminals with a tester.
(Ambient temperature 10°C - 30°C)

| Normal | Abnormal |
|---------------|---------------|
| 4.3kΩ - 9.6kΩ | Open or short |

(Refer to the thermistor characteristic graph below.)

1) Thermistor characteristic graph

Low-temperature thermistor

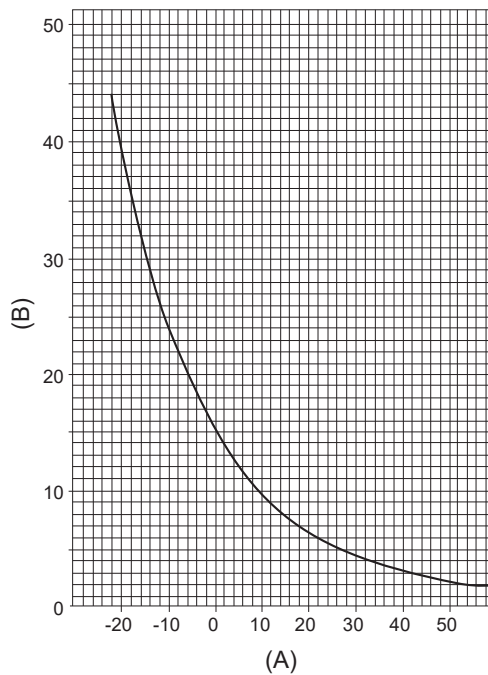
- Room temperature thermistor (TH21)
- Liquid pipe thermistor (TH22)
- Gas pipe thermistor (TH23)

- Thermistor $R_0 = 15 \text{ k}\Omega \pm 3\%$
- Multiplier of B = $3480 \text{ k}\Omega \pm 2\%$

$$R_t = 15 \exp \left\{ 3480 \left(\frac{1}{273+t} - \frac{1}{273} \right) \right\}$$

- 0°C 15kΩ
- 10°C 9.6kΩ
- 20°C 6.3kΩ
- 25°C 5.2kΩ
- 30°C 4.3kΩ
- 40°C 3.0kΩ

- (A) Temperature (°C)
- (B) Resistance (kΩ)



(2) Fan motor (CNMF)

Refer to the page on "DC fan motor (fan motor/indoor control board)."

(3) Linear expansion valve

Disconnect the connector, and measure the resistance between terminals with a tester.
Refer to the next page for details.

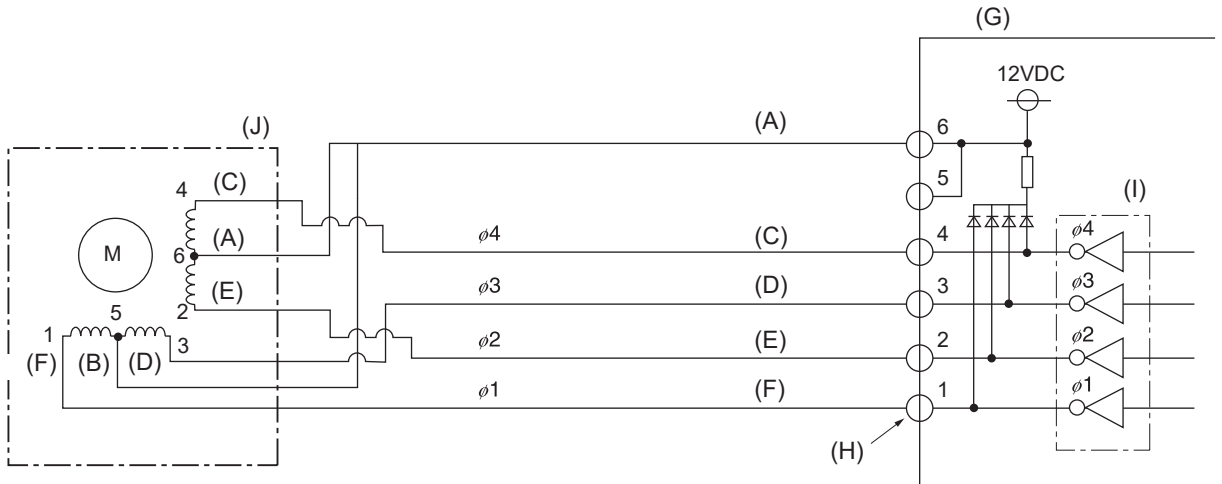
| | Normal | | | | Abnormal |
|--|------------------|-------------------|-------------------|-----------------|---------------|
| | 1-6 White-Red | 2-6 Yellow-Red | 3-6 Orange-Red | 4-6 Blue-Red | |
| | (150Ω) ± 10% | | | | Open or short |

- (A) Red
- (B) Blue
- (C) Orange
- (D) Orange
- (E) Yellow
- (F) White

1) Summary of linear expansion valve (LEV) operation

- The LEV is operated by a stepping motor, which operates by receiving a pulse signal from the indoor control board.
- The LEV position changes in response to the pulse signal.

Indoor control board and LEV connection



- | | |
|------------|----------------------------|
| (A) Red | (G) Control board |
| (C) Blue | (H) Connection (CN60) |
| (D) Orange | (I) Drive circuit |
| (E) Yellow | (J) Linear expansion valve |
| (F) White | |

Pulse signal output and valve operation

| Phase number | Output pulse | | | |
|--------------|--------------|-----|-----|-----|
| | 1 | 2 | 3 | 4 |
| ø1 | ON | OFF | OFF | ON |
| ø2 | ON | ON | OFF | OFF |
| ø3 | OFF | ON | ON | OFF |
| ø4 | OFF | OFF | ON | ON |

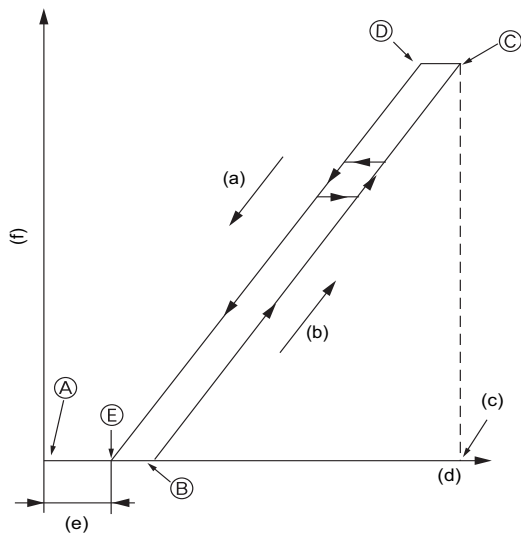
The output pulse changes in the following order:

When the valve closes 1 -> 2 -> 3 -> 4 -> 1

When the valve opens 4 -> 3 -> 2 -> 1 -> 4

- When the valve position remains the same, all output signals will be OFF.
- If any output signal is missing or if the signal remains ON, the motor vibrates and makes clicking noise.

2) LEV operation

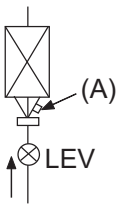


- (a) Close
- (b) Open
- (c) Fully open valve (2000 pulses)
- (d) No. of pulses
- (e) Extra tightning (0 - 200 pulse)
- (f) Valve opening degree

- When the power is turned on, a pulse signal of 2200 pulses is output (valve closure signal), to bring the valve to position A.
- When the valve is operating normally, it is free of vibration noise. If the valve locks or when it goes from point E to A in the figure, it makes louder noise than would be heard when there is an open phase.
- Check for abnormal sound/vibration by placing the metal tip of a screwdriver against the valve and the handle side against your ear.

3) Troubleshooting

| Symptom | Checking Criteria | Remedy |
|---|--|--|
| Circuit failure on the microcomputer | <p>Disconnect the connectors on the control board, and connect LEDs to test the circuit as shown below.</p> <p>Pulse signals are output for 10 seconds when the main power is turned on. If there are LEDs that do not light up at all or remain lit after the pulses are turned off, there is a problem with the driving circuit.</p> | Replace the indoor control board if driving circuit failure is detected. |
| Locked LEV | The motor will idle and make small clicking noise if it is run while the LEV is locked. If this clicking noise is heard both when the valve is fully closed and while it is being opened, it indicates a problem. | Replace the LEV. |
| Disconnected or shorted LEV motor coils | Measure the resistance between the coils with a tester (red-white, red-orange, brown-yellow, brown-blue). The normal range of resistance is $150 \Omega \pm 10\%$ | Replace the LEV. |

| Symptom | Checking Criteria | Remedy |
|---|--|---|
| Valve closure failure (leaky valve) | <p>To check the LEV on the indoor unit, check the indoor unit liquid pipe temperature that appears on the operation monitor on the outdoor unit's multi control board while operating the indoor unit in question in the FAN mode and the other indoor units in the cooling mode.</p> <p>(A) Thermistor (TH22)</p>  <p>Normally, the LEV is fully closed while the unit is in the FAN mode. If the valve is leaky, liquid pipe thermistor reading will be lower than normal. If it is significantly lower than the inlet temperature on the remote controller, valve closure failure is suspected. If the amount of leakage is insignificant, replacement of LEV is unnecessary unless it is causing a problem.</p> | Replace the LEV if the amount of leakage is great. |
| Misconnections of connectors or contact failure | Perform a visual check for disconnected connectors. Perform a visual check of lead wire color. | Disconnect the connectors on the control board and perform a continuity test. |

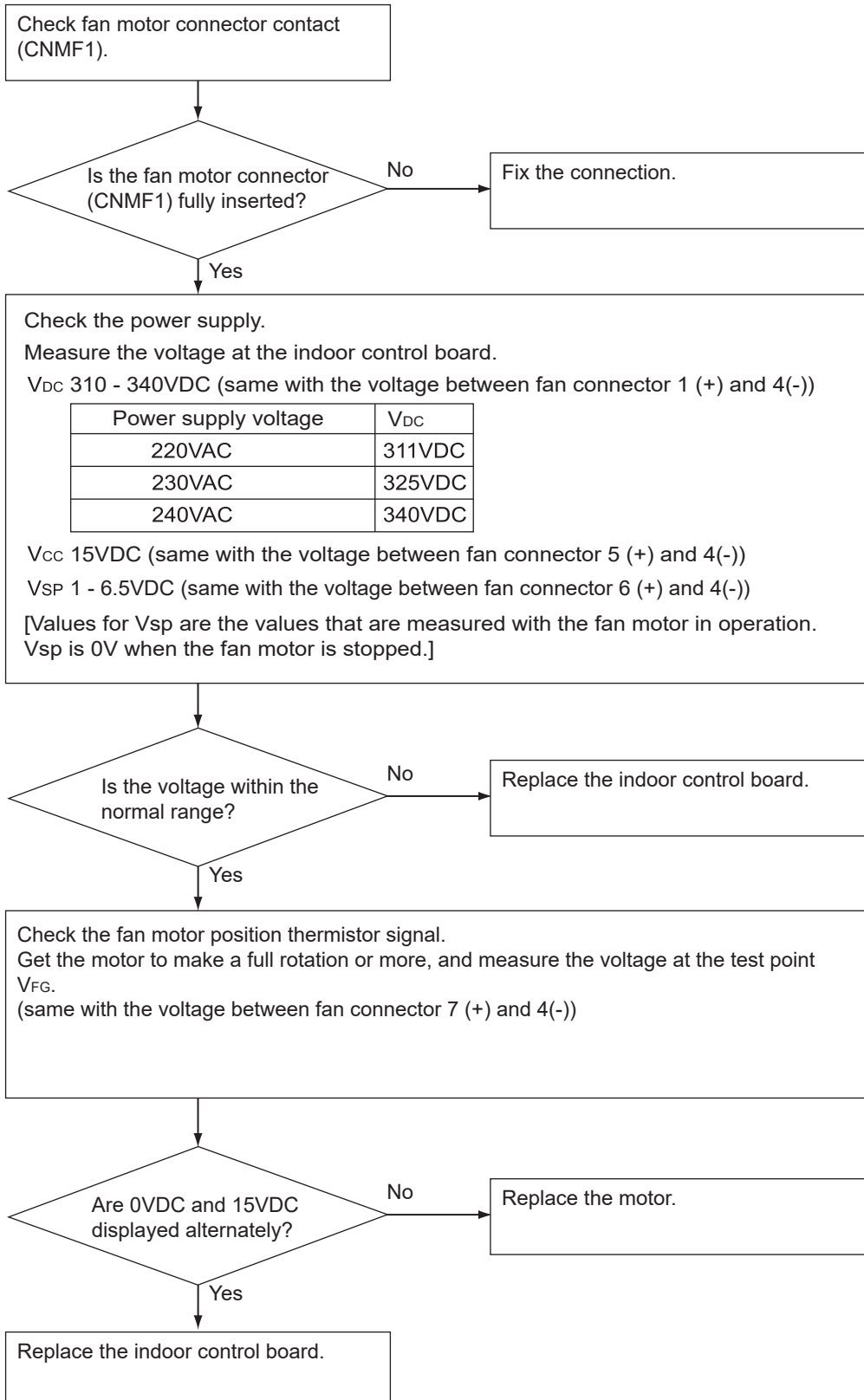
2. DC fan motor (fan motor/indoor control board)

1. CAUTION

- A high voltage is applied to the connector for connection to the fan motor (CNMF1).
- Do not unplug the connector CNMF1 with the unit energized to avoid damage to the indoor control board and fan motor.

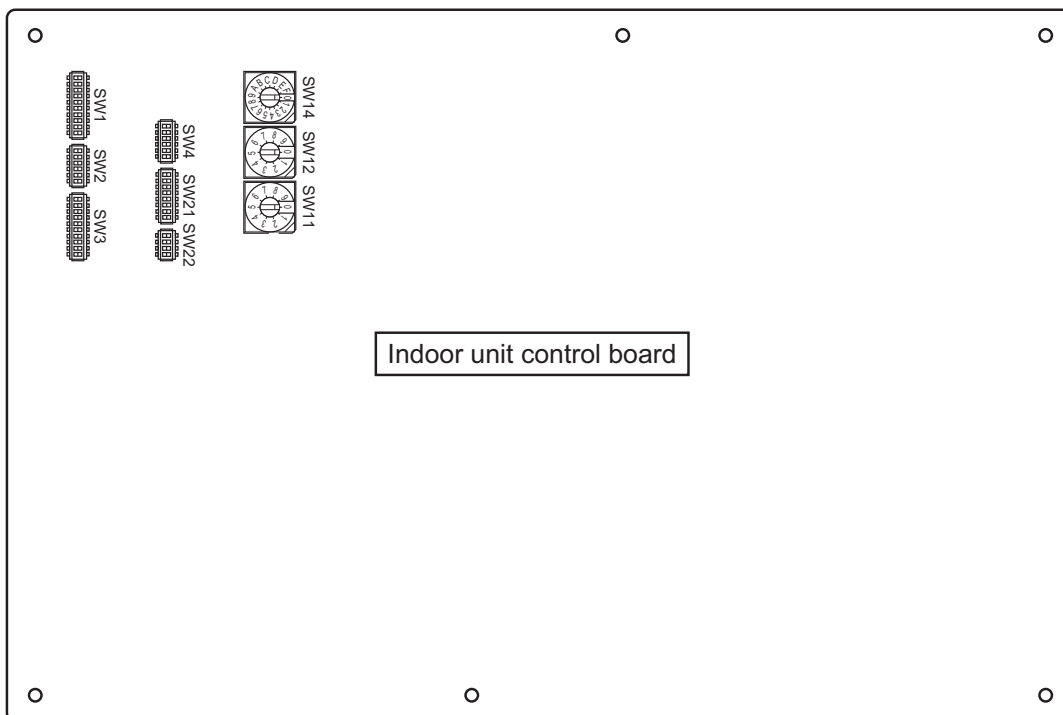
2. Troubleshooting

- Symptom: Indoor unit fan does not run.



3. Setting of address switch

Make sure that power source is turning off.



- 1) In case using network remote controller, address is set by rotary switches. (SW11,SW12)

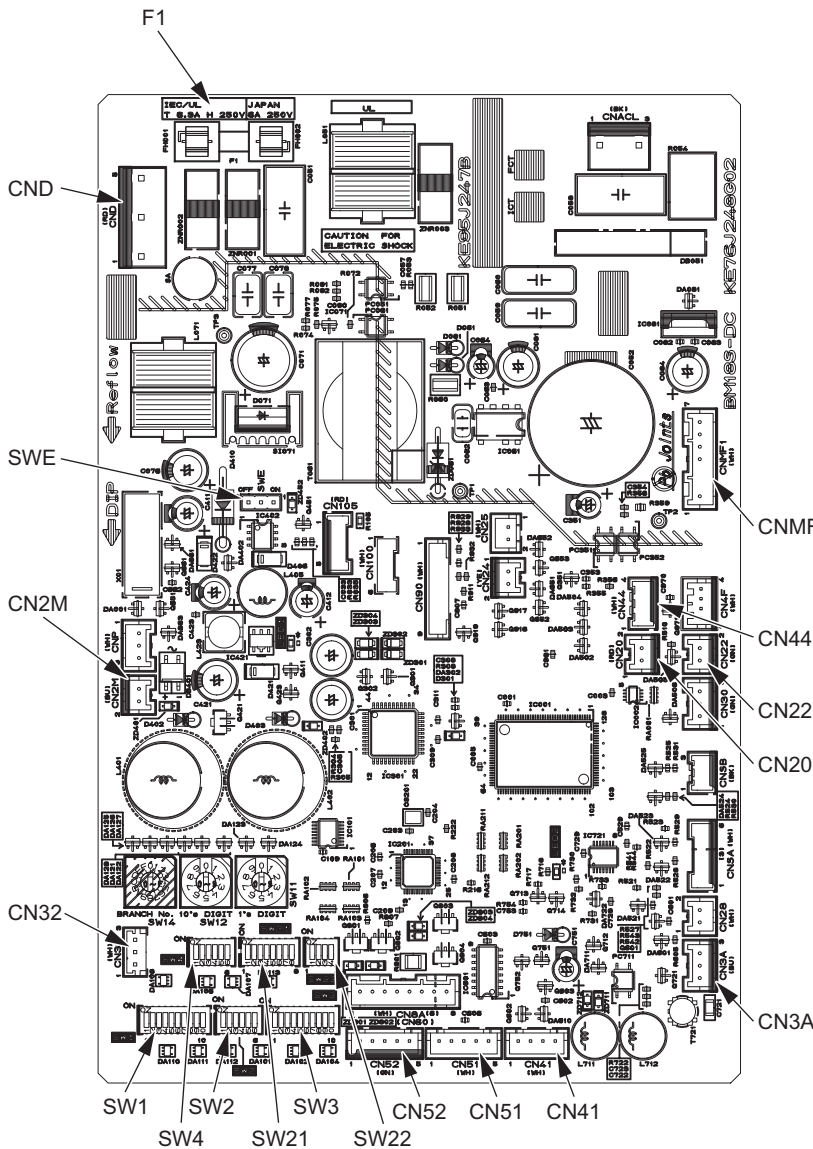
*It is not necessary setting address in case of using unit remote controller.

Indoor unit do not run without address setting in field.

- 2) Indoor unit address setting rule is different by each field work.
Refer to install manual of outdoor unit, operate the address setting.
- 3) Setting the address is combination of SW11 (1st digit address setting) and SW12 (2nd digit address setting).
Address " 3 " setting is composed SW11 " 3 " and SW12 " 0 ".
Address " 25 " setting is composed SW11 " 5 " and SW12 " 2 ".

4. Voltage test points on the control board

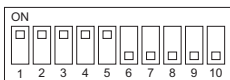
1. PFFY-P20, 25, 32, 40, 50, 63VCM-E



- F1 Fuse (AC 250V 6.3A)
- CND Power supply voltage (220 - 240VAC)
- CN2M For M-NET transmission cable connection (24 - 30VDC)
- SWE Emergency operation
- SW2 Capacity setting
- SW4 Function setting
- SW3 Function setting
- CN32 Remote start/stop adapter
- CN3A For MA remote controller cable connection (10 - 13 VDC (Between 1 and 3.))
- CN52 Remote display
- CNMF1 Centralized control
- CN41 JAMA standard HA terminal A
- CN44 Thermistor (liquid/gas temperature)
- CN20 Thermistor (Inlet temperature)
- CNMF1 Fan motor output
 - 1 - 4: 294 - 340 VDC
 - 5 - 4: 15 VDC
 - 6 - 4: 0 - 6.5 VDC
 - 7 - 4: Stop 0 or 15 VDC
 - Run 7.5 VDC (0 - 15 pulse)
- (*1)
 - V_{FG} Voltage on 3 of PC352 and the (-) side of C081 (Same with the voltage between 7 (+) and 4 (-) of CNMF)
 - V_{CC} Voltage between the C084 pins 15 VDC (Same with the voltage between 5 (+) and 4 (-) of CNMF)
 - V_{sp} Voltage between the C351 pins 0VDC (with the fan stopped) 1 - 6.5VDC (with the fan in operation) (Same with the voltage between 6 (+) and 4 (-) of CNMF)

5. Setting of Dip-switch (at delivery)

| Models | SW1 | SW2 | SW3 | SW4 | SW21 | SW22 | SWE |
|---------------|-----|-----|-----|-----|------|------|-----|
| PFFY-P20VCM-E | | | | | | | |
| PFFY-P25VCM-E | | | | | | | |
| PFFY-P32VCM-E | | | | | | | |
| PFFY-P40VCM-E | | | | | | | |
| PFFY-P50VCM-E | | | | | | | |
| PFFY-P63VCM-E | | | | | | | |



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

6. Function setting

(1) SW1

| Switch position | Function | Switch setting | |
|-----------------|---|--|------------------------------|
| | | ON | OFF |
| 1 | Active Thermistor (Intake air thermistor) | Built-in thermistor on the remote controller | Indoor unit |
| 2 | Filter clogging detection | Available | Unavailable |
| 3 | Filter life | 2500 hr | 100 hr |
| 4 | - | - | - |
| 5 | Remote display | Thermo-ON signal | Fan output |
| 6 | - | - | - |
| 7 | Fan speed | Low | Very low |
| 8 | Fan speed at heating Thermo-OFF | Press for speed | Follows the setting of SW1-7 |
| 9 | Auto restart after power failure | Enabled | Disabled |
| 10 | Power start/stop | Enabled | Disabled |

(2) SW3

| Switch position | Function | Switch setting | |
|-----------------|-----------|----------------|-----------|
| | | ON | OFF |
| 1 | Unit type | Cooling only | Heat pump |
| 2 | - | - | - |
| 3 | - | - | - |
| 4 | - | - | - |
| 5 | - | - | - |
| 6 | - | - | - |
| 7 | - | - | - |
| 8 | - | - | - |
| 9 | - | - | - |
| 10 | - | - | - |

7. Selecting the external static pressure

Four levels of external static pressure (0 Pa/10 Pa/40 Pa/60 Pa) are available for selection.

Set the setting either by using the switches on the control board (SW21-1, SW21-2, and SW21-5) or from the function selection screen on the remote controller.

Note:

- ◆When the static pressure setting was set from the remote controller, the actual setting and the switch setting on the control board may not match because the latest setting from the remote controller overrides the previous setting. To check the latest static pressure setting, check it on the remote controller, not on the switch.
- ◆If the static pressure setting for the duct is lower than that for the unit, the fan of the unit may repeat start/stop, and the outdoor unit may remain in a stopped state. Match the static pressure settings for the unit to that for the duct.

To set the external static pressure with the switches on the control board

| External static pressure | SW21-1 | SW21-2 | SW21-5 |
|--------------------------|--------|--------|--------|
| 0 Pa | OFF | ON | ON |
| 10 Pa | OFF | ON | OFF |
| 40 Pa | OFF | OFF | OFF |
| 60 Pa | ON | OFF | OFF |

To set the external static pressure from the function selection screen on the remote controller

Follow the instructions below and the instructions detailed in the remote controller manual for how to set the switches.

1. Set the function setting No. 32 (Switch setting/Function selection) to "2".
2. Set the function setting No. 8 and No. 10 to appropriate values, according to the external static pressure.

| External static pressure setting | Function setting No. | | Initial setting | Current setting |
|----------------------------------|----------------------|--------|-----------------|-----------------|
| | No. 8 | No. 10 | | |
| 0 Pa | 1 | 2 | | |
| 10 Pa | 1 | 1 | ○ | |
| 40 Pa | 2 | 1 | | |
| 60 Pa | 3 | 1 | | |

[Important]

Be sure to write down the settings for all functions in the "Current setting" row if any of the initial settings has been changed.

8. Setting addresses

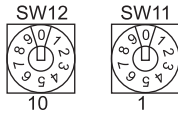
(Be sure to operate with the main power turned OFF.)

- There are two types of rotary switch setting available: setting addresses 1 to 9 and over 10, and setting branch numbers.

1) How to set addresses

Example: If Address is "3", remain SW12 (for over 10) at "0", and match SW11 (for 1 to 9) with "3".

Factory setting



2) How to set branch numbers SW14 (Series R2 only)

The branch number assigned to each indoor unit is the port number of the BC controller to which the indoor unit is connected.

Leave it to "0" on the non-R2 series of units.

Factory setting



- The rotary switches are all set to "0" when shipped from the factory. These switches can be used to set unit addresses and branch numbers at will.
- The determination of indoor unit addresses varies with the system at site. Set them referring to the Data Book.

9. Setting of intermittent fan control

When the unit is used in a high temperature and humidity environment, set the function setting No. 119 to "2."
(Default setting: "1")



CAUTION

When the setting is enabled, the stopped fan may start operating.

10. Function the LED of the indoor unit service board

| Symbol | Silk display | LED operation under normal state |
|--------|---------------------------|---|
| LED1 | Main power source | At applying main power source (indoor unit 200V) → Lighting |
| LED2 | Transmission power source | At receiving M-NET transmission power source → Lighting |

[1] Disassembly Procedure

1. Control box

Be careful removing heavy parts.

1. Removing the control box cover

(1) Remove the fixing screws (three) of the control box, and remove the cover (A). (Fig.1)

*At this stage, the following servicing is possible. (Fig.2)

1) Operation and check of the switches (listed below) which are on the control board.

- Dip switch SW1 Function change
- Dip switch SW2 Capacity code setting
- Dip switch SW3 Function change
- Dip switch SW4 Model code setting
- Dip switch SW21 Static pressure setting
- Dip switch SW22 Function setting
- Rotary switches SW11, 12 Address setting
- Rotary switch SW14 Branch port setting

2) Connection check of the lead wires (listed below) which are connected to the controller board.

- Power supply lead wire.
- Network remote controller transmission lead wire.
- Fan motor lead wire.
- LEV lead wire
- Intake air sensor lead wire
- Liquid piping sensor lead wire
- Gas piping sensor lead wire

3) Control board exchange

4) Condenser exchange

5) Fuse (Fuse holder) exchange

6) Relay exchange

7) Intake air sensor exchange

8) Power supply terminal bed exchange

9) Transmission terminal bed exchange x 2

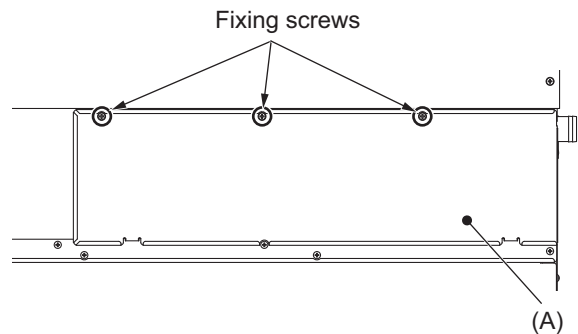


Fig.1

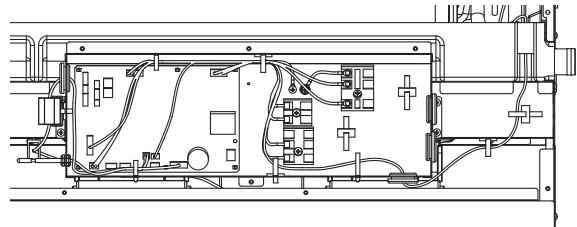


Fig.2

2. Thermistor (Intake air)

Be careful removing heavy parts.

1. Remove the control box cover (A) according with procedure [1]-1.
2. Remove the thermistor.
(1) Pull out the thermistor holder (B) and thermistor (C) on the control box in Fig. 3.

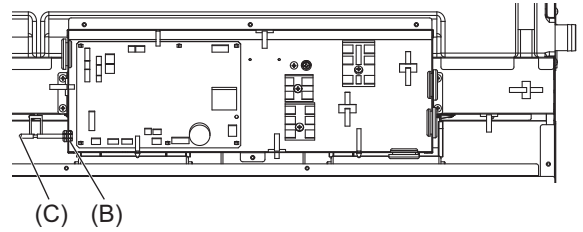


Fig.3

3. Drain pan

Be careful removing heavy parts.

1. Remove the control box cover (A) with procedure [1]-1.
2. Remove the fixing screws on the front plate (D), (E) to remove it. (Fig. 4)

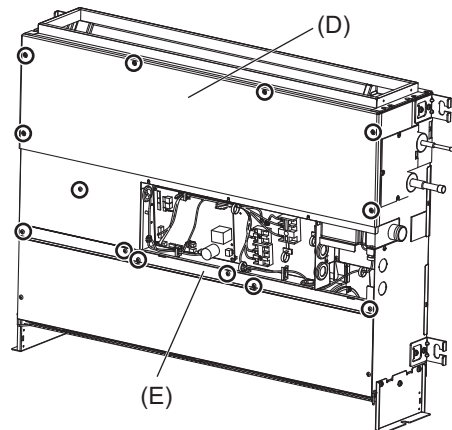


Fig.4

3. Remove the fixing screws on the control box (F), to remove it. (Fig. 5)

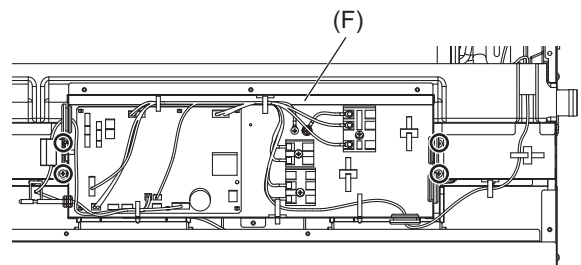


Fig.5

4. Removing the drain pan
 - (1) Drain the water out of the drain pan before removing it.
 - (2) Pull out the drain pan in the direction of the arrow. (Fig. 6)

(a) Drain pan

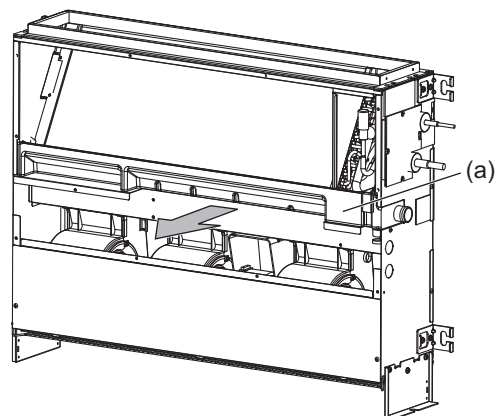


Fig.6

Note:

•To avoid dew condensation, use insulated screws in the places marked with circles in Fig. 7.

(a) Insulation material

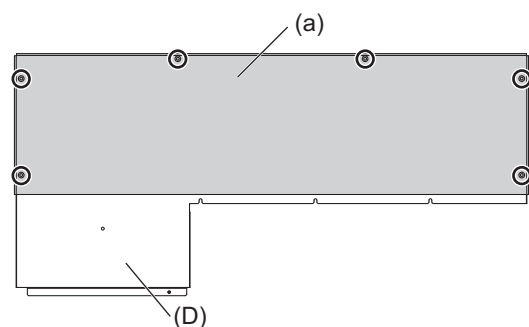


Fig.7

4. LEV, thermistor (Liquid/Gas piping temperature detection)

Be careful removing heavy parts.

1. Removing the LEV.
 - (1) Remove the control box cover (A) with procedure [1]-1.
 - (2) Remove the front plate (D) with procedure [1]-3.
 - (3) Remove the LEV driving motor. (Fig.8)

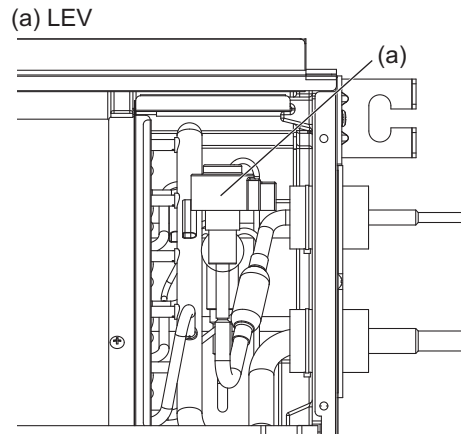


Fig.8

2. Removing the liquid pipe and gas pipe thermistor.
 - (1) Remove the front plate (E) with procedure [1]-3.
 - (2) Remove the control box (F) with procedure [1]-3.
 - (3) Pull out the drain pan with procedure [1]-3.
 - (4) Remove a fixing screw on the heat exchanger cover (G) to remove it. (Fig.9)

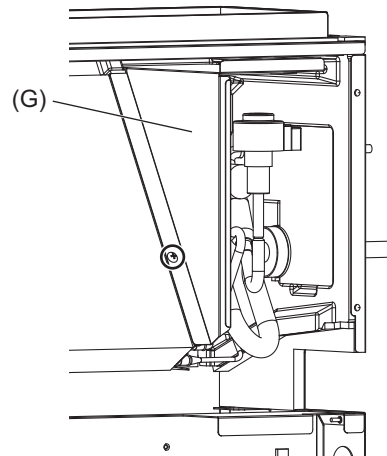


Fig.9

- (5) Remove the thermistor (H) from the thermistor holder (J) on the copper tube. (Fig.10)

Thermistor size
Liquid pipe: $\varnothing 8\text{mm}$
Gas pipe: $\varnothing 6\text{mm}$

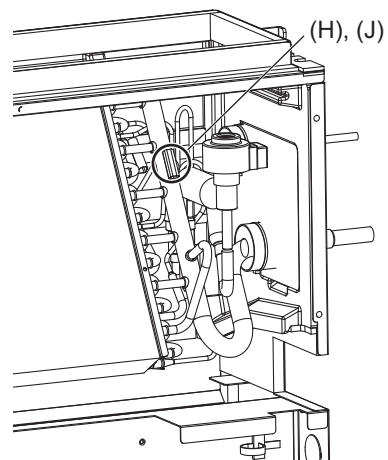


Fig.10

5. Fan and fan motor

Be careful removing heavy parts.

1. Removing the LEV.

- (1) Push down the tab on the filter, and pull out the filter in the direction of the arrow. (Fig.11)
- (2) Remove the control box cover (A) with procedure [1]-1.
- (3) Remove the front plate (D), (E) with procedure [1]-3.
- (4) Remove the fixing screws on the control box (F) with procedure [1]-3.
- (5) Remove the fixing screws on the front plate (K) to remove it. (Fig. 11)

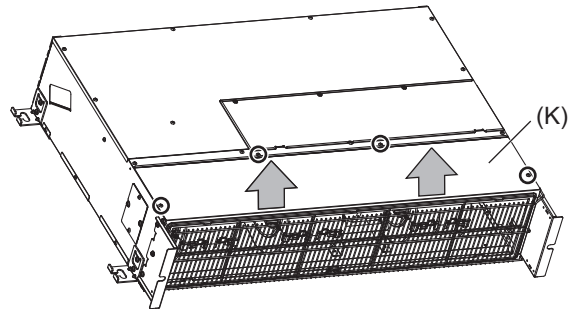


Fig.11

2. Removing the fan casing (bottom half)

- (1) Squeeze the tabs on the fan casing to remove it in the direction of arrow. (Fig. 12)

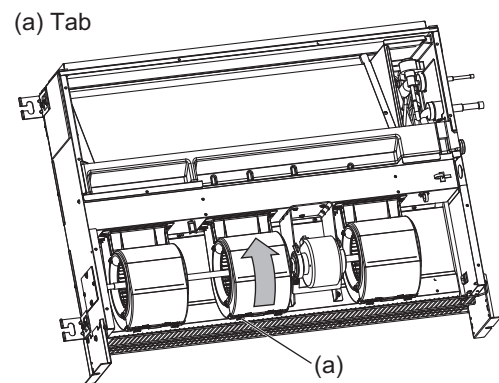


Fig.12

3. Removing the motor cable

- (1) Remove the motor cable through the rubber bush.

4. Removing the fan motor and the Sirocco fan

- (1) Remove the four fan guard (L) screws to remove it. (Fig. 13)
- (2) Remove the two motor fixing screws to remove the motor and the Sirocco fan in the direction of arrow. (Fig. 13)

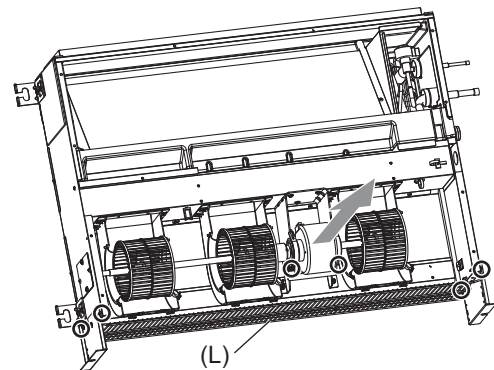


Fig.13

- (3) Remove the fan case fixing screws to take the top half of the fan casing off. (Fig. 14)

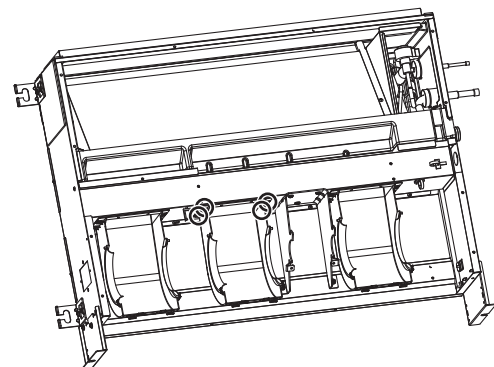


Fig.14

6. Bearing

P40, P50, P63 models only.

Be careful removing heavy parts.

1. Removing the bearing
 - (1) Remove the two fixing screws on the bearing cover (M) to remove it. (Fig. 15)

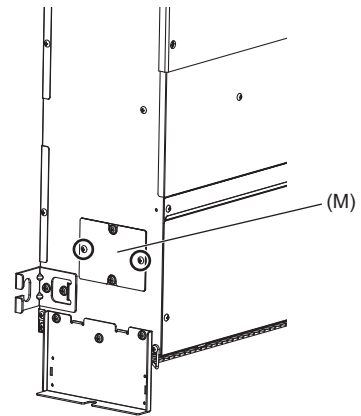


Fig.15

- (2) Remove the two bearing retainer screws to remove the bearing. (Fig. 16)

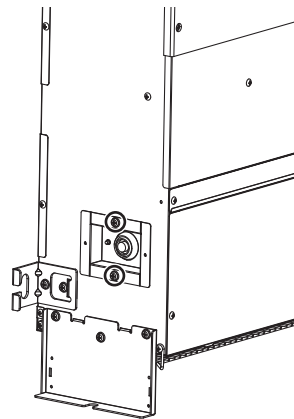


Fig.16

7. Heat exchanger

Be careful removing heavy parts.

1. Removing the control box cover, front plate, control box and drain pan
 - (1) Remove the control box cover (A) with procedure [1]-1.
 - (2) Remove the front plate (D), (E) with procedure [1]-3.
 - (3) Remove the control box (F) with procedure [1]-3.
 - (4) Pull out the drain pan with procedure [1]-3.
2. Remove the heat exchanger cover
 - (1) Remove the heat exchanger cover (G) with procedure [1]-4.
3. Removing the cover
 - (1) Remove the three fixing screws on the cover (N) to remove it. (Fig.17)
4. Removing the Heat exchanger
 - (1) Remove the fixing screws on the heat exchanger (P) to remove it (Fig.18, 19).

*Removed heat exchanger is as shown Fig. 20

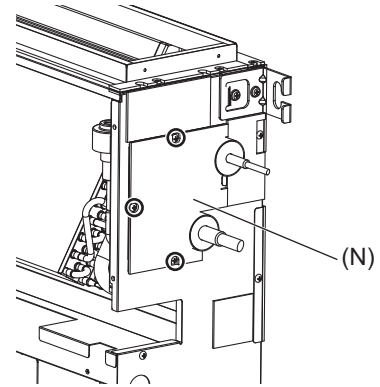


Fig.17

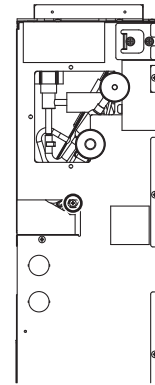


Fig.18

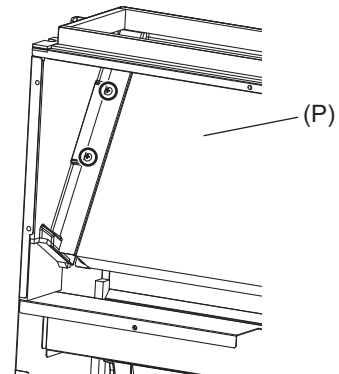


Fig.19

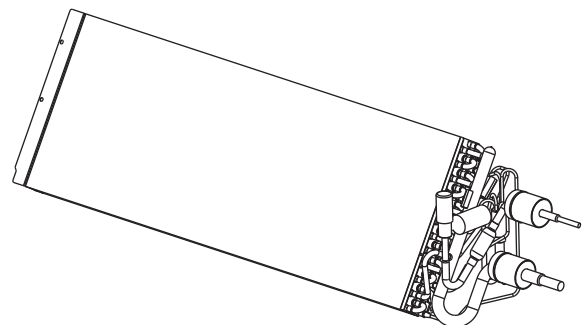


Fig.20

Note:

- In order to attach and fix the heat exchanger, insert the hook (a) on the heat exchanger (Fig. 21) to (b) (Fig. 22).

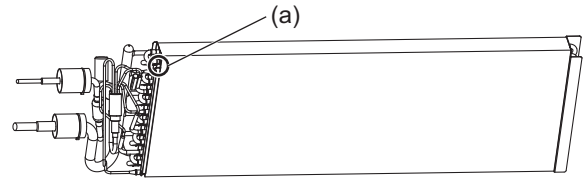


Fig.21

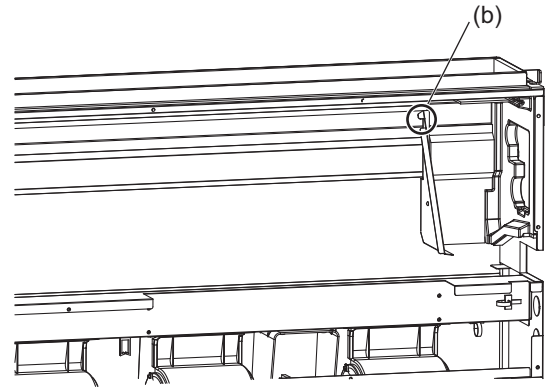
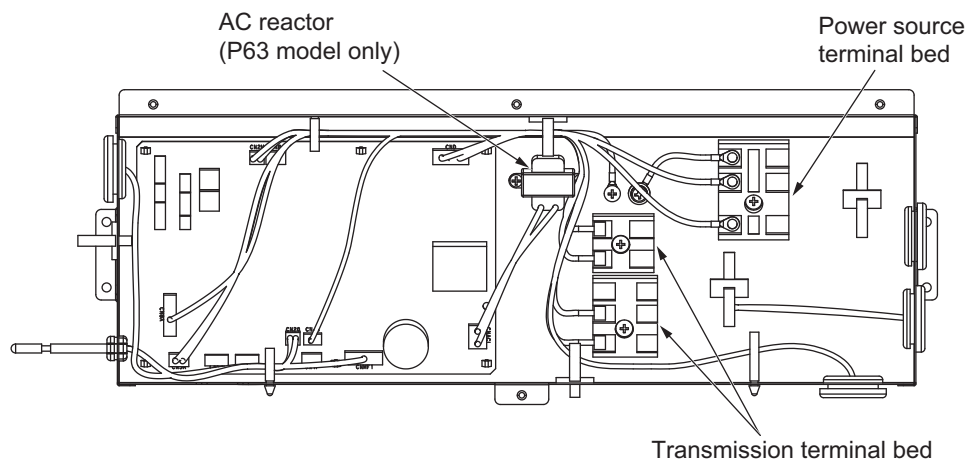


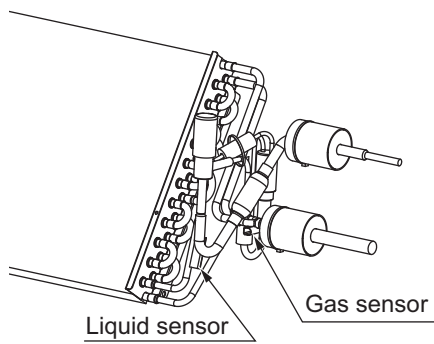
Fig.22

8. Control box inside layout

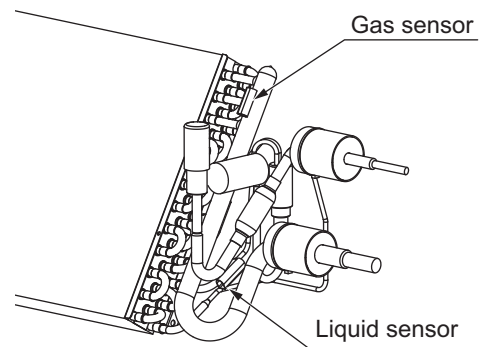


9. Sensor position

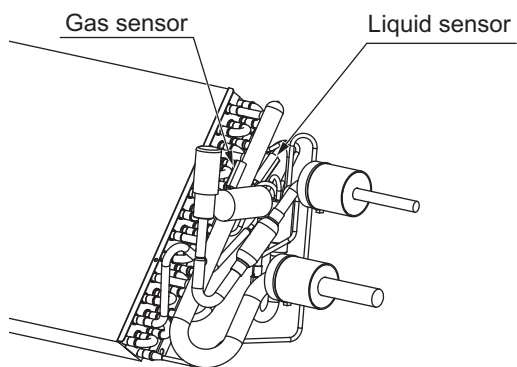
PFFY-P20, 25VCM-E



PFFY-P32VCM-E



PFFY-P40, 50, 63VCM-E



mitsubishi electric corporation

www.MitsubishiElectric.com
