MITSUBISHI ELECTRIC

Changes for the Better

SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

No. OC314

TECHNICAL & SERVICE MANUAL

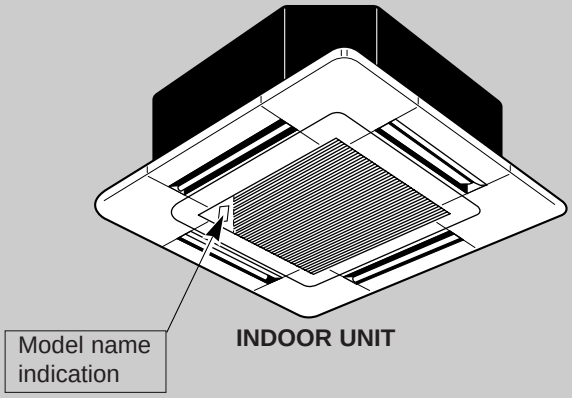
Series PLFY Ceiling Cassettes

R410A / R407C / R22

Indoor unit
[Model names]

[Service Ref.]

PLFY-P20VCM-E — **PLFY-P20VCM-E.TH**
PLFY-P25VCM-E — **PLFY-P25VCM-E.TH**
PLFY-P32VCM-E — **PLFY-P32VCM-E.TH**
PLFY-P40VCM-E — **PLFY-P40VCM-E.TH**



INDOOR UNIT

CONTENTS

1 SAFETY PRECAUTION

CAUTIONS RELATED TO NEW REFRIGERANT

Cautions for units utilizing refrigerant R407C

Do not use the existing refrigerant piping.

The old refrigerant and lubricant in the existing piping contains a large amount of chlorine which may cause the lubricant deterioration of the new unit.

Use liquid refrigerant to charge 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.

Use “low residual oil piping”

If there is a large amount of residual oil (hydraulic oil, etc.) inside the piping and joints, deterioration of the lubricant will result.

Do not use a refrigerant other than R407C.

If another refrigerant (R22, etc.) is used, the chlorine in the refrigerant may cause the lubricant deterioration.

Store the piping to be used during installation indoors with keep both ends 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 a vacuum pump with a reverse flow check valve.

The vacuum pump oil may flow back into the refrigerant cycle and cause the lubricant deterioration.

Use ESTR , ETHER or HAB as the lubricant to coat flares and flange connection parts.

If large amount of mineral oil enter, that can cause deterioration of refrigerant oil etc.

Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.

[1] Cautions for service

·After recovering the all refrigerant in the unit, proceed to working.
·Do not release refrigerant in the air.
·After completing the repair service, recharge the cycle with the specified amount of liquid refrigerant.

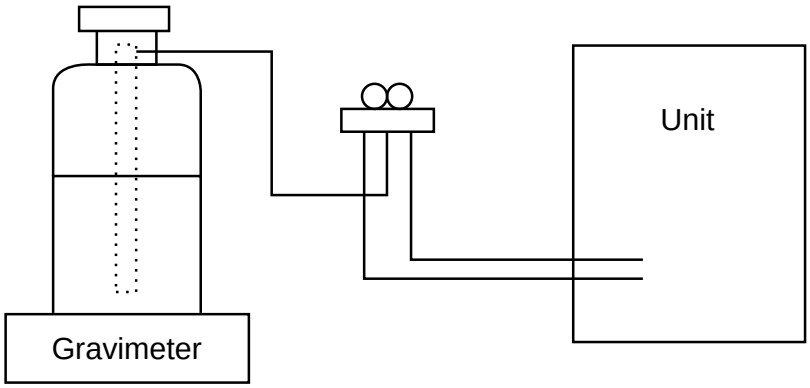
[2] Refrigerant recharging

(1) Refrigerant recharging process

①Direct charging from the cylinder.

·R407C cylinder are available on the market has a syphon pipe.

·Leave the syphon pipe cylinder standing and recharge it.
(By liquid refrigerant)



(2) Recharge in refrigerant leakage case

·After recovering the all refrigerant in the unit, proceed to working.

·Do not release the refrigerant in the air.

·After completing the repair service, recharge the cycle with the specified amount of liquid refrigerant.

[3] Service tools

Use the below service tools as exclusive tools for R407C refrigerant.

No.	Tool name	Specifications
①	Gauge manifold	·Only for R407C.
		·Use the existing fitting SPECIFICATIONS. (UNF7/16)
		·Use high-tension side pressure of 3.43MPa·G or over.
②	Charge hose	·Only for R407C.
		·Use pressure performance of 5.10MPa·G or over.
③	Electronic scale	
④	Gas leak detector	·Use the detector for R134a or R407C.
⑤	Adapter for reverse flow check.	·Attach on vacuum pump.
⑥	Refrigerant charge base.	
⑦	Refrigerant cylinder.	·For R407C ·Top of cylinder (Brown) ·Cylinder with syphon
⑧	Refrigerant recovery equipment.	

Cautions for units utilizing refrigerant R410A

Do not use the existing refrigerant piping.

The old refrigerant and lubricant in the existing piping contains a large amount of chlorine which may cause the lubricant deterioration of the new unit.

Use “low residual oil piping”

If there is a large amount of residual oil (hydraulic oil, etc.) inside the piping and joints, deterioration of the lubricant will result.

Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing. (Leave elbow joints, etc. in their packaging.)

If dirt, dust or moisture enter into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

Use ester oil, ether oil or alkylbenzene oil (small amount) as the refrigerant oil applied to flares and flange connections.

If large amount of mineral oil enter, that can cause deterioration of refrigerant oil etc.

Charge refrigerant from liquid phase of gas cylinder.

If the refrigerant is charged from gas phase, composition change may occur in refrigerant and the efficiency will be lowered.

Do not use refrigerant other than R410A.

If other refrigerant (R22 etc.) is used, chlorine in refrigerant can cause deterioration of refrigerant oil etc.

Use a vacuum pump with a reverse flow check valve.

Vacuum pump oil may flow back into refrigerant cycle and that can cause deterioration of refrigerant oil etc.

Use the following tools specifically designed for use with R410A refrigerant.

The following tools are necessary to use R410A refrigerant.

Tools for R410A	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adaptor
Torque wrench	Electronic refrigerant charging scale

Keep the tools with care.

If dirt, dust or moisture enter into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

Do not use a charging cylinder.

If a charging cylinder is used, the composition of refrigerant will change and the efficiency will be lowered.

Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.

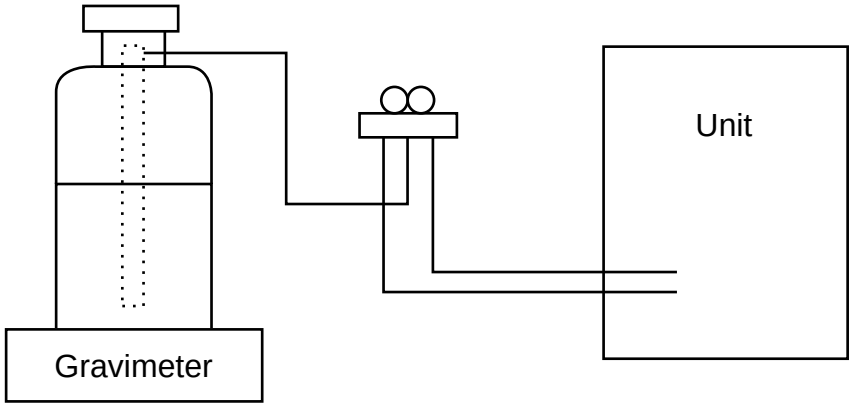
[1] Cautions for service

(1) Perform service after collecting the refrigerant left in unit completely.
(2) Do not release refrigerant in the air.
(3) After completing service, charge the cycle with specified amount of refrigerant.
(4) When performing service, install a filter drier simultaneously.
Be sure to use a filter drier for new refrigerant.

[2] Additional refrigerant charge

When charging directly from cylinder

· Check that cylinder for R410A on the market is syphon type.
· Charging should be performed with the cylinder of syphon stood vertically. (Refrigerant is charged from liquid phase.)



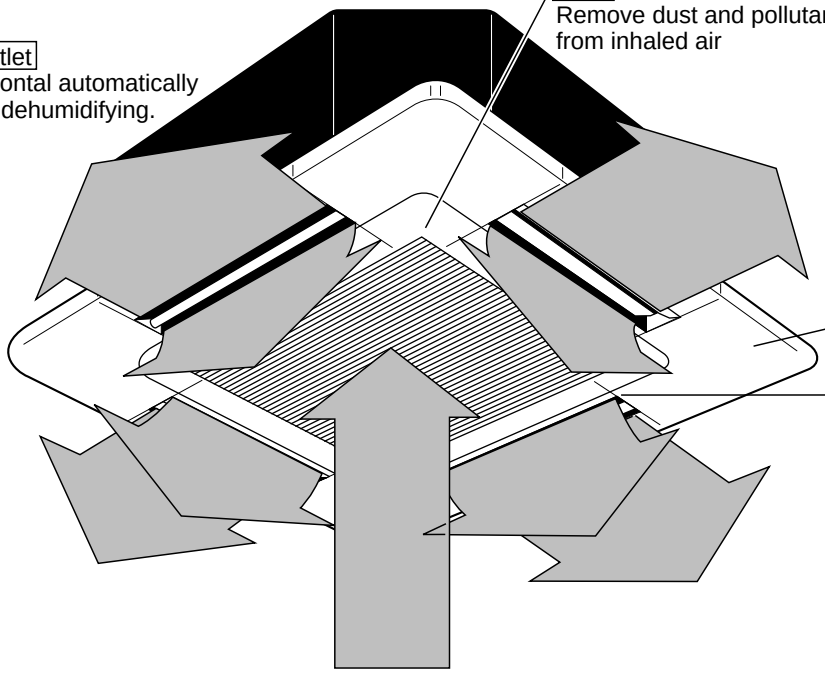
[3] Service tools

Use the below service tools as exclusive tools for R410A refrigerant.

No.		Specifications
①	Gauge manifold	·Only for R410A
		·Use the existing fitting specifications. (UNF1/2)
		·Use high-tension side pressure of 5.3MPa·G or over.
②	Charge hose	·Only for R410A
		·Use pressure performance of 5.09MPa·G or over.
③	Electronic scale	——
④	Gas leak detector	·Use the detector for R134a, R407C or R410A.
⑤	Adaptor for reverse flow check	·Attach on vacuum pump.
⑥	Refrigerant charge base	——
⑦	Refrigerant cylinder	·Only for R410A Top of cylinder (Pink) Cylinder with syphon
⑧	Refrigerant recovery equipment	——

2 PART NAMES AND FUNCTIONS

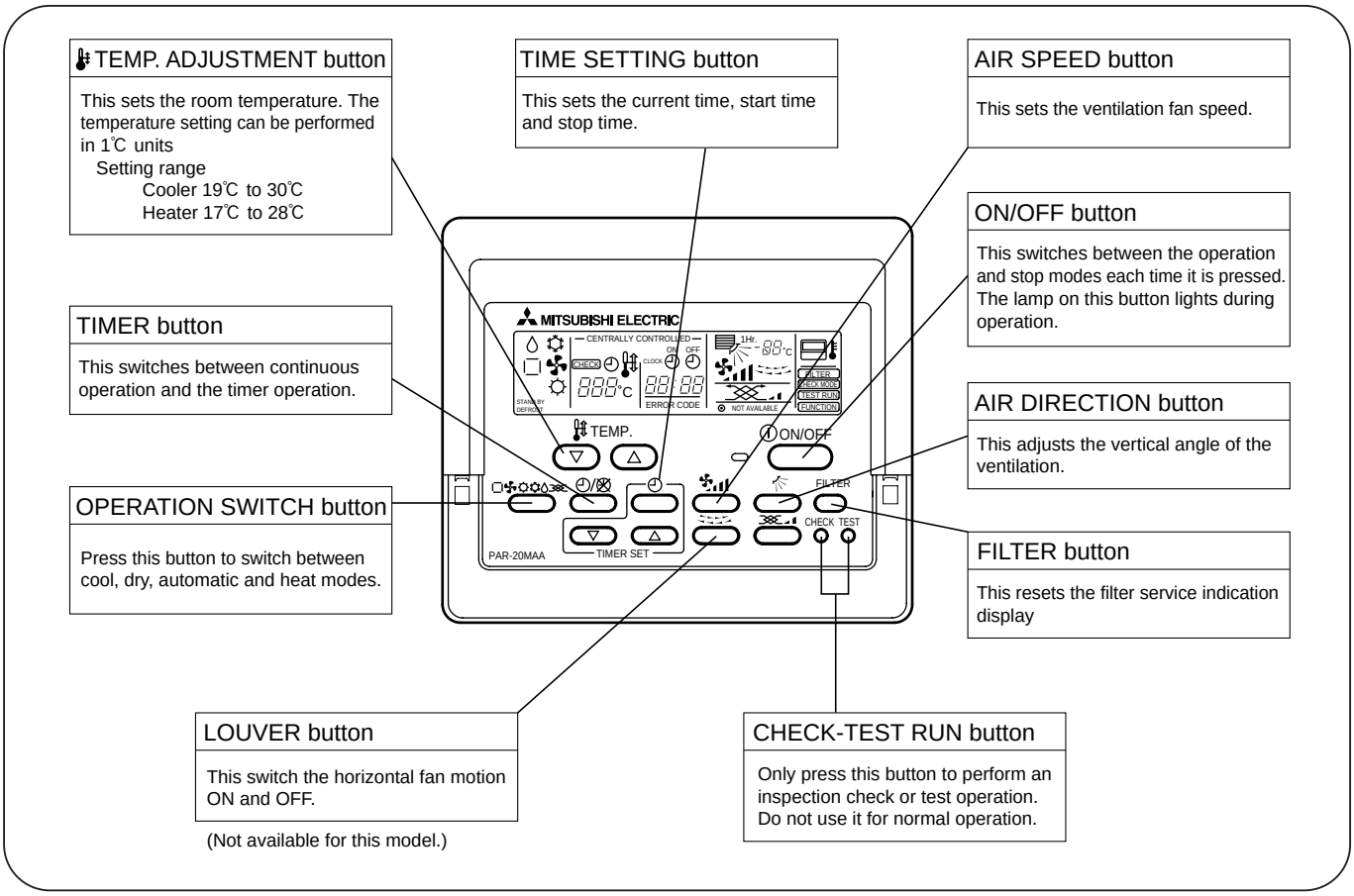
● **Indoor Unit**



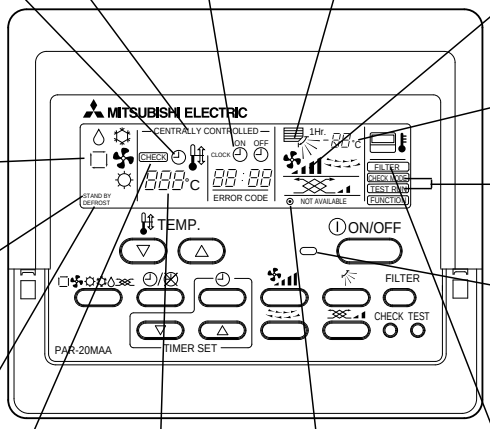
● **Remote controller** **[PAR-20MAA]**

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

● **Operation buttons**



● Display



CENTRALLY CONTROLLED display

This indicates when the unit is controlled by optional features such as central control type remote controller.

CLOCK display

The current time , start time and stop time can be displayed in ten second intervals by pressing the time switch button. The start time or stop time is always displayed during the timer operation.

In this display example on the bottom left, a condition where all display lamps light is shown for explanation purposes although this differs from actual operation.

AIR DIRECTION display

This displays the air direction.

TIMER display

This indicates when the continuous operation and time operation modes are set.
It also display the time for the timer operation at the same time as when it is set.

AIR SPEED display

The selected fan speed is displayed.

ROOM TEMPERATURE display

The temperature of the suction air is displayed during operation. The display range is 8°C to 39°C. The display flashes 8°C when the actual temperature is less than 8°C and flashes 39°C when the actual temperature is greater than 39°C.

OPERATION MODE display

This indicates the operation mode.

STANDBY display

The [STANDBY] symbol is only displayed from the time the heating operation starts until the heated air begins to blow.

Operation lamp

This lamp lights during operation, goes off when the unit stops and flashes when a malfunction occurs.

CHECK MODE / TEST RUN display

This display lights in the check mode or when a test operation is performed.

DEFROST display

This indicates when the defrost operation is performed.

FILTER display

This lamp lights when the filter need to be cleaned.

CHECK display

This indicates when a malfunction has occurred in the unit which should be checked.

SET TEMPERATURE display

This displays the selected setting temperature.

POWER display

This lamp lights when electricity is supplied to the unit.

Caution

- Only the Power display lights when the unit is stopped and power supplied to the unit.
- “NOT AVAILABLE” is displayed when the Air speed button is pressed. This indicates that this room unit is not equipped with the fan direction adjustment function and the louver function.
- When power is turned ON for the first time, it is normal that “H0” is displayed on the room temperature indication (For max. 2minutes). Please wait until this “H0” indication disappear then start the operation.

3 SPECIFICATIONS

3-1. Specifications

Item				PLFY-P20VCM-E.TH	PLFY-P25VCM-E.TH	PLFY-P32VCM-E.TH	PLFY-P40VCM-E.TH
Power			V･Hz	Single phase 220-230-240V 50Hz			
Cooling capacity			kW	2.2	2.8	3.6	4.5
Heating capacity			kW	2.5	3.2	4.0	5.0
Electric characteristic	Input	Cooling	kW	0.05		0.06	
		Heating	kW	0.05		0.06	
	Current	Cooling	A	0.23		0.28	
		Heating	A	0.23		0.28	
Exterior (munsell symbol)			—	Unit : Galvanized sheets with gray heat insulation Grills : ABS resin Munsell<0.70Y 8.59/0.97>			
Dimensions		Height	mm	208 <20>			
		Width	mm	570<650>			
		Depth	mm	570<650>			
Heat exchanger			—	Cross fin			
Fan	Fan × No		—	Turbo fan × 1			
	Air flow ※3		m^3/min	10-9-8		11-10-9	
	External static pressure		Pa	0			
	Fan motor output		kW	0.011	0.015	0.020	
Insulator			—	Polyethylene sheet			
Air filter			—	PP honey comb fabric			
Pipe dimensions		Gas side	ϕmm(in.)	ϕ12.7(1/2")			
		Liquid side	ϕmm(in.)	ϕ6.35(1/4")			
Unit drain pipe size			ϕmm	O.D.32 (PVC pipe VP-25 connectable)			
Noise level ※3			dB	35-31-28	37-31-29	38-33-29	39-34-30
Product weight			kg	15.5<3>		17<3>	

Note 1. Rating conditions(JIS B 8616)
Cooling : Indoor : D.B. 27°C W.B. 19.0°C
outdoor : D.B. 35°C
Heating : Indoor : D.B. 20°C
outdoor : D.B. 7°C W.B. 6°C

Note 2. The number indicated in < > is just for the grille.

※ 3. Air flow and the noise level are indicated as High-Medium-Low.

3-2. Electrical parts specifications

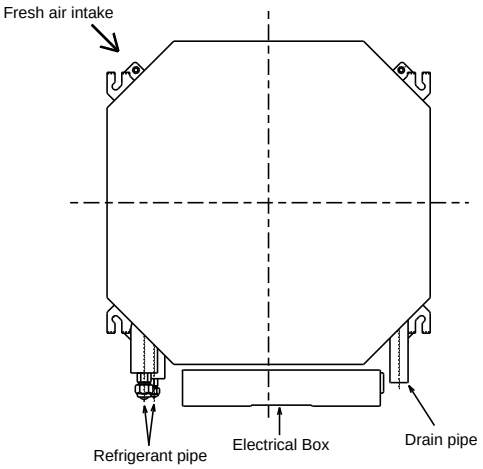
Parts name \ Model	Symbol	PLFY-P20VCM-E.TH	PLFY-P25VCM-E.TH	PLFY-P32VCM-E.TH	PLFY-P40VCM-E.TH
Thermistor (Room temperature detection)	TH21	Resistance 0℃/15kΩ, 10℃/9.6kΩ, 20℃/6.3kΩ, 25℃/5.4kΩ, 30℃/4.3kΩ, 40℃/3.0kΩ			
Thermistor (Pipe temperature detection/ Liquid)	TH22	Resistance 0℃/15kΩ, 10℃/9.6kΩ, 20℃/6.3kΩ, 25℃/5.4kΩ, 30℃/4.3kΩ, 40℃/3.0kΩ			
Thermistor (Pipe temperature detection/ Gas)	TH23	Resistance 0℃/15kΩ, 10℃/9.6kΩ, 20℃/6.3kΩ, 25℃/5.4kΩ, 30℃/4.3kΩ, 40℃/3.0kΩ			
Fuse (Indoor controller board)	FUSE	250V 6.3A			
Fan motor (with Thermal fuse)	MF	6-pole OUTPUT 11W PK6V11-LE	6-pole OUTPUT 15W PK6V15-LC	6-pole OUTPUT 20W PK6V20-LJ	6-pole OUTPUT 20W PK6V20-LK
		Thermal fuse OFF 145℃ ± 2℃			
Fan motor capacitor	C	1.0μF × 440V	1.5μF × 440V		
Vane motor	MV	MSBPC20M13 DC12V 300Ω/phase			
Drain pump	DP	PLD-12230ME-1 INPUT 12/10.8W 24 ℓ /Hr			
Drain sensor	DS	Thermistor resistance 0℃/6kΩ, 10℃/3.9kΩ, 20℃/2.6kΩ, 25℃/2.2kΩ, 30℃/1.8kΩ, 40℃/1.3kΩ			
Linear expansion valve [coil]	LEV	DC12V Stepping motor drive port dimension 5.2Ω (0~2000pulse) EDM-40YGME			
Electric heater (Condensation proof)	H2	240V 15W			
Power supply terminal block	TB2	(L, N, ⏚) Rated to 330V 30A ※			
Transmission terminal block	TB5	(M1, M2, S) Rated to 250V 20A ※			
MA remote controller terminal block	TB15	(1, 2) Rated to 250V 10A ※			

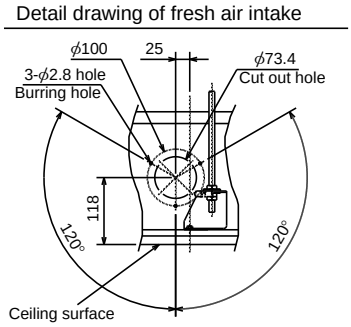
※ Note: Refer to WIRING DIAGRAM for the supplied voltage.

4 4-WAY AIR FLOW SYSTEM

4-1. Fresh air intake (Location for installation)

At the time of installation, use the duct holes (cut out) located at the positions shown in following diagram, as and when required.

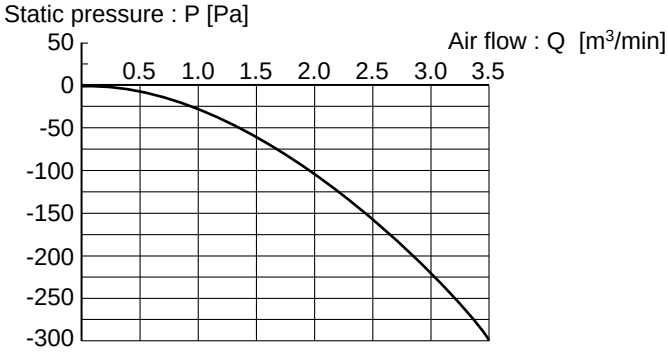




4-2. Fresh air intake amount & static pressure characteristics

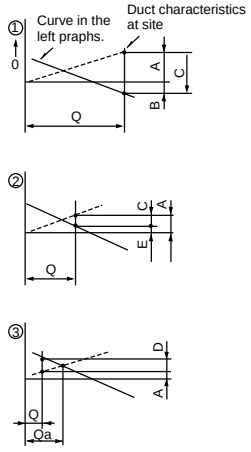
PLFY-P20VCM-E.TH
PLFY-P25VCM-E.TH
PLFY-P32VCM-E.TH
PLFY-P40VCM-E.TH

Taking air into the unit



NOTE: Fresh air intake amount should be 20% or less of whole air amount to prevent dew dripping.

How to read curves

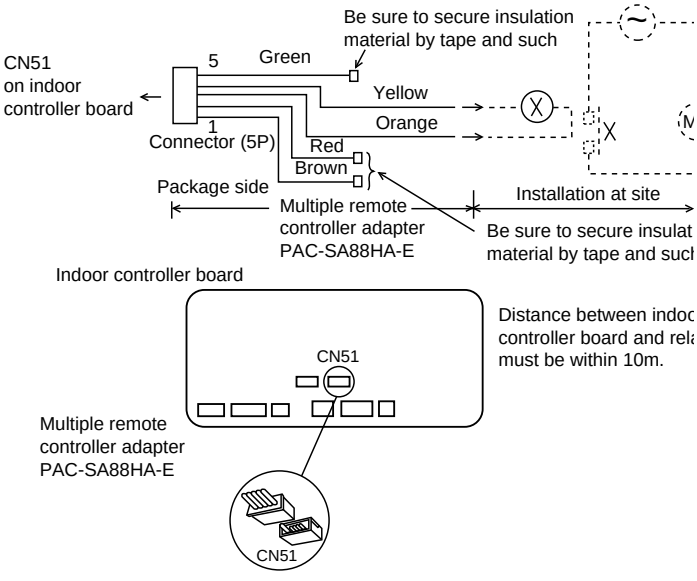


Q···Planned amount of fresh air intake <m³/min>
A···Static pressure loss of fresh air intake duct system with air flow amount Q <Pa>
B···Forced static pressure at air conditioner inlet with air flow amount Q <Pa>
C···Static pressure of booster fan with air flow amount Q <Pa>
D···Static pressure loss increase amount of fresh air intake dust system for air flow amount Q <Pa>
E···Static pressure of indoor unit with air flow amount Q <Pa>
Qa···Estimated amount of fresh air intake with out D <m³/min>

4-3. Interlocking operation method with duct fan (Booster fan)

- Whenever the indoor unit is operating, the duct fun also operates.
  (1)Connect the optional multiple remote controller adapter(PAC-SA88HA-E)to the connector CN51 on the indoor controller board.
  (2)Drive the relay after connecting the 12V DC relay between the Yellow and Orange connector lines.

MB: Electromagnetic switch power relay for duct fan.
X: Auxiliary relay (For DC 12V, coil rating : 1.0W or below)

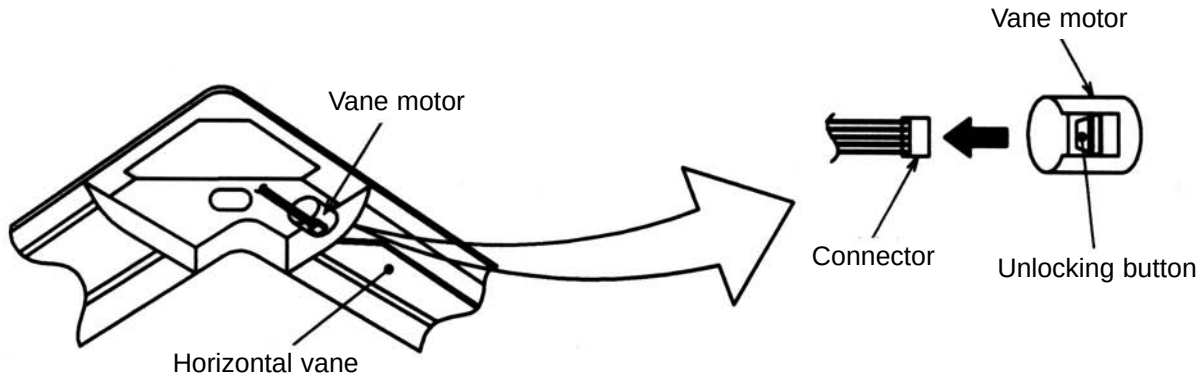


4-4. Fixing of horizontal vane

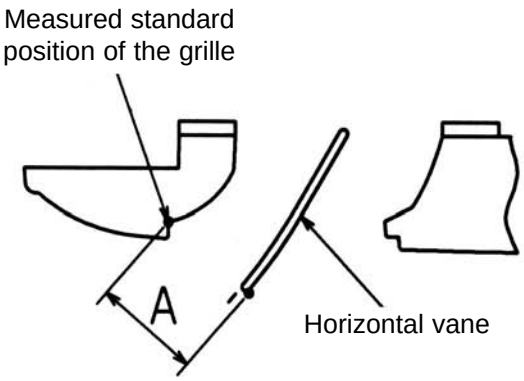
Horizontal vane of each air outlet can be fixed according to the environment, which is installed.

Setting procedure

1) Turn off a main power supply (Turn off a breaker).
2) Disconnect the vane motor connector of the direction of the arrow with pressing the unlocking button as shown in figure below.
   Electricity insulate the disconnected connector with the vinyl tape.



3) Set a vertical vane of the air outlet, which tries to fixed by the hand slowly within the range in the table below.



<Set range>

Standard of horizontal position	Level 30° (Min.)	Downward 45°	Downward 55°	Downward 70° (Max.)
Dimension A (mm)	21	25	28	30

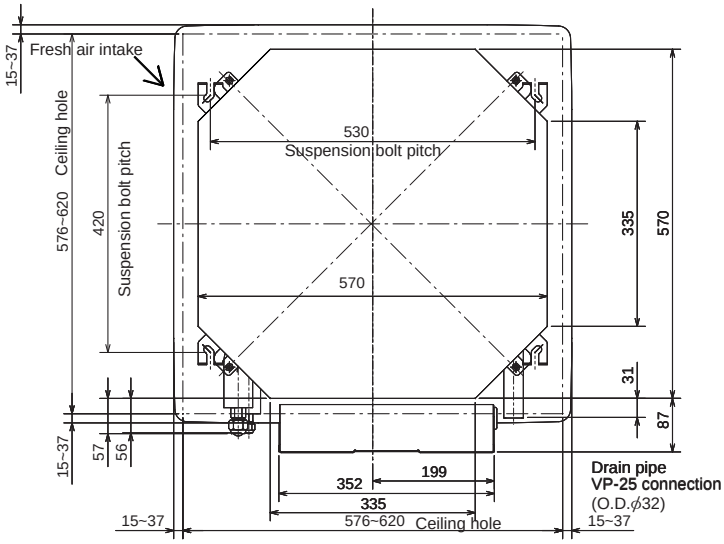
※ Dimension between 21 mm and 30 mm can be arbitrarily set.

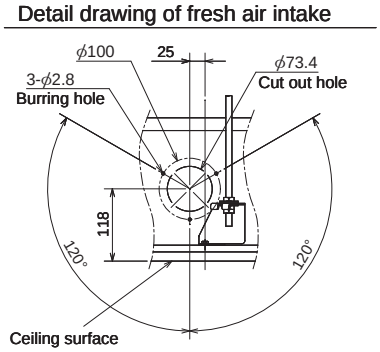
Caution ⚠	Do not set the dimension out of the range.
	Erroneous setting could cause dew drips, smudge on ceiling or malfunction of unit.

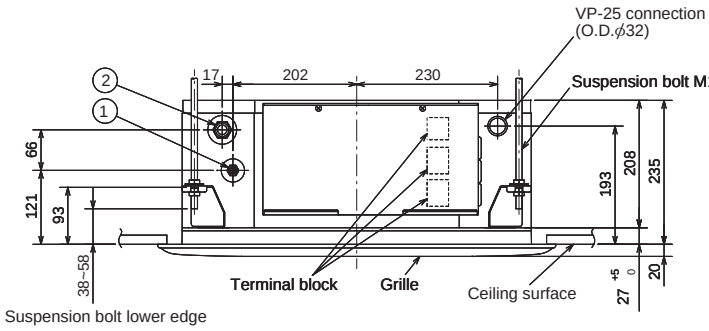
5 OUTLINES AND DIMENSIONS

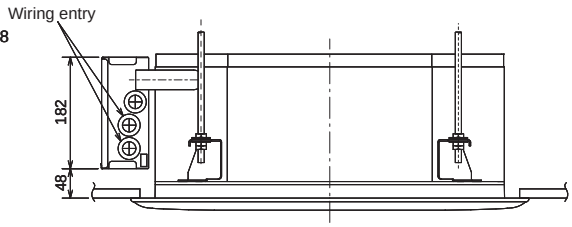
PLFY-P20VCM-E.TH
PLFY-P25VCM-E.TH
PLFY-P32VCM-E.TH
PLFY-P40VCM-E.TH

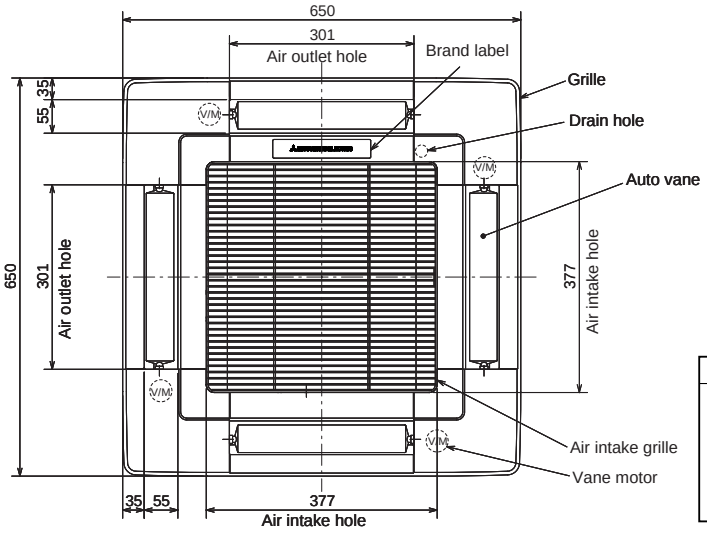
Unit : mm











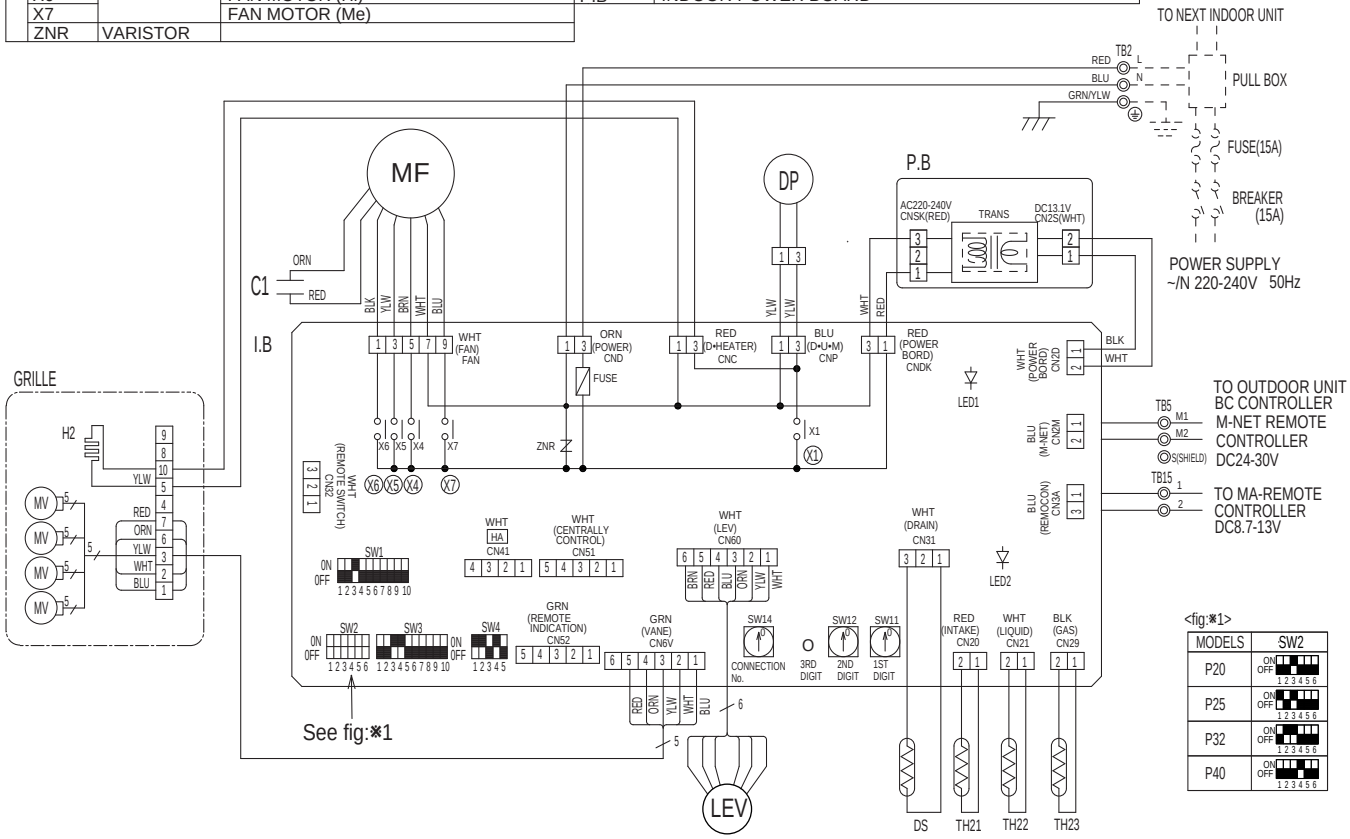
Models	①	②
PLFY-P20VCM-E PLFY-P25VCM-E PLFY-P32VCM-E PLFY-P40VCM-E	Refrigetant pipe (6.35mm dia.) flared connection 1/4F	Refrigetant pipe (12.7mm dia.) flared connection 1/2F

6 WIRING DIAGRAM

PLFY-P20VCM-E.TH
PLFY-P25VCM-E.TH
PLFY-P32VCM-E.TH
PLFY-P40VCM-E.TH

[LEGEND]

SYMBOL	NAME		SYMBOL	NAME	
I.B	INDOOR CONTROLLER BOARD		C1	CAPACITOR (FAN MOTOR)	
CN32	CONNECTOR	REMOTE SWITCH	DP	DRAIN PUMP	
CN41		HA TERMINAL-A	DS	DRAIN SENSOR	
CN51		CENTRALLY CONTROL	H2	DEW PREVENTION HEATER	
CN52		REMOTE INDICATION	LEV	LINEAR EXPANSION VALVE	
FUSE	FUSE (6.3A/250V)		MF	FAN MOTOR (WITH THERMAL FUSE)	
SW1	SWITCH	MODE SELECTION	MV	VANE MOTOR	
SW2		CAPACITY CODE	TB2	TERMINAL BLOCK	POWER SUPPLY
SW3		MODE SELECTION	TB5		TRANSMISSION
SW4		MODEL SELECTION	TB15		MA-REMOTE CONTROLLER
SW11		ADDRESS SETTING 1ST DIGIT	TH21	THERMISTOR	ROOM TEMPERATURE DETECTION (0℃/15kΩ 25℃/5.4kΩ)
SW12		ADDRESS SETTING 2ND DIGIT			
SW14		CONNECTION No.	TH22		PIPE TEMPERATURE DETECTION/LIQUID (0℃/15kΩ 25℃/5.4kΩ)
X1	AUX. RELAY	DRAIN PUMP/DEW PREVENTION HEATER	TH23		PIPE TEMPERATURE DETECTION/GAS (0℃/15kΩ 25℃/5.4kΩ)
X4		FAN MOTOR (LL)			
X5		FAN MOTOR (Lo)	P.B	INDOOR POWER BOARD	
X6		FAN MOTOR (Hi)			
X7		FAN MOTOR (Me)			
ZNR	VARISTOR				



<fig:※1>

MODELS	SW2
P20	ON OFF 1 2 3 4 5 6
P25	ON OFF 1 2 3 4 5 6
P32	ON OFF 1 2 3 4 5 6
P40	ON OFF 1 2 3 4 5 6

LED on indoor controller board for service

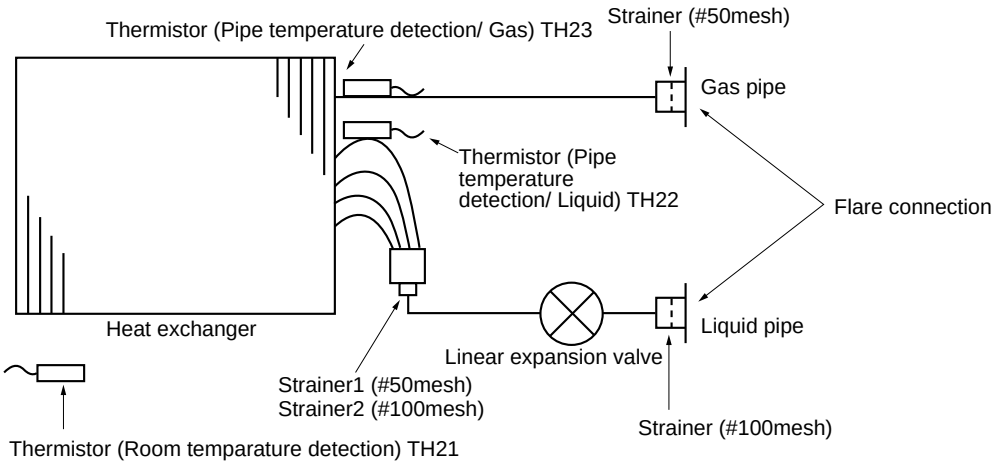
Mark	Meaning	Function
LED1	Main power supply	Main power supply(Indoor unit:220-240V) power on → lamp is lit
LED2	Power supply for MA-Remote controller	Power supply for MA-Remote controller on → lamp is lit

Notes:

1.At servicing for outdoor unit,always follow the wiring diagram of outdoor unit.
2.In case of using MA-Remote controller, please connect to TB15. (Remote controller wire is non-polar.)
3.In case of using M-NET, please connect to TB5. (Transmisson line is non-polar.)
4.Symbol[S] of TB5 is the shield wire connection.
5.Symbols used in wiring diagram above are, ◎ :terminal block, □□□ :connecter.
6.The setting of the SW2 dip switches differs in the capacity for the detail,refer to the fig:※1.

7 REFRIGERANT SYSTEM DIAGRAM

PLFY-P20VCM-E.TH
PLFY-P25VCM-E.TH
PLFY-P32VCM-E.TH
PLFY-P40VCM-E.TH

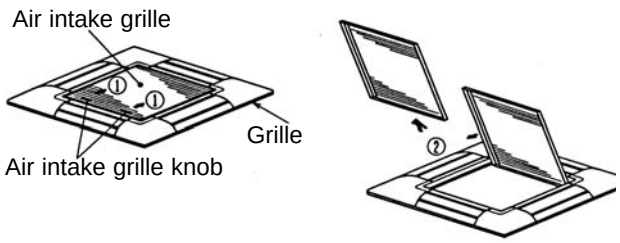
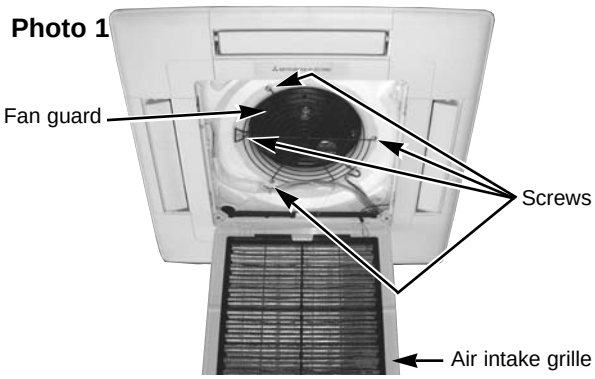
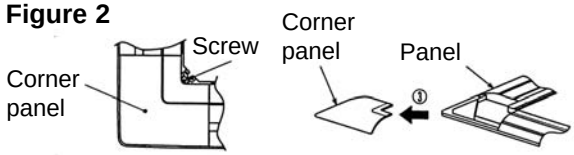
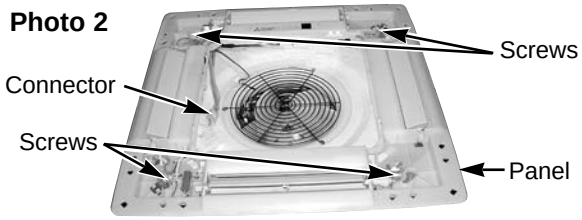
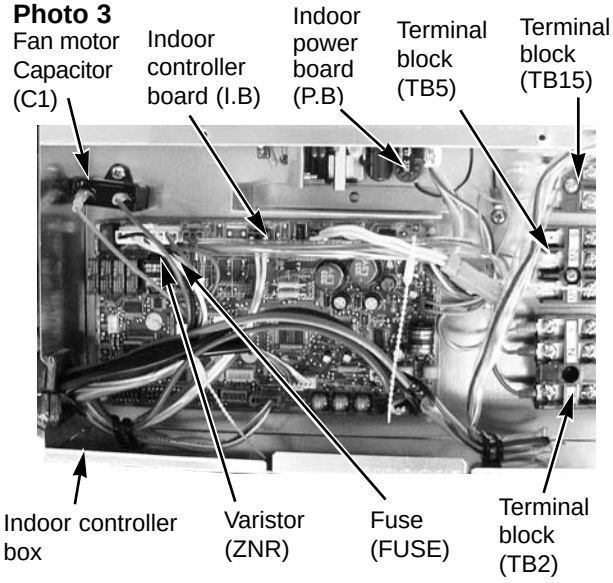


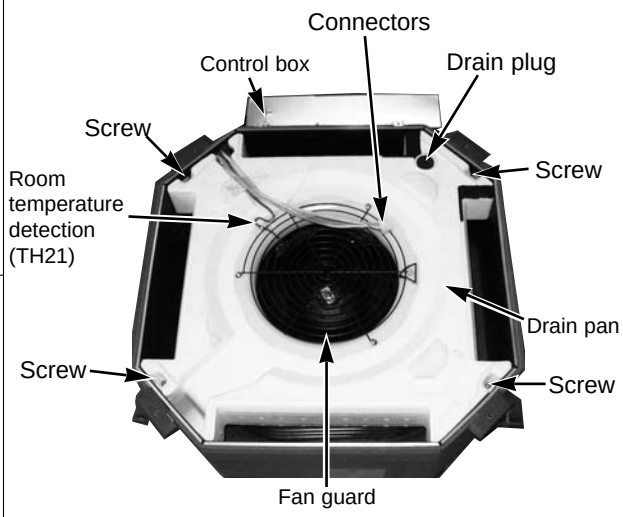
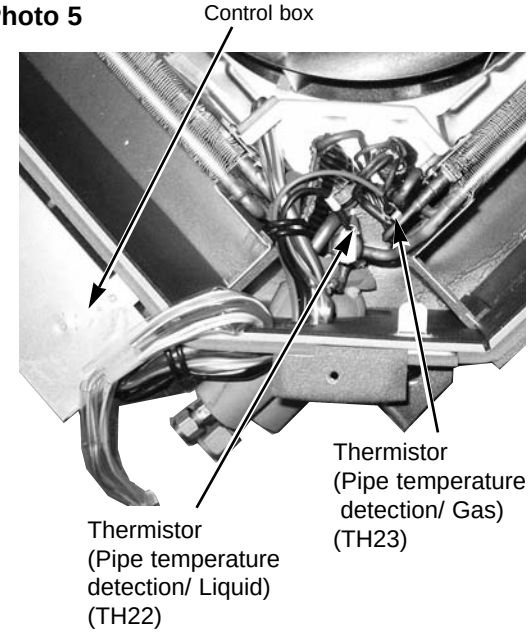
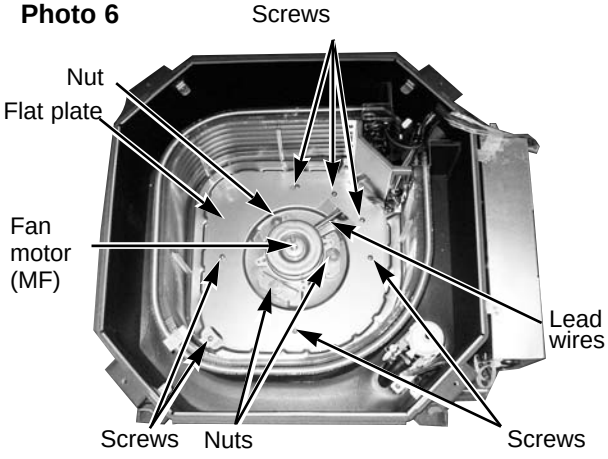
Gas pipe	ϕ12.7(1/2")
Liquid pipe	ϕ6.35(1/4")

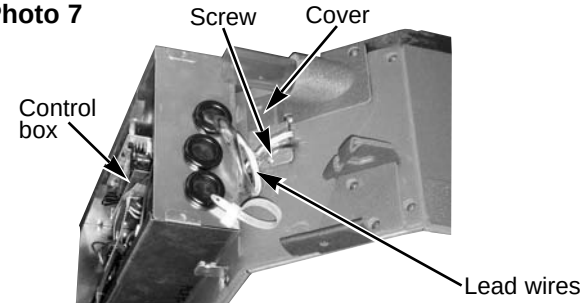
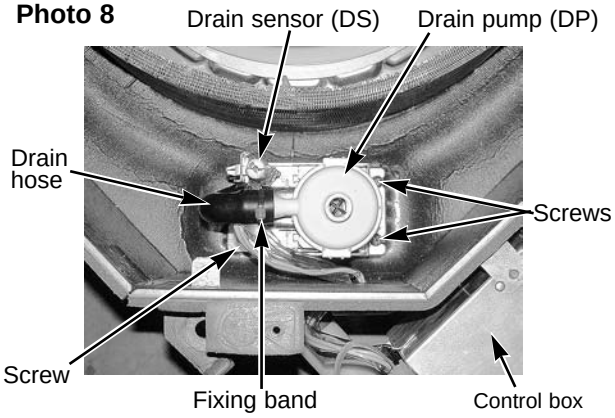
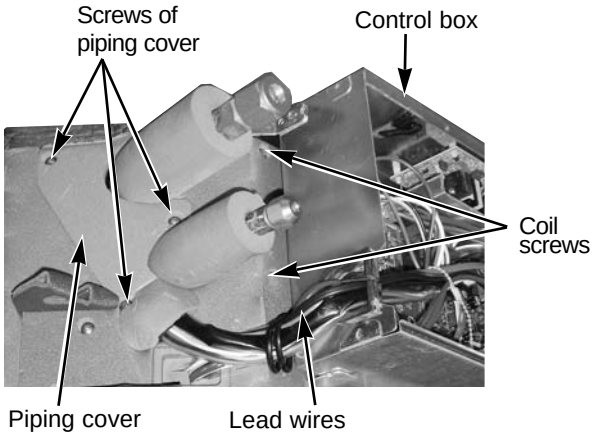
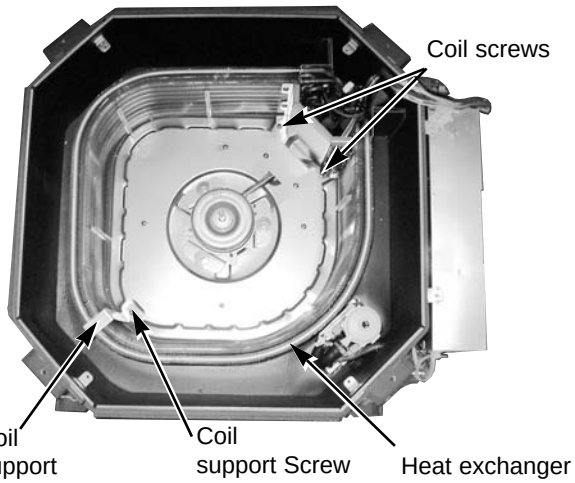
8 DISASSEMBLY PROCEDURE

PLFY-P20·P25·P32·P40VCM-E.TH

Be careful on removing heavy parts.

OPERATING PROCEDURE	PHOTOS&ILLUSTRATIONS
1. Removing the air intake grille (1) Slide the knob of air intake grille to the direction of the arrow ① to open the air intake grille. (2) Remove the hook for secure belt on air inlet grille from the panel. (3) Slide the shaft in the hinge to the direction of the arrow ② and remove the air intake grille.	**Figure 1** 
2. Removing the fan guard (1) Open the air intake grille. (2) Remove the 3 screws of fan guard.	**Photo 1** 
3. Removing the panel (1) Remove the air intake grille. (Refer to **1**) **Corner panel (See figure 2)** (1) Remove the screw of the corner. (2) Slide the corner panel to the direction of the arrow ③, and remove the corner panel. **Panel (See photo 2)** (1) Disconnect the connector that connects with the unit. (2) Remove the 2 screws from the panel and loose another 2 screws, which fixed to the oval hole, have different diameter. (3) Rotate the panel a little to remove the screws.(Slide the panel so that the screw comes to a large diameter of the oval hole, which has two different diameters.)	**Figure 2**  **Photo 2** 
4. Removing the electrical parts (1) Remove the 2 screws and the control box cover. <Electrical parts in the control box> • Indoor controller board (I.B) • Indoor power board (P.B) • Fan motor capacitor (C1) • Fuse (FUSE) • Varistor (ZNR) • Terminal block (TB)	**Photo 3** 

OPERATING PROCEDURE	PHOTOS&ILLUSTRATIONS
5. Remove the room temperature detection (TH21) (1) Remove the panel. (Refer to **3**) (2) Pull out the room temperature detection from the drain pan. (3) Remove the 2 screws fixed to the control box cover, and remove the control box cover. (4) Remove the connector (CN20) from the indoor controller board, and disconnect the room temperature detection.	**Photo 4** 
6. Remove the drain pan (1) Remove the panel. (Refer to **3**) (2) Remove the room temperature detection and the 2 lead wires held with fastener; wireless controller board relay connector (9P red) and panel relay connector (10P white). (3) Remove the 4 screws fixed to the drain pan, and remove the drain pan. (4) Remove the fan guard. (Refer to **2**)	
7. Removing the pipe temperature detection/liquid (TH22) and pipe temperature detection/gas (TH23) (1) Remove the panel. (Refer to **3**) (2) Remove the drain pan. (Refer to **6**) (3) Disconnect the liquid or gas from the holder. (4) Remove the 3 screws fixed to the piping cover, and remove the piping cover. (See photo 9) (5) Remove the 2 screws fixed to the control box cover, and remove the control box cover. **Pipe temperature detection/liquid (TH22)** (6) Remove the connector (CN21) from the indoor controller board, and disconnect the pipe temperature detection/Liquid. **Pipe temperature detection/gas (TH23)** (6) Remove the connector (CN29) from the indoor controller board, and disconnect the pipe temperature detection/Gas with its holder.	**Photo 5** 
8. Remove the fan motor (MF) (1) Remove the panel. (Refer to **3**) (2) Remove the drain pan. (Refer to **6**) (3) Remove the nut and the washer from the turbo fan, and remove the turbo fan. (4) Remove the 2 screws fixed to the control box cover, and remove the control box cover. (5) Disconnect the connectors of the (fan 1) and the (fan 2) from the indoor controller board. (6) Remove the 3 screws fixed to the piping cover, and remove the piping cover. (See photo 9) (7) Remove the 6 screws fixed to the flat plate, and remove the flat plate. (8) Disconnect the lead wires to the direction of the fan motor, and remove the 3 nuts of the fan motor.	**Photo 6** 

OPERATING PROCEDURE	PHOTOS&ILLUSTRATIONS
9. Removing the drain pump (DP) and drain sensor (DS) (1) Remove the panel. (Refer to **3**) (2) Remove the drain pan. (Refer to **6**) (3) Remove the 2 screws fixed to the control box cover, and remove the control box cover. (4) Remove the connectors of the (CNP) and the (CN31) from the indoor controller board. (5) Remove the 1 screw fixed to the cover, and remove the cover. (6) Disconnect the lead wires to the direction of the drain pump.(See photo 7) (7) Remove the 3 screws of the drain pump. (8) Cut the drain hose band, pull out the drain hose from the drain pump. (9) Pull out the drain pump. (10) Remove the drain sensor and the holder.	**Photo 7**  **Photo 8** 
10. Removing the heat exchanger (1) Remove the panel. (Refer to **3**) (2) Remove the drain pan. (Refer to **6**) (3) Remove the nut and the washer from the turbo fan, and remove the turbo fan. (4) Remove the 2 screws fixed to the control box cover, and remove the control box cover. (5) Disconnect the connectors of the (fan 1) and the (fan 2) from the indoor controller board. (6) Remove the 3 screws fixed to the piping cover, and remove the piping cover. (See photo 9) (7) Remove the pipe temperature thermistor/liquid and condenser/evaporator temperature thermistor. (Refer to **7**) (8) Disconnect the lead wires to the direction of the fan motor. (9) Remove the 1 coil support screw, the 2 inside coil screws (See photo 10), and the 4 outside coil screws (See photo 9) from the heat exchanger, and remove the heat exchanger.	**Photo 9**  **Photo 10** 

9 TROUBLE SHOOTING

9-1. How to check the parts

PLFY-P20VCM-E.TH
PLFY-P25VCM-E.TH
PLFY-P32VCM-E.TH
PLFY-P40VCM-E.TH

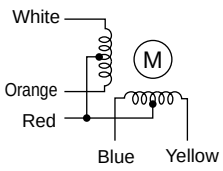
Thermistor (TH21) (Room temperature detection) / Thermistor (TH22) (Pipe temperature detection/ Liqid) / Thermistor (TH23) (Pipe temperature detection/ Gas)

Disconnect the connector then measure the resistance using a tester.
(Surrounding temperature 10℃~30℃)

Normal	Abnormal
4.3kΩ~9.6kΩ	Open or short

Refer to the next page for the details.

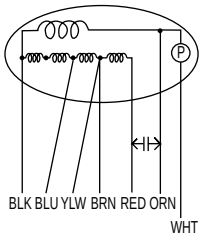
Vane motor (MV)



Measure the resistance between the terminals using a tester.
(Surrounding temperature 20℃~30℃)

Connector	Normal	Abnormal
Red — Yellow	300Ω	Open or short
Red — Blue		
Red — Orange		
Red — White		

Fan motor (MF)

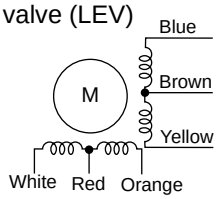


Ⓟ : Thermal fuse 145˚C ± 2˚C

Measure the resistance between the terminals with a tester.
(Coil wiring temperature 10°C ~ 30°C)

	Normal				Abnormal
	PLFY-P20VCM-E	PLFY-P25VCM-E	PLFY-P32VCM-E	PLFY-P40VCM-E	
WHT-BLK	302Ω~327Ω	390Ω~423Ω	378Ω~409Ω	312Ω~338Ω	Opened or short-circuited
BLK-BLU	91Ω~100Ω	82Ω~90Ω	157Ω~170Ω	137Ω~149Ω	
BLU-YLW	38Ω~42Ω	28Ω~32Ω	44Ω~49Ω	44Ω~49Ω	
YLW-RED RED-BRN	265Ω~288Ω	158Ω~172Ω	306Ω~332Ω	296Ω~321Ω	

Linear expansion valve (LEV)

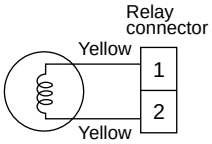


Disconnect the connector then measure the resistance valve using a tester.

Normal				Abnormal
White-Red	Yellow-Brown	Orange-Red	Blue-Brown	Open or short
150kΩ ±10%				

Refer to the next page for the details.

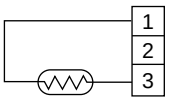
Drain pump (DP)



Measure the resistance between the terminals using a tester.
(Surrounding temperature 20℃~30℃)

Normal	Abnormal
290Ω	Open or short

Drain sensor (DS)



Measure the resistance after 3 minutes have passed since the power supply was intercepted.
(Surrounding temperature 0℃~60℃)

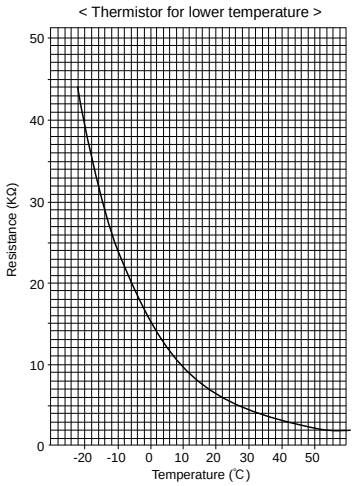
Normal	Abnormal
0.6kΩ~6.0kΩ	Open or short

Refer to the next page for the details.

<Thermistor characteristic graph>

Thermistor for lower temperature

Thermistor (TH21)
(Room temperature detection)
Thermistor (TH22)
(Pipe temperature detection/ Liquid)
Thermistor (TH23)
(Pipe temperature detection/ Gas)

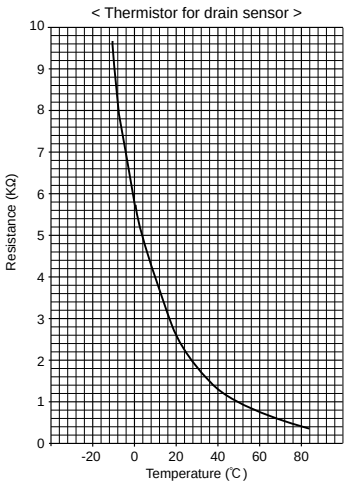


Thermistor R_0=15kΩ ± 3%
Fixed number of B=3480K ± 2%

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

0℃	15kΩ
10℃	9.6kΩ
20℃	6.3kΩ
25℃	5.4kΩ
30℃	4.3kΩ
40℃	3.0kΩ

Thermistor for drain sensor



Thermistor R_0=6.0kΩ ±5%
Fixed number of B=3390K ±2%

$$Rt=6\exp\{3390(\frac{1}{273+t}-\frac{1}{273})\}$$

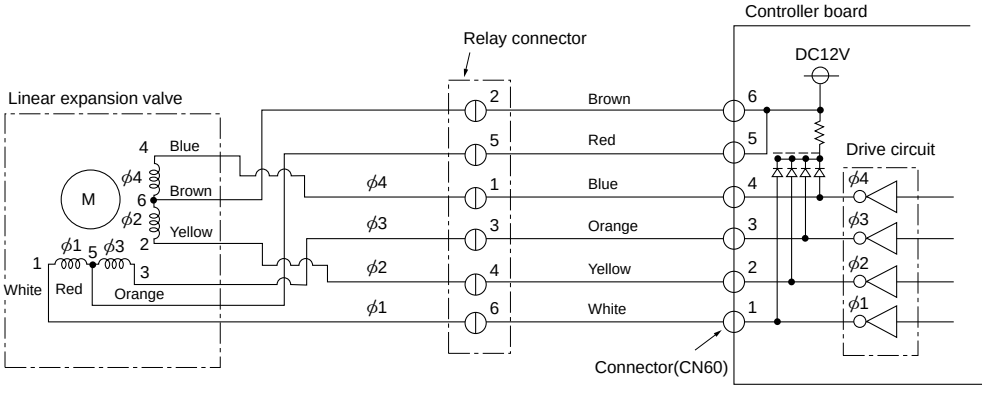
0℃	6.0kΩ
10℃	3.9kΩ
20℃	2.6kΩ
25℃	2.2kΩ
30℃	1.8kΩ
40℃	1.3kΩ
60℃	0.6kΩ

Linear expansion valve

① **Operation summary of the linear expansion valve.**

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

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



Note : Since the number of the connector at the controller board side and the relay connector are different, follow the color of the lead wire.

<Output pulse signal and the valve operation>

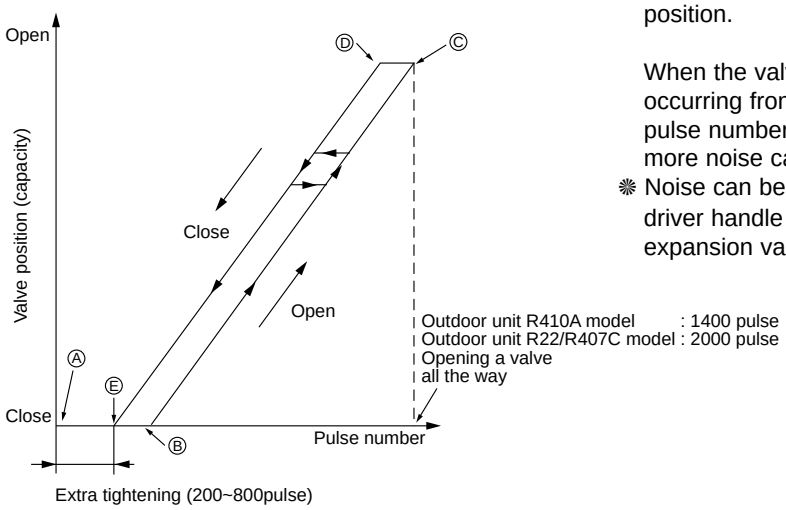
Output (Phase)	Output			
	1	2	3	4
ϕ1	ON	OFF	OFF	ON
ϕ2	ON	ON	OFF	OFF
ϕ3	OFF	ON	ON	OFF
ϕ4	OFF	OFF	ON	ON

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 locks and vibrates.

② Linear expansion valve operation

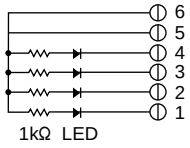
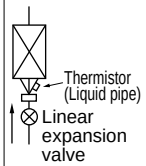


❋ When the switch is turned on, 2200 pulse closing valve signal will be send till it goes to point Ⓐ in order to define the valve position.

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

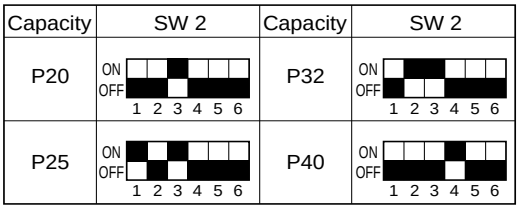
❋ Noise can be detected by placing the ear against the screw driver handle while putting the screw driver tip to the linear expansion valve.

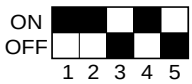
③ Trouble shooting

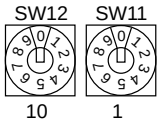
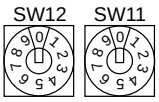
Symptom	Check points	Countermeasures
Operation circuit failure of the micro processor.	Disconnect the connector on the controller board, then connect LED for checking.  When power is turned on, pulse signals will output for 10 seconds. There must be some defects in the operation circuit if the LED does not light while the signals are output or keeps lighting even after the signals stop.	Exchange the indoor controller board at drive circuit failure.
Linear expansion valve mechanism is locked.	Motor will idle and make a ticking noise when the motor is operated while the linear expansion valve is locked. This ticking sound is the sign of the abnormality.	Exchange the linear expansion vale.
Short or breakage of the motor coil of the linear expansion valve.	Measure the resistance between each coil (white-red, yellow-brown, orange-red, blue-brown) using a tester. It is normal if the resistance is in the range of 150Ω ±10%.	Exchange the linear expansion valve.
Valve doesn't close completely.	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 is any 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 affecting normal operation. 	If large amount of thermistor 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.

9-2. FUNCTION OF DIP SWITCH

<table>
<tr><th rowspan="2">Switch</th><th rowspan="2">Pole</th><th rowspan="2">Function</th><th colspan="2">Operation by switch</th><th rowspan="2">Effective timing</th><th rowspan="2">Remarks</th></tr>
<tr><th>ON</th><th>OFF</th></tr>
<tr><td rowspan="10">SW1
Mode
Selection</td><td>1</td><td>Thermistor <Room temperature detection> position</td><td>Built-in remote controller</td><td>Indoor unit</td><td rowspan="10">Under suspension</td><td rowspan="10">Indoor controller board
<At delivery>
 

Note :
※1 Fan operation at Heating mode.
※2 Heater thermostat ON is operating.
※3 SW 1-7=OFF, SW 1-8=ON → Setting air flow.
SW 1-7=ON, SW 1-8=ON → Indoor fan stop.</td></tr>
<tr><td>2</td><td>Filter clogging detection</td><td>Provided</td><td>Not provided</td></tr>
<tr><td>3</td><td>Filter cleaning</td><td>2,500hr</td><td>100hr</td></tr>
<tr><td>4</td><td>Fresh air intake</td><td>Effective</td><td>Not effective</td></tr>
<tr><td>5</td><td>Remote indication switching</td><td>Thermostat ON signal indication</td><td>Fan output indication</td></tr>
<tr><td>6</td><td>Humidifier control</td><td>Always operated while the heat in ON ※1</td><td>Operated depends on the condition ※2</td></tr>
<tr><td>7</td><td rowspan="2">Air flow set in case of Heat thermostat OFF</td><td>Low ※3</td><td>Extra low ※3</td></tr>
<tr><td>8</td><td>Setting air flow ※3</td><td>Depends on SW1-7</td></tr>
<tr><td>9</td><td>Auto restart function</td><td>Effective</td><td>Not effective</td></tr>
<tr><td>10</td><td>Power ON/OFF</td><td>Effective</td><td>Not effective</td></tr>
<tr><td>SW2
Capacity code setting</td><td>1~6</td><td colspan="3"> 
</td><td>Before power supply ON</td><td>Indoor controller board
Set while the unit is off.
<At delivery>
Set for each capacity.</td></tr>
<tr><td rowspan="10">SW3
Function setting</td><td>1</td><td>Heat pump / Cooling only</td><td>Cooling only</td><td>Heat pump</td><td rowspan="10">Under suspension</td><td rowspan="10">Indoor controller board
Set while the unit is off.
<At delivery>
 

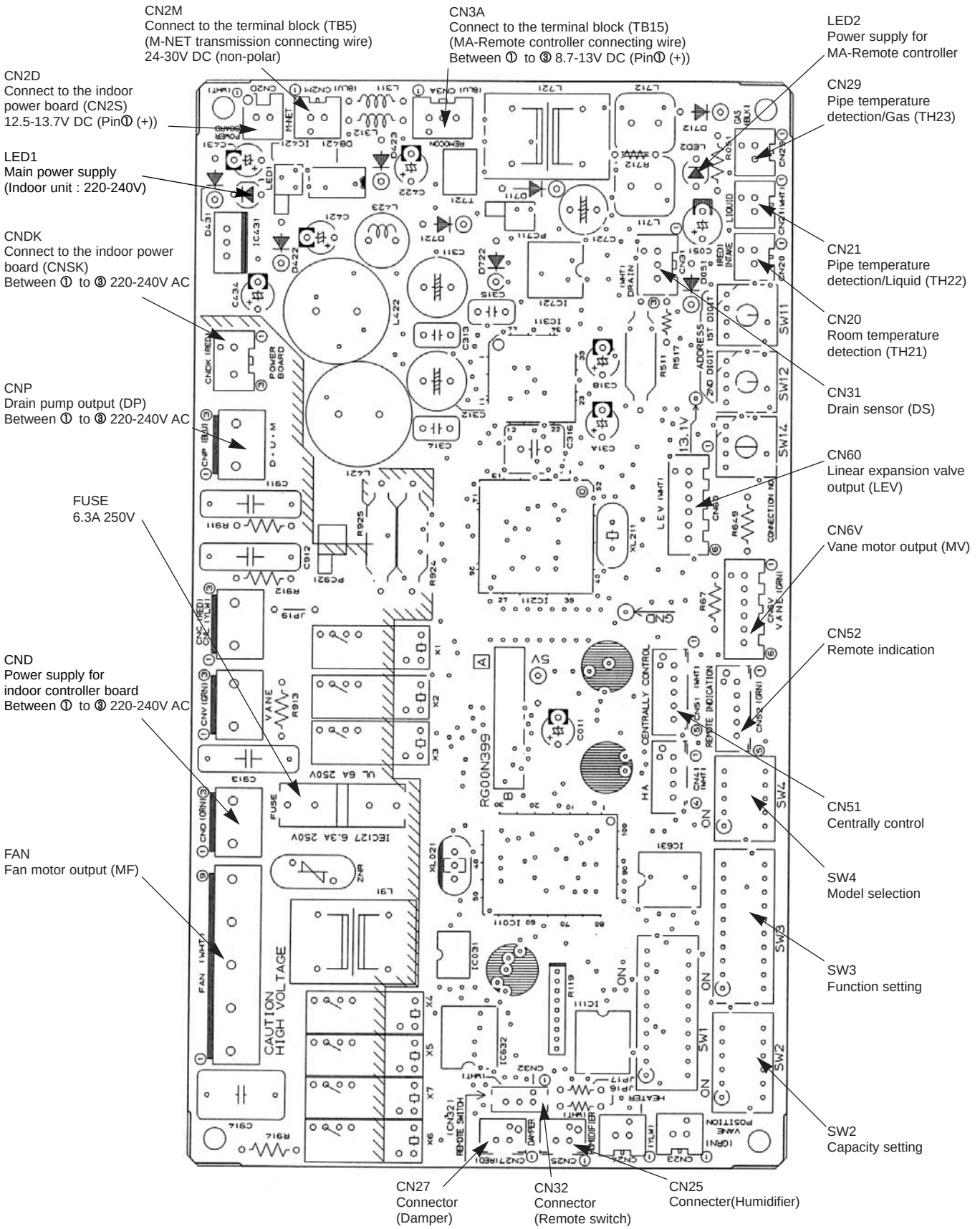
Note :
※4 At cooling mode, each angle can be used only 1 hour.
※5 The numerical valve in the parentheses shows the case which the R22 outdoor unit is connected.</td></tr>
<tr><td>2</td><td>Louver</td><td>Available</td><td>Not available</td></tr>
<tr><td>3</td><td>Vane</td><td>Available</td><td>Not available</td></tr>
<tr><td>4</td><td>Vane swing function</td><td>Available</td><td>Not available</td></tr>
<tr><td>5</td><td>Vane horizontal angle</td><td>Second setting</td><td>First setting</td></tr>
<tr><td>6</td><td>Vane cooling limit angle setting ※4</td><td>Horizontal angle</td><td>Down B, C</td></tr>
<tr><td>7</td><td>Indoor linear expansion valve opening</td><td>Effective</td><td>Not effective</td></tr>
<tr><td>8</td><td>Heat 4degrees up</td><td>Not effective</td><td>Effective</td></tr>
<tr><td>9</td><td>Superheat setting temperature ※5</td><td>9(5)degrees</td><td>6(2)degrees</td></tr>
<tr><td>10</td><td>Sub cool setting temperature</td><td>15degrees</td><td>10degrees</td></tr>
<tr><td>SW4
Unit Selection</td><td>1~5</td><td colspan="3">In case replacing the indoor controller board, make sure to set the switch to the factory-preset status, which is shown below.
 
</td><td>Before power supply ON</td><td>Indoor controller board</td></tr>
</table>

	Pole	Operation by switch	Effective timing	Remarks
SW11 1st digit address setting SW12 2nd digit address setting	Rotary switch	 Address setting should be done when M-NET Remote controller is being used.	Before power supply ON	Indoor controller board Address can be set while the unit is stopped. <At delivery> 
SW14 Connection No. setting	Rotary switch	 This is the switch to be used when the indoor unit is operated with R2 series outdoor unit as a set.		Indoor controller board <At delivery> 

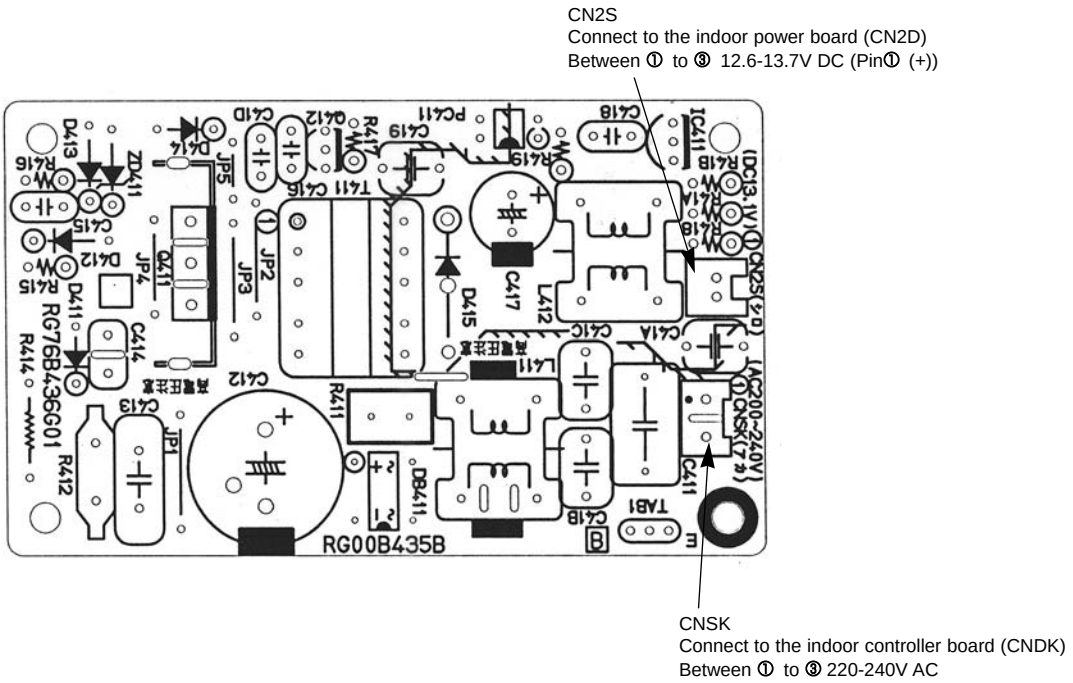
9-3. TEST POINT DIAGRAM

9-3-1. Indoor controller board

PLFY-P20VCM-E.TH
PLFY-P25VCM-E.TH
PLFY-P32VCM-E.TH
PLFY-P40VCM-E.TH

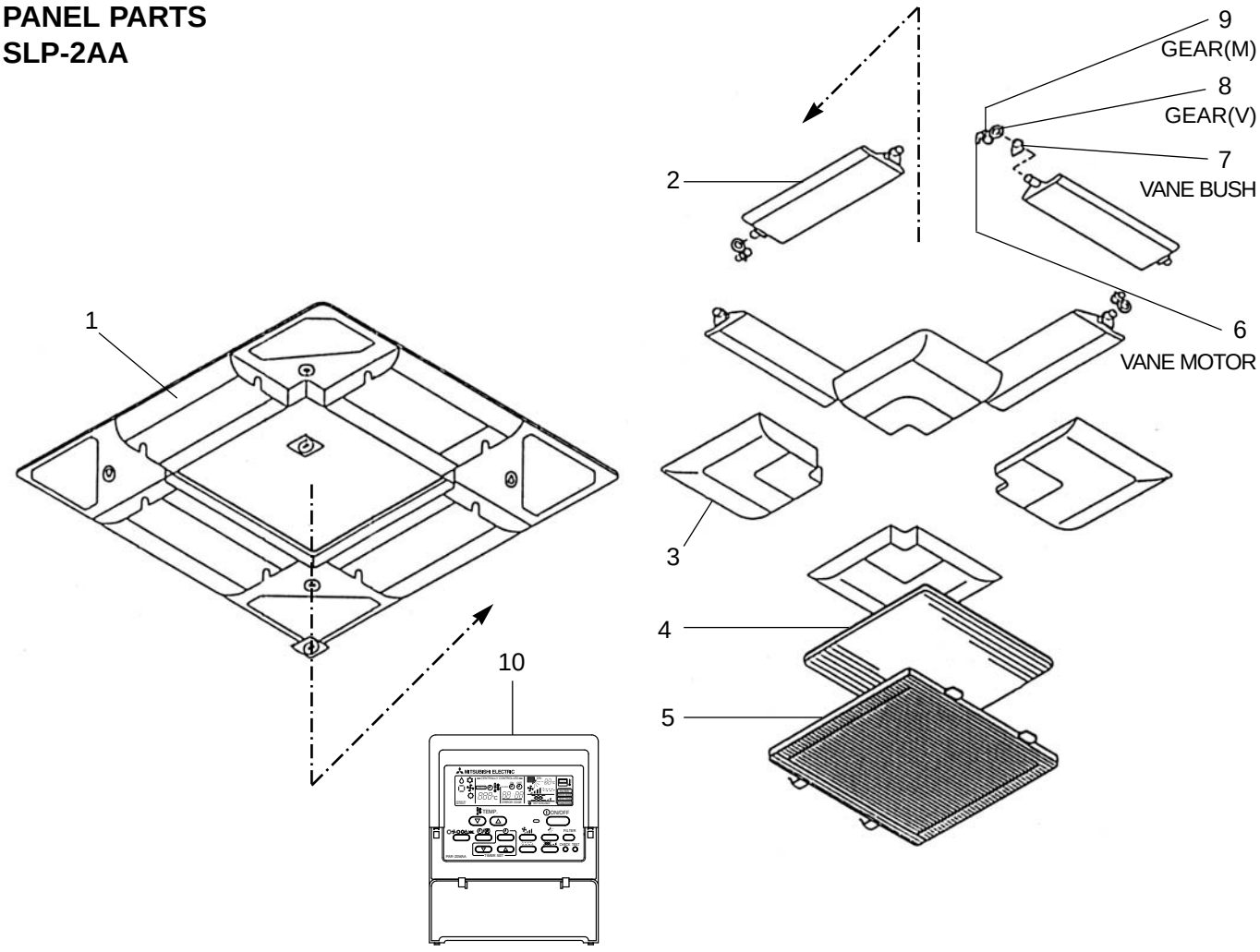


9-3-2. Indoor power board
PLFY-P20VCM-E.TH
PLFY-P25VCM-E.TH
PLFY-P32VCM-E.TH
PLFY-P40VCM-E.TH



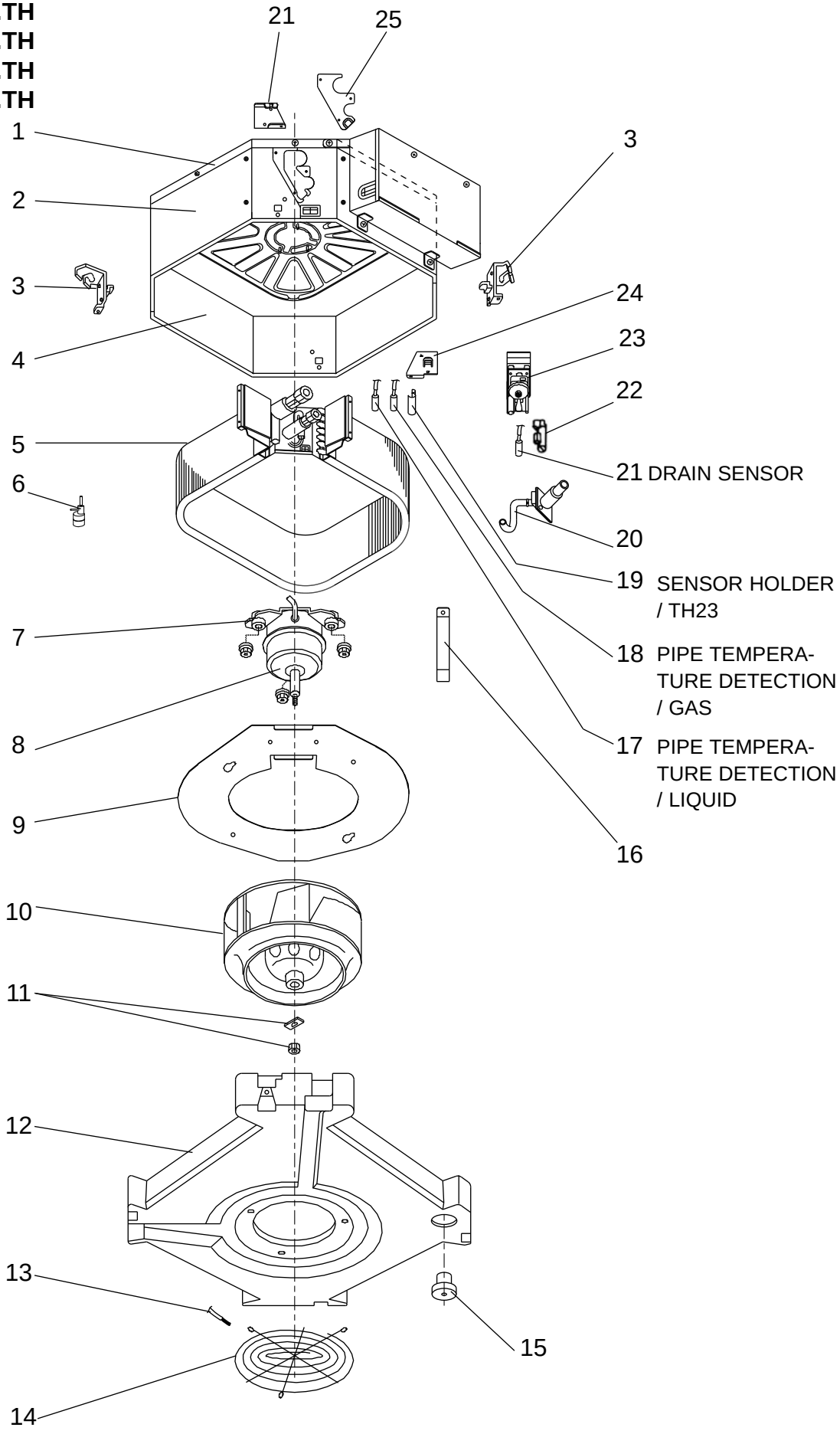
10 PARTS LIST

PANEL PARTS
SLP-2AA



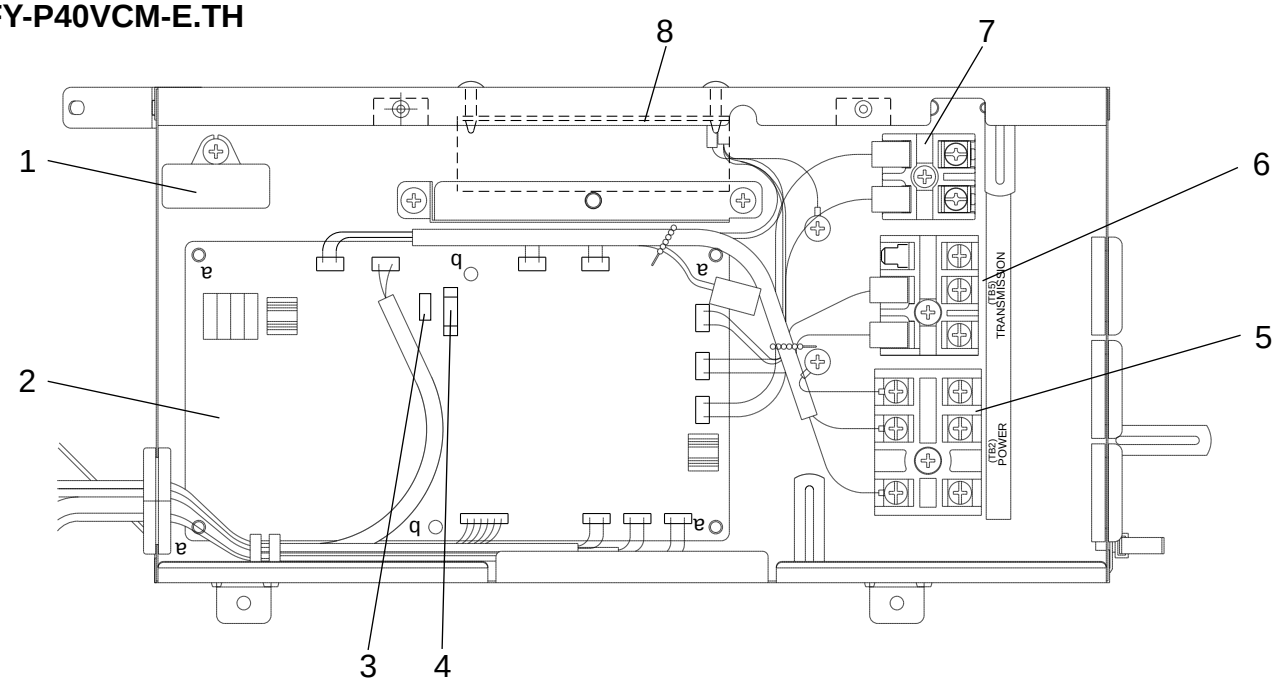
No.	Parts No.	Parts name	Specification	Q'ty/set	Remarks (Drawing No.)	Wiring Diagram Symbol	Recom-mended Q'ty	Price	
				SLP-2AA				Unit	Amount
1	E07 158 003	AIR OUTLET GRILLE		1					
2	E07 103 037	AUTO VANE		4		H2			
3	E07 103 975	CORNER PANEL		4					
4	E07 103 100	AIR FILTER		1					
5	E07 103 010	INTAKE GRILLE		1					
6	E07 103 303	VANE MOTOR		4		MV			
7	E07 103 044	VANE BUSH		8					
8	E07 103 031	GEAR (V)		4					
9	E07 103 032	GEAR (M)		4					
10	–	REMOTE CONTROLLER	PAR-20MAA	1					

FUNCTIONAL PARTS
PLFY-P20VCM-E.TH
PLFY-P25VCM-E.TH
PLFY-P32VCM-E.TH
PLFY-P40VCM-E.TH



No.	Parts No.	Parts name	Specification	Q'ty/set				Remarks (Drawing No.)	Wiring Diagram Symbol	Recom-mended Q'ty	Price	
				PLFY							Unit	Amount
				P20	P25	P32	P40					
				VCM-E.TH								
1	E07 104 290	BASE		1	1	1	1					
2	E07 104 124	DRUM-1		1	1	1	1					
3	E07 104 808	LEG-1		2	2	2	2					
4	E07 105 124	DRUM-2		1	1	1	1					
5	E07 154 620	INDOOR HEAT EXCHANGER		1	1							
	E07 155 620	INDOOR HEAT EXCHANGER				1	1					
6	E07 154 640	LINEAR EXPANSION VALVE		1	1	1	1		LEV			
7	E07 104 105	MOTOR MOUNT		3	3	3	3	3PCS/SET				
8	E07 154 300	INDOOR FAN MOTOR	PK6V11-LE	1					MF			
	E07 155 300	INDOOR FAN MOTOR	PK6V15-LC		1				MF			
	E07 156 300	INDOOR FAN MOTOR	PK6V20-LJ			1			MF			
	E07 157 300	INDOOR FAN MOTOR	PK6V20-LK				1		MF			
9	E07 104 816	FLAT PLATE		1	1	1	1					
10	E07 104 502	TURBO FAN		1	1	1	1					
11	E07 104 097	SPL WASHER		1	1	1	1					
12	E07 104 700	DRAIN PAN		1	1	1	1					
13	E07 154 308	RO0M TEMPERATURE DETECTION		1	1	1	1		TH21			
14	E07 104 520	FAN GUARD		1	1	1	1					
15	E07 104 524	DRAIN PLUG		1	1	1	1					
16	E07 104 648	COIL SUPPORT		1	1	1	1					
17	E07 154 307	PIPE TEMPERATURE DETECTION/LIQUID		1	1	1	1		TH22			
18	E07 154 309	PIPE TEMPERATURE DETECTION/GAS		1	1	1	1		TH23			
19	E07 154 241	SENSOR HOLDER/TH23	(TH23)	1	1	1	1					
20	E07 104 702	DRAIN HOSE		1	1	1	1					
21	E07 104 266	DRAIN SENSOR		1	1	1	1		DS			
22	E07 104 241	SENSOR HOLDER	(DS)	1	1	1	1					
23	E07 104 355	DRAIN PUMP		1	1	1	1		DP			
24	E07 104 809	LEG-2		2	2	2	2					
25	E07 154 006	COVER (DRUM)		1	1	1	1					

ELECTRICAL PARTS
PLFY-P20VCM-E.TH
PLFY-P25VCM-E.TH
PLFY-P32VCM-E.TH
PLFY-P40VCM-E.TH



No.	Parts No.	Parts name	Specification	Q'ty/set PLFY P20 VCM-E.TH	P25	P32	P40	Remarks (Drawing No.)	Wiring Diagram Symbol	Recommended Q'ty	Price Unit	Price Amount
1	E07 154 350	CAPACITOR	1.0μF / 440VAC	1					C1			
	E02 095 350	CAPACITOR	1.5μF / 440VAC		1	1	1		C1			
2	E07 154 447	INDOOR CONTROLLER BOARD		1					I.B			
	E07 155 447	INDOOR CONTROLLER BOARD			1				I.B			
	E07 156 447	INDOOR CONTROLLER BOARD				1			I.B			
	E07 157 447	INDOOR CONTROLLER BOARD					1		I.B			
3	E02 661 385	VARISTOR		1	1	1	1		ZNR			
4	E07 006 382	FUSE	250V 6.3A	1	1	1	1		FUSE			
5	E07 155 375	TERMINAL BLOCK		1	1	1	1	3P	TB2			
6	E07 154 375	TERMINAL BLOCK		1	1	1	1	3P	TB5			
7	E07 156 375	TERMINAL BLOCK		1	1	1	1	2P	TB15			
8	E07 154 440	INDOOR POWER BOARD		1	1	1	1		P.B			

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