SERVICE MANUAL

SANYO

SAP–K186QHS5 + SAP–C186QH38
SAP–K186QHS5 + SAP–C186QH38N
SAP–K226QHS5 + SAP–C226QH38

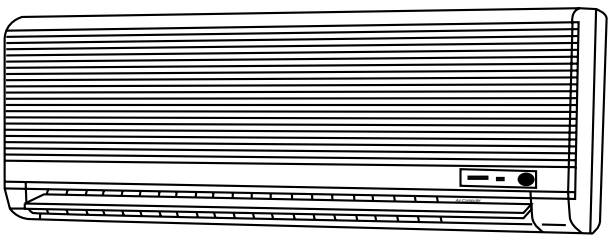
FILE NO.

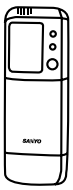
SPLIT SYSTEM AIR CONDITIONER

Indoor Model No	Product Code No.
SAP–K186QHS5–E	1 852 657 07
SAP–K226QHS5–E	1 852 657 08

Outdoor Model No.	Product Code No.
SAP–C186QH38–E	1 852 752 58
SAP–C186QH38N–E	1 852 752 59
SAP–C226QH38–E	1 852 753 61

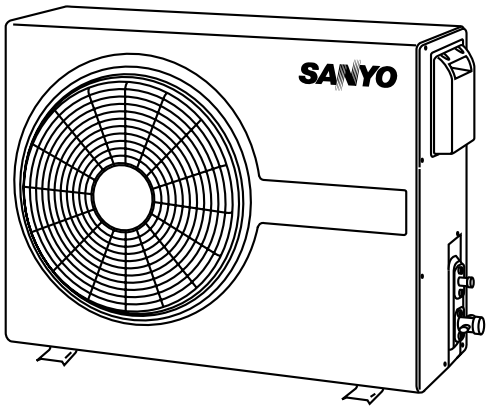
Indoor Unit



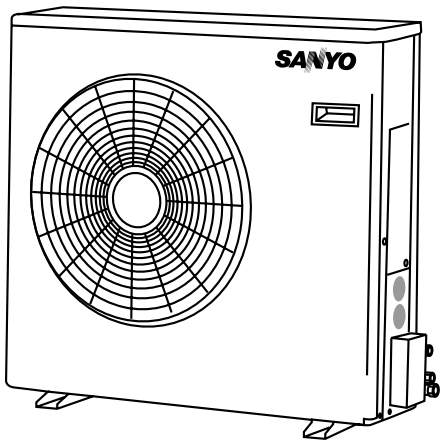


SAP–K186QHS5
SAP–K226QHS5

Outdoor Unit



SAP–C186QH38
SAP–C186QH38N



SAP–C226QH38

REFERENCE NO. SM700249

IMPORTANT!
Please Read Before Starting

This air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all warning and caution notices given in this manual.

WARNING This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

CAUTION This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS

WARNING When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death.**
- **Ground the unit** following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing…

…In a Ceiling or Wall

Make sure the ceiling/wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.

…In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

…In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

…In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

…In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing

- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.

When Servicing

- Turn the power OFF at the main power box (mains) before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.

Others

CAUTION

- Ventilate any enclosed areas when installing or testing the refrigeration system. Escaped refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm upon completing installation that no refrigerant gas is leaking. If escaped gas comes in contact with a stove, gas water heater, electric room heater or other heat source, it can produce dangerously toxic gas.

Table of Contents

1. OPERATING RANGE

	Temperature	Indoor Air Intake Temp.	Outdoor Air Intake Temp.
Cooling	Maximum	35°C DB / 22°C WB	46°C DB
	Minimum	19°C DB / 14°C WB	19°C DB
Heating	Maximum	27°C DB	24°C DB / 18°C WB
	Minimum	16°C DB	–8°C DB / –9°C WB

2. SPECIFICATIONS

2-1. Unit Specifications

Indoor Unit **SAP–K186QHS5**
Outdoor Unit **SAP–C186QH38 or SAP–C186QH38N**

Power Source				380 – 400 V – 3N ~ 50 Hz	
Control Circuit				220 – 230 V ~ 50 Hz	
Performance				Cooling	Heating
	Capacity		kW	4.80	5.80
			BTU/h	16,400	19,800
	Air circulation (High)		m^3/h	800	
	Moisture removal (High)		Liters/h	2.7	—
Electrical Rating	Voltage rating		V	380 – 400	
	Available voltage range		V	342 to 440	
	Running amperes		A	3.4	3.6
	Power input		W	1,900	1,980
	Power factor		%	—	—
	C.O.P.		W/W	2.5	2.9
	Compressor locked rotor amperes		A	22	
Features	Controls / Temperature control			Microprocessor / I.C. thermostat	
	Control unit			Wireless remote control unit	
	Timer			ON/OFF 24-hours & Daily Program	
	Fan speeds		Indoor / Outdoor	3 and Auto / 2(Auto)	
	Airflow direction (Indoor)		Horizontal	Manual	
			Vertical	Auto	
	Air filter			Washable, Anti–Mold	
	Compressor			Rotary (Hermetic)	
	Refrigerant / Amount charged at shipment		g	R22 / 1,970	
	Refrigerant control			Capillary tube	
	Operation sound	Indoor – Hi / Me / Lo	dB-A	45.0 / 41.0 / 36.0	
		Outdoor – Hi	dB-A	51.0	
	Refrigerant tubing connections			Flare type	
	Max. allowable tubing length at shipment		m	10	
	Refrigerant tube diameter	Narrow tube	mm (in.)	6.35 (1/4)	
		Wide tube	mm (in.)	12.7 (1/2)	
	Refrigerant tube kit / Accessories			Optional / Hanging wall bracket	
Dimensions & Weight				Indoor Unit	Outdoor Unit
	Unit dimensions	Height	mm	360	630
		Width	mm	1,000	830
		Depth	mm	205	305
	package dimensions	Height	mm	282	713
		Width	mm	1,080	994
		Depth	mm	443	413
	Weight	Net	kg	13.5	59.0
		Shipping	kg	17.7	64.0
	Shipping volume		m^3	0.13	0.29

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks: Rating conditions are:
Indoor air temperature 27°C DB/19°C WB
Outdoor air temperature 35°C DB/24°C WB

Indoor Unit **SAP – K226QHS5**
Outdoor Unit **SAP – C226QH38**

Power source				380 – 400 V – 3N ~ 50 Hz	
Control circuit				220 – 230 V ~ 50 Hz	
Performance				Cooling	Heating
	Capacity		kW	5.80	6.60
			BTU/h	19,800	22,500
	Air circulation (High)		m^3/h	900	
	Moisture removal (High)		Liters/h	3.3	—
Electrical Rating	Voltage rating		V	380 – 400	
	Available voltage range		V	342 to 440	
	Running amperes		A	4.4	4.8
	Power input		W	2,450	2,750
	Power factor		%	—	—
	C.O.P.		W/W	2.4	2.4
	Compressor locked rotor amperes		A	28	
Features	Controls / Temperature control			Microprocessor / I.C. thermostat	
	Control unit			Wireless remote control unit	
	Timer			ON/OFF 24-hours & Daily Program	
	Fan speeds		Indoor / Outdoor	3 and Auto / 2(Auto)	
	Airflow direction (Indoor)		Horizontal	Manual	
			Vertical	Auto	
	Air filter			Washable, Anti–Mold	
	Compressor			Rotary (Hermetic)	
	Refrigerant / Amount charged at shipment		g	R22 / 2,600	
	Refrigerant control			Capillary tube	
	Operation sound	Indoor – Hi / Me / Lo	dB-A	47.0 / 44.0 / 40.0	
		Outdoor – Hi	dB-A	55.0	
	Refrigerant tubing connections			Flare type	
	Max. allowable tubing length at shipment		m	10	
	Refrigerant tube diameter	Narrow tube	mm(in)	6.35 (1/4)	
		Wide tube	mm(in)	15.88 (5/8)	
	Refrigerant tube kit / Accessories			Optional / Hanging wall bracket	
Dimensions & Weight				Indor Unit	Outdoor Unit
	Unit dimensions	Height	mm	360	835
		Width	mm	1,000	850
		Depth	mm	205	305
	package dimensions	Height	mm	282	913
		Width	mm	1,080	1,000
		Depth	mm	443	400
	Weight	Net	kg	13.5	70.0
		Shipping	kg	17.7	79.0
	Shipping volume		m^3	0.13	0.37

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks: Rating conditions are:
Indoor air temperature 27°C DB/19°C WB
Outdoor air temperature 35°C DB/24°C WB

2-2. Major Component Specifications

2-2-1. Indoor Unit

Indoor Unit **SAP–K186QHS5**

Source					220 – 230 V ~ 50 Hz
Controller PCB	Part No.				POW–K186GHS/E
	Controls				Microprocessor
	Control circuit fuse				250 V – 3 A
Remote Control Unit					RCS-2SH2
Fan & Fan Motor	Type				Cross-flow
	Number ... Dia. and length			mm	1 ... ø100 / L760
	Fan motor model ... Number				UF2Q–21A5PA–S ... 1
	No. of poles ... rpm (220 V, High)				2 ... 1,490
	Nominal output			W	20
	Coil resistance (Ambient temp. 20°C)			Ω	WHT – BRN : 163.7 WHT – VLT : 68.8 VLT – ORG : 33.2 ORG – YEL : 73.6 YEL – PNK : 43.7
	Safety devices	Type			Internal protector
		Operating temp.	Open	°C	130 ± 8
			Close		Automatic reclosing
	Run capacity			µF	1.5
				VAC	440
Flap Motor	Model				M2LJ24ZE31
	Rating				AC 208 / 230 V, 50 / 60Hz
	No. of poles ... rpm				8 ... 2.5 / 3.0
	Nominal output			W	3 / 2.5
	Coil resistance (Ambient temp. 20°C)			kΩ	16.45 ± 15%
Heat Exch. Coil	Coil				Aluminum plate fin / Copper tube
	Rows				2
	Fin pitch			mm	1.8
	Face area			m^2	0.192

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Indoor Unit **SAP–K226QHS5**

Source					220 – 230 V ~ 50 Hz
Controller PCB	Part No.				POW–K226GHS/E
	Controls				Microprocessor
	Control circuit fuse				250 V – 3 A
Remote Control Unit					RCS–2SH2
Fan & Fan Motor	Type				Cross-flow
	Number ... Dia. and length			mm	1 ... ø100 / L760
	Fan motor model ... Number				UF2Q–31A5P–S ... 1
	No. of poles ... rpm (220 V, High)				2 ... 1,750
	Nominal output			W	30
	Coil resistance (Ambient temp. 20°C)			Ω	WHT – BRN : 145.3 WHT – VLT : 53.6 VLT – ORG : 30.9 ORG – YEL : 70.4 YEL – PNK : 38.8
	Safety devices	Type			Internal protector
		Operating temp.	Open	°C	130 ± 5
			Close		Automatic reclosing
	Run capacity			μF	1.8
				VAC	440
Flap Motor	Model				M2LJ24ZE31
	Rating				AC 208 / 230 V, 50 / 60 Hz
	No. of poles ... rpm				8 ... 2.5 / 3.0
	Nominal output			W	3 / 2.5
	Coil resistance (Ambient temp. 20°C)			kΩ	16.45 ± 15%
Heat Exch. Coil	Coil				Aluminum plate fin / Copper tube
	Rows				2
	Fin pitch			mm	1.8
	Face area			m^2	0.192

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

2-2-2. Outdoor Unit

Outdoor Unit **SAP–C186QH38 or SAP–C186QH38N**

Power source					380 – 400 V – 3N ~ 50 Hz	
Control circuit					220 – 230 V ~ 50 Hz	
Controller PCB					POW–C186GH	
Compressor	Type				Rotary (Hermetic)	
	Compressor model				C–R173H8M 80638988	
	Source				380 – 400 V – 3N ~ 50 Hz	
	Nominal output			W	1,700	
	Compressor oil			cc	1,200	
	Coil resistance (Ambient temp. 25°C)			Ω	C – K : 5.62 C – S : 5.51 R – S : 5.62	
	Safety devices	Type			Internal type	External type
		Overload relay			—	HOE–10TB TH–5A
		Operating temp.	Open	°C	120 ± 5	—
			Close	°C	Automatic reclosing	—
		Operating amp.(Ambient temp. 25°C)			—	5A
	Run capacitor			μF	—	
				VAC	—	
	Crank case heater				240V 30W	
Fan & Fan Motor	Type				Propeller	
	Number ... Dia.			mm	1 ... ø400	
	Fan motor model ... Number				SG6S–51B5P…1	
	Source				220 – 230 V ~ 50 Hz	
	No. of poles ... rpm(220V)				6 ... 900	
	Nominal output			W	50	
	Coil resistance (Ambient temp. 20°C)			Ω	WHT – BRN : 89.1 WHT – YEL :111.8 YEL – PNK : 55.9	
	Safety devices	Type			Internal protector	
		Operating temp.	Open	°C	130 ± 8	
			Close		Automatic reclosing	
	Run capacitor			μF	2.0	
				VAC	440	
Heat Exch. Coil	Coil				Aluminum plate fin / Copper tube	
	Rows				2	
	Fin pitch			mm	1.6	
	Face area			m^2	0.487	
External Finish					Acrylic baked-on enamel finish	

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Outdoor Unit **SAP – C226QH38**

Power source					380 – 400 V – 3N ~ 50 Hz	
Control circuit					220 – 230 V ~ 50 Hz	
Controller PCB					POW–C226GH	
Compressor	Type				Rotary (Hermetic)	
	Compressor model				C–R223H8S 80687188	
	Source				380 – 400 V – 3N ~ 50 Hz	
	Nominal output			W	2,200	
	Compressor oil			cc	1,350	
	Coil resistance (Ambient temp. 25°C)			Ω	C – R : 4.97 C – S : 4.64 R – S : 4.88	
	Safety devices	Type			Internal type	External type
		Overload relay			Built–in	HOE–10TB TH–7A
		Operating temp.	Open	°C	125 ± 5	—
			Close	°C	Automatic reclosing	—
		Operating amp.(Ambient temp. 25°C)			—	7A
	Run capacitor			μF	—	
				VAC	—	
	Crank case heater				240V 30W	
Fan & Fan Motor	Type				Propeller	
	Number ... Dia.			mm	1 ... ø460	
	Fan motor model ... Number				KFC6S–51B5P…1	
	Source				220 – 230 V ~ 50 Hz	
	No. of poles ... rpm(220V)				6 ... 840	
	Nominal output			W	50	
	Coil resistance (Ambient temp. 20°C)			Ω	WHT – BRN : 95.9 WHT – YEL : 55.4 YEL – PNK : 7.2	
	Safety devices	Type			Internal protector	
		Operating temp.	Open	°C	130 ± 8	
			Close		Automatic reclosing	
	Run capacitor			μF	5.0	
				VAC	440	
Heat Exch. Coil	Coil				Aluminum plate fin / Copper tube	
	Rows				2	
	Fin pitch			mm	1.9	
	Face area			m^2	0.610	
External Finish					Acrylic baked-on enamel finish	

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

2-3. Other Component Specifications

Indoor Unit SAP–K186QHS5, SAP–K226QHS5

Transformer (TR)		ATR-J105
Rating	Primary	AC 230V, 50Hz
	Secondary	19V, 0.526A
	Capacity	10VA
Coil resistance	Ω (at 21°C)	Primary (WHT – WHT): 205 ± 10%
		Secondary (BRN – BRN): 2.0 ± 10%
Thermal cut-off temp.		150°C

Thermistor (Coil sensor TH1)		PBC-41E-S4			
Resistance	kΩ	–20°C	40.1 ± 5%	20°C	6.5 ± 5%
		–10°C	24.4 ± 5%	30°C	4.4 ± 5%
		0°C	15.3 ± 5%	40°C	3.0 ± 5%
		10°C	9.9 ± 5%	50°C	2.1 ± 5%

Thermistor (Room sensor TH2)		KTEC-35-S6			
Resistance	kΩ	10°C	10.0 ± 4%	30°C	4.0 ± 4%
		15°C	7.9 ± 4%	35°C	3.3 ± 4%
		20°C	6.3 ± 4%	40°C	2.7 ± 4%
		25°C	5.0 ± 4%	50°C	1.8 ± 4%

Outdoor Unit SAP–C186QH38, SAP–C186QH38N

Relay (PR)		**MY2-TSDF**
Coil rating		DC 24V
Coil resistance	Ω (at 20°C)	650 ± 10%
Contact rating		AC 200V, 5A

Thermostat (Fan Speed Control 23S)		**MQT5S-27YZJ**
Switching temp.	°C	high → LOW 23.5°C ± 1.5
		low → HIGH 27.0°C $^{+0}_{-3}$
Contact rating		AC 220V, 3A

4-way Valve (SC)		**LB60012 (Coil), V26-110B (Valve)**
Coil rating		AC 220/240V, 50Hz, 6W
Coil resistance	Ω (at 20°C)	1,740 ± 7%

Negative Phase Relay (47C)	**RDR-S400**
Rating	AC 415V, 3-phase 50Hz
Contact rating	AC 400V, 1A
Operation	Positive phase: ON
	Negative phase: OFF

Electro Magnetic Contactor (MG)		**HOE-10TB TH-5A**
Magnetic contactor		
Coil rating		AC 220–240V, 50Hz / AC 240–260V, 60Hz
Coil resistance	Ω (at 25°C)	1,260 ± 10%
Contact rating (Main)		AC 440V, 8A
Thermal relay (Overcurrent relay)		
Operating amperes		5A

Outdoor Unit SAP–C226QH38

Thermostat (Defrost thermo. 23D)		TRS02-12MSR316
Operating temp.	°C	ON 12 ± 2
		Diff. 8 deg. below

Negative Phase Relay (47C)	RDR-S400
Rating	AC 415V, 3-phase 50Hz
Contact rating	AC 400V, 1A
Operation	Positive phase: ON
	Negative phase: OFF

Thermostat (Fan Speed Control 23S)		YTB-S383
Switching temp.	°C	high → LOW 28.5°C ± 1
		low → HIGH 31°C ± 1

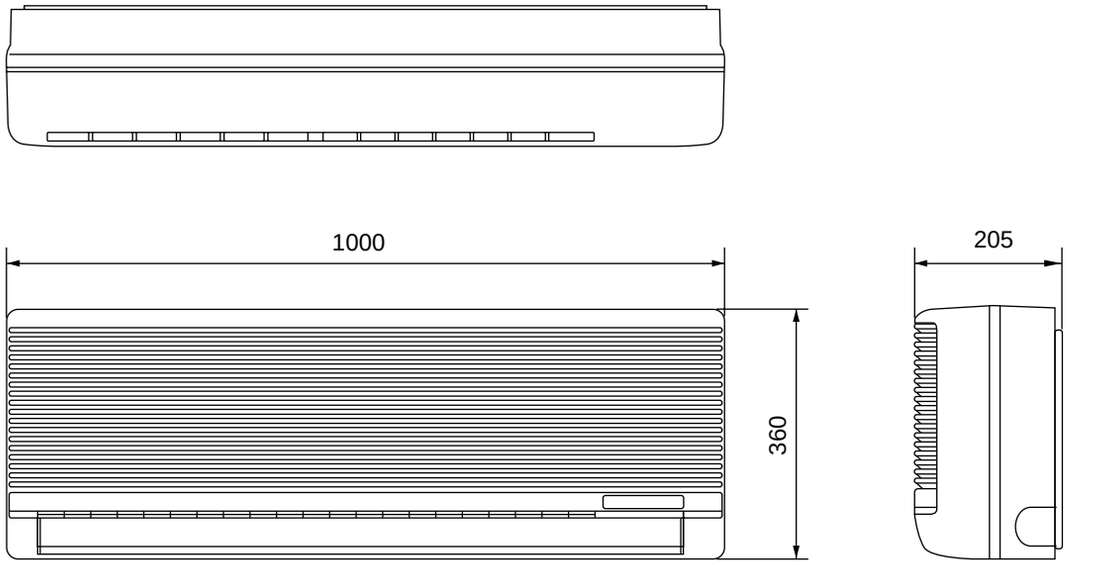
Solenoid Valve (SV)	NEV-J041B0 (Coil), NEV202DXF (Valve)
Rating	AC 240V, 50/60Hz
	7/6W, 45/35mA

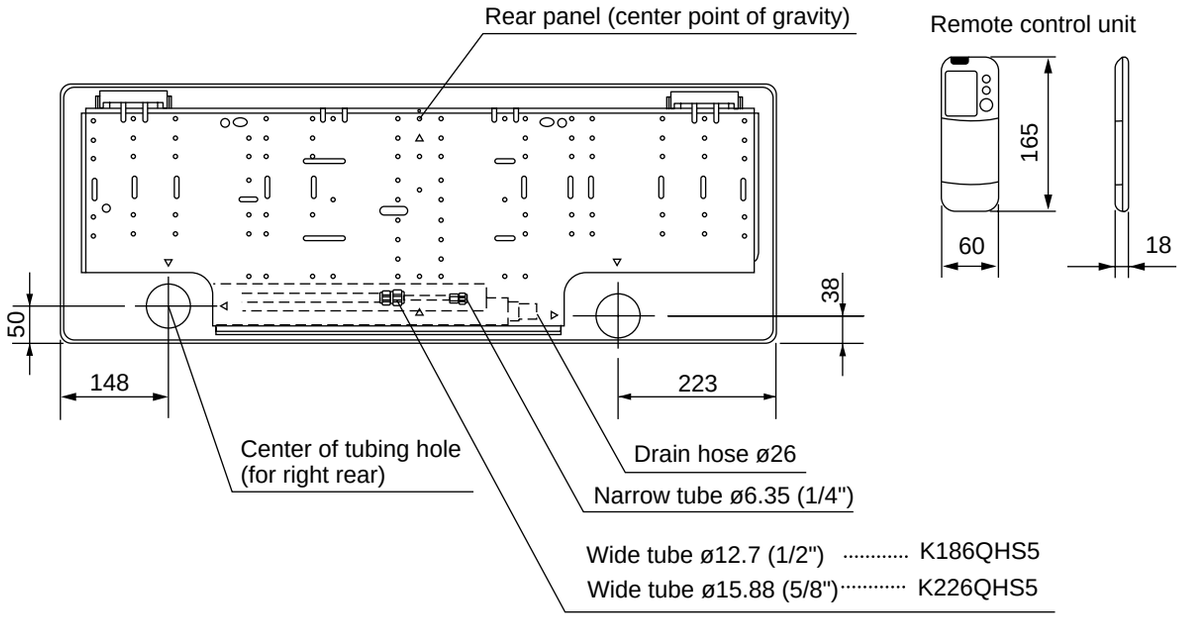
4-way Valve (20S)		LB60012 (Coil), V26-110D (Valve)
Coil rating		AC 220/240V, 50Hz, 6W
Coil resistance	Ω (at 20°C)	1,740 ± 7%

Electro Magnetic Contactor (MG)		HOE-10TB TH-7A
Magnetic Contactor		
Coil rating		AC 220–240V, 50Hz / AC 240–260V, 60Hz
Coil resistance	Ω (at 25°C)	1,260 ± 10%
Contact rating (Main)		AC 440V, 8A
Thermal relay (Overcurrent relay)		
Operating amperes		7A

3. DIMENSIONAL DATA

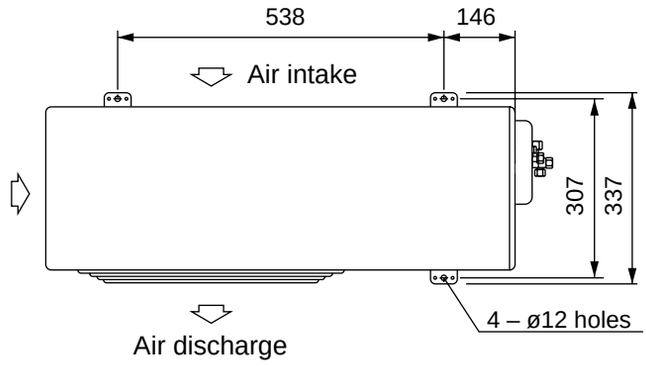
Indoor Unit **SAP – K186QHS5**
SAP – K226QHS5

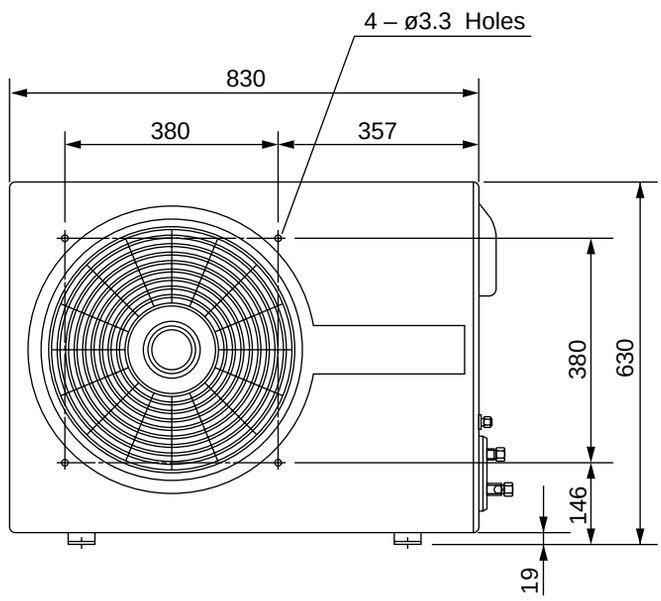


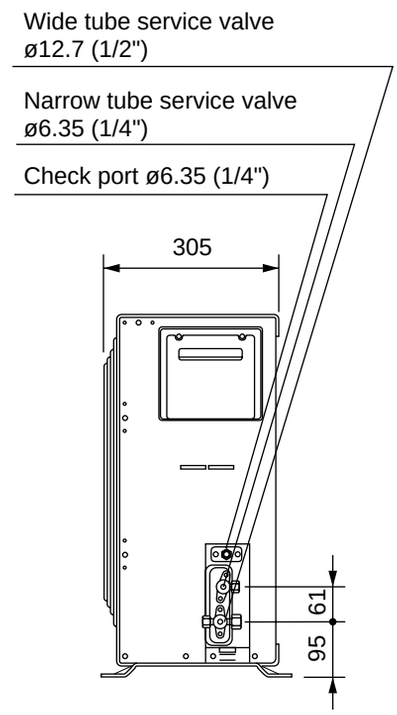


Dimensions : mm

Outdoor Unit **SAP – C186QH38**
SAP – C186QH38N

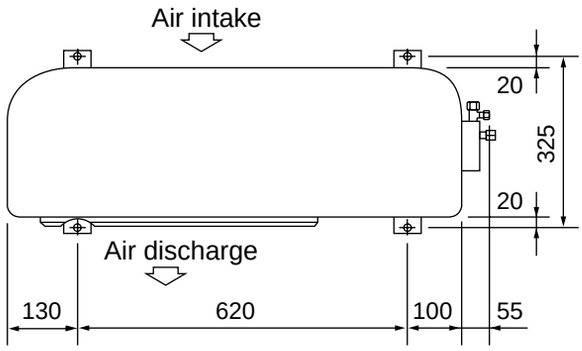


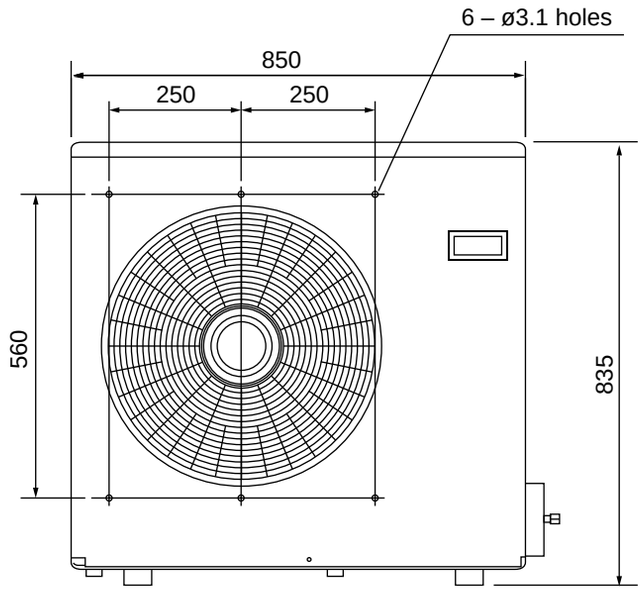


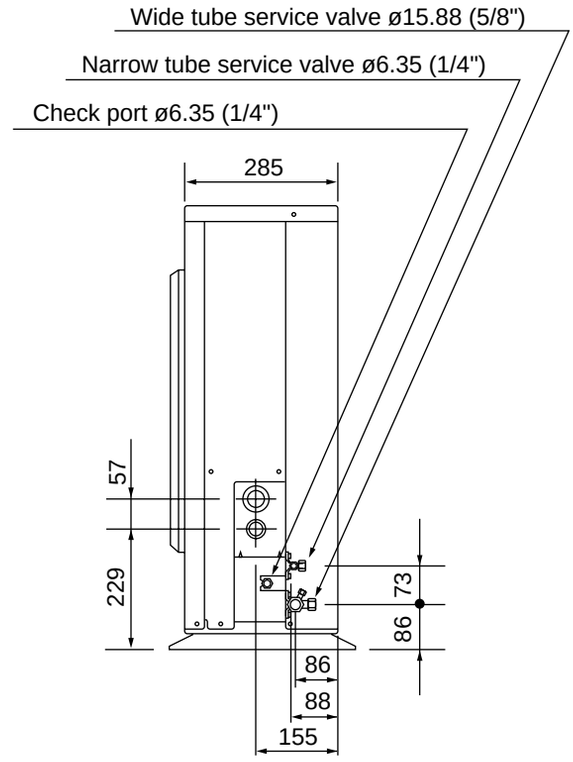


Dimensions : mm

Outdoor Unit **SAP – C226QH38**





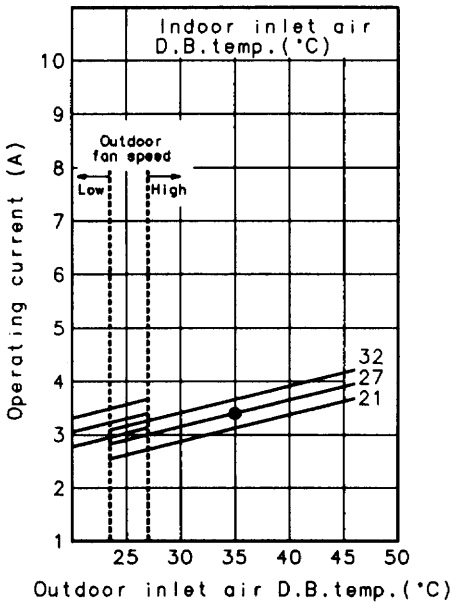


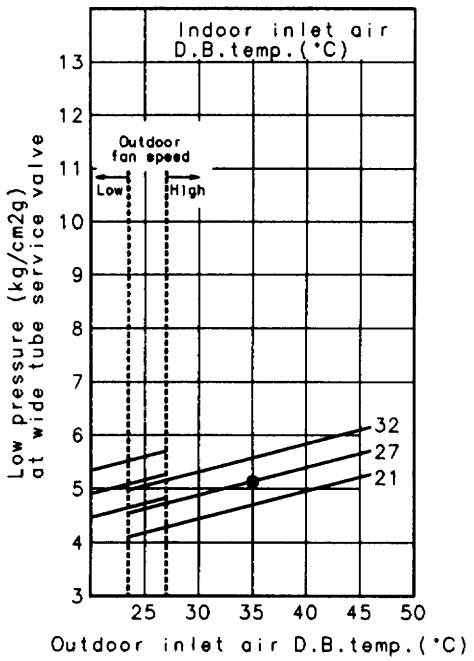
Dimensions : mm

4. PERFORMANCE CHARTS

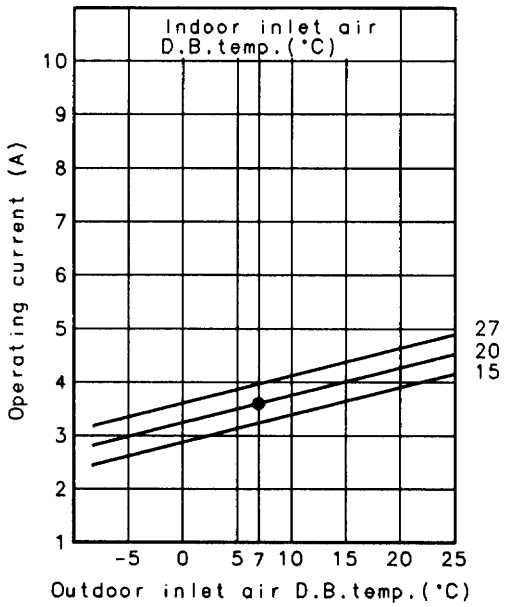
Indoor Unit **SAP–K186QHS5** **Outdoor Unit** **SAP–C186QH38**
SAP–C186QH38N

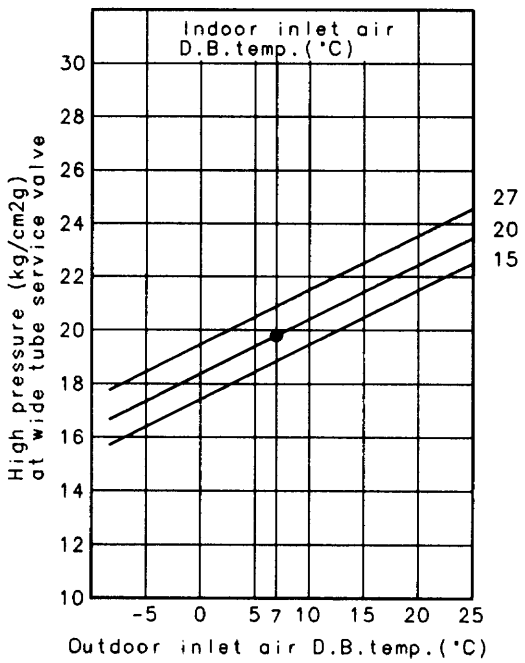
● Cooling characteristics





● Heating characteristics





NOTE

Overload prevention operates to protect the air conditioner when outdoor ambient temperature reaches extremely high in heating mode. (Refer to “5-5 Overload prevention”)

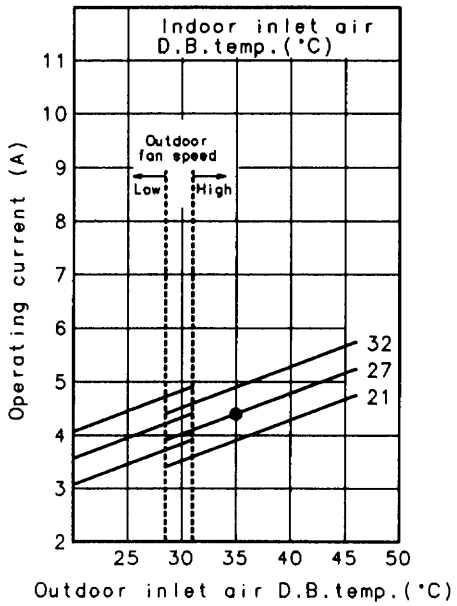
● .....Points of Rating condition
Black dots in above charts indicate the following rating conditions.

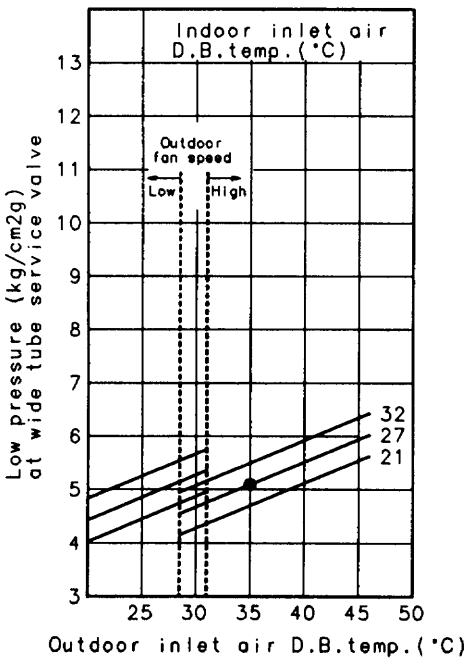
Cooling: Indoor air temperature 27°C DB/19°C WB
Outdoor air temperature 35°C DB/24°C WB

Heating: Indoor air temperature 20°C DB
Outdoor air temperature 7°C DB/6°C WB

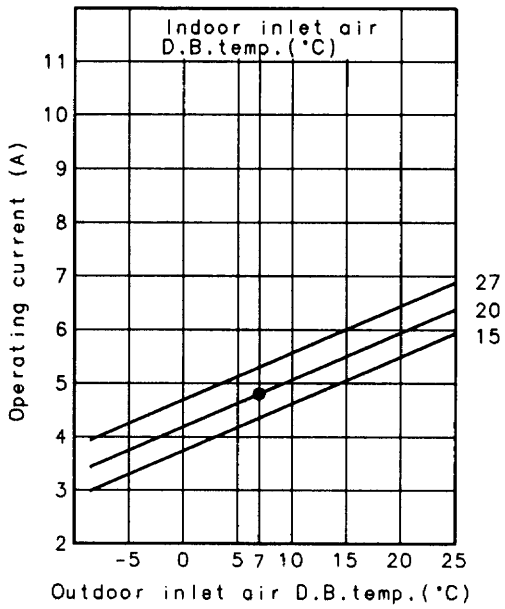
Indoor Unit SAP–K226QHS5 **Outdoor Unit SAP–C226QH38**

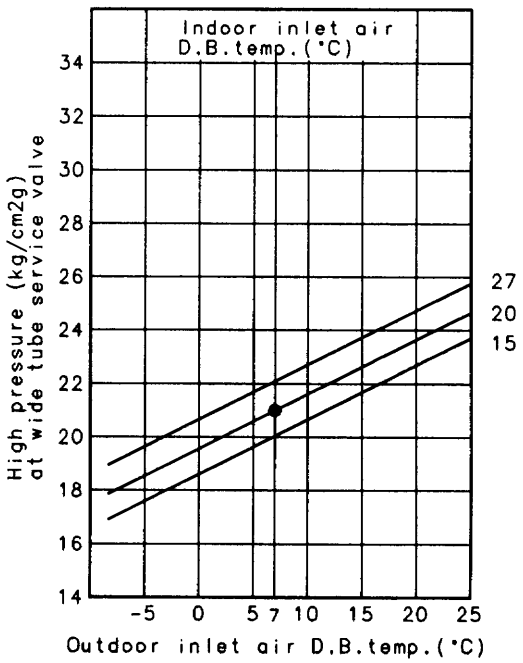
● Cooling characteristics





● Heating characteristics





NOTE

Overload prevention operates to protect the air conditioner when outdoor ambient temperature reaches extremely high in heating mode. (Refer to “5-5 Overload prevention”)

● .....Points of Rating condition

Black dots in above charts indicate the following rating conditions.

Cooling: Indoor air temperature 27°C DB/19°C WB
Outdoor air temperature 35°C DB/24°C WB

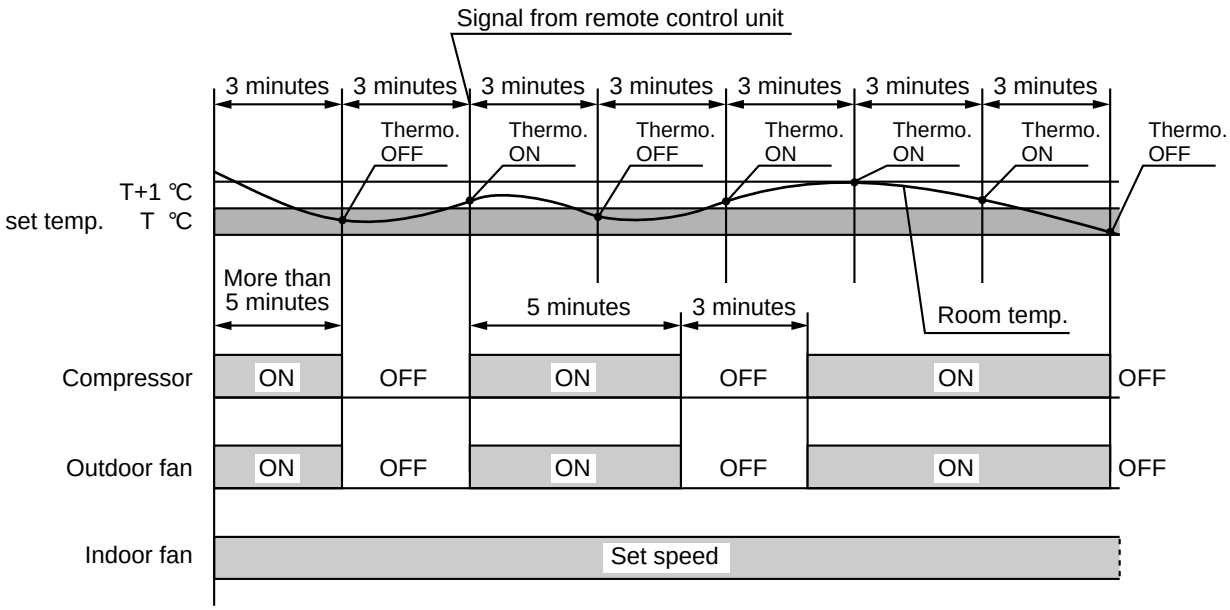
Heating: Indoor air temperature 20°C DB
Outdoor air temperature 7°C DB/6°C WB

5. FUNCTION

5-1. Room Temperature Control

■ Cooling

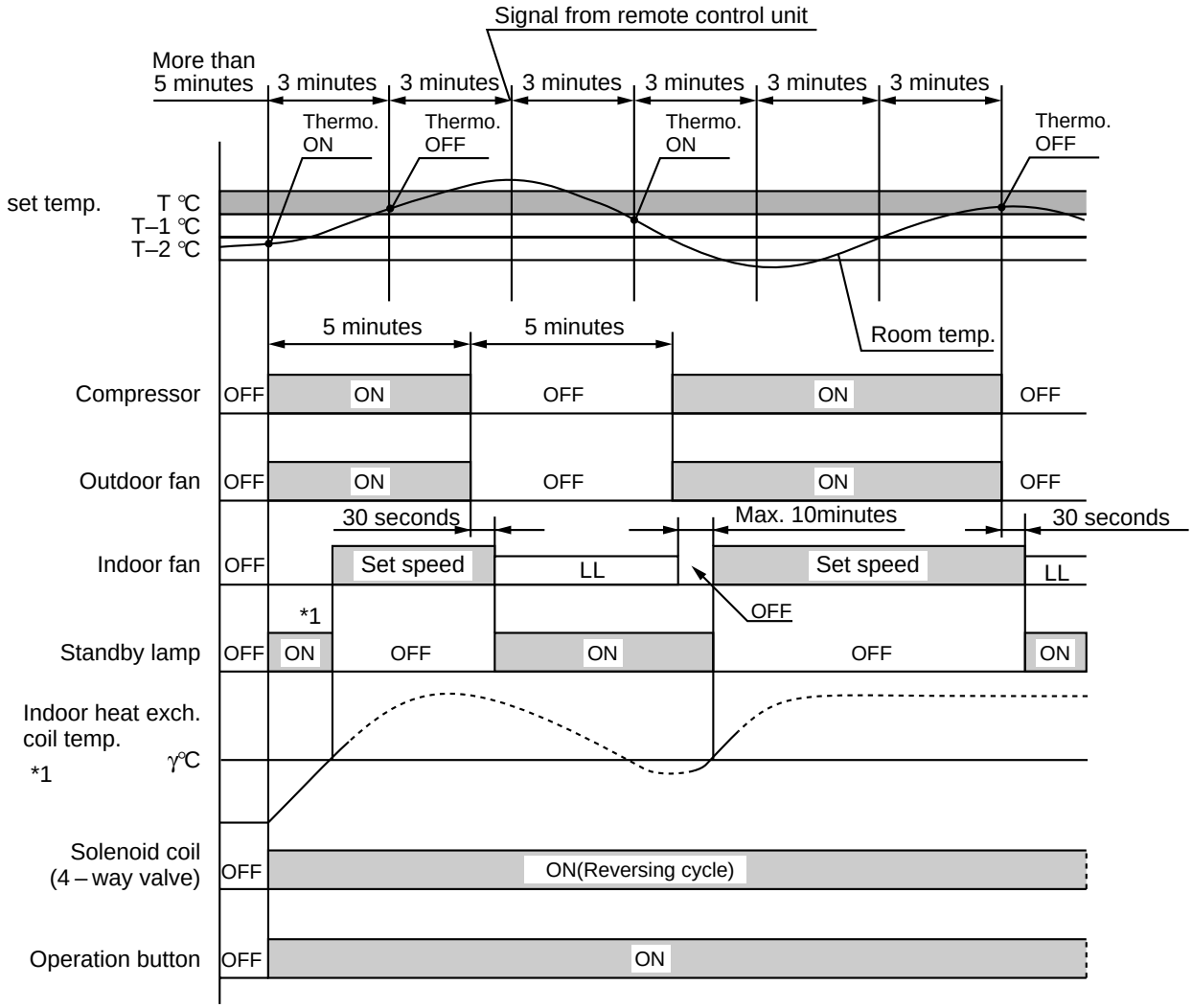
- Room temperature control is obtained by cycling the compressor ON and OFF under control of the room temperature sensor in the remote control unit.
- The room temperature (and other information) is transmitted every 3 minutes by the remote control unit to the controller in the indoor unit.



- The control circuit will not attempt to turn the compressor ON until the compressor has been OFF for at least 3 minutes. To protect the compressor from stalling out when trying to start against the high side refrigerant pressure, the control circuit has a built-in automatic time delay to allow the internal pressure to equalize.
- As a protective measure, the control circuit switches the compressor OFF after 5 minutes or more of compressor operation.
- Thermo. ON : When the room temperature is above T + 1°C (T°C is set temperature).
  Compressor → ON
- Thermo. OFF : When the room temperature is equal to or below set temperature T°C.
  Compressor → OFF

■ Heating

- Room temperature control is obtained by cycling the compressor ON and OFF under control of the room temperature sensor in the remote control unit.
- The room temperature (and other information) is transmitted every 3 minutes by the remote control unit to the controller in the indoor unit.

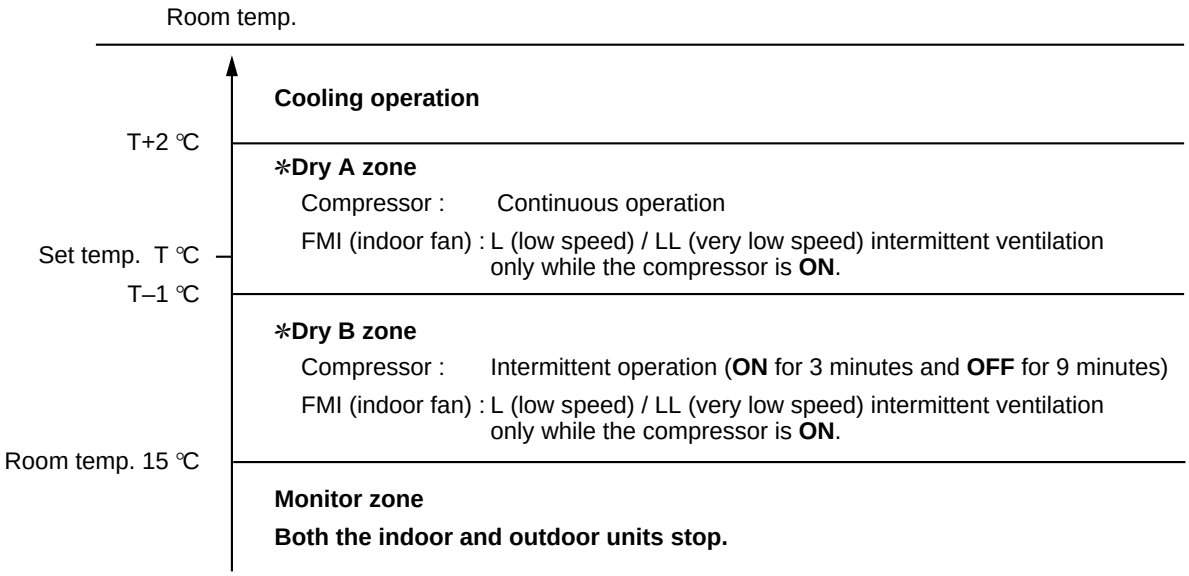


- The control circuit will not attempt to turn the compressor ON until the compressor has been OFF for at least 5 minutes. To protect the compressor from stalling out when trying to start against the high side refrigerant pressure, the control circuit has a built-in automatic time delay to allow the internal pressure to equalize.
- As a protective measure, the control circuit switches the compressor OFF after 5 minutes or more of compressor operation.
- Thermo. ON : When the room temperature is below T – 1°C (T°C is set temperature).
  Compressor → ON
- Thermo. OFF : When the room temperature is equal to or above set temperature T°C.
  Compressor → OFF

NOTE ✻1: Refer to 5-6 "Cold Draft Prevention".

5-2. Dry Operation (Dehumidification)

● Dry operation uses the ability of the cooling cycle to remove moisture from the air, but by running at low level to dehumidify without greatly reducing the room temperature. The air conditioner repeats the cycle of turning ON and OFF automatically as shown in the chart below according to the room temperature.



NOTE

- Intermittent ventilation occurs by switching the indoor fan speed between L ↔ LL.
- Dry operation does not occur when the room temperature is under 15°C, which is the monitor zone.
- When the compressor stops, the indoor fan stops as well.
- In order to keep the desired temperature, a built-in solenoid valve opens throughout the dry operation. (Provided only for 22,000BTU/h class model)

5-3. Automatic Switching between Cooling and Heating

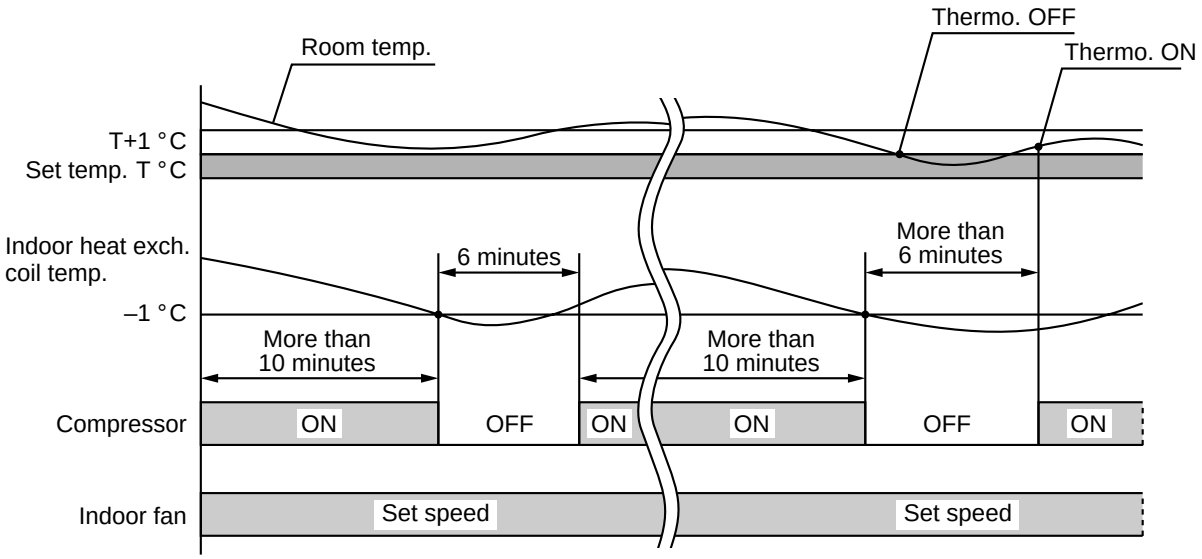
- When AUTO mode is selected, the microprocessor calculates the difference between the set temperature and the room temperature, and automatically switches to COOLING or HEATING mode to maintain the desired temperature.

Room temp. ≥ Set temp. → COOL
Room temp. < Set temp. → HEAT

This means that if the room temperature is **higher than** or **equal to** the set temperature, **COOLING** operation begins. If the room temperature is **lower than** the set temperature, **HEATING** operation begins.

5-4. Freeze Prevention (Cooling)

- This function prevents freezing of the indoor heat exchange coil.
- When the compressor has been running for 10 minutes or more and the temperature of the indoor heat exchange coil falls below –1°C, the control circuit stops the compressor for at least 6 minutes. The compressor does not start again until the temperature rises above 8°C or 6 minutes has elapsed.



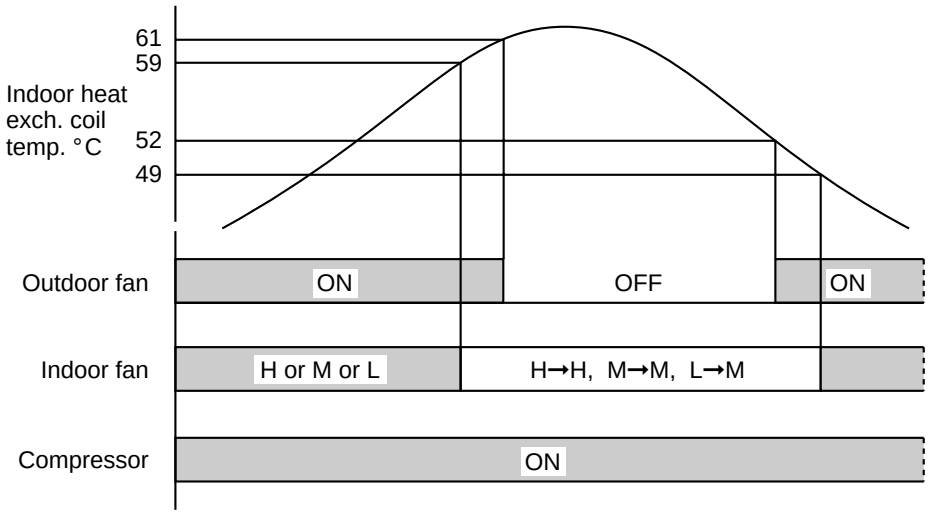
5-5. Overload Prevention (Heating)

● This function prevents overheating of the indoor heat exchange coil.

For SAP–K186QHS5

● When the temperature of the indoor heat exchange coil rises above **59**°C, and if the indoor fan is L (low speed), then the fan speed changes from L (low speed) to M (medium speed).

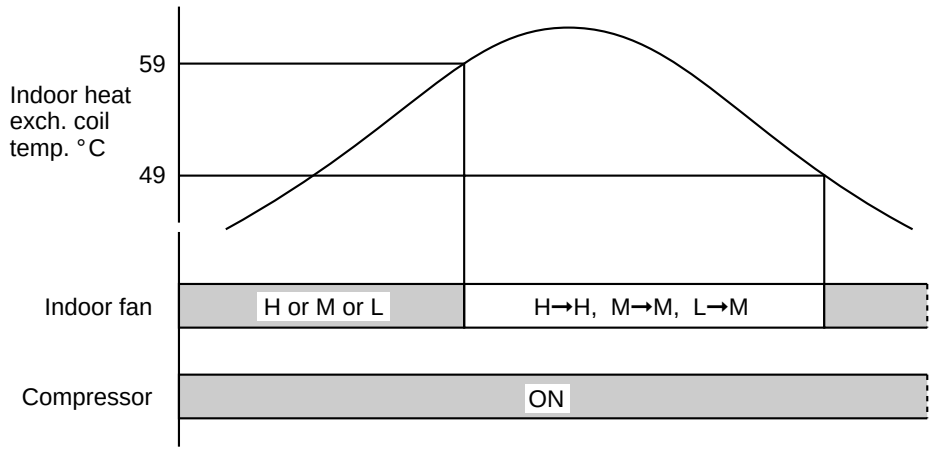
● When the temperature of the indoor heat exchange coil rises above **61**°C, the outdoor fan stops.



For SAP–K226QHS5

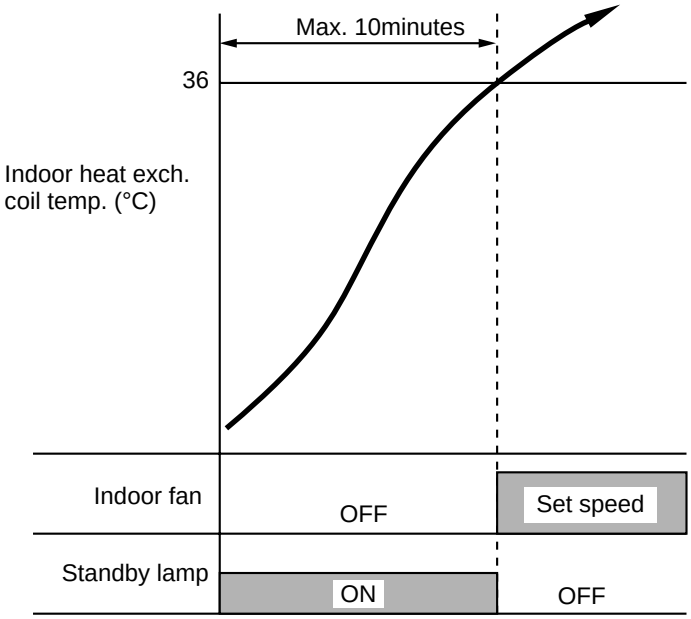
● When the temperature of the indoor heat exchange coil rises above 59°C, and if the indoor fan is L (low speed), then the fan speed changes from L (low speed) to M (medium speed).

● In this model SAP–K226QHS5, the outdoor fan continues to run.



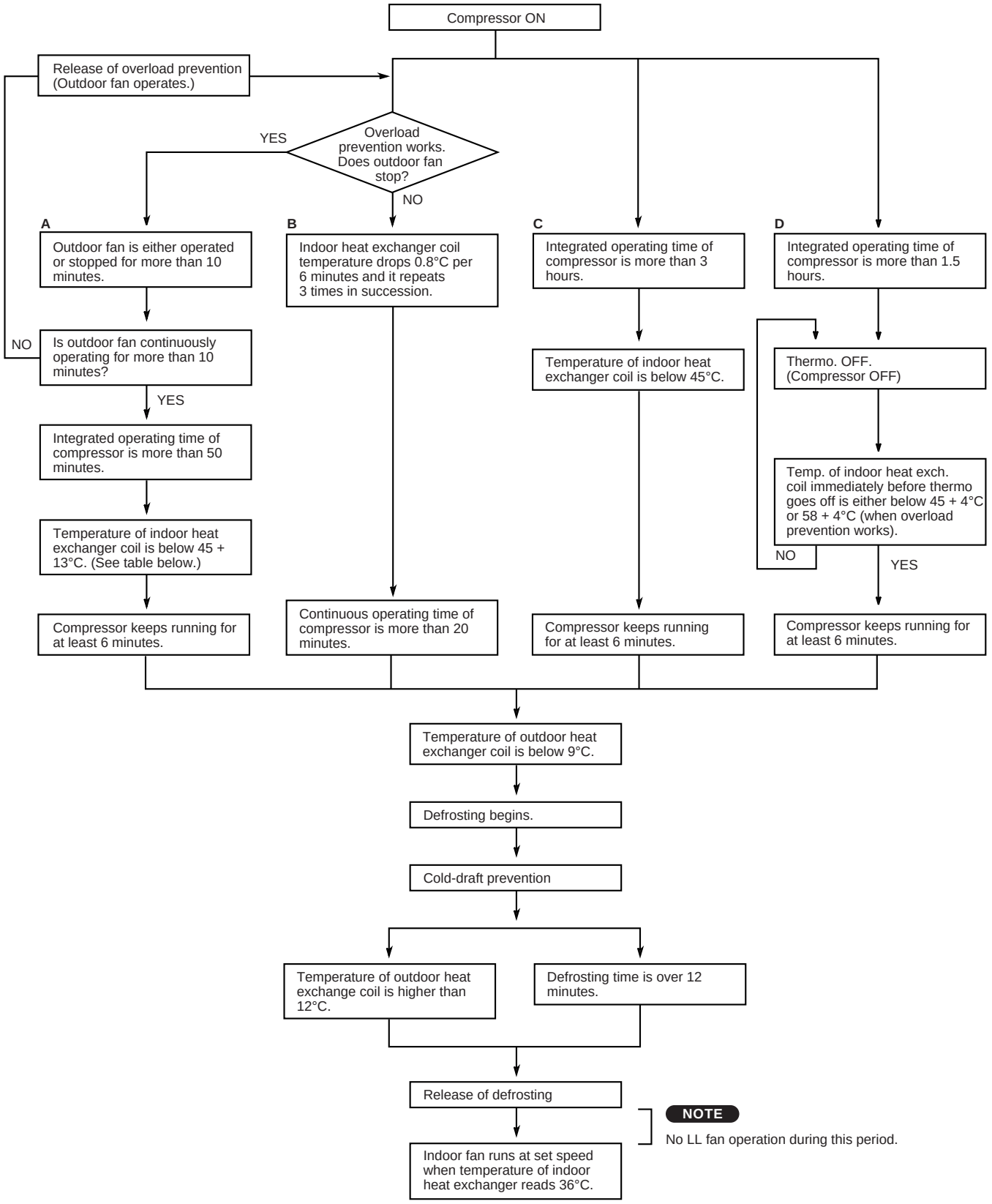
5-6. Cold draft Prevention (Heating)

- This function controls indoor fan speed so a strong draft of cold air will not blow out before the indoor heat exchange coil have sufficiently warmed up.
- STANDBY lamp on front of the indoor unit lights up when this function is working.
- when 10 minutes has elapsed,the fan speed is automatically switched to set speed regardless of indoor heat exchange coil temperature.

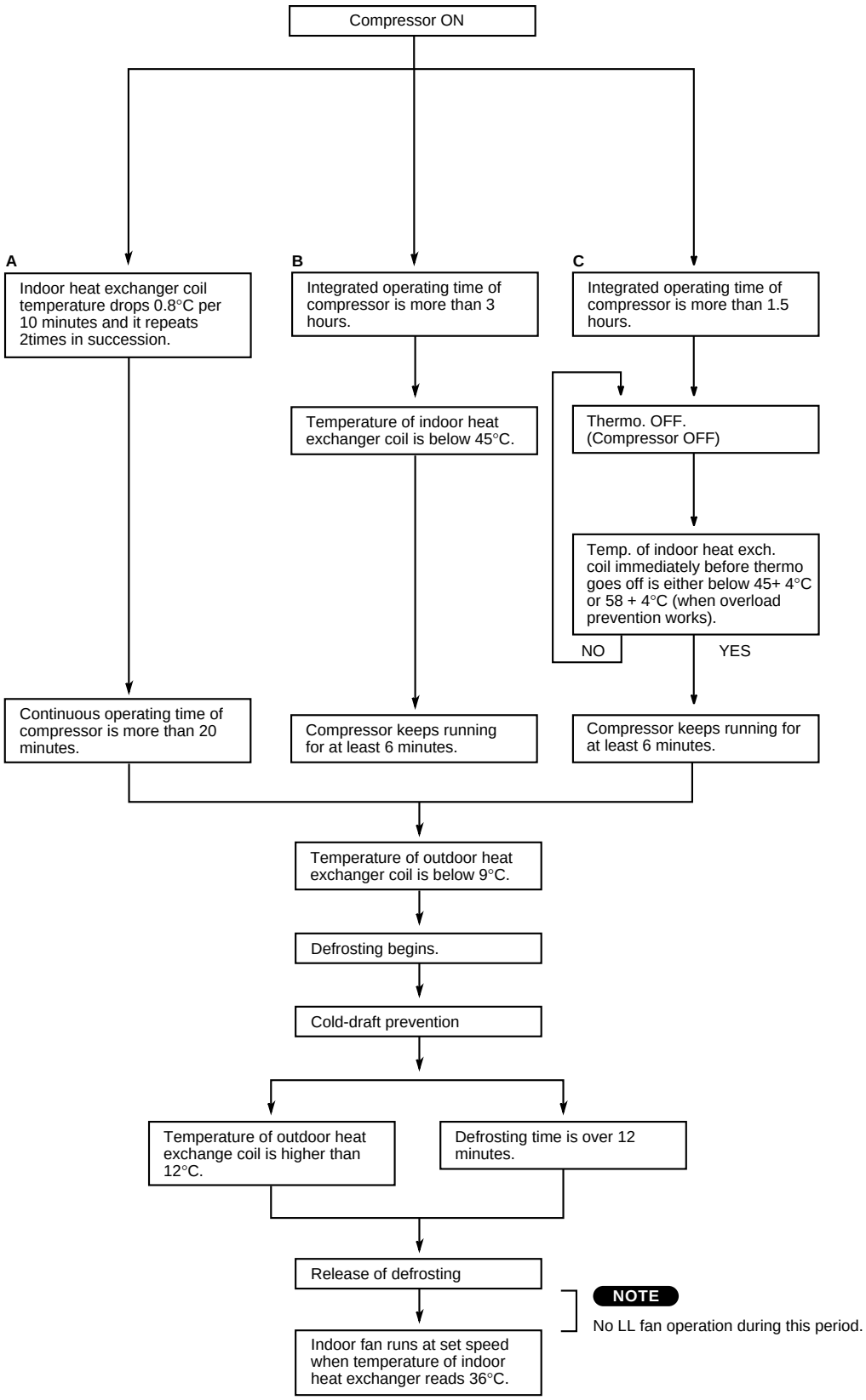


5-7. Defrosting Operation (Heating)

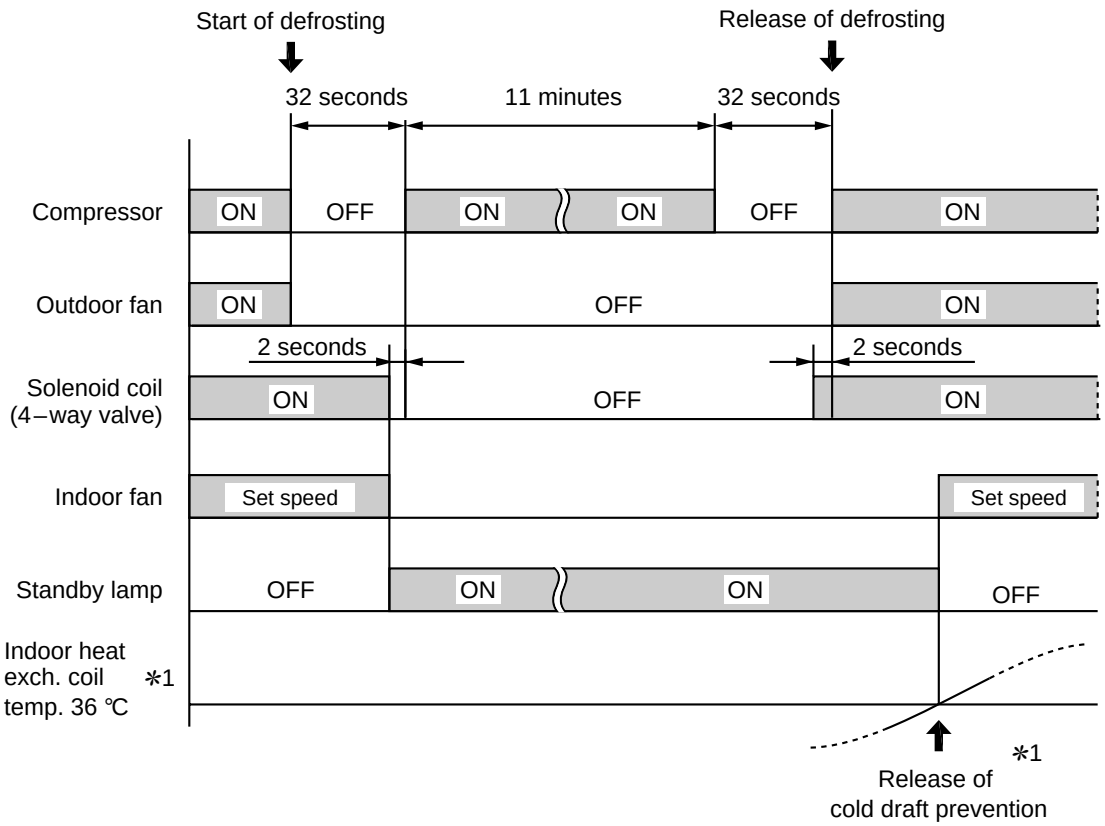
■ Defrosting Flowchart (for SAP–K186QHS5)



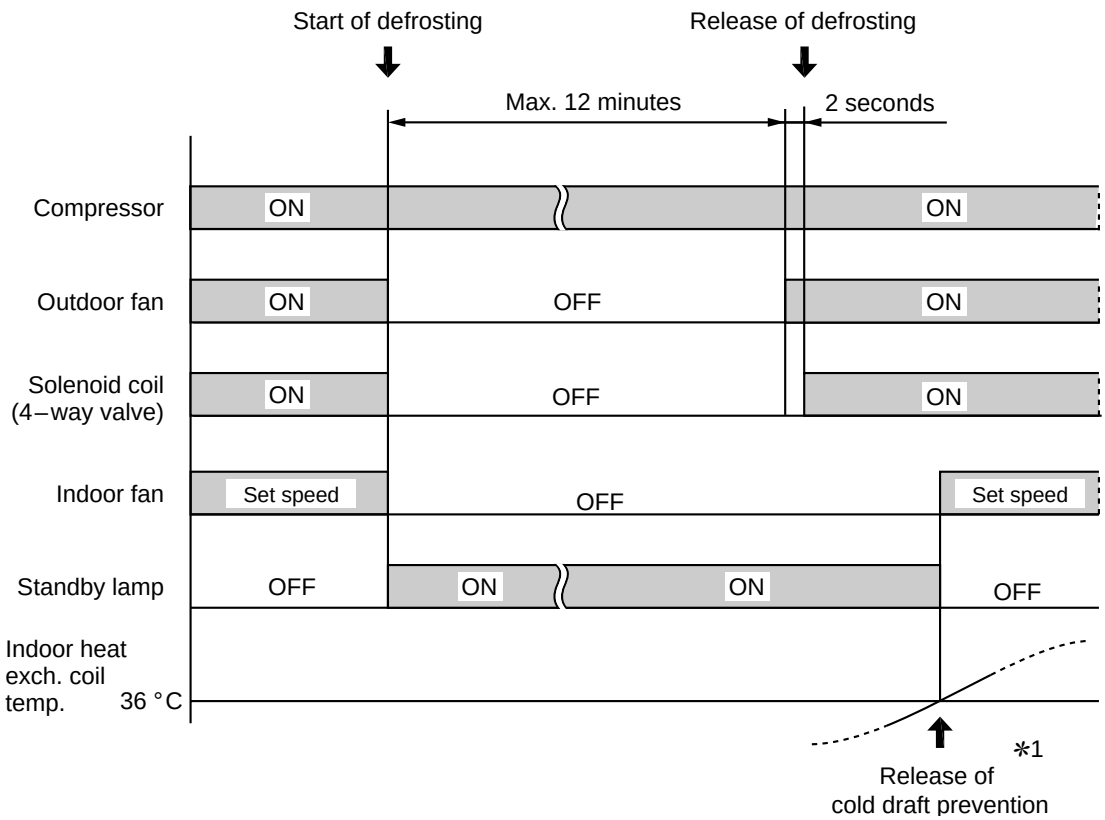
■ Defrosting Flowchart (for SAP–K226QHS5)



■ Defrosting Mode Timing Chart (SAP－K186QHS5)



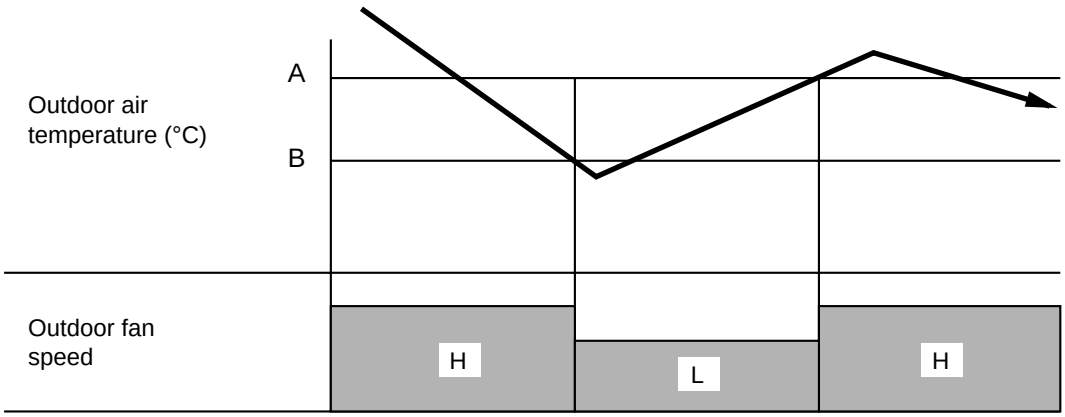
■ Defrosting Mode Timing Chart (SAP－K226QHS5)



NOTE ∗1: Refer to 5-6 "Cold Draft Prevention".

5-8. Outdoor Fan Speed Control (Cooling and Dry Operation)

- To optimize performance of the air conditioner, the outdoor fan speed is switched automatically according to the outdoor temperature.
- If the outdoor air temperature falls below **B**°C, the fan speed switches to LOW.
- If the outdoor air temperature rises above **A**°C, the fan speed switches to HIGH.
- This function does not become active in heating operation.

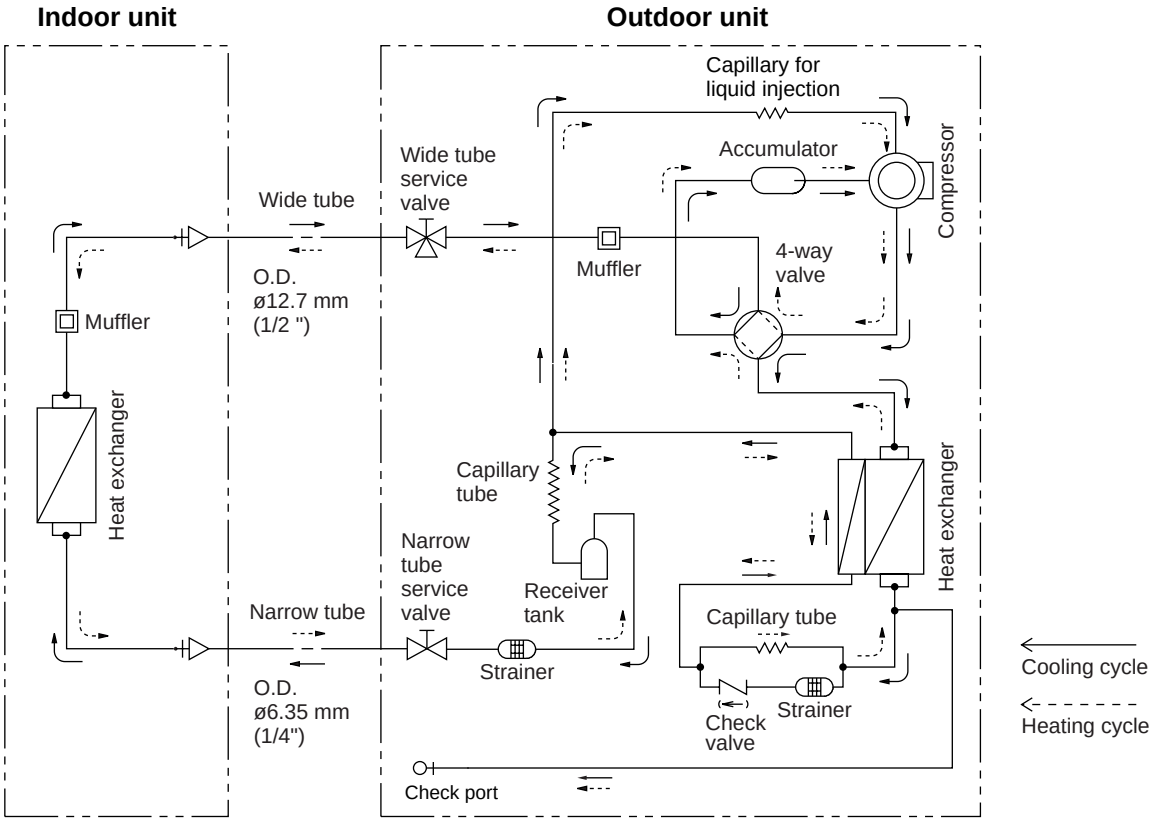


NOTE The operating temperature shown as **A** and **B** in the chart differ by models.

Models	A	B
SAP−C186QH38,QH38N	27.0°C	23.5°C
SAP−C226QH38	31.0°C	28.5°C

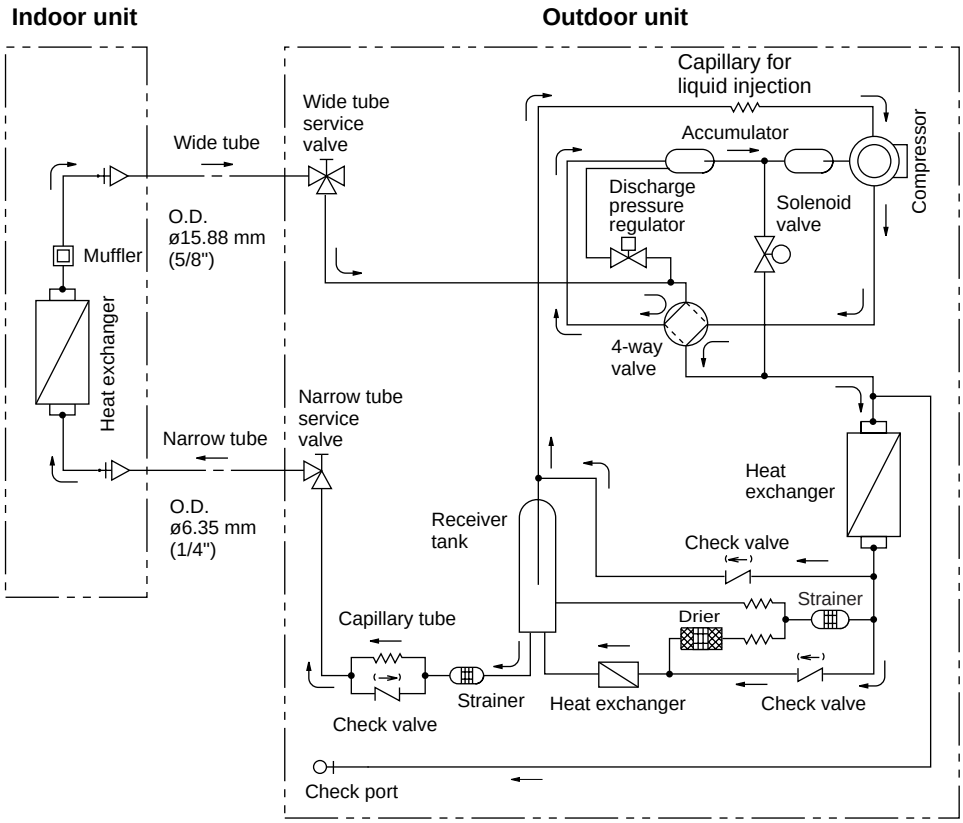
6. REFRIGERANT FLOW DIAGRAM

Indoor Unit **SAP – K186QHS5** **Outdoor Unit** **SAP – C186QH38**
SAP – C186QH38N

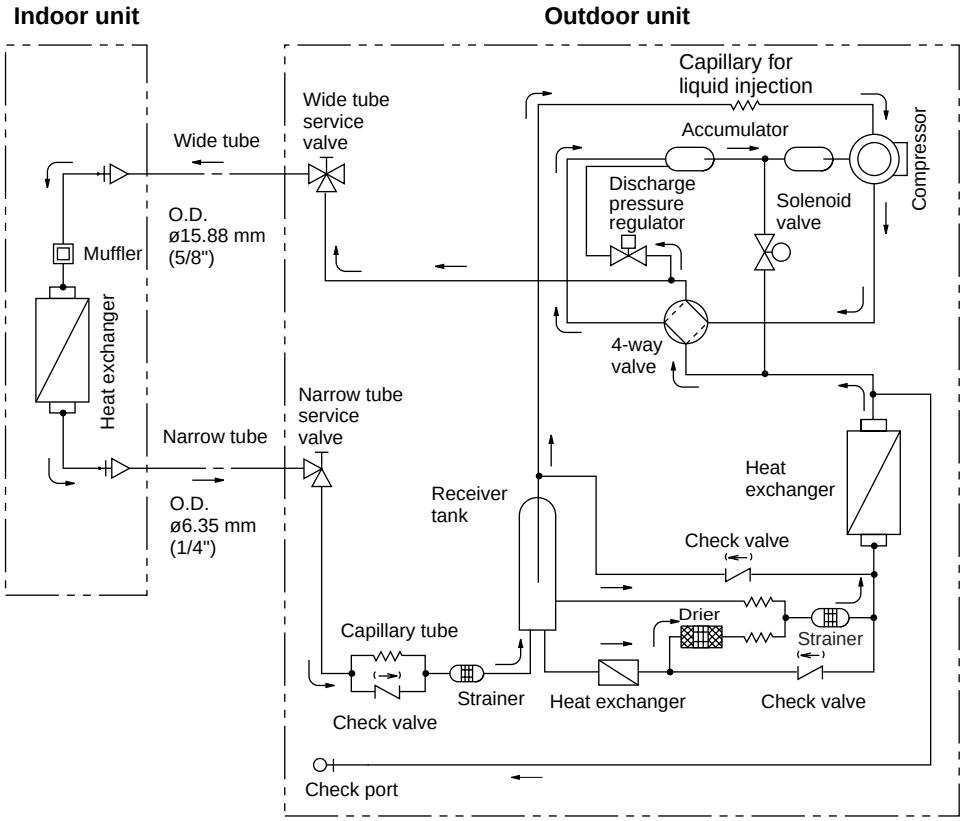


Indoor Unit **SAP–K226QHS5** **Outdoor Unit** **SAP–C226QH38**

Cooling cycle



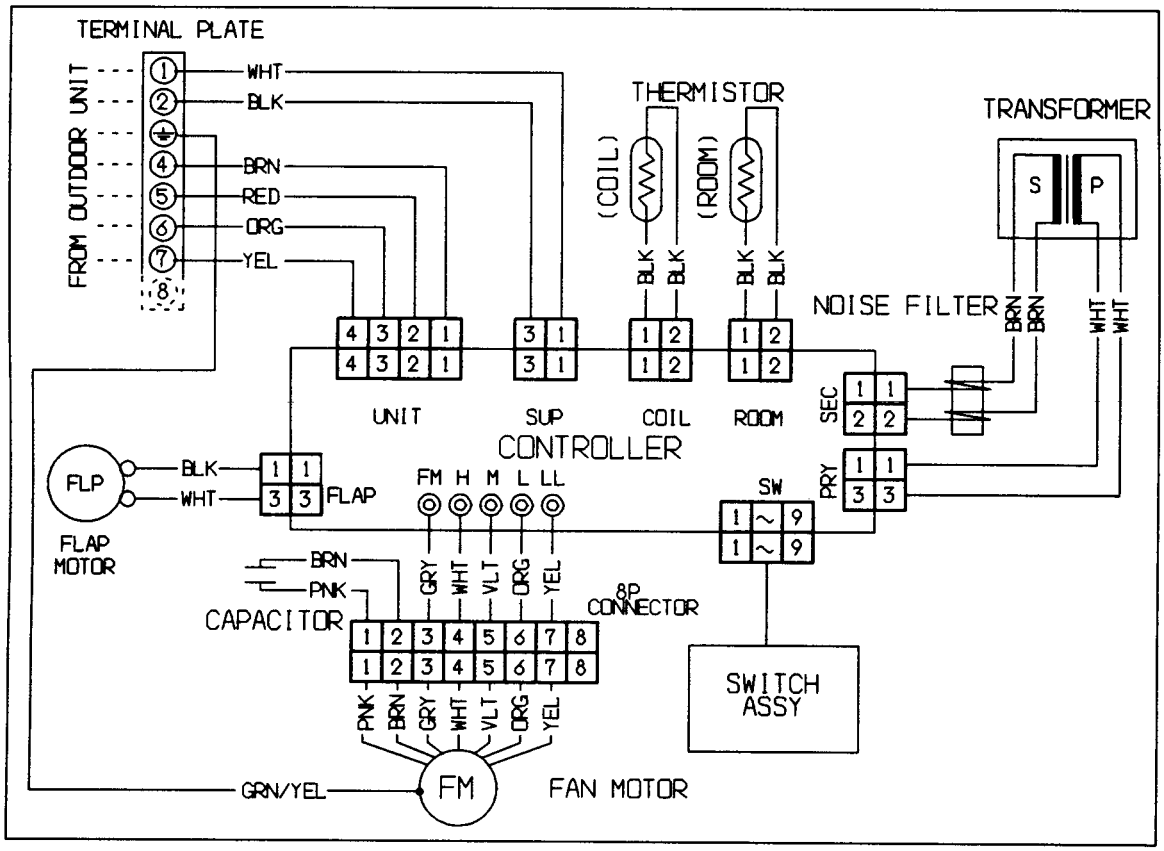
Heating cycle



7. ELECTRIC WIRING DIAGRAMS

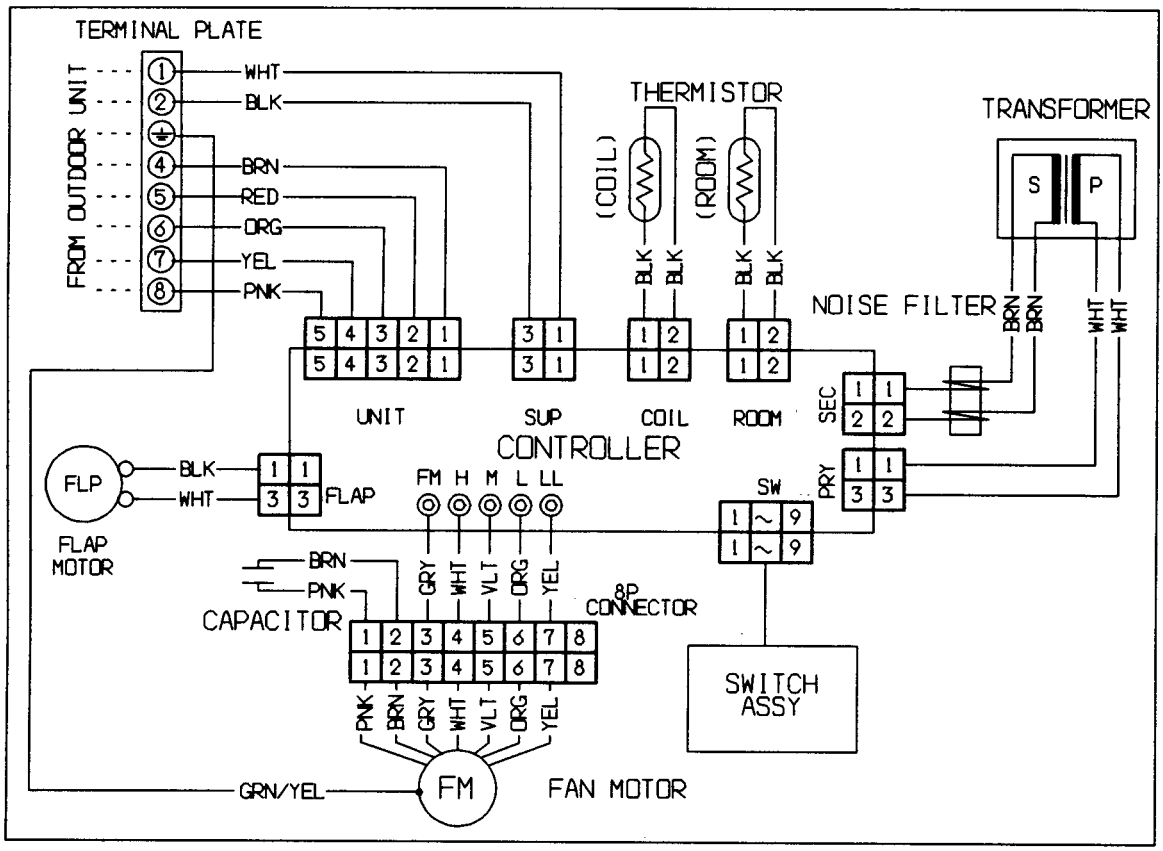
Indoor unit : SAP–K186QHS5

WARNING ***To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts.***



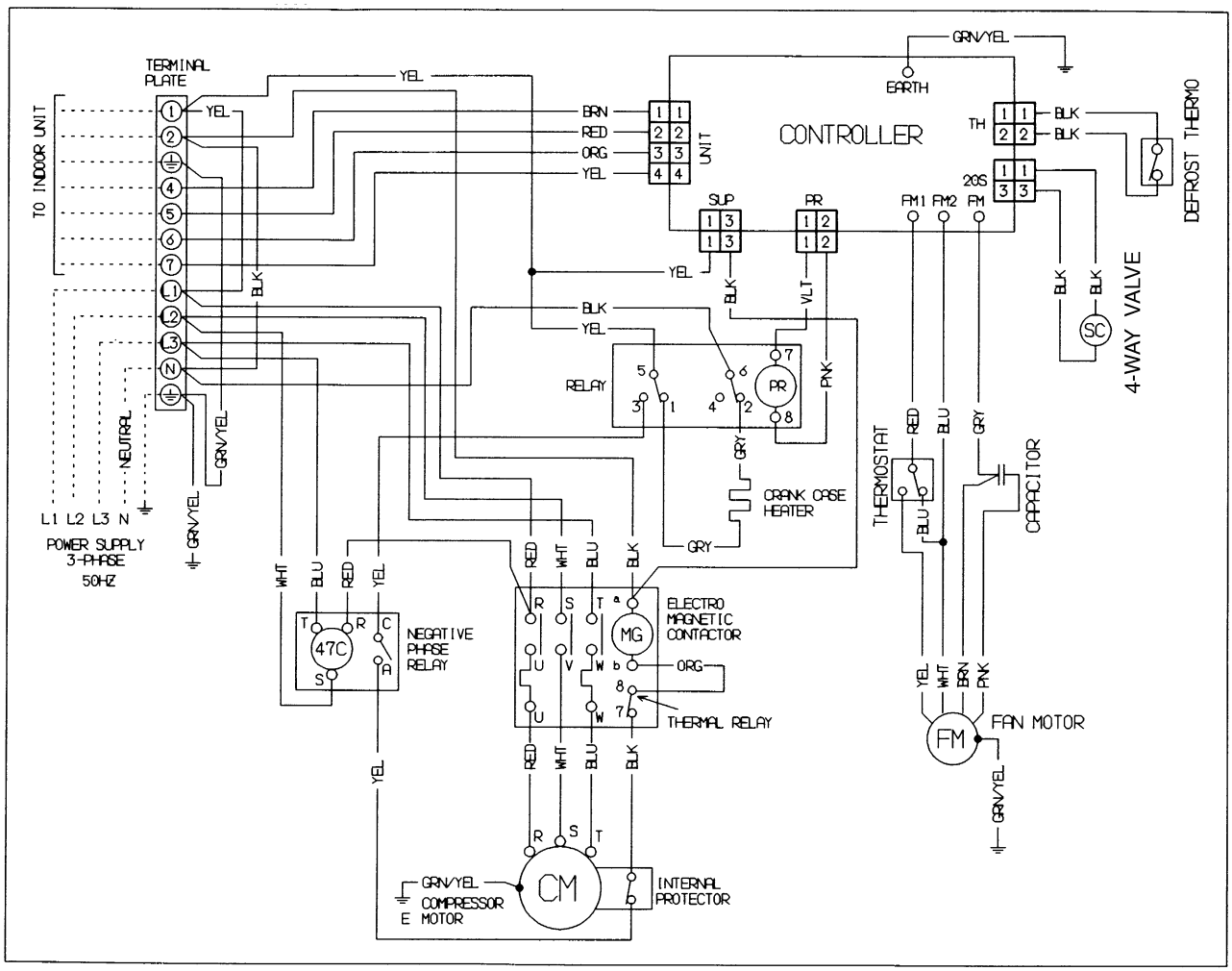
Indoor unit : SAP–K226QHS5

WARNING ***To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts.***



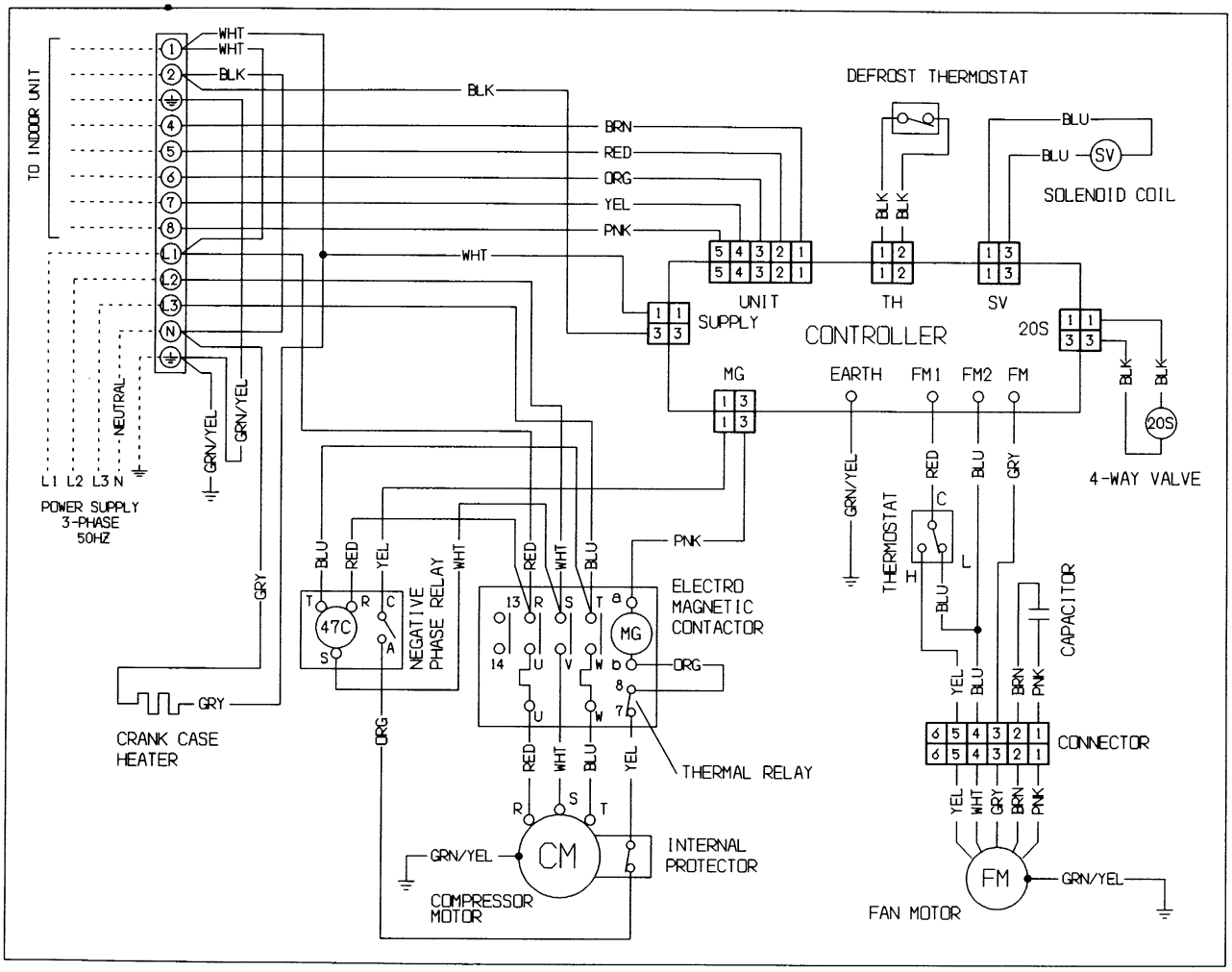
Outdoor unit : SAP–C186QH38
SAP–C186QH38N

WARNING ***To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts.***



Outdoor unit : SAP–C226QH38

WARNING ***To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts.***



8. TROUBLESHOOTING

8-1. Check before and after troubleshooting

WARNING

Hazardous voltage can cause ELECTRIC SHOCK or DEATH. Disconnect power or turn off circuit breaker before you start checking or servicing.

8-1-1. Check power supply wiring.

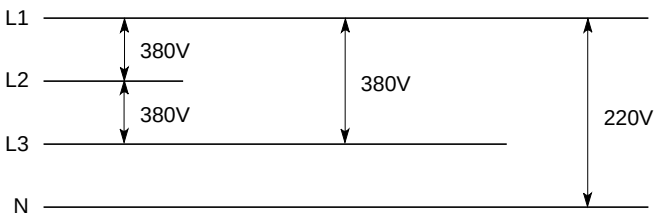
- Check that power supply wires are correctly connected to terminals **L1, L2 ,L3** and **N** on the terminal plate in the outdoor unit.

8-1-2. Check inter-unit wiring.

- Check that inter-unit wiring is correctly connected to the indoor unit from the outdoor unit.

8-1-3. Check power supply.

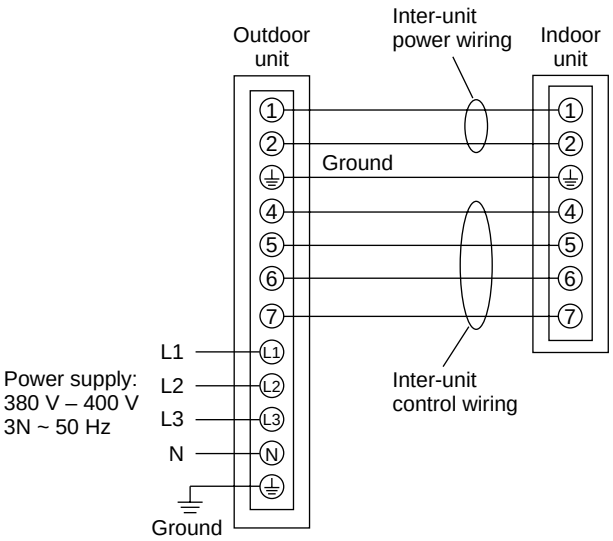
- Check that voltage is in specified range (±10% of the rating).
- Check that power is being supplied.



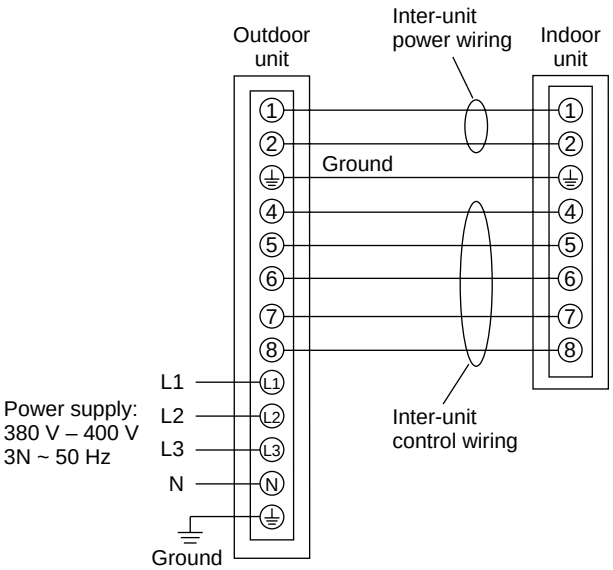
8-1-4. Check lead wires and connectors in indoor and outdoor units.

- Check that coating of lead wires is not damaged.
- Check that lead wires and connectors are firmly connected.
- Check that wiring is correct.

SAP-C186QH38 **SAP-K186QHS5**
C186QH38N



SAP-C226QH38 **SAP-K226QHS5**



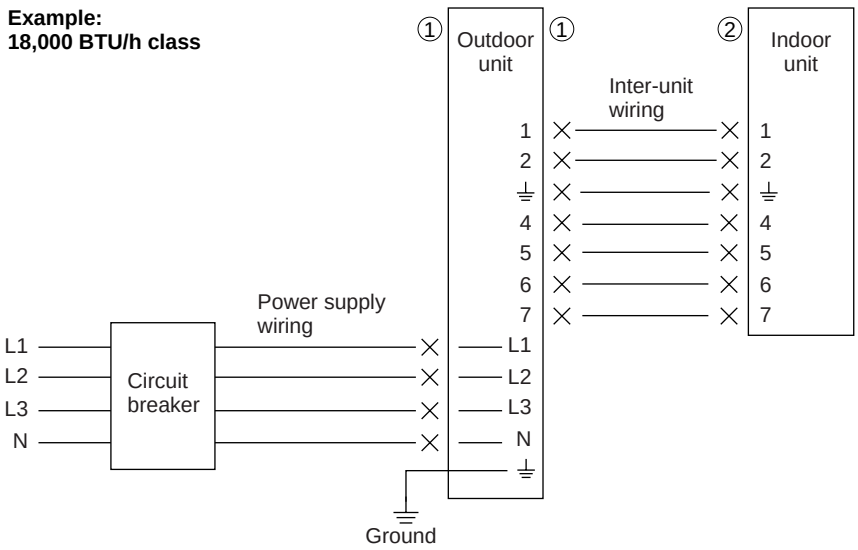
8-2. Air conditioner does not operate.

8-2-1. Circuit breaker trips (or fuse blows).

A. When the circuit breaker is set to ON, it is tripped soon. (Resetting is not possible.)

- There is a possibility of ground fault.
- Check insulation resistance.

If resistance value is 1MΩ or less, insulation is defective (“NO”).



*Set circuit breaker to OFF.

① Remove both power supply wires and inter-unit wires from terminal plate in outdoor unit.
- Measure insulation resistance of outdoor unit.

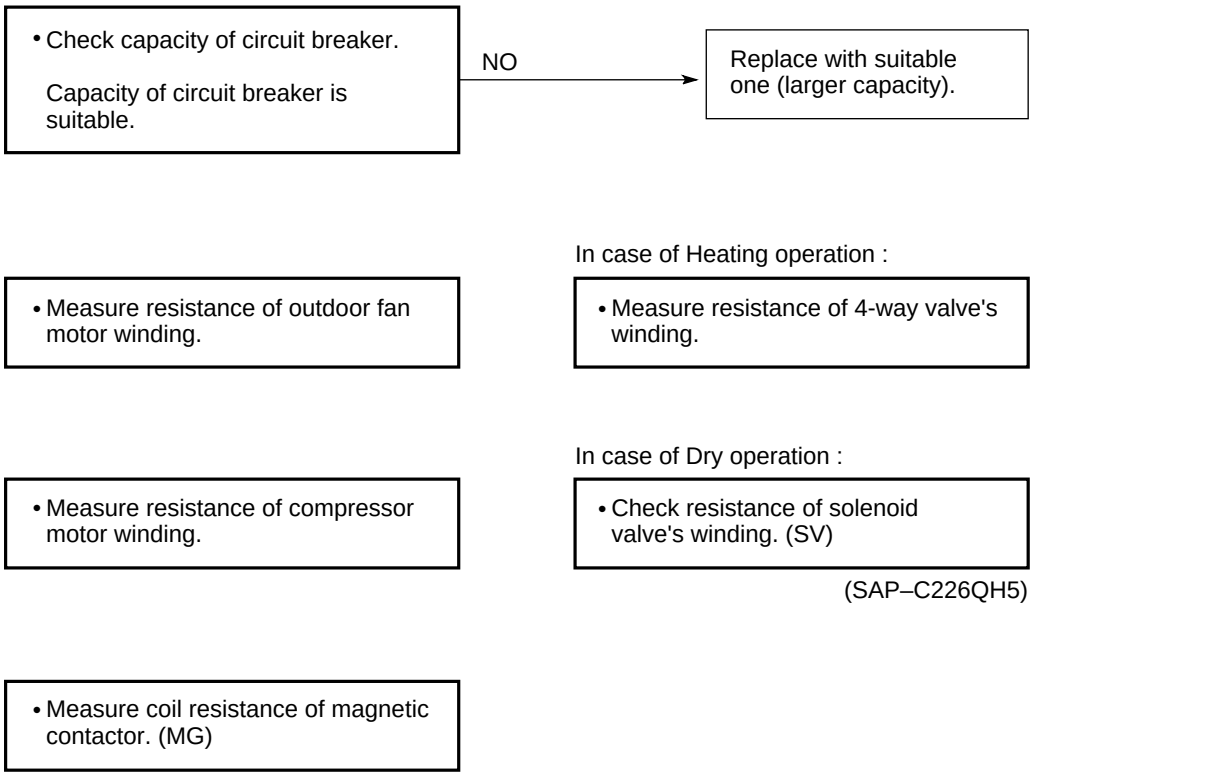
NO → Insulation of outdoor unit is defective.
- Measure insulation resistance of electrical parts in outdoor unit.

② Remove inter-unit wires from terminal plate in indoor unit.
- Measure insulation resistance of indoor unit.

NO → Insulation of indoor unit is defective.
- Measure insulation resistance of electrical parts in indoor unit.

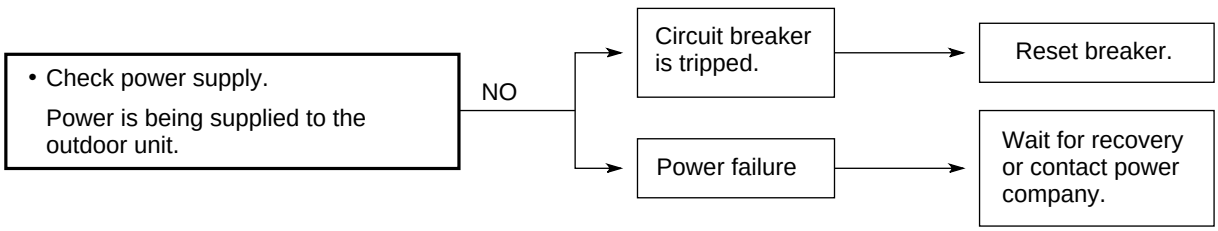
B. Circuit breaker trips in several minutes after turning the air conditioner on.

● There is a possibility of short circuit.

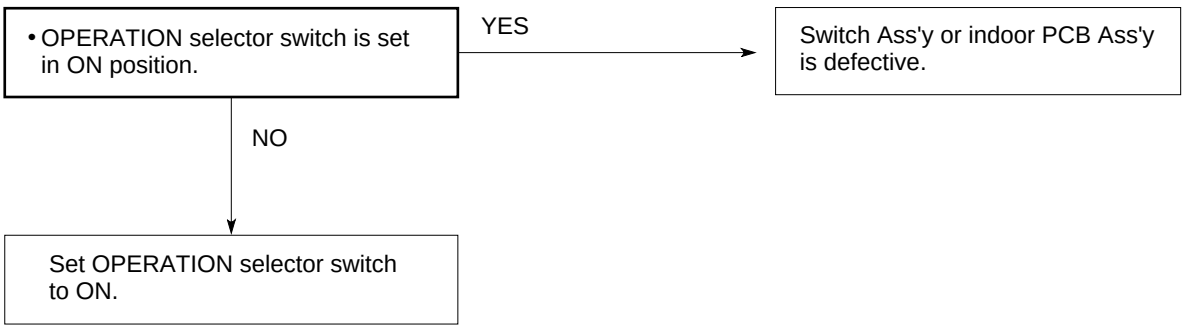


8-2-2. Neither indoor nor outdoor unit runs.

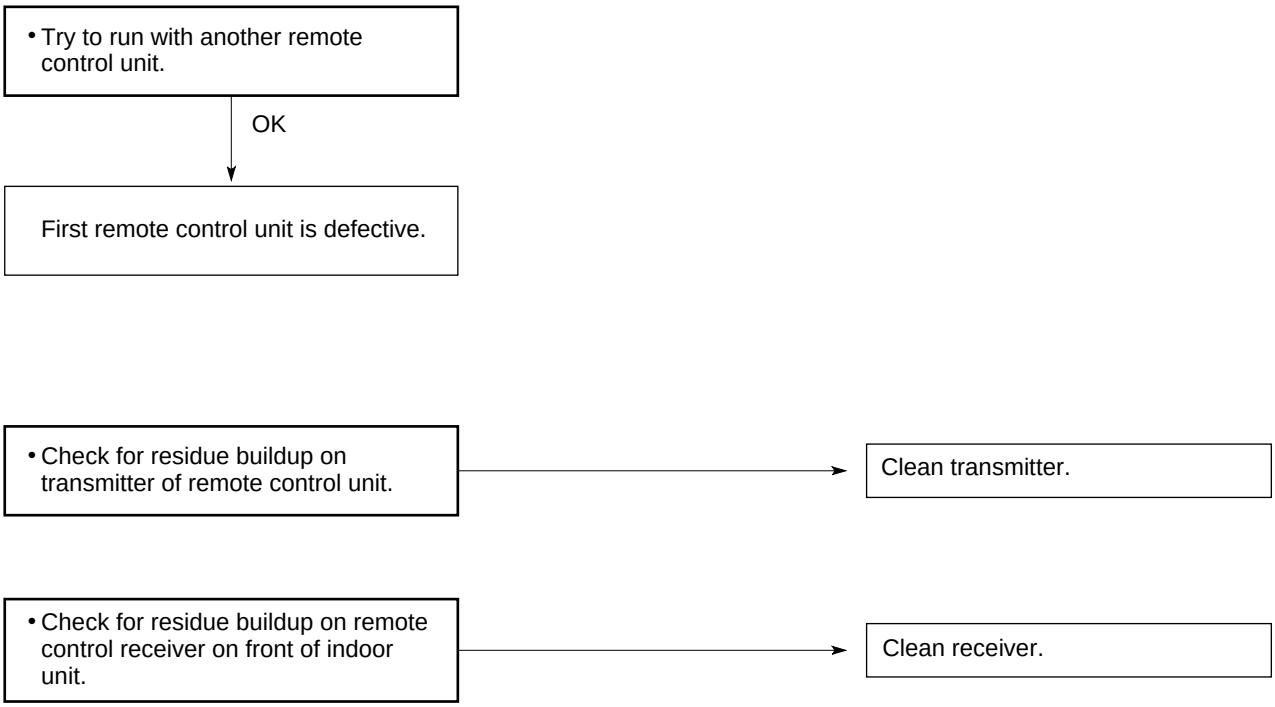
A. Power is not supplied.



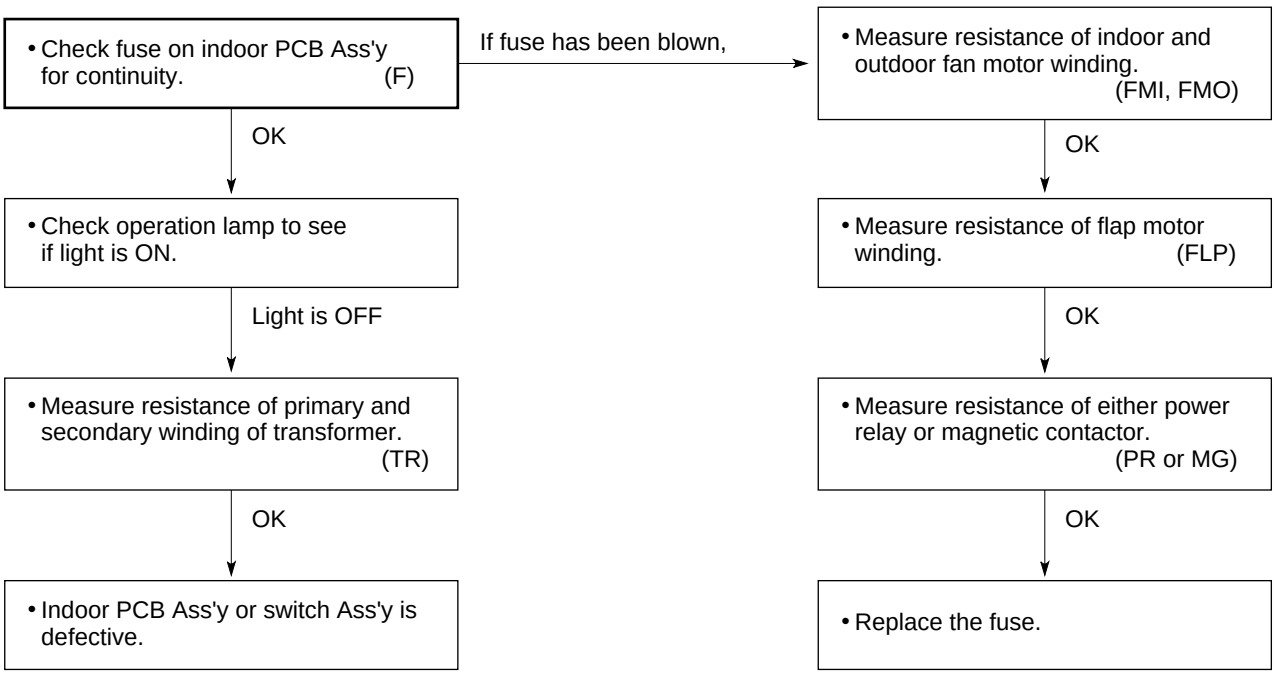
B. Check "OPERATION selector" switch in the indoor unit.



C. Check remote control unit.



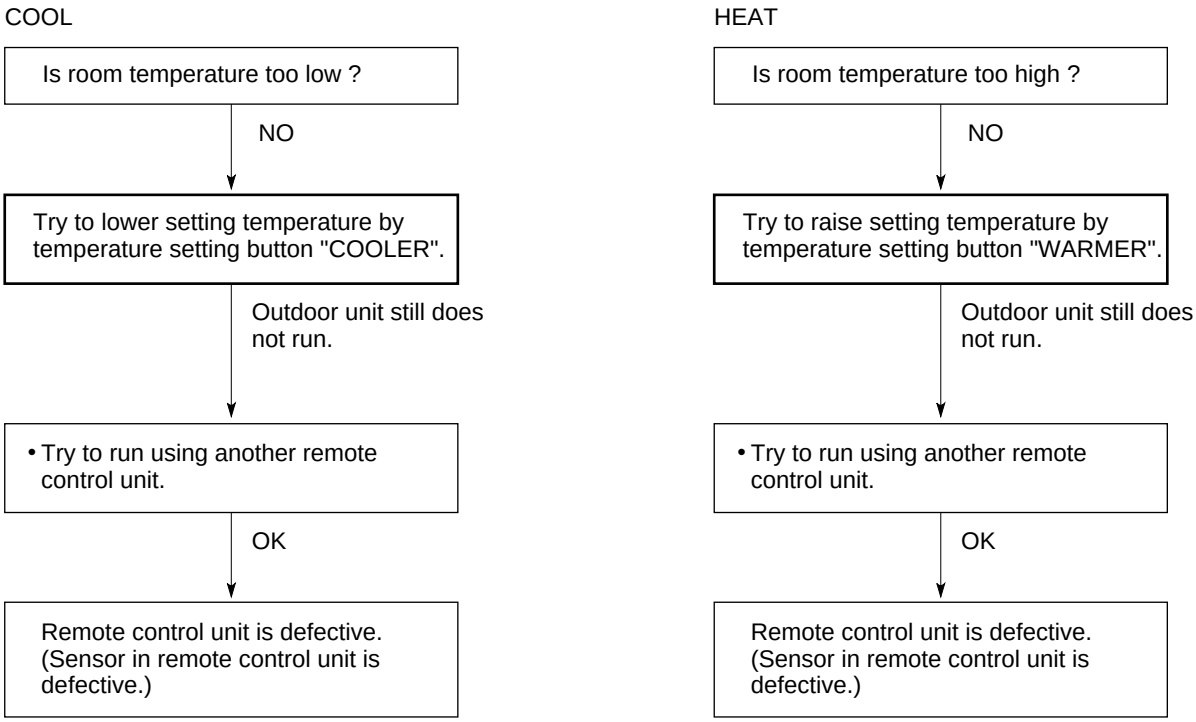
D. Check fuse on the indoor PCB Ass'y.



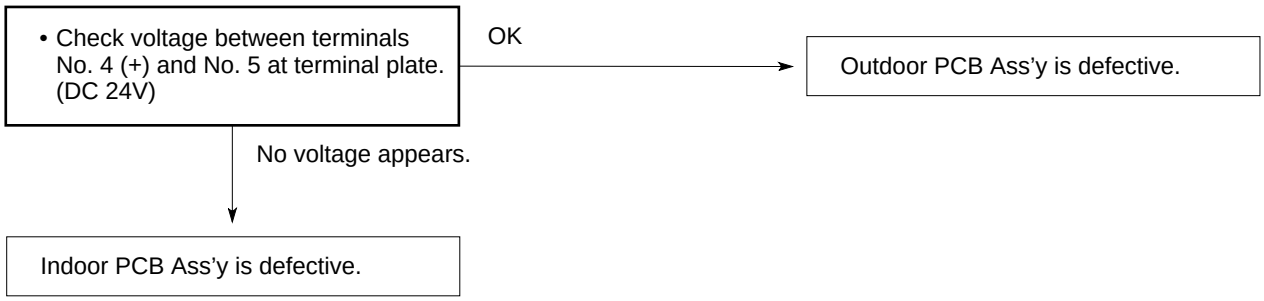
E. Check TIMER SELECT button on the remote control unit.

8-2-3. Only outdoor unit does not run.

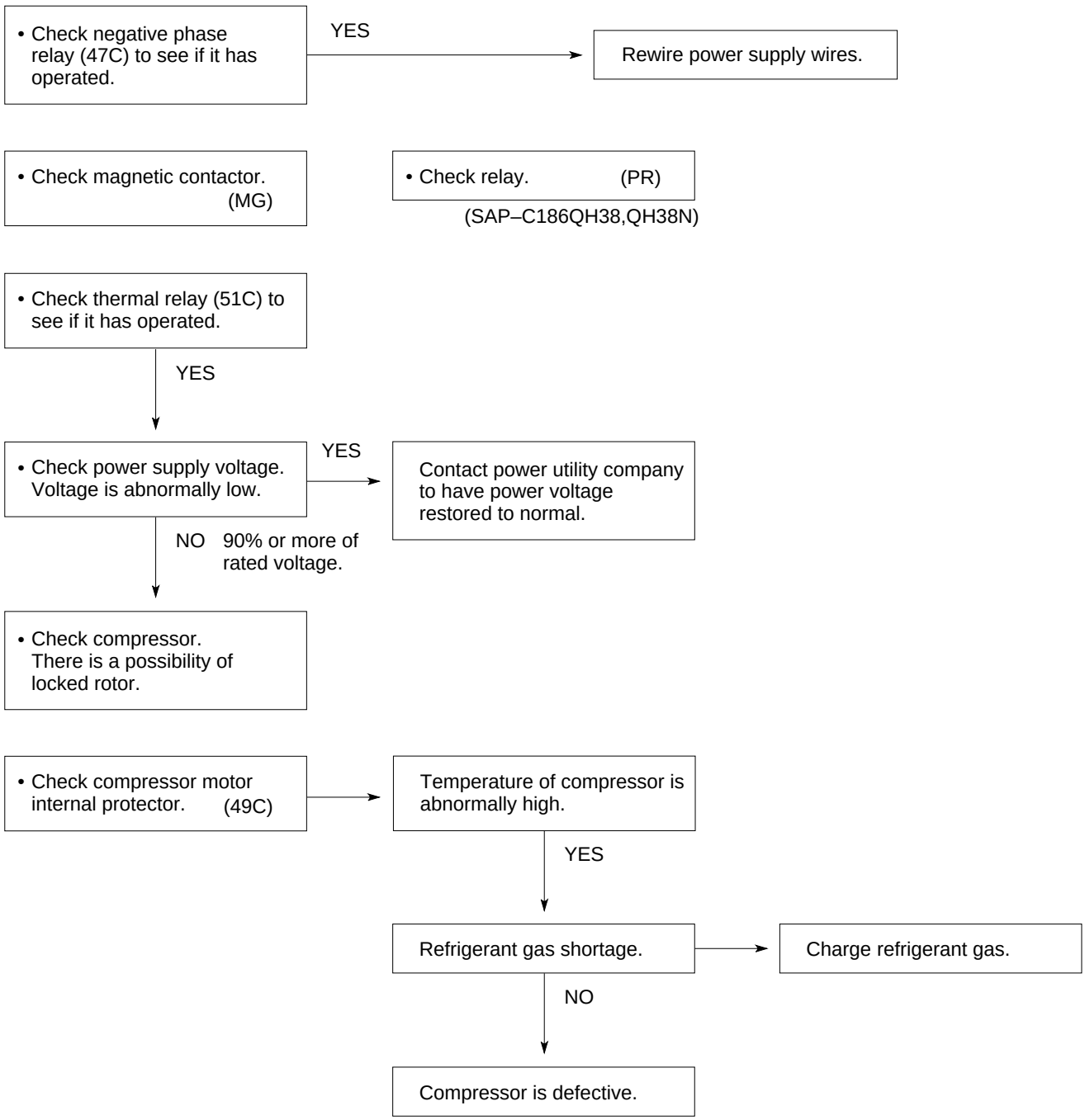
A. Check setting temperature.



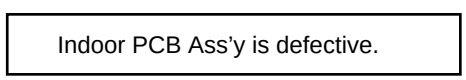
B. Check PCB Ass'y in either indoor or outdoor unit.



C. Check other components.

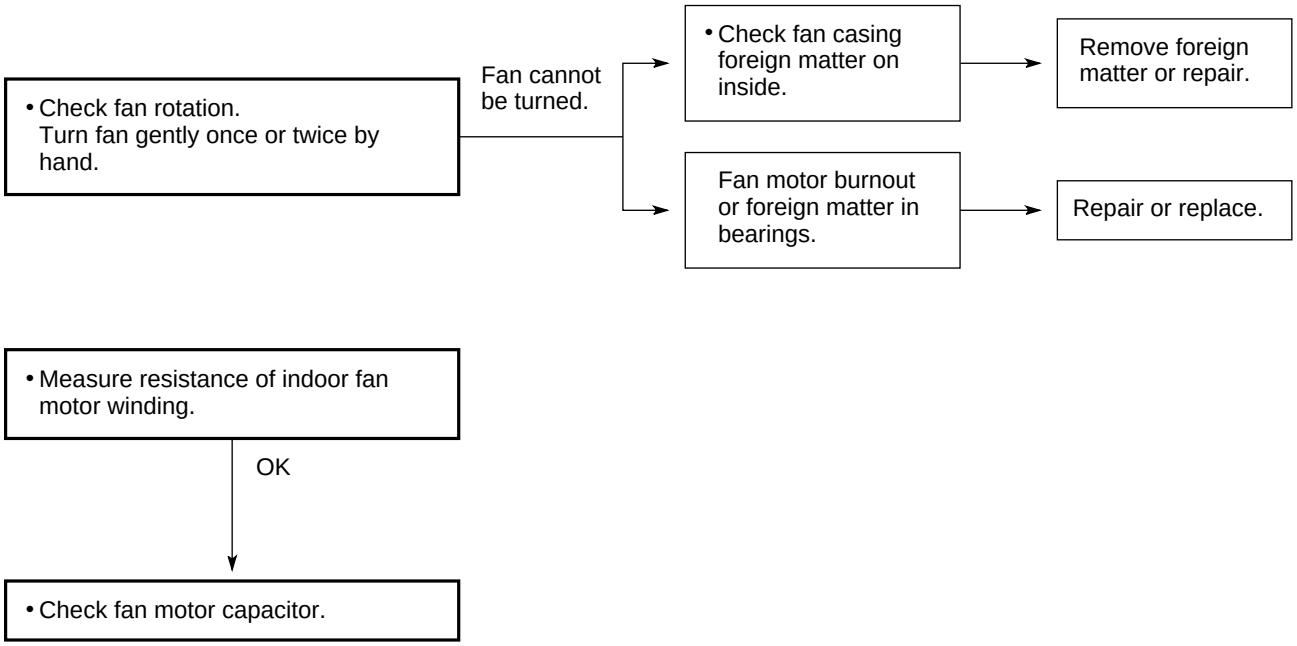


8-2-4. Only indoor unit does not run.



8-3. Some part of air conditioner does not operate.

8-3-1. Only indoor fan does not run.



8-3-2. Only flap motor does not run.

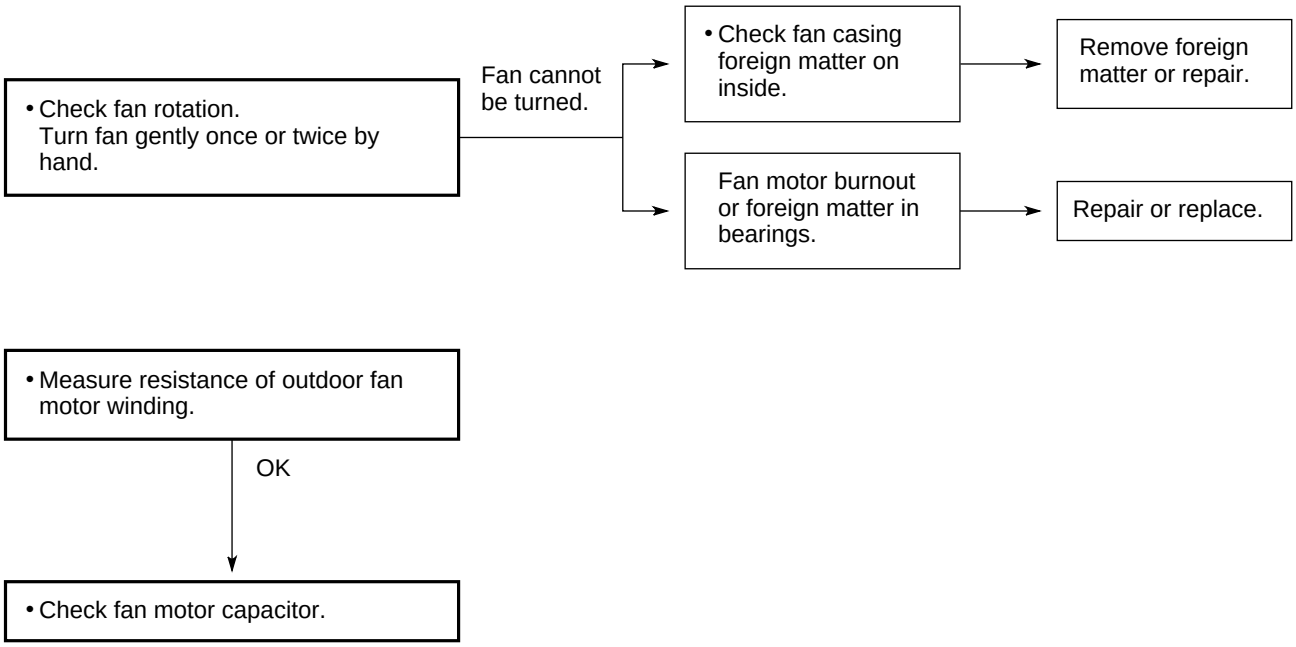
• Measure resistance of flap motor winding.

8-3-3. Function of outdoor fan speed control does not work properly.

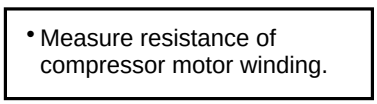
• Check thermostat in outdoor unit. (23S)

Refer to 5-8 "Outdoor Fan Speed Control".

8-3-4. Only outdoor fan does not run.

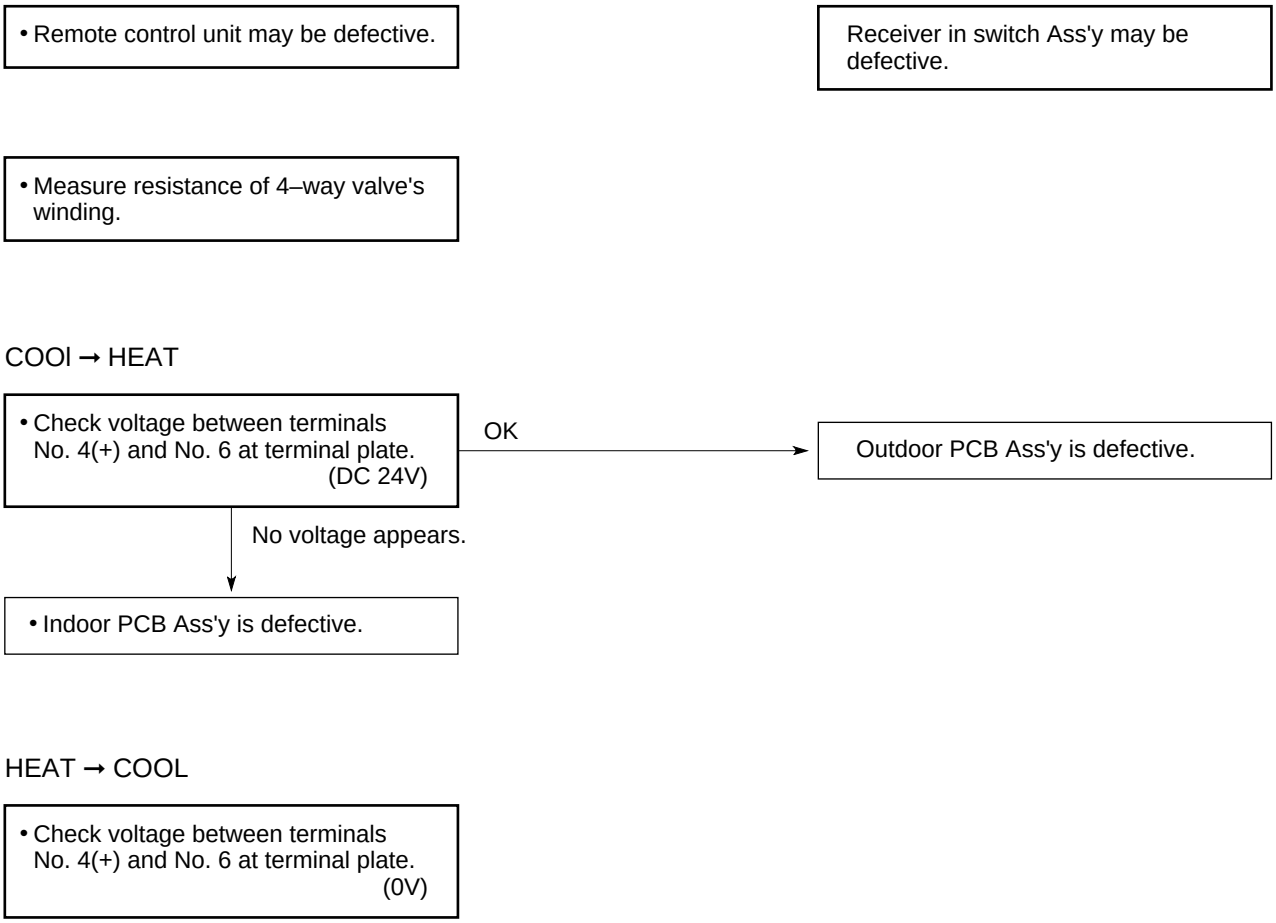


8-3-5. Only compressor does not run.

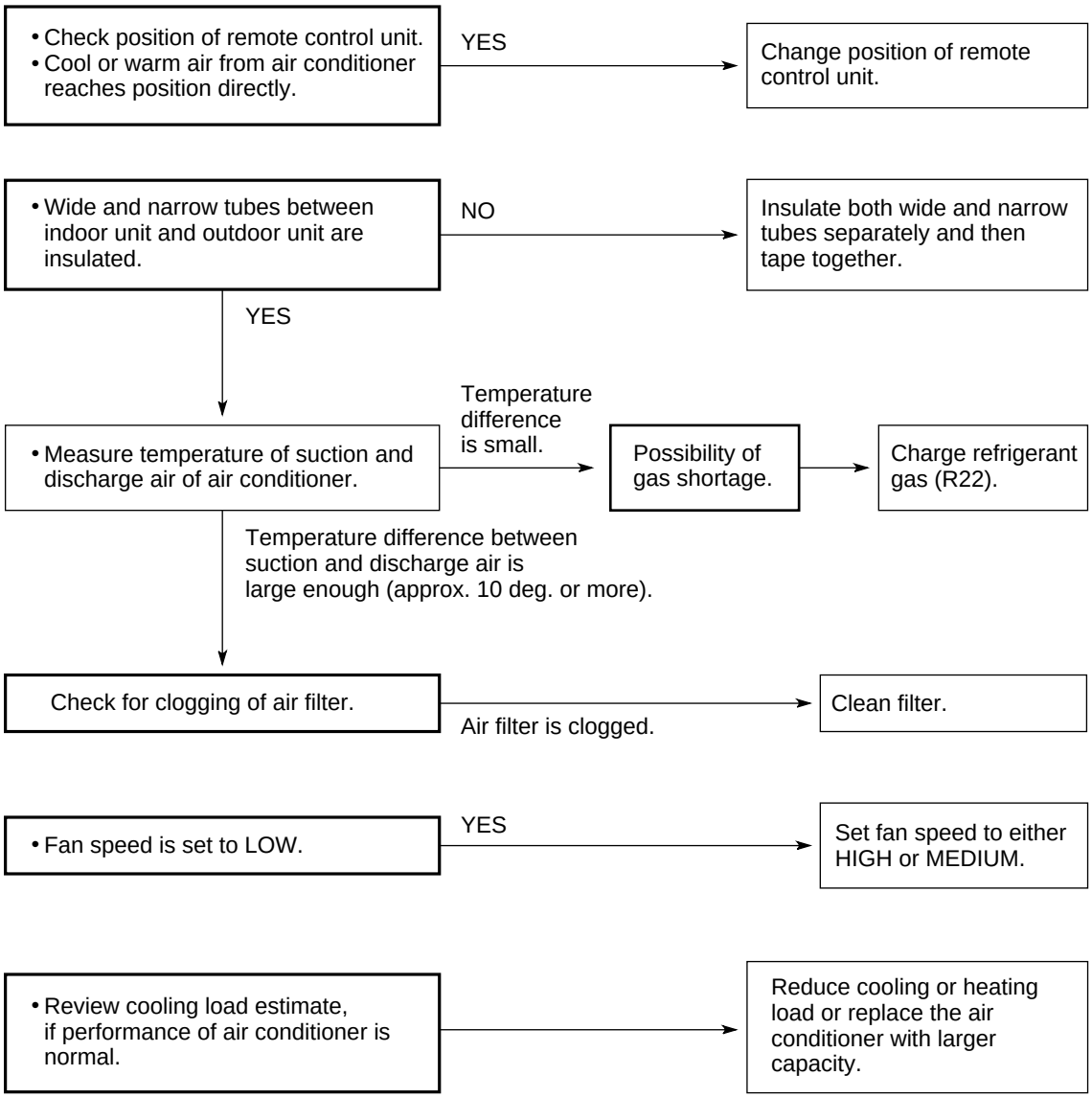


8-4. Air conditioner operates, but abnormalities are observed.

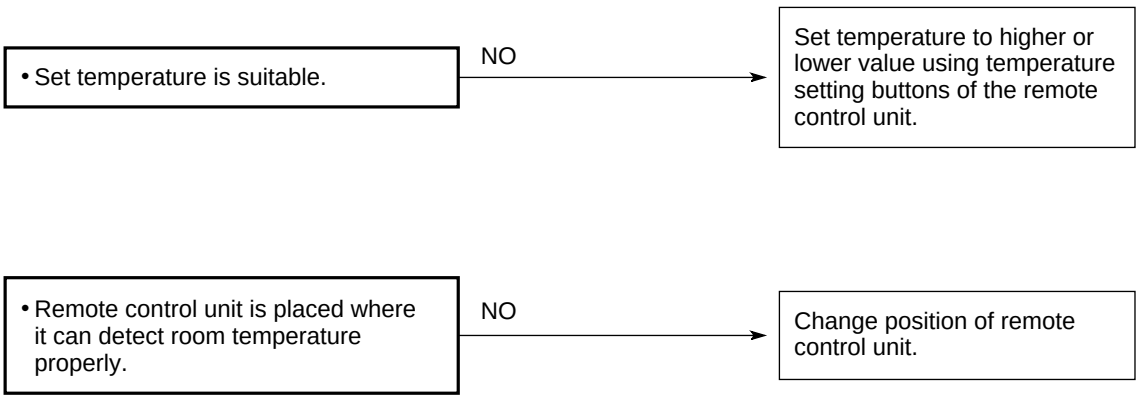
8-4-1. Operation does not switch from HEAT to COOL (or COOL to HEAT).



8-4-2. Poor cooling or heating.

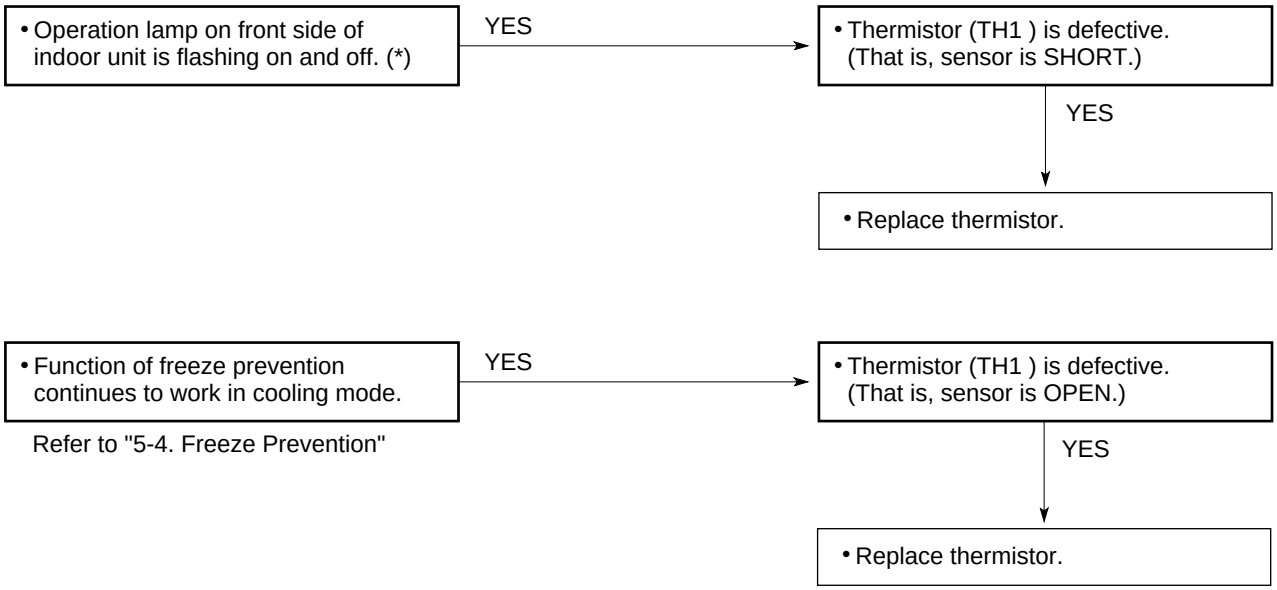


8-4-3. Excessive cooling or heating.



8-5. If a sensor is defective.

8-5-1. Indoor coil temp. thermistor (TH1) is defective.



NOTE **Alarm Signal (*)**

Operation lamp on the front side of the indoor unit will flash on and off when the indoor coil thermistor is defective. (That is, sensor is SHORT). At the same time the outdoor unit will stop. Indoor unit will operate only for ventilation.

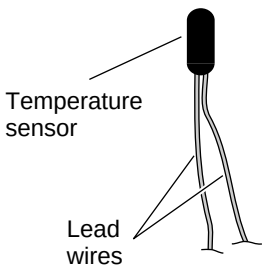
8-5-2. Room temp. thermistor (TH2) is defective.

A. Open

When thermistor opens, the air conditioner will be in the following conditions as the controller tries to detect extremely low room temperature.

a) In Cooling mode: The air conditioner soon stops and will not start again. (Thermo.OFF)
Neither outdoor fan nor compressor runs.

b) In Heating mode: The air conditioner continues to operate. (Thermo.ON)
Both the outdoor fan and compressor do not stop.
As a result, the room becomes too warm.



Thermistor Structure

B. Short

When thermistor is short, the air conditioner will be in the following conditions as the controller tries to detect extremely high room temperature.

a) In Cooling mode: The air conditioner continues to operate. (Thermo.ON)
Both the outdoor fan and compressor do not stop.
As a result, the room becomes too cold.

b) In Heating mode: The air conditioner soon stops and will not start again. (Thermo.OFF)
Neither outdoor fan nor compressor runs.

NOTE **Definition of Open or Short Circuit of Sensor (Thermistor)**

Open... A lead wire is broken or disconnected or the circuit inside the temperature sensor is open .

Short... The protective cover of a lead wire has been damaged, and the exposed wire is touching another metal part, or both lead wires have become exposed and are touching each other. Alternatively, the circuit inside the temperature sensor is closed.

9. CHECKING ELECTRICAL COMPONENTS

9-1. Measurement of Insulation Resistance

- The insulation is in good condition if the resistance exceeds 1MΩ.

9-1-1. Power Supply Wires

Clamp the ground wire of the power supply wires with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the power wires. (Fig. 1)

Then measure the resistance between the ground wire and the other power wire. (Fig. 1)

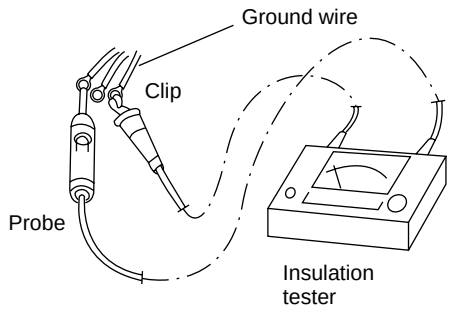


Fig. 1

9-1-2. Indoor Unit

Clamp an aluminum plate fin or copper tube with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on each terminal screw except where the ground line is connected on the terminal plate. (Fig. 2)

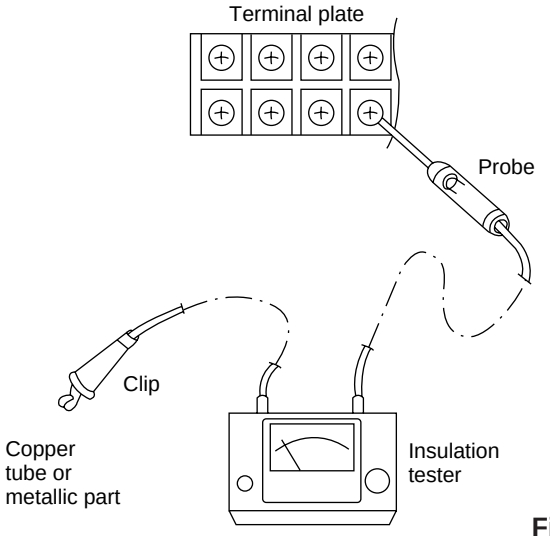


Fig. 2

9-1-3. Outdoor Unit

Clamp a metallic part of the unit with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on each terminal screw where power supply lines are connected on the terminal plate. (Fig. 2)

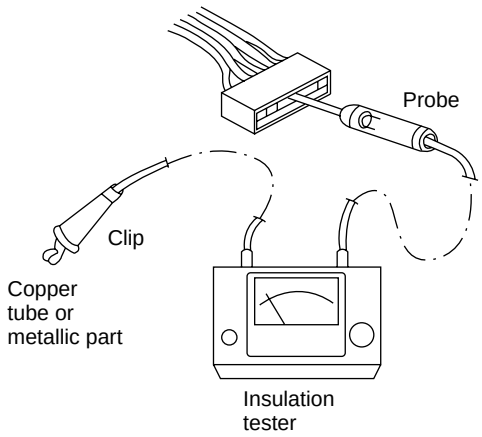


Fig. 3

9-1-4. Measurement of Insulation Resistance for Electrical Parts

Disconnect the lead wires of the desired electric part from terminal plate, capacitor, etc. Similarly disconnect the connector. Then measure the insulation resistance. (Figs. 1 to 4)

Refer to Electric Wiring Diagram.

NOTE

If the probe cannot enter the poles because the hole is too narrow then use a probe with a thinner pin.

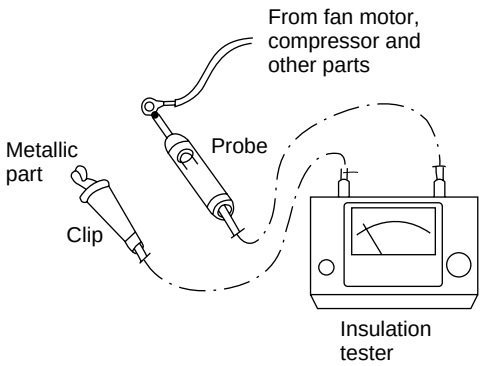


Fig. 4

9-2. Checking continuity of Fuse on PCB Assty

- Remove the PCB Ass'y from the electrical component box. Then pull out the fuse from the PCB Ass'y. (Fig. 5)
- Check for continuity using a multimeter as shown in Fig. 6.

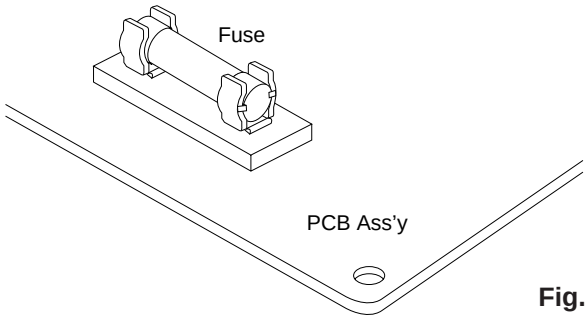


Fig. 5

9-3. Checking Motor Capacitor

Remove the lead wires from the capacitor terminals, and then place a probe on the capacitor terminals as shown in Fig. 7. Observe the deflection of the pointer, setting the resistance measuring range of the multimeter to the maximum value.

The capacitor is "good" if the pointer bounces to a great extent and then gradually returns to its original position.

The range of deflection and deflection time differ according to the capacity of the capacitor.

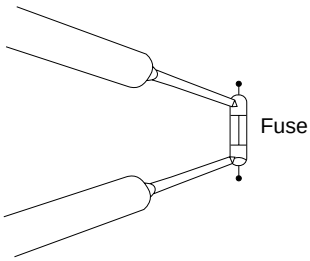


Fig. 6

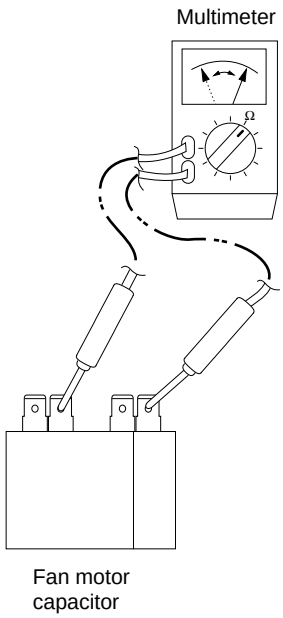


Fig. 7

APPENDIX INSTRUCTION MANUAL

Table of Contents

SANYO Electric Co.,Ltd
Osaka, Japan
SM700249 2/96/200
Printed in Japan