

Air-Conditioners For Building Application

2004

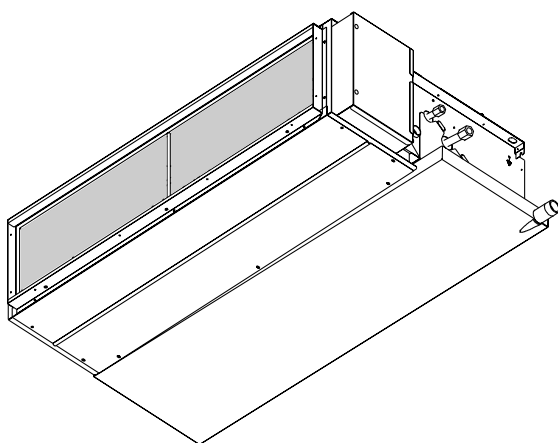
# TECHNICAL & SERVICE MANUAL

## Series PEFY Ceiling Concealed

<Indoor unit>

Models

**PEFY-P20VMM-E, PEFY-P71VMM-E  
PEFY-P25VMM-E, PEFY-P80VMM-E  
PEFY-P32VMM-E, PEFY-P100VMM-E  
PEFY-P40VMM-E, PEFY-P125VMM-E  
PEFY-P50VMM-E, PEFY-P140VMM-E  
PEFY-P63VMM-E**



INDOOR UNIT

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# CITY MULTI

For use with R410A & R407C & R22

# SAFETY PRECAUTIONS

## 1. Before installation and electric work

- ▶ **Before installing the unit, make sure you read all the “Safety precautions”.**
- ▶ **The “Safety precautions” provide very important points regarding safety. Make sure you follow them.**
- ▶ **This equipment may not be applicable to EN61000-3-2: 1995 and EN61000-3-3: 1995.**
- ▶ **This equipment may cause the adverse effect on the same supply system.**
- ▶ **Please report to or take consent by the supply authority before connection to the system.**

### Symbols used in the text






#### **Warning:**

Describes precautions that should be observed to prevent danger of injury or death to the user.

#### **Caution:**

Describes precautions that should be observed to prevent damage to the unit.

### Symbols used in the illustrations

-  : Indicates an action that must be avoided.
-  : Indicates that important instructions must be followed.
-  : Indicates a part which must be grounded.
-  : Indicates that caution should be taken with rotating parts. (This symbol is displayed on the main unit label.) <Color: Yellow>
-  : Beware of electric shock (This symbol is displayed on the main unit label.) <Color: Yellow>

#### **Warning:**

**Carefully read the labels affixed to the main unit.**

#### **Warning:**

- **Ask the dealer or an authorized technician to install the air conditioner.**
  - Improper installation by the user may result in water leakage, electric shock, or fire.
- **Install the air unit at a place that can withstand its weight.**
  - Inadequate strength may cause the unit to fall down, resulting in injuries.
- **Use the specified cables for wiring. Make the connections securely so that the outside force of the cable is not applied to the terminals.**
  - Inadequate connection and fastening may generate heat and cause a fire.
- **Prepare for typhoons and other strong winds and earthquakes and install the unit at the specified place.**
  - Improper installation may cause the unit to topple and result in injury.
- **Always use an air cleaner, humidifier, electric heater, and other accessories specified by Mitsubishi Electric.**
  - Ask an authorized technician to install the accessories. Improper installation by the user may result in water leakage, electric shock, or fire.

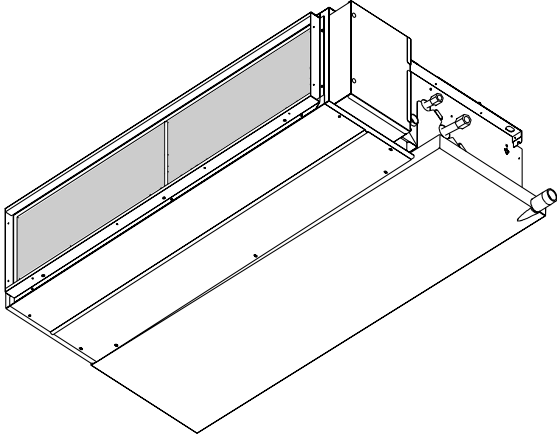
- **Never repair the unit. If the air conditioner must be repaired, consult the dealer.**
  - If the unit is repaired improperly, water leakage, electric shock, or fire may result.
- **Do not touch the heat exchanger fins.**
  - Improper handling may result in injury.
- **If refrigerant gas leaks during installation work, ventilate the room.**
  - If the refrigerant gas comes into contact with a flame, poisonous gases will be released.
- **Install the air conditioner according to this Installation Manual.**
  - If the unit is installed improperly, water leakage, electric shock, or fire may result.
- **Have all electric work done by a licensed electrician according to “Electric Facility Engineering Standard” and “Interior Wire Regulations” and the instructions given in this manual and always use a separate circuit.**
  - If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.
- **Keep the electric parts away from water (washing water etc.).**
  - It might result in electric shock, catching fire or smoke.
- **Securely install the cover of control box and the panel.**
  - If the cover and panel are not installed properly, dust or water may enter the outdoor unit and fire or electric shock may result.
- **When installing and moving the air conditioner to another site, do not charge it with a refrigerant different from the refrigerant specified on the unit.**
  - If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.
- **If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit even if the refrigerant should leak.**
  - Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, hazards due to lack of oxygen in the room could result.
- **When moving and reinstalling the air conditioner, consult the dealer or an authorized technician.**
  - If the air conditioner is installed improperly, water leakage, electric shock, or fire may result.
- **After completing installation work, make sure that refrigerant gas is not leaking.**
  - If the refrigerant gas leaks and is exposed to a fan heater, stove, oven, or other heat source, it may generate noxious gases.
- **Do not reconstruct or change the settings of the protection devices.**
  - If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result.
- **To dispose of this product, consult your dealer.**
- **Do not use a leak detection additive.**

## 2. Precautions for devices that use R410A or R407C refrigerant

### Caution:

- **Do not use the existing refrigerant piping.**
  - The old refrigerant and refrigerator oil in the existing piping contains a large amount of chlorine which may cause the refrigerator oil of the new unit to deteriorate.
- **Use refrigerant piping made of phosphorus deoxidized copper. In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulphur, oxides, dust/dirt, shaving particles, oils, moisture, or any other contaminant.**
  - Contaminants on the inside of the refrigerant piping may cause the refrigerant residual oil to deteriorate.
- **Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing. (Store elbows and other joints in a plastic bag.)**
  - If dust, dirt, or water enters the refrigerant cycle, deterioration of the oil and compressor trouble may result.
- **Use ester oil, ether oil or alkylbenzene (small amount) as the refrigerator oil to coat flares and flange connections.**
  - The refrigerator oil will degrade if it is mixed with a large amount of mineral oil.
- **Use liquid refrigerant to fill the system.**
  - If gas refrigerant is used to seal the system, the composition of the refrigerant in the cylinder will change and performance may drop.
- **Do not use a refrigerant other than R410A or R407C.**
  - If another refrigerant (R22, etc.) is used, the chlorine in the refrigerant may cause the refrigerator oil to deteriorate.
- **Use a vacuum pump with a reverse flow check valve.**
  - The vacuum pump oil may flow back into the refrigerant cycle and cause the refrigerator oil to deteriorate.
- **Do not use the following tools that are used with conventional refrigerants. (Gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, refrigerant recovery equipment.)**
  - If the conventional refrigerant and refrigerator oil are mixed in the R410A or R407C, the refrigerant may deteriorate.
  - If water is mixed in the R410A or R407C, the refrigerator oil may deteriorate.
  - Since R410A or R407C does not contain any chlorine, gas leak detectors for conventional refrigerants will not react to it.
- **Do not use a charging cylinder.**
  - Using a charging cylinder may cause the refrigerant to deteriorate.
- **Be especially careful when managing the tools.**
  - If dust, dirt, or water gets in the refrigerant cycle, the refrigerant may deteriorate.

## Series PEFY Ceiling Concealed



Indoor unit

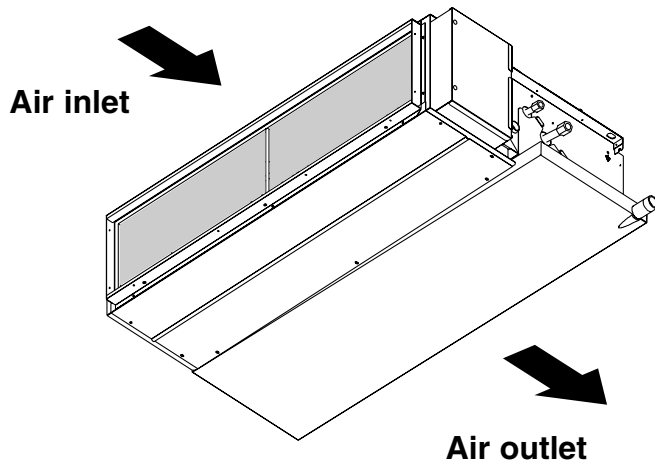
Models	Cooling capacity/Heating capacity
	kW
PEFY-P20VMM-E	2.2/ 2.5
PEFY-P25VMM-E	2.8/ 3.2
PEFY-P32VMM-E	3.6/ 4.0
PEFY-P40VMM-E	4.5/ 5.0
PEFY-P50VMM-E	5.6/ 6.3
PEFY-P63VMM-E	7.1/ 8.0
PEFY-P71VMM-E	8.0/ 9.0
PEFY-P80VMM-E	9.0/ 10.0
PEFY-P100VMM-E	11.2/ 12.5
PEFY-P125VMM-E	14.0/ 16.0
PEFY-P140VMM-E	16.0/ 18.0

## 2

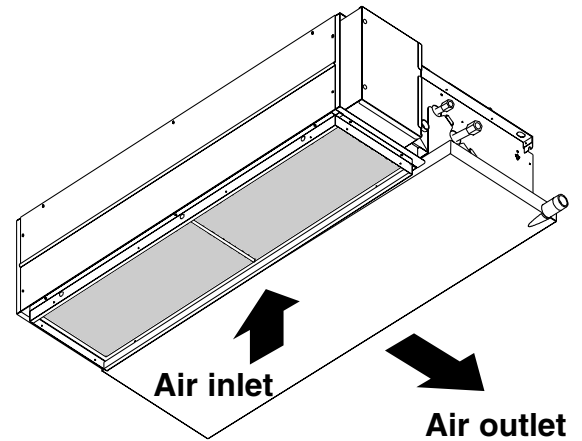
# PART NAMES AND FUNCTIONS

### ● Indoor (Main) Unit

[In case of rear inlet]



[In case of bottom inlet]

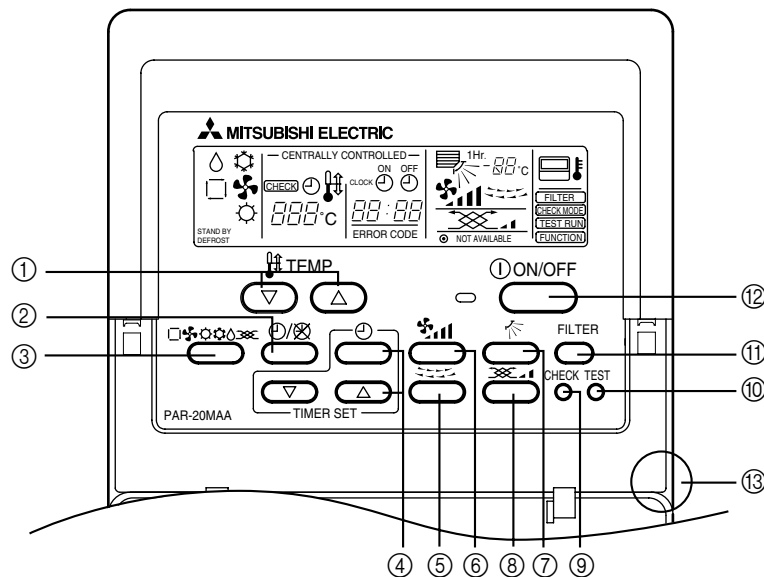


### ● Remote controller

#### [PAR-20MAA]

- Once the controls are set, the same operation mode can be repeated by simply pressing the ON/OFF button.

### ● Operation buttons



① [Room temperature adjustment] Button

② [Timer/continuous] Button

③ [Selecting operation] Button

④ [Time selection] Button  
[Time-setting] Button

⑤ [Louver] Button

⑥ [Fan speed adjustment] Button

⑦ [Up/down airflow direction] Button

⑧ [Ventilation] Button

⑨ [Checking/built-in] Button

⑩ [Test run] Button

⑪ [Filter] Button

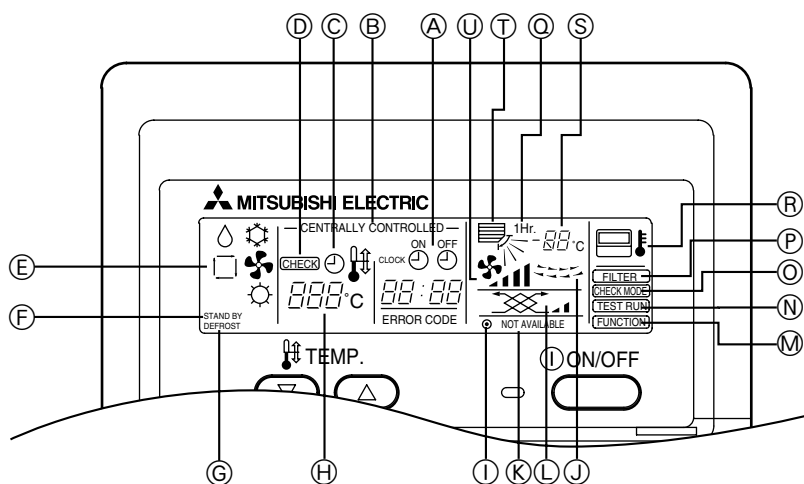
⑫ [ON/OFF] Button

⑬ Position of built-in room temperature sensor

- Never expose the remote controller to direct sunlight. Doing so can result in the erroneous measurement of room temperature.

- Never replace any obstacle around the lower right-hand section of the remote controller. Doing so can result in the erroneous measurement of room temperature.

## ● Display



- (A) Current time/Timer
- (B) Centralized control
- (C) Timer ON
- (D) Abnormality occurs
- (E) Operation mode: COOL, DRY, AUTO, FAN, HEAT
- (F) Preparing for Heating mode
- (G) Defrost mode
- (H) Set temperature
- (I) Power ON
- (J) Louver
- (K) Not available function
- (L) Ventilation
- (M) Function setting mode
- (N) Test run mode
- (O) Error check mode
- (P) Filter sign
- (Q) Set effective for 1 hr.
- (R) Sensor position
- (S) Room temperature
- (T) Airflow
- (U) Fan speed

# 3

# SPECIFICATION

## 3-1. Specification

Item \ Model			PEFY-P20 VMM-E	PEFY-P25 VMM-E	PEFY-P32 VMM-E	PEFY-P40 VMM-E	PEFY-P50 VMM-E	PEFY-P63 VMM-E	
Power source	Voltage	~V	220-240						
	Frequency	Hz	50						
Cooling capacity		kW	2.2	2.8	3.6	4.5	5.6	7.1	
Heating capacity		kW	2.5	3.2	4.0	5.0	6.3	8.0	
Power consumption	Cooling	kW	0.15		0.17	0.19	0.20	0.22	
	Heating	kW	0.15		0.17	0.19	0.20	0.22	
Current	Cooling	A	0.73		0.81	0.92	0.98	1.07	
	Heating	A	0.73		0.81	0.92	0.98	1.07	
External finish			Galvanized steel plate						
Dimension	Height	mm	295						
	Width	mm	815			935		1,175	
	Depth	mm	700						
Net weight		kg	27			33		42	
Heat exchanger			Cross fin( Aluminium plate fin and copper tube)						
Fan	Type		Sirocco fan X 1			Sirocco fan X 2			
	Airflow rate (Low-Middle-High)	m <sup>3</sup> /min	6.0-7.2-8.5		7.5-9.0-10.5	10.0-12.0-14.0	12.0-14.5-17.0	13.5-16.2-19.0	
External static pressure		Pa	30/50/100						
Motor	Type		Single phase induction motor						
	Output	kW	0.075					0.078	
Air filter			P.P. honeycomb						
Refrigerant pipe dimension	Gas(Flare)	mm	φ12.7				φ12.7(R410A) φ15.88(R22,R407C)		φ15.88
	Liquid(Flare)	mm	φ6.35				φ6.35(R410A) φ9.52(R22,R407C)		φ9.52
Drain pipe dimension			R1(External thread)						
Noise level (Low-Middle-High)		dB	27-30-32		28-32-35	31-34-37	31-35-38	31-35-38	

Note:1

Note:1

Note:2

Item \ Model			PEFY-P71 VMM-E	PEFY-P80 VMM-E	PEFY-P100 VMM-E	PEFY-P125 VMM-E	PEFY-P140 VMM-E	
Power source	Voltage	~V	220-240					
	Frequency	Hz	50					
Cooling capacity		kW	8.0	9.0	11.2	14.0	16.0	
Heating capacity		kW	9.0	10.0	12.5	16.0	18.0	
Power consumption	Cooling	kW	0.25	0.25	0.29	0.40	0.42	
	Heating	kW	0.25	0.25	0.29	0.40	0.42	
Current	Cooling	A	1.15		1.34	1.90	1.95	
	Heating	A	1.15		1.34	1.90	1.95	
External finish			Galvanized steel plate					
Dimension	Height	mm	295		325			
	Width	mm	1,175			1,415		1,715
	Depth	mm	700			740		
Net weight		kg	42		62	65	70	
Heat exchanger			Cross fin( Aluminium plate fin and copper tube)					
Fan	Type		Sirocco fan X 2					
	Airflow rate (Low-Middle-High)	m <sup>3</sup> /min	14.5-18.0-21.0		23.0-33.0	28.0-40.0	29.5-42.0	
External static pressure		Pa	30/50/100			50/130		
Motor	Type		Single phase induction motor					
	Output	kW	0.078		0.200	0.280		
Air filter			P.P. honeycomb					
Refrigerant pipe dimension	Gas(Flare)	mm	φ15.88		φ15.88(R410A), φ19.05(R22,R407C)			
	Liquid(Flare)	mm	φ9.52					
Drain pipe dimension			R1(External thread)					
Noise level(Low-Middle-High)		dB	32-36-39		40-44		42-45	

Note:1

Note:1

Note:2

Note: 1.Cooling / Heating capacity indicates the maximum value at operation under the following condition.

Cooling :Indoor 27°CDB/19.0°CWB  
:Outdoor 35°CDB

Heating :Indoor 20°C  
:Outdoor 7°CDB/6°CWB

2.The external static pressure is set to 50Pa at factory shipment.

### 3-2. Electrical parts specifications

Model Parts name	Symbol	PEFY-P20 VMM-E	PEFY-P25 VMM-E	PEFY-P32 VMM-E	PEFY-P40 VMM-E	PEFY-P50 VMM-E	PEFY-P63 VMM-E	PEFY-P71 VMM-E	PEFY-P80 VMM-E	PEFY-P100 VMM-E	PEFY-P125 VMM-E	PEFY-P140 VMM-E
Transformer	T	(Primary) 50/60Hz 220-240V (Secondary) (18.4V 1.7A)										
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 (Indoor controller board)	FUSE	250V 6.3A										
Fan motor (with Inner-thermostat)	MF1,2	4-pole Output 75W D104P75MW			4-pole Output 75W D104P85MW		4-pole Output 78W D10CP95MW			4-pole Output 200W NS-100VM-1	4-pole Output 280W NS-125VM-1	
Inner-thermostat (Fan motor)		OFF 130°C ±5 ON 90°C ±20										
Fan motor capacitor	C1	6.0μF X 440V X 1pcs								8.0μF X 440V X 1pcs	16μF X 440V X 2pcs	
Linear expansion valve	LEV	DC12V Stepping motor drive port dimension φ3.2 (0~2000pulse)						DC12V Stepping motor drive port dimension φ5.2 (0~2000pulse)			DC12V Stepping motor drive port dimension φ6.4 (0~2000pulse)	
Power supply terminal bed	TB2	(L,N,⊕) 330V 30A										
Transmission terminal bed	TB5 TB15	(M1,M2,S) (1,2) 300V 10A										

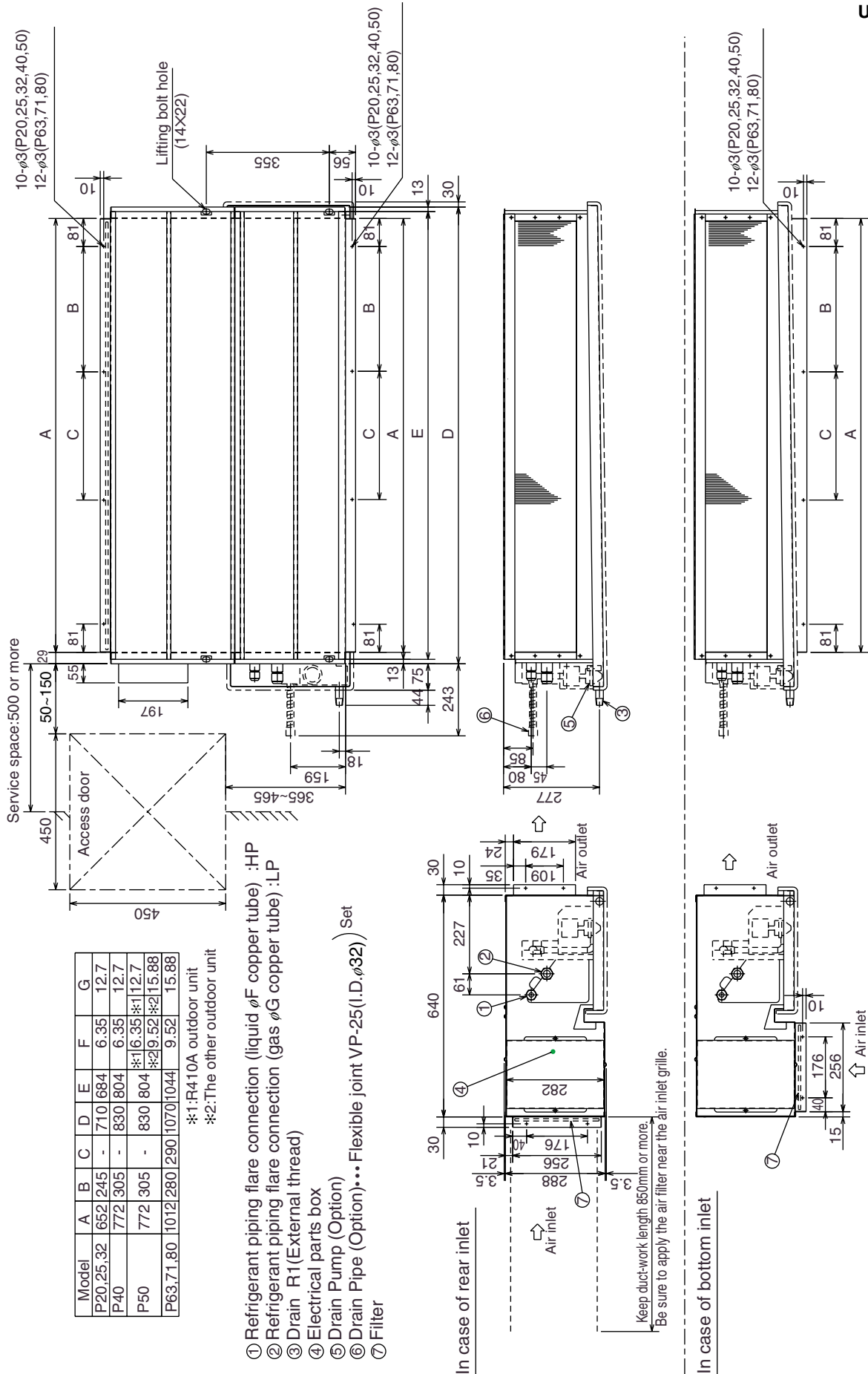


# 4

# OUTLINES AND DIMENSIONS

## Indoor Unit PEFY-P20•25•32•40•50•63•71•80VMM-E

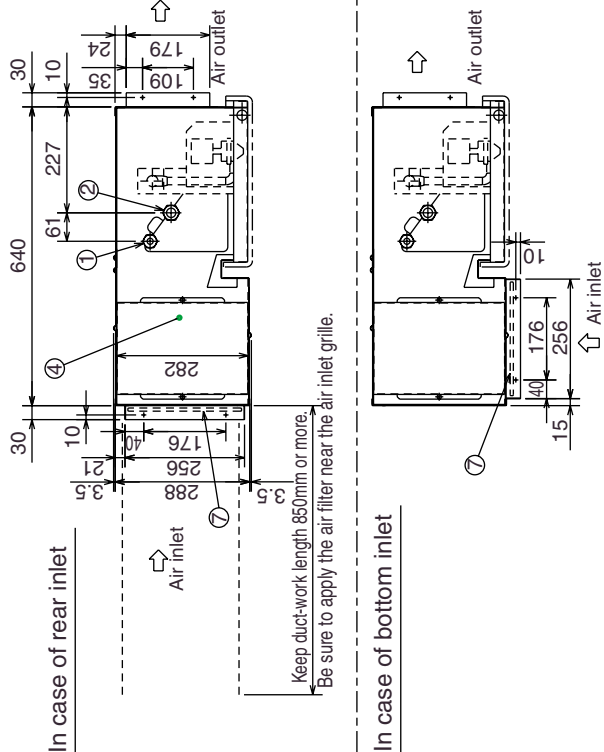
Unit : mm



Model	A	B	C	D	E	F	G
P20,25,32	652	245	-	710	684	6.35	12.7
P40	772	305	-	830	804	6.35	12.7
P50	772	305	-	830	804	*16.35	*112.7
P63,71,80	1012	280	290	1070	1044	*29.52	*215.88

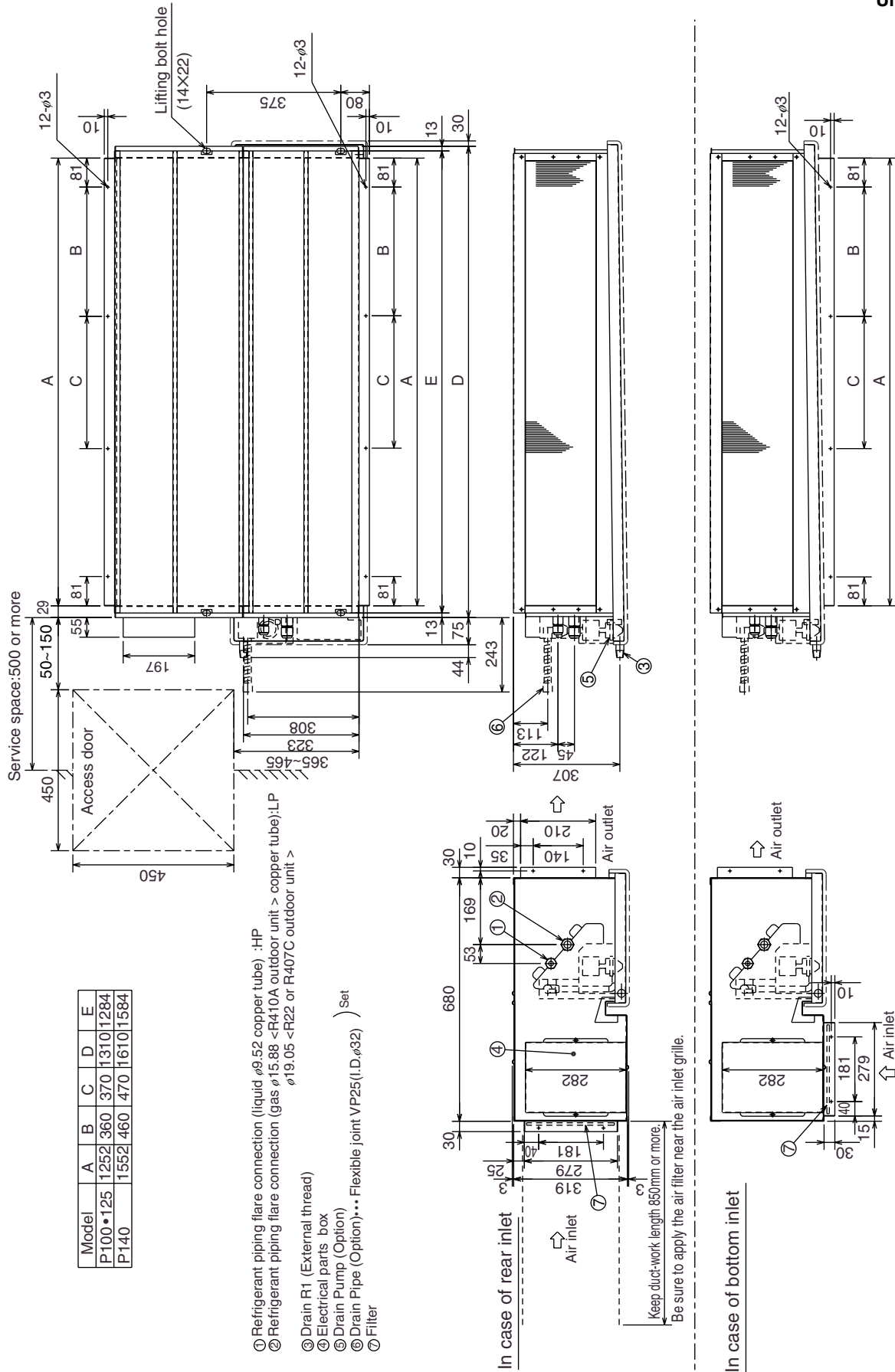
\*1:R410A outdoor unit  
\*2:The other outdoor unit

- ① Refrigerant piping flare connection (liquid  $\phi$ F copper tube) :HP
- ② Refrigerant piping flare connection (gas  $\phi$ G copper tube) :LP
- ③ Drain R1(External thread)
- ④ Electrical parts box
- ⑤ Drain Pump (Option)
- ⑥ Drain Pipe (Option)••• Flexible joint VP-25(I.D. $\phi$ 32) Set
- ⑦ Filter



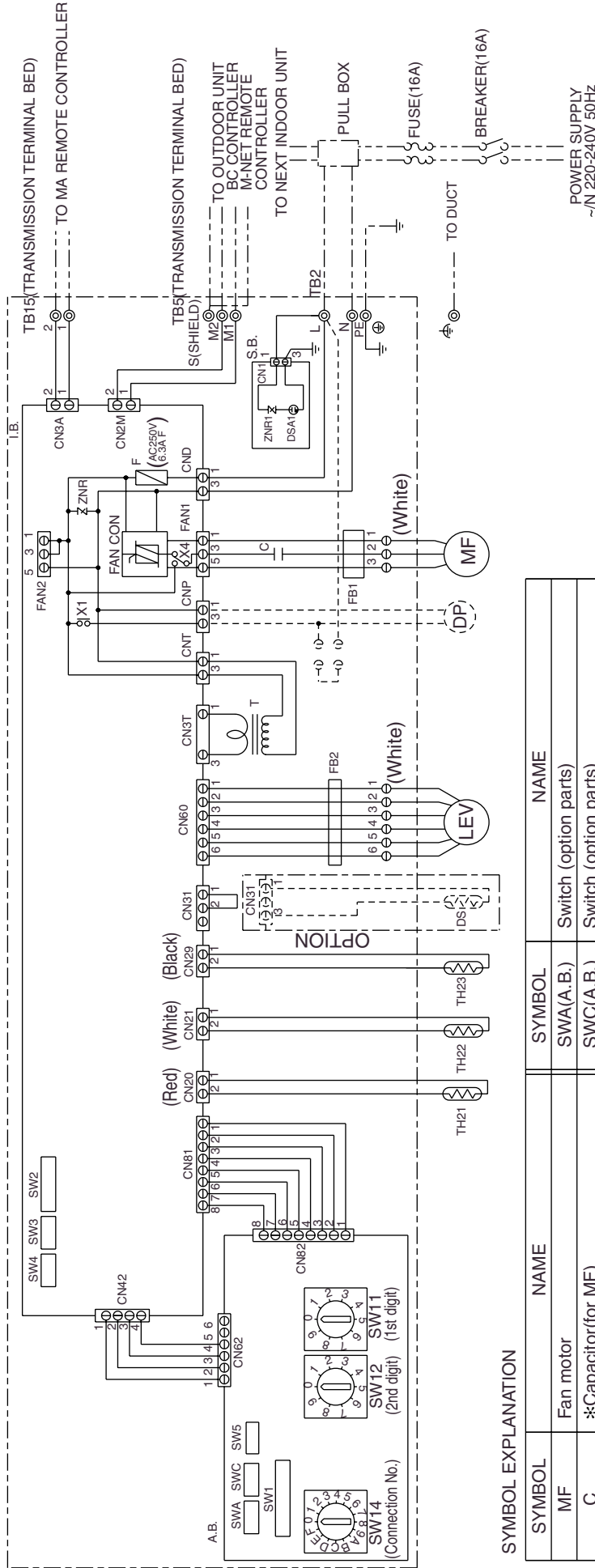
# Indoor Unit PEFY-P100•125•140VMM-E

Unit : mm



Indoor Unit PEFY-P20•25•32•40•50•63•71•80VMM-E

INSIDE SECTION OF CONTROL BOX



NOTE; 1. TB2, TB5 shown in dotted line are field work.

2. Mark ⊙ indicates terminal bed, ⊖ connector, ⊕ board insertion connector or fastening connector of control board.

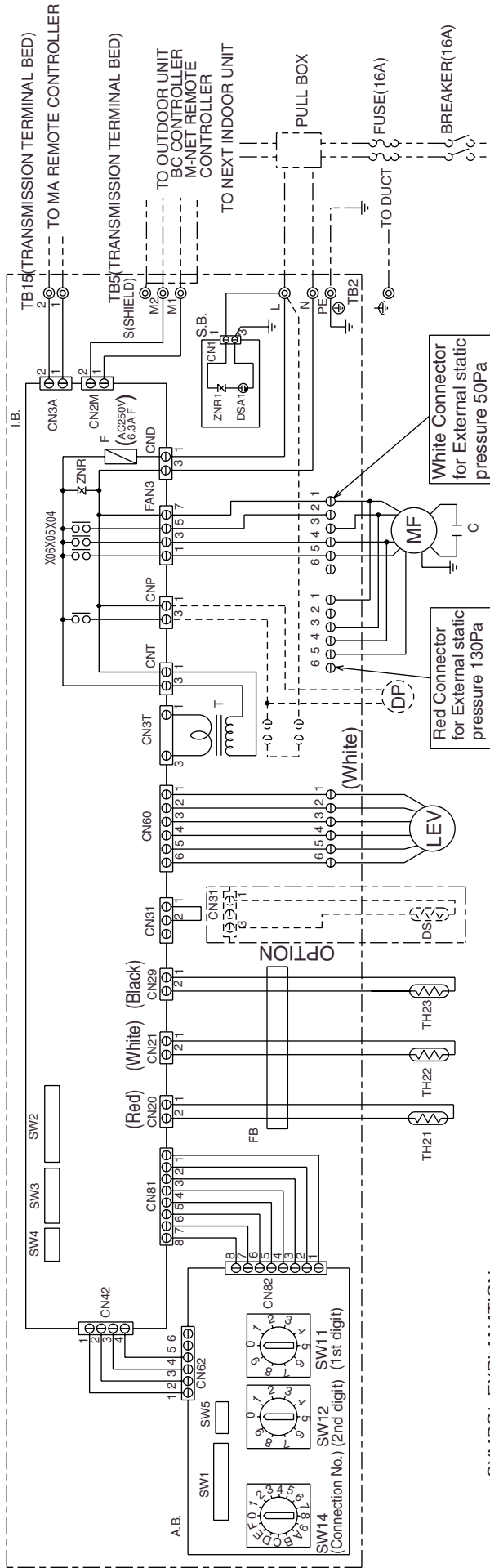
\*Capacitor MODELS 20/25/32/40/50/63/71/80 6μF X 1pcs

SYMBOL EXPLANATION

SYMBOL	NAME	SYMBOL	NAME
MF	Fan motor	SWA(A.B.)	Switch (option parts)
C	*Capacitor(for MF)	SWC(A.B.)	Switch (option parts)
I.B.	Indoor controller board	SW11(A.B.)	Switch (1st digit address set)
A.B.	Address board	SW12(A.B.)	Switch (2nd digit address set)
TB2	Power source terminal bed	SW14(A.B.)	Switch (connection No.set)
TB5	Transmission terminal bed	SW1(A.B.)	Switch (for mode selection)
TB15	Transmission terminal bed	SW2(I.B.)	Switch (for capacity code)
F	Fuse AC250V 6.3A F	SW3(I.B.)	Switch (for mode selection)
T	Transformer	SW4(I.B.)	Switch (for model selection)
LEV	Electronic linear expan. valve	SW5(A.B.)	Switch (for voltage selection)
TH21	Thermistor (inlet temp. detection)	FB1,2	Ferrite core
TH22	Thermistor (piping temp. detection/liquid)	S.B.	Surge absorber board
TH23	Thermistor (piping temp. detection/gas)	DP	Drain pump
CNV	Connector (Vane)	DS	Drain sensor
CN23	Connector (Vane)	CN32	Connector (Remote switch)
CN24	Connector (Heater)	CN41	Connector (HA Terminal-A)
CN25	Connector (Humidifier)	CN51	Connector (Centrally control)
CN27	Connector (Damper)	CN52	Connector (Remote indication)

# Indoor Unit PEFY-P100•125•140VMM-E

## INSIDE SECTION OF CONTROL BOX



### SYMBOL EXPLANATION

SYMBOL	NAME	SYMBOL	NAME
MF	Fan motor	TH22	Thermistor (piping temp.detection/liquid)
C	*Capacitor(for MF)	TH23	Thermistor (piping temp.detection/gas)
I.B.	Indoor controller board	SW11(A.B.)	Switch (1st digit address set)
A.B.	Address board	SW12(A.B.)	Switch (2nd digit address set)
TB2	Power source terminal bed	SW14(A.B.)	Switch (connection No.set)
TB15	Transmission terminal bed	SW1(A.B.)	Switch (for mode selection)
TB5	Transmission terminal bed	SW2(I.B.)	Switch (for capacity code)
F	Fuse AC250V 6.3A F	SW3(I.B.)	Switch (for mode selection)
T	Transformer	SW4(I.B.)	Switch (for model selection)
LEV	Electronic linear expan. valve	SW5(A.B.)	Switch (for voltage selection)
S.B.	Surge absorber board	X04-06	Aux.relay
FB	Ferrite core	DP	Drain pump
TH21	Thermistor (piping temp.detection)	DS	Drain sensor
CNV	Connector (Vane)	CN32	Connector (Remote switch)
CN23	Connector (Vane)	CN41	Connector (HA Terminal-A)
CN24	Connector (Heater)	CN51	Connector (Centrally control)
CN25	Connector (Humidifier)	CN52	Connector (Remote indication)
CN27	Connector (Damper)		

**NOTE; 1.** TB2, TB5 shown in dotted line are field work.

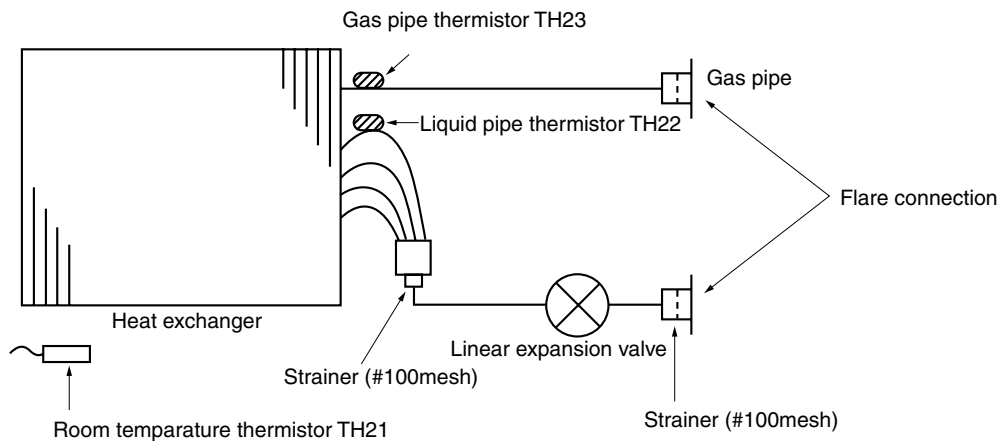
**2.** Mark ⊙ indicates terminal bed, ⊞ connector, ⊞ board insertion connector or fastening connector of control board.

\*:Capacitor MODELS 100 8μF X 1pcs  
125/140 8μF (16μF X 2pcs)

POWER SUPPLY  
~N 220-240V 50Hz

# 6

# REFRIGERANT SYSTEM DIAGRAM



Capacity	PEFY-P20,25,32,40VMM-E	PEFY-P50VMM-E
Item		
Gas pipe	$\phi 12.7 <1/2F>$	$\phi 12.7 <1/2F>$ (R410A) $\phi 15.88 <5/8F>$ (R22,R407C)
Liquid pipe	$\phi 6.35 <1/4F>$	$\phi 6.35 <1/4F>$ (R410A) $\phi 9.52 <3/8F>$ (R22,R407C)

Capacity	PEFY- P63,71,80VMM-E	PEFY-P100,125,140VMM-E
Item		
Gas pipe	$\phi 15.88 <5/8F>$	$\phi 15.88 <5/8F>$ (R410A) $\phi 19.05 <3/4F>$ (R22,R407C)
Liquid pipe	$\phi 9.52 <3/8F>$	$\phi 9.52 <3/8F>$

## 7-1. How to check the parts

Parts name	Check points														
Room temperature thermistor (TH21) Liquid pipe thermistor (TH22) Gas pipe thermistor (TH23)	Disconnect the connector, then measure the resistance using a tester. (Surrounding temperature 10°C~30°C)														
	<table border="1"> <thead> <tr> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>4.3kΩ~9.6kΩ</td> <td>Open or short</td> </tr> </tbody> </table> (Refer to the thermistor)	Normal	Abnormal	4.3kΩ~9.6kΩ	Open or short										
Normal	Abnormal														
4.3kΩ~9.6kΩ	Open or short														
Trans	Disconnect the connector and measure the resistance using a tester.														
	<table border="1"> <thead> <tr> <th></th> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>CNT(1)-(3)</td> <td>App.45Ω</td> <td rowspan="2">Open or short</td> </tr> <tr> <td>CN3T(1)-(3)</td> <td>App.1Ω</td> </tr> </tbody> </table>		Normal	Abnormal	CNT(1)-(3)	App.45Ω	Open or short	CN3T(1)-(3)	App.1Ω						
	Normal	Abnormal													
CNT(1)-(3)	App.45Ω	Open or short													
CN3T(1)-(3)	App.1Ω														
Linear expansion valve	Disconnect the connector then measure the resistance valve using a tester. Refer to the next page for detail.														
	<table border="1"> <thead> <tr> <th colspan="4">Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>(1)-(5) White-Red</td> <td>(2)-(6) Yellow-Blown</td> <td>(3)-(5) Orange-Red</td> <td>(4)-(6) Blue-Brown</td> <td rowspan="2">Open or short</td> </tr> <tr> <td colspan="4">150Ω ±10%</td> </tr> </tbody> </table>	Normal				Abnormal	(1)-(5) White-Red	(2)-(6) Yellow-Blown	(3)-(5) Orange-Red	(4)-(6) Blue-Brown	Open or short	150Ω ±10%			
Normal				Abnormal											
(1)-(5) White-Red	(2)-(6) Yellow-Blown	(3)-(5) Orange-Red	(4)-(6) Blue-Brown	Open or short											
150Ω ±10%															
Fan motor PEFY - P20~80VMM-E	Measure the resistance between the terminals using a tester. (at 20°C)														
	<table border="1"> <thead> <tr> <th>Motor terminal or Relay connector</th> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>Red-Black</td> <td>43.1Ω</td> <td rowspan="2">Open or short</td> </tr> <tr> <td>White-Black</td> <td>53.6Ω</td> </tr> </tbody> </table>	Motor terminal or Relay connector	Normal	Abnormal	Red-Black	43.1Ω	Open or short	White-Black	53.6Ω						
Motor terminal or Relay connector	Normal	Abnormal													
Red-Black	43.1Ω	Open or short													
White-Black	53.6Ω														
PEFY - P100VMM-E	Measure the resistance between the terminals using a tester. (at 20°C)														
	<table border="1"> <thead> <tr> <th>Motor terminal or Relay connector</th> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>Orange-Gray</td> <td>26.7Ω</td> <td rowspan="4">Open or short</td> </tr> <tr> <td>Black-Gray</td> <td>32.5Ω</td> </tr> <tr> <td>Yellow-Gray</td> <td>37.9Ω</td> </tr> <tr> <td>Blue-Gray</td> <td>42.4Ω</td> </tr> </tbody> </table>	Motor terminal or Relay connector	Normal	Abnormal	Orange-Gray	26.7Ω	Open or short	Black-Gray	32.5Ω	Yellow-Gray	37.9Ω	Blue-Gray	42.4Ω		
Motor terminal or Relay connector	Normal	Abnormal													
Orange-Gray	26.7Ω	Open or short													
Black-Gray	32.5Ω														
Yellow-Gray	37.9Ω														
Blue-Gray	42.4Ω														
PEFY - P125•140VMM-E	Measure the resistance between the terminals using a tester. (at 20°C)														
	<table border="1"> <thead> <tr> <th>Motor terminal or Relay connector</th> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>Orange-Gray</td> <td>11.6Ω</td> <td rowspan="4">Open or short</td> </tr> <tr> <td>Black-Gray</td> <td>13.6Ω</td> </tr> <tr> <td>Blue-Gray</td> <td>15.4Ω</td> </tr> <tr> <td>Yellow-Gray</td> <td>18.1Ω</td> </tr> </tbody> </table>	Motor terminal or Relay connector	Normal	Abnormal	Orange-Gray	11.6Ω	Open or short	Black-Gray	13.6Ω	Blue-Gray	15.4Ω	Yellow-Gray	18.1Ω		
Motor terminal or Relay connector	Normal	Abnormal													
Orange-Gray	11.6Ω	Open or short													
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Blue-Gray	15.4Ω														
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<Thermistor Characteristic graph>

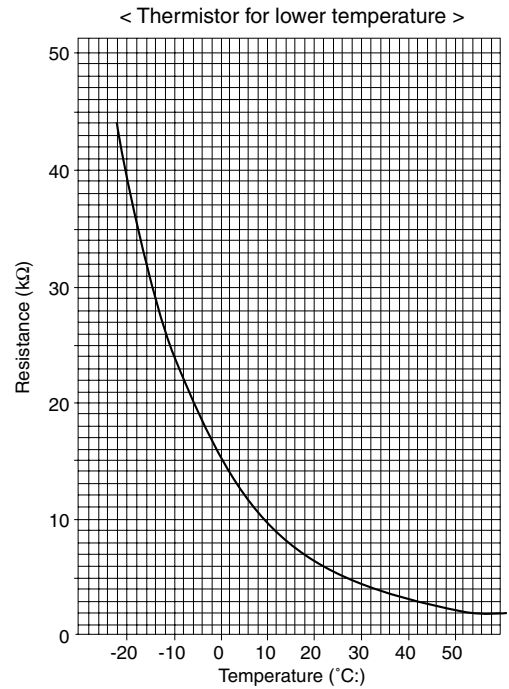
Thermistor for lower temperature

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

Thermistor  $R_0=15k\Omega \pm 3\%$   
 Fixed number of  $B=3480k\Omega \pm 2\%$

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

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

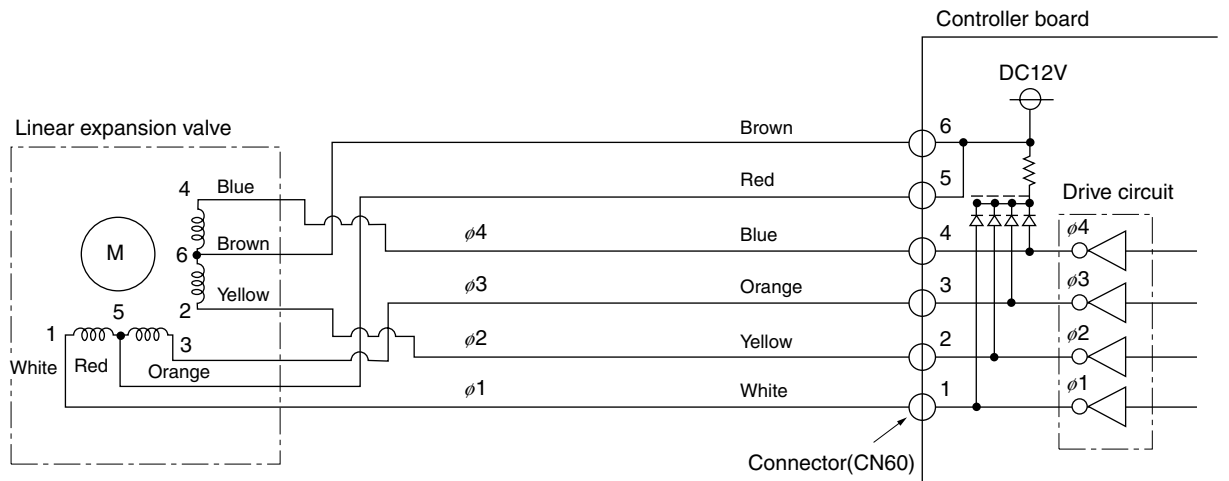


Linear expansion valve

① Operation summary of the linear expansion valve.

- Linear expansion valve open/close through stepping motor after receiving the pulse signal from the indoor controller board.
- Valve position can be changed in proportion to the number of pulse signal.

<Connection between the indoor controller board and the linear expansion valve>



## <Output pulse signal and the valve operation>

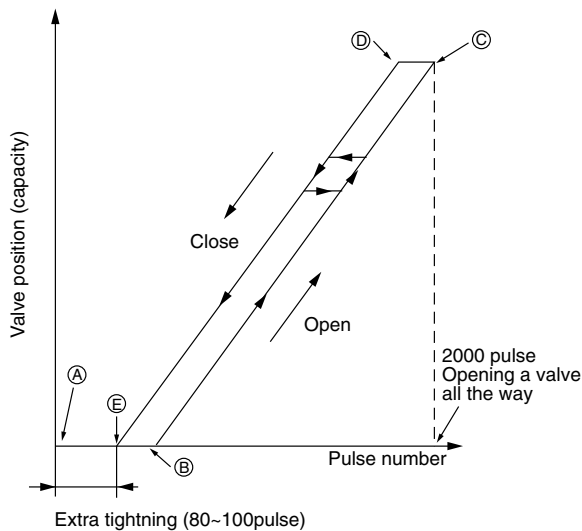
Output (Phase)	Output			
	1	2	3	4
φ1	ON	OFF	OFF	ON
φ2	ON	ON	OFF	OFF
φ3	OFF	ON	ON	OFF
φ4	OFF	OFF	ON	ON

Closing a valve : 1 → 2 → 3 → 4 → 1  
 Opening a valve : 4 → 3 → 2 → 1 → 4

The output pulse shifts in above order.

- \*1. When linear expansion valve operation stops, all output phase become OFF.
- 2. At phase interruption or when phase does not shift in order, motor does not rotate smoothly and motor will lock and vibrate.

### ② Linear expansion valve operation

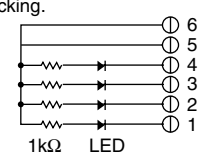
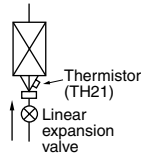


- \* When the switch is turned on, 2200 pulse closing valve signal will be send till it goes to A point in order to define the valve position.

When the valve operates correctly, there is no noise or vibration occurring from the linear expansion valve : however, when the pulse number moves from E to A or when the valve is locked, more noise can be heard than normal situation.

- \* Noise can be detected by placing the ear against a screw driver handle while touching the screw driver to the linear expansion valve.

### ③ Trouble shooting

Symptom	Check points	Countermeasures
Operation circuit failure of the micro processor.	Disconnect the connector on the controller board, then connect LED for checking.  Pulse signal will be sent out for 10 seconds as soon as the main switch is turned on. If there is LED lights on or lights off, it means the operation circuit is abnormal.	Exchange the indoor controller board due to drive circuit failure.
Linear expansion valve mechanism is locked.	Motor will idle and make ticking noise when motor is operated while the linear expansion valve is locked. This ticking sound is the sign of the abnormality.	Exchange the linear expansion valve.
Short or breakage of the motor coil of the linear expansion valve.	Measure the resistance between the each coil (red-white, red-orange, brown-yellow, brown-blue) using a tester. It is normal if the resistance is in the range of $150\Omega \pm 10\%$ .	Exchange the linear expansion valve.
Valve doesn't close completely (thermistor leaking).	To check the linear expansion valve, operate the indoor unit in fan mode and at the same time operate other indoor units in cooling mode, then check the pipe temperature <liquid pipe temperature> of the indoor unit by the outdoor multi controller board operation monitor. During fan operation, linear expansion valve is closed completely and if there are some leaking, detecting temperature of the thermistor will go lower. If the detected temperature is much lower than the temperature indicated in the remote controller, it means the valve is not closed all the way. It is not necessary to exchange the linear expansion valve, if the leakage is small and not making any trouble. 	If large amount of refrigeration is leaked, exchange the linear expansion valve.
Wrong connection of the connector or contact failure.	Check the color of lead wire and missing terminal of the connector.	Disconnect the connector at the controller board, then check the continuity.



## 7-2. FUNCTION OF DIP-SWITCH

Switch	Pole	Function	Operation by switch		Remarks																														
			ON	OFF																															
SW1 Mode Selection	1	Thermistor<Intake temperature detection>position	Built-in remote controller	Indoor unit	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Address board</div>																														
	2	Filter clogging detection	Provided	Not provided																															
	3	Filter life	2,500hr	100hr																															
	4	Air intake	Effective	Not effective																															
	5	Remote indication switching	Thermostat ON signal indication	Fan output indication																															
	6	Humidifier control	Operational while the heat is ON	Operational, depending on the condition																															
	7	Air flow st	Low	Extra low																															
	8	Heat thermostat OFF	Setting air flow	Reset to SW1-7																															
	9	Auto reset function	Effective	Not effective																															
	10	Power ON/OFF	Effective	Not effective																															
SW2 Capacity code setting	1~6	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>MODELS</th> <th>SW2</th> <th>MODELS</th> <th>SW2</th> <th>MODELS</th> <th>SW2</th> </tr> </thead> <tbody> <tr> <td>PEFY-P20VMM-E</td> <td>ON OFF </td> <td>PEFY-P50VMM-E</td> <td>ON OFF </td> <td>PEFY-P100VMM-E</td> <td>ON OFF </td> </tr> <tr> <td>PEFY-P25VMM-E</td> <td>ON OFF </td> <td>PEFY-P63VMM-E</td> <td>ON OFF </td> <td>PEFY-P125VMM-E</td> <td>ON OFF </td> </tr> <tr> <td>PEFY-P32VMM-E</td> <td>ON OFF </td> <td>PEFY-P71VMM-E</td> <td>ON OFF </td> <td>PEFY-P140VMM-E</td> <td>ON OFF </td> </tr> <tr> <td>PEFY-P40VMM-E</td> <td>ON OFF </td> <td>PEFY-P80VMM-E</td> <td>ON OFF </td> <td></td> <td></td> </tr> </tbody> </table>	MODELS	SW2	MODELS	SW2	MODELS	SW2	PEFY-P20VMM-E	ON OFF	PEFY-P50VMM-E	ON OFF	PEFY-P100VMM-E	ON OFF	PEFY-P25VMM-E	ON OFF	PEFY-P63VMM-E	ON OFF	PEFY-P125VMM-E	ON OFF	PEFY-P32VMM-E	ON OFF	PEFY-P71VMM-E	ON OFF	PEFY-P140VMM-E	ON OFF	PEFY-P40VMM-E	ON OFF	PEFY-P80VMM-E	ON OFF					<div style="border: 1px solid black; padding: 2px; display: inline-block;">Indoor controller board</div> Set while the unit is off.  <At delivery>  Set for each capacity.
		MODELS	SW2	MODELS	SW2	MODELS	SW2																												
		PEFY-P20VMM-E	ON OFF	PEFY-P50VMM-E	ON OFF	PEFY-P100VMM-E	ON OFF																												
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PEFY-P32VMM-E	ON OFF	PEFY-P71VMM-E	ON OFF	PEFY-P140VMM-E	ON OFF																														
PEFY-P40VMM-E	ON OFF	PEFY-P80VMM-E	ON OFF																																
SW3 Function Selection	1	Heat pump/Cool only	Cooling only	Heat pump	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Indoor controller board</div> Set while the unit is off.																														
	2	Louver	Available	Not available																															
	3	Vane	Available	Not available																															
	4	Vane swing function	Available	Not available																															
	5	Vane horizontal angle	Second setting	First setting																															
	6	Vane cooling limit angle setting	Horizontal angle	Down blow																															
	7	—	—	—																															
	8	Heating 4deg up	Not effective	Effective																															
	9	—	—	—																															
	10	—	—	—																															
SW4 Unit Selection	1~4	<table style="width: 100%; text-align: center;"> <tr> <td>P20~P80</td> <td>P100~P140</td> </tr> <tr> <td>ON OFF </td> <td>ON OFF </td> </tr> </table> <At delivery>	P20~P80	P100~P140	ON OFF	ON OFF			<div style="border: 1px solid black; padding: 2px; display: inline-block;">Indoor controller board</div> Set while the unit is off.																										
P20~P80	P100~P140																																		
ON OFF	ON OFF																																		

Note :The DipSW setting is effective during unit stopping ( remote controller OFF ) for SW1,2,3 and 4 commonly and the power source is not required to reset.

:When both SW1-7 and SW1-8 are being set to ON, the fan stops at the heating thermostat OFF.

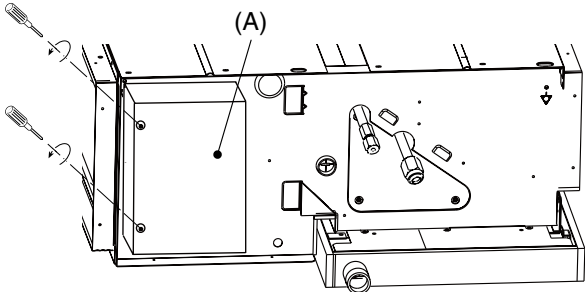



Switch	Pole	Operation by switch	Remarks
SWA Option  Note:1	1~3	<p>Factory setting is for use under an external static pressure of 50Pa, no switch operation is needed when using under the standard condition.</p> <p>*This switch is for only P20~P80 type.</p>	Address board
SWC Option  Note:1	2	<p>(SWA)      SWC</p>	Address board
SW11 1st digit address setting  SW12 2nd digit address setting  Note:2	Rotary switch	<p>SW12      SW11 10      1</p> <p>Address setting should be done when network remote controller (PAR-F25MA) is being used.</p>	Address board Address can be set while the unit is stopped. <At delivery> SW12      SW11 
SW14 Connect ion No. setting  Note:2	Rotary switch	<p>SW14</p> <p>This is the switch to be used when the indoor unit is operated with R2 series outdoor unit as a set.</p>	Address board <At delivery> SW14 
SW5 Voltage Selection  Note:2	2	<p>220V      240V</p> <p>If the unit is used in the 230V or 240V range, set the voltage to 240V. If the unit is being used in a 220V area, set the voltage to 220V.</p>	Address board

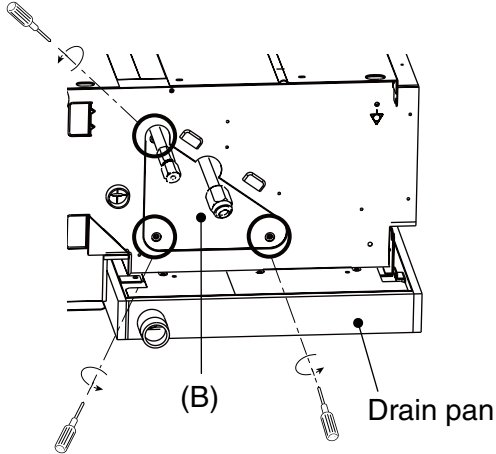
Note 1:The DipSW setting is effective always after powering ( remote controller ON ) for SWA and SWC.  
2:The DipSW setting is effective during unit stopping ( remote controller OFF ) for SW11,12,14 and 5

## 8-1. CONTROL BOX

Be careful on removing heavy parts.

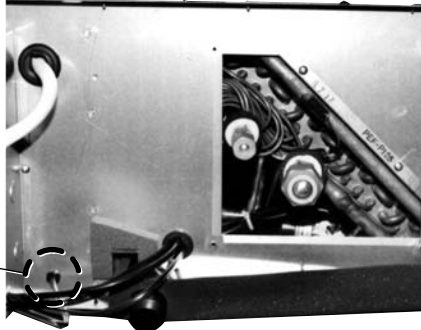

OPERATING PROCEDURE	PHOTOS
<p><b>1.Removing the control box cover</b>            (1) Remove the covers two fixing screws (A) and remove the cover.</p> <p><b>2.Re-fit</b>            (1) Re-fit in reverse order, be sure not to catch wires when re-fitting.</p>	<p><b>fig.1</b></p>  <p><b>fig.2</b></p> 

## 8-2. THERMISTOR (Liquid piping temperature detection)

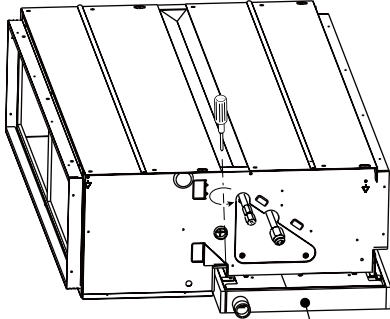
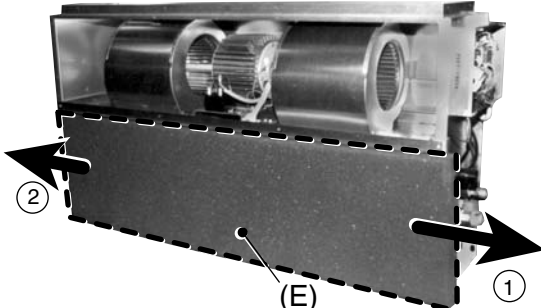
OPERATING PROCEDURE	PHOTOS
<p><b>1.Removing the pipe fixing cover</b>            (1) Remove the covers three fixing screws (B) and remove the cover.</p> <p><b>2.Removing the thermistor</b>            (1) Remove the thermistor from the thermistor holder which is installed on the copper tube.</p> <p><b>3.Re-fit</b>            (1) Re-fit in reverse order.</p>	<p><b>fig.1</b></p> 

### 8-3. THERMISTOR (Intake air temperature detection)

Be careful on removing heavy parts.

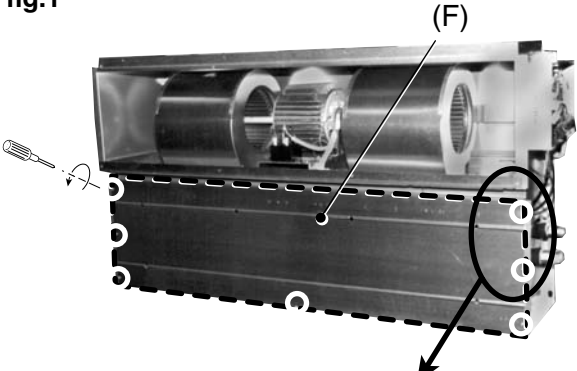
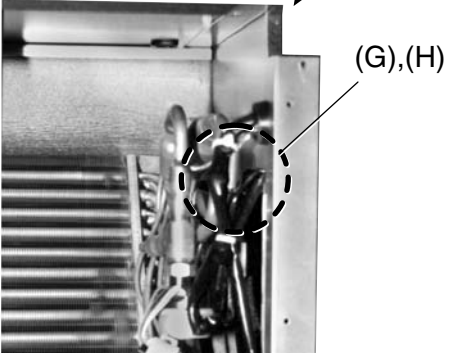
OPERATING PROCEDURE	PHOTOS
<p><b>1.Removing the thermistor and thermistor holder</b>                      (1) Pull out the thermistor holder (C) and thermistor (D).</p> <p><b>2.Re-fit</b>                      (1) Re-fit in reverse order.</p>	<p><b>fig.1</b></p>  <p>(C),(D)</p> <p><b>fig.2</b>                      View from the opposite side.</p>  <p>(C),(D)</p>

### 8-4. DRAINPAN

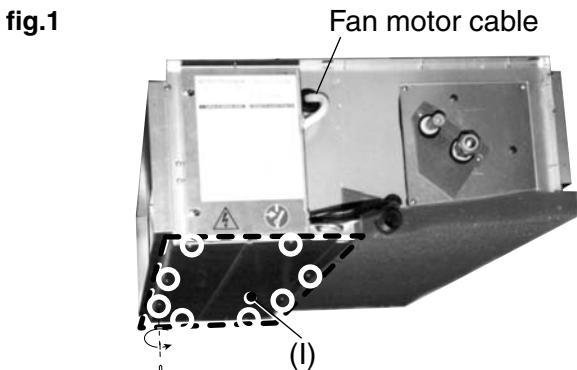
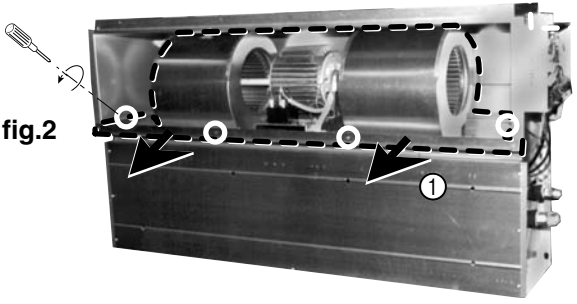
OPERATING PROCEDURE	PHOTOS
<p><b>1.Removing the drainpan</b>                      (1) Remove the drainpan (E) fixing screw.                      (2) Slide the drainpan in the direction of the arrow① and remove in the direction of the arrow②.</p> <p>Note: The bottom plate can remain in position during this procedure.</p> <p><b>2.Re-fit</b>                      (1) Re-fit in reverse order.</p>	<p><b>fig.1</b></p>  <p>(E)</p> <p><b>fig.2</b></p>  <p>(E)</p>

## 8-5. THERMISTOR (GAS piping temperature detection)

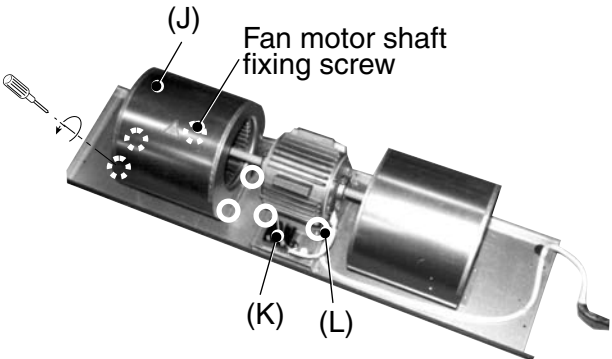
Be careful on removing heavy parts.

OPERATING PROCEDURE	PHOTOS
<p><b>1.Remove the drainpan with procedure 8-4</b></p> <p><b>2.Removing the bottom plate 2</b>                      (1) Remove the fixing screws (seven) of the bottom plate 2 (F) and remove plate. fig.1.</p> <p><b>3.Removing the thermistor</b>                      (1) Remove the thermistor (G) from the thermistor holder (H) which is installed on the copper tube.</p> <p>Note: The bottom plate and drain pan can remain in position during this procedure if accessing through the pipe cover hole.</p> <p><b>4.Re-assemble</b>                      (1) Re-assemble in reverse order.</p>	<p><b>fig.1</b></p>  <p><b>fig.2</b></p> 

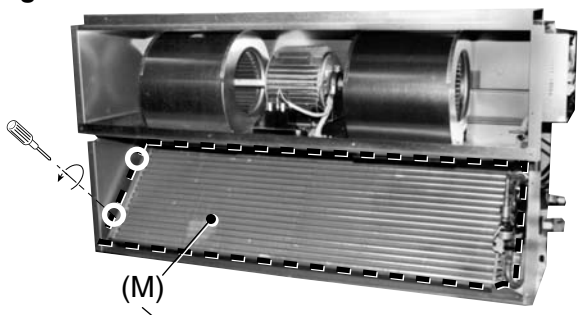
## 8-6. FAN and FAN MOTOR

OPERATING PROCEDURE	PHOTOS
<p><b>1.Removing the bottom plate 1 (I)</b>                      (1) Remove the fixing screws (eight) of the bottom plate 1 (I) and remove plate.</p> <p><b>2.Sliding the fan section</b>                      (1) Remove the fan motor cable connector in control box.                      (2) Remove the fixing screws (four) of the fan base plate.                      (3) Slide the fan section in direction of the arrow ①.</p> <p>Note: The drain pan can remain in position during this procedure.</p>	<p><b>fig.1</b></p>  <p><b>fig.2</b></p> 

Be careful on removing heavy parts.

OPERATING PROCEDURE	PHOTOS
<p><b>3.Removing the fan casing and sirocco fan</b></p> <ul style="list-style-type: none"><li>(1) Remove the fan casing fixing screws (four for each fan).</li><li>(2) Remove the fan motor shaft fixing screw (one for each fan) and remove the fan casing and sirocco fan.</li></ul> <p><b>4.Removing the fan motor</b></p> <ul style="list-style-type: none"><li>(1) Remove the capacitor cable (K).</li><li>(2) Remove the motor clamps (L) two clamps secure the motor on each side (over the rubber bushing).</li></ul> <p><b>5.Re-assemble</b></p> <ul style="list-style-type: none"><li>(1) Re-assemble in reverse order.</li></ul>	<p><b>fig.3</b></p> 

## 8-7. HEAT EXCHANGER

OPERATING PROCEDURE	PHOTOS
<p><b>1.Remove the drainpan with procedure 8-4</b></p> <p><b>2.Remove the bottom plate 2 with procedure 8-5</b></p> <p><b>3.Removing Heat exchanger</b></p> <ul style="list-style-type: none"><li>(1) Remove the fixing screws (four) of the heat exchanger (M) and remove the heat exchanger.</li></ul> <p>Note: Piping, pipe cover and thermistor wires to be removed first.</p> <p><b>4.Re-assemble</b></p> <ul style="list-style-type: none"><li>(1) Re-assemble in reverse order.</li></ul>	<p><b>fig.1</b></p>  <p><b>fig.2</b></p> 