MITSUBISHI ELECTRIC

Changes for the Better

SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

November 2011

No. OCH418
REVISED EDITION-B

TECHNICAL & SERVICE MANUAL

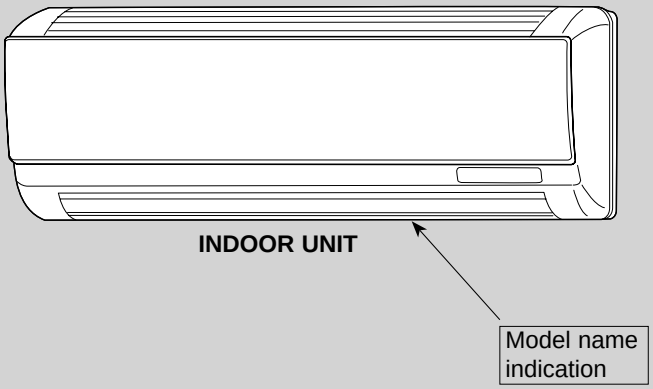
Series PKFY Wall Mounted R410A / R407C / R22

Indoor unit [Model names]	[Service Ref.]
PKFY-P15VBM-E	PKFY-P15VBM-E
	PKFY-P15VBM-ER2
PKFY-P20VBM-E	PKFY-P20VBM-E
	PKFY-P20VBM-ER1
	PKFY-P20VBM-ER2
PKFY-P25VBM-E	PKFY-P25VBM-E
	PKFY-P25VBM-ER1
	PKFY-P25VBM-ER2

Revision:
- PKFY-P15/20/25VBM-ER2 have been added in REVISED EDITION-B.
- Some descriptions have been modified.

- Please void OCH418 REVISED EDITION-A.

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



CONTENTS

1 TECHNICAL CHANGES

PKFY-P15VBM-E ➔ PKFY-P15VBM-ER2

PKFY-P20VBM-ER1 ➔ PKFY-P20VBM-ER2

PKFY-P25VBM-ER1 ➔ PKFY-P25VBM-ER2

HEAT EXCHANGER and WATER CUT have been changed.

PKFY-P20VBM-E ➔ PKFY-P20VBM-ER1

PKFY-P25VBM-E ➔ PKFY-P25VBM-ER1

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

2 SAFETY PRECAUTION

CAUTIONS RELATED TO NEW REFRIGERANT

Cautions for units utilizing refrigerant R407C

Do not use the existing refrigerant piping.

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

Use "low residual oil piping"

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

Store the piping to be used indoors during installation and both ends sealed until just before brazing.
(Store elbows and other joints in a plastic bag.)

If dust, dirt, or water enters the refrigerant cycle, deterioration of the oil and compressor trouble may result.

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

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

Use liquid refrigerant to charge the system.

If gas refrigerant is used to seal the system, the composition of the refrigerant in the cylinder will change and performance may drop.

Do not use a refrigerant other than R407C.

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

Use a vacuum pump with a reverse flow check valve.

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

Use 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.

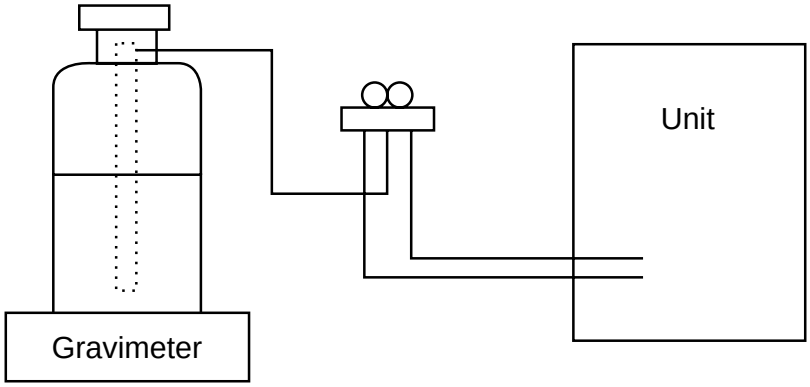
Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.

[1] Cautions for service

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

[2] Refrigerant recharging

(1) Refrigerant recharging process
① Direct charging from the cylinder.
·R407C cylinder available on the market has a syphon pipe.
·Leave the syphon pipe cylinder standing and recharge it.
(By liquid refrigerant)



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

[3] Service tools

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

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

Cautions for units utilizing refrigerant R410A

Do not use the existing refrigerant piping.

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

Use “low residual oil piping”

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

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

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

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

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

Charge refrigerant from liquid phase of gas cylinder.

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

Do not use refrigerant other than R410A.

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

Use a vacuum pump with a reverse flow check valve.

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

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

The following tools are necessary to use R410A refrigerant.

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

Handle tools with care.

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

Do not use a charging cylinder.

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

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.

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

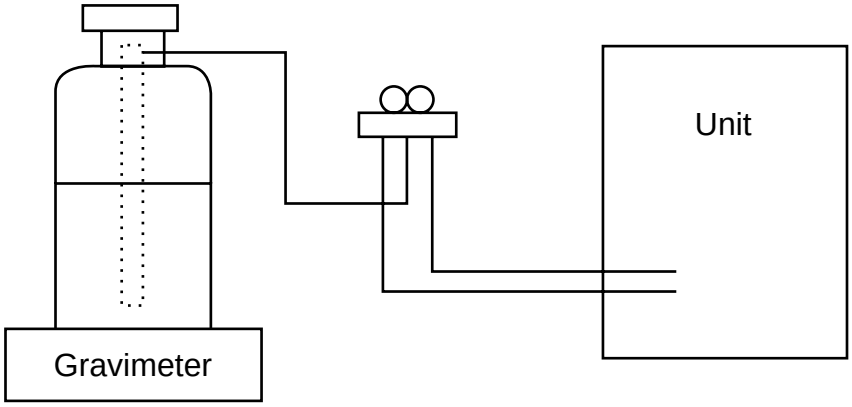
[1] Cautions for service

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

[2] Additional refrigerant charge

When charging directly from cylinder

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



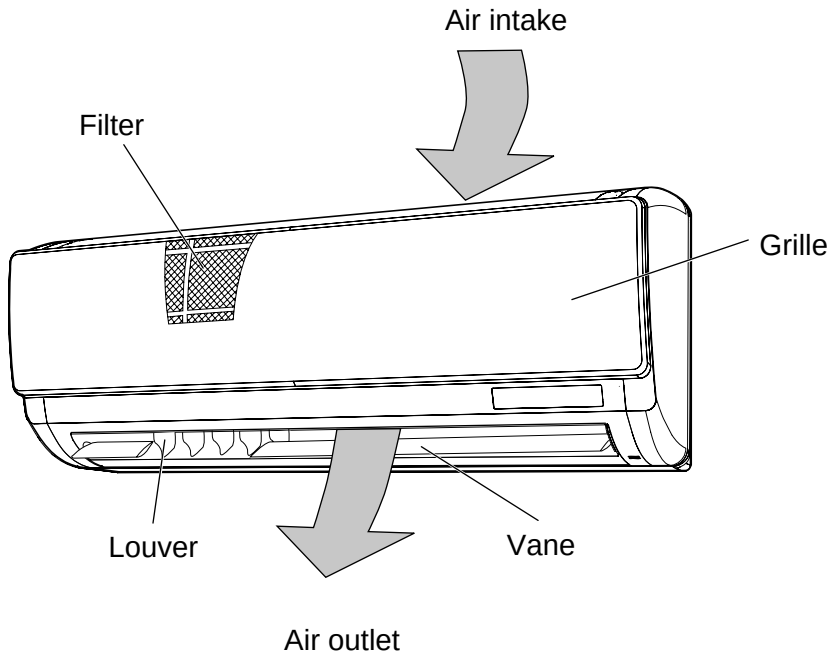
[3] Service tools

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

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

3 PART NAMES AND FUNCTIONS

● **Indoor unit**



● Wired remote controller

Display Section

For purposes of this explanation, all parts of the display are shown. 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.

"Sensor" indication
Displays 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.

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

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

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

Fan Speed indicator
Shows the selected fan speed.

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

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

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

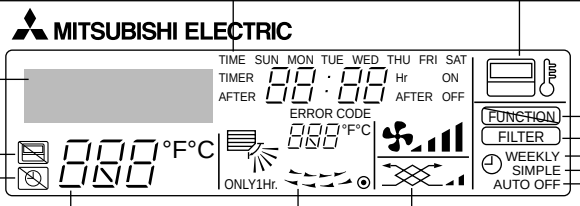
Room Temperature display
Shows the room temperature. The room temperature display range is 8–39℃. The display blinks if the temperature is less than 8℃ or 39℃ or more.

"One Hour Only" indicator
Displays 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.

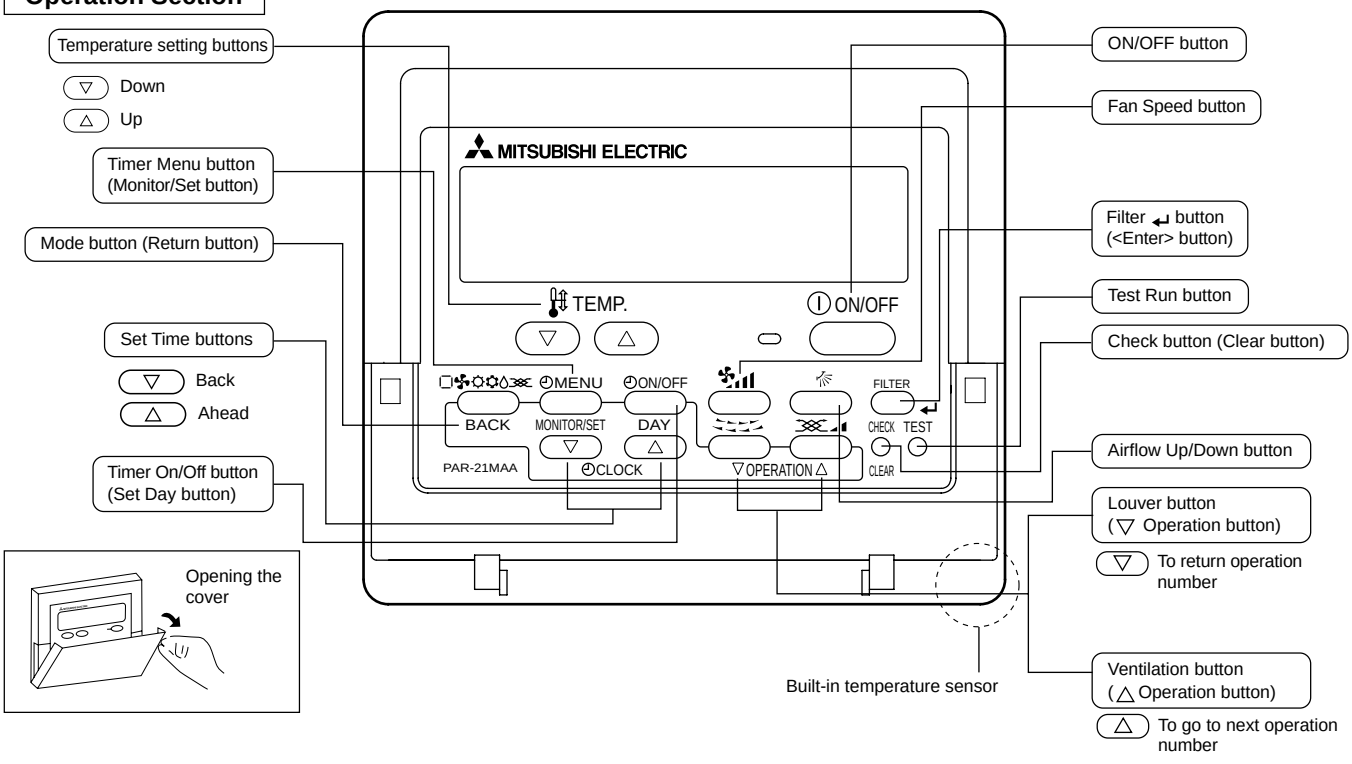
Louver display
Indicates the action of the swing louver. Does not appear if the louver is not running.

Temperature Setting
Shows the target temperature.

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

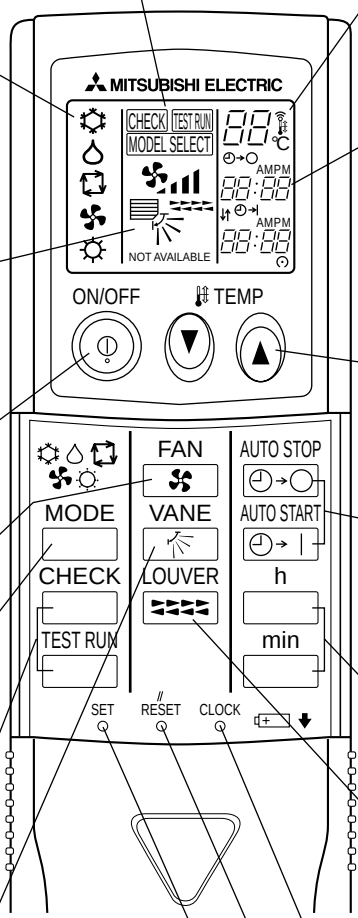


Operation Section



Note:
- "PLEASE WAIT" message
  This message is displayed for approximately 3 minutes when power is supplied to the indoor unit or when the unit is recovering from a power failure.
- "NOT AVAILABLE" message
  This message is displayed if an invalid button is pressed (to operate a function that the indoor unit does not have).
  If a single remote controller is used to operate multiple indoor units simultaneously that are different types, this message will not be displayed as far as any of the indoor units is equipped with the function.

● Wireless remote controller



CHECK TEST RUN display

CHECK and TEST RUN display indicate that the unit is being checked or test-run.

MODEL SELECT display

Blinks when model is selected.

display

Lights up while the signal is transmitted to the indoor unit when the button is pressed.

display

SET TEMP. display indicates the set desired temperature.

display

OPERATION MODE display
Operation mode display indicates which operation mode is in effect.

CLOCK display

Displays the current time.

TIMER display

Displays when in timer operation or when setting timer.

" ↓ " " ↑ " display

Displays the order of timer operation.

" ⏲→| " " ⏲→○ " display

Displays whether timer is on or off.

display

The vertical direction of air flow is indicated.

display

FAN SPEED display indicates which fan speed has been selected.

button

SET TEMPERATURE button sets any desired room temperature.

ON/OFF button

The unit is turned ON and OFF alternately each time the button is pressed.

TIMER CONTROL buttons

AUTO STOP (OFF timer): when this switch is set, the air conditioner will be automatically stopped at the preset time.
AUTO START (ON timer): when this switch is set, the air conditioner will be automatically started at the preset time.

FAN SPEED SELECT button

Used to change the fan speed.

h and min buttons

Buttons used to set the "hour and minute" of the current time and timer settings.

MODE SELECT button

Used to switch the operation mode between cooling, drying, fan, heating and auto mode.

※ In case the outdoor unit is cool only type, the heating and auto mode are not available.

LOUVER button

Changes left/right airflow direction.

(Not available for this model.)

CHECK-TEST RUN button

Only press this button to perform an inspection check or test operation.
Do not use it for normal operation.

CLOCK button

RESET button

SET button

VANE CONTROL button

Used to change the air flow direction.

4 SPECIFICATION

4-1. SPECIFICATIONS

Service ref.			PKFY-P15VBM-E PKFY-P15VBM-ER2	PKFY-P20VBM-E PKFY-P20VBM-ER1 PKFY-P20VBM-ER2	PKFY-P25VBM-E PKFY-P25VBM-ER1 PKFY-P25VBM-ER2
Power source			1-phase 220-240V 50Hz, 1-phase 220V 60Hz		
Cooling capacity (Nominal)	*1	kW	1.7	2.2	2.8
	*1	kcal/h	1,450	1,900	2,400
	*1	Btu/h	5,800	7,500	9,600
	*2	kcal/h	1,500	2,000	2,500
	Power input	kW	0.04	0.04	0.04
	Current input	A	0.20	0.20	0.20
Heating capacity (Nominal)	*3	kW	1.9	2.5	3.2
	*3	kcal/h	1,600	2,200	2,800
	*3	Btu/h	6,500	8,500	10,900
	Power input	kW	0.04	0.04	0.04
	Current input	A	0.20	0.20	0.20
External finish			Plastic, MUNSELL (1.0Y 9.2/0.2)		
External dimension H x W x D		mm	295 × 815 × 225	295 × 815 × 225	295 × 815 × 225
		in.	11-5/8" × 32-1/8" × 8-7/8"	11-5/8" × 32-1/8" × 8-7/8"	11-5/8" × 32-1/8" × 8-7/8"
Net weight		kg (lb)	10 (23)	10 (23)	10 (23)
Heat exchanger			Cross fin (Aluminum fin and copper tube)		
Fan	Type x Quantity		Line flow fan × 1	Line flow fan × 1	Line flow fan × 1
	External static press.	Pa	0	0	0
		mmH_2O	0	0	0
	Motor type		1-phase induction motor		
	Motor output	kW	0.017	0.017	0.017
	Driving mechanism		Direct-driven by motor		
	Airflow rate (Low-Mid2-Mid1-High)	m^3/min	4.9 - 5.0 - 5.2 - 5.3	4.9 - 5.2 - 5.6 - 5.9	4.9 - 5.2 - 5.6 - 5.9
		L/s	82 - 83 - 87 - 88	82 - 87 - 93 - 98	82 - 87 - 93 - 98
		cfm	173 - 177 - 184 - 187	173 - 184 - 198 - 208	173 - 184 - 198 - 208
Noise level (Low-Mid2-Mid1-High) (measured in anechoic room)		dB <A>	29 - 31 - 32 - 33	29 - 31 - 34 - 36	29 - 31 - 34 - 36
Insulation material			Polyethylene sheet		
Air filter			PP honeycomb		
Protection device			Fuse		
Refrigerant control device			LEV		
Connectable outdoor unit			R410A, R407C, R22 CITY MULTI		
Diameter of refrigerant pipe	Liquid (R410A)	mm (in.)	ø6.35 (ø1/4") Flare	ø6.35 (ø1/4") Flare	ø6.35 (ø1/4") Flare
	(R22, R407C)		ø6.35 (ø1/4") Flare	ø6.35 (ø1/4") Flare	ø6.35 (ø1/4") Flare
	Gas (R410A)	mm (in.)	ø12.7 (ø1/2") Flare	ø12.7 (ø1/2") Flare	ø12.7 (ø1/2") Flare
	(R22, R407C)		ø12.7 (ø1/2") Flare	ø12.7 (ø1/2") Flare	ø12.7 (ø1/2") Flare
Field drain pipe size		mm (in.)	I.D. 16mm (5/8")	I.D. 16mm (5/8")	I.D. 16mm (5/8")
Standard attachment	Document Accessory		Installation Manual, Instruction Book		
Remark	Optional parts				
	External LEV Box		PAC-SG95LE-E	PAC-SG95LE-E	PAC-SG95LE-E
	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

Indoor :	27°CDB/19°CWB (81°FDB/66°FWB)
Outdoor :	35°CDB (95°FDB)
Pipe length :	7.5 m (24-9/16 ft)
Level difference :	0 m (0 ft)

*2 Nominal cooling conditions

	27°CDB/19.5°CWB (81°FDB/67°FWB)
	35°CDB (95°FDB)
	5 m (16-3/8 ft)
	0 m (0 ft)

*3 Nominal heating conditions

	20°CDB (68°FDB)
	7°CDB/6°CWB (45°FDB/43°FWB)
	7.5 m (24-9/16 ft)
	0 m (0 ft)

* Nominal conditions *1, *3 are subject to JIS B8615-1.
* 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
lb = kg/0.4536

*Above specification data is subject to rounding variation.

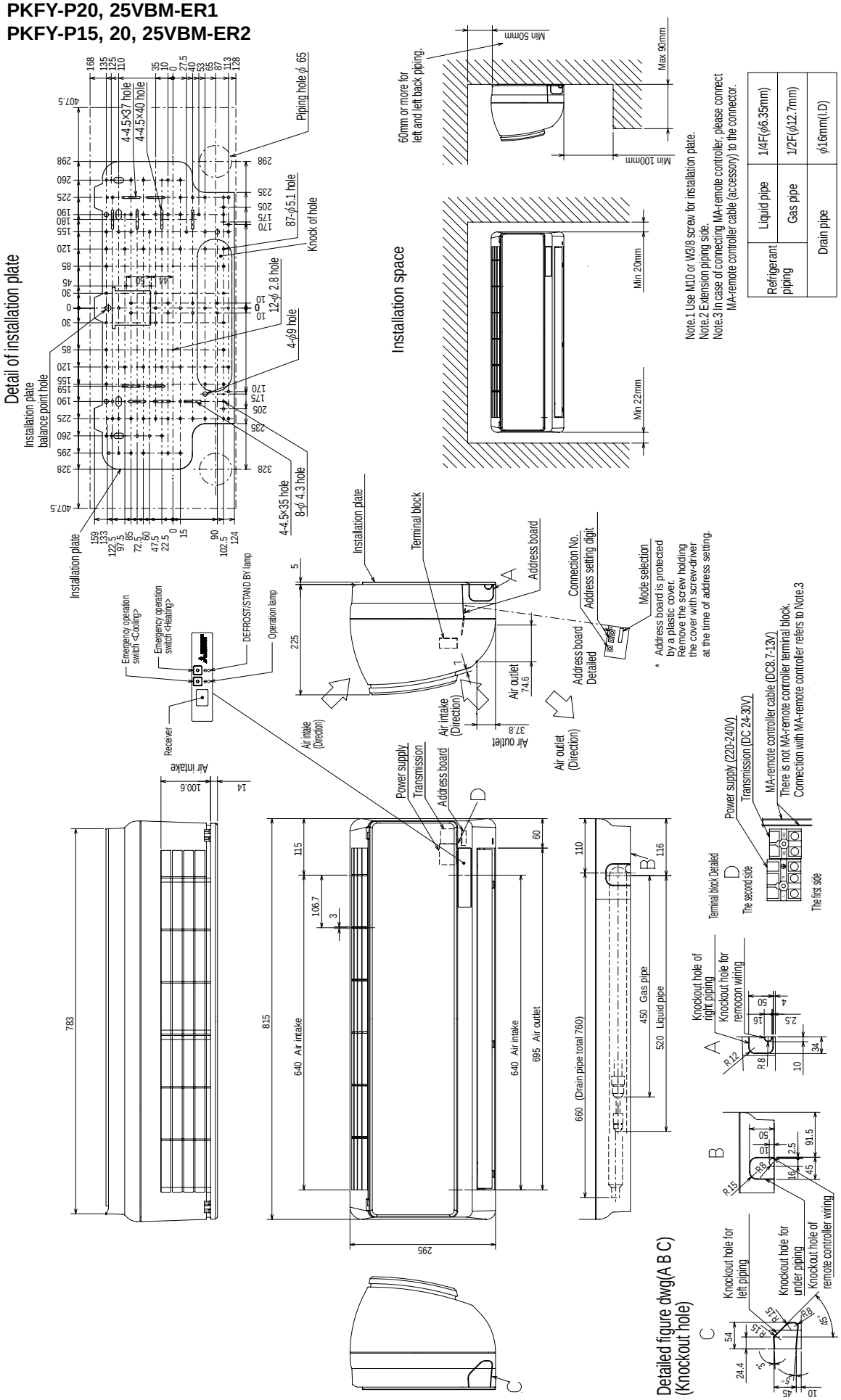
4-2. ELECTRICAL PARTS SPECIFICATIONS

Service ref. / Parts name	Symbol	PKFY-P15VBM-E PKFY-P15VBM-ER2	PKFY-P20VBM-E PKFY-P20VBM-ER1 PKFY-P20VBM-ER2	PKFY-P25VBM-E PKFY-P25VBM-ER1 PKFY-P25VBM-ER2
Room temperature thermistor	TH21	Resistance 0℃/15kΩ, 10℃/9.6kΩ, 20℃/6.3kΩ, 25℃/5.4kΩ, 30℃/4.3kΩ, 40℃/3.0kΩ		
Liquid pipe thermistor	TH22	Resistance 0℃/15kΩ, 10℃/9.6kΩ, 20℃/6.3kΩ, 25℃/5.4kΩ, 30℃/4.3kΩ, 40℃/3.0kΩ		
Gas pipe thermistor	TH23	Resistance 0℃/15kΩ, 10℃/9.6kΩ, 20℃/6.3kΩ, 25℃/5.4kΩ, 30℃/4.3kΩ, 40℃/3.0kΩ		
Fuse (Indoor controller board)	FUSE	250V 6.3A		
Fan motor (with thermal fuse)	MF	4-Pole Output 17W / PS4V17-KB		
Fan motor capacitor	C1	1.5μF × 440V		
Vane motor (with limit switch)	MV	MSFBC20 DC12V		
Linear expansion valve	LEV	DC12V Stepping motor drive Port ϕ3.2 (0~2000pulse)		
Power supply terminal block	TB2	(L, N, ⏚) 250V 20A		
Transmission terminal block	TB5	(M1, M2) 250V 10A		

5 OUTLINES AND DIMENSIONS

PKFY-P15, 20, 25VBM-E
PKFY-P20, 25VBM-ER1
PKFY-P15, 20, 25VBM-ER2

Unit: mm

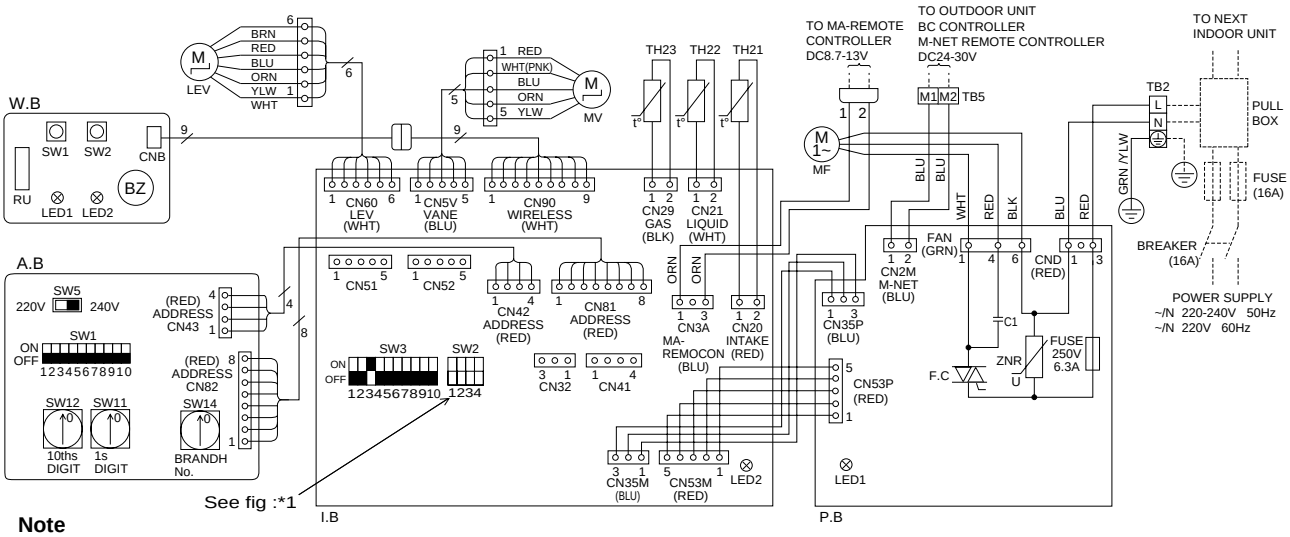


6 WIRING DIAGRAM

PKFY-P20, 25VBM-E

Legend

Symbol	Name		Symbol	Name		Symbol	Name	
I.B	Indoor controller board		MV	Vane motor		SW5	Switch	Voltage selection
CN32	Connector	Remote switch	LEV	Linear expansion valve		SW11		Address setting 1s digit
CN51		Centrally control	TB2	Terminal block	Power supply	SW12		Address setting 10ths digit
CN52		Remote indication	TB5		Transmission	SW14		Connection No.
SW2	Switch	Capacity code	TH21	Thermistor	Room temp.detection	W.B	Wireless remote controller board	
SW3		Mode selection			(0℃/15kΩ,25℃/5.4kΩ)	RU	Receving unit	
P.B	Indoor power board		TH22		Pipe temp.detection/liquid	BZ	Buzzer	
ZNR	Varistor				(0℃/15kΩ,25℃/5.4kΩ)	LED1	LED (Operation indicator: Green)	
FUSE	Fuse (6.3A 250V)		TH23		Pipe temp.detection/Gas	LED2	LED (Preparation for heating: Orange)	
F.C	Fan phase control				(0℃/15kΩ,25℃/5.4kΩ)	SW1	Emergency operation (Heat)	
C1	Capacitor (fan motor)		A.B	Address board		SW2	Emergency operation (Cool)	
MF	Fan motor		SW1	Switch	Mode selection			



Note

1. At servicing for outdoor unit, always follow the wiring diagram of outdoor unit.
2. In case of connecting MA-remote controller, please connect MA-remote controller cable in an accessory to the connector (1 2) . (Remote controller wire is non-polar.)
3. In case of using M-NET, please connect to TB5 (Transmission line is non-polar.)
4. Symbols used in wiring diagram above are, [| |] : terminal block, [○ ○ ○] : connector
5. The setting of the SW2 dip switches differs in the capacity. For the detail, refer to the fig :*1.
6. Please set the switch SW5 according to the power supply voltage.
   Set SW5 to 240V side when the power supply is 230 and 240 volts.
   When the power supply is 220 volts, set SW5 to 220V side.

LED on indoor board for service

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

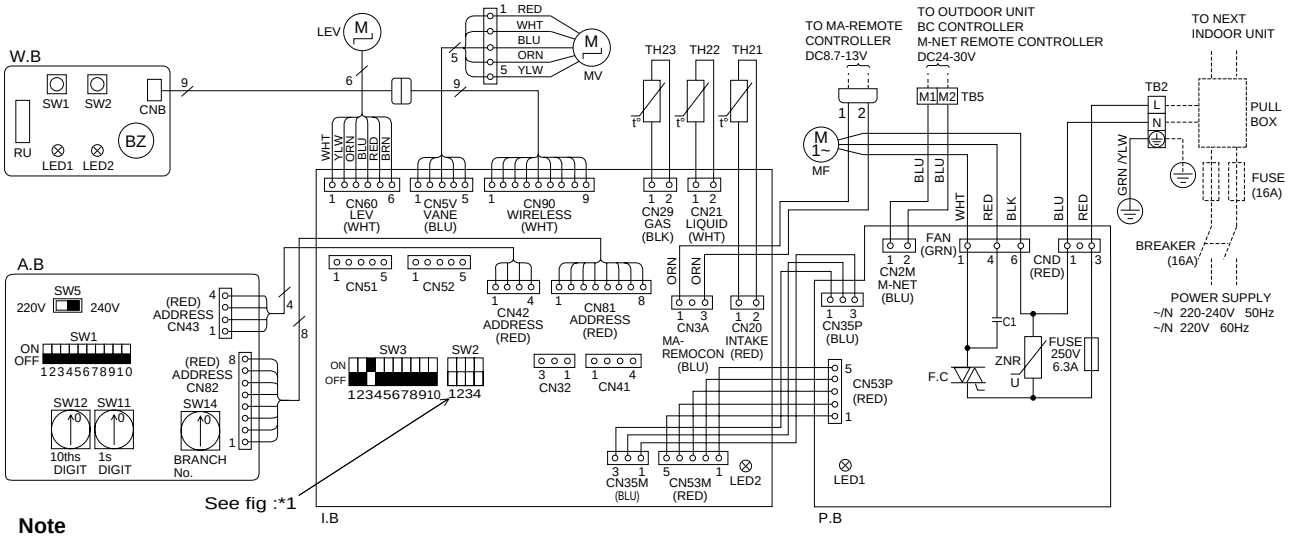
<*1>

MODELS	SW2	MODELS	SW2
P20	ON OFF 1 2 3 4	P25	ON OFF 1 2 3 4

PKFY-P15VBM-E
PKFY-P20, 25VBM-ER1
PKFY-P15, 20, 25VBM-ER2

Legend

Symbol	Name		Symbol	Name		Symbol	Name	
I.B	Indoor controller board		MV	Vane motor		SW5	Switch	Voltage selection
CN32	Connector	Remote switch	LEV	Linear expansion valve		SW11		Address setting 1s digit
CN51		Centrally control	TB2	Terminal block	Power supply	SW12		Address setting 10ths digit
CN52		Remote indication	TB5		Transmission	SW14		Connection No.
SW2	Switch	Capacity code	TH21	Thermistor	Room temp.detection	W.B	Wireless remote controller board	
SW3		Mode selection			(0℃/15kΩ,25℃/5.4kΩ)	RU	Receving unit	
P.B	Indoor power board		TH22		Pipe temp.detection/Liquid	BZ	Buzzer	
ZNR	Varistor				(0℃/15kΩ,25℃/5.4kΩ)	LED1	LED (Operation indicator: Green)	
FUSE	Fuse (T6.3AL 250V)		TH23		Pipe temp.detection/Gas	LED2	LED (Preparation for heating: Orange)	
F.C	Fan phase control				(0℃/15kΩ,25℃/5.4kΩ)	SW1	Emergency operation (Heat)	
C1	Capacitor (Fan motor)		A.B	Address board		SW2	Emergency operation (Cool)	
MF	Fan motor		SW1	Switch	Mode selection			



Note

1. At servicing for outdoor unit, always follow the wiring diagram of outdoor unit.
2. In case of using MA-remote controller, please connect MA-remote controller cable in an accessory to the connector (1 2). (Remote controller wire is non-polar.)
3. In case of using M-NET, please connect to TB5 (Transmission line is non-polar.)
4. Symbols used in wiring diagram above are, [| |] : terminal block, [○ ○ ○] : connector
5. The setting of the SW2 dip switches differs in the capacity. For the detail, refer to the fig :*1.
6. Please set the switch SW5 according to the power supply voltage.
   Set SW5 to 240V side when the power supply is 230 and 240 volts.
   When the power supply is 220 volts, set SW5 to 220V side.

LED on indoor board for service

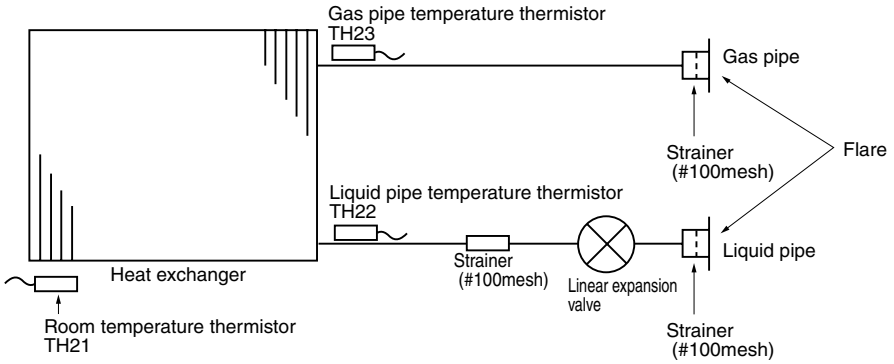
Mark	Meaning	Function
LED1	Main power supply	Main power supply (indoor unit:220-240V) power on → lamp is lit
LED2	Power supply for MA-Remote controller	Power supply for MA-Remote controller on → lamp is lit

<*1>

MODELS	SW2	MODELS	SW2	MODELS	SW2
P15	ON OFF 1 2 3 4	P20	ON OFF 1 2 3 4	P25	ON OFF 1 2 3 4

7 REFRIGERANT SYSTEM DIAGRAM

PKFY-P15, 20, 25VBM-E
PKFY-P20, 25VBM-ER1
PKFY-P15, 20, 25VBM-ER2



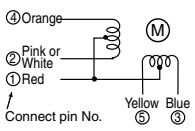
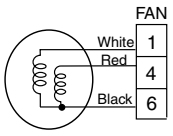
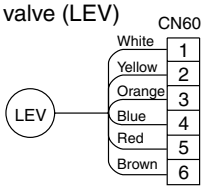
Unit: mm(inch)

Item \ Service ref.	PKFY-P15, 20, 25VBM-E PKFY-P20, 25VBM-ER1 PKFY-P15, 20, 25VBM-ER2
Gas pipe	ϕ12.7 (1/2")
Liquid pipe	ϕ6.35 (1/4")

8 TROUBLESHOOTING

8-1. HOW TO CHECK THE PARTS

PKFY-P15, 20, 25VBM-E
PKFY-P20, 25VBM-ER1
PKFY-P15, 20, 25VBM-ER2

<table>
<tr><th>Parts name</th><th>Check points</th></tr>
<tr><td>Room temperature thermistor (TH21)
Liquid pipe temperature thermistor (TH22)
Gas pipe temperature thermistor (TH23)</td><td>Disconnect the connector then measure the resistance with a tester.
(At the ambient temperature 10℃~30℃)
<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 the details.</td></tr>
<tr><td>Vane motor (MV)
  </td><td>Measure the resistance between the terminals with a tester. (At the ambient temperature 25℃)
<table><tr><th colspan="4">Normal</th><th>Normal</th><th>Abnormal</th></tr><tr><td>①-②
Red-Pink or White</td><td>①-③
Red-Blue</td><td>①-④
Red-Orange</td><td>①-⑤
Red-Yellow</td><td rowspan="2">Open or short</td></tr><tr><td colspan="4">400Ω 7%</td></tr></table></td></tr>
<tr><td>Fan motor (MF)
  </td><td>Measure the resistance between the terminals with a tester. (At the ambient temperature 20℃)
<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>White-Black</td><td>286Ω</td><td rowspan="2">Open or short</td></tr><tr><td>Red-Black</td><td>200Ω</td></tr></table></td></tr>
<tr><td>Linear expansion valve (LEV)
  </td><td>Disconnect the connector then measure the resistance valve with a tester.
(Coil temperature 20℃)
<table><tr><th colspan="4">Normal</th><th>Abnormal</th></tr><tr><td>(1)-(5)
White-Red</td><td>(2)-(6)
Yellow-Brown</td><td>(3)-(5)
Orange-Red</td><td>(4)-(6)
Blue-Brown</td><td rowspan="2">Open or short</td></tr><tr><td colspan="4">150Ω 10%</td></tr></table></td></tr>
</table>

<Thermistor Characteristic graph>

Thermistor for lower temperature

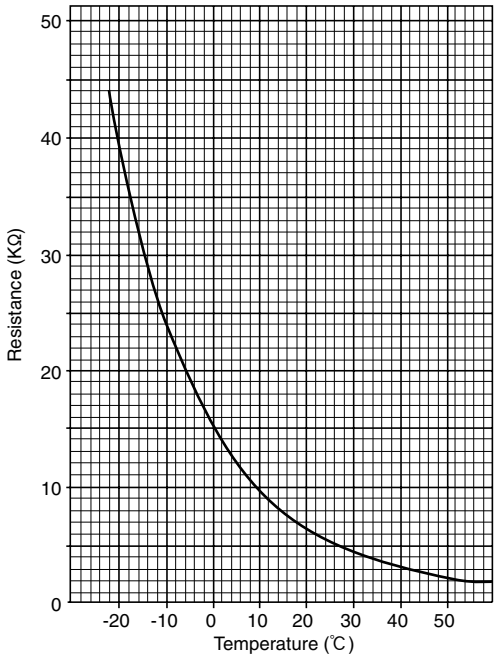
Room temperature thermistor (TH21)
Liquid pipe temperature thermistor (TH22)
Gas pipe temperature thermistor (TH23)

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

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

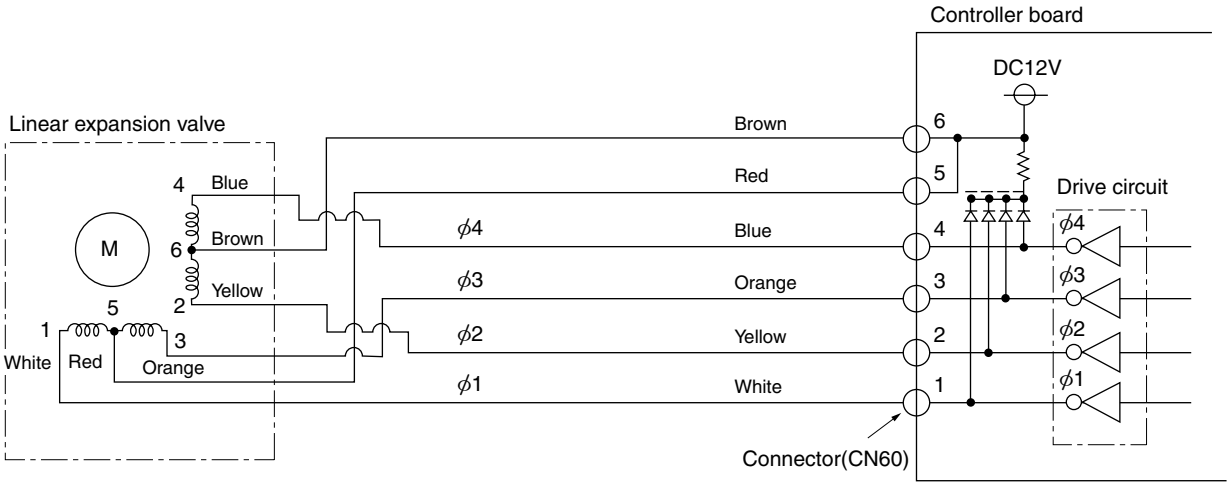
0℃	15kΩ
10℃	9.6kΩ
20℃	6.3kΩ
25℃	5.4kΩ
30℃	4.3kΩ
40℃	3.0kΩ

< Thermistor for lower temperature >



Linear expansion valve

① **Operation summary of the linear expansion valve**
• Linear expansion valve opens/closes through stepping motor after receiving the pulse signal from the indoor controller board.
• Valve position can be changed in proportion to the number of pulse signal.
<Connection between the indoor controller board and the linear expansion valve>



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.

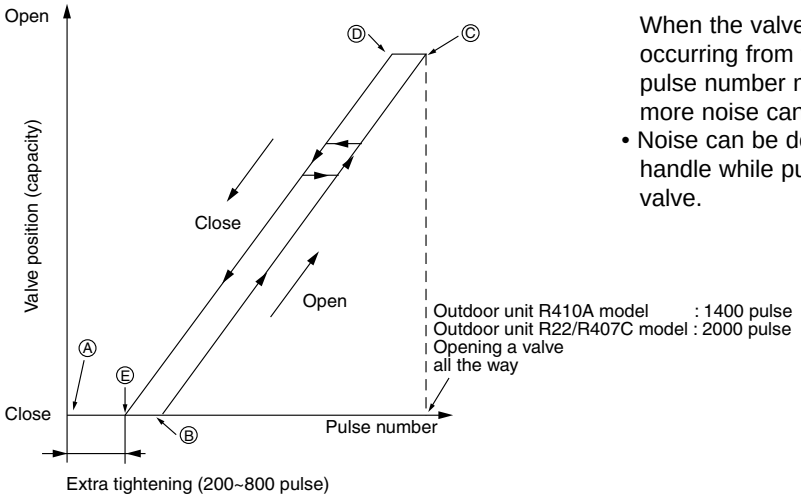
<Output pulse signal and the valve operation>

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.

- 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.

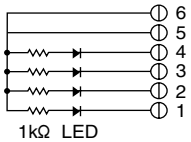
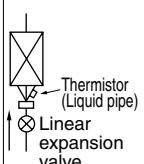
② Linear expansion valve operation



- 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.

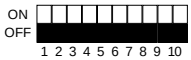
  When the valve moves smoothly, there is no noise or vibration occurring from the linear expansion valves : however, when the pulse number moves from Ⓔ to Ⓐ or when the valve is locked, more noise can be heard than in a normal situation.
- Noise can be detected by placing the ear against the screw driver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

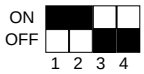
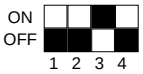
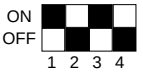
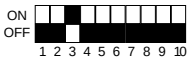
③ Troubleshooting

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) using a tester. It is normal if the resistance is in the range of 150Ω ±10%.	Exchange the linear expansion valve.
Valve doesn't close completely.	To check the linear expansion valve, operate the indoor unit in fan mode and at the same time operate other indoor units in cooling mode, then check the pipe temperature <liquid pipe temperature> of the indoor unit by the outdoor multi controller board operation monitor. During fan operation, linear expansion valve is closed completely and if there is any leaking, detecting temperature of the thermistor will go lower. If the detected temperature is much lower than the temperature indicated in the remote controller, it means the valve is not closed all the way.  Linear expansion valve 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.

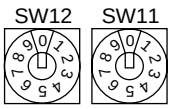
8-2. FUNCTION OF DIP SWITCH

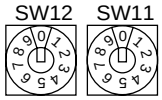
PKFY-P15, 20, 25VBM-E
PKFY-P20, 25VBM-ER1
PKFY-P15, 20, 25VBM-ER2

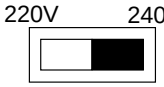
<table>
<tr><th rowspan="2">Switch</th><th rowspan="2">Pole</th><th rowspan="2">Function</th><th colspan="2">Operation by switch</th><th rowspan="2">Effective timing</th><th rowspan="2">Remarks</th></tr>
<tr><th>ON</th><th>OFF</th></tr>
<tr><td rowspan="10">SW1
Mode selection</td><td>1</td><td>Thermistor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

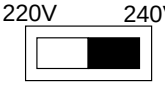
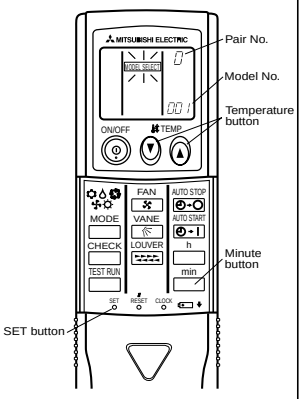
NOTE:
※1
<table><tr><td>SW1-7</td><td>SW1-8</td><td>Fan speed</td></tr><tr><td>OFF</td><td>OFF</td><td>Extra low</td></tr><tr><td>ON</td><td>OFF</td><td>Low</td></tr><tr><td>OFF</td><td>ON</td><td>Setting air flow</td></tr><tr><td>ON</td><td>ON</td><td>Stop</td></tr></table>
※2 It is impossible to intake the fresh air.</td></tr>
<tr><td>2</td><td>Filter clogging</td><td>Provide</td><td>Not provide</td></tr>
<tr><td>3</td><td>Filter sign indication</td><td>2,500 hr</td><td>100 hr</td></tr>
<tr><td>4</td><td>Air intake ※2</td><td>Not effective</td><td>Not effective</td></tr>
<tr><td>5</td><td>Remote indication switching</td><td>Thermo ON signal indication</td><td>Fan output indication</td></tr>
<tr><td>6</td><td>Humidifier control</td><td>Fan operation at Heating mode</td><td>Thermo ON operation at heating mode</td></tr>
<tr><td>7</td><td rowspan="2">Air flow set in case of heat thermo OFF</td><td>Low ※1</td><td>Extra low ※1</td></tr>
<tr><td>8</td><td>Setting air flow ※1</td><td>Depends on SW1-7</td></tr>
<tr><td>9</td><td>Auto restart function</td><td>Effective</td><td>Not effective</td></tr>
<tr><td>10</td><td>Power ON/OFF</td><td>Effective</td><td>Not effective</td></tr>
<tr><td>SW2
Capacity code switch</td><td>1~4</td><td colspan="3"><table><tr><th>Models</th><th>SW2</th></tr><tr><td>P15</td><td> 
</td></tr><tr><td>P20</td><td> 
</td></tr><tr><td>P25</td><td> 
</td></tr></table></td><td>Before power supply ON</td><td>Indoor controller board
<Initial setting>
Set for each capacity.</td></tr>
<tr><td rowspan="10">SW3
Function selection</td><td>1</td><td>Heat pump/Cool only</td><td>Cooling only</td><td>Heat pump</td><td rowspan="10">Under suspension</td><td rowspan="10">Indoor controller board
<Initial setting>
 

※1 At cooling mode, each angle can be used only 1 hour.
※2 Please do not use SW3-9,10 as trouble might be caused by the usage condition.
※3 Second setting is the same as first setting.</td></tr>
<tr><td>2</td><td>Louver</td><td>—</td><td>—</td></tr>
<tr><td>3</td><td>Vane</td><td>Available</td><td>Not available</td></tr>
<tr><td>4</td><td>Vane swing</td><td>—</td><td>—</td></tr>
<tr><td>5</td><td>Vane horizontal angle</td><td>Second setting ※3</td><td>First setting</td></tr>
<tr><td>6</td><td>Vane cooling limit angle setting ※1</td><td>Horizontal angle</td><td>Down B,C</td></tr>
<tr><td>7</td><td>Changing the opening of linear expansion valve</td><td>Effective</td><td>Not effective</td></tr>
<tr><td>8</td><td>Heating 4 degree up</td><td>Not effective</td><td>Effective</td></tr>
<tr><td>9</td><td>Superheat setting temperature ※2</td><td>—</td><td>—</td></tr>
<tr><td>10</td><td>Subcool setting temperature ※2</td><td>—</td><td>—</td></tr>
</table>

<table>
<tr><th>Switch</th><th></th><th>Operation by switch</th><th>Effective timing</th><th>Remarks</th></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="3">Before power supply ON</td><td>Address board
<Initial setting>
 
</td></tr>
<tr><td>SW14
Branch No. Setting</td><td>Rotary switch</td><td> 

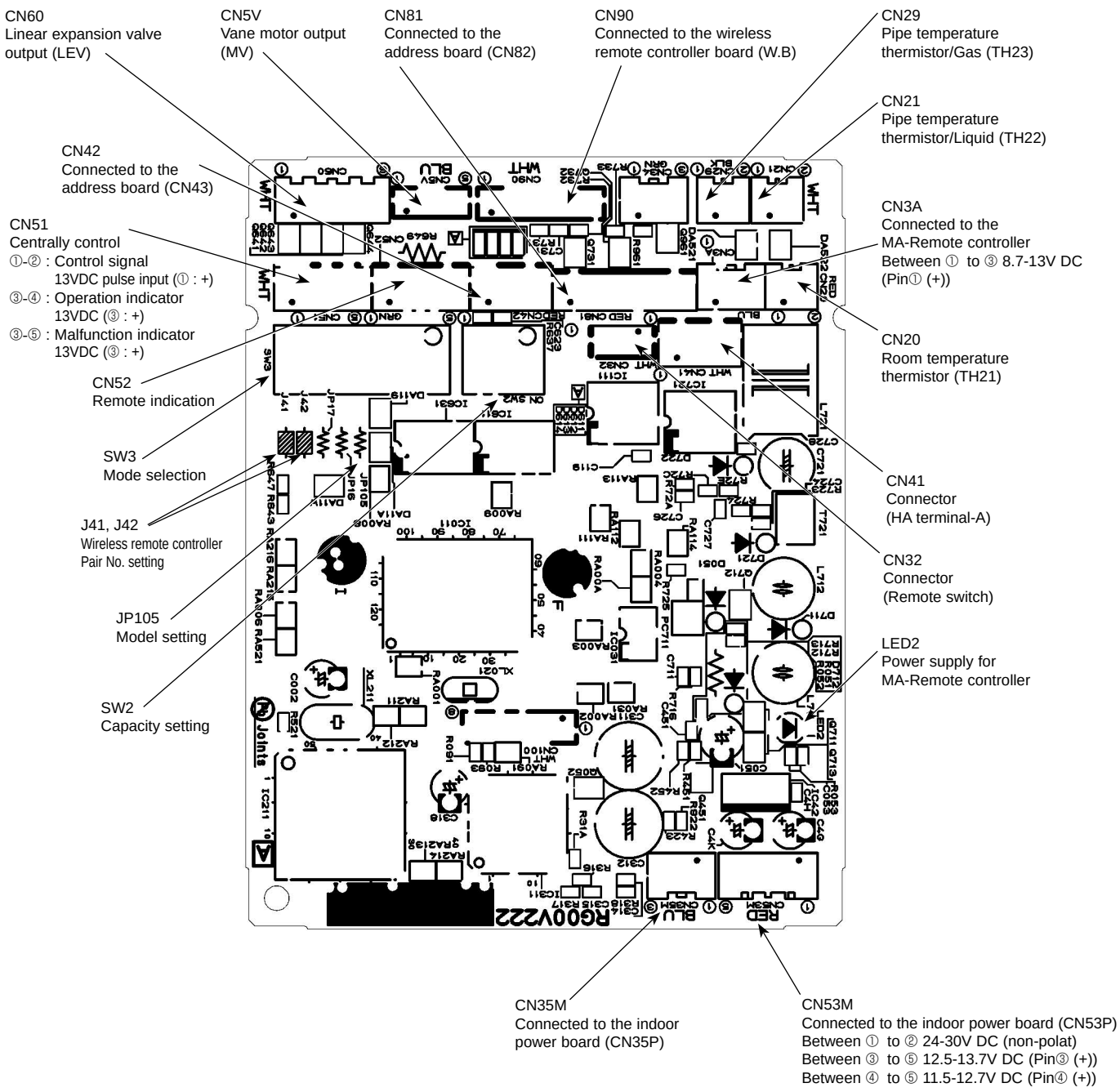
How to set branch number SW14 (Series R2 only).
Match the indoor unit's refrigerant pipe with the BC contoller's end connection number
Remain other than series R2 at "0".</td><td>Address board
<Initial setting>
 
</td></tr>
<tr><td>SW5
Voltage selection</td><td>2</td><td> 

If the unit is used at the 230V or 240V area, set the voltage to 240V.
If the unit is used at the 220V, set the voltage to 220V.</td><td>Address board
<Initial setting>
 
</td></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.
● 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.
● Setting for indoor unit
Jumper wire J41, J42 on the indoor controller board are cut according to the table below.
● Wireless remote controller pair number:
Setting operation
1. Press the SET button (using a pointed implimaent). Check that the remote controller's display has stopped before continuing. MODEL SELECT flashes, 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 implemet). The set pair number 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><Initial setting>
Pattern A
 
</td></tr>
</table>

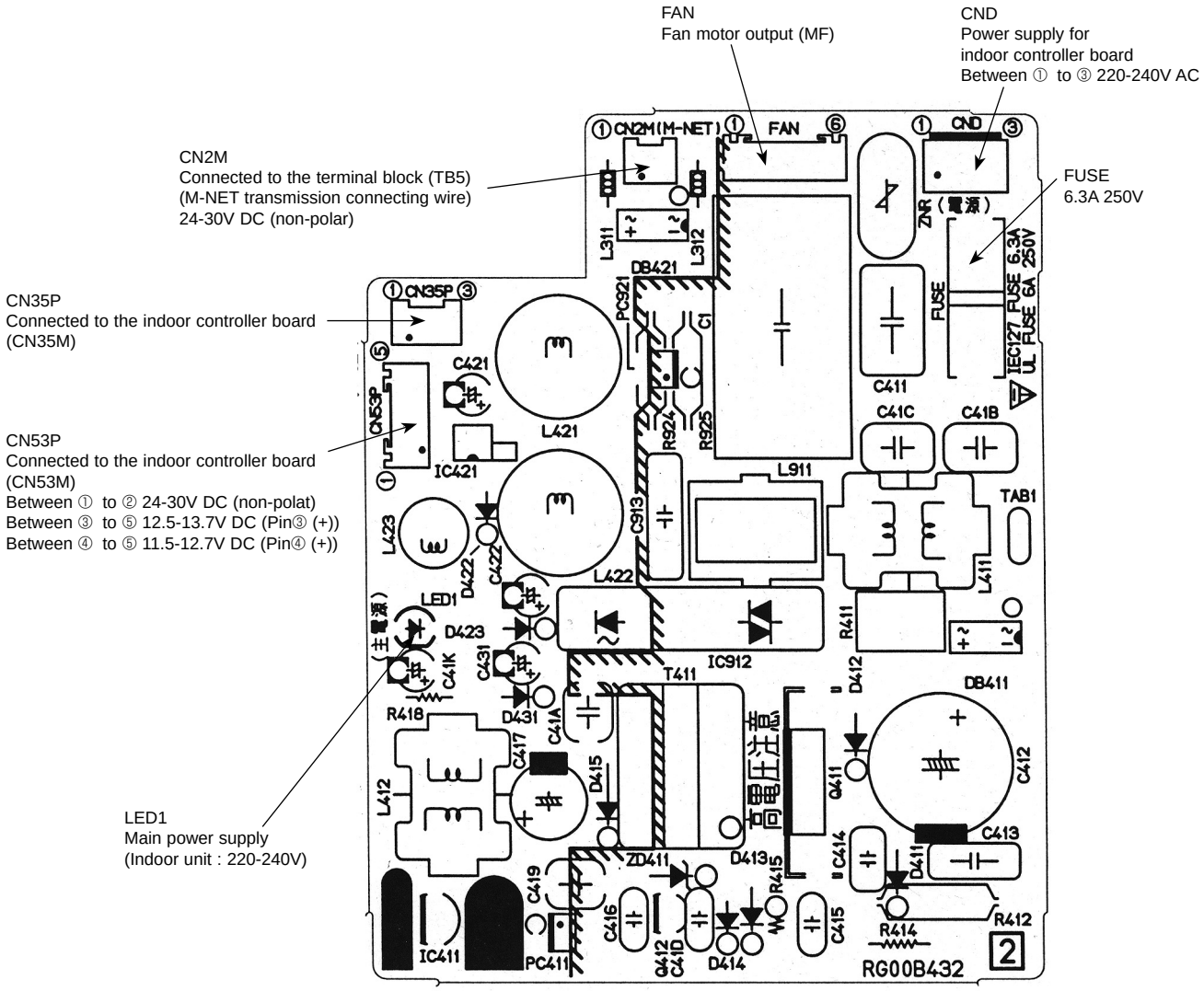
8-3. TEST POINT DIAGRAM

8-3-1. Indoor controller board

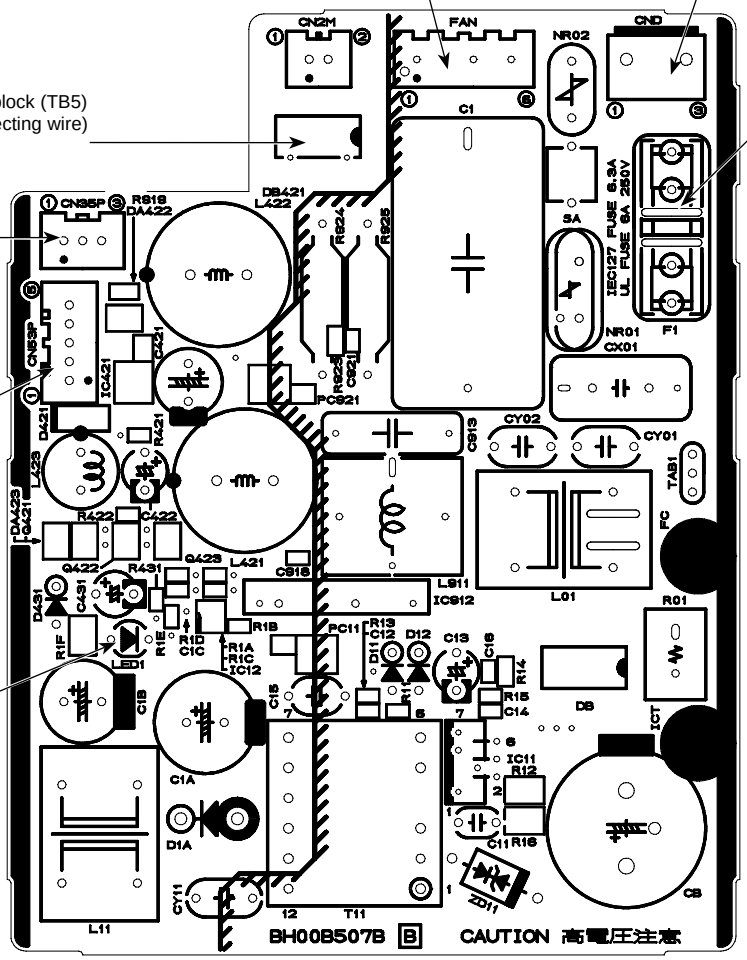
PKFY-P15, 20, 25VBM-E
PKFY-P20, 25VBM-ER1
PKFY-P15, 20, 25VBM-ER2



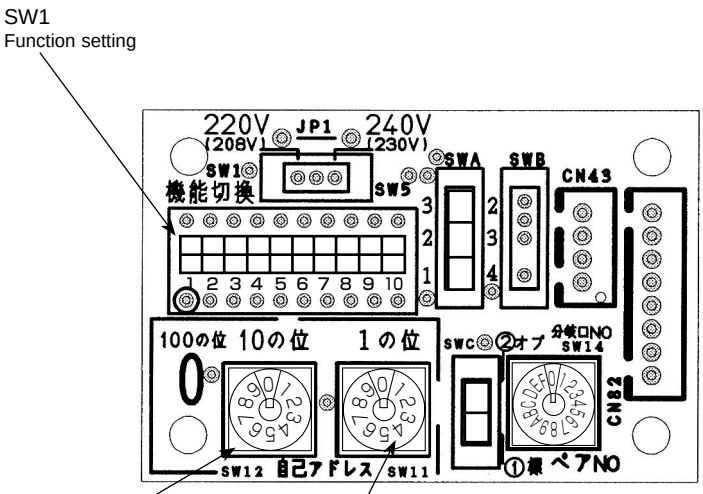
8-3-2. Indoor power board
PKFY-P15, 20, 25VBM-E
PKFY-P20, 25VBM-ER1
PKFY-P15, 20, 25VBM-ER2



8-3-2. Indoor power board
PKFY-P15, 20, 25VBM-E
PKFY-P20, 25VBM-ER1
PKFY-P15, 20, 25VBM-ER2



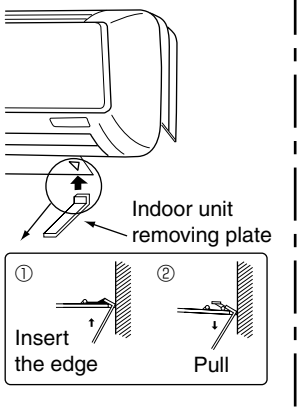
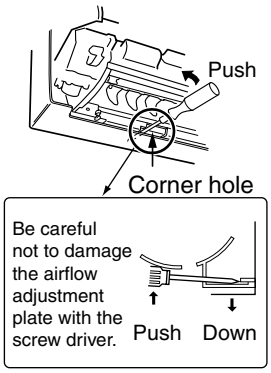
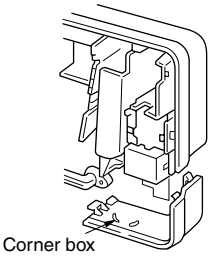
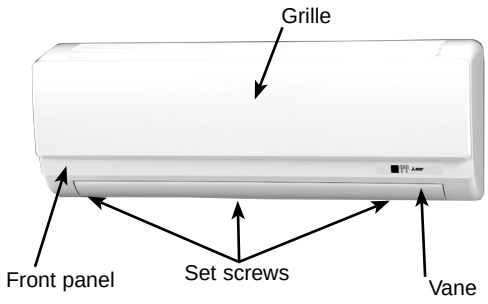
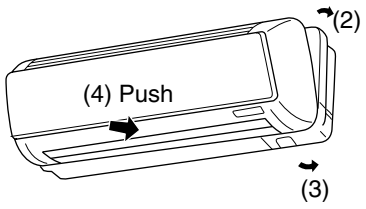
8-3-3. Address board
PKFY-P15, 20, 25VBM-E
PKFY-P20, 25VBM-ER1
PKFY-P15, 20, 25VBM-ER2

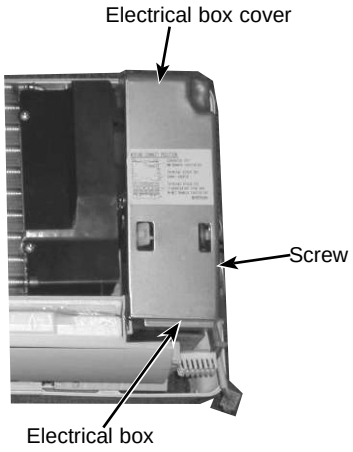
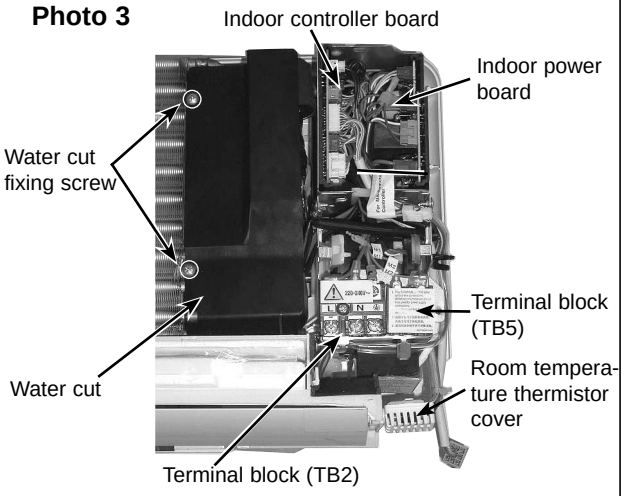
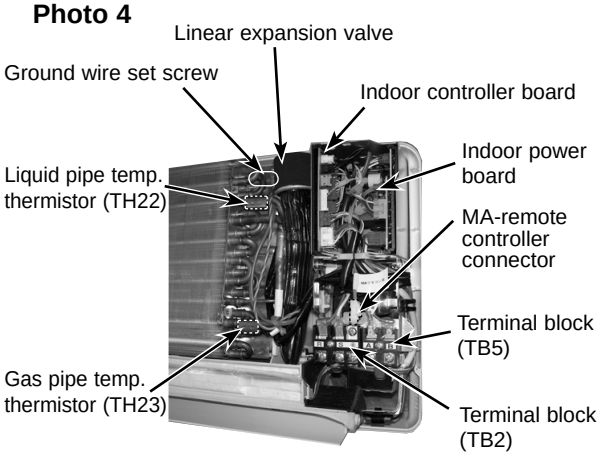


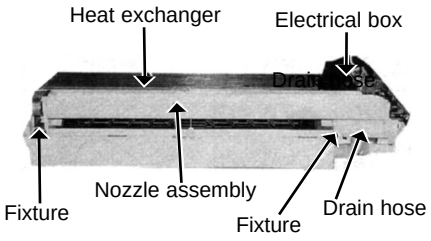
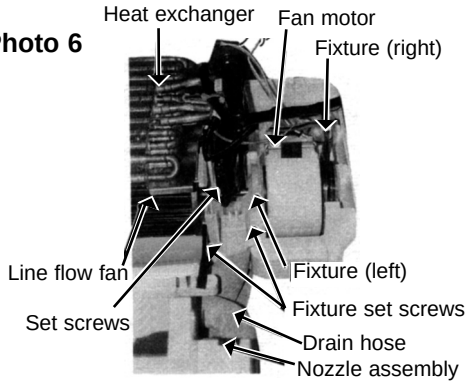
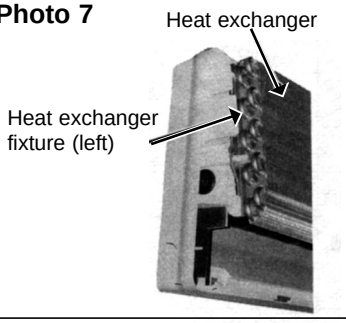
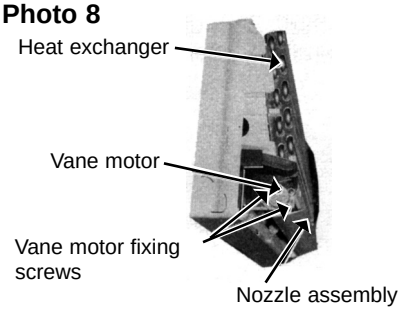
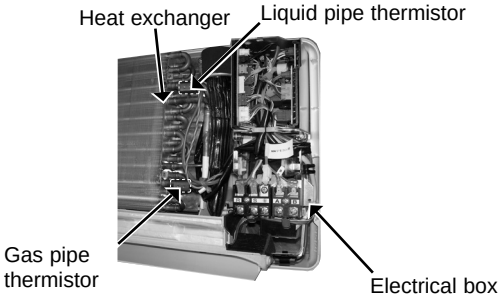
9 DISASSEMBLY PROCEDURE

PKFY-P15VBM-E PKFY-P20VBM-E(R1) PKFY-P25VBM-E(R1)

Be careful when removing heavy parts.

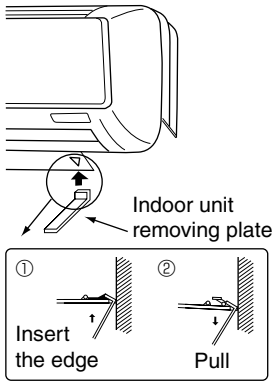
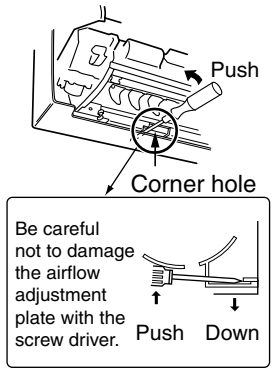
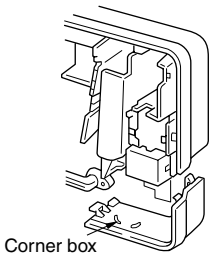
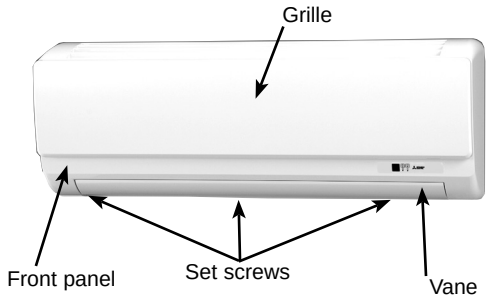
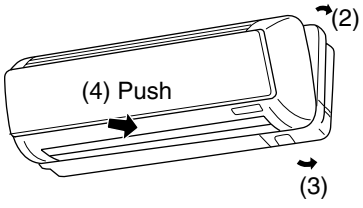
OPERATION PROCEDURE	PHOTOS & ILLUSTRATIONS
1. REMOVING THE LOWER SIDE OF THE INDOOR UNIT FROM THE INSTALLATION PLATE When there is removing plate (1) Remove the corner box at right lower side of the indoor unit and remove the removing plate from the corner box. (Figure 3) (2) Insert the removing plate at the back side of the corner box to remove the indoor unit. (3) Remove the hook by pulling the lower side of the indoor unit down as shown in the Figure 1. When there is no removing plate or it cannot be used for some reason. (1) Remove the front panel. (2) Insert the screw driver to the corner hole at both left and right side as shown in the Figure 2. (3) Push it up, then pull down the lower side of indoor unit and remove the hook.	**Figure 1**  **Figure 2**  **Figure 3** 
2. REMOVING THE FRONT PANEL * Before removing the front panel, leave the open space at upper side of the vane approximately 2 to 3 cm. (1) Remove the 3 screw caps then remove the 3 set screws. (Refer to the Photo 1) (2) Remove the grille. (3) Remove the left side of the front panel, then right side. (4) After removing the lower side of the front panel a little, remove it as pulling the upper side toward you. * Please pay attention to the nozzle assembly. INSTALLING THE FRONT PANEL (1) Insert the lower side of the front panel under the vane. (2) Set the upper side of the front panel. (Figure 4) (3) Set the lower side of the front panel then fix it with the screws. (4) Press the area indicated as arrow sign and set it to the air conditioner unit. (5) Attach the screw caps.	**Photo 1**  **Figure 4** 

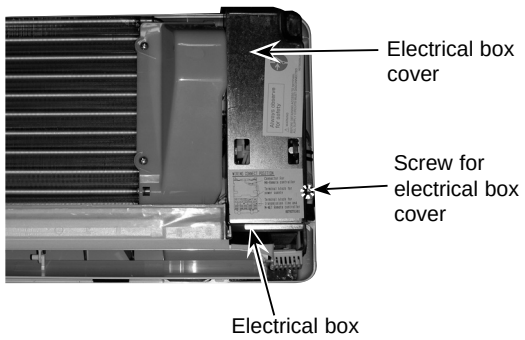
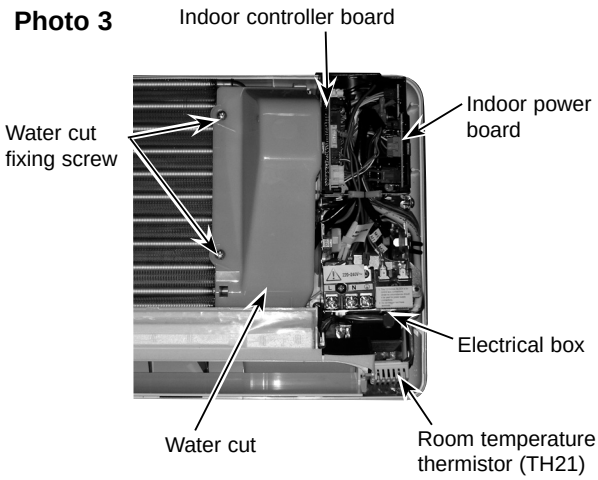
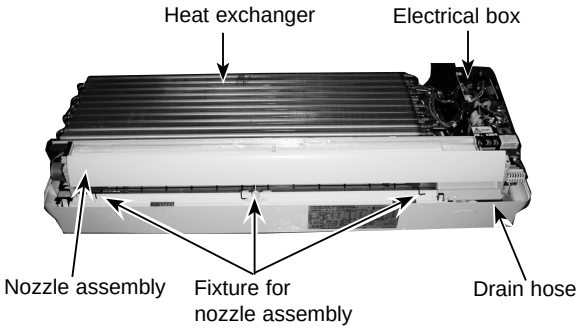
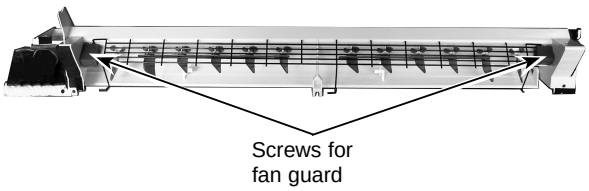
OPERATION PROCEDURE	PHOTOS & ILLUSTRATIONS
3. REMOVING THE INDOOR CONTROLLER BOARD AND INDOOR POWER BOARD (1) Remove the front panel. (Refer to 2) (2) Remove the electrical box cover (screw 4 × 10). (Refer to the Photo 2) INDOOR CONTROLLER BOARD (1) Disconnect the following connectors on the indoor controller board. (connector in front of) ● CN60, CN5V, CN90, CN29, CN21 ● CN42, CN81, CN3A, CN20 (2) Pull out the indoor controller board toward you, then disconnect the rest of connectors. ● CN53M, CN35M (See the Photo 3) INDOOR POWER BOARD (1) Disconnect the following connectors on the indoor power board. ● FAN, CN53P, CN35P, CN2M, CND (2) Remove the earth wire for TAB1. (3) Pull out the indoor power board toward you. (See the Photo 3)	**Photo 2**  **Photo 3** 
4. REMOVING THE ELECTRICAL BOX (1) Remove the front panel. (Refer to 2) (2) Remove the electrical box cover. (See the Photo 2) (3) Pull the nozzle assembly toward you as opening the catch of the nozzle assembly. (See the Photo 5) (4) Disconnect the indoor/outdoor transmission wiring of TB5. (5) Disconnect the power supply wiring of TB2. (6) Disconnect the relay connector of MA-remote controller. (7) Disconnect the following connector on the indoor controller board. ● CN60, CN5V, CN29, CN21, CN90, (CN3A) (8) Disconnect the connector (FAN) on the indoor power board. (9) Remove the ground wire fixing screw. (10) Pull the disconnected lead wire out from the electrical box. (11) Push up the upper fixture catch to remove the box, then pull the lower fixture and remove it from the box fixture.	**Photo 4** 

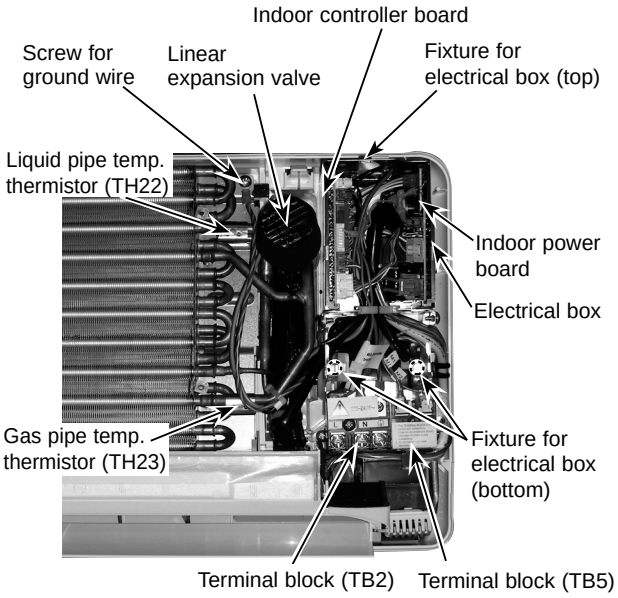
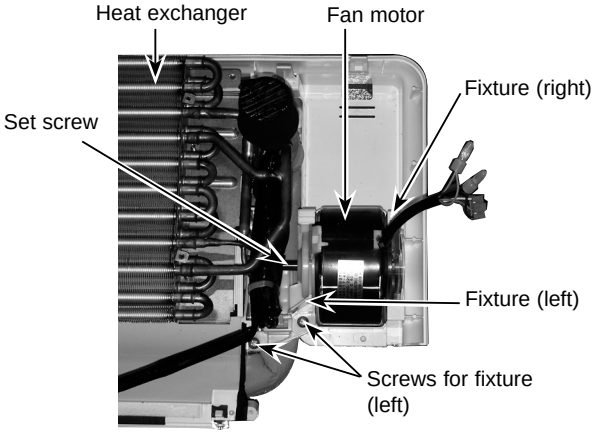
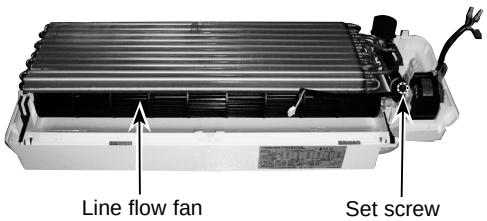
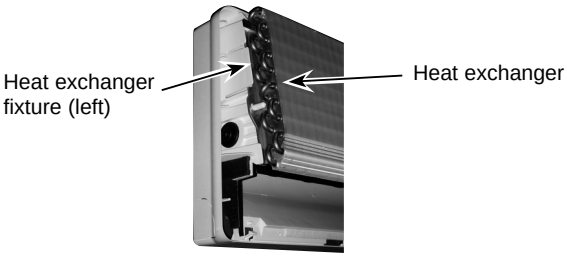
OPERATION PROCEDURE	PHOTOS & ILLUSTRATIONS
5. REMOVING THE NOZZLE ASSEMBLY AND DRAIN HOSE (1) Remove the front panel (Refer to 2). (2) Remove the electrical box cover. (3) Disconnect the connector (CN5V) on the indoor controller board. (4) After unhook the right side of the corner box, press the upper left side and remove the corner box. (5) Remove the nozzle assembly from the fixture. (See the Photo 5) (6) Remove the drain hose.	**Photo 5** 
6. REMOVING THE LINE FLOW FAN AND THE FAN MOTOR (1) Remove the front panel. (Refer to 2) (2) Remove the nozzle assembly. (Refer to 5) (3) Remove the electrical parts box. (4) Remove the fixture while pressing the right side of motor fixture catch. (See the Photo 6) (5) Remove the left side of the motor fixture. (6) Loosen the screw which fixes the line flow fan to the fan motor, then remove the fan motor by sliding it to the right side. (See the Photo 6) (7) Pull the left-hand side of the heat exchanger toward you. (See the Photo 7) (8) Remove the line flow fan.	**Photo 6**  **Photo 7** 
7. REMOVING THE VANE MOTOR (1) Remove the front panel. (2) Remove the screw of the electrical parts box cover, and remove the cover. (3) Remove the 2 screws of the vane motor. Disconnect the relay connector and remove the motor from the shaft. (4) Disconnect the vane motor connector (CN5V) on the indoor controller board.	**Photo 8** 
8. REMOVING THE LIQUID PIPE THERMISTOR AND GAS PIPE THERMISTOR (1) Remove the front panel. (Refer to 2) (2) Remove the electrical box cover. (3) Remove the water cut. (4) Cut the wiring fixed band. (5) Remove the liquid pipe thermistor and gas pipe thermistor. (See the Photo 9) (6) Disconnect the connector (CN29) (CN21) on the indoor controller board.	**Photo 9** 

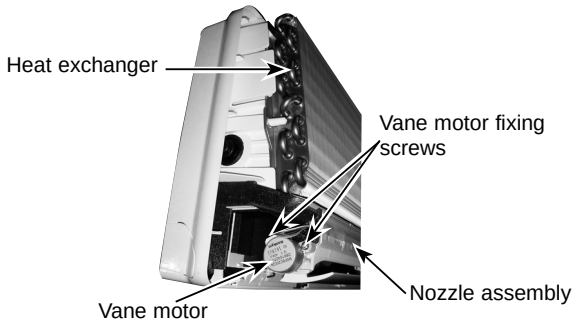
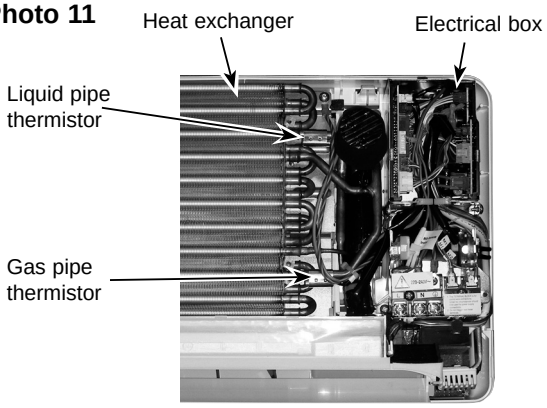
PKFY-P15VBM-ER2 PKFY-P20VBM-ER2 PKFY-P25VBM-ER2

Be careful when removing heavy parts.

OPERATION PROCEDURE	PHOTOS & ILLUSTRATIONS
1. REMOVING THE LOWER SIDE OF THE INDOOR UNIT FROM THE INSTALLATION PLATE When there is removing plate (1) Remove the corner box at right lower side of the indoor unit and remove the removing plate from the corner box. (See the Figure 3) (2) Insert the removing plate at the back side of the corner box to remove the indoor unit. (3) Remove the hook by pulling the lower side of the indoor unit down as shown in the Figure 1. When there is no removing plate or it cannot be used for some reason. (1) Remove the front panel. (2) Insert the screw driver to the corner hole at both left and right side as shown in the Figure 2. (3) Push it up, then pull down the lower side of indoor unit and remove the hook.	**Figure 1**  **Figure 2**  **Figure 3** 
2. REMOVING THE FRONT PANEL * Before removing the front panel, leave the open space at upper side of the vane approximately 2 to 3 cm. (1) Remove the 3 screw caps then remove the 3 set screws. (See the Photo 1) (2) Remove the grille. (3) Remove the left side of the front panel, then right side. (4) After removing the lower side of the front panel a little, remove it as pulling the upper side toward you. * Please pay attention to the nozzle assembly. INSTALLING THE FRONT PANEL (1) Insert the lower side of the front panel under the vane. (2) Set the upper side of the front panel. (See the Figure 4) (3) Set the lower side of the front panel then fix it with the screws. (4) Press the area indicated as arrow sign and set it to the air conditioner unit. (5) Attach the screw caps.	**Photo 1**  **Figure 4** 

OPERATION PROCEDURE	PHOTOS & ILLUSTRATIONS
3. REMOVING THE INDOOR CONTROLLER BOARD AND INDOOR POWER BOARD (1) Remove the front panel. (Refer to procedure 2) (2) Remove the electrical box cover (screw 4 × 10). (See the Photo 2) INDOOR CONTROLLER BOARD (1) Disconnect the following connectors on the indoor controller board. (connector in front of) ● CN60, CN5V, CN90, CN29, CN21 ● CN42, CN81, CN3A, CN20 (2) Pull out the indoor controller board toward you, then disconnect the rest of connectors. ● CN53M, CN35M (See the Photo 3) INDOOR POWER BOARD (1) Disconnect the following connectors on the indoor power board. ● FAN, CN53P, CN35P, CN2M, CND (2) Remove the earth wire for TAB1. (3) Pull out the indoor power board toward you. (See the Photo 3)	**Photo 2**  **Photo 3** 
4. REMOVING THE NOZZLE ASSEMBLY AND DRAIN HOSE (1) Remove the front panel. (Refer to procedure 2) (2) Remove the electrical box cover. (See the Photo 2) (3) Disconnect the connector (CN5V) on the indoor controller board. (4) After unhook the right side of the corner box, press the upper left side and remove the corner box. (5) Remove the nozzle assembly from the fixture. (See the Photo 4) (6) Remove the drain hose.	**Photo 4** 
5. REMOVING THE FAN GUARD (1) Remove the nozzle assembly and drain hose. (Refer to procedure 4) (2) Remove the screws of fan guard. (3) Remove the fan guard.	**Photo 5** 

OPERATION PROCEDURE	PHOTOS & ILLUSTRATIONS
6. REMOVING THE ELECTRICAL BOX (1) Remove the front panel. (Refer to procedure 2) (2) Remove the electrical box cover. (See the Photo 2) (3) Remove the water cut. (See the Photo 3) (4) Pull the nozzle assembly toward you as opening the catch of the nozzle assembly. (See the Photo 4) (5) Disconnect the indoor/outdoor transmission wiring of TB5. (6) Disconnect the power supply wiring of TB2. (7) Disconnect the relay connector of MA-remote controller. (8) Disconnect the following connector on the indoor controller board. ● CN60, CN5V, CN29, CN21, CN90, (CN3A) (9) Disconnect the connector (FAN) on the indoor power board. (10) Remove the ground wire fixing screw. (11) Pull the disconnected lead wire out from the electrical box. (12) Push up the upper fixture catch to remove the box, then pull the lower fixture and remove it from the box fixture.	**Photo 6** 
7. REMOVING THE LINE FLOW FAN AND THE FAN MOTOR (1) Remove the front panel. (Refer to procedure 2) (2) Remove the nozzle assembly. (Refer to procedure 4) (3) Remove the electrical parts box. (Refer to procedure 6) (4) Remove the fixture while pressing the right side of motor fixture catch. (See the Photo 7) (5) Remove the left side of the motor fixture. (6) Loosen the set screw which fixes the line flow fan to the fan motor, then remove the fan motor by sliding it to the right side. (See the Photo 7) (7) Pull the left-hand side of the heat exchanger toward you. (See the Photo 8) (8) Remove the line flow fan.	**Photo 7** 
Photo 8  	**Photo 9** 

OPERATION PROCEDURE	PHOTOS & ILLUSTRATIONS
8. REMOVING THE VANE MOTOR (1) Remove the front panel. (Refer to procedure 2) (2) Remove the screw of the electrical parts box cover, and remove the cover. (3) Remove the 2 screws of the vane motor. Disconnect the relay connector and remove the motor from the shaft. (4) Disconnect the vane motor connector (CN5V) on the indoor controller board.	**Photo 10** 
9. REMOVING THE LIQUID PIPE THERMISTOR AND GAS PIPE THERMISTOR (1) Remove the front panel. (Refer to procedure 2) (2) Remove the electrical box cover. (See the Photo 2) (3) Remove the water cut. (See the Photo 3) (4) Cut the wiring fixed band. (5) Remove the liquid pipe thermistor and gas pipe thermistor. (See the Photo 10) (6) Disconnect the connector (CN29) (CN21) on the indoor controller board.	**Photo 11** 

MITSUBISHI ELECTRIC CORPORATION

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

Distributed in Nov. 2011 No. OCH418 REVISED EDITION-B
Distributed in Nov. 2008 No. OCH418 REVISED EDITION-A PDF 7
Distributed in May 2007 No. OCH418 PDF 9
Made in Japan

New publication, effective Nov. 2011
Specifications are subject to change without notice.