

# TECHNICAL & SERVICE MANUAL

## Series PL

## Ceiling Cassettes

R410A

[Model Name]

[Service Ref.]

PL-P18BAK

PL-P18BAK.TH  
PL-P18BAK.TH-D  
PL-P18BAK.TH-N

PL-P24BAK

PL-P24BAK.TH  
PL-P24BAK.TH-D  
PL-P24BAK.TH-N

PL-P30BAK

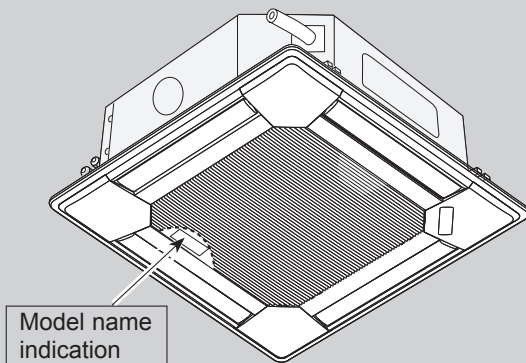
PL-P30BAK.TH  
PL-P30BAK.TH-D  
PL-P30BAK.TH-N

PL-P36BAK

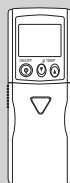
PL-P36BAK.TH  
PL-P36BAK.TH-D  
PL-P36BAK.TH-N

PL-P42BAK

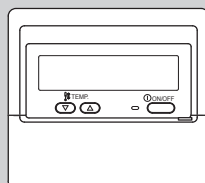
PL-P42BAK.TH  
PL-P42BAK.TH-D  
PL-P42BAK.TH-N



INDOOR UNIT



WIRELESS REMOTE  
CONTROLLER



WIRED REMOTE  
CONTROLLER

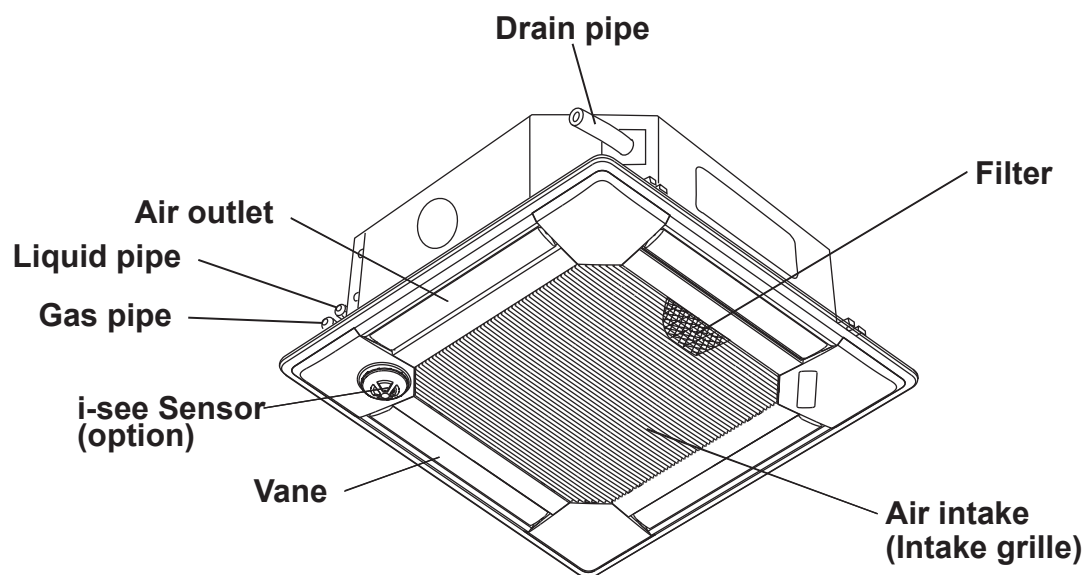
**Mr. SLIM**

# REFERENCE MANUAL

## OUTDOOR UNIT SERVICE MANUAL

Service Ref	
PU-P18/24/30/36VAKD.TH	PU-P36/42YAKD.TH
PU-P18/24/30/36VAKD.TH-D	PU-P36/42YAKD.TH-D
PU-P18/24/30/36VAKD.TH-N	PU-P36/42YAKD.THZ-N

## PARTS NAMES AND FUNCTIONS



# SPECIFICATIONS

## STANDARD SPECIFICATIONS

Service Ref.			PL-P18BAK.TH PL-P18BAK.TH-D PL-P18BAK.TH-N	PL-P24BAK.TH PL-P24BAK.TH-D PL-P24BAK.TH-N	PL-30BAK.TH PL-30BAK.TH-D PL-30BAK.TH-N
Cooling capacity*1	50 Hz	W	5,100	6,600	8,300
		BTU/h	17,400	22,500	28,300
Total input (50Hz)*2		kW	1.67	2.17	2.83
<b>Service Ref.</b>			<b>PL-P18BAK.TH PL-P18BAK.TH-D PL-P18BAK.TH-N</b>	<b>PL-P24BAK.TH PL-P24BAK.TH-D PL-P24BAK.TH-N</b>	<b>PL-30BAK.TH PL-30BAK.TH-D PL-30BAK.TH-N</b>
Input			0.07	0.07	0.14
Running current			A	0.51	0.94
Fan motor output			kW	0.05	0.12
Airflow		m³/min	14-16-18-20		19-22-25-28
Low-Medium2-Medium1-High		CFM	495-565-635-705		670-780-885-990
External static pressure		Pa (mmAq)	0 (Direct blow)		
Operation control & Thermostat			Remote control & Built-in		
Noise level			dB		32-36-39-42
Low-Medium2-Medium1-High					
Cond.drain connector		O.D.	mm (in)		
			32 (1-1/4)		
Dimensions (Panel)		W	mm/in		
		D	840 (950)/33-1/6 (37-3/8)		
		H	840 (950)/33-1/6 (37-3/8)		
Weight (Panel)		kg/lb	258 (35)/10-3/16 (1-3/8)		298 (35)/11-3/4 (1-3/8)
			23 (6)/51 (13)		
<b>Service Ref.</b>			<b>PU-P18VAKD.TH PU-P18VAKD.TH-D PU-P18VAKD.TH-N</b>	<b>PU-P24VAKD.TH PU-P24VAKD.TH-D PU-P24VAKD.TH-N</b>	<b>PU-P30VAKD.TH PU-P30VAKD.TH-D PU-P30VAKD.TH-N</b>
Refrigerant (R410A) control			Capillary tube		
Compressor output		50Hz	kW	1.3	1.8
				2.2	
Protection device			Inner thermostat		
Fan motor output			kW	0.03	0.075
Airflow		m³/min	(CFM)	31 (1095)	53 (1871)
				50 (1765)	
Noise level		50Hz	dB	51	54
				55	
Dimensions		W	mm (in)		
		D	800 (31-1/2)		
		H	285 (11-1/4)		
			550 (21-5/8)		
			840 (33-1/16)		
			330 (13)		
			880 (34-5/8)		
Weight		kg (lb)	36	56	72



Item			Service Ref.		PL-P36BAK.TH PL-P36BAK.TH-D PL-P36BAK.TH-N	PL-P42BAK.TH PL-P42BAK.TH-D PL-P42BAK.TH-N
			50 Hz	W		
Cooling capacity*1	50 Hz	W		10,400	12,400	
		BTU/h		35,500	42,300	
Total input (50Hz)*2		kW		3.59 (V)/3.37(Y)	5.54	
UNIT O.D. N I T O R O D D I T O	Service Ref.			PL-P36BAK.TH PL-P36BAK.TH-D PL-P36BAK.TH-N	PL-P42BAK.TH PL-P42BAK.TH-D PL-P42BAK.TH-N	
	Input		kW	0.15	0.16	
	Running current		A	1.00	1.07	
	Fan motor output		kW	0.12	0.12	
	Airflow		m³/min	20-24-27-30	24-26-29-32	
	Low-Medium2-Medium1-High		CFM	705-850-955-1060	850-920-1025-1130	
	External static pressure		Pa (mmAq)	0 (Direct blow)		
	Operation control & Thermostat			Remote control & Built-in		
	Noise level		dB	33-37-40-43	38-40-42-45	
	Low-Medium2-Medium1-High					
	Cond.drain connector		O.D. mm (in)	32 (1-1/4)		
	Dimensions (Panel)		W mm/in	840 (950)/33-1/6 (37-3/8)		
			D mm/in	840 (950)/33-1/6 (37-3/8)		
			H mm/in	298 (35)/11-3/4 (1-3/8)		
Weight (Panel)		kg/lb	27 (6)/60 (13)			
Service Ref.			PU-P36V/YAKD.TH PU-P36V/YAKD.TH-D PU-P36V/YAKD.TH-N	PU-P42YAKD.TH PU-P42YAKD.TH-D PU-P42YAKD.TH-N		
Refrigerant (R410A) control			Capillary tube			
Crankcase heater*3		W	35	—		
Compressor output		50Hz kW	2.7	4.6		
Protection device			*4	*5		
Fan motor output		kW	0.065 + 0.065	0.10 + 0.10		
Airflow		m³/min (CFM)	95 (3350)	100 (3530)		
Noise level		50Hz dB	54	56		
Dimensions		W mm (in)	870 (34-1/4)	970 (38-3/16)		
		D mm (in)	295 + 24 (11-5/8 +1)	345 + 24 (13-9/16+1)		
		H mm (in)	1,258 (49-1/2)			
Weight		kg (lb)	85	108		

Notes :

\*1 Rating condition (ISO T1<JIS B8616>)

Indoor : D.B.27°C [80°F], W.B.19°C [66°F]

Outdoor : D.B.35°C [95°F], W.B.24°C [75°F]

Refrigerant piping length (one way): 7.5 m [24 ft]

\*2 Total input based indicated voltage (In/Out)

PU-VAKD: 1ph, 230 V

PU-YAKD: 3ph, 400 V

\*3 The capacity of crankcase heater (W) shows the case of 230 V(PU-VAKD).

\*4 PU-VAKD: Inner thermostat

PU-YAKD: Reversed-phase protector, Thermal relay, Inner thermostat

\*5 Reversed-phase protector, HP switch, Thermal relay, LP switch, Inner thermostat

## ELECTRICAL SPECIFICATIONS

Rating conditions — JIS B8616

Indoor : D.B. 27°C [80°F] , W.B. 19°C [66°F]

Outdoor : D.B. 35°C [95°F] , W.B. 24°C [75°F]

Series PL Indoor unit (Single phase)

Power supply (1 Phase)		V: 220 V, 50 Hz				
Model		PL-P18BAK	PL-P24BAK	PL-P30BAK	PL-P36BAK	PL-P42BAK
Current	A	0.51	0.51	0.94	1.00	1.07
Input	kW	0.07	0.07	0.14	0.15	0.16

Power supply (1 Phase)		V: 230 V, 50 Hz				
Model		PL-P18BAK	PL-P24BAK	PL-P30BAK	PL-P36BAK	PL-P42BAK
Current	A	0.51	0.51	0.94	1.00	1.07
Input	kW	0.07	0.07	0.14	0.15	0.16

Power supply (1 Phase)		V: 240 V, 50 Hz				
Model		PL-P18BAK	PL-P24BAK	PL-P30BAK	PL-P36BAK	PL-P42BAK
Current	A	0.51	0.51	0.94	1.00	1.07
Input	kW	0.07	0.07	0.14	0.15	0.16

## OUTLET AIR SPEED AND COVERAGE RANGE

Configuration		4-way airflow				
Model		PL-P18BAK	PL-P24BAK	PL-P30BAK	PL-P36BAK	PL-P42BAK
Airflow	m <sup>3</sup> /min	20	20	28	30	32
Air speed	m/s	3.5	3.5	5	5.3	5.6
Coverage range	m	5.3	5.3	7.5	8	8.5
	ft	17.4	17.4	24.6	26.2	27.9

Note: The air coverage range is the distance to which the 0.25 m/s air can reach when air blows out horizontally from the unit at the High notch position.

The coverage range should be used only as a general guideline since it varies according to the size of the room and the furniture inside the room.

## COOLING CAPACITY CORRECTION FACTORS

Cooling Capacity Correction Factors **50 Hz** (Outdoor unit model: PU-P·VAKD)

Model	Refrigerant piping length (one way)									
	5 m [16 ft]	10 m [33 ft]	15 m [49 ft]	20 m [66 ft]	25 m [82 ft]	30 m [98 ft]	35 m [115 ft]	40 m [131 ft]	45 m [148 ft]	50 m [164 ft]
<b>PL-P18BAK</b>	1.0	0.985	0.971	0.957	0.943	0.931	—	—	—	—
<b>PL-P24BAK</b>	1.0	0.989	0.978	0.966	0.956	0.946	—	—	—	—
<b>PL-P30BAK</b>	1.0	0.989	0.978	0.966	0.956	0.946	—	—	—	—
<b>PL-P36BAK</b>	1.0	0.986	0.972	0.958	0.944	0.930	0.916	0.903	—	—
<b>PL-P42BAK</b>	1.0	0.981	0.963	0.945	0.929	0.913	0.897	0.882	0.868	0.854

## STANDARD OPERATION DATA

Models			PL-P18BAK	PL-P24BAK	PL-P30BAK	PL-P36BAK		PL-P42BAK
Mode			Cooling					
Total	Capacity	W	5,100	6,600	8,300	10,400	10,400	12,400
	Input	kW	1.67	2.17	2.83	3.59	3.37	5.54
Electrical circuit	Indoor unit model		PL-P18BAK	PL-P24BAK	PL-P30BAK	PL-P36BAK		PL-P42BAK
	Phase, Hz		1, 50	1, 50	1, 50	1, 50	1, 50	1, 50
	Voltage	V	230	230	230	230	230	230
	Current	A	0.51	0.51	0.94	1.00	1.00	1.07
	Outdoor unit model		PU-P18VAKD	PU-P24VAKD	PU-P30VAKD	PU-P36VAKD	PU-P36YAKD	PU-P42YAKD
	Phase, Hz		1, 50	1, 50	1, 50	1, 50	3, 50	3, 50
	Voltage	V	230	230	230	230	400	400
	Current	A	7.2	9.3	12.0	15.3	4.8	8.7
Refrigerant circuit	Discharge pressure	MPa (kgf/cm <sup>2</sup> )	3.07 (31.3)	2.88 (29.4)	2.84 (29.0)	2.89 (29.5)	2.89 (29.5)	2.96 (30.2)
	Suction pressure	MPa (kgf/cm <sup>2</sup> )	0.98 (10.0)	0.96 (9.8)	0.93 (9.5)	0.89 (9.1)	0.89 (9.1)	0.61 (6.2)
	Discharge temperature	°C	83.5	79.6	80.7	79.4	79.4	78.2
	Condensing temperature	°C	72.2	67.9	68.2	48.0	48.0	48.6
	Suction temperature	°C	15.6	12.8	13.5	11.5	11.5	5.7
	Ref. pipe length	m	7.5	7.5	7.5	7.5	7.5	7.5
Indoor side	Intake air temperature	DB°C	27	27	27	27	27	27
		WB°C	19	19	19	19	19	19
	Discharge air temperature	DB°C	15.1	15.0	15.0	13.7	13.7	13.0
Outdoor side	Intake air temperature	DB°C	35	35	35	35	35	35
		WB°C	24	24	24	24	24	24

The unit of pressure has been changed to MPa based on SI ( International System of unit ) in accordance with I. S. O. ( International Organization for Standardization ).  
The conversion factor is: 1 (Mpa) = 10.2 (kg/cm<sup>2</sup>)

# OUTLINES AND DIMENSIONS

PL-P18BAK.TH  
PL-P18BAK.TH-D  
PL-P18BAK.TH-N

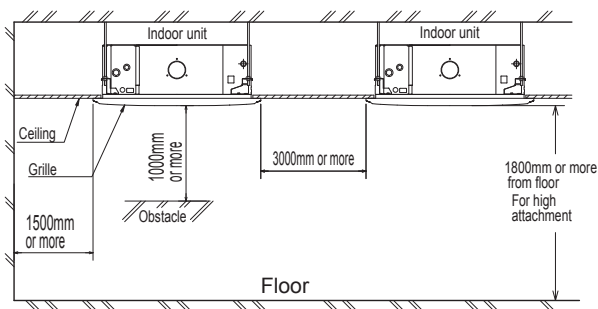
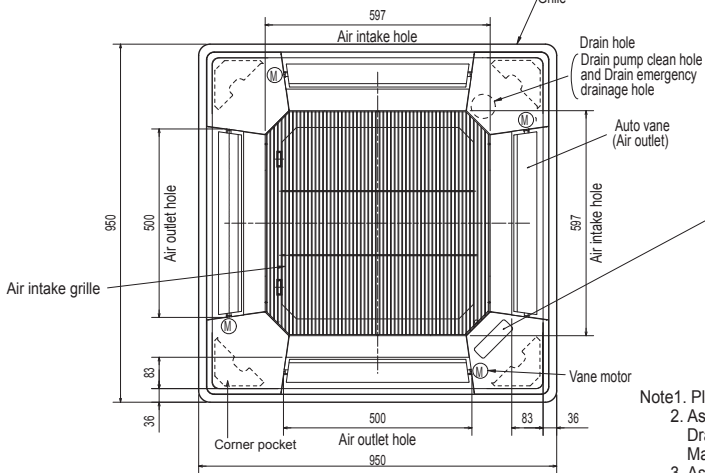
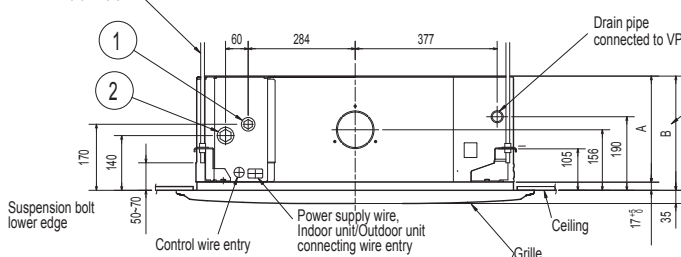
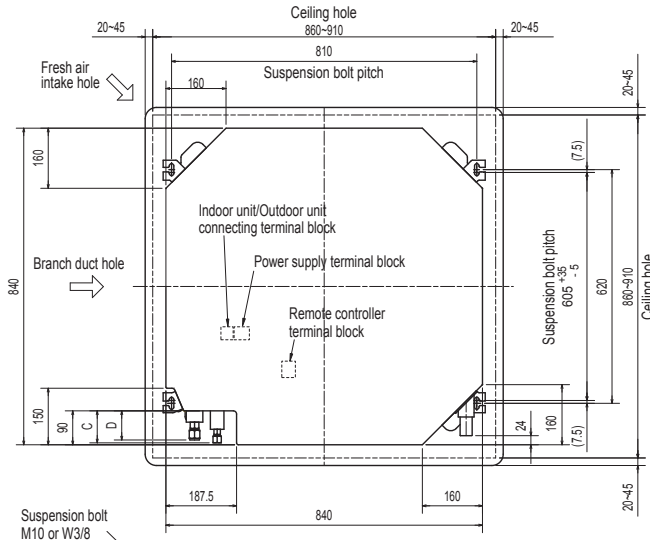
PL-P24BAK.TH  
PL-P24BAK.TH-D  
PL-P24BAK.TH-N

PL-P30BAK.TH  
PL-P30BAK.TH-D  
PL-P30BAK.TH-N

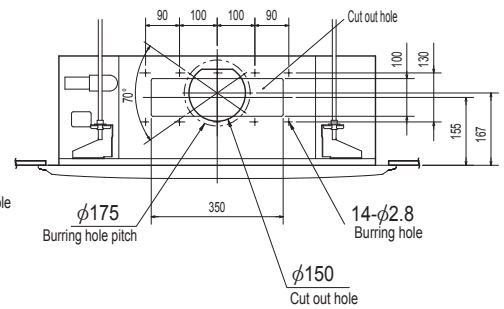
PL-P36BAK.TH  
PL-P36BAK.TH-D  
PL-P36BAK.TH-N

PL-P42BAK.TH  
PL-P42BAK.TH-D  
PL-P42BAK.TH-N

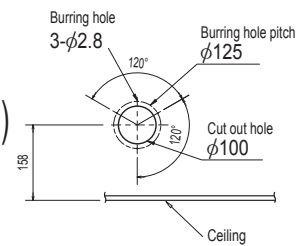
Unit: mm



Detail connecting of branch duct (Both aspects)



Detail drawing of fresh air intake hole



(Connected the attached flexible pipe or socket.)  
Keep approximately 10 to 15mm space between unit ceiling and ceiling slab.

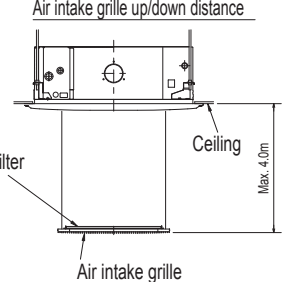
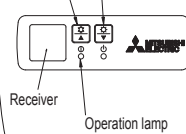
In case of wired remote controller : PLP-6BA / PLP-6BAMD



In case of auto-grille : PLP-6BAJ

In case of wireless remote controller : PLP-6BALCM Auto grille

Emergency operation switch <Cooling> and Emergency Up/Down switch <Up>  
Emergency operation switch <Fan mode> and Emergency Up/Down switch <Down>

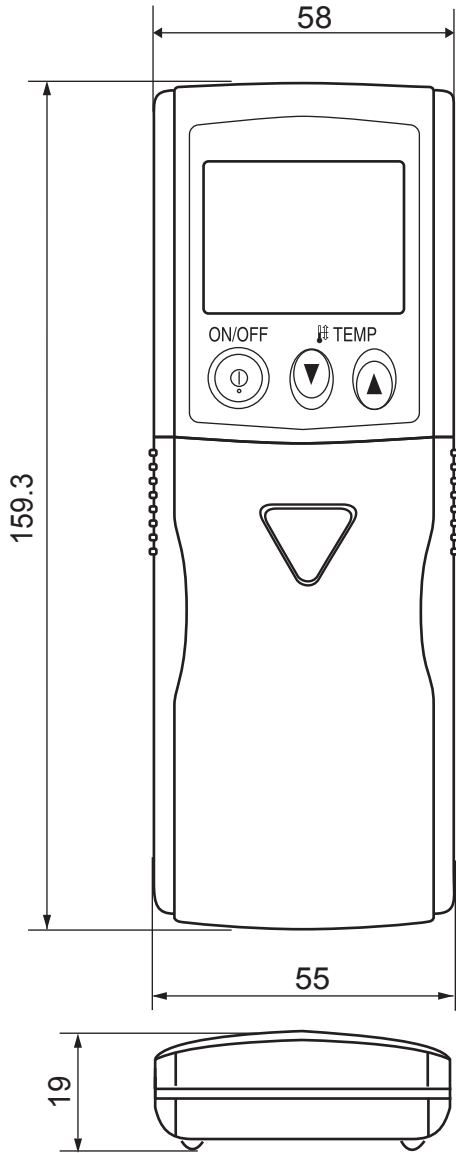


- Note1. Please choose the grille from a standard grille, auto-grille.  
2. As for drain pipe, please use VP-25 (O.D. φ32 PVC TUBE). Drain pump is included. Max. lifting height is 850mm from the ceiling.  
3. As for suspension bolt, please use M10 or W3/8. (Procured at local site)  
4. Electrical box 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 multi-functional casement.  
1) Requires E or more space between branch and ceiling for the installation.  
2) Add 135 mm to the dimensions \* marked on the figure.  
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.

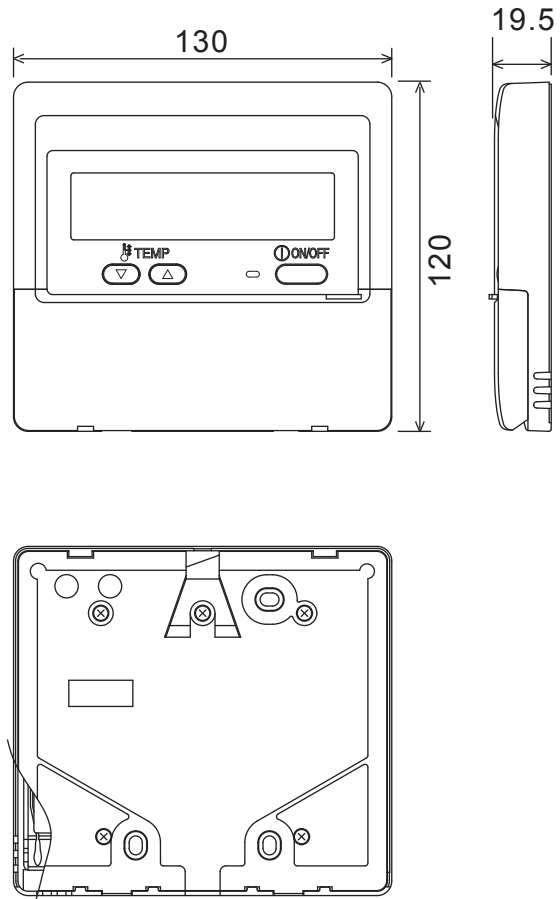
Models	①	②	A	B	C	D	E
PL-P18BAK	Refrigerant pipe ...φ6.35 Flared connection ...1/4F	Refrigerant pipe ...φ12.7 Flared connection ...1/2F	241	258	80	74	400
PL-P24BAK	Refrigerant pipe ...φ9.52 Flared connection ...3/8F	Refrigerant pipe ...φ15.88 Flared connection ...5/8F	241	258	80	74	400
PL-P30BAK PL-P36BAK PL-P42BAK	Refrigerant pipe ...φ9.52 Flared connection ...3/8F	Refrigerant pipe ...φ15.88 Flared connection ...5/8F	281	298	85	77	440

Unit: mm

WIRELESS REMOTE CONTROLLER



WIRED REMOTE CONTROLLER





# WIRING DIAGRAM

**PL-P18BAK.TH**  
**PL-P18BAK.TH-D**  
**PL-P18BAK.TH-N**

**PL-P24BAK.TH**  
**PL-P24BAK.TH-D**  
**PL-P24BAK.TH-N**

**PL-P30BAK.TH**  
**PL-P30BAK.TH-D**  
**PL-P30BAK.TH-N**

**PL-P36BAK.TH**  
**PL-P36BAK.TH-D**  
**PL-P36BAK.TH-N**

**PL-P42BAK.TH**  
**PL-P42BAK.TH-D**  
**PL-P42BAK.TH-N**

**[LEGEND]**

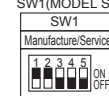
SYMBOL	NAME	SYMBOL	NAME
I.B	INDOOR CONTROLLER BOARD	MV	VANE MOTOR
CN2L	CONNECTOR (LOSSNAY)	TB2	TERMINAL BLOCK (Indoor unit Power)
CN32	CONNECTOR (REMOTE SWITCH)	TB4	TERMINAL BLOCK (INDOOR/OUTDOOR CONNECTING LINE)
CN41	CONNECTOR (HA TERMINAL-A)	TB5, TB6	TERMINAL BLOCK (REMOTE CONTROLLER TRANSMISSION LINE)
CN51	CONNECTOR (CENTRALLY CONTROL)	TH1	ROOM TEMP. THERMISTOR (0°C / 15kΩ, 25°C / 5.4kΩ DETECT)
DSA	SURGE ABSORBER	TH2	PIPE TEMP. THERMISTOR/LIQUID (0°C / 15kΩ, 25°C / 5.4kΩ DETECT)
FUSE	FUSE (T6.3A/250V)	OPTION PART	
LED1	POWER SUPPLY (L.B)	W.B	PCB FOR WIRELESS REMOTE CONTROLLER
LED2	POWER SUPPLY (R.B)	BZ	BUZZER
SW1	SWITCH (MODEL SELECTION) *See table 1	LED1	LED (OPERATION INDICATION : GREEN)
SW2	SWITCH (CAPACITY CODE) *See table 2	RU	RECEIVING UNIT
SW5	SWITCH (SYSTEM SELECTION) *See table 3	SW1	EMERGENCY OPERATION (FAN / DOWN)
SWE, SW6	CONNECTOR (EMERGENCY OPERATION)	SW2	EMERGENCY OPERATION (COOL / UP)
X1	RELAY (DRAIN PUMP)		
ZNR01_02	VARIATOR		
DP	DRAIN PUMP		
FS	DRAIN FLOAT SWITCH		
MF	FAN MOTOR		

<Table 2>SW2(CAPACITY CODE)

SW2		SW2	
MODELS	Manufacture/Service	MODELS	Manufacture/Service
PL-P18BAK		PL-P36BAK	
PL-P24BAK		PL-P42BAK	
PL-P30BAK			

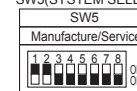
The black square (■) indicates a switch position.

<Table 1> SW1(MODEL SELECTION)

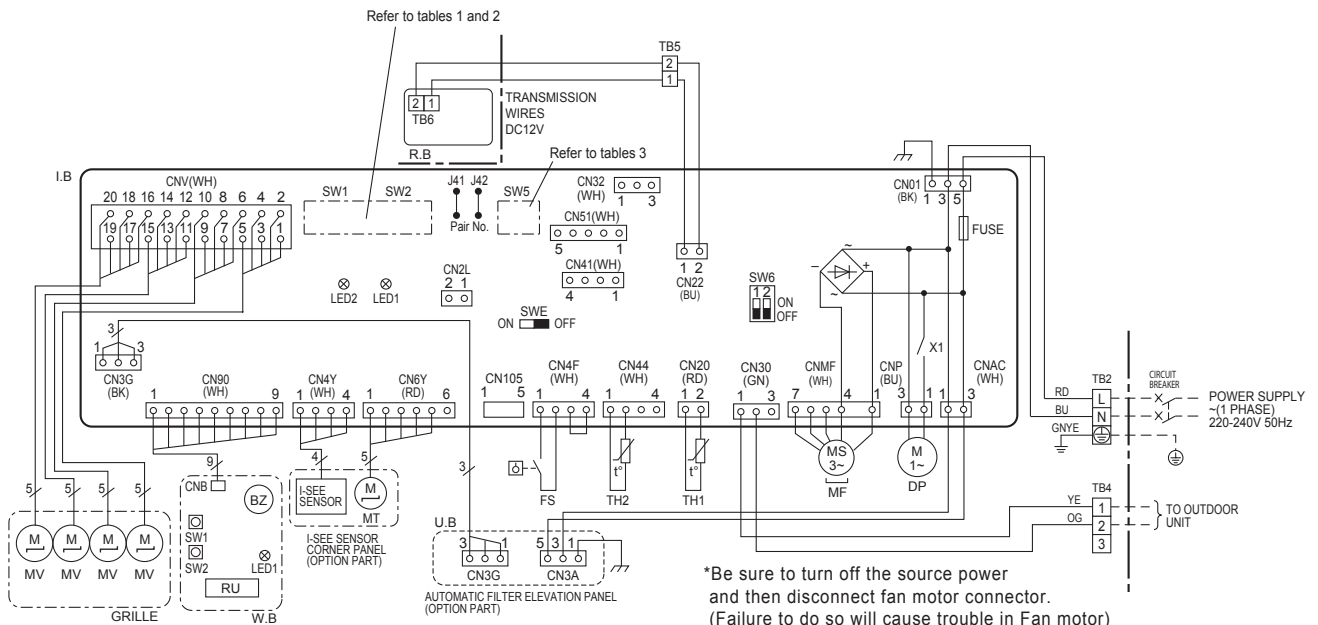


The black square (■) indicates a switch position.

<Table 3> SW5(SYSTEM SELECTION)



The black square (■) indicates a switch position.



Check code	Symptom
P1	Intake (TH1) sensor error
P2	Pipe (TH2) sensor error
P4	Float switch connector open
P5	Drain pump error
P6	Freezing/overheating protection operation
P8	Pipe temperature error
PL	Refrigerant circuit abnormal
E0-E5	Abnormality of the signal transmission between remote controller and indoor unit
Fb	Indoor unit control system error (memory error, etc.)
---	No trouble generated in the past
F F F F	No corresponding unit

- Notes: 1. Symbols used in wiring diagram above are, : Connector, : Terminal (block).  
 2. Indoor and outdoor connecting wires are made with polarities, make wiring matching terminal numbers (1, 2, 3).  
 3. Since the outdoor side electric wiring may change be sure to check the outdoor unit electric wiring for servicing.

**[Self-diagnosis]**

- For details on how to operate self-diagnosis with the wireless remote control, refer to the technical manuals etc.
- For the wired remote control: When you quickly press twice the CHECK switch on the remote control, the unit begins self-diagnosis, and Check Codes generated in the past appear on the display. For Check Codes and Symptoms refer to the table right.

# REFRIGERANT SYSTEM DIAGRAM

PL-P18BAK.TH  
 PL-P18BAK.TH-D  
 PL-P18BAK.TH-N

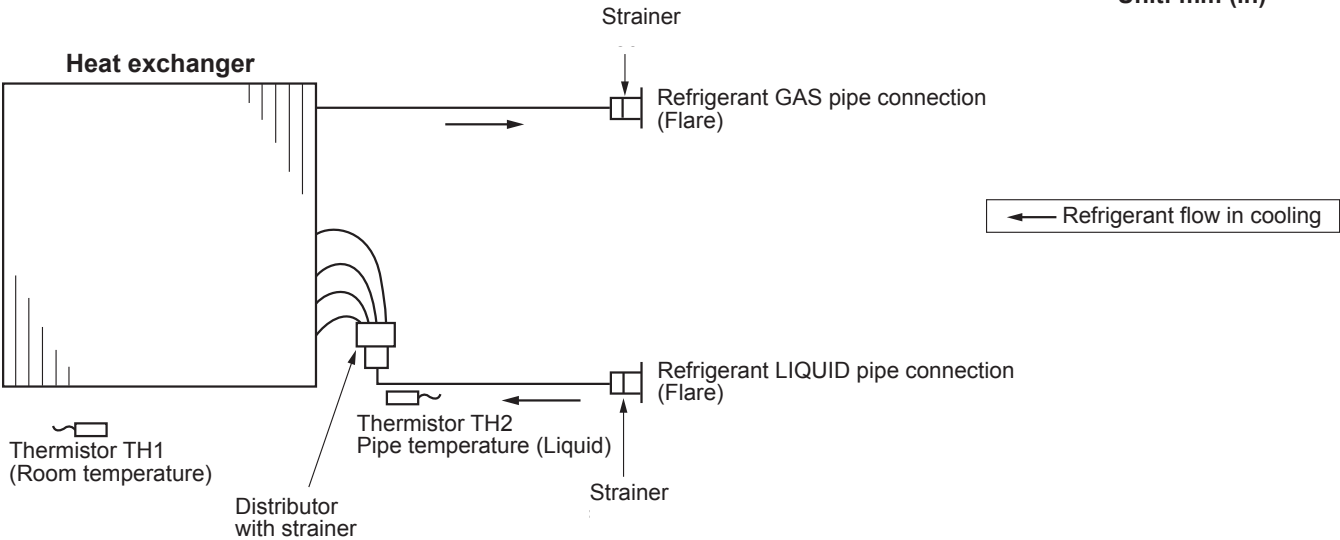
PL-P24BAK.TH  
 PL-P24BAK.TH-D  
 PL-P24BAK.TH-N

PL-P30BAK.TH  
 PL-P30BAK.TH-D  
 PL-P30BAK.TH-N

PL-P36BAK.TH  
 PL-P36BAK.TH-D  
 PL-P36BAK.TH-N

PL-P42BAK.TH  
 PL-P42BAK.TH-D  
 PL-P42BAK.TH-N

Unit: mm (in)



# AIRFLOW SYSTEM

## FRESH AIR INTAKE AND BRANCH DUCT

### Branch duct hole and fresh air intake hole (Fig. 1)

At the time of installation, use the duct holes (cut out) located at the positions shown in Fig.1, as and when required.  
 • A fresh air intake hole for the optional multi function casement can also be made.

**Note:**

The figure marked with \* in the drawing represent the dimensions of the main unit excluding those of the optional multi function casement.

When installing the optional multi function casement, add 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: mm

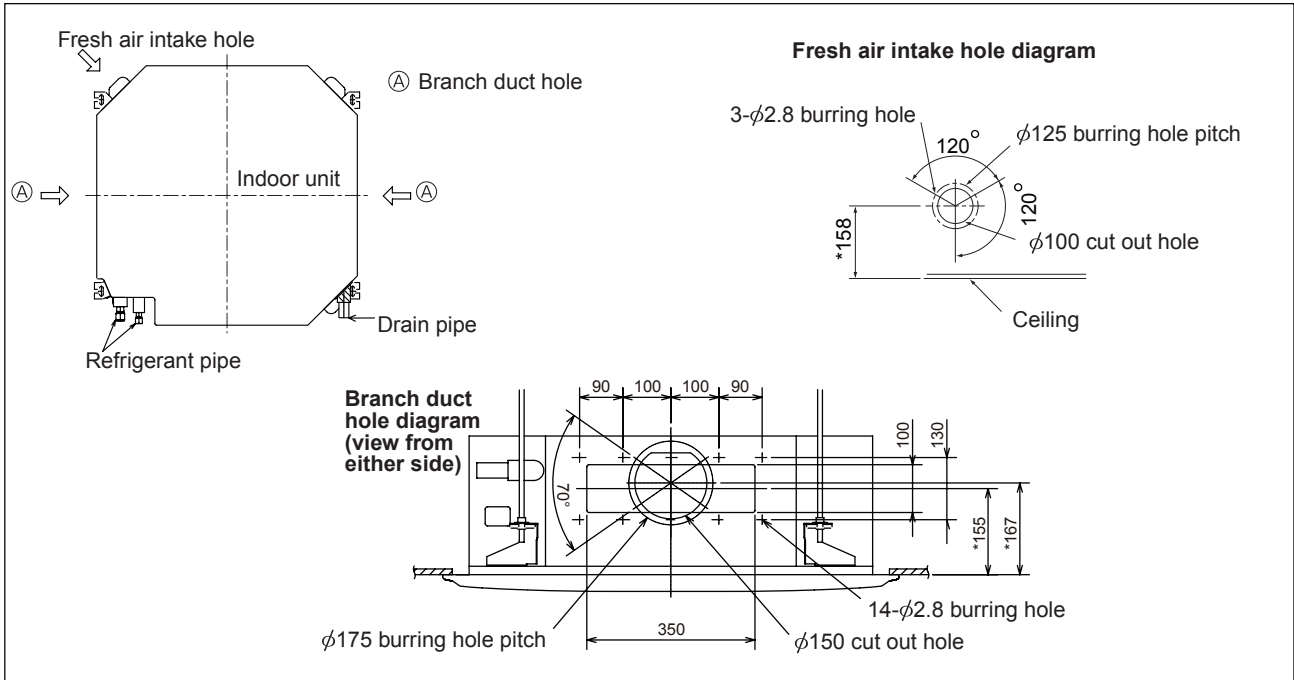


Fig. 1

### Fresh Air Intake (Installation at site)

- By mounting the optional multi-function casement to the indoor unit main body, and mounting the duct and duct flange (operation) on to it further, fresh exterior air intake can be accomplished.  
 (The mounting of the multi-function casement increases the height of the ceiling plenum by 135 mm)

