

# Heat Pump Water Heater

## SERVICE MANUAL

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### CAUTION

BEFORE SERVICING THE UNIT, READ THE SAFETY PRECAUTIONS IN THIS MANUAL.

**MODEL : APHWC501D(R5TT50F-SB1), APHWC801D(R5TT80F-SB1), APHWC501L(R5TT50F-SC1),  
APHWC801L(R5TT80F-SC1)**

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# SAFETY PRECAUTIONS

To prevent injury to the user or other people and property damage, the following instructions must be followed.

- Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

|   |
|---|
|  <b>WARNING</b><br>This symbol indicates the possibility of death or serious injury.             |
|  <b>CAUTION</b><br>This symbol indicates the possibility of injury or damage to properties only. |

- Meanings of symbols used in this manual are as shown below.

|   |                                    |
|---|------------------------------------|
|  | Be sure not to do.                 |
|  | Be sure to follow the instruction. |
|  | Dangerous Voltage.                 |

## Cautions in Repair

|  <b>WARNING</b> |   |
|--|---|
|                 | Do not turn on the breaker or power under condition that front panel, rear panel, top cover, or control box cover is removed or opened. Otherwise, it may cause fire, electric shock, explosion or death.   |
|                 | Be sure to disconnect the power to unit before disassembling the equipment for a repair. Internal components and circuit boards are at main potential when the equipment is connected to the power. This high voltage is extremely dangerous and may cause death or severe injury if an individual comes into contact with it |
|                 | Do not touch the discharging refrigerant gas during the repair work. The refrigerant gas can cause frostbite.   |
|                 | Release the refrigerant gas completely at a well-ventilated place first. Otherwise, when the pipe is disconnected, refrigerant gas or refrigerating machine oil discharges and it can cause injury.   |
|                 | When the refrigerant gas leaks during work, perform ventilation. If the refrigerant gas comes in contact with a fire, poisonous gas generates. A case of leakage of the refrigerant and the closed room full with gas is dangerous because a shortage of oxygen occurs. Be sure to perform ventilation.                       |
|               | When removing the front panel or cabinet, execute short-circuit and discharge between high voltage capacitor terminals. If discharge is not executed, an electric shock is caused by high voltage resulting in a death or injury.   |
|               | Do not use a defective or underrated circuit breaker. Use the correctly rated breaker and fuse. Otherwise, there is a risk of fire or electric shock.   |
|               | Install the panel and the cover of control box securely. Otherwise there is risk of fire or electric shock due to dust, water etc.  |

|  <b>WARNING</b> |  |
|--|--|
|                 | Wiring connections must be secured tightly and the cable should be routed properly so that there is no force pulling the cable from the connection terminals. Improper or loose connections can cause heat generation or fire. |
|                 | Do not touch, operate, or repair the product with wet hands. Otherwise there is risk of electric shock or fire.  |

|  <b>CAUTION</b> |   |
|--|---|
|                 | Do not turn on the breaker when the front panel and cabinet are removed.  |
|                 | Be sure to ground the water heater with an earthing conductor connected to the earthing terminal.   |
|                 | Conduct repair works after checking that the refrigerating cycle section has cooled down sufficiently. Otherwise, working on the unit, the hot refrigerating cycle section can cause burns. |
|                 | Do not tilt the unit while removing panels. Otherwise, the water inside the unit can spill and wet floor.   |
|                | Do not use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.   |
|               | Be sure to turn off power switch before connecting or disconnecting connector, or parts may be damaged.   |

## Inspections after Repair

|  <b>WARNING</b> |  |
|--|--|
|                 | Check to see if the power cable is dirty or loose. If the cable is dusty or loose it can cause an electrical shock or fire.  |
|                 | Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances. Otherwise, it can cause an electrical shock, excessive heat generation or fire. |
|                 | Do not insert hands or other objects through the air inlet or outlet while the product is operating. There are sharp and moving parts that could cause personal injury.                              |
|                 | Do not block the inlet or outlet of air flow. It may cause product failure.  |

|  <b>CAUTION</b> |  |
|--|--|
|                 | Check to see if the parts are mounted correctly and wires are connected. Improper installation and connections can cause an electric shock or an injury.   |
|                 | Check whether the installation platform or frame has corroded. Corroded installation platform or frame can cause the unit to fall, resulting in injury.  |
|               | Be sure to check whether the earth wire is correctly connected.  |
|               | After the work has finished, be sure to do an insulation test to check whether the resistance is 2[Mohm] or more between the charge section and the non-charge metal section (Earth position). If the resistance value is low, a disaster such as a leak or electric shock is caused at user's side. |
|               | Check the drainage of the indoor unit after the repair. If drainage is faulty the water may enter the room and wet floor.  |

# NOMENCLATURE

## Factory Model Name

| Model        | No. |   |   |   |   |   |   |   |   |    |    |
|--------------|-----|---|---|---|---|---|---|---|---|----|----|
|              | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Water Heater | R   | 5 | T | T | 5 | 0 | F | - | S | B  | 1  |

| No.  | Signification  |
|------|--|
| 1, 2 | Heat Pump Water Heater for R134a   |
| 3    | Classification<br>- T : Packaged   |
| 4    | Compressor Type<br>- T : Inverter Heating Only   |
| 5,6  | Water Tank Capacity<br>- e.g. 50gal → “50”   |
| 7    | Water Tank Capacity<br>- F : Frontier  |
| 8    | Outdoor Unit Platform<br>- “-” : Packaged(No Outdoor Unit)   |
| 9    | Look/Color<br>- S : Frontier Silver  |
| 10   | Function<br>- A : Smart Function + Hybrid Mode<br>- B : Demand Response function<br>- C : DR & Water leak detection function |
| 11   | Serial No.<br>- LG Model Development Serial No.  |

## Buyer Model Name

| Refrigerant | Series | No. |   |   |   |   |   |   |   |   |
|-------------|--------|-----|---|---|---|---|---|---|---|---|
|             |        | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| R134A       | 1      | A   | P | H | W | C | 5 | 0 | 1 | D |

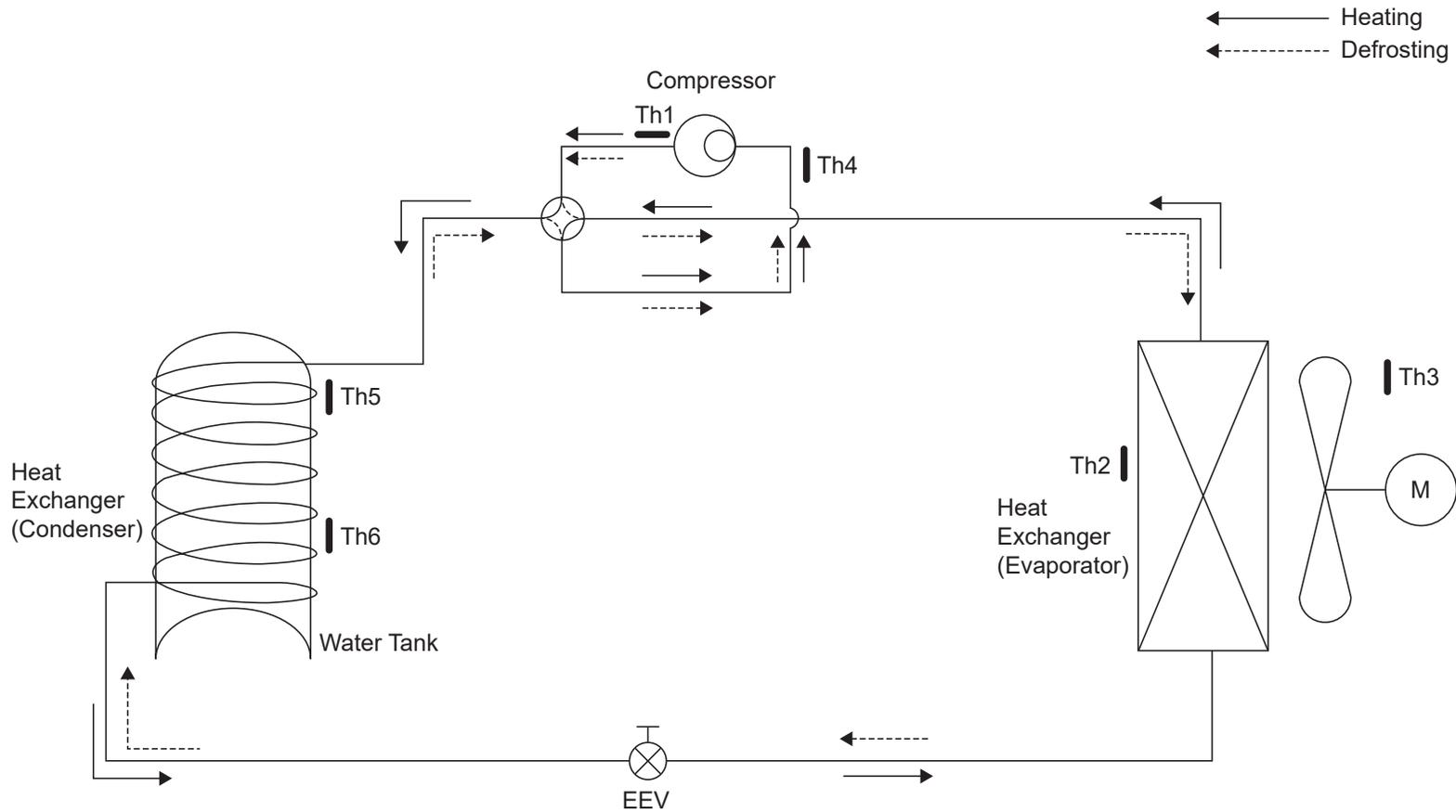
| No.  | Signification   |
|------|---|
| 1    | Refrigerant<br>- A: R134a   |
| 2    | Component<br>- P : Packaged   |
| 3    | Product Category<br>- H: Heating  |
| 4    | Product Type<br>- W : Tank Water  |
| 5    | Product Grade<br>- C : Standard Efficiency  |
| 6, 7 | Nominal Capacity<br>- e.g. 50gal → “50”   |
| 8    | Generation  |
| 9    | Features<br>- M : Mid Temp. Water<br>- D : Demand Response function<br>- L : DR & Water leak detection function |

# PRODUCT SPECIFICATIONS

| Model                   |                                    |          | APHWC501D        | APHWC501L                      | APHWC801D        | APHWC801L                     |  |
|-------------------------|------------------------------------|----------|------------------|--------------------------------|------------------|-------------------------------|--|
| Capacity                | Volume(Nominal)                    | Gal      | 58               |                                | 80               |                               |  |
|                         |                                    | L        | 220              |                                | 303              |                               |  |
|                         | Volume(Rated)                      | Gal      | 53               |                                | 72               |                               |  |
|                         |                                    | L        | 201              |                                | 273              |                               |  |
|                         | UEF(Draw Pattern Medium)           |          | -                | -                              |                  | -                             |  |
|                         | UEF(Draw Pattern High)             |          | -                | 3.93                           |                  | 3.90                          |  |
|                         | FHR                                |          | Gal              | 76                             |                  | 94                            |  |
|                         | Annual Energy Consumption          |          | kWh              | 1262                           |                  | 1272                          |  |
| Power Input             | Upper Element Wattage(208V / 240V) |          | kW               | 3.8 / 5.0                      |                  | 3.8 / 5.0                     |  |
|                         | Lower Element Wattage(208V / 240V) |          | kW               | 3.8 / 5.0                      |                  | 3.8 / 5.0                     |  |
| Energy Star             |                                    | -        | Yes              |                                | Yes              |                               |  |
| Power Supply            |                                    | Ø, V, Hz | 1Ø,208/240V,60Hz |                                | 1Ø,208/240V,60Hz |                               |  |
| Available Voltage Range |                                    | V        | 176~276          |                                | 176~276          |                               |  |
| Air Flow Rate           | Rated                              | CFM      | 155.4            |                                | 155.4            |                               |  |
| Sound Pressure Level    | Auto                               | dB(A)    | 42               |                                | 42               |                               |  |
|                         | Turbo/Heat Pump                    | dB(A)    | 45               |                                | 45               |                               |  |
| Dimensions              | Net(W x H x D)                     |          | in.              | 22-27/32 x 63-31/32 x 22-29/32 |                  | 22-27/32 x 79-1/16 x 22-29/32 |  |
|                         | Shipping(W x H x D)                |          | in.              | 29-1/16 x 69-7/8 x 27-5/32     |                  | 29-1/16 x 84-31/32 x 27-5/32  |  |
| Weight                  | Net                                |          | lb.              | 225                            |                  | 267                           |  |
|                         | Shipping                           |          | lb.              | 265                            |                  | 309                           |  |
| Operation Range         | Heating                            |          | °F DB            | 23 ~ 120                       |                  | 23 ~ 120                      |  |
| Exterior Color          |                                    | -        | Luxury Silver    |                                | Luxury Silver    |                               |  |
| Compressor              | Type                               |          | -                | Twin Rotary                    |                  | Twin Rotary                   |  |
|                         | Model                              |          | -                | EST092MBA                      |                  | EST092MBA                     |  |
|                         | Motor Type                         |          | -                | BLDC                           |                  | BLDC                          |  |
|                         | Locked Rotor Ampere(LRA)           |          | A                | N/A(Inverter)                  |                  | N/A(Inverter)                 |  |
|                         | Oil Type                           |          | -                | POE<br>PVE                     |                  | POE<br>PVE                    |  |
|                         | Oil Charge                         |          | cc               | 220                            |                  | 220                           |  |
|                         | Rated Load Ampere(208V / 240V)     |          | A                | 3.3 / 3.1                      |                  | 3.3 / 3.1                     |  |

| Model                            |                                    |             | APHWC501D                  | APHWC501L | APHWC801D                  | APHWC801L |
|----------------------------------|------------------------------------|-------------|----------------------------|-----------|----------------------------|-----------|
| Fan                              | Type                               | -           | Propeller Fan              |           | Propeller Fan              |           |
|                                  | Motor Type                         | -           | BLDC                       |           | BLDC                       |           |
|                                  | Motor Output                       | -           | 43                         |           | 43                         |           |
|                                  | Full Load Ampere(FLA)              | -           | 0.22                       |           | 0.22                       |           |
| Heat Ex changer(Evaporator)      | Quantity                           | -           | 1                          |           | 1                          |           |
|                                  | Rows                               | -           | 3                          |           | 3                          |           |
|                                  | Columns                            | -           | 15                         |           | 15                         |           |
|                                  | FPI                                | -           | 21                         |           | 21                         |           |
| Design Pressure(System)          | High Side                          | psi         | 290                        |           | 290                        |           |
|                                  | Low Side                           | psi         | 130.5                      |           | 130.5                      |           |
| Max Working Pressure(Water Tank) |                                    | psi         | 150                        |           | 150                        |           |
| Minimum Circuit Ampacity         |                                    | A           | 30                         |           | 30                         |           |
| Maxium Circuit Breaker           | Heat Pump & Heater                 | A           | 30                         |           | 30                         |           |
| Wiring Connections               | Power Supply Cable(included Earth) | AWG x cores | 10 x 3C                    |           | 10 x 3C                    |           |
| Drain Hose Size                  | I.D                                | in.         | 3/4, 1/2                   |           | 3/4, 1/2                   |           |
| Refrigerant                      | Type                               | -           | R134a                      |           | R134a                      |           |
|                                  | Pre Charge                         | oz.         | 23                         |           | 26                         |           |
|                                  | Additional Charge                  | oz./ft.     | -                          |           | -                          |           |
|                                  | Control                            | -           | Electronic Expansion Valve |           | Electronic Expansion Valve |           |
| Defrost Method                   |                                    | -           | Reverse Cycle              |           | Reverse Cycle              |           |
| Anode                            |                                    | -           | Sacrificial                |           | Sacrificial                |           |
| Foam Insulation                  |                                    | inch        | 1.6 ~ 2.4                  |           | 1.6 ~ 2.4                  |           |
| T&P Relief Valve                 |                                    | -           | Yes                        |           | Yes                        |           |
| Water Connection Location        |                                    | -           | Side                       |           | Side                       |           |
| Water Connection Size            |                                    | inch        | 3/4                        |           | 3/4                        |           |
| Digital Display                  |                                    | -           | Yes                        |           | Yes                        |           |
| Wi-Fi                            |                                    | -           | Yes                        |           | Yes                        |           |
| Bluetooth                        |                                    | -           | Yes                        |           | Yes                        |           |
| Eco Port CTA-2045                |                                    | -           | Yes                        |           | Yes                        |           |
| Water Leak Detection Function    |                                    | -           | No                         | Yes       | No                         | Yes       |

# PIPING DIAGRAM

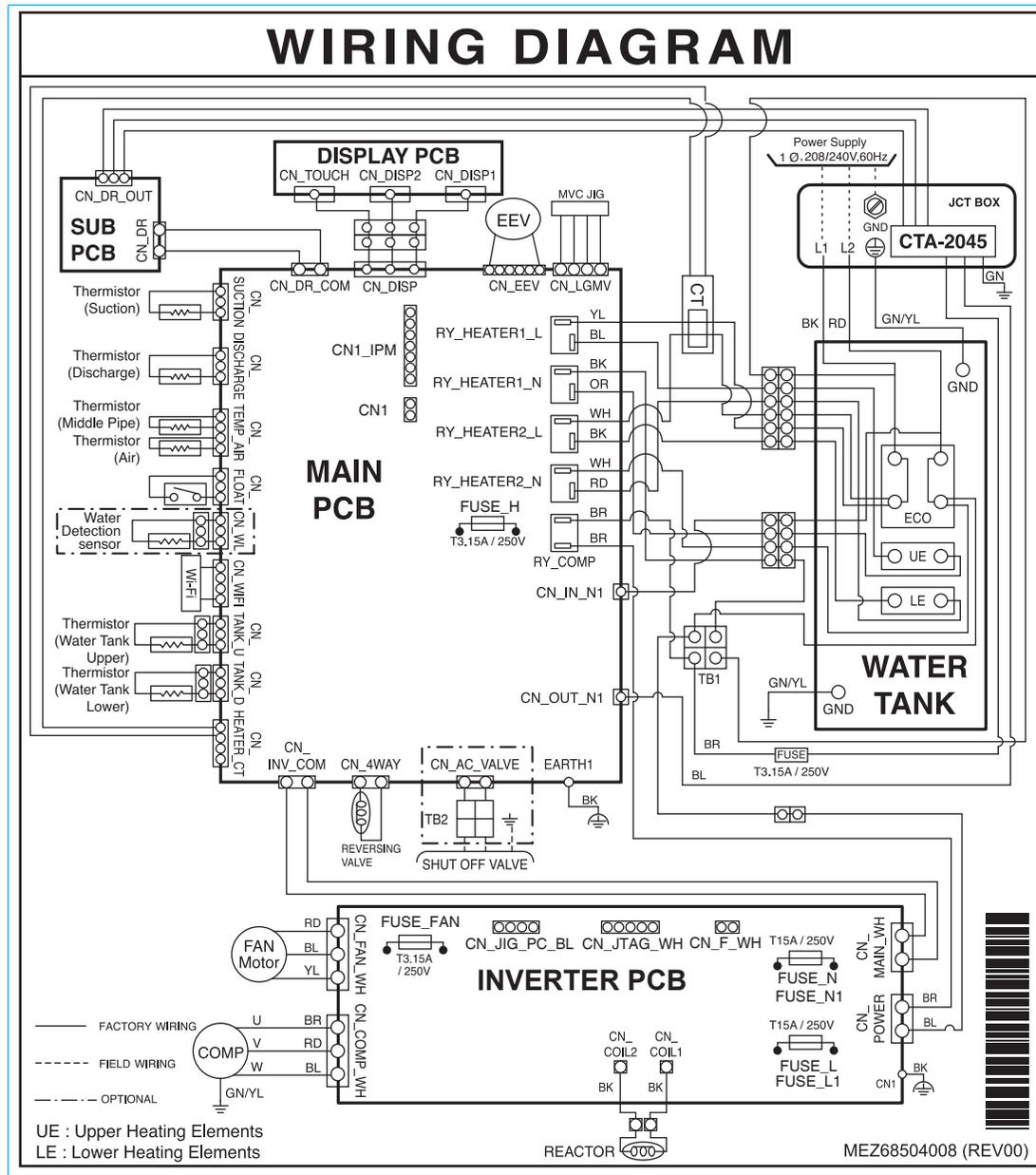


| LOC | Description                                 | PCB Connector |
|-----|---|---------------|
| Th1 | Thermistor for discharge pipe temperature   | CN_DISCHARGE  |
| Th2 | Thermistor for evaporating temperature      | CN_TEMP_AIR   |
| Th3 | Thermistor for indoor air temperature       | CN_TEMP_AIR   |
| Th4 | Thermistor for suction pipe temperature     | CN_TH1        |
| Th5 | Thermistor for upper water tank temperature | CN_TANK_U     |
| Th6 | Thermistor for lower water tank temperature | CN_TANK_D     |

\*EEV : Electronic Expansion Valve.

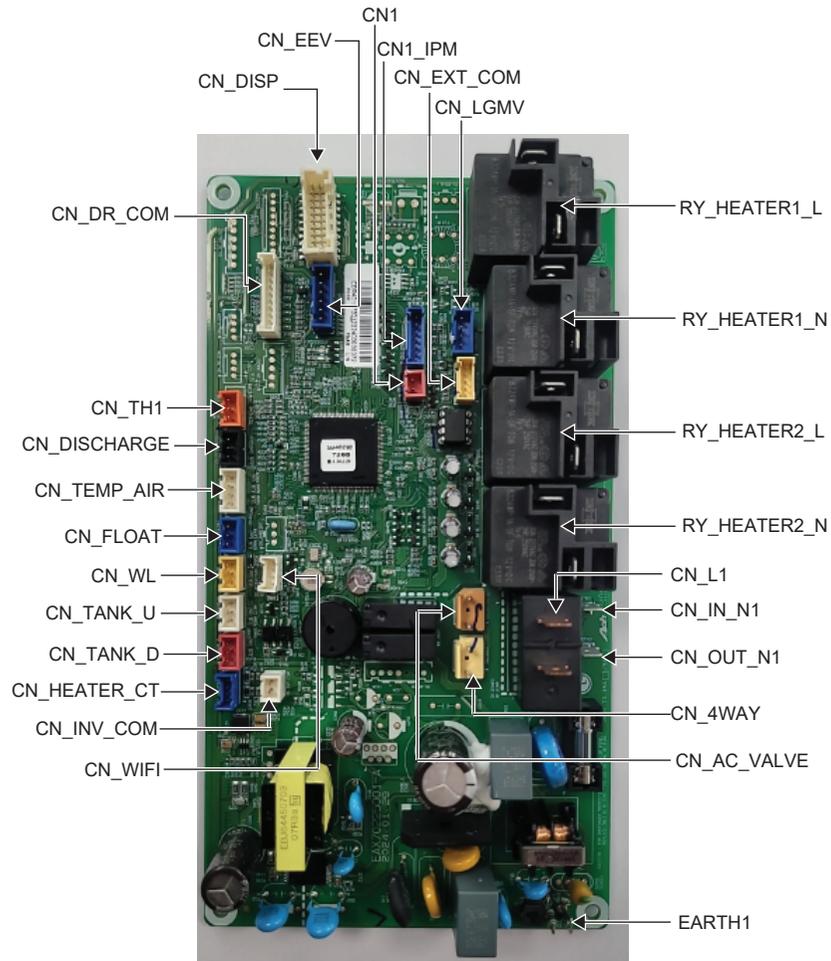
# WIRING DIAGRAM

APHWC501D / APHWC801D / APHWC501L / APHWC801L

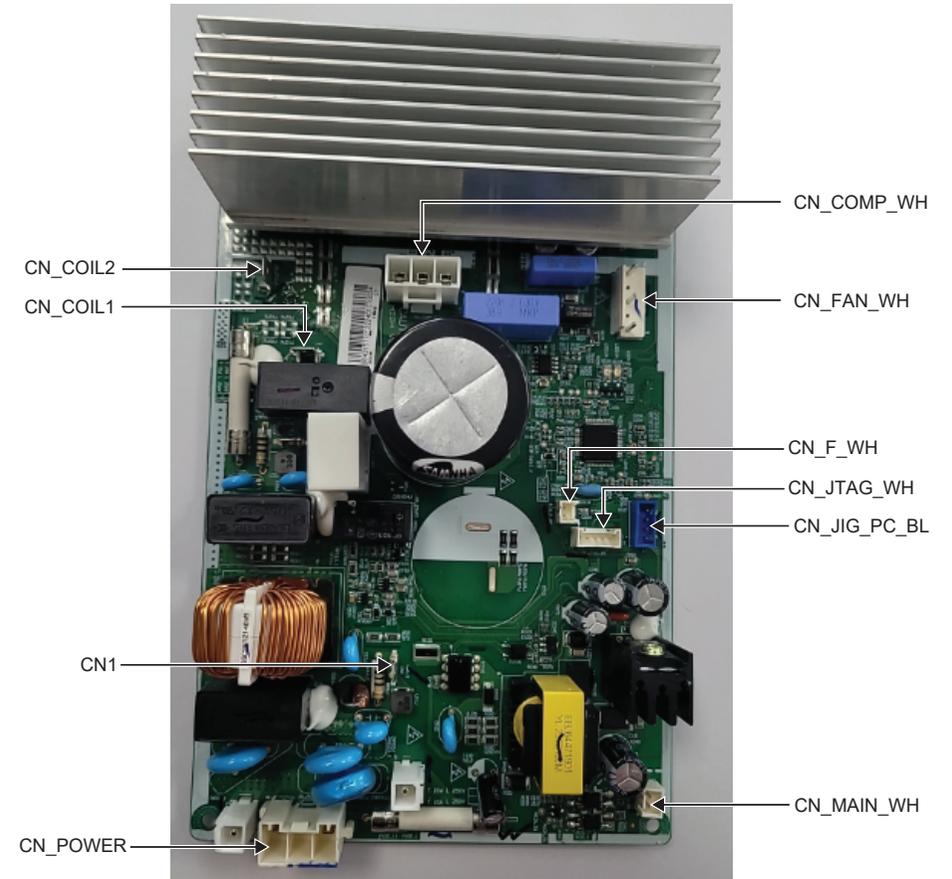


# APHWC501D / APHWC801D / APHWC501L / APHWC801L

## MAIN PCB



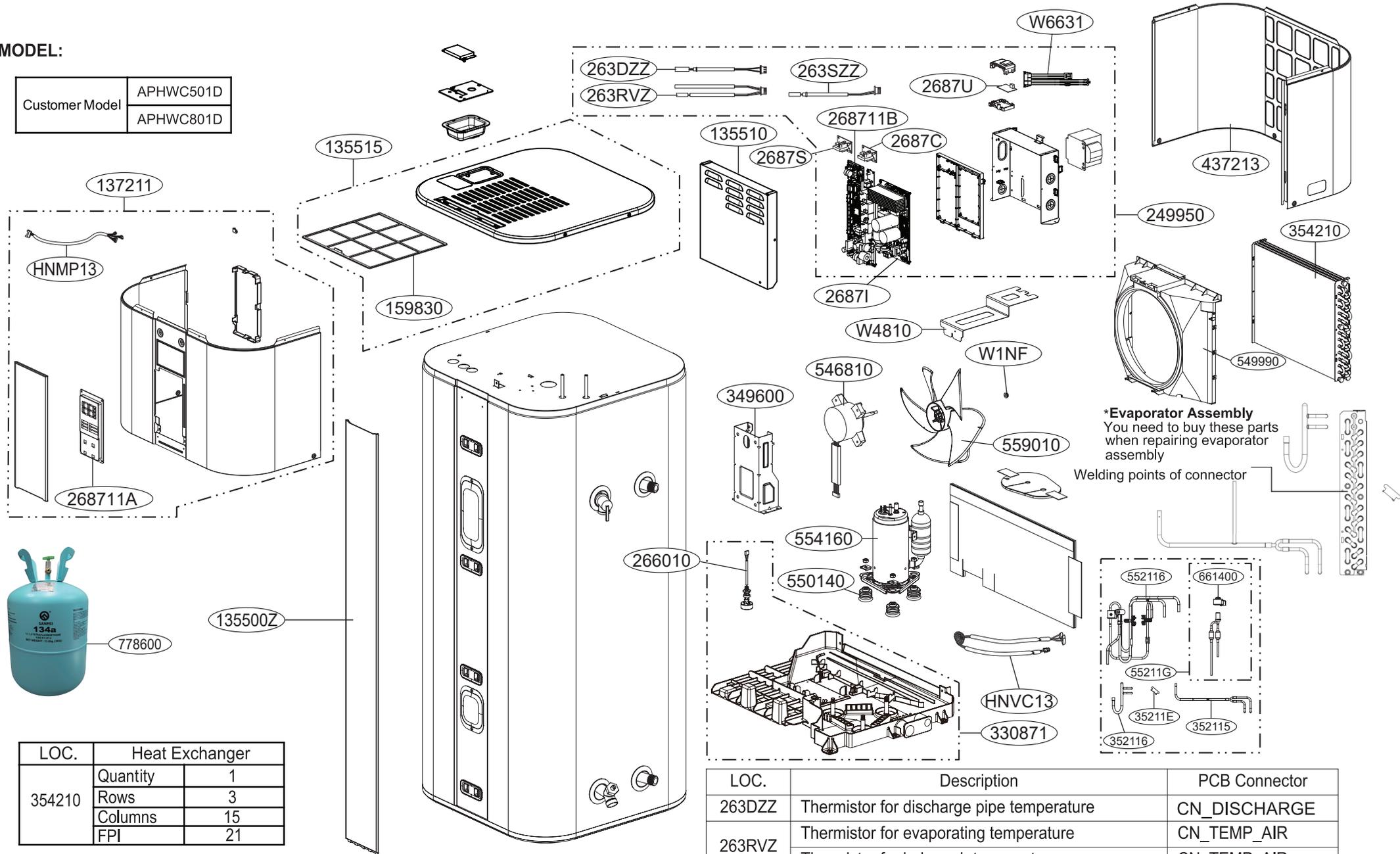
## INVERTER PCB



# EXPLODED VIEW

MODEL:

|                |           |
|----------------|-----------|
| Customer Model | APHWC501D |
|                | APHWC801D |



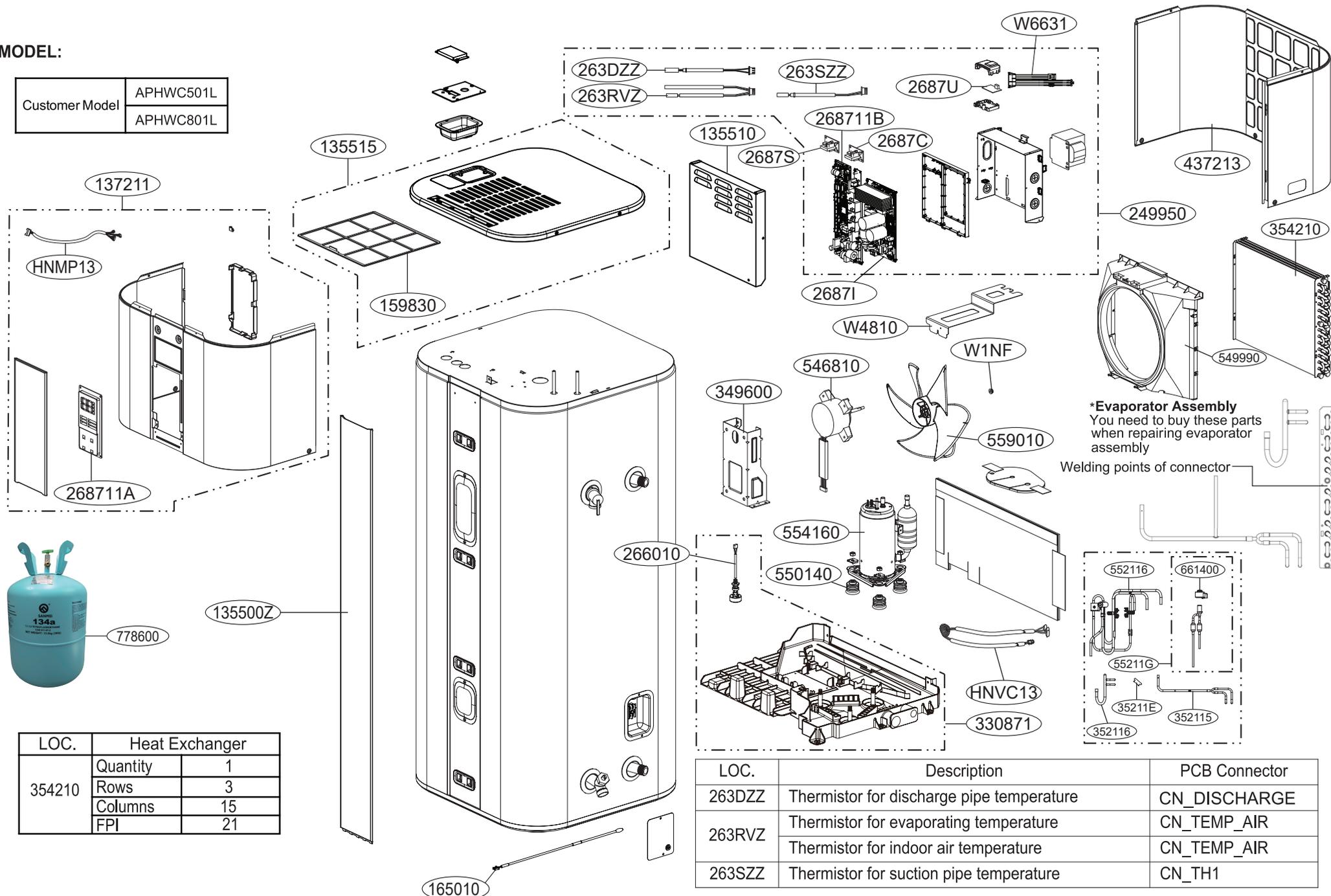
| LOC.   | Heat Exchanger |    |
|--------|----------------|----|
| 354210 | Quantity       | 1  |
|        | Rows           | 3  |
|        | Columns        | 15 |
|        | FPI            | 21 |

| LOC.   | Description                               | PCB Connector |
|--------|---|---------------|
| 263DZZ | Thermistor for discharge pipe temperature | CN_DISCHARGE  |
| 263RVZ | Thermistor for evaporating temperature    | CN_TEMP_AIR   |
|        | Thermistor for indoor air temperature     | CN_TEMP_AIR   |
| 263SZZ | Thermistor for suction pipe temperature   | CN_TH1        |

# EXPLODED VIEW

MODEL:

|                |           |
|----------------|-----------|
| Customer Model | APHWC501L |
|                | APHWC801L |



**\*Evaporator Assembly**  
 You need to buy these parts  
 when repairing evaporator  
 assembly

Welding points of connector

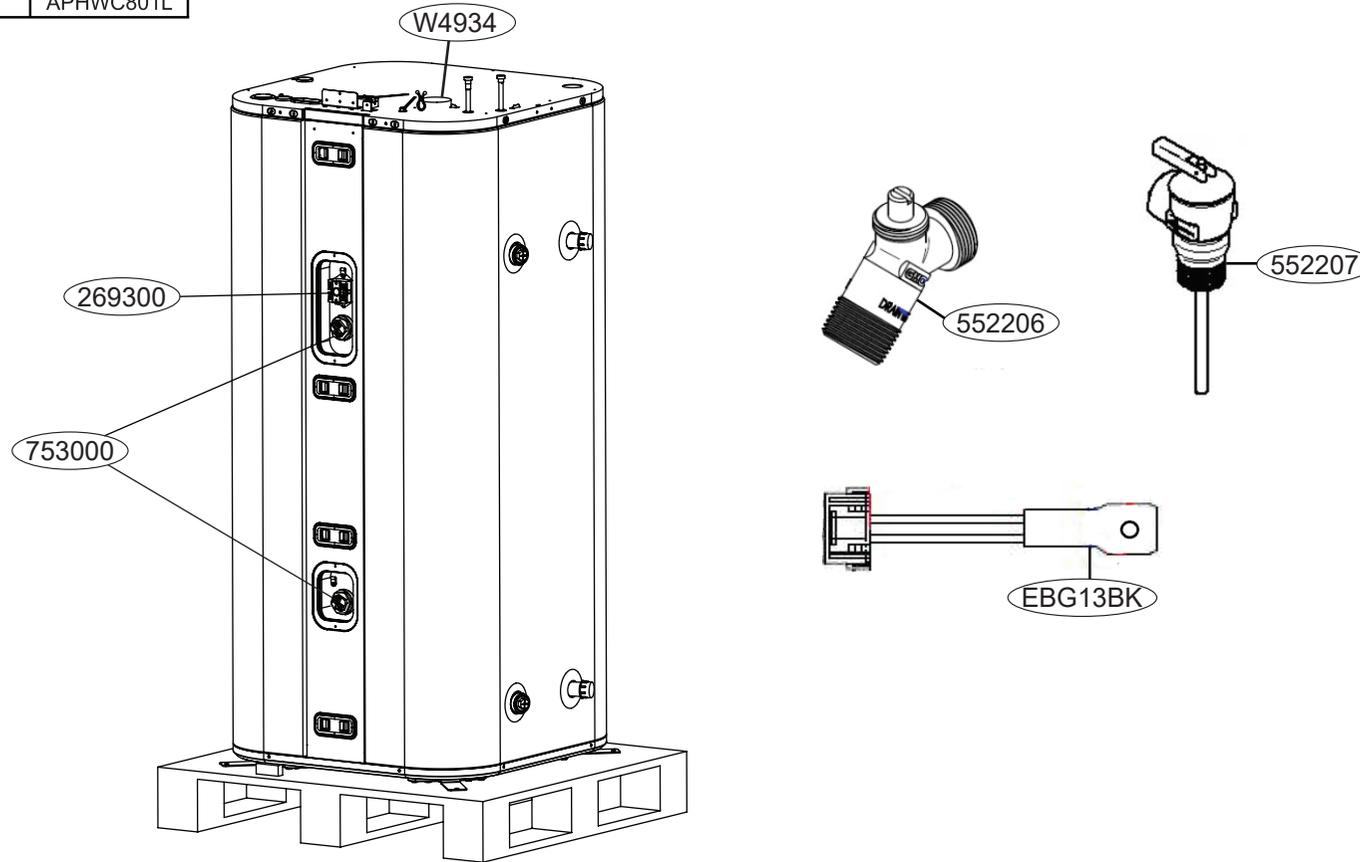
| LOC.   | Heat Exchanger |    |
|--------|----------------|----|
| 354210 | Quantity       | 1  |
|        | Rows           | 3  |
|        | Columns        | 15 |
|        | FPI            | 21 |

| LOC.   | Description                               | PCB Connector |
|--------|---|---------------|
| 263DZZ | Thermistor for discharge pipe temperature | CN_DISCHARGE  |
| 263RVZ | Thermistor for evaporating temperature    | CN_TEMP_AIR   |
|        | Thermistor for indoor air temperature     | CN_TEMP_AIR   |
| 263SZZ | Thermistor for suction pipe temperature   | CN_TH1        |

# EXPLODED VIEW

MODEL:

|                |           |
|----------------|-----------|
| Customer Model | APHWC501D |
|                | APHWC501L |
|                | APHWC801D |
|                | APHWC801L |



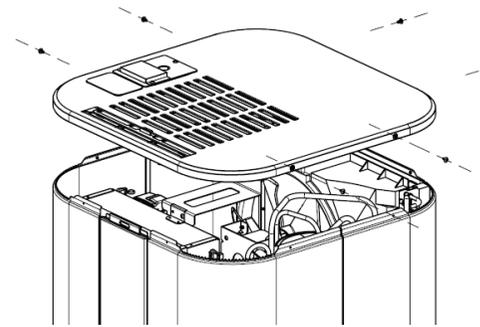
\* The feature may vary according to the type of model.

# DISASSEMBLY

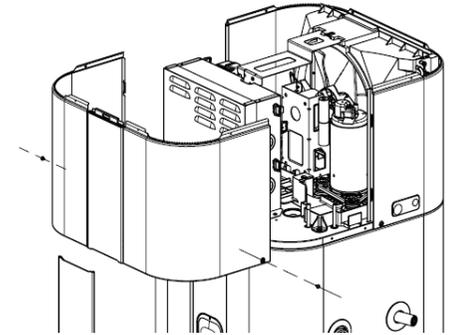
Before the following disassembly, disconnect all power to the heater and shut off the water supply to the heater.

## 1. Top cover and Front panel

- Remove the 6 screws that fasten the top cover. (See Figure 1)
- Remove the top cover.
- Remove the front décor. (There are 4 hooks.)
- Remove the 4 screws that fasten the front panel. (See Figure 2)
- Lift the front panel out. (Lift right side first.)
- Disconnect the connector between the front panel and control box.
- Re-install the components by referring to the removal procedure, above.



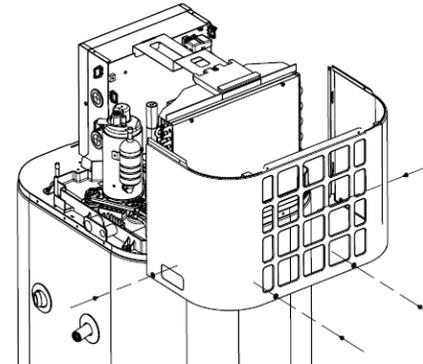
(Figure 1)



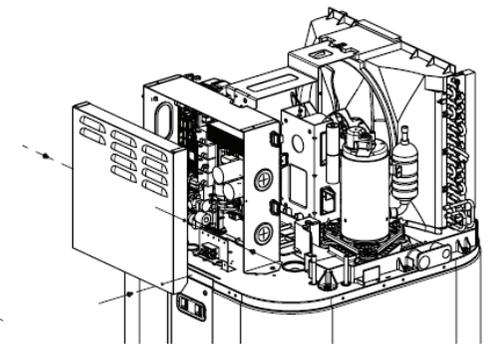
(Figure 2)

## 2. Rear panel

- Remove the top cover and front panel. (Refer to section 1)
- Remove the 2 screws that fasten the rear panel at both sides.
- Remove the 2 screws that fasten the rear panel at back.
- Lift the rear panel out. (See Figure 3)
- Re-install the components by referring to the removal procedure, above.



(Figure 3)



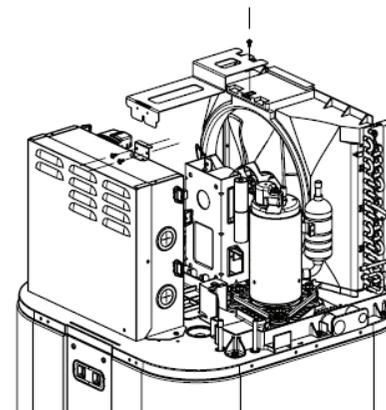
(Figure 4)

## 3. Control box

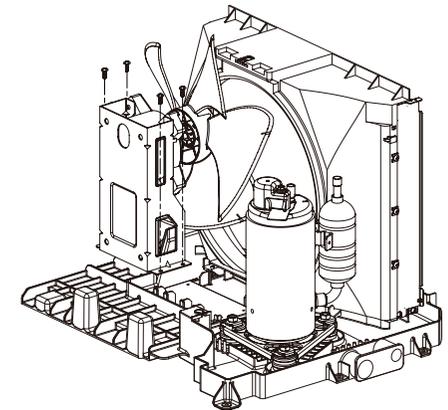
- Remove the top cover and front panel. (Refer to section 1)
- Remove the 1 screw that fastens the control box cover.
- Remove the control box cover. (There are 3 hooks.) (See Figure 4)
- Re-install the components by referring to the removal procedure, above.

## 4. Motor and Fan

- Remove the top cover, front panel, and rear panel. (Refer to section 1, 2)
- Remove the 2 screws that fasten the bracket. (See Figure 5)
- Remove the bracket.
- Remove the 4 screws that fasten the motor bracket.
- Lift out the motor bracket, motor, and fan. (See Figure 6)
- Remove the 2 screws and the nut that secure the motor and fan.
- Separate the motor bracket, motor, and fan.
- Re-install the components by referring to the removal procedure, above.



(Figure 5)



(Figure 6)

## 5. Shroud

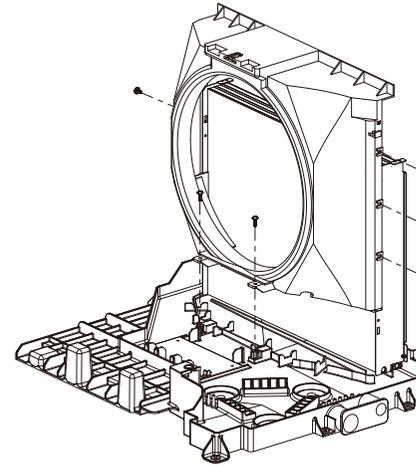
- Remove the fan. (Refer to section 4)
- Remove the 6 screws that fasten the shroud.
- Remove the shroud. (See Figure 7)
- Re-install the components by referring to the removal procedure, above.

## 6. Heating Elements

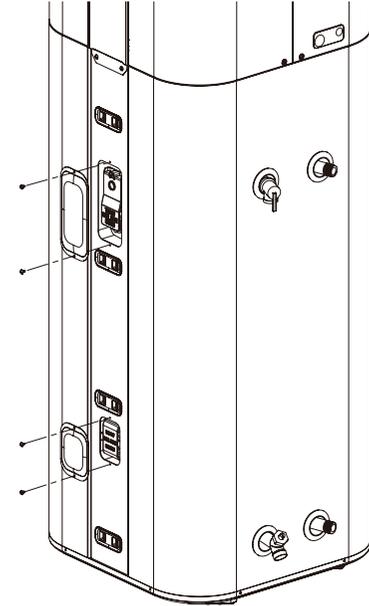
- Drain the water heater to a level just below the element to be replaced.
- Remove the front décor. (There are 4 hooks.)
- Remove 2 screws that fasten the element cover.
- Remove the element cover. (See Figure 8)
- Mark, then disconnect the wires from the element by removing the 2 screws.
- Using socket wrench, remove the element.
- Re-install the components by referring to the removal procedure, above.

## 7. ECO

- Drain the water heater to a level just below the upper element
- Remove the front decor. (There are 4 hooks.)
- Remove 2 screws that fasten the upper element cover. (See Figure 8)
- Remove the upper element cover.
- Mark, then disconnect the wires from the ECO by removing the 4 screws.
- Remove 2 nuts that fasten the ECO.
- Remove the ECO.
- Re-install the components by referring to the removal procedure, above.



(Figure 7)



(Figure 8)

\* The feature may be vary according to the type of model.

