SANITARY HOT WATER HEAT PUMP

HITACHI
Inspire the Next

Technical Catalogue

Tank Unit

TAW

Outdoor Unit

RAC

HITACHI

Specifications in this catalogue are subject to change without prior notice in order for HITACHI to bring in the latest innovations to their customers

Whilst every effort is made to ensure that all dimensions and specifications are correct, any printers' error not rectified are outside the control of HITACHI, who cannot be held responsible for the same

CONTENTS

1 SYSTEM DESCRIPTION

CONTENTS

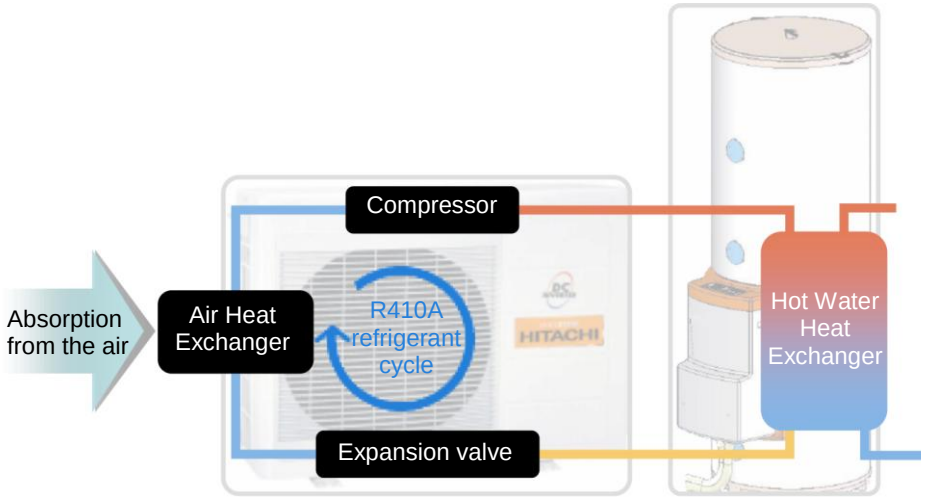
1.1 FEATURES AND BENEFITS OF THE SANITARY HOT WATER HEAT PUMP

■ Energy-saving and efficient water-heating solution

HITACHI SHW boils water efficiently with less electrical power; we can effective savings the energy compared to conventional combustion-type water heaters.

This is enabled by the use of heat pump technology, which is the same as that of air conditioners and refrigerators

SHW boils water by harnessing the energy from the heat of air



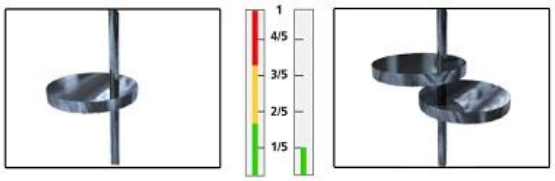

Hot water supply

HITACHI SHW consists of a 'heat pump unit' to absorb the heat of air and heat water up to approximately 55 degrees Celsius, and a 'hot water storage unit' to store water. In the heat pump unit, the heat of air is changed to energy with the heat exchanger for the air, and the heat exchanger for the water heating boils water using this energy. The reason why SHW can boil water with less electricity is that it uses electricity for collecting the heat of air only.
In fact, it can boil water with one third or one fourth of the electric power consumption of that used to boil water by electricity only.

■2-Cylinder rotary compressor

Hitachi's new 2-Cylinder rotary compressor is the heart of our air conditioners and is highly regarded as the most worth for value model of compressor. It has less vibration and higher efficiency than conventional rotary compressors. The two rotating cylinders ensure well-balanced rotations unlike the conventional single rotary type, thus vibration noise is greatly reduced.
The compressor's operation is improved by moving two independent cylinders efficiently

Comparison of Vibration



Conventional Single Rotary

New 2-Cylinder Rotary

■Use of the HFC new R410A Refrigerant

SHW is eco-friendly and uses R410A (HFC) as a refrigerant to absorb the heat of air. Unlike chlorofluorocarbon, R410A used as a refrigerant is an ideal refrigerant whose ozone-depletion potential is near zero without combustibility and toxicity. Thus SHW is evolving into a comfort-giving piece of household appliance with a lower environmental load, by taking advantages of these world-class technologies.

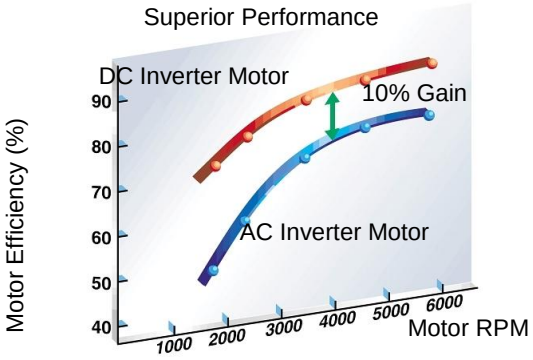
■ High economical efficiency operation

HITACHI uses the high technology to achieve the high operation efficiency. The applications of the following technologies provide HITACHI to achieve results like the great power saving due to heat recovery system.

These technologies are:

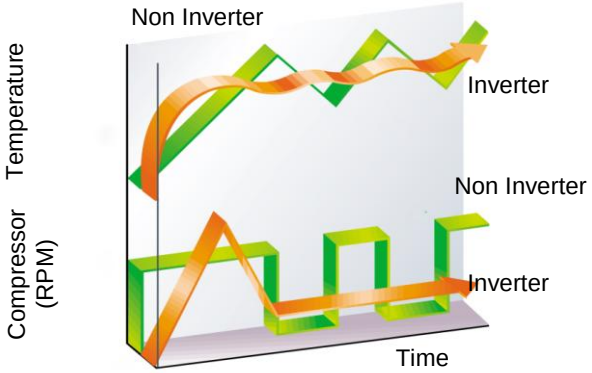
■ All DC Inverter

Inverter driven systems have a big performance advantage over constant speed systems. The variable compressor can make a very fast start-up and reach the setting temperature rapidly, then reduce the rotation speed to achieve energy savings of about 30% with no loss of comfort. Moreover, only Hitachi's DC driven fans and compressors deliver about 10% better performance than AC inverters. HITACHI is the world's pioneer of DC inverter systems and PAM in room air conditioners technology.



■ Inverter Control

Hitachi's DC inverter control system is able to keep the current pulse waveform to avoid distortion. It enhances the power efficiency.



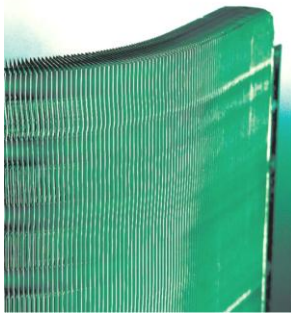
Rapid start up

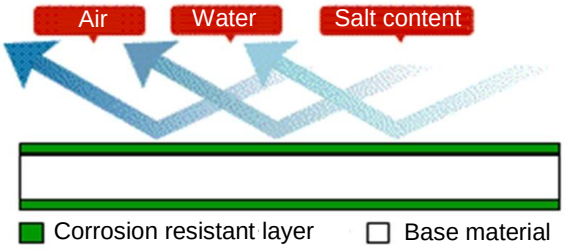
The variable speed compressor (inverter) enables the system rapidly reaches the desired water temperature setting.

Once the desired preset water temperature in the tank unit has been achieved, the compressor rotation speed is reduced, saving up the energy usage (when compared to conventional systems) without compromising comfort levels

■ Green and Durable

The special anti-corrosion coating on the outdoor heat exchanger improves durability while the green tint harmonizes with the outdoor environment





■ Easy installation

The SHW covers up to total 20m length with vertical interval of up to 10m.

■ Easy servicing

Self-diagnosis
Errors are easily identified by the LED blinking patterns of the indoor and outdoor units

■ A user-friendly control panel for convenience operation

Large buttons and a 7 segment LED are used, being conscious of universal design. The weekly timer can be set 2 modes daily. Features are:

- ECO mode
- BOOST mode
- LEGIONELLA prevention mode
- Timer setting
- Temperature setting
- ON/OFF

2 GENERAL DATA

CONTENTS

2.1. SANITARY HOT WATER HEAT PUMP

2.1.1. Tank Unit (TAW-270NH2A)

Model		Units	TAW-270NH2A
Power Supply			AC 1ph, 230V, 50Hz
Tank Nominal Volume		dm^3	262
Setting Temperature of the performance below		°C	53
Reference Hot Water Temperature		ºC	53.3
Electric Heater		kW	2.0
Heat Up	Time	h:min	6:20
	Energy Input (Weh)	kWh	3.84
Temperature Setting range		°C	40~65
Maximum water temperature (with electric heater)		°C	65
Water Tank Rated Pressure		MPa	0.7
Maximum Quantity of Hot Water (Vmax)		dm^3 / 40ºC	375
Electrical Data			
Power Cable*		No.	2 pcs + Earth when power source is connected to Tank unit
Cable Size**		mm^2	Ø2.0
Interconnection wires		No.	4 pcs + Earth when power source to Tank unit.
Wire size		mm^2	-
Dimensions			
Width (packing)		mm	600 (670)
Height (packing)		mm	1,570 (1730)
Depth (packing)		mm	730 (770)
Net Weight (gross weight)		kg	63(73)
Colour (Munsell Code)			White (RAL9016)
Tank material			Stainless Steel SUS304
Flare nut size (Small / Large)		mm	Ø 6.35 / Ø 9.52

*Power cables are not included; please install the unit with cable sizes that comply with local regulations.
** Cable size depends on length (refer to chapter 13 for more details)

NOTE:

1. *The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the EN16147*

Operation Conditions		***Heating***
Water Temperature	***°C***	*From 15°C to 55°C*
Indoor Ambient Air Temperature	***dB***	*20°C*
	WB	*12°C*
Outdoor Air Inlet Temperature	***dB***	*7°C*
	WB	*6°C*
***Piping Length**: 8 meters;* ***dB**: Dry Bulb Temperature; **WB**: Wet Bulb Temperature*		

2.1.2. Outdoor Unit (RAW-25NH2A)

Model RAC		Units	RAW-25NH2A
Power Supply			AC 1ph, 230V, 50Hz
Heat up Energy Input		kWh	3.84
Maximum Current		A	16
Standby effective Power Input (Pes)		W	30
COPt	Outside Temperature : 7 ºC		3.09
	Outside Temperature : 15 ºC		3.70
Sound Pressure Level		dB(A)	46
Outside Air Operating Temperature (Heating)		ºC	-15 ~ 37
Recommended fuse size		A	3.15 (250 V)
Power Cable*		No.	2 pcs + Earth
Cable Size**		mm^2	2.0
Interconnection wires		No.	2 pcs + Earth
Wire size		mm^2	Ø1.6, Ø2.0
Dimensions			
Width (Packing)		mm	750 (905)
Height (Packing)		mm	570 (633)
Depth (Packing)		mm	280 (394)
Net Weight (Gross)		kg	38(43)
Cabinet			Synthetic Resin Paint Baked on Galvanised Steel Plate
Colour (Munsell Code)			Beige (5Y 7/2)
System			
Refrigerant Flow Control			Micro-Computer Control Expansion Valve
Compressor			DC 2-Cylinder Rotary
Compressor oil type			HAF68D1
Compressor coil resistance		Ω	0.648 at 20°C
			0.788 at 75°C
Condenser Fan			Propeller Fan
Quantity			1
Refrigerant Piping			Flare-Nut and/or Flange Connection
Liquid Line		mm	Ø6.35
		(in.)	(1/4)
Gas Line		mm	Ø12.7
		(in.)	(3/8)
Piping length max/height		m	20/10
Charge less pipe length		m	20
Additional charge		g/m	-
Refrigerant Type			R410A
Refrigerant Charge		g	950

*Power cables are not included; please install the unit with cable sizes that comply with local regulations.
**Cable size depends on length (refer to chapter 13 for more details)

NOTE:

1. *The Sound Pressure Level is based on the following conditions:*
   - *1 meter from the unit front surface and 1 meter from floor level*

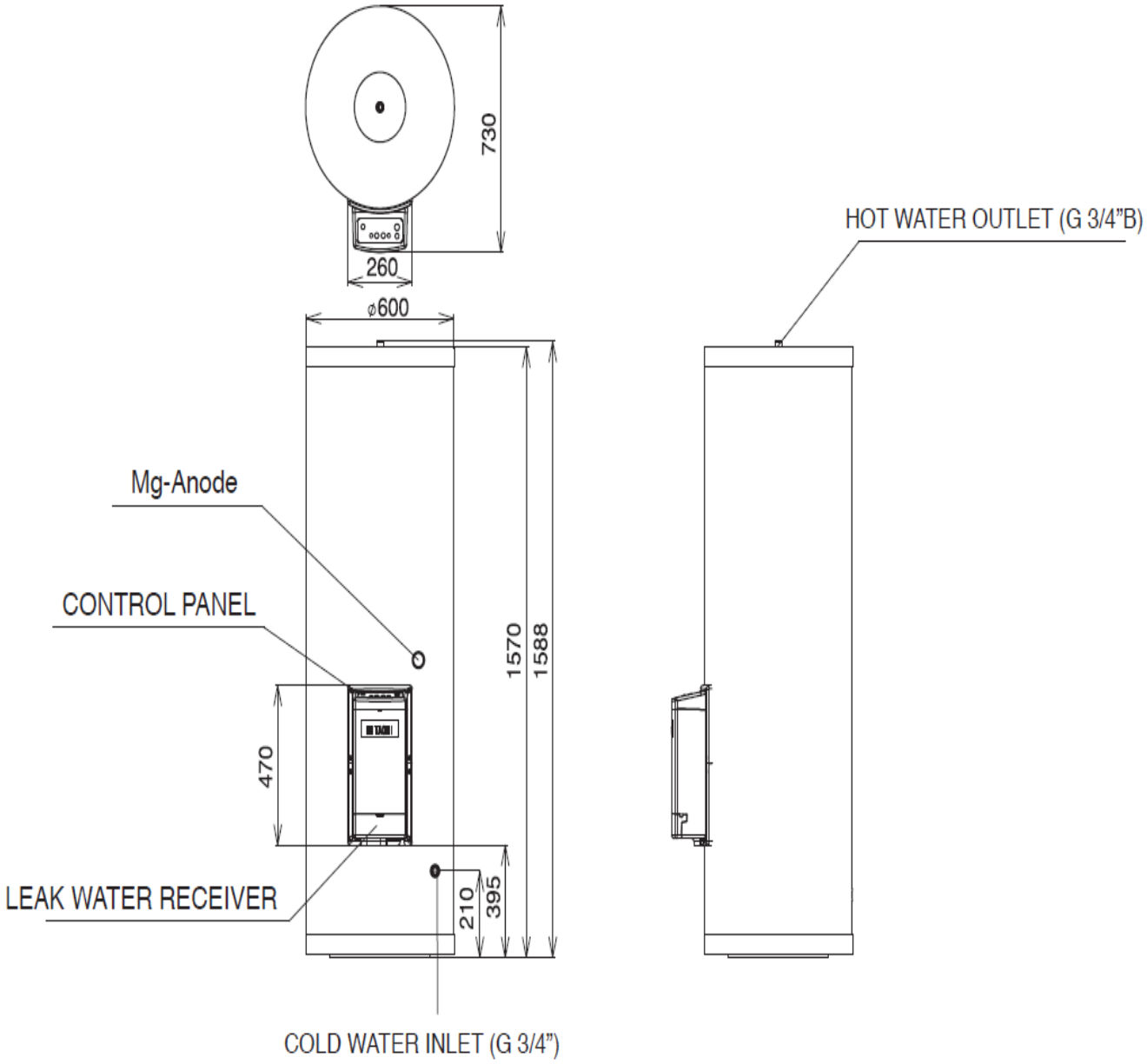
   The above data was measured in an anechoic chamber so that reflected sound should be taken into consideration when installing the unit.

3 DIMENSIONAL DATA

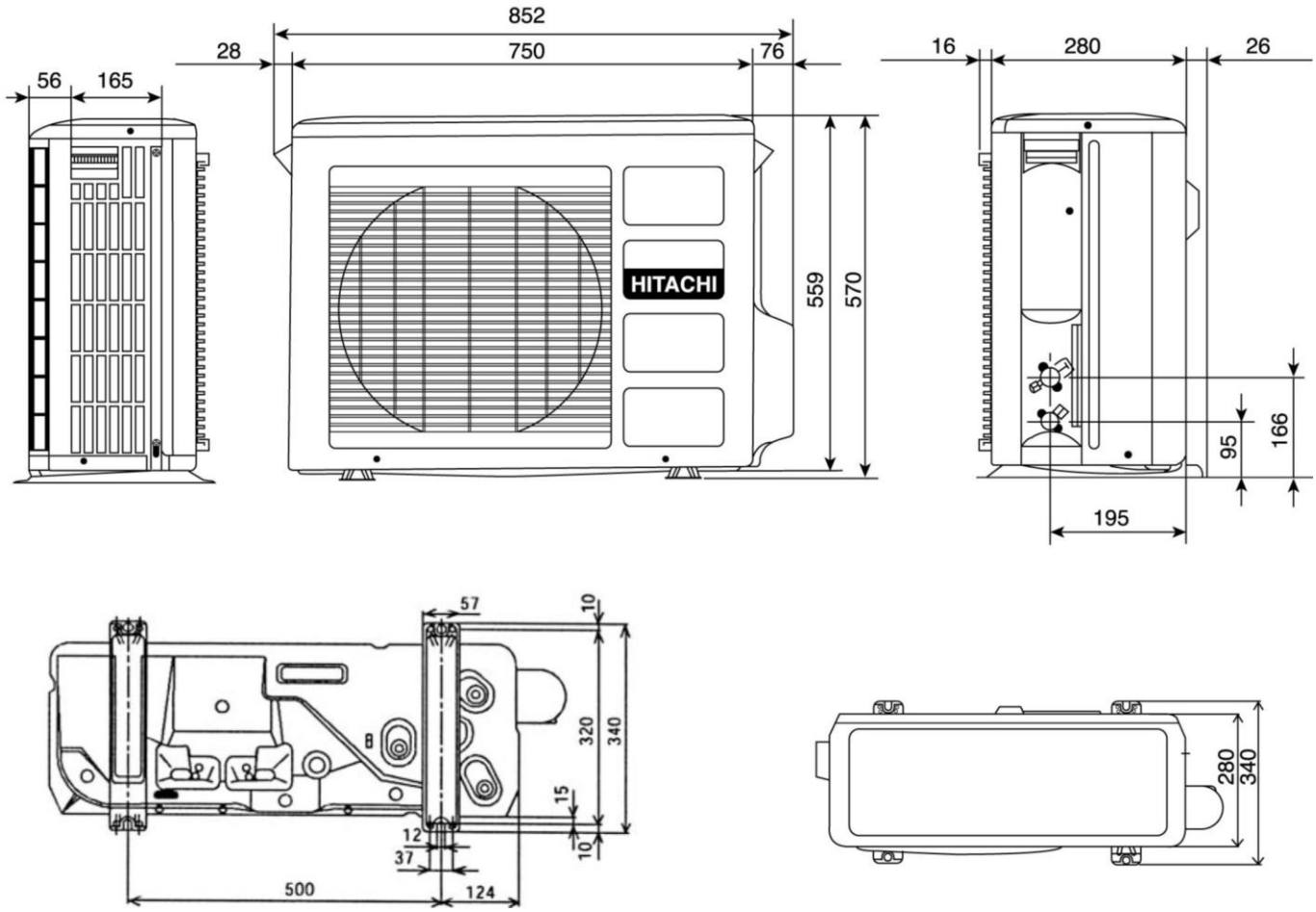
CONTENTS

3.1. SANITARY HOT WATER HEAT PUMP

3.1.1. TANK STRUCTURE OVERVIEW



3.1.2. OUTDOOR UNIT OVERVIEW

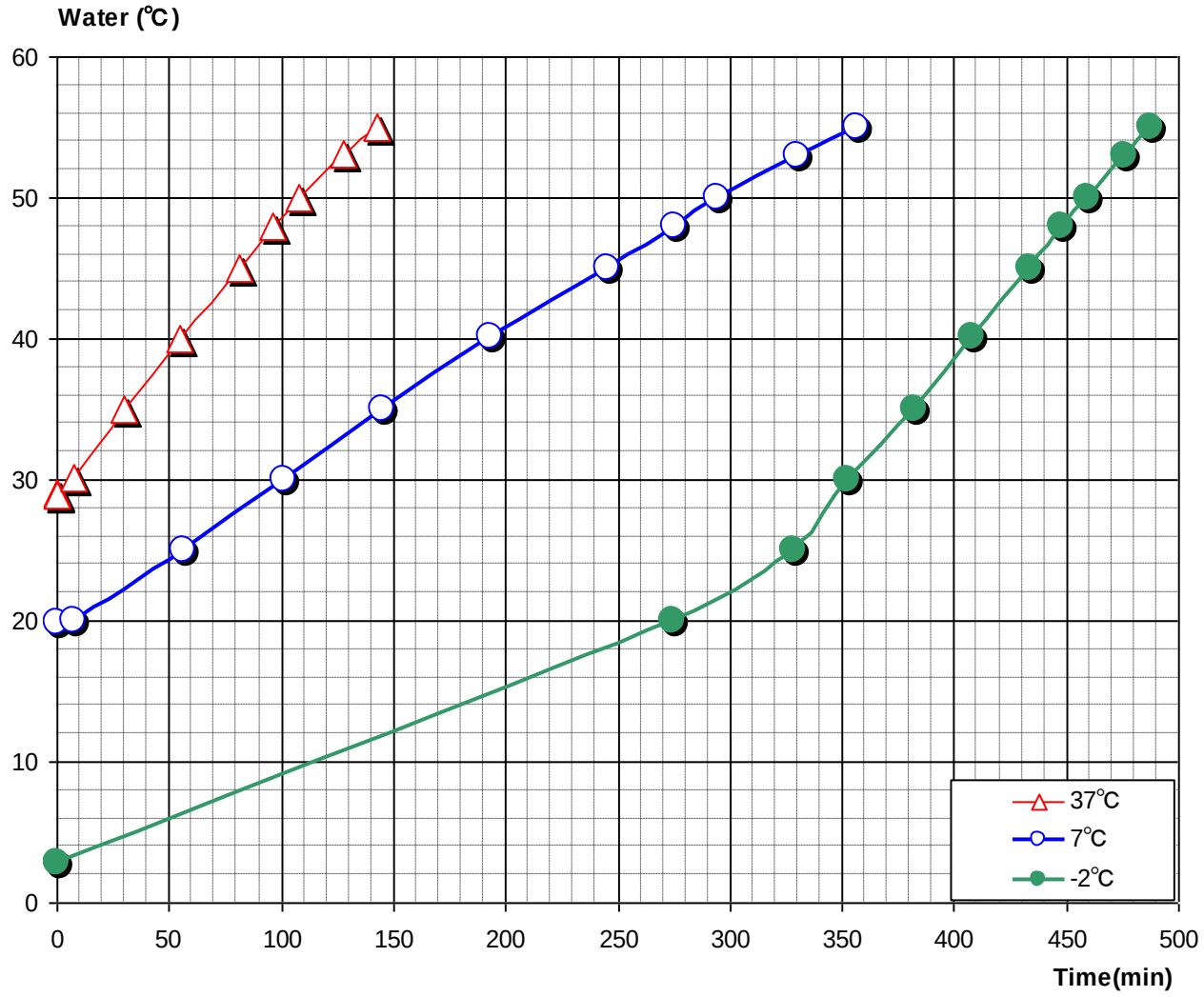


4 HEATING CAPACITIES

CONTENTS

4.1 HEATING TIME DATA

The following graph show the time required to heat up the water temperature in the tank unit to 55ºC.



HEATING [50Hz, 230V]

OUTDOOR CDB	INDOOR EWB	Starting Water Temperature	Electric Heater ON/OFF	Time take for water to reach 55ºC
37ºC	20ºC	29ºC	OFF	142 min
7ºC	20ºC	20ºC	OFF	356 min
-2ºC	20ºC	3ºC	**ON	488 min

** When the water temperature and outside temperature are low and heating the water takes times, the electric heater is automatically set to auxiliary operation to heat the water within eight hours.
For more detail please refer to Chapter 9.

5 WORKING RANGE

CONTENTS

5.1. POWER SUPPLY

Working Voltage	207V ~ 253V
Voltage Imbalance	Within a 3% Deviation from Each Voltage at the Main Terminal of Outdoor Unit
Starting Voltage	Higher than 85% of the Rated Voltage

5.2. WORKING RANGE

Applicable models:
RAW- 25NH2A

The temperature range is indicated in the following table.

Heating

working range	min (°C)	max (°C)	rated (°C)
outdoor	-15	37	7
indoor	-	-	20

6 ELECTRICAL DATA

CONTENTS

6.1. TANK UNIT AND OUTDOOR UNIT

Tank Unit

Model	Unit Main Power		Applicable Current		Electrical Heater	
	VOL, PH, Hz	Fuse Rating (A)	STC	RNC	RNC	IPT
TAW-270NH2A	230,1,50	16	*3.5	*6.8	8.7	2

Test Condition: EN255-3 (Indoor Ambient Air 20°C, outside air 7°C, water 15 to 55°C.

* When power supply is connected to Tank unit only.

Outdoor Unit

Model	Unit Main Power				Compressor Motor			
	VOL, PH, Hz	Fuse Rating (A)	Min (V)	Max (V)	Locked Rotor Ampere (A)	STC	Heating Operation	
							RNC	IPT
RAW-25NH2A	230, 1, 50	16	207	253	N/A	5.4	10	4.3

Test Condition: EN255-3 (Indoor Ambient Air 20°C, outside air 7°C , water 15 to 55°C.

VOL: Rated Unit Power Supply Voltage (V)
HZ: Frequency (Hz)
STC: Starting Current (A)
RNC: Running Current (A)
PH: Phase (ϕ)
IPT: Input (kW/h)

NOTE:

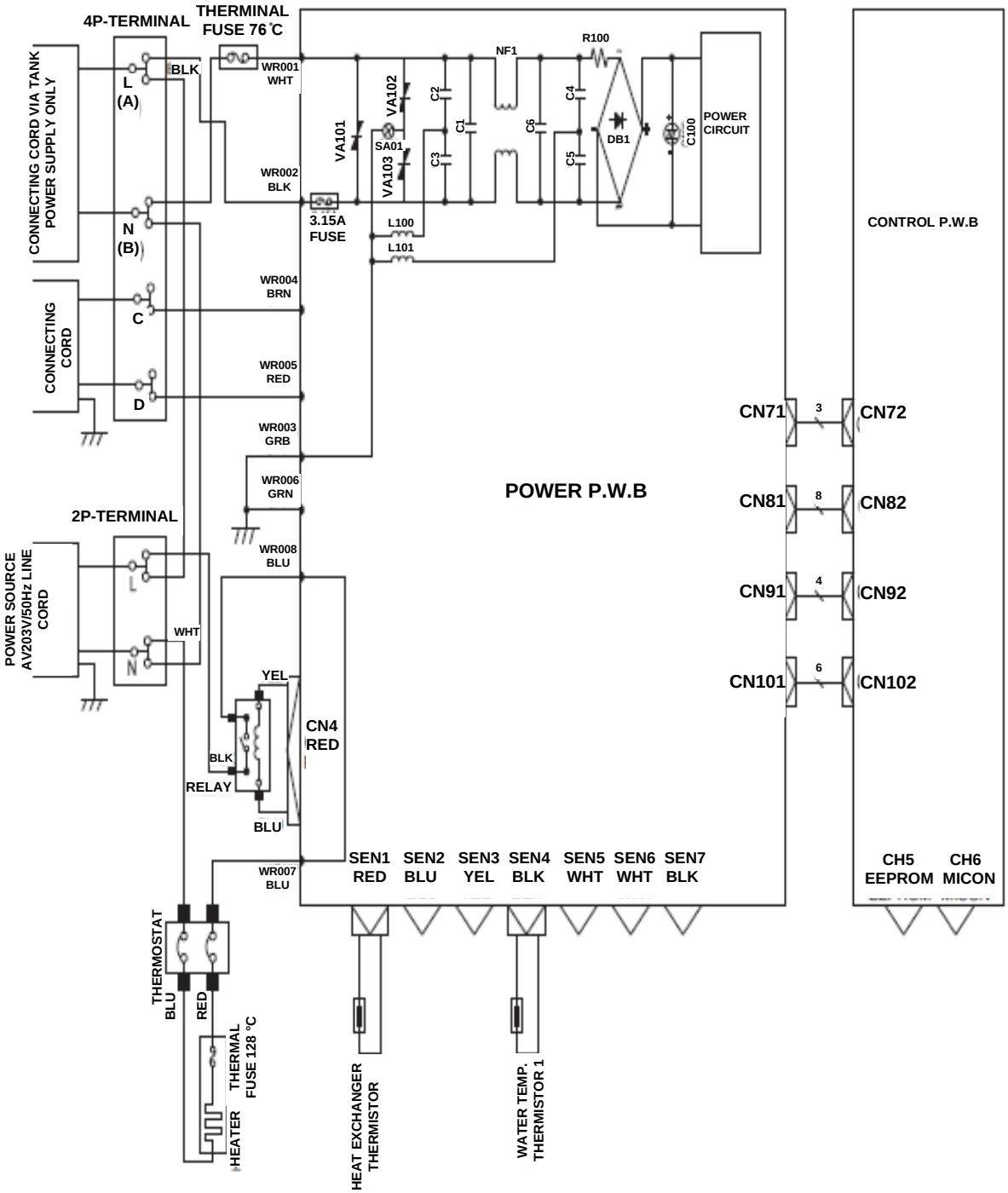
1. *The above compressor data is based on 100% capacity of Tank units at the rated operating frequency*
2. *This data is based on the same conditions as the nominal heating capacities.*
3. *The compressor started by an inverter, resulting in extremely low starting current.*

7 ELECTRICAL WIRING DIAGRAM

CONTENTS

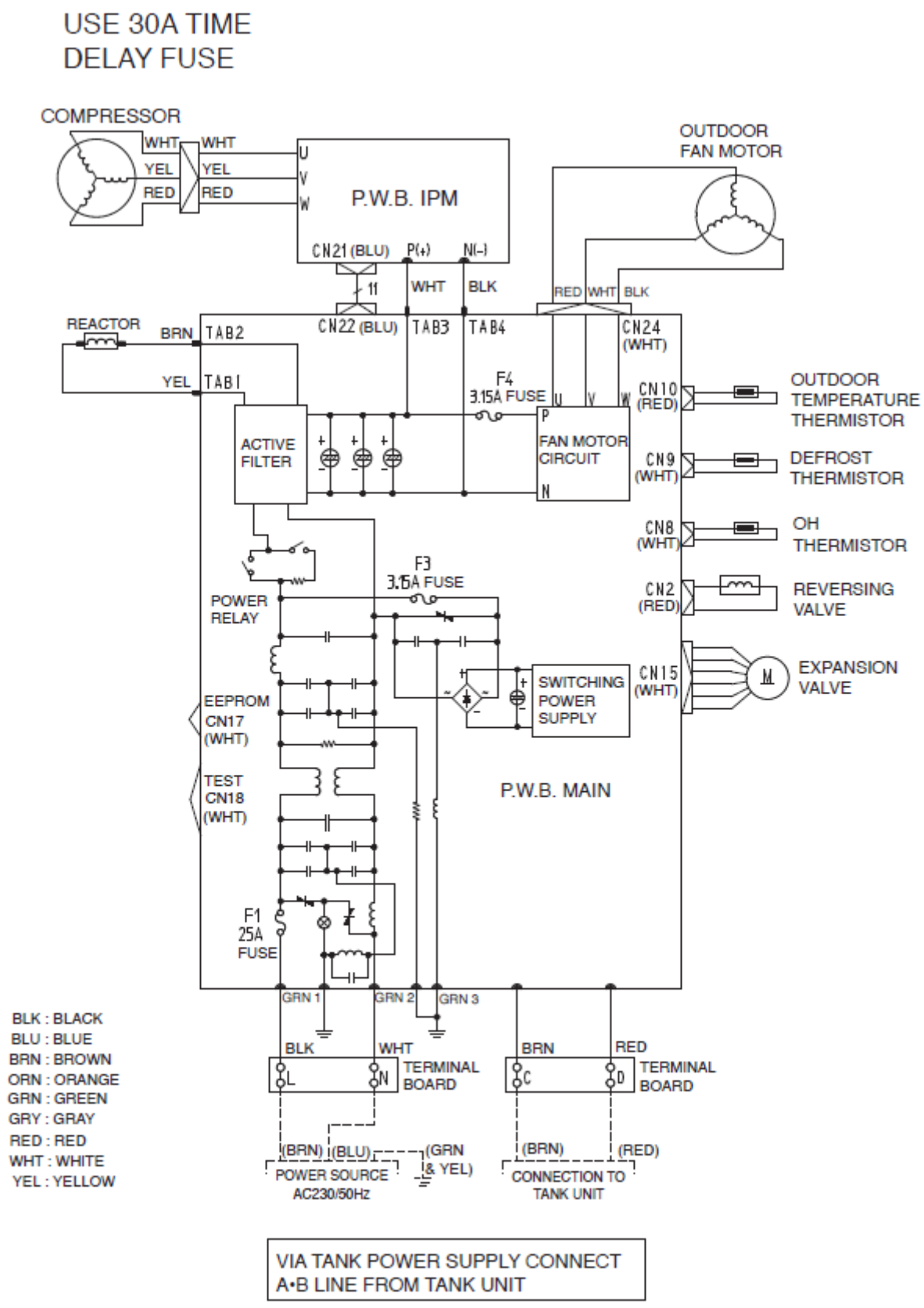
7.1. TANK AND OUTDOOR UNIT

7.1.1. TAW-270NH2A



TANK UNIT

7.1.2. RAW-25NH2A

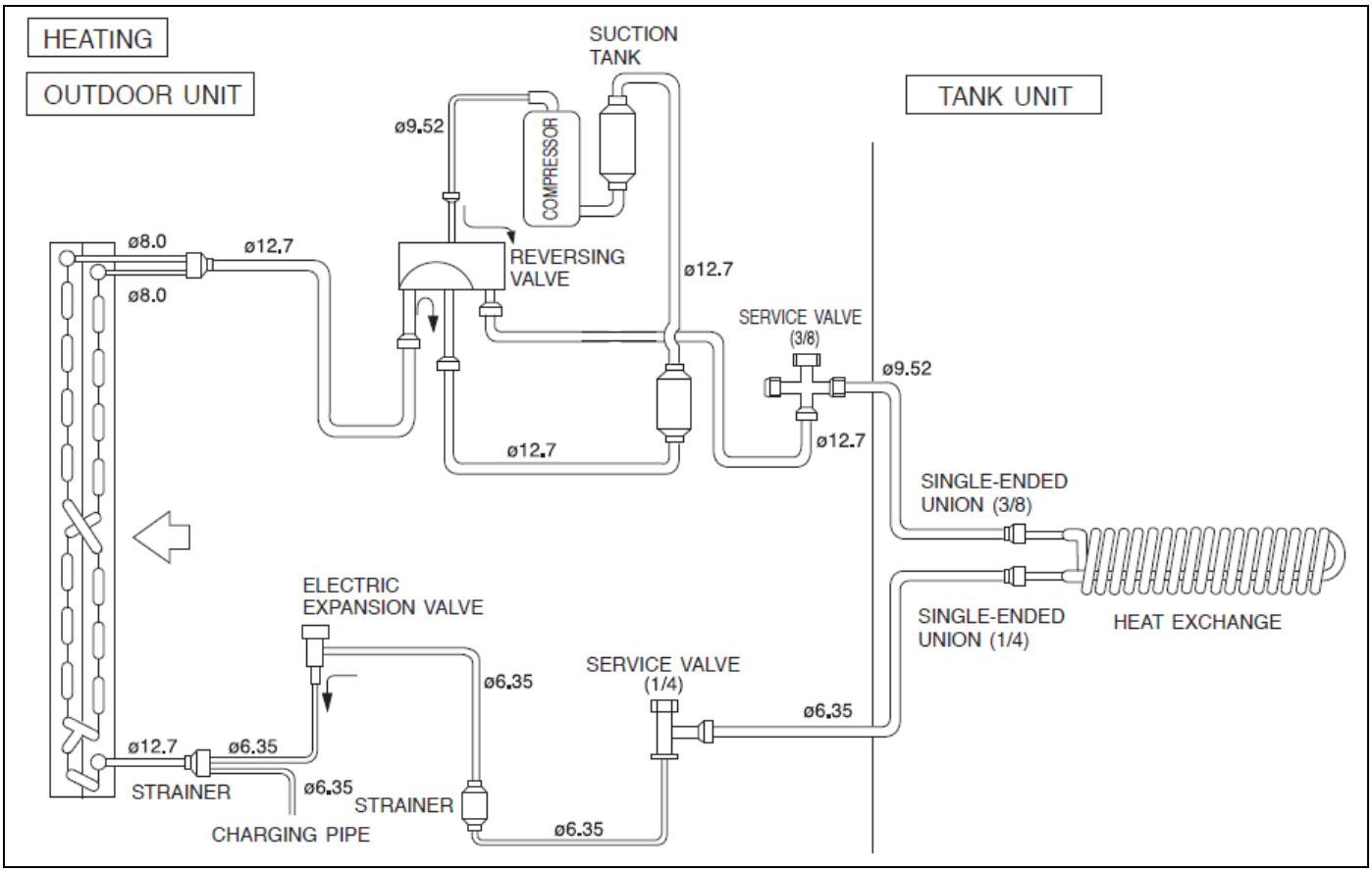


8 REFRIGERANT CYCLE

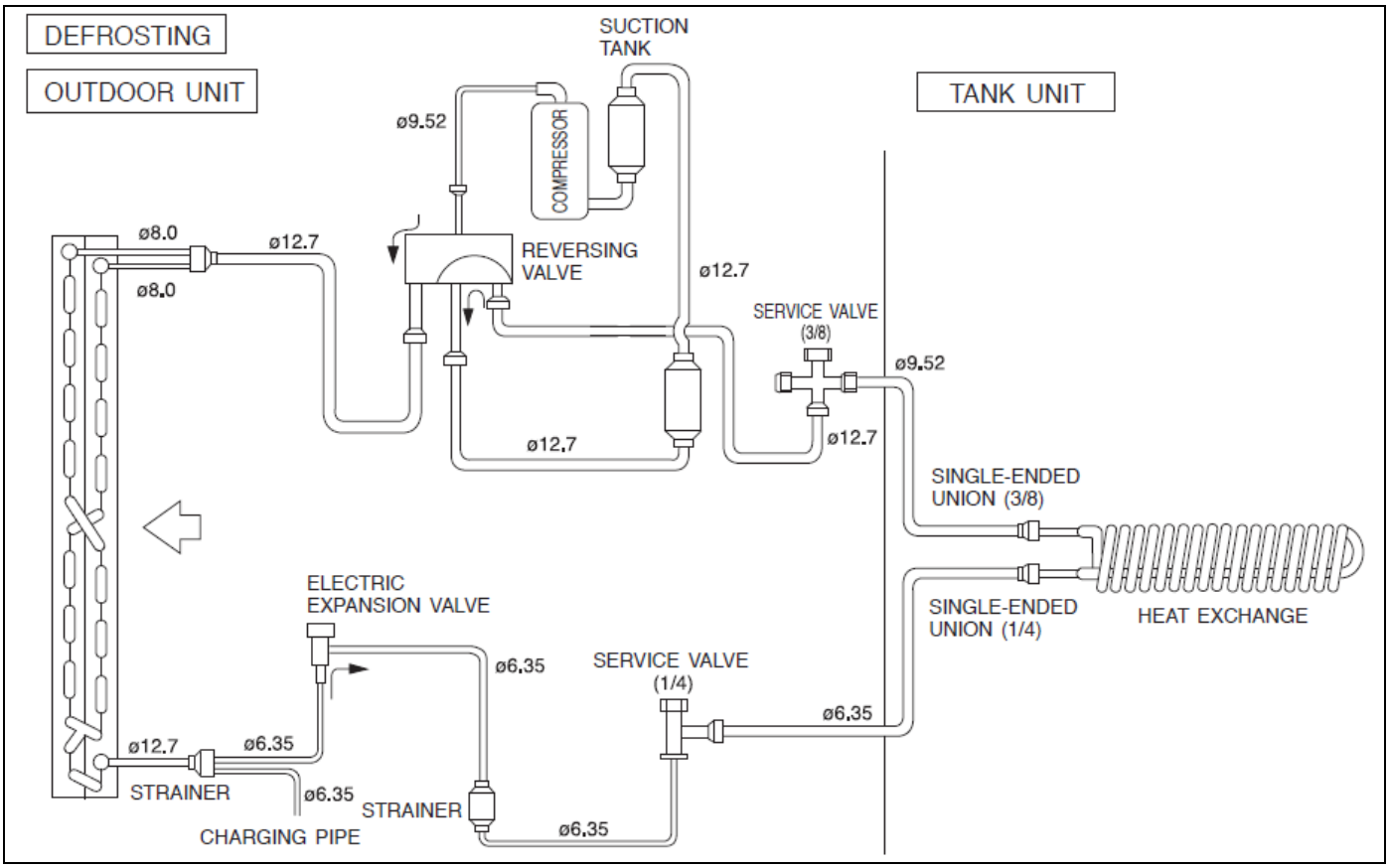
CONTENT

8.1. HEATING AND DEFROSTING

8.1.1. TAW-270NH2A/RAW-25NH2A (HEATING)



8.1.2. TAW-270NH2A/RAW-25NH2A (DEFROSTING)



9 CONTROL PANEL OPERATION

CONTENTS

9.1 CONTROL PANEL FUNCTION

9.1.1. PRECAUTIONS

- Before starting to use the water heater, ensure the DIP-switch setting position during installation. (Default DIP-Switch setting is [FULL TIME],please refer Chapter 13 for more information)

DIP-Switch setting position	REMARKS
[FULL TIME]:	Setting can be done for Time, Day of the Week, Water temperature, Timer and Legionella cycle
[OFF PEAK HOUR]:	Setting can be done for Water Temperature and Legionella cycle only

9.1.2. NAMES AND FUNCTIONS OF CONTROL PANEL

7-segment LED indicator:
Indicates water temperature, time and other information.
(Refer to page 9-4 to 9-14)

Time LED indicator:
Lights while timer is set
(Refer to page 9-7 to 9-9)

ECO button:
Sets/releases ECO mode
(Refer to page 9-11)

ECO LED indicator:
Lights in ECO mode
(Refer to page 9-11)

Heating operation LED indicator:
- Lights during heating operation.
- Blinks during boost operation.

(Refer to page 9-6 , 9-13)

START/STOP button:
Turns the unit on and off.
(Refer to page 9-6)

Operation LED indicator:
- Lights during operation. (Refer to page 9-6)
- Blinks during defrosting. (Refer to page 9-6)

Anti-bacteria LED indidcator:
- Lights during Anti-bacteria setting
- Blinks during Anti-bacteria operation

(Refer to page 9-12)

Boost button:
Use to quickly reach boiling temperature by operating the heater pump at full power
(Refer to page 9-13)

Function button:
To change function mode when setting
(Refer to page 9-4 to 9-5, 9-7 to 9-12, 9-14)

Set button:
Confirms changes made to water temperature, time and other settings.
(Refer to page 9-4 to 9-5, 9-7 to 9-12)

Up button/Down button:
Changes water temperature, time and other settings.
(Refer to page 9-4 to 9-5, 9-7 to 9-12, 9-14)

Each push of the function button changes the insications as shown below.

- Current water temperature
- Time
- Day of the week
- Hot water temperature setting
- Timer setting
- Anti-bacteria function setting

Each push of the △▽ button changes the indications as shown below.
Timer 1 setting: day/operation mode
↓↑
Timer 1 setting: start time
↓↑
Timer 2 setting: day/operation mode
↓↑
Timer 2 setting: start time

9.1.3. PREPARING FOR OPERATION

- Use the following steps to start up the unit for the first time or when it has not been used for extended period of time.

Filling up the Tank

1) Turn on the water tap and close the drain valve.
2) Turn on all connected mixer tap (hot water side).
   It takes about 20 to 30 minutes to fill up the tank. Please keep all taps open for a while in order to clean the tank and the drain pipes by running water.
3) Close all connected mixer taps (hot water side) and open all taps (cold water side).
   Let the cold water run for a while to clean out the tank.
4) Turn off all connected mixer taps.
5) Inspection
   i. After filling the tank, check all pipe joints and the tank for leakage.
   ii. Check operation of the pressure-relief valve.
   iii. After heating water for the first time, again check pipe joints and the tank for water leaks.

Turning on the Power

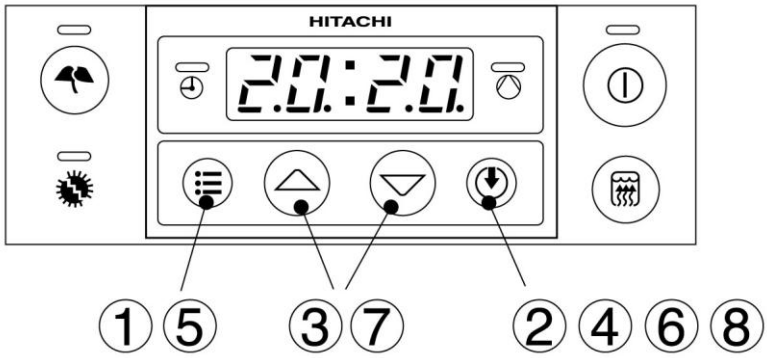
1) Turn on circuit breaker.
   When the circuit breakers have been turned on, "- -:- -". will start to blink on the control panel of the tank unit.

CAUTION
Fill up the tank completely before turning the power on.
Turning the power when tank is empty will overheat it and damage the unit.

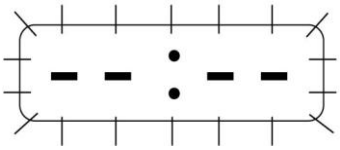
NOTE:
In case that the electric power is supplied to both of tank unit and outdoor unit, please always turn on the outdoor unit side first.
If the tank side is turned on first, it may fall into error mode of "E0 03" and the unit is unable to operate

9.1.4. SETTING THE CURRENT TIME (ONLY WHEN CONNECTED TO A FULL TIME POWER SUPPLY)

NOTE:
Timer operation is possible only when you set the current time and day of the week.
An extended power outage (30 minutes or longer) will cancel the time setting. If this happens, reset it.

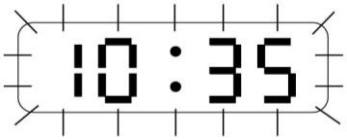


1 Press the ☰ button to display the time.
The time will start to blink slowly.



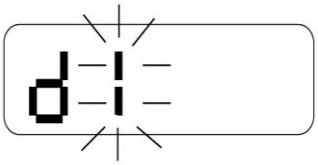
2 Press the ⏬ button.
The time will start to blink rapidly.

3 Press the ▽ △ buttons to set the time.
Hold down either button to quickly increase or decrease the number settings.



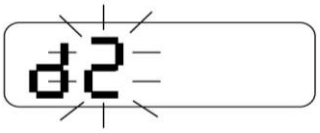
4 Press the ⏬ button.
The time has now been set.

5 Press the ☰ button to set the day of the week.

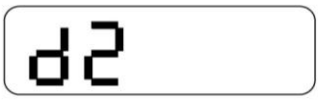


6 Press the ⏬ button.
The number indicating the day of the week starts to blink.

7 Press the ▽ △ buttons to set the day of the week.
d1: MON ; d2: TUE ; d3: WED ; d4: THU ; d5: FRI ; d6: SAT ; d7: SUN



8 Press the ⏬ button.
The day of week has now been set.
After about 10 seconds, the indicator will alternately display current water temperature and the time.



9.1.5. SETTING HOT WATER TEMPERATURE

- Hot water temperature can be set between 40ºC to 65ºC. Set the temperature depending on hot water volume that you require. The recommended temperature range is 40ºC to 55ºC (the factory default setting is 55ºC). A low water temperature setting will mean more efficient operation. A higher temperature setting will make more scale.

  Estimated hot water volume when converted to 40ºC.

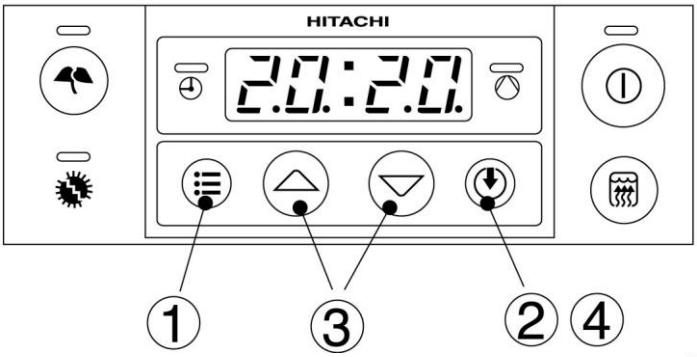
Hot water temperature	40ºC	45ºC	50ºC	55ºC	60ºC	65ºC
Hot water volume when converted to 40ºC	270L	320L	370L	430L	480L	530L

- The operation mode will automatically change depending on the hot water setting temperature.

Hot water temperature	~ 55ºC	55ºC ~ 65ºC
Heat pump operation	ON (*1)	OFF
Electric heater operation	OFF/ON (*2)	ON

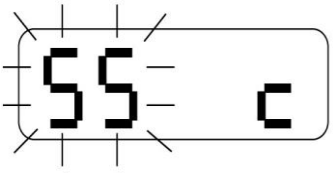
(*1): Heat pump may not operate depending on the condition of outdoor temperature and tank water temperature. Air temperature is below -15ºC or above 37ºC, the heat pump does not operate for the compressor protection.

(*2): Electric heater will operate in case that heating capacity of heat pump operation is not enough to heat up the water to setting temperature.

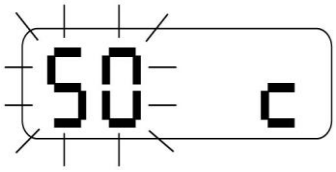


1 Press the ☰ button to display hot water temperature setting.

2 Press the ▼ button.
The hot water temperature setting starts to blink.

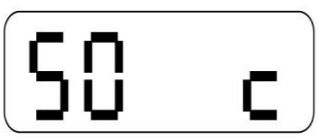


3 Press the ▽ △ buttons to adjust how water temperature setting.
Hold down the buttons to rapidly increase or decrease the number values.



4 Press the ▼ button.
This sets the how water temperature.

After about 10 seconds, the indicator will alternately display current water temperature and the time.

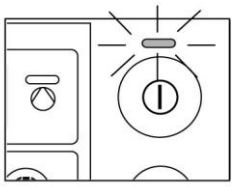


9.1.6. STANDARD OPERATION

- Time required to reach the set water temperature depends on water temperature, outside temperature and other factors.
- When the water temperature and outside temperature are low and heating the water takers time, the electric, heater is automatically set to auxiliary operation to heat the water within eight hours.
  (*1) Depending on the operating conditions, it may take longer than eight hours.
  (Water temperature; <5ºC, setting temperature; >55ºC

  (*2) The ECO mode will not reduce the time it takes to heat the water.

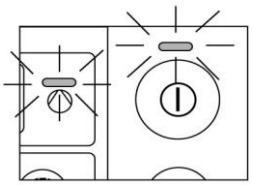
1 Press the ⏻ button.
The ⏻ indicator will light and operation starts.



OPERATING PROCEDURES

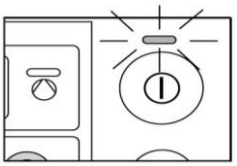
1) When the water temperature is lower than hot water temperature setting, heating operation will start.
   The ⏲ indicator lights during heating operation.

   (The ⏻ indicator blinks during defrosting. Defrosting will be performed about once an hour when frost forms on the heat exchanger of the outdoor unit, 5-10 minutes each time.)



2) The heating operating stops when the water temperature reaches the hot water temperature setting.

   The ⏲ indicator goes off.



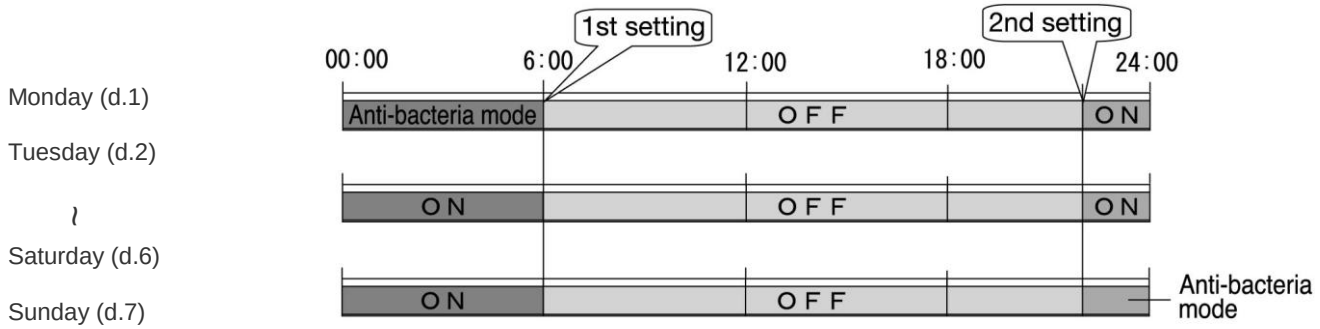
STOPPING

Press ⏻ button when the ⏻ indicator is lit.
Heating stops and the ⏻ indicator goes off.

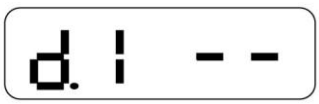
9.1.7. TIMER FUNCTION (SETS THE SAME MODE EVERY DAY)

- This function is available only when the unit is connected to a full-time power supply.
- Two timer settings can be made per day.
- A setting made for Monday (d.1) will also be used on Tuesday (d.2) through Sunday (d.7) in the same way as on Monday.
- The unit records the set time.
- Anti-bacteria mode starts at 22:00 on Sunday every week regardless of timer setting.

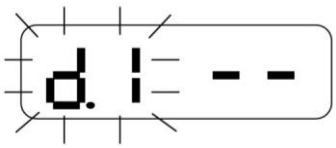
Operation example



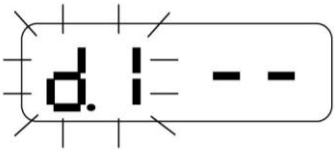
1 Press the ☰ button to display “d.* **”
The setting for today is displayed.
d1: MON; d2: TUE; d3: WED; d4: THU; d5: FRI; d6: SAT; d7: SUN



2 Press the ⏻ button.
“d. *” starts to blink.

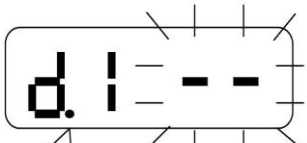


3 Press the ▽ △ buttons to enter “d.1.”
A setting made for “d.1” will also be used on “d.2 to d.7.

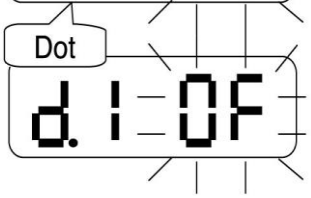


Setting operation mode and time for the 1st setting.

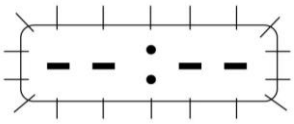
4 Press the ⏻ button.
“d.1” is now set and “- -“ blinks.



5 Press the ▽ △ buttons to set the operation mode.
ON : Standard operation.
EC : ECO mode operation.
OF : OFF
- - : No timer operation (operation mode continues)

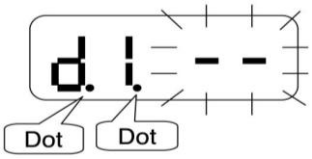


6 Press the ⏻ button.
The day of the week is set and the time starts to blink.



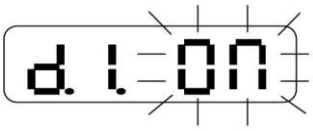
7 Press the ▽ △ buttons to change the time.
(The time can be set in 10-minute increments.)

8 Press the ⏻ button.
The 1st setting has now been made and the 2nd operation mode is displayed.

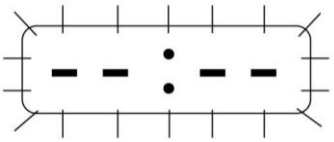


Setting the operation mode and time for the 2nd setting

9 Press the ▽ △ buttons to set the operation mode.
ON : Standard operation
EC : ECO mode operation
OF : OFF
- - : No timer operation



10 Press the ⏻ button.
The operation mode is now set and the time starts to blink.

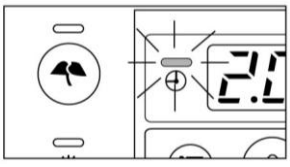


11 Press the ▽ △ buttons to change the time.
(the time can be set in 10-minute increments.)

12 Press the ⏻ button.
The 2nd setting is now made and the 🕒 indicator lights.

After about 10 seconds, the indicator will alternately display current water temperature and the time.

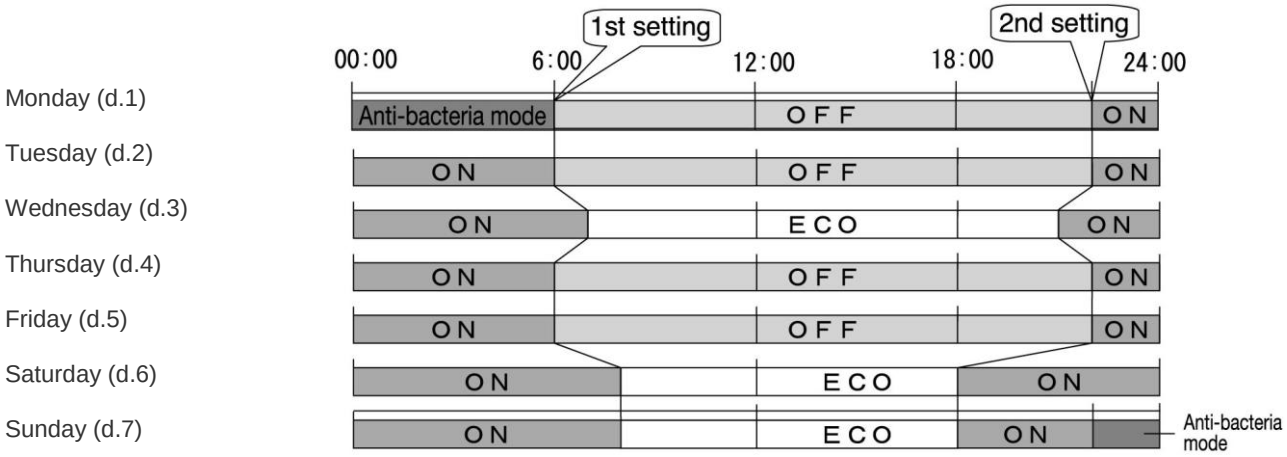
NOTE:
When the time for the 2nd setting is set ahead of the 1st setting, the 1st setting will be given priority and the 2nd setting will be cancelled.



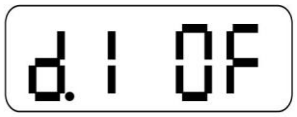
9.1.8. TIMER FUNCTION (SETS A DIFFERENT MODE EACH DAY)

- This function is available only when the unit is connected to a full-time power supply.
- Two timers setting can be made per day.
- A setting make for Monday (d.1) will also be used on Tuesday (d.2) through Sunday (d.7) in the same way as on Monday. When first setting up the function, make a setting for Monday (d.1) then reset the days where you want change the settings (Refer to page 9-3)
- When a setting is making for Saturday (d.6), the same setting is also set for Sunday (d.7).
- The unit records the set time.
- Anti-bacteria mode starts at 22:00 on Sunday every week regardless of timer setting.

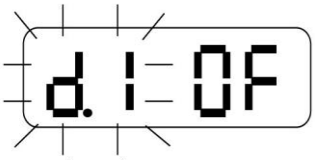
Operation example



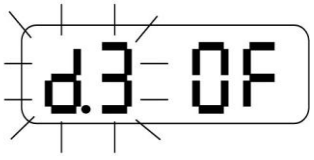
1 Press the ☰ button to display “d.* **”
Today’s setting is displayed.
d1: MON; d2: TUE; d3: WED; d4: THU; d5: FRI; d6: SAT; d7: SUN



2 Press the ⏻ button.
“d. *” starts to blink.

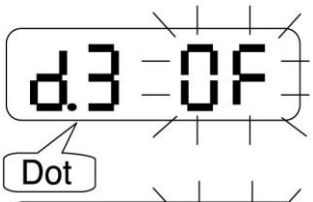


3 Press the ▽ △ buttons to display the day where you want to change a setting.

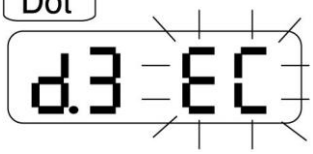


Setting the operation mode and time for the 1st setting.

4 Press the ⏻ button.
The day of the week is now set and the operation mode starts to blink.

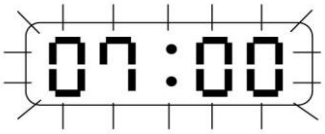


5 Press the ▽ △ buttons to set the operation mode.
ON : Standard operation
EC : ECO mode operation
OF : OFF
- - : No timer operation

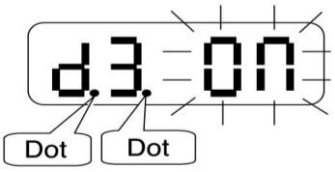


6 Press the ⏻ button.
The operating mode is set and the time starts to blink.

7 Press the ▽ △ buttons to change the time.
(The time can be set in 10-minute increments.)

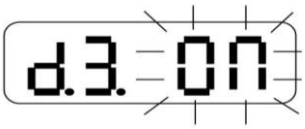


8 Press the ⏻ button.
The 1st setting has now been made and the 2nd operation mode is displayed.

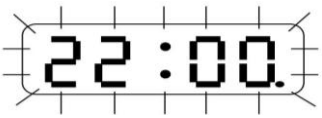


Setting the operation mode and time for the 2nd setting

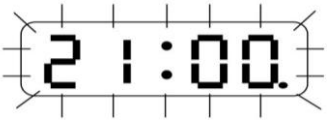
9 Press the ▽ △ buttons to set the operation mode.
ON : Standard operation
EC : ECO mode operation
OF : OFF
- - : No timer operation



10 Press the ⏻ button.
The operation mode is now set and the time starts to blink.

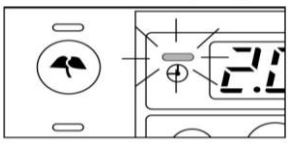


11 Press the ▽ △ buttons to change the time.
(The time can be set in 10-minute increments.)



12 Press the ⏻ button.
The 2nd setting is now set and the 🕘 indicator goes on.

After about 10 seconds, the indicator will alternately display current water temperature and the time.



9.1.9. ECO MODE FUNCTION

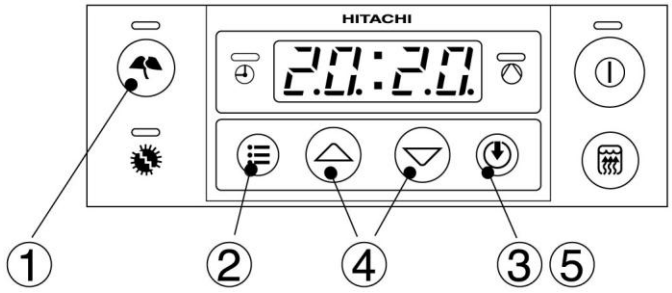
- The ECO mode uses the heater pump for heating without engaging the electric heater. In ECO mode, you can use a lower temperature for hot water temperature setting than is otherwise possible. It is a convenient feature for reducing power consumption when less water is available.
  Note:
  1) Water temperature, outside temperature and other factor may increase the heating time and make it impossible to reach the hot water temperature.
  2) Anti-bacteria mode uses the electric heater. If you do not want to use the electric heater, turn anti-bacteria mode off.
  3) Electric heater operates in the case of compressor protection.

- You can set a water temperature between 40ºC to 65ºC. It is recommended that you set a water temperature that is about 5ºC lower than usual. The factory default setting is 55ºC. A lower temperature setting will increase operating efficiency.

  Hot water volume when convert to 40ºC

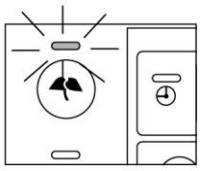
Hot water temperature	40ºC	45ºC	50ºC	55ºC	60ºC	65ºC
Hot water volume when converted to 40ºC	270L	320L	370L	430L	480L	530L

- This function is available also during timer operation.



SETTING ECO MODE

1. Press the button during operation.
   The indicator lights engaging the ECO mode.
   The ECO mode can be sent and cancelled only during operation.
   (Only when indication for power is lit)



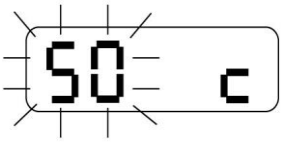
CANCELLING ECO MODE

Press the button when the indicator is lit.
The indicator goes off and ECO mode is cancelled.

SETTING HOW WATER TEMPERATURE IN ECO MODE

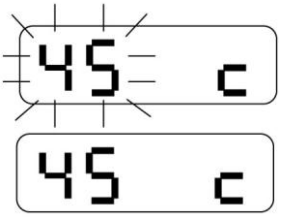
A set temperature is stored so it only has to be set once.

2. Press the button to display the hot water temperature setting.



3. Press the button.
   The hot water temperature setting starts to blink.

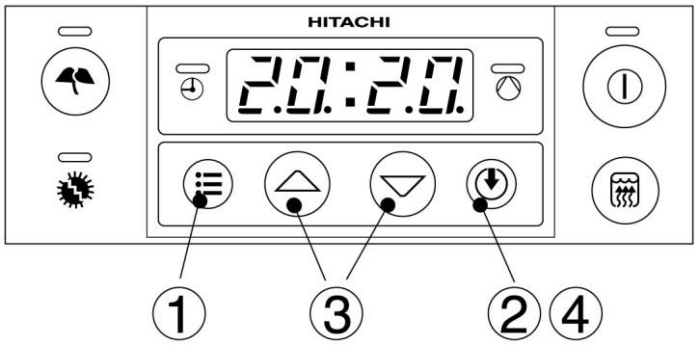
4. Press the buttons to adjust hot water temperature setting.
   Hold down either button to quickly increase or decrease the figure settings.



5. Press the button.
   The hot water temperature has now been set.

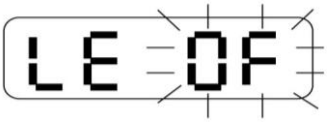
9.1.10. ANTI-BACTERIA FUNCTION

- When anti-bacteria mode is set, the unit will raise the temperature of the tank to 65ºC once a week to sterilize the water.
  1) In a full-time power supply system, anti-bacteria mode starts at 22:00 on Sunday every week.
  2) In an off-peak power supply system, anti-bacteria mode is performed in once out of every seven operating sessions. It is not possible to set a day for anti-bacteria mode.
- Anti-Bacteria mode uses the electric heater.

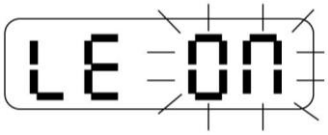


1 Press the button to display “LE **”

2 Press the button.
“ON” or “OFF” starts to blink.



3 Press the buttons to select “ON” or “OF”.

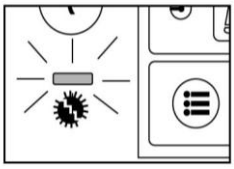


4 Press the button.

The indicator lights to indicate that anti-bacteria mode has been set (ON or OFF).

After about 10 seconds, the indicator will alternately display current water temperature and the time.

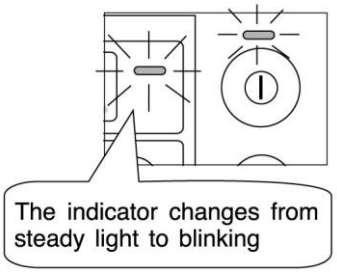
- The indicator blinks during anti-bacteria mode.



9.1.11. BOOST FUNCTION

- The boost function operates the electric heater and uses the full power of the heater pump to reduce heating time.
  Note: The boost function is not available during anti-bacteria mode.

1 Press the button when the indicator is on.
The indicator blinks to indicate the boost function has been engaged.
While operation is off the indicator is off, boost mode cannot start.



CANCELLING THE BOOST FUNCTION

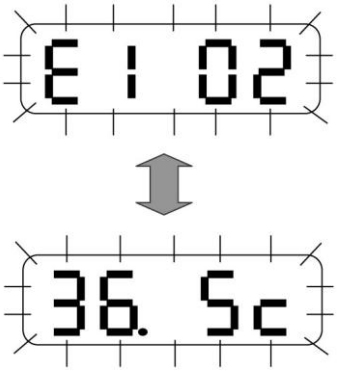
- Press the button when the indicator is blinking.
  The indicator changes to steady light as normal heating operation starts.

9.1.12. EMERGENCY FUNCTION

- When the outdoor unit has failed (and error code E1 ** blinks) and heater pump operation is not available, emergency operation using the electric heater is possible for limited time period.
- However, emergency operation is not available when a tank unit failure (and error code E0 ** blinks) has occurred.
- The water temperature is set to 55ºC.
- ECO mode, Boost or Anti-bacteria mode cannot be performed.

Note :
Be sure to contact your sales agent to have the unit repaired before starting emergency operation.

Use emergency operation when the outdoor unit has failed (and the E1 ** indicator blinks).



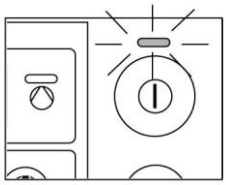
1 Hold down the ▽ and the 🌡 buttons for 5 seconds.

Setting the EMERGENCY mode, the current water temperature and error code (E1 **) are displayed alternately.

A set EMERGENCY mode is stored so it only has to be set once.

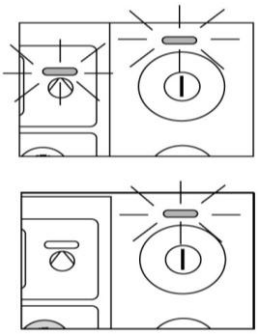
CANCELLING EMERGENCY OPERATION

- During emergency operation, hold down the ▽ and 🌡 buttons for 5 seconds.



2 Press the ⏻ button.
The ⏻ indicator will light and operation starts.

OPERATING PROCEDURES



1) When the water temperature is lower than hot water temperature setting, heating operation will start.
   The ♨ indicator lights during heating operation.
2) The heating operation stops when the water temperature reaches the hot water temperature setting.
   The ♨ indicator goes off.

STOPPING

Press ⏻ button when the ⏻ indicator it lit.

Heating stops and the ⏻ indicator goes off.

10 UNITS INSTALLATION

CONTENTS

10.1 INSTALLATION OF TANK UNIT

Please read the safety precautions carefully before operating the unit. The contents of this section are vital to ensure safety. Please pay special attention to the following signs.

⚠WARNING Incorrect methods of installation may cause death or serious injury

⚠CAUTION Improper installation may result in serious consequences.

⏚ Make sure to connect earth wire

⃠ This sign indicates prohibition

Be sure that the unit operates in proper condition after installation. Explain to customer the proper way of operating the unit as described in the Operation manual.

⚠ WARNING

- Please request your sales agent or qualified technician to install your unit. Water leakage, short circuit of fire may occur if you do the installation work yourself.
- Please observe the instructions stated in the installation manual during the process of installation. Improper installation may cause water leakage, electric shock and fire.
- Make sure that the units are mounted at locations which are able to provide full support of the weight of the units. If not, the units may collapse and impose danger.
- Observe the rules and regulations of the electrical installation and the methods described in the installation manual when dealing with the electrical work. Use power cables approved by the authorities of your country.
- Be sure to use the specified wire for connecting the indoor and outdoor units. Please ensure that the connections are tight after the conductors of the wire are inserted into the terminals. Improper insertion and loose contact may cause over-heating and fire.
- Please use the specified components for installation work. Otherwise, the units may collapse or water leakage, electric shock and fire may occur.
- Besure to use the specified piping set for R-410A. Otherwise, this may result in broken copper pipes or faults.
- When installing or removing the sanitary hot water heat pump, only specified refrigerant (R410A) shall be allowed, do not allow air or moisture to remain in the refrigeration cycle. Otherwise, pressure in the refrigeration cycle may become abnormally high so that a rupture may be caused.
- Be sure to ventilate fully in case refrigerant gas leaks while at work. If the refrigerant gas comes into contact with fire, poisonous gas might be discharged.
- After completion of installation work, check to make sure that there is no refrigeration gas leakage. If the refrigerant gas leaks into the room, coming into contact with fire in a fan-driver heater, space heater, etc; poisonous gas may be emitted.
- Unauthorized modifications to the sanitary hot water heat pump may be dangerous. If a breakdown occurs, please contact a qualified sanitary hot water heat pump technical or electrician. Improper repairs may result in water leakage, electric shock and fire.
- Be sure to use the supplied or specified installtion parts. Use of other parts may cause the unit to vibrate loosely, and may cause water leakage, electrical shock, or fire.
- Use the specified types of wires for electrical connections between the tank and outdoor unit. Firmly clamp the interconnecting wires so that their terminals receive no external stress. Incomplete connections or clamping may cause terminal overheating or fire.
- Be sure to connect the earth wire from power supply wire to the outdoor unit and between the outdoor and indoor unit. Improper grounding may cause electric shock. ⏚
- A pressure-relief valve should be installed. Without a pressure-relief valve, the tank may be broken.

⚠ CAUTION

- A circuit breaker or a time delay fuse (16A) must be installed. Without a circuit breaker or fuse, the danger of electric shock exists. A main switch with a contact gap of more than 3mm has to be installed in the power supply line to the outdoor unit.
- Do not install the unit near a location where there is a flammable gas. The indoor unit may catch fire if flammable gas leaks around it.
- Be sure to tighten the flare nut to the specified torque using a toque wrench. If the flare nut is tightened excessively, it may crack as time elapses, causing the refrigerant leakage.
- Please ensure smooth flow of water when installing the drain hose.
- Piping shall be suitable supported with a maximum spacing of 1m between supports.
- Please ensure the floor where the unit is installed for waterproof and drainage. Otherwise, it may damage downstairs.
- The tank should be fixed stably at the location which can support heavy weight. Otherwise, it may fall by earthquake and so on, and cause injury.

■ **The Choice of Mounting site**

(Please note that the following matters and obtain permission from customer before installation).

⚠ WARNING

- The tank unit must be placed at location that can withstand the weight of its full capacity.
- The outdoor unit must be mounted at a location which can support heavy weight. Otherwise, noise and vibration will increase.

⚠ CAUTION

- No nearby heat source and no obstruction near the air outlet is allowed.
- The clearance distances from top right and left are specified in figure below.
- The location must be convenient for water drainage and pipe connection with the Outdoor unit.
- To avoid interference from noise, please place the unit and its remote controller at least 1m from the radio, television and inverter type fluorescent lamp.
- To avoid any error in signal transmission form the remote controller, please put the controller far away from high-frequency machines and high-power wireless systems.
- The installation height of indoor unit must be 2.3m or more.
- Do not set it up near the septic tank.

Installation of the tank Unit

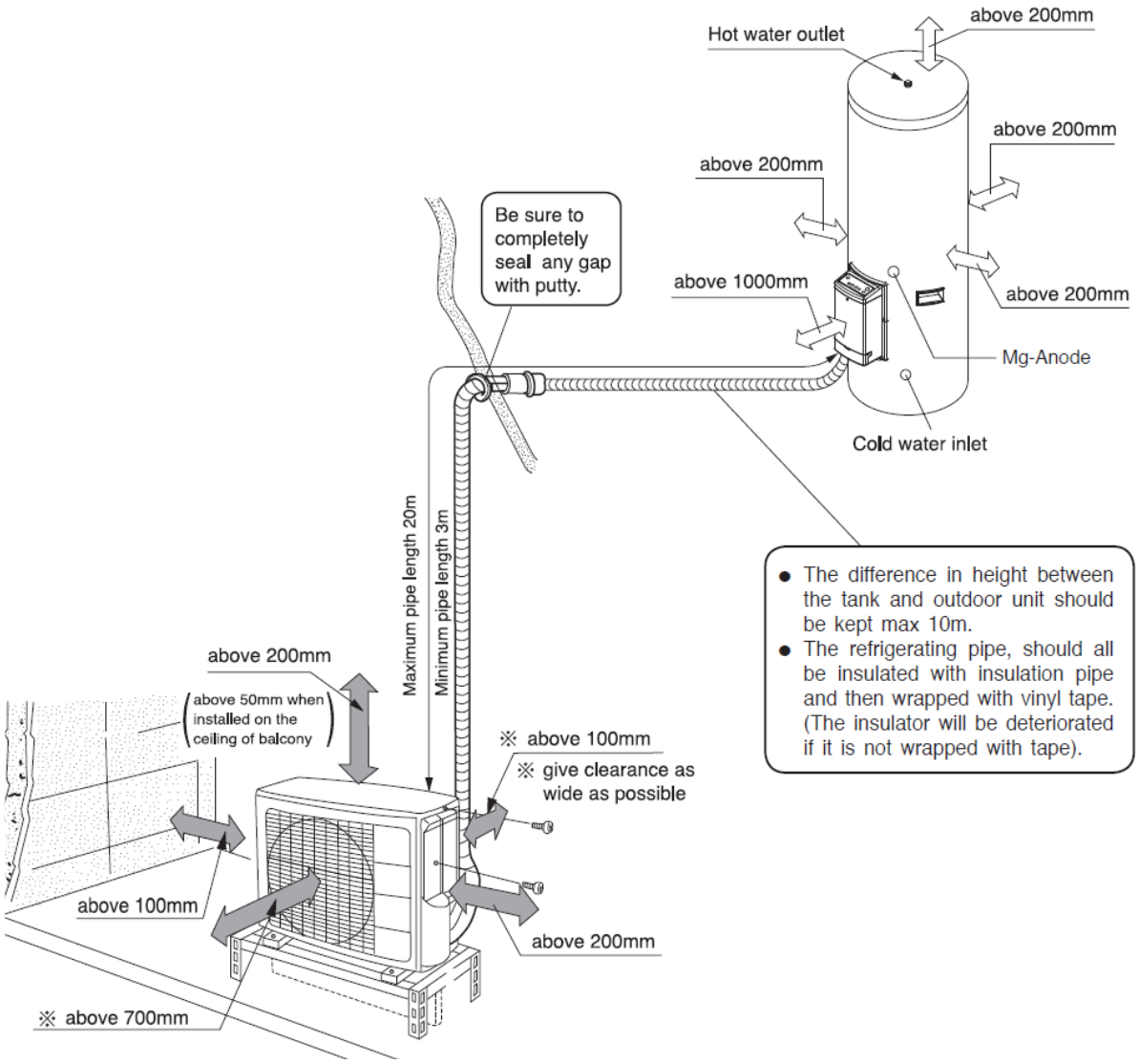


Figure showing the the Installation of Tank and Outdoor Unit.

WATER QUALITY

- Water that conforms to the drinking water regulation in each country must be used. Do not use water that contains impurities such as salinity, lime, etc. Like well-water.
- Please install the water softener device when the hardness of water is high. (Maximum hardness French degree 25ºF)

PRESSURE-RELIEF VALVE

- Pressure-relief valve must use the following one.
- The tank has to mounted with a pressure-relief, diameter ¾" following standard FN36, 40. (But this may be suitable for France only)
- The pressure-relief valve is installed in the water supply line. Between the cold water inlet and pressure-relief valve, you should not install water check valves. Pressure relief valve can prevent excess water pressure which cause volumetric expansion of heayed water. Pressure relief valve discharges up to 3% of the capacity of the equipment in the process of boiling the water.

PRESSURE REDUCING VALVE

- Please install the pressure reducing valve in the water supply line as much as possible when the tap water pressure becomes 3.5bar or more.

MIXER TAP

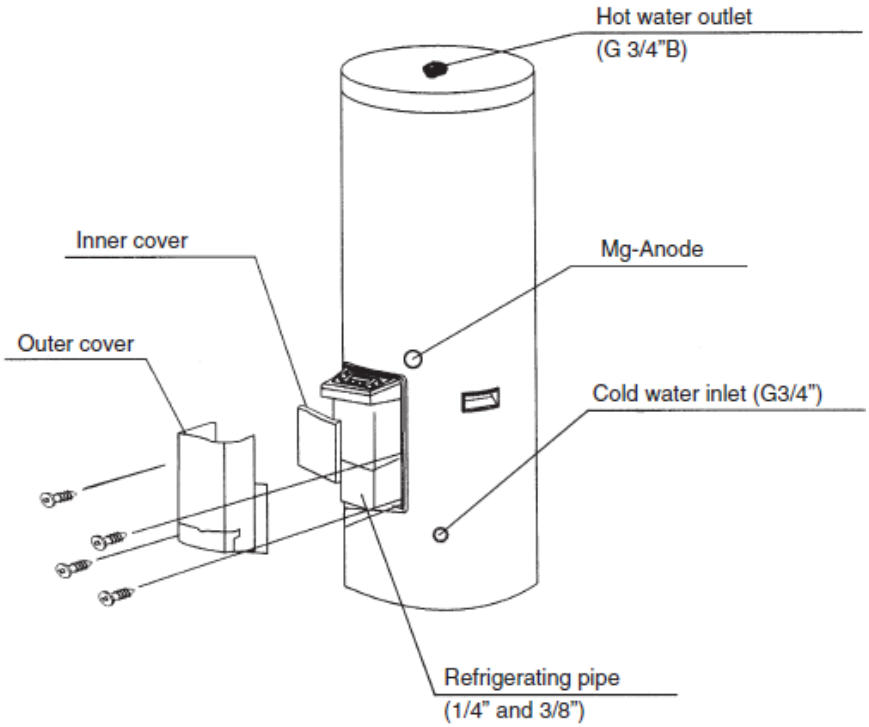
- Please install thermostat type mixer tap in each hot-water supply spot to prevent the scald accident.

PLUMBING

- Please set up the drain trap in the drainage piping. The drainage gas flows backward if there is no drain trap, the sanitary hot water pump corrodes remarkably, and it breaks down.
- Please connect it through a dielectric joint to prevent the electrolysis phenomenon.
- Please make piping parts around the tank such as pressure-relief valve and the drain valve to be easily maintained and checked.

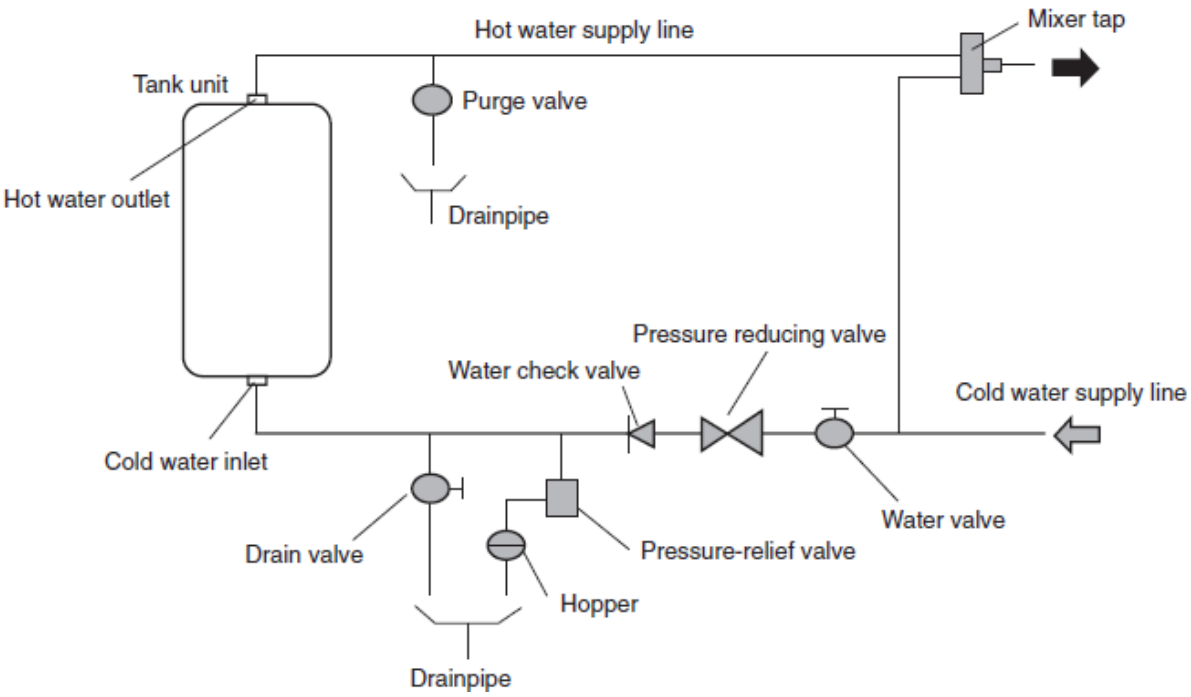
⚠ WARNING

- A pressure-relief valve should be installed. Without a pressure-relief valve, the tank may be broken.



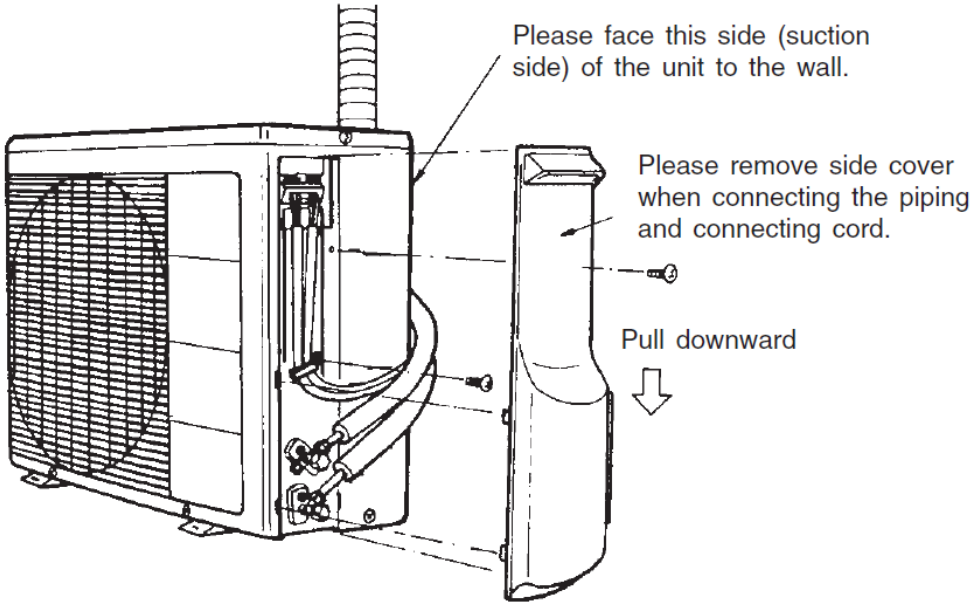
Please remove outer and inner cover when connecting the piping and connecting cord.

Please refer to the Figure below for the installation of water piping.



10.2 INSTALLATION OF OUTDOOR UNIT

- Please mount the Outdoor unit on stable ground prevent vibration and increase of noise level.
- Decide the location for piping after sorting out the different types of pipe available.
- When removing side cover, please pull the handle after undoing the hook by pulling it downward.



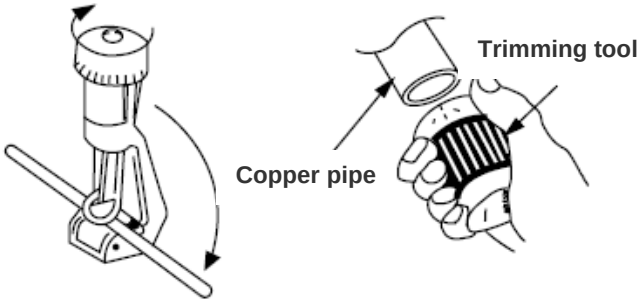
11 REFRIGERANT PIPING AND REFRIGERANT CHARGE

CONTENTS

11.1. REFRIGERANT PIPING

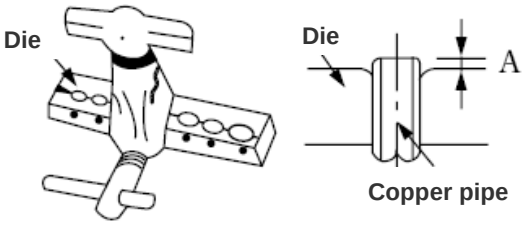
11.1.1. PREPARATION OF PIPE

- Use a pipe cutter to cut the copper pipe



CAUTION

- Jagged edge will cause leakage.
- Point the side to be trimmed downwards during trimming to prevent copper chips from entering the pipe.
- Before flaring, please put on the flare nut.

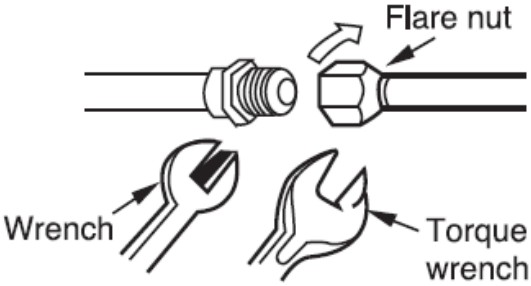


Outer diameter (Ø)	A (mm)
	For R410A tool
6.35mm (1/4")	0~0.5 mm
9.52mm (3/8")	0~0.5 mm

11.1.2. PIPE CONNECTION

Caution

- In case of removing flare nut of an indoor unit, first remove a nut of small diameter side, or else a seal cap of big diameter side will fly out. Prevent water from entering into piping when working
- Please be careful when bending the copper pipe.
- Applied frozen grease to the connection points and then screw in manually. After that, use a torque wrench to tighten the connection. Problem may arise if over tightened when connecting the pipe.



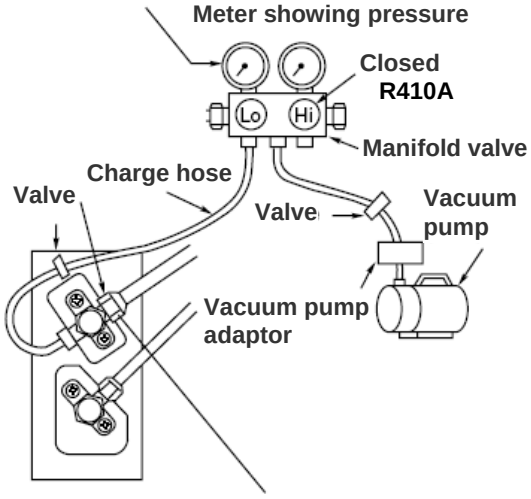
		Outer dia of pipe	Torque N.m (kgf.cm)
Small dia side		**6.35mm (1/4")**	**13.7~18.6 (140~190)**
Large dia side		**9.52mm (3/8")**	**34.3~44.1 (350~450)**
Valve head cap	Small dia side	**6.35mm (1/4")**	**19.6~24.5 (200~250)**
	Large dia side	**9.53mm (3/8")**	**19.6-24.5 (200~250)**
Valve core cap			**12.3~15.7 (125~160)**

11.1.3. REMOVAL OF AIR FROM THE PIPE AND GAS LEAKAGE INSPECTION

■ Procedures of using Vacuum Pump for Air Removal

①As shown in figure below, remove the cap of valve core. Then, connect the charge hose. Remove the cap of valve head. Connect the vacuum pump adapter to the vacuum pump and connect to the charge hose to the adapter.

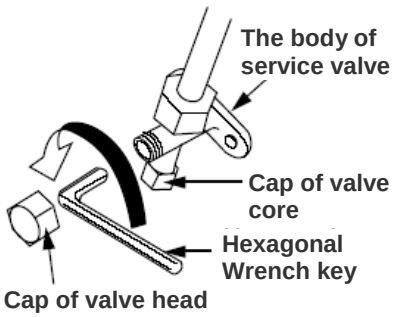
When the meter reaches -101kPa (-76cmHg) during pumping, fully tighten the shuttle

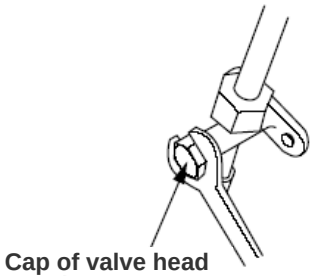


When pumping starts, slightly loosen the flare nut to check of air sucked in. Then tighten the flare nut.

②Fully tighten the "Hi" shuttle of the manifold valve and completely unscrew the "Lo" shuttle. Run the vacuum pump for about 10~15 minutes, then completely tighten the "Lo" shuttle and switch off the vacuum pump

③Completely unscrew the spindle of the service valve (at 2 places) in anticlockwise direction to allow the flow of coolant (using Hexagonal Wrench key).

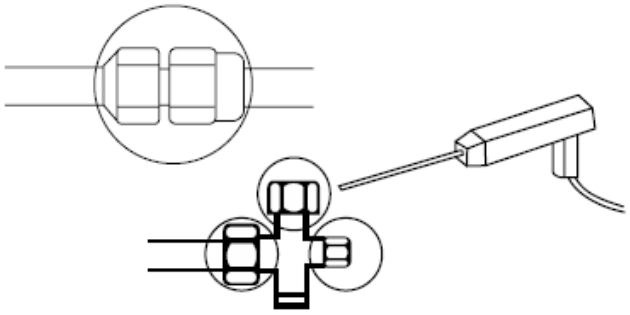




④Remove the charge hose and tighten the cap of valve head. Check the cap's periphery if there is any gas leakage. The task is then completed.

■ Gas Leakage Inspection

Please use gas leakage detector to check if leakage occurs at the connection of Flare nut as shown on the right.



11.2. RECOVERY OF REFRIGERANT DURING RELOCATION OR UNINSTALLING OF UNIT.

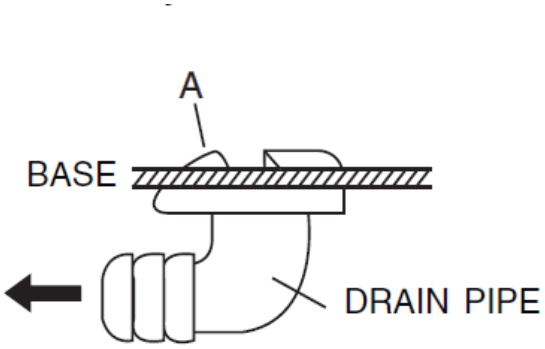
1) Switching on the outdoor unit's service switch will run the forced cooling operation.
2) After operating for around 5 minutes, rotate the service valve spindle located at the side of the small pipe rim, in a clockwise direction to achieve a full shut off.
3) After operating for around 2~3 minutes, rotate the service valve spindle located at the side of the large pipe rim, in a clockwise direction to attain a full shut off.
4) Immediately stop the forced cooling operation and switch off the power supply.
5) Use a spanner or similar tools to tighten fully all valve cap and valve core cap to their specified torque values.
6) Install and tighten the seal caps and flared nuts on all connecting mouths of each and every piping installed.

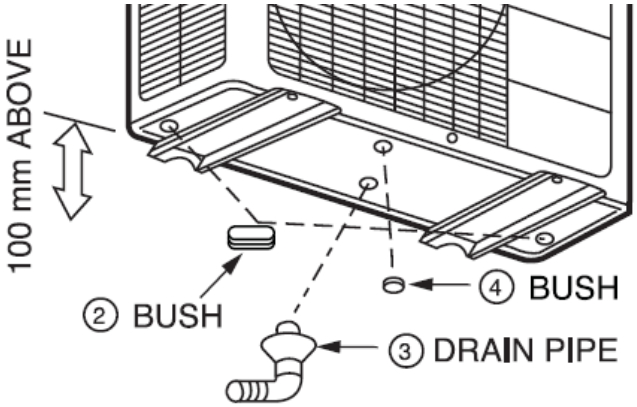
12 DRAIN PIPING

CONTENTS

12.1 CONDENSED WATER DISPOSAL OF OUTDOOR UNIT

- There are holes on the base of Outdoor unit for condensed water to exhaust.
- In order to drain out the condensed water to the drain, the unit is installed on a stand or a block so that the unit is 100mm above the ground as shown figure. Join the drain pipe to one hole.
- At first insert one portion of the hook to the base (Portion A), then pull the drain pipe in the direction shown by the arrow while inserting the hook into the base. After installation, check whether the drain pipe cling to the base firmly.





When Use and Install in Cold Areas

- When the air conditioner is used in low temperature and in snowy conditions, water from the heat exchanger may freeze on the base surface to cause poor drainage. When using the sanitary hot water heat pump in such areas, do not install the bush. Keep a space of at least 300mm between the drain hole and the supposed snow height. When using the drain pipe, consult your sales agent.

13 ELECTRICAL WIRING

CONTENTS

13.1 GENERAL CHECK

ATTENTION:

– *Turn OFF*

– *Check to ensure that the indoor tank unit and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.*

– *Protect the wires, drain pipe, electrical parts, etc. from rats or other small animals. If not protected, rats or other small animals may gnaw at unprotected parts and at the worst, a fire will occur.*

– *Avoid the wires from touching the refrigerant pipes, plate edges and electrical parts inside the unit. Otherwise, the wires will be damaged and at the worst, a fire will occur.*

CAUTION:

Tightly secure the wires with the cord clamp inside the tank unit.

NOTE:

Fix the rubber bushes with adhesive when conduit tubes to the outdoor unit are not used.

1. Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data given in this technical catalog. Make sure that the components comply with National Electrical Code (NEC).
2. Check to ensure that the power supply voltage is within ±10% of the rated voltage.
3. Check the capacity of the electrical wires. If the power source capacity is too low, the system cannot be started due to the voltage drop.
4. Check to ensure that the ground wire is connected.
5. Power Source Main Switch
   Install a multi-pole main switch with a space of 3.5mm or more between each phase.

13.2 ELECTRICAL WIRING FOR SANITARY HOT WATER HEAT PUMP UNIT

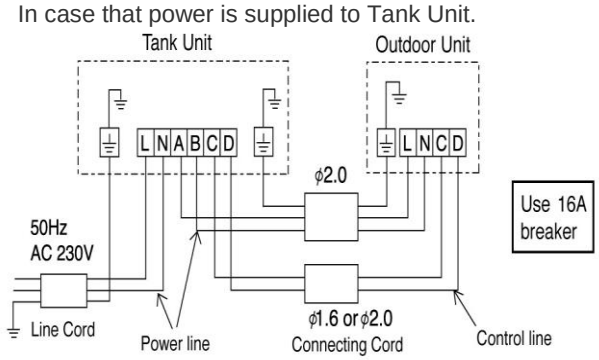
13.2.1 PROCEDURES OF WIRING

WARNING :

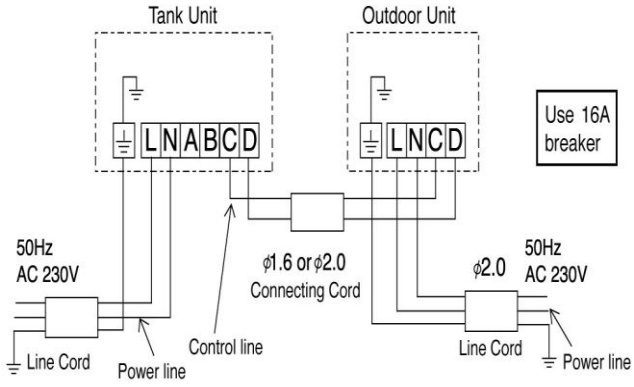
This appliance must ne earthed.

This sanitary hot water heat pump can be connected either A or B power supply method according to electricity supply contract. But how to set the switch is different in A or B.
A : Full time power supply
B : Off peak hours power supply

- In case that power is supplied to Tank Unit.



- In case that power is supplied to Tank and outdoor.

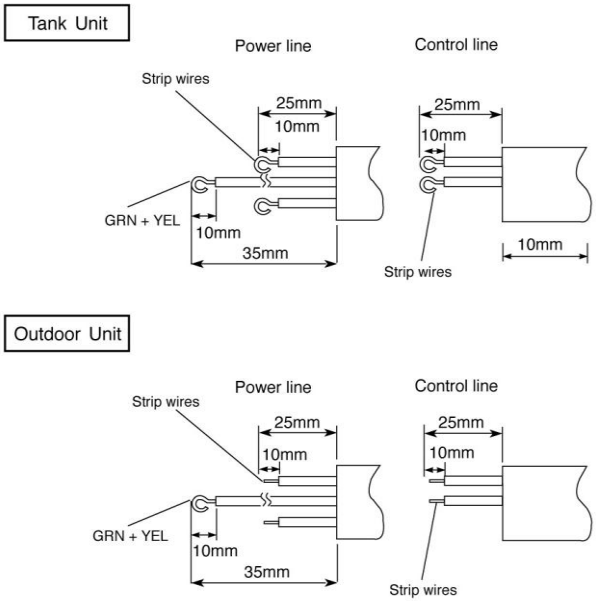


CAUTION:

Please refer to the Installation manual when connecting the wires for the tank unit and the outdoor unit.

Incorrect connection of the A, B terminal of the tank unit and the C. D terminals of the outdoot unit will damage the electrical parts of the outdoor unit

- Processing of terminal



WARNING:

- *The naked part of the wire core should be 10 mm and fix it to the terminal tightly. Then try to pull the individual wire to check if the contact is tight. Improper insertion may cause the terminal to burn.*
- *Be sure to use only power cables approved from the authorities from your country. For example in Germany: Cable type : NYM 3x1.5mm^2*
- *Please refer to the installation manuals for wire connection to the terminals of the units. The cabling must meet the standards of electrical installation*
- *There is an AC voltage of 230V between the L and N terminals. Therefore, before servicing, be sure to remove the plug from the AC outlet or switch off the main switch.*

13.2.2 CHECKING FOR THE ELECTRIC SOURCE AND THE VOLTAGE RANGE

- Before installation, the power source must be checked and necessary wiring work must be completed. To make the wiring capacity proper, use the wire gauges list below for the lead-in from a pole transformer and the wiring from a switch board of fuse box to the mian switch and tank unit and ourdoor unit in consideration of the locked rotor current.

IMPORTANT

Cable Length	Wire cross-section
up to 6m	1.6mm²
up to 15m	2.5mm²
up to 25m	2.5mm²

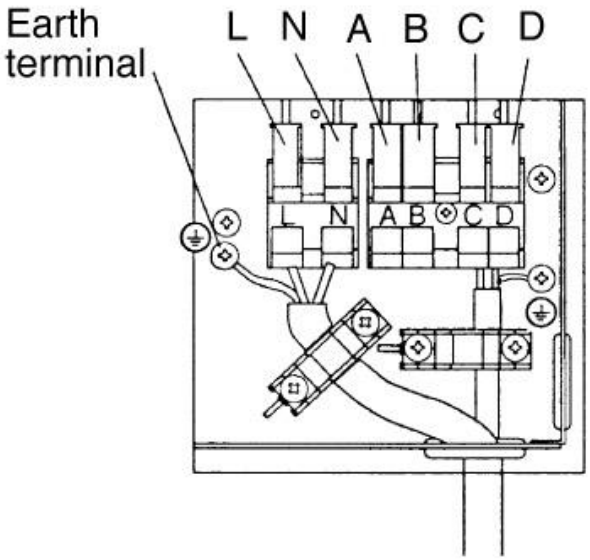
- Investigate the power supply capacity and other electrical conditions at the installation location. Depending on the model of room air conditioner to be installes, request the customer to make arrangements for the necessaty electrical work, etc. The electrical work includes the wiring work up the outdoor. In localities where electrical conditions are poor, use of a voltage regulation is recommended.

13.2.3 WIRING OF THE TANK UNIT

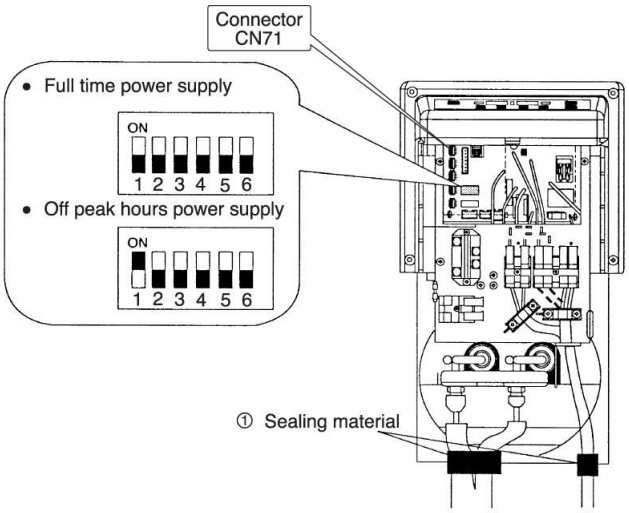
- Please remove outer and inner cover for wire connection.

WARNING:

- *Please fix the connecting cord in the band. If it is not fixed, external force apply to joint, it causes heat and a fire, etc.*
- *The connecting cord should not touch to pipes. (It becomes high temperature.) Please install outer and inner cover surely after constructs it.)*



- This switch must be set before turning on the electric power.



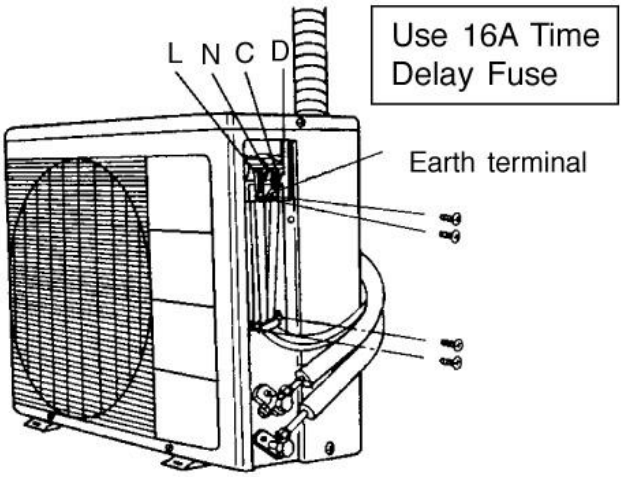
- The space with the penetration part of the cover is buried.

Once turning on the electric power, the setting cannot be changed for a few minutes or for a few hours after turning off the power, until the electricity charged in the electric parts is discharged.
In case that it is necessary to change the setting of the switch after turning on the electric power, please follow the procedure below.
The method to change the setting after turning on the electric power:

1) Turn off the electric power.
2) Get off outer cover and inner cover from the control box.
3) Pull out the connector CN71 from PWB assembly.
4) Wait more than ten seconds.
5) Change thesetting of the switch.
6) Reconnect the connector CN71.
7) Attached inner cover and outer cover of the control box.

13.2.4 WIRING OF THE OUTDOOR UNIT

- Please remove the side cover for wire connection.



WARNING:

- *If you cannot attach the side cover due to the connecting cord, press the connecting cord in direction to the front panel to fix it.*
- *Be sure that the hooks of the side cover are fixed in certainly. Otherwise water leakage may occur and this causes short circuit or faults.*
- *The connecting cord should not touch to service valve and pipes. (It becomes high temperature.)*
- *Please fix the connecting cord in the band. If it is not fixed, external force apply to joint, it causes heat and a fire.etc.*

14 TROUBLESHOOTING

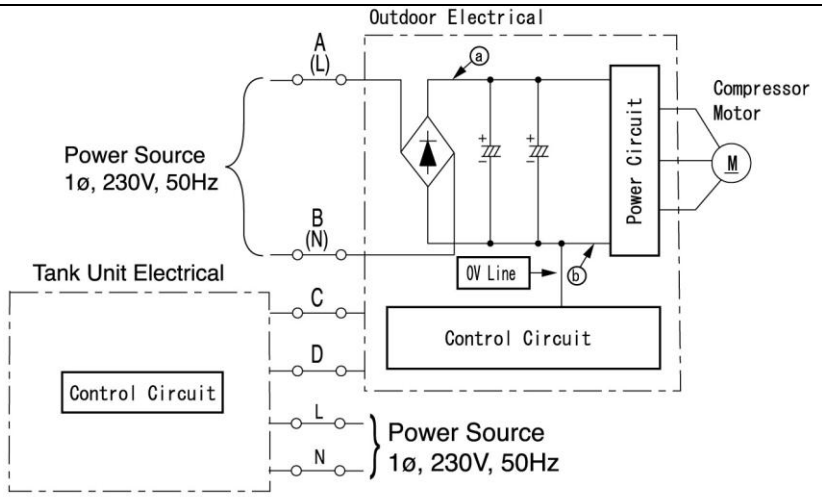
CONTENTS

14.1 PRECAUTIONS FOR TROUBLE SHOOTING

14.1.1 SANITARY HOT WATER HEAT PUMP, RAW-25NH2A

CAUTION

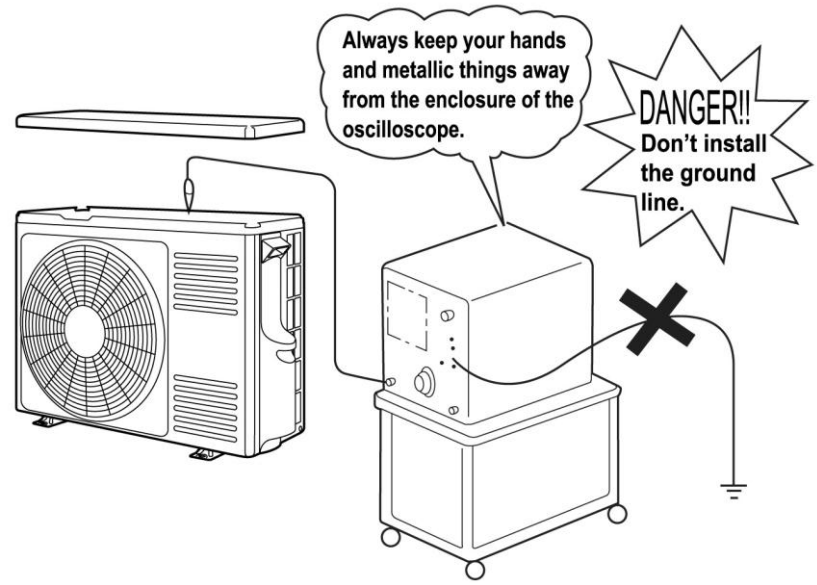
1. Remember that the 0V line is biased to 320 – 360V in reference to the ground level.
2. Also note that it takes about 10 minutes until the voltage fall after the power switch is turned off.



Across a - b (0V line) ----------approx 320 - 360V
Across a - ground ----------approx 155 - 170V
Across b (0V line) - ground -------approx 155 - 170V

CAUTION

When using an oscilloscope, never ground it. Don't forget that high voltages as noted above may apply to the oscilloscope.



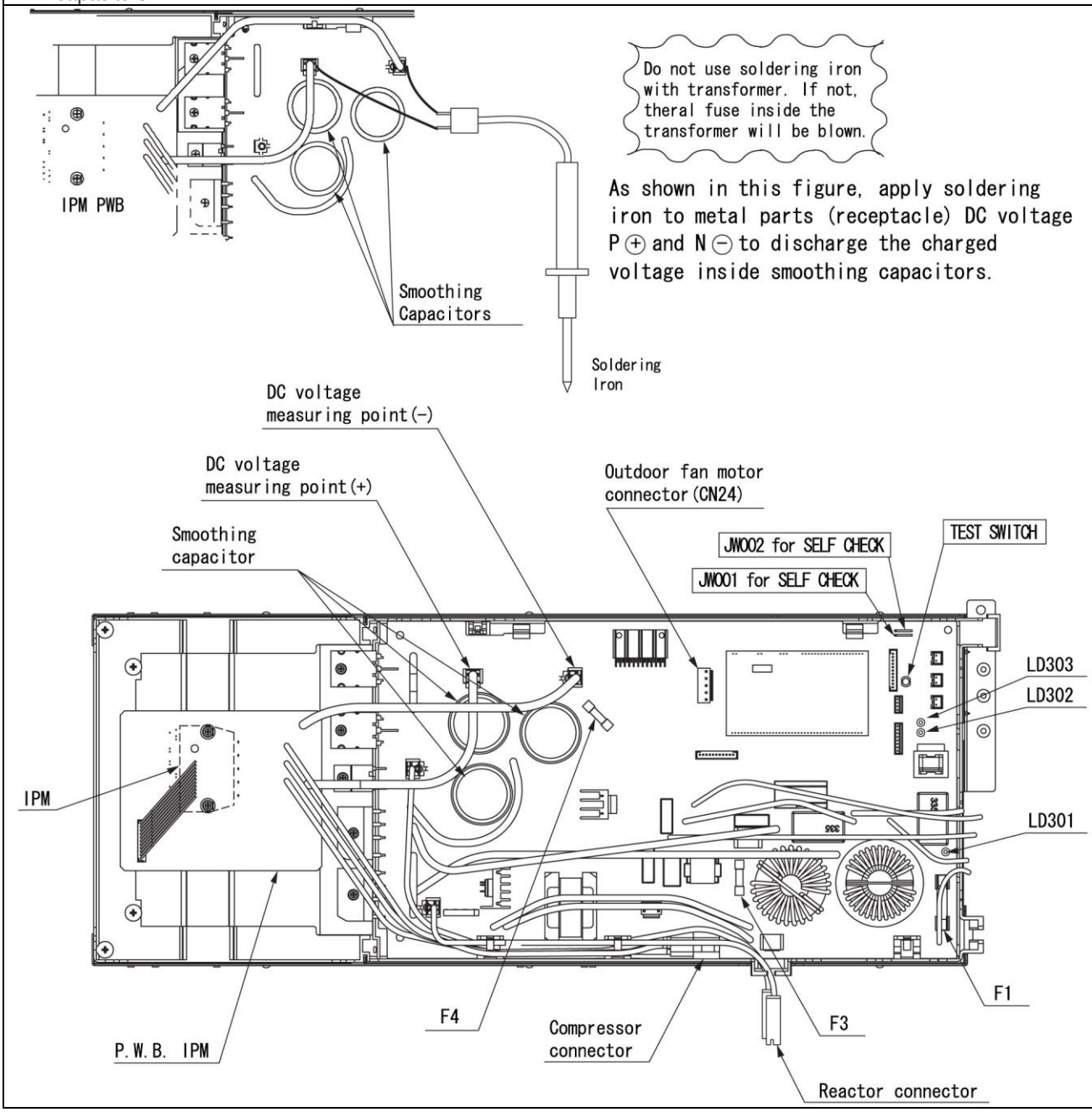
14.2 DISCHARGE PROCEDURE AND METHOD TO STOP ENERGIZE THE POWER CIRCUIT

⚠ WARNING ⚡

Caution

- Voltage of about 300-330V is charged between both ends of smoothing capacitors.
- During continuity check for each part of circuit in outdoor electrical parts, be sure to discharge smoothing capacitor to prevent secondary trouble.

1) Turn OFF power supply to the outdoor unit.
2) After power is turned OFF, wait for 15 minutes or more. Then remove electrical parts cover and apply soldering iron of 30 to 75W for 15 seconds or more to DC voltage (+) and DC voltage (-) terminals in order to discharge voltage in smoothing capacitors.

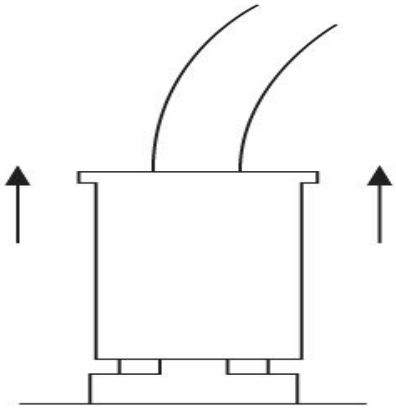


Other cautions

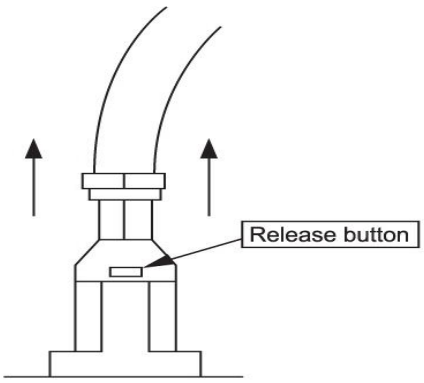
1) Disconnection of tab terminal receptacle

All receptacle used to connect with tab terminal are built with lock mechanism. Please take note that by using a force to pull out the receptacle without releasing the lock, can cause a damage. Furthermore, during connecting the receptacle back make sure to securely insert until end.

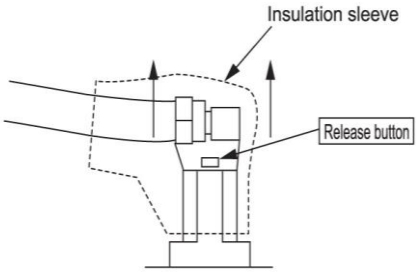
*Receptacle type and procedure to releasing the lock.



Vertical type (with plastic casing)
Pull out by holding the plastic casing.



Vertical type (without casing)
Pull out while pushing the release button.

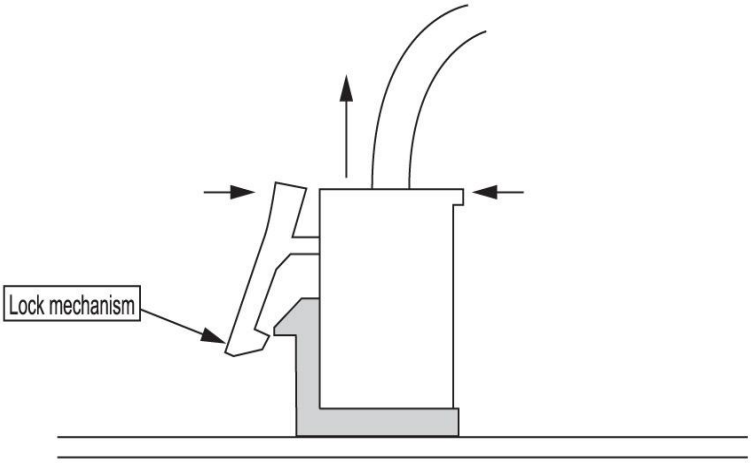


Horizontal type (with insulation sleeve)
Pull out from top of insulation sleeve while pushing the release button.

2) Disconnecting on board connector

On board connector with lock mechanism are widely used. Please take note that by using a force to pull out without releasing the lock mechanism, can cause a damage. Furthermore, during inserting back the connector make sure it surely done.

Release lock with finger before disconnecting.



3) Connector disconnection during discharge is prohibited

Disconnecting connector during discharge is extremely prohibited. Component on board and fan motor will damage. Proceed troubleshooting process after confirming smoothing capacitor of indoor & outdoor pwb has been discharge.

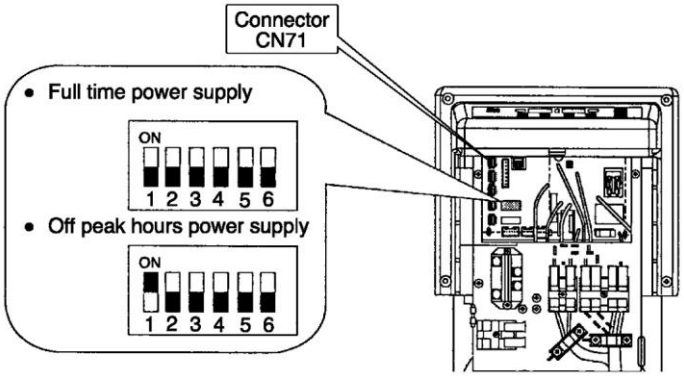
14.3 METHOD TO RESET MICROCOMPUTER

If once the electric power is connected, the microcomputer cannot be reset until the electricity charged into electric parts is completely discharged. In case of some trouble or error of setting and that it is necessary to reset the microcomputer, please follow the procedure below to discharge the electricity inside.

1. In case to change the choice of the way of power supply according to the contract to the electric power company.

In case that it is necessary to change the setting of the switch after turning on the electric power, please follow the procedure below:

1) Turn off electric power
2) Get off outer cover and inner cover from the control box.
3) Pull out the connector CN71 from PWB assembly.
4) Wait more than ten seconds until
5) *Change the setting of the switch
6) Reconnect the connector CN71
7) Attached inner cover and outer cover of the control box



2. In case to have fallen into error mode of "E0 03" after turning on the power of outdoor unit.

In case that the electric power is supplied to both of tank unit and outdoor unit, must do turn on the outdoor unit side first. If the tank side is turned on first, it may fall into error mode of "E0 03" and to unable to operate. When once the tank side is turned on first and it falls in to error mode of "E0 03" by mistake, please turn on the outdoor first, then turn on the tank side, after following measures.

1) Turn off electric power
2) Get off outer cover and inner cover from the control box.
3) Pull out the connector CN71 from PWB assembly.
4) Wait more than ten seconds
5) Reconnect the connector CN71
6) Attached inner cover and outer cover of the control box

If error mode does not disappear after the procedure above, the machine is broken.

3. In case to have fallen into error mode of the tank unit trouble "E0 **"

1) Turn off the electric power
2) Get off outer cover and inner cover from the control box
3) Pull out the connector CN71 from PWB assembly
4) Wait more than ten seconds
5) Reconnect the connector CN71
6) Turn on the electric power
7) Make a trial operation
8) Attach inner cover and outer cover of the control box.

4. In case to have fallen into error mode of the outdoor unit trouble "E1 **"

It is not possible to restart the operation after once falling into error mode of the outdoor unit trouble "E1 **", because the microcomputer of the tank controller is keeping this error in the memory.

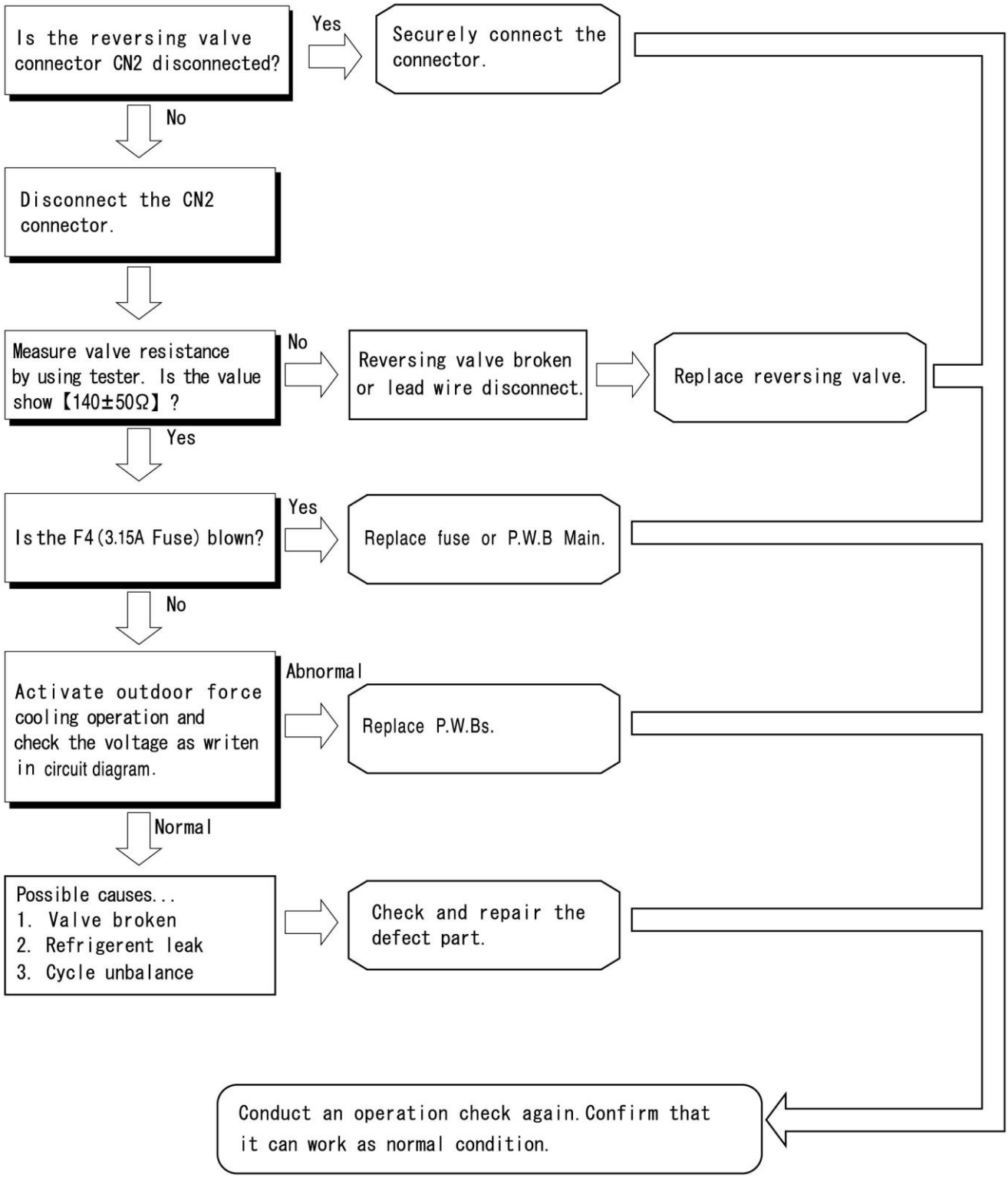
After finishing the maintenance or repair, please release the error mode of outdoor unit trouble "E1 **" according to the procedure below.

And this procedure will erase all of the previous setting, therefore please reset each of them.

1) Turn on the electric power. (In case that the electric power has already turned on, turn off once and turn on again.)
2) With keeping to push "UP button (△)", push "START/STOP button (⏻) "for more than 5 seconds. Until heard a beep sound.
3) Turn off the electric power
4) Get off outer cover and inner cover from the control box
5) Pull out the connector CN71 from PWB assembly
6) Wait more than ten seconds
7) Reconnect the connector CN71
8) Turn on the electric power
9) Error code indication disappears
10) Make a trial operation
11) Attach inner cover and outer cover of the control box
12) Reset each function of the current time and the day of the week, hot water setting temperature, timer operation, anti bacteria operation, ECO mode and so on.

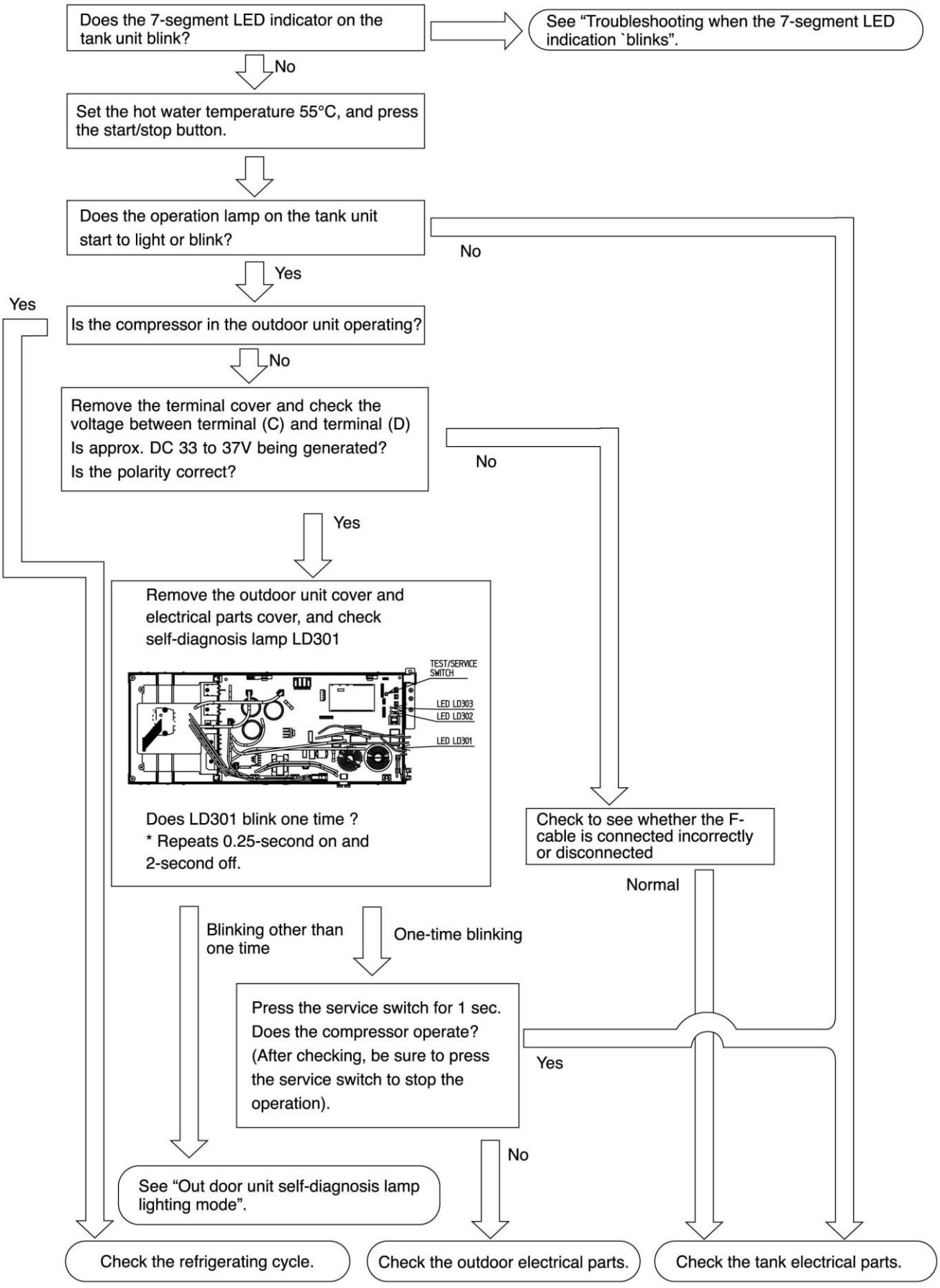
14.4 CHECKING THE 7-SEGMENT LED INDICATOR IF BLINKING “E0 01”

<Caution> Please turn OFF power supply before proceed with below checking flow.



14.5 CHECKING THE TANK/OUTDOOR UNIT ELECTRICAL PARTS AND REFRIGERATING CYCLE

MODEL TAW-270NH2



14.5.1 TO SEE THE RECORD OF TROYBLE

By the following procedure, the record of trouble can be indicated at the 7-segment indicator on the control box.

1) Once turn off the electric power by a circuit breaker, and turn on again.
2) While keeping to push “UP button (△)”, push “ECO button (🌂)” for more than 5 seconds at same time.
3) At first, the latest record of trouble code is indicated.

Example of the indication for trouble of tank unit

Example of the indication for trouble of outdoor unit

4) In order to indicate the record of previous trouble, push “DOWN button (▽)”. Previous 7 records of trouble can be indicated each time by pushing the button.

Release from seeing the record of trouble

While keeping to push “UP button (△)”, push “ECO button (ECO)” for more than 5 seconds at the same time.

14.5.2 THE METHOD TO REASE TROUBLE RECORDS

After finishing repair, please erase trouble records inside the microcomputer according to the following procedure.

1) Turn on the electric power. (In case that the electric power has already turned on, turn off once and turn on again.)
2) With keeping to push “ UP button (△)”, pushing “ FUNCTION button (☰)” for more than 5 seconds. Trouble records are erased.

14.5.3 TO SEE THE CONDITION OF POWER OPERATION

By the following procedure, the condition of current operation can be indicated at the 7-segment LED indicator on the control box.

1. While keeping to pushing “UP button (△)”, pushing “BOOST button ( )” for more than 5 seconds at the same time.
2. “ECO” LED indicator blinks and the condition of current operation is indicated.
3. By pushing “UP button (△)” or “DOWN button( )▽”, the following indication shifts in turn.

	Example of indication	
1) Compressor speed		Current compressor rotation speed (100 times indicated right two figures. Per minute)
2) Outdoor temperature		Current outdoor temperature (right two figures, degree Celsius)
3) Defrost signal		Defrost signal “ON” : right two figures “01” Defrost signal “OFF” : right two figures “00”
4) Water temperature 1		Right two figures “00” always indicated: No meaning
5) Water temperature 2		Current water temperature near the electric heater (right two figures, degree Celsius)
6) Water temperature 3		Current water temperature near the heat exchanger (right two figures, degree Celsius)
7) Compressor delivery pressure		Right two figures “00” always indicated: No meaning
7) Water heat exchanger temperature out		Current temperature of heat exchanger inlet (right two figures, degree Celsius)
8) Water heat exchanger temperature out		Right two figures “00” always indicated : No meaning
9) Electric heater operate		Heater “ON” : right two figures “01” Heater “OFF” : right two figures “00”

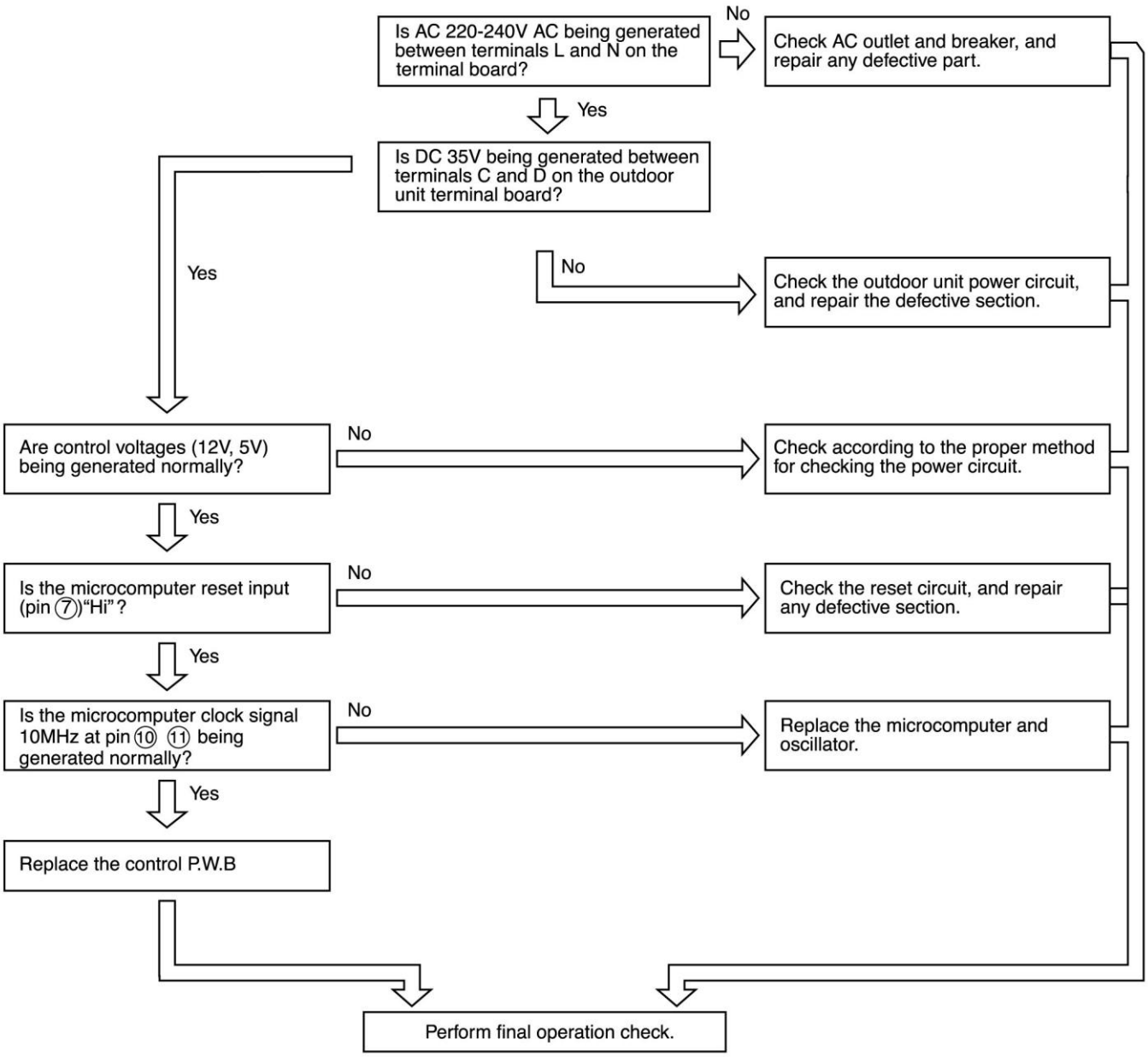
Release from seeing the condition of current operation

While keeping to push “UP button (△)”, push “BOOST button ( ) “ for more that 5 seconds at the same time.

14.6 CHECKING TANK UNIT ELECTRICAL PARTS

MODEL RAW-25NH2

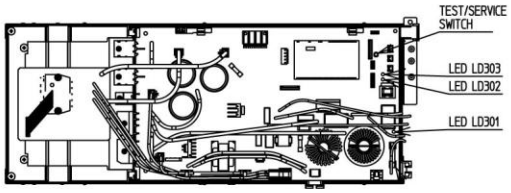
1. Power does not come on (no operation)



2. Outdoor unit does not operate

Set to hot water temperature 55°C, and press the start/stop button.

Remove the outdoor unit cover and electrical parts cover, and check self-diagnosis lamp LD301.



Does LD301 blink one time?
*Repeats 0.25-second on and 2-second off.

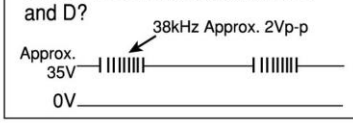
Yes → Check the hot water temperature thermistor; if it is defective, replace it.
<Normal values>
10°C → approx. 20kΩ
25°C → approx. 10kΩ
30°C → approx. 8kΩ

Check the heat exchanger thermistor; if it is defective, replace it.
<Normal values>
10°C → approx. 20kΩ
25°C → approx. 10kΩ
30°C → approx. 8kΩ

No

Does outdoor electrical part LD301 blink nine times?

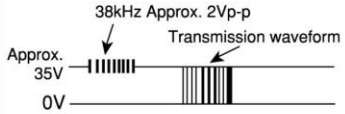
Yes → Is the indoor/outdoor unit communication signal superimposed on 35V DC of connection wires C and D?



No → Check outdoor electrical parts, and repair any defective parts (around the outdoor interface transmitting circuit).

Yes

Is the indoor transmitting signal being generated at Q801's collector?



No → Check the indoor interface transmitting circuit. Replace IC801.

Yes → Check outdoor electrical parts, and repair any defective parts (around the outdoor interface transmitting circuit).

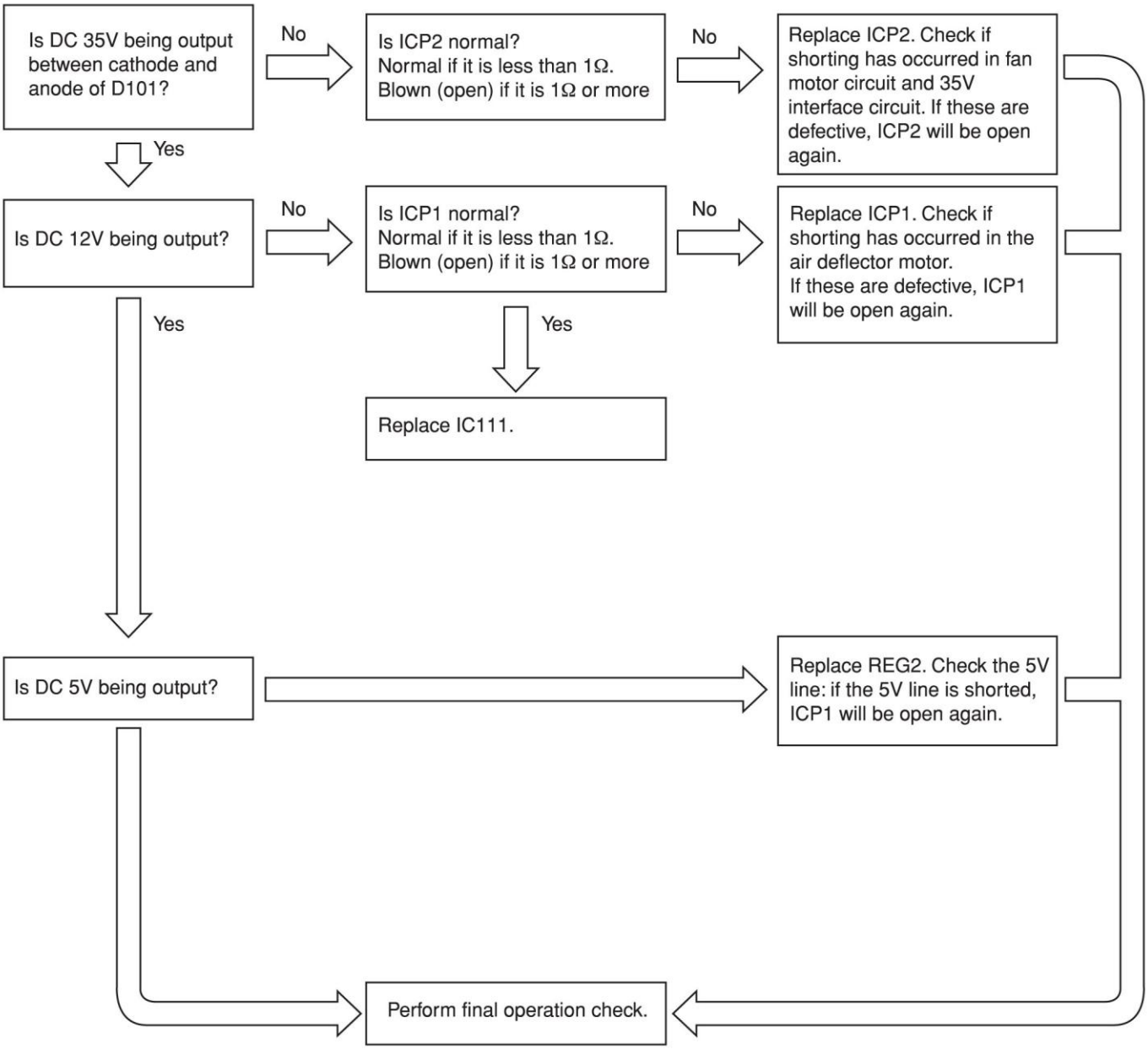
No

Does LD303 switch off several second after it lights?

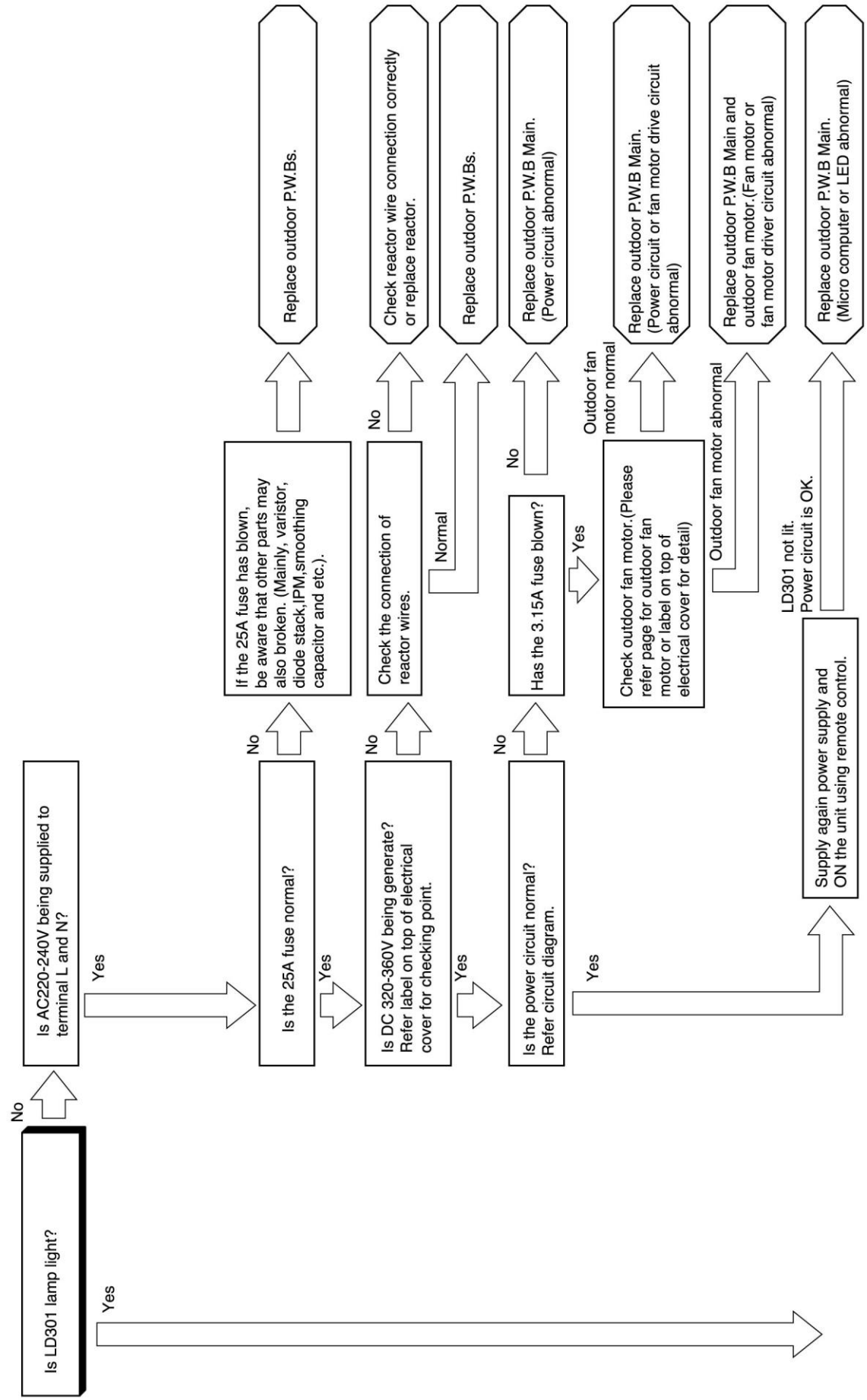
Yes → Check outdoor electrical parts, and repair any defective parts.

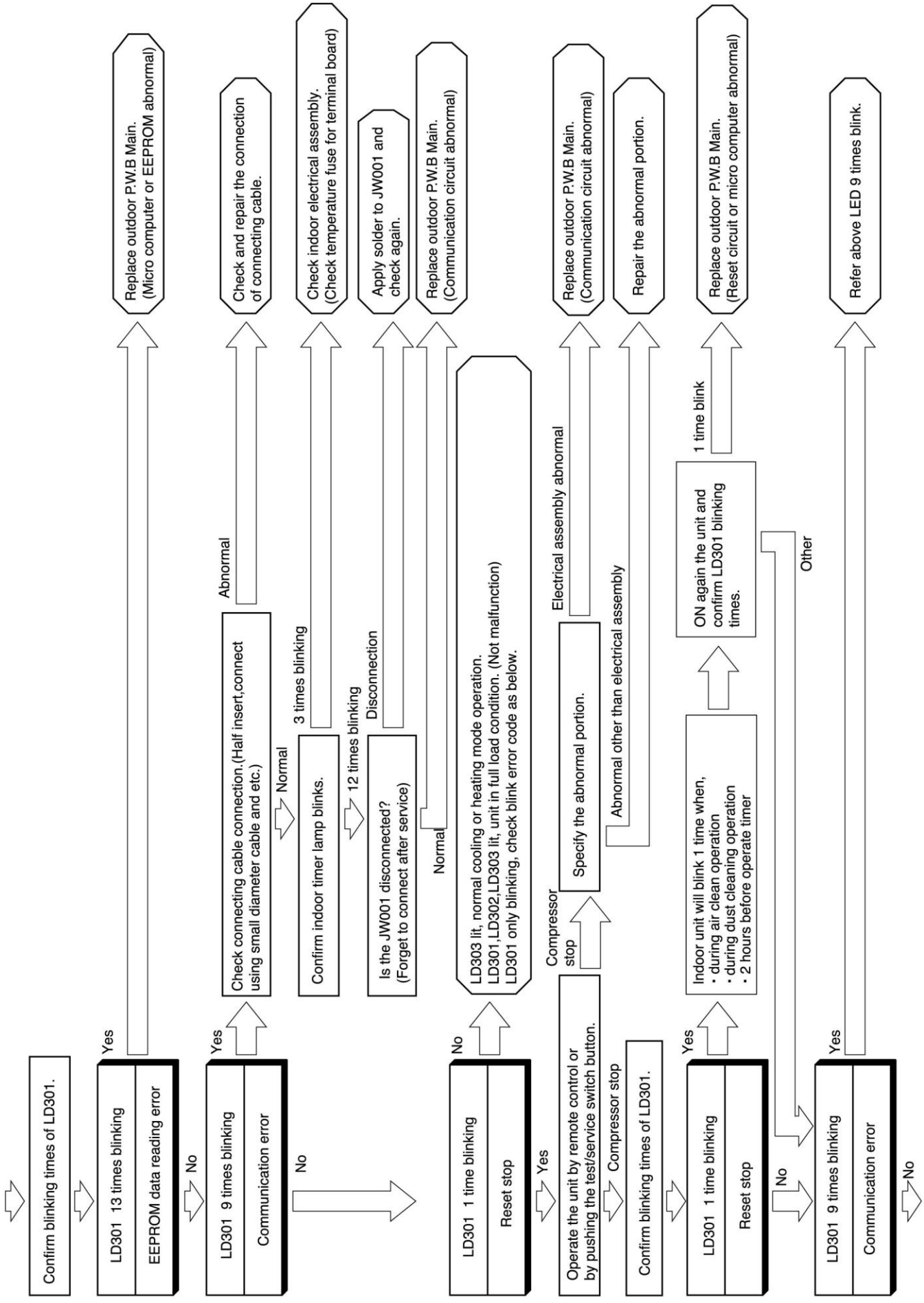
Perform final operation check.

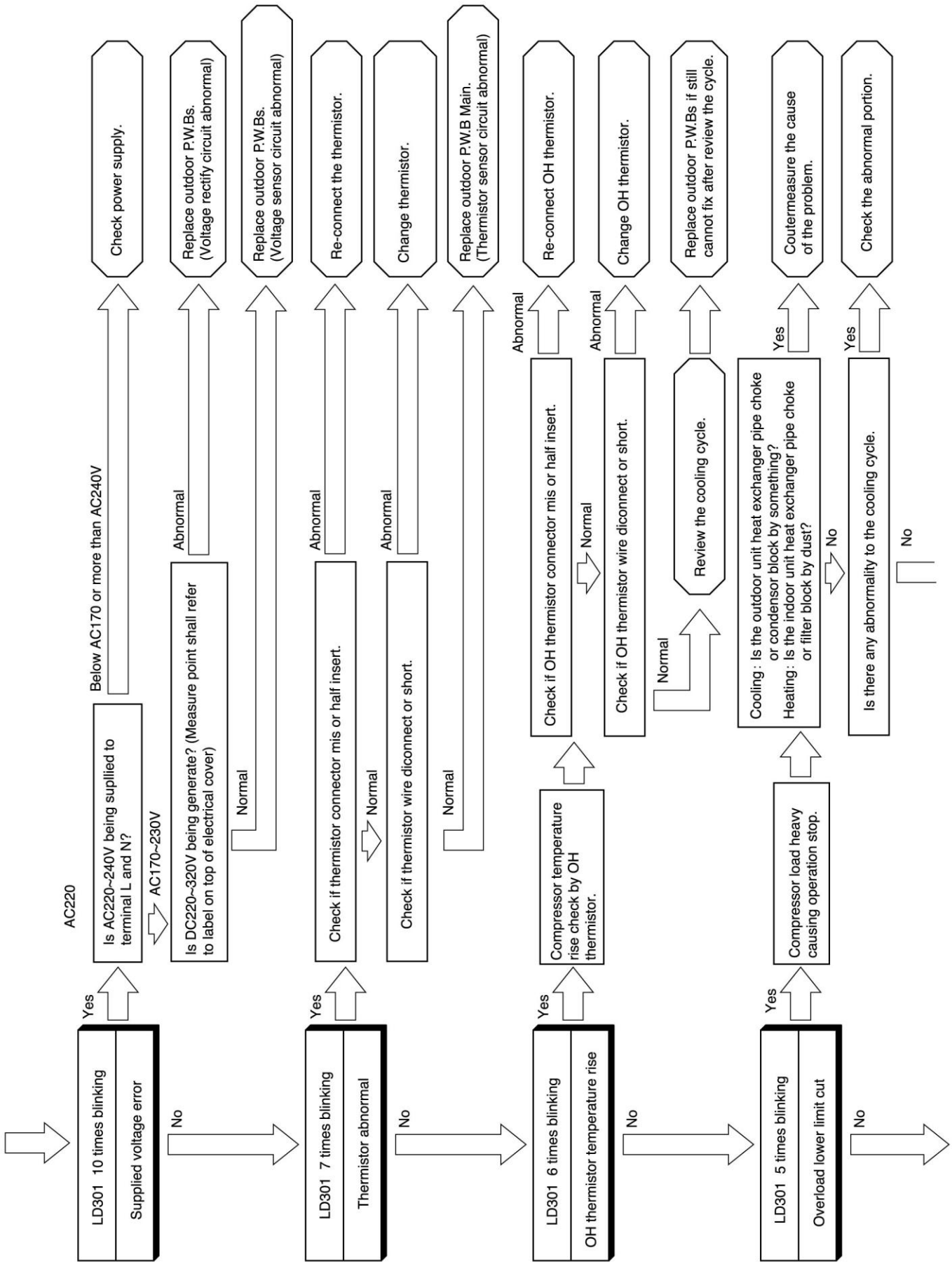
3. Check the main P.W.B (power circuit)

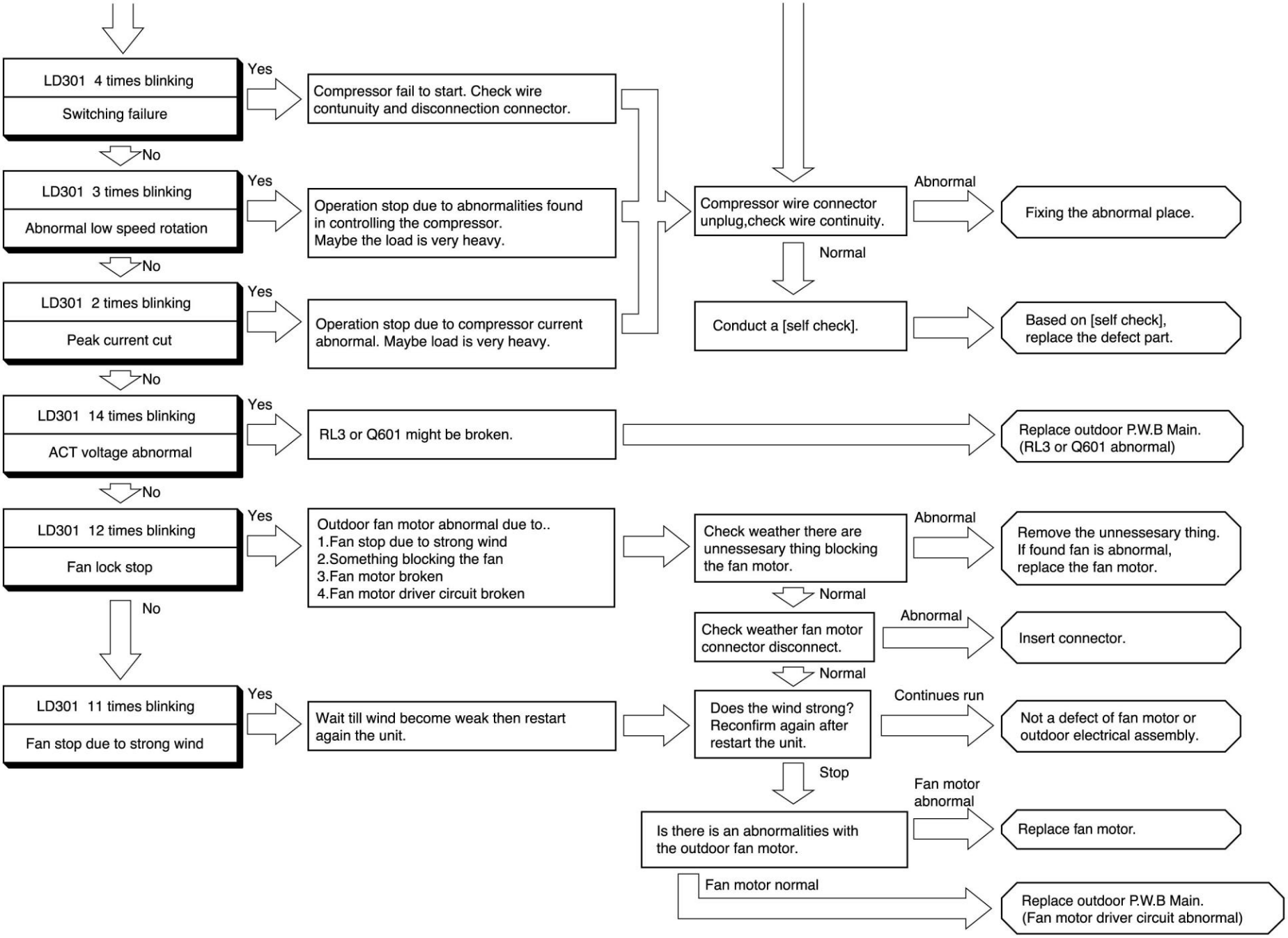


14.7 CHECKING OUTDOOR UNIT ELECTRICAL PART




Confirm blinking times of LD301.
LD301 13 times blinking
EEPROM data reading error
Yes
Replace outdoor P.W.B Main.
(Micro computer or EEPROM abnormal)
No
LD301 9 times blinking
Communication error
Yes
Check connecting cable connection.(Half insert,connect using small diameter cable and etc.)
Abnormal
Check and repair the connection of connecting cable.
Normal
Confirm indoor timer lamp blinks.
3 times blinking
Check indoor electrical assembly. (Check temperature fuse for terminal board)
No
Is the JW001 disconnected? (Forget to connect after service)
12 times blinking
Disconnection
Apply solder to JW001 and check again.
Normal
Replace outdoor P.W.B Main. (Communication circuit abnormal)
LD303 lit, normal cooling or heating mode operation.
LD301,LD302,LD303 lit, unit in full load condition. (Not malfunction)
LD301 only blinking, check blink error code as below.
No
LD301 1 time blinking
Reset stop
Yes
Operate the unit by remote control or by pushing the test/service switch button.
Compressor stop
Specify the abnormal portion.
Electrical assembly abnormal
Replace outdoor P.W.B Main. (Communication circuit abnormal)
Abnormal other than electrical assembly
Repair the abnormal portion.
Compressor stop
Confirm blinking times of LD301.
Yes
LD301 1 time blinking
Reset stop
Indoor unit will blink 1 time when,
• during air clean operation
• during dust cleaning operation
• 2 hours before operate timer
ON again the unit and confirm LD301 blinking times.
1 time blink
Replace outdoor P.W.B Main. (Reset circuit or micro computer abnormal)
Other
No
Yes
LD301 9 times blinking
Communication error
No
Refer above LED 9 times blink.


AC220
LD301 10 times blinking
Supplied voltage error
Yes
Is AC220~240V being supllied to terminal L and N?
Below AC170 or more than AC240V
Check power supply.
AC170~230V
No
Is DC220~320V being generate? (Measure point shall refer to label on top of electrical cover)
Abnormal
Replace outdoor P.W.Bs. (Voltage rectify circuit abnormal)
Normal
Replace outdoor P.W.Bs. (Voltage sensor circuit abnormal)
LD301 7 times blinking
Thermistor abnormal
Yes
Check if thermistor connector mis or half insert.
Abnormal
Re-connect the thermistor.
Normal
Check if thermistor wire diconnect or short.
Abnormal
Change thermistor.
Normal
Replace outdoor P.W.B Main. (Thermistor sensor circuit abnormal)
No
LD301 6 times blinking
OH thermistor temperature rise
Yes
Compressor temperature rise check by OH thermistor.
Check if OH thermistor connector mis or half insert.
Abnormal
Re-connect OH thermistor.
Normal
Check if OH thermistor wire diconnect or short.
Abnormal
Change OH thermistor.
Normal
Review the cooling cycle.
Replace outdoor P.W.Bs if still cannot fix after review the cycle.
No
LD301 5 times blinking
Overload lower limit cut
Yes
Compressor load heavy causing operation stop.
Cooling : Is the outdoor unit heat exchanger pipe choke or condensor block by something?
Heating : Is the indoor unit heat exchanger pipe choke or filter block by dust?
Yes
Coutermeasure the cause of the problem.
No
Is there any abnormality to the cooling cycle.
Yes
Check the abnormal portion.
No


LD301 4 times blinking
Switching failure
Yes
Compressor fail to start. Check wire contunuity and disconnection connector.
No
LD301 3 times blinking
Abnormal low speed rotation
Yes
Operation stop due to abnormalities found in controlling the compressor. Maybe the load is very heavy.
No
LD301 2 times blinking
Peak current cut
Yes
Operation stop due to compressor current abnormal. Maybe load is very heavy.
No
LD301 14 times blinking
ACT voltage abnormal
Yes
RL3 or Q601 might be broken.
Replace outdoor P.W.B Main. (RL3 or Q601 abnormal)
No
LD301 12 times blinking
Fan lock stop
Yes
Outdoor fan motor abnormal due to..
1.Fan stop due to strong wind
2.Something blocking the fan
3.Fan motor broken
4.Fan motor driver circuit broken
Check weather there are unnessesary thing blocking the fan motor.
Abnormal
Remove the unnessesary thing. If found fan is abnormal, replace the fan motor.
Normal
Check weather fan motor connector disconnect.
Abnormal
Insert connector.
Normal
No
LD301 11 times blinking
Fan stop due to strong wind
Yes
Wait till wind become weak then restart again the unit.
Does the wind strong? Reconfirm again after restart the unit.
Continues run
Not a defect of fan motor or outdoor electrical assembly.
Stop
Is there is an abnormalities with the outdoor fan motor.
Fan motor abnormal
Replace fan motor.
Fan motor normal
Replace outdoor P.W.B Main. (Fan motor driver circuit abnormal)
Compressor wire connector unplug,check wire continuity.
Abnormal
Fixing the abnormal place.
Normal
Conduct a [self check].
Based on [self check], replace the defect part.

14.8 SELF CHECK

When self-diagnosis lamp blinks 2,3,4 and 5 times happen, to determine whether compressor faulty or electrical unit faulty, please conduct a SELF CHECK as below.

*SELF CHECK diagnosis method

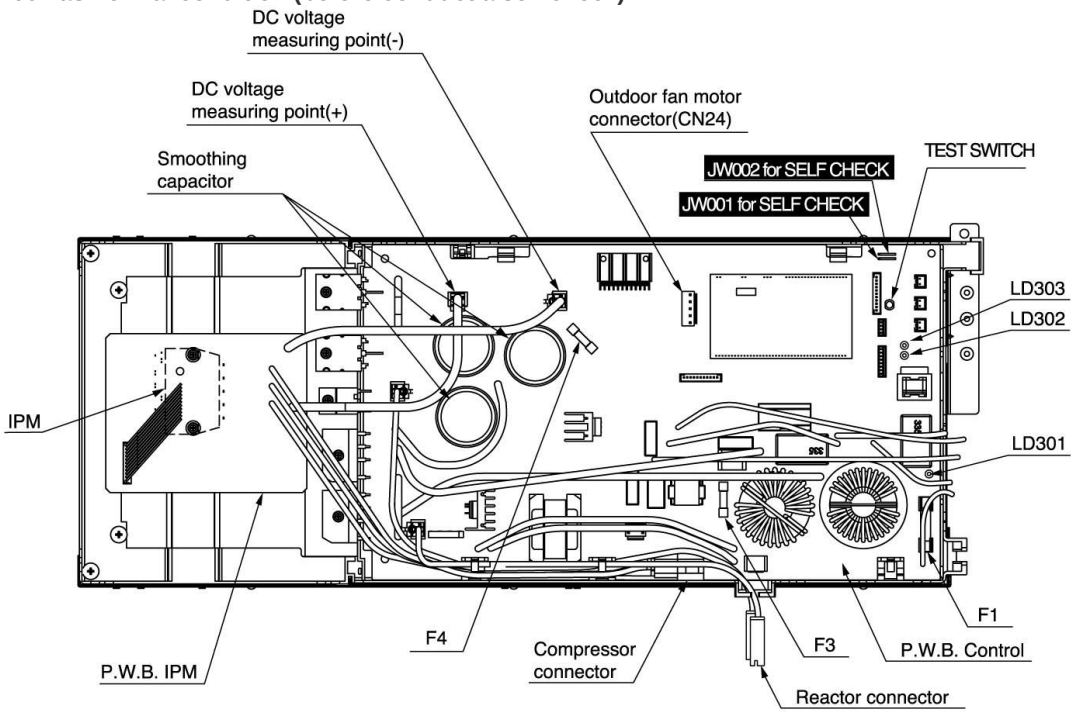
1. Switch OFF main power supply.
2. Cut JW001 (become open) or short circuit between JW001 and JW002.
3. Switch ON main power supply (LD302 will blink 1 time).
4. Press Test/Service Switch for 1 second or more.
5. Self-diagnosis result will be shown (LD303 light on and LD301 will be blinking), refer diagnosis table 2.
6. Switch OFF main power supply.
   If JW001 open : solder it to joint back
   If JW001 and JW002 short : release back to original condition (No short circuit condition)

***SELF CHECK diagnosis result**

SELF-DIAGNOSIS LIGHTING MODE ■ LIT ▨ BLINKING □ OFF				
LD301 RED	LD302 RED	LD303 RED	SELF-DIAGNOSIS RESULT	REPAIR METHOD
▨ 1 TIME	□	■	ELECTRICAL OK	① CHANGE COMPRESSOR
▨ 2 TIMES	□	■	PEAK CURRENT CUT OFF	① CHANGE P.W.B.s
▨ 7 TIMES	□	■	COMPRESSOR CURRENT ABNORMAL	① IF COMPRESSOR CONNECTOR LOOSE OR NG – CHECK CONNECTOR CONDITION ② IF COMPRESSOR CONNECTOR OK, – CHECK COMPRESSOR, CHANGE P.W.B.s
▨ 10 TIMES	□	■	DC VOLTAGE ABNORMAL	① IF AC VOLTAGE INPUT ABNORMAL (OVER STANDARD VOLTAGE ±10%), – FOLLOW STANDARD AC VOLTAGE INPUT ② IF AC VOLTAGE INPUT IS NORMAL (WITHIN ±10%), – CHANGE P.W.B.s
▨ 13 TIMES	□	■	EEPROM READING ERROR	① CHANGE P.W.B. MAIN

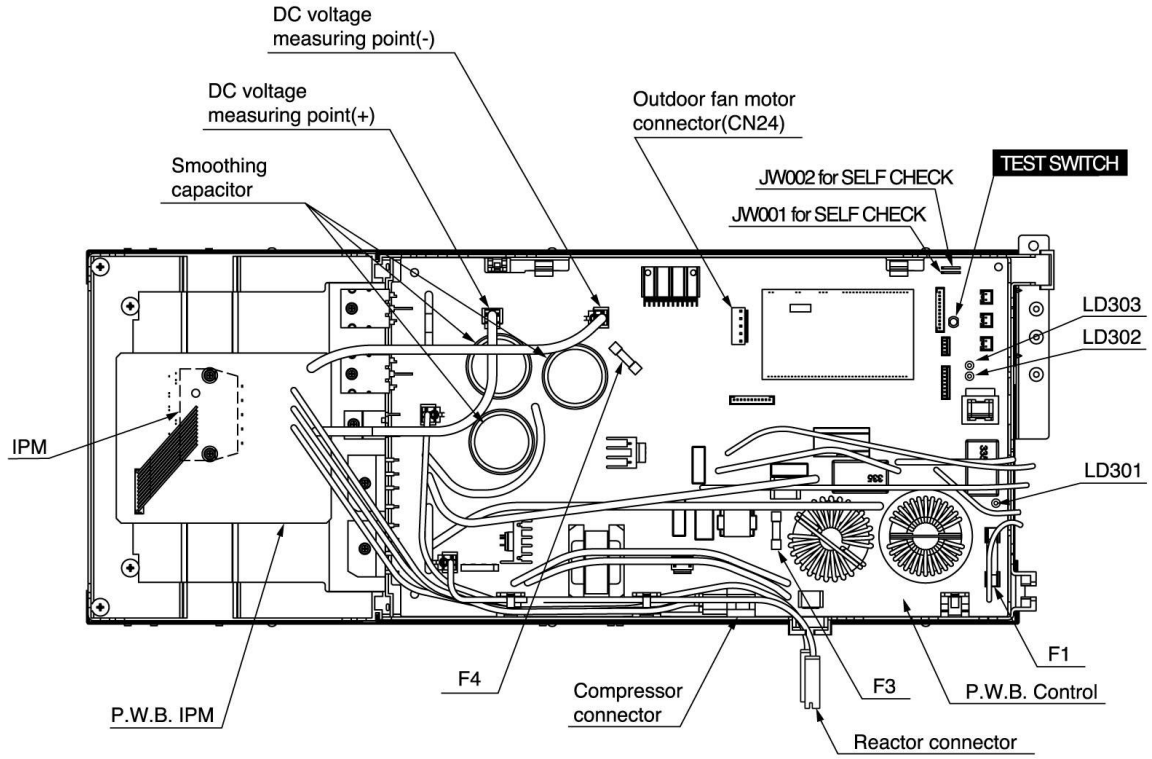
In case abnormalities found in measurement result, change the defect part.
In case electrical is normal and before it can be use, modify back

JW001 and JW002 as normal condition (before conduct a self check).



14.8.1 HOW TO OPERATE USING OUTDOOR UNIT TEST SWITCH

1. Turn off the power supply and then turn on again.
2. Remove outdoor electrical cover and confirm that LD301 will blink 1 time.
3. **Force cooling operation is start when TEST SWITCH is pressed for 1 second or more.**
   *(There is case where operation will only start after 1 minute after pressing the TEST SWITCH due to initializing of the expansion valve)
4. Press again the TEST SWITCH for about 1 minute or more to stop the force cooling operation.



*Caution
1. Turn OFF the breaker first before can start servicing.
2. Never operate the unit in this condition for more than 5 minutes.
3. If the checking is done with the compressor connector disconnected, the unit will continue normal operation when electrical part are normal, or it will repeat operating for approximate 1 minute and stop due to overload power limit cut.
4. If interface signal (DC35V) terminal C and D are not connected when the outdoor unit TEST SWITCH is used for checking, LD301 will blink 9 times after operation to indicate a communication error.
5. To proceed with TEST SWITCH operation again, breaker must be turn OFF and ON it again.
   (TEST SWITCH will operate 1 time only once power is supplied)
6. When service operation is completed, restore the connection as original condition.

14.8.2 TROUBLESHOOTING WHEN 7-SEGMENT LED INDICATOR BLINKS

MODEL TAW-270NH2

SELF-DIAGNOSIS LIGHTING MODE

DIAGNOSIS TABLE

EXAMPLE OF TANK UNIT ERROR

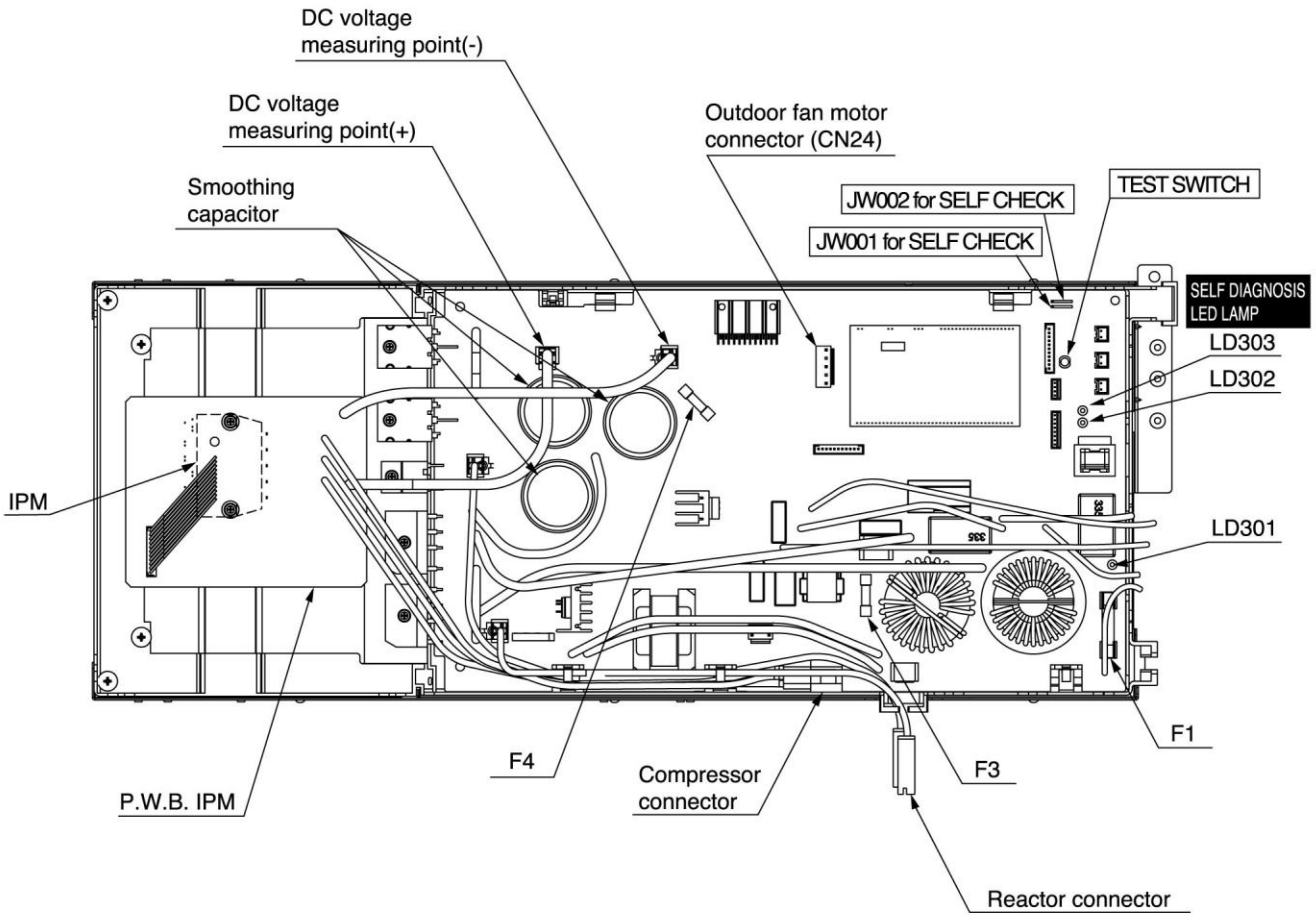
EXAMPLE OF OUTDOOR UNIT ERROR

LEFT SEGMENT	RIGHT SEGMENT	DETAILS	MAIN CHECK POINT
E0 CAUSE OF TANK UNIT	0A	4 WAY VALVE DEFECTIVE	1. 4 WAY VALVE
	0B	TANK/OUTDOOR UNIT COMMUNICATION ERROR	1. CABLE
	0C	THERMISTOR DEFECTIVE OR EEPROM READING ERROR (OUTDOOR UNIT)	1. THERMISTOR 2. OUTDOOR TEMP. THERMISTOR 3. P.W.B MAIN (OUTDOOR UNIT)
	0E	BACKUP HEATER DEFECTIVE	1. BACKUP HEATER 2. THERMAL FUSE CUT OFF
	0F	IC401 DEFECTIVE	1. P.W.B.s
E1 CAUSE OF OUTDOOR UNIT	00	RESET STOP	1. P.W.B.s
	01	PEAK CURRENT CUT	1. COMPRESSOR 2. P.W.B.s
	02	ABNORMAL LOW SPEED ROTATION	1. P.W.B.s 2. COMPRESSOR
	03	SWITCHING FAILURE	1. P.W.B.s 2. COMPRESSOR
	05	OVERLOAD LOWER LIMIT CUT	1. OUTDOOR UNIT IS EXPOSED TO SUNLIGHT OR ITS AIRFLOW BLOCKED 2. FAN MOTOR 3. FAN MOTOR CIRCUIT 4. HIGH VOLTAGE EXTREMELY LOW
	06	OH THERMISTOR TEMPERATURE RISE	1. LEAK OF REFRIGERANT 2. COMPRESSOR 3. OH THERMISTOR CIRCUIT 4. FAN MOTOR 5. FAN MOTOR CIRCUIT
	07	ABNORMAL THERMISTOR	1. THERMISTOR 2. CONNECTION OF THERMISTOR IS FAULTY 3. THERMISTOR CIRCUIT
	09	COMMUNICATION ERROR TANK & OUTDOOR UNIT	1. CONNECTION IS WRONG CONNECTED 2. CABLE IS OPEN 3. INTERFACE CIRCUIT BETWEEN INDOOR & OUTDOOR
	0H	POWER SUPPLY VOLTAGE ERROR	1. POWER SUPPLY VOLTAGE 2. RECEIPTACLE OF WIRE FOR P.W.B IPM IS NOT PROPERLY INSERT
	0J	FAN MOTOR OVERLOAD	1. FAN MOTOR 2. OUTDOOR CONDITION (WIND)
	0L	FAN LOCK ERROR	1. FAN MOTOR 2. FAN MOTOR CIRCUIT
	0P	ACTIVE CONVERTER DEFECTIVE	1. P.W.B MAIN 2. COMPRESSOR
	0U	ACTIVE CONVERTER DEFECTIVE	1. P.W.B

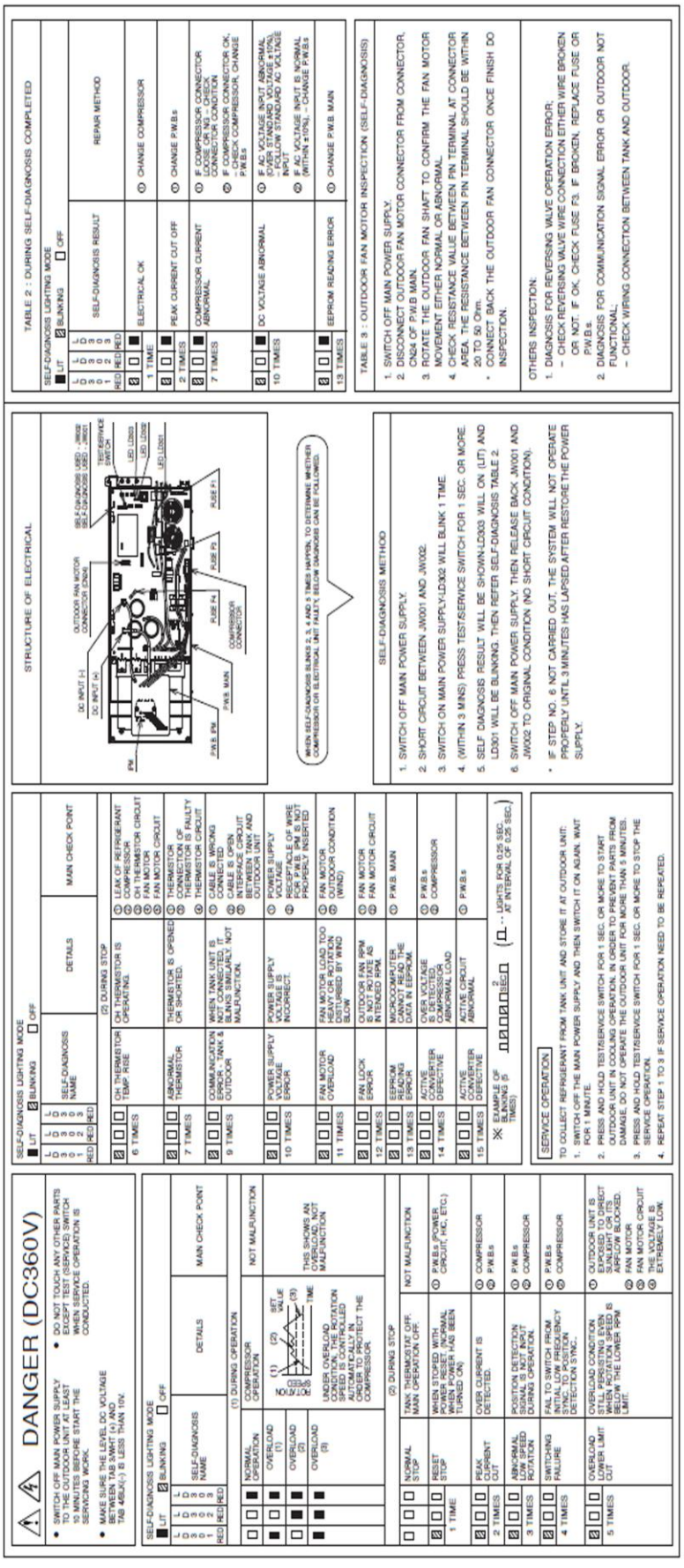
⚠ IF THE INTERFACE CIRCUIT IS FAULTY WHEN POWER IS SUPPLY, THE SELF DIAGNOSIS DISPLAY WILL NOT BE DISPLAYED

14.8.3 LIGHTING MODE OF SELF-DIAGNOSIS LAMP

1 POSITION OF SELF-DIAGNOSIS LAMP

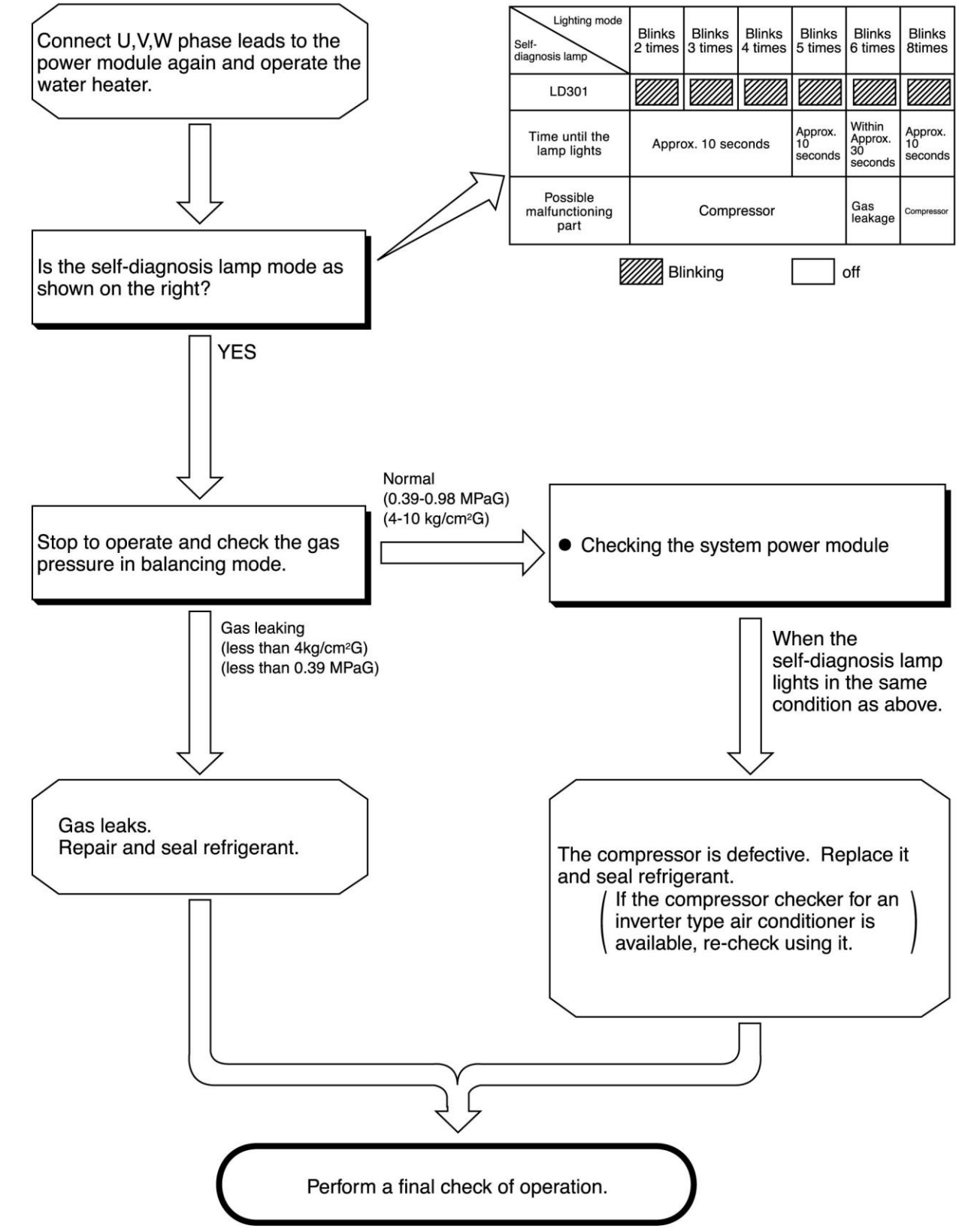


2 LIGHTING MODE SELF-DIAGNOSIS LAMP



CHECKING THE REFRIGERATING CYCLE (JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

1. Troubleshooting procedure (No operation, No heating, No cooling)



15 MISCELLANEOUS NOTE

CONTENTS

15.1. INSTALLATION AT COLD REGIONS OR SNOWFALL REGIONS.

Snowy district reports that even the powerful PAM air conditioner is difficult to warm in the following situations.
The outdoor unit is buried in snow

- Snow stuck to the sides or the air inlet (rear side) of the outdoor. Therefore, only the snow around the heat exchanger can be melted by the defrost operation.
- Water from defrost operation is frozen at the base of the outdoor unit.

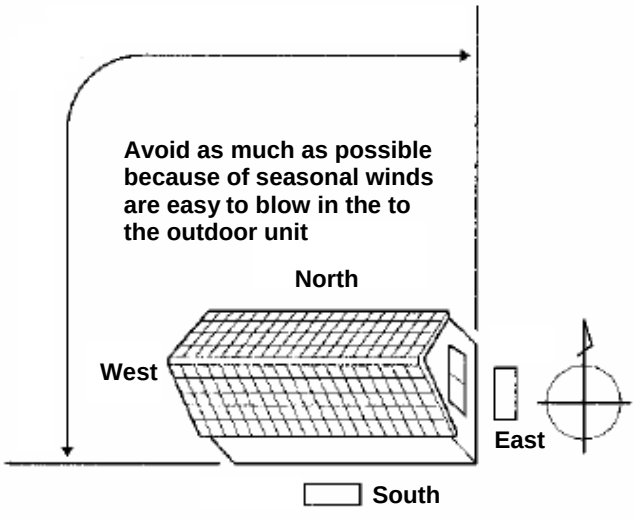
15.2. INSTALLATION POINTS ON OUTDOOR UNITS IN COLD OR SNOWFALL REGIONS.

When the outdoor unit is installed at cold regions, please install at places where there is less impact from the snow or seasonal wind.

– *With the powerful PAM air conditioner, it is still difficult to provide sufficient heating if the outdoor unit is exposed to heavy snow piles and cold seasonal wind blow. Therefore, to enable effective heating performance, it is important to ensure the outdoor unit is installed at a location where heat could be gathered and where exposure to seasonal wind is minimal.*

15.2.1. INSTALLATION PLACE OF COLD AND SNOWFALL REGIONS

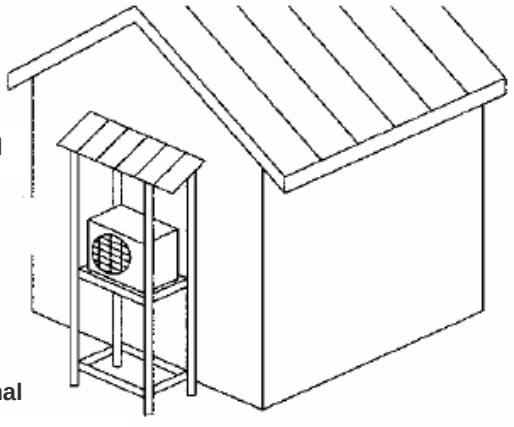
- The outdoor unit should not be installed at the places where the cold seasonal wind is blowing directly from the north or west side of a building.
- Please install at the east or south side of a building where enhanced heating efficiency and less influence of seasonal winds and easy to collect heat



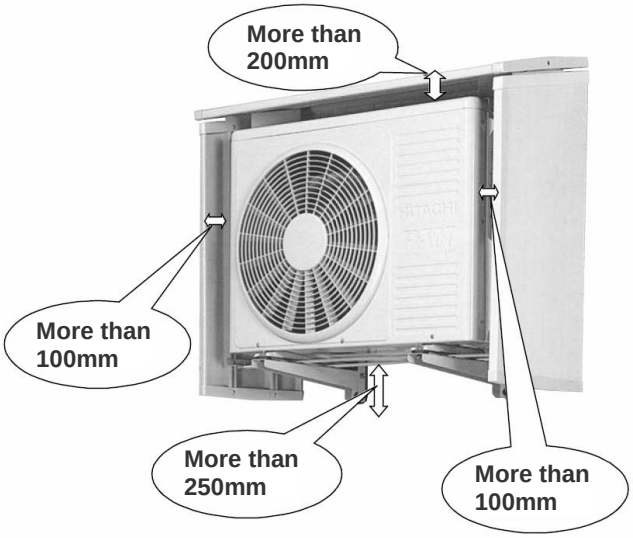
15.2.2. CONSIDERATIONS TO THE SEASONAL WINDS AND SNOWFALL

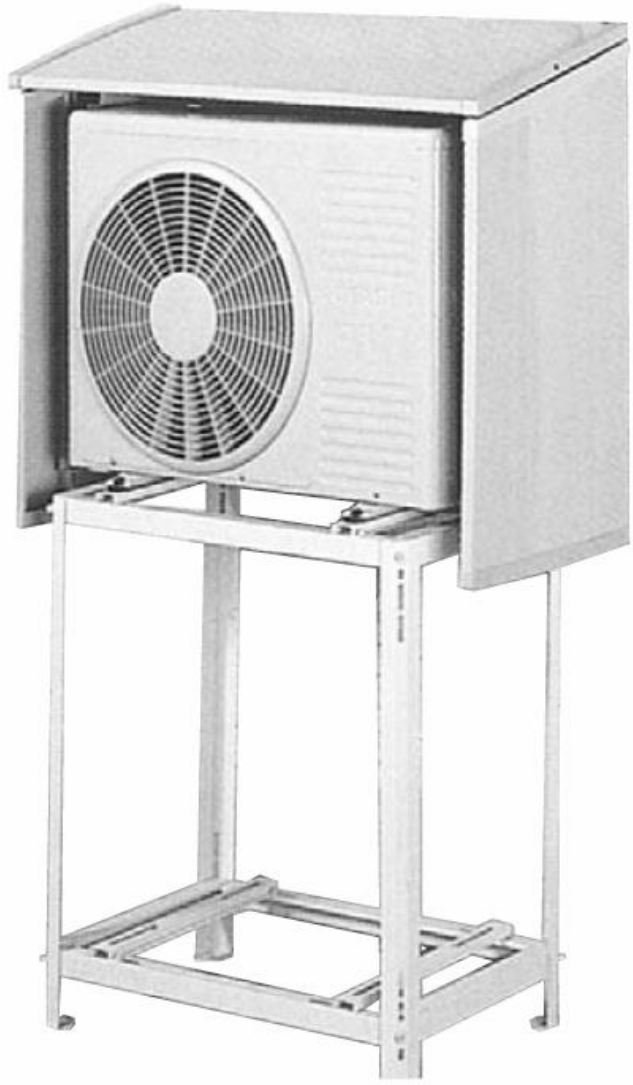
- When snow blows into the outdoor unit from the side, it becomes easy to stick snow and difficult to collect heat
- Please fix the snowstorm guard against wind or snow in order not to blow directly into the outdoor unit

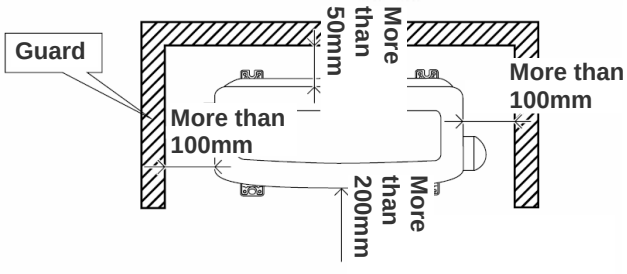
Snow will stuck to the outdoor unit caused by seasonal wind



- Examples of snowstorm guard



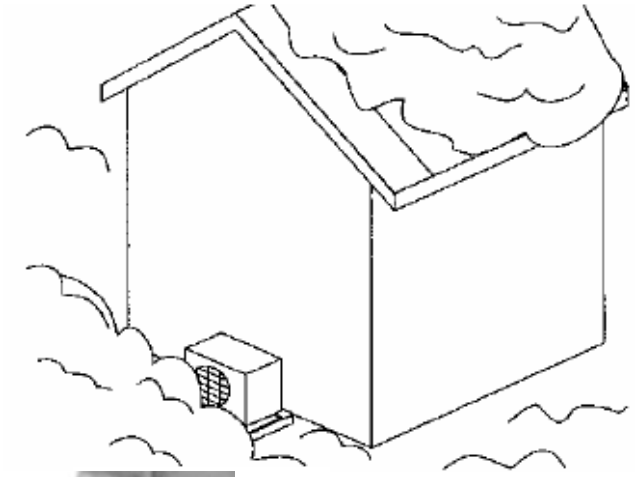




15.2.3. CONSIDERATIONS TO SNOWFALL / SNOW BUILDUP

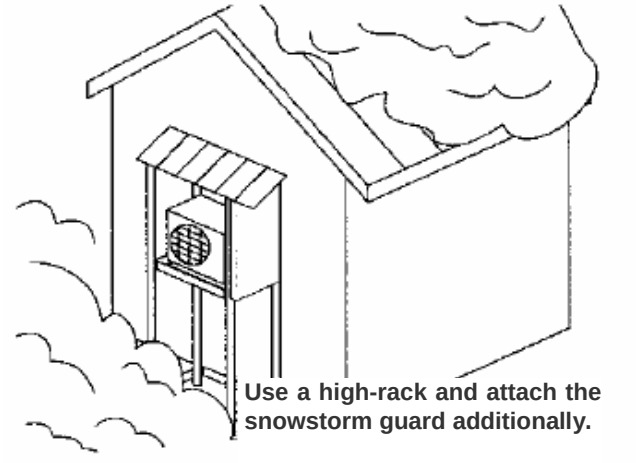
- When the outdoor unit is to be placed where there is heavy snow accumulation, please install at the high wall position by using a high-rack or metal fittings to wall.
- To protect against falling snow, please install under the eaves of the building.

In case of ground installation



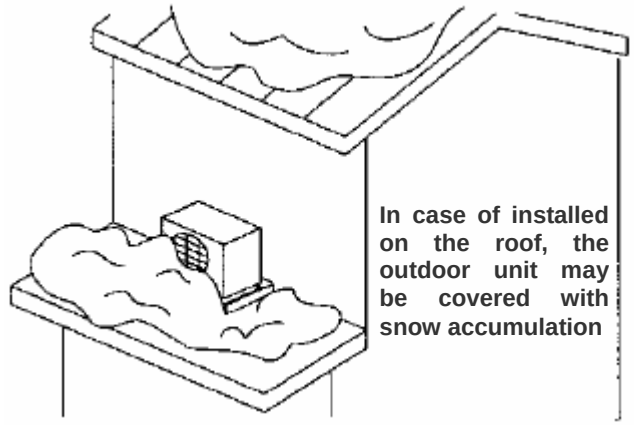
In case of installed on the ground, the outdoor unit may be covered with snow.

To be installed at high position as much has possible



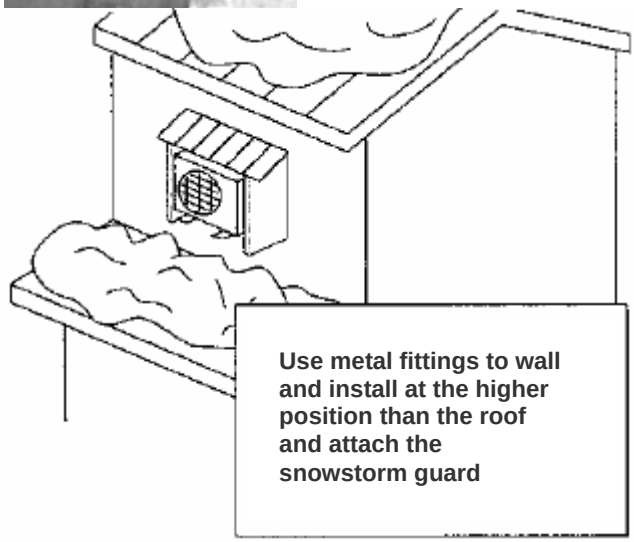
Use a high-rack and attach the snowstorm guard additionally.

In case of installing on the second storey



In case of installed on the roof, the outdoor unit may be covered with snow accumulation

Mount the unit in a high position on a wall



Use metal fittings to wall and install at the higher position than the roof and attach the snowstorm guard

CAUTION:

– *If the distance between the outdoor unit and the wall is too close, the place between the rear side (heat exchanger) and the wall may become a snow accumulation.*

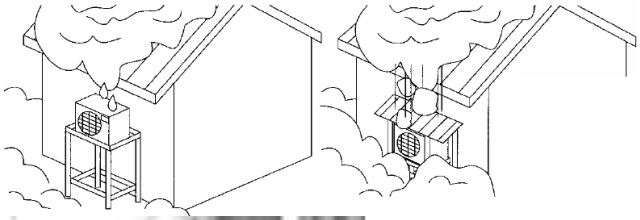
– *The distance between the outdoor unit and the wall should be more than 100mm, and are attached with snowstorm guard.*

15.2.4. CONSIDERATIONS TO SLIDING SNOW FROM ROOF OR SNOWFALL

- Please install the outdoor unit at the places that are not exposed to snow sliding off from the roof or snow fall.
- Please install the snow storm guard to prevent the outdoor unit from exposing directly to the melting snow water or rain water.

If the outdoor unit is installed under the short eaves, the melted snow water or rainwater may enter directly into the outdoor unit.

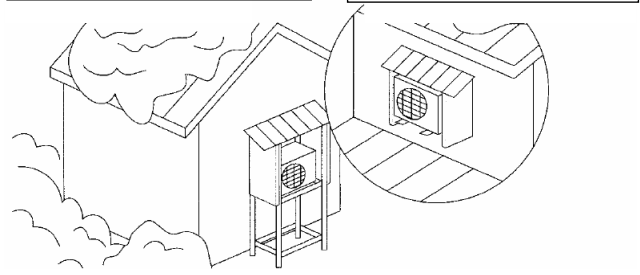
If the outdoor unit is installed at the place where the snow may slide from the above roof, the outdoor unit will be covered with snow.



At the places where possibilities of melted snow water or snow sliding off from roof

Please install at the place where melted snow water do not drop from the roof and fix the snowstorm guard.

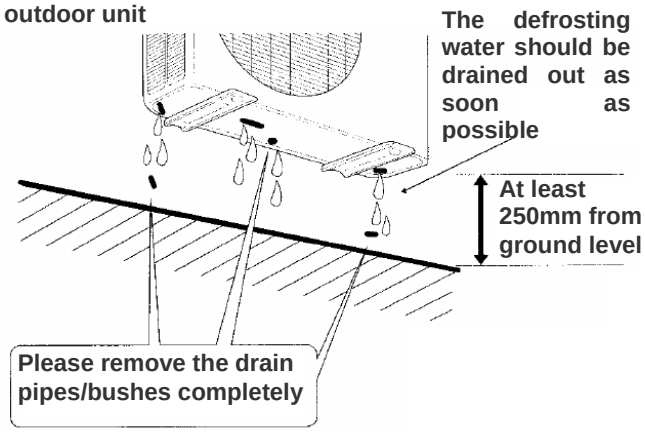
Please install at the high position where it is not covered with snow by using metal fittings to wall and attach the snowstorm guard



15.2.5. AS TO PROPER DRAINAGE OF DEFROSTING WATER

- At cold districts, there is a possibility that drainage can not be done due to freezing the defrosting water on the base surface. Therefore, please remove the drain pipes attached to the bottom of the outdoor unit and the bushes. If any, install at places where the defrosting water can flow smoothly.
- The drainage holes will be covered by icicles which produced by the defrosting water from the bottom. Therefore please mount the unit at least 250mm from the eaves and so on.

To make better drainage from bottom face of the outdoor unit



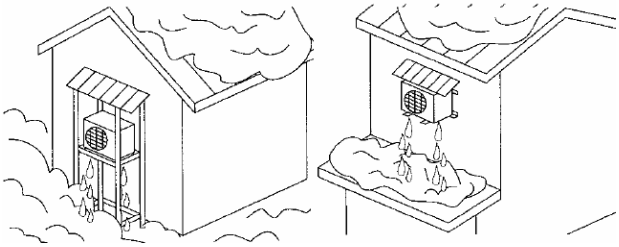
CAUTION:

– *Drainage of the defrosting water by connecting the drain pipe will cause freezing. Do not do it.*

– *If the bushes are not removed, the defrosting water will be frozen at the base of the heat exchanger. This causes heating capacity to drop and abnormal noise operation.*

– *If the blocks of the plastic block racks are used, the drainage hole at the base bottom may be blocked or covered with icicles (frozen water from defrost). Do not do it.*

Ensure enough clearance at the ground when installing the unit so the water could drain out smoothly.

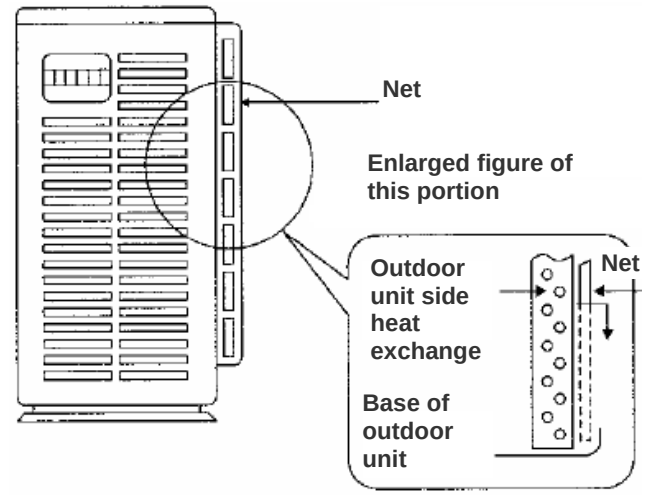


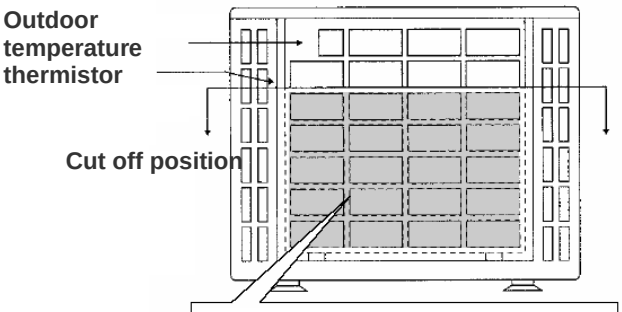
Installation using high position racks

Installation using metal fittings on wall

15.2.6. REQUEST TO CUT NET ATTACHED TO REAR SIDE OF OUTDOOR UNIT

At the places, where snow enters into the air inlet, the net at the rear side will lead to easy snow accumulation. Moreover, only the snow around the heat exchanger may be melted during defrosting whereas snow that attached to the net will remain stuck and not melt. Therefore, please cut the net at the rear after installation.





As the upper drawing, please cut off and remove the lower part of the net.

HITACHI

TCA2W001_0 – 07/12