Changes for the Better

MITSUBISHI ELECTRIC

SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

April 2012
No. OCH421
REVISED EDITION-B

TECHNICAL & SERVICE MANUAL

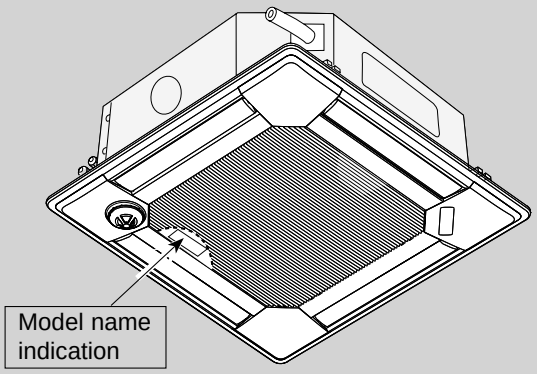
CITY MULTI Series Ceiling Cassettes R410A / R22

Indoor unit [Model names]	[Service Ref.]		
PLFY-P12NBMU-E	PLFY-P12NBMU-E	PLFY-P12NBMU-ER1	PLFY-P12NBMU-ER2
PLFY-P15NBMU-E	PLFY-P15NBMU-E	PLFY-P15NBMU-ER1	PLFY-P15NBMU-ER2
PLFY-P18NBMU-E	PLFY-P18NBMU-E	PLFY-P18NBMU-ER1	PLFY-P18NBMU-ER2
PLFY-P24NBMU-E	PLFY-P24NBMU-E	PLFY-P24NBMU-ER1	PLFY-P24NBMU-ER2
PLFY-P30NBMU-E	PLFY-P30NBMU-E	PLFY-P30NBMU-ER1	PLFY-P30NBMU-ER2
PLFY-P36NBMU-E	PLFY-P36NBMU-E	PLFY-P36NBMU-ER1	PLFY-P36NBMU-ER2

Revision:
- PLFY-P12/15/18/24/30/36 NBMU-ER2 have been added in REVISED EDITION-B.
- Some descriptions have been modified.

- Please void OCH421 REVISED EDNTION-A.

Note:
- This manual does not cover outdoor units. When servicing them, please refer to the outdoor unit's service manual.
- RoHS compliant products have <G> mark on the spec name plate.



INDOOR UNIT

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PARTS CATALOG (OCB421)

CITY MULTI

Use the specified refrigerant only

Never use any refrigerant other than that specified.

Doing so may cause a burst, an explosion, or fire when the unit is being used, serviced, or disposed of.
Correct refrigerant is specified in the manuals and on the spec labels provided with our products.
We will not be held responsible for mechanical failure, system malfunction, unit breakdown or accidents caused by failure to follow the instructions.

1 TECHNICAL CHANGES

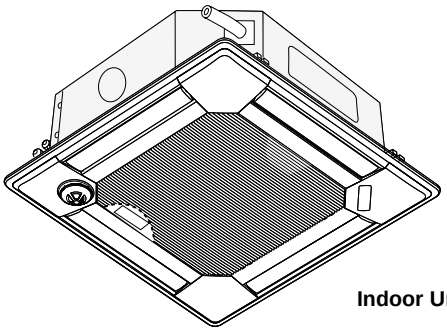
PLFY-P12NBMU-ER1 → PLFY-P12NBMU-ER2
PLFY-P15NBMU-ER1 → PLFY-P15NBMU-ER2
PLFY-P18NBMU-ER1 → PLFY-P18NBMU-ER2
PKFY-P24NBMU-ER1 → PLFY-P24NBMU-ER2
PKFY-P30NBMU-ER1 → PLFY-P30NBMU-ER2
PKFY-P36NBMU-ER1 → PLFY-P36NBMU-ER2

INDOOR CONTROLLER BOARD (I.B.) has been changed (S/W version up).

PLFY-P12NBMU-E → PLFY-P12NBMU-ER1
PLFY-P15NBMU-E → PLFY-P15NBMU-ER1
PLFY-P18NBMU-E → PLFY-P18NBMU-ER1
PKFY-P24NBMU-E → PLFY-P24NBMU-ER1
PKFY-P30NBMU-E → PLFY-P30NBMU-ER1
PKFY-P36NBMU-E → PLFY-P36NBMU-ER1

INDOOR CONTROLLER BOARD (I.B.) has been changed.

2 FEATURES

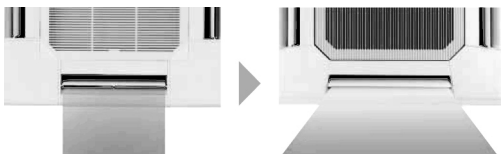


Indoor Unit

Models	Cooling capacity / Heating capacity
PLFY-P12NBMU-E	12,000 / 13,500 Btu/h
PLFY-P15NBMU-E	15,000 / 17,000 Btu/h
PLFY-P18NBMU-E	18,000 / 20,000 Btu/h
PLFY-P24NBMU-E	24,000 / 27,000 Btu/h
PLFY-P30NBMU-E	30,000 / 34,000 Btu/h
PLFY-P36NBMU-E	36,000 / 40,000 Btu/h

1. WIDE AIRFLOW

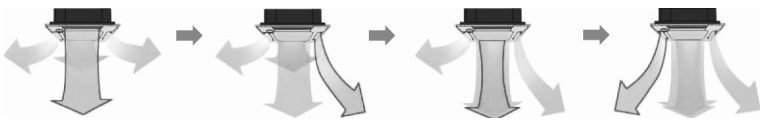
The new wide shape vane capable of wide angle air supply provides comfort even at the corners of a room regardless of cooling and heating operation. A reduction in the air speed by 20% compared to the conventional product eliminates uncomfortable draft sensation for friendly air conditioning.



2. WAVE AIRFLOW SYSTEM (HEATING MODE)

The wave airflow system has 4 vanes where each vane runs independently. Repeating of horizontal and down blows with a time lag allows the conditioned warm air to be distributed even to room corners thus preventing uneven room temperature distribution.

Operation image of "Wave Airflow"



3. AUTOMATIC AIR SPEED ADJUSTMENT MODE

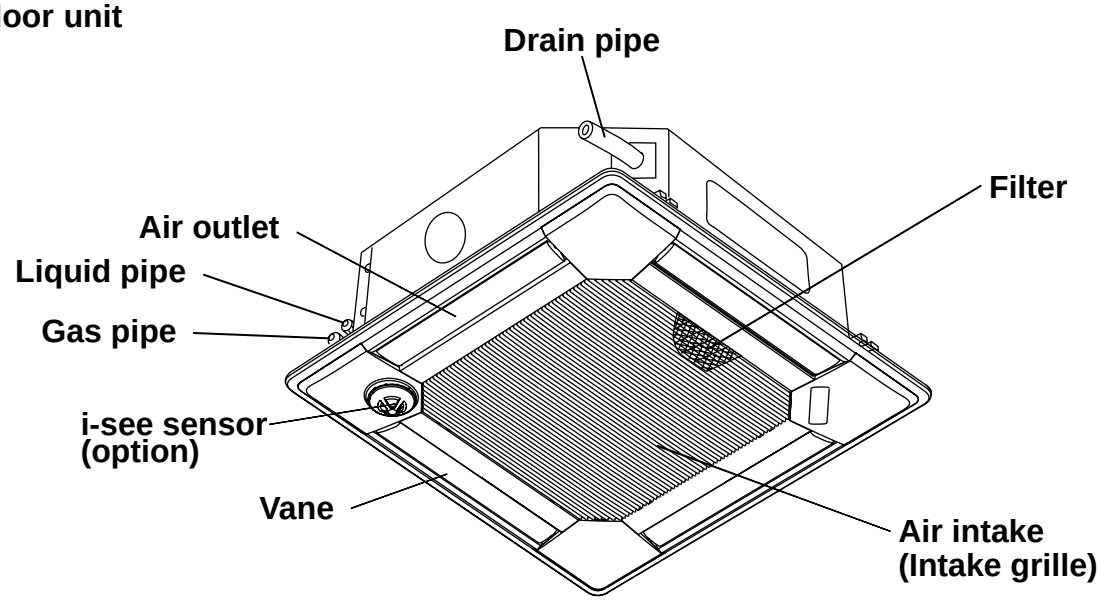
The automatic air speed adjustment mode is provided in addition to the 4 air speed stages of "High/Medium 1/Medium 2/ Low." Air speed can be changed freely in accordance with a difference between the set temperature and the room temperature. The automatic air speed adjustment mode presents quick cooling of a room with the high mode, such as at the starting up of cooling operation, for example. After the room temperature is stabilized, the low mode will be applied by automatic switching to keep your comfort.

4. i-see Sensor (OPTIONAL CORNER PANEL)

The i see sensor is a radiation temperature sensor originated from Mitsubishi's new technology. In order to create a really comfortable space in shops and offices, it is essential to control the temperature near the floor where occupants/visitors gather. The i see sensor measures the infrared rays generated from the surrounding wall and floor surface at an angle of 360° and the infrared ray energy is computed to convert it into the value of temperature. In addition, the floor temperature at distant spots (radiation temperature) is also measured to supply the optimum airflow to realize comfort which was never experienced in the past.

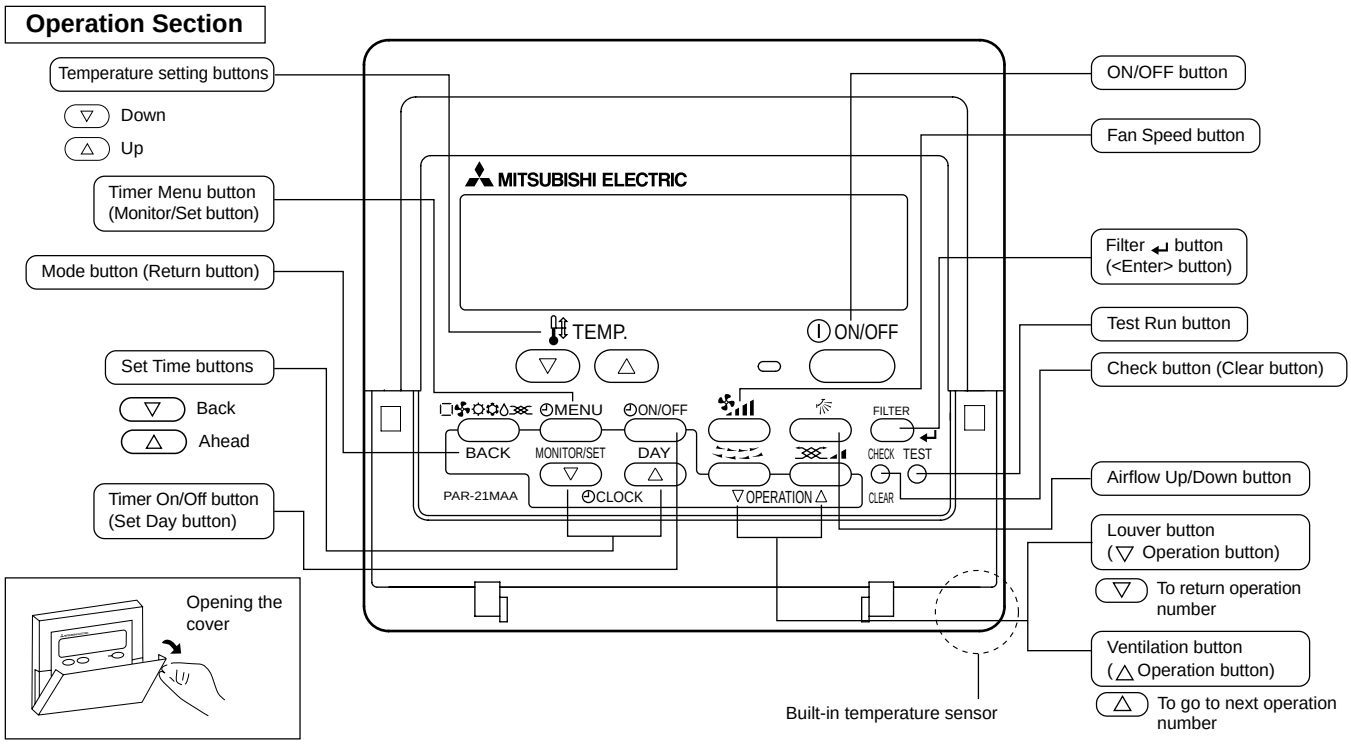
3 PART NAMES AND FUNCTIONS

- **Indoor unit**



- **Wired remote controller**

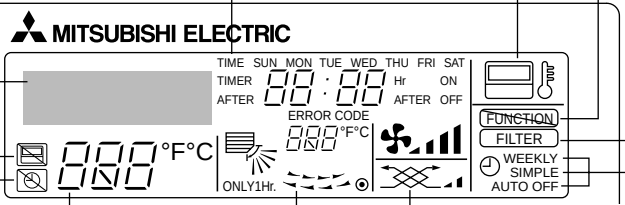
Note:
The phrase "Wired remote controller" in this manual refers only to the PAR-21MAA.
If you need any information for the other remote controller, please refer to either the installation manual or initial setting manual which are included in remote controller's box.



• Wired remote controller

Display Section

For purposes of this explanation, all parts of the display are shown as lit. During actual operation, only the relevant items will be lit.



Day-of-Week
Shows the current day of the week.

Time/Timer Display
Shows the current time, unless the simple or Auto Off timer is set.
If the simple or Auto Off timer is set, the time to be switched off is shown.

Identifies the current operation
Shows the operating mode, etc.
*Multilanguage display is available.

"Centrally Controlled" indicator
Indicates that operation from the remote controller has been prohibited by a master controller.

"Timer is Off" indicator
Indicates that the timer is off.

Temperature Setting
Shows the target temperature.

Up/Down Air Direction indicator
The indicator ↘ shows the direction of the outcoming airflow.

"One Hour Only" indicator
Displayed if the airflow is set to Low or downward during COOL or DRY mode. (Operation varies according to model.)
The indicator goes off in one hour, at which time the airflow direction also changes.

Room Temperature display
Shows the room temperature. The room temperature display range is 46–102F. The display blinks if the temperature is less than 46F or 102F or more.

Louver display
Indicates the action of the swing louver. Does not appear if the louver is not running.

◉ (Power On indicator)
Indicates that the power is on.

"Sensor" indication
Displayed when the remote controller sensor is used.

"Locked" indicator
Indicates that remote controller buttons have been locked.

"Clean The Filter" indicator
To be displayed on when it is time to clean the filter.

Timer indicators
The indicator comes on if the corresponding timer is set.

Fan Speed indicator
Shows the selected fan speed.

Ventilation indicator
Appears when the unit is running in Ventilation mode.

4 SPECIFICATIONS

4-1. SPECIFICATIONS

Model			PLFY-P12NBMU-E PLFY-P12NBMU-ER1 PLFY-P12NBMU-ER2	PLFY-P15NBMU-E PLFY-P15NBMU-ER1 PLFY-P15NBMU-ER2	PLFY-P18NBMU-E PLFY-P18NBMU-ER1 PLFY-P18NBMU-ER2
Power source			1-phase 208-230V 60Hz		
Cooling capacity (Nominal)	*1	BTU/h	12,000	15,000	18,000
	*1	kW	3.5	4.4	5.3
	Power input	kW	0.03	0.04	0.05
	Current input	A	0.22	0.29	0.36
Heating capacity (Nominal)	*2	Btu/h	13,500	17,000	20,000
	*2	kcal/h	4.0	5.0	5.9
	Power input	kW	0.02	0.03	0.04
	Current input	A	0.14	0.22	0.29
External finish			Galvanized steel sheet		
External dimension H × W × D		in.	10-3/16 × 33-3/32 × 33-3/32	10-3/16 × 33-3/32 × 33-3/32	10-3/16 × 33-3/32 × 33-3/32
		mm	258 × 840 × 840	258 × 840 × 840	258 × 840 × 840
Net weight		lbs (kg)	49 (22)	49 (22)	51 (23)
Decoration panel	Model		PLP-40BAU	PLP-40BAU	PLP-40BAU
	External finish		MUNSELL (6.4Y 8.9/0.4)		
	Dimension H × W × D	in.	1-3/8 × 37-13/32 × 37-13/32	1-3/8 × 37-13/32 × 37-13/32	1-3/8 × 37-13/32 × 37-13/32
		mm	35 × 950 × 950	35 × 950 × 950	35 × 950 × 950
	Net weight	lbs (kg)	13 (6)	13 (6)	13 (6)
Heat exchanger			Cross fin		
FAN	Type x Quantity		Turbo fan × 1	Turbo fan × 1	Turbo fan × 1
	External static press.	in.WG	0.000 (208V)	0.000 (208V)	0.000 (208V)
		Pa	0	0	0
		in.WG	0.000 (230V)	0.000 (230V)	0.000 (230V)
		Pa	0	0	0
	Motor type		DC motor		
	Motor output	kW	0.050	0.050	0.050
	Driving mechanism		Direct-drive		
	Airflow rate (Low-Mid2-Mid1-High)	cfm	388 - 424 - 459 - 494	424 - 459 - 494 - 565	494 - 530 - 565 - 636
		m^3/min	11.0 - 12.0 - 13.0 - 14.0	12.0 - 13.0 - 14.0 - 16.0	14.0 - 15.0 - 16.0 - 18.0
		L / s	183 - 200 - 217 - 233	200 - 217 - 233 - 267	233 - 250 - 267 - 300
Noise level (Low-Mid2-Mid1-High) (measured in anechoic room)		dB <A>	27 - 28 - 29 - 31 (208-230V)	27 - 28 - 30 - 31 (208-230V)	28 - 29 - 30- 32 (208-230V)
		dB <A>	—	—	—
		dB <A>	—	—	—
Insulation material			PS		
Air filter			PP honeycomb (long life filter, anti-bacterial type)		
Protection device			Fuse		
Refrigerant control device			LEV		
Connectable outdoor unit			R410A, R22 CITY MULTI		
Diameter of refrigerant pipe (O.D.)	Liquid (R410A)	in. (mm)	1/4 (6.35) Flare	1/4 (6.35) Flare	1/4 (6.35) Flare
	(R22)		1/4 (6.35) Flare	1/4 (6.35) Flare	3/8 (9.52) Flare
	Gas (R410A)	in. (mm)	1/2 (12.7) Flare	1/2 (12.7) Flare	1/2 (12.7) Flare
	(R22)		1/2 (12.7) Flare	1/2 (12.7) Flare	5/8 (15.88) Flare
Field drain pipe size		in. (mm)	O.D. 1-1/4 (32)	O.D. 1-1/4 (32)	O.D. 1-1/4 (32)
Standard attachment	Document Accessory		Installation Manual, Instruction Book		
Optional parts	Air outlet shutter plate		PAC-SH51SP-E	PAC-SH51SP-E	PAC-SH51SP-E
	High efficiency filterelement		PAC-SH59KF-E	PAC-SH59KF-E	PAC-SH59KF-E
	Multi-function casement		PAC-SH53TM-E	PAC-SH53TM-E	PAC-SH53TM-E
Remark					
	Installation		Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.		

Note:

	*1 Nominal cooling conditions	*2 Nominal heating conditions
Indoor :	80degF D.B. / 67degF W.B.	70degF D.B.
	(26.7degC D.B. / 19.4degC W.B.)	(21.1degC D.B.)
Outdoor :	95degF D.B.	47degF D.B. / 43degF W.B.
	(35degC D.B.)	(8.3degC D.B. / 6.1degC W.B.)
Pipe length :	25 ft. (7.6 m)	25 ft. (7.6 m)
Level difference :	0 ft. (0 m)	0 ft. (0 m)

*Due to continuing improvement, above specification may be subject to change without notice.

Unit converter

kcal/h = kW × 860
BTU/h = kW × 3,412
cfm = m^3/min × 35.31
lbs = kg/0.4536

*Above specification data is subject to rounding variation.

Model			PLFY-P24NBMU-E PLFY-P24NBMU-ER1 PLFY-P24NBMU-ER2	PLFY-P30NBMU-E PLFY-P30NBMU-ER1 PLFY-P30NBMU-ER2	PLFY-P36NBMU-E PLFY-P36NBMU-ER1 PLFY-P36NBMU-ER2
Power source			1-phase 208-230V 60Hz		
Cooling capacity (Nominal)	*1	BTU/h	24,000	30,000	36,000
	*1	kW	7.0	8.8	10.5
	Power input	kW	0.06	0.07	0.16
	Current input	A	0.43	0.51	1.07
Heating capacity (Nominal)	*2	Btu/h	27,000	34,000	40,000
	*2	kcal/h	7.9	10.0	11.7
	Power input	kW	0.05	0.06	0.15
	Current input	A	0.36	0.43	1.00
External finish			Galvanized steel sheet		
External dimension H × W × D		in.	10-3/16 × 33-3/32 × 33-3/32	10-3/16 × 33-3/32 × 33-3/32	11-3/4 × 33-3/32 × 33-3/32
		mm	258 × 840 × 840	258 × 840 × 840	298 × 840 × 840
Net weight		lbs (kg)	51 (23)	51 (23)	60 (27)
Decoration panel	Model		PLP-40BAU	PLP-40BAU	PLP-40BAU
	External finish		MUNSELL (6.4Y 8.9/0.4)		
	Dimension H × W × D	in.	1-3/8 × 37-13/32 × 37-13/32	1-3/8 × 37-13/32 × 37-13/32	1-3/8 × 37-13/32 × 37-13/32
		mm	35 × 950 × 950	35 × 950 × 950	35 × 950 × 950
	Net weight	lbs (kg)	13 (6)	13 (6)	13 (6)
Heat exchanger			Cross fin		
FAN	Type × Quantity		Turbo fan × 1	Turbo fan × 1	Turbo fan × 1
	External static press.	in.WG	0.000 (208V)	0.000 (208V)	0.000 (208V)
		Pa	0	0	0
		in.WG	0.000 (230V)	0.000 (230V)	0.000 (230V)
		Pa	0	0	0
	Motor type		DC motor		
	Motor output	kW	0.050	0.050	0.120
	Driving mechanism		Direct-drive		
	Airflow rate (Low-Mid2-Mid1-High)	cfm	530 - 565 - 636 - 706	565 - 636 - 706 - 777	777 - 883 - 989 - 1,059
		m^3/min	15.0 - 16.0 - 18.0 -20.0	16.0 - 18.0 - 20.0 - 22.0	22.0 - 25.0 - 28.0 - 30.0
		L/s	250 - 267 - 300 - 333	267 - 300 - 333 - 367	367 - 417 - 467 - 500
Noise level (Low-Mid2-Mid1-High) (measured in anechoic room)		dB <A>	28 - 30 - 32 - 34 (208-230V)	30 - 32 - 35 - 37 (208-230V)	35 - 38 - 41 - 43 (208-230V)
		dB <A>	—	—	—
		dB <A>	—	—	—
Insulation material			PS		
Air filter			PP honeycomb (long life filter, anti-bacterial type)		
Protection device			Fuse		
Refrigerant control device			LEV		
Connectable outdoor unit			R410A, R22 CITY MULTI		
Diameter of refrigerant pipe (O.D.)	Liquid (R410A)	in. (mm)	3/8 (9.52) Flare	3/8 (9.52) Flare	3/8 (9.52) Flare
	(R22)		3/8 (9.52) Flare	3/8 (9.52) Flare	3/8 (9.52) Flare
	Gas (R410A)	in. (mm)	5/8 (15.88) Flare	5/8 (15.88) Flare	5/8 (15.88) Flare
	(R22)		5/8 (15.88) Flare	5/8 (15.88) Flare	3/4 (19.05) Flare
Field drain pipe size		in. (mm)	O.D. 1-1/4 (32)	O.D. 1-1/4 (32)	O.D. 1-1/4 (32)
Standard attachment	Document Accessory		Installation Manual, Instruction Book		
Optional parts	Air outlet shutter plate		PAC-SH51SP-E	PAC-SH51SP-E	PAC-SH51SP-E
	High efficiency filterelement		PAC-SH59KF-E	PAC-SH59KF-E	PAC-SH59KF-E
	Multi-function casement		PAC-SH53TM-E	PAC-SH53TM-E	PAC-SH53TM-E
Remark					
	Installation		Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.		

Note:

	*1 Nominal cooling conditions	*2 Nominal heating conditions
Indoor :	80degF D.B. / 67degF W.B.	70degF D.B.
	(26.7degC D.B. / 19.4degC W.B.)	(21.1degC D.B.)
Outdoor :	95degF D.B.	47degF D.B. / 43degF W.B.
	(35degC D.B.)	(8.3degC D.B. / 6.1degC W.B.)
Pipe length :	25 ft. (7.6 m)	25 ft. (7.6 m)
Level difference :	0 ft. (0 m)	0 ft. (0 m)

*Due to continuing improvement, above specification may be subject to change without notice.

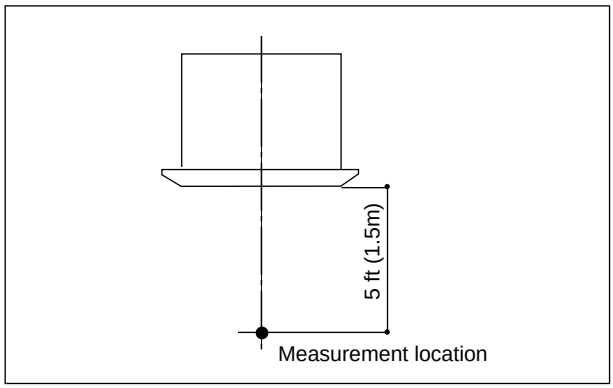
Unit converter

kcal/h = kW × 860
BTU/h = kW × 3,412
cfm = m^3/min × 35.31
lbs = kg/0.4536

*Above specification data is subject to rounding variation.

4-2. SOUND LEVEL

PLFY-P-NBMU-E

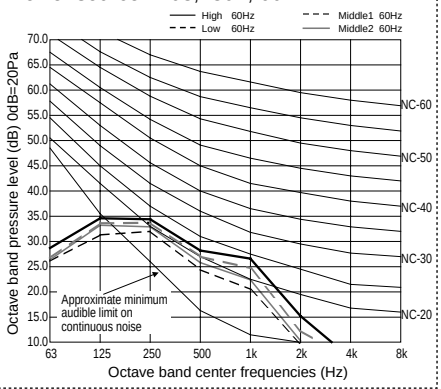


Sound level at anechoic room : Low-Mid2-Mid1-High

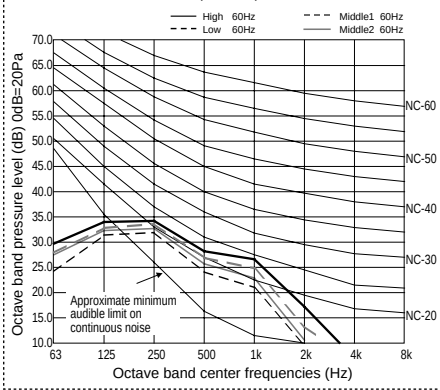
	Sound level dB (A)
PLFY-P12NBMU-E PLFY-P12NBMU-ER1 PLFY-P12NBMU-ER2	27-28-29-31
PLFY-P15NBMU-E PLFY-P15NBMU-ER1 PLFY-P15NBMU-ER2	27-28-30-31
PLFY-P18NBMU-E PLFY-P18NBMU-ER1 PLFY-P18NBMU-ER2	28-29-30-32
PLFY-P24NBMU-E PLFY-P24NBMU-ER1 PLFY-P24NBMU-ER2	28-30-32-34
PLFY-P30NBMU-E PLFY-P30NBMU-ER1 PLFY-P30NBMU-ER2	30-32-35-37
PLFY-P36NBMU-E PLFY-P36NBMU-ER1 PLFY-P36NBMU-ER2	35-38-41-43

4-3. NC CURVES

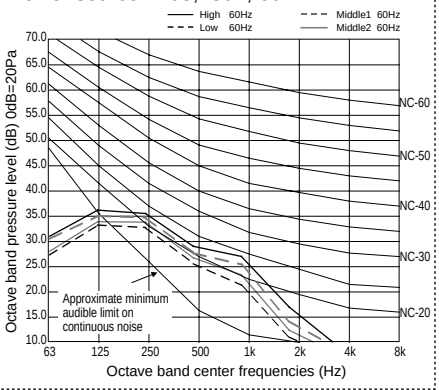
PLFY-P12NBMU-E
PLFY-P12NBMU-ER1
PLFY-P12NBMU-ER2
External static pressure : 0Pa
Power source : 208,230V, 60Hz



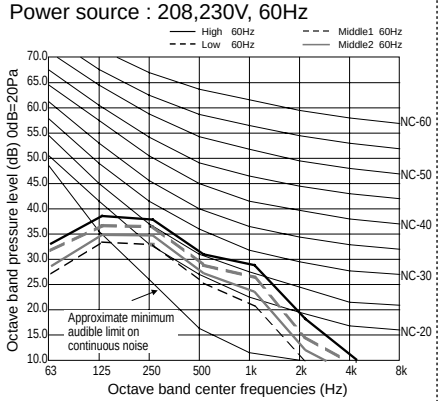
PLFY-P15NBMU-E
PLFY-P15NBMU-ER1
PLFY-P15NBMU-ER2
External static pressure : 0Pa
Power source : 208,230V, 60Hz



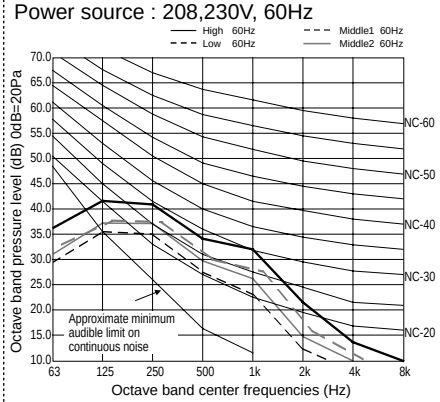
PLFY-P18NBMU-E
PLFY-P18NBMU-ER1
PLFY-P18NBMU-ER2
External static pressure : 0Pa
Power source : 208,230V, 60Hz



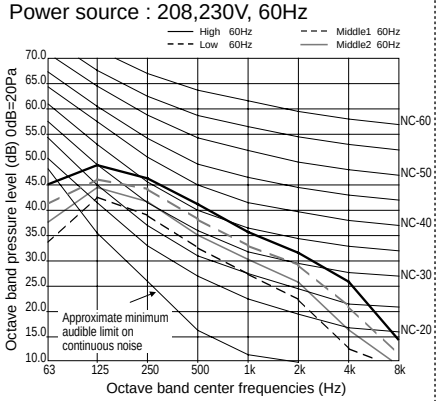
PLFY-P24NBMU-E
PLFY-P24NBMU-ER1
PLFY-P24NBMU-ER2
External static pressure : 0Pa
Power source : 208,230V, 60Hz



PLFY-P30NBMU-E
PLFY-P30NBMU-ER1
PLFY-P30NBMU-ER2
External static pressure : 0Pa
Power source : 208,230V, 60Hz



PLFY-P36NBMU-E
PLFY-P36NBMU-ER1
PLFY-P36NBMU-ER2
External static pressure : 0Pa
Power source : 208,230V, 60Hz



4-4. ELECTRICAL PARTS SPECIFICATIONS

Service Ref. / Parts name	Symbol	PLFY-P12NBMU-E PLFY-P12NBMU-ER1 PLFY-P12NBMU-ER2	PLFY-P15NBMU-E PLFY-P15NBMU-ER1 PLFY-P15NBMU-ER2	PLFY-P18NBMU-E PLFY-P18NBMU-ER1 PLFY-P18NBMU-ER2	PLFY-P24NBMU-E PLFY-P24NBMU-ER1 PLFY-P24NBMU-ER2	PLFY-P30NBMU-E PLFY-P30NBMU-ER1 PLFY-P30NBMU-ER2	PLFY-P36NBMU-E PLFY-P36NBMU-ER1 PLFY-P36NBMU-ER2
Room temperature thermistor	TH21	Resistance 30°F/15.8kΩ, 50°F/9.6kΩ, 70°F/6.0kΩ, 80°F/4.8kΩ, 90°F/3.9kΩ, 100°F/3.2kΩ					
Liquid pipe thermistor	TH22	Resistance 30°F/15.8kΩ, 50°F/9.6kΩ, 70°F/6.0kΩ, 80°F/4.8kΩ, 90°F/3.9kΩ, 100°F/3.2kΩ					
Gas pipe thermistor	TH23	Resistance 30°F/15.8kΩ, 50°F/9.6kΩ, 70°F/6.0kΩ, 80°F/4.8kΩ, 90°F/3.9kΩ, 100°F/3.2kΩ					
Fuse (Indoor controller board)	FUSE	250V 6.3A					
Fan motor	MF	8-pole OUTPUT 50W					8-pole OUTPUT, 120W
Vane motor	MV	MSBPC20M04 DC12V 300Ω/phase					
Drain pump	DP	PLD-12230ME-1 INPUT 12/10.8W 24 ℓ /Hr					
Drain float swich	FS	Open/short detection					
Linear expansion valve	LEV	DC12V Stepping motor drive port dimension ϕ3.2 (0~2000pulse) EDM-40YGME				DC12V Stepping motor drive port dimension ϕ5.2 (0~2000pulse) EDM-80YGME	
Power supply terminal block	TB2	(L1, L2, GR) 330V 30A					
Transmission terminal block	TB5	(M1, M2, S) 250V 20A					
MA remote controller terminal block	TB15	(1, 2) 250V 10A					

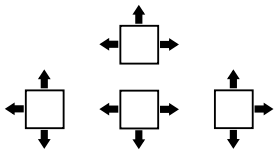
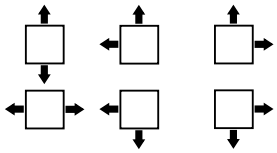
5 4-WAY AIR FLOW SYSTEM

5-1. PLACEMENT OF THE AIR OUTLETS

• For this grille, the blowout direction comes in 11 patterns.
Also, by setting the remote controller to the appropriate settings, you can adjust the air flow and speed. Select the settings from Table1 according to the location in which you want to install the unit.

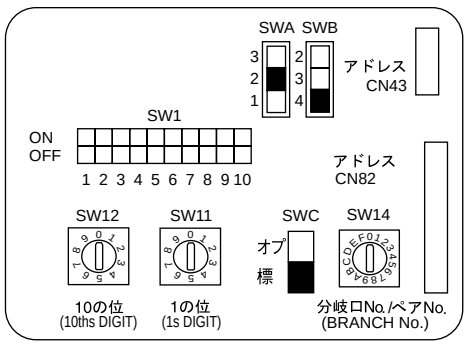
1) Decide on the pattern of the airflow direction.

<Table 1>

Blowout direction pattern	4-direction	3-direction	2-direction
	Pattern 1 Initial setting	Pattern 4 One air outlet fully closed	Pattern 6 2 air outlet fully closed
			

Note: For 3 and 2-direction settings, please use the air outlet shutter plate (option).

2) According to the number of air outlets and height of the ceiling to install the unit, be sure to set up the switches (SWA, SWB) on the address board to the appropriate setting.
• Correspondence of ceiling heights to numbers of air outlets



PLFY-P12·P15·P18·P24·P30NBMU-E
PLFY-P12·P15·P18·P24·P30NBMU-ER1
PLFY-P12·P15·P18·P24·P30NBMU-ER2

SWA / SWB		① Silent	② Standard	③ High ceiling
4	4 direction	2.5m, 8.2ft	2.7m, 8.9ft	3.5m, 11.5ft
3	3 direction	2.7m, 8.9ft	3.0m, 9.8ft	3.5m, 11.5ft
2	2 direction	3.0m, 9.8ft	3.3m, 10.8ft	3.5m, 11.5ft

PLFY-P36NBMU-E
PLFY-P36NBMU-ER1
PLFY-P36NBMU-ER2

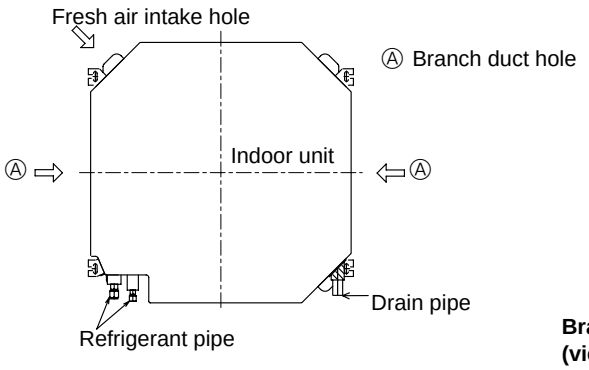
SWA / SWB		① Silent	② Standard	③ High ceiling
4	4 direction	2.7m, 8.9ft	3.2m, 10.5ft	4.5m, 14.8ft
3	3 direction	3.0m, 9.8ft	3.6m, 11.8ft	4.5m, 14.8ft
2	2 direction	3.3m, 10.8ft	4.0m, 13.1ft	4.5m, 14.8ft

5-2. BRANCH DUCT HOLE AND FRESH AIR INTAKE HOLE

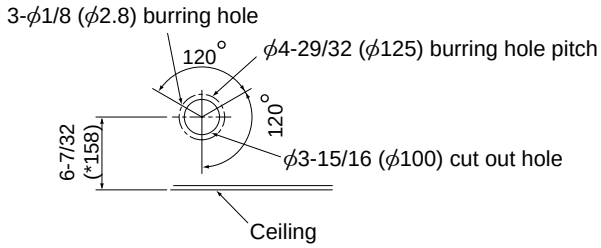
At the time of installation, use the duct holes (cut out) located at the positions shown in following diagram, as and when required.
• A fresh air intake hole for the optional multi function casement can also be made.

Note:
The figures marked with * in the drawing below represent the dimensions of the main unit excluding those of the optional multi function casement.
When installing the optional multi function casement, add 5-5/16" (135 mm) to the dimensions marked on the figure.
When installing the branch ducts, be sure to insulate adequately.
Otherwise, condensation and dripping may occur.

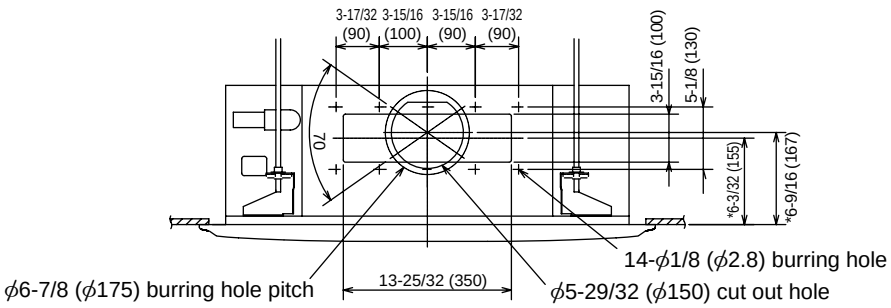
Unit : inch(mm)



Fresh air intake hole diagram

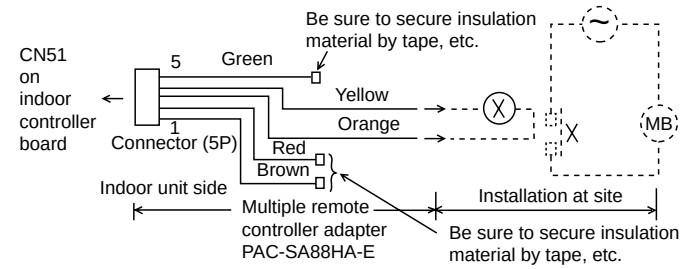


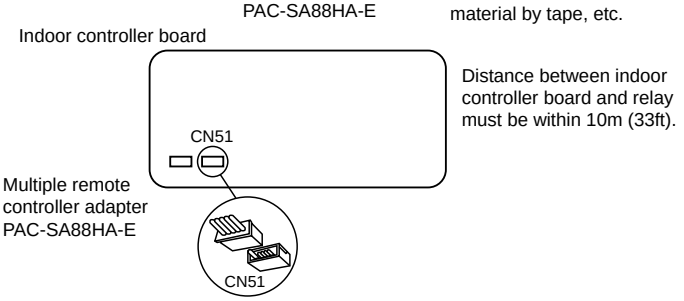
Branch duct hole diagram
(view from either side)



5-3. OPERATION IN CONJUNCTION WITH DUCT FAN (Booster fan)

• Whenever the indoor unit is operating, the duct fan 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 smaller)

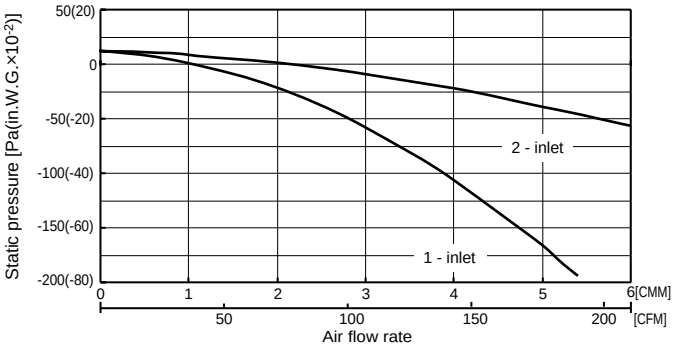




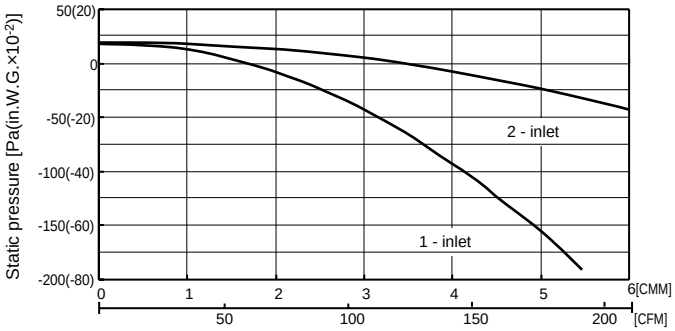
5-4. FRESH AIR INTAKE AMOUNT & STATIC PRESSURE CHARACTERISTICS

1 PLFY-P12 · P18 · P24 · P30NBMU-E, PLFY-P12 · P18 · P24 · P30NBMU-ER1
PLFY-P12 · P18 · P24 · P30NBMU-ER2

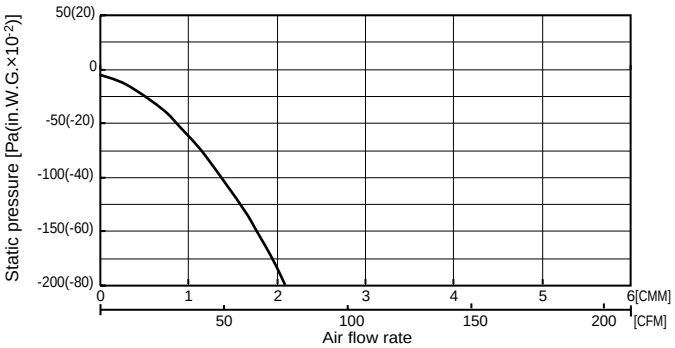
Multifunction casement + High efficiency filter



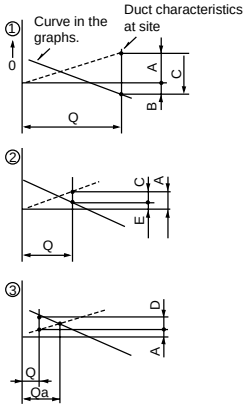
Multifunction casement + Standard filter



Taking air into the unit



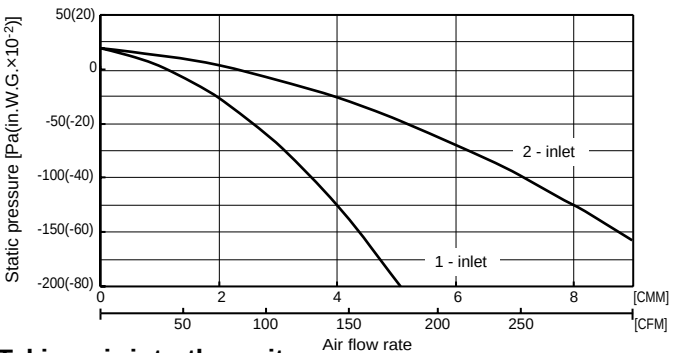
How to read curves



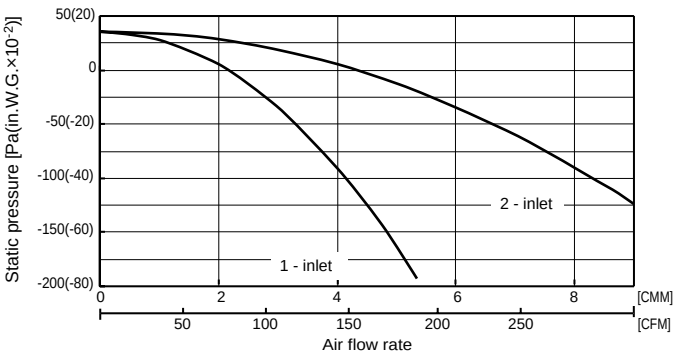
Q…Designed amount of fresh air intake <CMM (CFM)>
A…Static pressure loss of fresh air intake duct system with air flow amount Q <Pa (in.W.G.×10-2)>
B…Forced static pressure at air conditioner inlet with air flow amount Q <Pa (in.W.G.×10-2)>
C…Static pressure of booster fan with air flow amount Q <Pa (in.W.G.×10-2)>
D…Static pressure loss increase amount of fresh air intake duct system for air flow amount Q <Pa (in.W.G.×10-2)>
E…Static pressure of indoor unit with air flow amount Q <Pa (in.W.G.×10-2)>
Qa…Estimated amount of fresh air intake without D <CMM (CFM)>

2 PLFY-P36NBMU-E, PLFY-P36NBMU-ER1, PLFY-P36NBMU-ER2

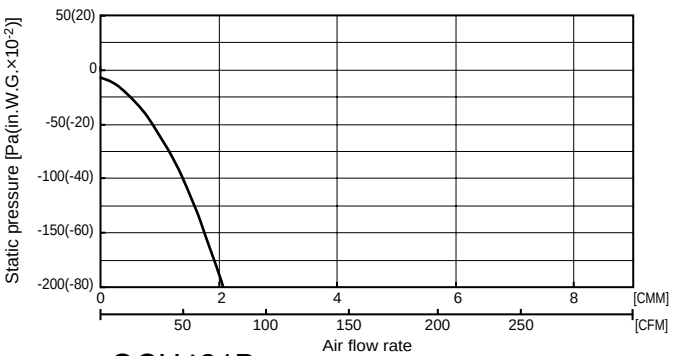
Multifunction casement + Standard filter



Multifunction casement + High efficiency filter



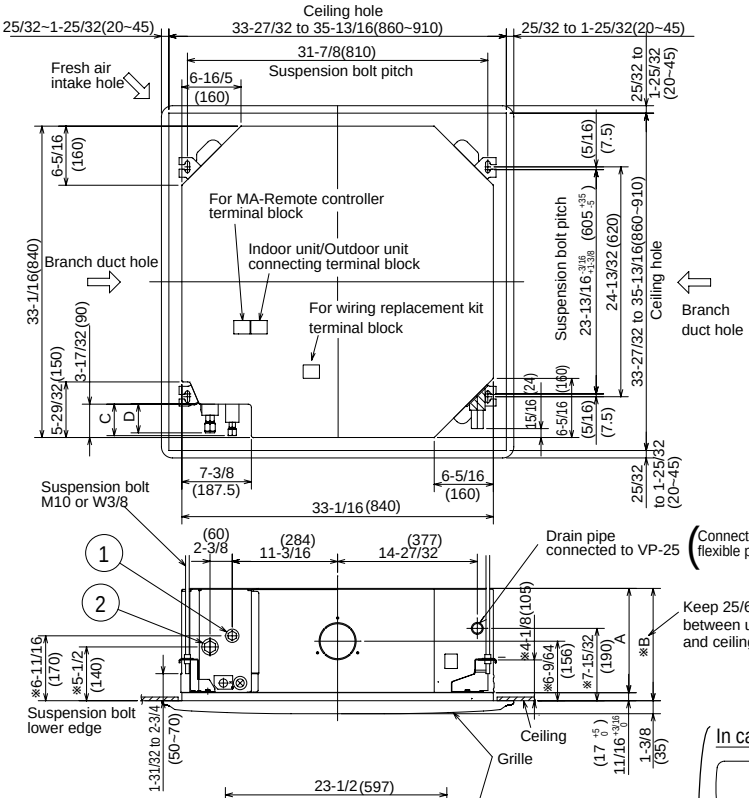
Taking air into the unit

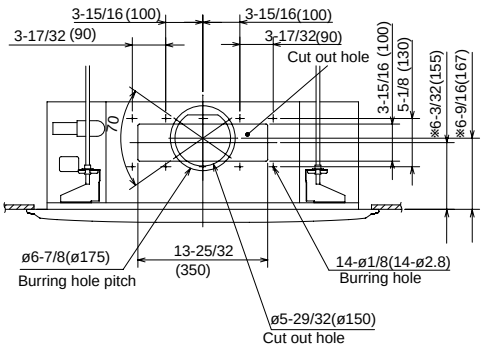


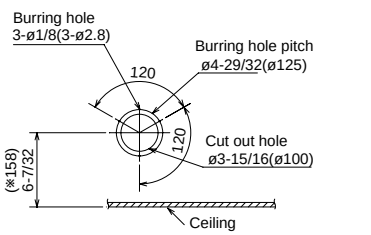
6 OUTLINES AND DIMENSIONS

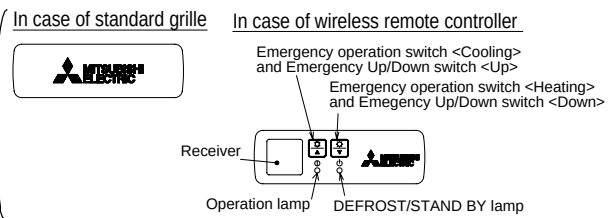
PLFY-P12/15/18/24/30/36NBMU-E
PLFY-P12/15/18/24/30/36NBMU-ER1
PLFY-P12/15/18/24/30/36NBMU-ER2

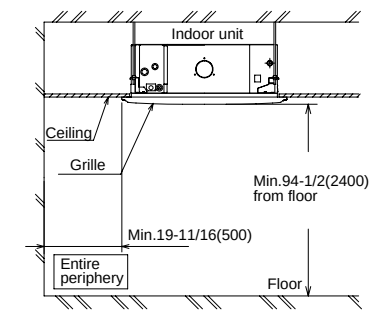
Unit : inch (mm)









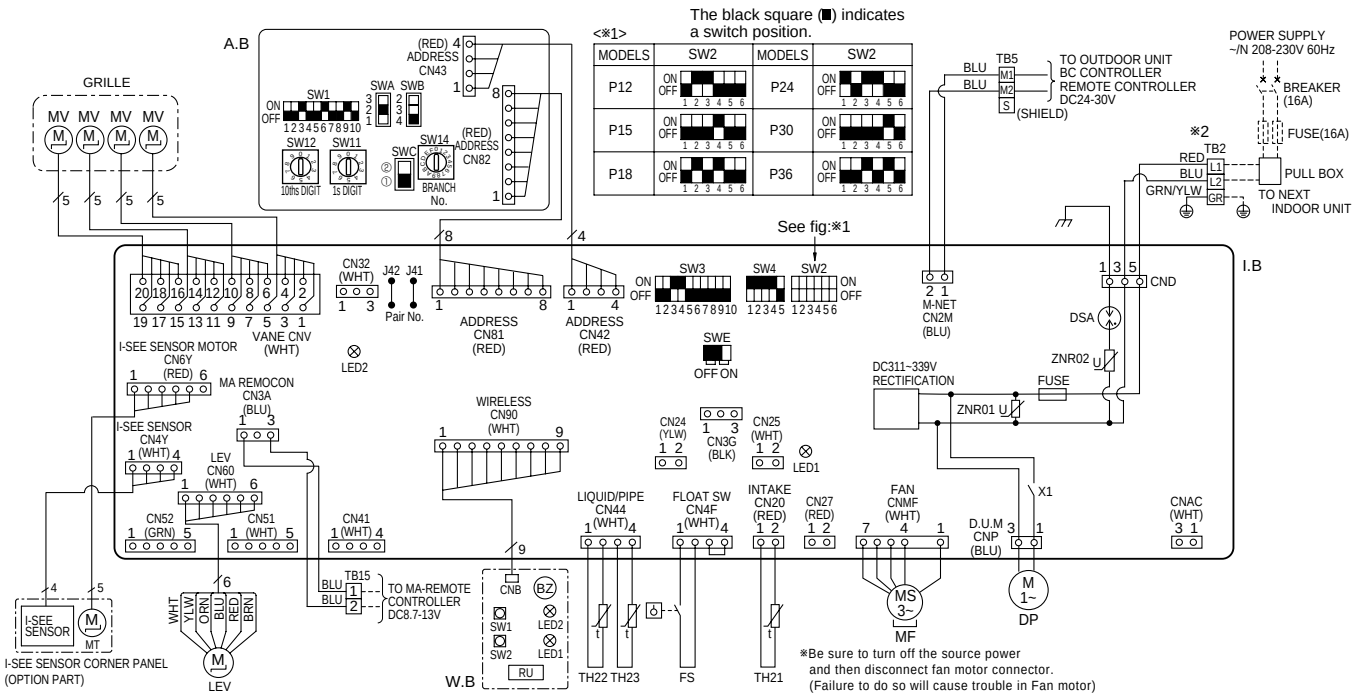


Note:
1. Please choose the Grille from a standard grille.
2. As for drain pipe, please use VP-25 (O.D. ϕ1-1/4(ϕ32) PVC TUBE.)
   Drain pump is included.
   Max. lifting height is 70-7/18 (850mm) from the ceiling.
3. As for suspension bolt, please use M10 or W3/8. (Procured at local site)
4. Electrical box may be removed for the service purpose.
   Make sure to slack the electrical wire little bit for control/power wires connection.
5. The height of the indoor unit is able to be adjusted with the grille attached.
6. For the installation of the optional high efficiency filter or optional multi-functional casement.
   1) Add 5-5/16"(135mm) to the dimensions ※marked on the figure.
   2) The optional high efficiency filter becomes optional multi-functional casement and concomitant use.
7. When installing the branch ducts, be sure to insulate adequately.
   Otherwise condensation and dripping may occur.
   (It becomes the cause of dew drops/water dew.)
8. As for necessary installation/service space, please refer to the left figure.

Service ref.	①	②	A	B	C	D
PLFY-P12NBMU-E PLFY-P12NBMU-ER1 PLFY-P12NBMU-ER2 PLFY-P15NBMU-E PLFY-P15NBMU-ER1 PLFY-P15NBMU-ER2 PLFY-P18NBMU-ER1 PLFY-P18NBMU-ER2	Refrigerant pipe ···ø6.35 Flared connection ···1/4F	Refrigerant pipe ···ø12.7 Flared connection ···1/2F	9-1/2 (241)	10-3/16 (258)	3-5/32 (80)	2-29/32 (74)
PLFY-P18NBMU-E	Refrigerant pipe ø6.35 / ø9.52 Flared connection 1/4F / 3/8F (compatible)	Refrigerant pipe ø12.7 / ø15.88 Flared connection 1/2F / 5/8F (compatible)				
PLFY-P24NBMU-E PLFY-P24NBMU-ER1 PLFY-P24NBMU-ER2 PLFY-P30NBMU-E PLFY-P30NBMU-ER1 PLFY-P30NBMU-ER2	Refrigerant pipe ···ø9.52 Flared connection ···3/8F	Refrigerant pipe ···ø15.88 Flared connection ···5/8F				
PLFY-P36NBMU-E		Refrigerant pipe ø15.88 / ø19.05 Flared connection 5/8F / 3/4F (compatible)	11-1/16 (281)	11-3/4 (298)	3-11/32 (85)	3-1/32 (77)
PLFY-P36NBMU-ER1 PLFY-P36NBMU-ER2		Refrigerant pipe ···ø15.88 Flared connection ···5/8F				

7 WIRING DIAGRAM

PLFY-P12/15/18/24/30/36NBMU-E
PLFY-P12/15/18/24/30/36NBMU-ER1



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. (Transmission 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 fig.<※1>.
※2.Use copper supply wires.

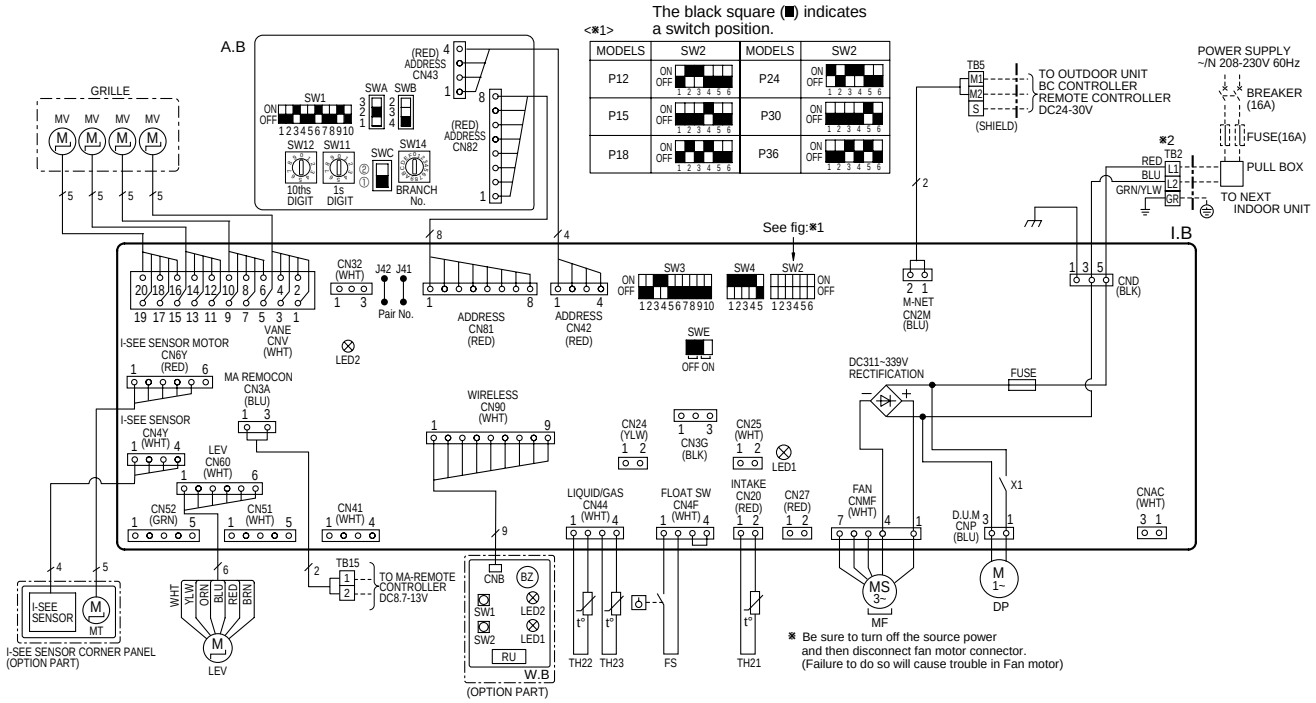
[LEGEND]

SYMBOL	NAME		SYMBOL	NAME		SYMBOL	NAME	
I. B	INDOOR CONTROLLER BOARD		DP	DRAIN-UP MACHINE		A. B	ADDRESS BOARD	
CN27	CONNECTOR	DAMPER	FS	DRAIN FLOAT SWITCH		SWA	SWITCH	CEILING HEIGHT SELECTOR
CN32		REMOTE SWITCH	LEV	LINEAR EXPANSION VALVE		SWB		DISCHARGE OUTLET NUMBER SELECTOR
CN51		CENTRALLY CONTROL	MF	FAN MOTOR		SWC		OPTION SELECTOR
CN52		REMOTE INDICATION	MV	VANE MOTOR		SW1		MODE SELECTION
DSA	SURGE ABSORBER		TB2	TERMINAL BLOCK	POWER SUPPLY	SW11		ADDRESS SETTING 1s DIGIT
FUSE	FUSE (T6.3AL250V)		TB5		TRANSMISSION	SW12		ADDRESS SETTING 10ths DIGIT
LED1	POWER SUPPLY (I. B)		TB15		MA-REMOTE CONTROLLER	SW14		BRANCH NO.
LED2	POWER SUPPLY (I. B)		TH21	THERMISTOR	ROOM TEMP. DETECTION (0℃/15kΩ, 25℃/5.4kΩ)	OPTION PART		
SW2	SWITCH	CAPACITY CODE				W.B	PCB FOR WIRELESS REMOTE CONTROLLER	
SW3		MODE SELECTION	TH22		PIPE TEMP. DETECTION / LIQUID (0℃/15kΩ, 25℃/5.4kΩ)	BZ	BUZZER	
SW4		MODEL SELECTION				LED1	LED (OPERATION INDICATION: GREEN)	
SWE		DRAIN-UP MACHINE (TEST MODE)	TH23		PIPE TEMP. DETECTION / GAS (0℃/15kΩ, 25℃/5.4kΩ)	LED2	LED (PREPARATION FOR HEATING: ORANGE)	
X1	AUX. RELAY	DRAIN WATER LIFTING-UP MACH.				RU	RECEIVING UNIT	
ZNR01,02	VARISTOR					SW1	EMERGENCY OPERATION (HEAT/DOWN)	
						SW2	EMERGENCY OPERATION (COOL/UP)	

LED on indoor board for service

Mark	Meaning	Function
LED1	Main power supply	Main Power supply (Indoor unit:208-230V) power on → lamp is lit.
LED2	Power supply for MA-Remote controller	Power supply for MA-Remote controller on → lamp is lit.

PLFY-P12/15/18/24/30/36NBMU-ER2



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. (Transmission 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 fig<※1>.

※2. Use copper supply wires.

[LEGEND]

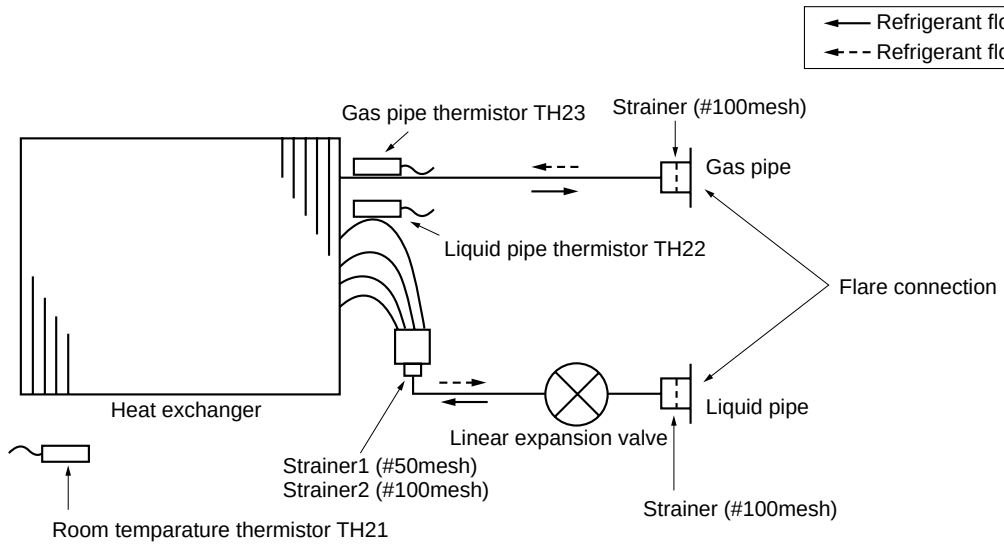
SYMBOL		NAME		SYMBOL	NAME		SYMBOL		NAME	
I. B		INDOOR CONTROLLER BOARD		DP	DRAIN PUMP		A. B		ADDRESS BOARD	
	CN24	CONNECTOR	EXTERNAL HEATER	FS	DRAIN FLOAT SWITCH			SWA	SWITCH	CEILING HEIGHT SELECTOR
	CN27		DAMPER	LEV	LINEAR EXPANSION VALVE			SWB		DISCHARGE OUTLET NUMBER SELECTOR
	CN32		REMOTE SWITCH	MF	FAN MOTOR			SWC		OPTION SELECTOR
	CN51		CENTRALLY CONTROL	MV	VANE MOTOR			SW1		MODE SELECTION
	CN52		REMOTE INDICATION	TB2	TERMINAL BLOCK	POWER SUPPLY		SW11		ADDRESS SETTING 1s DIGIT
	FUSE	FUSE (T6.3AL250V)		TB5		TRANSMISSION		SW12		ADDRESS SETTING 10ths DIGIT
	LED1	POWER SUPPLY (I. B)		TB15		MA-REMOTE CONTROLLER		SW14		BRANCH NO.
	LED2	POWER SUPPLY (I. B)		TH21	THERMISTOR	ROOM TEMP. DETECTION (32°F/15kΩ, 77°F/5.4kΩ)	OPTION PART			
	SW2	SWITCH	CAPACITY CODE					W.B	PCB FOR WIRELESS REMOTE CONTROLLER	
	SW3		MODE SELECTION	TH22		PIPE TEMP. DETECTION / LIQUID (32°F/15kΩ, 77°F/5.4kΩ)		BZ	BUZZER	
	SW4		MODEL SELECTION					LED1	LED (OPERATION INDICATION : GREEN)	
	SWE		DRAIN PUMP (TEST MODE)	TH23		PIPE TEMP. DETECTION / GAS (32°F/15kΩ, 77°F/5.4kΩ)		LED2	LED (PREPARATION FOR HEATING : ORANGE)	
	X1	AUX. RELAY	DRAIN PUMP					RU	RECEVING UNIT	
								SW1	EMERGENCY OPERATION (HEAT / DOWN)	
								SW2	EMERGENCY OPERATION (COOL / UP)	
								MT	I-SEE SENSOR MOTOR	

LED on indoor board for service

Mark	Meaning	Function
LED1	Main power supply	Main Power supply (Indoor unit: 208-230V) power on → lamp is lit
LED2	Power supply for MA-Remote controller	Power supply for MA-Remote controller on → lamp is lit

8 REFRIGERANT SYSTEM DIAGRAM

PLFY-P12/15/18/24/30/36NBMU-E
PLFY-P12/15/18/24/30/36NBMU-ER1
PLFY-P12/15/18/24/30/36NBMU-ER2

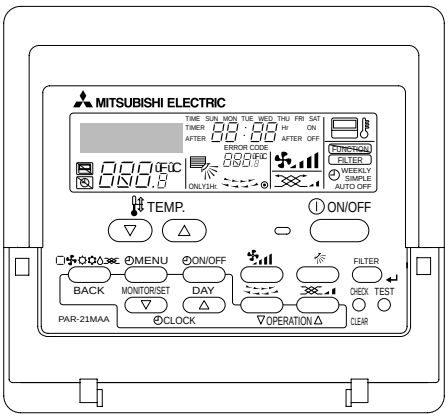


Unit : mm (inch)

Item \ Model	PLFY-P12/P15NBMU-E PLFY-P12/P15NBMU-ER1 PLFY-P12/P15NBMU-ER2	PLFY-P18NBMU-E PLFY-P18NBMU-ER1 PLFY-P18NBMU-ER2	PLFY-P24/P30NBMU-E PLFY-P24/P30NBMU-ER1 PLFY-P24/P30NBMU-ER2	PLFY-P36NBMU-E PLFY-P36NBMU-ER1 PLFY-P36NBMU-ER2
Gas pipe	ϕ12.7 (1/2")	ϕ12.7 (1/2")/ϕ15.88 (5/8")	ϕ15.88 (5/8")	ϕ15.88 (5/8")/ϕ19.05 (3/4")
Liquid pipe	ϕ6.35 (1/4")	ϕ6.35 (1/4")/ϕ9.52 (3/8")	ϕ9.52 (3/8")	ϕ9.52 (3/8")

9 MICROPROCESSOR CONTROL

INDOOR UNIT CONTROL
9-1. COOL OPERATION



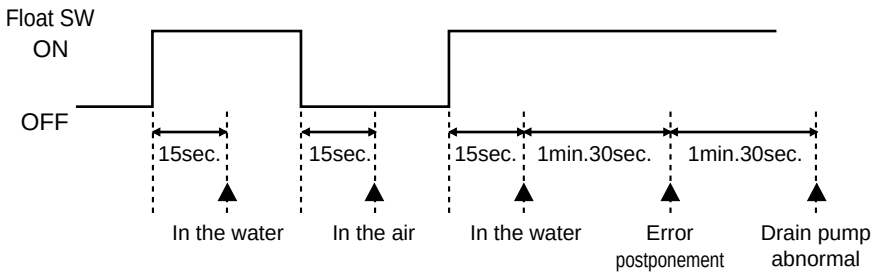
<How to operate>

① Press POWER ON/OFF button.
② Press the operation MODE button to display COOL.
③ Press the TEMP. button to set the desired temperature.
NOTE: The set temperature changes 2°F when the ▽ or △ button is pressed one time. Cooling 67 to 87°F

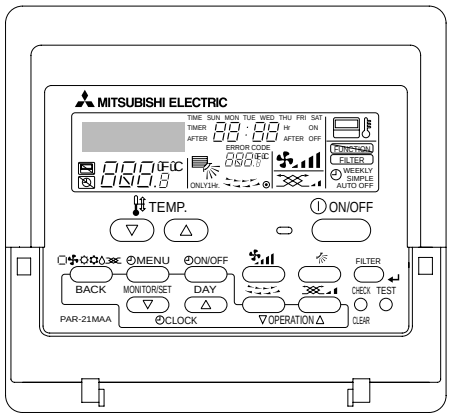
Control modes	Control details	Remarks
1. Thermostat function	1-1. Thermostat function (Function to prevent restarting for 3 minutes) • Room temperature ≧ desired temperature + 2°F ···Thermo ON • Room temperature ≦ desired temperature ···Thermo OFF	
	1-2. Anti-freezing control Detected condition : When the liquid pipe temp. (TH22) is 32°F or less in 16 minutes from compressors start up, anti-freezing control starts and the thermo OFF. Released condition : The timer which prevents reactivating is set for 3 minutes, and anti-freezing control is cancelled when any one of the following conditions is satisfied. ① Liquid pipe temp. (TH22) turns 50°F or above. ② The condition of the thermo OFF has become complete by thermostat, etc. ③ The operation modes became mode other than COOL. ④ The operation stopped.	
2. Fan	By the remote controller setting (switch of 4 speeds+Auto) Type: 4 speeds + Auto type — Fan speed notch: [Low], [Med2], [Med1], [High], [Auto] When [Auto] is set, fan speed is changed depending on the value of: Room temperature - Desired temperature	

To be continued on the next page.

From the preceding page.

Control modes	Control details	Remarks
3. Drain pump	3-1. Drain pump control •Always drain pump ON during the COOL and DRY mode operation. (Regardless of the thermo ON/OFF) •When the operation mode has changed from the COOL or DRY to the others (including Stop), OFF the control after the drain pump ON for 3 minutes.	
	Float switch control • Float switch control judges whether the sensor is in the air or in the water by turning the float switch ON/OFF. In the water: Detected that the float switch is ON for 15 seconds. In the air : Detected that the float switch is OFF for 15 seconds. 	
4. Vane (up/down vane change)	(1) Initial setting: Start at COOL mode and horizontal vane. (2) Vane position: Horizontal →Downward A →Downward B →Downward C→Downward D→Swing→Auto (3) Restriction of the downward vane setting When setting the downward vane A, B, C or D in [Med1], [Med2] or [Low] of the fan speed notch, the vane changes to horizontal position after 1 hour have passed.	· "ONLY 1 Hr" appears on the wired remote controller.

9-2. DRY OPERATION

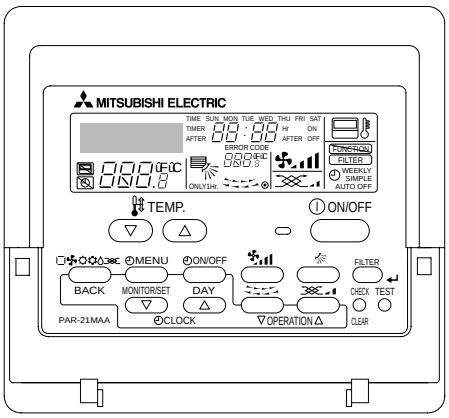


<How to operate>

① Press POWER ON/OFF button.
② Press the operation MODE button to display DRY.
③ Press the TEMP. button to set the desired temperature.
NOTE: The set temperature changes 2°F when the ▽ or △ button is pressed one time. Dry 67 to 87°F

<table>
<tr><th>Control modes</th><th>Control details</th><th>Remarks</th></tr>
<tr><td>1. Thermostat function</td><td>1-1. Thermostat function (Function to prevent restarting for 3 minutes)
Setting the Dry thermo by the thermostat signal and the room temperature (TH21).
Dry thermo ON Room temperature ≧ desired temperature + 2°F
Dry thermo OFF Room temperature ≦ desired temperature
<table>
<tr><td rowspan="2">Room temperature</td><td colspan="2">3 min. passed since starting operation</td><td rowspan="2">Dry thermo ON time (min)</td><td rowspan="2">Dry thermo OFF time (min)</td></tr>
<tr><td>Thermostat signal</td><td>Room temperature (T1)</td></tr>
<tr><td rowspan="4">Over 64°F</td><td rowspan="4">ON</td><td>T1 ≧ 83°F</td><td>9</td><td>3</td></tr>
<tr><td>83°F > T1 ≧ 79°F</td><td>7</td><td>3</td></tr>
<tr><td>79°F > T1 ≧ 75°F</td><td>5</td><td>3</td></tr>
<tr><td>75°F > T1</td><td>3</td><td>3</td></tr>
<tr><td></td><td>OFF</td><td>Unconditional</td><td>3</td><td>10</td></tr>
<tr><td>Less than 64°F</td><td colspan="4">Dry thermo OFF</td></tr>
</table>
</td><td></td></tr>
<tr><td></td><td>1-2. Frozen prevention control
No control function</td><td></td></tr>
<tr><td>2. Fan</td><td>Indoor fan operation controlled depends on the compressor conditions.
<table>
<tr><td>Dry thermo</td><td colspan="2">Fan speed notch</td></tr>
<tr><td>ON</td><td colspan="2">[Low]</td></tr>
<tr><td rowspan="2">OFF</td><td>Excluding the following</td><td>Stop</td></tr>
<tr><td>Room temp. < 64°F</td><td>[Low]</td></tr>
</table>
Note: Remote controller setting is not acceptable.</td><td></td></tr>
<tr><td>3. Drain pump</td><td>Same control as COOL operation</td><td></td></tr>
<tr><td>4. Vane
(up/down vane change)</td><td>Same control as COOL operation</td><td></td></tr>
</table>

9-3. FAN OPERATION



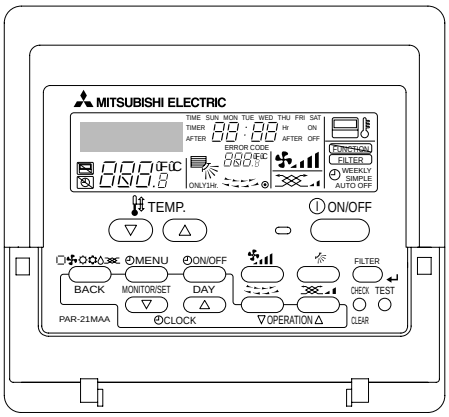
<How to operate>

① Press POWER ON/OFF button.

② Press the operation MODE button to display FAN.

Control modes	Control details	Remarks
1. Fan	Set by remote controller. Type: 4 speeds + Auto type — Fan speed notch: [Low], [Med2], [Med1], [High], [Auto] When [Auto] is set, fan speed becomes [Low].	
2. Drain pump	2-1. Drain pump control The drain pump turns ON for the specified amount of time when any of the following conditions is met: ① ON for 3 minutes after the operation mode is switched from COOL or DRY to another operation mode (FAN). ② ON for 6 minutes after the float switch is submerged in the water when the float swich control judges the sensor is in the water.	
	2-2. Float switch control • Float switch control judges whether the sensor is in the air or in the water by turning the float switch ON/OFF. In the water : Detected that the float switch is ON for 15 seconds. In the air : Detected that the float switch is OFF for 15 seconds.	· Same control as COOL operation
3. Vane (up/down vane change)	Same as the control performed during the COOL operation, but with no restriction on the vane's downward blow setting	

9-4. HEAT OPERATION

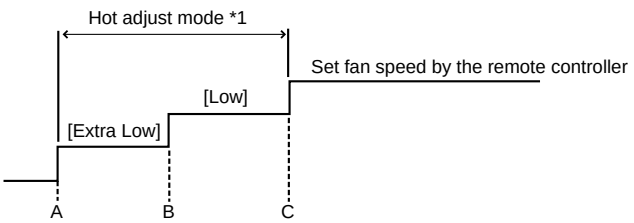


<How to operate>

① Press POWER ON/OFF button.
② Press the operation MODE button to display HEAT.
③ Press the TEMP. button to set the desired temperature.
NOTE: The set temperature changes 2°F when the ▽ or △ button is pressed one time. Heating 63 to 83°F.

<Display in HEAT operation>

[DEFROST]
The [DEFROST] symbol is only displayed during the defrost operation.
[STANDBY]
The [STANDBY] symbol is only displayed during the hot adjust mode.

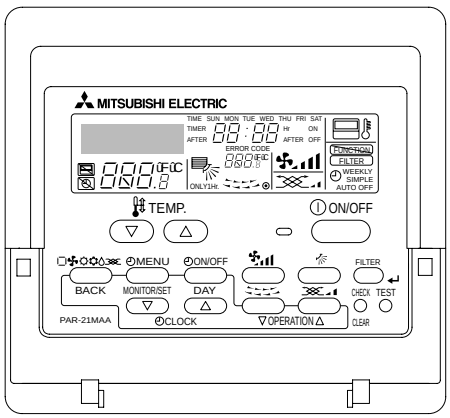
<table>
<tr><th>Control modes</th><th>Control details</th><th>Remarks</th></tr>
<tr><td>1. Thermostat function</td><td>1-1. Thermostat function (Function to prevent restarting for 3 minutes)
• Room temperature ≦ desired temperature -2°F ···Thermo ON
• Room temperature ≧ desired temperature ···Thermo OFF</td><td></td></tr>
<tr><td rowspan="2">2. Fan</td><td>By the remote controller setting (switch of 4 speeds+Auto)
<table><tr><th>Type</th><th>Fan speed notch</th></tr><tr><td>4 speeds + Auto type</td><td>[Low], [Med2], [Med1], [High], [Auto]</td></tr></table>When [Auto] is set, fan speed is changed depending on the value of:
Desired temperature - Room temperature
Give priority to under-mentioned controlled mode
2-1. Hot adjust mode
2-2. Preheating exclusion mode
2-3. Thermo OFF mode (When the compressor off by the thermostat)
2-4. Cool air prevention mode (Defrosting mode)</td><td></td></tr>
<tr><td>2-1. Hot adjust mode
The fan controller becomes the hot adjuster mode for the following conditions.
① When starting the HEAT operation
② When the thermostat function changes from OFF to ON.
③ When release the HEAT defrosting operation
 
A: Hot adjust mode starts.
B: 5 minutes have passed since the condition A or the indoor liquid pipe temperature turned 95°F or more.
C: 2 minutes have passed since the condition A. (Terminating the hot adjust mode)</td><td>*1 "STAND BY" will be displayed during the hot adjust mode.</td></tr>
<tr><td>2-2. Preheating exclusion mode
When the condition changes the auxiliary heater ON to OFF (thermostat or operation stop, etc), the indoor fan operates in [Low] mode for 1 minute.</td><td>· This control is same for the model without auxiliary heater.</td></tr>
</table>

To be continued on the next page.

From the preceding page

Control modes	Control details	Remarks
2. Fan	2-3. Thermo OFF mode When the thermostat function changes to OFF, the indoor fan operates in [Extra low].	
	2-4. Heat defrosting mode The indoor fan stops.	
3. Drain pump	3-1. Drain pump control The drain pump turns ON for the specified amount of time when any of the following conditions is met: ① ON for 3 minutes after the operation mode is switched from COOL or DRY to another operation mode (FAN). ② ON for 6 minutes after the float switch is submerged in the water when the float swich control judges the sensor is in the water.	
	3-2. Float switch control • Float switch control judges whether the sensor is in the air or in the water by turning the float switch ON/OFF. In the water: Detected that the float switch is ON for 15 seconds. In the air : Detected that the float switch is OFF for 15 seconds.	· Same control as COOL operation
4. Vane control (Up/down vane change)	(1) Initial setting: OFF → HEAT···[last setting] When the last setting is [Swing] ··· [Downward D] When changing the mode from exception of HEAT to HEAT operation ···[Downward D] (2) Vane position: Horizontal →Downward A →Downward B →Downward C→Downward D→Swing→Auto (3) Restriction of vane position ① The vane is horizontally fixed for the following modes. (The control by the remote controller is temporally invalidated and control by the unit.) •Thermo OFF •Hot adjust [Extra low] mode •Heat defrost mode	

9-5. AUTO OPERATION [AUTOMATIC COOL/HEAT CHANGE OVER OPERATION]



<How to operate>

① Press POWER ON/OFF button.
② Press the operation MODE button to display AUTO.
③ Press the TEMP. button to set the desired temperature.
NOTE: The set temperature changes 2°F when the ▽ or △ button is pressed one time. Automatic 67 to 83°F

Control modes	Control details	Remarks
1. Initial value of operation mode	HEAT mode for room temperature < Desired temperature COOL mode for room temperature ≧ Desired temperature	
2. Mode change	(1) HEAT mode → COOL mode Room temperature ≧ Desired temperature + 3°F. or 3 min. has passed (2) COOL mode → HEAT mode Room temperature ≦ Desired temperature - 3°F. or 3 min. has passed	
3. COOL mode	Same control as cool operation	
4. HEAT mode	Same control as heat operation	

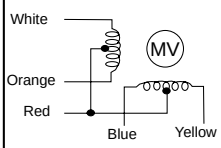
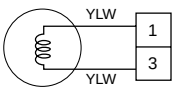
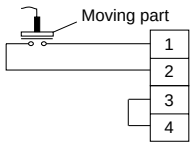
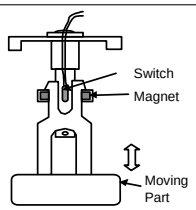
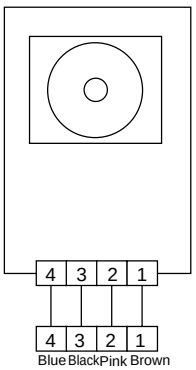
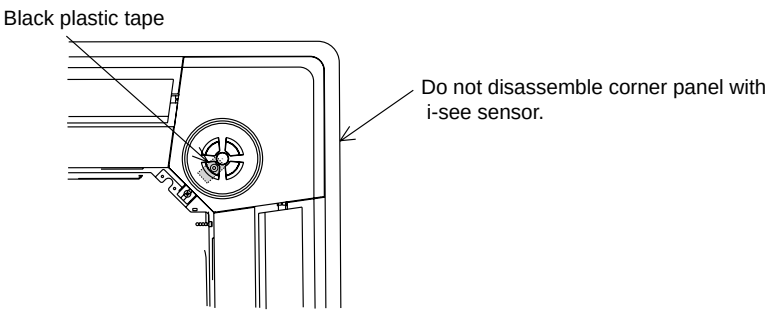
9-6. WHEN UNIT IS STOPPED CONTROL MODE

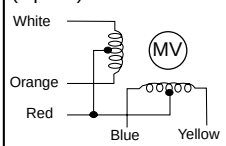
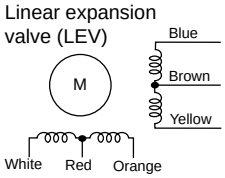
Control modes	Control details	Remarks
1. Drain pump	1-1. Drain pump control The drain pump turns ON for the specified amount of time when any of the following conditions is met: ① ON for 3 minutes after the operation mode is switched from COOL or DRY to another operation mode (FAN). ② ON for 6 minutes after the float switch is submerged in the water when the float swich control judges the sensor is in the water.	
	1-2. Float switch control • Float switch control judges whether the sensor is in the air or in the water by turning the float switch ON/OFF. In the water : Detected that the float switch is ON for 15 seconds. In the air : Detected that the float switch is OFF for 15 seconds.	· Same control as COOL operation

10 TROUBLESHOOTING

10-1. HOW TO CHECK THE PARTS

PLFY-P12/15/18/24/30/36NBMU-E **PLFY-P12/15/18/24/30/36NBMU-ER1**
PLFY-P12/15/18/24/30/36NBMU-ER2

<table>
<tr><th>Parts name</th><th>Check points</th></tr>
<tr><td>Room temperature thermistor (TH21)
Liquid pipe thermistor (TH22)
Gas pipe thermistor (TH23)</td><td>Disconnect the connector then measure the resistance with a tester.
(At the ambient temperature 50°F~86°F)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>4.3kΩ~9.6kΩ</td><td>Open or short</td></tr></table>(Refer to the next page for a detail.)</td></tr>
<tr><td>Vane motor (MV)
 
</td><td>Measure the resistance between the terminals with a tester.
(At the ambient temperature of 68°F~86°F)
<table><tr><th>Connector</th><th>Normal</th><th>Abnormal</th></tr><tr><td>Red - Yellow</td><td rowspan="4">300Ω</td><td rowspan="4">Open or short</td></tr><tr><td>Red - Blue</td></tr><tr><td>Red - Orange</td></tr><tr><td>Red - White</td></tr></table></td></tr>
<tr><td>Drain pump (DP) (Option)
 
</td><td>Measure the resistance between the terminals with a tester.
(Winding temperature 68°F)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>290Ω</td><td>Open or short</td></tr></table></td></tr>
<tr><td>Drain float switch (FS) (Option)
 
</td><td>Measure the resistance between the terminals using a tester.
<table><tr><th>State of moving part</th><th>Normal</th><th>Abnormal</th></tr><tr><td>UP</td><td>Short</td><td>Other than short</td></tr><tr><td>DOWN</td><td>Open</td><td>Other than open</td></tr></table> 
</td></tr>
<tr><td>i-see sensor (Option)
 
</td><td>Turn on the indoor unit with black plastic tape on the outside of the i-see sensor controller board.
With electricity being turned on, measure the power voltage between connectors with a tester.
The i-see sensor rotates, and pull out the connector of motor for the i-see sensor.
 

i-see sensor (At the ambient temperature of 50°F~104°F)
<table><tr><th>i-see sensor connector</th><th>Normal</th><th>Abnormal</th></tr><tr><td>②(–)—④(+)</td><td>DC 1.857V~ 3.132V</td><td>Other than the normal</td></tr><tr><td>①(+)—②(–)</td><td>DC 0.939V~ 1.506V</td><td>Other than the normal</td></tr></table>**NOTE** : Be careful when handling static electricity.</td></tr>
<tr><td>i-see sensor motor (MT) (Option)
 
</td><td>Measure the resistance between the terminals with a tester.
(At the ambient temperature of 68°F~86°F)
<table><tr><th>Connector</th><th>Normal</th><th>Abnormal</th></tr><tr><td>Red - Yellow</td><td rowspan="4">250Ω</td><td rowspan="4">Open or short</td></tr><tr><td>Red - Blue</td></tr><tr><td>Red - Orange</td></tr><tr><td>Red - White</td></tr></table></td></tr>
<tr><td>Linear expansion valve (LEV)
 
</td><td>Disconnect the connector then measure the resistance valve with a tester.
<table><tr><th colspan="4">Normal</th><th>Abnormal</th></tr><tr><td>White-Red</td><td>Yellow-Brown</td><td>Orange-Red</td><td>Blue-Brown</td><td rowspan="2">Open or short</td></tr><tr><td colspan="4">200Ω ±10%</td></tr></table>Refer to 7-1-2.</td></tr>
</table>

10-1-1. Thermistor

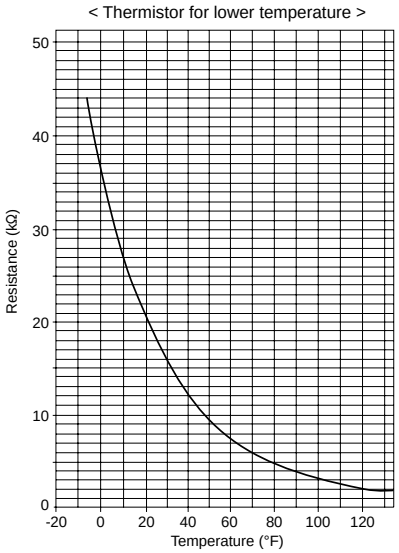
<Thermistor characteristic graph>

Thermistor for lower temperature	Room temperature thermistor (TH21) Liquid pipe temperature thermistor (TH22) Gas pipe temperature thermistor (TH23)

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

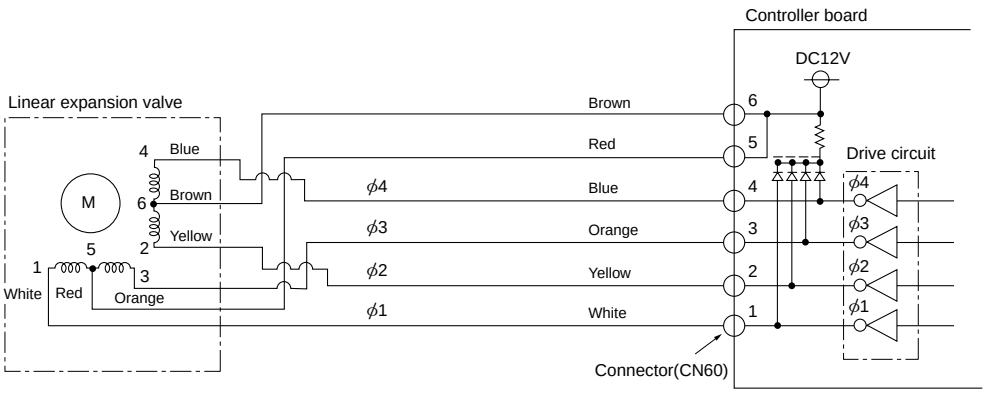
$$Rt=15\exp\{3480(\frac{1}{273+(t-32)/1.8}-\frac{1}{273})\}$$

30°F	15.8kΩ
50°F	9.6kΩ
70°F	6.0kΩ
80°F	4.8kΩ
90°F	3.9kΩ
100°F	3.2kΩ



10-1-2. 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 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.

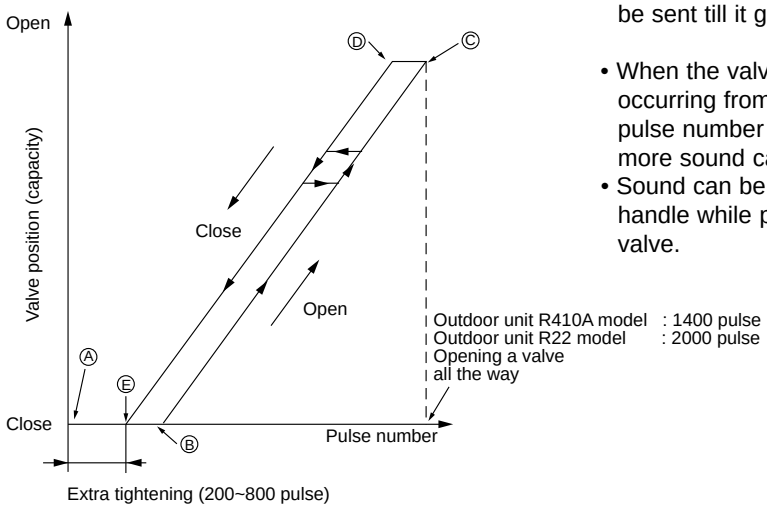
<Output pulse signal and the valve operation>

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.

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

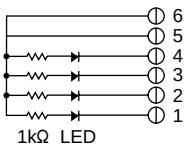
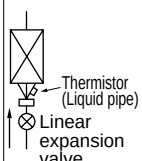
② Linear expansion valve operation



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

- When the valve moves smoothly, there is no sound or vibration occurring from the linear expansion valves, however, when the pulse number moves from Ⓔ to Ⓐ or when the valve is locked, more sound can be heard than in a normal situation.
- Sound can be detected by placing the ear against the screw driver handle while putting the screw driver tip to the linear expansion valve.

③ Troubleshooting

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) with a tester. It is normal if the resistance is in the range of 150Ω ±10%.	Exchange the linear expansion valve.
Valve does not 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 refrigerant 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.

10-1-3. DC Fan motor (fan motor/indoor controller board)

Check method of indoor fan motor (fan motor/indoor controller board)

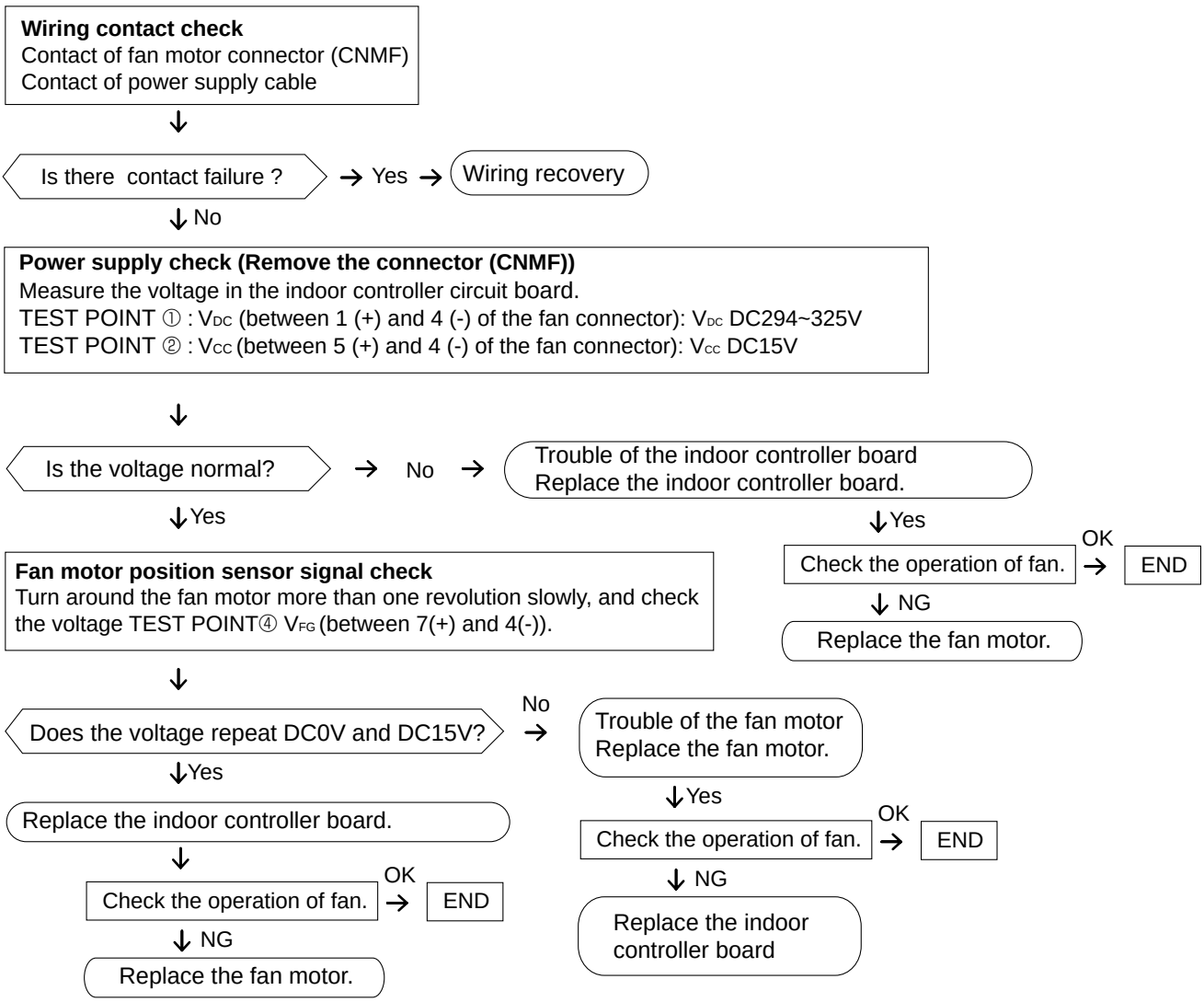
① Notes

· High voltage is applied to the connecter (CNMF) for the fan motor. Pay attention to the service.

· Do not pull out the connector (CNMF) for the motor with the power supply on.
(It causes trouble of the indoor controller board and fan motor)

② Self check

Conditions : The indoor fan cannot turn around.



10-2. FUNCTION OF DIP SWITCH

The black square (■) indicates a switch position.

Switch	Pole	Function	Operation by switch ON	Operation by switch OFF	Effective timing	Remarks
SW1 Function setting	1	Thermistor <Room temperature detection> position	Built-in remote controller	Indoor unit	Under suspension	Address board <Initial setting> ON/OFF 1 2 3 4 5 6 7 8 9 10 Note : ※1 Fan operation at Heating mode ※2 Heating thermo ON is operating. ※3
	2	Filter clogging detection	Provided	Not provided		
	3	Filter cleaning	2,500hr	100hr		
	4	Fresh air intake	Effective	Not effective		
	5	Switching remote display	Thermo ON signal display	Indicating fan operation ON/OFF		
	6	Humidifier control	Always operated while the heat in ON ※1	Operated depends on the condition ※2		
	7	Air flow set in case of Heat thermo OFF	Low ※3	Extra low ※3		
	8		Setting air flow ※3	Depends on SW1-7		
	9	Auto restart function	Effective	Not effective		
	10	Power ON/OFF by breaker	Effective	Not effective		

※3

SW1-7	SW1-8	
OFF	OFF	Extra low
ON	OFF	Low
OFF	ON	Setting air flow
ON	ON	Stop

SW2 Capacity code setting	1~6	MODELS	SW2	MODELS	SW2	Before power supply ON	Indoor controller board <Initial setting> Set for each capacity.
		P12	ON/OFF 1 2 3 4 5 6	P24	ON/OFF 1 2 3 4 5 6		
		P15	ON/OFF 1 2 3 4 5 6	P30	ON/OFF 1 2 3 4 5 6		
		P18	ON/OFF 1 2 3 4 5 6	P36	ON/OFF 1 2 3 4 5 6		

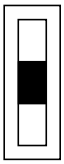
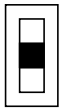
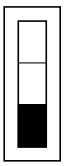
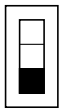
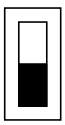
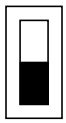
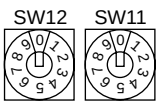
SW3 Function setting	1	Heat pump/Cooling only	Cooling only	Heat pump	Under suspension	Indoor controller board <Initial setting> ON/OFF 1 2 3 4 5 6 7 8 9 10 Note : ※4 SW3-5,6 ※5 Please do not use SW-3-9,10 as trouble might be caused by the usage condition.
	2	Louver/Humidifier	Available	Not available		
	3	Vane	Available	Not available		
	4	Vane swing function in heating (wave-flow)	Available	Not available		
	5	Vane horizontal angle ①	Second setting ※4	First setting ※4		
	6	Vane horizontal angle ②	Third setting ※4	Depends on SW3-5		
	7	Changing the opening of linear expansion valve	Effective	Not effective		
	8	Sensible temperature correction	Not effective	Effective		
	9	Superheat setting temperature ※5	—	—		
	10	Sub cool setting temperature ※5	—	—		
SW4 Model Selection (Setting for PLFY series)	1~5	ON/OFF 1 2 3 4 5			Before power supply ON	Indoor controller board

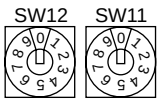
Note : ※4 SW3-5,6

SW3-5	SW3-6	Vane setting	Initial setting	Setting	Vane position
OFF	OFF	Set up ①	●	Standard	Standard
ON	OFF	Set up ②		Less draft *	Upward position than the standard
OFF	ON	Set up ③		Less smudging	Downward position than the standard
ON	ON	unused		—	—

* Be careful of the smudge on ceiling.

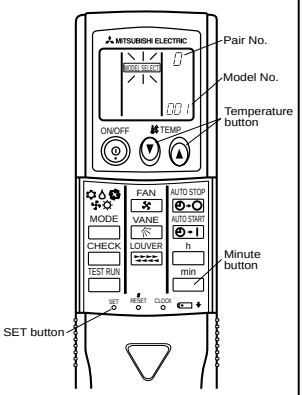
The black square (■) indicates a switch position.

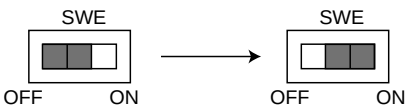
<table>
<tr><th>Switch</th><th>Pole</th><th>Operation by switch</th><th>Effective timing</th><th>Remarks</th></tr>
<tr><td>SWA
Ceiling height selector</td><td>1~3</td><td>(High ceiling) 3
(Standard) 2
(Silent) 1
 
* Ceiling height can be changed depending on SWB setting.
PLFY-P12·P15·P18·P24·P30NBMU-E
PLFY-P12·P15·P18·P24·P30NBMU-ER1
PLFY-P12·P15·P18·P24·P30NBMU-ER2
<table><tr><th>SWA / SWB</th><th>①
Silent</th><th>②
Standard</th><th>③
High ceiling</th></tr><tr><td>4 4 direction</td><td>2.5m, 8.2ft</td><td>2.7m, 8.9ft</td><td>3.5m, 11.5ft</td></tr><tr><td>3 3 direction</td><td>2.7m, 8.9ft</td><td>3.0m, 9.8ft</td><td>3.5m, 11.5ft</td></tr><tr><td>2 2 direction</td><td>3.0m, 9.8ft</td><td>3.3m, 10.8ft</td><td>3.5m, 11.5ft</td></tr></table></td><td rowspan="4">Under operation or suspension</td><td>Address board
<Initial setting>
3
2
1
  </td></tr>
<tr><td>SWB
Discharge outlet number selector</td><td>3</td><td>(2 direction) 2
(3 direction) 3
(4 direction) 4
 
PLFY-P36NBMU-E
PLFY-P36NBMU-ER1
PLFY-P36NBMU-ER2
<table><tr><th>SWA / SWB</th><th>①
Silent</th><th>②
Standard</th><th>③
High ceiling</th></tr><tr><td>4 4 direction</td><td>2.7m, 8.9ft</td><td>3.2m, 10.5ft</td><td>4.5m, 14.8ft</td></tr><tr><td>3 3 direction</td><td>3.0m, 9.8ft</td><td>3.6m, 11.8ft</td><td>4.5m, 14.8ft</td></tr><tr><td>2 2 direction</td><td>3.3m, 10.8ft</td><td>4.0m, 13.1ft</td><td>4.5m, 14.8ft</td></tr></table></td><td>Address board
<Initial setting>
2
3
4
  </td></tr>
<tr><td>SWC
Option selector</td><td>2</td><td>② オプ (Option)
① 標 (Standard)
 
When attaching the optional high performance filter elements (multi function casement) to the unit, be sure to attach it to the option side in order to prevent the airflow reducing.</td><td>Address board
<Initial setting>
② オプ
① 標
  </td></tr>
<tr><td>SW11
1s digit address setting
SW12
10ths digit address setting</td><td>Rotary switch</td><td> 

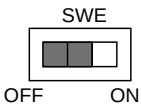
How to set address
Example : If address is "3", remain SW12 (for over 10) at "0", and match SW11 (for 1 to 9) with "3".</td><td rowspan="2">Before power supply ON</td><td>Address board
<Initial setting>
 
</td></tr>
<tr><td>SW14
Branch No. setting</td><td>Rotary switch</td><td>

How to set branch number SW14 (Series R2 only)
Match the indoor unit's refrigerant pipe with the BC contoller's end connection number
Remain other than series R2 at "0".</td><td>Address board
<Initial setting>

</td></tr>
</table>

<table>
<tr><th>Switch</th><th>Pole</th><th>Operation by switch</th><th>Effective timing</th><th>Remarks</th></tr>
<tr>
<td>J41, J42 Wireless remote controller Pair No.</td>
<td>Jumper</td>
<td>
• To operate each indoor unit by each remote controller when installed 2 indoor units or more are near, Pair No. setting is necessary.
① Pair No. setting is available with the 4 patterns (Setting patters A to D).
② Make setting for J41, J42 of indoor controller board and the Pair No. of wireless remote controller.
• You may not set it when operating it by one remote controller.
① Setting for indoor unit
Jumper wire J41, J42 on the indoor controller board are cut according to the table below.
② Wireless remote controller Pair No.:
Setting operation
1. Press the SET button (using a pointed implement). Check that the remote controller's display has stopped before continuing.
MODEL SELECT blinks, and the model No. (3 digits) appears (steadily-lit).
2. Press the MINUTE button twice. The pair number appears flashing.
3. Press the temperature ▼ ▲ buttons to select the pair number to set.
4. Press the SET button (using a pointed implement). The set Pair No. is displayed (steadily-lit) for 3 seconds, then disappears.
<table>
<tr><th rowspan="2">Setting pattern</th><th colspan="2">Indoor controller Jumper wire</th><th rowspan="2">Pair No. of wireless remote controller ※</th><th rowspan="2"></th></tr>
<tr><th>J41</th><th>J42</th></tr>
<tr><td>A</td><td>—</td><td>—</td><td>0</td><td>Initial setting</td></tr>
<tr><td>B</td><td>Cut</td><td>—</td><td>1</td><td>—</td></tr>
<tr><td>C</td><td>—</td><td>Cut</td><td>2</td><td>—</td></tr>
<tr><td>D</td><td>Cut</td><td>Cut</td><td>3</td><td>—</td></tr>
</table>
※ Pair No.4-9 of wireless remote controller is setting pattern D.
</td>
<td>Under operation or suspension</td>
<td>
Indoor controller board
<Initial setting>
Pattern A


</td>
</tr>
<tr>
<td>SWE Test run for Drain pump</td>
<td>Connector</td>
<td>
Drain pump and fan are activated simultaneously after the connector SWE is set to ON and turn ON the power.


The connector SWE is set to OFF after test run.
</td>
<td>Under operation</td>
<td>
Indoor controller board
<Initial setting>


</td>
</tr>
</table>

10-3. TEST POINT DIAGRAM

10-3-1. Indoor controller board

PLFY-P12/15/18/24/30/36NBMU-E **PLFY-P12/15/18/24/30/36NBMU-ER1**
PLFY-P12/15/18/24/30/36NBMU-ER2

CN4Y
i-See sensor

CN60
Linear expansion valve (LEV)
output 12VDC pulse output

CN6Y
i-see sensor motor output
12VDC pulse output

CN3A
Connect to the terminal block (TB15)
(MA-Remote controller connecting wire)
① - ③ : 8.7-13V DC (Pin① (+))

CN52
Remote indicator
①-②: Status lamp 12VDC (① : +)
Fan motor output (SW1-5 OFF)
Thermostat ON (SW1-5 ON)
①-③: Cooling/Dry status lamp
12VDC (① : +)
①-④: Heating status lamp
12VDC (① : +)

CNV
Vane motor output
12VDC pulse

CN32
Remote switch

CN51
Centrally control
①-② : Control signal
12VDC pulse input (① : +)
③-④ : Operation indicator
12VDC (③ : +)
③-⑤ : Malfunction indicator
12VDC (③ : +)

Jumper wire J41, J42
Pair No. setting for wireless
remote controller

CN44
Pipe temperature thermistor
①-② : Liquid (TH22)
③-④ : Gas (TH23)

LED2
Power supply for
MA-Remote controller

SW3
Function setting

CN4F
Drain float switch (FS)

SW4
Model selection

CN20
Room temperature
thermistor (TH21)

SW2
Capacity setting

CN24
External heater
12VDC (① : +)
*except PLFY-P•NBMU-E

SWE
Test run (Drain pump)

CN27
Damper signal output
12VDC(① : +)

CN90
Connect to the wireless
remote controller board
(W.B)

CN2M
Connect to the terminal block (TB5)
(M-NET transmission connecting wire)
24-30VDC (non-polar)

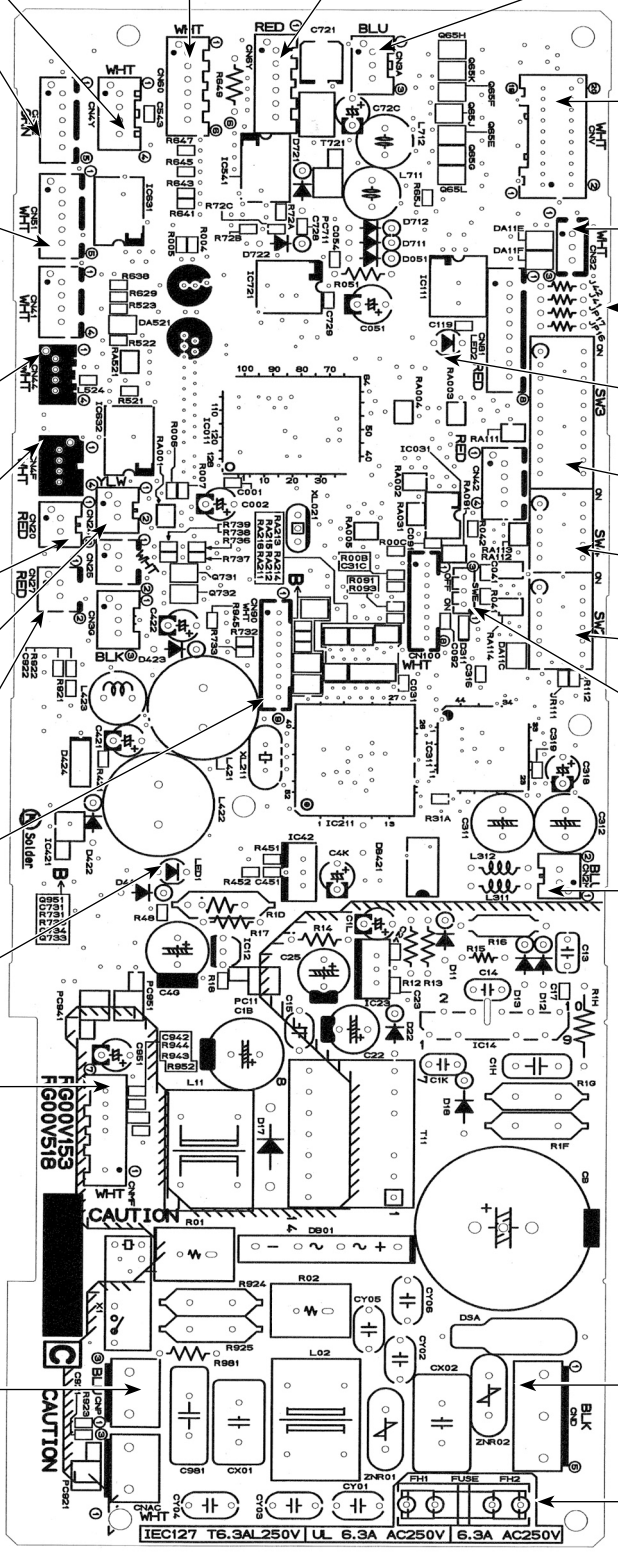
LED1
Main power supply
(Indoor unit : 208-230V)

CNMF
Connect to the
fan motor (MF)
①-④ : DC310~340V
⑤-④ : DC15V
⑥-④ : DC0~6V
⑦-④ : DC0 or DC15V (Stop)
DC7.5V (Operation)
(12VDC pulse)

CNP
Drain pump output (DP)
①-③ : 208-230VAC

CND
Power supply for indoor controller board
③ - ⑤ : 208-230VAC

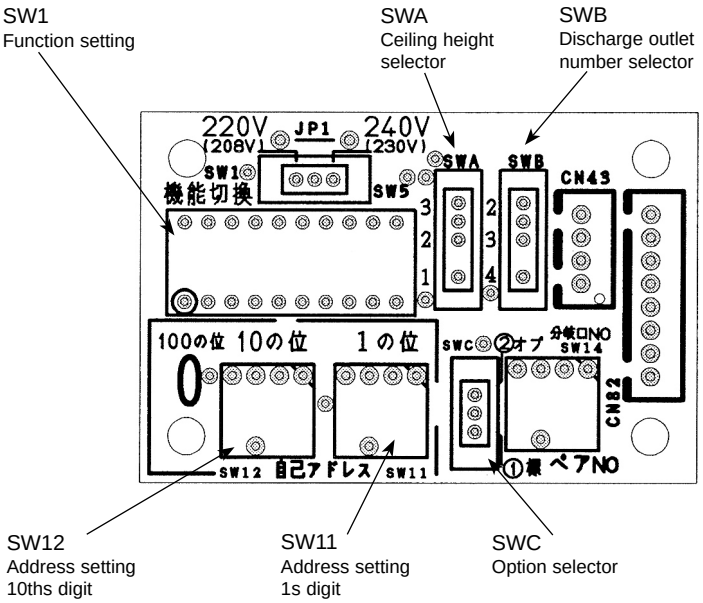
FUSE
6.3A 250V



10-3-2. Circuit board

PLFY-P12/15/18/24/30/36NBMU-E **PLFY-P12/15/18/24/30/36NBMU-ER1**

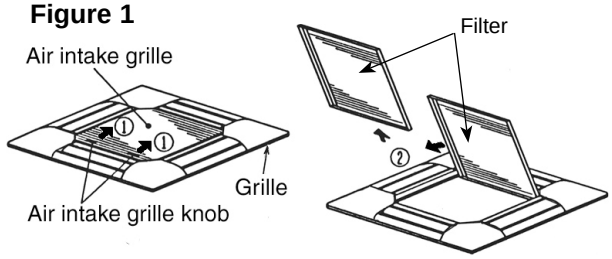
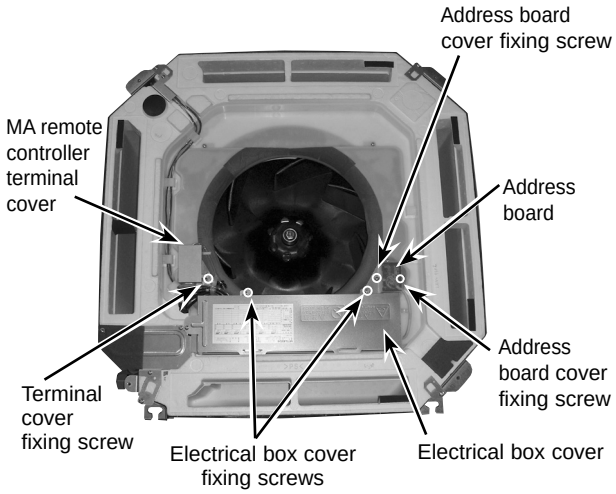
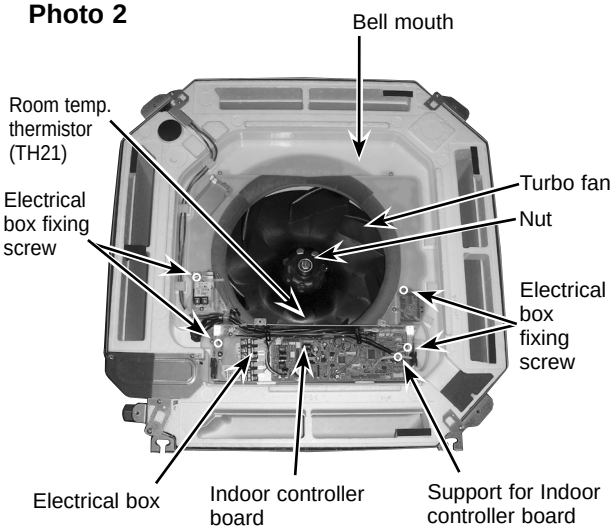
PLFY-P12/15/18/24/30/36NBMU-ER2

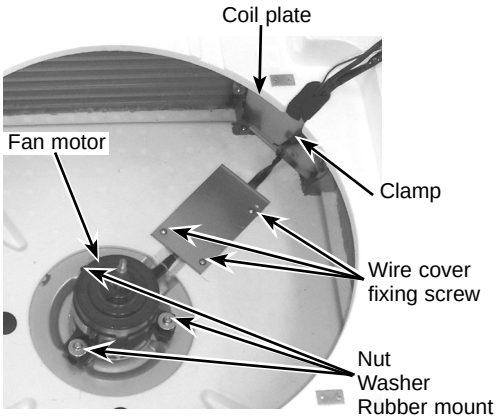
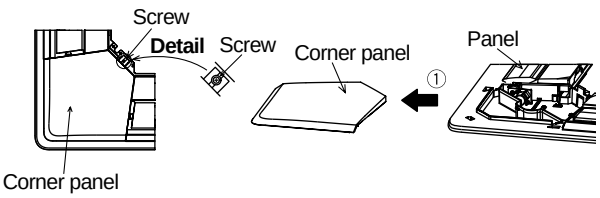
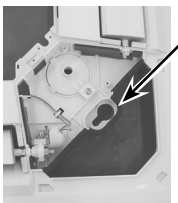
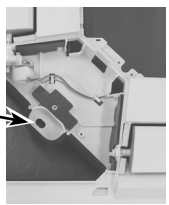
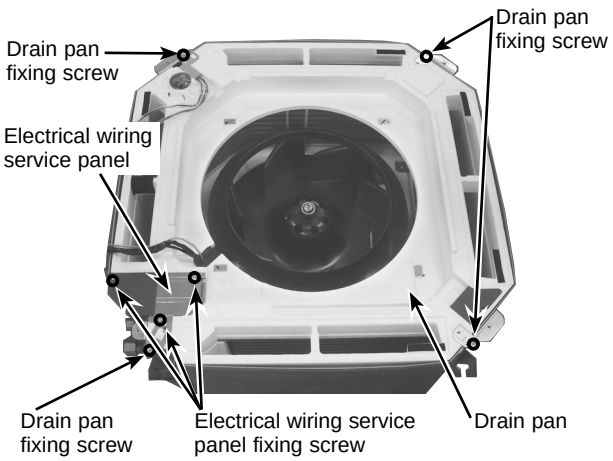


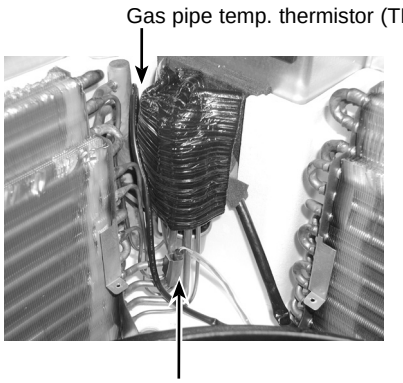
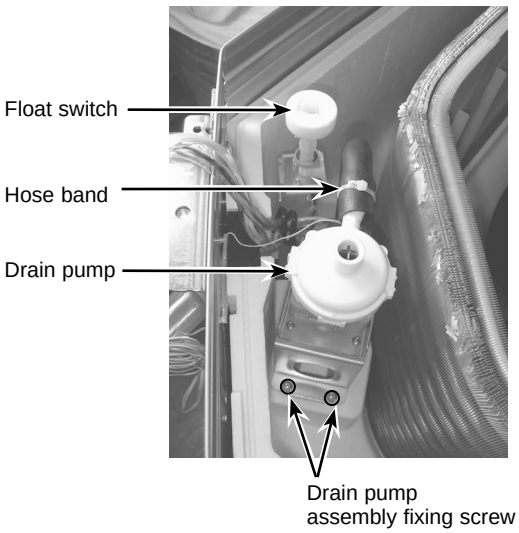
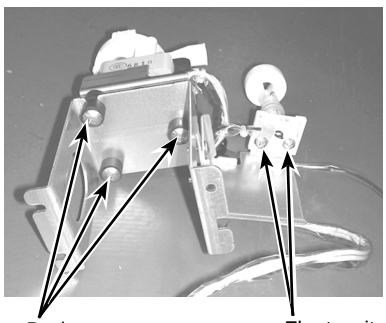
11 DISASSEMBLY PROCEDURE

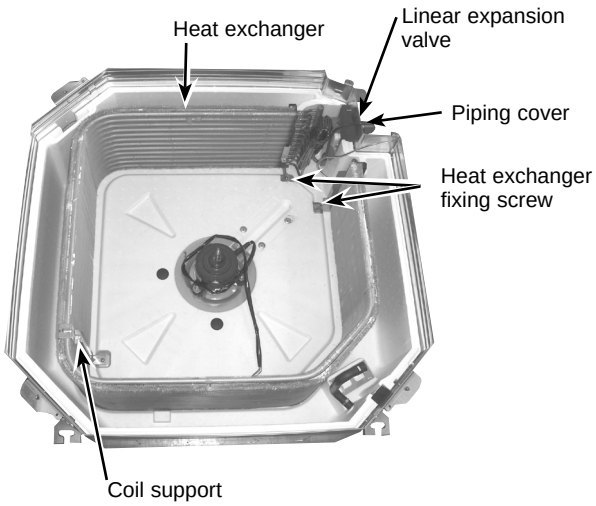
PLFY-P12/15/18/24/30/36NBMU-E **PLFY-P12/15/18/24/30/36NBMU-ER1**
PLFY-P12/15/18/24/30/36NBMU-ER2

Be careful when removing heavy parts.

OPERATING PROCEDURE	PHOTOS & ILLUSTRATIONS
1. Removing the air intake grille (1) Slide the knob of air intake grille toward the arrow ① to open the air intake grille. (2) Remove drop prevention hook 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 room temperature thermistor (TH21) (1) Remove the air intake grille and the filter. (See Figure 1) (2) Remove the 2 screws from the electrical box cover. (3) Disconnect the connector CN20 (Red) from the indoor controller board. (4) Remove the room temperature thermistor.	**Photo 1** 
3. Removing the address board (A.B) (1) Remove the air intake grille and the filter. (See Figure 1) (2) Remove the 2 screws from the address board cover. (3) Disconnect the connectors CN43 (RED/4P) and CN82 (RED/8P). (4) Slide and remove the address board.	
4. Removing the indoor controller board (I.B) (1) Remove the air intake grille and the filter. (See Figure 1) (2) Remove the 2 screws from the electrical box cover. (3) Disconnect the connectors : CNMF (White/7P) for fan motor CN44 (White/4P) for thermistor (TH22/TH23) CNP (Blue/3P) for drain pump CN4F (White/4P) for float switch CND (Black/5P) for earth and TB2 CNV (White/20P) for vane motor CN81, CN42 (Red/8P, 4P) for address board CN2M (Blue/2P) for TB5 CN3A (Blue/3P) for TB15 (4) Remove the 6 supports from indoor controller board. (5) Remove the indoor controller board.	**Photo 2** 
5. Removing the electrical box (1) Remove the air intake grille and the filter. (See Figure 1) (2) Remove the 2 screws from the electrical box cover. (3) Disconnect the connectors. (Refer to procedure 4) (4) Remove 4 electrical box fixing screws and remove 2 hooks. (5) Pull the electrical box. <Electrical parts in the electrical box> Indoor controller board Terminal block (TB2) (TB5)	

OPERATING PROCEDURE	PHOTOS & ILLUSTRATIONS
6. Removing the fan and fan motor (MF) (1) Remove the electrical box. (See Photo 2) (2) Remove the bell mouth (3 screws). (See Photo 2) (3) Remove the turbo fan nut. (4) Pull out the turbo fan. (5) Remove the wire cover (3 screws). (6) Remove 2 wiring clamps. (7) Disconnect the connector of the fan motor (CNMF). (8) Remove the 3 nuts and washers and rubber mounts of the fan motor.	**Photo 3** 
7. Removing the panel (1) Remove the air intake grille and the filter. (See Figure 1) (2) Disconnect the connector CNV (White/20P). **Corner panel (See Figure 2)** (3) Remove the corner screw. (4) Slide the corner panel to the direction of the arrow ①, and remove the corner panel. **Panel (See Photo 4, 5)** (5) Remove the 2 screws from the panel which fixes to the oval holes. (6) Rotate the panel a little to come to the bell shaped hole where the screw is large and remove the panel.	**Figure 2**  **Photo 4**  **Photo 5** 
8. Removing the drain pan (1) Remove the air intake grille and the filter. (See Figure 1) (2) Remove the 2 screws from the electrical box cover. (3) Disconnect the connectors. (Refer to procedure 4) (4) Remove the panel. (See Photo 4, 5) (5) Remove the electrical wiring service panel (3 screws). (6) Remove the electrical box. (See Photo 2) (7) Remove the bell mouth. (See Photo 2) (8) Remove the 4 screws and pull out the drain pan. ※ Pull out the left and right of the pan gradually. Be careful not to crack or damage the pan.	**Photo 6** 

OPERATING PROCEDURE	PHOTOS & ILLUSTRATIONS
9. Removing the liquid pipe temperature thermistor (TH22) and gas pipe temperature thermistor (TH23) (1) Remove the drain pan. (See Photo 6) (2) Remove the turbo fan. (Refer to procedure 6) (3) Remove the 2 wiring clamps. (See Photo 3) (4) Remove the coil plate (2 screws). (5) Remove the thermistors which are inserted into the holders installed to the thin copper pipe. (6) Disconnect the 4-pin white connector (CN44).	**Photo 7** 
10 Removing the drain pump (DP) and float switch (FS) (1) Remove the drain pan. (See Photo 6) (2) Cut the hose band and remove the hose. (3) Remove the drain pump assembly (3 screws and 2 hooks). (4) Remove the drain pump (3 screws). (5) Remove the float switch (2 screws).	**Photo 8**  **Photo 9** 

OPERATING PROCEDURE	PHOTOS & ILLUSTRATIONS
11. Removing the heat exchanger (1) Remove the drain pan. (See Photo 6) (2) Remove the 3 screws of the piping cover, and pull out piping cover. (3) Remove the 2 screws of coil plate. (4) Remove the 2 screws of the coil. (5) Remove the screw of the coil support. (6) Pull out the heat exchanger.	**Photo 10** 

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Distributed in Apr. 2012 No. OCH421 REVISED EDITION-B
Distributed in Nov. 2008 No. OCH421 REVISED EDITION-A PDF 7
Distributed in Jul. 2007 No. OCH421 PDF 9
Made in Japan

New publication, effective Apr. 2012
Specifications are subject to change without notice.