

April 2012
No. OCH518

TECHNICAL & SERVICE MANUAL

CITY MULTI Series **Wall Mounted** **R410A** / **R22**

Indoor unit
[Model names]

[Service Ref.]

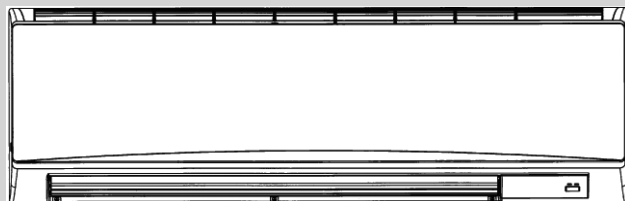
PKFY-P24NKMU-E2

PKFY-P24NKMU-E2.TH

PKFY-P30NKMU-E2

PKFY-P30NKMU-E2.TH
Note:

- This manual describes only service data of the indoor units.
- RoHS compliant products have <G> mark on the spec name plate.


INDOOR UNIT

CONTENTS

1. PART NAMES AND FUNCTIONS	2
2. SPECIFICATION	4
3. OUTLINES AND DIMENSIONS	6
4. WIRING DIAGRAM	7
5. REFRIGERANT SYSTEM DIAGRAM	8
6. MICROPROCESSOR CONTROL	9
7. TROUBLESHOOTING	14
8. DISASSEMBLY PROCEDURE	21

PARTS CATALOG (OCB518)

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.

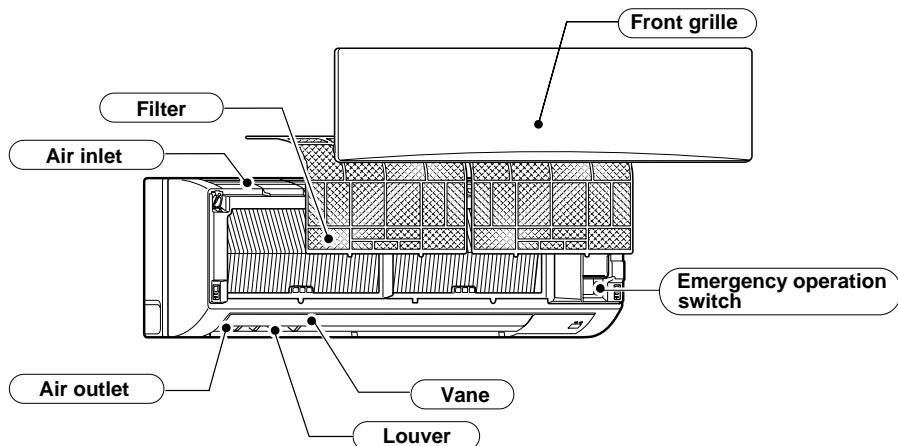
Correct refrigerant is specified in the manuals and on the spec labels provided with our products.

We will not be held responsible for mechanical failure, system malfunction, unit breakdown or accidents caused by failure to follow the instructions.

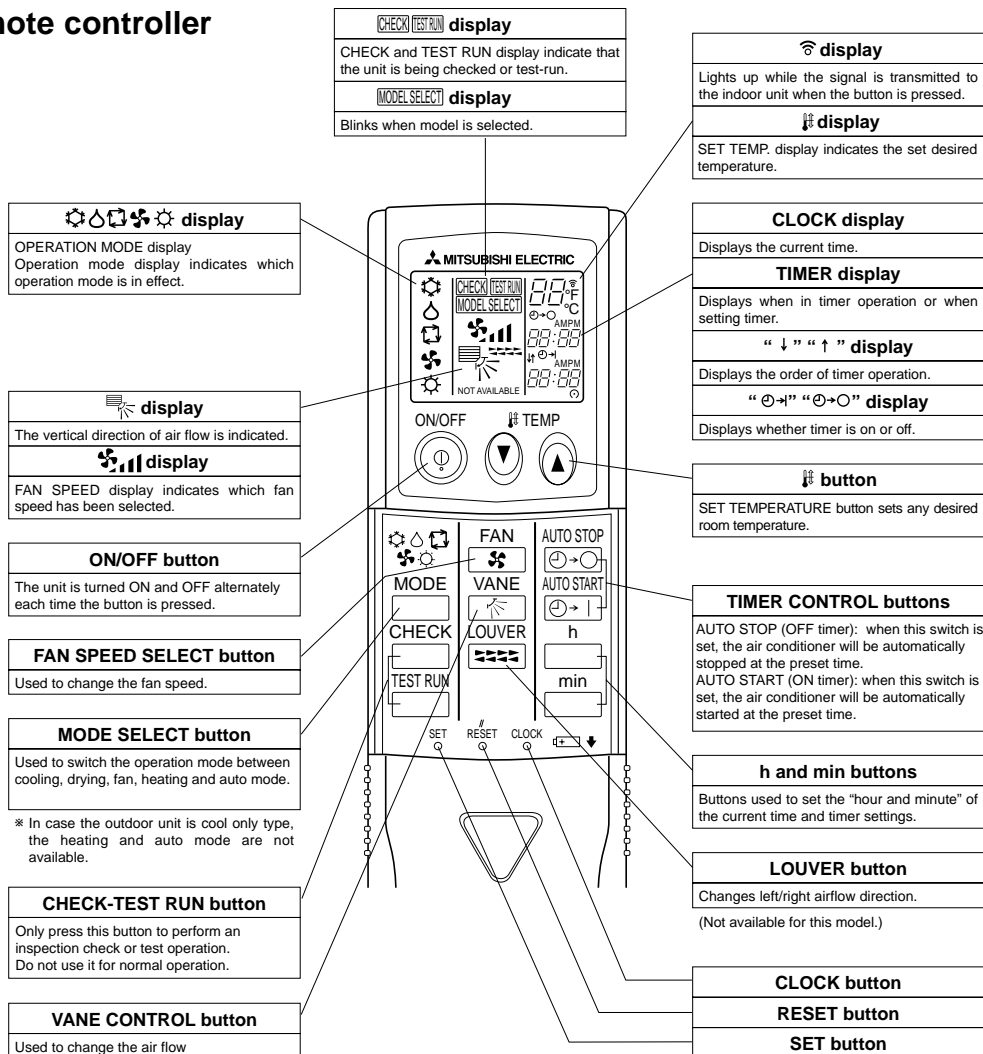
1

PART NAMES AND FUNCTIONS

• Indoor unit



• Wireless remote controller

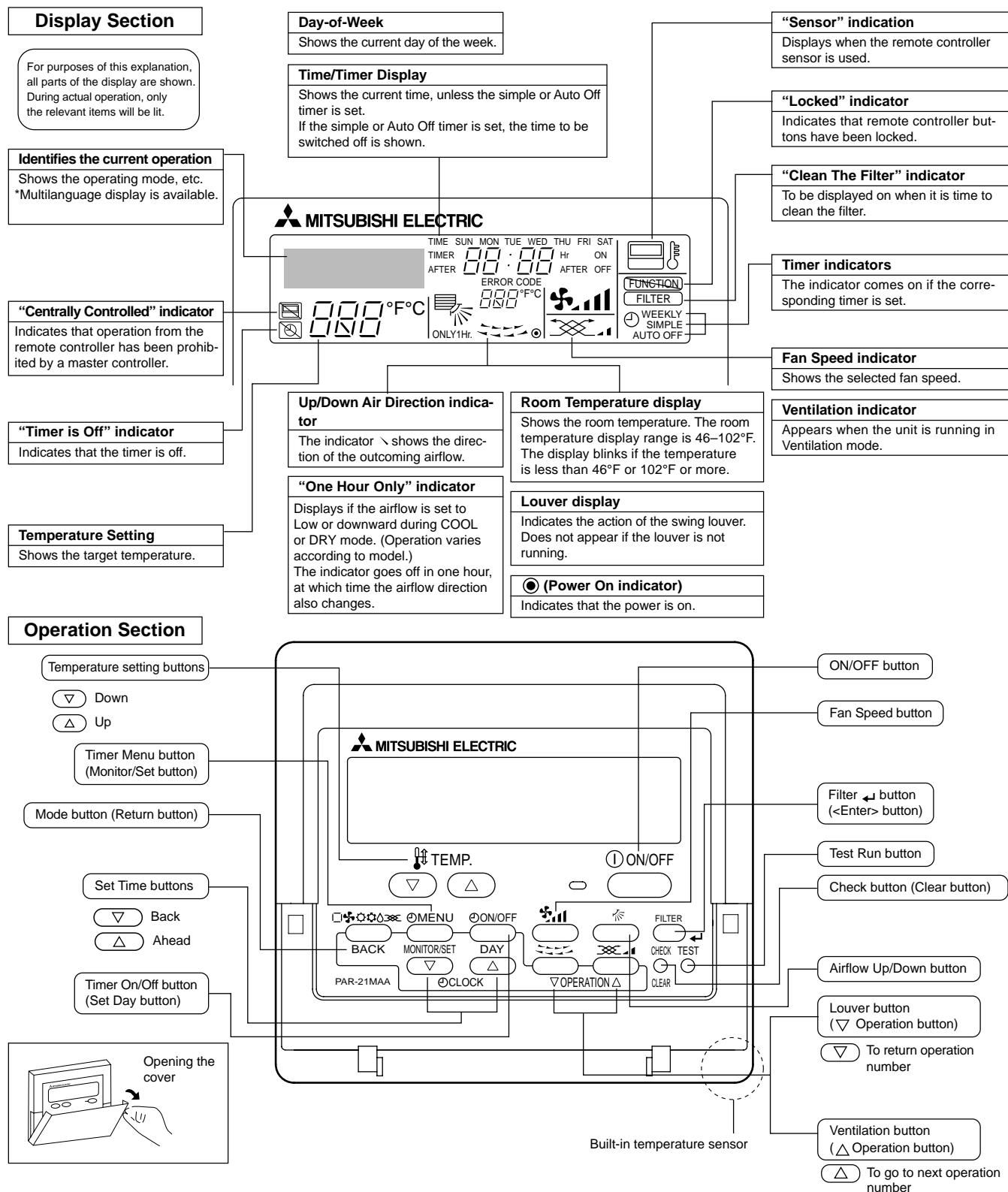


• Wired remote controller

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.



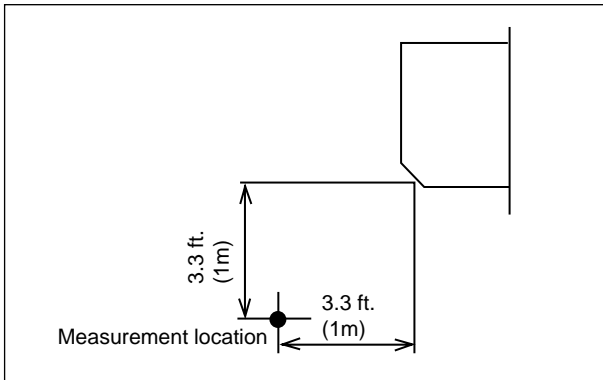
2-1. Specifications

Model			PKFY-P24NKMU-E2		PKFY-P30NKMU-E2			
Power source			1-phase 208-230V 60Hz					
Cooling capacity (Nominal)	*1	kW	7.0		8.8			
	*1	Btu/h	24,000		30,000			
	Power input	kW	0.07		0.07			
	Current input	A	0.50		0.50			
Heating capacity (Nominal)	*2	kW	7.9		10.0			
	*2	Btu/h	27,000		34,000			
	Power input	kW	0.07		0.07			
	Current input	A	0.50		0.50			
External finish			Plastic, MUNSELL (1.0Y 9.2/0.2)					
External dimension H × W × D		mm	365 × 1170 × 295					
		in.	14-3/8" × 46-1/16" × 11-5/8"					
Net weight		kg (lb)	21 (46)					
Heat exchanger			Cross fin (Aluminum fin and copper tube)					
Fan	Type × Quantity		Line flow fan × 1					
	External static press.	Pa	0					
		mmH ₂ O	0					
	Motor type		DC motor					
	Motor output	kW	0.056					
	Driving mechanism		Direct-drive					
	Airflow rate (Low-High)	m ³ /min	16 - 26		20 - 26			
		L/s	267 - 433		333 - 433			
		cfm	570 - 920		710 - 920			
Noise level (Low-High) (measured in anechoic room)		dB <A>	39 - 49		43 - 49			
Insulation material			Polyethylene sheet					
Air filter			PP honeycomb					
Protection device			Fuse					
Refrigerant control device			LEV					
Connectable outdoor unit			R410A, R22 CITY MULTI					
Diameter of refrigerant pipe	Liquid (R410A) (R22)	mm (in.)	ø9.52 (ø3/8") Flare		ø9.52 (ø3/8") Flare			
			ø9.52 (ø3/8") Flare		ø9.52 (ø3/8") Flare			
	Gas (R410A) (R22)	mm (in.)	ø15.88 (ø5/8") Flare		ø15.88 (ø5/8") Flare			
Field drain pipe size		mm (in.)	I.D. 16mm (5/8")					
Standard attachment	Document Accessory		Installation Manual, Instruction Book					
Optional parts	External heater adapter		PAC-YU25HT					
Remarks	Installation		Details on foundation 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 : 80°FDB/67°F WB (26.7°CDB/19.4°CWB)			70°FDB(21°CDB)		
			Outdoor : 95°FDB (35°CDB)			47°FDB/43°F WB (8.3°CDB/6.1°CWB)		
			Pipe length : 25 ft. (7.6 m)			25 ft. (7.6 m)		
			Level difference : 0 ft (0 m)			0 ft (0 m)		
						Unit converter		
						kcal/h = kW × 860		
						Btu/h = kW × 3,412		
						cfm = m ³ /min × 35.31		
						lb = kg/0.4536		
						*Above specification data is subject to rounding variation.		
						* Due to continuing improvement, above specification may be subject to change without notice.		

2-2. Electrical parts specifications

Service Ref. Parts name	Symbol	PKFY-P24NKMU-E2.TH	PKFY-P30NKMU-E2.TH
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 TH24	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 3.15A	
Fan motor	MF	8-Pole Output 56W / RCOJ56-AC	
Vane motor (with limit switch)	MV	MSBPC20 DC12V	
Linear expansion valve	LEV	EFM-40YGME DC 12 V	EFM-80YGME DC 12 V
Power supply terminal block	TB2	(L1, L2, GR) 250V 20A	
Transmission terminal block	TB5	(M1, M2, S) 250V 20A	
MA remote controller terminal block	TB15	(1, 2) 250V 10A	

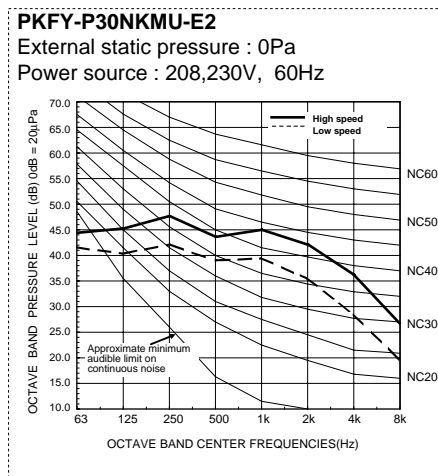
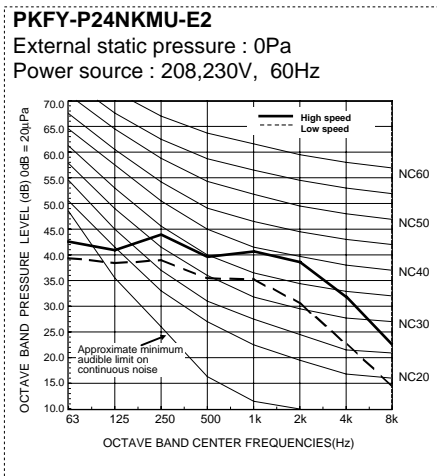
2-3. Sound levels



* Measured in anechoic room.

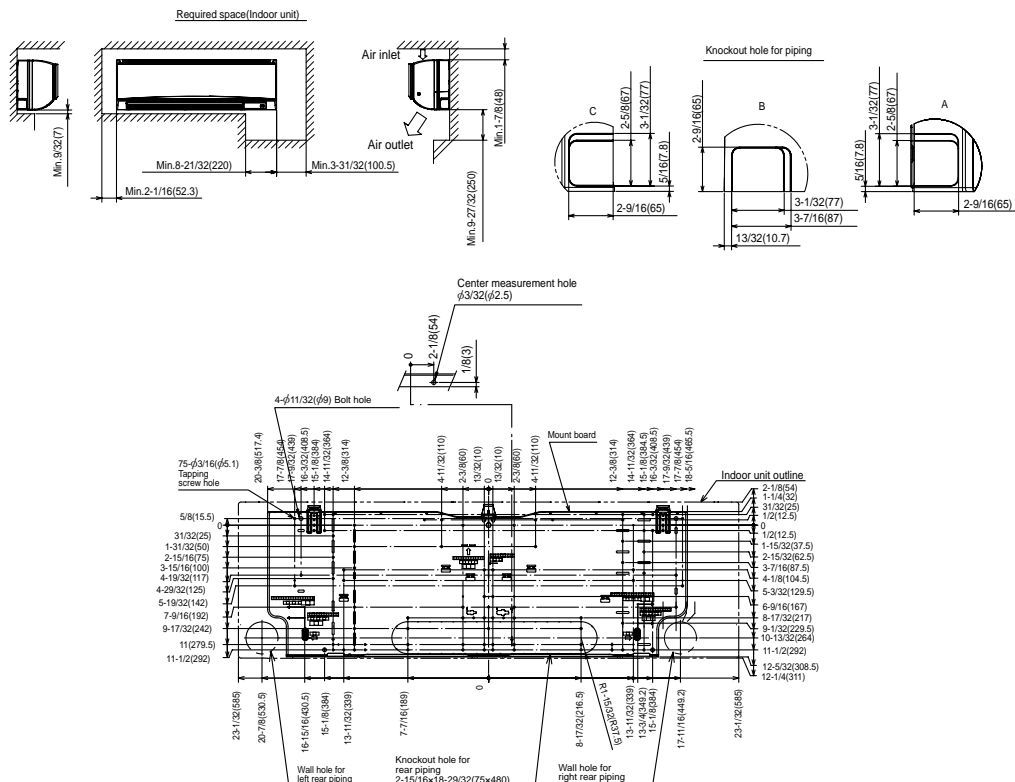
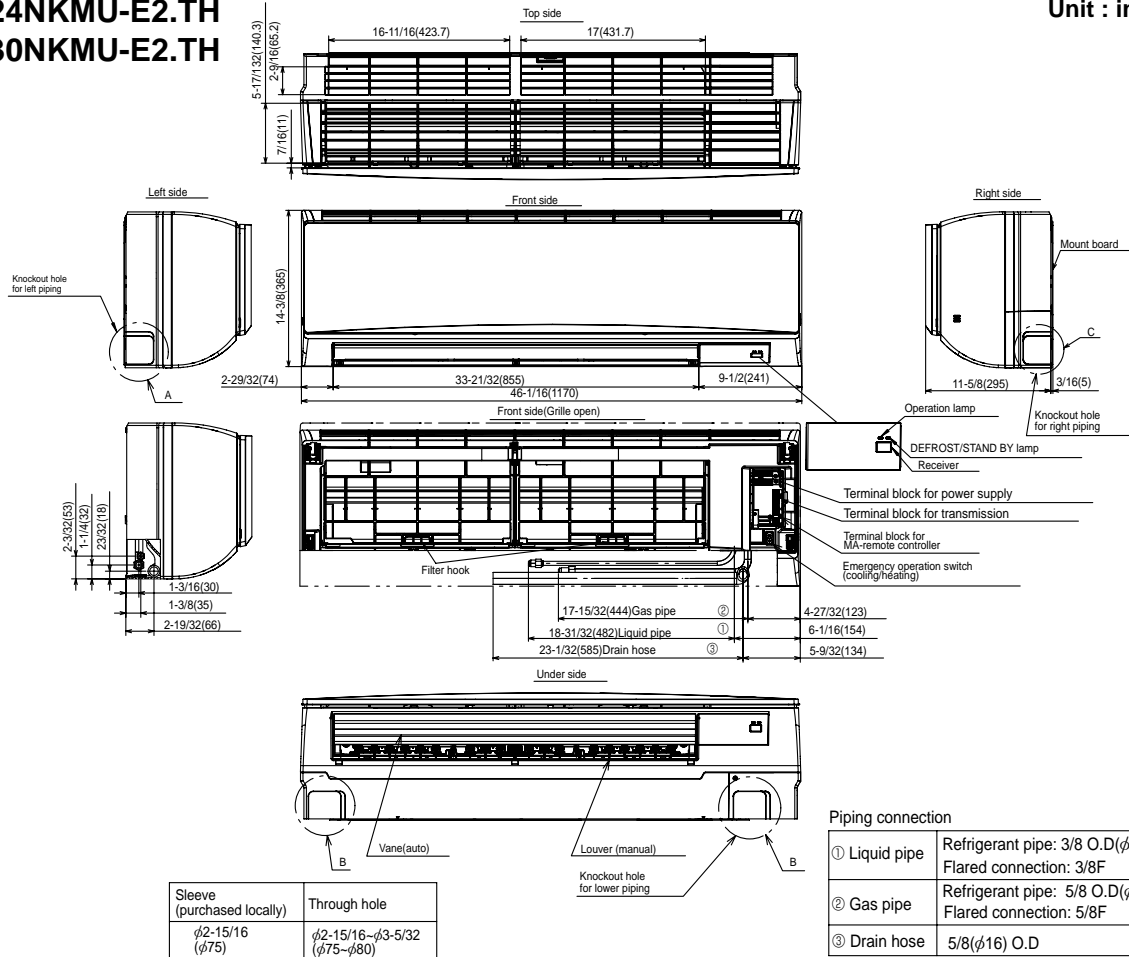
Sound level at anechoic room : Low-High	
Service Ref.	Sound level dB (A)
PKFY-P24NKMU-E2.TH	39 - 49
PKFY-P30NKMU-E2.TH	43 - 49

2-4. NC curves



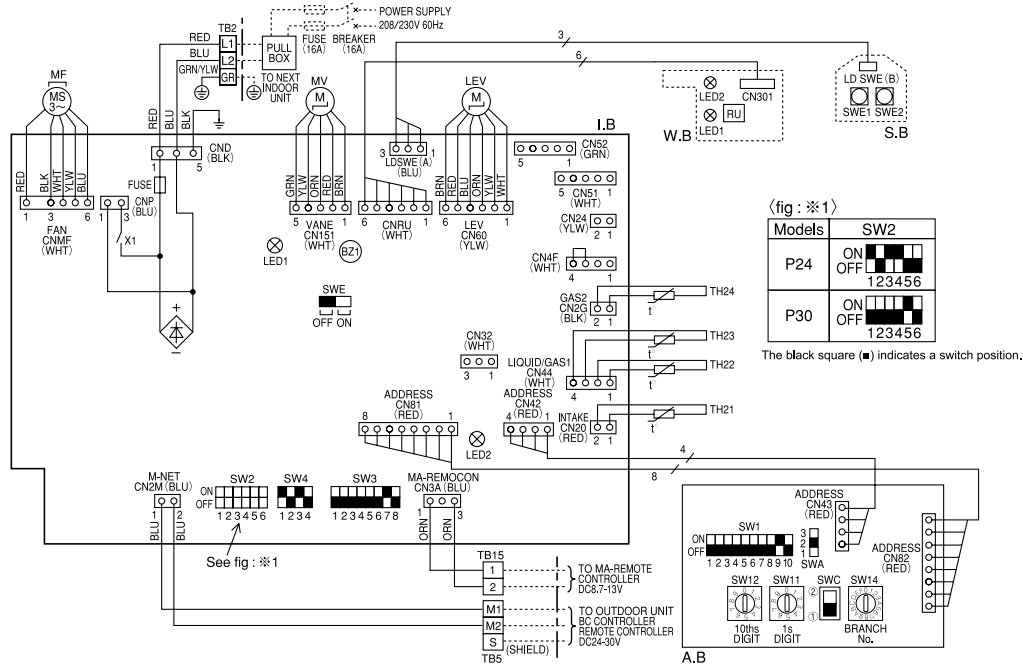
PKFY-P24NKMU-E2.TH
PKFY-P30NKMU-E2.TH

Unit : inch (mm)



PKFY-P24NKMU-E2.TH

PKFY-P30NKMU-E2.TH



SYMBOL	NAME	SYMBOL	NAME
I.B	INDOOR CONTROLLER BOARD	TH21	THERMISTOR ROOM TEMP. DETECTION (32°F/15kΩ, 77°F/5.4kΩ)
CN24	CONNECTOR EXTERNAL HEATER	TH22	PIPE TEMP. DETECTION / LIQUID (32°F/15kΩ, 77°F/5.4kΩ)
CN32	REMOTE SWITCH	TH23	PIPE TEMP. DETECTION / GAS1 (32°F/15kΩ, 77°F/5.4kΩ)
CN51	CENTRALLY CONTROL	TH24	PIPE TEMP. DETECTION / GAS2 (32°F/15kΩ, 77°F/5.4kΩ)
CN52	REMOTE INDICATION	A.B	ADDRESS BOARD
BZ1	BUZZER	SW2	SWITCH CAPACITY CODE
FUSE	FUSE (T3.15A/250V)	SW1	SWITCH FAN SPEED SELECTOR
LED1	POWER SUPPLY (I.B)	SW11	SWITCH MODE SELECTION
LED2	POWER SUPPLY (I.B)	SW12	SWITCH ADDRESS SETTING 1s DIGIT
SW2	SWITCH CAPACITY CODE	SW14	SWITCH ADDRESS SETTING 10ths DIGIT
SW3	SWITCH MODE SELECTION	S.B	SWITCH BOARD
SW4	SWITCH MODEL SELECTOR	SWE1	SWITCH EMERGENCY OPERATION(HEAT)
SWE	SWITCH DRAIN PUMP (TEST MODE)	SWE2	SWITCH EMERGENCY OPERATION(COOL)
X1	AUX. RELAY DRAIN PUMP	W.B	PCB FOR WIRELESS REMOTE CONTROLLER
LEV	LINEAR EXPANSION VALVE	LED1	LED(OPERATION INDICATOR:GREEN)
MF	FAN MOTOR	LED2	LED(PREPARATION FOR HEATING : ORANGE)
MV	VANE MOTOR	RU	RECEIVING UNIT
TB2	TERMINAL POWER SUPPLY		
TB5	BLOCK TRANSMISSION		
TB15	BLOCK MA-REMOTE CONTROLLER		

NOTES:

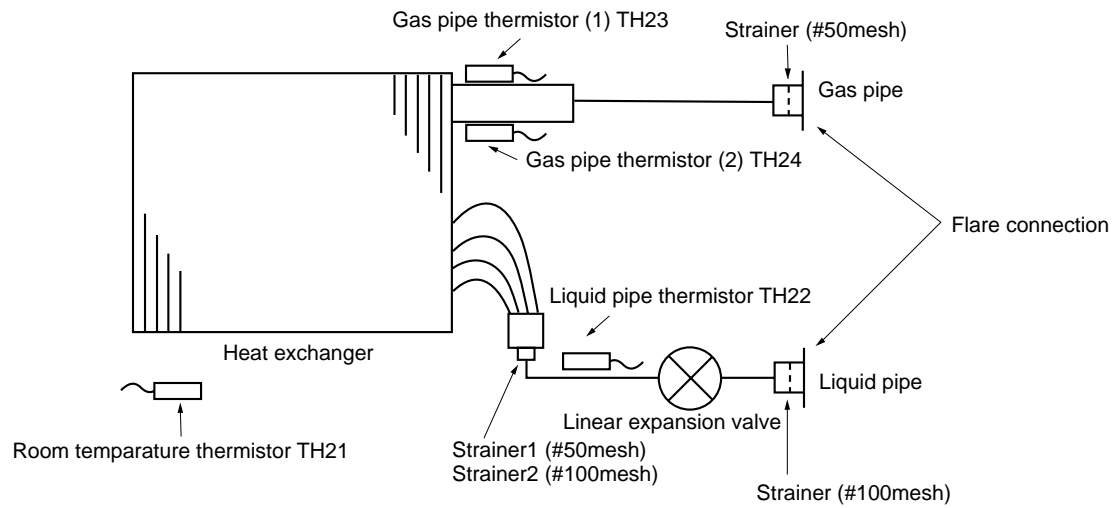
- At servicing for outdoor unit, always follow the wiring diagram of outdoor unit.
 - In case of using MA-Remote controller, please connect to TB15. (Remote controller wire is non-polar.)
 - In case of using M-NET, please connect to TB5. (Transmission line is non-polar.)
 - Symbol [S] of TB5 is the shield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

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

PKFY-P24NKMU-E2.TH

PKFY-P30NKMU-E2.TH

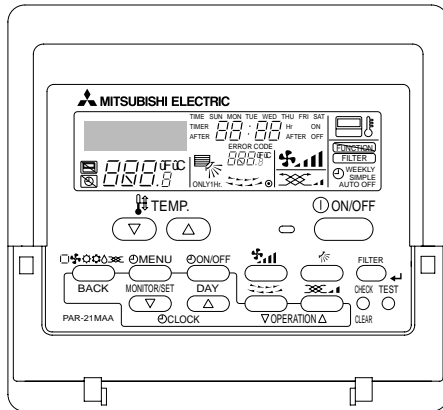


Unit : mm (inch)

Item	Model	PKFY-P24NKMU-E2	PKFY-P30NKMU-E2
Gas pipe		$\phi 15.88$ (5/8)	$\phi 15.88$ (5/8)
Liquid pipe		$\phi 9.52$ (3/8)	$\phi 9.52$ (3/8)

INDOOR UNIT CONTROL


6-1. COOL OPERATION



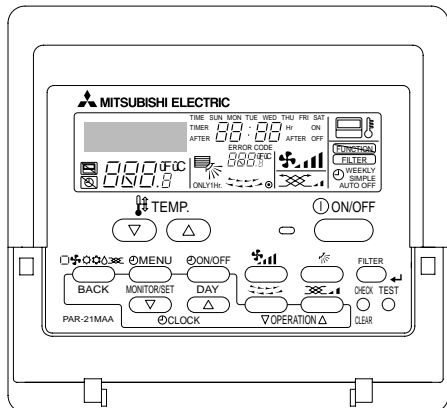
<How to operate>

- 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 Δ 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) <ul style="list-style-type: none">Room temperature \geq desired temperature + 2°F ...Thermo ONRoom temperature \leq 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. <ul style="list-style-type: none">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 2 speeds) <table border="1"><tr><td>Type</td><td>Fan speed notch</td></tr><tr><td>2 speeds</td><td>[Low], [High]</td></tr></table>	Type	Fan speed notch	2 speeds	[Low], [High]	
Type	Fan speed notch					
2 speeds	[Low], [High]					
3. 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 [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.				

6-2. DRY OPERATION



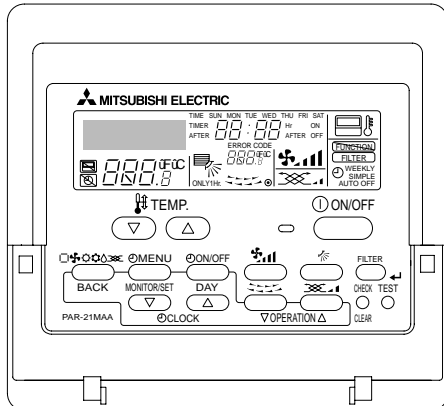
<How to operate>

- 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

Control modes	Control details	Remarks																														
1. Thermostat function	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 \geq desired temperature + 2°F Dry thermo OFF Room temperature \geq desired temperature																															
	<table><tr><th rowspan="2">Room temperature</th><th colspan="2">3 min. passed since starting operation</th><th rowspan="2">Dry thermo ON time (min)</th><th rowspan="2">Dry thermo OFF time (min)</th></tr><tr><th>Thermostat signal</th><th>Room temperature (T1)</th></tr><tr><td rowspan="4">Over 64°F</td><td rowspan="4">ON</td><td>T1 \geq 83°F</td><td>9</td><td>3</td></tr><tr><td>83°F > T1 \geq 79°F</td><td>7</td><td>3</td></tr><tr><td>79°F > T1 \geq 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>	Room temperature	3 min. passed since starting operation		Dry thermo ON time (min)	Dry thermo OFF time (min)	Thermostat signal	Room temperature (T1)	Over 64°F	ON	T1 \geq 83°F	9	3	83°F > T1 \geq 79°F	7	3	79°F > T1 \geq 75°F	5	3	75°F > T1	3	3		OFF	Unconditional	3	10	Less than 64°F	Dry thermo OFF			
Room temperature	3 min. passed since starting operation		Dry thermo ON time (min)	Dry thermo OFF time (min)																												
	Thermostat signal	Room temperature (T1)																														
Over 64°F	ON	T1 \geq 83°F	9	3																												
		83°F > T1 \geq 79°F	7	3																												
		79°F > T1 \geq 75°F	5	3																												
		75°F > T1	3	3																												
	OFF	Unconditional	3	10																												
Less than 64°F	Dry thermo OFF																															
	1-2. Freeze prevention control No control function																															
2. Fan	Indoor fan operation controlled depending on the compressor conditions. <table><tr><th>Dry thermo</th><th colspan="2">Fan speed notch</th></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.	Dry thermo	Fan speed notch		ON	[Low]		OFF	Excluding the following	Stop	Room temp. < 64°F	[Low]																				
Dry thermo	Fan speed notch																															
ON	[Low]																															
OFF	Excluding the following	Stop																														
	Room temp. < 64°F	[Low]																														
3. Vane (up/down vane change)	Same control as COOL operation																															

6-3. FAN OPERATION

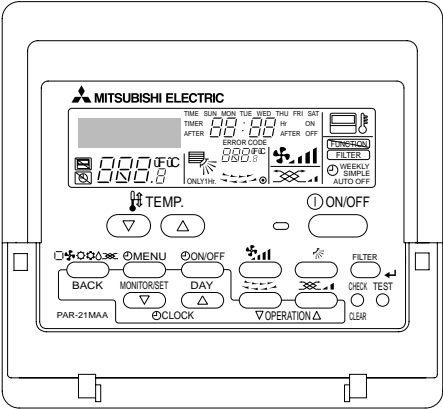


<How to operate>

- ① Press POWER ON/OFF button.
- ② Press the operation MODE button to display FAN.

Control modes	Control details	Remarks				
1. Fan	<div>Set by remote controller.</div> <table><tr><td>Type</td><td>Fan speed notch</td></tr><tr><td>2 speeds</td><td>[Low], [High]</td></tr></table>	Type	Fan speed notch	2 speeds	[Low], [High]	
Type	Fan speed notch					
2 speeds	[Low], [High]					
2. 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	<ul style="list-style-type: none">• Same control as COOL operation				

6-4. 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.

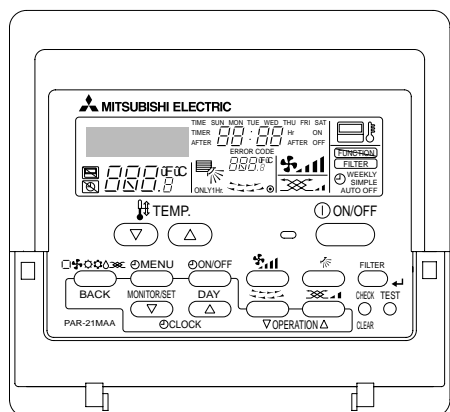
Control modes	Control details	Remarks				
1. Thermostat function	1-1. Thermostat function (Function to prevent restarting for 3 minutes) <ul style="list-style-type: none">Room temperature ≤ desired temperature -2°F ...Thermo ONRoom temperature ≤ desired temperature ...Thermo OFF					
2. Fan	By the remote controller setting (switch of 2 speeds) <table><tr><td>Type</td><td>Fan speed notch</td></tr><tr><td>2 speeds</td><td>[Low], [High]</td></tr></table>	Type	Fan speed notch	2 speeds	[Low], [High]	
	Type	Fan speed notch				
	2 speeds	[Low], [High]				
2-1. Hot adjust mode The fan controller becomes the hot adjuster mode for the following conditions. <ul style="list-style-type: none">① When starting the HEAT operation② When the thermoregulating function changes from OFF to ON.③ When release the HEAT defrosting operation <div><p>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 B. (Terminating the hot adjust mode)</p></div>	*1 "STAND BY" will be displayed during the hot adjust mode.					
2-2. Residual heat 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.	· This control is same for the model without auxiliary heater.					

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. Vane control (Up/down vane change)	<p>(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]</p> <p>(2) Vane position: Horizontal → Downward A → Downward B → Downward C → Downward D → Swing → Auto</p> <p>(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.)</p> <ul style="list-style-type: none"> • Thermo OFF • Hot adjust [Extra low] mode • Heat defrost mode 	

6-5. 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	<p>(1) HEAT mode → COOL mode Room temperature ≥ Desired temperature + 3°F. or 3 min. has passed</p> <p>(2) COOL mode → HEAT mode Room temperature ≥ Desired temperature - 3°F. or 3 min. has passed</p>	
3. COOL mode	Same control as cool operation	
4. HEAT mode	Same control as heat operation	

7-1. HOW TO CHECK THE PARTS

PKFY-P24NKMU-E2.TH PKFY-P30NKMU-E2.TH

Parts name	Check points				
Room temperature thermistor (TH21)	Disconnect the connector then measure the resistance with a tester. (At the ambient temperature 50°F~86°F)				
Liquid pipe temperature thermistor (TH22)	Refer to 7-1-1.				
Gas pipe temperature thermistor (TH23 ,24)					
	Normal	Abnormal			
	4.3kΩ~9.6kΩ	Open or short			
Vane motor (MV)	Measure the resistance between the terminals with a tester. (Coil temperature 68°F)				
	Normal			Abnormal	
	①-② Brown-Red	①-③ Brown-Orange	①-④ Brown-Yellow	①-⑤ Brown-Green	Open or short
	250Ω ± 7%				
Fan motor (MF)	Refer to 7-1-3.				
Linear expansion valve (LEV)	Disconnect the connector then measure the resistance value with a tester. (Coil temperature 68°F)				
	Normal			Abnormal	
	(1)-(5) White-Red	(2)-(6) Yellow-Brown	(3)-(5) Orange-Red	(4)-(6) Blue-Brown	Open or short
	200Ω ± 10%				

7-1-1. Thermistor

<Thermistor characteristic graph>

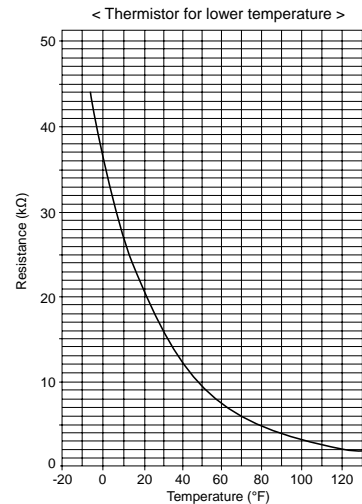
Thermistor for lower temperature

Room temperature thermistor (TH21)
Liquid pipe temperature thermistor (TH22)
Gas pipe temperature thermistor (TH23) (TH24)

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

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

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

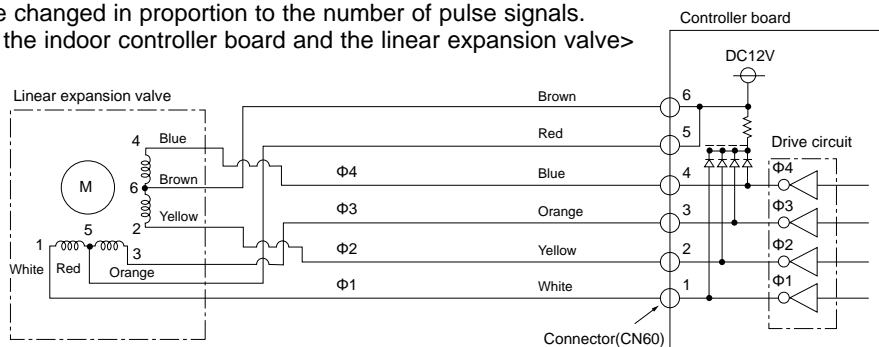


7-1-2. Liner expansion valve

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>



<Output pulse signal and the valve operation>

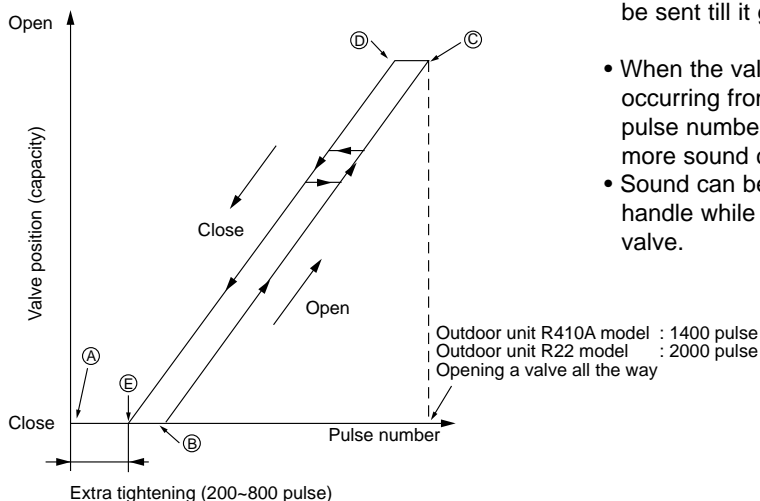
Output (Phase)	Output			
	1	2	3	4
$\phi 1$	ON	OFF	OFF	ON
$\phi 2$	ON	ON	OFF	OFF
$\phi 3$	OFF	ON	ON	OFF
$\phi 4$	OFF	OFF	ON	ON

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

② Linear expansion valve operation



③ Trouble shooting

Symptom	Check points	Countermeasures
Operation circuit failure of the micro processor	Disconnect the connector on the controller board, then connect LED for checking. 1kΩ LED <p>When power is turned on, pulse signals will be 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.</p>	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 valve.
Short or breakage of the motor coil of the linear expansion valve	Measure the resistance between each coil (white-red, yellow-brown, orange-red, blue-brown) using a tester. It is normal if the resistance is in the range of 200Ω ±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. Thermistor (Liquid pipe) Linear expansion valve <p>It is not necessary to exchange the linear expansion valve, if the leakage is small and not affecting normal operation.</p>	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.

7-1-3. DC Fan motor (fan motor/indoor controller circuit board)

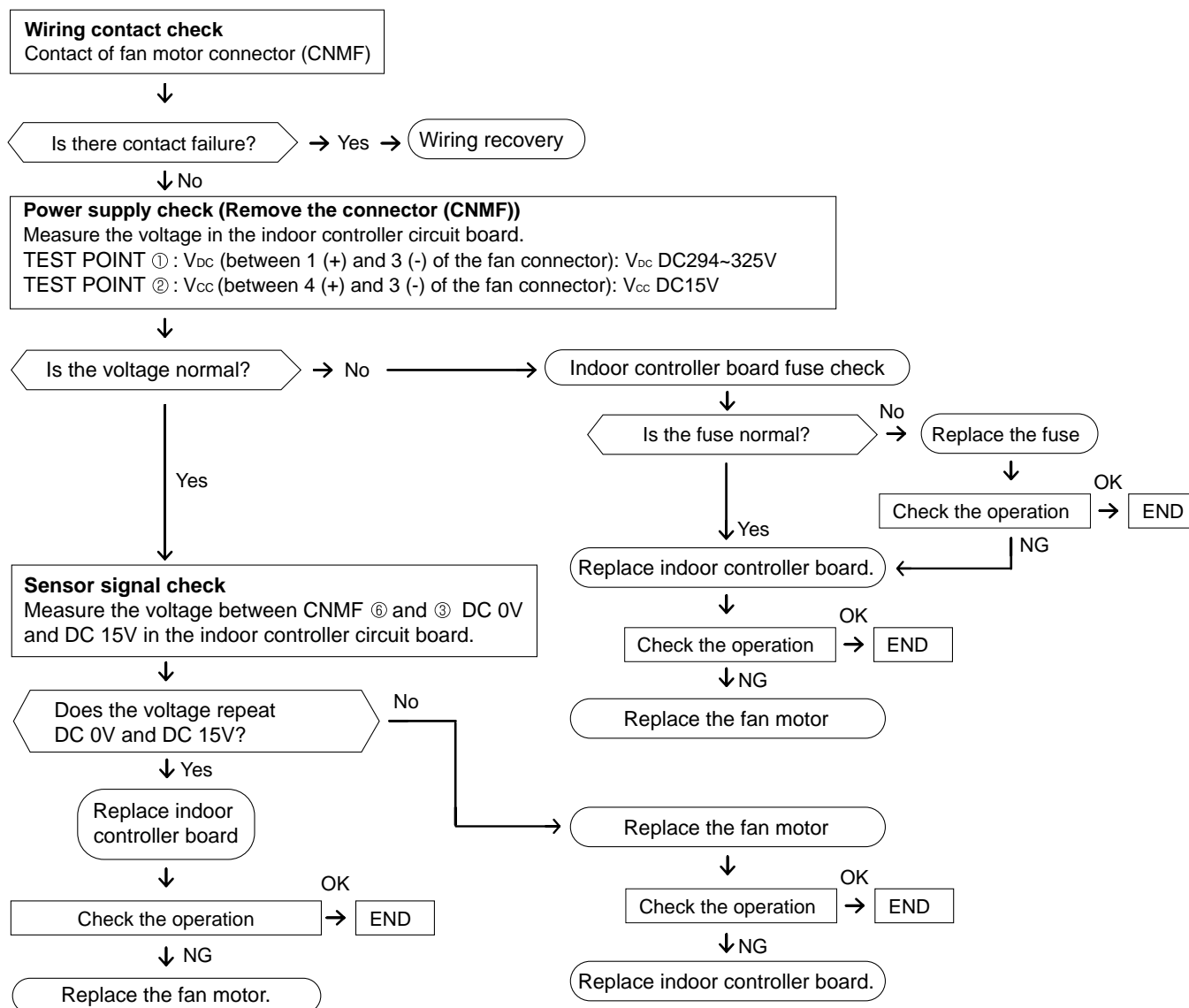
Check method of DC fan motor (fan motor/indoor controller circuit board)

① Notes

- High voltage is applied to the connector (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 circuit board and fan motor.)

② Self check

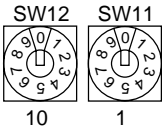
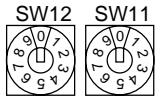



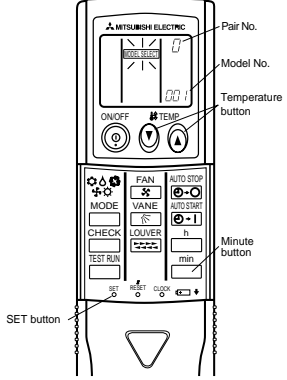
Symptom : The indoor fan cannot turn around.



7-2. Function of Dip switch

PKFY-P24NKMU-E2.TH PKFY-P30NKMU-E2.TH

Switch	Pole	Function	Operation by switch		Effective timing	Remarks															
			ON	OFF																	
SW1 Mode selection	1	Thermistor<Room temperature> position	Built-in remote controller	Indoor unit	Under suspension	<div>Address board</div> <div><Initial setting></div> <div><div>ON</div><div>OFF</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>1 2 3 4 5 6 7 8 9 10</div></div> <div>NOTE: ※1</div> <table><tr><td>SW1-7</td><td>SW1-8</td><td>Fan speed</td></tr><tr><td>OFF</td><td>OFF</td><td>Extra low</td></tr><tr><td>ON</td><td>OFF</td><td>Low</td></tr><tr><td>OFF</td><td>ON</td><td>Setting air flow</td></tr><tr><td>ON</td><td>ON</td><td>Stop</td></tr></table> <div>※2 It is impossible to intake the fresh air.</div>	SW1-7	SW1-8	Fan speed	OFF	OFF	Extra low	ON	OFF	Low	OFF	ON	Setting air flow	ON	ON	Stop
	SW1-7	SW1-8	Fan speed																		
	OFF	OFF	Extra low																		
	ON	OFF	Low																		
	OFF	ON	Setting air flow																		
	ON	ON	Stop																		
	2	Filter clogging detection	Provide	Not provide																	
	3	Filter cleaning sign	2,500 hr	100 hr																	
	4	Fresh air intake ※2	Not effective	Not effective																	
	5	Switching remote controller display	Thermo ON signal indication	Fan output indication																	
6	Humidifier control	Fan operation at Heating mode	Thermo ON operation at heating mode																		
7	Air flow set in case of heat thermo OFF	Low ※1	Extra low ※1																		
8		Setting air flow ※1	Depends on SW1-7																		
9	Auto restart function	Effective	Not effective																		
10	Power ON/OFF by breaker	Effective	Not effective																		
SW2 Capacity code switch	1~6	<table><tr><td>Models</td><td>SW2</td></tr><tr><td>P24</td><td><div>ON</div><div>OFF</div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>1 2 3 4 5 6</div></td></tr><tr><td>P30</td><td><div>ON</div><div>OFF</div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>1 2 3 4 5 6</div></td></tr></table>		Models	SW2	P24	<div>ON</div> <div>OFF</div> <div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>1 2 3 4 5 6</div>	P30	<div>ON</div> <div>OFF</div> <div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>1 2 3 4 5 6</div>	Before power supply ON	Indoor controller board										
Models	SW2																				
P24	<div>ON</div> <div>OFF</div> <div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>1 2 3 4 5 6</div>																				
P30	<div>ON</div> <div>OFF</div> <div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div>1 2 3 4 5 6</div>																				
SW3 Function selection	1	Heat pump/Cool only	Cooling only	Heat pump	Under suspension	<div>Indoor controller board</div> <div><Initial setting></div> <div><div>ON</div><div>OFF</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>1 2 3 4 5 6 7 8</div></div> <div>※1 Second setting is same as first setting. ※2 Please do not use SW3-7,8 as trouble might be caused by the usage condition.</div>															
	2	Not used	—	—																	
	3	Not used	—	—																	
	4	Vane horizontal angle	Second setting ※1	First setting																	
	5	Changing the opening of linear expansion valve during thermo OFF	Effective	Not effective																	
	6	Heating 4 degree up	Not effective	Effective																	
	7	Target superheat setting※2	—	—																	
	8	Target subcool ※2	—	—																	
SW4 Model selection	1~4	In case of replacing the indoor controller board, make sure to set the switch to the initial setting, which is shown below. <div><div>ON</div><div>OFF</div><div><div></div><div></div><div></div><div></div></div><div>1 2 3 4</div></div>		Before power supply ON	Indoor controller board																

Switch		Operation by switch	Effective timing	Remarks																											
SW11 1s digit address setting SW12 10ths digit address setting	Rotary Switch	 <p>How to set addresses</p> <p>Example : If address is "3", remain SW12 (for over 10) at "0", and match SW11 (for 1 to 9) with "3".</p>	Before power supply ON	<div>Address board</div> <p><Initial setting></p> 																											
SW14 Branch No. Setting	Rotary switch	 <p>How to set branch numbers SW14 (Series R2 only)</p> <p>Match the indoor unit's refrigerant pipe with the BC controller's end connection number. Remain other than series R2 at "0".</p>		<div>Address board</div> <p><Initial setting></p> 																											
J41, J42 Wireless remote controller Pair No.	Jumper	<ul style="list-style-type: none"> To operate each indoor unit by each remote controller when installed 2 indoor units or more are near, Pair No. setting is necessary. <ul style="list-style-type: none"> Pair No. setting is available with the 4 patterns (Setting patterns A to D). 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. <ul style="list-style-type: none"> Setting for indoor unit <p>Cut jumper wire J41, J42 on the indoor controller board according to the table below.</p> Wireless remote controller pair number: <p>Setting operation</p> <ol style="list-style-type: none"> Press the SET button (using a pointed implement). Check that the remote controller's display has stopped before continuing. MODEL SELECT flashes, and the model No. (3 digits) appears (steadily-lit). Press the MINUTE button twice. The pair number appears flashing. Press the temperature  buttons to select the pair number to set. Press the SET button (using a pointed implement). The set pair number is displayed (steadily-lit) for 3 seconds, then disappears. <table border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </table> <p>* Pair No.4-9 of wireless remote controller is setting pattern D.</p>	Setting pattern	Indoor controller jumper wire		Pair No. of wireless remote controller*		J41	J42	A	—	—	0	Initial setting	B	Cut	—	1	—	C	—	Cut	2	—	D	Cut	Cut	3	—	Under operation or suspension	<p><Initial setting> Pattern A</p> 
Setting pattern	Indoor controller jumper wire			Pair No. of wireless remote controller*																											
	J41	J42																													
A	—	—	0	Initial setting																											
B	Cut	—	1	—																											
C	—	Cut	2	—																											
D	Cut	Cut	3	—																											

7-3. TEST POINT DIAGRAM

7-3-1. Indoor controller board

PKFY-P24NKMU-E2.TH

PKFY-P30NKMU-E2.TH

CN2M

Connect to the terminal block (TB5)
(M-NET transmission connecting wire)
24-30VDC (non-polar)
Power supply from outdoor unit

SW2
Capacity setting

SW4
Model selection

SW3
Function setting

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

LED2
Power supply for
MA-Remote controller

CN32
Remote switch

CN20
Room temperature
thermistor (TH21)

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

CN44
Pipe temperature thermistor
①-② : Liquid (TH22)
③-④ : Gas1 (TH23)

CN2G
Pipe temperature
thermistor Gas2 (TH24)

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

CN24
External heater
12VDC (① : +)

CNMF

Connect to the fan motor (MF)
①-③ : DC294-325V
④-⑤ : DC15V
⑥-⑦ : DC0-6V
⑧-⑨ : DC0 or DC15V (Stop)
DC7.5V (Operation)
(12VDC pulse)

CND

Power supply for
indoor controller board
①-③ : 208/230VAC

FUSE
3.15A 250V

LED1
Main power supply
(Indoor unit :
208/230VAC)

CN151
Vane motor output
12VDC pulse

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

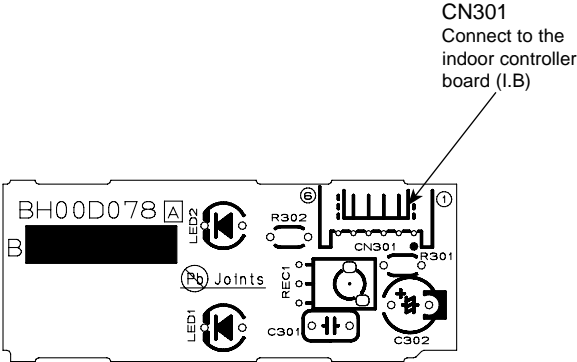
LDSWE(A)
Connect to the
wireless remote
controller board
(S.B)

LD SWE (B)
Connect to the
indoor controller
board (I.B)

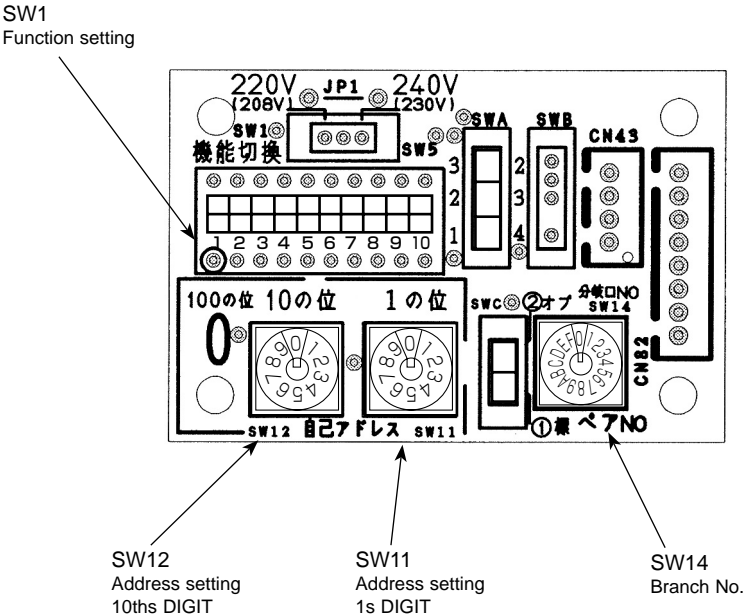
CN52
Remote indicator
①-② : Status lamp 12VDC (① : +)
Fan motor output (SW1-5 OFF)
Thermostat ON (SW1-5 ON)
①-③ : Cooling/Dry status lamp
12VDC (① : +)
①-④ : Heating status lamp
12VDC (① : +)

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

7-3-2. Wireless remote controller board
 PKFY-P24NKMU-E2.TH
 PKFY-P30NKMU-E2.TH



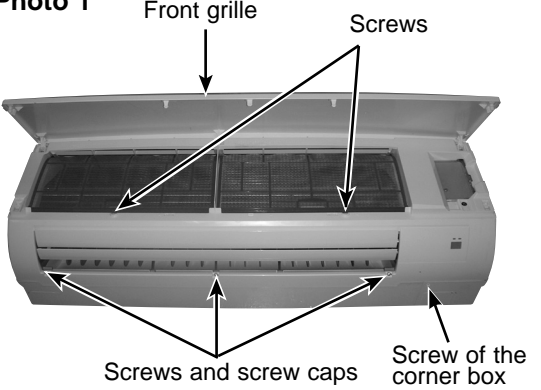
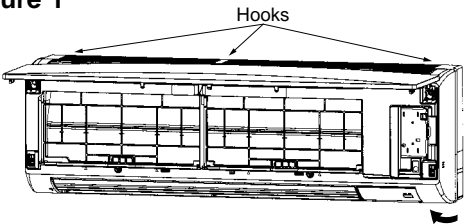
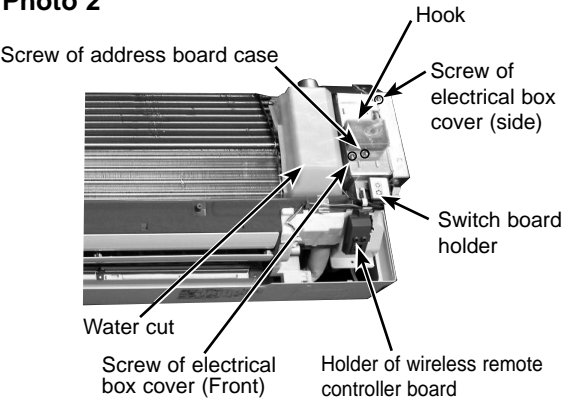
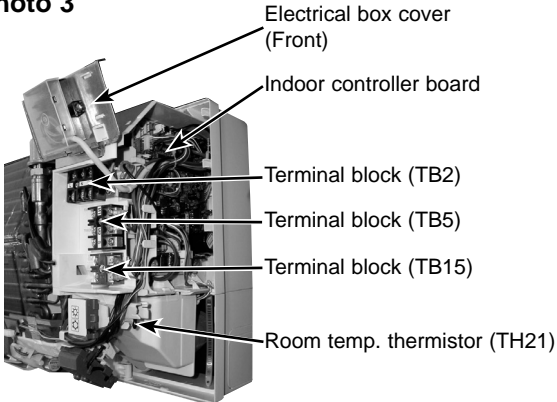
7-3-3. Address board
 PKFY-P24NKMU-E2.TH
 PKFY-P30NKMU-E2.TH

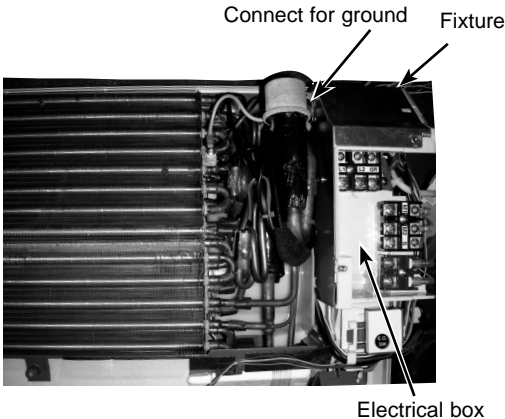
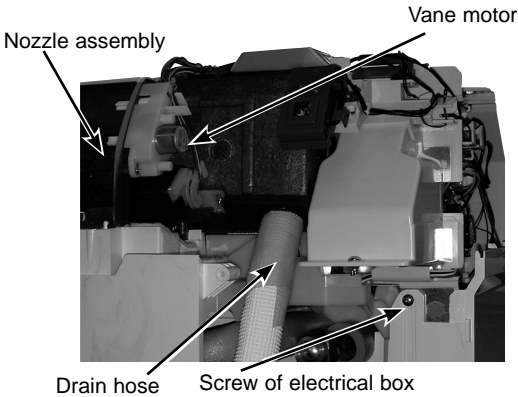
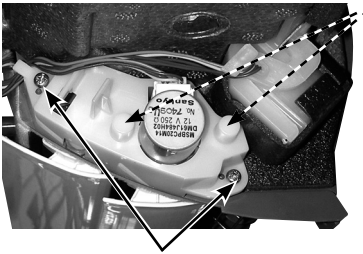


PKFY-P24NKMU-E2.TH

PKFY-P30NKMU-E2.TH

Be careful when removing heavy parts.

OPERATION PROCEDURE	PHOTOS & ILLUSTRATIONS
<p>1. REMOVING THE PANEL</p> <ol style="list-style-type: none"> (1) Press and unlock the knobs on both sides of the front grille and lift the front grille until it is level. Pull the hinges forward to remove the front grille. (See Photo 1) (2) Remove 3 screw caps of the panel. Remove 5 screws. (See Photo 1) (3) Unfix 3 hooks. (See Figure 1) (4) Hold the lower part of both ends of the panel and pull it slightly toward you, and then remove the panel by pushing it upward. (5) Remove the screw of the corner box. (See Photo 1) Remove the corner box. 	<p>Photo 1</p>  <p>Figure 1</p> 
<p>2. REMOVING THE ADDRESS BOARD, THE INDOOR CONTROLLER BOARD AND THE WIRELESS CONTROLLER BOARD</p> <ol style="list-style-type: none"> (1) Remove the panel and the corner box. (Refer to procedure 1) (2) Remove the screw and hook of address board case. (See Photo 2) (3) Disconnect the connectors of address board. (4) Remove the front and side electrical box covers (each 1 screw). (5) Disconnect the connectors on the indoor controller board. (See Photo 3) (6) Remove the switch board holder and open the cover. (7) Pull out the indoor controller board toward you then remove the indoor controller board and switch board. (See Photo 3) (8) Remove the holder of wireless remote controller board. (9) Disconnect the connector of wireless remote controller board and remove the wireless remote controller board from the holder. 	<p>Photo 2</p>  <p>Photo 3</p> 

OPERATION PROCEDURE	PHOTOS
<p>3. REMOVING THE ELECTRICAL BOX</p> <ol style="list-style-type: none"> (1) Remove the panel and the corner box. (Refer to procedure 1) (2) Remove the screw and hook of address board case. (3) Remove the front and side electrical box covers (each 1 screw). (4) Remove the transmission wiring of TB5, the power supply wiring of TB2 and the wiring of MA-remote controller (TB15). (5) Disconnect the connectors on the indoor controller board. (6) Disconnect the connector for ground wire. (7) Remove the screw on lower side of the electrical box. (See Photo 5) (8) Push up the upper fixture catch to remove the box, then remove it from the box fixture. 	<p>Photo 4</p>  <p>Connect for ground Fixture</p> <p>Electrical box</p>
<p>4. REMOVING THE NOZZLE ASSEMBLY (with VANE and VANE MOTOR) AND DRAIN HOSE</p> <ol style="list-style-type: none"> (1) Remove the panel and corner box. (Refer to procedure 1) (2) Remove the electrical box covers. (Refer to procedure 2) (3) Disconnect the vane motor connector (CN151) on the indoor controller board. (4) Pull out the drain hose from the nozzle assembly, and remove nozzle assembly. (See Photo 5) 	<p>Photo 5 (see the bottom)</p>  <p>Nozzle assembly Vane motor</p> <p>Drain hose Screw of electrical box</p>
<p>5. REMOVING THE VANE MOTOR</p> <ol style="list-style-type: none"> (1) Remove the nozzle assembly. (Refer to procedure 4) (2) Remove 2 screws of the vane motor unit cover, and pull out the vane motor unit. (3) Remove 2 screws of the vane motor unit. (4) Remove the vane motor from the vane motor unit. (5) Disconnect the connector from the vane motor. 	<p>Photo 6</p>  <p>Screws of the vane motor unit</p> <p>Screws of the vane motor unit cover</p>

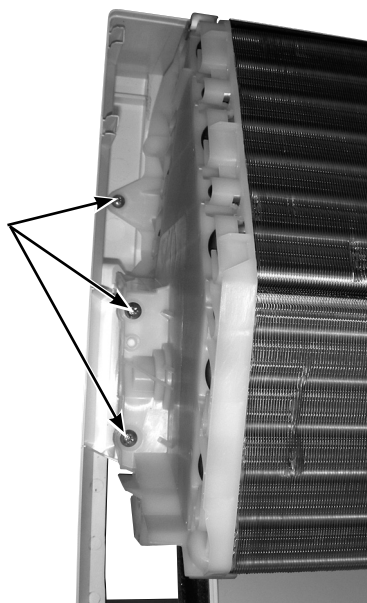
OPERATION PROCEDURE

6. REMOVING THE INDOOR FAN MOTOR AND THE LINE FLOW FAN

- (1) Remove the panel and the corner box. (Refer to procedure 1)
- (2) Remove the electrical box (Refer to procedure 2) and the nozzle assembly (Refer to procedure 3).
- (3) Remove the water cut. (See Photo 2)
- (4) Remove the screw fixing the line flow fan. (See Photo 8)
- (5) Remove 5 screws fixing the motor bed. (See Photo 7)
- (6) Remove the lead wire of pipe thermistor from the hook of motor bed. (See Photo 7)
- (7) Remove the screw fixing motor band. (See Photo 7)
- (8) Remove the motor bed together with fan motor and motor band.
- (9) Remove 3 screws fixing the left side of the heat exchanger. (See Photo 9)
- (10) Lift the heat exchanger, and pull out the line flow fan to the lower-left.

Photo 9

Screws of the left side of the heat exchanger



PHOTOS

Photo 7

Screw of the motor band

Lead wire of pipe thermistor

Screws of the motor bed

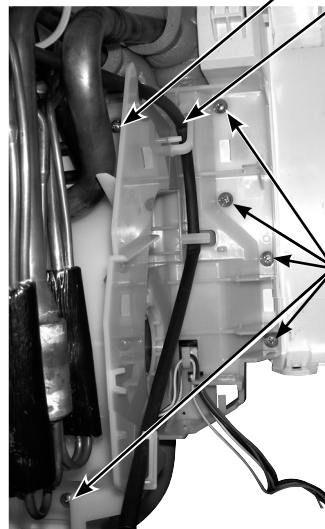
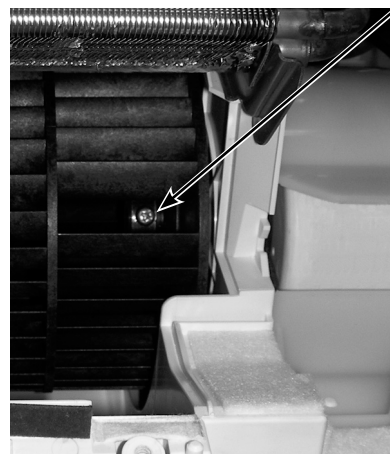


Photo 8

Screw of the line flow fan



7. REMOVING THE LIQUID PIPE THERMISTOR AND GAS PIPE THERMISTOR

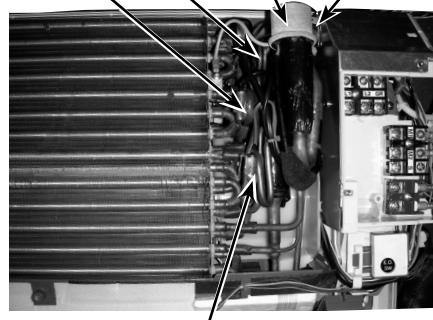
- (1) Remove the panel and the corner box. (Refer to procedure 1)
- (2) Remove the electrical box covers. (Refer to procedure 2)
- (3) Remove the water cut. (See Photo 2)
- (4) Remove the liquid pipe thermistor and gas pipe thermistors.
- (5) Disconnect the connector (CN44) (CN2G) on the indoor controller board. (TH22 and TH23/CN44, TH24/CN2G)

Photo 10

Gas pipe thermistor (TH23) (TH24)

LEV

Connect for ground



Liquid pipe thermistor (TH22)

OPERATION PROCEDURE

8. REMOVING THE HEAT EXCHANGER AND LEV

- (1) Remove the panel and the corner box. (Refer to procedure 1)
- (2) Remove the electrical box (Refer to procedure 3) and the nozzle assembly (Refer to procedure 4.).
- (3) Remove the water cut.
- (4) Remove the pipe thermistors (Refer to procedure 7).
- (5) Disconnect the connector (CN60) on the indoor controller board and the connector for ground wire.
- (6) Remove 3 screws fixing the left side of the heat exchanger. (See Photo 9)
- (7) Remove the heat exchanger with LEV.

Photo 11

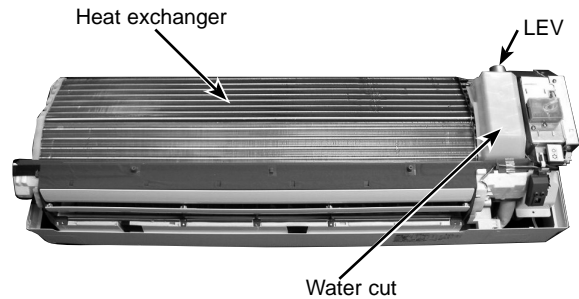
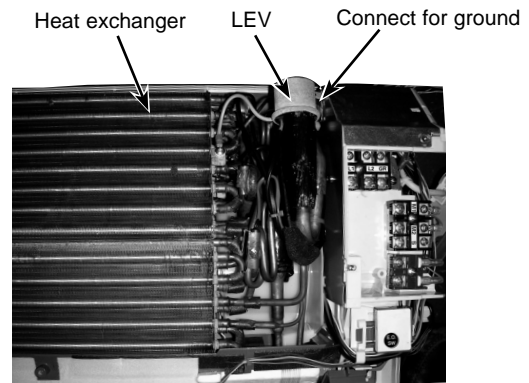


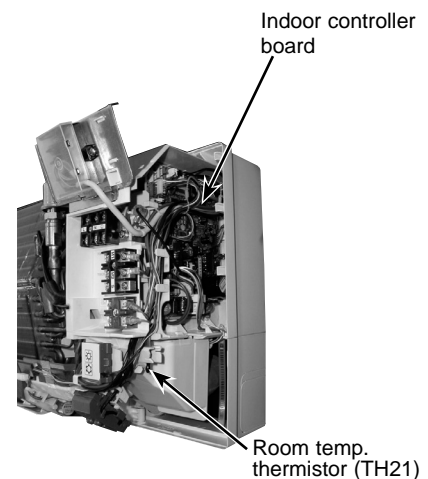
Photo 12



9. REMOVING THE ROOM TEMPERATURE THERMISTOR

- (1) Remove the panel and corner box. (Refer to procedure 1)
- (2) Remove the electrical box covers.
- (3) Remove the room temperature thermistor.
- (4) Disconnect the connector (CN20) on the indoor controller board.

Photo 13



MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU TOKYO 100-8310, JAPAN