MITSUBISHI ELECTRIC

SPLIT-TYPE,HEAT PUMP AIR CONDITIONERS

1997

No. OC135

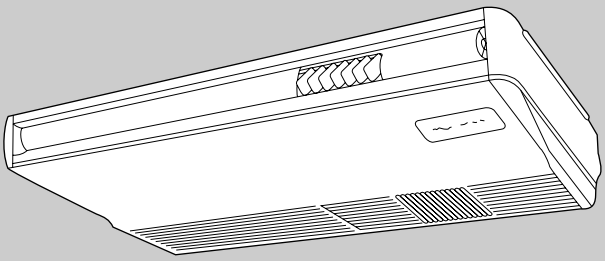
TECHNICAL & SERVICE MANUAL

Series PCH Ceiling Suspended

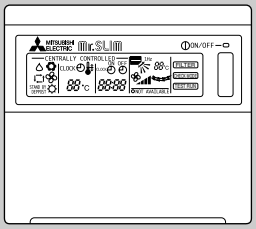
Indoor unit

[Models names]	[Service Ref.]
PCH-2GKHA	**PCH-2GKHA1**
PCH-2.5GKHA	**PCH-2.5GKHA1**
PCH-3GKHA	**PCH-3GKHA1**
PCH-4GKHSA	**PCH-4GKHSA1**
PCH-5GKHSA	**PCH-5GKHSA1**
PCH-6GKHSA	**PCH-6GKHSA1**

This manual does not cover the following outdoor units. When serving them, please refer to the service manual No.OC128 and this manual in a set.
[Service Ref.]
PUH-2VKA2
PUH-2.5VKA2
PUH-3VKA2
PUH-3YKA2
PUH-4YKSA3
PUH-5YKSA3
PUH-6YKSA2



INDOOR UNIT



REMOTE CONTROLLER

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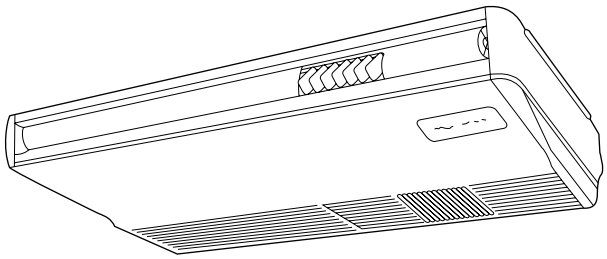
The Slim Line.
From Mitsubishi Electric.

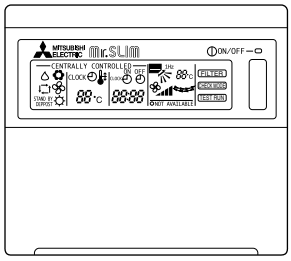
Mr.SLIM™

1 FEATURES

Series PCH Ceiling Suspended



Indoor unit



Remote controller

Service Ref.	Cooling capacity/Heating capacity	
	W	Btu/h
PCH-2GKHA1	5,400 / 6,200 (7,600)	18,400 / 21,200 (25,900)
PCH-2.5GKHA1	7,000 / 7,100 (9,200)	23,900 / 24,200 (31,400)
PCH-3GKHA1	7,500 / 8,500 (10,600)	25,600 / 29,000 (36,200)
PCH-4GKHSA1	10,000 / 10,450 (13,150)	34,100 / 35,700 (44,900)
PCH-5GKHSA1	12,400 /13,900 (16,900)	42,300 / 47,400 (57,700)
PCH-6GKHSA1	14,500 / 15,000 (18,000)	49,500 / 51,200 (61,400)

※ Rating Conditions (JIS B 8616)
Cooling : Indoor : 27℃ (80°F)DB, 19℃ (66°F)WB.
Outdoor : 35℃ (95°F)DB, 24℃ (75°F)WB.
Heating : Indoor : 20℃ (68°F)DB.
Outdoor : 7℃ (45°F)DB, 6℃ (43°F)WB.

1. ADVANCED REMOTE CONTROLLER

● **Operation buttons**

● Once the operation of the unit is set, subsequent operation can only be performed by pressing the ON/OFF button repeatedly.

button
This switches between continuous operation and the timer operation.

CLOCK ON OFF button
This sets or switches the current time. start time and stop time.

button
This sets the ventilation fan speed.

button
Press this button to switch the cooler electronic dry (dehumidify) automatic and heater modes.

ON/OFF button
This switches between the operation and stop modes each time it is pressed. The lamp on this butoon lights during operation.

button
This adjusts the vertical angle of the ventilation.

TEMP button
This sets the room temparature The temparature setting can be performed in 1°C units
Setting range
Cooler 19°C to 30°C
Heater 17°C to 28°C

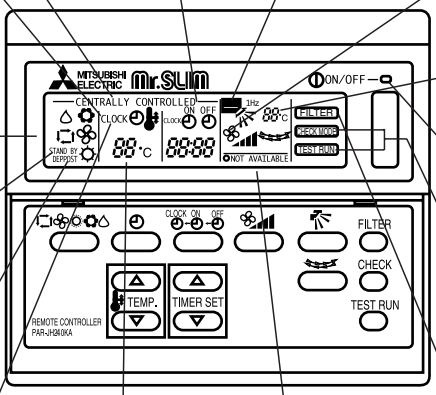
FILTER button
This resets the filter service indication display.

This model name of the remote controller is indicated.

button
This switches the horizontal fan motion ON and OFF.
(This button dose not operate in this model)

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

● Display



CENTRALLY CONTROLLED display

This indicates when the unit is controlled by optional features such as central control type remote controller.

CLOCK ON OFF display

The current time , start time and stop time can be displayed in tensecond intervals by pressing the time switch button. The start time or stop time is always displayed during the timer operation.

display

This displays the air direction.

display

This indicates when the continous operation and time operation modes are set.
It also display the time for the timer operation at the same time as when it is set.

display

The selected fan speed is displayed.

88°C display

The temperature of the suction air is displayed during operation. The display range is 8° to 39°C. The display flashes 8°C when the actual temperature is less than 8° and flashes 39°C when the actual temperature is greater than 39°C.

OPERATION MODE display

This indicates the operation mode.

Operation lamp

This lamp lights during operation, goes off when the unit stops and flashes when a malfunction occurs.

STANDBY display

This indicates when the standby mode is set from the time the sleep operation starts until the heating air is discharged.

CHECK MODE / TEST RUN display

This display lights in the check mode or when a test operation is performed.

DEFROST display

This indicates when the defrost operation is performed.

FILTER display

This lamp lights when the filter need to be cleaned.

CHECK display

This indicates when a malfunction has occurred in the unit which should be checked.

-88°C display

This displays the selected setting temperature.

⊙display

This lamp lights when electricity is supplied to the unit.

Caution

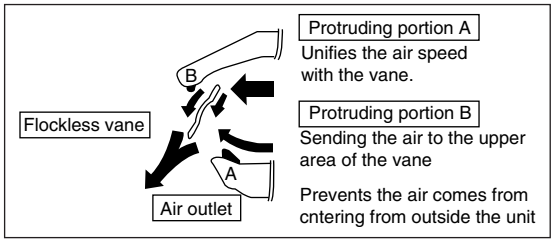
- Only the ⊙ display lights when the unit is stopped and power supplied to the unit.
- When power is turned ON for the first time the (CENTRAL CTRL) display appears to go off momentarily but this is not a malfunction.
- When the central control remote control unit, which is sold separately, is used the ON-OFF button, button and TEMP button do not operate.
- "NOT AVAILABLE" is displayed when the button are pressed.This indicates that this room unit is not equipped with the fan direction adjustment function and the louver function.

1. AIR OUTLET

New PCH series models have 1 air outlet (auto vane switching of horizontal air flow / down flow by switched by auto vane) instead of 2 (horizontal,and down flows).

2. EASY TO CLEAN ; FLOCKLESS VANE

With our original air current control mechanism, a flockless vane is newly adapted.
The flockless vane prevents the condensation on the vane.
By changing the vane to the flockless type, the unit can be cleaned much easier with mild household detergent.

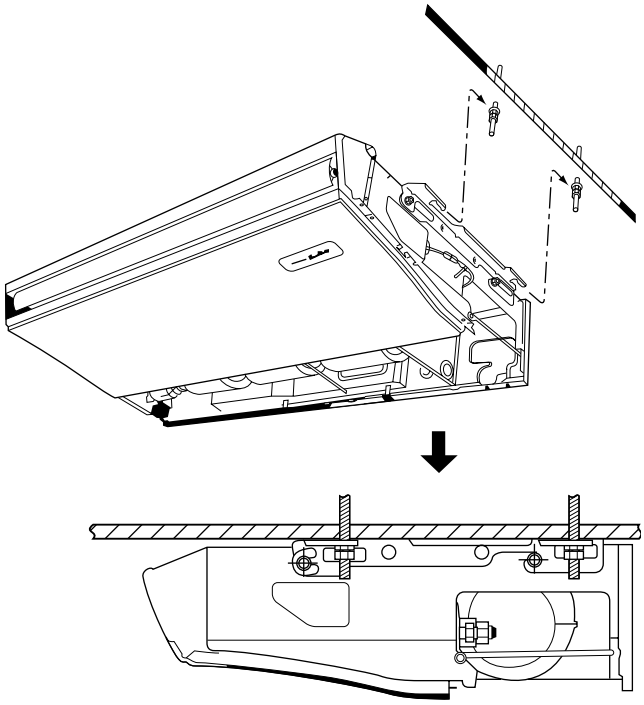


3. NEW MATERIALS FOR BETTER OIL RESISTANCE

We have changed the materials of grill, filer, fan and fan casing from ABS to P.P. (polypropylene) for better oil resistance. As a result, oil crazing is cut in haif.

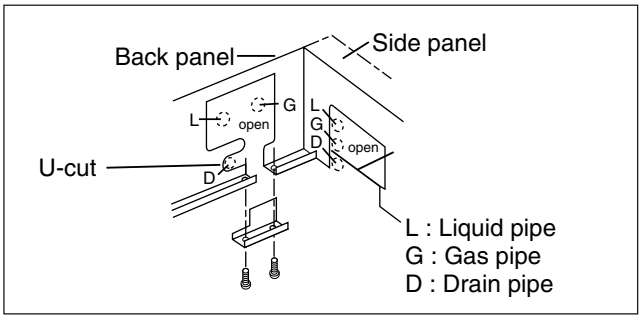
4. SIMPLIFIED INSTALLATION WORK (DIRECT SUSPENDING METHOD)

Simplified the installation work by changing the suspending method to the direct suspending method (suspending the unit directly from the suspension fixture).
In this way, the unit can be attached to the suspension fixture without removing the installation parts off (Only the side cover is removed). This method is much simpler than the “One-time installation method”.



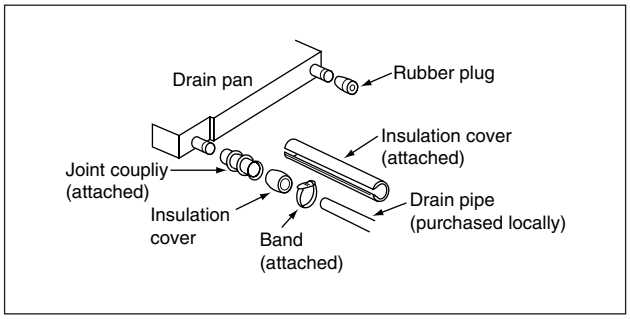
5. IMPROVING EFFICIENCY OF PIPING WORK

① Removed the knockout work by separating the piping space from the air outlet for efficiency of the piping work.



※ Knockout work is needed for the top part. When optional drain-up machine is installed, the refrigerant pipe exits out from the top.

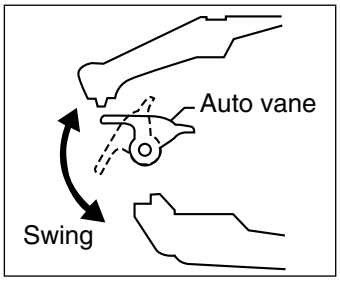
② Improved the flexbility by making it possible for drainage pipe to exit not only from the right side back but also from the left side back.



※ Please move the rubber plug for the unit to the right joint when drainage pipe exits from the left side.

6. QUITENESS ; 43dB (HIGH NOTCH)

New PCH series has No.1 quietness by changing the air course and the adapting the new shape air outlet.



7. EASY MAINTENANCE ; NO MAINTENANCE NECESSARY FOR 2500 HOURS

The new longlife air filter can be used continuously 2500 hours without maintenance (at general office situation).

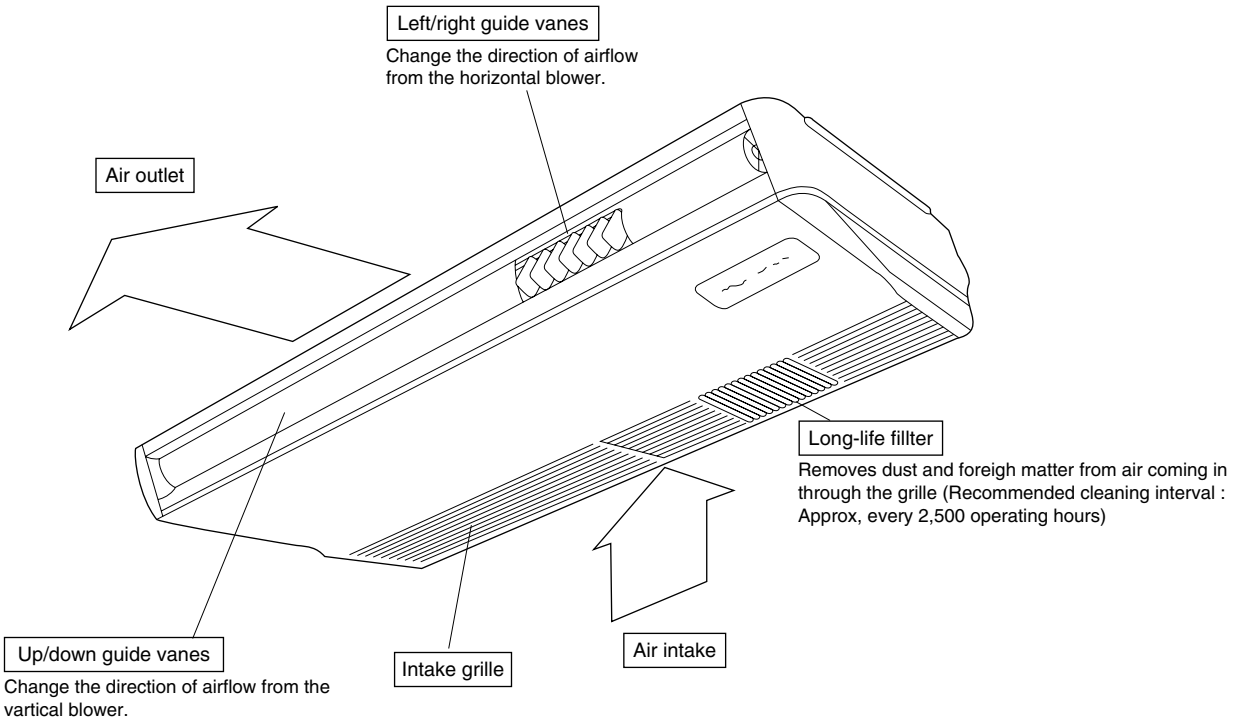
8. CHOICE OF FILTER

High performance filter can be purchaced optionally for the special needs.

Locations	Appropriate filter	Capability	Filter life	Maintenance	How to attach to the unit
Busy shops etc...	High performance filter	Weighing method 70%	2500 hour	The filter can be used again after cleaning.	Remove the standard long life filter before attach this optional parts.
Regular office, shops	Standard longlife filter	Weighing method 30%	2500 hour	The filter can be used again after cleaning.	It is attached to the unit.

2 PART NAMES AND FUNCTION

● Indoor (Main) Unit



3 SPECIFICATIONS

Rating Conditions (JIS B8616)

Item				Service Ref.	PCH-2GKHA1		PCH-2.5GKHA1	
Function					Cooling	Heating	Cooling	Heating
Capacity				Btu/h	18,400	21,200 (25,900)	23,900	24,200 (31,400)
				W	5,400	6,200 (7,600)	7,000	7,100 (9,200)
Total input				kW	2.30	2.32 (3.72)	2.59	2.36 (4.46)
INDOOR UNIT	**Service Ref.**				**PCH-2GKHA1**		**PCH-2.5GKHA1**	
	Power supply				Single phase. 50Hz. 220-240V			
		Input		kW	0.10	0.10 (1.50)	0.13	0.13 (2.23)
		Running current		A	0.43	0.43(6.21)	0.55	0.55 (9.30)
		Starting current		A	1.20	1.20 (6.98)	1.27	1.27 (10.02)
	External finish				Munsell 0.70Y 8.59 / 0.97			
	Heat exchanger				Plate fin coil			
		Fan(drive) x No.			Sirocco (direct) x 2		Sirocco (direct) x 3	
		Fan motor output		kW	0.054		0.07	
		Airflow(Low-High)		m³/min <CFM>	10 -13 <353-459>		14 -18 <494-635>	
		External static pressure		Pa(mmAq)	0 (direct blow)			
	Booster heater			kW	(1.4)		(2.1)	
	Operation control & Thermostat				Remote controller & built-in			
	Noise level(Low-High)			dB(A)	37 - 42		37 - 43	
	Cond. drain connection O.D.			mm,(in)	26(1)			
	Dimensions		W	mm,(in)	1,000 (39-3/8)		1,310 (51-9/16)	
			D	mm,(in)	680 (26-3/4)			
			H	mm,(in)	210 (8-1/4)			
	Weight			kg,(lbs)	28.5 (63)		36 (79)	
OUTDOOR UNIT	**Service Ref.**				**PUH-2VKA2**		**PUH-2.5VKA2**	
	Power supply				Single phase. 50Hz. 220-240V			
		Input		kW	2.20	2.22	2.46	2.23
		Running current		A	9.86	9.95	10.68	9.78
		Starting current		A	45	45	52	52
	External finish				Munsell 5Y 7/1			
	Refrigerant control				Capillary tube			
	Compressor				Hermetic			
		Model			NH38VMD		NH41VMD	
		Motor output		kW	1.7		2.0	
		Starter type			Line start			
		Protection devices			Internal thermostat. High-pressure switch			
	Heat exchanger				Plate fin coil			
		Fan(drive) x No.			Propeller (direct)×1			
		Fan motor output		kW	0.065		0.085	
		Airflow		m³/min <CFM>	45 (1,590)		50 (1,764)	
	Defrost method				Reverse cycle			
	Crankcase heater			W	38			
	Noise level			dB(A)	49		52	
	Dimensions		W	mm,(in)	870 (34-1/4)			
			D	mm,(in)	295 + 24 (11-5/8 add 1)			
			H	mm,(in)	650 (25-5/8)		850 (33-7/16)	
	Weight			kg,(lbs)	64 (141)		68 (150)	
REFRIGERANT PIPING	Refrigerant				R-22			
		Charge		kg,(lbs)	2.2 (4.9)		2.8 (6.2)	
	Pipe size O.D.		Liquid	mm,(in)	9.52 (3/8)			
			Gas	mm,(in)	15.88 (5/8)			
	Connection method			Indoor side	Flared			
				Outdoor side	Flared			
	Between the indoor & outdoor unit			Height difference	Max. 40m		Max. 50m	
				Piping length	Max. 40m		Max. 50m	

Notes1. Rating Conditions (JIS B8616)

Cooling : Indoor : 27℃(80°F)DB. 19℃(66°F)WB
Outdoor : 35℃(95°F)DB. 24℃(75°F)WB
Heating : Indoor : 20℃(68°F)DB.
Outdoor : 7℃(45°F)DB. 6℃(43°F)WB
Refrigerant piping length (one way) : 5m(16ft)

3. Above data based on indicated voltage
Indoor Unit 1 phase 240V 50Hz
Outdoor Unit 1 phase 240V 50Hz

2. Guaranteed operating range

		Indoor	Outdoor
Cooling	Upper limit	35℃ DB, 22.5℃ WB	46℃ DB
	Lower limit	21℃ DB, 15.5℃ WB	-5℃ DB
Heating	Upper limit	27℃ DB	21℃ DB, 15.5℃ WB
	Lower limit	20℃ DB	-8.5℃ DB, -9.5℃ WB

Rating Conditions (JIS B8616)

Item / Service Ref.				PCH-3GKHA1		PCH-4GKHSA1	
Function				Cooling	Heating	Cooling	Heating
Capacity			Btu/h	25,600	29,000 (36,200)	34,100	35,700 (44,900)
			W	7,500	8,500 (10,600)	10,000	10,450 (13,150)
Total input			kW	3.28	3.07 (5.17)	3.36	3.35(6.05)
INDOOR UNIT	**Service Ref.**			**PCH-3GKHA1**		**PCH-4GKHSA1**	
	Power supply			Single phase. 50Hz. 220-240V			
		Input	kW	0.13	0.13 (2.23)	0.16	0.16 (2.86)
		Running current	A	0.55	0.55 (9.30)	0.70	0.70 (11.95)
		Starting current	A	1.27	1.27 (10.02)	1.48	1.48 (12.73)
	External finish			Munsell 0.70Y 8.59 / 0.97			
	Heat exchanger			Plate fin coil			
		Fan(drive) x No.		Sirocco (direct) × 3			
		Fan motor output	kW	0.07		0.09	
		Airflow(Low-High)	m³/min <CFM>	14 -18 <494-635>		20 -25 <706-883>	
		External static pressure	Pa(mmAq)	0 (direct blow)			
	Booster heater		kW	(2.1)		(2.7)	
	Operation control & Thermostat			Remote controller & built-in			
	Noise level(Low-High)		dB(A)	37 - 43		40 - 45	
	Cond. drain connection O.D.		mm,(in)	26 (1)			
	Dimensions	W	mm,(in)	1,310 (51-9/16)			
		D	mm,(in)	680 (26-3/4)			
		H	mm,(in)	210 (8-1/4)		270 (10-5/8)	
	Weight		kg,(lbs)	36 (79)		39.5 (87)	
OUTDOOR UNIT	**Service Ref.**			**PUH-3VKA2,PUH-3YKA2**		**PUH-4YKSA3**	
	Power supply			VKA...1phase, 50Hz, 220-240V / YK(S)A...3phase, 50-380Hz, 415V, 4wires			
		Input	kW	3.15	2.94	3.20	3.19
		Running current	A	13.82 / 5.16	12.89 / 4.81	5.24	5.22
		Starting current	A	58 / 37	58 / 37	40	40
	External finish			Munsell 5Y 7/1			
	Refrigerant control			Capillary tube			
	Compressor			Hermetic			
		Model		NH52VND(PUH-3VKA),NH52YDA(PUH-3YKA)		NH56YDA	
		Motor output	kW	2.2 / 2.4		2.7	
		Starter type		Line start			
		Protection devices		VKA...Inner thermostat. High-pressure switch YKA...Anti-phase protector, Thermal relay, Thermal switch, High-pressute switch			
	Heat exchanger			Plate fin coil			
		Fan(drive) x No.		Propeller (direct) × 1		Propeller (direct) × 2	
		Fan motor output	kW	0.085		0.065 + 0.065	
		Airflow	m³/min <CFM>	50 (1,764)		95 (3,350)	
	Defrost method			Reverse cycle			
	Crankcase heater		W	38		38	
	Noise level		dB(A)	52		54	
	Dimensions	W	mm,(in)	870 <34-1/4>			
		D	mm,(in)	295 + 24 <11-5/8 add 1>			
		H	mm,(in)	850 (33-7/16)		1,258 (49-1/2)	
	Weight		kg,(lbs)	75 (165)		94 (207)	
REFRIGERANT PIPING	Refrigerant			R-22			
		Charge	kg,(lbs)	3.2 (7.1)		4.2 (9.2)	
	Pipe size O.D.	Liquid	mm,(in)	9.52 (3/8)		9.52 (3/8)	
		Gas	mm,(in)	15.88 (5/8)		19.05 (3/4)	
	Connection method	Indoor side		Flared			
		Outdoor side		Flared			
	Between the indoor & outdoor unit	Height difference		Max. 50m			
		Piping length		Max. 50m			

Notes1. Rating Conditions (JIS B8616)
Cooling : Indoor : 27℃(80°F)DB. 19℃(66°F)WB
Outdoor : 35℃(95°F)DB. 24℃(75°F)WB
Heating : Indoor : 20℃(68°F)
Outdoor : 7℃(45°F)DB. 6℃(43°F)WB.
Refrigerant piping length (one way) : 5m(16ft)

2. Guaranteed operating range

		Indoor	Outdoor
Cooling	Upper limit	35℃ DB, 22.5℃ WB	46℃ DB
	Lower limit	21℃ DB, 15.5℃ WB	-5℃ DB
Heating	Upper limit	27℃ DB	21℃ DB, 15.5℃ WB
	Lower limit	20℃ DB	-8.5℃ DB, -9.5℃ WB

3. Above data based on indicated voltage
Indoor Unit 1 phase 240V 50Hz
Outdoor Unit 1 phase 240V 50Hz / 3 phase 415V 50Hz

Rating Conditions (JIS B8616)

Item			Service Ref.	PCH-5GKHSA1		PCH-6GKHSA1	
Function				Cooling	Heating	Cooling	Heating
Capacity			Btu/h	42,300	47,400 (57,700)	49,500	51,200 (61,400)
			W	12,400	13,900 (16,900)	14,500	15,000 (18,000)
Total input			kW	4.45	4.40 (7.40)	4.97	4.82 (7.82)
INDOOR UNIT	**Service Ref.**			**PCH-5GKHSA1**		**PCH-6GKHSA1**	
	Power supply			Single phase. 50Hz. 220-240V			
		Input	kW	0.24	0.24 (3.24)	0.24	0.24 (3.24)
		Running current	A	1.06	1.06 (13.56)	1.06	1.06 (13.56)
		Starting current	A	2.20	2.20 (14.70)	2.20	2.20 (14.70)
	External finish			Munsell 0.70Y 8.59 / 0.97			
	Heat exchanger			Plate fin coil			
		Fan(drive) x No.		Sirocco (direct)×4			
		Fan motor output	kW	0.15			
		Airflow(Low-High)	m³/min <CFM>	27 -34 <953-1,200>			
		External static pressure	Pa(mmAq)	0 (direct blow)			
	Booster heater		kW	(3.0)			
	Operation control & Thermostat			Remote controller & built-in			
	Noise level(Low-High)		dB(A)	41-46		42-48	
	Cond. drain connection O.D.		mm,(in)	26 (1)			
	Dimensions	W	mm,(in)	1,620 (63-3/4)			
		D	mm,(in)	680 (26-3/4)			
		H	mm,(in)	270 (10-5/8)			
	Weight		kg,(lbs)	46 (101)		48 (106)	
OUTDOOR UNIT	**Service Ref.**			**PUH-5YKSA3**		**PUH-6YKSA2**	
	Power supply			3 phases. 50Hz. 380-415V (4 wires)			
		Input	kW	4.21	4.16	4.73	4.58
		Running current	A	6.89	6.81	7.74	7.50
		Starting current	A	53	53	74	74
	External finish			Munsell 5Y 7/1			
	Refrigerant control			Capillary tube			
	Compressor			Hermetic			
		Model		ZR61KC-TFD		ZR68KC-TFD	
		Motor output	kW	3.5		4.0	
		Starter type		Line start			
		Protection devices		Anti-phase protector, Internal thermostat, Thermal switch, High-pressure switch			
	Heat exchanger			Plate fin coil			
		Fan(drive) x No.		Propeller (direct)×2			
		Fan motor output	kW	0.085 + 0.085		0.10 + 0.10	
		Airflow	m³/min <CFM>	95 (3,350)		100 (3,530)	
	Defrost method			Reverse cycle			
	Crankcase heater		W	38			
	Noise level		dB(A)	55		56	
	Dimensions	W	mm,(in)	970 (38-3/16)			
		D	mm,(in)	345 + 24 (13-9/16 add 1)			
		H	mm,(in)	1,258 (49-1/2)			
	Weight		kg,(lbs)	114 (251)		117 (258)	
REFRIGERANT PIPING	Refrigerant			R-22			
		Charge	kg,(lbs)	5.4 (11.9)		5.0 (11.0)	
	Pipe size O.D.	Liquid	mm,(in)	9.52 (3/8)			
		Gas	mm,(in)	19.05 (3/4)			
	Connection method	Indoor side		Flared			
		Outdoor side		Flared			
	Between the indoor & outdoor unit	Height difference		Max. 50m			
		Piping length		Max. 50m			

Notes1. Rating Conditions (JIS B8616)

Cooling : Indoor : 27℃ (80°F)DB. 19℃ (66°F)WB
Outdoor : 35℃ (95°F)DB. 24℃ (75°F)WB
Heating : Indoor : 20℃ (68°F)DB.
Outdoor : 7℃ (45°F)DB. 6℃ (43°F)WB.
Refrigerant piping length (one way) : 5m(16ft)

2. Guaranteed operating range

		Indoor	Outdoor
Cooling	Upper limit	35℃ DB, 22.5℃ WB	46℃ DB
	Lower limit	21℃ DB, 15.5℃ WB	-5℃ DB
Heating	Upper limit	27℃ DB	21℃ DB, 15.5℃ WB
	Lower limit	20℃ DB	-8.5℃ DB, -9.5℃ WB

3. Above data based on indicated voltage
Indoor Unit 1 phase 240V 50Hz
Outdoor Unit 3 phase 415V 50Hz

4 DATA

1. PERFORMANCE DATA

1) COOLING CAPACITY

Service Ref.	Indoor Intake air WB°C	Outdoor intake air DB°C											
		20		25		30		35		40		45	
		CA	P.C.	CA	P.C.	CA	P.C.	CA	P.C.	CA	P.C.	CA	P.C.
PCH-2GKHA1	16	5448	1.84	5299	1.92	5104	2.07	4897	2.22	4678	2.37	4447	2.52
	18	5800	1.88	5648	1.96	5442	2.12	5226	2.27	5000	2.43	4764	2.58
	20	6157	1.92	6012	2.00	5798	2.16	5574	2.33	5341	2.49	5099	2.66
	22	6517	1.95	6392	2.04	6171	2.21	5940	2.38	5700	2.56	5451	2.75
PCH-2.5GKHA1	16	7062	2.08	6869	2.16	6616	2.33	6348	2.50	6064	2.67	5765	2.84
	18	7519	2.12	7321	2.21	7054	2.38	6775	2.56	6482	2.73	6176	2.91
	20	7981	2.16	7794	2.25	7515	2.44	7225	2.62	6923	2.81	6609	3.00
	22	8448	2.20	8286	2.30	7999	2.49	7700	2.68	7389	2.89	7067	3.10
PCH-3GKHA1	16	7566	2.63	7359	2.74	7089	2.95	6802	3.16	6515	3.38	6199	3.59
	18	8056	2.68	7844	2.80	7558	3.02	7259	3.24	6954	3.46	6632	3.68
	20	8551	2.73	8350	2.85	8052	3.08	7741	3.32	7419	3.55	7089	3.79
	22	9052	2.78	8878	2.91	8571	3.15	8250	3.40	7910	3.65	7570	3.92
PCH-4GKHSA1	16	10088	2.69	9812	2.81	9452	3.02	9069	3.24	8686	3.46	8266	3.68
	18	10741	2.75	10459	2.87	10078	3.09	9678	3.32	9272	3.55	8842	3.77
	20	11402	2.80	11134	2.92	10736	3.16	10322	3.40	9892	3.64	9451	3.89
	22	12069	2.85	11838	2.98	11427	3.23	11000	3.48	10547	3.74	10094	4.01
PCH-5GKHSA1	16	12510	3.57	12167	3.72	11720	4.00	11245	4.29	10771	4.58	10249	4.87
	18	13319	3.64	12969	3.79	12496	4.10	12001	4.40	11497	4.70	10964	5.00
	20	14138	3.71	13806	3.87	13313	4.19	12799	4.50	12266	4.82	11720	5.15
	22	14965	3.78	14679	3.95	14170	4.27	13640	4.61	13078	4.96	12516	5.32
PCH-6GKHSA1	16	14628	3.98	14228	4.15	13705	4.47	13150	4.79	12595	5.12	11985	5.44
	18	15575	4.06	15165	4.24	14613	4.57	14033	4.91	13445	5.25	12821	5.58
	20	16532	4.14	16144	4.32	15568	4.67	14967	5.03	14344	5.39	13705	5.75
	22	17500	4.22	17164	4.41	16570	4.77	15951	5.15	15293	5.54	14636	5.94

Notes CA : Capacity (W)
P.C. : Power consumption (kW)

Cooling cpapacity correction factors

Service Ref.	Refrigerant piping length (one way)									
	5m	10m	15m	20m	25m	30m	35m	40m	45m	50m
PCH-2GKHA1	1.00	0.992	0.983	0.978	0.966	0.959	0.950	0.945	—	—
PCH-2.5GKHA1	1.00	0.989	0.980	0.970	0.960	0.950	0.940	0.930	0.920	0.910
PCH-3GKHA1	1.00	0.981	0.968	0.952	0.940	0.925	0.913	0.900	0.886	0.874
PCH-4GKHSA1	1.00	0.989	0.980	0.970	0.960	0.950	0.940	0.930	0.920	0.910
PCH-5GKHSA1	1.00	0.981	0.968	0.952	0.940	0.925	0.913	0.900	0.886	0.874
PCH-6GKHSA1	1.00	0.975	0.955	0.935	0.918	0.900	0.884	0.869	0.855	0.840

2. HEATING CAPACITY

Service Ref.	Indoor Intake air DB°C	Outdoor intake air WB°C											
		-10		-5		0		5		10		15	
		CA	P.C.	CA	P.C.	CA	P.C.	CA	P.C.	CA	P.C.	CA	P.C.
PCH-2GKHA1	15	4246	1.58	4866	1.75	5546	1.93	6285	2.11	7082	2.31	7936	2.52
	20	4066	1.71	4675	1.89	5337	2.08	6051	2.28	6816	2.49	7632	2.71
	25	3907	1.81	4485	2.01	5125	2.22	5827	2.44	6590	2.67	7413	2.91
PCH-2.5GKHA1	15	4862	1.61	5573	1.78	6351	1.96	7198	2.15	8110	2.35	9088	2.57
	20	4656	1.73	5354	1.92	6112	2.11	6929	2.32	7806	2.53	8740	2.76
	25	4474	1.84	5136	2.04	5869	2.26	6673	2.48	7546	2.72	8489	2.96
PCH-3GKHA1	15	5821	2.09	6671	2.31	7604	2.55	8617	2.80	9710	3.06	10880	3.34
	20	5574	2.26	6409	2.49	7317	2.75	8296	3.01	9345	3.30	10463	3.59
	25	5356	2.40	6149	2.66	7027	2.94	7989	3.23	9034	3.53	10163	3.85
PCH-4GKHSA1	15	7156	2.29	8202	2.53	9348	2.78	10594	3.05	11937	3.34	13376	3.64
	20	6852	2.46	7880	2.72	8996	3.00	10199	3.29	11488	3.60	12863	3.92
	25	6585	2.61	7560	2.90	8639	3.20	9821	3.52	11107	3.86	12495	4.21
PCH-5GKHSA1	15	9519	3.00	10910	3.32	12434	3.65	14091	4.01	15878	4.39	17792	4.78
	20	9115	3.23	10481	3.58	11966	3.94	13566	4.32	15281	4.72	17110	5.15
	25	8759	3.43	10056	3.81	11491	4.21	13064	4.63	14774	5.07	16620	5.52
PCH-6GKHSA1	15	10272	3.29	11773	3.63	13418	4.00	15206	4.39	17135	4.81	19200	5.24
	20	9836	3.54	11311	3.92	12912	4.31	14640	4.73	16491	5.18	18464	5.64
	25	9453	3.76	10851	4.17	12400	4.61	14098	5.07	15943	5.55	17935	6.05

Notes CA : Capacity (W)
P.C. : Power consumption (kW)

Heating capacity correction factors

Service Ref.	Refrigerant piping length (one way)									
	5m	10m	15m	20m	25m	30m	35m	40m	45m	50m
PCH-2GKHA1	1.00	1.00	1.00	1.00	1.00	1.00	0.998	0.995	—	—
PCH-2.5GKHA1	1.00	1.00	1.00	1.00	1.00	1.00	0.998	0.995	0.993	0.990
PCH-3GKHA1	1.00	1.00	1.00	1.00	1.00	1.00	0.998	0.995	0.993	0.990
PCH-4GKHSA1	1.00	1.00	1.00	1.00	1.00	1.00	0.998	0.995	0.993	0.990
PCH-5GKHSA1	1.00	1.00	1.00	1.00	1.00	1.00	0.998	0.995	0.993	0.990
PCH-6GKHSA1	1.00	1.00	1.00	1.00	1.00	1.00	0.998	0.995	0.993	0.990

3. ELECTRICAL DATA

Rating Conditions (JIS B8616)
Indoor·····220V 50Hz 1phase
Outdoor··· 220V 50Hz 1phase / 380V 50Hz 3phase

Service Ref.		PCH-2GKHA1		PCH-2.5GKHA1		PCH-3GKHA1		PCH-4GKHSA1		PCH-5GKHSA1		PCH-6GKHSA1	
Mode		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Capacity (W)		5,300	6,100 [7,280]	6,900	7,000 [8,760]	7,400	8,400 [10,160]	9,900	10,350 [12,620]	12,200	13,700 [16,220]	14,400	14,800 [17,320]
Total Input (kW)		2.20	2.22 [3.40]	2.52	2.27 [4.03]	3.24	3.03 [4.79]	3.31	3.30 [5.57]	4.39	4.33 [6.85]	4.84	4.76 [7.28]
Indoor	Input (kW)	0.08	0.08	0.11	0.11	0.11	0.11	0.14	0.14	0.20	0.20	0.20	0.20
	Current (A)	0.38	0.38	0.51	0.51	0.51	0.51	0.68	0.68	0.96	0.96	0.96	0.96
	Starting current (A)	1.10	1.10	1.17	1.17	1.17	1.17	1.36	1.36	2.0	2.0	2.0	2.0
Outdoor	Input (kW)	2.12	2.14	2.41	2.16	3.13	2.92	3.17	3.16	4.19	4.13	4.64	4.56
	Current (A)	9.83	9.93	11.18	10.02	14.67/5.23	13.68/4.88	5.29	5.28	7.32	7.21	8.10	7.96
	Starting current (A)	43	43	52	52	54 / 34	54 / 34	37	37	49	49	68	68

Indoor·····230V 50Hz 1phase
Outdoor··· 230V 50Hz 1phase / 400V 50Hz 3phase

Service Ref.		PCH-2GKHA1		PCH-2.5GKHA1		PCH-3GKHA1		PCH-4GKHSA1		PCH-5GKHSA1		PCH-6GKHSA1	
Mode		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Capacity (W)		5,350	6,150 [7,440]	6,950	7050 [8,980]	7,450	8,450 [10,380]	9,950	10,400 [12,880]	12,300	13,800 [16,560]	14,450	14,900 [17,660]
Total Input (kW)		2.25	2.27 [3.56]	2.56	2.32 [4.25]	3.26	3.05 [4.98]	3.34	3.33 [5.81]	4.42	4.37 [7.13]	4.91	4.79 [7.55]
Indoor	Input (kW)	0.09	0.09	0.12	0.12	0.12	0.12	0.15	0.15	0.22	0.22	0.22	0.22
	Current (A)	0.41	0.41	0.53	0.53	0.53	0.53	0.69	0.69	1.01	1.01	1.01	1.01
	Starting current (A)	1.15	1.15	1.22	1.22	1.22	1.22	1.42	1.42	2.10	2.10	2.10	2.10
Outdoor	Input (kW)	2.16	2.18	2.44	2.20	3.14	2.93	3.19	3.18	4.20	4.15	4.69	4.57
	Current (A)	9.78	9.87	10.94	9.86	14.22 / 5.21	13.27 /4.86	5.23	5.22	7.05	6.97	7.87	7.67
	Starting current (A)	44	44	52	52	56 / 36	56 / 36	39	39	51	51	71	71

Indoor·····240V 50Hz 1phase
Outdoor··· 240V 50Hz 1phase / 415V 50Hz 3phase

Service Ref.		PCH-2GKHA1		PCH-2.5GKHA1		PCH-3GKHA1		PCH-4GKHSA1		PCH-5GKHSA1		PCH-6GKHSA1	
Mode		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Capacity (W)		5,400	6,200 [7,600]	7,000	7,100 [9,200]	7,500	8,500 [10,600]	10,000	10,450 [13,150]	12,400	13,900 [16,900]	14,500	15,000 [18,000]
Total Input (kW)		2.30	2.32 [3.72]	2.59	2.36 [4.46]	3.28	3.07 [5.17]	3.36	3.35 [6.05]	4.45	4.40 [7.40]	4.97	4.82 [7.82]
Indoor	Input (kW)	0.10	0.10	0.13	0.13	0.13	0.13	0.16	0.16	0.24	0.24	0.24	0.24
	Current (A)	0.43	0.43	0.55	0.55	0.55	0.55	0.70	0.70	1.06	1.06	1.06	1.06
	Starting current (A)	1.20	1.20	1.27	1.27	1.27	1.27	1.48	1.48	2.20	2.20	2.20	2.20
Outdoor	Input (kW)	2.20	2.22	2.46	2.23	3.15	2.94	3.20	3.19	4.21	4.16	4.73	4.58
	Current (A)	9.86	9.95	10.68	9.78	13.82 / 5.16	12.89 / 4.81	5.24	5.22	6.89	6.81	7.74	7.50
	Starting current (A)	45	45	52	52	58 / 37	58 / 37	40	40	53	53	74	74

4. STANDARD OPERATION DATA

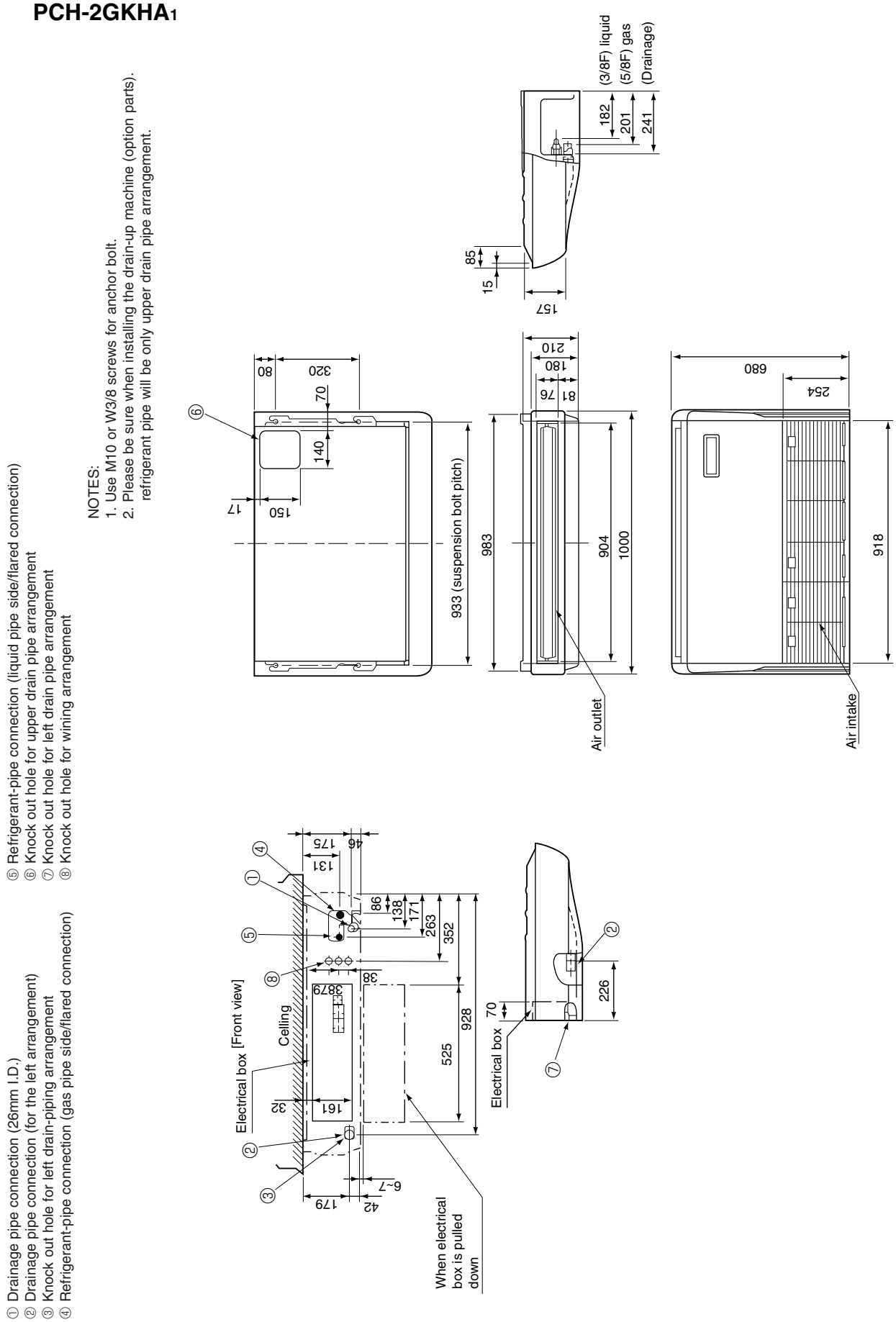
Rating Conditions (JIS B8616)

Service Ref.			PCH-2GKHA1		PCH-2.5GKHA1		PCH-3GKHA1		PCH-4GKHSA1		PCH-5GKHSA1		PCH-6GKHSA1	
Mode			Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Total	Capacity	W	5,400	6,200 [7,600]	7,000	7,100 [9,200]	7,500	8,500 [10,600]	10,000	10,450 [13,150]	12,400	13,900 [16,900]	14,500	15,000 [18,000]
	Input	KW	2.30	2.32 [3.72]	2.59	2.36 [4.46]	3.28	3.07 [5.17]	3.36	3.35 [6.05]	4.45	4.40 [7.40]	4.97	4.82 [7.82]
Electrical circuit	**Indoor unit Service Ref.**		**PCH-2GKHA1**		**PCH-2.5GKHA1**		**PCH-3GKHA1**		**PCH-4GKHSA1**		**PCH-5GKHSA1**		**PCH-6GKHSA1**	
	Phase, Hz		1, 50		1, 50		1, 50		1, 50		1, 50		1, 50	
	Volts	V	240		240		240		240		240		240	
	Amperes	A	0.43	0.43	0.55	0.55	0.55	0.55	0.70	0.70	1.06	1.06	1.06	1.06
	Outdoor unit Service Ref.		**PUH-2VKA2**		**PUH-2.5VKA2**		**PUH-3VKA2 PUH-3YKA2**		**PUH-4YKSA3**		**PUH-5YKSA3**		**PUH-6YKSA2**	
	Phase, Hz		1, 50		1, 50		1/3, 50		3, 50		3, 50		3, 50	
	Volts	V	240		240		240 / 415		415		415		415	
	Amperes	A	9.86	9.95	10.68	9.78	13.82/ 5.16	12.89/ 4.81	5.24	5.22	6.89	6.81	7.74	7.50
Refrigerant circuit	Discharge pressure	Mpa·G(kgf/cm²·G)	1.92 (19.6)	1.90 (19.4)	2.05 (20.9)	1.73 (17.6)	2.04 (20.8)	1.94 (19.8)	1.83 (18.7)	1.72 (17.5)	1.92 (19.6)	1.78 (18.1)	1.97 (20.1)	1.80 (18.4)
	Suction pressure	Mpa·G(kgf/cm²·G)	0.47 (4.8)	0.37 (3.77)	0.53 (5.4)	0.38 (3.87)	0.43 (4.39)	0.36 (3.67)	0.50 (5.1)	0.39 (3.98)	0.48 (4.90)	0.37 (3.77)	0.45 (4.59)	0.38 (3.88)
	Discharge temperature	°C	87	89	85	77	87	83	78	75	75	70	74	69
	Condensing temperature	°C	50	—	53	—	53	—	48	—	50	—	51	—
	Suction temperature	°C	3.8	-2.7	6.9	-2.1	1.6	-2.9	6.7	-1.0	4.4	-2.8	2.6	-1.8
	Ref. pipe length	m	5	5	5	5	5	5	5	5	5	5	5	5
Indoor side	Intake air temperature	DB °C	27	20	27	20	27	20	27	20	27	20	27	20
		WB °C	19	15	19	15	19	15	19	15	19	15	19	15
	Discharge air temperature	DB °C	11.5	44.8	12.4	40.4	11.1	44.8	11.1	42.1	12.4	42.4	10.0	44.9
Outdoor side	Intake air temperature	DB °C	35	7	35	7	35	7	35	7	35	7	35	7
		WB °C	24	6	24	6	24	6	24	6	24	6	24	6
SHF			0.68	—	0.69	—	0.66	—	0.68	—	0.73	—	0.65	—
BF			0.11	—	0.14	—	0.15	—	0.12	—	0.07	—	0.14	—

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·G)=10.2(kgf/cm²·G)

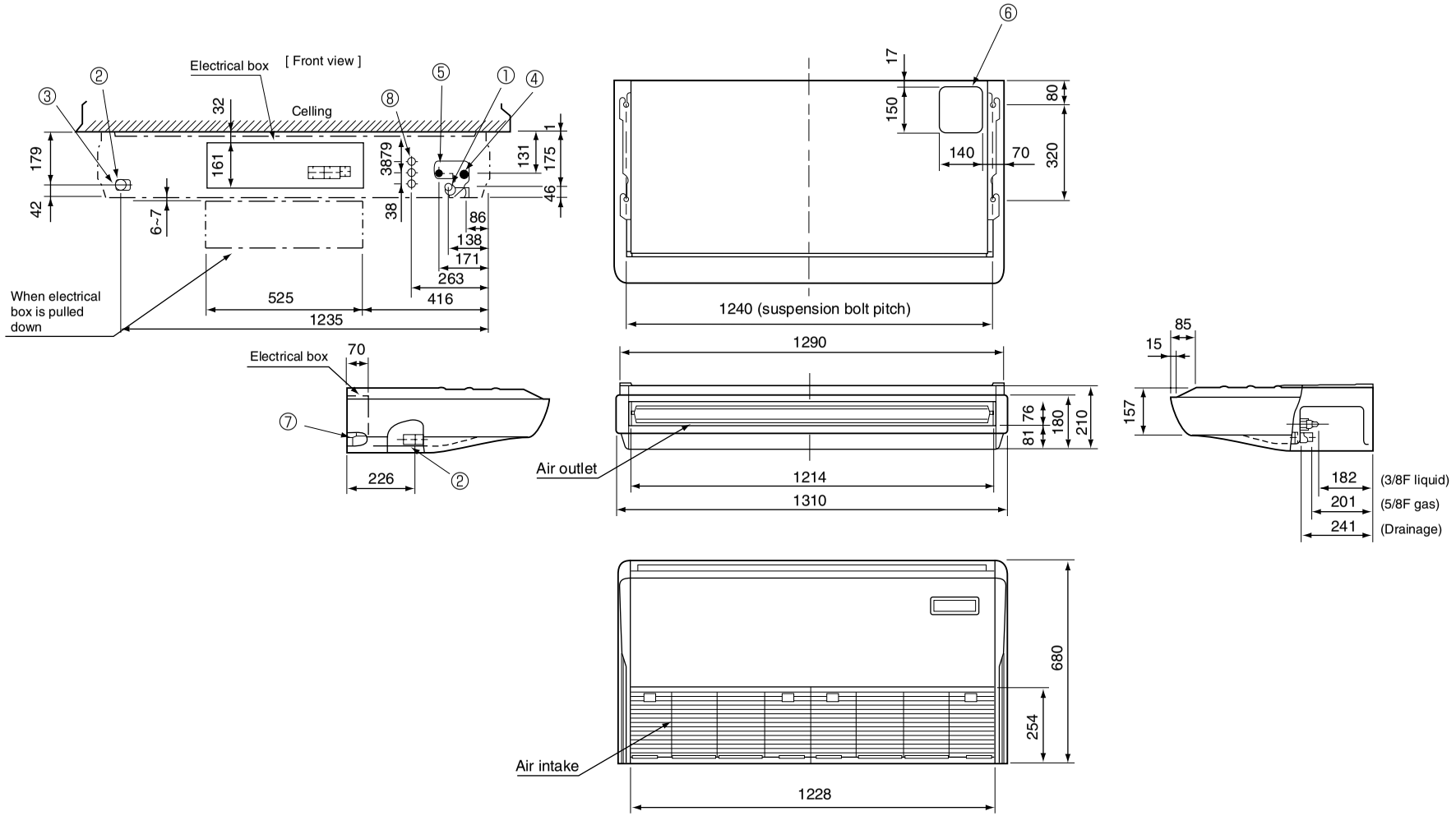
5 OUTLINES AND DIMENSIONS

1. INDOOR UNIT
PCH-2GKHA1



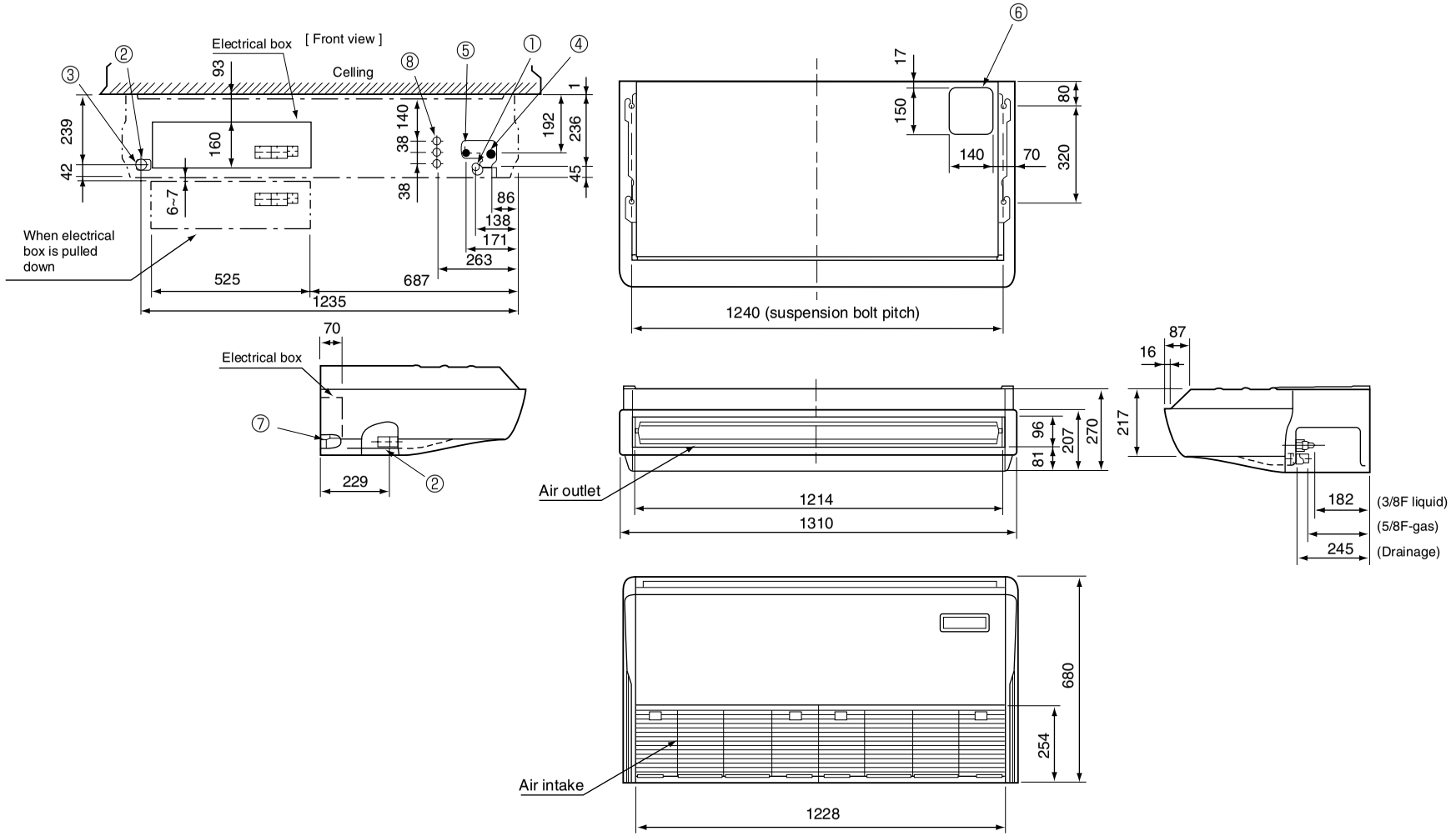
① Drainage pipe connection (26mm I.D.)
② Drainage pipe connection (for the left arrangement)
③ Knock out hole for left drain-piping arrangement
④ Refrigerant-pipe connection (gas pipe side/flared connection)
⑤ Refrigerant-pipe connection (liquid pipe side/flared connection)
⑥ Knock out hole for upper drain pipe arrangement
⑦ Knock out hole for left drain pipe arrangement
⑧ Knock out hole for wining arrangement

NOTES:
1. Use M10 or W3/8 screws for anchor bolt.
2. Please be sure when installing the drain-up machine (option parts). refrigerant pipe will be only upper drain pipe arrangement.



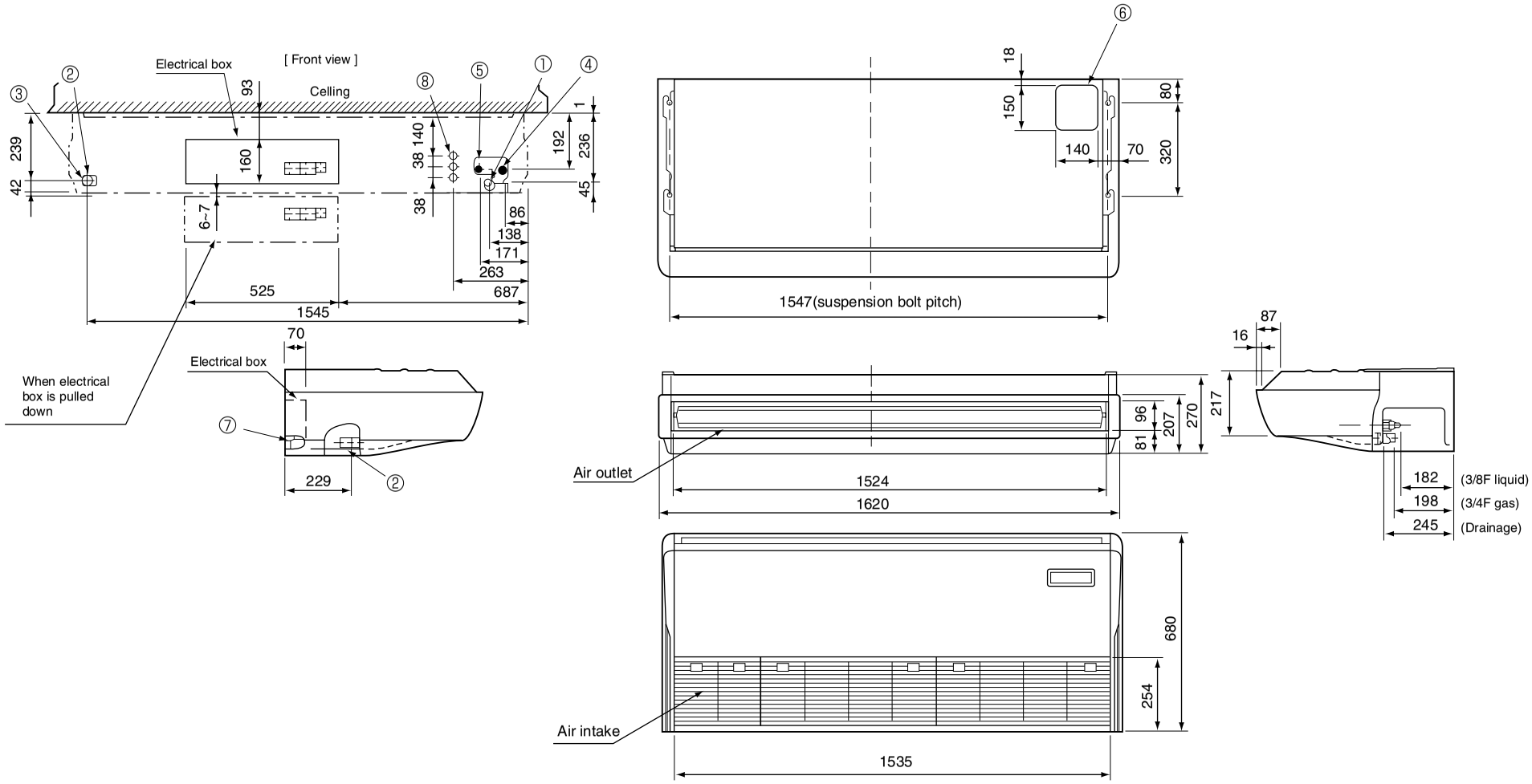
① Drainage pipe connection (26mm I.D.)
② Drainage pipe connection (for the left arrangement)
③ Knock out hole for left drain-piping arrangement
④ Refrigerant-pipe connection (gas pipe side/flared connection)
⑤ Refrigerant-pipe connection (liquid pipe side/flared connection)
⑥ Knock out hole for upper drain pipe arrangement
⑦ Knock out hole for left drain pipe arrangement
⑧ Knock out hole for wining arrangement

NOTES:
1. Use M10 or W3/8 screws for anchor bolt.
2. Please be sure when installing the drain-up machine (option parts). refrigerant pipe will be only upper drain pipe arrangement.



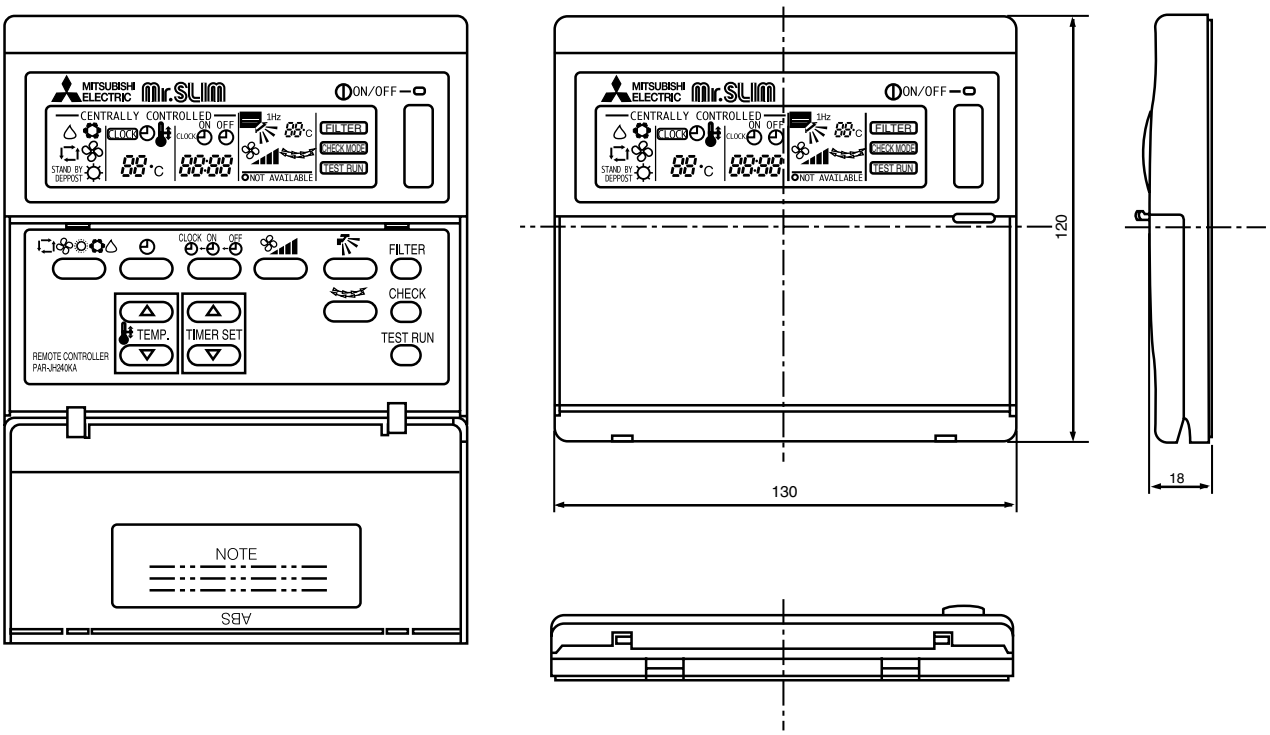
① Drainage pipe connection (26mm I.D.)
② Drainage pipe connection (for the left arrangement)
③ Knock out hole for left drain-piping arrangement
④ Refrigerant-pipe connection (gas pipe side/flared connection)
⑤ Refrigerant-pipe connection (liquid pipe side/flared connection)
⑥ Knock out hole for upper drain pipe arrangement
⑦ Knock out hole for left drain pipe arrangement
⑧ Knock out hole for wining arrangement

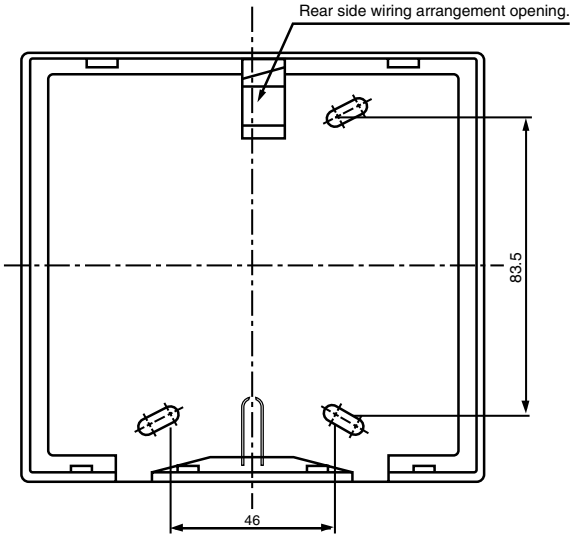
NOTES:
1. Use M10 or W3/8 screws for anchor bolt.
2. Please be sure when installing the drain-up machine (option parts). refrigerant pipe will be only upper drain pipe arrangement.

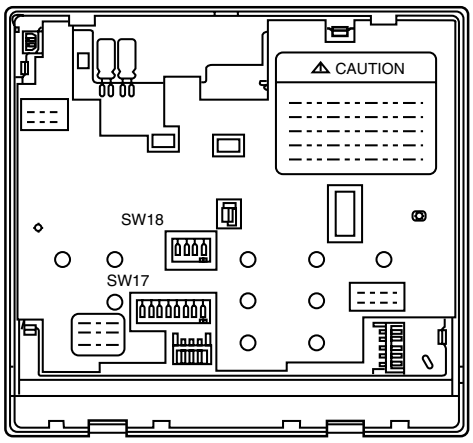


2. REMOTE CONTROLLER

Unit : mm(inch)



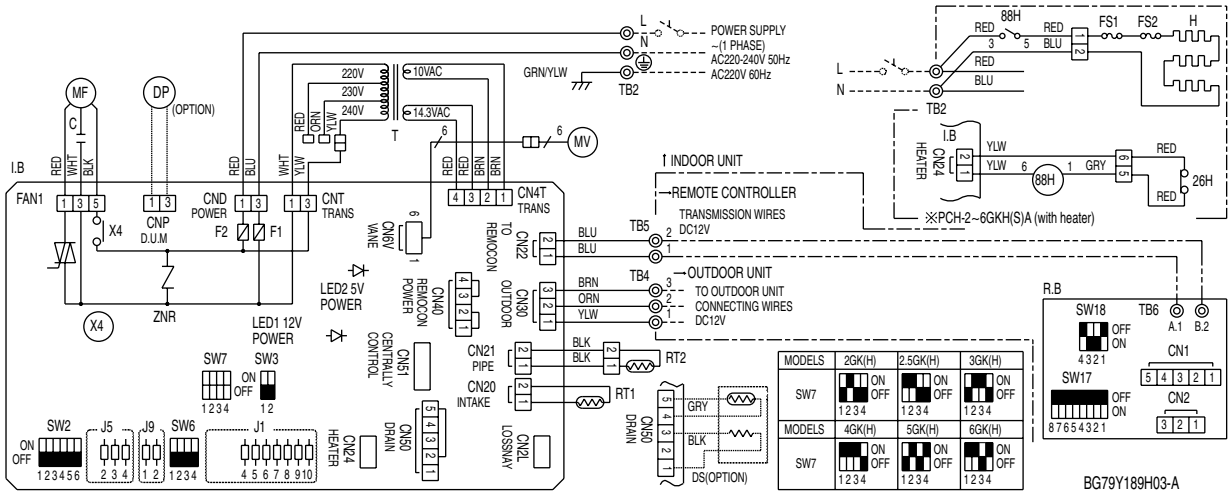




6 WIRING DIAGRAM

PCH-2GKHA1/PCH-2.5GKHA1/PCH-3GKHA1
PCH-4GKHSA1/PCH-5GKHSA1/PCH-6GKHSA1

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C	FAN MOTOR CAPACITOR	J9<I.B>	MODEL SELECTOR JUMPER RESISTORS	SW17<R.B>	ADDRESS SELECTOR
CN1<R.B>	PROGRAM TIMER CONNECTOR	LED1<I.B>	DC 12V POWER LED	SW18<R.B>	FUNCTION SELECTOR
CN2<R.B>	REMOTE SWITCH CONNECTOR	LED2<I.B>	DC 5V POWER LED	T	TRANSFORMER
CN2L<I.B>	LOSSNAY CONNECTOR	MF	FAN MOTOR	TB2	POWER SUPPLY TERMINAL BLOCK
CNP<I.B>	DRAIN-UP MACHINE CONNECTOR	MV	VANE MOTOR	TB4	INDOOR/OUTDOOR CONNECTING WIRE TERMINAL BLOCK
CN50<I.B>	DRAIN SENSOR CONNECTOR	R.B	REMOTE CONTROLLER BOARD	TB5,6	REMOTE CONTROLLER TERMINAL BLOCK
CN51<I.B>	CENTRALLY CONTROL CONNECTOR	RT1	ROOM TEMPERATURE THERMISTOR		LINE TRANSMISSION
F1,2<I.B>	FUSE(6.3A 250V)		(0℃/15kΩ, 25℃/5.4kΩ DETECT)	X4<I.B>	FAN MOTOR RELAY
FS1,2	THERMAL FUSE(98℃10A:2GKHA / 117℃16A:	RT2	INDOOR COIL THERMISTOR	ZNR	VARISTOR
	4GKHA110℃16A:2.5,3GKHA.5.6GKHSA)		(0℃/15kΩ, 25℃/5.4kΩ DETECT)	26H	HEATER THERMAL SWITCH
H	HEATER	SW2<I.B>	ADDRESS SELECTOR	88H	HEATER CONTACTOR
I.B	INDOOR CONTROLLER BOARD	SW3<I.B>	EMERGENCY OPERATION SWITCH	DP	OPTION DRAIN-UP MACHINE
J1<I.B>	FUNCTION SELECTOR JUMPER RESISTORS	SW6<I.B>	TWIN/TRIPLE SELECTOR	DS	OPTION DRAIN-UP SENSOR
J5<I.B>	MODEL SELECTOR JUMPER RESISTORS	SW7<I.B>	MODEL SELECTOR		



[Emergency operation procedure]
(2) Turn on the outdoor unit side circuit breaker, then indoor unit side circuit breaker in this order.
(3) During emergency operation indoor fan runs at high speed but automatic vane remains stop.
(4) If vane closed, open the vane by hand slowly.
(5) Thermostat will not function. Cold air belows out for defrosting during heating thus do not operate defrosting for a long time.
(6) Emergency cooling should be limited to 10 hours maximum.
(The indoor unit heat exchanger may freeze).
(7) If the microcomputer doctor detects the abnormality of the drain-up machine during cooling mode, do not execute emergency operation.(If causes drain overflow)

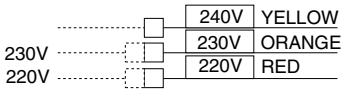
NOTES :

1. Since the indoor fan motor (MF 1.2) is connected with 230~240V power. IF 220V power is used. change the dip switch (SWS<1.B>)on the indoor controller board showing fig:※1.

fig:※1 Indoor fan motor (MF) for

2. Since the indoor transformer (T)is connected with 240Vpower.if 220.230V power is used. Change the wiring connection showing fig:※2.

fig:※2 When power supply is



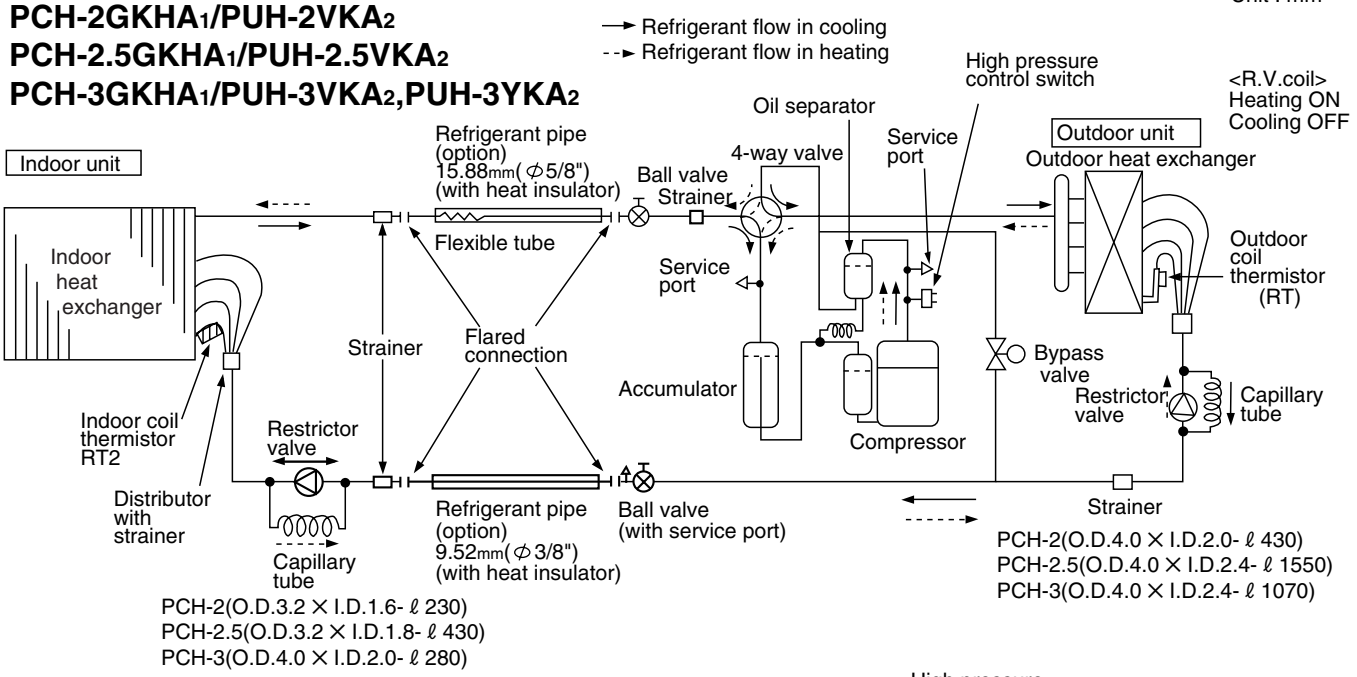
3. Since the outdoor side electric wiring may change be sure to check the outdoor unit electric wiring for servicing.
4. Indoor and outdoor connecting wires are made with polarities. make wiring matching terminal numbers.
5. Symbols used in wiring diagram above are.
□□□: Connector, ◎ : Terminal block.
6. Emergency operation
If remote controller or microcomputer fails but there is no other truble. emergency operation is possible by setting dip switch (SW3<I.B>) on the indoor controller board.

[Check items]
(1)Make sure that no other trouble exist the outdoor unit. Trouble with the outdoor unit prevents emergency operation.
(If any trouble exists the outdoor unit error code “P8”will be displayed on the remote controller and the trouble position will be shown on the outdoor controller LED. See electric wiring diagram of the outdoor unit for details.)
(2)Make sure that there is no trouble with the indoor fan.
Emergency operation will be continuous operation mode due to power ON/OFF (ON/OFF with the remote controller is not possible).
[Emergency operation procedure]
(1)Set the dip switch (SW3<I.B>) on the indoor controller board to 1 on and 2 off for cooling and 1 - 2 on for heating.

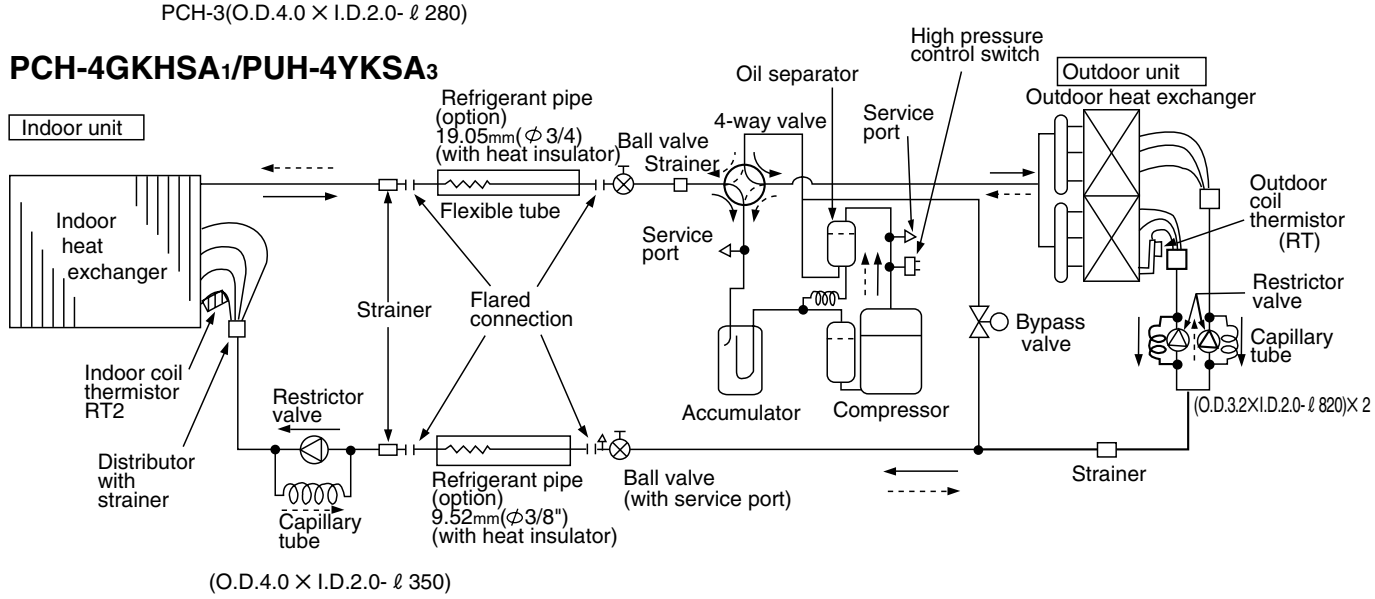
7 REFRIGERANT SYSTEM DIAGRAM

Unit : mm

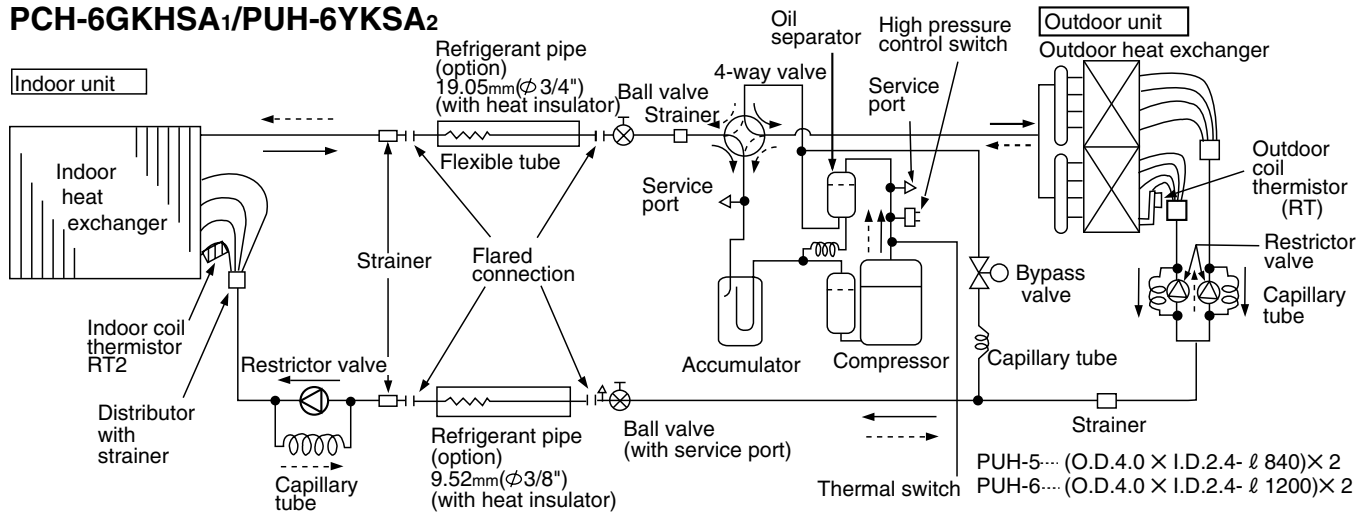
PCH-2GKHA1/PUH-2VKA2
PCH-2.5GKHA1/PUH-2.5VKA2
PCH-3GKHA1/PUH-3VKA2,PUH-3YKA2



PCH-4GKHSA1/PUH-4YKSA3

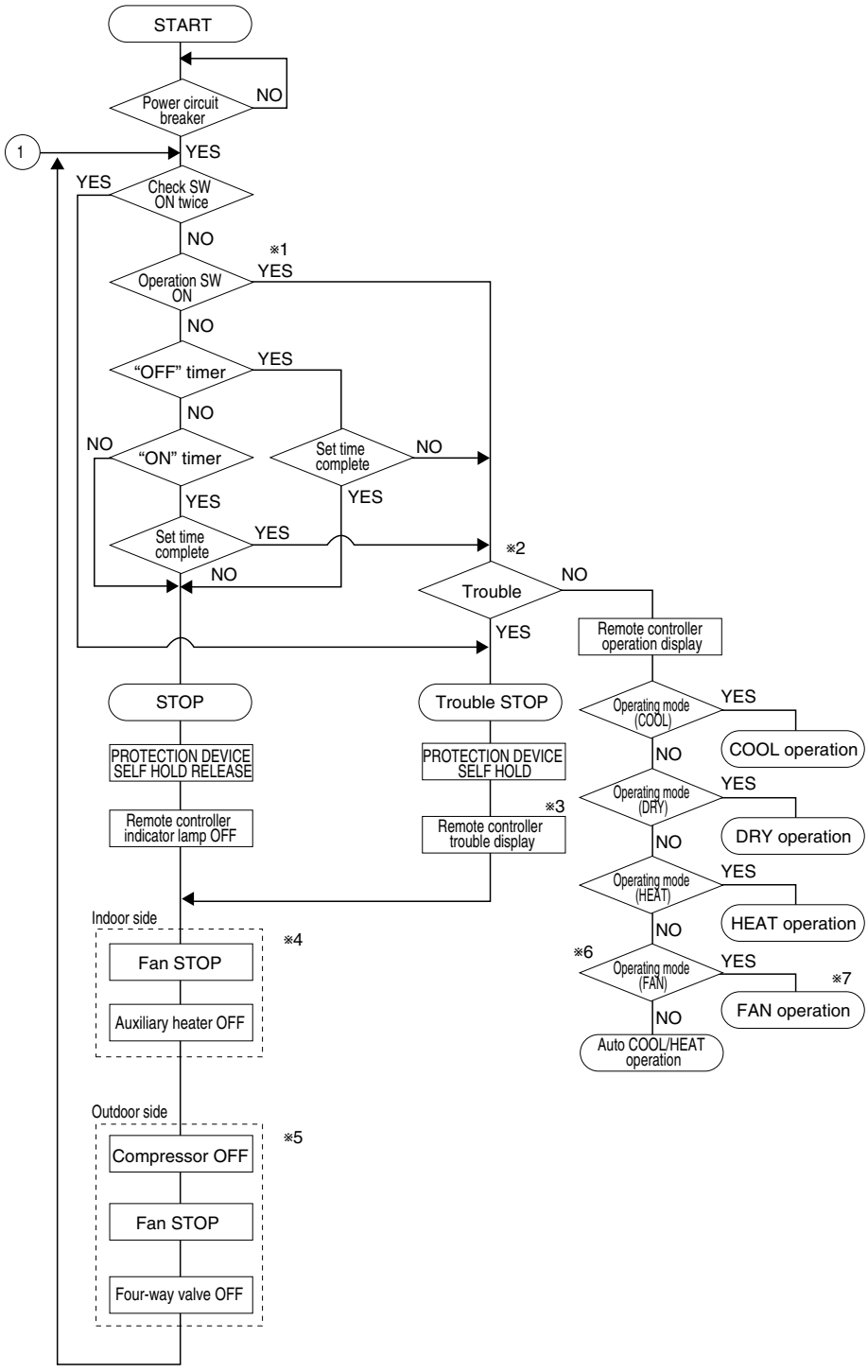


PCH-5GKHSA1/PUH-5YKSA3
PCH-6GKHSA1/PUH-6YKSA2



8 OPERATION FLOW-CHART

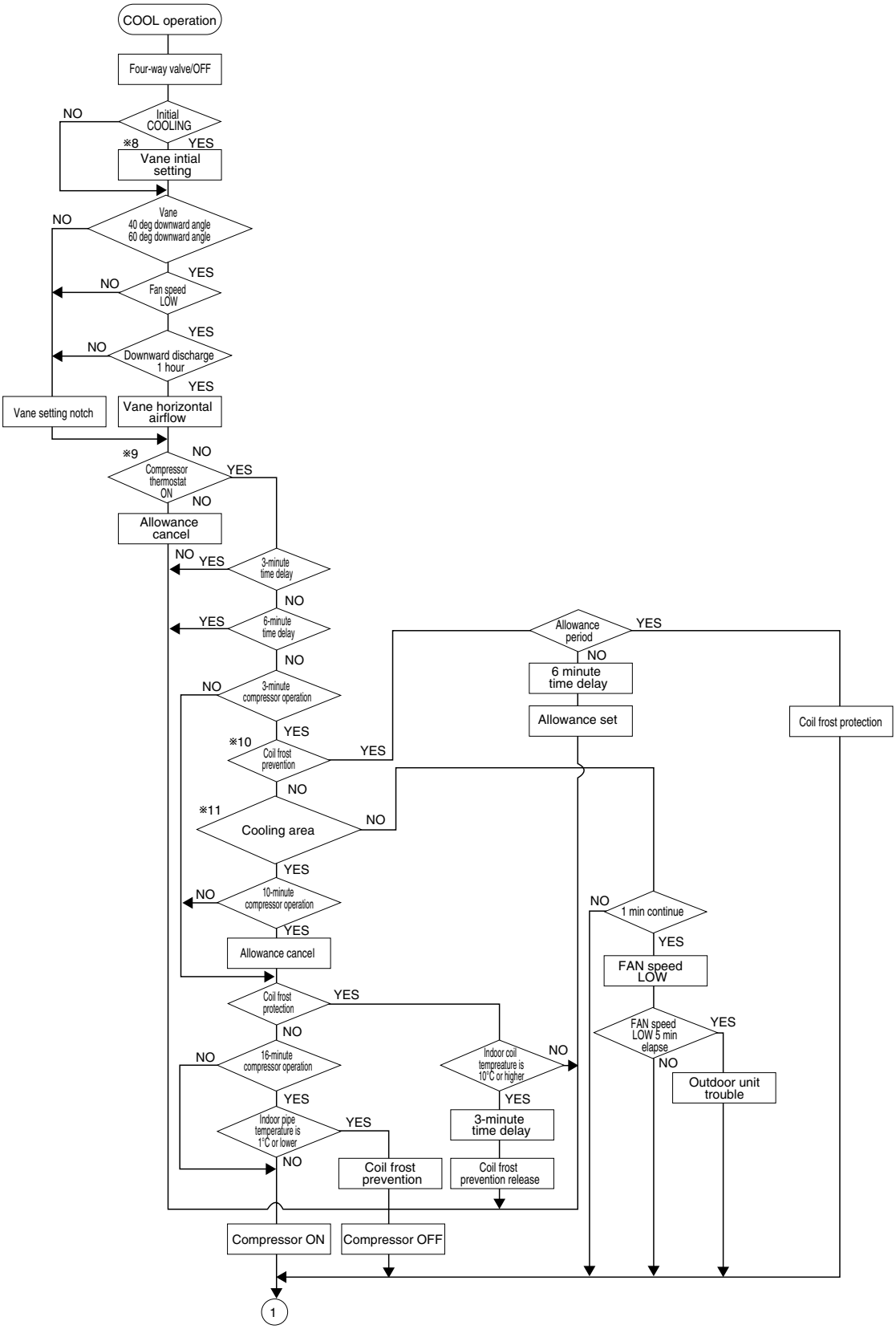
MAIN OPERATION



※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-Indoor coil thermistor malfanction
- P4-Drain sensor malfunction
- P5-Drain overflow
- P6-Coil frost/overheat protection
- P7-System error
- P8-Outdoor unit trouble

※3 The CHECK swich will show 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 (6 minutes ··· heating mode) time-delay functions after compressor stops.
※6 FAN or AUTO mode is selected by the indoor dipswitch setting.
※7 In FAN mode, fan speed and vane operation depend on the remote controller setting. (Compressor is OFF.)

COOLING OPERATION



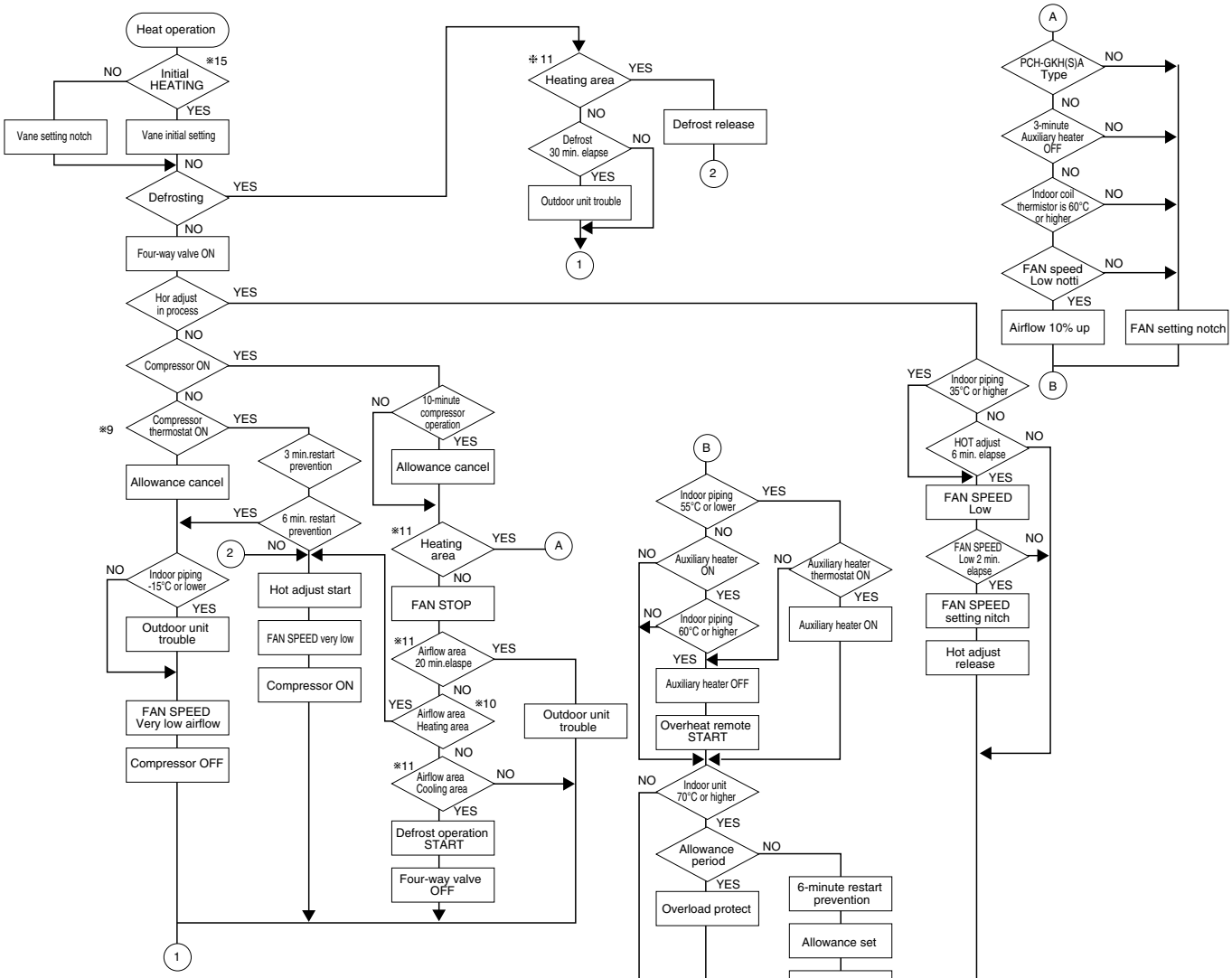
※8 When operation stops or changes to cooling or dry mode, the auto vane turns to a horizontal angle. If operation changes during auto vane SWING, the auto vane will continue to swing.

※9 When operating TEST RUN, the thermostat will be continuously ON.

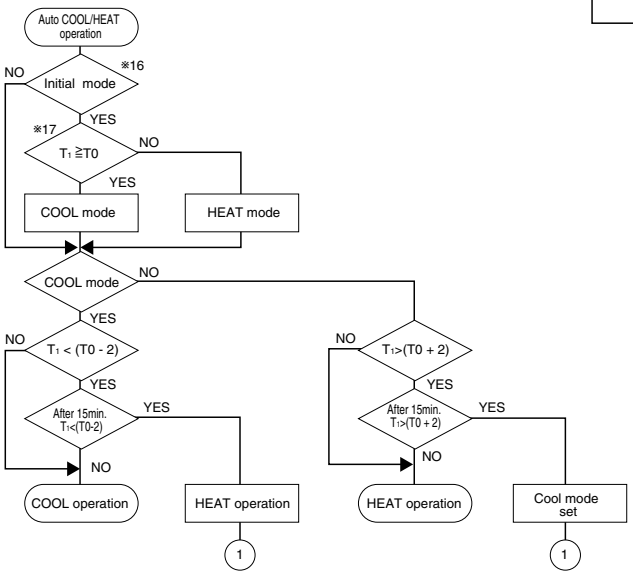
※10 After 3 minute compressor operation, if the indoor coil thermistor reads -15°C or below for 3 minutes, the compressor will stop for 6 minutes.

※11 Cooling area : Indoor coil temperature is more than 5 degrees above the room temperature.
Heating area : Indoor coil temperature is more than 5 degrees below the room temperature.
FAN area : Indoor coil temperature is within 5 degrees either way of the room temperature.

HEATING OPERATION

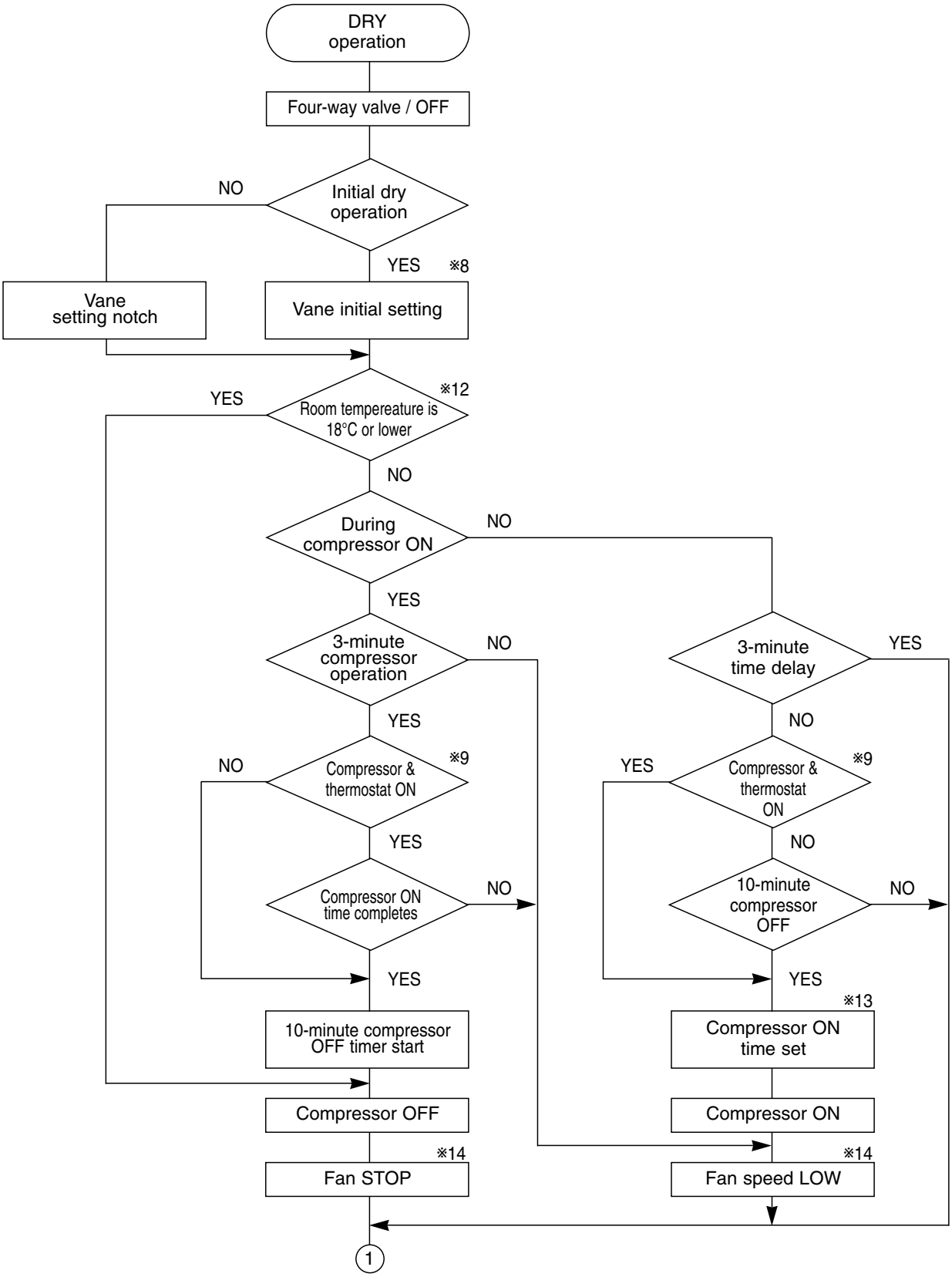


AUTOMATIC COOLING/HEATING OPERATION



※15 (i) Until Low airflow is set while in hot adjustment
(ii)While defrosting (FAN STOP)
(iii)When thermostat is OFF
In the case of(i), (ii) and (iii) above, airflow is horizontal regardless the VANE setting.
※16 When AUTO operation is started, COOL or HEAT mode is selected automatically.
※17 T1 : Room temperature.
To : Set temperature

DRY OPERATION



※8—9 Refer to page 31~32.

※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 31~32.

※14 In dry operation, compressor ON makes the fan speed LOW and compressor OFF stops the fan.
It is not possible to set the fan speed with the remote controller.

9 MICROPROCESSOR CONTROL

1.OUTLINE OF MICROPROCESSOR CONTROL

INPUT to remote controller

- OFF-ON switching.
- COOL/DRY-AUTO-HEAT 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)

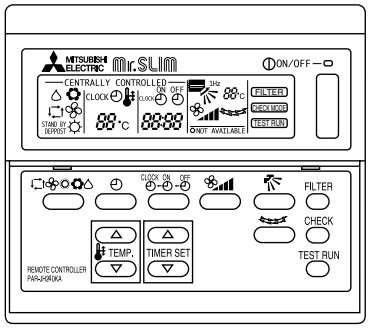
Remote controller board

- Processes and transmits orders.orders.

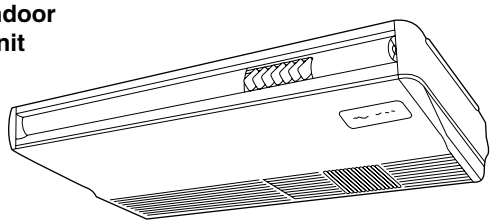
OUTPUT to remote controller

Remote controller

- LCD indicator



Indoor unit



Non-polar, two-wire cable maximum length 500 meters

Signal

12VDC

INPUT from indoor unit

- Room temperature thermistor (RT1)
- Indoor coil thermistor (RT2)
- Drain sensor

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 dipswitch on indoor controller board.
- Transmits the power to remote controller.

OUTPUT to indoor unit

- Autovane's angle setting.
- Booster heater ON-OFF Control.
- Drain pump : ON-OFF.
- Emergency stop.

1 2 3

Polar three-wire cable

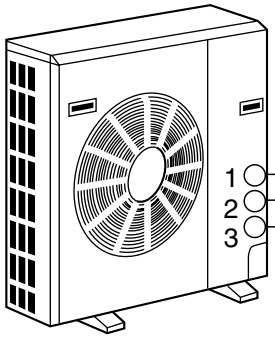
OUTPUT to outdoor unit

- Compressor and outdoor fan : ON-OFF
- Operation mode change :COOL-HEAT.

Independent Control of Outdoor Unit

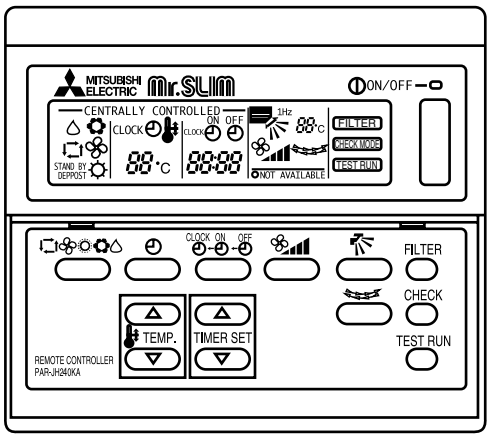
- Compressor protection device working
- Defrosting START-STOP
- Fan speed control.
- Crankcase heater control ON-OFF.
- Self diagnostic function

Outdoor unit



2. INDOOR UNIT CONTROL

2-1COOL operation



<How to operate>

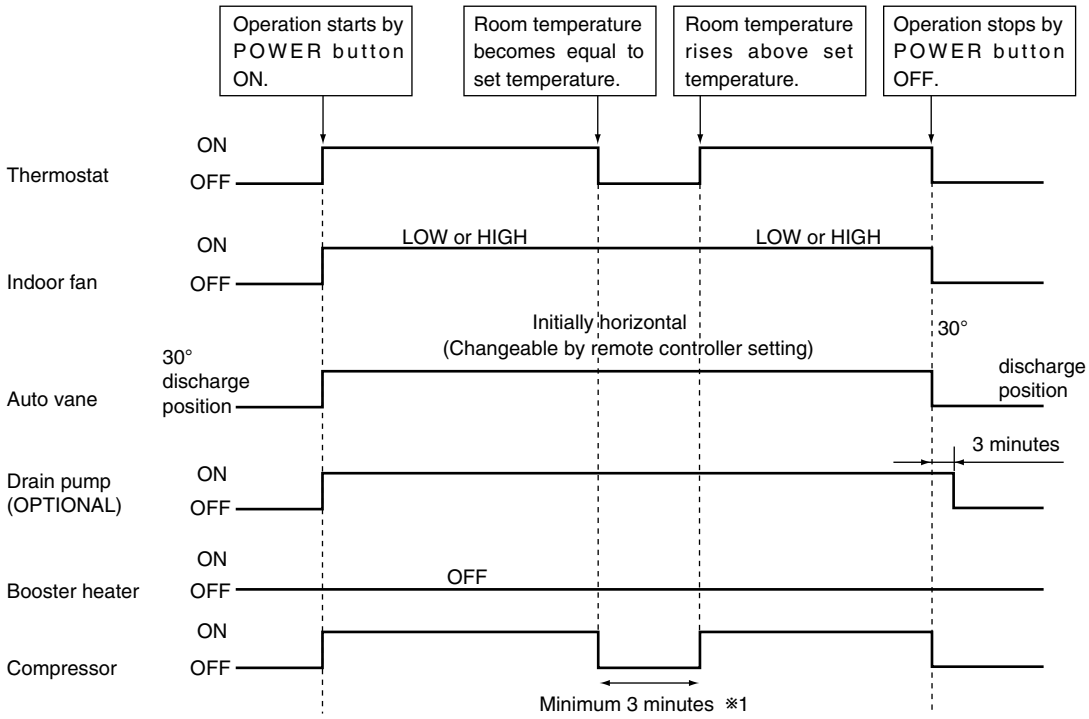
① Press POWER ON/OFF button.

② Press the ↻❄☀✿♨ 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°C 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.

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 indoor coil thermistor (RT2) reads 1°C or below after the compressor has been continuously operated for at least 16 minutes or more. When the indoor coil temperature rises to 10°C or above, the compressor will start after a 3-minute time delay.

NOTE : By cut off the J-5 (Jumper resistance)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 temperatuer 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° 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.

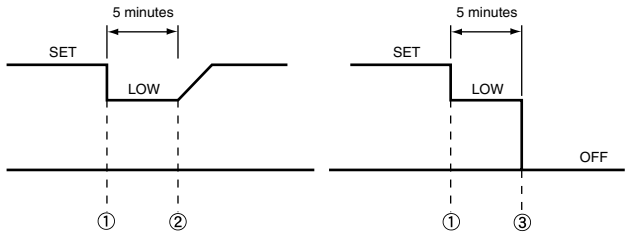
When the outdoor unit abnormality detection is released and the fan speed returns to the set speed, the quiet cycle control will work.

(a) Normal control

(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)

When the abnormality detection is released, the fan speed returns to the set speed.



① Start-up of outdoor unit abnormality detection.

② Release of outdoor unit abnormality detection.

③ Unit stop due to outdoor unit abnormality with P8 indication.

NOTE 1 : Fan stops immediately if the unit stops or the check mode is started.

(3) Auto vane control

Auto vane position is set to horizontal airflow at the start-up of COOL operation. It can then be changed by the remote controller.

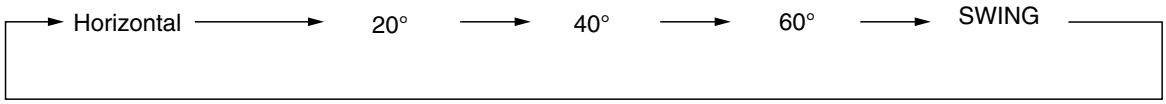
(a) Stop mode (fixed operation)

(i) At start-up of COOL operation, the auto vane is set to 30 degrees airflow direction.

(ii) Discharge direction can be changed with botton.

① Fan speed : LOW

② Fan speed : HIGH



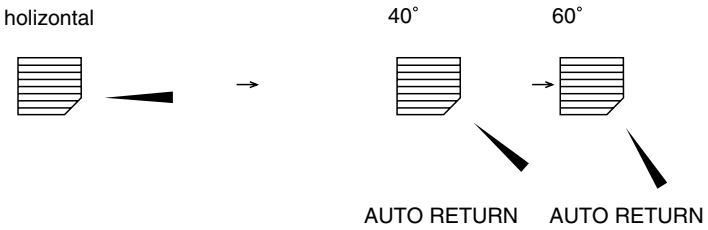
※ Vane angle can be change to upper angle by cutting off the J5-3.(Jumper resistance of indoor units)

(b) SWING mode.

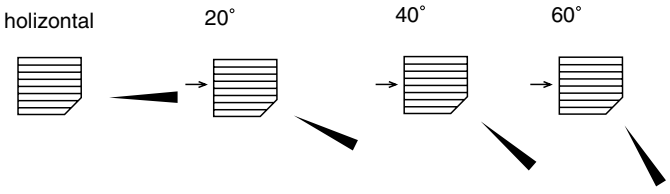
(i) The vane motor turns ON when the SWING mode is selected.
The vane motor is continuously ON during SWING mode.

<AUTO RETURN>

① Fan speed : LOW



② Fan speed : HIGH



When 40° degrees or 60° degrees airflow is selected with the LOW fan speed in COOL operation, “AUTO RETURN” will appear below the temperature display. One hour later, the airflow direction returns to horizontal automatically and “AUTO RETURN” will disappear. If the airflow direction is set to horizontal during “AUTO RETURN” indication, the time counting for AUTO RETURN is cancelled.

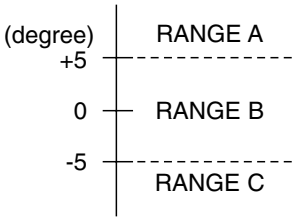
<Auto vane drive>
(a) The auto vane is driven by DC12V motor.
(b) Airflow direction is selected depends on the number of pulse were sended.
(c) Before start driving the auto vane, detect the standard position first, output the number of pulse to each airflow.
(d) The speed of the auto vane drive for both open and close are setted at 200 pulse/sec.
(d) Method of driving the auto vane.
① Detecting the standard position :
Output 1448 (PCH-2~3),1498 (PCH-4~6)
② Position setting :
Output the number of pulse indicated no below chart to the closing direction.

	The number of pulse outputed after directing the standard position	
	PCH-2~3	PCH-4~6
Close	1448	1498
Horizontal	247	318
Downward A	435	511
Downward B	624	693
Downward C	813	817

(4) Detecting abnormalities in the outdoor unit

After the compressor has been continuously operated for 3 minutes, if the difference between the indoor coil 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 controler.
RANGE A : Indoor coil temperature is more than 5 degrees above room temperature.
RANGE B : Indoor coil temperature is within 5 degrees either way of room temperature.
RANGE C : Indoor coil temperature is more than 5 degrees below room tempetature.

Indoor coil temperature
minus room temperature.



(5) Drain pump control (OPTION)

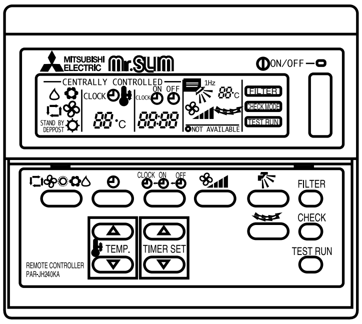
The drain pump works in COOL or DRY operation. When operation stops or changes to HEAT mode, the drain pump continues to operate for 3 more minutes. The drain pump does not work in check mode.

<Drain sensor>

When both the drain pump and unit are operating, the drain sensor detects the temperature. This temperature tells whether the drain water level is above or under the drain sensor. If the drain water level rises above the drain sensor due to a drain pump malfunction, the unit will stop operating in order to prevent drain from overflowing. The check code "P5" on the remote controller will display this occurrence. When either of the following conditions are satisfied, the drain sensor is determined to be under water.

- Though the drain sensor has been heated by the drain sensor heater for more than 40 seconds, its temperature rise is less than 20 degrees.
- The drain sensor temperature is below 63°C.

2-2 DRY operation



<How to operate>

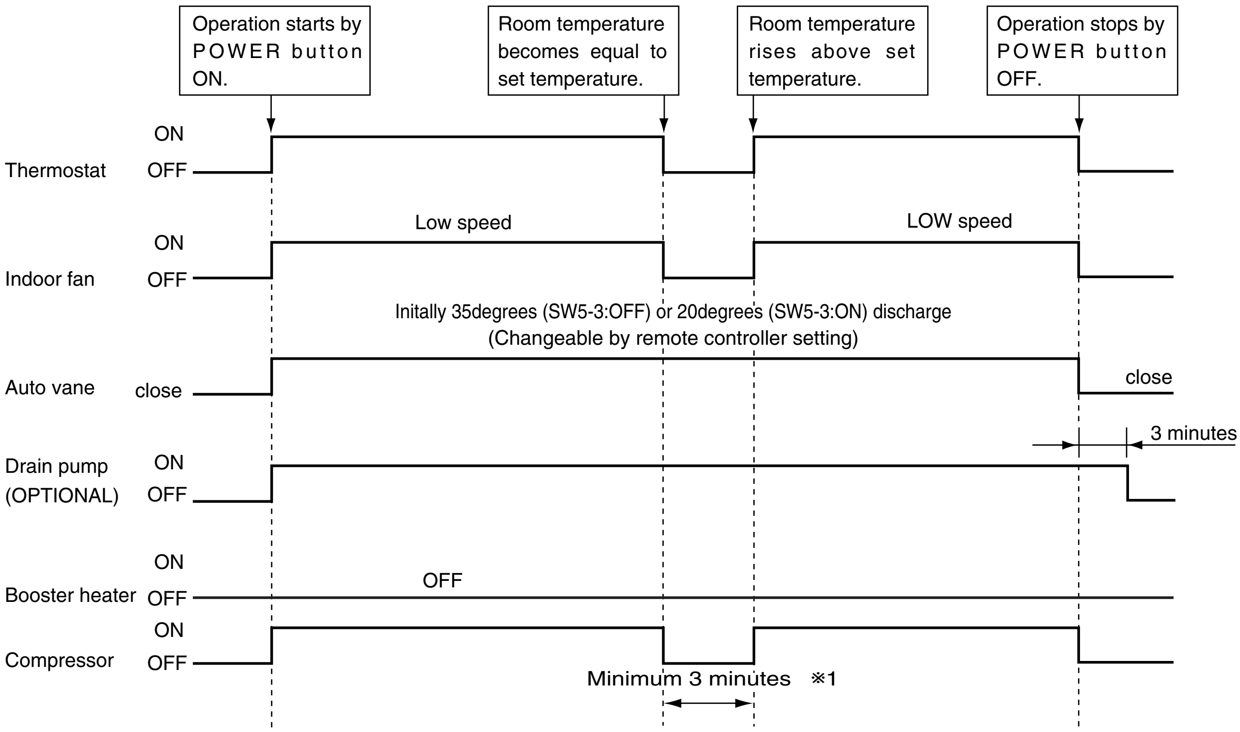
① Press POWER ON/OFF button.

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°C 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 runs when the room temperature is higher than the set temperature.
The compressor stops when the room temperature is equal to or lower than the set temperature.

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

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

- ●If the room temperature thermistor reads above 28℃ with themostat ON, the compressor will operate for 6 more minutes and then stop for 3 minutes.
- ●If the room temperature thermistor reads above 26℃ ~ 28℃ with themostat ON, the compressor will operate for 4 more minutes and then stop for 3 minutes.
- ●If the room temperature thermistor reads above 24℃ ~ 26℃ with themostat ON, the compressor will operate for 2 more minutes and then stop for 3 minutes.
- ●If the room temperature thermistor reads below 24℃ with themostat ON, the compressor will stop for 3 minutes.
- ●If the thermistat is OFF regaedless of room temperatere, the compressor will stop for 10 minutes.

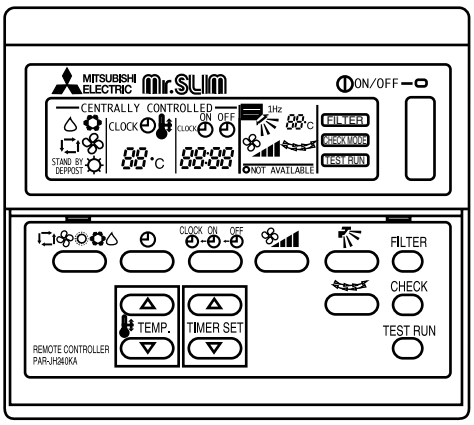
⑤Coil frost protection
Coil frost protection in DRY operation is the same as in COOL operation.
⑥Coil frost protection
Coil frost protection does not operate in DRY operation.

(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 indoor fan does not run during compressor OFF.

(3) Auto vane & drain pump controls
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 HEAT operation



<How to operate>

① Press POWER ON/OFF button.

② Press the ⟳ 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.

Heating 17°C to 28°C

<Display in HEAT operation>

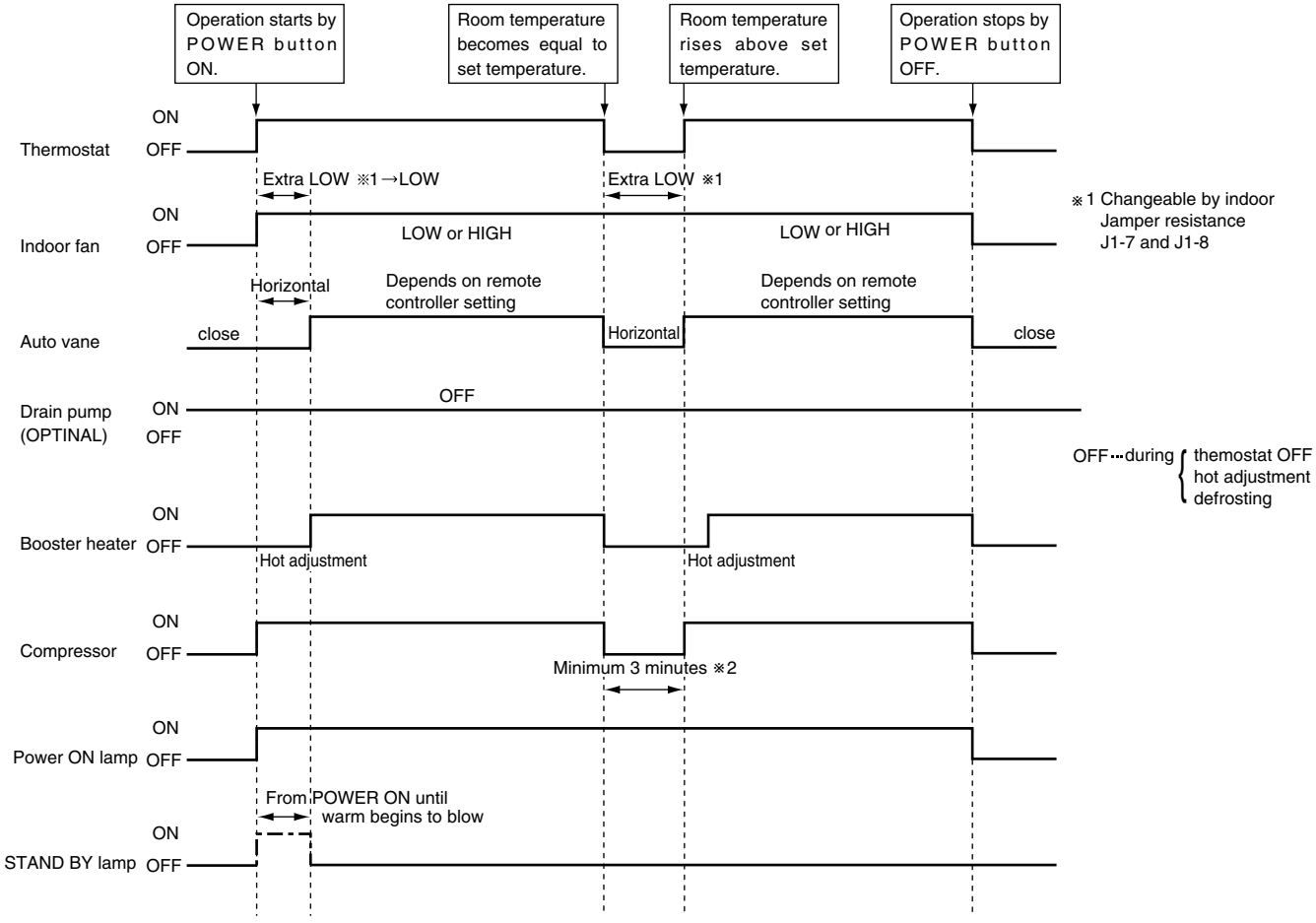
[DEFROST]

The [DEFROST] symbol is only displayed during the defrost operation.

[STANDBY]

The [STANDBY] symbol is displayed from the heating operation starts until the heated air begins to blow.

<HEAT operation time chart>



※2 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 runs when the room temperature is higher than the set temperature.
The compressor stops when the room temperature is equal to or lower than the set temperature.

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

④Overheat protection.

<Start condition>

When the indoor coil thermistor reads 70℃ or above, the overheat protection will start.

<Overheat protection>

The compressor stops for 6 minutes, and then restarts.
If the start condition is satisfied again within 10 minutes of compressor operation, both the indoor and outdoor units stop, displaying a check coe of “P6” on the remote controller.

<Termination conditions>

Overheat protection is terminated when the start condition is not satisfied again during the allowance (10-minute compressor operation), when operation mode changes to other mode, or when thermostat turns OFF.

(2) Indoor fan control

(a) Normal control

(i)The indoor fan runs on EXTRA-LOW speed during the thermostat OFF.
EXTRA-LOW speed can be changed to LOW or HIGH speed by setting the Jumper resistance J1 and J1-8. If the indoor coil temperature becomes more than 5 degrees below the room temperature during the thermostat OFF, the indoor fan will stop. After, when the indoor coil temperature becomes within 5 degrees of room temperature, the indoor fan will run on EXTRA-LOW speed.

(ii)Hot adjustment
Hot adjustment is a warm-up for HEAT operation.
<Start conditions>
The hot adjustment works under any of the following conditions.
●HEAT operation starts.
●Defrosting ends.
●Thermostat turns ON.
<Hot adjustment>
Initially, the indoor fan runs on EXTRA-LOW speed. When 5 minutes have passed or the indoor coil temperature exceeds 35℃, the fan speed changes to LOW. Two minutes later, the hot adjustment ends. Then, the fan speed depends on the remote controller setting.

(iii)The indoor fan stops when the indoor coil temperature is within 5 degrees either way of room temperature.

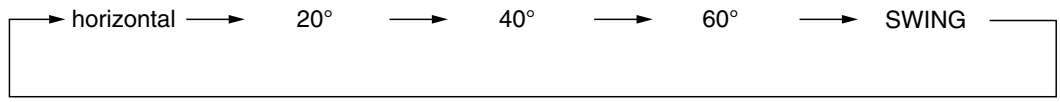
(iv)To eliminate the remaining heat, the indoor fan runs for the first 1 minute after the booster is turned OFF.

(3) Auto vane control

(a) STOP mode (fixed operation)

(i) The airflow direction at the start-up of HEAT operation is the same as that of the previous operation.

(ii) The airflow direction can be charged by the remote controller setting.



In the following cases, airflow direction becomes horizontal regardless of the remote controller setting.

① During the hot adjustment with fan speed at EXTRA-LOW

② During defrosting with indoor fan OFF

③ During the thermostat OFF

(b) SWING mode

(i) The vane motor turns ON when the SWING mode is selected.
The vane motor is continuously ON during SWING mode.

(ii) In the following cases, the airflow direction is horizontal regardless of the remote controller setting.

① During the hot adjustment with fan speed at EXTRA-LOW

② During defrosting with indoor fan OFF

③ During thermostat OFF

(4) Booster heater control

When the room temperature is 3 degrees below from the set temperature, the booster heater will turn ON.
When the room temperature is equal to the set temperature, booster heater will turn OFF.
During the hot adjustment, the booster heater will not work.

< Overheat prevention >

When the indoor coil thermistor rises to 60℃ or above, the booster heater cannot work.
When the indoor coil thermistor falls to 55℃ or below, the booster heater can work.

(5) Detecting abnormalities in the outdoor unit

When the outdoor unit is determined to be abnormal by the following causes, the compressor will stop and the check code " P8 " will appear on the remote controller display.

① During compressor ON after hot adjustment ※1 (See the next page)

① If the difference between the indoor coil temperature and room temperature is in the RANGE B, the indoor fan will stop.

② Within 20 minutes after entering RANGE B (except for the first 10 seconds),

a) If the temperature difference enters RANGE A, the hot adjustment stasrts,

b) If the temperature difference is still in RANGE B, the outdoor unit is deemed abnormal.

c) If the temperature difference enters RANGE C, defrosting starts.
Within 20 minutes after entering RANGE C,

- If the temperature difference does not return to RANGE B,the outdoor unit is deemed abnormal.
- If the temperature difference returns to RANGE B, the next 20 minutes is an allowance period. If the difference enter RANGE A during the allowance, defrosting ends and the hot adjustment starts. If the difference does not enter RANGE A during the allowance, the outdoor unit is deemed abnormal.

② During compressor ON in hot adjustment

After 30 minutes of defrosting in hot adjustment, if the temperature difference is still in RANGE C, the outdoor unit is determined to be abnormal.

③ During compressor OFF

After 20 minutes of thermostat OFF, if the indoor coil thermistor reads -25°C or below, the outdoor unit is determined to be abnormal.

(6) Indoor coil thermistor abnormality detection

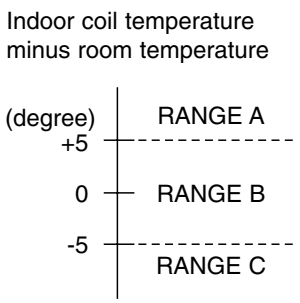
An abnormality can be detected during compressor ON, except for the following.

- ●For the first 30 minutes after the temperature difference between the indoor coil temperature and room temperature enters the RANGE C.
- ●When the temperature difference enters the RANGE C until it moves to the RANGE B.

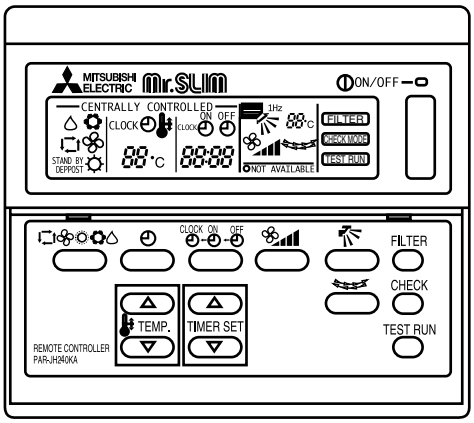
(7) Defrosting operation

After the outdoor unit starts the defrosting operation, when the temperature difference beetween the indoor coil temperature and room temperature gets out of RANGE A and into RANGE B, the indoor unit starts the defrosting mode. After the outdoor unit stops the defrosting operation, when the temperature difference returns to the RANGE A, the indoor unit stops the defrosting mode. While the indoor unit is in the defrosting mode, the indoor fan and the booster heater stop.

※1 RANGE A : Indoor coil temperature is more than 5 degrees above room temperataure.
RANGE B : Indoor coil temperature is within 5 degrees either way of room temperature.
RANGE C : Indoor coil temperature is more than 5 degrees below room temperature



2-4 AUTO operation (Automatic COOL/HEAT change over operation)



<How to operate>

① Press POWER ON/OFF button.

② Press the ↻ 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.

Automatic 19 to 28°C

●"AUTOMATIC" works to change by itself the operation mode either to cooling or heating according to the room temperature.

(1) Initial mode

① When AUTO operation starts after unit OFF.

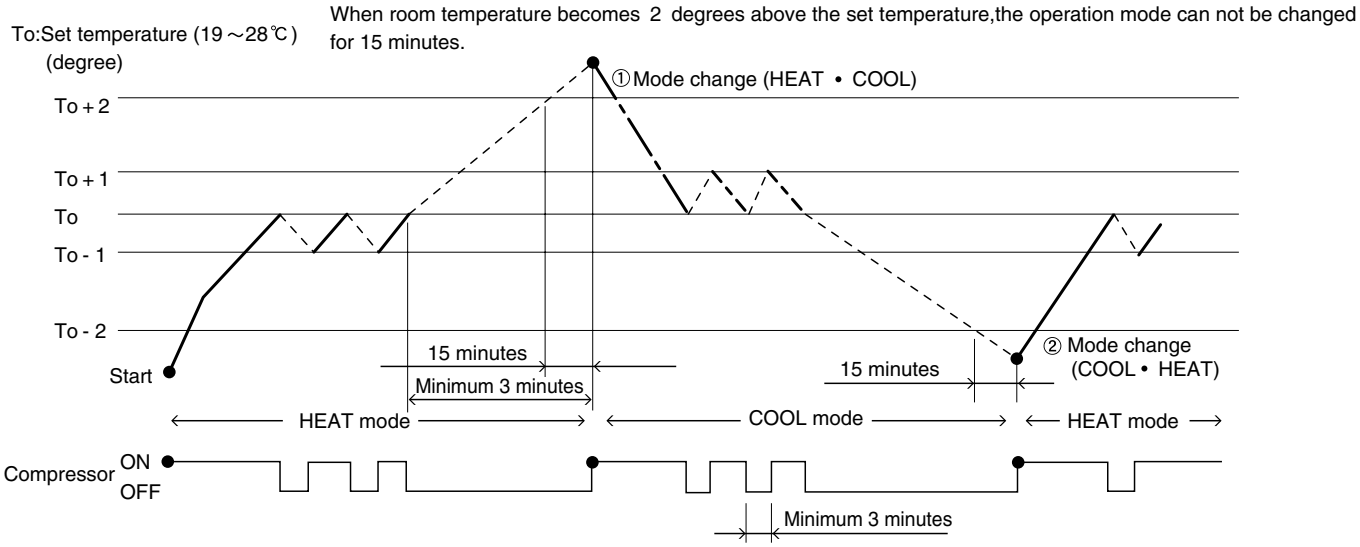
- If the room temperature is higher than the set temperature, operation starts in COOL mode.
- If the room temperature is equal to or lower than the set temperature, operation starts HEAT mode.

② When AUTO operation starts after COOL or HEAT operation, the previous mode continues.

(2) Mode change

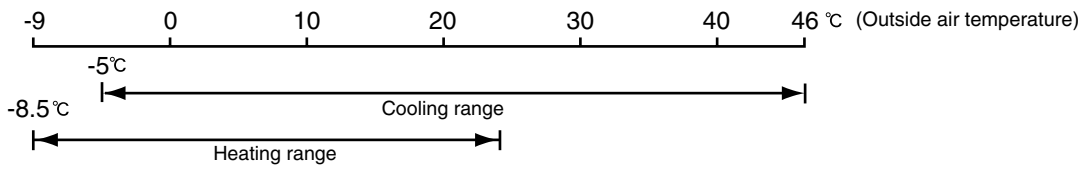
① HEAT mode changes to cool mode when 15 minutes have passed since the room temperature became 2 degrees above the set temperature.

② COOL mode changes to HEAT mode when 15 minutes have passed since the room temperature became 2 degrees below the set temperature.

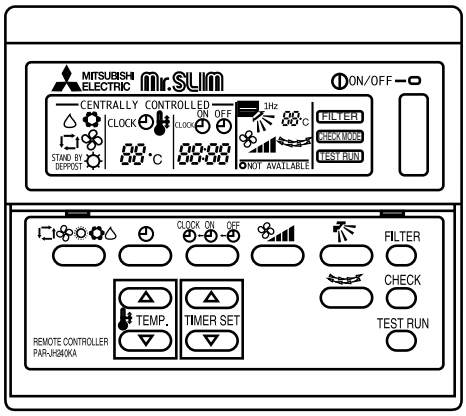


(3) Temperature range

AUTO operation is available under the outside air temperatures as follows.

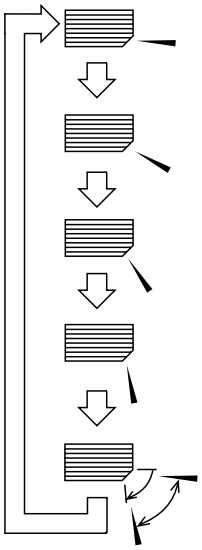


2-5 Auto vane control



<How to operate>
To change the air flow direction, press 🌬 button.

NOTE: Vane angle can be change to upper angle by cutting off the J5-3.
(Jamper resistance of indoor units)



① Horizontal

② 20˚ ..... Available in COOL operation with fan speed on HIGH or in HEAT operation.
Unavailable in DRY operation.
If fan speed changes from LOW to HIGH during 20° downward airflow in COOL mode, the direction automatically changes to horizontal.

③ 40˚

④ 60˚

⑤ swing

Changes by pressing the 🌬 button.

(1) COOL/DRY operation

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

<Auto return>

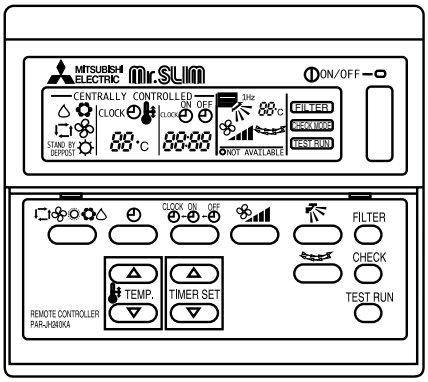
When 40° or 60° airflow is set with fan speed in LOW, “AUTO RETURN” appears below the room temperature display. One hour later the direction changes to horizontal degrees, automatically and “AUTO RETURN” disappears.

(2) HEAT operation

At the start-up of HEAT operation, airflow direction depends on the setting of the last operation.
After, it can be changed to another direction with 🌬 button. The airflow direction shifts to horizontal regardless of the remote controller settings under any of the following conditions.

- Thermostat OFF
- Defrosting
- Indoor fan speed EXTRA-LOW in hot adjustment

2-6 TIMER operation



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

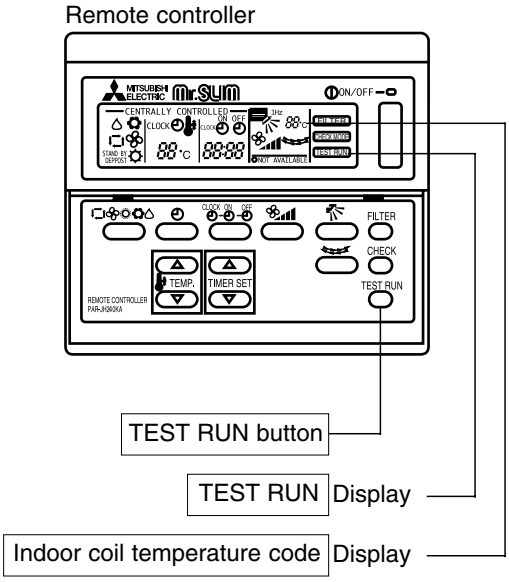
<How to operate>
1. Press POWER ON/OFF button.
2. Press "◴" button to select AUTO STOP or AUTO START.
3. Press "CLOCK ON OFF" button to set desired time.
   Time setting is in 1 hour units for up to 24 hours.
   Each time HOURS button is pressed, set time increases by 1 hour.
   When HOURS button is 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.

2-7 Test run
<Before test run>
- After installing, wiring, and piping the indoor and outdoor units, check for refrigerant leakage, looseness in power supply or contorol 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.



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

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 to display , COOL/DRY(or HEAT)to confirm that cool (or warm) air is blown out. (At heating operation, there may be a short delay before warm air begins to blow 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 mulfunction.
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.

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

(1) Indoor coil temperature code
During the test run, the indoor coil 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, and should rise in normal HEAT operation.

Code	1	2	3	4	5	6	7	8
Indoor coil temperature	-40~1℃	~10℃	~15℃	~20℃	~25℃	~30℃	~35℃	~40℃
Code	9	10	11	12	13	14	15	
Indoor coil temperature	~45℃	~50℃	~55℃	~60℃	~70℃	~90℃	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.

2-8 Emergency operation

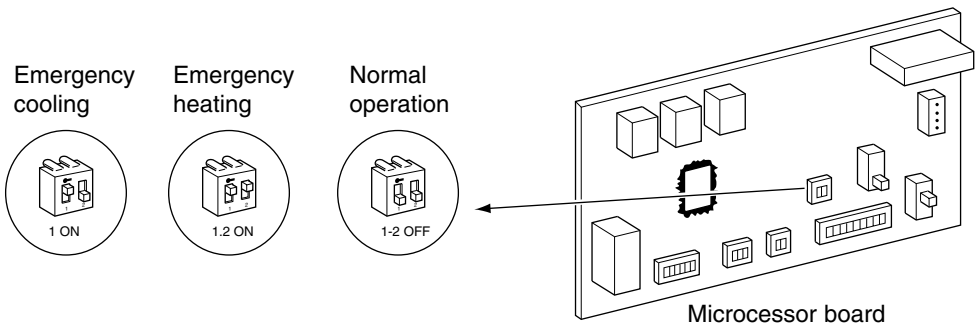
When the remote controller or microprocessor malfunctions but all other parts are normal, emergency operation is started by setting the dipswitch SW3 on the indoor controller board.

<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 dipswitch SW3-1 to ON and SW3-2 to OFF.
   For emergency heating, set the dipswitch SW3-1,2 to ON.



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, but the swing louvers and the auto vanes do not operate.
4. To stop emergency operation, turn OFF the indoor unit breaker.

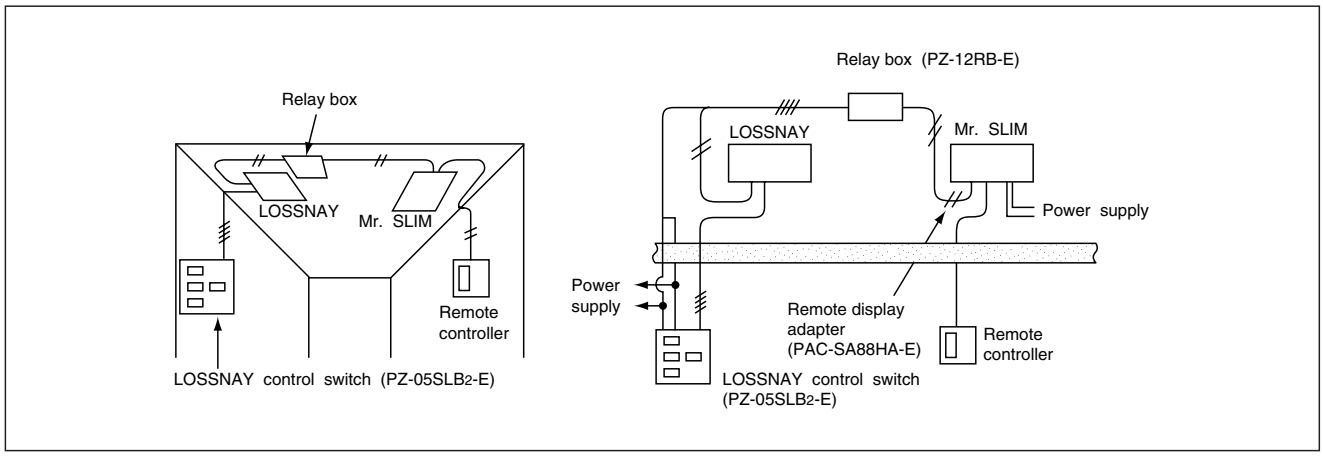
NOTE: The remote controller POWER ON/OFF button can not start/stop emergency operations.

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

2-9 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) Reqired 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

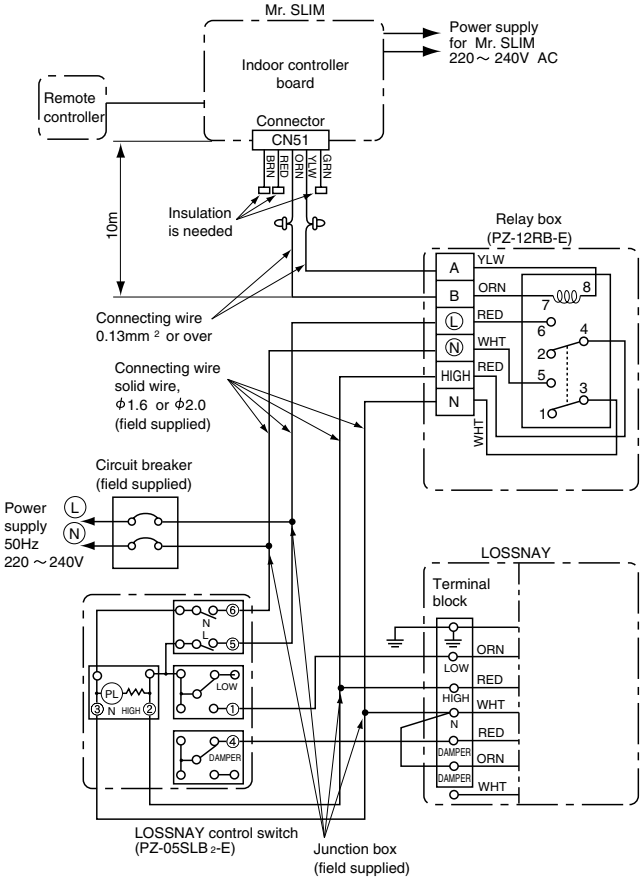
(4) Operation

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

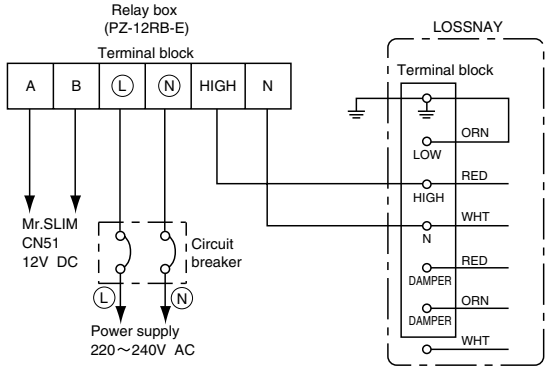
②While Mr. SLIM is OFF, LOSSNAY individual operation is available by using the LOSSNAY control switch. When Mr. SLIM turns OFF with the LOSSNAY control switch at ON, LOSSNAY will continue to operate.

(5) Wiring.

①When the LOSSNAY control switch is used



②When the LOSSNAY control switch is not used:



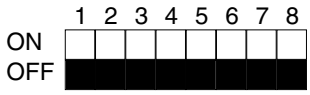
NOTE: For further information, refer to the LOSSNAY technical & service manual.

2-10 Dip switch functions

Each figure shows the initial factory setting.

1 On remote controller board

(1) SW17(Address selector)

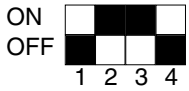


SW17-1~6) For address setting

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 (This switch is unavailable for PLH-GKHA.Keep this switch at OFF.)
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

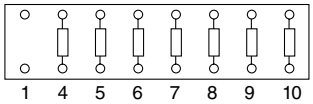
SW18-3) Switch for filter sign time setting.
OFF:100Hr ON:2500Hr

SW18-4) Not yet used.

2 On indoor controller board

PCH-2,2.5,3,4,5,6,GKH(S)A_1

(1) J1 (Function selector Jumper resistors)



J1-4) Switch for drain pump
Provided :The drain pump works in only COOL operation.
Not Provided :The drain pump works in both COOL and HEAT operation.

J1-5) Switch to change the temperature to start coil frost prevention
Provided :1°(For all current models)
Not Provided :-3°(For previous special models)

J1-6) Switch for set temperature adjustment in HEAT mode
During HEAT operation,warm air collects near the ceiling.When the indoor unit is installed near the ceiling,the temperature read by room temperature thermistor differs from the actual living-space temperature by about 4 degrees. Therefore,the room temperature read by room temperature thermistor must be lowered by 4 degrees.
Provided :4-degree adjustment
Not Provided :No adjustment

J1-7) Switch for fan speed during thermostat OFF in HEAT operation
Provided :EXTRA LOW
Not Provided :LOW

J1-8) Switch for fan speed during thermostat OFF in HEAT operation
Provided :EXTRA LOW or LOW(set with SW1-7)
Not Provided :LOW or HIGH(set with remote controller)

J1-9) Switch for detecting abnormalities in the outdoor unit abnoamality detection
Provided :When an abnormality occurs,it is detected.
Not Provided :Even if an abnormality occurs,it can not be detected.

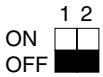
J1-10) Switch for auto restart function
Provided :This function does not work
Not Provided :This function works.

(2) SW2 (Address selector)

Used insetting the unit-address for group control.
For further information, refer to page 40.

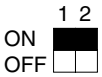
(3) SW3 (Emergency operation switch)

Normal operation

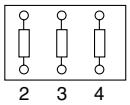


For emergency cooling

For emergency heating



(4) J5 (Model selector emergency heating)



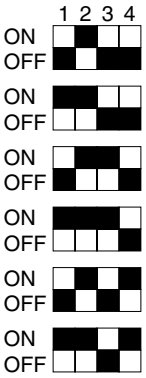
J5-2) Provided : For models with heat pump.
Not provided : For models without heat pump.
J5-3) Available : Vane horizontal angle ····· Normal
Not available : Vane horizontal angle ····· Upper angle
J5-4) This jumper is unavailable for PCH-GKA, keep this.

(5) SW6 (Model selector)

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

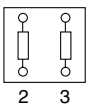
(6) SW7 (Model selector)

SW7-1,7-3,7-4) : Capacity setting



SW7-2) Voltage change
ON : 240V
OFF : 220V

(7) J9 (Model selector)



J9-1) Provided
J9-2) Provided
} PCH-GKHA

2-11 INDOOR FAN CONTROL

Each figure shows the initial factory setting.

(1) Fan motor max. rotational frequncy for PCH-GKHA

(2) Indoor fan relay output

(a) During fan ON

The indoor fan relay turns ON. One second later, the phase control will start.

(a) During fan OFF

The phase control turns OFF. One second later, the indoor fan relay will turn OFF.

Service Ref.	Voltage (V)	100% rotational frequency (rpm)
		15Hz
PCH-2GKHA1	220	1370
	230	1380
	240	1390
PCH-2.5GKHA1	220	1350
	230	1360
	240	1370
PCH-3GKHA1	220	1350
	230	1360
	240	1370
PCH-4GKHSA1	220	1150
	250	1160
	240	1170
PCH-5GKHSA1	220	1150
	230	1170
	240	1190
PCH-6GKHSA1	220	1160
	230	1180
	240	1200

3. OUTDOOR UNIT CONTROL

3-1 Outdoor fan control

The rotational frequency of outdoor fan is phase-controlled according to the outdoor coil temperature. This control allows the cooling operation even with the low outside-air temperature and the heating operation even with the high outside-air temperature.

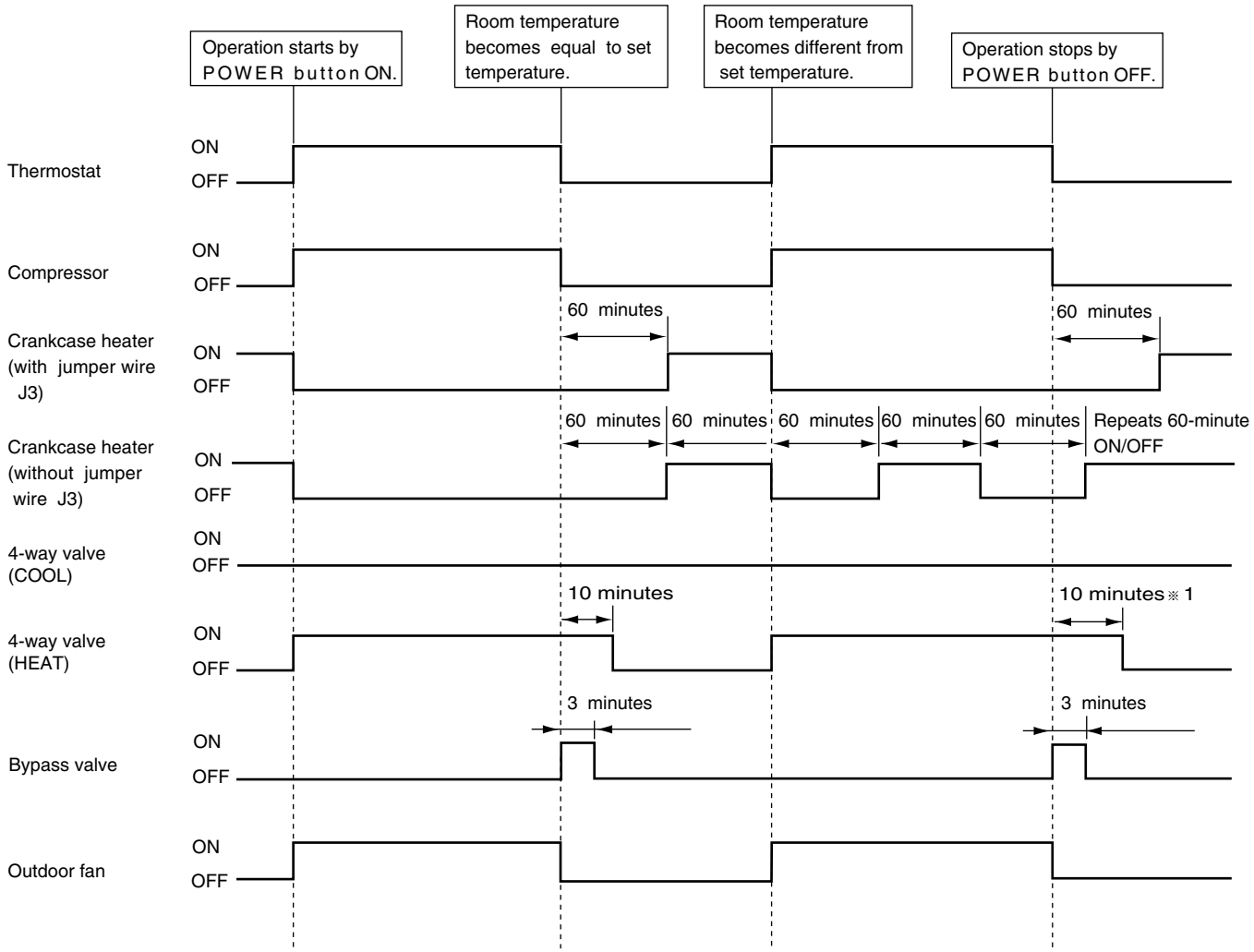
3-2 Outdoor unit control

The outdoor unit turns ON/OFF the cooling/heating operation according to orders given from the indoor unit.

3-3 Protective functions

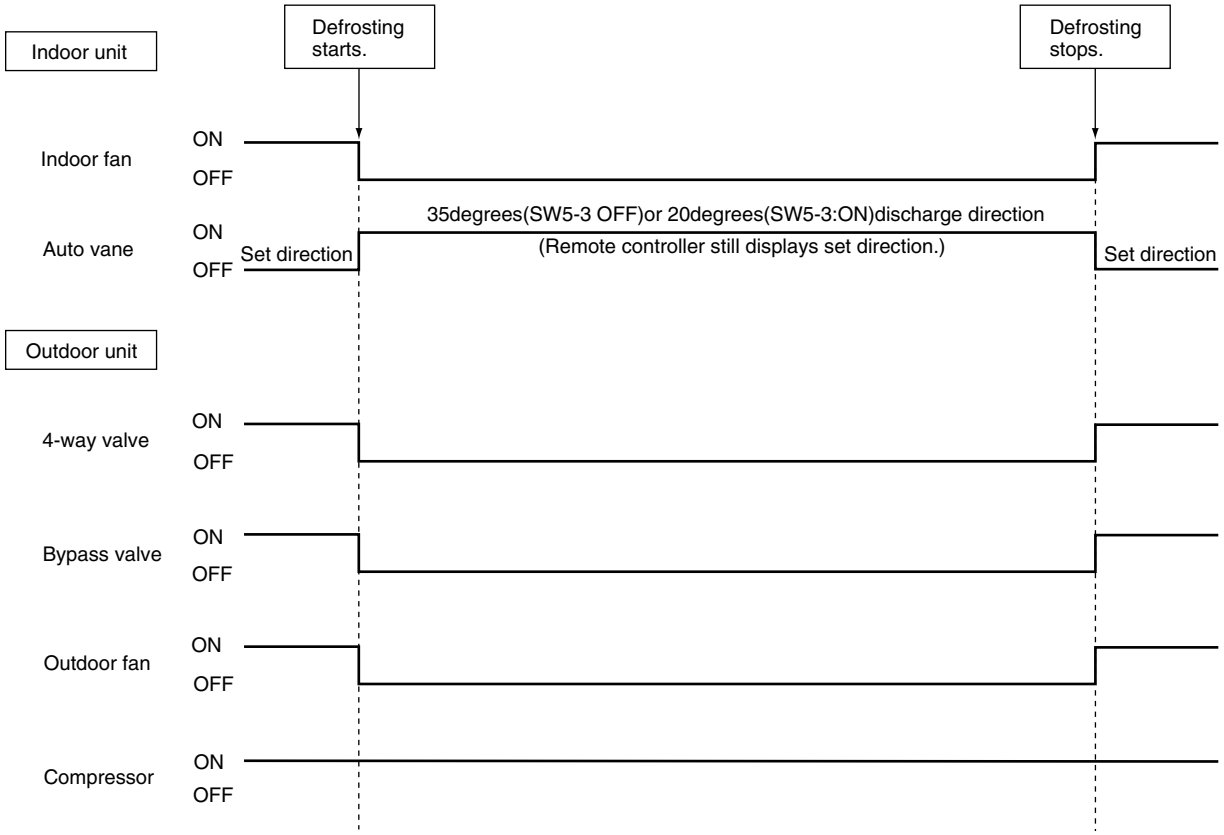
① If an reversed-phase, an open phase, or an indoor controller abnormality is detected, the outdoor unit will stop operation and the check mode will start. (For the check mode details, see page 52.)
② If a protective function works, the compressor will stop running. Three minutes later, the compressor will restart. If the protective function works again, the compressor will stop running and the check mode will start.
③ The protective function is memorized.
④ The memory is cleared when the POWER ON/OFF button on the remote controller is turned OFF. However, the check mode dispaly continues until the outdoor unit receives the “operation ON” command from the indoor unit.

3-4 COOL/HEAT operation time chart



※1 If compressor restarts within 10 minutes, 4-way valve remains ON.

3-5 Defrosting in HEAT mode
<Defrosting time chart>



(1) Start conditions

A. When all of the following conditions are satisfied, defrosting will start. However, when the bypass valve turns OFF, defrosting starts 10 minutes later.
   (a) More than seven minutes have passed since the compressor start-up.
   (b) The outdoor coil thermistor reads -5°C or below.
   (c) The outdoor fan motor output step is 100%
   (d) Total time of compressor operation exceeds 30 minutes, and the outdoor coil temperature has fallen by 8 degrees or more in comparison with that of 10 minutes after the compressor start-up.
      NOTE: The outdoor coil temperature of 10 minutes after the compressor start-up is memorized until the defrosting operation has ended.

B. When all of the following conditions are satisfied, defrosting will start.
   (a) ~ (c) The same as above (a) ~ (c) in item A
   (d) Total time of compressor operation exceeds “defrost interval”.
      Further information on the defrost interval is described in (3).

C. After the total time of compressor operation exceeds the defrost interval, the thermostat repeats ON/OFF three times. Two minutes after the fourth “ON” of the thermostat, if the outdoor coil thermistor reads -5°C or below and the fan output output is 100%, defrosting will start.
   NOTE: The count of the thermostat ON/OFF is cleared by the compressor-OFF command or defrosting start-up.

(2) During defrosting

- Even if the thermostat turns OFF, defrosting continues.
- The 4-way valve, bypass valve, outdoor fan, and indoor fan are OFF.

(3) Defrost interval

The defrost interval time is determined as follows.

- Initial defrost interval is 50 minutes.
- The defrost interval after defrosting depends on the preceding defrosting time as shown below.

Defrosting operation time	Next defrost interval
3 minutes or below	120 minutes
3 to 7 minutes	80 minutes
7 to 10 minutes	60 minutes
10 to 15 minutes	40 minutes
15 minutes (Maximum)	30 minutes

NOTE1:If the unit stops during defrosting , the next defrost interval will be 50 minutes.

NOTE2:If a protection function works for the first time during defrosting, the compressor will stop.
After a 3-minute time delay, defrosting will restart. In this case, a 3-minute time delay is included with the defrosting time.
If the protection function works for the second time, the unit stops operation and displays the check code.
The next defrost interval will be 30 mimutes.

NOTE3:When the defrosting has ended, the total time of the compressor operation is cleard.

(4) Termination conditions

Defrosting finishes when any of the following conditions are satisfied.

①Defrosting has continued for 15 munites.
②Outdoor coil thermistor reads 22°C or above for the first 75 seconds after defrosting start-up.
③Outdoor coil thermistor reads 8°C or above after the 75-second defrosting.
④Power ON/OFF button is turned OFF during defrosting.

3-6 Actuators

(1) Bypass valve control

<Cooling mode>

①When the unit stops due to the coil frost prevention, the bypass valve turns ON. When one hour ahs passed since the compressor stopped, the bypass valve returns to OFF.
②When the compressor operates with the bypass valve at ON for more than 30 minutes, the bypass valve turns OFF.
③When the compressor stops with the bypass valve at OFF, the bypass valve turns ON and remains ON for three minutes.

<Heating mode>

①When the unit starts for the first time after the circuit breaker has been turned ON, or when it starts after the compressor OFF of 30 minutes or more, if the outdoor coil thermistor reads 12°C or more, the bypass valve turns ON.
②When the high pressure switch (63H1) works, the bypass valve turns ON.
③When the bypass has been ON for 30 minutes:
- If the high pressure switch has already returned, the bypass valve turns to OFF.
- If not, the fan output step keeps 70 for three minutes. Meanwhile, if the high pressure switch returns, the bypass valve turns OFF. Otherwise the normal fan control starts.

④When the operation mode changes or stops, the bypass valve turns ON and remains ON for three minutes.

<Defrosting operation>

①The bypass valve is OFF.

(2) Crankcase heater control

①With jumper wire J3
The crankcase heater is ON from when the power is turned ON until the compressor starts, and then turns ON one hour after the compressor stops.
②Without jumper wire J3
The crankcase heater is ON from when the power is turned ON until the compressor starts, and repeats 1-hour ON and 1-hour OFF.

3-7 Service functions

(1) Compulsory defrositng

①When all of the following conditions are satisfied, pressing SW2 starts the compulsory defrosting.

- During HEAT mode
- The compressor is ON.
- The outdoor coil temperature is being displayed by LED. (Outdoor controller board dip switch SW3-1 : OFF, SW3-2 : ON)
- The outdoor coil thermistor reads 8°C or below.

②The operation state and the termination conditions of the compulsory defrosting are the same as those of the normal defrosting. As an exception, the defrost interval after the defrosting completion is 50 minutes.

(2) Fixed fan-output

While the compressor is operating (exept during defrosting) and the fan output step is indicated by LED, pressing SW2 fixes the fan output. The fixed fan-output can be released when any of the following conditions are satisfied.

①SW2 is pressed again.
②SW3 setting is changed.
③The compressor stops.
④Defrosting operation starts.

(3) Function of switches on the outdoor controller board

SW1: Clears the check code memory (push-button switch)
SW2: Switches the output state indication and the check code display (push-button switch)
SW3-1,2: Switches the output state indication items (dip swtich)
For further information, refer to page 47.

(4) 100% fan output

Fan output is fixed to 100% by shorting the connector CN22. However, the fan stops during compressor OFF or defrosting. Open-circuit of CN22 restarts the normal fan control.

(5) Time shorterning

Short circuit of the connector CN21 shortens the time as follows

①Fan control period: 30 seconds → 3 seconds
②Three-minutes time delay function : 3 minites → 3 seconds
③Max. time of defrosting : 15 minites → 15 seconds
④Defrost interval : 30 ~ 120 minutes → 3 ~ 12 seconds
⑤Compressor ON/OFF time for bypass valve ON/OFF : 30 minutes → 3 seconds
⑥Compressor ON time to start other functions : x minutes → x seconds
⑦Crankcase heater operation : 1 hour → 6 seconds

10 TROUBLESHOOTING

1.TROUBLES IN TEST RUN

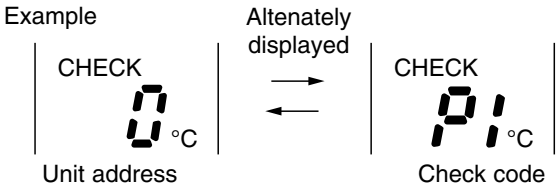
<table>
<tr><th>Symptom</th><th>Cause</th><th>Check points</th></tr>
<tr><td>The display “CENTRALLY CONTROLLED” on remote controller dose not disappear.</td><td>1) Wrong address setting of remote controller/indoor controller board.
2) Timer adapter is connected to the remote controller.
3) Singnal transmission 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</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) Short circuit of drain sensor heater circuit.
4) Wrong operation of remote controller due to noise wave emitted by other appliances.</td><td>1), 2) Check the wire
3) Measure the resistance of the drain sensor connector CN50 ① ~ ③. Normal resistance should be 82Ω.
4) 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 transformer.
6) Bad contact of CN40.
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

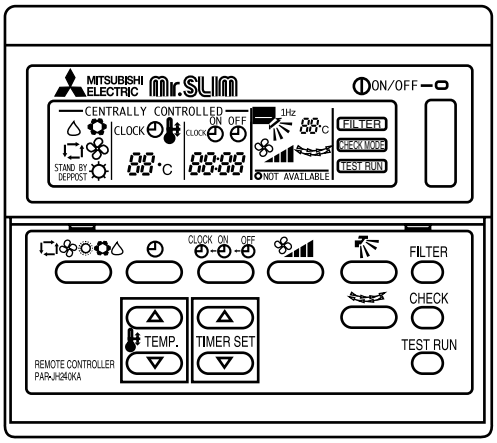
2-1 When malfunction occurs during operation

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 diplayed alternately at one-second intervals. (Check mode)



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” 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 the next page.)

2-3 For group control using one remote controller

(1) Press the △ TEMP. 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.

(2) 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.

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

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 C ···15kΩ 30 C·····4.3kΩ 10 C·····9.6kΩ 40 C·····3.0kΩ 20 C·····6.3kΩ If the resistance is normal, replace the indoor controller board.
P2	Abnormality of indoor coil 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 ● Second and third units in triple control ● Sub units in group control
P4	Abnormality of drain sensor	1) Bad contact of transmission wire 2) Damaged thermistor	1) Check the connector. 2) Measure the resistance of the thermistor ④ ~ ⑤. As for the normal resistance, refer to the case of P1. If the resistance is normal, replace the indoor controller board.
P5	Malfunction of drain pump	1) Malfunction of drain pump 2) Damaged drain sensor	1) Check the drain pump. 2) ● Check the drain sensor. ● Check the drain sensor heater. Normal resistance should be 82Ω. If the resistance is normal, replace the indoor controller board.
P6	Coil frost 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 4) Damaged outdoor coil thermistor	1) Check the indoor/outdoor connecting wire. 2) Change the connection of electric wiring. 3) Check the protection device. 4) Measure the resistance of the outdoor coil thermistor. If the resistance is normal, replace the outdoor controller board.

3. SERVICE DATA INDICATION BY SWITCHES ON OUTDOOR CONTROLLER BOARD

Setting dip switchs SW2 and SW3 on the outdoor controller board enables LED to show the output state and check code.
Output state is shown by LED lighting, and check code by blinking.

SW1 : Turning SW1 ON clears the check code. If SW1 is turned ON while the check code is blinking , the indication changes to output state indication.

NOTE : SW1 is usually available independant of SW3 setting. As an exception, when the check code shows a reversed phase or an open phase during the power-on-reset state, SW1 is not available.

SW2 : SW2 is turned ON by pressing, and OFF by releasing.
When SW3-1 and SW3-2 are OFF, pressing SW2 changes indication between output state and check code alternately.
When SW2 is turned On with SW3-1 OFF and SW3-2 ON, the compulsory defrosting starts.

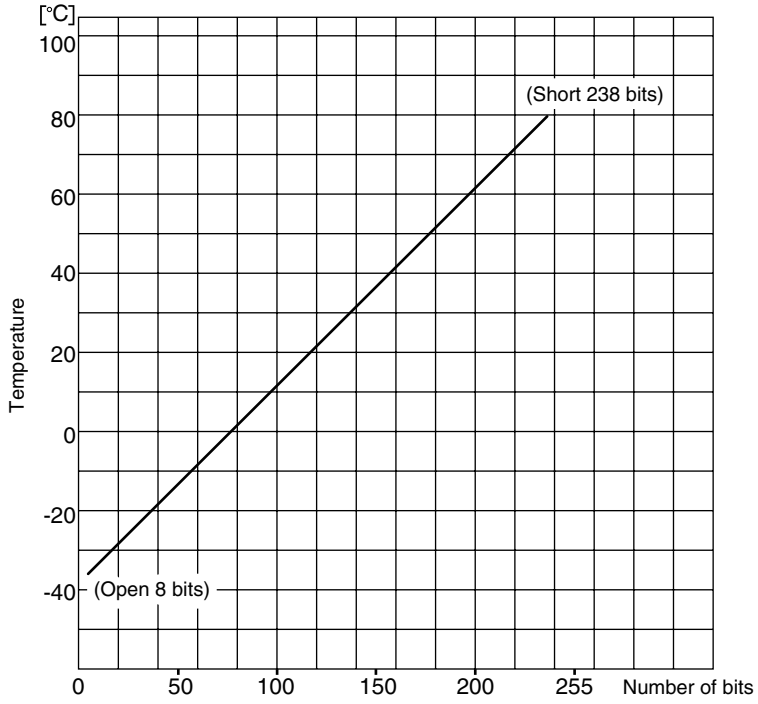
SW3 : Output state indication items depend on the combination of SW3-1 ON/OFF and SW3-2 ON/OFF.

Changed alternately by pressing SW2.

	Check code	Output state	Outdoor coil temperature (bit)	Fan Output step (bit)	Total time of compressor operation(Hr)
SW3-1	OFF	OFF	OFF	ON	ON
SW3-2	OFF	OFF	OFF	ON	ON
LED	Blinking	Lighting			
LD1	Reversed phase	Compressor ON command from indoor controller	1	1	256
LD2	Open phase	Heating operation command from indoor controller	2	2	512
LD3	Outdoor coil thermistor is abnormal	During 63H1 function	4	4	1024
LD4	63H2 function	Compressor ON	8	8	2048
LD5	51C function	Outdoor fan ON	16	16	4096
LD6	26C function	4-way valve ON	32	32	8192
LD7	Overheat protection	Bypass valve ON ※	64	64	16384
LD8	Input circuit on controller board is abnormal	Crankcase heater ON	128	128	32768

3-1 Outdoor coil temperature

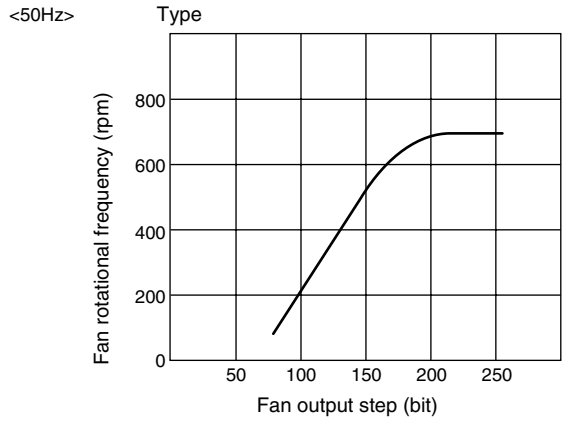
To obtain data on the outdoor coil temperature, add the number of bits of lighting LEDs, and see the graph below to find the temperature.



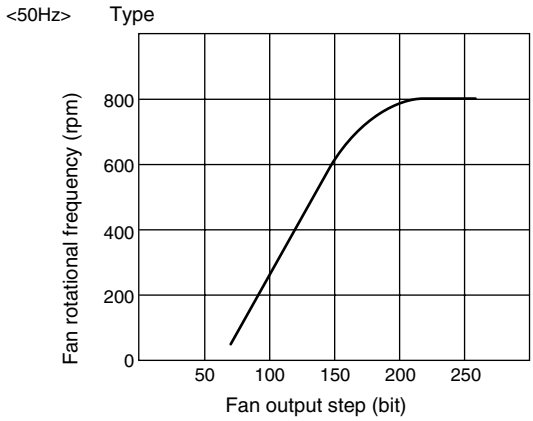
3-2 Fan output step

To obtain data on the fan output step, add the number of bits of lighting LEDs, and see the graph below to find the fan rotational frequency.

①PUH-2/4K type



②PUH-2.5/3/5/6K type



3-3 Total time of compressor operation

Compressor operation time is indicated in 256 hour units. To obtain the compressor operation time, add the hours of lighting LEDs. During the compressor operation time indication, SW2 is not available.

3-4 Check code indication

- When a protection function works for the first time during operation, the operation stops and restarts after the 3-minutes time delay mode. When the protection function works again, the operation stops. (Check mode) When both SW3-1 and SW3-2 are OFF, the check code is indicated.
- If the outdoor controller board receives the compressor ON command from the indoor controller board during check mode the indication changes to output state indication.
- By pressing SW2 duirng normal operation. operation will continue.
- The latest check code is indicated.

4. TROUBLESHOOTING ACCORDING TO CHECK CODE

Blinking LED	Diagnosis of malfunction	Cause	Check point
LD1	Reversed phase	Phases L_1, L_2, and L_3 are connected improperly.	Check the power supply connection.
LD2	Open phase	● Phase L_2 is open. ● Contact of protector, such as thermal switch, opened when power was turned on.	● Check the power supply. ● Check each protector.
LD3	Outdoor coil thermistor is abnormal. (Open circuit or short circuit)	● Outdoor coil thermistor is broken. ● Thermistor was connected incorrectly.	● Measure the resistance of the thermistor. ● Check the thermistor. If normal, replace the outdoor controller board.
LD4	High pressure switch (63H2) function	● 62H2 was badly connected. ● 63H2 was working.	● Check 63H2 and the outdoor fan motor. ● Check if refrigerant supply is low. ● Check if air cycle is short-cycled.
LD5	Thermal relay (51C) function	● 51C was connected incorrectly. ● 51C was working.	● Check 51C, the compressor, and power supply.
LD6	Thermal switch (26C) function.	● 26C was connected incorrectly. ● 26C is working.	● Check 26C. ● Check if refrigerant supply is low. ● Check if the capillary tube is clogged.
LD7	Over heat protection	● The thermistor is broken. ● Coil temperature is over 67°C.	● Measure the resistance of the thermistor. ● Check the outdoor fan motor. ● Check if air cycle is short-cycled.
LD8	Input circuit of outdoor controller board is abnormal.	● Pulse input is abnormal.	● Replace the outdoor controller board.

5. WHEN OUTDOOR UNIT DOES NOT WORK

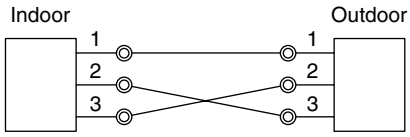
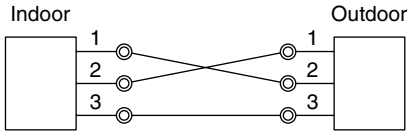
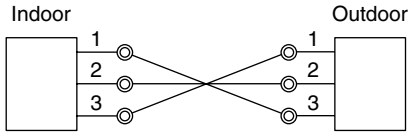
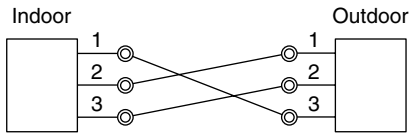
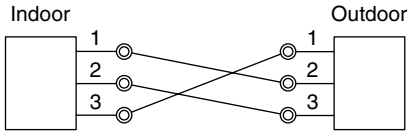
Cause	Check points
1) Indoor/outdoor connecting wires are poorly connected. (Refer to next page.) 2) Power supply is poorly connected. 3) Connector or transformer is broken. 4) Fuse (6A) in the outdoor controller board is blown.	1) Check the connecting wires. 2) Check the power supply. 3) Check connectors and transformers. 4) Check the fuse.

6. WRONG WIRING ON SITE

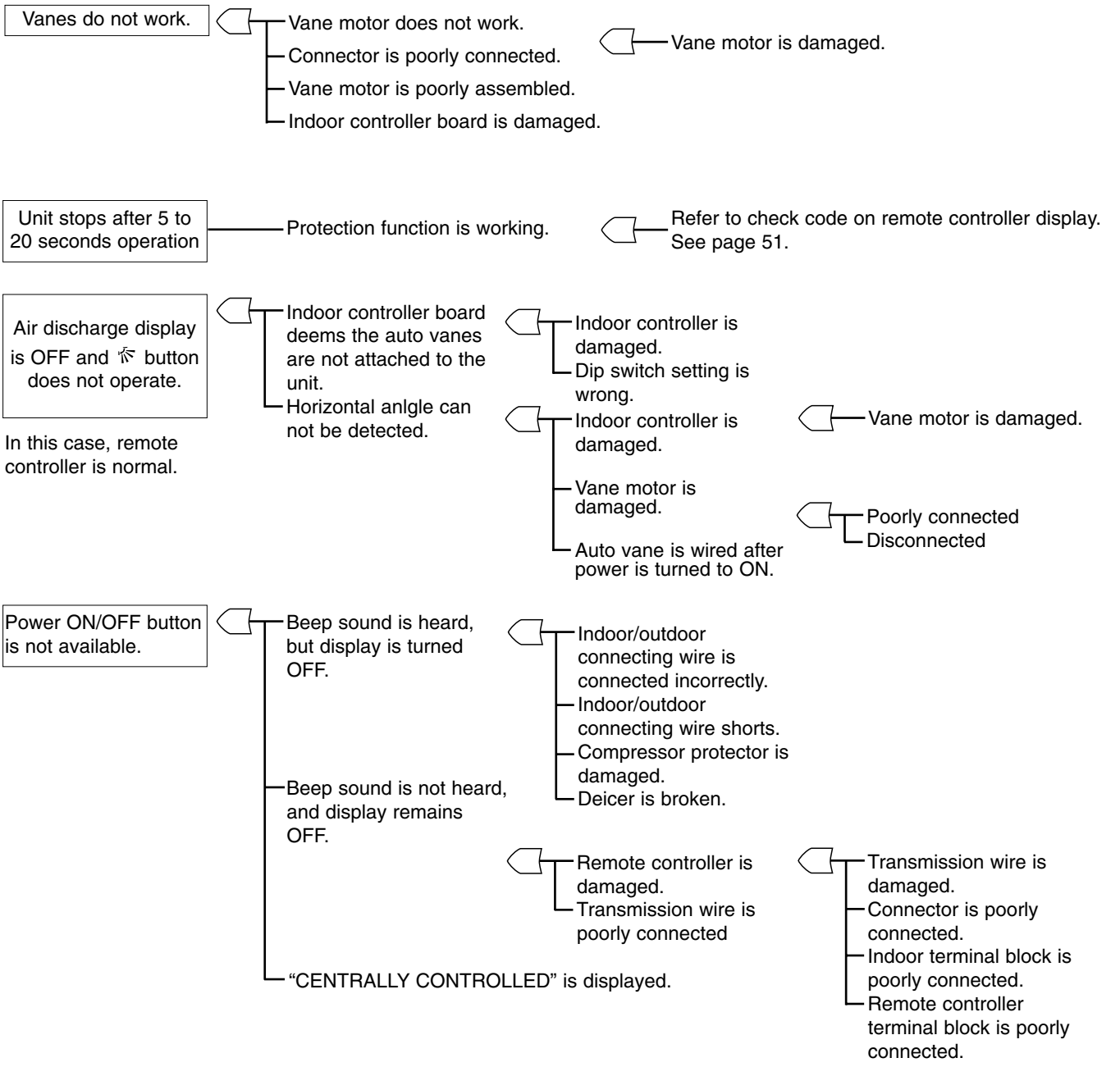
6-1 Between remote controller and indoor unit

If the wire is disconnected between the remote controller and the indoor unit, nothing is displayed on the remote controller when the POWER button is pressed. The beep sound will also not be heard.

6-2 Phenomenon due to wrong wiring between indoor and outdoor units

Wrong wiring	Mode	Thermostat	Phenomenon
	COOL	OFF	Operation stops.
		ON	4-Way valve turns ON. 9 minutes later, check code “P8” appears on remote controller display.
	HEAT	OFF	Cooling operation. Several minutes later, check code “P8” appears on remote controller display.
		ON	Normal operation.
	COOL	OFF	Outdoor unit stops.
		ON	Operation stops. 9 minutes later, check code “P8” appears on remote controller display.
	HEAT	OFF	Operation stops.
		ON	Operation stops. 27 minutes later, check code “P8” appears on remote controller display.
	COOL	OFF	Outdoor unit stops.
		ON	Operation stops. 9 minutes later, check code “P8” appears on remote controller display.
	HEAT	OFF	Operation stops.
		ON	Operation stops. 27 minutes later, check code “P8” appears on remote controller display.
	COOL	OFF	Outdoor unit stops.
		ON	Operation stops. 9 minutes later, check code “P8” appears on remote controller display.
	HEAT	OFF	Operation stops.
		ON	Operation stops, 27 minutes later, check code “P8” appears on remote controller display.
	COOL	OFF	Outdoor unit stops.
		ON	Operation stops. 9 minutes later, check code “P8” appears on remote controller display.
	HEAT	OFF	Operation stops.
		ON	Operation stops. 27 minutes later, check “P8” appears on remote controller display.
Disconnection between 1 and 1 or 2 and 2.	COOL	OFF	Operation stops.
		ON	Operation stops. 9 minutes later, check code “P8” appears on remote controller display.
	HEAT	OFF	Operation stops. 4-way valve turns OFF.
		ON	27 minutes later, check code “P8” appears on remote controller display.
Disconnection between 3 and 3.	COOL	—	Normal operation.
	HEAT	OFF	Operation stops. 4-way valve turns ON.
		ON	Operation stops. 27 minutes later check code “P8” appears on remote controller display.

7. OTHER TROUBLES AND CAUSES



8. MR. SLIM/LOSSNAY INTERLOCK OPERATION

<Symptoms that are not malfunctions>

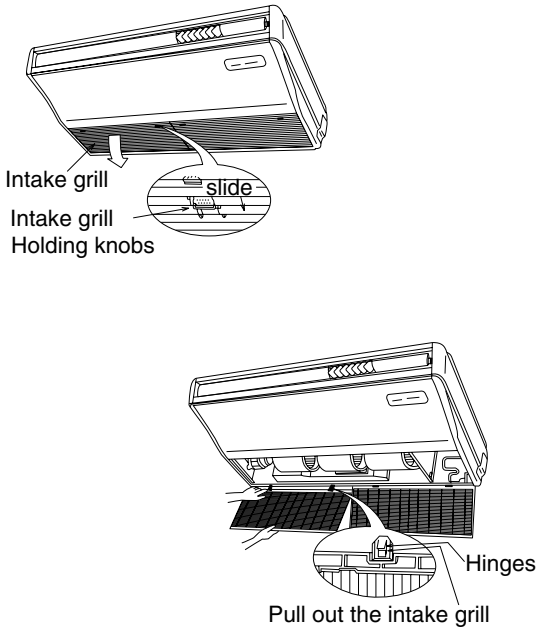
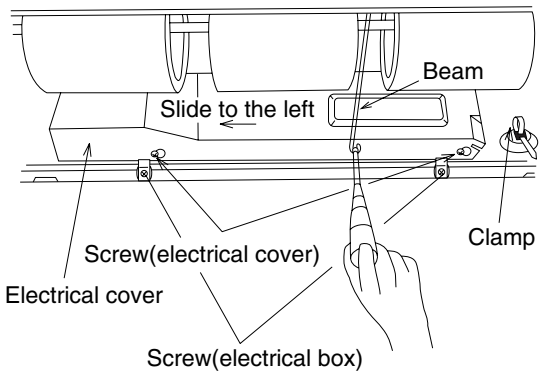
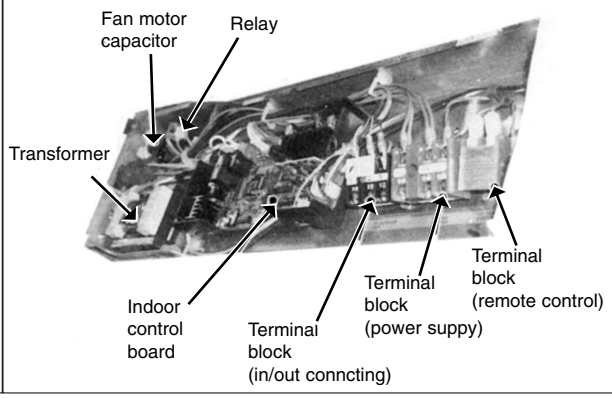
If any of the following symptoms occur, they are not malfunctions.

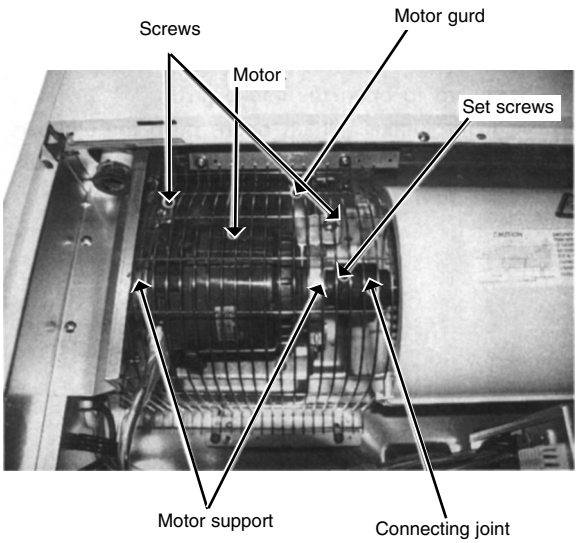
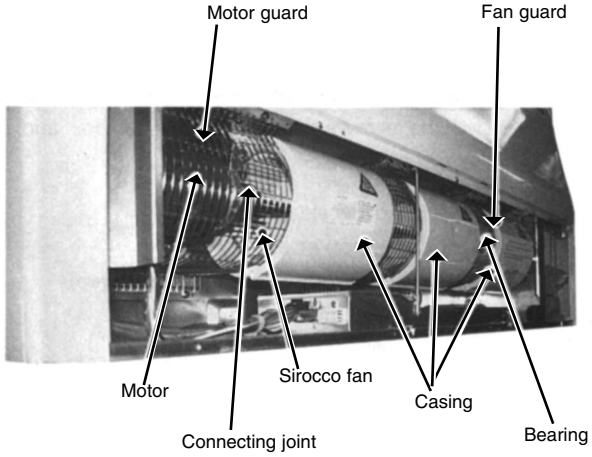
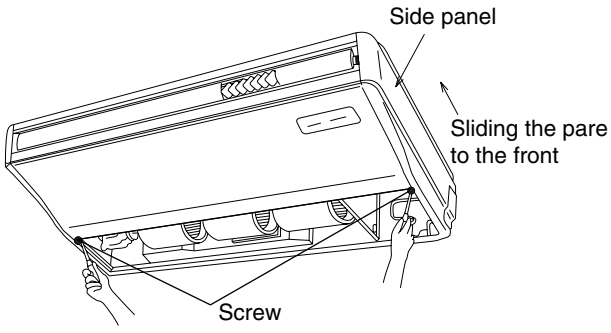
Symptom	Cause
LOSSNAY control switch does not work.	LOSSNAY control switch can not work during interlock operation. LOSSNAY control switch is effective only while Mr. SLIM is not operating.
LOSSNAY air speed can not be controlled in interlock operation.	LOSSNAY fan speed is fixed to HIGH during interlock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

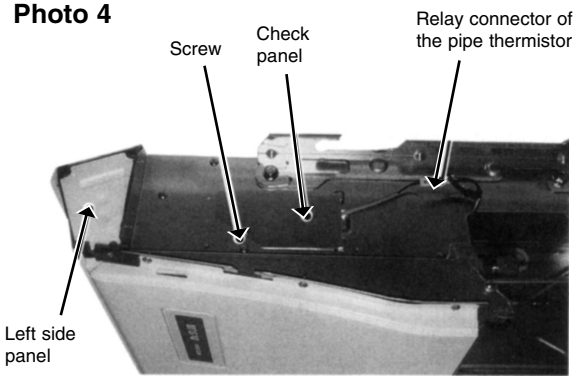
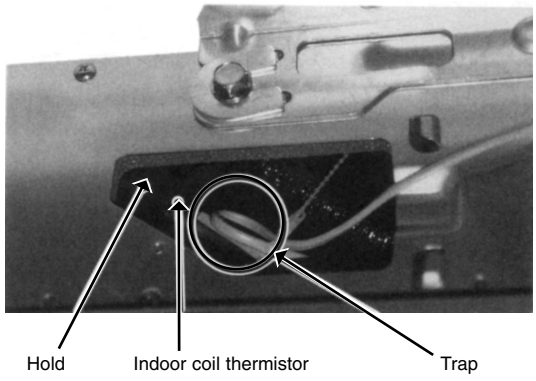
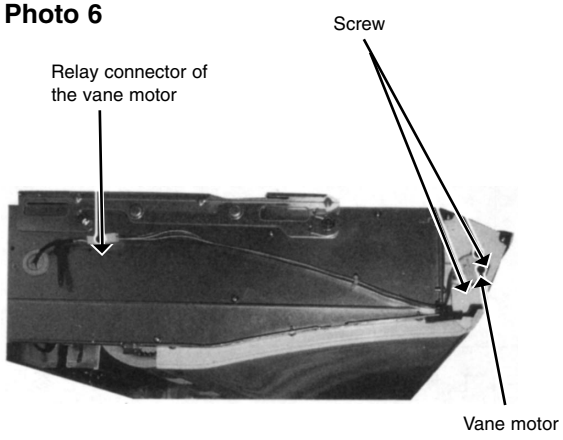
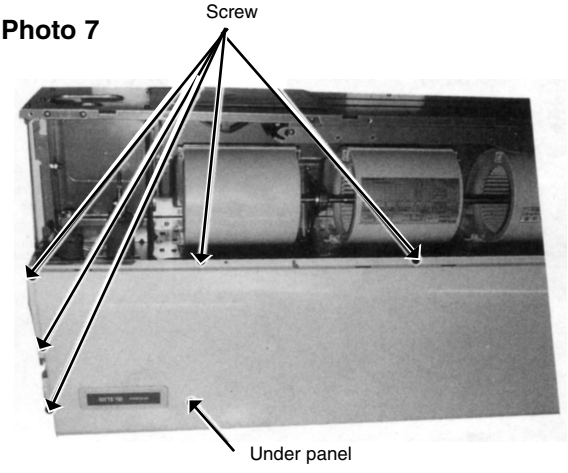
For LOSSNAY, troubleshooting refer to the LOSSNAY technical & service manual.

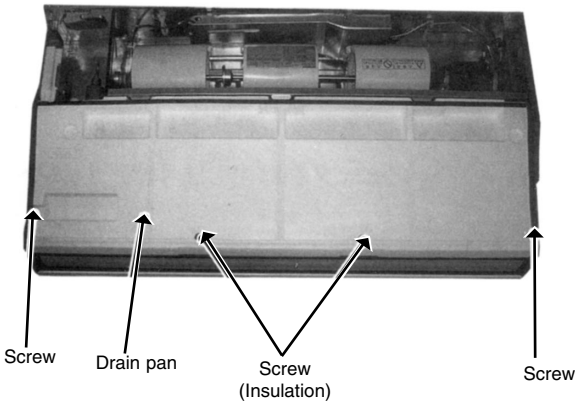
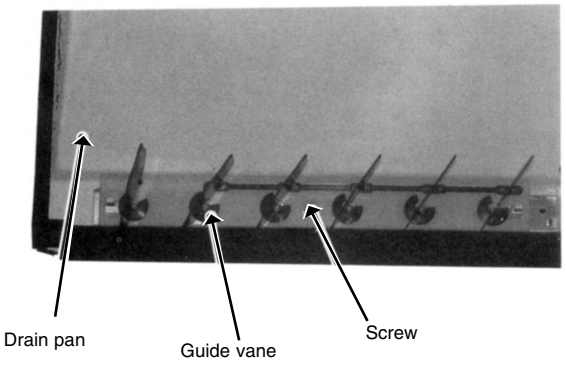
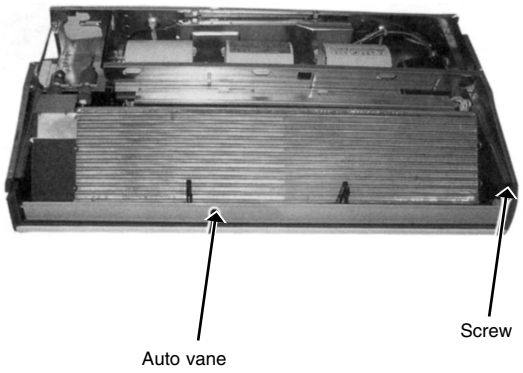
11 DISASSEMBLY PROCEDURE

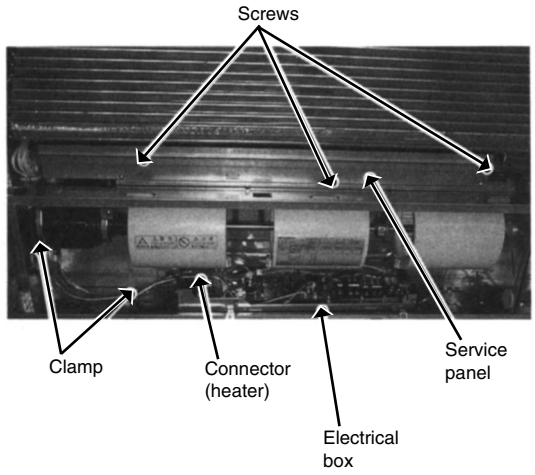
PCH-3GKHA$_1$

OPERATING PROCEDURE	PHOTOS&ILLUSTRATIONS
1. Removing the air intake grill (1) Slide the intake grill holding knobs (at two locations) backward to open the intake grill. (2) When the intake grill left open, push the stoppers on the rear hinges (at two locations) to pull out the intake grill.	**Figure 1** 
2. Removing the electrical box (1) Remove the air intake grill. (2) Remove the screw from the beam and remove the beam. (3) Remove the screws from the electrical cover, and remove the electrical cover. (4) Disconnectors including CN6V and CN21. (5) Remove the screws from the electrical box and pull out the electrical box. <Electrical parts in the electrical box> Terminal block (for power supply) Terminal block (for in/outdoor connecting wire) Terminal block (for remote controller) Fan motor capacitor Indoor control board Relay Transformer	**Figure 2**  **Photo 1** 

OPERATING PROCEDURE	PHOTOS&ILLUSTRATIONS
3. Removing the fan motor (1) Remove the intake grill. (2) Disconnect the fan motor connector. (3) Unscrew screws for removing the motor guard. (4) Unscrew screws for removing the fan guard. (5) Remove the screw for removing the motor support at both left and right side. (6) Loosen the set screws at the fan motor side of the connecting joint. (7) Slide the fan motor to the left side and pull it out.	**Photo 2** 
4. Removing the sirocco fan (1) Remove the air intake grill. (2) Remove 1 beam. (3) Unscrew screws for removing the motor guard. (4) Unscrew screws for removing the fan guard. (5) Remove the lower casing while pressing the stoppers at upper side of the casing. (6) Loosen the set screws at the connecting joint. (7) Remove the sirocco fan and shaft together by sliding the shaft to the left. (Note) Make sure that the upper side casing is snaped to the fan plate securely with catch.	**Photo 3** 
5. Removing the side panel (1) Remove the air intake grill. (2) Remove the screw from the side panel, and remove the side panel by sliding the panel to the front.	**Figure 2** 

OPERATING PROCEDURE	PHOTOS
6. Removing the vane motor (1) Remove the air intake grill. (2) Remove the left side panel. (3) Remove the relay connector of vane motor. (4) Remove the electrical box. (5) Remove the screws of vane motor, then remove vane motor. (Note) Connect the lead wires and connectors properly and place them in the proper position so that the wires are not pinched by other parts.	**Photo 4**  **Photo 5** 
7. Removing the Indoor coil thermistor (1) Remove the air intake grill. (2) Remove the right side panel. (3) Remove the relay connector of the pipe thermistor. (4) Remove the screw, and remove the check panel. (5) Extract the indoor coil thermistor from the holder. <Caution for the installation> There is a possibility for the short circuit when connector gets wet by water through the thermistor lead wire. Therefore, lead wire of the indoor coil thermistor should be traped as shown in the photo 5.	**Photo 6** 
7. Removing the Under panel (1) Remove the air intake grill. (2) Remove the beam. (3) Remove the side panel (right and left). (4) Unscrew the screws of the under panel, then remove the under panel. ※ Weight of the under panel : app. 2kg.	**Photo 7** 

OPERATING PROCEDURE	PHOTOS
9. Removing the drain pan (option) (1) Remove the air intake grill. (2) Remove the beam. (3) Remove the side panel (right and left). (4) Remove the under panel. Remove the screws of the right and left side drain pan. (5) Remove the insulation in center of the drain pan, and after removing the screw, remove the drain pan. (Note) Please aware that there might be drain left in the drain pan when you remove the drain pump (option).	**Photo 8** 
10. Removing the guide vane (1) Remove the intake grill. (2) Remove the beam. (3) Remove the side panel (right and left). (4) Remove the under panel. (5) Remove the drain pan. (6) Remove the screw from the guide vane, then remove the guide vane.	**Photo 9** 
11. Removing the Auto vane (1) Remove the intake grill. (2) Remove the left side panel. (3) Remove the left side box. (4) Remove the under panel. (5) Remove the screw from the auto vane. (6) Slide the auto vane to the right side and pull the auto vane out.	**Photo 10** 

OPERATING PROCEDURE	PHOTOS
12. Removing the support heater. (1) Remove the air intake grill. (2) Remove the beam. (3) Remove the side panel (right and left). (4) Remove the relay connector for the pipe thermistor. (5) Remove the under panel. (6) Remove the drain pan. (7) Remove the screw from the pipe cover, and remove the pipe cover. (8) Remove the screw from the pipe support, and remove the pipe fixed support.	**Photo 11** 
13. Removing the heat exchanger. (1) Remove the air intake grill. (2) Remove the beam. (3) Remove the side panel (right and left). (4) Disconnect the relay connector. (5) Remove the under panel. (6) Remove the drain pan. (7) Unscrew the screw of the pipe cover, and remove the pipe cover. (8) Unscrew the screw of the pipe support, and remove the pipe support. (9) Unscrew the screw of the heat exchanger, and remove the heat exchanger. Remove the heat exchanger with care. Since this is quite heavy, removing work should be done with more than 2 people. ※Weight of heat exchanger : App. 5.3kg	**Photo 12**