MITSUBISHI ELECTRIC

SPLIT-TYPE, AIR CONDITIONERS

2000

No.OC230

TECHNICAL & SERVICE MANUAL

Series PK **Wall Mounted**

Indoor unit [Model names]

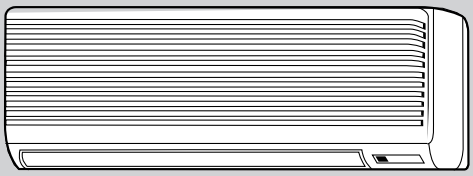
PK-1.6GKL

PK-2GKL

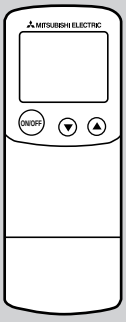
[Service Ref.]

PK-1.6GKL
PK-2GKL

This manual does not cover the following outdoor units. When servicing them, please refer to the service manual No.OC127 Revised Edition-A and this manual in a set.
[Service Ref.]
PU-1.6VLJA2
PU-2VJA2



Indoor unit



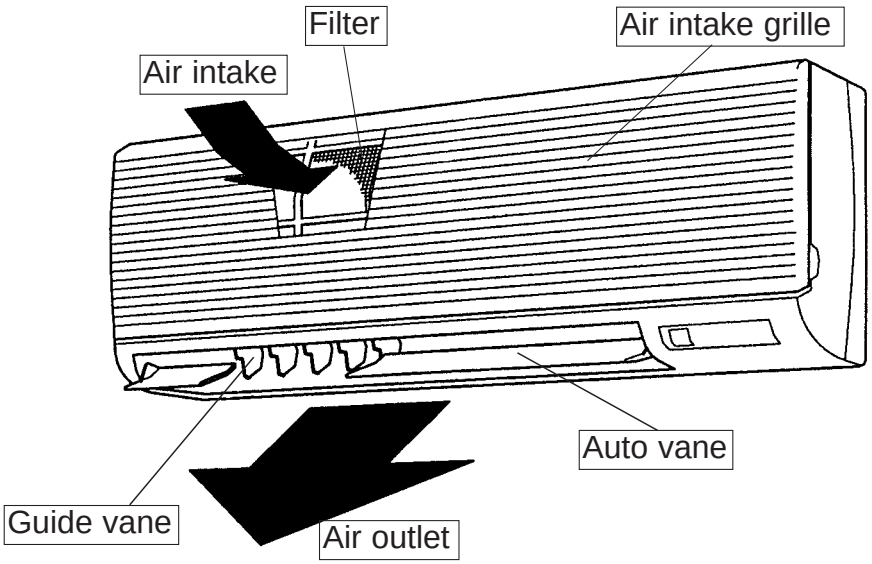
Remote controller

CONTENTS

Mr.SLIM™

1 PART NAMES AND FUNCTIONS

● **Indoor Unit**



●Wireless remote controller

● When cover is open.

display

Lights up while transmission to the indoor unit is mode using switches.

display

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

• FUNCTION display

Lights up when function are set..

• TEST RUN • CHECK display

CHECK&TEST RUN display indicates that the unit is being checked or test-run.

display

Displays when batteries are dead.

display

The vertical direction of airflow is indicated.

display

FAN SPEED display indicates which fan speed has been selected.

display

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

ADDRESS display

Displays the refrigerant address.

UNIT NO. display

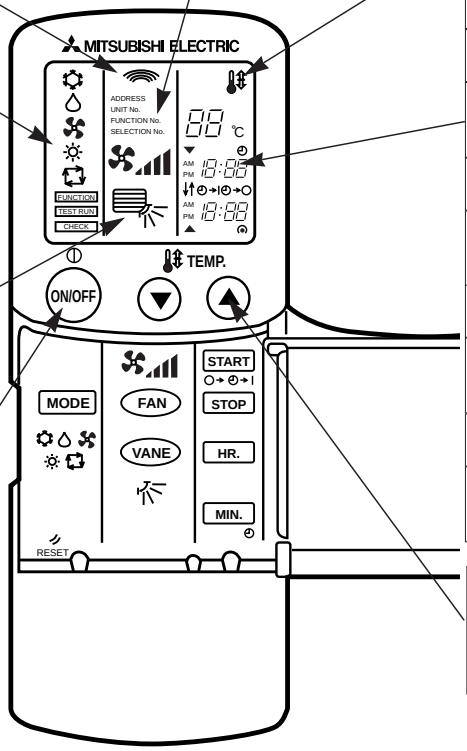
Displays the number of unit..

FUNCTION NO. display

Displays the mode.

SELECTION NO. display

Displays the selection number..



display

SET TEMP. display indicates desired temperature set.

CLOCK display

DIsplays the current time.

“ ◴ ”display

Flashes when the current time is displayed.

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

Displays when the current time and the timer time can be changed.

TEMP. button

SET TEMPERATURE button sets any desired room temperature.

● When cover is open.

MODE SELECT button

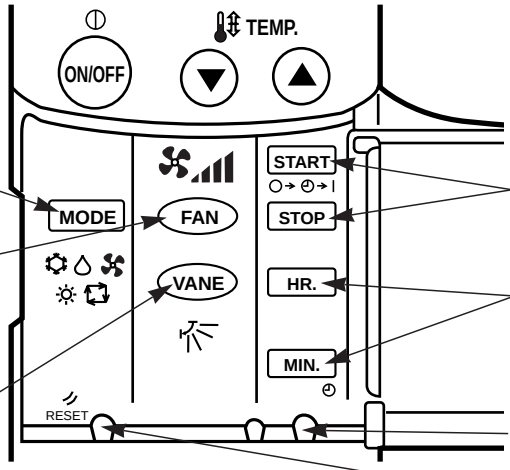
Used to switch the operation mode between cooling , drying , mode.

FAN SPEED SELECT button

Used to change the fan speed.

VANE CONTROL button

Used to change the airflow direction.



TIMER CONTROL buttons

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

HR. and MIN.buttons

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

◴ button

RESET button

2 SPECIFICATIONS

1. STANDARD SPECIFICATION

Item \ Service Ref.				PK-1.6GKL	PK-2GKL
Indoor, Outdoor D.B. / W.B.°C				27/19.0°C, 35/24°C	27/19.0°C, 35/24°C
Condition				Cooling (JIS B8616,GB4706.32-96)	Cooling (JIS B8616,GB4706.32-96)
Capacity ※1			Btu/h	13,300	19,100
			W	3,900	5,600
Total input ※1			kW	1.49/1.59	2.51/2.55
INDOOR UNIT	**Service Ref.**			**PK-1.6GKL**	**PK-2GKL**
	Power supply(phase, cycle,voltage)			Single, 50Hz, 220/240V	Single, 50Hz, 220/240V
		Input	kW	0.07	0.07
		Running current (Power factor)	A (%)	0.33(96/88)	0.33(96/88)
		Starting current	A	0.4	0.4
	External finish			Munsell 0.70Y 8.59/0.97	Munsell 0.70Y 8.59/0.97
	Heat exchanger			Plate fin coil	Plate fin coil
	Fan	Fan(drive) × No.		Line flow (direct) × 1	Line flow (direct) × 1
		Fan motor output	kW	0.030	0.030
		Airflow (Low-High)	m^3/min (CFM)	9-12 (318-424)	9-12 (318-424)
		External static pressure	Pa (mmAq)	0 (direct blow)	0 (direct blow)
	Booster heater		kW	—	—
	Operation control & Thermostat			Wireless remote controller & Built-in	Wireless remote controller & Built-in
	Noise level (Low-High) ※2		dB	36 - 43	36 - 43
	Cond. drain conn. I.D.		mm (in.)	20 (13/16)	20 (13/16)
	Dimensions	W	mm (in.)	990 (39)	990 (39)
		D	mm (in.)	235 (9-1/4)	235 (9-1/4)
		H	mm (in.)	340 (13-3/8)	340 (13-3/8)
	Weight		kg (lbs)	16 (35)	16 (35)
OUTDOOR UNIT	**Service Ref.**			**PU-1.6VLJA2**	**PU-2VJA2**
	Power supply (phase, cycle, voltage)			Single, 50Hz, 220/240V	Single, 50Hz, 220/240V
		Input	kW	1.42 / 1.52	2.44 / 2.48
		Running current /Power factor	A (%)	6.7 / 6.9 (97/92)	11.3 / 10.8(98/96)
		Starting current	A	30 /33	48 / 52
	External finish			Munsell 5Y 7/1	Munsell 5Y 7/1
	Refrigerant control			Capillary tube	Capillary tube
	Compressor			Hermetic	Hermetic
		Model		RH247VFC	NHJ41VMD
		Motor output	kW	1.2	2.0
		Starter type		Line start	Line start
		Protection devices		Inner thermostat, HP/LP switch	
	Heat exchanger			Plate fin coil	Plate fin coil
	Fan	Fan(drive) × No.		Propeller (direct) × 1	Propeller (direct) × 1
		Fan motor output	kW	0.065	0.065
		Airflow	m^3/min(CFM)	45 (1588)	45 (1588)
	Defrost method			—	—
	Noise level ※2		dB	49	49
	Dimensions	W	mm (in.)	870 (34-1/4)	870 (34-1/4)
		D	mm (in.)	295 (11-5/8)	295 (11-5/8)
		H	mm (in.)	650 (25-5/8)	650 (25-5/8)
	Weight		kg (lbs)	45 (99)	60 (132)
REFRIGERANT PIPING	Crankcase heater		W	—	32 / 38
	Refrigerant Charge		kg (lbs)	R-22 1.3 (2.9)	R-22 1.78 (3.9)
	Pipe size O.D.	Liquid	mm (in.)	9.52 (3/8)	9.52 (3/8)
		Gas	mm (in.)	15.88 (5/8)	15.88 (5/8)
	Connection method	Indoor side		Flared	Flared
		Outdoor side		Flared	Flared
	Between the indoor & outdoor units	Height difference		※3 Max. 15m	※3 Max. 20m
		Piping length		※3 Max. 20m	※3 Max. 30m

※1 Refrigerant piping length (one way) : 5m (16ft)
※2 Noise level is measured in an unacoustic room based on JIS Z8731 conditions.
※3 Up to 20m it is unnecessary to charge additional refrigerant.

Guaranteed operating range

		Indoor	Outdoor
Cooling	Upper limit	D.B. 35˚C, W.B. 22.5˚C	D.B. 52˚C (46˚C)
	Lower limit	D.B. 21˚C, W.B. 15.5˚C	D.B. 21˚C

( ) : PU-1.6VLJA2

2. POWER SUPPLY & MODEL NAMES

Power supply		**Service Ref.(Indoor unit)**	Service Ref.(Outdoor unit)	
			PK-1.6GKL	PK-2GKL
50Hz	1ph.	220, 230, 240V	PU-1.6VLJA2	PU-2VJA2
	3ph.	380/220, 400/230, 415/240V	—	—

Notes : 1. Power supply key V(L) ··· 1ph, 220, 230 240V, 50Hz
2.Primary power supplies for all indoor units are single-phase.

3. ELECTRICAL SPECIFICATION

(1) Rating conditions ——— JIS B8616,GB4706.32-96

Indoor : D.B. 27°C (80°F), W.B. 19°C(66°F)
Outdoor : D.B. 35°C (95°F)

Series PK Indoor Unit (Single Phase)

Power supply (1 Phase)		V : 220V 50Hz		V : 230V 50Hz	
Service Ref.		**PK-1.6GKL**	**PK-2GKL**	**PK-1.6GKL**	**PK-2GKL**
Current	A	0.33	0.33	0.33	0.33
Input	KW	0.07	0.07	0.07	0.07
Starting courrent	A	0.4	0.4	0.4	0.4
Outdoor unit		PU-1.6	PU-2	PU-1.6	PU-2

Power supply (1 Phase)		V : 240V 50Hz	
Service Ref.		**PK-1.6GKL**	**PK-2GKL**
Current	A	0.33	0.33
Input	KW	0.07	0.07
Starting courrent	A	0.4	0.4
Outdoor unit		PU-1.6	PU-2

3 DATA

1. PERFORMANCE DATA

Cooling capacity **50Hz**

PK-1.6GKL, PK-2GKL

Service Ref.		PK-1.6GKL		PK-2GKL	
Temperature		T.C.	C.F. (T.I.)	T.C.	C.F. (T.I.)
Outdoor D.B.	Indoor W.B.				
21˚C (69.8˚F)	16˚C (60.8˚F)	3.9	0.81	5.6	0.81
	18˚C (64.4˚F)	4.2	0.82	6.0	0.82
	19˚C (66.2˚F)	4.3	0.83	6.2	0.83
	19.4˚C (67˚F)	4.4	0.83	6.2	0.83
	20˚C (68˚F)	4.4	0.84	6.4	0.84
	22˚C (71.6˚F)	4.7	0.86	6.7	0.86
25˚C (77˚F)	16˚C (60.8˚F)	3.8	0.84	5.5	0.84
	18˚C (64.4˚F)	4.1	0.85	5.9	0.85
	19˚C (66.2˚F)	4.2	0.86	6.0	0.86
	19.4˚C (67˚F)	4.3	0.86	6.1	0.86
	20˚C (68˚F)	4.3	0.87	6.2	0.87
	22˚C (71.6˚F)	4.6	0.89	6.6	0.89
30˚C (86˚F)	16˚C (60.8˚F)	3.7	0.90	5.3	0.90
	18˚C (64.4˚F)	3.9	0.92	5.6	0.92
	19˚C (66.2˚F)	4.1	0.93	5.8	0.93
	19.4˚C (67˚F)	4.1	0.93	5.9	0.93
	20˚C (68˚F)	4.2	0.94	6.0	0.94
	22˚C (71.6˚F)	4.5	0.96	6.4	0.96
32.2˚C (90˚F)	16˚C (60.8˚F)	3.6	0.93	5.2	0.93
	18˚C (64.4˚F)	3.9	0.95	5.5	0.95
	19˚C (66.2˚F)	4.0	0.96	5.7	0.96
	19.4˚C (67˚F)	4.0	0.97	5.8	0.97
	20˚C (68˚F)	4.1	0.97	5.9	0.97
	22˚C (71.6˚F)	4.4	0.99	6.3	0.99
35˚C (95˚F)	16˚C (60.8˚F)	3.5	0.96	5.1	0.96
	18˚C (64.4˚F)	3.8	0.99	5.4	0.99
	19˚C (66.2˚F)	3.9	1.00	5.6	1.00
	19.4˚C (67˚F)	4.0	1.00	5.7	1.00
	20˚C (68˚F)	4.0	1.01	5.8	1.01
	22˚C (71.6˚F)	4.3	1.04	6.2	1.04
40˚C (104˚F)	16˚C (60.8˚F)	3.4	1.03	4.9	1.03
	18˚C (64.4˚F)	3.6	1.06	5.2	1.06
	19˚C (66.2˚F)	3.7	1.07	5.4	1.07
	19.4˚C (67˚F)	3.8	1.08	5.4	1.08
	20˚C (68˚F)	3.9	1.08	5.5	1.08
	22˚C (71.6˚F)	4.1	1.11	5.9	1.11

Service Ref.		PK-1.6GKL		PK-2GKL	
Temperature		T.C.	C.F. (T.I.)	T.C.	C.F. (T.I.)
Outdoor D.B.	Indoor W.B.				
40.6˚C (105˚F)	16˚C (60.8˚F)	3.4	1.04	4.8	1.04
	18˚C (64.4˚F)	3.6	1.06	5.2	1.06
	19˚C (66.2˚F)	3.7	1.08	5.3	1.08
	19.4˚C (67˚F)	3.8	1.08	5.4	1.08
	20˚C (68˚F)	3.8	1.09	5.5	1.09
	22˚C (71.6˚F)	4.1	1.12	5.9	1.12
45˚C (113˚F)	16˚C (60.8˚F)	3.2	1.10	4.6	1.10
	18˚C (64.4˚F)	3.4	1.12	4.9	1.12
	19˚C (66.2˚F)	3.6	1.14	5.1	1.14
	19.4˚C (67˚F)	3.6	1.15	5.2	1.15
	20˚C (68˚F)	3.7	1.16	5.3	1.16
	22˚C (71.6˚F)	3.9	1.20	5.7	1.20
46˚C (115˚F)	16˚C (60.8˚F)	3.2	1.11	4.6	1.11
	18˚C (64.4˚F)	3.4	1.14	4.9	1.14
	19˚C (66.2˚F)	3.5	1.15	5.1	1.15
	19.4˚C (67˚F)	3.6	1.16	5.1	1.16
	20˚C (68˚F)	3.6	1.17	5.2	1.17
	22˚C (71.6˚F)	3.9	1.21	5.6	1.21
50˚F (122˚F)	16˚C (60.8˚F)			4.4	1.16
	18˚C (64.4˚F)			4.7	1.19
	19˚C (66.2˚F)			4.9	1.21
	19.4˚C (67˚F)			4.9	1.22
	20˚C (68˚F)			5.0	1.23
	22˚C (71.6˚F)			5.4	1.28
52˚C (125.5˚F)	16˚C (60.8˚F)			4.3	1.19
	18˚C (64.4˚F)			4.6	1.22
	19˚C (66.2˚F)			4.7	1.24
	19.4˚C (67˚F)			4.8	1.25
	20˚C (68˚F)			4.9	1.26
	22˚C (71.6˚F)			5.3	1.31
Evaporator airflow (CMM)		12		12	
Bypass factors		0.10		0.12	
S.H.F. at rating conditions		0.80		0.69	

Notes: 1. T.C. : Total capacity (kW) ··· (kcal/h)=(kW)x860, (Btu/h)=4x(kW)x860
C.F.(T.I.) : Correction factors of Total input(Indoor unit input + Outdoor unit input)
2. (°F)=32+9/5(°C)
3. Guaranteed operating range(cooling)
Lower limit … Indoor : D.B. 21°C(70°F) , W.B. 15.5°C(60°F)
Outdoor : D.B. 21°C(70°F)
Upper limit … Indoor : D.B. 35°C(95°F) , W.B. 22.5°C(72.5°F)
Outdoor : D.B. 46°C(115°F) ※ Outdoor : D.B. 52°C(125.5°F)…VJ,YJ

COOLING CAPACITY correction factors **50Hz**

Service Ref.	Refrigerant piping length (one way)							
	5m (16ft)	10m (33ft)	15m (49ft)	20m (66ft)	25m (82ft)	30m (98ft)	35m (115ft)	40m (131ft)
PK-1.6GKL	1.0	0.992	0.987	0.982	—	—	—	—
PK-2GKL	1.0	0.985	0.975	0.964	0.954	0.944	—	—

2. ELECTRICAL DATA

2-1 Rating conditions (JISB 8616,GB4706.32-96)

Indoor : D.B. 27°C, W.B. 19°C
Outdoor : D.B. 35°C, W.B. 24°C
Indoor unit ··· 220V / 230V / 240V 50Hz 1phase
Outdoor unit···220V / 230V / 240V 50Hz 1phase

Service Ref.	Indoor unit	PK-1.6GKL	PK-2GKL	PK-1.6GKL	PK-2GKL	PK-1.6GKL	PK-2GKL
	Outdoor unit	PU-1.6VLJA2	PU-2VJA2	PU-1.6VLJA2	PU-2VJA2	PU-1.6VLJA2	PU-2VJA2
Capacity (W)		3,900	5,600	3,900	5,600	3,900	5,600
Total Input (kW)		1.49	2.51	1.54	2.53	1.59	2.55
Indoor	Input (kW)	0.07	0.07	0.07	0.07	0.07	0.07
	Current (A)	0.33	0.33	0.33	0.33	0.33	0.33
	Starting current (A)	0.40	0.40	0.40	0.40	0.40	0.40
Outdoor	Input (kW)	1.42	2.44	1.47	2.45	1.52	2.48
	Current (A)	6.7	11.3	6.7	11.0	6.9	10.8
	Starting current (A)	30	48	32	50	33	52

3. OUTLET AIR SPEED AND COVERAGE RANGE

	PK-1.6GKL	PK-2GKL
Air flow m^3/min	12	12
Air speed m/sec	5.3	5.3
Coverage range m (ft)	10(32.8)	10(32.8)

The air coverage range is the value up to the position where the air speed is 0.25m/sec. when air is blown out horizontally from the unit at the Hi notch position.
The coverage range should be used only as a general guideline since it varies according to the size of the room and the furniture inside the room.

4. STANDARD OPERATION DATA

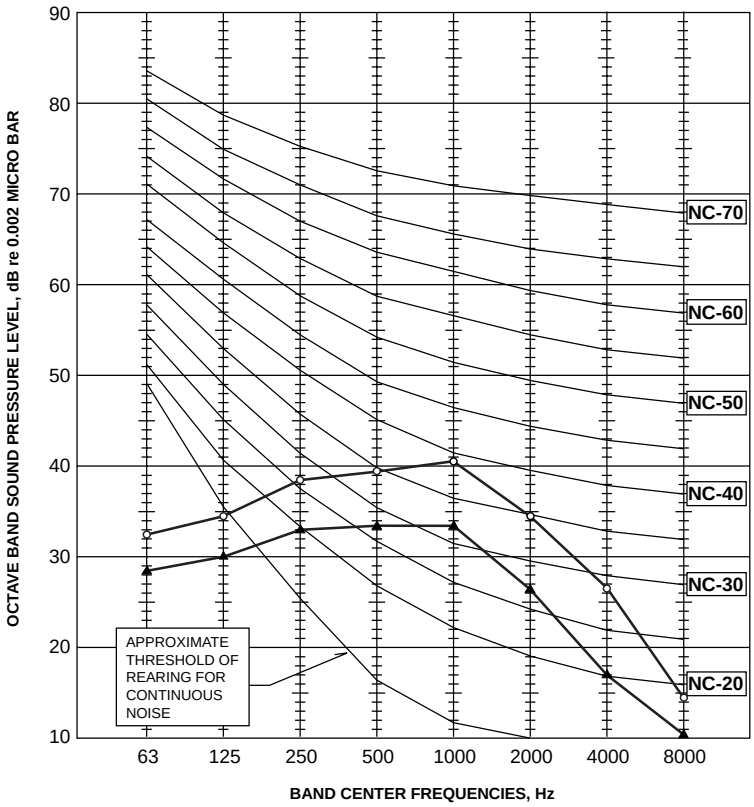
Service Ref.				PK-1.6GKL	PK-2GKL
Mode				Cooling	Cooling
Total	Capacity		W	3,900	5,600
	Input		kW	1.49	2.51
Electrical circuit	**Indoor unit Service Ref.**			**PK-1.6GKL**	**PK-2GKL**
	Phase, Hz			1, 50	1, 50
	Volts		V	220	220
	Amperes		A	0.33	0.33
	Outdoor unit Service Ref.			**PU-1.6VLJA2**	**PU-2VJA2**
	Phase, Hz			1, 50	1, 50
	Volts		V	220	220
	Amperes		A	6.7	11.3
Refrigerant circuit	Discharge pressure		MPa (kg/cm^2)	2.0 (20.6)	2.0 (20.4)
	Suction pressure		MPa (kg/cm^2)	0.52 (5.3)	0.44 (4.5)
	Discharge temperature		˚C	70	72
	Condensing temperature		˚C	52	52
	Suction temperature		˚C	7	3
	Ref. pipe length		m	5	5
Indoor side	Intake air temperature	D.B.	˚C	27	27
		W.B.	˚C	19	19
	Discharge air temperature	D.B.	˚C	14.2	11.6
Outdoor side	Intake air temperature	D.B.	˚C	35	35
		W.B.	˚C	24	24
SHF				0.80	0.69
BF				0.10	0.12

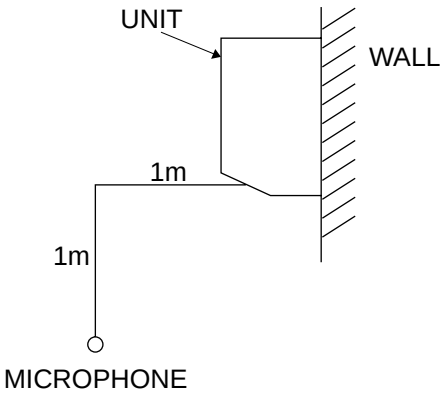
The unit of pressure has been changed to Mpa on the international system of unit (SI unit system).
The converted score against the traditional unit system can be gotten according to the formula below.
1(Mpa) = 10.2(kg/cm^2)

5. NOISE CRITERION CURVES

PK-1.6GKL
PK-2GKL

NOTCH	SPL(dB)	LINE
Hi	43	○——○
Lo	36	▲——▲





Ambient temperature 27℃

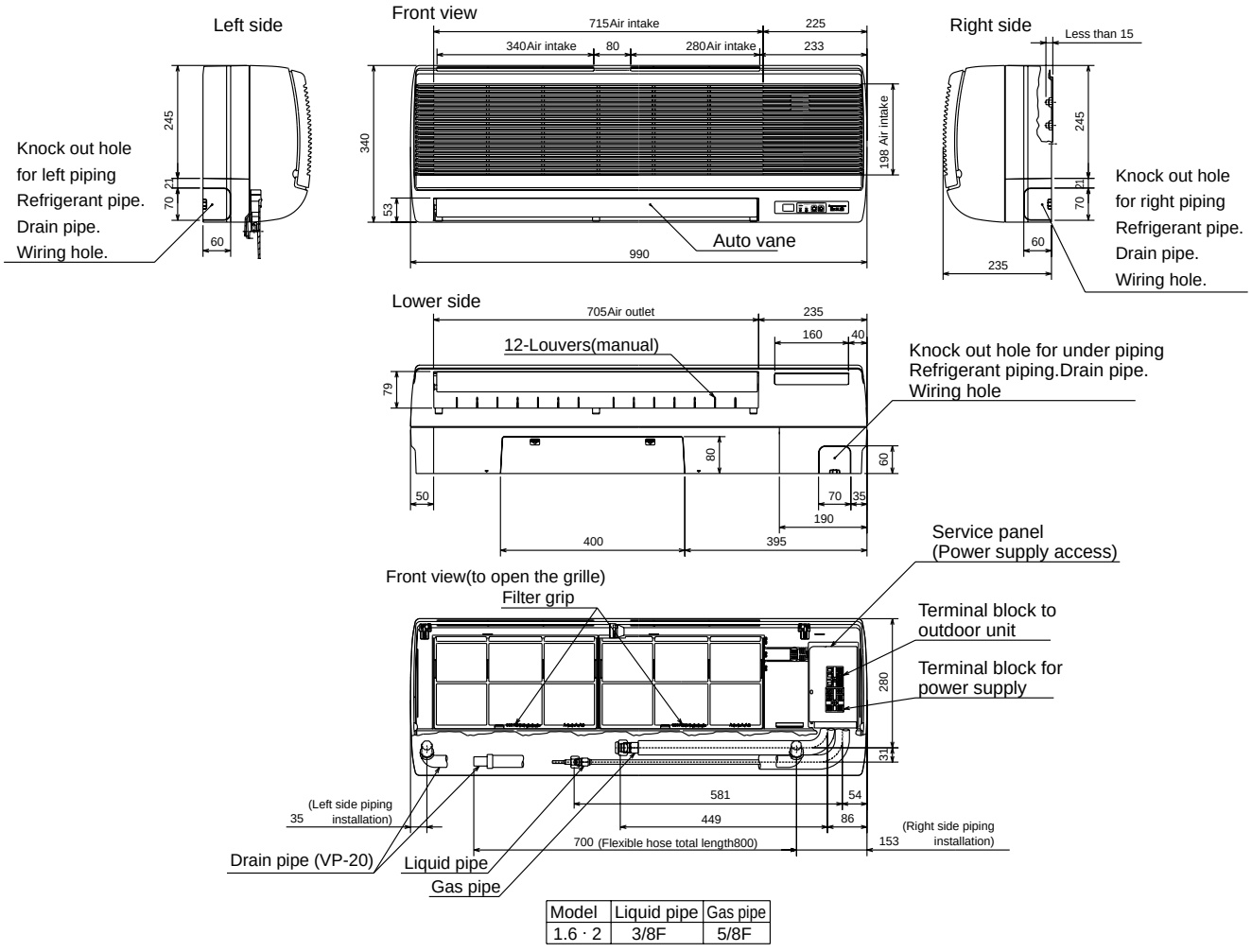
Test conditions are based on JIS Z8731

4 OUTLINES AND DIMENSIONS

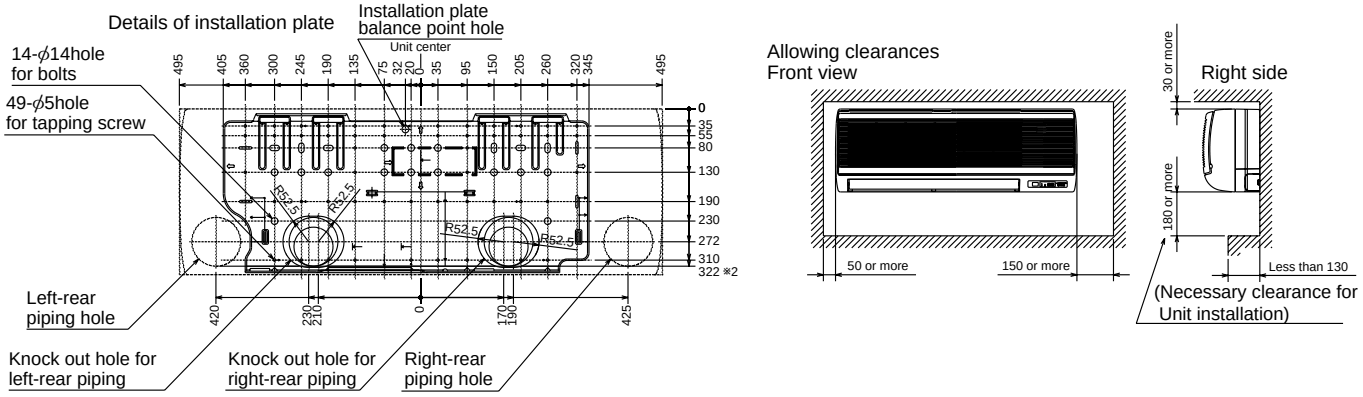
1.INDOOR UNIT

Unit : mm

PK-1.6GKL
PK-2GKL



Model	Liquid pipe	Gas pipe
1.6 · 2	3/8F	5/8F



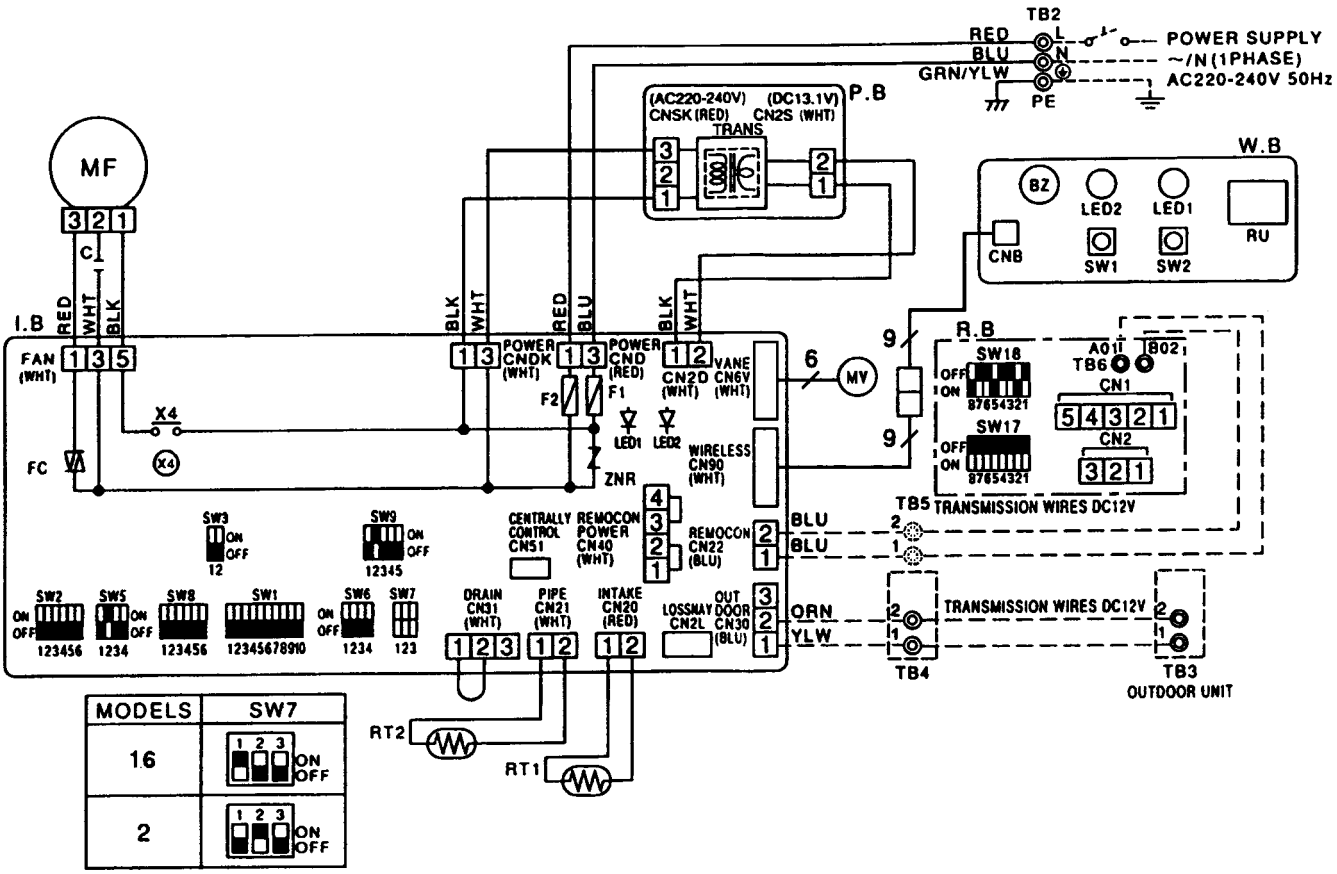
Model	Sleeve ※1	Through hole
1.6 · 2	ϕ90	ϕ90~ϕ100

※1 Sleeves are available on the market.
※2 This size shows the lower end of through hole.

5 WIRING DIAGRAM

PK-1.6GKL
PK-2GKL

SYMBOL		NAME	SYMBOL		NAME	SYMBOL		NAME
P.B		INDOOR POWER BOARD	I.B	X4	RELAY (FAN MOTOR)	R.B		REMOTE CONTROLLER BOARD (OPTION)
I.B		INDOOR CONTROLLER BOARD		F1, F2	FUSE (6.3V / 250V)		CN1	CONNECTOR (PROGRAM TIMER)
	CN2L	CONNECTOR (LOSSNAY)		ZNR	VARISTOR		CN2	CONNECTOR (REMOTE SWITCH)
	CN51	CONNECTOR (CENTRALLY CONTROL)		LED1	LED (DC 12V POWER)		SW17	SWITCH (ADDRESS SELECTOR)
	FC	FAN PHASE CONTROL		LED2	LED (DC 5V POWER)		SW18	SWITCH (FUNCTION SELECTOR)
	SW1	SWITCH (FUNCTION SELECTOR)	C		CAPACITOR (FAN MOTOR)	W.B		WIRELESS REMOTE CONTROLLER BOARD
	SW2	SWITCH (ADDRESS SELECTOR)	MF		FAN MOTOR		RU	RECEIVING UNIT
	SW3	SWITCH (EMERGENCY OPERATION)	MV		VANE MOTOR		BZ	BUZZER
	SW5	SWITCH (MODEL SELECTOR)	TB2~TB6		TERMINAL BLOCK		LED1	LED (RUN INDICATOR)
	SW6	SWITCH (TWIN / TRIPLE SELECTOR)	RT1		ROOM TEMPERATURE THERMISTOR		SW2	SWITCH (COOLING ON / OFF)
	SW7	SWITCH (MODEL SELECTOR)			(0℃ / 15kΩ , 25℃ / 5.4kΩ / DETECT)			
	SW8	SWITCH (OPTION)	RT2		PIPE TEMPERATURE THERMISTOR / LIQUID			
	SW9	SWITCH (MODEL SELECTOR)			(0℃ / 15kΩ , 25℃ / 5.4kΩ / DETECT)			

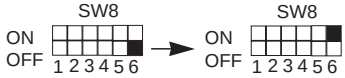


NOTES :

1. Since the indoor fan motor (MF) is connected with 230, 240V power. If 220V power is used, change the dip switch (SW8) on the indoor controller board as shown in fig : ※2.

   fig ※2

   Indoor fan motor (MF)for 220V.

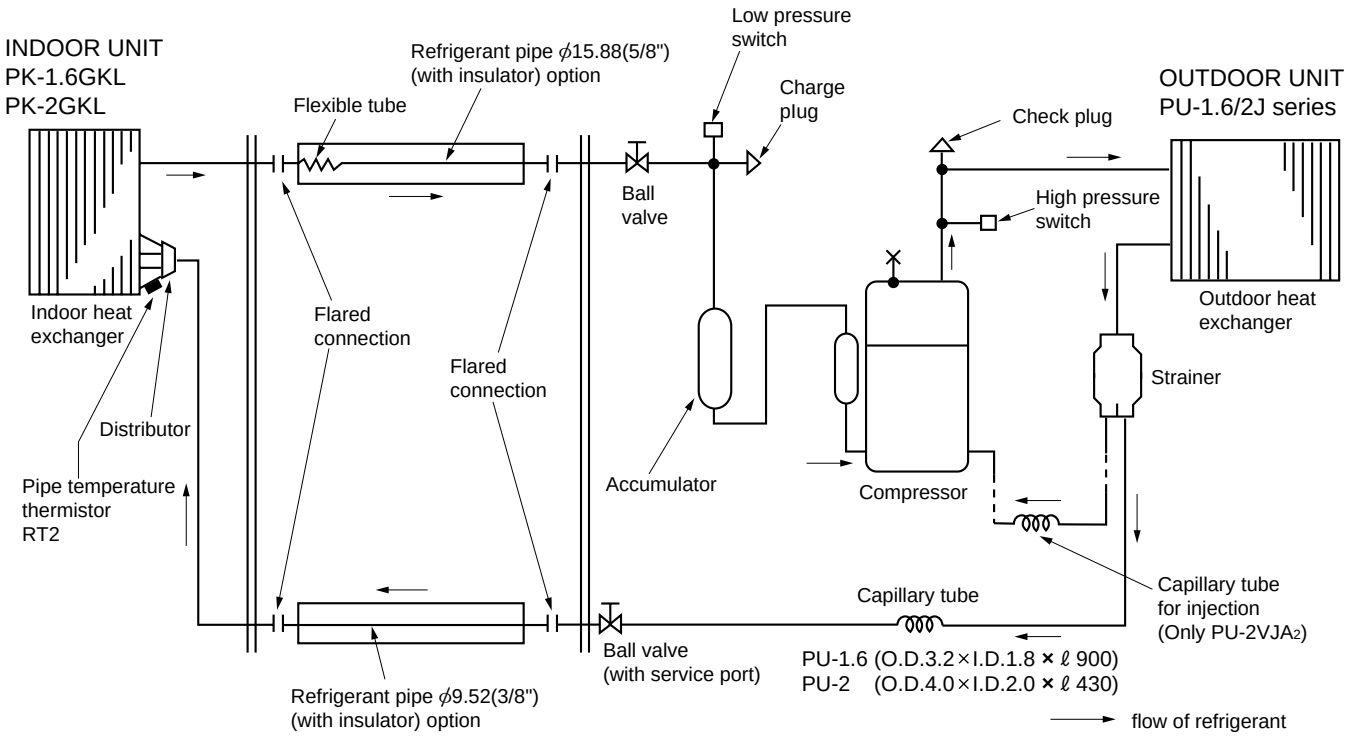
   

2. Since the outdoor side electric wiring may change be sure to check the outdoor unit electric wiring for servicing.
3. Symbols used in wiring diagram above are, □□: Connector, ◎: Terminal block.
4. Emergency operation
   If remote controller or microcomputer fails but there is no other trouble , emergency operation is possible by setting dip switch (SW3<I.B>) on the indoor controller board.

6 REFRIGERANT SYSTEM DIAGRAM

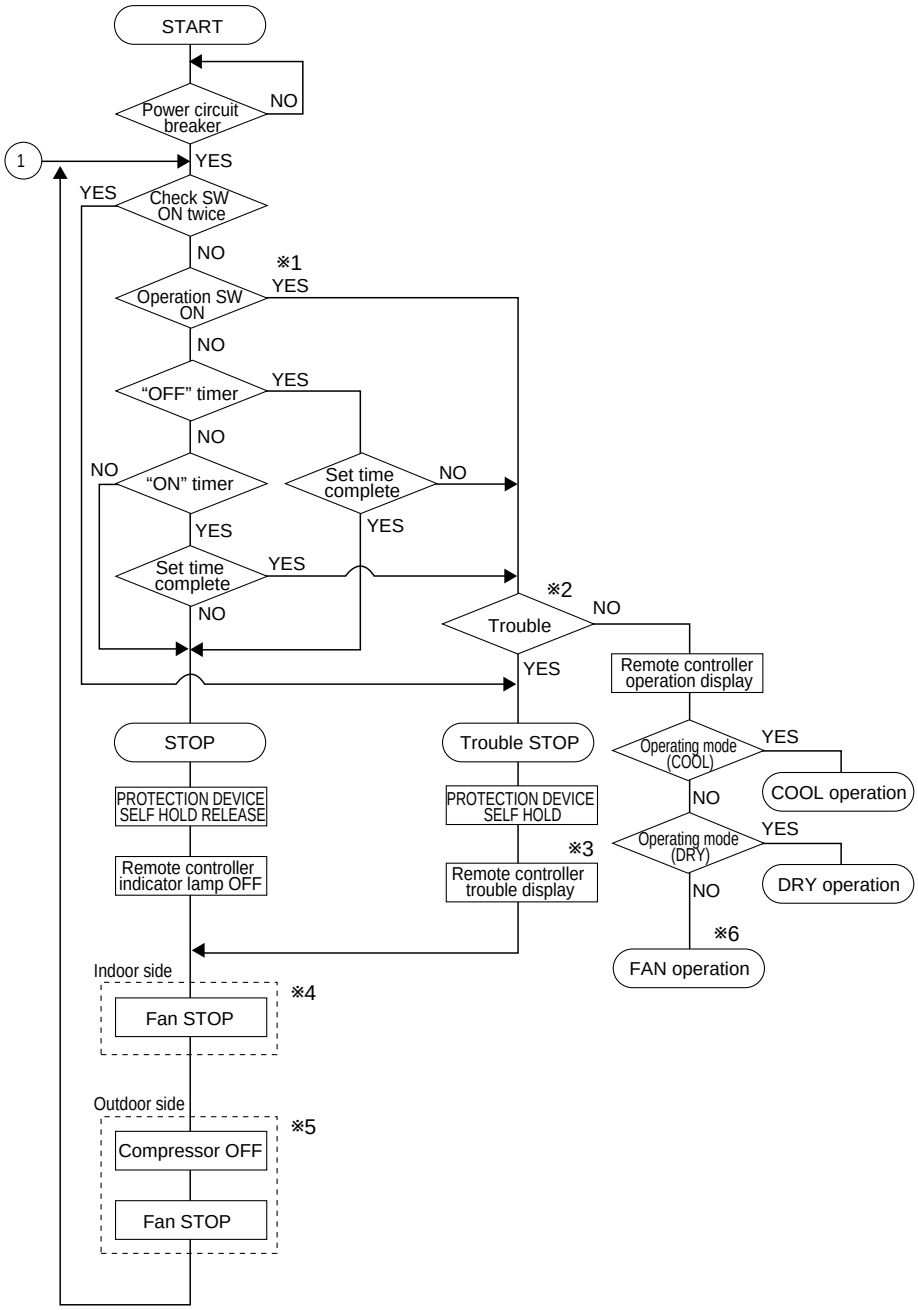
PK-1.6GKL / PU-1.6VLJA2
PK-2GKL / PU-2VJA2

Unit : mm



7 OPERATION FLOW-CHART

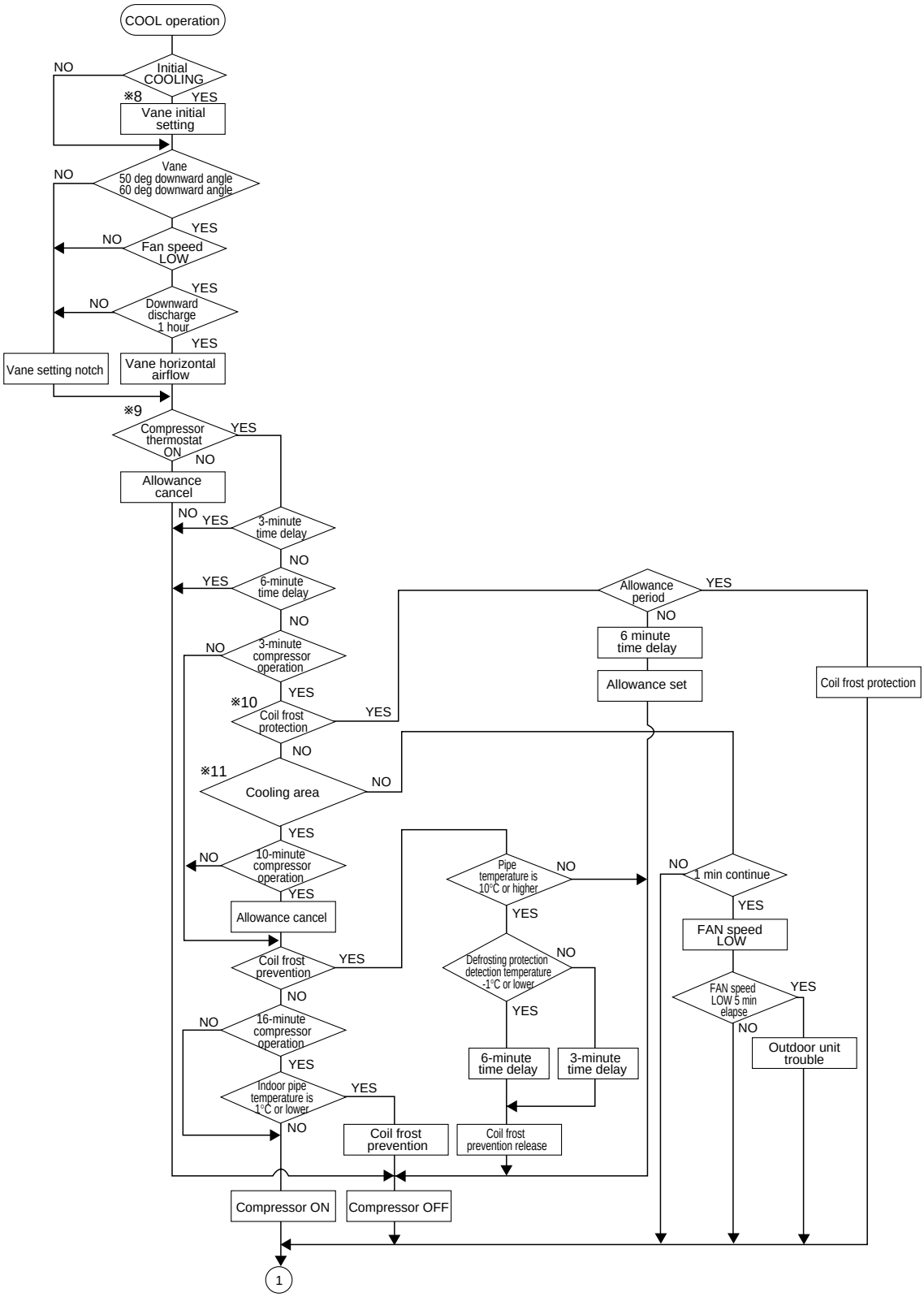
MAIN OPERATION



※1 In addition, the centralized control and remote control can be operated.
※2 The modes which indicate the sources of trouble are listed below.
- EO-Signal transmitting/receiving error
- P1-Room temperature thermistor malfunction
- P2-Pipe temperature thermistor malfunction
- P4-Drain sensor malfunction
- P5-Drain overflow
- P6-Coil frost
- P7-System error
- P8-Outdoor unit trouble

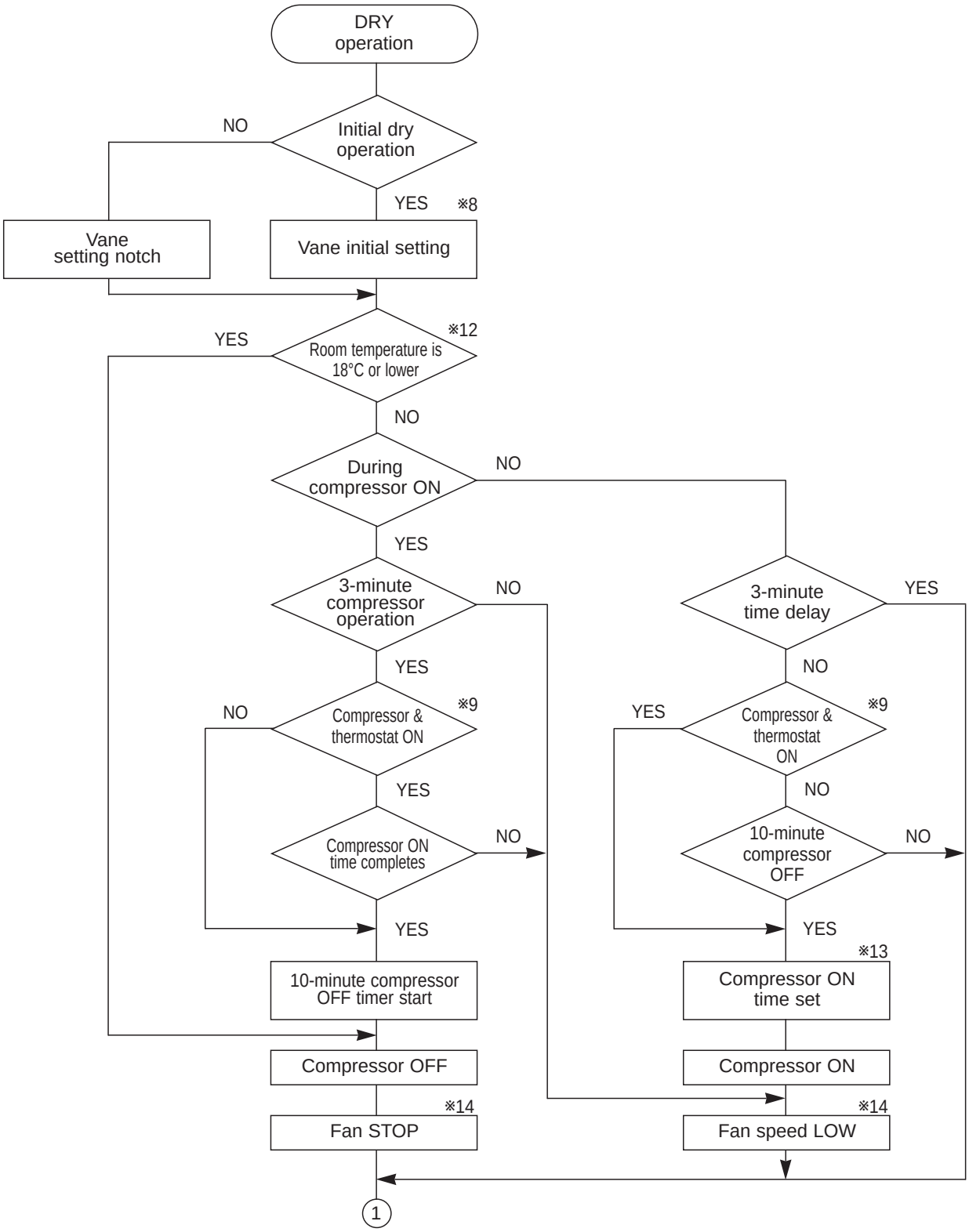
※3 The CHECK switch will indicate if an error has occurred in the past.
※4 Fan runs on low speed for 1 minute in order to remove overheat air.
※5 The 3-minute time-delay functions after compressor stops.
※6 In FAN mode, fan speed and vane operation depend on the remote controller setting. (Compressor is OFF.)

COOLING OPERATION



※8 When operation stops or changes to cooling or dry mode, the auto vane turns to a horizontal angle. If operation changes during auto vane SWING, the auto vane will continue to swing.
※9 When operating TEST RUN, the thermostat will be continuously ON.
※10After 3 minute compressor operation, if the pipe temperature thermistor reads -15°C or below for 3 minutes, the compressor will stop for 6 minutes.
※11Heating area : Pipe temperature is more than 5 degrees above the room temperature.
Cooling area : Pipe temperature is more than 5 degrees below the room temperature.
FAN area : Pipe temperature is within 5 degrees either way of the room temperature.

DRY OPERATION



※8~9 Refer to page 20~21.

※12 When room temperature is 18°C or below, the compressor cannot operate.
When room temperature rises over 18°C, the compressor starts after a 3-minute time delay.

※13 Compressor ON time is decided by room temperature. Refer to page 20~21.

※14 In dry operation, compressor ON makes the fan speed LOW. Also, when the compressor OFF and the pipe temperature is 26°C or less, the fan stops, or when the compressor OFF and the pipe temperature is below 6°C, the fan speed changes to LOW mode.
It is not possible to set the fan speed with the remote controller.

8 MICROPROCESSOR CONTROL

1. OUTLINE OF MICROPROCESSOR CONTROL

INPUT to remote controller

- OFF-ON switching.
- COOL/DRY-FAN selector switching.
- Thermostat setting.
- TIMER mode selector-switching and Timer setting.
- HIGH-LOW fan speed switching.
- AUTO Vane selector (AIR DISCHARGE) switching.
- TEST RUN switching.
- CHECK mode switching. (Self diagnostic trouble shooting)

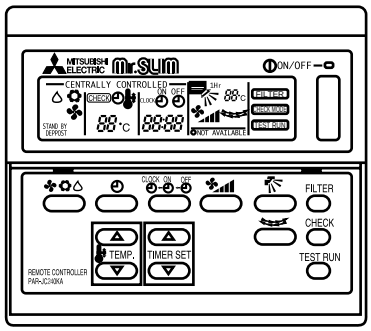
Remote controller board

- Processes and transmits orders.

OUTPUT to remote controller

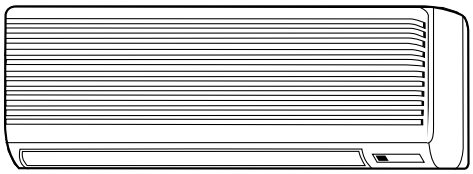
Remote controller

- LCD indicator



WIRED REMOTE CONTROLLER (OPTION)

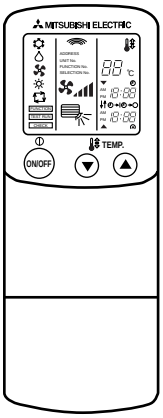
Indoor unit



Non-polar, two-wire cable maximum length 500 meters (WIRED only)

12VDC

Signal



WIRELESS REMOTE CONTROLLER

INPUT from indoor unit

- Room temperature thermistor (RT1)
- Pipe temperature thermistor (RT2)

Indoor controller board

- Receives orders from remote controller and temperature data from indoor unit.
- Processes orders and data.
- Controls indoor and outdoor operation.
- Self diagnostic function.
- ※ System control operation.
- ※ Emergency operation.
- ※ Set by dip switch on indoor controller board.
- Transmits the power to remote controller.

1 2

OUTPUT to indoor unit

- Auto vane's angle setting.
- Emergency stop.

Non-polar two-wire cable

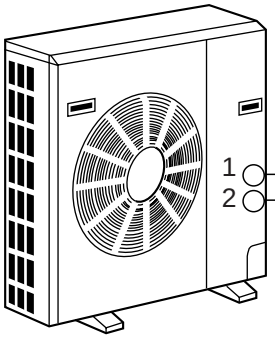
OUTPUT to outdoor unit

- Compressor and outdoor fan : ON-OFF.

Independent Control of Outdoor Unit

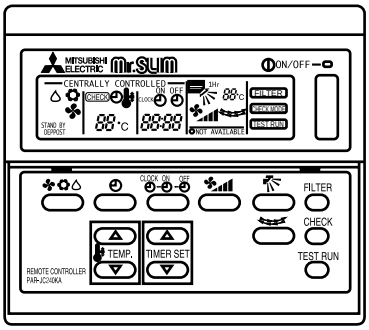
- Compressor protection device working
- Crankcase heater control ON-OFF.

Outdoor unit

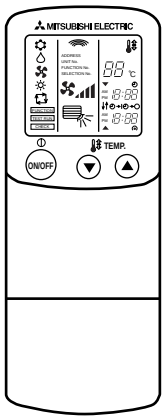


2. INDOOR UNIT CONTROL

2-1 COOL operation



WIRED REMOTE CONTROLLER (OPTION)



WIRELESS REMOTE CONTROLLER

<How to operate>

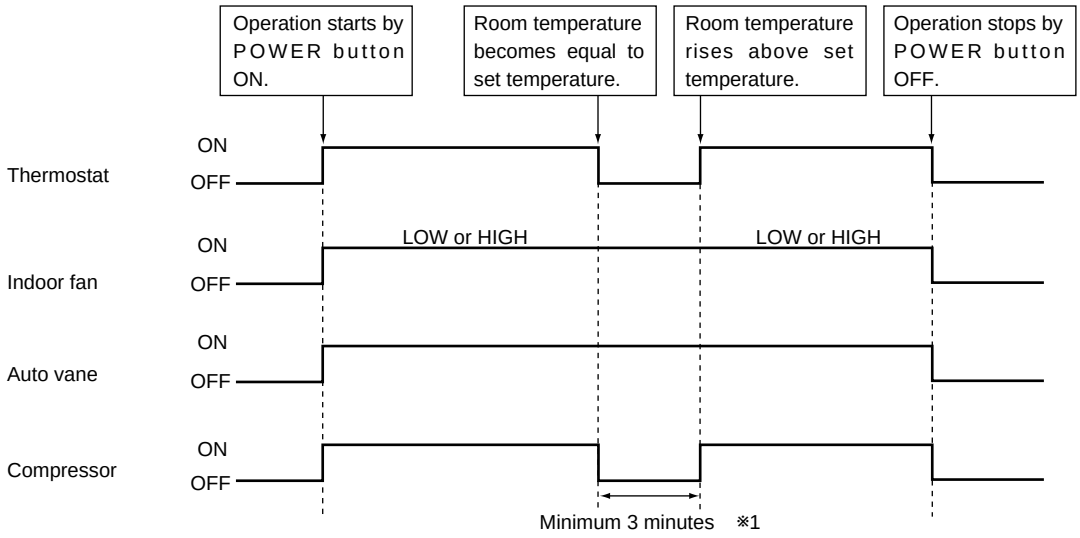
① Press POWER ON/OFF button.

② Press the MODE button to display ✿

③ Press the TEMP. button to set the desired temperature.

NOTE: Set temperature changes 1°C when the ⊙ or ⊙ button is pressed one time.
Cooling 19 to 30°C

<COOL operation time chart>



※1 Even if the room temperature rise above the set temperature during this period, the compressor will not start until this period has ended.

(1) Compressor control

① 3-minute time delay
To prevent overload, the compressor will not start within 3 minutes after stop.

② The compressor runs when room temperature is higher than set temperature.
The compressor stops when room temperature is equal to or lower than the set temperature.
The compressor maintains the previous state when the discharge temperature minus the set temperature is 0°C or more, or lower than 1°C.

③ The compressor stops in check mode or during protective functions.

④ Coil frost prevention
To prevent indoor coil frost, the compressor will stop when the pipe temperature thermistor (RT2) reads 1°C or below after the compressor has been continuously operated for at least 16 minutes or more. When the pipe temperature rises to 10°C or above, the compressor will start in a 3-minute(※2) time delay.
※2 When the pipe temperature is -1°C or less, the compressor starts in 6 minutes.

NOTE : By turning OFF the dip switch SW1-3 on indoor controller board, the start temperature of coil frost prevention changes from 1°C to -3°C.

⑤ Coil frost protection

When indoor coil temperature becomes -15°C or below,coil frost protection will proceed as follows.

<Start condition>

After the compressor has been continuously operated for 3 minutes or more,and the indoor coil temperature has been -15°C or below for 3 minutes,the coil frost protection will start.

<Coil frost protection>

Compressor stops for 6 minutes,and then restarts.

If the start condition is satisfied again during the first 10 minutes of compressor operation,both the indoor and outdoor units stop, displaying a check code of “P6” on the remote controller.

<Termination conditions>

Coil frost protection is released when the start condition is not satisfied again during the allowance, or when the COOL mode stops or changes to another mode.

(2) Indoor fan control

Indoor fan speed LOW/HIGH depends on the remote controller setting.

However, if an outdoor unit abnormality is detected, the indoor fan speed will be LOW, regardless of the remote controller setting.

(i) Fan speed LOW/HIGH depends on the remote controller setting regardless of the thermostat ON/OFF.

(ii) Fan speed will remain on LOW if an abnormality in outdoor unit is detected. (5 minutes)

NOTE : Fan stops immediately if the unit stops or the check mode is started.

(3) Auto vane control

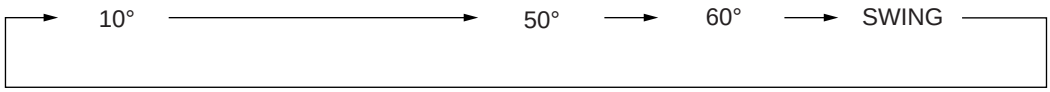
Auto vane position is set to 10 degrees airflow at the start-up of COOL operation.

(a) Vane position set mode & swing mode.

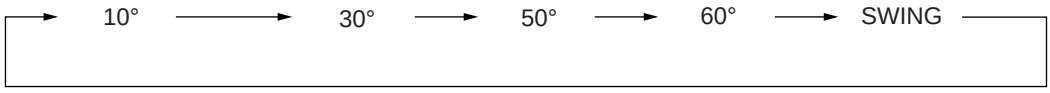
(i) Every time (VANE) button is pressed, setting will be changed .

(ii) Airflow direction can be changed with (VANE) button.

① Fan speed : LOW

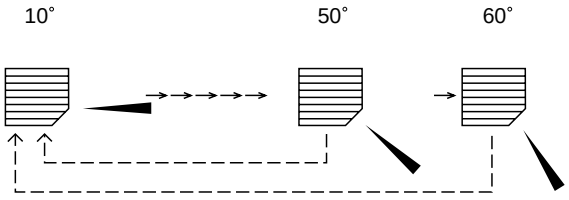


② Fan speed : HIGH

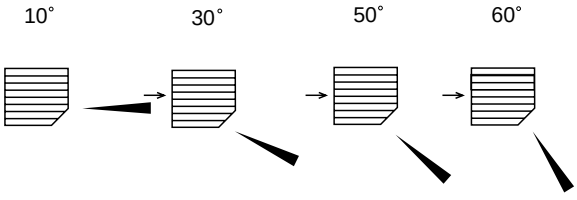


<VANE POSITION>

① Fan speed : LOW



② Fan speed : HIGH



AUTO RETURN

As for the unit opreted with only wired remote controller,

When 50 degrees or 60 degrees airflow is selected with the LOW fan speed in COOL operation, “1Hr” will appear right side of the air direction display. One hour later, the airflow direction returns to 10 degrees automatically and “1Hr” will disappear. If the airflow direction is set to 10 degrees during “1Hr” indication, the time counting for AUTO RETURN is cancelled.

(4) Detecting abnormalities in the outdoor unit

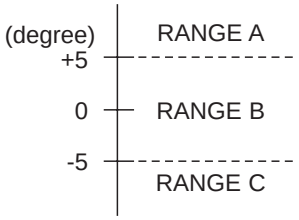
After the compressor has been continuously operated for 3 minutes, if the difference between the pipe temperature and room temperature is out of RANGE C for 1 minute, the indoor fan speed will turn to LOW. Five minutes later, if the difference is still out of RANGE C,the outdoor unit is functioning abnormally. Thus, the compressor stops and check code “P8” appears on remote controller.

RANGE A : Pipe temperature is more than 5 degrees above room temperature.

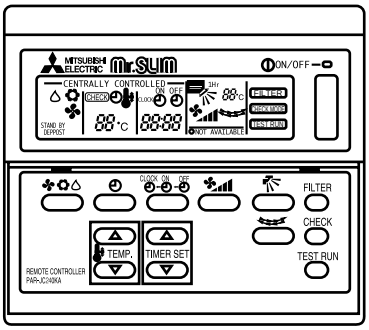
RANGE B : Pipe temperature is within 5 degrees either way of room temperature.

RANGE C : Pipe temperature is more than 5 degrees below room temperature.

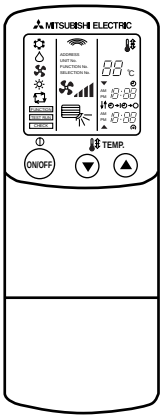
Pipe temperature
minus room temperature



2-2 DRY operation



WIRED REMOTE CONTROLLER (OPTION)



WIRELESS REMOTE CONTROLLER

<How to operate>

① Press POWER ON/OFF button.

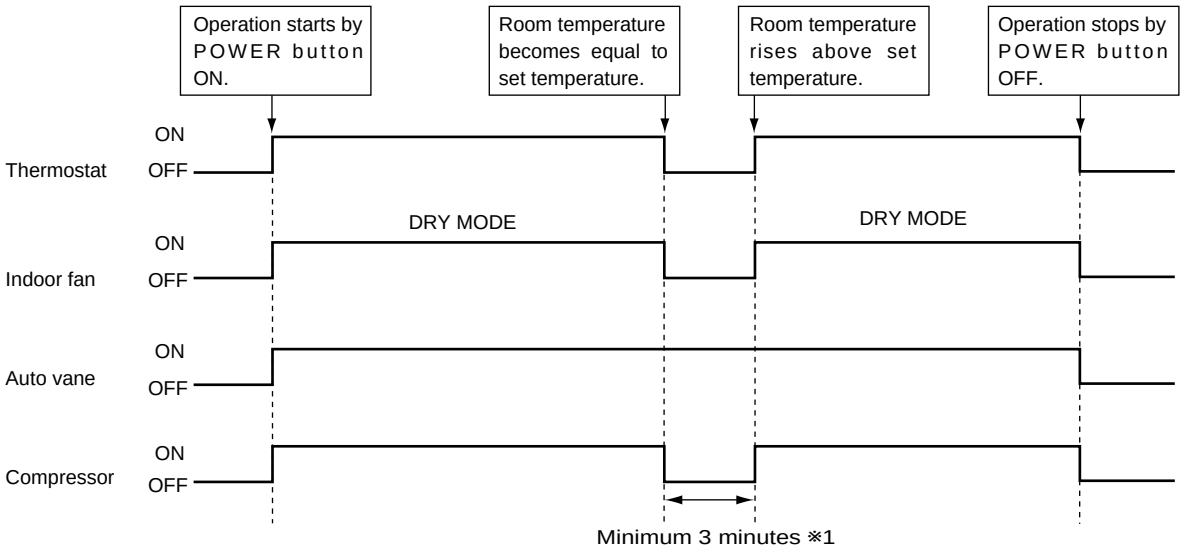
② Press the MODE button to display "△"

③ Press the TEMP. button to set the desired temperature.

NOTE: The set temperature changes 1°C when the ▼ or ▲ button is pressed one time.

Dry 19 to 30°C

<DRY operation time chart>



※1 Even if the room temperature rises above the set temperature during this period, the compressor will not start until this period has ended.

(1) Compressor control

①3-minute time delay

To prevent overload, the compressor will not start within 3 minutes after stop.

②The compressor stops in check mode or during protective functions.

④The compressor will not start when the room temperature is below 18°C.
The compressor starts intermittent operation when the power is turned ON with room temperature above 18°C. The compressor ON/OFF time depends on the thermostat ON/OFF and the following room temperatures.After 3-minute compressor operation,

- If the room temperature thermistor reads above 28°C with thermostat ON, the compressor will operate for 6 more minutes and then stop for 3 minutes.
- If the room temperature thermistor reads above 26°C~28°C with thermostat ON, the compressor will operate for 4 more minutes and then stop for 3 minutes.
- If the room temperature thermistor reads 24°C~26°C with thermostat ON, the compressor will operate for 2 more minutes and then stop for 3 minutes.
- If the room temperature thermistor reads below 24°C with thermostat ON, the compressor will stop for 3 minutes.
- If the thermostat is OFF regardless of room temperature, the compressor will stop for 10 minutes.

⑤Coil frost protection
Coil frost protection in DRY operation is the same as in COOL operation.
⑥Coil frost prevention
Coil frost prevention does not operate in DRY operation.

(2) Indoor fan control

The indoor fan runs on LOW speed during compressor operation. The fan speed cannot be changed with the remote controller. Also, the fan runs on LOW speed when the pipe temperature is 6°C or more, or the compressor is OFF and the pipe temperature is below 6°C.

(a)During compressor OFF

- When the pipe temperature is 6°C or above, the indoor fan will stop.
- When the pipe temperature is below 6°C, the indoor fan will run on LOW speed.

(b)During compressor ON

- The indoor fan runs on LOW speed.

<Dry mode>

The fan notch is controlled by the pipe temperature every 30 seconds.

Fan control in DRY operation.

	Pipe temp.	Fan
Compressor OFF	6°C or more	STOP
	Below 6°C	LOW
Compressor ON	All	LOW

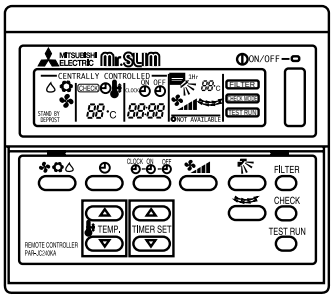
(3) Auto vane

Same as in COOL operation

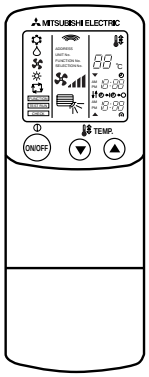
(4) Detecting abnormalities in the outdoor unit

An abnormality in the outdoor unit can not be detected in DRY operation.

2-3 Auto vane control



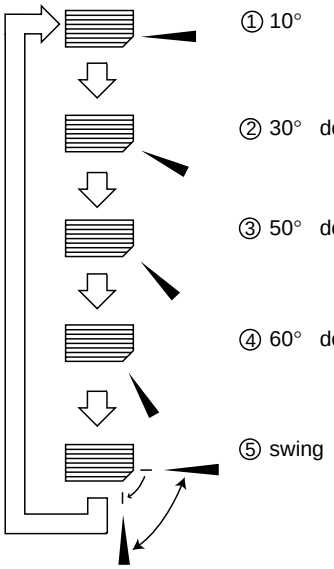
WIRED REMOTE CONTROLLER (OPTION)



WIRELESS REMOTE CONTROLLER

<How to operate>
To change the air flow direction, press (VANE) button.

①	②	③	④
10°	30°	50°	60°



Changes by pressing the (VANE) button.

Available in COOL operation with fan speed on HIGH .
Unavailable in DRY operation.
If fan speed changes from HIGH to LOW during 30° downward airflow in COOL mode, the direction automatically changes to 10°.

(1) COOL/DRY operation

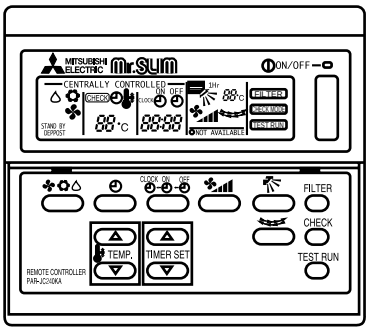
At the start-up of COOL or DRY operation, the airflow direction in automatically set to 10°. After, it can be changed to another direction with (VANE) button on the remote controller.

<Auto return>

When 50° or 60° airflow is set with fan speed in LOW, “1Hr” appears right side of the air direction. One hour later the direction changes to 10 degrees, automatically and “1Hr” disappears. (Only wired remote controller)

2-4 TIMER operation

(1) WIRED REMOTE CONTROLLER (OPTION)



<Timer function>

AUTO STOP ·····The air conditioner stops after the set time lapses.
AUTO START ·····The air conditioner starts after the set time lapses.
AUTO OFF ·····Timer is not active.

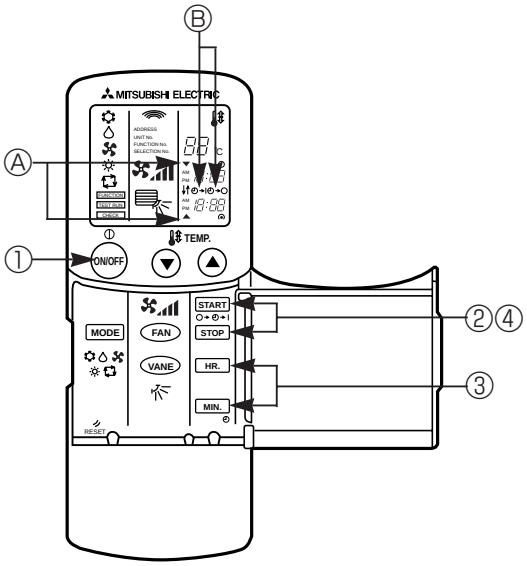
<How to operate>

1. Press POWER ON/OFF button.
2. Press " ◴ " button to select AUTO STOP or AUTO START.
3. Press " ◴-◴-◴ " button to set desired time.
   Time setting is in 1 hour units for up to 24 hours.
   Each time HOURS button is pressed, set time increases by 1 hour.
   When HOURS button is pressed and held, the set time increases by 1 hour every 0.5 seconds.
4. To cancel the timer operation, press POWER ON/OFF button.

<Timer setting example>

This setting will stop the air conditioner in 8 hours.
With the lapse of time, time display changes in 1 hour units, showing remaining time.

(2) WIRELESS REMOTE CONTROLLER



<How to operate>

① Press the ON/OFF button to turn it ON.
② Press the [STOP] or [START] button (TIMER SET).
- Time can be set while the following symbol is displayed.
  OFF timer : Ⓐ ▼, Ⓑ ◴-○ is displayed.
  ON timer : Ⓐ ▲, Ⓑ ◴-| is displayed.

③ Use the [HR.] and [MIN.] buttons to set the desired time.
④ Cancelling the timer.
  To cancel the OFF timer, press the [STOP] button.
  To cancel the ON timer, press the [START] button.

- It is possible to combine both OFF and ON timers.
- Pressing the ⏻ ON/OFF button of the remote controller during timer mode to stop the unit will cancel the timers.

2-5 Test run

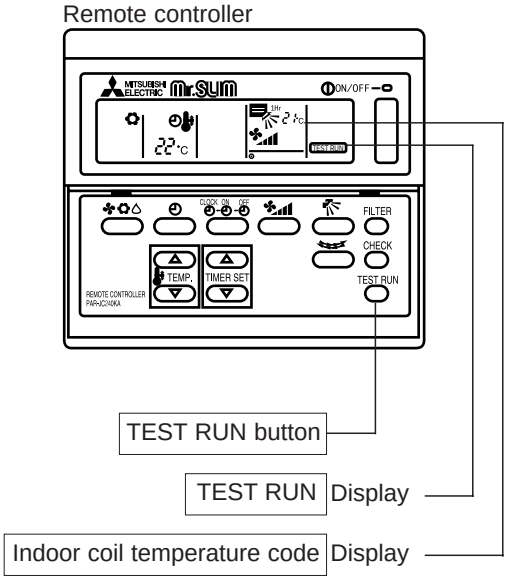
(1) WIRED REMOTE CONTROLLER (OPTION)

<Before test run>

- After installing, wiring, and piping the indoor and outdoor units, check for refrigerant leakage, looseness in power supply or control wiring, and mistaken polarity.
- Use a 500-volt megger to check the resistance between the power supply terminal block and ground to make sure that it is at least 1.0MΩ.

Attention:

Do not use the air conditioner if resistance is less than 1.0MΩ.

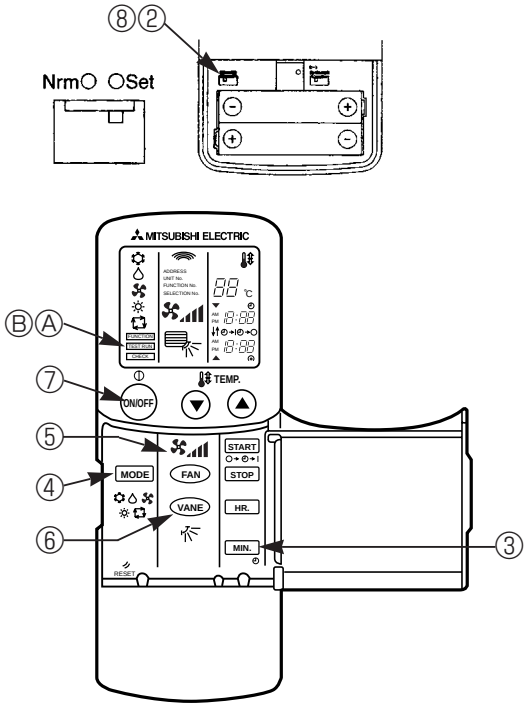


1	Turn on main switch.12 hours before proceeding to step 2 to allow for crankcase heater operation.
2	Push the TEST RUN button twice and indication of TEST RUN will be shown on the liquid crystal display.
3	Press the button, COOL/DRY to confirm that cool air is blown out.
4	Push button LOW/HIGH to check that the fan speed changes properly.
5	Check the operation of outdoor unit fans.This unit controls the rotation speed and performance capacity of fans. In some cases,it may rotate at low speed as the condition of outside air requires and the speed will be kept unless the performance has become deficient. Therefore,when the condition of outside air demands,there may be such cases as the fan stops or rotates reversely. Please note that these symptoms are not malfunction.
6	After the check is finished leave the test run mode, push the power ON/OFF button. It can also be stopped by pushing the timer MODE button.

*The above figure shows the state of TEST RUN at cooling operation.

●When a TEST RUN is started,the timer shall be set to 2 hours. The unit will automatically turn off after 2 hours.

(2) WIRELESS REMOTE CONTROLLER



<Before test run>

Measure an impedance between the power supply terminal block on the outdoor unit and the ground with a 500 V Megger and check that it is equal or greater than 1.0MΩ.

① Turn on the main power to the unit..

② Set the Nrm/Set selector switch (on the back of the controller)to <Set>.
Ⓐ The FUNCTION, TEST RUN and CHECK begin to blink.

③ Press the MIN. button.
Ⓑ TEST RUN and current operation mode are displayed.

④ Press the MODE button to activate COOL mode, then check whether cool air in blown out from the unit.

⑤ Press the FAN button and check whether strong air is blown out from the unit.

⑤ Press the VANE button and check whether the auto vane operates properly.

⑦ Press the ON/OFF button to stop the test run.

⑧ After trial run is complete, set the Nrm/Set selector switch to <Nrm.>

Note :

- **Point the remote controller toward the inside unit's receiver while steps ③ though ⑦ .**
- **It is not possible to run the unit in FAN or DRY mode.**

(1) Pipe temperature code

During the test run, the pipe temperature code from 1 to 15 is displayed on the remote controller instead of room temperature. The code should fall with the lapse of time in normal COOL operation.

Code	1	2	3	4	5	6	7	8
Pipe temperature	-40~2(1)°C	3(2)~10°C	~15°C	~20°C	~25°C	~30°C	~35°C	~40°C
Code	9	10	11	12	13	14	15	
Pipe temperature	~45°C	~50°C	~55°C	~60°C	~70°C	~90°C	Thermistor abnormality	

(2) Trouble during test run

- If the unit malfunctions during the test run, refer to section 10 in this manual entitled “TROUBLESHOOTING.”
- When the optional program timer is connected to the conditioner, refer to its operating instructions.

2-6 Emergency operation

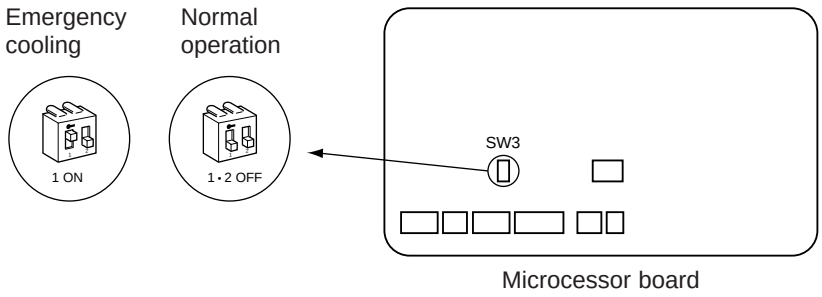
When the remote controller or microprocessor malfunctions but all other parts are normal, emergency operation is started by setting the dip switch SW3 on the indoor controller board.

<Before emergency operation>

1. Make sure the compressor and the indoor fan are operating normally.
2. Locate the defect with the self-diagnostic function. When the self-diagnostic function indicates “protective function is working”, release the protective function before starting the emergency operation.
   CAUTION: When the self-diagnostic function indicates a check code of “P5” (drain pump malfunction), DO NOT start the emergency operation because the drain may overflow.

<How to operate>

1. For emergency cooling, set the dip switch SW3-1 to ON and SW3-2 to OFF.



Microcessor board

2. Turn ON the outdoor unit breaker and then ON the indoor unit breaker.
   Emergency operation will now start.
3. During emergency operation, the indoor fan operates on high speed, the auto vanes do not operate.
4. To stop emergency operation, turn OFF the indoor unit breaker.
5. Movements of the vanes do not work in emergency operation, therefore you have to slowly set them manually to the appropriate position.

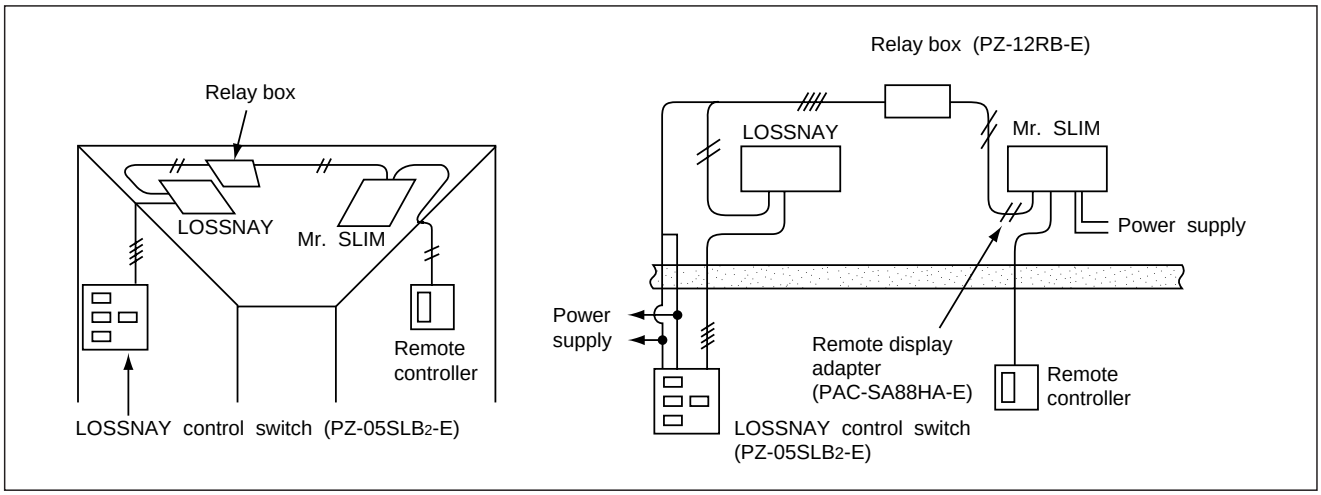
NOTE: The remote controller POWER ON/OFF button can not start/stop emergency operations.

CAUTION: Do not use emergency cooling for more than 10 hours, as the indoor coil may freeze.

2-7 Interlock with ventilation system (LOSSNAY)

Mr. SLIM/LOSSNAY interlock operation is available by using the optional parts listed below.

(1) System organization



(2) LOSSNAY models connectable to Mr. SLIM are: LGH-15RS-E, LGH-50RS-E
LGH-25RS-E, LGH-80RS-E
LGH-35RS-E, LGH-100RS-E

(3) Required parts are:

- Relay box (PZ-12RB-E)···Contact capacity 10A
- Remote display adapter (PAC-SA88HA-E)···An optional part for Mr. SLIM
- LOSSNAY control switch (PZ-05SLB2-E)···For LOSSNAY individual operation

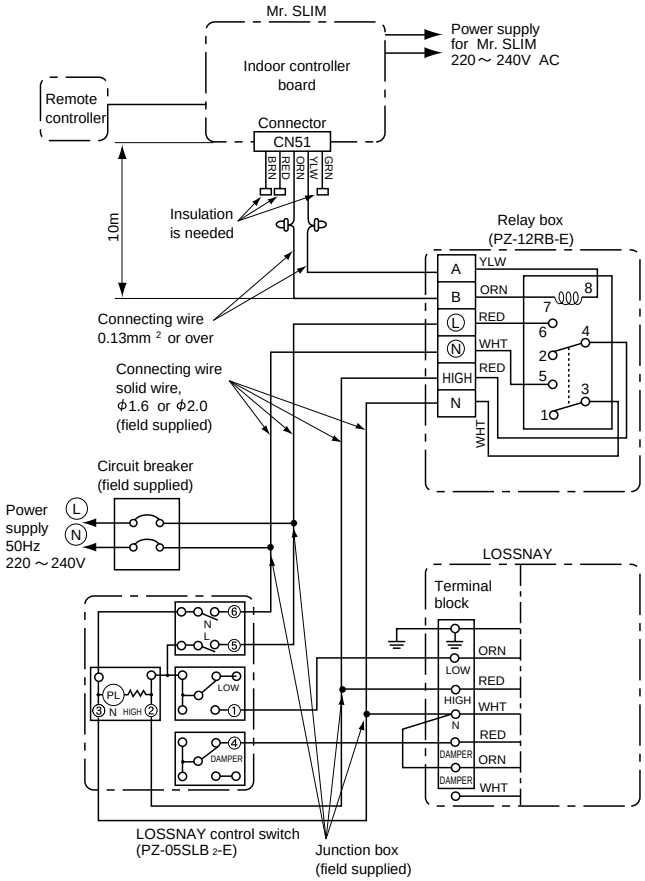
(4) Operation

①LOSSNAY turns ON/OFF according to Mr. SLIM ON/OFF

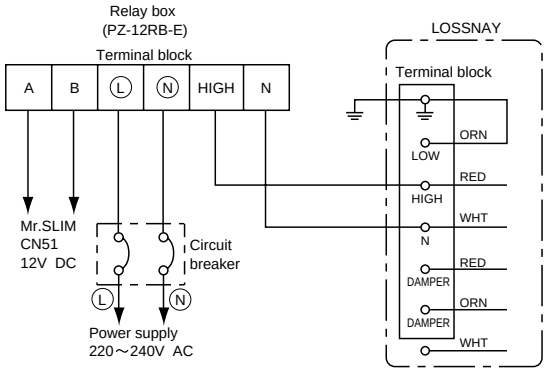
②While Mr. SLIM is OFF, LOSSNAY individual operation is available by using the LOSSNAY control switch. When Mr. SLIM turns OFF with the LOSSNAY control switch at ON, LOSSNAY will continue to operate.

(5) Wiring.

①When the LOSSNAY control switch is used



②When the LOSSNAY control switch is not used:



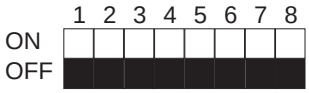
NOTE: For further information, refer to the LOSSNAY technical & service manual.

2-8 Dip switch functions

Each figure shows the initial factory setting.

1. On remote controller board

(1) SW17(Address selector)

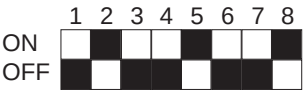


SW17-1~6) For address setting

SW17-7) When two remote controllers are used,this switch sets the controller function.
OFF:The remote controller is set as a main controller.
ON :The remote controller is set as a sub controller.

SW17-8) Switch for system back-up.
OFF:Without back-up
ON :With back-up

(2) SW18(Function selector)



SW18-1) Switch for timer
OFF:Single day ON:timer every day

SW18-2) Switch for filter sign
OFF:filter sign absent
ON :filter sign present

SW18-3) Switch for filter sign time setting.
OFF:100Hr ON:2500Hr

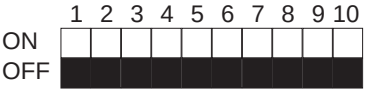
SW18-4) Not for use.

SW18-5) OFF:For models with heat pump.
ON :For models with cooling only.

SW18-6~8) Not for use.

2. On indoor controller board

(1) SW1 (Mode selector)



SW1-1) Switch that changes between FAN mode and AUTO mode
OFF:AUTO mode for models with heat pump
ON :Fan mode for models with heat pump

SW1-2) Not for use.

SW1-3) Switch to change the temperature to start coil frost prevention
OFF:1°C
ON :-3°C

SW1-4) Not for use.

SW1-5) Not for use.

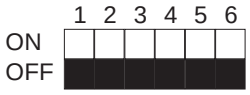
SW1-6) Not for use.

SW1-7) Switch for detecting abnormalities in the outdoor unit abnormality detection
OFF:When an abnormality occurs,it is detected.
ON :Even if an abnormality occurs,it can not be detected.

SW1-8) Switch for auto restart function
OFF:This function does not work
ON :This function works.

SW1-9, 10) Not for use.

(2) SW2 (Address selector)



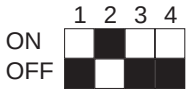
Used in setting the unit-address for group control.
For further information,refer to page 36.

(3) SW3 (Emergency operation switch)

Normal operation

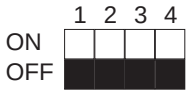
For emergency cooling

(4) SW5 (Model selector)



SW5-1) Not for use.
SW5-2) OFF:For models with heat pump
ON: For models with cooling only
SW5-3) Not for use.
SW5-4) Not for use.

(5) SW6 (Address selector)

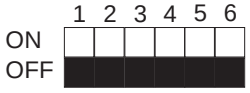


	Single control	Twin control
SW6-1	OFF	ON(Twin NO.1)
SW6-2	OFF	ON(Twin NO.2)
SW6-3	OFF	OFF
SW6-4	OFF	OFF

(6) SW7 (Model selector)
Switch to set the output of phase-controlled indoor fan motor.
Address setting is available at any time.
The initial factory setting by is based on each capacity.

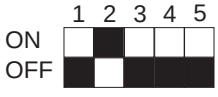
Service Ref.	PK-1.6GKL	PK-2GKL
SW7		

(7) SW8



SW8-1~2) Not for use.
SW8-3~4) Not for use.
SW8-5) Not for use.
SW8-6) OFF:For 240, 230V power supply
ON: For 220V power supply

(8) SW9



SW9-1~5) Keep this switch.

9 TROUBLESHOOTING

1. TROUBLES IN TEST RUN

<table>
<tr><th>Symptom</th><th>Cause</th><th>Check points</th></tr>
<tr><td>The display “CENTRALLY CONTROLLED” on remote controller dose not disappear.</td><td>1) Wrong address setting of remote controller/indoor controller board.
2) Timer adapter is connected to the remote controller.
3) Signal transmission error between indoor unit and remote controller.</td><td>1) Check the address setting of remote controller and indoor controller.
2) Make sure the timer adapter is used correctly.
3) ① Turn another remote controller’s DIP SW17-7 ON to make it sub controller.
② Connect the sub controller to the unit, and turn circuit breaker ON.
● If the display “centrally controlled” disappears, replace the original remote controller.
● If the display remains the same, replace the indoor controller board.</td></tr>
<tr><td>When remote controller POWER button is turned ON, the check code “EO”appears.</td><td>1) Signal transmission error between indoor unit and remote controller</td><td>1) ① Connect a sub remote controller.
② Turn circuit breaker ON.
If the display “centrally controlled” remains, replace the indoor controller board.
③ If the display disappears, turn the remote controller POWER button ON and check as follows.
<table>
<tr><th></th><th>Remote controller</th><th>Sub remote controller</th><th>Malfunction</th></tr>
<tr><td>1</td><td>Operating Display</td><td>EO Display</td><td>Malfunction of indoor Unit</td></tr>
<tr><td>2</td><td>Operating Display</td><td>Operating Display</td><td>Malfunction of Remote controller</td></tr>
<tr><td>3</td><td>No Display</td><td>EO Display</td><td>Malfunction of indoor Unit and Remote Controller</td></tr>
<tr><td>4</td><td>No Display</td><td>Operating Display</td><td>Malfunction of Remote controller</td></tr>
</table></td></tr>
<tr><td>When remote controller POWER button is turned ON, operating display appears, but disappears soon.</td><td>1) Short circuit of indoor/outdoor connecting wire
2) Short circuit of transmission wire.
3) Wrong operation of remote controller due to noise wave emitted by other appliances.</td><td>1), 2) Check the wire
3) Turn the circuit breaker OFF, and then turn ON.
If the remote controller remains abnormal, despite the above measures, replace the indoor controller board.</td></tr>
<tr><td>Despite turning POWER button ON, the remote controller display does not appear.</td><td>1) Damaged remote controller.
2) Short circuit of transmission wire.
3) Bad contact of indoor CN40.
4) CN40 is attached to a sub unit.
5) Damaged power board.
6) Bad contact of CN2D.
7) Blown fuse.
8) Circuit breaker OFF.</td><td>1) Measure the voltage between terminals of remote controller. If no voltage, remove the terminals and measure the voltage between wires. If the voltage is between 6VDC and 12V, replace the remote controller.
2) ~ 8) Check each point.
If it is not defective, replace the indoor controller board.</td></tr>
</table>

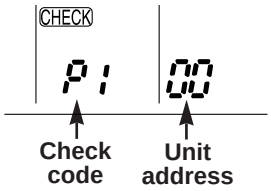
2. SELF DIAGNOSTIC FUNCTION WITH REMOTE CONTROLLER (WIRED REMOTE CONTROLLER (OPTION))

2-1 When malfunction occurs during operation

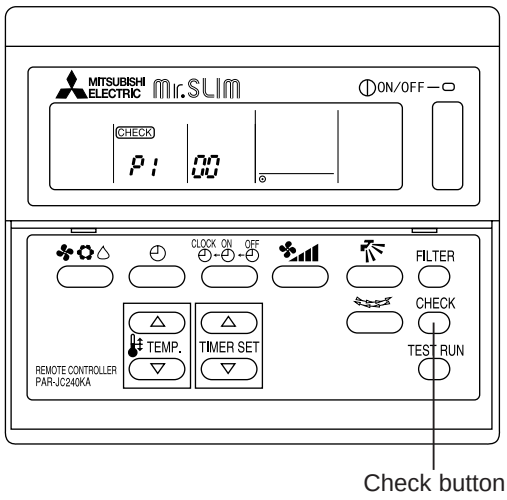
When a malfunction occurs, the indoor and outdoor units stop and the malfunction is displayed on the LCD of the remote controller.

(1) ON the set temperature display part, “CHECK” appears, and the unit address and the check code are displayed alternately at one-second intervals. (Check mode)

Example



CHECK mode



(2) When one remote controller controls several units in the group control, the LCD shows the unit address and check code of the first malfunctioning unit.

(3) To cancel the check mode, press the ⏻ON/OFF button. In remote ON/OFF control, press the remote ⏻ON/OFF switch. In centralized control, turn OFF the ⏻ON/OFF button of centralized controller.

NOTE: The latest check code is memorized, even if the check mode is cancelled by the way mentioned above. It takes 60 seconds maximum to display the memorized check code.

2-2 How to use the self diagnostic function for service

A. For normal control with one unit and one remote controller

(1) Pressing the ⬭ CHECK button on the remote controller twice starts the self diagnostic function.

(2) During the self diagnostic function, “CHECK MODE” appears at two positions on the remote controller display. Then, at least 10 seconds later, the unit address and the check code is alternately displayed at one-second intervals.

(3) Check and repair the unit according to the check code. (Refer to page 32.)

B. For group control using one remote controller

(1) Pressing the ⬭ CHECK button on the remote controller twice starts the self diagnostic function.

(2) Press the ▲ TEMP. button or ▼ TEMP. button on the remote controller to advance or go back to the unit address. Each time ▲ TEMP. button is pressed, the unit address advances by one. Each time ▼ TEMP. button is pressed, the unit address goes back by one.
The check code and the unit address, appear alternately.

(3) The check code “U8” means no malfunction has occurred since installation.
The check code “EO” means the following conditions:
- The unit address displayed on the remote controller does not apply to any unit.
- power is not supplied to the unit.
- Signal transmitting/receiving circuit is abnormal.

(4) Check and repair the unit according to the check code. (Refer to page 32.)

(WIRELESS REMOTE CONTROLLER)

(1) Turn on the main power of the unit.

(2) Set the adjusting switch on the back of the wireless remote controller to “Set” then FUNCTION, TEST RUN and CHECK will start lighting.

★(3) Press the HR. button then CHECK will start blinking.

★(4) Send the signal from the remote controller to the unit with pressing HR. button.

If the buzzer sound is heard are the ON/OFF lamp (Unit display) blinks, refer to the following table.

Buzzer sound	The number of ON/OFF lamp (Unit display) blinking
1 second (0.5 second interval) Beep	This corresponds to the number of buzzer sound

The number of ON/OFF lamp (Unit display) blinking and buzzer sound	Irregular point
1(P1)	Irregular intake sensor
2(P2)	Irregular piping sensor
3(P3)	Signal transmission error
4(P4)	Irregular drain sensor
5(P5)	Irregular drain pump
6(P6)	Freezing protection is working
7(P7)	System error
8(P8)	Irregular outdoor unit

(Refer to the page 32 in detail.)

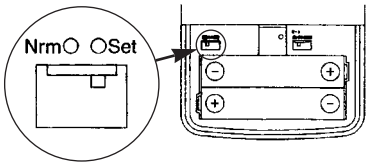
When there is any error, receiving sound beeps.

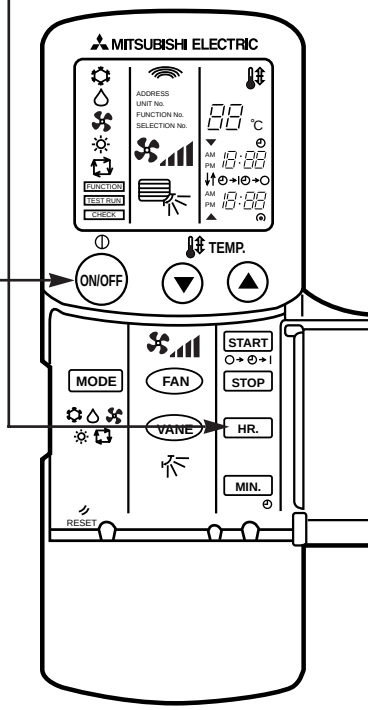
★(5) Push the POWER ON/OFF button and cancel the test run.

(6) After completing a test run, be sure to

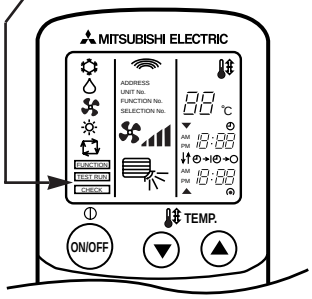
Remove the battery cover on the back side of the wireless remote controller, display will start flashing when the “Set” switch is turned on.
For operations marked “ ★”, point the transmitter to the wireless receiver, and make sure that you will hear a short beep from the receiver.

Turn the adjusting switch to “Set”





Display will start blinking



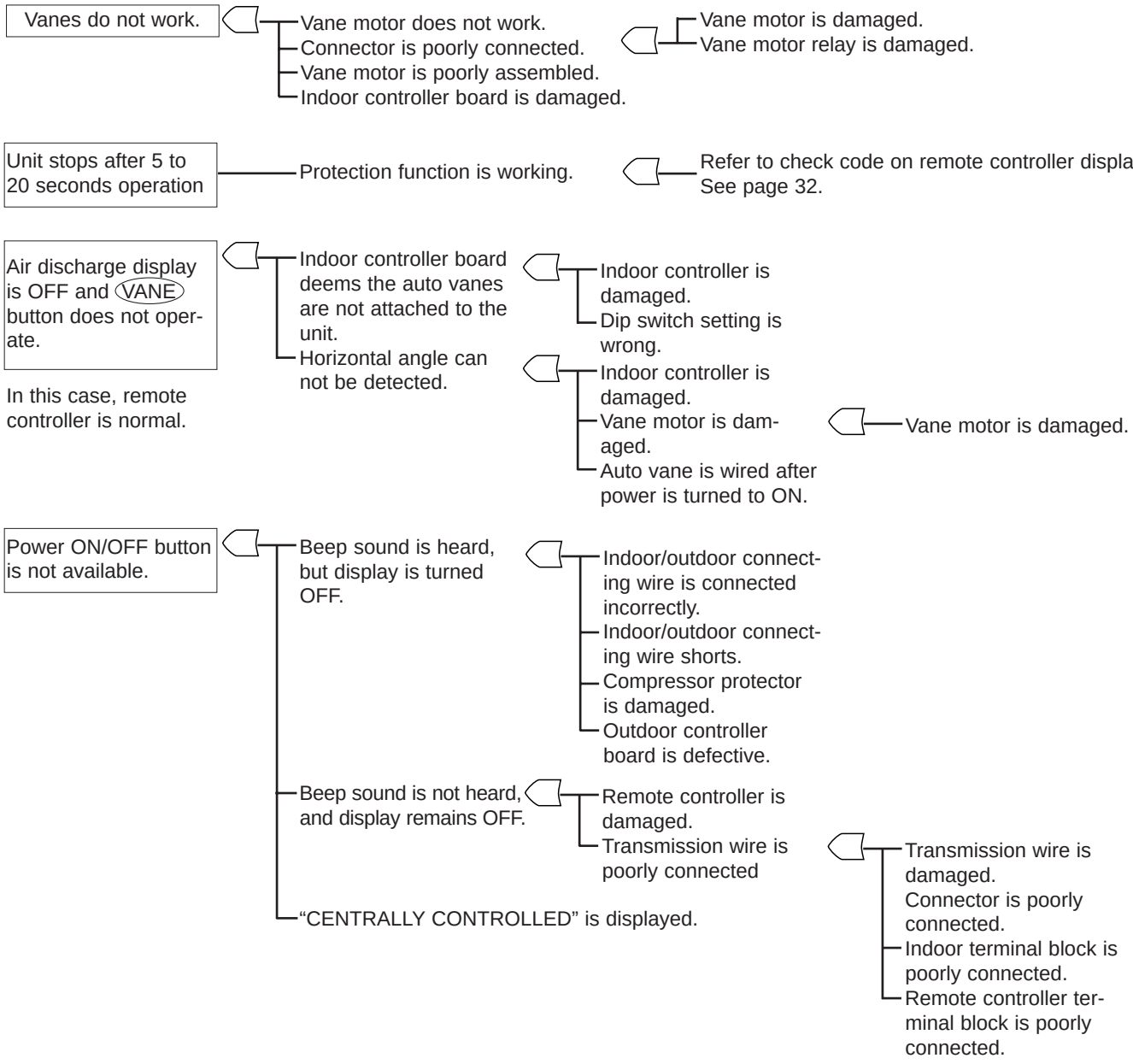
For operations marked “ ★”, point the transmitter to the wireless receiver, and make sure that you will hear a short beep from the receiver.
When the other than main unit is operated by the wireless remote controller, the receiver beeps an ineffectual beep 3-times.

Check code	Diagnosis of malfunction	Cause	Check points
EO	Signal transmitting/receiving error (Indoor controller does not respond to remote controller signal.)	During individual unit control 1) Bad contact of transmission wire 2) Signal transmitting/receiving circuit is abnormal.	1) Check the transmission wire. 2) Check with another remote controller. If “EO” is still indicated, replace the indoor controller board. If other check code appears. replace the original remote controller.
P1	Abnormality of room temperature thermistor (RT1)	1) Bad contact of thermistor 2) Damaged thermistor	1) Check the thermistor. 2) Measure the resistance of the thermistor. Normal resistance should be as follows. 0℃ ···15kΩ 30℃ ·····4.3kΩ 10℃ ·····9.6kΩ 40℃ ·····3.0kΩ 20℃ ·····6.3kΩ If the resistance is normal, replace the indoor controller board.
P2	Abnormality of pipe temperature thermistor (RT2)		
P3	Signal transmission error (Remote controller does not respond to indoor controller signal.)	1) Bad contact of transmission wire 2) Signal transmitting/receiving circuit is abnormal. 3) Wrong operation due to noise wave emitted by other appliances	1) Check the transmission wire. 2) Check with another remote controller. If “P3” is still indicated, replace the indoor board. If other check code appears, replace the original remote controller. 3) Short-circuit between 1 and 2 of CN40 and attach CN40 to the following units. ● Second unit in twin control ● Sub units in group control
P6	Freezing protection is working.	1) Short cycle of air cycle 2) Dirty air filter 3) Damaged fan 4) Abnormal refrigerant	1) Clear obstructions from the air cycle. 2) Clean the air filter 3) Check the fan. 4) Check the refrigerant temperature.
P7	System error	1) Wrong address-setting 2) Signal transmitting/receiving circuit of remote controller is abnormal. 3) Wrong SW6-setting	1) Check the address-setting. 2) Check with another remote controller. If check code other than “P7” appears, replace the original remote controller. 3) Check SW6 setting.
P8	Abnormality in outdoor unit	1) Wrong wiring of indoor/outdoor connecting wire 2) Reversed phase 3) Protection device is working	1) Check the indoor/outdoor connecting wire. 2) Change the connection of electric wiring. 3) Check the protection device.

3. WHEN OUTDOOR UNIT DOES NOT WORK

Cause	Check points
1) Indoor/outdoor connecting wires are poorly connected. 2) Power supply is poorly connected. 3) Fuse (5A) in the outdoor controller board is blown.	1) Check the connecting wires. 2) Check the power supply. 3) Check the fuse.

4. OTHER TROUBLES AND CAUSES



5. MR. SLIM/LOSSNAY INTERLOCK OPERATION

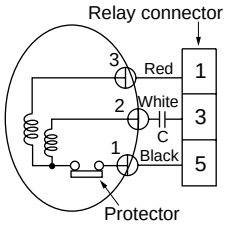
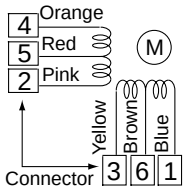
<Symptoms that are not malfunctions>

If any of the following symptoms occur, they are not malfunctions.

Symptom	Cause
LOSSNAY control switch does not work.	LOSSNAY control switch can not work during interlock operation. LOSSNAY control switch is effective only while Mr. SLIM is not operating.
LOSSNAY air speed can not be controlled in interlock operation.	LOSSNAY fan speed is fixed to HIGH during interlock operation. LOSSNAY fan speed LOW/HIGH can be switched only during LOSSNAY individual operation with the LOSSNAY control switch.

For LOSSNAY, troubleshooting refer to the LOSSNAY technical & service manual.

6. How to check the parts PK-1.6GKL , PK-2GKL

<table>
<tr><th>Parts name</th><th>Check points</th></tr>
<tr><td>Room temperature thermistor (RT1)
Pipe temperatuer thermistor (RT2)</td><td>Disconnect the connector, then measure the resistance using a tester.
(Surrounding temperature 10°C~30°C)
<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 thermistor)</td></tr>
<tr><td>Fan motor (MF)
 
</td><td>Measure the resistance between the terminals using a tester.
<table><tr><td rowspan="2">Motor terminal or Relay connector</td><td>Normal</td><td rowspan="2">Abnormal</td></tr><tr><td>PK-GKL
1.6, 2</td></tr><tr><td>Red-Black</td><td>141.2Ω</td><td rowspan="2">Open or short</td></tr><tr><td>White-Black</td><td>131.5Ω</td></tr></table></td></tr>
<tr><td>Vane motor (MV)
 
</td><td>Measure the resistance between the terminals using a tester.
(Surrounding temperature 20°C~30°C)
<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>Brown-Yellow</td><td rowspan="4">186~214Ω</td><td rowspan="4">Open or short</td></tr><tr><td>Brown-Blue</td></tr><tr><td>Red-Orange</td></tr><tr><td>Red-Pink</td></tr></table></td></tr>
</table>

<Thermistor Characteristic graph>

Thermistor for lower temperature

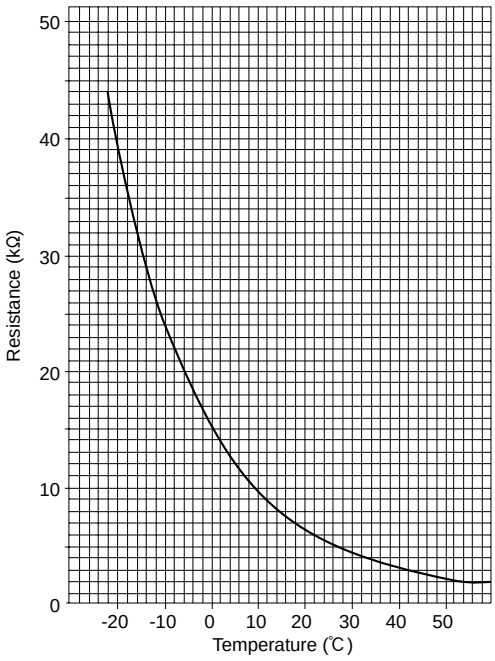
Room temperature thermistor(RT1)
Pipe temperature thermistor(RT2)

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

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

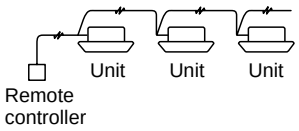
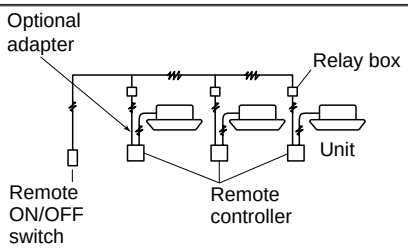
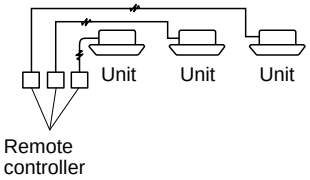
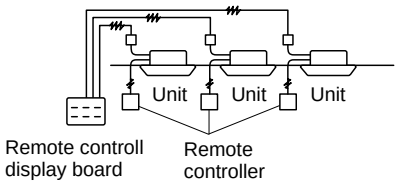
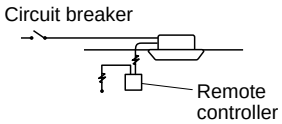
0℃	15kΩ
10℃	9.6kΩ
20℃	6.3kΩ
25℃	5.2kΩ
30℃	4.3kΩ
40℃	3.0kΩ

< Thermistor for lower temperature >



10 SYSTEM CONTROL

1. VARIETY OF SYSTEM CONTROL FUNCTIONS

1 Group control with a single remote controller (See page 36.)		Many units, installed at different locations, can be started and controlled with a single remote controller. The remote controller can be mounted in a different location using a non-polar two-wire cable, which can be extended up to 500m. A maximum of 50 units can be controlled with a single remote controller. All units operate in the same mode.
3 Both remote ON/OFF and individual controls (See page 37.) ※ Timer adapter (PAC-SA89TA-E) is needed.		All units can be turned on or off simultaneously using a remote ON-OFF switch. Also, each unit can be controlled individually by each remote controller. Dunning remote ON-OFF control, a message of “CENTRALLY CONTROLLED” is displayed on the LCD of the remote controller. This is available for both one unit control and several units control.
4 Individual control by grouping remote controllers (See page 38.)		By grouping the remote controllers in one place, several units installed at different locations can be controlled individually, and operation conditions of all units are visible without a special control board. The control method is the same as that of the single unit with a single remote controller.
5 Multiple remote control display (See page 39.) ※ Multiple remote controller adapter (PAC-SA88HA-E) is needed.		Several units can be controlled with a remote control display board. Operation conditions of all the units are visible with the remote control display board. Individual control by each remote controller is also possible.
6 Auto restart function (See page 39.)		A unit can be started or stopped with the circuit breaker on or off. Remote controller is also available. With this function, when the power is restored after power failure, the unit will restart automatically. (However, when the remote controller POWER ON/OFF button is OFF, the unit will not start.)

2. GROUP CONTROL WITH A SINGLE REMOTE CONTROLLER

A maximum of 50 units can be started in order according to the dip switch settings

2-1 How to wire

(1) Connect the remote controller to the double terminal block on the indoor controller board of the master unit (No.0 unit). (See Figure 1.)
(2) Connect the double terminal block of the master unit to the double terminal block of No.1 unit.
(3) Connect the double terminal block of No.1 unit to the double terminal block of No.2 unit.
(4) Continue the process until all the units are connected with two-wire cables. (See Figure 2.)
(5) Remove the connector CN40 from the indoor controller board of each unit except the master unit. (See Figure 3.)
(6) Set the unit-address of each unit with SW2 on the indoor controller board following the instructions below.

Figure 1

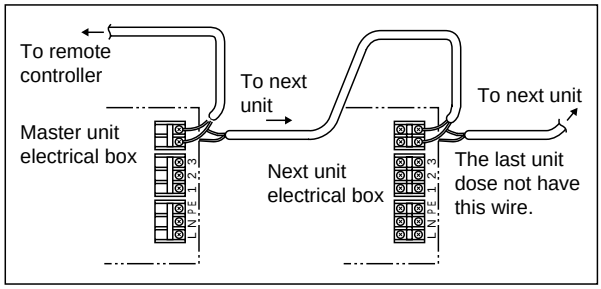
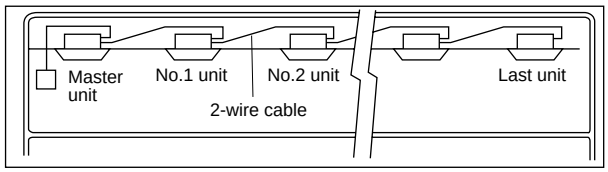


Figure 2



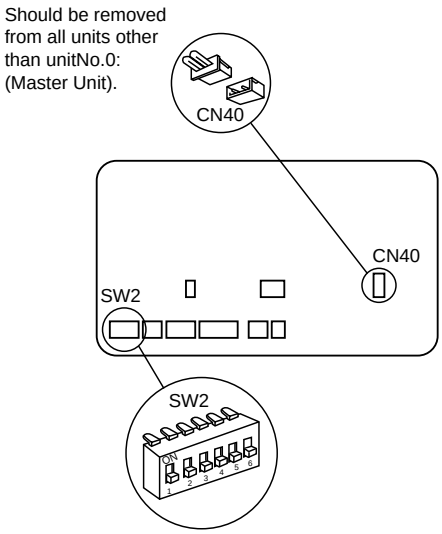
2-2 How to set unit-address

The unit-address also serves as a successive-start timer which starts each unit at intervals of 1 second. If two or more units have the same unit-address in a group control, operation stops due to system error. Be sure to set SW2 correctly following the instructions below.

(1) Each lever of SW2 shows the number as follows.
SW2-1 : 1 SW2-4 : 8
SW2-2 : 2 SW2-5 : 16
SW2-3 : 4 SW2-6 : 32
(2) Total number of levers turned to ON shows the address of the unit.
For example, to set No.3 unit, turn ON SW2-1 and SW2-2.
(3) In this way, set from the master unit to the last unit.
Do not forget to set the master (No. 0) unit.

Figure 3

Indoor controller board ▼



Setting examples

	Master (No. 0) unit	No. 1 unit	No. 2 unit	No. 4 unit	No. 8 unit	No. 16 unit	No. 32 unit
SW2	ALL OFF	1 ON	2 ON	3 ON	4 ON	5 ON	6 ON
Unit address & start delay in seconds.	0	1	2	4	8	16	32

2-3 Unit control

The remote controller can control all units ON/OFF, temperature, air flow, and swing louver. However, the thermostat in each unit turns ON or OFF individually to adjust to the room temperature.

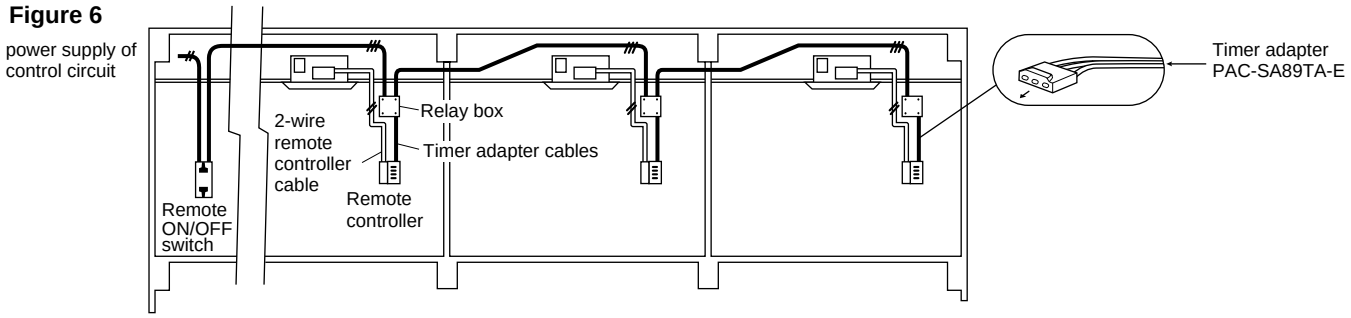
3. REMOTE ON-OFF AND INDIVIDUAL REMOTE CONTROLS

This method is available to control one unit or any number of units.
The following operations are available by connecting a relay, a timer adapter (PAC-SA89TA-E), and a remote ON/OFF switch to the system. Timer adapter is an optional part. Other parts are available on the market.
(A) To start all units in order by remote ON-OFF switch
(B) To stop all units simultaneously by remote ON-OFF switch
(C) To switch between the remote ON-OFF control and the individual remote control

3-1 System

Figure 6 shows the case of three units. The same is the case with any number of units.

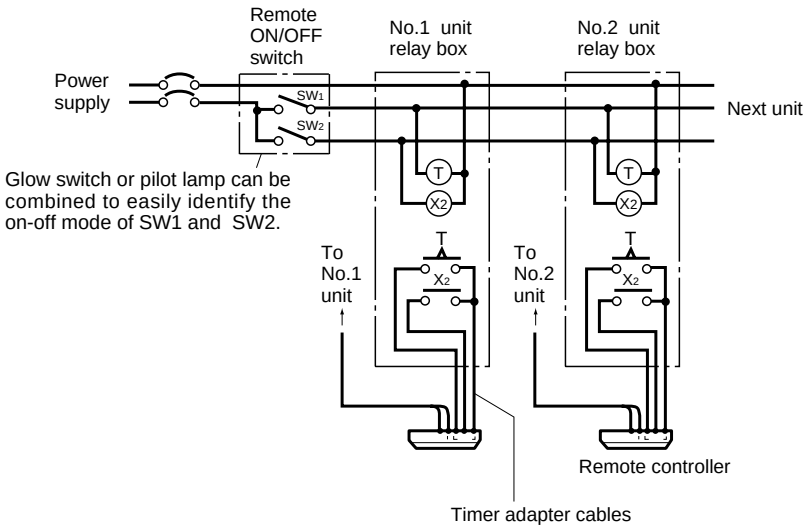
Figure 6



NOTE1 : Install the relay box where you can be serviced it easily.
NOTE2 : For control circuit wiring, use a wire of No. 14 AWG or a control cable according to the power supply of control circuit.
NOTE3 : When the power supply of the control circuit is 220/240V AC,
- ● Do not connect the control circuit wire to the remote controller cable directly.
- ● Do not place the control circuit wire and the remote controller cable into the same conduit tube.

3-2 Basic wiring

Caution : Before starting all units simultaneously by the remote ON-OFF switch, be sure to connect a sequence-start timer into the remote ON-OFF circuit. Otherwise, a rush of starting current may damage the power supply.



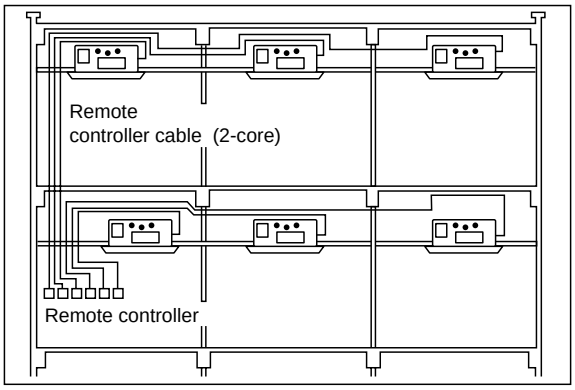
3-3 Switch function of remote ON-OFF switch

		SW2 (Switches between remote ON-OFF and individual control)	
		ON (Remote ON-OFF control)	OFF (Individual control)
SW1 (Switches between remote ON and OFF.)	ON (Start)	All units start together. ※1 Individual control is not available.	Each unit can be controlled by each remote controller. Remote ON-OFF switch is not available.
	OFF (Stop)	All units stop together. ※2 Individual control is not available.	

※1 After all units start together, if SW2 is turned OFF, each unit can be individually stopped by each remote controller.
※2 After all units stop together, if SW2 is turned OFF, each unit can be individually started by each remote controller.

4. INDIVIDUAL CONTROL BY GROUPING THE REMOTE CONTROLLERS

- Grouping the remote controllers allows individual control and centralized monitoring of units installed in different places without a special control board.
- Remote control cables are extendible up to 500m. When the cable length exceeds 12m, use the double-insulated two-care cable such as Belden 9407. Also, the cable thickness must be No. 22 AWG or above.
- When gathering the power ON/OFF switches of air conditioners near the remote controllers, you should also install the power ON/OFF switch near each unit to prevent electric trouble during servicing.



5. MULTIPLE REMOTE CONTROL DISPLAY

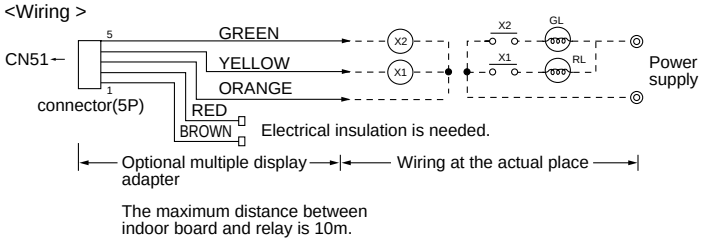
You can control several units with a multiple remote control display, by wiring an optional multiple remote controller adapter (PAC-SA88HA-E) with relays and lamps on the market.

5-1 How to wire

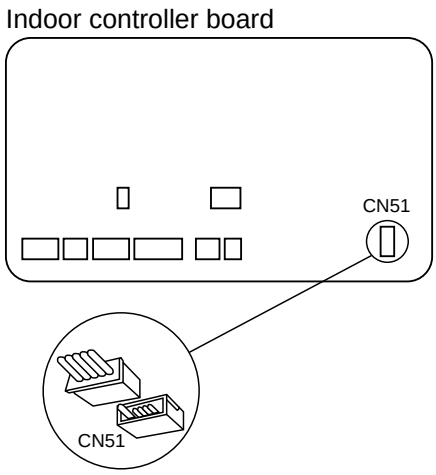
(1) Connect the multiple display adapter to the connector CN51 on the indoor controller board.

(2) Wire three of the five wires from the multiple display adapter as shown in the figure below.

<Wiring >

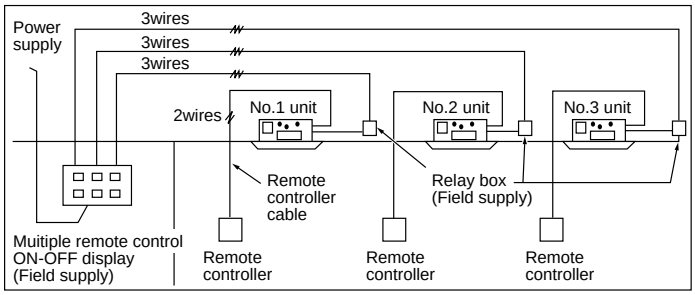


Indoor controller board



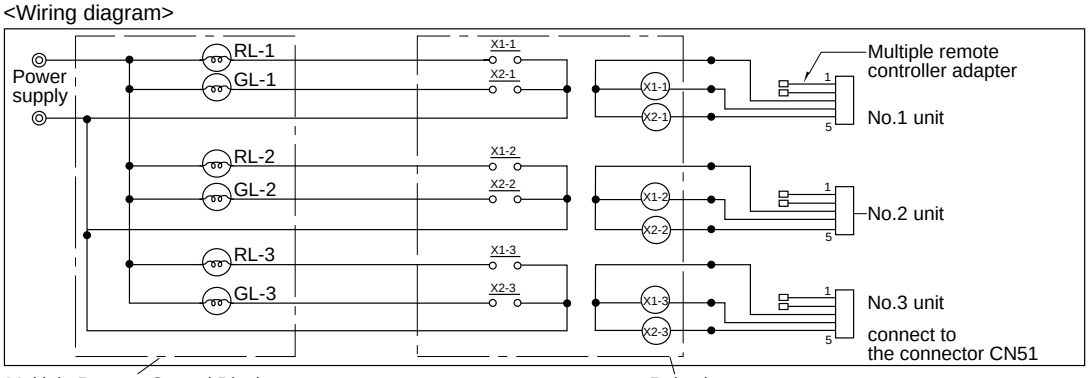
[Notes on Signs]
X1:Relay (for operation lamp)
X2:Relay (for check lamp)
RL:Operation Lamp
GL:Check Lamp
[Field supplied parts]
Relays:12V DC with rated coil power consumption below 0.9W.
Lamps:Matching to power supply voltage.

<System>



(Operation check)

<Wiring diagram>



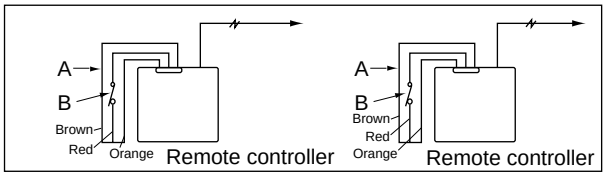
6. AUTO RESTART FUNCTION

By setting the dip switch SW1-8 to ON, the air conditioner can be started/stopped by power supply ON/OFF.
If the air conditioner is OFF before the power failure, it will not start operation by power restore.

•This function is mainly to emergency performance when the power supply stops temporarily. Therefore, since the protection function (for example, clank case heater and prevention from restarting in 3 minutes, etc.) of the device is not operated, this function should not be used mostly.

7. TIMER OPERATION OR THE OPERATION BY AN EXTERNAL SIGNAL

<Wiring>

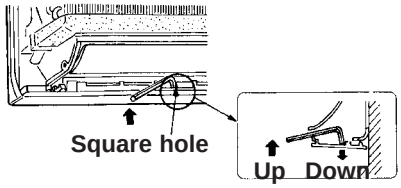
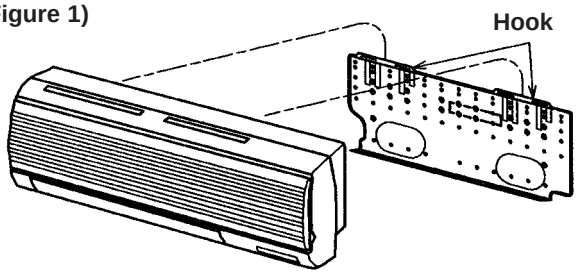
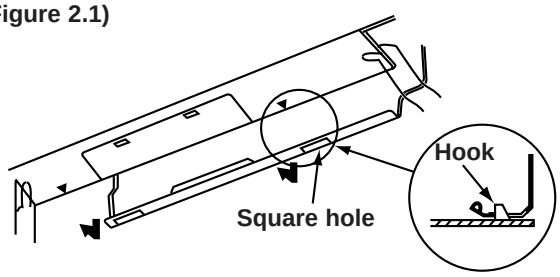
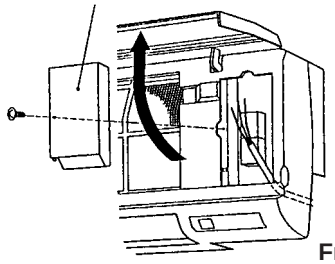
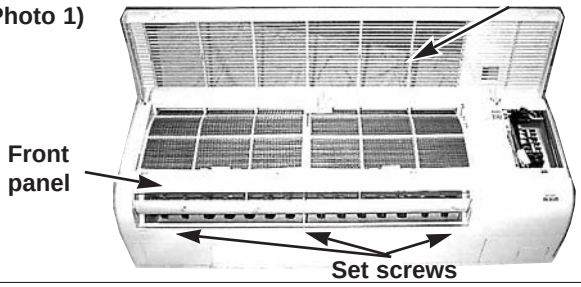
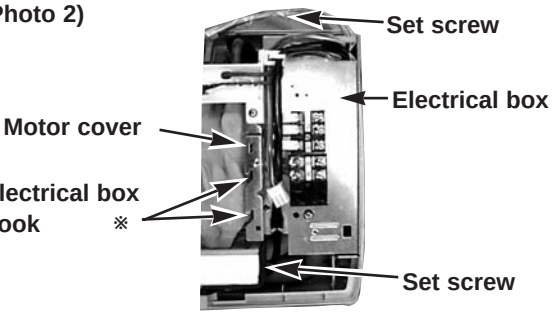
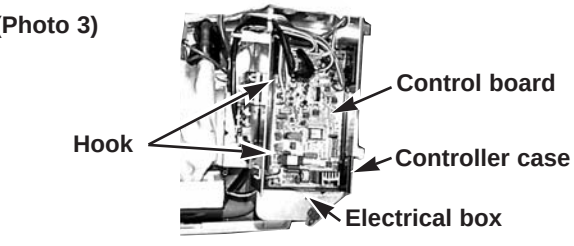


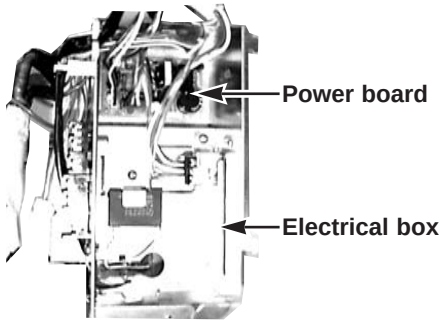
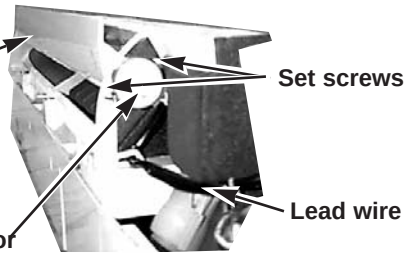
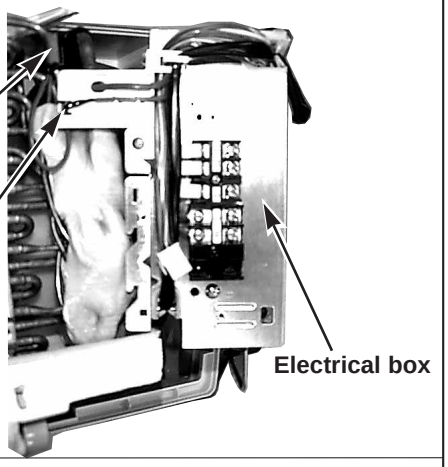
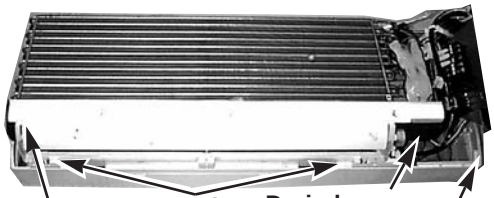
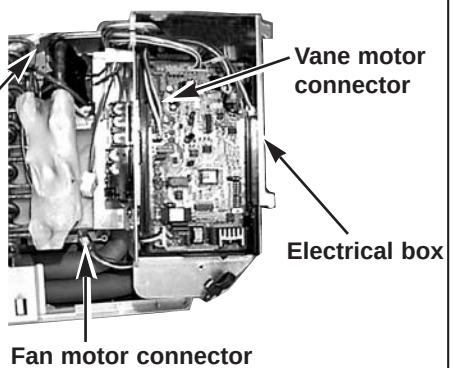
A : an optional timer adapter
B : a single-throw switch

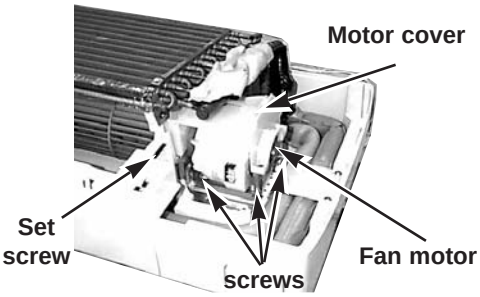
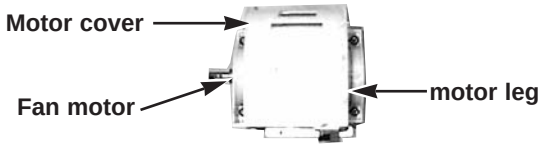
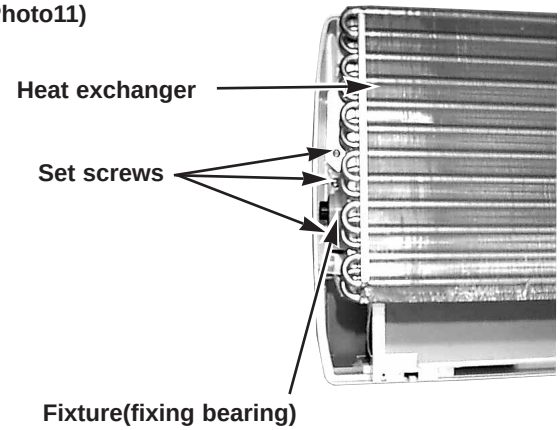
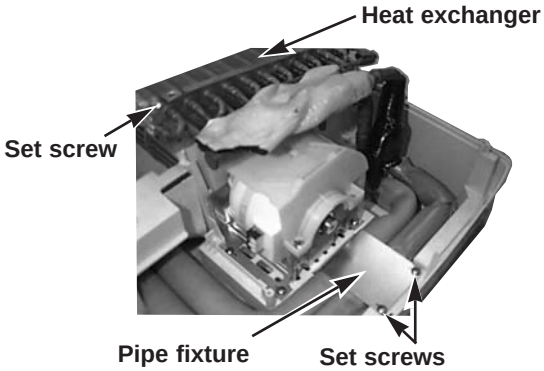
For remote control, connect the optional timer adapter (PAC-SA89TA-E)

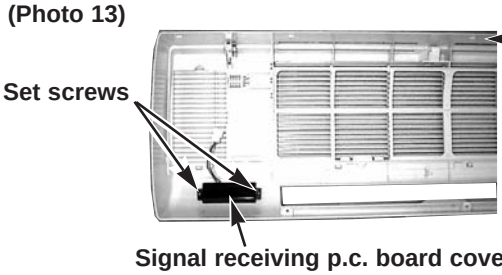
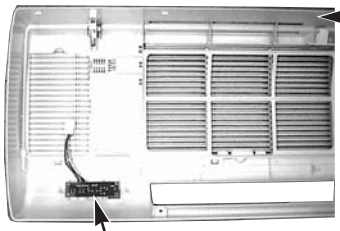
11 DISASSEMBLY PROCEDURE

PK-1.6GKL
PK-2GKL

OPERATION PROCEDURE	PHOTOS & ILLUSTRATION
1. REMOVE THE LOWER SIDE OF THE INDOOR UNIT FROM THE INSTALLATION PLATE. (1) Remove the left / right corner box of the indoor unit. (2) Hold and pull down the lower and both ends of the indoor unit, and remove the ▼ section from the square hole. (Refer to the figure 2.1) Or remove the front panel and push the ▼ section down by using hexagonal wrench ,etc. from the front side. (Refer to the figure 2.2). (3) Unhook the top of the indoor unit from the back plate catch. **(Figure 2.2)** 	**(Figure 1)**  **(Figure 2.1)** 
2. REMOVING THE FRONT PANEL. (1) Open the front grille. (2) Remove the terminal block cover with a screw. (3) Remove the screw 3 caps then remove the set 3 screws. (4) After removing the lower side of the front panel a little, remove it as pulling toward upper.	**(Figure 3)**  **(Photo 1)** 
3. REMOVING THE INDOOR CONTROLLER BOARD. (1) Remove the terminal block cover. (2) Remove the front panel. (see the photo 1) (3) Remove the electrical box(2 screws). (4) Remove the electrical box cover(1 screw). (5) Disconnect the connector on the controller board and remove the controller board by pulling up the hook of the controller case. ※ To smooth works, hang the side hooks of the electrical box on the hook of the motor cover. (see the photo 3)	**(Photo 2)**  **(Photo 3)** 

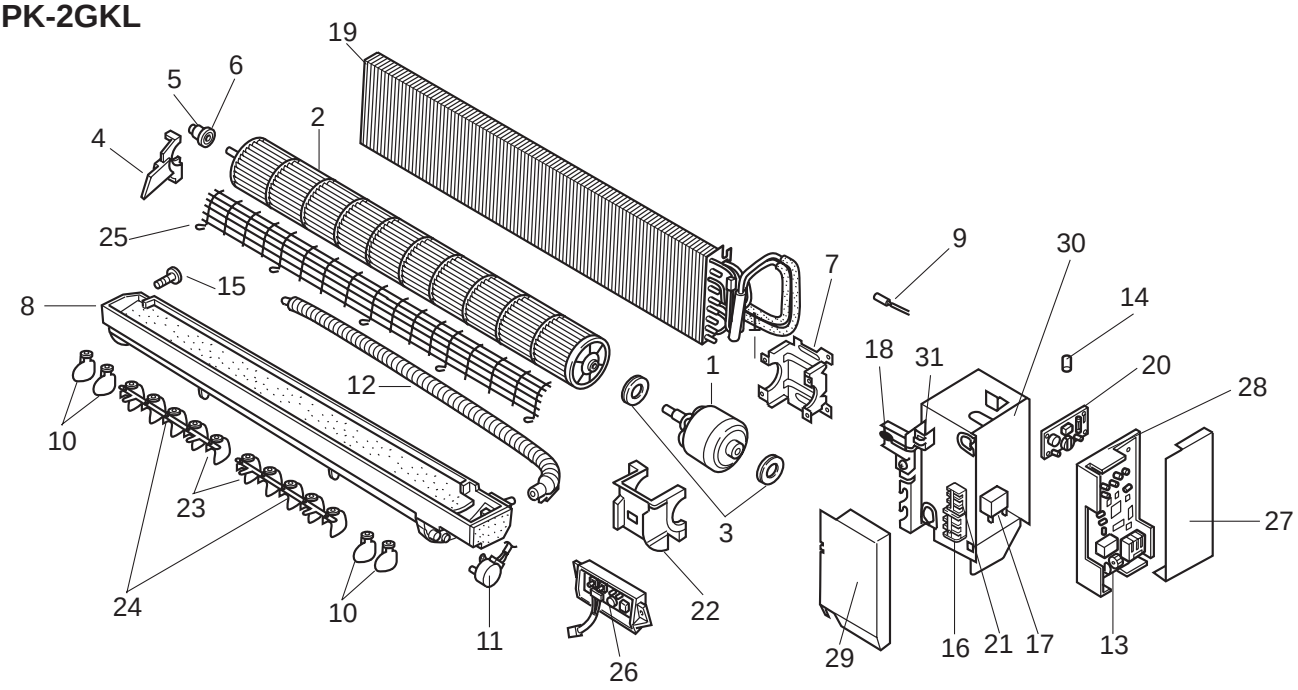
OPERATION PROCEDURE	PHOTOS & ILLUSTRATION
4. REMOVING THE POWER BOARD (1) Remove the front panel.(see the photo 1) (2) Remove the electrical box(2 screws).(see the photo 2) (3) Disconnect the whole connector in the control board. (4) After lifting the controller case with pressing it's convex section, remove the controller case and the control board simultaneously.(see the photo 3) (5) Disconnect the connector in the power board. (6) Remove the power board.	**(Photo 4)** 
5. REMOVING THE VANE MOTOR (1) Disconnect the connector CN6V on the indoor controller board. (2) Remove the 2 screws of the vane motor, disconnect the lead wire and remove the vane motor from the shaft.	**(Photo 5)** 
6. REMOVING THE THERMISTOR (1) Removing the room temperature thermistor RT1. ①Disconnect the connector CN20<red> on the indoor controller board. ②Remove the room temperature thermistor from the holder. (2) Removing the pipe temperature thermistor RT2. ①Disconnect the connector CN21<white> on the controller board. ②Remove the pipe temperature thermistor with set to the pipe.	**(Photo 6)** 
7. REMOVING THE NOZZLE ASSEMBLY (1) Disconnect the connector CN6V on the controller board. (2) Disconnect the lead wire of the vane motor. (3) Remove the corner cover. (4) Pull the drain hose out from the nozzle assembly. (5) Unhook the hook of the lower nozzle assembly and pull the nozzle assembly toward you, then remove the nozzle assembly by sliding it down.	**(Photo 7)** 
8. REMOVING THE ELECTRICAL BOX (1) Remove the terminal block cover. (2) Remove the front panel.(see the photo 1) (3) Disconnect the vane motor connector. (4) Disconnect the fan motor connector from the fan motor. (5) Remove the pipe thermistor and the room temperature thermistor.(see the photo 6) (6) Remove the electrical box (2 screws).	**(Photo 8)** 

OPERATION PROCEDURE	PHOTOS & ILLUSTRATION
9. REMOVING THE FAN MOTOR. (1) Remove the terminal block cover. (2) Remove the front panel.(see the photo 1) (3) Remove the electrical box.(see the photo 8) (4) Remove the nozzle assembly.(see the photo 7) (5) Remove the fan motor leg fixing 3 screws. (6) Unscrew the set screws using by alankey and remove it by sliding the fan motor to right. (7) Remove the 4 screws and remove the motor cover from the fan motor leg.	**(Photo 9)**  **(Photo 10)** 
10. REMOVING THE LINE FLOW FAN (1) Remove the terminal block cover. (2) Remove the front panel.(see the photo 1) (3) Remove the electrical box.(see the photo 8) (4) Remove the nozzle assembly.(see the photo 7) (5) Remove the fan motor.(see the photo 9) (6) Remove the pipe fixture with 2 screws.(see the photo12) (7) Remove the left / right screws of the heat exchanger and pull the left-hand side up. (8) Remove the 2 screws by sliding it toward you remove the fixture(fixing bearing). ※ The fan motor is removable first , when the fan removing is hard. ※ When resetting the fan to the fan motor. Locate and fix the shaft after installing the fan.	**(Photo11)** 
11. REMOVING THE HEAT EXCHANGER (1) Remove the terminal block cover. (2) Remove the front panel.(see the photo 1) (3) Remove the electrical box.(see the photo 8) (4) Remove the corner box. (5) Remove the nozzle assembly.(see the photo 7) (6) Remove the 2 screws and the pipe fixture. (7) Remove the 2 screws and heat exchanger.	**(Photo 12)** 

OPERATION PROCEDURE	PHOTOS & ILLUSTRATION
12. REMOVING the SIGNAL RECEIVING P.C. BOARD (1) Remove the terminal block cover. (2) Disconnect the connector <yellow> for the wireless remote controller. (3) Remove the front panel.(see the photo 1) (4) Remove the 2 screws and signal receiving p.c. board cover. (5) Remove the signal receiving p.c. board.	**(Photo 13)**  **(Photo 14)** 

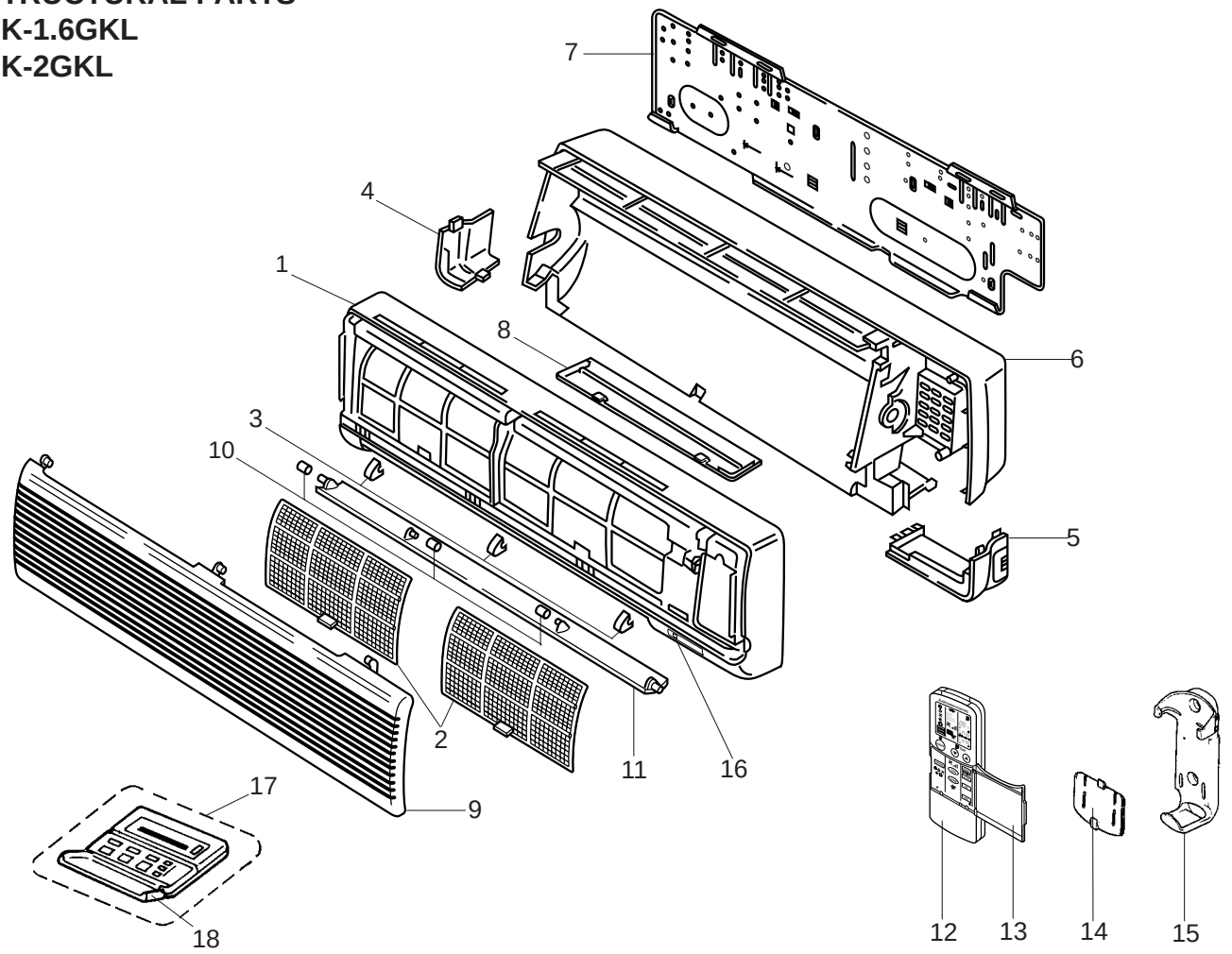
12 PARTS LIST

PK-1.6GKL
PK-2GKL



No.	Parts No.	Parts Name	Specifications	PKH-		Remarks (Drawing No.)	Wiring Diagram Symbol	Recommended Q'ty	Price	
				1.6GKL	2GKL				Unit	Amount
1	T7W A01 762	FAN MOTOR	PM4V30-K	1	1		MF			
2	R01 07Y 114	LINE FLOW FAN		1	1					
3	R01 07Y 105	RUBBER MOUNT		2	2					
4	R01 07Y 106	BEARING SUPPORT		1	1					
5	R01 005 103	SLEEVE BEARING		1	1					
6	R01 07Y 102	BEARING MOUNT		1	1					
7	R01 07Y 130	MOTOR SUPPORT		1	1					
8	T7W E13 530	NOZZLE		1	1					
9	T7W E06 202	PIPE TEMPERATUER THERMISTOR		1	1		RT2			
10	R01 09Y 038	GUIDE VANE		4	4					
11	T7W E13 223	VANE MOTOR		1	1		MV			
12	R01 07Y 527	DRAIN HOSE		1	1					
13	T7W E12 310	INDOOR CONTROLLER BOARD		1	1		I.B			
14	T7W 520 239	FUSE	250V 6.3A	1	1		F1,F2			
15	R01 07Y 524	DRAIN PLUG		1	1					
16	T7W 521 716	TERMINAL BLOCK	3P(L, N, ⏚)	1	1		TB2			
17	R01 588 255	CAPACITOR	2.0μF ×440V	1	1		C			
18	T7W E05 202	ROOM TEMPERATURE THERMISTOR		1	1		RT1			
19	T7W E67 480	HEAT EXCHANGER		1	1					
20	T7W E02 313	POWER BOARD		1	1		P.B			
21	T7W 512 716	TERMINAL BLOCK	2P(1, 2)	1	1		TB4			
22	R01 07Y 135	MOTOR COVER		1	1					
23	R01 07Y 038	GUIDE VANE		10	10					
24	R01 07Y 059	ARM		2	2					
25	T7W A00 675	FAN GUARD		1	1					
26	R01 50J 317	WIRERLESS ADAPTER CONTROLLER BOARD		1	1		W.B			
27	—	CONTROLLER COVER		1	1	(BG02V194H05)				
28	—	CONTROLLER CASE		1	1	(BG25B573H05)				
29	—	TERMINAL COVER		1	1	(BG02V195H10)				
30	—	ELECTRICAL PARTS COVER		1	1	(BG00V196G20)				
31	—	SENSOR HOLDER		1	1	(RG25C546H06)				

STRUCTURAL PARTS
PK-1.6GKL
PK-2GKL



No.	Parts No.	Parts Name	Specifications	PK- 1.6 / 2 GKL	Remarks (Drawing No.)	Wiring Diagram Symbol	Recommended Q'ty	Price Unit	Price Amount
1	R01 89Y 651	FRONT PANEL		1					
2	R01 A16 500	AIR FILTER		2					
3	R01 07Y 096	SCREW CAP		3					
4	R01 09Y 658	CORNER COVER		1					
5	R01 07Y 658	CORNER COVER		1					
6	R01 07Y 635	BOX ASSEMBLY		1					
7	R01 07Y 808	BACK PLATE		1					
8	R01 07Y 623	UNDER COVER		1					
9	R01 07Y 691	FRONT GRILLE		1					
10	R01 07Y 092	VANE SLEEVE		1					
11	R01 07Y 002	AUTO VANE		1					
12	T7W E04 714	WIRELESS REMOTE CONTROLLER		1					
13	T7W E01 049	WIRELESS REMOTE CONTROLLER DOOR		1					
14	R01 07Y 050	BATTERY COVER		1					
15	R01 07Y 075	WIRELESS REMOTE CONTROLLER HOLDER		1					
16	R01 24K 658	RECEIVING UNIT		1		RU			
17	T7W E04 713	REMOTE CONTROLLER		1					
18	T7W E03 049	REMOTE CONTROLLER COVER		1					

13 OPTIONAL PARTS

1. REFRIGERANT PIPES

Service Ref. : PK-1.6GKL, PK-2GKL

Part No.	PAC-05FFS-E	PAC-07FFS-E	PAC-10FFS-E	PAC-15FFS-E
Pipe length	5m	7m	10m	15m
Pipe size O.D .	Liquid:ϕ9.52 Gas:ϕ15.88			
Connection method	Indoor unit: Flared Outdoor unit: Flared			

Note 1. How to connect refrigerant pipes.
Factory supplied optional refrigerant pipings contain refrigerant at the above atmospheric pressures. As long as the connection takes no more than 5 minutes, no air will enter, and there will be no need for air purging.
Remove the blind caps and make the connections within 5 minutes. After the connections for the indoor and outdoor units are made, open the stop valve on the outdoor unit to allow refrigerant gas to flow.
If piping length exceeds 20m, an additional charge of refrigerant is needed.

Note 2. The following main parts are contained in the optional refrigerant piping kit.
Heat insulating cover, vinyl tapes, nipples, sleeve and flange (for wall hole).

2. TIMER

When using a program timer, PAC-SC32PTA, a program timer adapter (PAC-825AD) are and a wired remote controller (PAR-JA240KAT-E) also needed.

Part No.	PAC-SC32PTA (with set back function)
Model Name	Program timer

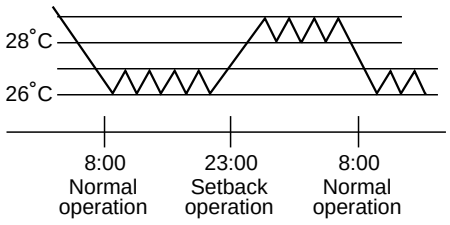
2-1 Program timer specifications

Parts name	Program timer
Parts No.	PAC-SC32PTA
Exterior dimensions (inch)	5-4/32x4-23/32x23/32 (130x120x18mm)
Installation	Wall mount
Type of clock	Quartz
Clock accuracy	±50 second / month at 25°C
Display-Time -Week -Timer setting unit	Liquid crystal display Liquid crystal display Liquid crystal display
Program cycle	24 hours
Timer setting unit	30 minutes
No. of set points	48 / day
Power rating	5V DC ±5% (Supplied by Remote Controller)

2-2 Feature of program timer

(1) Daily timer function
Daily timer can be set in 30 minutes units for up to 24 hours.
Each unit can be set for unit ON, unit OFF, or setback operation.

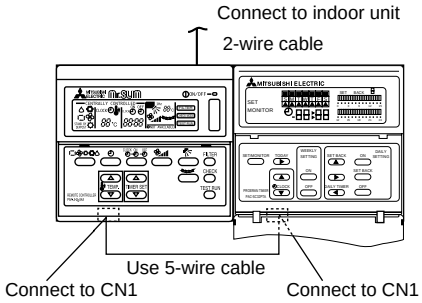
(2) Setback operation (PAC-SC32PTA)
Set back operation is useful for reducing running costs
e.g. At a hotel with a 24-hour system
8:00~23:00 Cooling operation with set temperature at 26°C
23:00~8:00 Setback operation with 2 degrees of setback
As shown in the chart on the night, the set temperature rises 2 degrees automatically during the setback operation. When the setback operation ends, normal operation will begin.



(3) Weekly timer function
Daily timer function can apply to each day of the week.

2-3 How to connect program timer

(1) Install the program timer next to the remote controller the same way as the remote controller is installed.
(2) Connect the program timer and the remote controller with a 5-wire cable as shown in the figure below



NOTE:While the program timer is connected to the remote controller, the 24hour ON/OFF timer on the remote controller will not operate.

2-4 Names and functions

<PAC-SC32PTA>

WEEKLY TIMER SETTING DISPLAY
Used for selection of if or not the day operation pattern set by PATTERN SETTING is to be applied in weekly day unit, setting.

CURRENT TIME DISPLAY
During MONITOR status,current time is display.
During Daily timer setting, a time desire for timer setting is displayed.

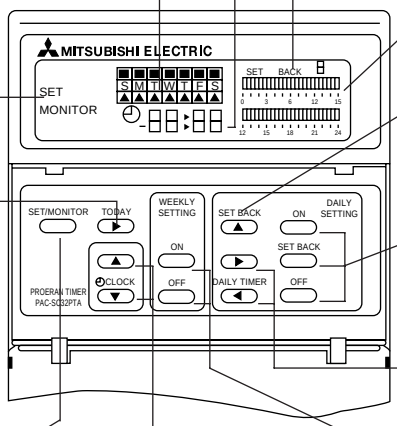
SET BACK DISPLAY
Indicates the setting set back range.

DAILY TIMER SETTING DISPLAY
24 hours is divided into 48 blocks and each block express 30 minutes.
The block display consists of 3 pattern.

Set back can be done in the range of 1,2,4,6 and 8°C.

SET BACK SETTING SW
Used for set back setting.

SET/MONITOR DISPLAY
During SET is display, clock adjustment, change of weekly day, daily and weekly timer setting can be performed.
During MONITOR is display, all switches except SET/MONITOR SW are invalidated. This is normal status.



ON/SET BACK/OFF SW
Used to specify the time setting pattern.

WEEK DAY SETTING SW
Used for week day setting.

DAILY TIMER SW
Used for timer setting in 30 minutes unit.

MODE SELECTOR SW
Using this switch select “MONITOR” or “SET” Mode.

“MONITOR” :Indicates the current timer setting. All switch expect MODE SELECTOR SW are invalidated then.This is the normal status.
“SET”: Set to “SET” mode for clock adjustment, charge of week day, daily and weekly timer setting.

CLOCK ADJUSTMENT SW
Used for adjustment of the current time.

Push ▲ SW to advance the time. Each time the button is pushed the time advance by 1 minute, pushing continuously advances by 1 minute at 0.5 second interval, and when the lower digit of minute becomes 0 indication advances in 10 minutes unit.
▼ SW is used for reversing the time. Each time the button is pushed the time reverses by 1 minute, pushing continuously reverses the time by 1 minute at 0.5 second interval, and when the lower digit of minute becomes 0 indication reverses in 10 minutes unit.

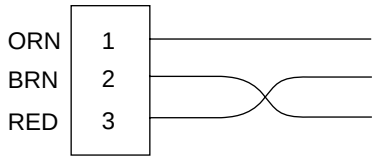
WEEKLY TIMER SW
Used for setting timer in day of week unit.

Pushing ▶ SW moves the week day light display in order of
S → M → T → W ⋯
enabling to set the week day.

3. TIMER ADAPTER

This adapter is needed for system control and for operation via external contacts. Adapter connection is described on page 37.

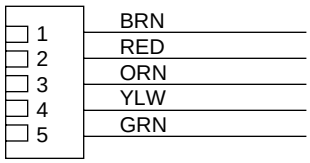
Part No.	PAC-SA89TA-E



4. MULTIPLE REMOTE CONTROLLER ADAPTER

This adapter is needed for remote indication (operation/check). Adapter connection is described on page 39.

Part No.	PAC-SA88HA-E



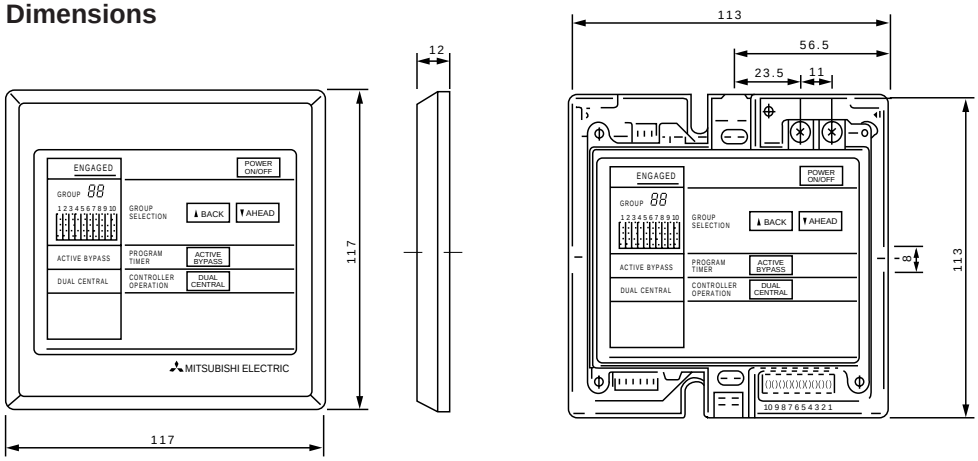
5. CENTRALIZED REMOTE CONTROLLER

Allows individual or combined control of up to 16 units. When using the PAC-805RC, the program timer adapter (PAC-825AD)is also needed.

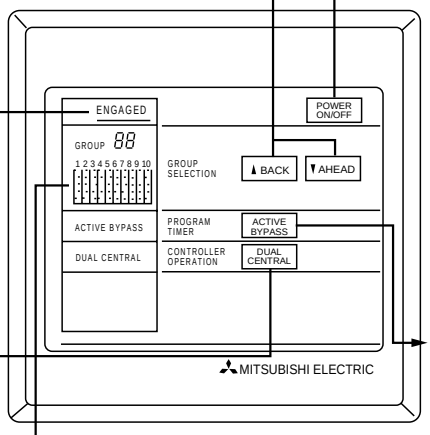
Part No.	PAC-805RC

Unit:mm

5-1 Dimensions



5-2 Functions



"ENGAGED" indicator
When this indicator is lit, transmission is in progress and all switches are inoperative.

DUAL/CENTRAL switch
This change-over switch governing the operation of the accessory remote controller.

"DUAL"
Instructions from both the accessory remote controller and the centralized remote controller are valid. (Priority given to the last instruction received.)

"CENTRAL"
ON/OFF switching by the accessory remote controller is invalidated. Control is by the centralized remote controller only.
Initial setting is "DUAL".

LCD Matrix Display
This display indicates the operational status of all connected units either by steady lighting or by flashing.

POWER ON/OFF switch
Operation ON/OFF switch.

▲BACK ▼AHEAD buttons
These buttons are used to designate the attached unit(s). (They designate the unit to be centrally controlled.)

●When group “00” is designated; collective ON/OFF instruction is sent to all units.

●When group “01”-“16“ is designated; ON/OFF instruction is sent to the designated units only.

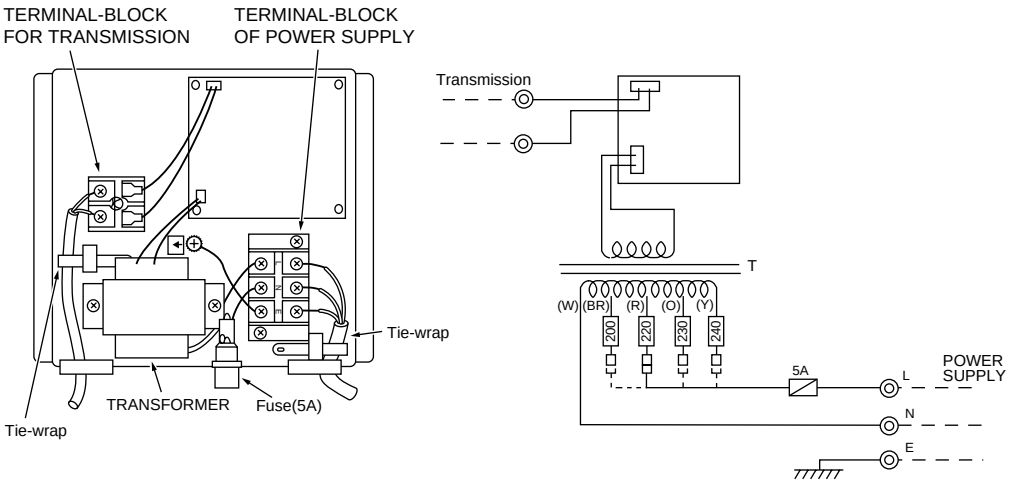
ACTIVE/BYPASS switch
This is a change-over switch for the program timer.
(It selects timer operation on the program timer.)
Use “BYPASS” when a program timer is not connected.
“ACTIVE”
The switch turns ON/OFF operational instructions from the program timer automatically.
“BYPASS”
ON/OFF Operation is by the centralized remote controller only.
Initial setting is “BYPASS”.

Independent “DUAL / CENTRAL” and “ACTIVE / BYPASS” setting of all the groups is possible. When the power supply to the centralized remote controller is cut due to power failure, all settings will return to original “DUAL” and “BYPASS”.

5-3 Connection method

(1) Connections in the power supply cord.

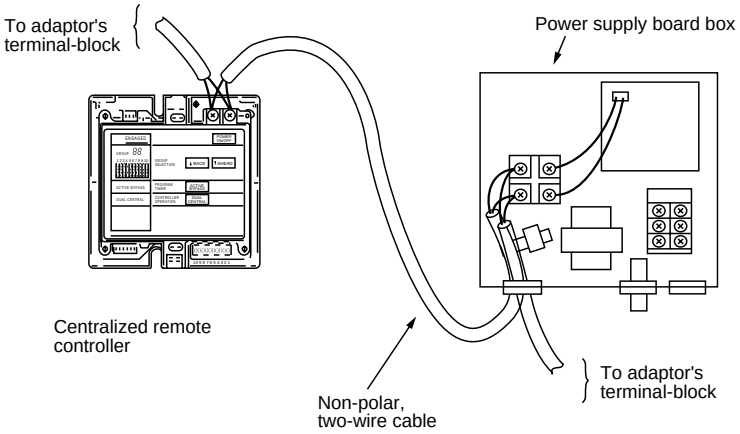
1. Connect the power supply cord to the power supply terminal-block and fix it in-place with a tie-wrap.
   Connect a single phase 200V AC (220, 230, 240V) to Ⓛ Ⓝ .
   As Ⓔ is the GND terminal, be sure to ground the earth wire.
2. Connect the transmission line to the transmission terminal-block and fix it in-place with a tie-wrap.
   Use a Ω1.6 (AWG 14) or above two-wire cable for the transmission line.
   CAUTION : Never connect the power supply cord to the transmission terminal-block.



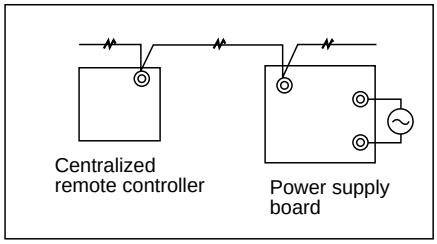
Wiring has to be changed when
a 200,230 or 240V power is used.

(2) Connection method of centralized remote controller and power supply board.

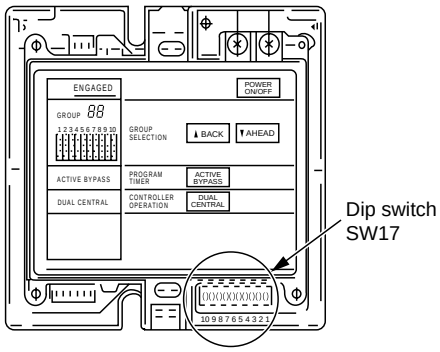
1. Connect the centralized remote controller and power supply board with a non-polar, two-wire cable.



2. Wiring diagram



3. Be sure to set the maximum address number with the dip switch SW17 on the centralized remote controller.

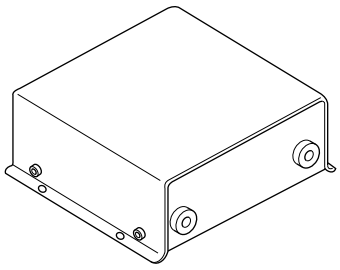
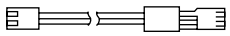
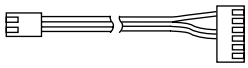
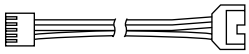
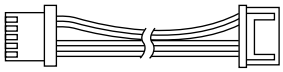


6. PROGRAM TIMER ADAPTER

This adapter is needed when a program timer(PAC-SC32PTA)or a centralized remote controller(PAC-805RC)is used.

Part No.	PAC-825AD

6-1 Parts included

① ADAPTER ·····1P	② 3-core cable·····1P	③ 3-core cable·····1P
	 Length : 2m (6' 7")	 Length : 2m (6' 7")
	④ 4-core cable·····1P	⑤ 5-core cable·····1P
	 Length : 2m (6' 7")	 Length : 2m (6' 7")

6-2 Connection method

Connection and wiring methods differ with the type of the indoor unit used. Confirm the type before carrying out the work.

(1) Connections in the adapter box.

1. Connect the power supply cord to the terminal-block and fix it in-place with a tie-wrap.
   Connect a single phase 200V AC (220, 230, 240V) to Ⓛ Ⓝ.
   As Ⓔ is the GND terminal, be sure to ground the earth wire.
2. Connect the transmission line to the transmission terminal-block and fix it in-place with a tie-wrap (when a centralized remote controller is being used).
   CAUTION : Never connect the power supply cord to the transmission terminal-block

Fig.1

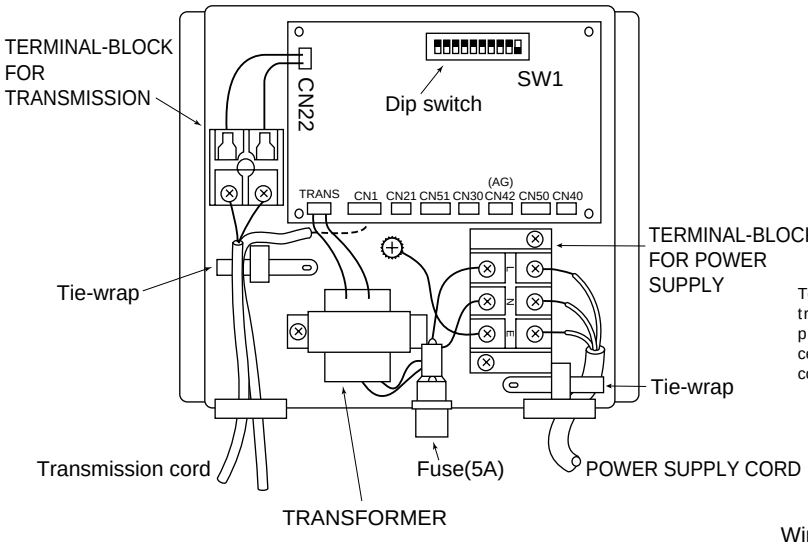
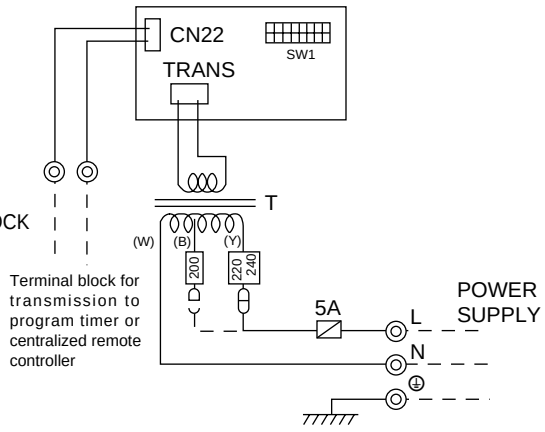


Fig.2

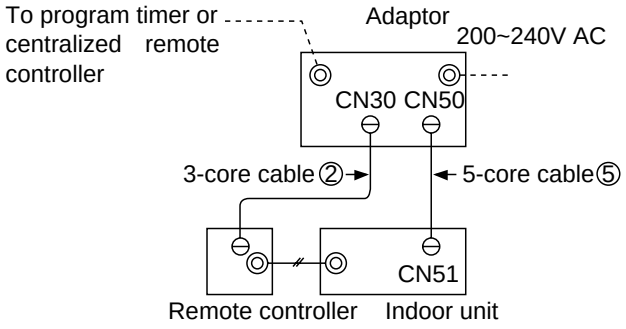


Wiring has to be changed when 200V power supply is used.

(2) When the centralized remote controller is used, set the address number with the dip switch SW1 of the program timer adapter.

(3) Connections from adaptor

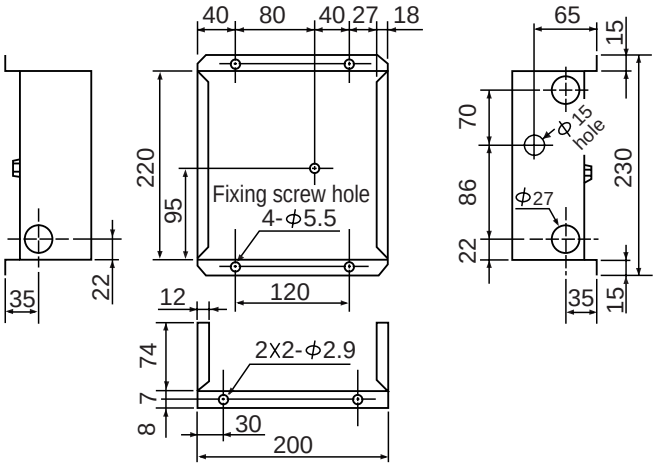
Fig.3



Max. length of each calbe is 10m.

6-3 Dimensions (Unit : mm)

Fig. 4



7. Wired remote controller and terminl bed for remote controller

Part No.	PAR-JA240KAT-E

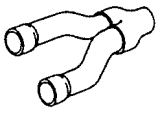
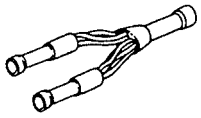
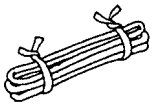
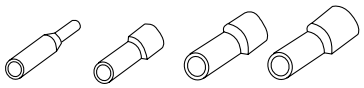
8. Remote Sensor

Part No.	PAC-SE41TS-E

10. MULTI DISTRIBUTION PIPE FOR TWIN (50:50)

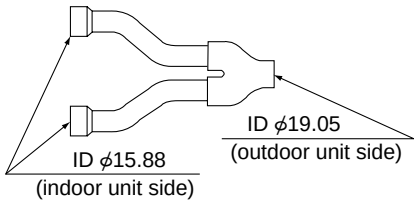
Part No.	SDD-50S-E
Applicable Service Ref.	Indoor unit : PK-1.6GKL, 2GKL Outdoor unit : PU-3,4 type

10-1 Parts included

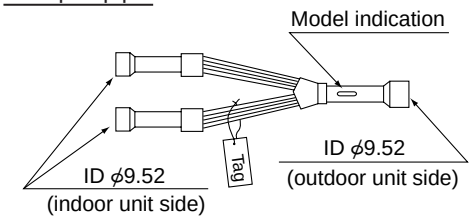
① Installation manual	② Gas pipe	③ Liquid pipe	④ Pipe cover (Gas pipe)
 This sheet 1 sheet	 1 pc	 1 pc	 1 pc
⑤ Pipe cover (Liquid pipe)	⑥ 2-core cable (12m)	⑦ Joint pipe	
 1 pc	 1 pc	 Ⓐ 1pc Ⓑ 1pc Ⓒ 1pc Ⓓ 1pc	

• The gas pipe ② and liquid pipe ③ are specified as shown below.

② Gas pipe



③ Liquid pipe



◎ After cutting the pipe with the pipe cutter, deburr the pipe and clean off dirt and foreign materials.

The following items must be obtain locally in addition to the packed parts.
ⓐ Heat insulating sealing tape.
ⓑ Extension pipe for refrigerant pipe.

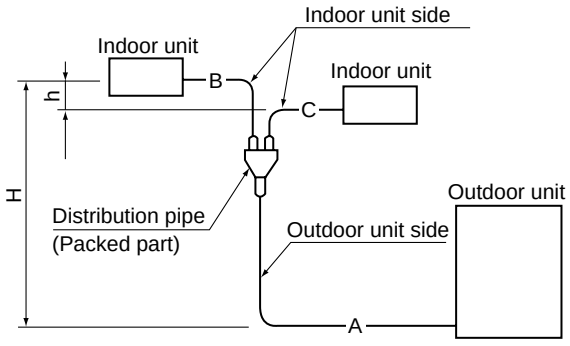
Combination of indoor/outdoor unit

Distributor pipe model	SDD-50S-E
Outdoor unit	Indoor unit
PU-3	1.6 + 1.6
PU-4	2 + 2

10-2 Pipe size and refrigerant pipe limits.

Outdoor unit	Pipe size (mm)				Actual piping leng <m>		Height deffence <m>		(Note 1) No. of bend
	Gas side		Liquid side		Indoor ~ Outdoor	Indoor ~ Indoor	Indoor ~ Outdoor	Indoor ~ Indoor	
	Outdoor unit side	Indoor unit side	Outdoor unit side	Indoor unit side					
PU-3 type	ϕ15.88<5/8>	ϕ15.88<5/8>	ϕ9.52<3/8>	ϕ9.52<3/8>	A+B= A+C= 30m or less	|B-CI= 8m or less	H=20m or less	h=1m or less	less than 8
PU-4S type	ϕ19.05<3/4>								

Note1. The number of bends in the refrigerant pipe is respectively 8 or less in the range of <A+B> <A+C>



10-3 Pipe connection

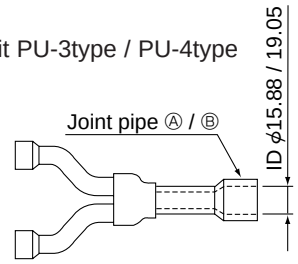
(1) Note the following during work:
- Be sure to recheck the combination <Table1> and pipe size <Table2> of the outdoor/indoor units.
- Observe the refrigerant pipe length limits and no of bend limits <Table2>.
- Insert the refrigerant pipe (obtain locally) into the flared end of the distributior pipe (packed) until the former pipe stops. Use oxidization-free solder for connection when possible.
- The installation of the distributor pipe (packed) is not regulated.
- Take care to prevent dirt, foreign materials, etc., from entering the pipe when connecting the pipe.
- After checking remove the tag from the liquid pipe ③.

(2) Piping connection
- When welding the piping, use the exclusive joint ⑦ as the diameters of the pipe on the outdoor unit side and the joint section differ. (Refer to the table on the right.)

● Do not bend or expend any distributor pipe (Liquid pipe)

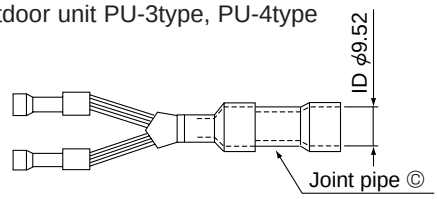
Gas side

•Outdoor unit PU-3type / PU-4type



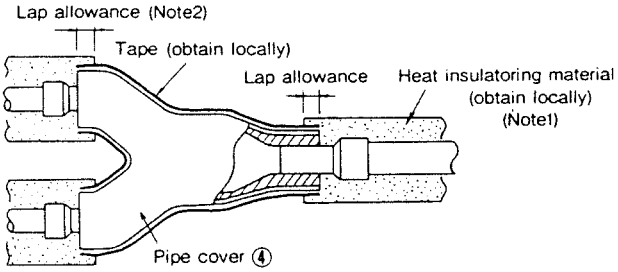
Liquid side

•Outdoor unit PU-3type, PU-4type



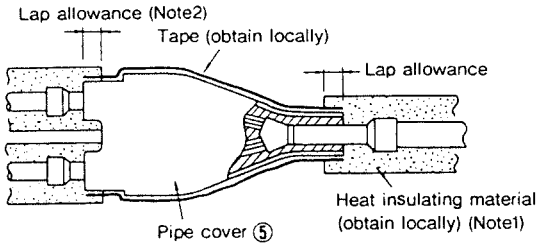
10-4 Heat insulating work

Gas pipe



- Install the gas pipe ② while aligning it with the pipe cover ④. Seal the joint area of the pipe cover ④ with heat insulating sealing tape (obtain locally).

Liquid pipe



- Install the liquid pipe ③ while aligning it with the pipe cover ⑤. Seal the joint area of the pipe cover ⑤ with heat insulating sealing tape (obtain locally).

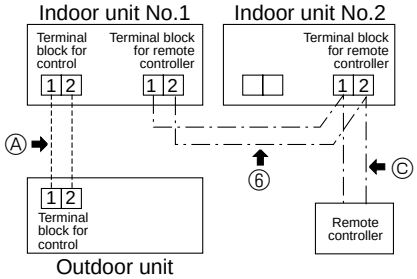
Note:
1. Cover the entire refrigerant pipe (obtain locally) with heat insulating material If connercial heat insulating meterial is used, it must be 12mm or thicker.
2. As the pipe covers ④ and ⑤ will shrink slightly due to the high temperature, allow a lap when installing the heat insulating material.

10-5 Control wiring for indoor unit

- Connect the control cables of the indoor units Nos. 1 and 2 with the enclosed 2-core cable (12m) ⑥.
- Connect the 2-core cable ⑥ to the remote controller terminal in the electrical box of each indoor unit and tighten the screws. (The polarity is not designated.)

Specifications of each control cable

	Ⓐ	⑥	Ⓒ
Control cable	Prepared by site	Enclosed with optional distributor pipe. (12m)	Enclosed with the optional remote controller.
Control circuit voltage	DC12V		
Cable thickness	0.8mm or more	0.3mm^2 or more	
Polarity	Not designated		



Twin Setting

1 Set DIP switch SW6.
2 Remove the short-circuit connector CN40. (Leave it connected to the No.1 unit.)

	No.1 unit	No.2 unit
SW6 Twin type	OFF ON 4 3 2 1	OFF ON 4 3 2 1
CN40 connector	Leave it connected.	Disconnect.

Note 1: SW6 default settings are all OFF.
Note 2: The short-circuit connector CN40 is connected by factory.

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